

# GR10, DR10

## Series Single Tank Fixed Bed Softening Valve Installation, and Service Manual

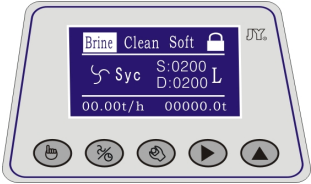

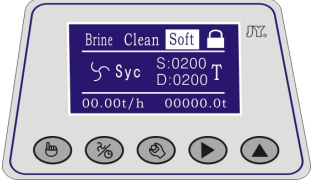


**Xi 'an JIEYUAN Water Treatment Technology co.,  
LTD**

## I. Operating Board

### 1. Instructions of the LCD display controller

#### Flow mode“☞”interface

	<p><b>Display: Brine (Regeneration)</b></p> <p><b>S:0200:</b> Setting of regenerating water, measured by the flow meter, blended with brine solution to a 8-10% concentration</p> <p><b>D:0200:</b> Volume remaining to zero</p> <p><b>00.00t/h:</b> The current flowrate</p> <p><b>00000.0t:</b> The total volume of treated water through the meter</p>
	<p><b>Display: Clean (rinse)</b></p> <p><b>S:0200:</b> Setting of rinse water, measured by the flow meter</p> <p><b>D:0200:</b> Volume remaining to zero</p>
	<p><b>Display: Soft (softening)</b></p> <p><b>S:0200:</b> Setting of softening water capacity, measured by the flow meter</p> <p><b>D:0200:</b> Volume remaining to zero</p>




#### The operation button:


☞: Manual button; ☞: Parameter setting; ☞: Mode button; ►: Shift button ▲: Up button


**A、Unlock:** Press and hold the Shift and Up button simultaneously for one second ► & ▲, Displaying ☞.

**B、Lock:** After three minutes of inactivity, the display panel will

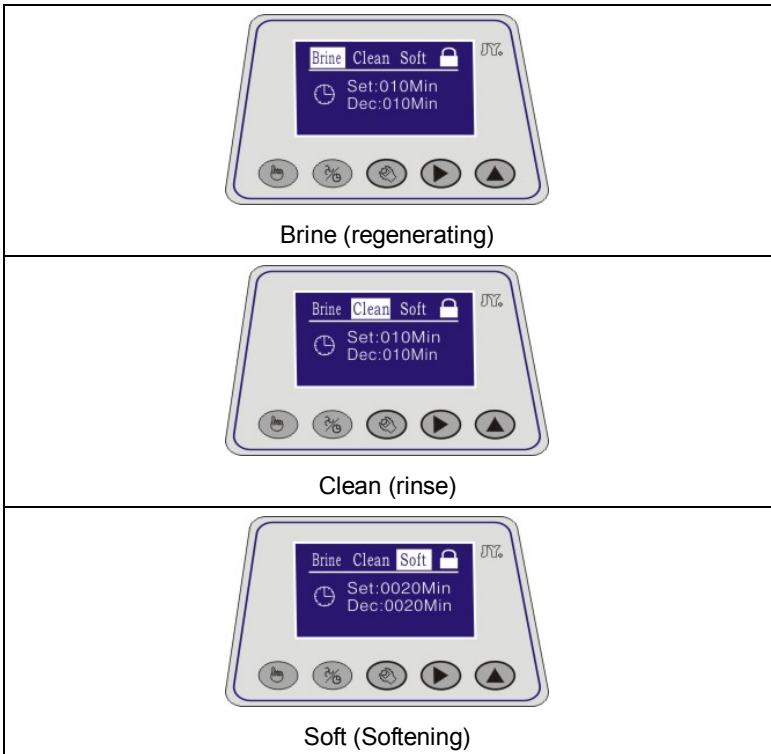
automatically lock.

