# GR-2D

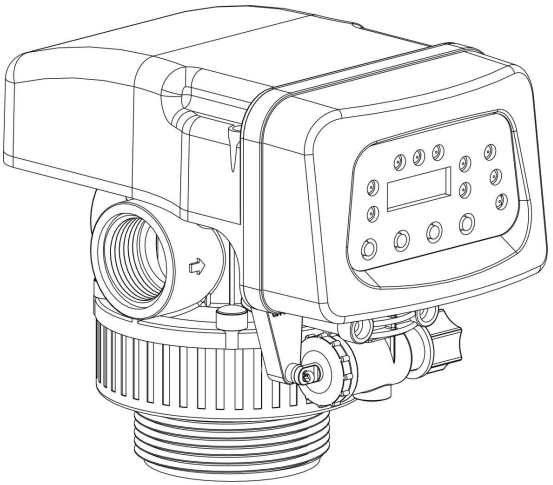
## Downflow Regenerate Control Valve

### Installation, Use and Maintenance

(GR2-2D\GR4-2D\GR10-2D)

GR-2D-E

Scan Qr code for the latest



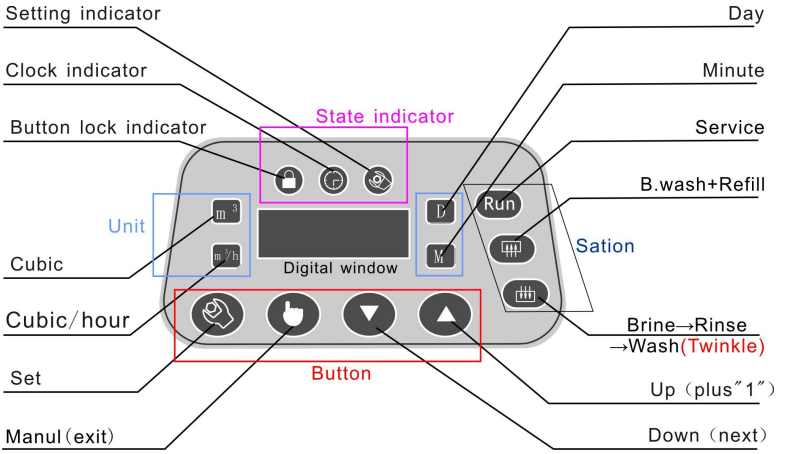
2DSHIFT

GR-2D valve shift animation

2_Install

GR-2D Install animation

# Ⅰ.The Controller




**Pic1: GR-2D Controller interface**

## （1）Panel indicator and button

### 1、Station Indicator

：Backwash+Refill

：Brine in →Rinse(when air check)→Wash(Twinkle);

Run：Service(Softening)

### 2、Control signal light

**Light “”**

**lighting,** The LED digital display is the clock.

**Flashing,** It means there is a long time power off (more than 10 days). That need to set the current clock

**Light "**

**Lighting**, means *lock state*, the buttons are locked. Any button is pressed will not work.

**Goes out**,*Unlock* state,if there is no operation on button in 2 minutes, the

buttons will be automatic locked.

**Light“”**

**Lighting,** indicate under *inquiry* state. The parameters menus can be inquired by “”“ ” up and down.

**Flashing,** indicate under *setting* state. The parameters can be changed by “”“ ” plus and minus

**3、Button.**

**Button “”**

If the button “” were pressed under *unlock state*, ”” indicator lighting, enter into *inquire state,* to inquire parameter menus(follow table) up and down by “”“ ” button.

Press “” under *inquire state*, “” flashing, enter to *setting state,* the parameter can be modified.by “”“ ”to plus & minus to modify the value of the blinking digit, press again to switch another blinking digit, finally press “” to confirm the modification and return to the *inquire* state.

**Button “”**

locking“”state，push“”6 times，the valve enter into **B.Wash***(Forced backwash)*

Press “” under *unlock state,* the current valve station will be shift into next(**Manual shift**).

Press “” ”under *inquire state*, return back to *unlock state.*

Press“ ” ”under *setting state*,return back to *inquiry state* and the parameter modified will be not saved.

