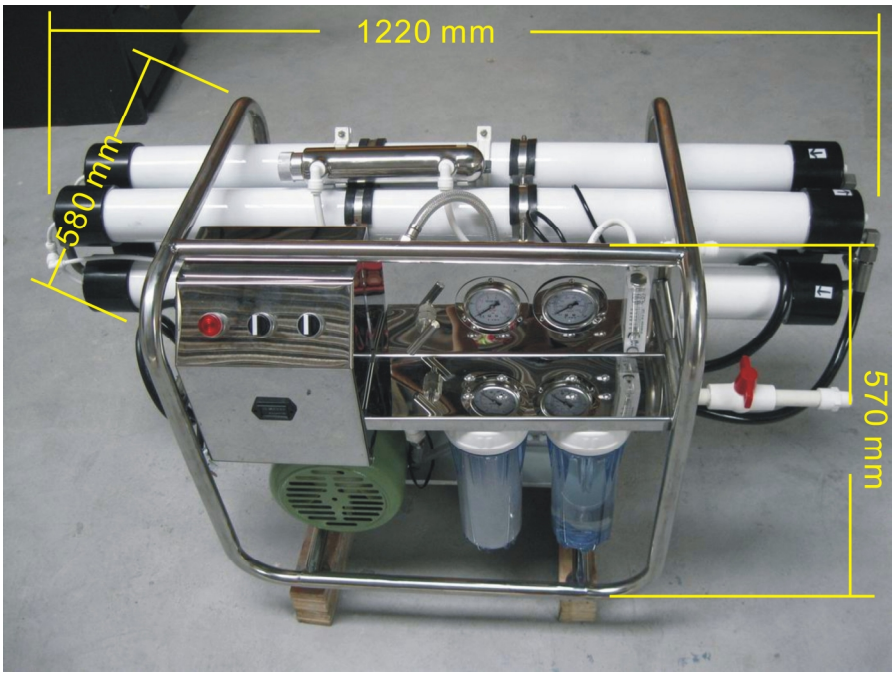
REVERSE OSMOSIS

DESALINATOR

GREEN PLANET

MODEL: SW-IVR-5000L (SEAWATER)



USER INSTRUCTIONS

Manufacturer: XHY WATER TECH
Address:
Distributor:
Website:

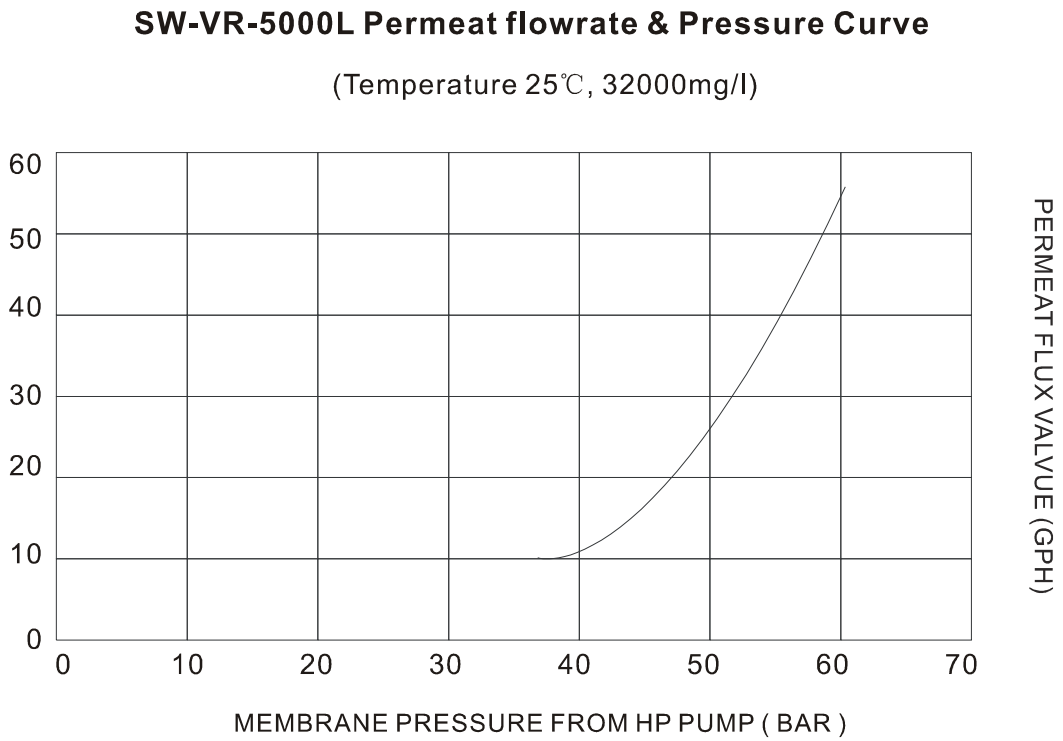
INDEX

Features

SW-IVR-5000LPD desalinator is specially design for portable water producing from seawater which TDS is less than 38000 mg/l, any other under-ground water, river water or borehole water is also applicable to it. The character of the unit is small, compact, easy to use and maintainence, can be carried easily (wheels optional) , durable, low noise. Etc. SW-IVR-5000L is classified into Brackish water model and seawater model, base on the adapted circuit capacity and motor power. The whole desalination system is composed by Source water pump, Multi-media filter, Main desalinator unit and the cleaning PE tank. performance specification are as below:

Power Cost:	2.2 KW / 220-240V 60Hz;
Feeding Water TDS:	<38000mg/l;
Product water TDS:	< 600mg/l;
Working Pressure:	< 1000 psi; (55-60 bar)
Feeding Pressure:	> 1 bar;
Production Capacity:	< 210 LPH (at TDS 38000);
Feeding water Flow:	< 700 LPH;
Working Temperature:	10-45C;
Chlorine Density:	<0.1 ppm;
Feeding water SDI:	< 5;
Feeding water Turbidity:	< 1;
Feeding water PH:	3 < PH < 10;

Permeat flow & Pressure curve base on 25C, 38000 mg/l;



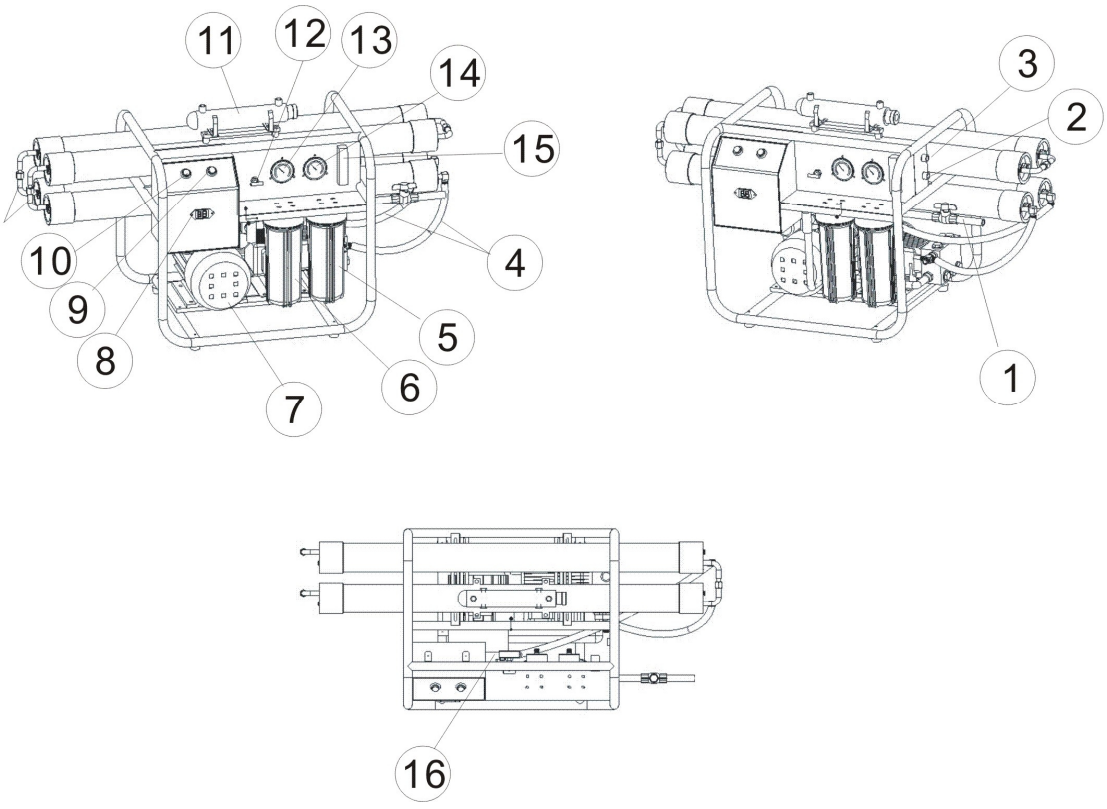
Packing List:

Please check the items in the package whether the items listed below is all included, if any Item is missed, please contact the supplier.

