

H2 PAC SERIES - HYDROGEN GENERATORS

The H2 Pac series is our high-performance on-site hydrogen generator system that offers a production rate of 0 to 24 Nm³/hr at 30 bar.

MODULAR • SAFE • EFFICIENT

H2 PAC FEATURES

- **Modularity**

The H2 Pac series comes in two versions. The H2 Pac 50 and H2 Pac 100. The H2 Pac 50 can be upgraded by adding an additional electrolyzer stack. Multiple H2 Pac systems can be connected together to increase production capacity.

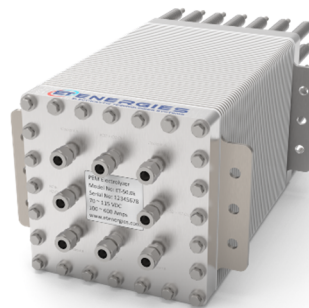
- **Safe & Automated**

- 7" HMI touch screen with automated PLC control
- Differential pressure and temperature monitoring allows the system to safeguard against abnormalities
- Hydrogen leak detection allows the system to initiate an automatic shutdown
- Automatic Nitrogen purging system activates in the event of an automated shutdown to ensure a safe environment
- Mud dauber fittings on the vent lines prevents insects from entering and plugging the lines
- ATEX Zone 2 and PED 2014/68/EU components

- **PEM Technology**

The use of PEM technology offers inherent advantages such as high-pressure discharge of hydrogen and high-purity hydrogen delivery. This eliminates the need for external purification and compression – increasing downstream system efficiency. No caustic additives are required which decreases operational maintenance frequency and cost. PEM is also more compact and offers higher current densities than other technologies.

Electrolyzer stack



H2 PAC™ is an ET Energies Trademark for its Hydrogen Generation Systems

TUBE CONNECTIONS PROVIDED:

ITEM	DESCRIPTION
Purge	The system is equipped with a bypass valve for the removal of any remaining H ₂ in the line, vessels, and stack during Nitrogen purging after an emergency stop. It is also utilized to vent any Nitrogen when the system is restarted.
O ₂ Out	Humidified Oxygen is vented out through this connection.
H ₂ /O ₂ Prv	These connections are designated for the installation of pressure relief devices.
PSA Vent	This serves as the PSA system reject connection, allowing the dryer to vent out any moisture.
H ₂ Out	This connection functions as the high-pressure discharge point for dry Hydrogen gas, with the hydrogen back-pressure reaching up to 30 bar(g) and maintaining purity exceeding 99%.
Cooling In/Out 1	Utilized for heat-exchanger and stack cooling, this connection is on the chiller's cold side.
Cooling In/Out 2	This connection represents the return line to the chiller (hot water) from the heat-exchanger and stack.
H ₂ Water Drain	Via a coalescing filter, this connection tube releases water from the hydrogen lines before entering the PSA dryer system.
DI In	This connection supplies DI water to the system.
DI Out	Employed for draining the Anode vessel, this connection serves its purpose effectively.



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H2 PAC SERIES

HYDROGEN GENERATORS

MODEL	UNIT	H2 PAC 50	H2 PAC 100
Water Supply	ISO 3696 grade 1 (Ultrapure water)		
Consumption	L/h	10	20
	gph	2.6	5.2
Minimum Quality	MΩ·cm (μS/cm)	10 (0.1)	
Recommended Quality	MΩ·cm (μS/cm)	18 (0.056)	
Built-In Water Polisher		YES	
TDS Meter		YES	
Hydrogen Production			
Flow Rate	NLPM	0 - 200	0 - 400
	Nm³/hr	0 - 12	0 - 24
	scfh	0 - 422	0 - 844
	Kg/day	0 - 24	0 - 48
Discharge Pressure	barg	30	
	psig	435	
Purity	%	>99.999 (dry)	
Oxygen Production			
Flow Rate	NLPM	0 - 100	0 - 200
	Nm³/hr	0 - 6	0 - 12
	scfh	0 – 210	0 - 420
	Kg/day	0 - 192	0 - 384
Discharge Pressure	barg	2	
	psig	29	
Purity	%	>99 (humid)	
Power Supply			
Voltage	V	380 – 480 vac 3 phase	
Frequency	Hz	50 / 60	
PEM Stack Specs			
Temperature Range	°C	25 – 80	
	°F	77 - 176	
Efficiency	%	>82% (HHV)	
Max Heat Dissipation	kW	10	20
Anode Water Feed	L/min	0 - 40	0 - 80
H2 Pac System			
Built-In H2 Gas Dryer		YES	
Caustic-free		YES	
Dimensions	W × D × H (m)	3.0 × 1.5 × 2.0	
Safety		Pressure relief and check valves	
		Automatic safe shutdown with inert gas purge	