**Button “”&“”**

***Unlock*** : hold down at the same time button“”“” for around 2 seconds, "" light will go out and enter into *unlock state.*

**Inquire** parameters menus up and down under *inquire state*.

**Plus1 and minus1:**for digit of each parameter under *setting state*.

## (2) Parameters menus

| **Function** | **Digital window** | **Indicator light of LED and instruction** |
|---|---|---|
| Start up display |  | **S**: Time model, **L**: Meter model<br>**5** means the fifth generation products,<br>03 means that the current program version |
| |  | |
| **clock** |  | clock, the factory set for random |
| Unlock state, press "⏻"to *inquire state,* display in turn | | |
| Time model |  | Run means RUN station. **D** is unit. Left of "**.**" is day. Right of "**.**"is hour, If the unit is **M** ,Left of "**.**" is hour. Right of "."is minute, |
| |  | **B.wash+Refill** time, unit is minute（**M**）, |
| |  | **Brine→ Rinse** time,unit is minute（**M**） |
| |  | （Twinkle）**Wash** time, unit is minute（**M**） |
| Meter model |  | Run **RUN** volume. unit display is **M³** |
| |  | **B.wash+Refill** volume. unit is **M³** |
| |  | **Brine→ Rinse** volume,unit is **M³** |
| |  | （Twinkle）**Wash** volume. unit is **M³** |
| Output control mode |  | Relay output mode include: 00, 01, 02, 03, 04, 05, 06. See section **Relay output mode** for details. |
| Delay Regen |  | Delay Regeneration,"--:--" lighting; If set left as "99"(default), means cancel the function. |
| Regen times |  | L is setting code. 01 means from to once per cycle |
| Unit **D/M** of Time model |  | 00: "-- : --"the unit ahead of ":"is hour , the unit behind of ":"is minutes **M**<br>01: "-- : --"the unit ahead of ":"is day **D**, the unit behind of ":"is hour |

## Note

*1. Under inquire state or setting state, if there is no button operation in 30 seconds.,The state will automatically exit.*

*2.During normal operation, the data window will display: station parameters (decreasing state), clock, water inflow flow rate, and corresponding signal indication, station indication, unit indication every 10 seconds*

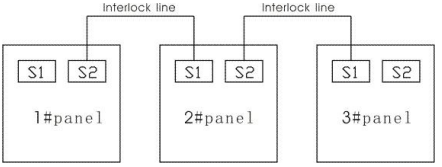
*3. Display*  *,means the valve is shifting to next station.the motor is rotating.*

*4. Display clock flashing, such as*  *, that means power off time is too long, remind the user to check current time.*

*5.* ***" E1"*** *display means the system out of order.*

### (3)、Output control

### 1、Interlock line connection as below




**Pic2: Interlock line Instruction**


## Explanation:

*A. Any valve at*  *position, the valve can send lock signal.*

*B. Any valve from*  *to*  *position, the program will read locking signal from interlock line. If there are locking signals (that means there are other valves is in*  *, the valve will continue service in*  *,Until other valves finish in*  *(locking signal*

*disappear), this valve shift to* 、 .

*C. S1 and S2 is same signal on PCB board. There is no sequence relationship.*

## 3、Delay regeneration explain :

Under delay regeneration function, when the digital of Run station decrease to "0", the equipment will continue in "Run" until the actual time come to the time of "0-23" clock set in advance.

### 4. Relay output mode（b-0X）

A、The contact capacity of the relay is 5A/250V.

B. **Relay output port:**

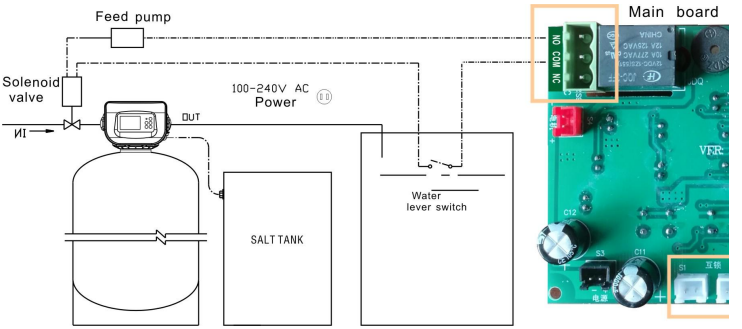
**NO**= Normal open port, **NC**=Normal Close port ,**COM** =Common port

C.When connecting the output of the relay, the AC220V power supply input end shall be connected with the leakage circuit breaker.

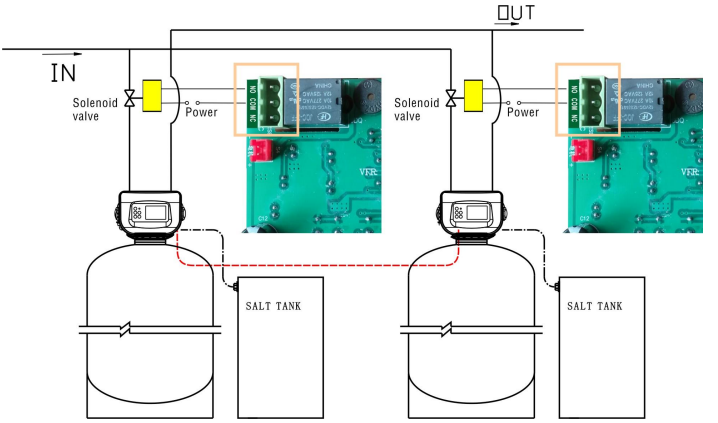
**Different mode, the relay output NO and COM Connected for "C", disconnect for "x"**

