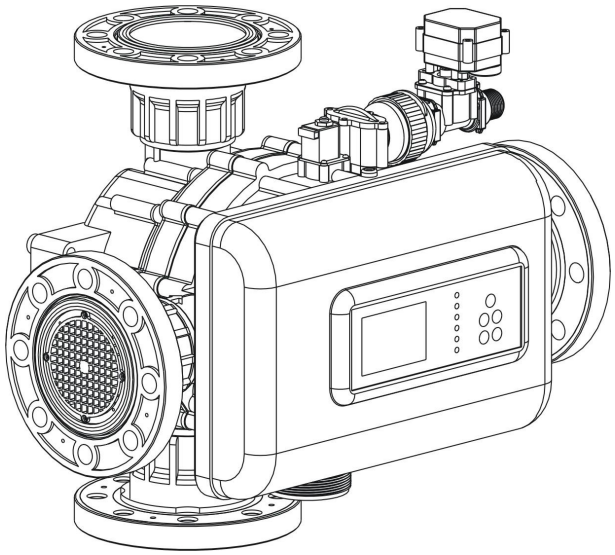
# GRDR204050

# SINGLE TANK SERIES LARGE SOFTEN VALVE

## INSTALL、USEING、MAINTENANCE MANUAL

（GRDR15）（GR15T）（GRDR20）（GR20T）（GRDR40）（GR40T）（GRDR50）

Scan Qr code for the latest



Brine system flow process animation (gif)

Brine system repair animation (gif)

DR20 Install

GR20 Install

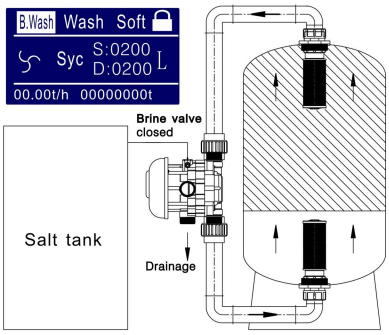
DR4050 Install

GR4050 Install

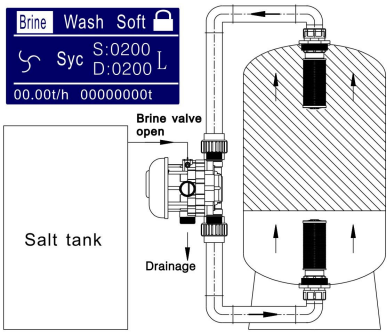
DR15 Install

GR15 Install

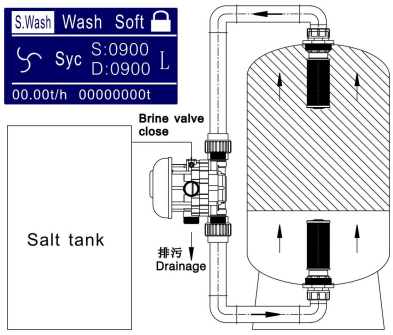
# Ⅰ、the control principle



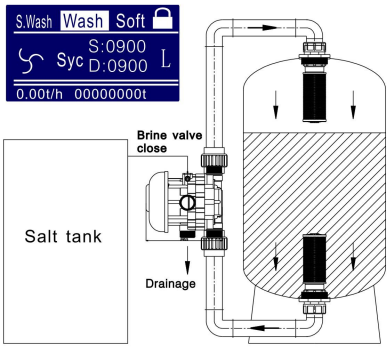

1、Back wash (*Appears in according to the set cycles*)



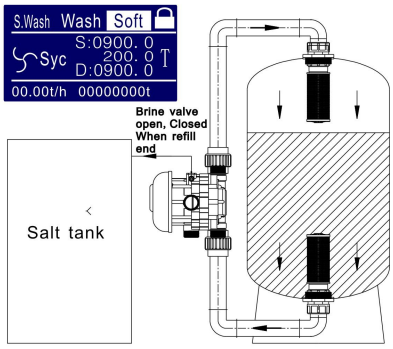

2、Regenerating




3、Slow back wash




4、Washing




5、Soft and Refill

Figure1:GR Fixed bed valve principle

## Control valve station action description:

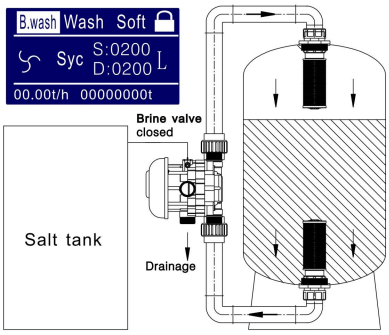
1,**B.Wash**(backwash:Set according to cycle appear) : after the softening station, the main valve of rotation to the next position includes backwash station(**B.Wash**), Regeneration station(**Brine**), slow wash station(**S.Wash**), the sum of the backwash station not every cycle, is set according to the cycle frequency, backwashing when external pilot solenoid valve open electricity (DC12V), main backwash valve inside main valve to open.

2, **Brine**( Regeneration station): the station brine electric valve (DC12V) is opened, raw water through the jet to generate negative pressure suction brine mixed into the multi-way valve.

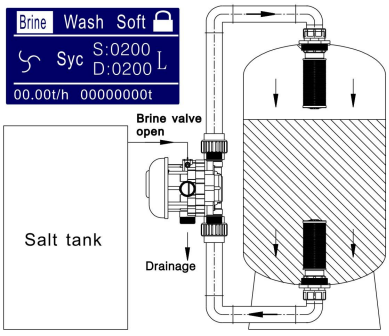
3, **S.Wash**(Slow washing station): brine electric valve is closed, raw water continues to enter the main valve through the jet, into the resin layer to continue to slow wash the resin.

4, **Wash**(Washing station): the main valve turn an Angle, brine electric valve is closed, raw water through the main valve, water flow direction and softening consistent with a large amount of water to thoroughly rinse the resin.

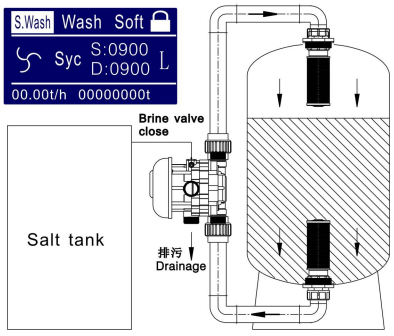
5. **Soft**(Softening station): the main valve turns an Angle and the softening process begins. At the same time, the brine electric valve is opened, and the main valve in the softening process is refill water to the salt tank at the same time. When the quantity set by the salt tank water is reached, the electric valve is closed, the water filling is finished, and the softening process continues.



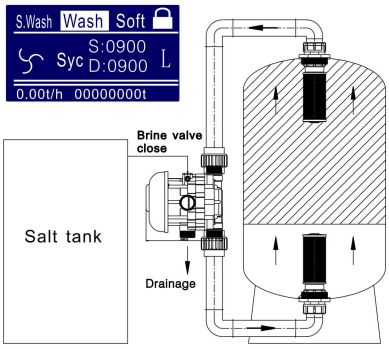

1、Back wash (*Appears in according to the set cycles*)



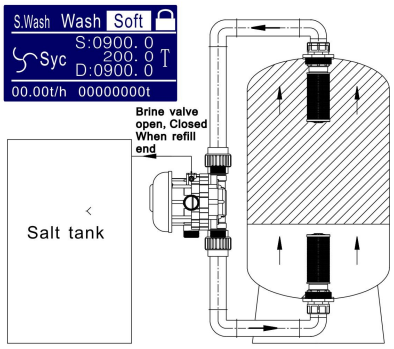

2、 Regenerating




3、 Slow wash




4、 Washing




5、Soft and Refill

Figure2: DR floating bed valve principle

# Ⅱ、Controller display and operation

## The operation button.:

: **Manual switch**; : **Parameter setting**; : **Mode switch**; ▶ : **Move to next** ▲: **Plus 1**

**A**、**Unlock**: Press "▶ " and"▲ "at the same time, the screen displaying" ■" to indicate that the lock has been opened.

