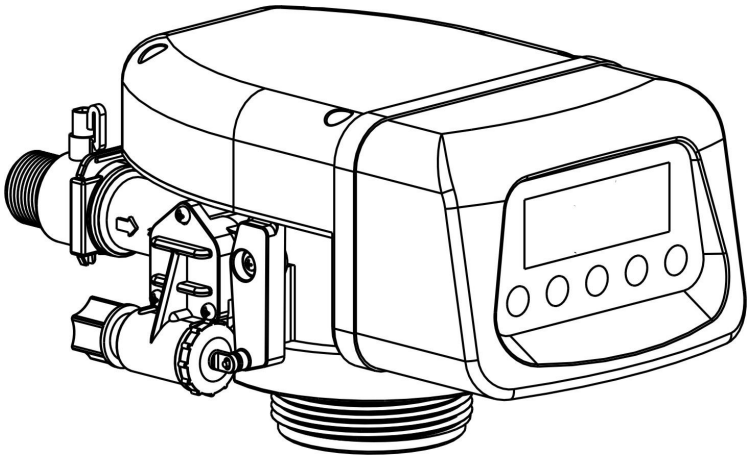
# GR-1D-gallon

## Downflow Regenerate Control Valve

**Installation, use and maintenance manual**

（GR-1D-Gallon、GR-1DLCD-Gallon）

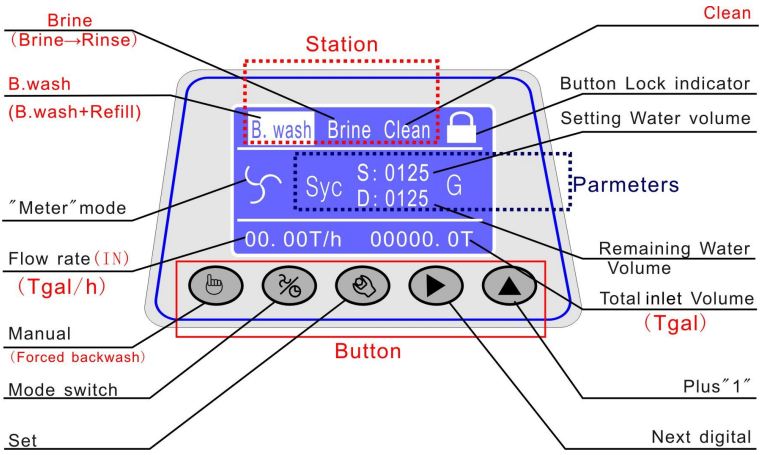
Scan Qr cord for the latest



| GR-1D shift Animation | GR-1D install Animation | GR10-1DS Install | GR-D-Process Animation | 2-1D、4-1D Controller |
|---|---|---|---|---|

# Ⅰ. Operating Board

## 1、Instructions of the LCD display controller




**Pic1：GR-1DLCD Screen**

**Flow mode"** **"interface**

| | |
|---|---|
|  | **B.wash+Refill**<br>**S:0125**: Setting water for backwash and Refill , measured by the inlet flow meter,<br>**D:0125**:Decrementing State, Decrement to zero and switch to the next station ;<br>**00.00t/h**: The current flow rate of inlet<br>**0000000t**: Accumulative water amount of inlet |
|  | **Brine(Brine in → Rinse)**<br>**S:0125**: Setting water for Brine absorb and Rinse, measured by the inlet flow meter, it is amount of water passing through the ejector<br>**D:0125**:Decrementing State, Decrement to zero and switch to the next station ; |

| | |
|---|---|
|  | **Clean(Solenoid valve open)**<br>**S:0125**: Setting of Washing, measured by the inlet flow meter;<br>**D:0125**: Decrementing State,Decrement to zero and switch to the next station; |
|  | **Soft（Softening）**<br>**S:005.5**: water volume of one cycle setting, measured by the inlet flow meter.unit:T<br>**D:005.5**: Decrementing State, to zero and switch to the next station |

**Time mode“🕒”interface**

| | |
|---|---|
| <br>**B.wash+Refill** | <br>Brine(**Brine→Rinse)** |
| <br>**Clean** | <br>**Soft** |

**The operation button：**

👆：Manual button；🔧：Parameter setting；%🕒：Mode Switch；▶：next；▲：plus 1

**A 、 Unlock**： Press and hold ▶ & ▲ simultaneously for one second ,Displaying 🔓. the operation button is unlocked.

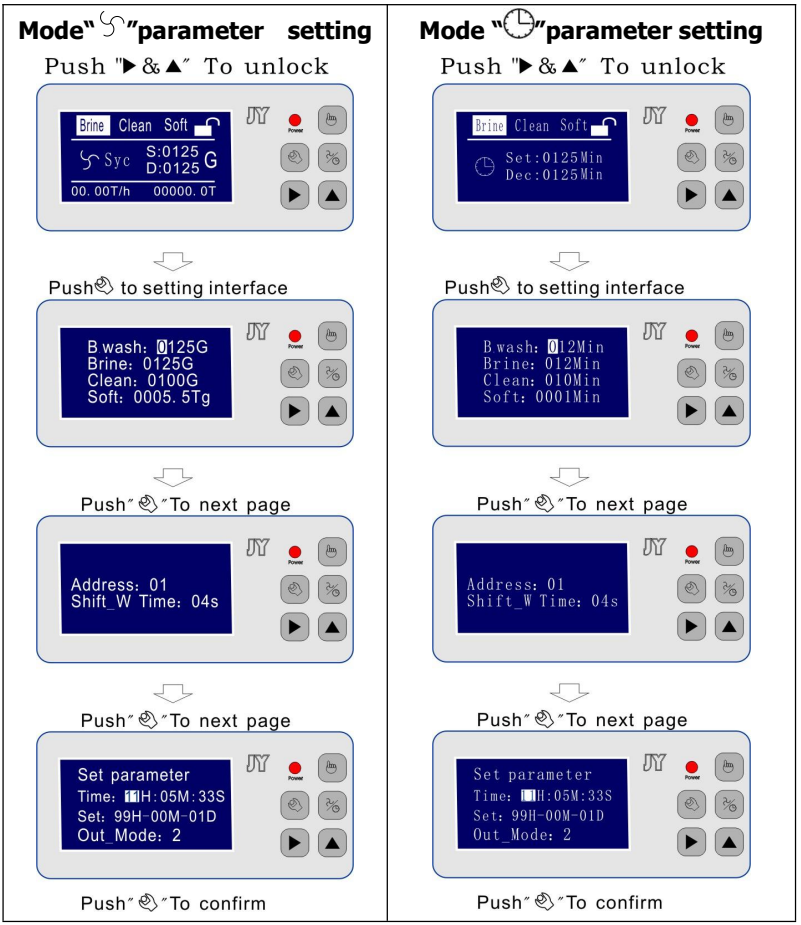
**B 、 Lock**： After three minutes of inactivity, the operation button is automatically locked.

