

Pure Water Hydrogen Generator

SPE-200/300/600

User's Guide

Matters Need Special Attention

1. This machine **must** use pure water or deionized water or redistilled water. Water quality must meet below requirement, bad water will damage machine inside cell.

water resistivity: >2 megohm.cm

Or water conductivity: $< 0.5\mu\text{S/cm}$

2. Add deionized water or redistilled water into water tank and maintain the water level as requirement. SPE-200 keeps between 600--1000ml water, SPE-300/600 keeps between 1600ml to 2000ml water. Customer need to observe water level display to add water in time. Normally 3--5 days to add water once.

3. After adding water, first time use, please pull out drain tube(at back of machine), drain some water to make sure inside pipe is unimpeded before power on.

4. Power on, please block H₂ output port to check the equipment. Pressure will rise to setting figure and flow rate display is less than 10ml, indicate machine in good condition.

5. Need to replace desiccant when color change to pink, must without pressure.

6. Please keep water tank clean. Need to add new water once 3--6 months.

7. If customer not use machine for some time, still need to keep water inside. Machine could not short of water. Otherwise will damage inside cell.

8. If customer need to transport machine, need to drain out water in order to prevent water coming out.

9. Machine operating environment:

Temperature: 0--45 centigrade. Good ventilation

No alkaline or acid etc corrosion thing or other chemical gas around

No big dust. No obviously shaking and impact.

9. In order to longer machine using lifetime. Our machine advise:

SPE-200: daily use much better keep less than 100ml/min.

SPE-300: daily use much better keep less than 150ml/min.

SPE-600: daily use much better keep less than 300ml/min.

**Use qualified water and
machine not too tired working will enable you to use extra years!**

Attention:

1. Please read the manual carefully before using this instrument.
2. During use the SPE series pure water hydrogen generator, Do not put in the alkali liquid(KOH nor NaOH), only use pure water.
3. Customer should test if has gas leakage after using some time. Do not work full capacity for long time. Advise use less than half of maximum flow rate capacity.

SPE-200 advise use less than 100ml/min

SPE-300 advise use less than 150ml/min.

SPE-600 advise use less than 300ml/min

4. Changing desiccant (silica gel) must be under no pressure.
5. Must use qualify water, deionized water or redistilled water.

Forbidden to use tap water.

6. In winter seasons, If outside or room temperature lower than zero temperature, machine inside pipe water is frozen, forbidden to power on machine! Customer should put machine in warm location till water fully melt, then can fill in water and power on to use.

7. Machine could not short of water for more than 1 month. Delivery or put aside not use for more than one month, should firstly fill in water, dont power on machine, put machine aside for one day. power on to use on the next day. if not use machine, should keep water in the water tank.

1. General Description:

SPE series of pure water hydrogen generator prohibit using the alkali liquid(KOH nor NaOH). SPE/PEM technology is world advance technology which can replace the hydrogen gas cylinder. Our machine is small size, high conversion efficiency and continuously gas generation.

2. Installation and Use of the Instrument

- 1) First take the instrument from the package, Check out the equipment outlook and spare parts if have any damage during the transportation.
- 2) Open water tank cover(on the top of the machine) ,add pure water or Deionized Water, keep the water level(in front of machine has water level display) between 1600ml to 2000ml for SPE-300/600. SPE-200 keeps water level between 600--1000ml. Daily use, also need to keep water level according to above requirement. Normally once 3 to 5 days, need to add new water.
- 3) Screw tightly hydrogen output port, and make sure inside has a end pad for sealing.
- 4) First time use, please pull out “water drain tube”(at back of machine, a silicone tube), drain some water to make sure inside pipe is unimpeded before power on.
- 5) As international delivery forbidden to ship particular matter by air. Customer need to buy silica gel and fill it into desiccant pipe locally. Open desiccant pipe(on top of the machine), must notice not lost cap inside sealing “O” rings. Add silica gel into the desiccant pipe till full. Tighten the cover tightly with sealing “O rings”. Guarantee without hydrogen leakage.
- 6) Power on, “H2 Generation On” green light is on. LCD panel show hydrogen output flow rate: SPE-200 display about “200”, SPE -300 display about “300”, SPE-600 display about “600”, meanwhile pressure is rising slowly, when pressure reaches 0.4Mpa, hydrogen flow rate display should be less than “010”, it indicate machine in good condition. Acceptance check is finished.