a). Souce water pump 0.55KW, : 1 pcs;
b). 5 Micron PP filter cartridge: 5 pcs;
c). 0.2 micrion pleated filter cartridge: 2 pcs;
d). Plastic Spanner: 1 pcs;
e). Pressure storage tank15L 1 pcs;
f). 1/4 soft tube 0.5 meter : 2 pcs;
g). Washing chemical: Alkaline(1kg), Acid(0.5kg), Protection (1kg)
h). TDS meter : 1 pcs;

Operation Instruction

A. SYSTEM CONSTRUCTION ILLUSTRATION:

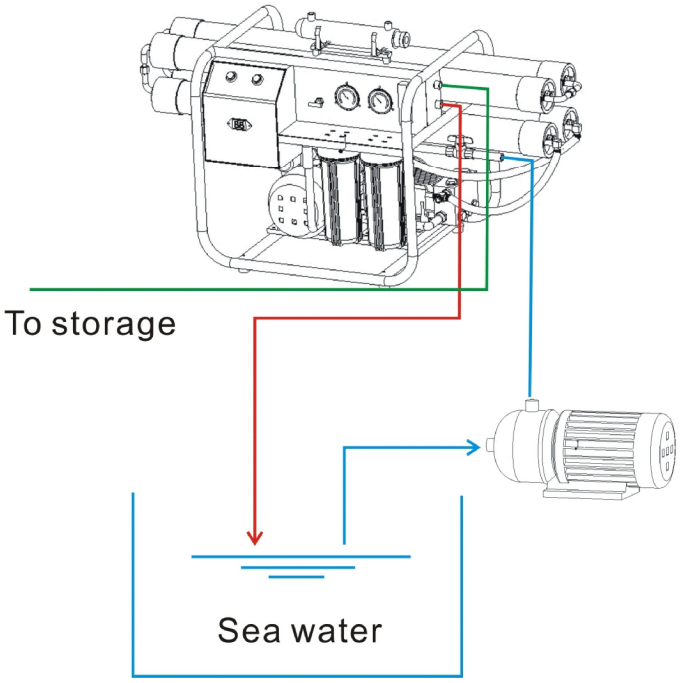


Numbers presented:

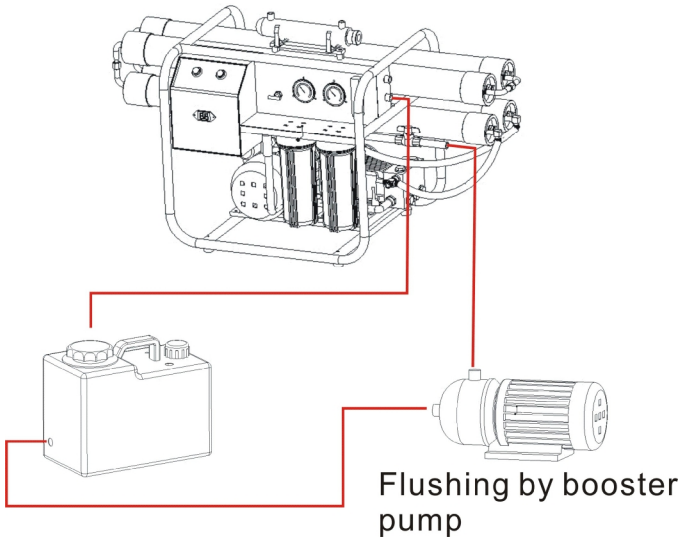
1. Seawater Inlet ; 2. Brine water outlet; 3: Fresh water outlet; 4: HP tubes; 5: 5micrion housing; 6: 0.5 micron housing; 7:HP motor ; 8: HP pump run time accumulator; 9: LP only or HP only

switching button; 10:Auto running button 11: UV sterilizer housing ; 12: HP pump Pressure Regulator valve; 13: membrane pressure (pump pressure) gauge ; 14:Fresh water pressure gauge; 15: fresh water flow rate meter;

