

## Hydrogen Generator



### Features

#### I. Core Technologies and Advantages

##### 1. PEM Electrolyzer Hydrogen Production Technology

- Utilizes proton exchange membrane (PEM) electrolyzer technology to directly generate hydrogen through the electrolysis of deionized water, eliminating the need for alkali solutions or other chemical reagents for enhanced safety and environmental sustainability;

- Supports flow rate adjustment, enabling flexible scaling of hydrogen production to meet demand. Operates within a 0–0.5 L/min flow range, suitable for applications from laboratory to industrial scale;

- Highly efficient and energy-saving, with enhanced electrolysis efficiency and lower energy consumption compared to traditional alkaline electrolysis;

- Enables rapid start/stop and power regulation, minimizing energy waste during idle or low-load operation—a significant improvement over the slow response of conventional alkaline

electrolysis.

##### 2. High-Pressure Hydrogen Output

- Customizable Pressure: Supports hydrogen output pressure adjustment from 0 to 7 MPa (standard 1.6 MPa), accommodating diverse application requirements such as fuel cells, hydrogen storage at refueling stations, and industrial reactors.

- Drying and Purification System: Features a three-stage filtration system with integrated molecular sieves, silica gel, and trace oxygen removal agents to ensure dry, pure hydrogen meeting the demands of precision instruments like CVD and GC-MS.

#### II. Intelligent Control System

##### 1. Siemens SMART 200 ST40 PLC

- Core control utilizes Siemens industrial-grade PLC, featuring high stability and anti-interference capability, supporting real-time monitoring and closed-loop regulation of pressure, flow, and temperature.

TCP/IP Communication Protocol: Enables remote monitoring and data exchange, seamlessly integrating with factory DCS or IoT platforms to achieve unmanned operation and intelligent maintenance.

Human-Machine Interface: Equipped with a touchscreen for real-time display of operating parameters (pressure, flow, temperature), supporting fault alarms and historical data traceability/export.

##### 2. Safety Protection Mechanisms

- Multi-layered Safety Protection: Automatic leak alarms, overpressure relief, and electrolyzer overheat protection ensure equipment and operational safety.

- Fault Self-Diagnosis: The system identifies issues like abnormal water quality, automatically shuts down, and pushes

maintenance alerts.

### III. Application Scenarios

#### 1. Hydrogen Energy Transportation and Mobility

Enables household users to produce hydrogen locally, refueling hydrogen-powered two-wheelers to address hydrogen refueling challenges.

#### 2. Industrial Manufacturing and Precision Production

Provides stable gas sources for semiconductor and electronics industries, petrochemical and chemical synthesis, metal heat treatment, and powder metallurgy.

#### 3. Scientific Research and Laboratory Settings

Supplies high-purity carrier or reaction gases for GC, GC-MS, ICP-MS, and similar equipment, replacing hazardous cylinders.

Supports fuel cell stack performance testing and single-cell efficiency verification.

#### 4. Emerging and Cross-Industry Applications

Nitrogen displacement for food packaging (extending shelf life)

Pharmaceutical hydrogenation reactions (e.g., antibiotic synthesis)

### IV. Product Structure and Configuration

This system includes, but is not limited to, electrolysis cells, power supply facilities, gas-liquid separation facilities, hydrogen purification facilities, and PLC control facilities. Specific equipment comprises: circulating water pumps, gas-liquid separators, gas dryers, valve and piping assemblies, constant current power supplies, control panels and control systems, safety systems, etc.

Technical parameters:

## Hydrogen Production Equipment Performance Parameters

Table

Serial Number	Project	Unit	Parameters
1	System Dimensions (including wheels)	mm	557×400×530
2	Hydrogen Output	ml/min	0-500
3	Oxygen Output	ml/min	0-250
4	Hydrogen Purity	%	>99.99
5	Operating Temperature	°C	5~60
6	Operating Pressure	MPaG	0~7
7	Electrolyzed Water Inlet Pressure	barg	1~4
8	Power Supply Voltage (AC)	V	220
9	Electrolysis Efficiency	%	>77.7% <sub>HHV</sub>
10	Startup Time	min	0.2
11	Dew Point	°C	<-45





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