| Station | B.wash+ Refill | Brine→ Rinse | Wash | Soft | Shifting |
|---|---|---|---|---|---|
| Symbol | | | Twinkle | RUN | |
| b=00 | C | C | C | C | × |
| b=01 | C | C | C | × | × |
| b=02 | × | × | × | C | × |
| b=03 | C | C | C | × | × |
| b=04 | C | C | C | × | × |
| b=05 | × | × | × | CX | × |
| b=06 | C | × | × | × | × |
| b=07 | C | C | C | × | C |
| b=08 | × | × | × | × | C |

| Mode | Applications |
|---|---|
| b=00 | **Inflow water solenoid valve mode:** Pressure relief when valve shifting.water Lever switch,feed pump combine control PIC3 |
| b=01 | **Booster pump mode:** this function is used for filter valve, control backwash pump start-up. |
| b=02 | **Out of the water pump start-up mode:** For subsequent reverse osmosis high pressure pump startup. |
| b=03 | **Tow valve one RUN & one standby inflow water solenoid valve mode:** Interlock wire connected. When one valve completes  and  and switches to **Run** station, judge that if another valve is also **Run** station, the valve close its own inlet solenoid valve and wait for backup. As shown in PIC 4. |
| b=04 | **Tow valve RUN simultaneously Backwash respectively**: this mode for filter valve use. |
| b=05 | **CX(Mode2 additional conditions) :** When the inlet flow meter check the water flow signal in RUN station.the Relay is Connected. |
| b=06 | **Backwash booster and compressed air mode** |
| b=07 | **Only in service, "NO" is open** |
| b=08 | **Only in the valve shifting,"NO" is closed** |