**C**、%🕒 **Mode switch**：When unlocked, pressing it switches between Time mode 🕒 and Meter mode 🌀.

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

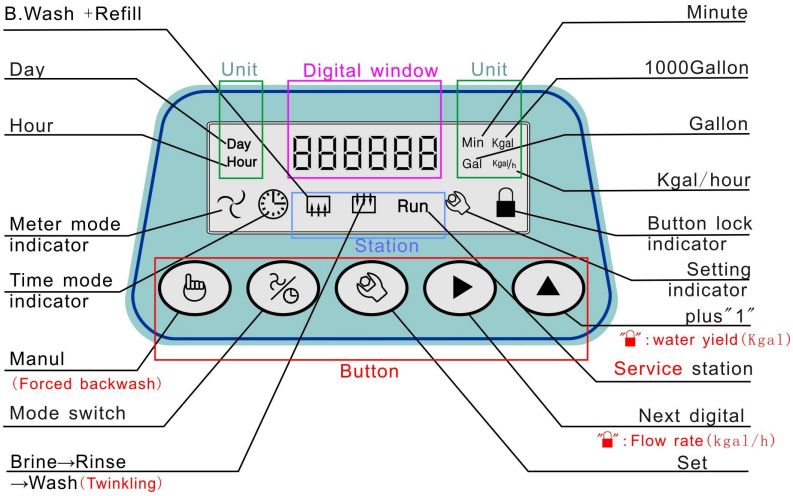
**E**、 **Parameter setting**： When unlocked, pressing it display the interface to change parameter settings.

**F**、 **Forced Backwash**：locked state, press 6 times the valve shift to **B.wash** station.



## 2、 LED Controller Operation instruction

instr




**Pic2：GR-1DLED Screen instruction**

**LED Display**

Day \ hour \ min \ kgal \ gal \ Kgal/h are the units of time or flow, respectively, with the content, as suggested by the highlighted display

: Meter mode symbol

: Time mode symbol

: **B.wash+Refill**

: **Brine→Rinse→Wash**(Twinkle)

**Run**: **Soft**

: Enter to the setting status indicator

: Buttons locked indicator

**Button：**

**Name:**

:

**Manual button**：Unlock state， press it the valve shifting to next station

**Forced Backwash**: Lock state,press it 6 times the valve shifting to

**B.wash**

：Parameter Set

：Mode switch

：Next

：Plus 1

## Setting the defined parameters

**C1:** Meter Mode, water for Brine sucking and Rinse water. Unit:Gal

**C2:** Meter Mode,Setting water of **Wash**. Unit:Gal

**C3**: Meter Mode, Softening water quantity of one cycle. Unit:T Gal

**CO**：Meter mode:setting water volume for **B.wash+Refill**.unit:Gal

**C4:** Time mode: Setting **Brine** sucking and **Rinse** time. Unit: Min

**C5:** Time mode: Setting **Wash** water time. Unit: Min

**C6**: Time mode: Setting Softening time of one cycle. Unit: Min

**CP**：Time mode:setting time for **B.wash+Refill**.unit:Min

**C7**: Hour clock setting 0-23(Hours )

**C8** Minute clock setting 0-59(Minutes )

**C9** Delay B.wash 0-23. if the valve is in servicing and can not switch to B.wash.it can be take delay B.wash.set a day any 0-23 hour , set 99 is to cancel this function.

**CF**：When the delay B.wash is enabled, If you want to take days as the unit of time; B.wash once per set number of days. To achieve daily B.wash, set parameter C6 not more than one day (1440 minutes)

**CC**: Relay output control mode , set the mode 0, 1, 2, 3, 4, 5, 6、7、8 in the following table.

**CL**: Number of cycle：Such as setting "2", the program will realize and twice one cycle ;

**Cd**：485 Communication address

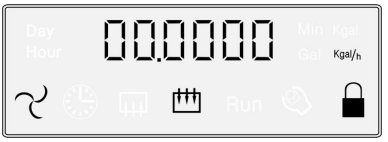
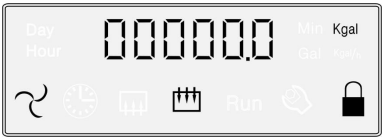
**(1)、Working station parameter**

| | |
|---|---|
|  | : Meter mode<br>: Station，Brine→Rinse<br>**C1-060:** Station water volume is set as 60L. Alternately display the decrement state, decrement to zero and switch to the next station. |

**(2)、Parameter setting（Flow mode example）**

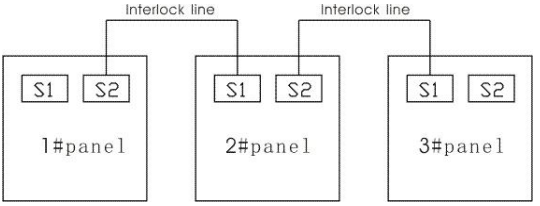
| | |
|---|---|
|  | Simultaneously press the ▶ & ▲ buttons to unlock<br>Press to enter parameter setting interface<br>Press ▲, plus 1 to change value of the digit.<br>Press ▶ to confirm ,press it continue proceed to next C2、C3、CO.Nether to Set C4→CP under Pressing to time mode. |

(3)、**Flow rate and accumulative water quantity query**

| | |
|---|---|
|  | locked state<br>Press ▶ to display the current flow rate of inlet .unit is $M^3/h$ |
|  | locked state<br>Press ▲ to display the accumulated water inlet，unit is $M^3$ |

## Ⅱ、Input/output control instructions

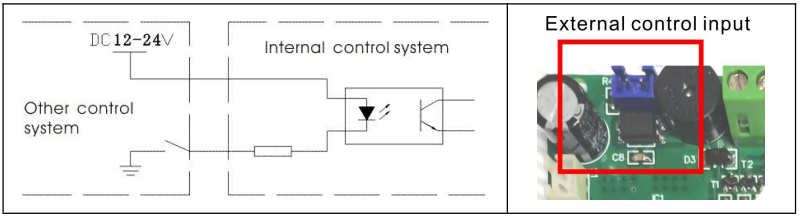
### 1、Interlock line connection as below




**Pic3：Interlock**

**2．External control interface**

In RUN station，The valve can be controlled into **Brine**(⫴) **by** the external other control system.