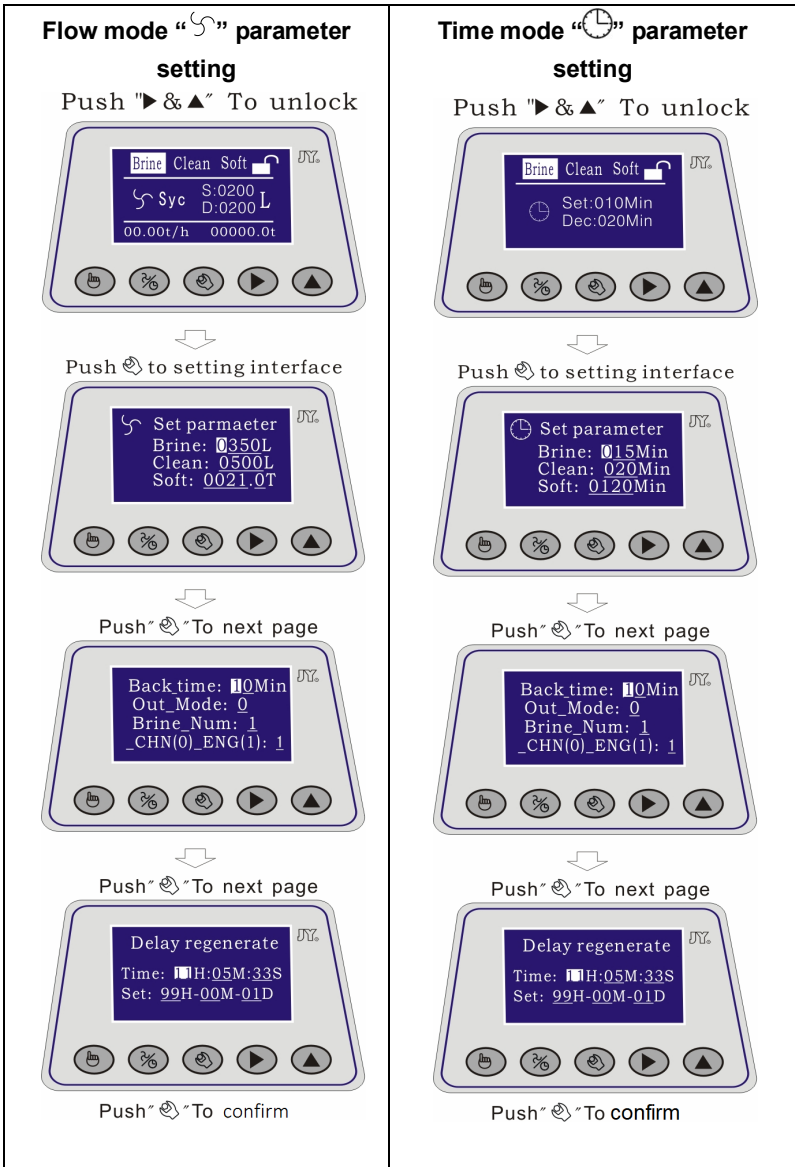
**C、**  **Mode** button: When unlocked, pressing the Mode button switches between time mode  and flow mode .

**D、**  **Manual** button: When unlocked, pressing the manual button switches the valve to the next station.

**E、**  **Parameter setting**: When unlocked, pressing the parameter button displays the interface to change parameter settings.

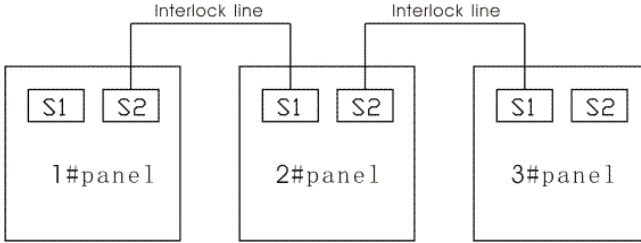
### Time mode“”interface





## II Input/output control instructions

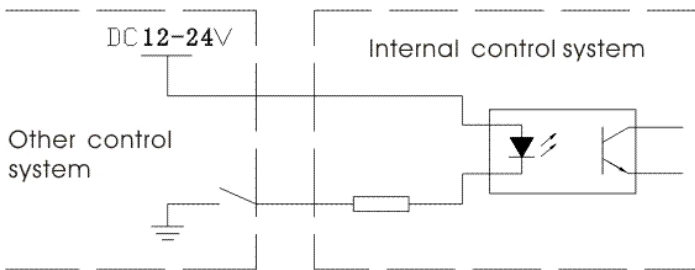
### 1. Interlock line connection



**Pic 1: Interlock**

### 2. External Control Interface

The valve can be managed through an external system to control regeneration (☐), cleaning (☐) or **RUN**. The voltage signal given is equivalent to the (☐) button being pressed.





**Pic 2: External control input**

### 3. Relay Output Interface (CC)


- A. The capacity for terminal contacts. Relay output of 5A / 230 V.
- B. Relay output port:
  - NO**= normally open, **NC**=normally closed, **COM** = common
- C. With a AC220V connection on power output relay, load is to meet circuit breaker leakage.


