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## —. Work process

The RO water system is adopt advanced technology , the RO water output rate is 1.0M<sup>3</sup>/HR .

The quartz sand filter can remove the suspend solid and improve the outlet water turbidity .

The activated carbon filters will remove color, odor, chlorine from the raw water .After these two filters , the water will be through into the security filter which can remove the smaller suspended solids .Then water flow into RO system part cause by the boosting of high pressure pump .

Because the raw water is contain calcium salt and magnesiums salt which are the main hardness ion .In order to assure the quality of the water , should remove the hardness from the raw water .

This system can exchange the hardness ion ( $\text{Ca}^{2+}$ 、 $\text{Mg}^{2+}$ ) from cation-exchanger ( $\text{Na}^+$ 、 $\text{H}^+$ 、 $\text{NH}_4^+$ ).And the  $\text{Ca}^{2+}$ 、 $\text{Mg}^{2+}$  will be exchanged by the cation-exchanger  $\text{Na}^+$ ,then the water will be become soft .When the water softener running , the raw water will through resin layer from top to bottom ,then the raw water  $\text{Ca}^{2+}$ 、 $\text{Mg}^{2+}$  will be adsorbed and removed by the resin , and the resin  $\text{Na}^+$  will separate out continuously ,so the water will be soft .When the water reached a certain amount , the resin will be become invalid because they are full of  $\text{Ca}^{2+}$ 、 $\text{Mg}^{2+}$ , then the resin should be out of service and then regeneration .The inlet water reach working pressure of the RO system part , then transport into to the pressure vessel which with RO membrane module .The water will be separated by the RO membrane and become two water current, the one is outlet pure water , the other one is dense water .The pure water is transport to pure storage tank and the dense water is discharged to gutter after the adjustment of dense water valve and measurement of the measure meter .

In order to ensure the water system run automatic , safe and stable , the RO water system adopt the following measures : **Water scarcity protection** :The system installed with a low pressure detector switch ,the system will be automatic alarm or stop process when the feed water abnormal and cause low level of water . **Safe operation setting** : In order to prevent the damage of membrane from the flowing still water during the machine stop ,there is a inlet water solenoid valve before the high pressure pump , the valve will be switch on when operating and switch off when stop operating . **Advance membrane protection function** :When the pure water is filled, the system will automatic wash the impurity(n order to make extend lifespan of RO membrane) and then stay stop and standby condition .

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### The system process instruction :

Raw water → raw water pump → quartz sand filter → active carbon filter → water softener → security filter  
→ high pressure pump → RO system → pure water

## 二 .Pre-treatment system

### 1.Quartz sand filter (All switch like raw water pump switch....ect. is on the RO panel)

#### (1) Quartz sand principle

There is precise quartz sand in the quartz sand filter .During the raw water through the filtering layer , the impurity , suspended matter ,particles,colloids and other impurities etc will be remove from the raw water .Then the water will be more clear and with lower turbidity. Along with the increasing of outlet water and filtration time , the impurity in the filler(quartz sand) will be increasing , the water filters inlet water and outlet water pressure difference will be increased too .When the operation pressure difference  $>0.1\text{Mpa}$  the maximum permissible value, the filter should be backwashing and fast rinse .Though the backwash and fast rinse can remove the impurity on the filler(quartz sand )

#### (2) quartz sand filter installation method (There is automatic valve operation manual )

##### filter material filling :

1.Rotate the pipe connection to revolve manual multi-channel control valve , Please block off the central tube ( with paper or other things)which inside the water tank in case of the filler(quartz sand) entered by accident during filling process .



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2. Firstly filling with the big particle quartz sand (about 12kg), then fill with the small quartz sand, Fill quartz sand till 2/3rd of the tank, Please wash the tank opening after finishing the filling and then rotate into the multi-control valves.



**filter material flushing** : (All the switch are on the panel)

1. The fillers should be flush when the first time filling into the tank, please connect and tighten the pipeline connection after the tank be filled with 2/3 quartz sand.