**B**、**Lock**: Equipment without any operation after 3 minutes, automatic to lock.

**C**、 **Mode switch**: Unlock state, the operation button in time mode"" and flow Mode"" display to switch between.

**D**、 **Manual switch**: Unlock state, when pushing the button the valve switch to next station.

**E、Parameter setting**：Unlock state, press the button，the screen will show the interface of setting parameters

**F、Manual forced backwash**：locking "🔒" state，push "☝" 6 times，the valve enter into **B.Wash**

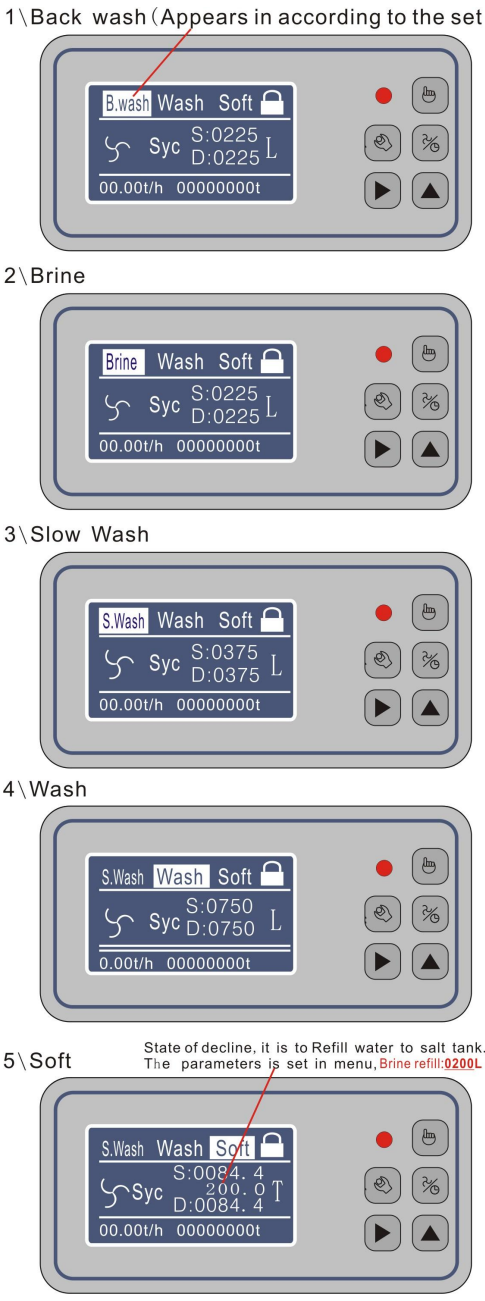



Figure3: Meter mode display interface


Figure4: Time mode display interface

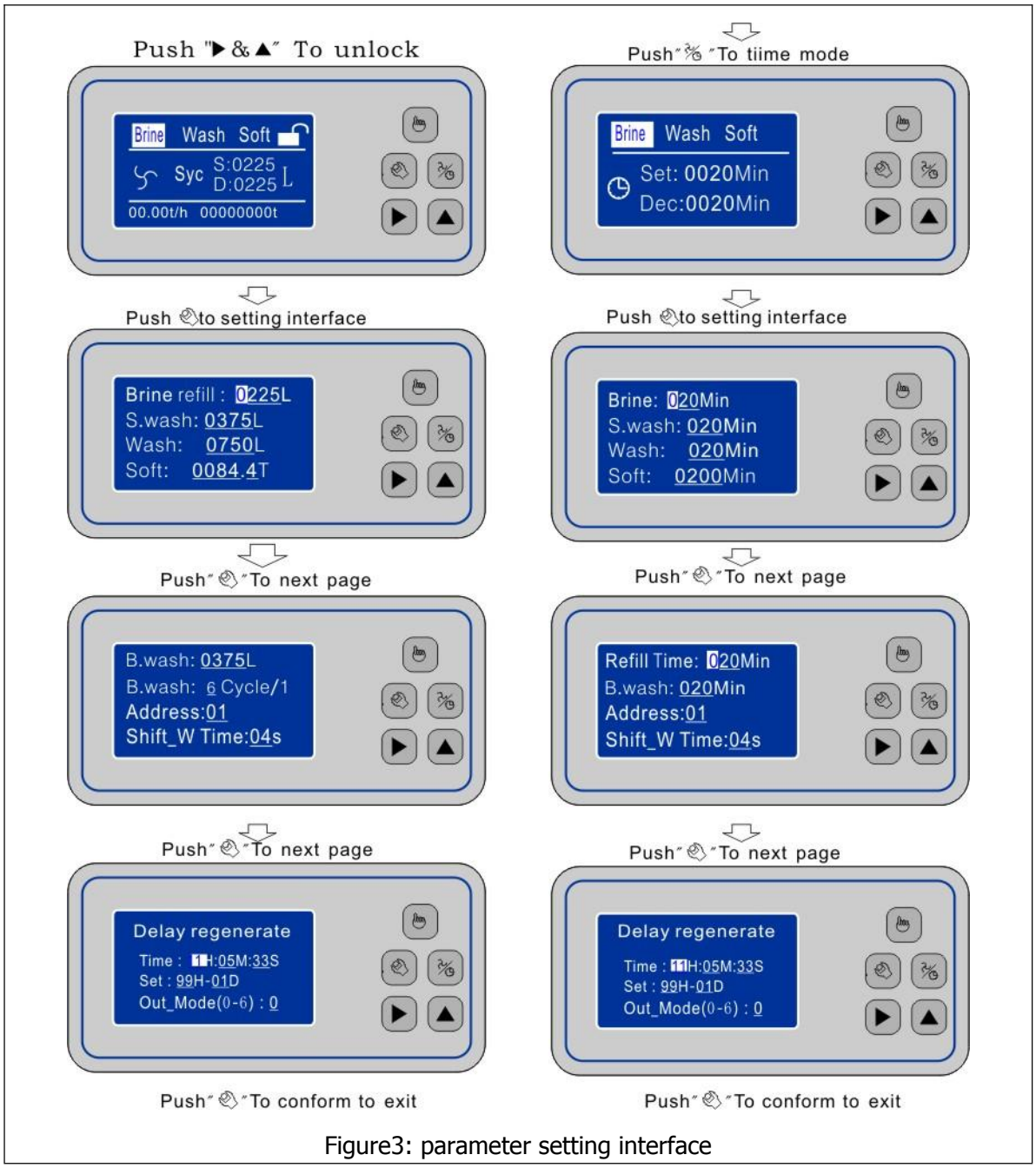



Figure3: parameter setting interface

## Setup project description:

**Brine refill:** Meter mode，The set quantity is the amount of water to absorb Brine and also the amount of water to refill salt tank, which is measured by the brine flow meter in both directions.

**S.Wash Wash & Soft :** Meter mode, **t**he set value is measured by inflow flow meter.

**Delay regenerate**: Delay Regeneration function, According to the system for 24 hours, the default 99 is to cancel the delay, set the range of 0-23 hour representing an hour a day, 01 D means once of 1 day. Detailed explanatory below.

**Address**: Set the device definition to be used and used only when extending 485 communication modules.

**Shift_W Time**: Set only when installing inlet solenoid or electric valve, solenoid for 7 seconds, electric valve for 28 seconds.

**Output mode(0-6)**: Represent the extension control output functions, external booster pump from spreading. Detailed explanatory to see *"Electric valve"*、*"Booster pump" relay output interface: mode setting .*

**B.Wash:6 Sycles/1:** The water softener performs backwash once every 6 cycles by default. The water softener can be adjusted from 1-9 according to the water source. Backwash is not recommended for every cycle, because it will

lose the characteristics of countercurrent regeneration resin layer.

### Delay regeneration

As the function is enable, When the set digital of **Soft** station decrease to "0", the valve does not shift to the next station and stays at the "**Soft**" station until the preset 0-23 clock begins to regenerate. If the user regenerates according to the set day as the unit of time, change the value in -01D, and at the same time, the setting time of **soft** station shall not be more than 1 day (1440 minutes) or the water amount set in the flow mode shall be guaranteed to run within one day. To cancel functions, simply set the regeneration clock to "99".