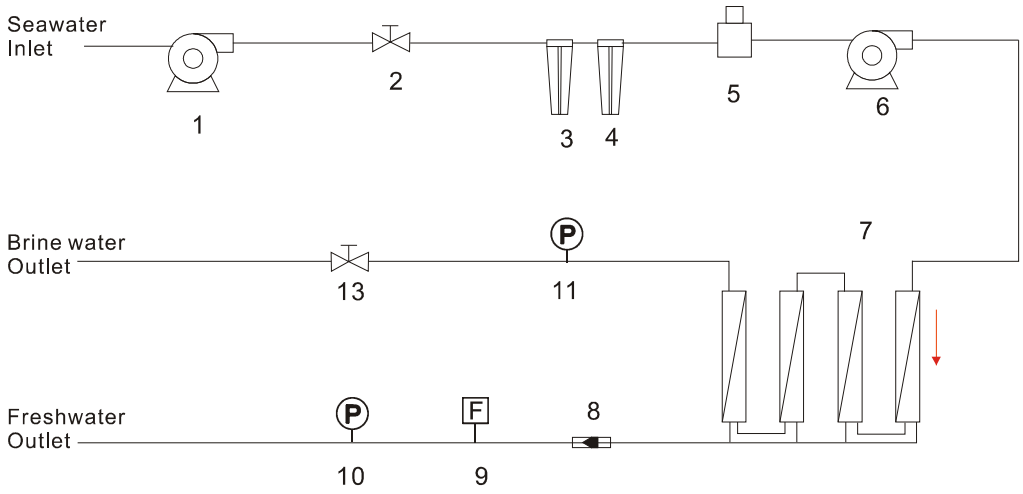
Normal running connection diagram:



Flushing connection diagram:



Water Flow Scheme (4membrane)



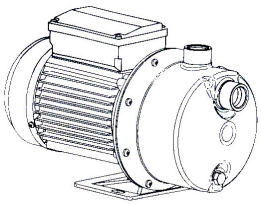
Number Presented:

A: Seawater Inlet B: Fresh water Outlet (tap) C. Brine water outlet

1. Booster pump (auto suction pump); 2.Inlet Ball valve ; 3: 5 Micron filter ; 4: 0.5 Micron filter pleated ; 5. Low pressure sensor; 6: HP pump (Plunger pump); 7: Seawater membranes; 8: Non-return valve . 9: fresh water Flowrate meter; 10. Fresh water Pressure gauge; 11. membrane HP pressure gauge; 12. UV sterilizer ; 13. HP regulator valve;

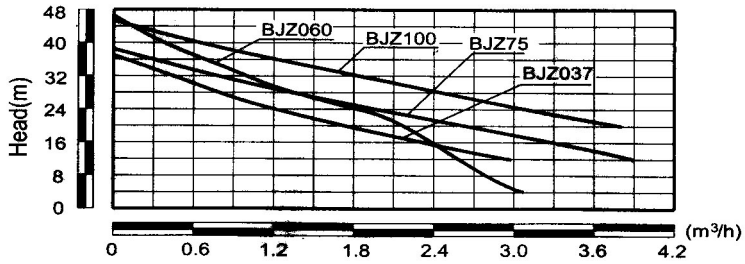
B. FEEDING WATER PUMP SPECIFCATION

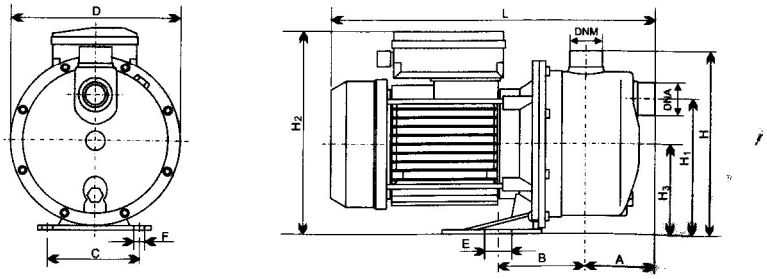
Feeding water pump is a boostering device which can both draw the water and feed to the unit, please pay attention to the water level at the entry side, the pump can be damaged if dry running, a bottom valve (*bottom check valve*) at the end of the entry pipe and *water level sensor* is suggested to use, detail instruction please check the later charter.



Model single phase 220V	Power		SUCTION HEIGHT Hs(m)	Entry Size (Inch)		Q	L/min	5	15	20	30	40	50	60
	kW	HP		Inlet	Outlet		m^3/h	0.3	0.9	1.2	1.8	2.4	3.0	3.6
BJZ037	0.37	0.5	8	1	1	Heading H (m)		31	25	23	19	14	9	
BJZ060	0.60	0.8		1	1			41	33	29	24	15	5	
BJZ75	0.55	0.75	9	1	1			34	29	26	23	19	16	13
BJZ100	0.75	1.0		1	1			38	32	30	25	22	19	13