#### 4. For Different modes, the relay output NO and COM

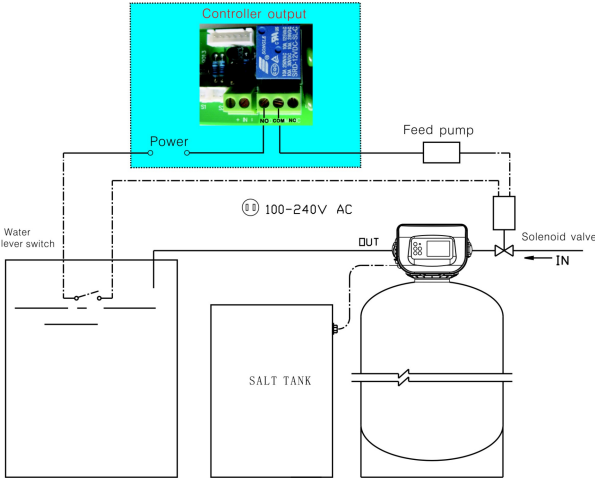
As per diagram below: - Connected to "C", disconnect from "x", conditional disconnect from "Cx"

Mode	 Regenerate	 Rinse	RUN	Valve Shifting
0	C	C	C	x
1	C	C	x	x
2	x	x	C	x
3	C	Cx	C	x
4	C	C	Cx	x

MODE	APPLICATIONS
0	<b>Solenoid valve (default) mode:</b> Softener inlet valve will shift when control valve initiates signal. Pic 3
1	<b>Backwashing booster pump mode:</b> This function is used to initiate a booster pump start-up when the control valve begins its regeneration cycle
2	<b>Out of the water pump start-up mode:</b> This setting turns the output on/off during <b>RUN</b> only. E.g.: For RO high pressure pump start-up
3	<b>Two valves in parallel. One in service and one standby.</b> The inlet solenoid valve must interlock the line connection. Pic 4.
4	<b>Tow valve RUN Backwashing mode respectively:</b> this mode for filter valve use

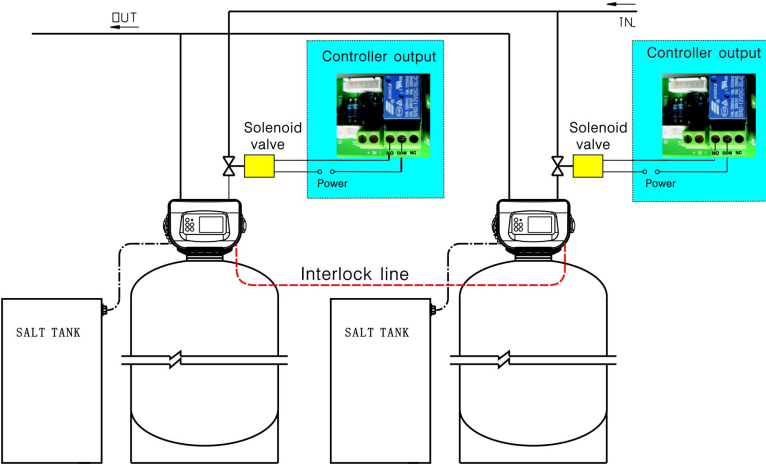
**Note:**"Cx" in mode 3; at the end of the rinse station . If another valve is in RUN, it will disconnect itself from the solenoid valve.

"Cx" In mode 4; If another valve needs to backwash , it will disconnect itself from the solenoid valve. The above solenoid valve is a normally closed type.



**Pic 3: Mode (0): Solenoid valve, Liquid level switch and Feed pump.**

Water pressure will release when the softener control valve is shifting and the solenoid valve will cut off.



