

Operating Manual Number : HM-006E

Revised : April 2001

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Covering Model Numbers

GWS-14S / GWS-18S

GWS-14D / GWS-18D

Glass Water Still System



Before operating this unit,
please read and understand
this manual completely
and keep it for future
reference.

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1. DISTILLED WATER SYSTEM

GWS Series using a distillation method removes Particle, Inorganic matter, Organism, and bacteria from Supply and Underground Water and produces Pure and Ultra Pure Water

This Pure and Ultra Pure Water are used for a general experiment and feed water of the analysis equipment

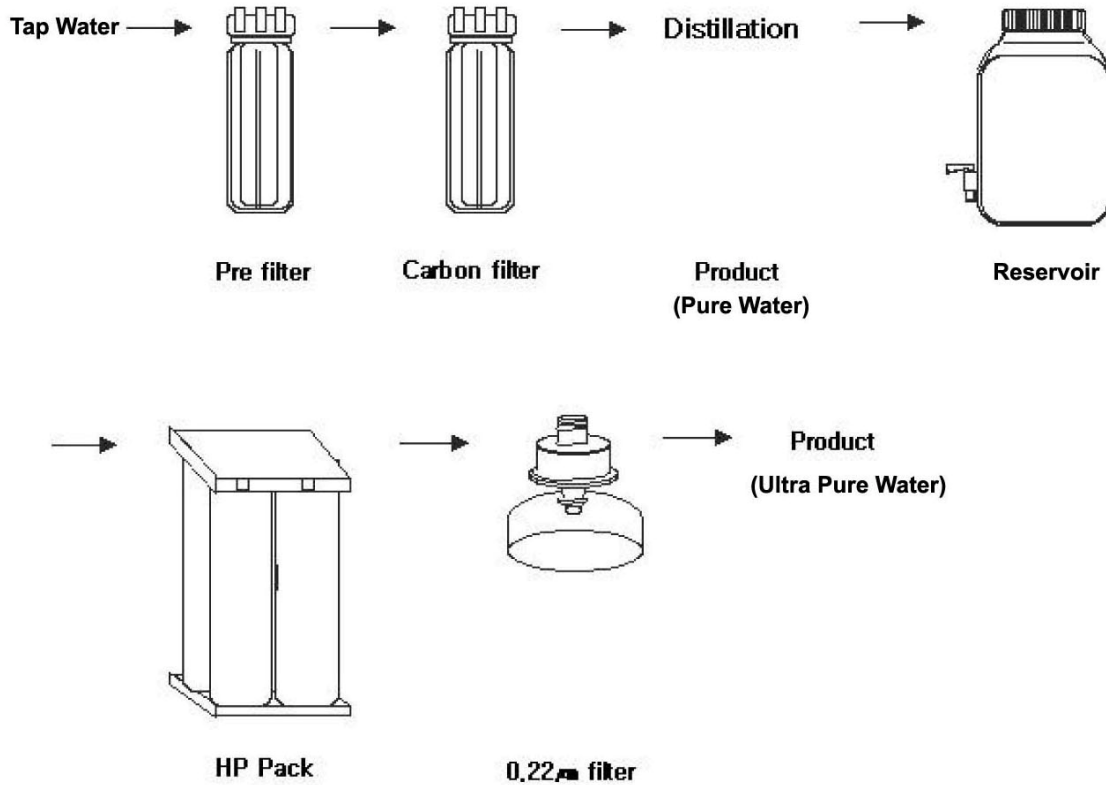
GWS system can remove an inorganic matter and organism(>90%) included in the supply water: consequently, the product water has 1 percent of the pollutant from the feed water

1-1. GWS System Standard and Condition

- Mono valence Ion : 95 - 95%
- Polyvalent Ion : 95 - 99%
- Particle : 99%
- Microorganism : 99.99%
- Pyrogen : 99%
- Organism : 99%
- Product Rate(25°C) : 3 Liter/Hr or 6 Liter/Hr
- Pressure (Min) : 14 PSI (1.0 kg/cm²)
(Max) : 60 PSI (2 kg/cm²)
- Dimensions : 70cm(W) x 450cm(D) x 120cm(H)
- Power : 220V, 7.5A / 15A / 60Hz
- Feed Water Condition
- pH Range : 4.0 - 7.5
- TDS(Total Dissolved Solids) : below 500ppm
- Conductivity : below 350 μ S/cm