7) After above acceptance check , at first shut down the generator when you are prepared to use it . Take out the sealing end pad and H2 output screw nut at the H2 output port, put them aside well for future use. Use another similar screw nut in the accessory bag. Connect H2 pipe with your GC instrument, and using O rings at end of pipe for sealing. Advise use a spanner to make sure no gas leakage.

8) After hydrogen-applied equipment is connected, use soap water to check the sealing for leakage . If bubbles occur , the assemble should be readjusted until no leakage is found . The same method should be used for checking leakage in sealing nuts of the other parts and components .

9) Instrument comes with a drying tube. Observing the silica gel changing color or not. If the half desiccant changed color, please replace the colored silica gel. Before replace, customer should shut down machine, pressure must be released to zero. Replacement should be carried out without the pressure. Open the cap of desiccant tube, take away colored gel from inner tube and replace the new one or renewable gel then put the inner tube in dry tube. Tighten the cover to ensure that no leakage. Normally, if customer used for GC-FID, H2 flow 30--40ml/min, 24 hours each day, about 2--3 months to replace desiccant once.

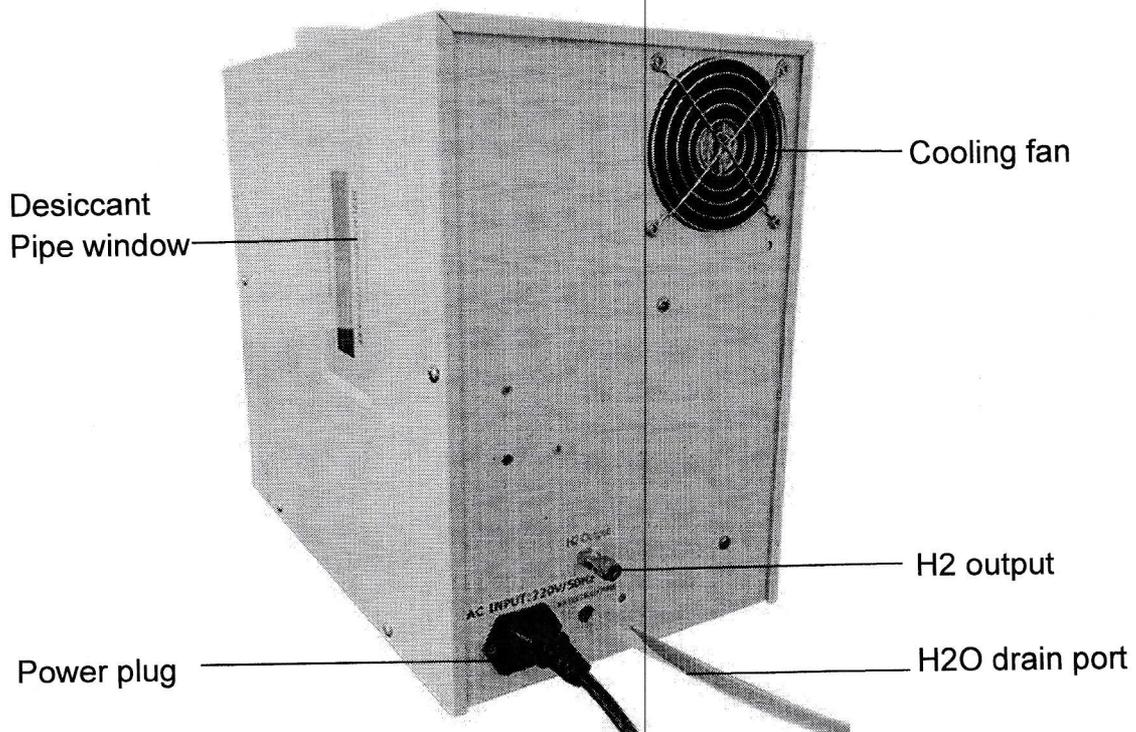
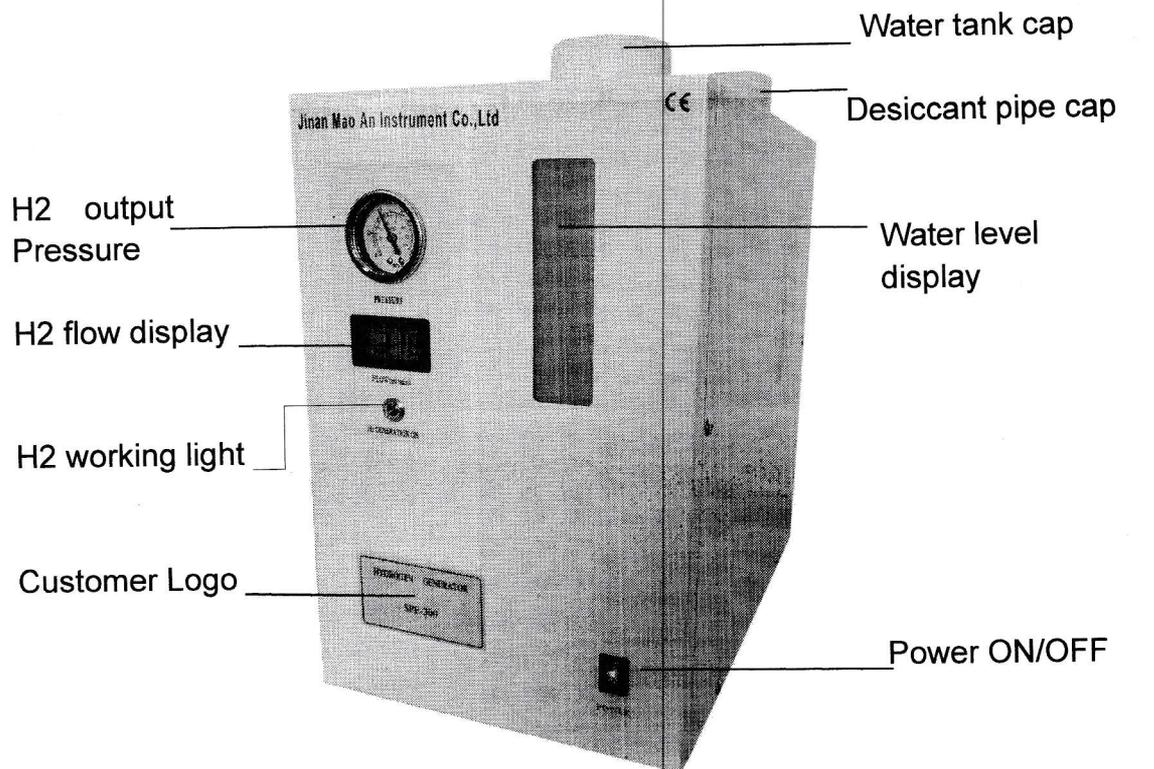
10) The pure water will be less pure or turbid when instrument is used for some time. At this time, add or replace the pure water is important. Remark: change whole water in the water tank after 3 to 6 month operation. Clean the water tank and add the new water. Drain off the water through the “water drain port”(at back of equipment). The detail method is pulling out the silicone tube behind the generator and taking out the nylon cover. Water will come out automatically.