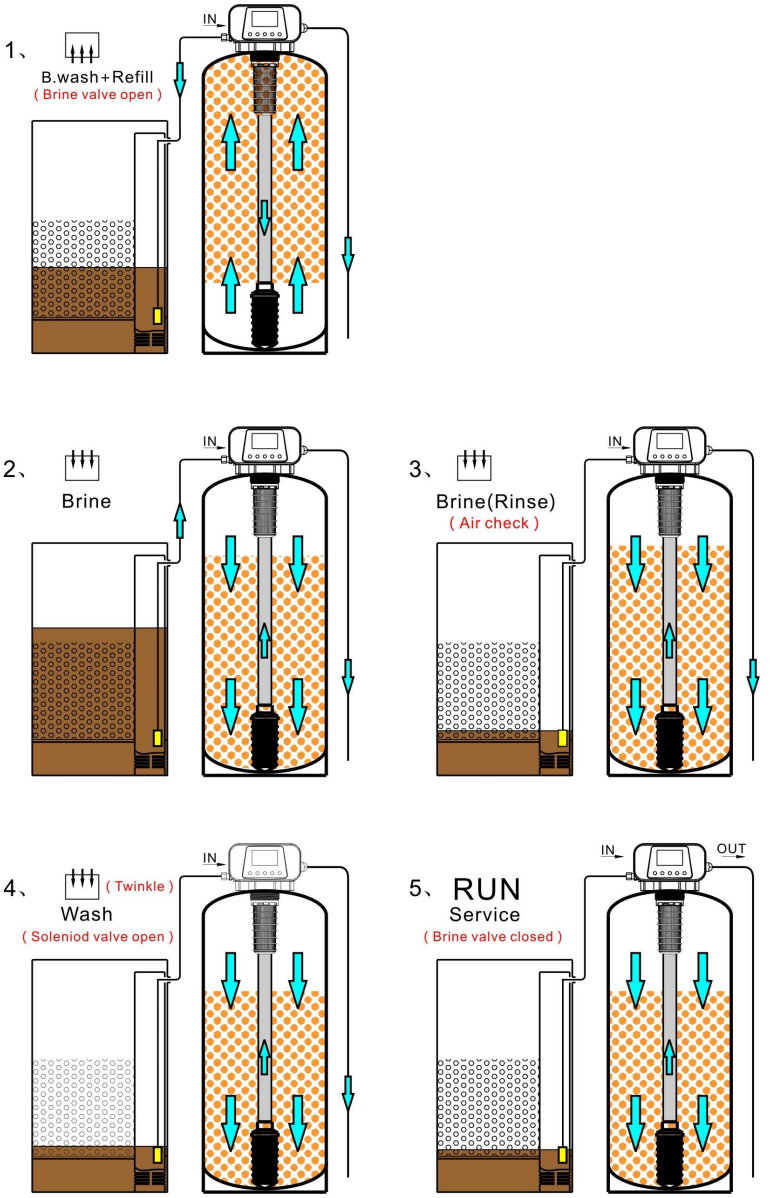



**Pic3：Mode(b=00): Solenoid valve liquid level switch and feed pump.**




**Pic4：Mode(b=03): Tow valve one RUN & one standby inflow water solenoid valve mode:**

## Ⅱ、Flow Process




**Pic5：GR-2D Downflow regenerate flow process**

## Ⅲ、Configuration and Installation

*1，If the raw water contains mechanical impurities of gel or powder, it is necessary to install sand filter, cloth bag or disc type functional filter, factory valve inlet filter can only ensure the occasional large particles into the valve body.*

*2. The volume of the salt tank is not less than the volume of the exchange tank.*

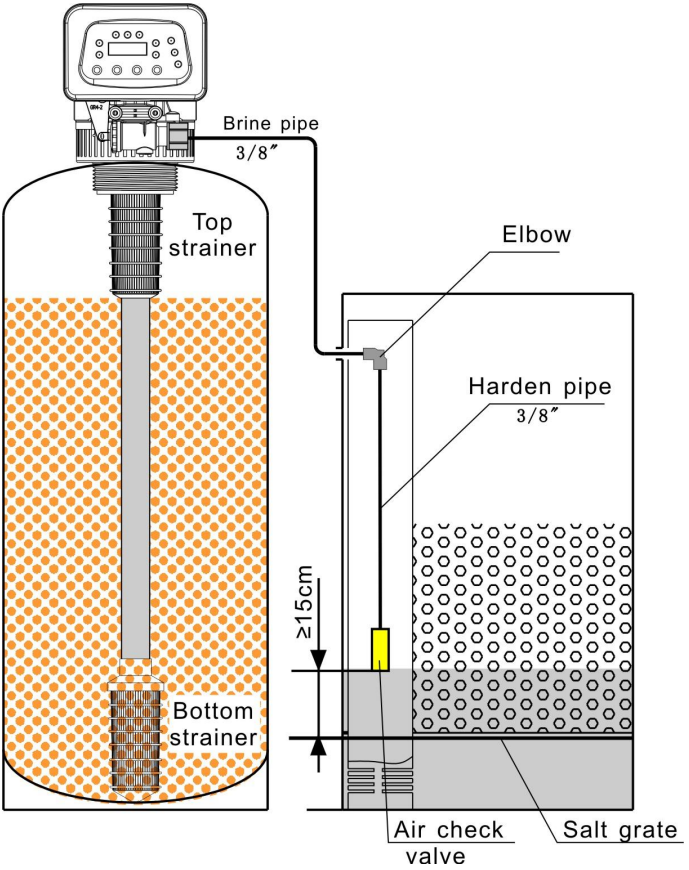
*3 .The drainage pipe outlet is close to the ground level, too high or too low will affect the brine absorption of equipment.*