2. Ultra Pure Water Production Process

2-1. Production Process



2-2. Filter Function

- . Pre-filter : Pre-filter removes the particles, mud, and floating matters etc...
When this filter color is yellow, it is exchanged. Usually its using time is about a month but using period can be decreased according to the quality of supply water and using time.
- . Carbon filter : Carbon filter removes Cl ion and organism in feed water. And Carbon filter is exchanged one time when Pre filter is exchanged two times
- . HP pack : Ultra Pure Water is produced by the High Purity Pack(HP-Pack) locating in the equipment. It removes Cl, residue, an ion compound and an organism because this cartridge has activity carbon, an ion exchange resin and an organism resin of semiconductor grade. So Ultra Pure Water(resistance: 18.2 MΩ-cm) using at HPLC, IC, AAS... can be produced.
- . 0.22 μm filter : 0.22 μm filter, Final Filter, removes ion particle and microorganism.

2-3. Filter Exchange Period

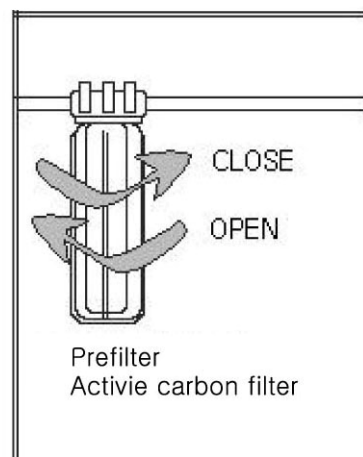
- 1) Pre filter : In case prefilter color becomes yellow
- 2) Carbon filter : Carbon filter is exchanged one time when Pre filter is exchanged two times
- 3) HP Pack : When the resistance is becoming below 10 MΩ-cm
- 4) 0.22 μm filter : When HP-Pack is exchanged and Product volume is decreased

2-4. Filter Exchange Method

- 1) Pre filter and Carbon filter exchange method

You can exchange the filter easily after pressure removal. When pressure gage is normal range(=when pure water is producing), user turn off the supply water.

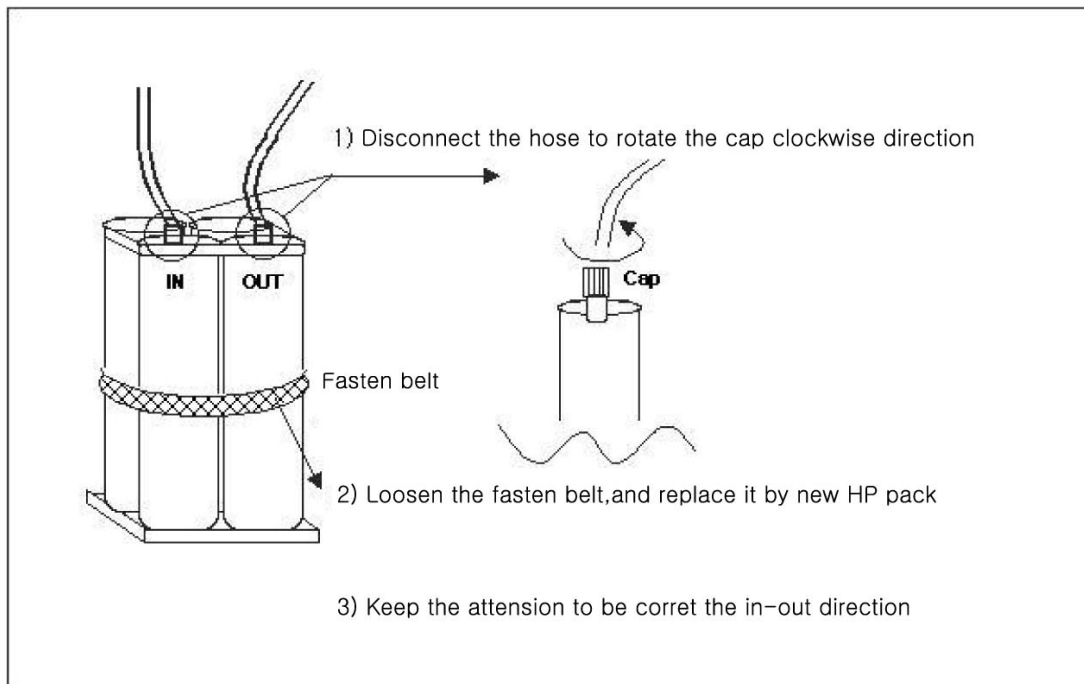
The pressure is removed while internal pressure go down. And you can exchange the filter after RO switch is pushed(RO switch OFF).