**Pic4：External control input**

## 3．Relay Output and mode set（CC）

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

B. Relay output port:

**NO**= normally open, **NC**=normally closed, **COM** = common

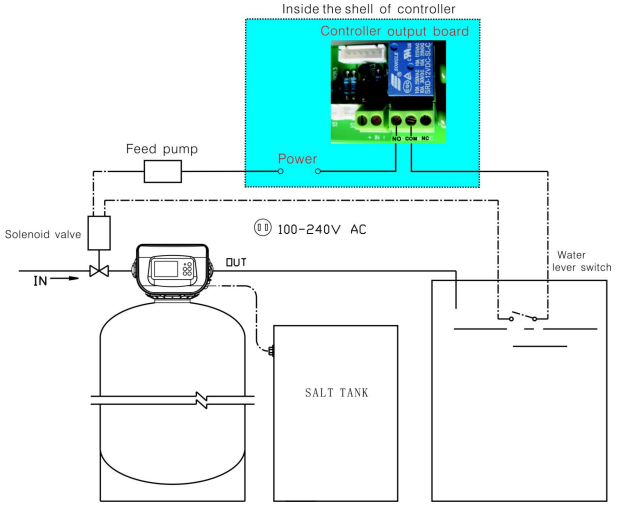
C. When connecting the output of the relay, the AC110V-220V power supply input end shall be connected with the leakage circuit breaker.

**In different modes, the relay outputs NO and COM, which is connected as "C", disconnected as "×"**

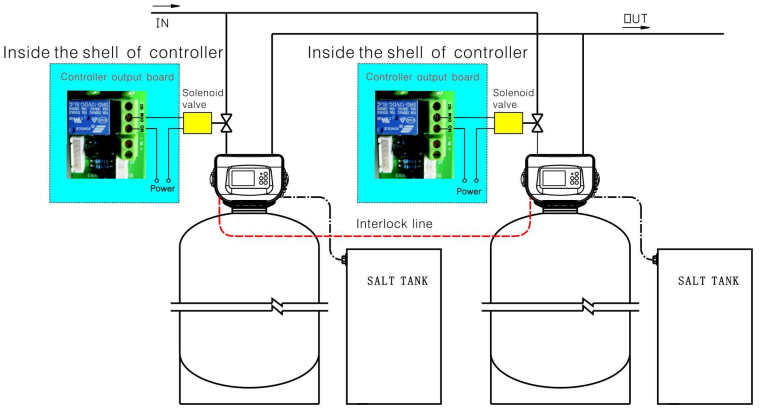
| Mode | B.wash<br>B.wash+Refill | Brine<br>Brine→Rinse | (Twinkle)<br>Clean | **RUN**<br>Soft | Valve<br>shifting |
|---|---|---|---|---|---|
| 0 | **C** | **C** | **C** | **C** | × |
| 1 | **C** | **C** | **C** | × | × |
| 2 | × | × | × | **C** | × |
| 3 | **C** | **C** | **C** | × | × |
| 4 | **C** | **C** | **C** | × | × |
| 5 | × | × | × | **CX** | × |
| 6 | **C** | × | × | × | × |
| 7 | C | C | C | × | C |
| 8 | × | × | × | × | C |

| Mode | Applications |
|---|---|
| 0 | **Inlet Solenoid valve mode:** Pressure relief during transposition,lever switch and feed pump control. Pic 5 |
| 1 | **Inlet pump mode:** When its station is in **(B.wash+Refill)** and **(Brine→Clean),**Start the inlet booster pump |
| 2 | **Outlet pump mode:** For example, for subsequent RO high pressure pump start-stop control. |
| 3 | **Tow valve one RUN & one standby mode**:Interlock line connected. When one valve completes **(B.wash+Refill)** and **(Brine→Rinse→clean)** and switches to **soft(Run)** station, judge that if another valve is also in **Run(Soft)** station, the valve close its own inlet solenoid valve and wait for backup. As shown in figure 6. |
| 4 | **Inlet solenoid valve double valve parallel interlock respectively backwash mode**:Interlock line connection is required, this mode for filter valve use. |
| 5 | **CX(Mode2 additional conditions) :** When the inlet flow meter check the water flow signal in **Soft** station.the Relay is |

| | |
|---|---|
| | Connected. |
| 6 | **Backwash booster and compressed air mode** |
| 7 | **Only in service, “NO” is open** |
| 8 | **Only in the valve shifting,“NO” is closed** |

