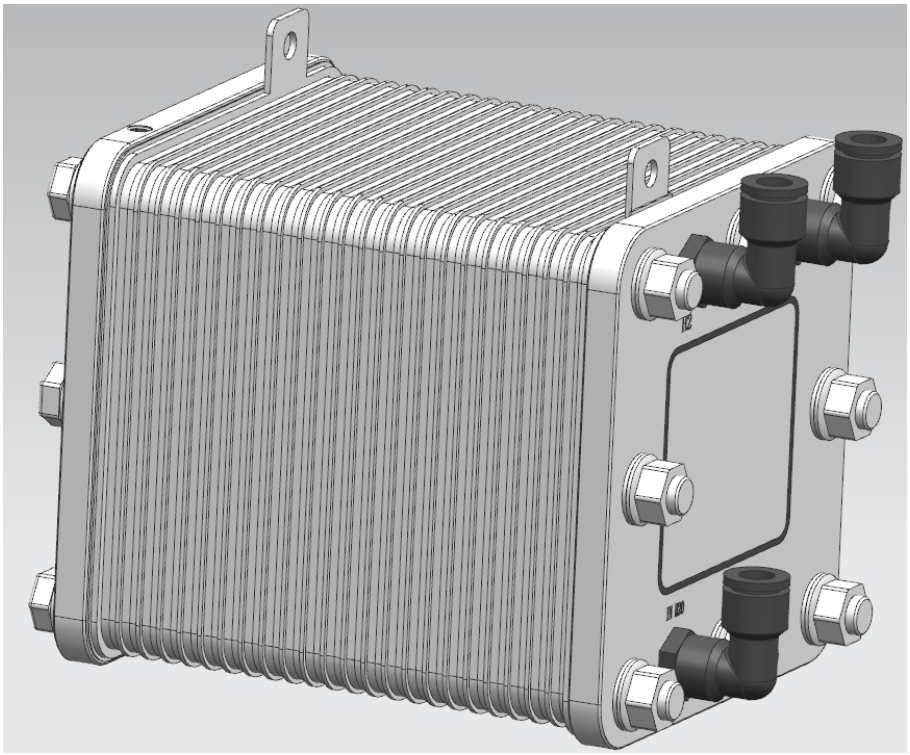
Mads Energy

Operating Instructions for the 3L Hydrogen Generation System

I System structure

The 3L hydrogen production unit consists of PEM Electrolyzer, transformer, and water system components.

1. PEM Electrolyzer



Appearance of PEM Electrolyzer

(1) PEM Electrolyzer Technical Parameters Table

Features	Parameter	Remark
Water quality requirements (electrical conductivity)	≤2μs/cm	
Hydrogen production	3L/min±5%	Oxygen 1.5L/min±5%
Rated carrying current	40A	
Factory performance	＜34V@40A @30℃	single layer 2.0V@40 A@30℃
Max working pressure	0.3MPa	
Min working temperature	>5℃	Do not work at low temperature for a long time
Max working temperature	75℃	
Optimum working temperature	65℃	Working efficiency, the best service life
Use ambient temperature	3~40℃	
Connection pipe size	8.0 mm	
Main Size	118* 139*106(W) mm	Different joints with different thickness and size
Weight	5 kg	
Recommended circulating water tank capacity	5~8L	Need to be matched based on the heat dissipation system
Matching DC constant current power supply	36V /40A	
Note: After leaving the factory, according to the principle of electrochemistry, the performance will change with the use time and storage time		

(2) Precautions for using PEM Electrolyzer

a. Before use, it is necessary to ensure that the water quality meets the standard (conductivity less than 2 μ s/cm), and at the same time, add a purification resin before the inlet of the electrolytic cell to ensure that the ions generated during operation are adsorbed, thereby ensuring stable water quality. Note: Using substandard water can accelerate the degradation of electrolyzer performance and cause irreparable damage.

b. The electrolyzer must operate under water circulation, as "dry burning" can cause loss of function, and even running under water circulation again can accelerate aging and rapid performance degradation. It is recommended to add a circulating water pump at the inlet before purifying the resin to force water in, in order to avoid possible "dry burning" caused by waterway design.

c. All circulating water tanks, pipelines, etc. that come into contact with water must not contain substances that precipitate components (such as iron, aluminum, etc., which may precipitate metal ions during use).

d. Positive and negative power wiring:

1) The power cord must be able to withstand a current of 45A or more for long-term operation (it is recommended to use oxygen free copper wire with a cross-sectional area of $10mm^2$ or more), and the wiring must be firm to ensure good contact.