ELECTROLYZER STACKS



POWERED FOR THE FUTURE

Hydrogen is the fuel of the future

Our PEM electrolyzer stacks are specifically engineered for high efficiency and pressure, catering to niche markets seeking a compact yet powerful solution. Traditionally, smaller electrolyzer stacks have posed challenges with their cost per kilowatt ratio, limiting their adoption in various industries. However, ET Energies has successfully patented ground-breaking technology that addresses this issue head-on. By focusing on cost optimization without compromising on performance, we have unlocked the potential to make hydrogen production economically viable for small to medium-sized markets.

STACK SPECIFICATIONS

At ET Energies LLC our vision is to pave the way for a cleaner and more sustainable hydrogen future, where hydrogen becomes the gold standard for achieving ambitious energy transformation goals. With our advanced PEM electrolyzers, we strive to empower industries with the ability to generate hydrogen on-site easily and affordably. At ET Energies, we are committed to making hydrogen synthesis readily available, playing a pivotal role in fostering a greener, more sustainable world. Join us on this transformative journey towards a brighter, hydrogen-powered future.

STACK PARAMETER	UNIT	ET-50.OK	ET-100.OK
Power and electrical specifications	kW	50 ⁽¹⁾	100 ⁽¹⁾
Voltage	VDC	70 ~ 115 ⁽²⁾	140 ~ 230 ⁽²⁾
Current	A	100 ~ 600	
Power quality		5% peak – peak, min 300 Hz	
Ramp rate	A/s	<30	
Peak power ⁽³⁾	kW	63 ⁽³⁾	126 ⁽³⁾
Connectors	M14	4 (2x2 per terminal)	4 (2x2 per terminal)
Mechanical specifications			
Stack weight	Kg	139	253
Dimensions (W×H×L)	mm	250×250×403	250×250×735
Oxygen discharge pressure ⁽⁴⁾	barg	35 ⁽⁴⁾	
Hydrogen discharge pressure	barg	35	
Water Supply		ISO 3696 grade 1 (Ultrapure water)	
Anode water feed ⁽⁵⁾	L/min	20 - 40	40 - 80
Minimum quality, process ⁽⁶⁾	MΩ·cm (μS/cm)	10 (0.1)	
Recommended quality, process ⁽⁷⁾	MΩ·cm (μS/cm)	18 (0.056)	
Hydrogen Production			
Flow Rate	NLPM (Nm ³ /h)	0 – 200 (0 - 12)	0 – 400 (0 - 24)
	Kg/day	0 - 24	0 - 48
Oxygen Production			
Flow Rate	NLPM (Nm ³ /h)	0 – 100 (0 - 6)	0 – 200 (0 - 12)
	Kg/day	0 - 192	0 - 384
PEM Stack Specs			
Temperature range	°C	25 - 80	
Recommended dT at anode	°C	<6	
Efficiency	%	>82% (HHV)	
Max heat dissipation ⁽⁸⁾	kW	<7	<14
MTBF	hrs	>80000	
Notes		*Subject to change without notice	

1. Nominal power rating before EoL and 25°C.
2. Voltage at specified current is dependent on temperature.
3. Peak power rating is only allowed for a short duration with a temperature < 70°C and voltage lower than 2.1v/cell.
4. Intended for 5 bar(g), but can safely sustain rated pressure on Oxygen side.
5. dP at given flow is less than 7 bar(g).
6. ASTM D1193 Type I type deionized water is the minimum quality allowed but may cause rapid degradation of the stack.
7. Ultrapure water, ISO 3696 grade 1.
8. During peak power operation