## Input/output control instructions

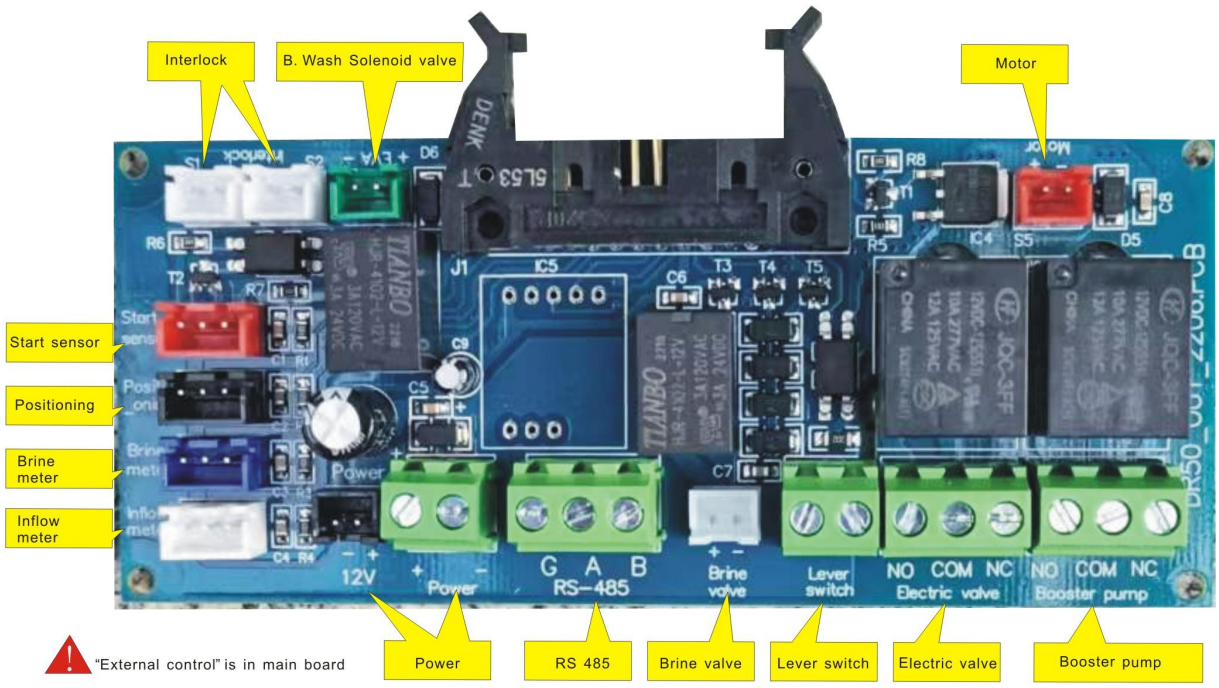



Figure 4: Output control board

### 1、S1\S2：Interlock line connection as below

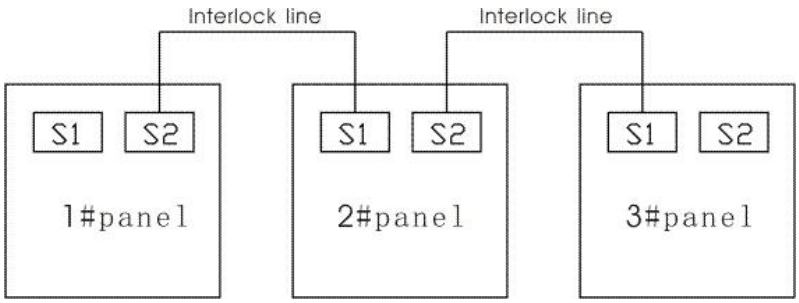



Figure 5: Multiple-valve interlock

### 2. RS-485：The communication port

This function according to user requirements to add 485 communication protocol

### 3. "External control" (main board)：The external switch priority control interface

When the control valve is in a "soft" state, the valve can be controlled into "Brine" by other external control systems, such as an online water quality monitoring access.

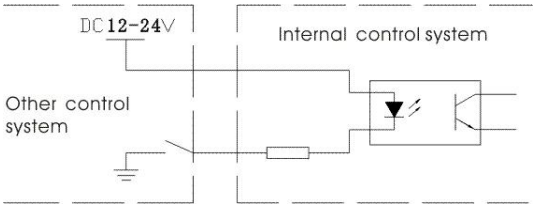



Figure6: external switch priority control instruction

**4, "Electric valve"：** Output wiring of inlet electric valve or solenoid valve is shown in Figure 7.

**5, "level switch"(figure 9):** Soften water tank water level switch closing signal input, inlet electric (Solenoid) valve closed, the softener to stop service.(Note! The water level switch receives the closed loop signal, the active voltage cannot be connected!)

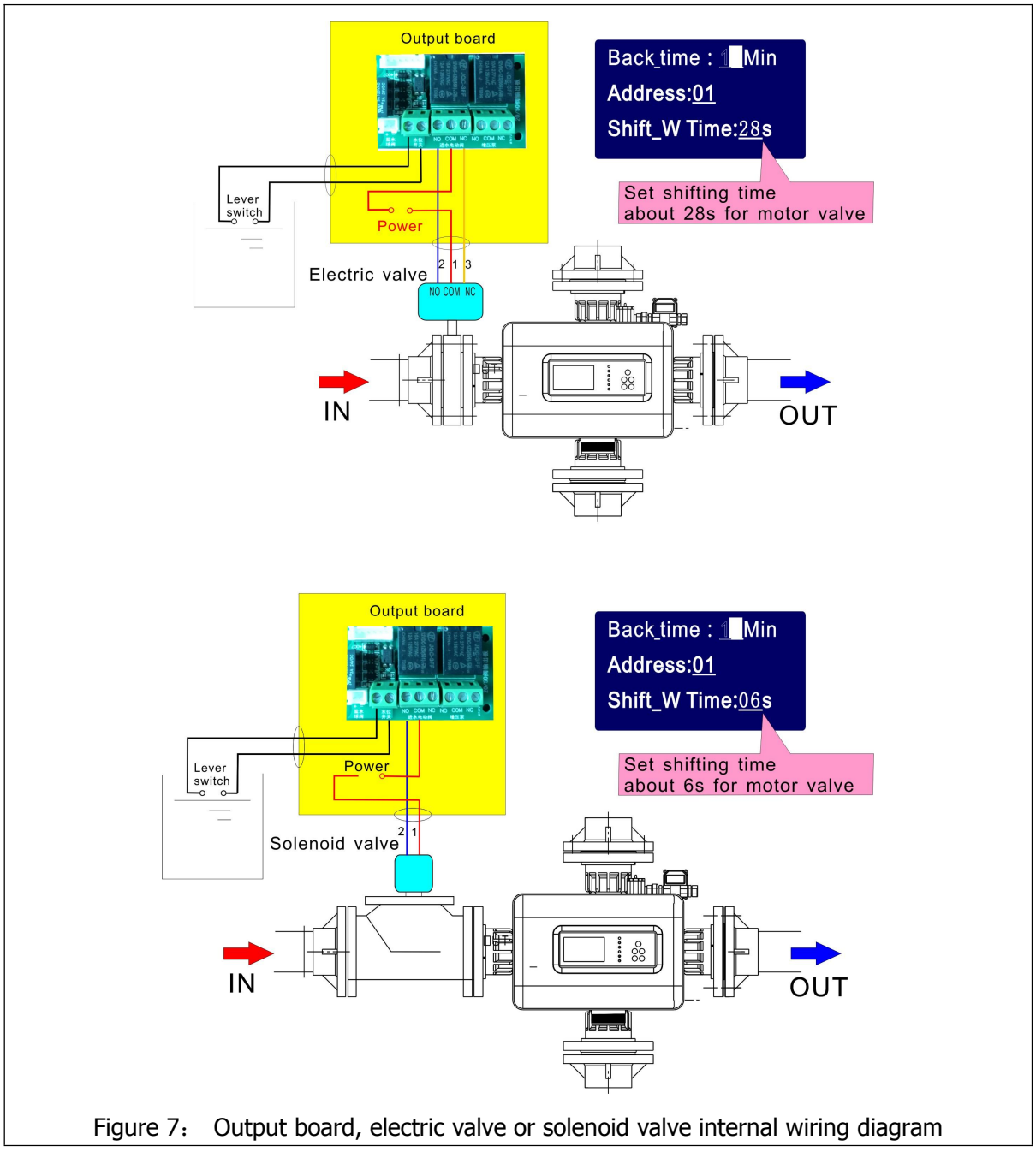



Figure 7： Output board, electric valve or solenoid valve internal wiring diagram

**5. "Electric valve"、"Booster pump" relay output interface: mode setting**

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

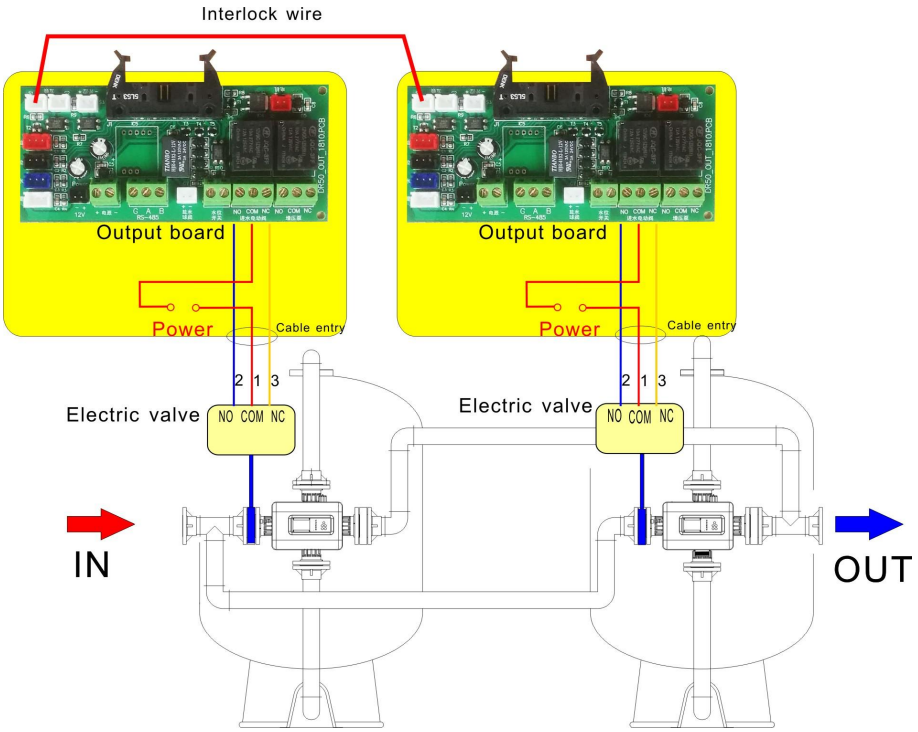
B、Relay output port, NO(Normally open) , COM (common port),NC(Normally closed)