<Fig 2.1> Prefilter & A/C filter exchange

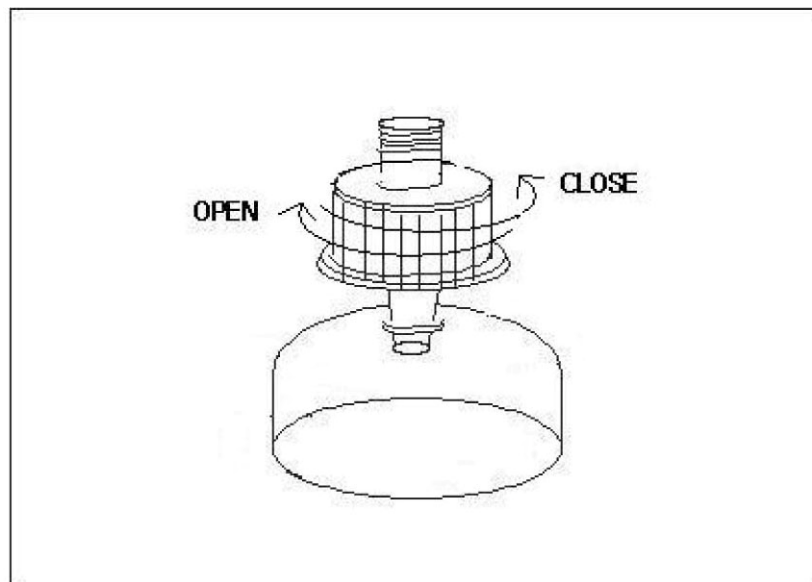
2) HP Pack Exchange Method

- User turns off the supply water, pushes down UP Switch and exchanges the HP-Pack