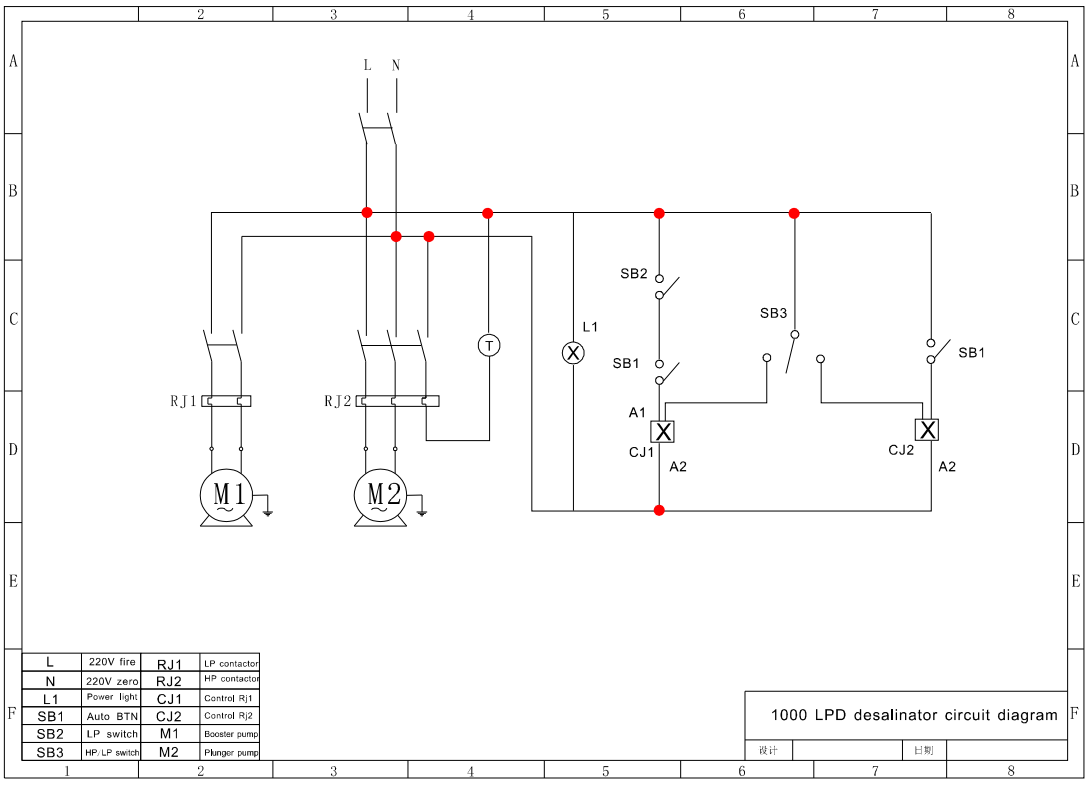
Curves & installation size



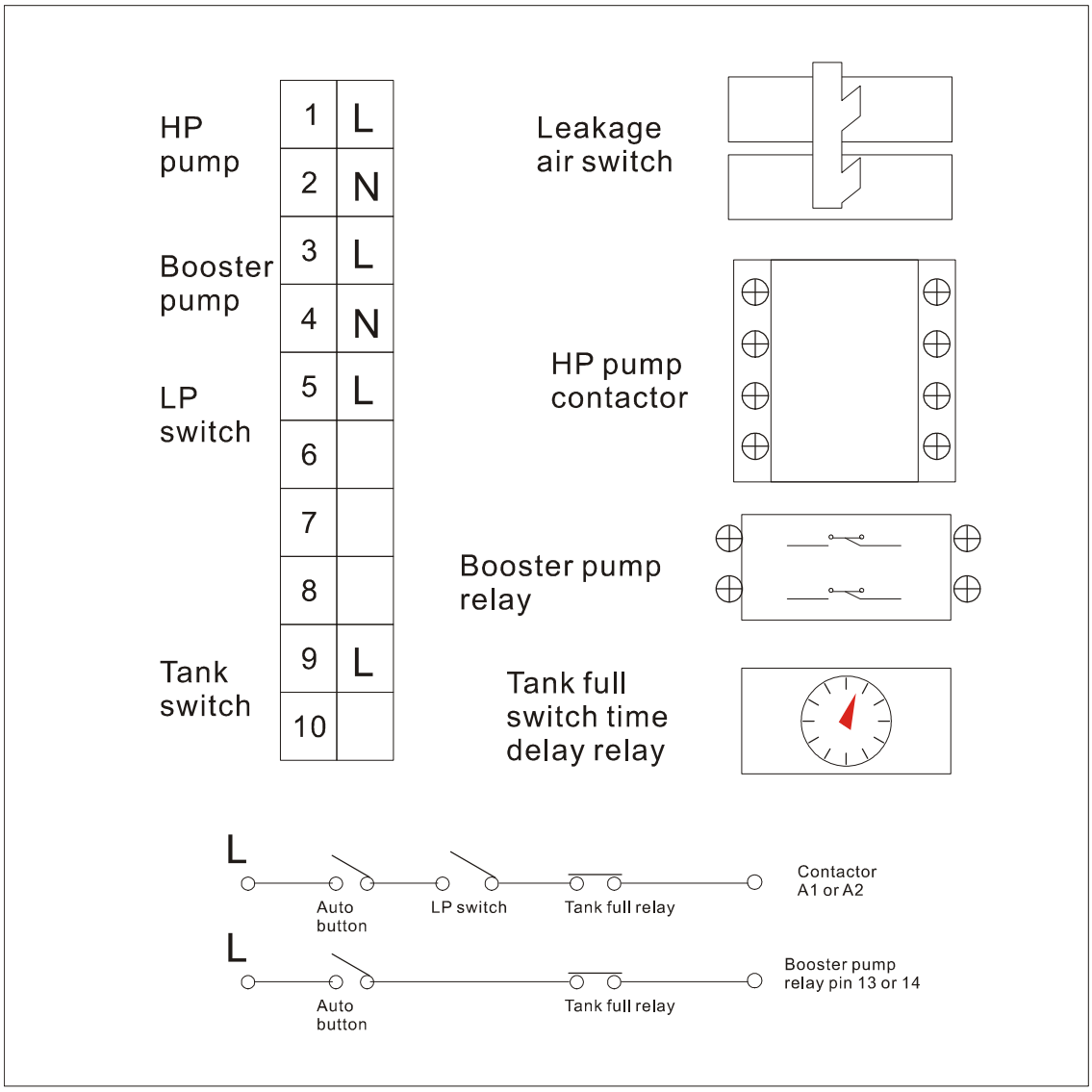


Model	A	B	C	D	E	F	H	H1	H2	H3	L	DNA	DNM	Weight (Kg)
BJZ037	88	109	100	170	7	7	178	128	195	88	365	G1	G1	6.0
BJZ060	88	109	100	170	7	7	178	128	208	88	388	G1	G1	7.0
BJZ50	80	80	98	184	20	10	203	157.5	187	98	332	G1	G1	6.0
BJZ75	80	80	98	184	20	10	203	157.5	202	98	354	G1	G1	8.0
BJZ100	80	80	98	184	20	10	203	157.5	202	98	354	G1	G1	9.0

D. MAIN UNIT CONTROLLING CIRCUIT DIAGRAM



Circuit kits location



For the first time Running, the Source water pump M1 should be wired to the control box, or use separate power supply of 220V/50Hz;

E. OPERATION STEPS

E1: Starting up the machine

1). Pipe up necessary components according to Runing Diagram ; Install the PP cartridge as 1st， and the pleated cartridge as 2nd stage precision filtration.

2). Connect the source water pump to the control box via the bottom sockets. (according to the circuit diagram);

3). Release the regulator valve to Max allow, and turn on the feeding water valve (UPVC valve); pipe up the suction pipe from the sea, and fill some water into the source water pump via the nuts (open it), until it's full, then put the nut back.