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, below:

(Connected for "C", disconnect for "x")

| Mode | Relay | B.wash | Brine | S.wash | Clean | Soft | Shift | Applications |
|---|---|---|---|---|---|---|---|---|
| 0 | Electric valve | C | C | C | C | C | × | **Inlet electric valve mode:** relay break when shifting station. |
| 1 | Booster pump | C | × | × | C | × | × | **booster pump mode:** this mode is for filter valve. |
| 2 | | × | × | × | × | C | × | **Pump starting mode:** for the subsequent reverse osmosis high pressure pump starting.default mode |
| 3 | Electric valve | C | C | C | C | × | × | **Tow valve one RUN & one standby mode:** :.As shown in figure 8. |
| 4 | | C | C | C | C | × | × | **Tow valve RUN Backwash respectively mode**: this mode for filter valve. |
| 5 | Booster pump | × | × | × | × | C× | × | **CX(Mode2 additional conditions) :** When the inlet flow meter check the water flow signal in **Soft** station.the Relay is Connected. |
| 6 | | C | × | × | × | × | × | **Backwash booster & compressed air mode** |




Interlock wire connected. When one valve completes **Brine** and **Wash** and will switch to **soft** , judge that if another valve is also **Soft**, the valve close its own inlet solenoid valve and wait for standby

Figure 8：Mode (3) Tow valve one RUN & one standby inflow water solenoid valve mode

## Ⅲ、Recommended configuration and operation parameter setting

## 1、Recommended parameter setting table

| Station and description | Bed type | Formula |
|---|---|---|
| Soft（Ton） | DR | 〔filled amount of resin(L)×70%〕÷raw water hardness（mmol/L） |
| | GR | 〔filled amount of resin(L)×90%〕÷raw water hardness（mmol/L） |
| Brine（L） | DR | 30%×filled amount of resin(L) |
| | GR | 40%×filled amount of resin(L) |
| Slow wash（L） | DR/GR | 50%×filled amount of resin(L) |
| Wash | DR | 50%×filled amount of resin(L) |
| | GR | 100%×filled amount of resin(L) |
| B.Wash | DR/GR | 100%×filled amount of resin(L) |
| Note：Resin Filling rate of DR ≧90%;Resin Filling rate of GR ≧70% | | |

*Note!*

*1、Water hardness unit is mmol/L；*

*2、Resin work exchange capacity calculating is 1000 mol/m³=1mol/L*

*3、Design and calculation of brine concentration is 20%;*

*4、1Liter brine(20%)Molar value=1000g×20%/58.8g(NaCL)×1.4(specific consumption) ≈200/80=2.5mol，That is, the brine used for regeneration is equivalent to 40% of the resin filling amount*

*5、3. The volume of the salt tank is not less than the volume of filling resin*

## 2、DR15/GR15/GR15T Softener configuration (reference)

| Production | | | 10T/h | 15 T/h | 20 T/h |
|---|---|---|---|---|---|
| pressure | | | 0.1-0.5MPa | | |
| Raw water hardness | | | Ⅰ：≤6mmol/L；Ⅱ：≤12mmol/L | | |
| Swap tank (D× effective height) | DR | Ⅰ | D500×1600 | D600×1800 | D750×1800 |
| | | Ⅱ | D500×1800 | D600×2000 | D750×2000 |
| Swap tank（diameter D× effective height） | GR | Ⅰ | D600×1600 | D750×1600 | D900×1800 |
| | | Ⅱ | D600×1800 | D750×1800 | D900×2000 |
| Salt tank volume | | | 500L | 500L | 800L |

## 3、DR20/GR20/GR20T Softener configuration (reference)

| Production | | | 15T/h | 20 T/h | 25 T/h |
|---|---|---|---|---|---|
| pressure | | | 0.1-0.4MPa | | |
| Raw water hardness | | | Ⅰ：≤6mmol/L；Ⅱ：≤12mmol/L | | |
| Swap tank (D× effective height) | DR | Ⅰ | D600×1600 | D750×1800 | D750×1800 |
| | | Ⅱ | D600×1800 | D750×2000 | D750×2000 |
| Swap tank（diameter D× effective height） | GR | Ⅰ | D750×1600 | D750×1600 | D900×1800 |
| | | Ⅱ | D750×1800 | D750×1800 | D900×2000 |
| Salt tank volume | | | 500L | 800L | 800L |

**4、DR40 Softener configuration (reference)**

| Production | | 25T/h | 30T/h | 40T/h |
|---|---|---|---|---|
| pressure | | 0.1-0.4MPa | | |
| Raw water hardness | | Ⅰ：≤6mmol/L；Ⅱ：≤12mmol/L | | |
| Swap tank(D× Effective height） | Ⅰ | D750×1600 | D900×1800 | D1000×1800 |
| | Ⅱ | D750×1800 | D900×2000 | D1000×2000 |
| Salt tank volume | | 500L | 800L | 1000L |

**5、GR40/GR40T Softener configuration (reference)**

| Production | 25T/h | 30T/h | 40T/h |
|---|---|---|---|
| Power and consumption | AC 90-220V；Power：0.03kw | | |
| Soften hardness value | ≤0.03mmol/L | | |
| Raw water hardness | Ⅰ：≤6mmol/L；Ⅱ：≤12mmol/L | | |
| Swap tank(D× Effective height）） | D900×1500 | D1000×1500 | D1200×1800 |
| Salt tank volume | 800L | 1000L | 1500L |

**6、GR50 Softener configuration (reference)**

| Production | | 40T/h | 50T/h | 60T/h |
|---|---|---|---|---|
| pressure | | 0.1-0.4MPa | | |
| Raw water hardness | | Ⅰ：≤6mmol/L；Ⅱ：≤12mmol/L | | |
| Swap tank (D× Effective height）） | Ⅰ | D1000×1500 | D1200×1500 | D1500×1800 |
| | Ⅱ | D1200×2000 | D1500×2200 | D1500×2400 |
| Salt tank volume | | 1500L | 2000L | 2000L |

**7、DR50 Softener configuration (reference)**

| Production | | 40T/h | 50T/h | 60T/h |
|---|---|---|---|---|
| User pressure | | 0.1-0.4MPa | | |
| Raw water hardness | | Ⅰ：≤6mmol/L；Ⅱ：≤12mmol/L | | |
| Swap tank (D× Effective height） | Ⅰ | D900×1800 | D1000×1800 | D1200×1800 |
| | Ⅱ | D900×2000 | D1000×2200 | D1200×2400 |
| Salt tank volume | | 1500L | 2000L | 2000L |