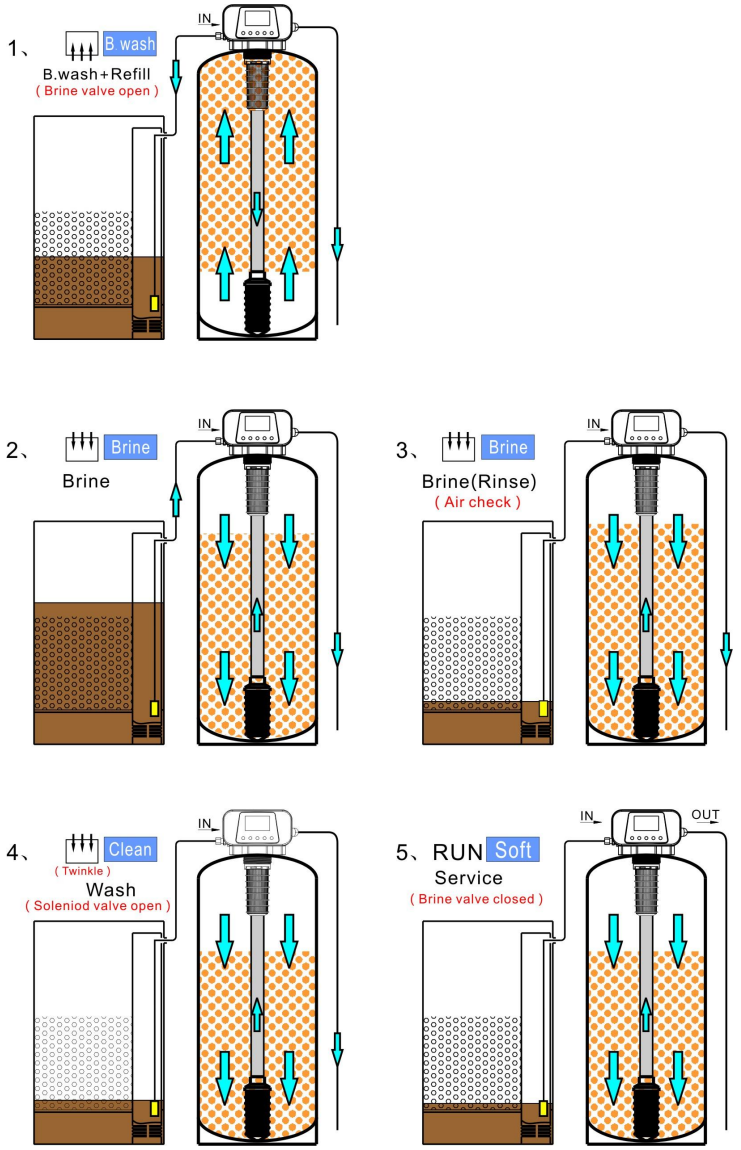



**Pic5：Mode(0): Solenoid valve liquid level switch and feed pump**




**Pic6：Mode(3): Tow valve one RUN & one standby inlet water solenoid valve mode:**

## Ⅲ、Process




**Pic7：GR-1D Downflow Regenerate flow process**

# IV Configuration, installation and raw water condition

## 1、Using condition

*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.*

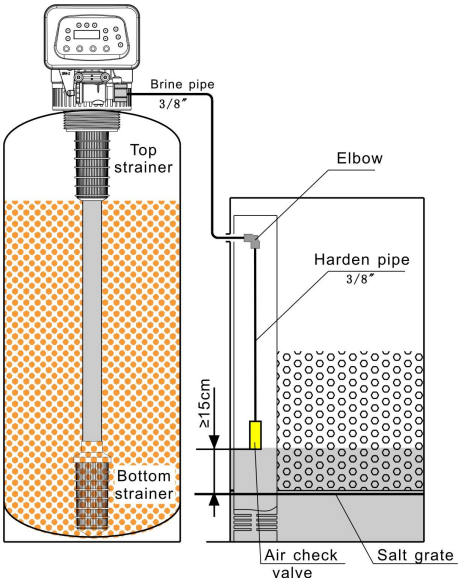
*3, Drainage pipe exports nearly flush with the ground, too high or too low will affect the equipment of Brine,Pipe must be mounted stable.*