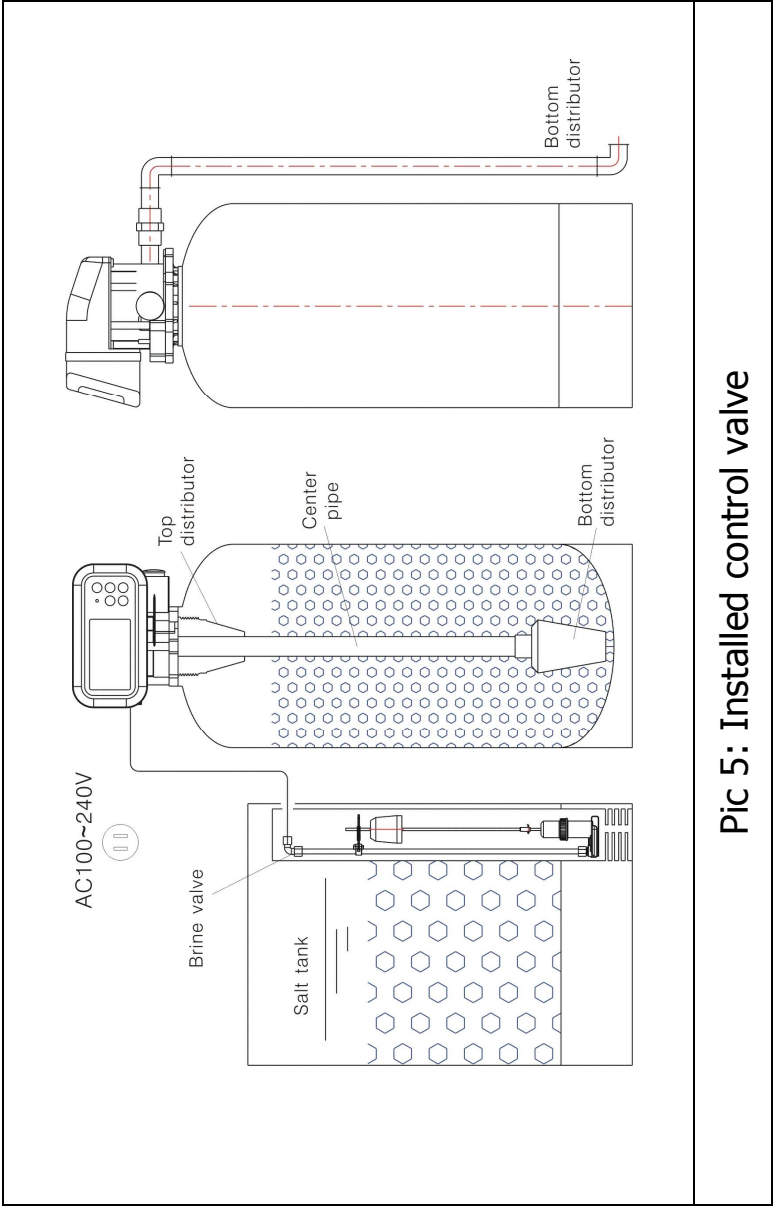
**Pic 4: Mode (3): Two valves; one in service (RUN) and one on standby.**

**Inflow water is controlled by solenoid valve.**

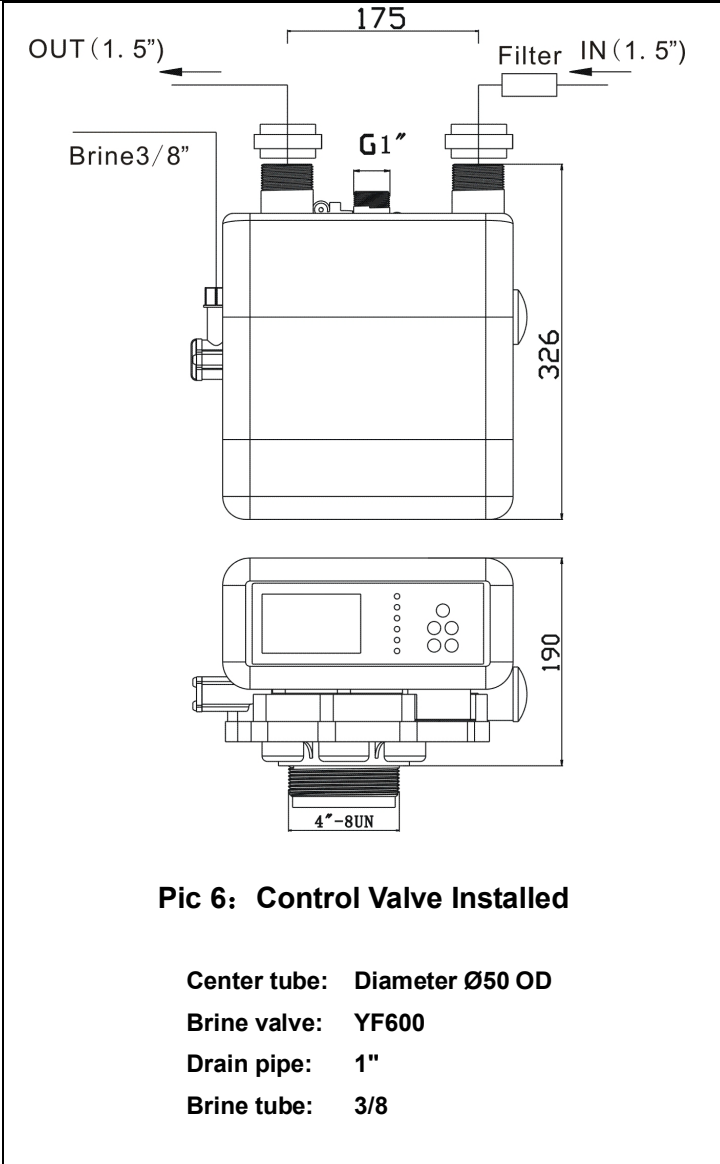
After valve regeneration cycle, the control valve will disconnect (shut) its solenoid valve and go into standby mode, until the second control valve initiates a regeneration, then it moves into service (RUN) position. This ensures continuous water production.