*4, Water static pressure is 0.1MPa～0.6 MPa*

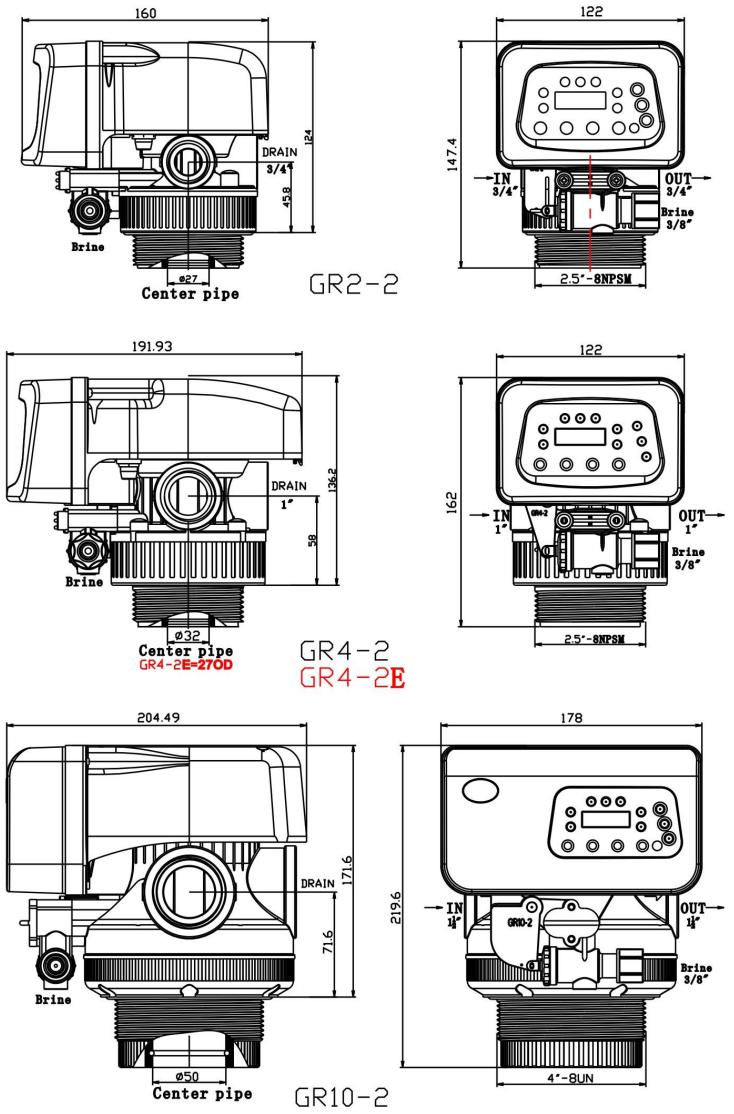
*5, water temperature is 0°C ～ 50°C*

*6, the equipment is installed in the room, the humidity should not be too high, there should be no corrosive chemical gas around, to avoid strong electromagnetic interference to affect the power supply of the control valve.*

*7,Floor drain or trench drainage shall be set around the equipment to avoid accidental water leakage causing the floor and other indoor items to be flooded.*




**Pic6：GR-2D configuration and install**




**Pic7：valve geometric parameter**

## Ⅳ Recommended parameter setting

| Station | describe | Formula |
|---|---|---|
| Run | Service | [resin filling volume (L) x 90%] ÷ Raw water hardness(mmol/L). unit is $m^3$ |
| | B.wash+Refill | Resin filling volume (L) x 250%(200%+50%)** |
| | Brine →Rinse | Resin filling volume (L) x 250%(50%+200%)* |
| Twinkle | Wash | Resin filling volume (L) x 100% |

*1 *The setting water refers to the process of jet injection quantity sum, including Brine Absorption 50% and Rinse 200%.*

*2. **50% is the salt tank refill water and 200% is the B.wash water. This ratio is based on the valve body channel design and test. (50% means 1 liter of pure brine regenerate 2 liters of resin).*

*3, Water hardness unit is mmol/L*

*4, Resin work exchange capacity calculating is 1000 mol/$m^3$;*

*5, Design and calculation of brine concentration is 16%(Dry salt tank dilution concentration）;*

*6、1Liter brine(16%)Molar value=1000g×16%/58.8g(NaCL)×1.4(Specific consumption) ≈160/80=2mol*

## Ⅴ Steps for initial water supply

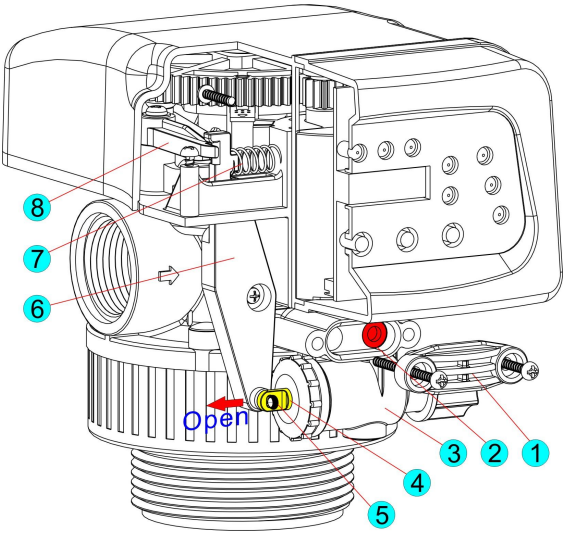
1.Make sure that the external pipeline and sealing are strong and the brine pipeline is connected in good condition, and turn on the power.

2.Forced backwash,(press "" 6 times lock state),cleaning resin and refill water to salt tank,observe the lever of water in salt tank.

3.To "" station, observe sucking brine and the proportion of brine 50% and rinse 200%,observe drain or taste drainage water.