2. The inlet water pipe should be keep unobstructed, turn on the total power, adjust the automatic multi-channel control valve to the (**BACK WASH**), turn on the raw water pump (manual condition), After seeing the dense water drain off from the pipe, please flush 5 minutes and then adjust the valve to **FAST RINSE** to flush (the red arrow is dense water pipe). During the flushing, after the backwashing please change to fast rinse for a while until the outlet water is clear from the dense water pipe. After the quartz sand filter material (quartz sand) flushing, please adjust to the normal operation condition and transfer to the carbon tank flushing. (remember: Both of the backwashing and fast rinse, you can see the dense water drain off from the pipe)

### **(3) quartz sand filter normal operation**

Adjust the automatic multi-operating control valve to operation condition (FILTER), it is ok.

## **2. Activated carbon filter**

(1) Activated carbon is used shell (coconut) and other carbonaceous material made by chemical or physical method activation. It has a very large number of pores and specific surface area, which has a strong physical adsorption capacity, the effective adsorption of organic pollutants in water. Primarily to

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remove organic matter in raw water, chlorine, odor, color, etc., so that the original residual chlorine in water  $\leq 0.1\text{mg / l}$ , effective protection of RO membrane from chlorine damage to parts of activated carbon .After the filter run for some certain amount of time , the impurity of activated carbon should be backwash and fast rinse .

## **(2)activated carbon filter installation method (There is automatic valve operation manual )**

### **filter material filling :**

- 1.Rotate the pipe connection to revolve manual multi-channel control valve , Please block off the central tube ( with paper or other things) which inside the water tank in case of the (activated carbon) entered by accident during filling process .
- 2 Firstly filling with the big particle quartz sand (about 10kg),then fill with the activated carbon ,Fill activated carbon till 2/3rd of the tank ,Please wash the tank opening after finish filling and then rotate into the multi-control valves .



### **filter material flushing :**

- 1.The fillers should be flush when the first time filling into the tank , please connect and tighten the pipeline connection after the tank be filled with 2/3 activated carbon .
2. Please adjust the activated carbon filter to the normal operation condition (FILTER) ,adjust the automatic multi-channel control valve to the( **BACK WASH** ) , turn on the raw water pump (manual condition) ,  
After seeing the dense water drain off from the pipe ,please flush 5 minutes and then adjust the valve to

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**FAST RINSE** to flush (the red arrow is dense water pipe ) .During the flushing , after the backwash please change to fast rinse for a while until the outlet water is clear from the dense water pipe .

**(3)Activated carbon filter normal operation**

Adjust the automatic multi-operating control valve to operation condition (FILTER) ,it is ok.

**3. Water softener**

**(1)water softener filter instruction (Additional there is instruction of the valve )**

**filter material filling :**

1.Rotate the pipe connection to revolve manual multi-channel control valve , Please block off the central tube ( with paper or other things)which inside the water tank in case of the filler (resin) entered by accident during filling process .

2.Firstly filling into the resin(about 75L), filled to 2 / 3 of the tank .after finish to filling ,use the fresh water to clean the tank ,then rotate into the multi-control valves.

**filter material flushing :**

1.The fillers should be flush when the first time filling into the tank , please connect and tighten the pipeline connection after the tank be filled with 2/3 resin .

2.Sand filter and activated carbon filter adjusts to the normal condition (FILTER),water softener multi-channel control valve transfers to the back flushing condition, turn on the raw water pump (manual condition), Seeing the dense water drain out from the dense water pipe then wash for 5 minutes and transfer to the FAST RINSE condition .The red arrow is the dense water pipeline .When flushing please backwash for a while about 1 minute and then transfer to the fast rinse for one while until the output water drain our from the dense water pipe is clear ,

**water softener filter normal operation**

Rotate to automatic multi-operating control valve to operation condition (FILTER) ,it is ok.

**4. security filter**

The security filter prevents the entry of particles, colloidal impurities, small suspended particles into the intermediate tank .Security filter cartridge is made of polypropylene melt spray, with small resistance, filtration speed characteristic. The filter cartridge should be replace regularly to ensure the the inlet water flow ,or the particles or impurities will flow into the RO part .The filter cartridge should be replaced about

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every month .