*4, Water static pressure is 0.1～ 0.6 MPa.water temperature is 0°C～55°C .*

*5, 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.*

*6. 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.*

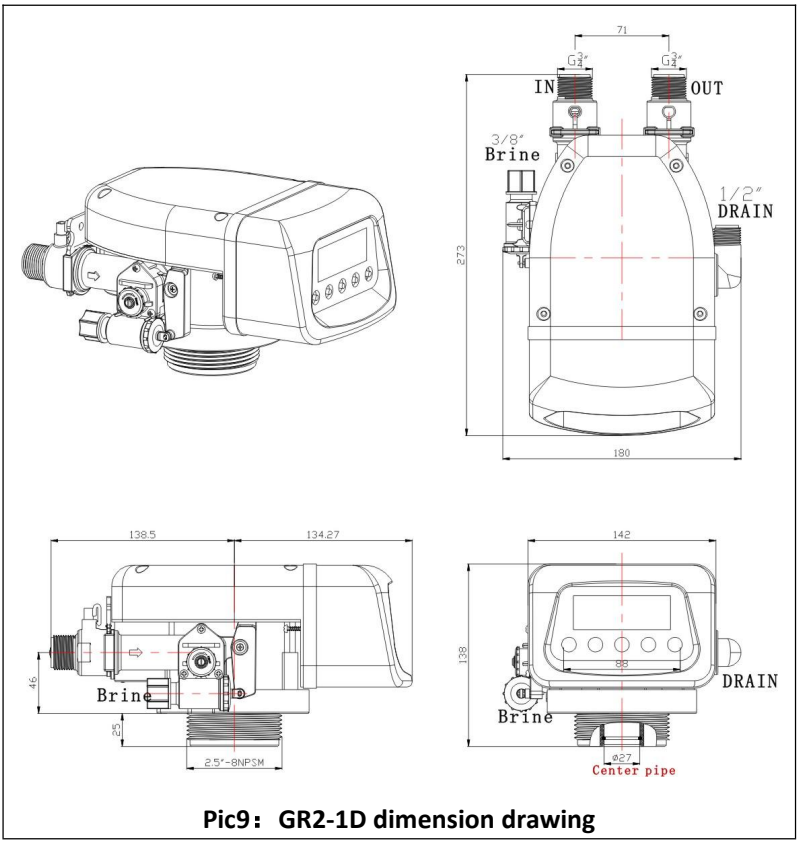
## 2、Install air check valve




**Pic8：GR-1D Install air check valve**

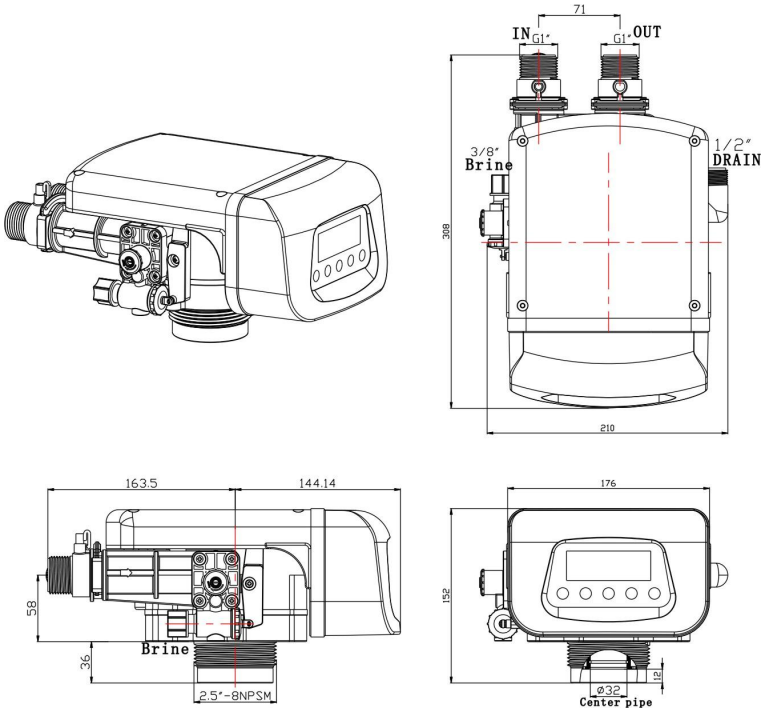
## 3、the valve geometry size

### GR2-1D dimension drawing



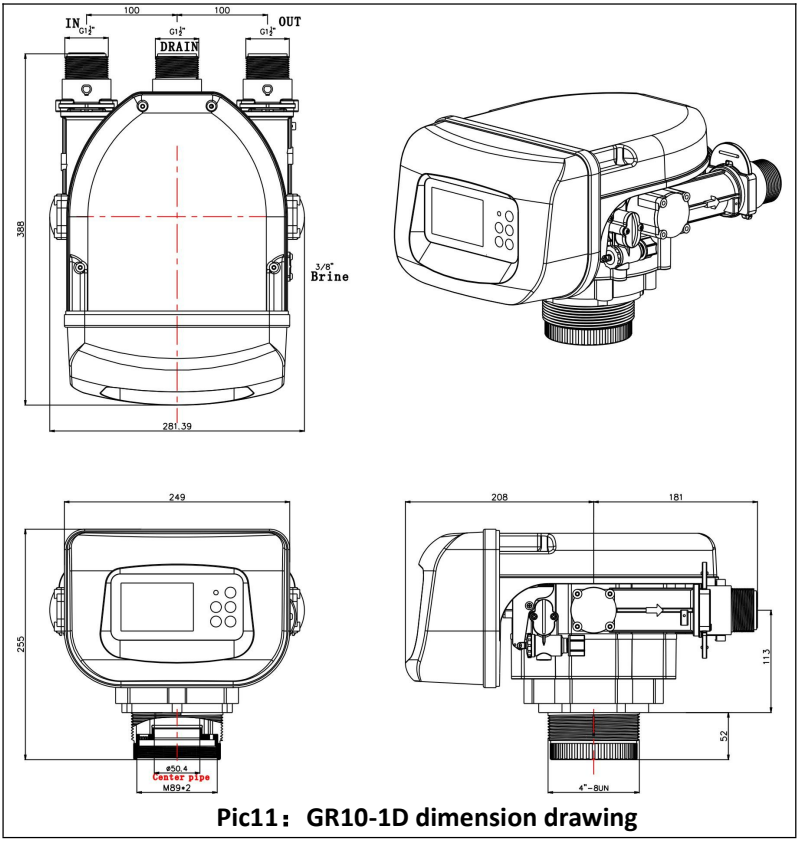

**Pic9：GR2-1D dimension drawing**

## GR4-1D dimension drawing



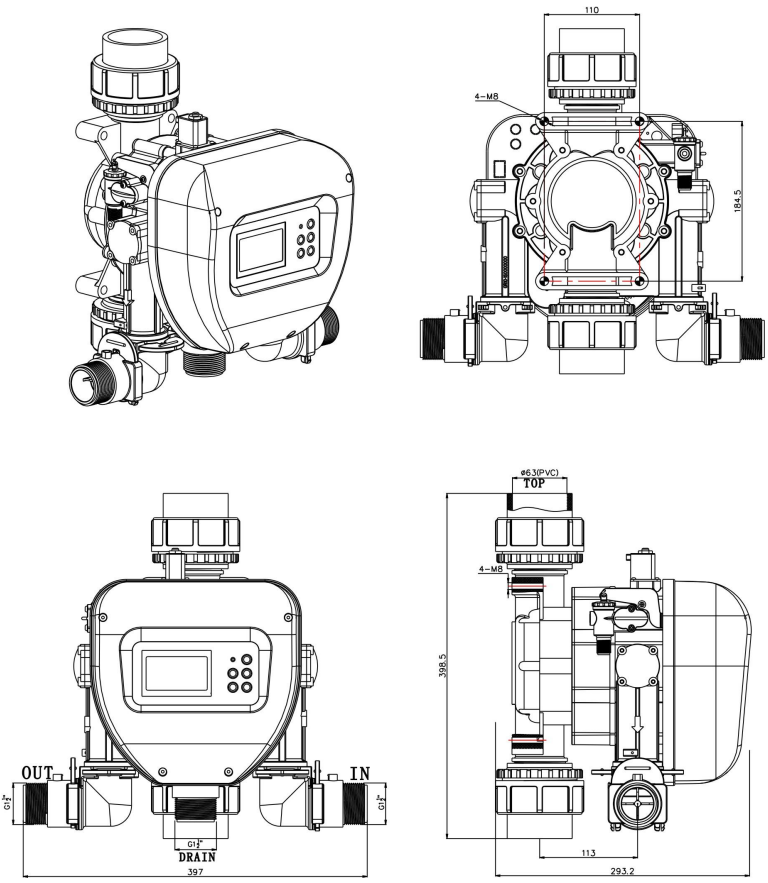

**Pic10：GR4-1D dimension drawing**

## GR10-1D dimension drawing



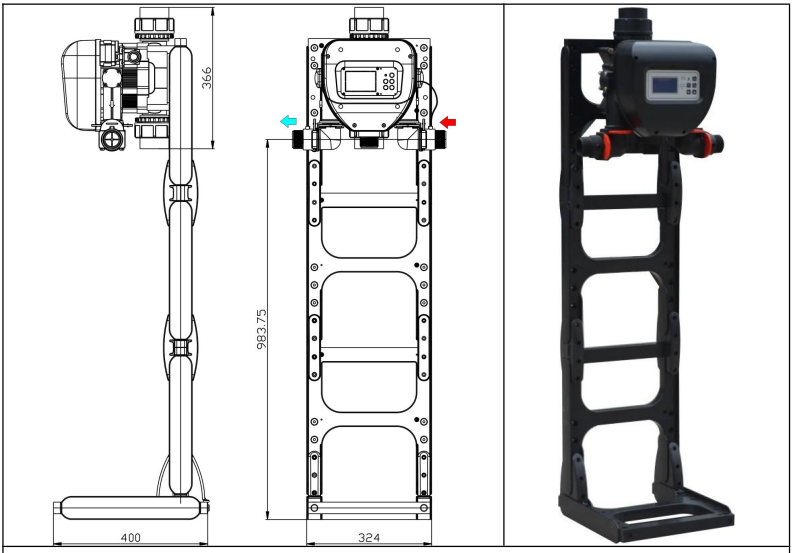

**Pic11：GR10-1D dimension drawing**

## GR10-1DS dimension drawing




**Pic12：GR10-1DS dimension drawing**

**GR10-1DS Valve mounted frame drawing**




**Pic13：GR10-1DS Valve mounted frame drawing**

## V. Configuration and setting

| Describe | Display | Formula |
|---|---|---|
| Service | **RUN**（Soft）：T | C3=[resin filling volume (L) x 90%] ÷ Raw water hardness (mmol/L) |
| Brine →Rinse | （**Brine**）：L | C1=Resin filling volume (L) x 250%(50%+200%)* |
| Wash | （**Clean**）：L | C2=Resin filling volume (L) x 200% |
| B.wash+Refill | （**B.Wash**）L | CO=Resin filling volume (L) x 250%(200%+50%)** |