# Ⅳ、Install

## 1、Installation of control valve unpacking parts

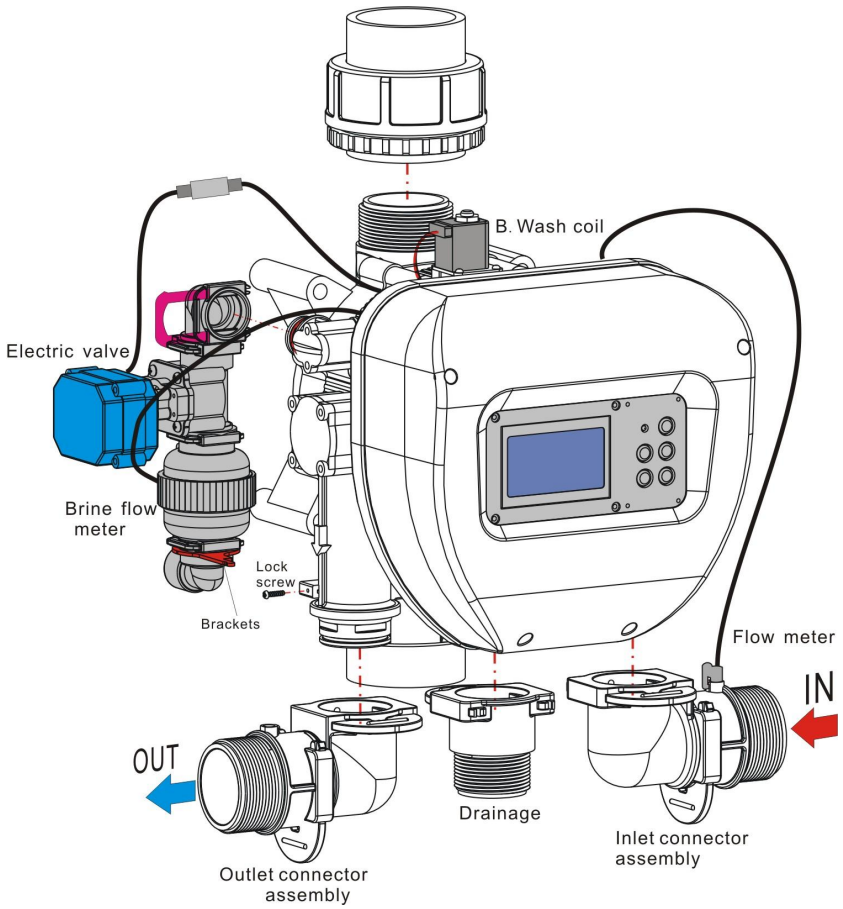



Figure 9、DR15/GR15 side installation control valve unpacking parts

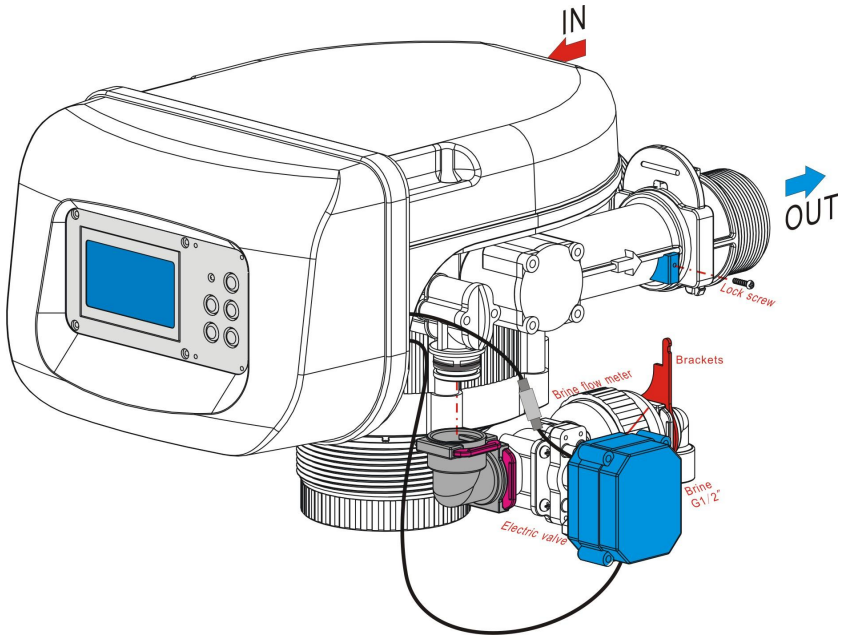



Figure 10、GR15T top mounted control valve unpacking component

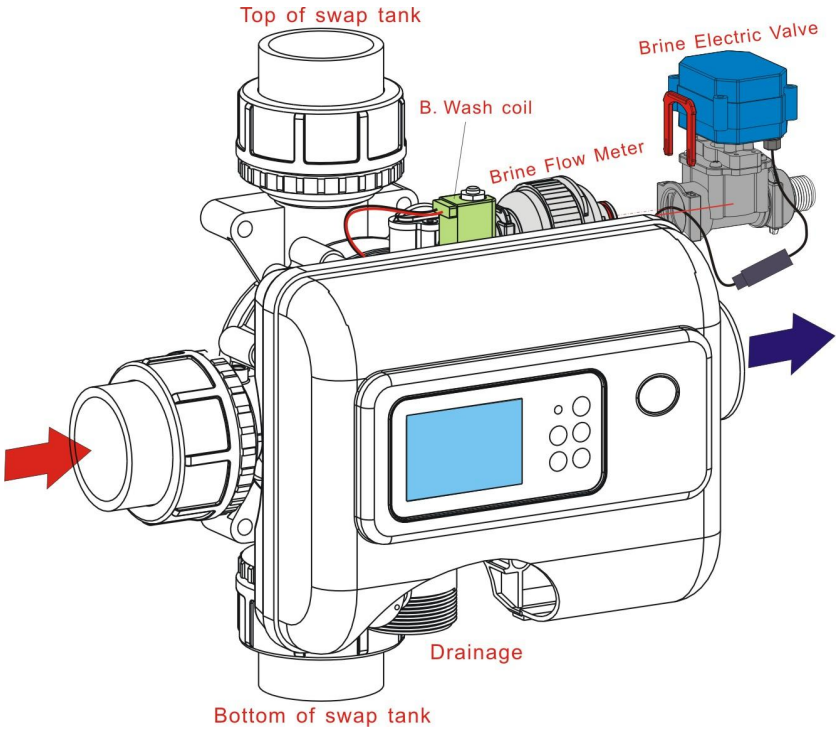



Figure 11：DR20/GR20 side installation　control valve unpacking component

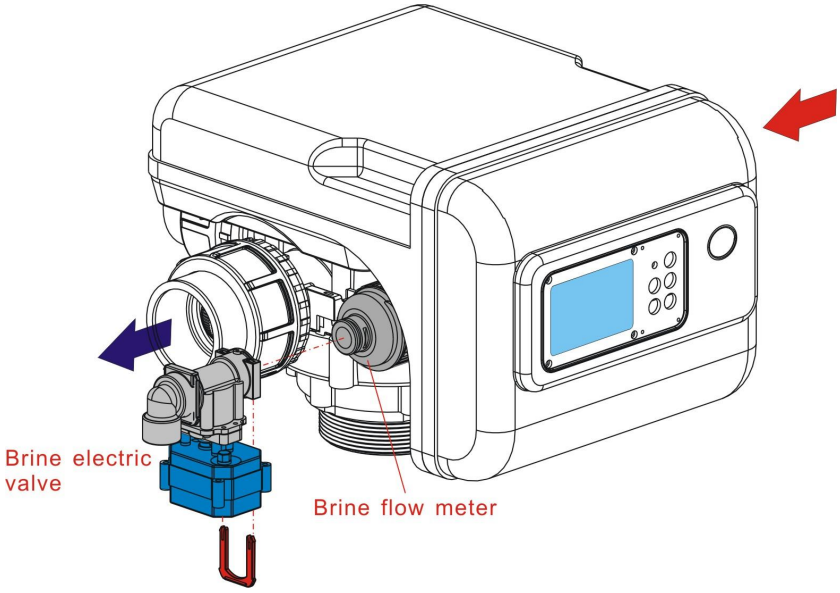
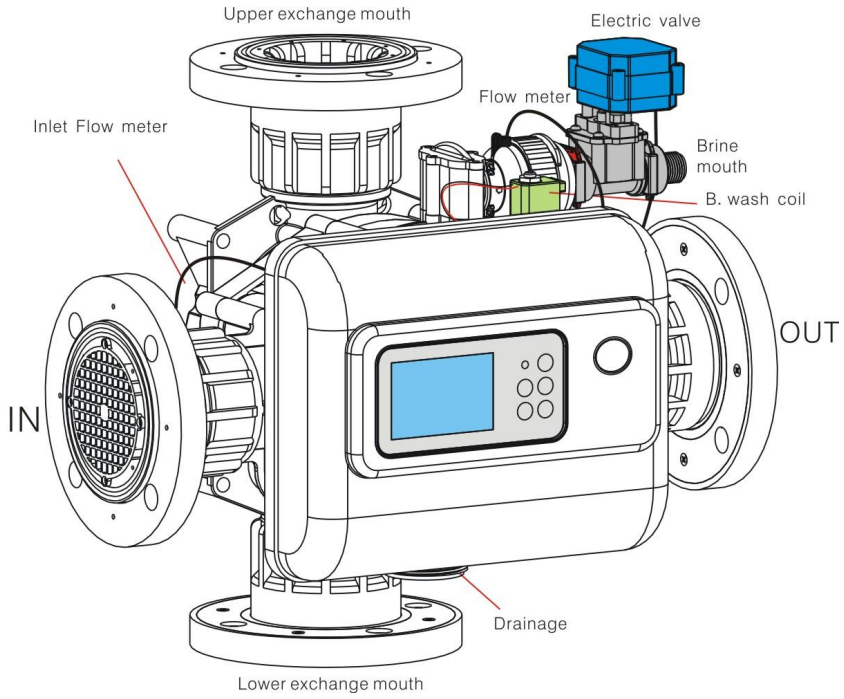
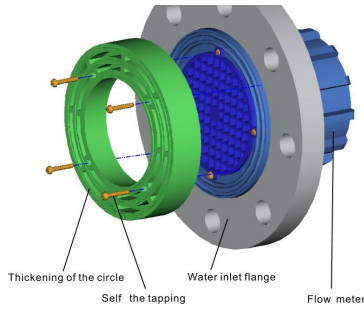