## ≡ .RO system

### 1.RO system operation manual and principle

The reverse osmosis device is an equipment to purify the saline water with the action of pressure difference of semi permeable membrane. RO is also effective with asbestos, many taste, color and odor producing chemicals, particulates, total dissolved solids, turbidity and radium. RO system is widely used in water supply treatment, purification for tap water, underground water and brackish water, pure water and ultra-pure drinking water production, power stations, electronic industries, medicine manufactories, and medical treatment. It is key equipment of pure water plant.

### 2. Reverse osmosis membrane installation method

Reverse osmosis membrane installation

1.)Unscrew the RO rack stainless steel membrane pipe interface, remove the upper and lower covers and place the black rubber ring inside . (2 pcs for each cover)



2.)Take out the RO Membrane from its packing and place them inside the membrane pipe (with a black rubber ring of the RO membrane is the inlet water direction, please place them inside the membrane pipe by following the direction of the blue arrow which on the membrane housing . Then press the upper and lower covers in place and tighten the screws. Finally connect the pipe .(Before placing the membrane into the pipe, please clean the pipe with water and apply some cleaner essence to the black rubber ring as oiling agent function )



### RO membrane flushing

1. The membrane should be flushed when the first time installed .After finish the placement of the membrane , please open the RO rack high pressure regulating valve (on the right side of the high pressure pump ) , dense water regulating valve (the top left side/corner ) .The quartz sand filter and carbon filter should adjust to the normal operation condition .Please assure the inlet water pipe is unobstructed , switch on the total power and the raw water pump (manual condition) .switch on the top exhaust valves of the security filter to remove air .



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Please flush about 30mins , the water quality conductivity is below 30 is ok .(raw water conductivity less than 400us/cm)

### **RO system adjustment .**

1.Please switch on the total power, switch on the raw water pump , and switch on the high pressure pump (manual condition), And check if the motor is in positive rotation or not.If not please open the electrical cabinet ,and exchange the high pressure pump power line (non-motor reversal) .



2. Quartz sand filter and carbon filter adjusted to normal operation, and the high pressure regulating valve and dense water regulating valve to be adjusted to semi-open condition , switch on the total power, Switch on raw water pump and high pressure pump (automatic condition),after 90 seconds automatic washing , slowly adjust inlet water valve and dense water valve to the pressure 4-9kg , output water should be 17LPM(PER MIN 17 LITER), dense water should be 17LPM .

3.During the adjustment if there is a low voltage alarm ,then turn off the total power and slowly turn down the high pressure regulating valve .Then re-start the total power , raw water pump , high pressure pump can be adjusted to automatic ..

**After the system run stability ,please adjust all the control switch to automatic operation mode .**

**Then the whole system can run in automatic protection .**

**Note :It will damage the RO membrane if close the dense water control valve !**

**Note :After confirm adjust the all valves correctly ,please do not change the valves opening direction frequently and randomly .**

### **The system control and meters**

The system is with the full automatic control function . It will be stay automatic control , operation , protection condition once enter into the automatic running status.

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## Operation meters :

- 1.The system is according to the standard of the pressure operation in order to assure the system to run normally and safety .
- 2.The RO inlet water pressure and dense water pressure is used for the detection of the RO membrane difference .The difference of the operation pressure standard between inlet water and dense water Is 0.2 MPa .

## 四. Note

- Please be sure to read the system instruction and related component products equipment instruction, and follow up the instructions for safe operation .
- We will not responsible for any loss caused by the users who does not operate the machine according to our operation manual .
- Before start the system,please check and assure all the values open condition are correct.
- When adjust (turn on or turn off)the valve please slowly , the flow rate should be adjusted by the valve manually .
- After adjust the right condition of the machine ,please do not change the valve opening condition frequently or arbitrary .
- If examine and repair or change the circuit ,must check the diversion(direction) of the

pump .You

can open the machine to operate after check the correct diversion(direction) .

- The machine can not hang up any irrelevant things ,.Avoid unnecessary personnel to enter In order to protect the machine .
- The machine can not under the strong sunshine .

## 五 .consumable items

quartz sand : should be replaced every about 15 month .

actived carbon : should be replaced every about 15 month .

filter cartridge : should be replaced every about 1 month .

RO membrane : should be replaced every about 1.5-2 years .