4). Plug the power cord to the side socket on the desalinatior, after do that the light of the Auto button will be on;

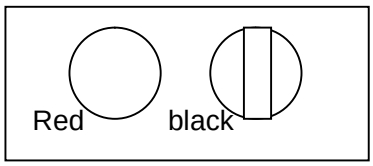
5). ONLY switch on the booster pump (source water pump), and check whether the whole piping system is fine; keep running the booster pump (not dry running) for 10 minutes, to drain off the protection liquid in the pipes, then switch down the booster pump;

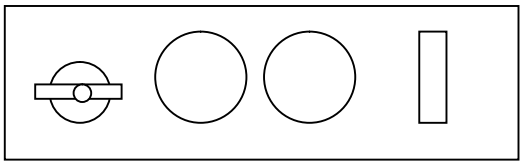
6). Push on the Auto button;

7). Steadily add pressure on the the membrane , by turning the regulator valve slowly, keep the plant running for 1 or 2 minutes every 5 bar;

8). When the flow rate reach target value, stop adding pressure, the system is in service.

The Electical buttons functions is as below:





Auto & Power light

Left –booster pump only
Right – High pressure pump only

Regulator valve

HP pressure gauge

LP

flowmeter

Please don't use the fresh water produced within half hour, the water can be stored in the PE tank for flushing usage.