*Note!*

*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*** *（1/2CaCO3）*

**1mmol/L(CN)=50mg/L(1/2CaCO3)=5°fH(FR)=3.5°e(GB)=2.8°dH((DE)=50ppm(US)**

*4, Resin working exchange capacity calculating is 1000 mol/m³;*

*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*

## VI Mode choice

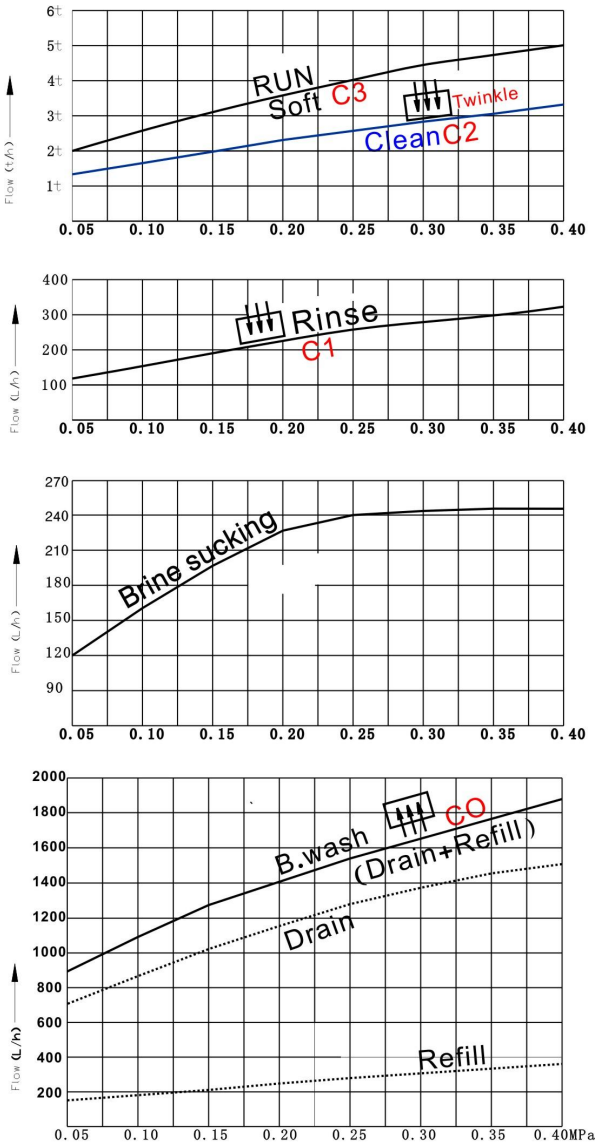
**(1) Meter mode "** **"** **(Default mode)**

Under normal circumstances, should choose meter mode, the mode is not affected by the feed water pressure changes in equipment operation effect.Very important,the flow meter have water stop memory.

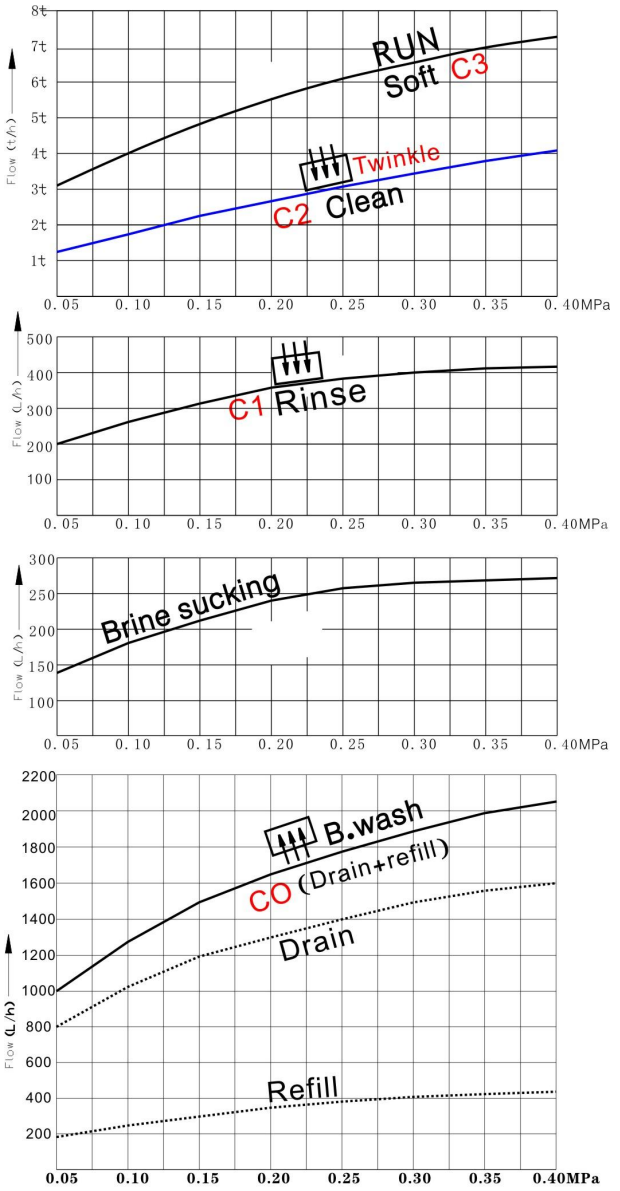
**(2) Time mode"** **" (standby mode)**

When the water pressure is stable, instantaneous water yield stability, equipment according to user requirements can choose **Time mode**.If the flow meter is fault,you can switch to **Time mode** by the button temporary.

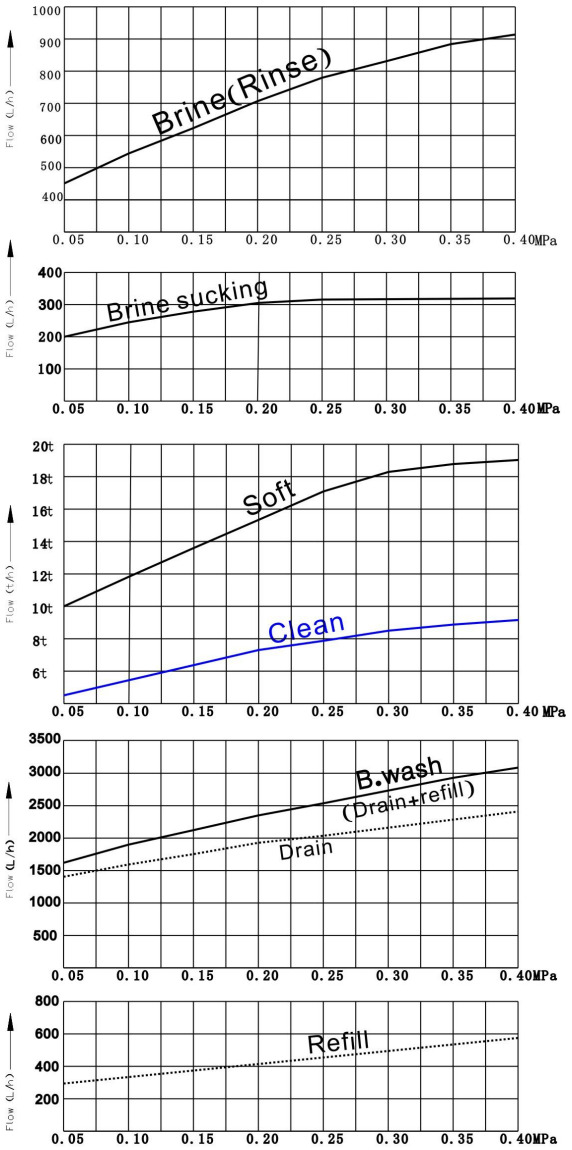
## VII. Curve of Flow and Pressure for the Valve




**Pic14: GR2-1D Curve of Flow and Pressure for the Valve**




**Pic15: GR4-1D Curve of Flow and Pressure for the Valve**




**GR10-1D**

**Pic16: GR10-1D\GR10-1DS Flow and Pressure curve**

## VIII. Tips and Precautions for Equipment

**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. |

## IX. Tips and Precautions of Equipment

1. **Add salt to salt tank**

The equipment should use large particles industrial salt. If some fine salt is used, please keep it at small amount. Otherwise, it will get agglomerated, leak to the salt filter and clog the tube.