### **III Installation**

1. **Note! Inlet and outlet water pipe installation considerations:**  
*The feed water pressure should always be higher than the equipment. If not, a reliable check valve should be installed, in order to prevent pressure backflow and brine return.*
2. *The outlet water pressure should always be higher than that of equipment, in case of siphoning brine when the equipment is not in use.*
3. *A screen filter should be installed before the control valve to prevent blocking the injector and to ensure no clogging of the distributors or fouling of the resin.*
4. *The drain line outlet must be flush with the ground. Too high or too low will affect the brining equipment.*
5. *Piping to and from the control valve must not be reduced to less than the valve Inlet & outlet size.*
6. *Water static pressure should not exceed 0.6 MPa.*



Pic 5: Installed control valve



**Pic 6: Control Valve Installed**

**Center tube: Diameter Ø50 OD**

**Brine valve: YF600**

**Drain pipe: 1"**

**Brine tube: 3/8**

#### IV. Configuration and Setting

## 1、 The table of configuration of water softener series GR-10

Flow Rate or Raw Water Hardness		< 8 m <sup>3</sup> /h or < 400 ppm	< 10 m <sup>3</sup> /h or < 600 ppm	< 12 m <sup>3</sup> /h or < 600 ppm
Operating Water Pressure		0.1~0.4MPa		
Vessel (mm) Diameter Ø × Height		Φ450 × 1650	500 × 1750	Φ600 × 1850
Resin Quantity (L)		70 - 90% of Vessel volume		
Brine Tank		350 L	500 L	500L
Calculated Brine Volume (L)		Resin volume (L) x 40%		
Flow Mode Parameters	Brine/Regen (L)	Resin volume (L) x 250%		
	Clean/Rinse (L)	Resin volume (L) x 100%		
	Softening Capacity (m <sup>3</sup> )	[Resin volume (L) x 90%] ÷ Raw water hardness (mmol/L)		

## 2、 The table of configuration of water softener series DR-10

Flow Rate		8 m <sup>3</sup> /h	10 m <sup>3</sup> /h	12 m <sup>3</sup> /h
Operating Water Pressure		0.1~0.4 MPa		
Vessel (mm) Diameter Ø × Height		Ø450 × 1670	Ø500 × 1750	Ø600 × 2200
Resin Quantity (L)		90% of Vessel volume		
Brine Tank (L)		> 200	> 350	> 500
Calculated Brine Volume (L)		Resin volume (L) x 40%		
Flow Mode Parameters	Brine/Regen (L)	Resin volume (L) x 100%		
	Clean/Rinse (L)	Resin volume (L) x 100%		
	Softening Capacity (m <sup>3</sup> )	[Resin volume (L) x 70%] ÷ Raw water hardness (mmol/L)		

**Note: (the above GR10\DR10 series)**

1. The calculated setting for Brine/Regen water is the sum of the brine tank water volume as well as the regeneration (C1) and fast rinse water. The brine tank water setting is determined by adjusting brine float valve height, based on the salt tank diameter. ( $V=\pi r^2 h$ )
2. Rinse water setting can be adjusted based on the waste water being free from any salinity after 3 minutes.
3. Water hardness unit is mmol/L (50% of CaCO<sub>3</sub>) (1 ppm = 0.02mmol/L)
4. Resin work exchange capacity is calculated at 1000 mol/m<sup>3</sup>
5. Design and calculation of salt concentration is 20%.
6. Rinse mode also includes the filling of the brine tank to the set volume.
7. As a reference, select a vessel which ensures that the exchange velocity does not exceed 40 m/h.
10. The YF300 Safety Brine Valve is **indispensable** to the system.

## V Mode Choice




### (1) Flow mode "🌀" (the default mode)

Flow mode option should be chosen under normal circumstances Flow mode is not affected by changes to feed water pressure.