Under auto mode, the unit is control only by whether the user is turn on the tap, if the tap is on, the storage tank supply water first. And then the plant will start to make water; if the tap is off, the plant will stop after it fill up the storage tank.

E2: Shut down the machine

1). Turn the regulator valve to Max release.

2). Push off the Auto Button.

3). Unplug the power cord.

E3: Flushing the machine

1). Pipe up necessary components according to Diagram 2;

2). Put the PE tank on or above the desalinator; turn the regulator valve to Max release (no pressure)

3). Plug the power cord to the side socket on the desalinatior, Switch the mode to " HP pump only ";

4). Push off the " Auto button after enough rinsing time;

F. Maintenance

F1: Necessity of Chemical Cleaning and Fresh water Cleaning.

While running the desalination plant, the separated mineral ion, metal salt, bicrobiology, algae, colloid and other impurities will gather on the surface of the membrane, and then cause the membrane pollution, and this will lead to the flow rate decreasing, or the desalination rate drops. No matter at any time, if the freshwater flow rate drops to the rated standard (the same condition), or the salinity of the freshwater increase obviously, that mean the membrane need

cleaning.

The reason for membrane pollution will be somehow complex, and the pollution character and the pollutant could be different. On the other hand, not enough working pressure or pump flow rate decreasing will cause the decreasing of the freshwater productivity. So the user should analyze the proper reason, in order to get a proper way to solve the problem.

The most popular pollution come from the microbiology, organics and the algae in the sea. To recover from this kind of pollution is to do a monthly cleaning for the membranes. In the package come with the plant, there is 5 – 10 dose chemical liquid, they are the solute of the cleaning liquids. But for a special chemical cleaning, please contact the manufacturer or process under the guidance from the professional.

Tabel 1: list the character for common membrane pollutions:

Pollution Reason	Common reason		
	Salt permeate rate	Membrane pressure loss	Freshwater productivity
Metal oxides(Fe，Mn，Ni，Cu)	Double up rapidly	Double up rapidly	Decrease 20-25%
Sediments (CaCO3, MgCO3)	Increase 20-25％	Increase 10-25％	Decrease <10％
Colloid (Silicon colloid)	Double up gradually	Double up gradually	Decrease ≥50%
Microbiology (Germs, algae)	Double up	Double up	Decrease ≥50%

F2: Safe cleaning routines and cleaning steps

(1). Safe cleaning routines

a. Before use any chemical dose mentioned at the follow charters, be sure to follow the experience that stated here, and claim the detail operation instruction from the dose supplier or the professional.

b. While prepare the protecting liquid, be sure stir the solute to dissolved totally and equally.

c. Use the freshwater without free chlorine to flush the membrane, the water temperature should not be less then 20℃. The permeated water from the membrane or the water after pre-filtration from a non-rusty pipes can do.

d. Before return to normal running, be sue to flush the system under no pressure for about 5 minutes, and then release the freshwater of the initial 30 minutes when the machine begin working.

e. There is a water temperature limit on cleaning, if the PH of the water is 2-10, the temperature should be lower than 40℃， and if 10-11, should lower than 35℃, and if 11-12, should lower than 30℃, please keep the cleaning liquid over 15℃, otherwise the cleaning time could be too long.

F3: Cleaning and protection chemical dose use instruction

Cleaning dose operation

1. flush the water tank with fresh water at 40~45℃ for 5-10 minutes, till the water turn clean.
2. Add fresh water into the tank, at 40~45℃, add alkaline cleaning dose, density at 0.5%~1%, control the PH value at 11-12, cycle for 40 minutes.
3. flush plant with freshwater at 40~45℃ for 10 minutes, till the water be neutral.
4. Add fresh water into the tank, at 40~45℃, add acid cleaning dose, density at 3%, cycle for 15 minutes.
5. flush plant with freshwater at 40~45℃ for 10 minutes, till the water be neutral.

Protection dose operation

Add fresh water into the tank, at normal temperature, add protection liquid, density at 1-2%, cycle for 15-30 minutes, keep the liquid inside the system.

Caution: Either the desalination rate or product water flow rate decrease over 15%, the plant should be cleaned immediately, otherwise the life and the plant capacity can not be recovered any more.