2) The positive and negative poles of the wiring must correspond. Incorrect wiring may cause rapid aging of the electrolytic cell and irreparable damage.

3) Do not use conductive materials in contact with both positive and negative terminal plates to avoid short circuits.

e. If the storage time exceeds one month, it is necessary to circulate pure water for one hour (pump circulation is required before use), and the water temperature should be around 20 ℃~40 ℃.

f. The storage temperature should be between 2~40 ℃, and storage at freezing points or below is prohibited.

2. Pressure controller

The pressure controller can be set to stop working at high pressure and start working at low pressure.

Setting method:

① With the device powered on, press the "SET" button to enter the settings.

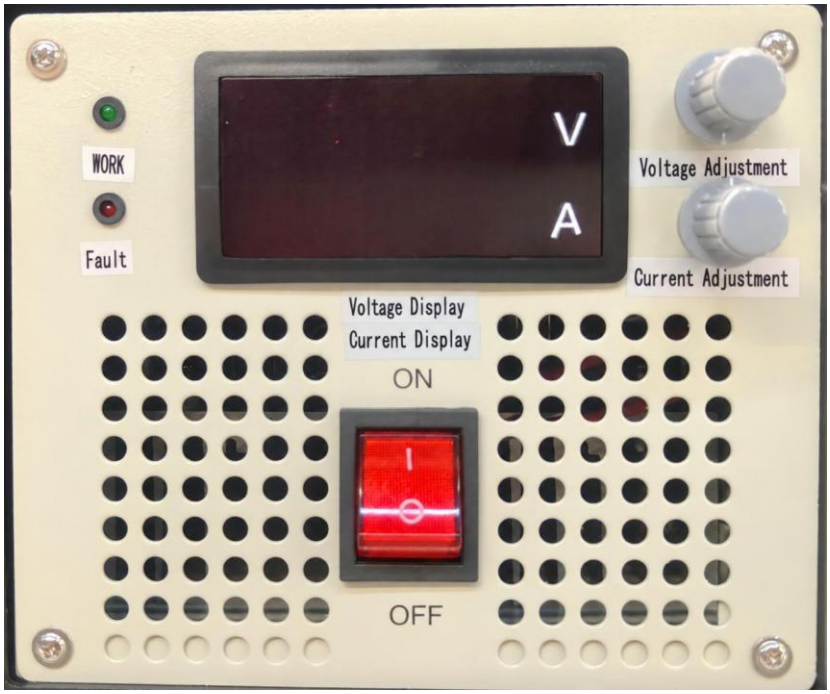
② When the low-pressure indicator (L) is lit, the low-pressure start value can be configured; press the "Increase ▲" key to raise the start pressure or the "Decrease ▼" key to lower it. After setting the value, press the "OK" key to confirm the low-pressure start setting, then press the "SET" key to proceed to setting the high-pressure stop value.

③ When the high-pressure indicator (H) is lit, the high-pressure cut-off value can be set. Press the "Increase ▲" key to raise the cut-off pressure, or the "Decrease ▼" key to lower it (note that the cut-off pressure cannot be set lower than the start-up pressure). After setting the value, press the "OK" key to confirm the setting, then press the "SET" key to exit the setup mode.

4) After setup is complete, you can press the "SET" button to view the configured upper and lower pressure limits.

5) With the pressure reading at "0.00," press the "Decrease Value ▼" button and observe the position of the yellow indicator light; when the light shifts to your desired pressure unit, that unit is selected.