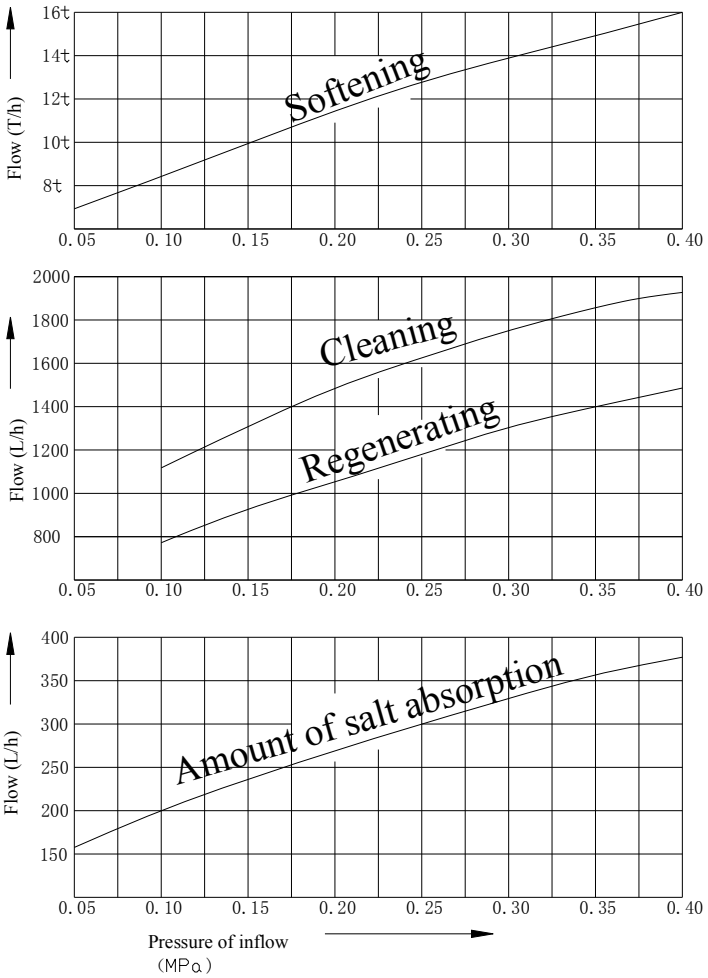
### (2) Time mode "🕒" (time management)

When the water pressure is stable, and the user requires time specific supply then this mode is an option.

## VI First time start-up

1. Confirm the drain pipe is installed correctly, the brine valve is connected and, that there is power supply.
2. **RUN Softening Station:** Completely open the outlet water valve or sampling faucet. Slowly open the water inlet valve to vessel. Check that the brine tank fills with water at the same time, and that water runs to drain, drainage equipment sampling water mouth rinse resin, can be completely open the inlet valve and equipment put into operation.
3.  **Regeneration Station:** Determine if the vacuum of the salt is normal. Check to see if there are any air bubbles in the brine tube during brine draw. If so, check all seals.
4.  **Rinse Station:** Observe whether brine water has filled and the safety brine valve is reliable.
5.  **Rinse Station:** Before the end of the rinse cycle, check to see whether the cycle has rinsed thoroughly.
6. After the regeneration cycle is complete, test the outlet water to determine the quality of the soft water.

## VII. Curve of Flow and Pressure for the Valve



**Pic 7: Curve of Flow and Pressure**  
(Ø4 Jet nozzle)

### VIII. Tips and Precautions for Equipment

1. This equipment should use industrial grade salt with a size of more than 4mm to guarantee the smooth passage of water filling and salt absorption.
2. The bottom of the salt tank needs to be checked and cleaned frequently. All sludge deposits need to be cleaned out.
3. The inlet screen filter requires periodic cleaning to ensure no loss of efficiency or output flow reduction.
4. A decrease of outlet flow and an increase of pressure might be due to a clogged water distributor inside the vessel. This will require removing the head and cleaning out top and bottom distributors.

### IX. Service Instructions - Troubleshooting

#### Hard Water

CAUSE	CORRECTION
No salt in the brine tank	Add salt to the brine tank
Plugged salt screen in brine tank	Clean it regularly
Clogged filtering net in the brine valve	Check and clean the filtering net
No enough absorption of salt water	Increase the salt volume in brine tank water
Too much salt and not enough space for water	Strictly obey the rule that the level of salt must be lower than that of the brine valve
Water flowrate is too high	Reduce the pressure difference between the inlet and outlet
No enough resin and too much space at the top of the vessel	Add more resin to reduce the freeboard space

Leak at distributor tube	Ensure distributor tube is not cracked. Check the O-ring. Check that distributor pipe is not too short
Raw water ions are too high (Na <sup>+</sup> , K <sup>+</sup> )	It needs to be solved immediately