F4: PLANT MAINTAINENCE

1. Keep the plant clean, wipe off the oil stain or splashed seawater

2. Fasten the screw or change the sealing if leakage is found between the pipes

3. Clean or change the precision filter cartridges

a. After running the plant for some time, the pre-filter cartridge could be stuffed by the impurities in the seawater, this will affect the feed water pressure loss, or feed water flow rate decrease, then could lead to low fresh water productivity. When the reading of the feed water pressure gauge less then 0.1 Mpa , that means the precision filter need to be cleaned or replaced.

b. When replace the cartridge, screw off the housing with the plastic wrench come with the package, put the old cartridge out, and install the new one, and then screw the housing back.

c. The stuffed cartridge can be recovered by dipping it into caustic soda liquid of 5-8% density, for about 6 hours. then flush it with fresh water, then airing to dry.

4. HP pumps maintenances

a. Strictly prohibit impurities or particles to enter the HP pump

b. Strictly prohibit HP pump racing without water

c. Add and replace the gear oil. The oil should be SAE10-40 engine oil or any higher class engine oil (SAE xx < 10), The volume of the oil should be kept between the upper limit and the lower limit indicator of the scale. Be sure always use the same model lubricant. If the lubricant appears white or dirty, then it should be replaced. At normal working time, the lubricant should be replace once a month, if the HP pump have a lubricating whole,

then the user should add 2-3 drops of lubricant every week.

d. Before the plant leaves the factory, the HP pump and the motor position is regulated, if the user have to replace the motor wheel or the underlay rubber, they should readjust the co-plane of the pump wheel and the motor wheel, otherwise the HP pump or the motor could not work properly.

e. The lubricant should be replace once at the first 50 working hours, and then once every 1000 working hours; the sealing of the HP pump should be replace every 6-10 months, this depend on the working time of the pump.

Detail technical information refers to the HP pump manual and the illustration.

5. Membrane and membrane shell maintenance

a. Don’t depart the membrane elements by the user itself, please contact the local supplier or the manufacturer for the departing operation.

b. During normal running, if the fresh water capacity or the desalination rate decrease and can not the recovered by chemical cleaning, the membrane should be replaced. The normal working life of a membrane should be 3-5 years. While the membrane burst for over pressure, the desalination rate drops rapidly, the membrane should be replaced immediately.

c. membrane replacement operation refer to the membrane shell construction illustration. While insert the membrane into the shell, the end without the “V” sealing should enter first, then follow the arrow direction on the membrane shell, push into the shell slightly, then put on the cap, and the fittings. While connecting the inlets and outlets of other membranes, the operator also should follow the arrow instruction on the membrane shell.

If the plant is to be leisure for over 72 hour to 1 month, please inject the protection liquid of 5%, and if over 1 month or in the winter, please inject protection liquid of 10%. The protection liquid could restrain the germs and the microbiology growth, humidify the membrane and protect the membranes from pollution and frost. If the membrane is exposed in the air or without protection liquid, it could be damaged badly.

G.TROUBLE SHOOTING

TYPE	FEATURES	REASON	MEANS
System Failure	Start up Failure	Power not connected	Put the power through
		Power Voltage or phases not meet	Change the Power source
		Circuit problem or bad touch	Check the starting circuit - Reposition the heat relay, or increase its current.
		No Feed water	Start the source water pump or turn on the infall valve
		Lack of Feed Pressure	Increase the feed water pressue or check the the precision filter
Booster pump failure	Pressure not increase, With abnormal sound; abnormal libration, Pressure Gauge finger waggle	Feed water capacity not enough	Increase the source water prssure
		Lack of water pressure	Increase the feed water pressue or change the the precision filter
		Pump suction, Single-track expel	Depart the pump, clear the stem change the bad parts.
		Sealing abrasion	Change the sealing
		Inserts damage	Change the bad parts
		Connecting pole abrasion,burn	Change the bad parts
		Pressure Valve damage	Change the spring or valve core
		Lack of lubrication	Fill lubration to normal position
		Crankcase lubrication mixed with water	Change the oilproof gasket
		Pipe leakage,air enter	Check the entry pipe,seal the leakage
		Base loosen	Fasten the screw nut
		Driving belt slid & hop	Fasten the driving belt or change it
RO system Failure	Output decreasing	Running Pressure too low	Turn up the working pressure
		Feed water temp. Too low	Heat feed water
		Salinity too high	Feed water salinity too high
		Wrong connection to the membrane	Correct to the right direction
		Membrane is stuffed	Clear the stem by clean the membrane
		Membrane aging	Change a new membrane
	Low desalination Rate and bad quality	Membrane damage	Change a new membrane
		Membrane polluted	Clear and flush the membrane
		O ring of the membrane damage	Change the O ring
		Two high recovery rate	Reduce the working pressure
		Chlorine too high	Add active carbon filters
		Chemical corrusion	Avoid the chemical elements

APPENDIX: SOURCE WATER PUMP USER MANUAL