3. Transformer

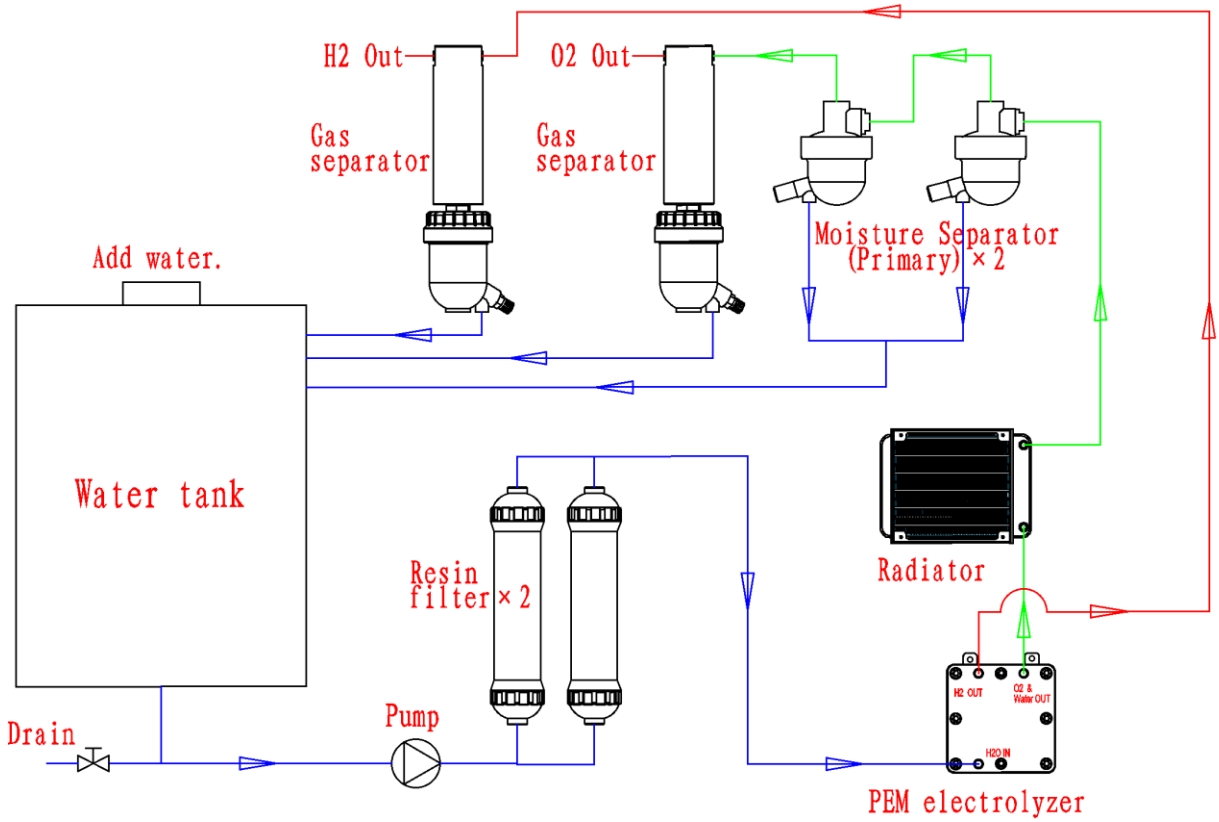


Transformer (front)

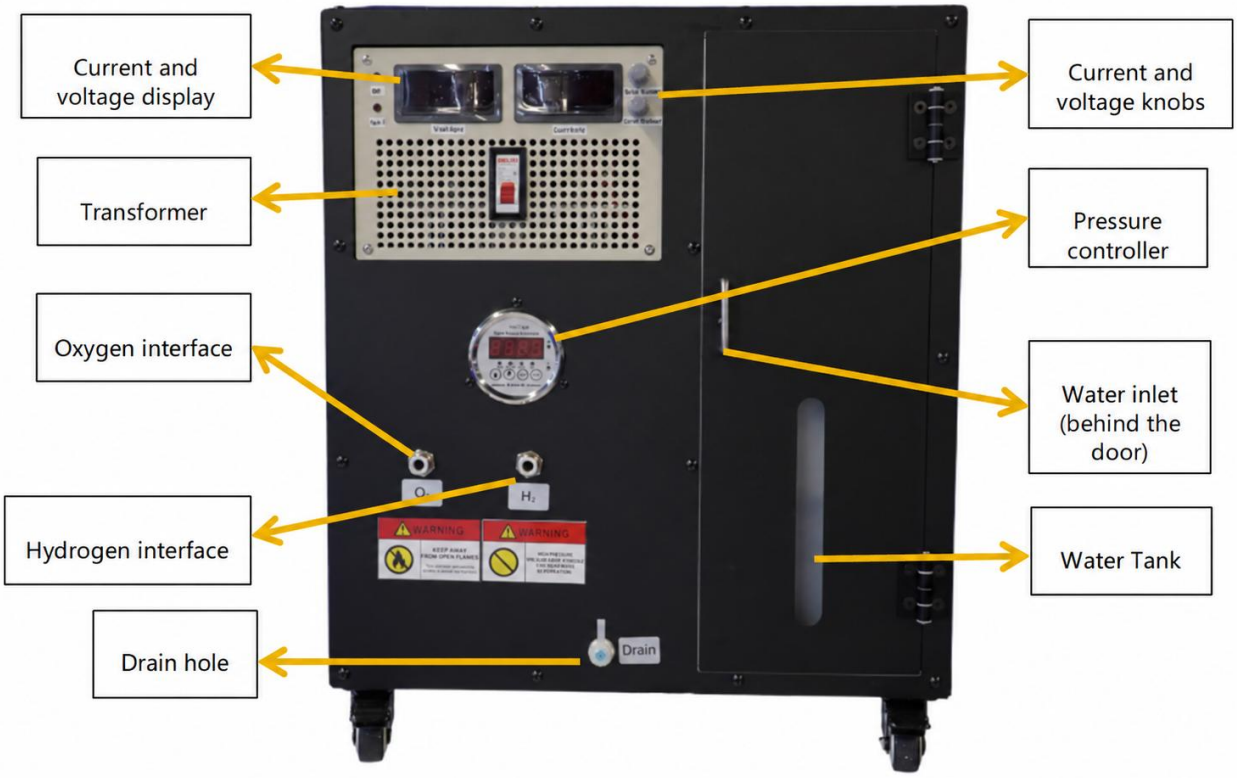
Technical parameter table of transformer:

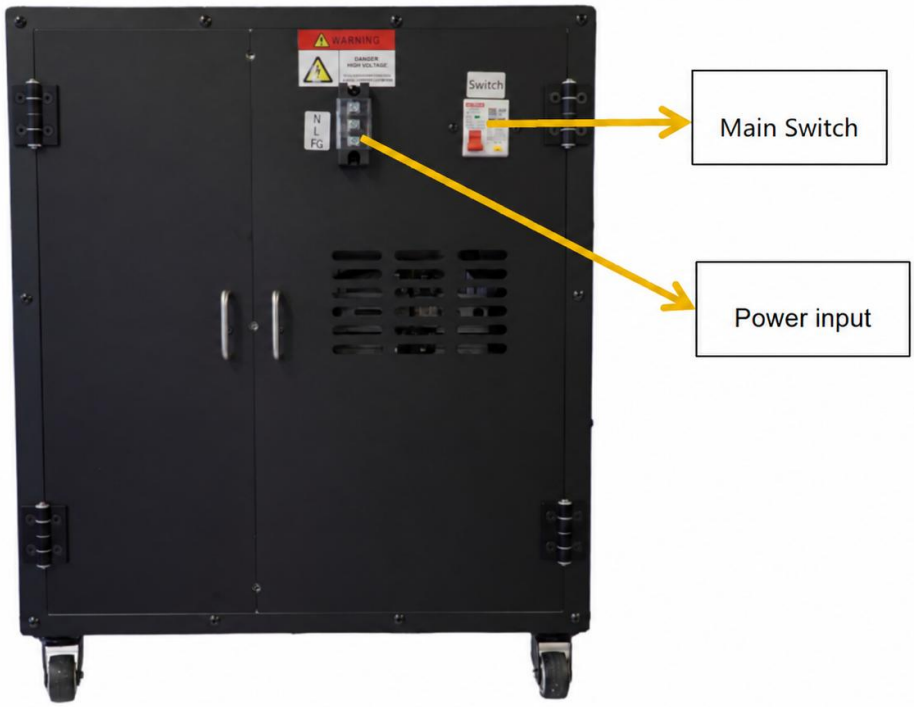
Features	Parameter	Remark
Input Power	AC 220V±10% 50~60 Hz	
Output Power	DC 36V(Max) 40A(Max)	
Max output power	1440 W	3L hydrogen corresponds to a current of 40A
Fan startup temperature	35℃~45˚C	
Use ambient temperature	-5℃~50˚C RH<90%	
Storage environment	-10℃~60˚C RH<90%	
Main Size	15* 23*12.5(H) cm	