**Brine water passing to the water outlet**

<b>CAUSE</b>	<b>CORRECTION</b>
Insufficient amount of rinsing	Increase the rinse time/volume
No enough resin, resulting in a too high brine concentration at the top of the vessel from too much space causing incomplete cleaning	Add more resin to reduce the space

**Increase of inlet pressure and decrease of flowrate at outlet**

<b>CAUSE</b>	<b>CORRECTION</b>
Resin's being polluted by the suspended matter	Remove the valve and wash the resin both inside and outside the tank
The upper water distributor is broken or blocked with resin	Remove the water distributor and clean it
Water pipes are blocked	Check and eliminate the problem

**Water leaking from the brine tank**

<b>CAUSE</b>	<b>CORRECTION</b>
Brine valve float not closing	Adjust the brine valve link to ensure active movement
Poor connection of the brine valve	Remove the brine valve, connect the pipe and check the sealing condition of the valve.

**Poor brine draw to the control valve**

CAUSE	CORRECTION
Erratic drain flow	Check whether the drain pipe is clogged
Clogged ejector	Remove and clean the ejector. (Pic 10)

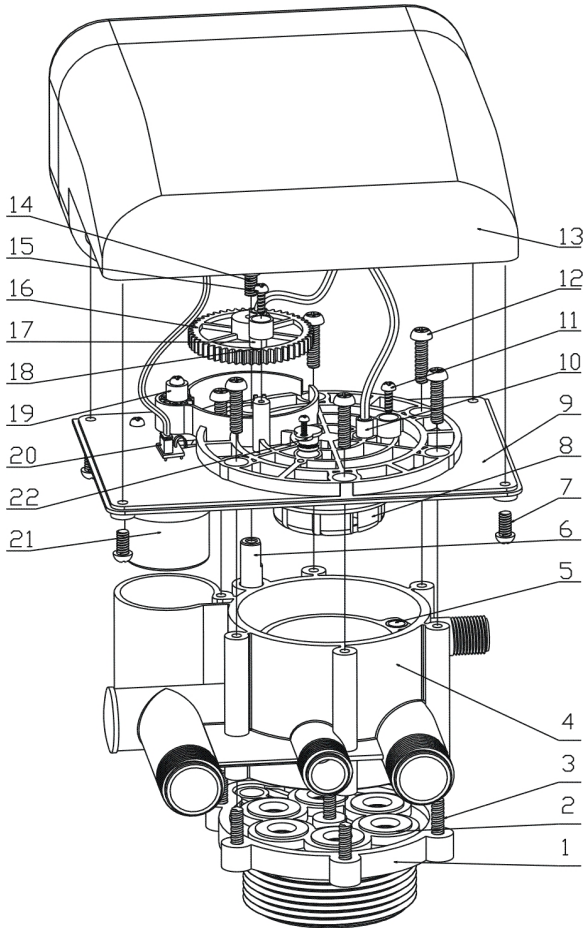
**Valve flow parameter values do not shift**

CAUSE	CORRECTION
Water outlet flow parameter values do not decline.	Meter impeller blocked by foreign body or impeller magnets have eroded due to irons in the water. Remove the impeller shell and clean or repair
	Faulty/damaged flow sensor or sensor pick-up is disconnected

**Incorrect drain flow**

CAUSE	CORRECTION
Valve is programmed incorrectly and is not aligned	Controller pick-up location does not agree with the valve body. A <b>Station alignment</b> is required.
Small leak to drain during service mode	Valve core ceramic ring, silicone ring has foreign matter or is damaged. Replace or clean up and check.

## X Control Valve Assembly

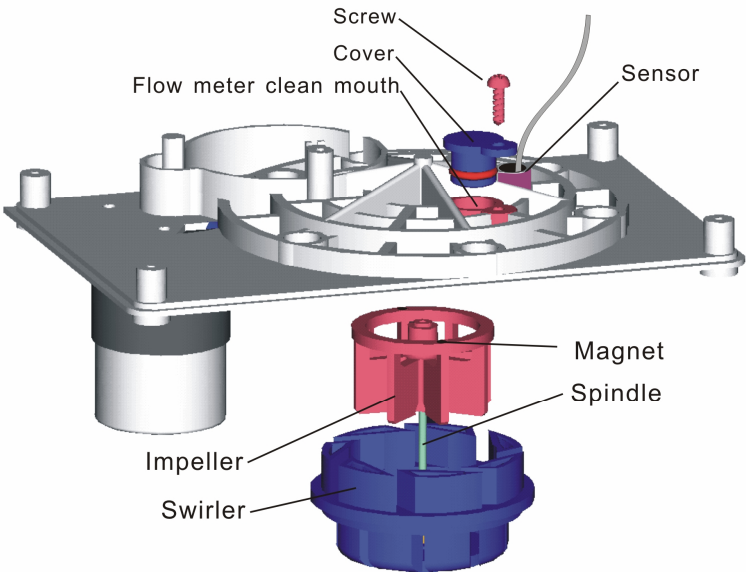


**Pic 8: Control valve assembly**

A valve core aim and arbitrary pair of valve hole, then use "**Station alignment:**" way to adjust.