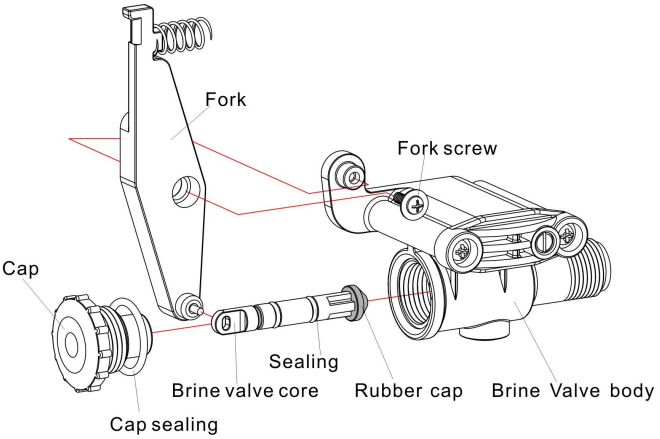
4.To "Tinkle" **Wash** station, check the drainage water and sure it clean in the end of the station.

## Ⅵ. The disassembly of the brine valve and injector

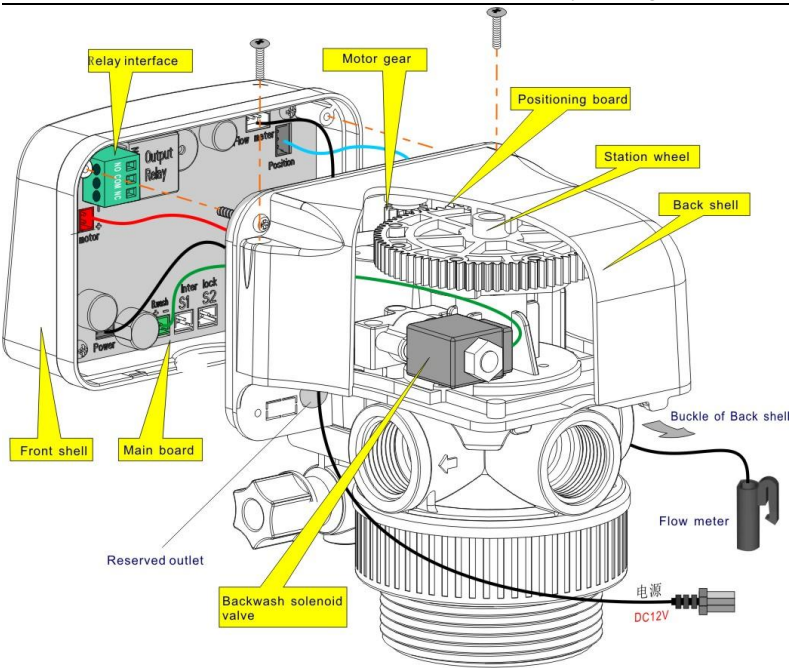



1. End cover; 2. Jet nozzle; 3 Brine valve ; 4, Brine valve core; 5,Pin; 6, fork;7. Spring; 8, leverage