Figure 12：GR20T top mounted control valve unpacking component




Butterfly valve thickening ring

Figure13、DR40/GR40 side installation control valve unpacking component

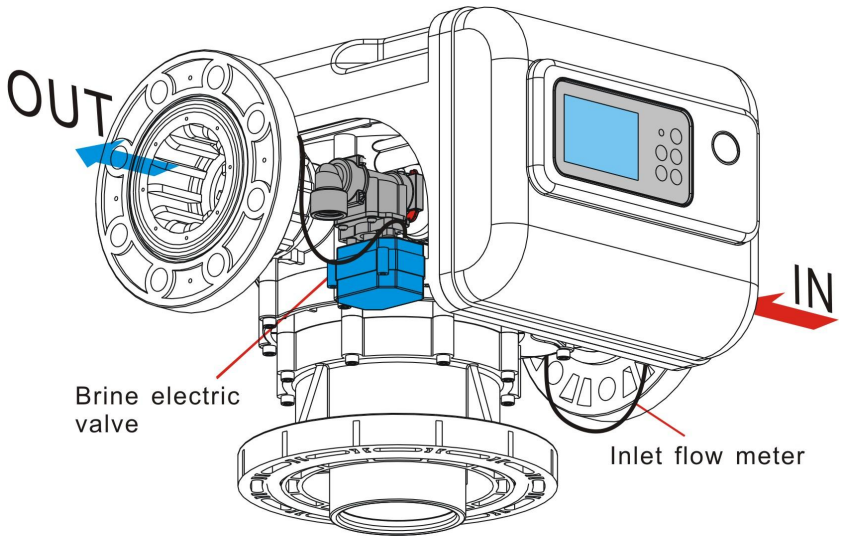
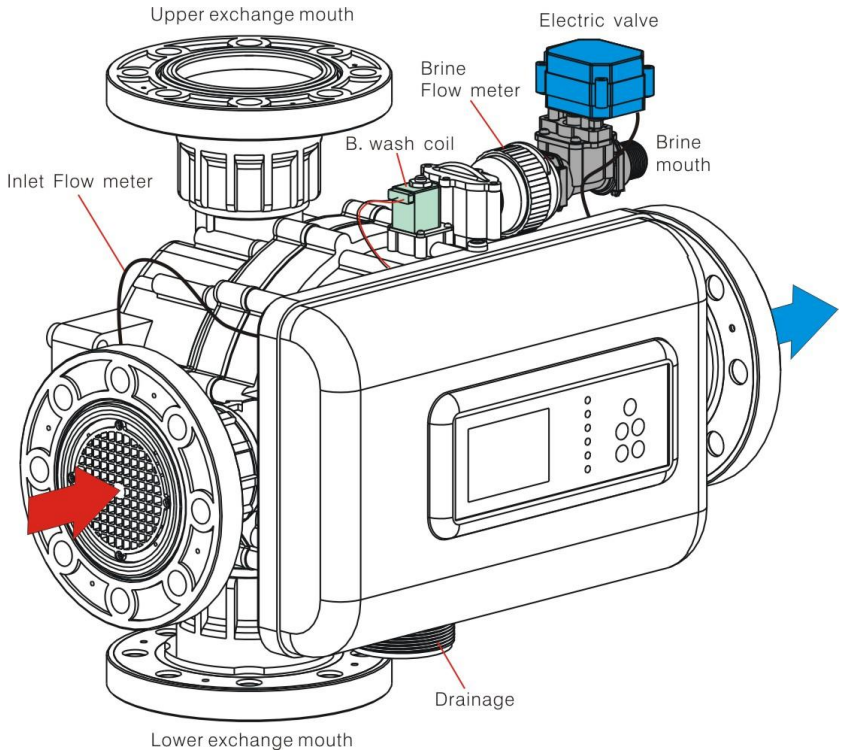
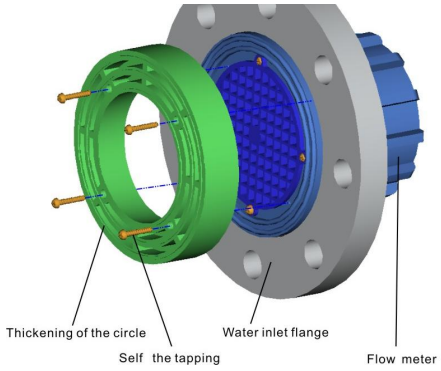