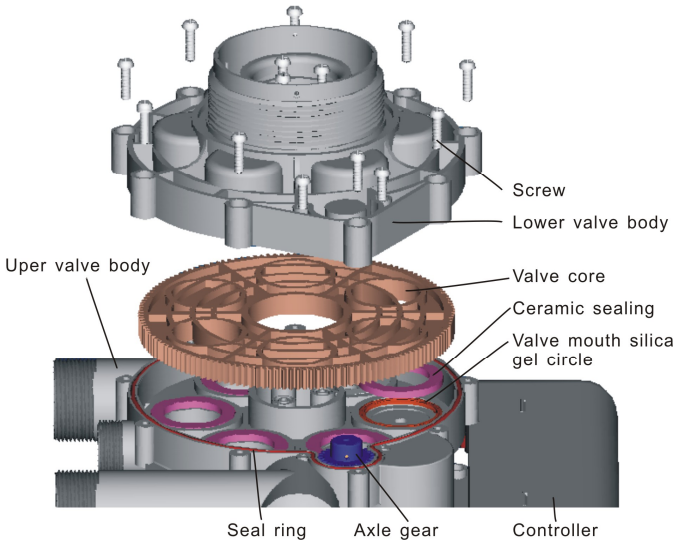
Align selective gear over valve holes (Ceramic gaskets), power up valve to allow for alignment of correct positioning.

- 1-Lower valve body
- 2-Ceramic gasket
- 3-Upper and lower valve connecting screw (7)
- 4-Upper valve body
- 5-Jet
- 6-Shaft
- 7-Controller screw (4)
- 8-Flow meter components
- 9-Upper cover
- 10-Flow sensor
- 11-Flow sensor screw
- 12-Cover valve connection screw (6)
- 13-Controller assembly
- 14- Positioning gear shaft coupling screw
- 15- Positioning sensor screw
- 16-Positioning gear
- 17-Positioning sensors
- 18-Magnets
- 19-Motor gear
- 20-Electrical outlet
- 21-Motor
- 22-Flow meter cleaning mouth



**Pic 9: Flow meter disassembled**

## Valve core maintenance and overhaul

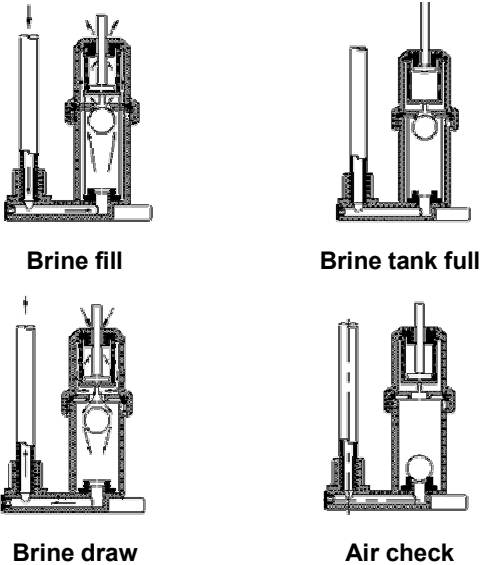


**Pic 10: Valve core assembly (GR10)**

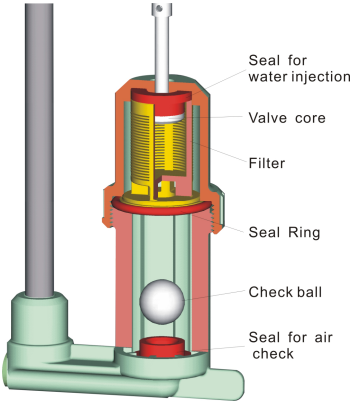
### Note:

1. The removed valve should be placed on a working platform or on the ground. Be careful as the ceramic rings will break if they fall.
2. On both sides of the ceramic ring smooth face the valve core.
3. The position of the valve core, should according to remove the Angle, if you don't remember to remove the state, to ensure that the valve core aim and arbitrary pair of valve hole, then use "location for" way to adjust.

**XI. YF300 Brine valve**



**Pic 11: Brine valve Principle**



**Pic 12: Brine valve Structure**