<Fig. 2.2> HP Pack exchange

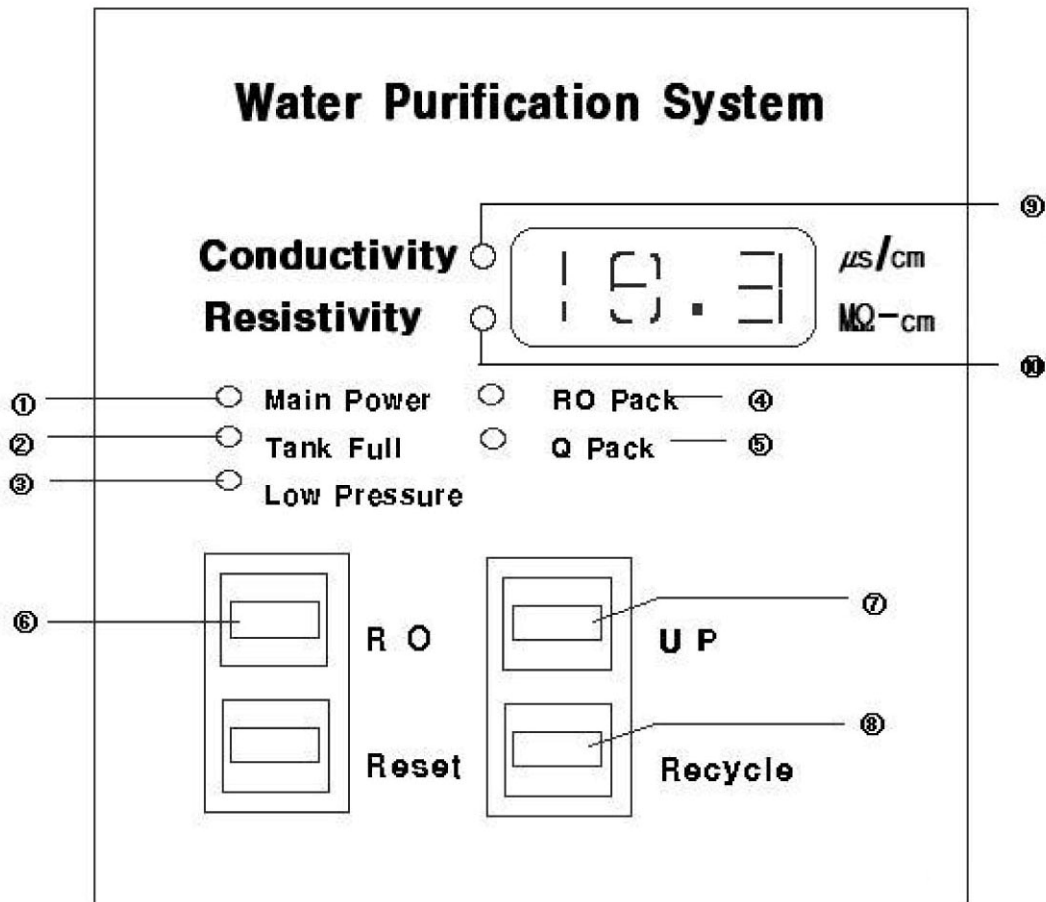
3) 0.22 μm filter Exchange Method



<Fig. 2.3> 0.22 μm Filter exchange

3. Equipment Operating

3-1. Control Panel



<Fig. 3.1> Control Panel

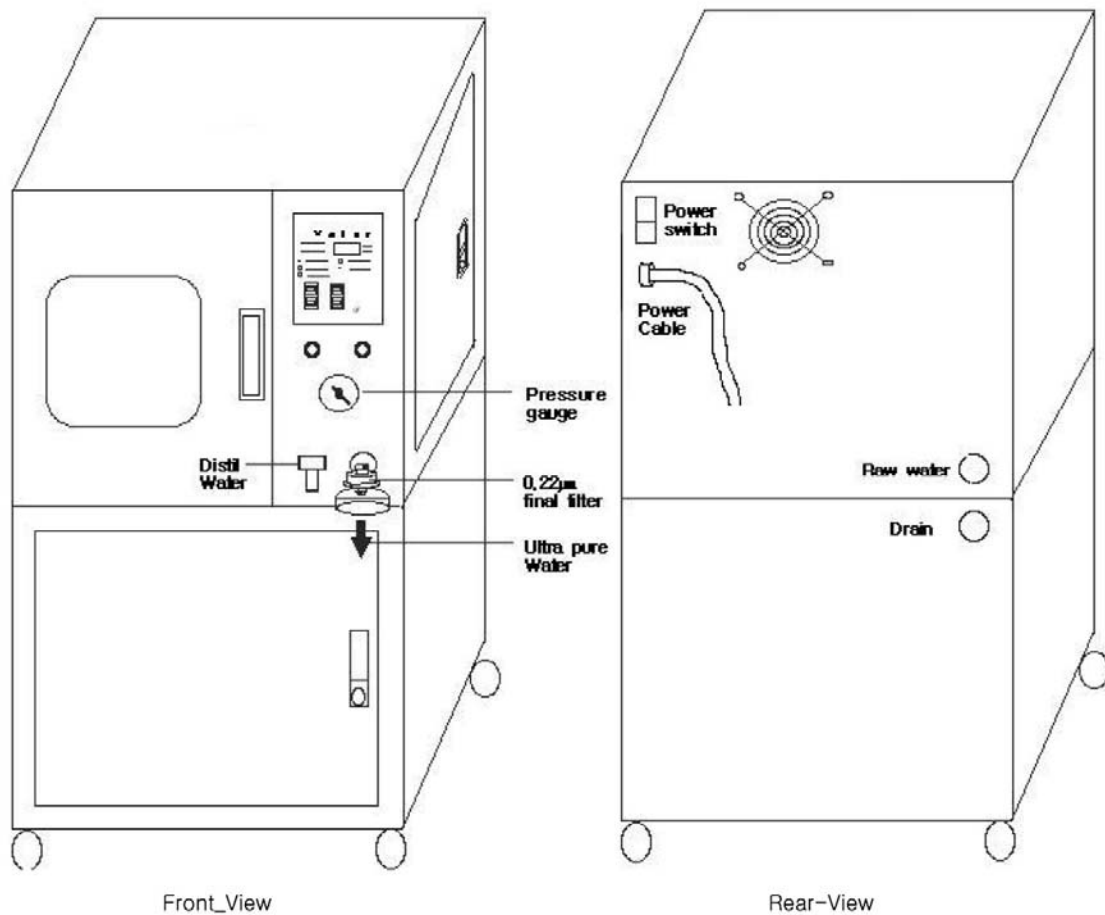
- ① - Main Power Lamp is turned on when Power is ON
- ② - Tank Full Lamp is turned on when water tank is filled
- ③ - Low pressure Lamp is turned on when the water level in a boiler is located below the Heater (automatic equipment stop)
- ④ - RO Pack Lamp is turned on when the feed water having pollutants (a detergent and bubble) flow in
- ⑤ - Q-Pack Lamp is turned on when HP Pack exchange period becomes (below 10 MΩ-cm, User can regulate the range)
- ⑥ - RO : Button to distill Feed Water
- ⑦ - UP : Button to produce Pure Water
(In case of UP Switch ON, Pure Water is produced by Pump)
- ⑧ - Recycle : Button to produce Ultra Pure Water
(Ultra Pure Water can be produced through HP-Pack)
- ⑨ - Pure water's grade is shown
- ⑩ - Ultra Pure water's grade is shown (Normal range : 10 ~ 18.3 MΩ-cm)