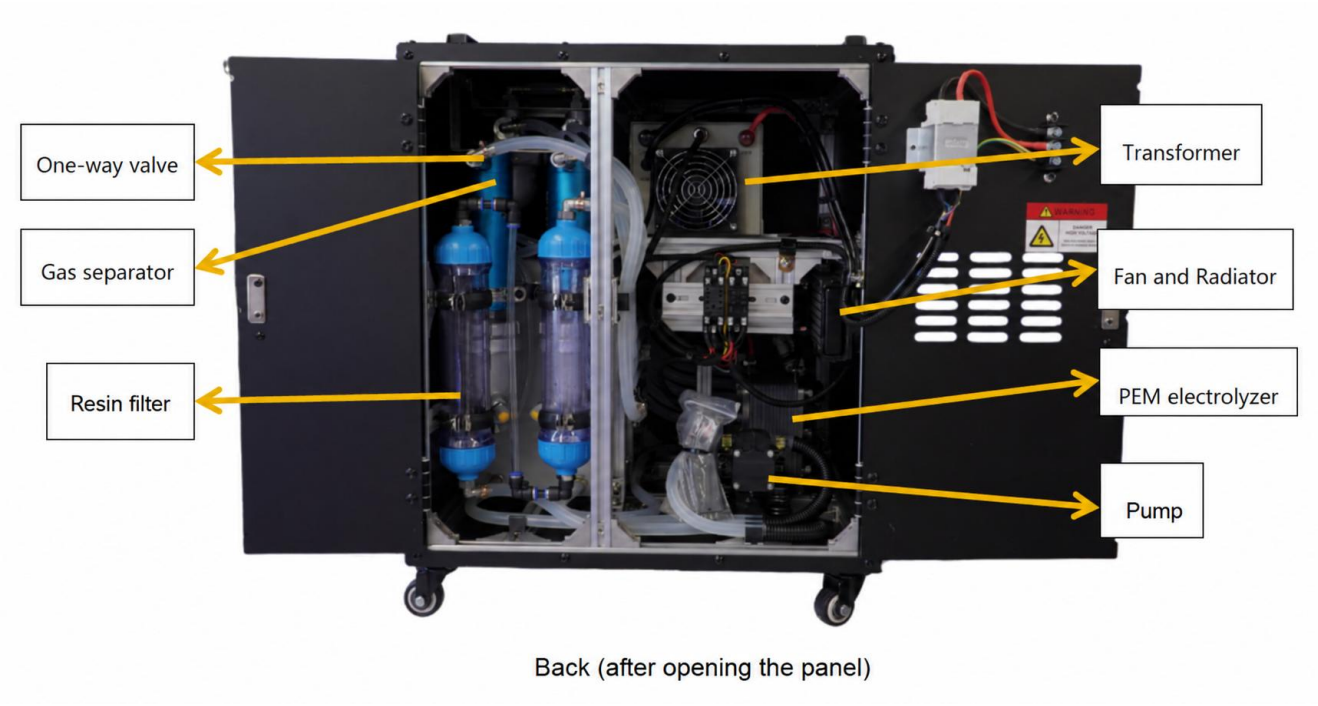
II System connection



Water system diagram


Current and voltage display
Transformer
Oxygen interface
Hydrogen interface
Drain hole
Current and voltage knobs
Pressure controller
Water inlet (behind the door)
Water Tank
Drain


Switch
Main Switch
Power input



Outline drawing of 3L hydrogen production unit

Technical Parameters Table of System:

Features	Function or Parameter
Input Power	AC 220V±10% 50~60 Hz
protection function	Short circuit protection, low water level protection, temperature protection
Water quality display	—
Moisture separator	Yes, Hydrogen outlet
Water tank	20 L
pipe diameter	12 mm
Use ambient temperature	3℃~50˚C RH<90%
Main Size	46* 50*50(H) cm

III Instructions

1. Please place the system on a flat table or floor and do not tilt it. Suggest that the working environment temperature should not exceed 40 ℃, and confirm that the usage environment meets the precautions for PEM electrolyzer use.

2. Connect all pipes to ensure proper connection.

3. Add an appropriate amount of purified water or distilled water to the water tank. Please observe the water level on the side of the water tank, do not exceed the maximum level, and ensure that the water in the tank is sufficient during operation. When using for the first time, please wait for 5 minutes after adding water before starting the system (wait for all the water to enter the pump to prevent it from not working properly due to air entering the pump).

4. Connect the power cords of each group, and the system input voltage is AC 220V.Be sure to connect the positive and negative poles correspondingly.

5. Turn on the power switch, turn on the transformer switch, first adjust the current to 5A, and then gradually adjust the current. (clockwise increase, counterclockwise decrease).

6. The water entering the electrolytic cell is less than 2 μ s/cm. Circulating water also has thermal conductivity and heat dissipation functions; If used for a long time, it is recommended to add 10-15L of water to the water tank and match it with a radiator.

7. After the system is supplied with water and electricity, the PEM electrolyzer starts working and produces hydrogen gas. Hydrogen gas with a small amount of water vapor is filtered through a filter.

8. When shutting down the system, the cooling fan may continue to operate for a few minutes.

9. Hydrogen is prone to combustion or explosion, please pay attention to ventilation and do not use open flames around this system.

10. If water needs to be replaced or drained, open the drain valve switch to drain the water.

11. When the water conductivity value reaches 7 μs/cm, replace the resin (first turn off the transformer switch, then turn off the main switch before replacing the resin)

12. If the system starts again after being placed for more than 6 hours, it takes 1 to 2 minutes to enter the optimal working state.

13. The system has passed the factory test. In order to ensure its normal operation, it is not allowed to disassemble the system without permission.