Figure14：GR40T top mounted control valve unpacking component




Feed butterfly valve thickening ring

Figure15：DR50/GR50 side installation　control valve unpacking component

## 2, Side mounted control valve support seat

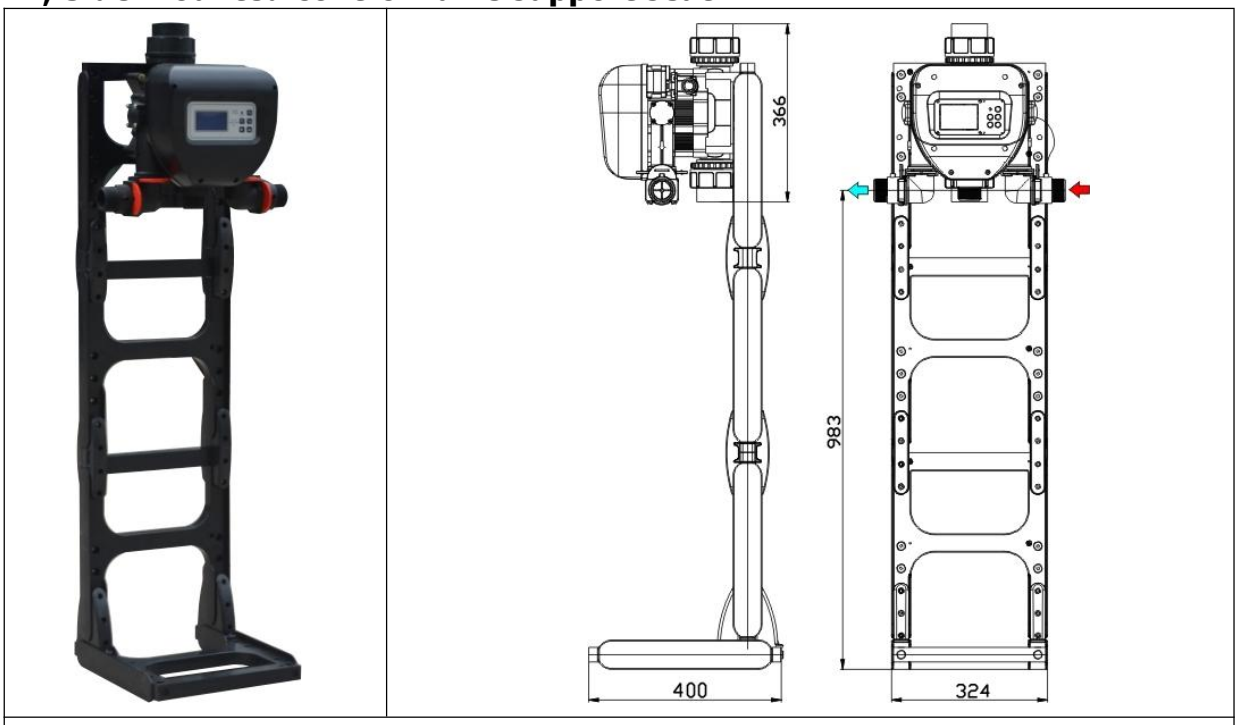



Figure16：DR15/GR15 Side installation control valve support seat

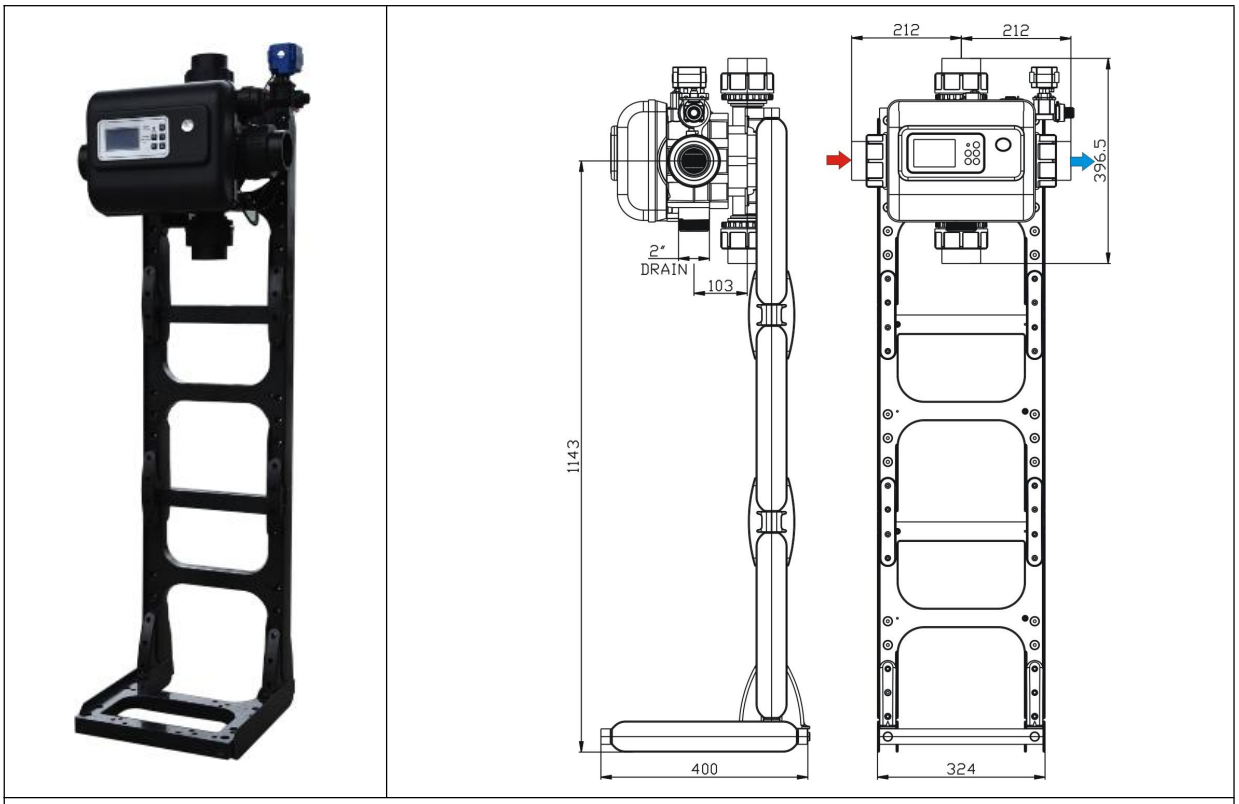



Figure17：DR20/GR20 Side installation control valve support seat

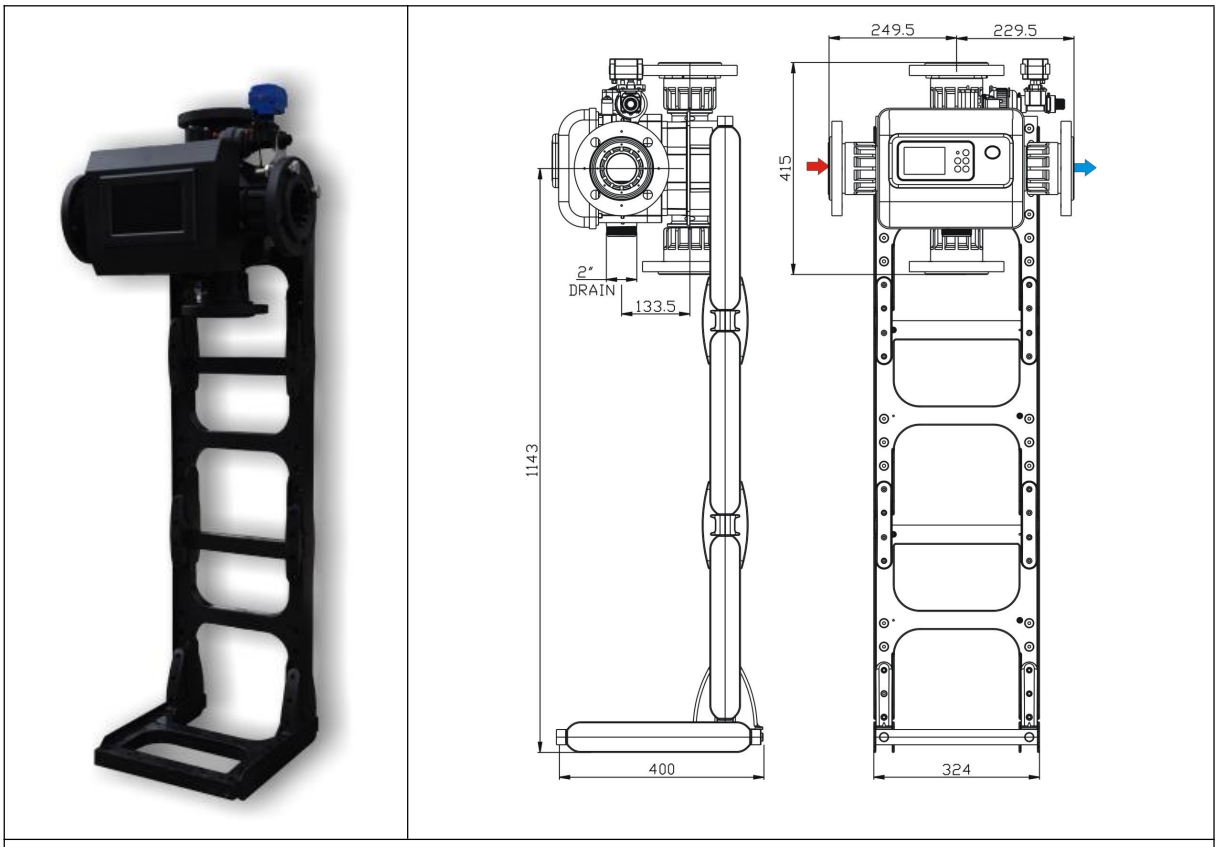



Figure18：DR40/GR40 Side installation control valve support seat

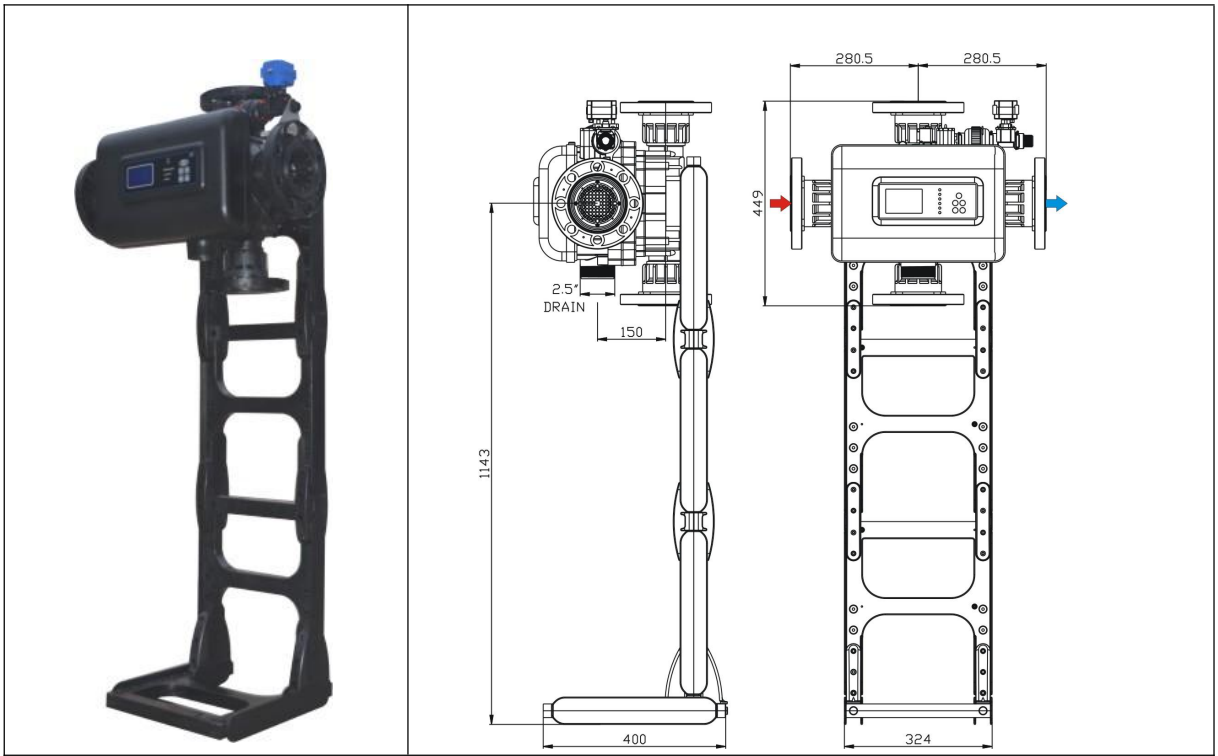