3-2. Equipment Operating Method

1. Process to make the distilled water
 - 1) Turn on the supply water - The water is provided
 - 2) Power ON - Panel is turned on
 - 3) User must control the feed water's regulator (water volume)
 - 4) "RO Switch ON"
 - 5) When the water is filled up until the setting level, the heater is ON
2. To stop the distilled water
 - 1) "RO Switch OFF"
The heater is stopped. (There is the remaining heat)
 - 2) When a boiler gets cold, user turn off the main power
(All Panel Indicator is turned off)
 - 3) Turn off the supply water (the water in a boiler remains)

4. Installation Condition

4-1. Equipment Shape



<Fig.4.1> Appearance

4-2. Equipment Installation Condition

1. Feed Water : 1 ~ 2kg/cm², Supply water or Underground water
2. Power : 220V, 4Kw, Cutoff
3. Dimension : 60cm x 50cm x 120cm
4. Waterway Line : A waterway of the equipment must be located upper more than a waterway.

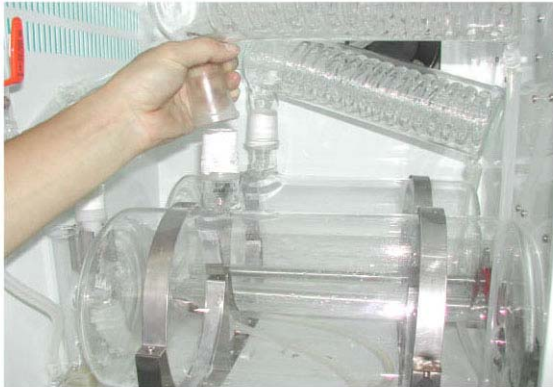
5. Trouble shooting

Problem	Cause	Remedy
. Power on safety sensor of Panel ① "No working Heater"	1) Leakage of feed water 2) Floater (safety sensor) badness of control location	1) Increase the quantity of feed water or control of entering water valve 2) re-test after adding water in boiler 3) control location of floater(safety sensor)
. Power on tank full of Panel ① "No heater"	1) When full of water in tank 2) Sensor badness of the support water tank 3) Badness of Main Controller	1) normality 2) sensor exchange 3) sensor exchange
. Keep condition as no coming out distil switch(red color)	1) Switch is out of order	1) Switch or Panel exchange
. Overflow during distillation	1) High location of floater sensor 2) snarl of silicon tube	1)Control feed water valve by depending on overflow quantity of feed water control tube 2)Correct folded or pressed the tube
.No heating during distillation	1) Heater damage 2)No performing in case of Tank-full 3) Damage heater's regulation circuit 4) exchanging of entering water volume 5)"a circuit breaker switch Off "	1) heater exchange 2) normality 3) heater's regulation circuit need exchange or repair 4) after user look at the regulation tube of entering water, regulation valve have to be controlled 5) working after " a circuit breaker Switch ON