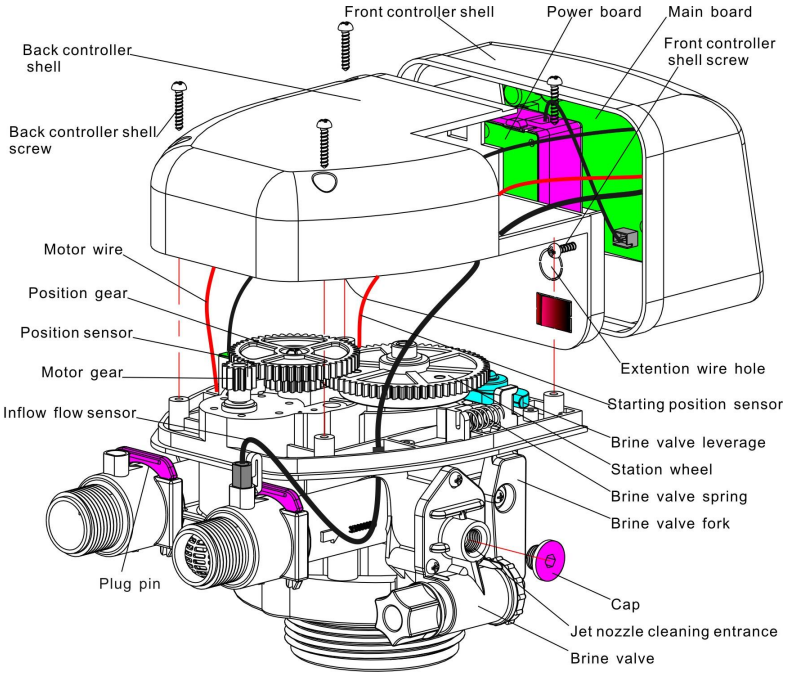
**2. Clean salt tank**

The bottom of the salt tank needs to be checked frequently; the deposit and sludge need to be cleared out.

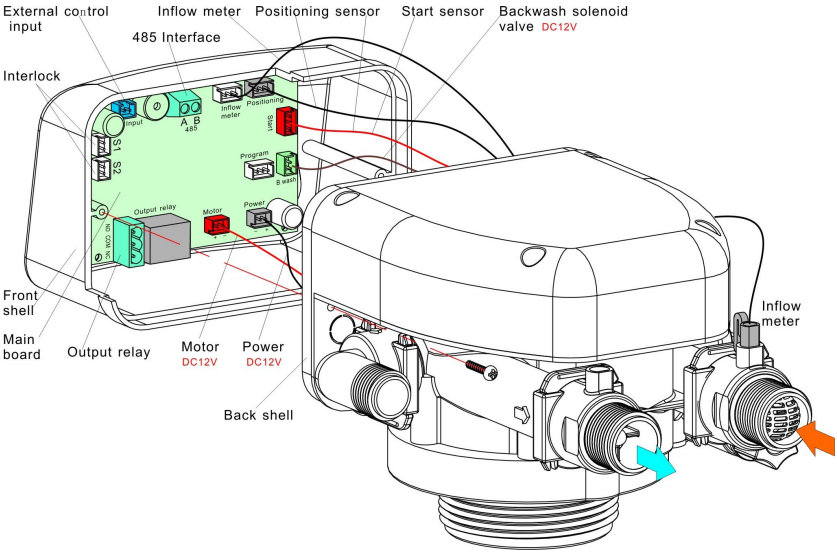
**3. Clean inflow filter**

The filter of inflow needs to be cleaned periodically in case that the inflow clogs the tubes and leads to low efficiency of the equipment as well as the decrease of the outflow amount.