11) If customer not use machine, still need to keep water tank has water. And change new water once 3--6 months. Machine could not short of water. If already put aside nearly one year. Customer need to put water inside of water tank for whole day. On the second day, power on to use.

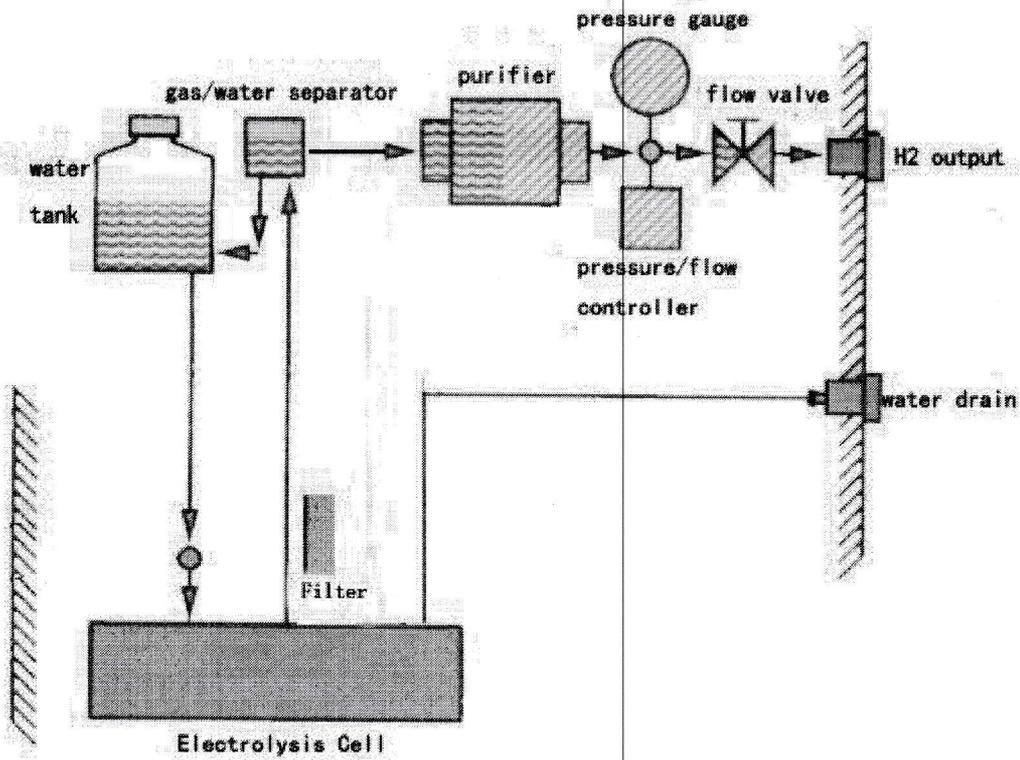
3. Operating Principles

Our hydrogen generator adopts world most advanced hydrogen technology of solid polymer electrolyte which use titanium electrode and pure water as electrolyte. The new structure can make the oxygen in hydrogen is below 0.1ppm. the oxygen will be produced from cathode and hydrogen is from anode. When power on. Water will be electrolysis into hydrogen and oxygen. Cell will separate hydrogen and oxygen in two electrodes. Pure hydrogen gas goes into gas-water separator, which will remove mostly vapour inside of hydrogen gas. Oxygen is drained out into air through water tank hole. Hydrogen will go through the dry tube in order to get higher purity hydrogen gas. SPE hydrogen generator adopts the automatic tracking control system with high sensitivity. Achieving flexible control of the volume of gas production with automatic constant pressure and flow. The Pressure range of stability is below 0.001Mpa to make sure produce high purity hydrogen under stable pressure and safety condition.

4. Machine Indication



5. Flow Chat:



6. Technical Parameter

Model	SPE-200	SPE-300	SPE-600
H2 Flow(ml/min)	0--200	0--300	0--600
H2 Output Pressure	0.4MPa		
H2 Output Purity	99.999%		
Input Water Requirement	Deionized water (>2M) or redistilled water		
Pressure Stability	<0.001Mpa		
Input Voltage	220V or 110V±10%		50Hz--60Hz
Power Consumption	100W	150W	300W
Dimension	28*12*36cm	37cm×22cm×39cm	
Net Weight	9kgs	11kgs	12kgs

7. Notice

- 1、 Forbid operating near open flame.
- 2、 Good ventilation conditions.
- 3、 Forbid using water like tap water, plain water which will destroy the electrolysis cell.
- 4、 Do not disassemble electrolysis cell with arbitrary.
- 5、 If need to transport machine, please drain out water.

8. Requirements for operational environments and conditions:

- a. Temperature : $4^{\circ}\text{C} - 40^{\circ}\text{C}$;
- b. Humidity : $< 85\%$;
- c. Power supply : $220\text{V}/110\text{V} \pm 10\%$ $50\text{Hz} - 60\text{Hz}$
- d. The generators should be put horizontally near hydrogen-applied instruments with their front boards facing operators for the convenience of operation ;
- e. There should be no obvious shaking and striking ;
- f. There should be no direct sunshine and open fire ;
- g. There should be no big dust , conducting particles , acid , alkali , and other corrosive gases ;
- h. Ventilation should be good ;
- i. Ground connection of power supply should be good . \perp

9. Failure Causes and Elimination Method

Phenomenon	Reason	Solution
No working, power light is off	1. No power connect 2. Fuse damage	Power connect well Replace fuse
Hydrogen no pressure flow rate over 300(SPE-300 model)	Gas leakage in generator, or H2 connection pipe or outside H2 generator has leakage	1. Use soap water, Check the connect position to see if have bubbles.
Hydrogen have pressure, H2 display larger than actually using		2. Tighten leakage position.
Big hydrogen flow offset	1. electrolysis cell degradation 2. abnormal power output	1. Replace or clean electrolysis cell 2. Adjust or change power
Less hydrogen purity	silica gel in dry tube absorption saturated	Replace silica gel
Have water in drying tube	Abnormal work in gas/water separator	Replace or clean gas/water separator
Large pure water consumption	1. Water leakage in circle system 2. Cell high temperature	Water leakage remove. Replace or clean the degraded cell

10. After Sales Service

Our machine supply one year quality guarantee. After one year, only charge raw material fees and delivery fees.

If the following occurs , the maintenance will not be free of charge:

- a. Users do not operate the generators according to the operational manual;
- b. Users disassemble parts by themselves , which are forbidden by the manufacturer to be disassembled.