	6) In case of suspension Of water supply, Tank full, and safety sensor	6) working the equipment first
.No working additional water during distillation	1) In case of leakage of feed water rather than buffering water 2) Badness of the feed water control tube 3) Breaking of smoothly performing by debris in the tube or connection pipe inside	1) Regulation of the feed water control valve 2) Working machine after control of the feed water tube 3) Remove debris in the connection tube inside or tube
.Discordance of water level by out of a boiler, a safety sensor tube, and a feed water control tube	1) Increasing resistance of water flow by flowing debris 2) No circulation of water drain by causing vacuum 3) air Inflow in the tube	1) Remove debris 2) Open an outlet for cooling water and an outlet tube of the feed water tube in order not to drown drain tube 3) Remove flowing air by shaking drain tube or overflow tube
In case of any other problem	We'll handle as soon as possible if you connection us with memo of usage method and problem	

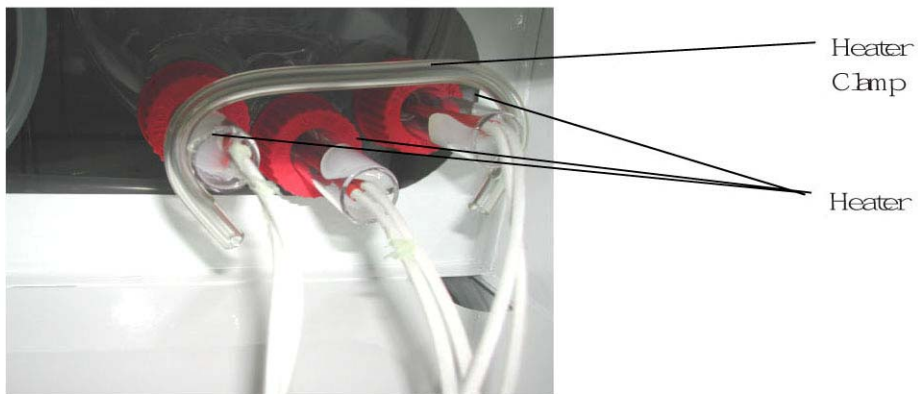
6. Installation

1. Assemble cooling tube to the boiler



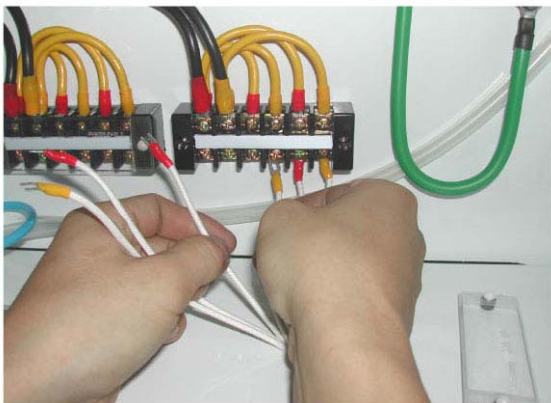
< Fig.6.1> Assemble the cooling tube

2. Assemble heater to the boiler (Keep the distance of 10 mm from the end of heater)
3. Fasten the heater by means of heater clamp.



<Fig.6.2> Lock the heater by clamp

4. Connect the electric wire to the terminal block



< Fig.6.3> Connect the electric wire

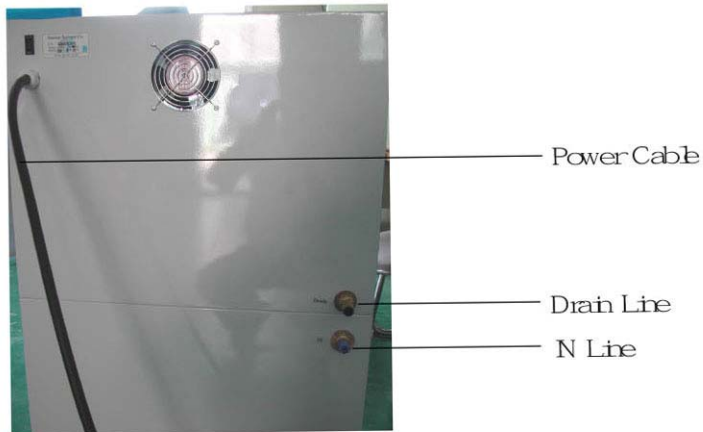
5. Connect HP pack filter in correct direction of in-outlet.