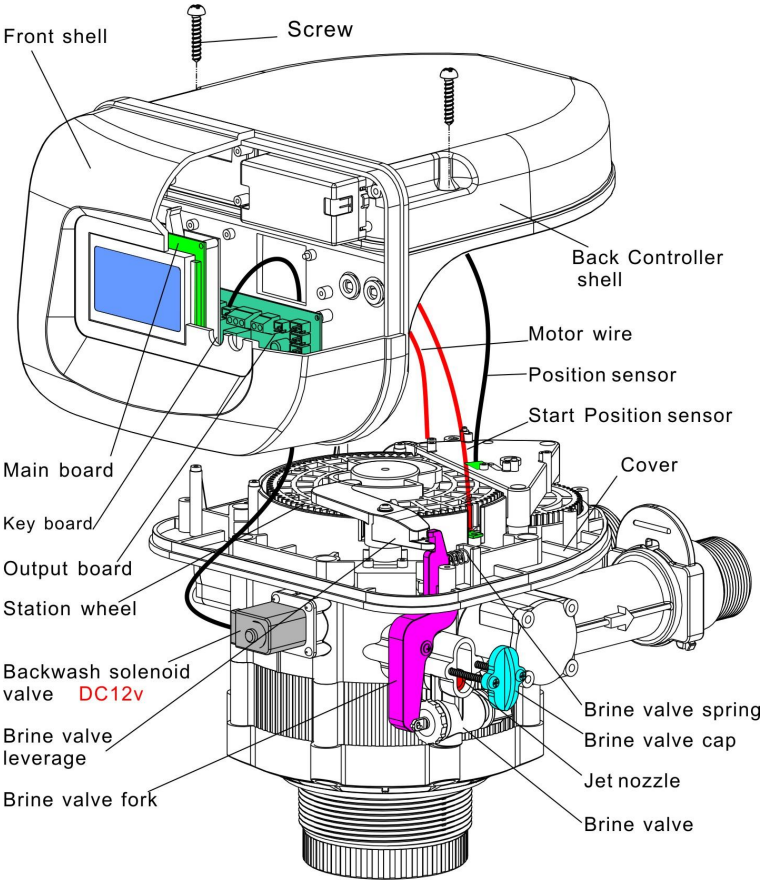
## X Control valve structure



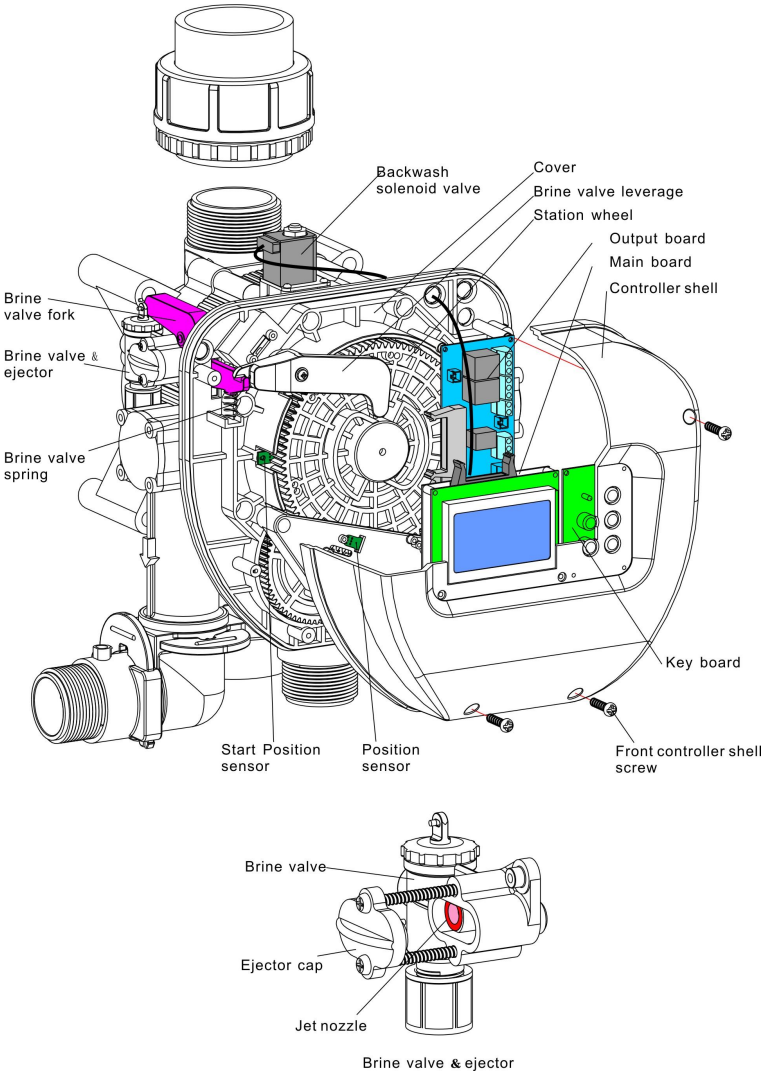

**Pic17: Control valve structure(GR2-1D\GR4-1D)**




**Pic18: Controller front shell disassembly(GR2-1D\GR4-1D)**

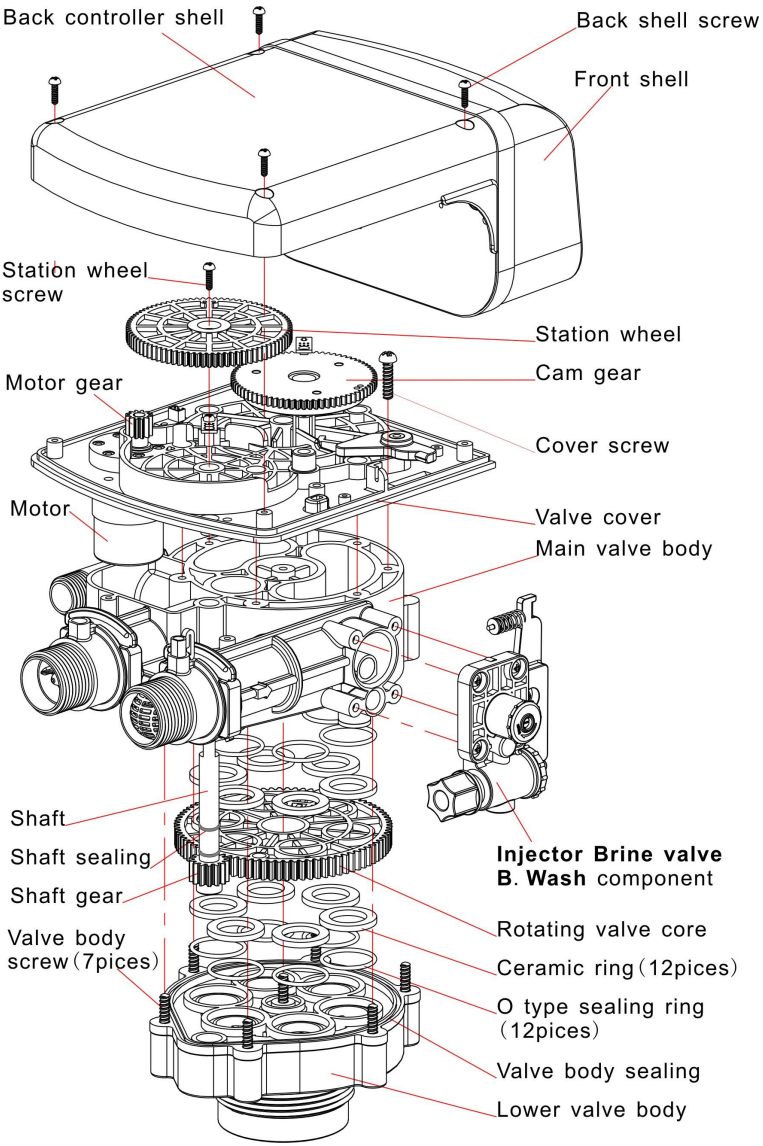



**Pic19: GR10-1D Control valve structure**

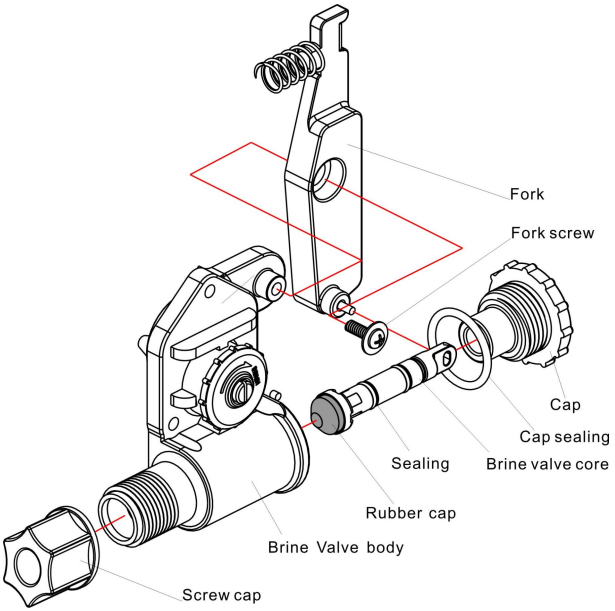



**Pic20: GR10-1DS Control valve structure**

## XI、Explode drawing（GR4-1D example）




**Pic21:Explode drawing（GR4-1D example）**




**Pic22:Brine valve explode drawing（GR2-1D example）**