**Pic8.The disassembly of the brine valve and injector**

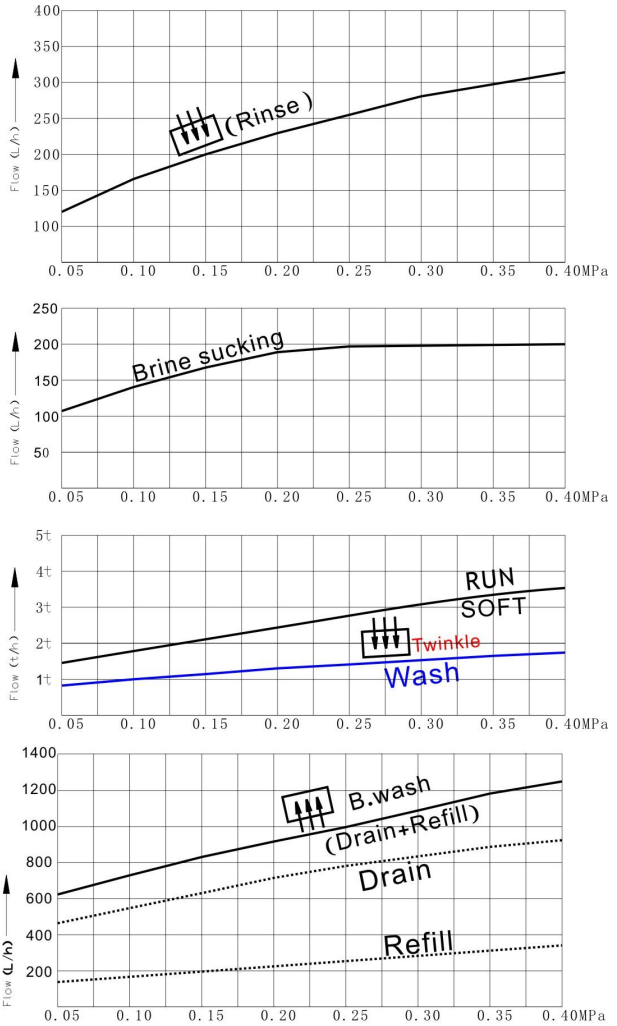



**Pic9:Brine valve explode drawing**

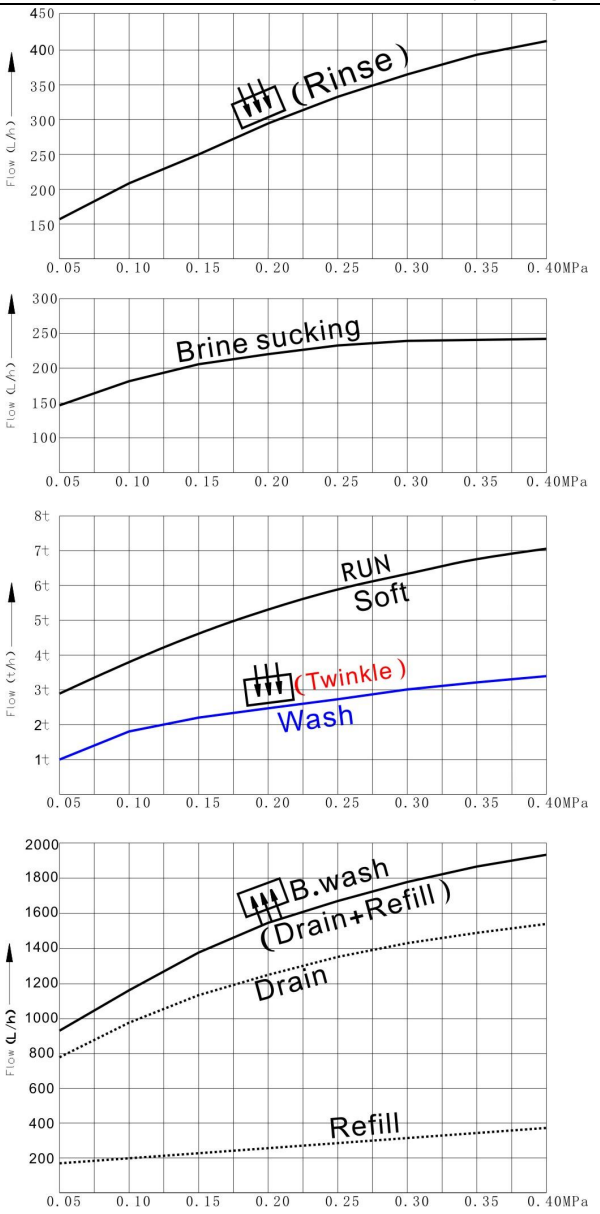



**Pic10: Removal and connection of front shell of the controller**

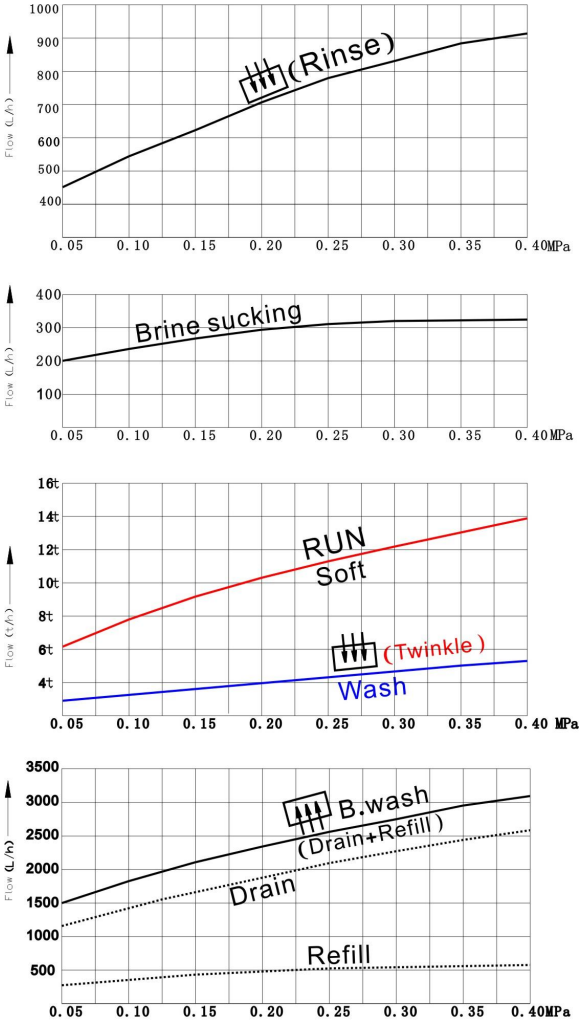
## Ⅶ. Curve of Flow and Pressure for the Valve