<Fig. 6.4> Conect the HP pack

6. Connect 0.22um filter

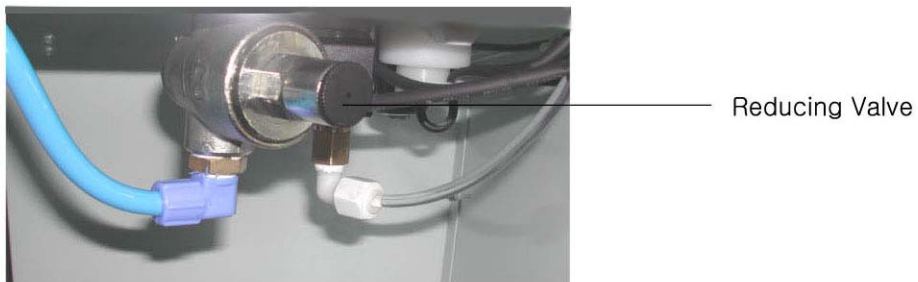
7. Connect the electric power cable



<Fig. 6.5> Conect the drain hose and inlet water hose

8. Connect the drain hose and inlet water hose.

9. Open the tap water valve, and adjust the water pressure.

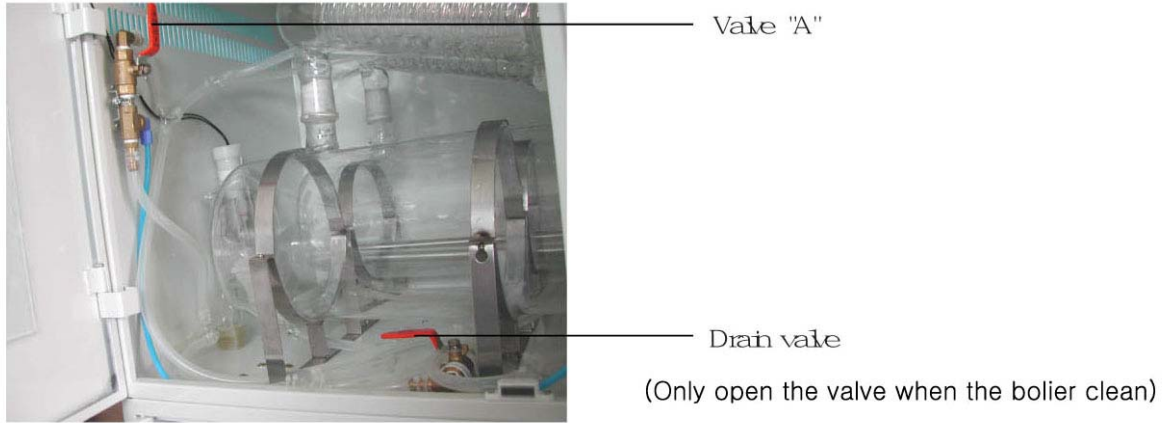


< Fig.6.7> Tap water pressure reducing valve

10. Power switch "ON"

11. Check the cooling fan is operated normally.

12. RO Switch "ON", and the boiling is beginning in 2 -3 min.



<Fig.6.6> Ro switch "ON"



INSPECTION LOG

AMB. TEMPERATURE	25 ℞ °C
	℞ °F
VOLTAGE	220 Volts
	50/60 Hz

Water Distillation & Dionizer	
MODEL No.	GWS System
SERIAL No.	
CLIENT	

ITEM	ARTICLE	Passed	Rejected	REMARKS
Appearance	Framw	℞	℞	
	Powder Coating	℞	℞	
	Chamber	℞	℞	
	Control Panel	℞	℞	
Assembly	Heater	℞	℞	
	Sensors	℞	℞	
	Water Leakage	℞	℞	
Circuit	Correspond to Circuit Diagram	℞	℞	
Test Run	Run Hours	℞	℞	
Electric Insulation	Check Electrical Insulation (∞)	℞	℞	
Operating Manual	Included	℞	℞	

Human Engineering Co. hereby certifies that this equipment is judged to be up to manufacturer's standard and satisfy manufacturing specifications. This equipment has been tested using standards whose accuracies are traceable to the manufacturer.

MANUFACTURING

QUALITY ASSUARANCE

CHECKED BY

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DATE



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