**Pic11：GR2-2D Flow pressure curve**




**Pic12：GR4-2D Flow pressure curve**




**Pic13：GR10-2D Flow pressure curve**

## Ⅷ、Regular failure and failure elimination

**Produced water is not qualified**

| **Phenomena/reasons** | **Solution** |
|---|---|
| No salt particle in the brine tank | Add salt to the brine tank |
| No enough absorption of salt water | Increase refilling water amount of setting value |
| Flow rate is too large, running velocity is too high | Reduce the pressure difference between the inflow and outflow |

**Brine water leaking out to the water outlet**

| **Phenomena/reasons** | **Solution** |
|---|---|
| Insufficient amount of washing | Increase **wash** value to extended wash time |
| No enough resin and too much space at the top of the swap tank | Add more resin or other to reduce the space |

**The inlet pressure of the equipment increases and the water output decreases**

| **Phenomena/reasons** | **Solution** |
|---|---|
| Resin's being polluted by the suspended matter | Forced backwash or Unload the valve and wash the resin both inside and outside the tank. |
| Strainer is blocked by broken resin | Unload the Strainer and clean it. |
| Out pipes system have closure phenomenon | Check and eliminate the problem |

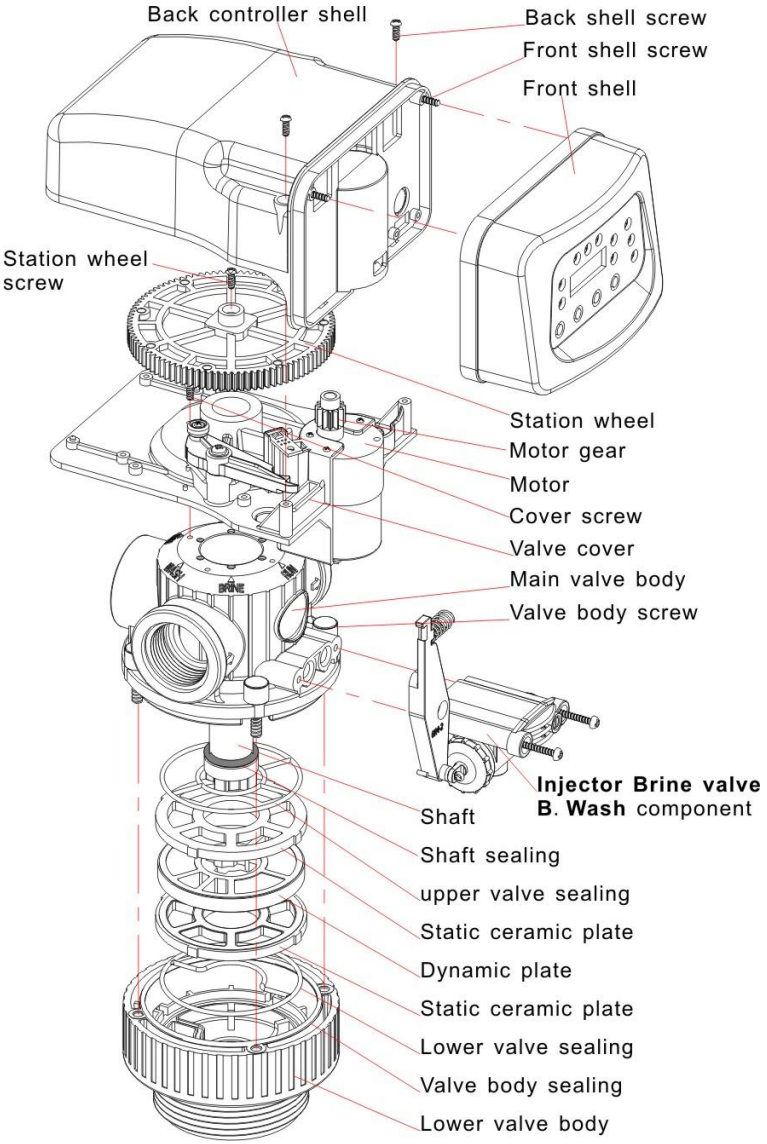
**The salt tank overflowed**

| **Phenomena/reasons** | **Solutions** |
|---|---|
| Station setting is too large or the salt tank is too small | Reduce the set value, or increase the salt tank |

**No brine absorption**

| **Phenomena** | **Reasons and Solution** |
|---|---|
| Drainage pipe have water out,but no brine absorption | Water distributor inside the exchange tank is blocked, resin is contaminated, or there is interception in the drainage pipe system, |
| No water out from drain pipe,also no brine absorption. | Mainly is the jet nozzle blocked, (pic:9). |

## Ⅸ. GR-2 valve explode drawing（GR4-2 example）




**Pic14：GR-2 valve explode drawing（GR4-2 example）**