Figure19：DR50/GR50 Side installation control valve support seat

## 3、 Internal configuration and installation of side equipment

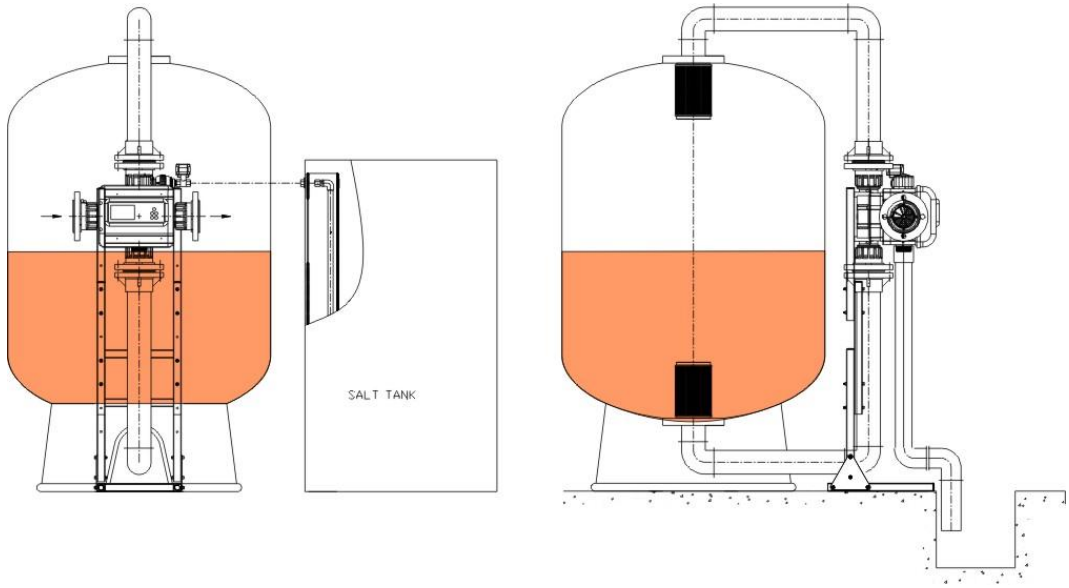



Figure 20: Schematic Diagram of installation of side valve Softener (GR40 valve as an example)

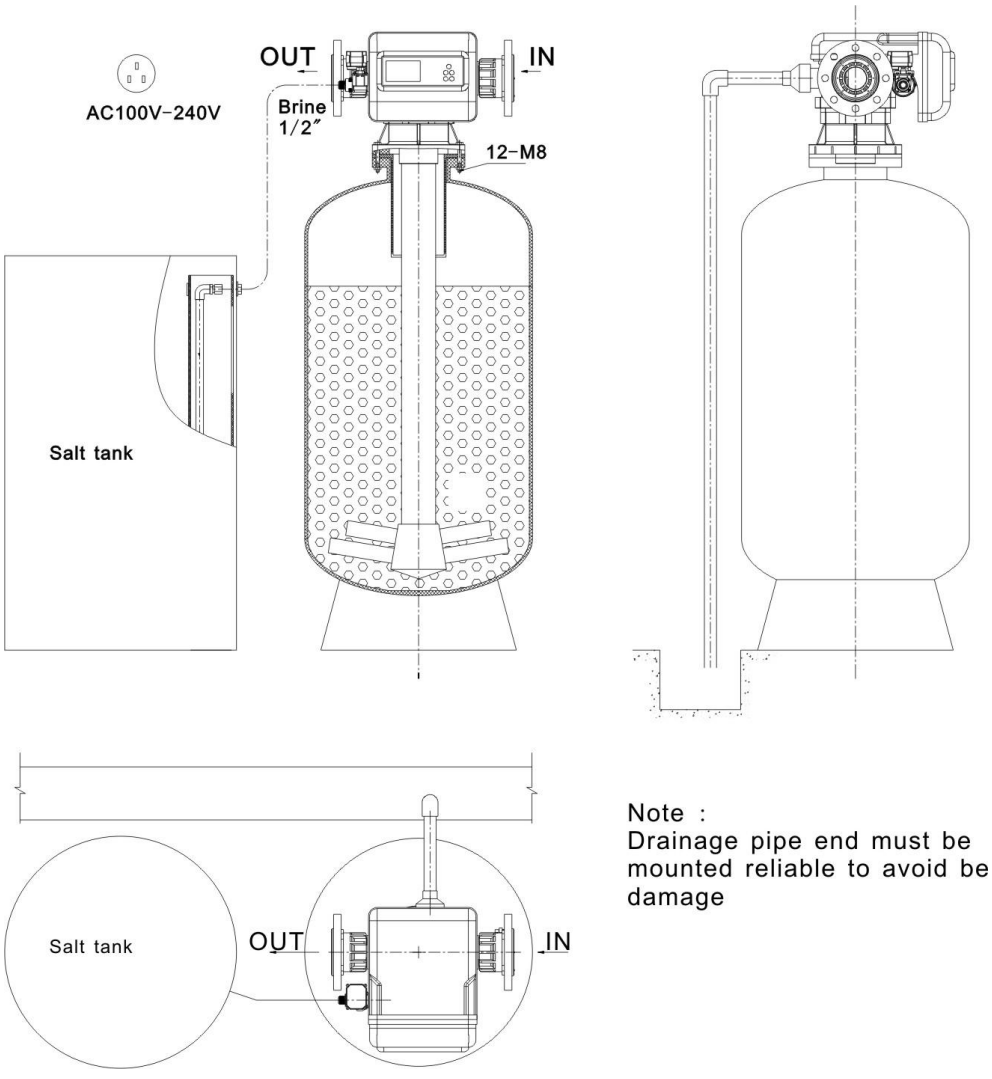



Figure 21：Schematic Diagram of installation of top mounted valve Softener (GR40T as an example)

## 4、 The Valve body geometry size

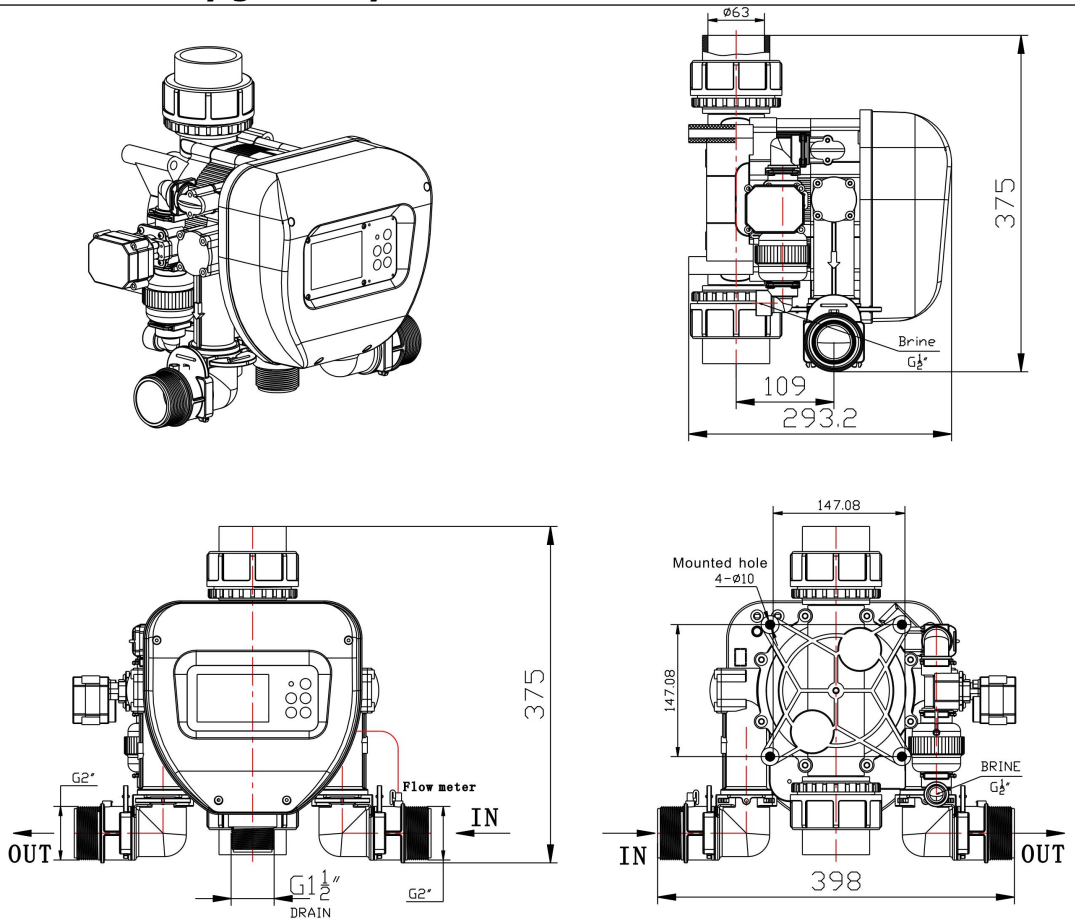



Figure 22：DR15/GR15　Side installation valve geometry size

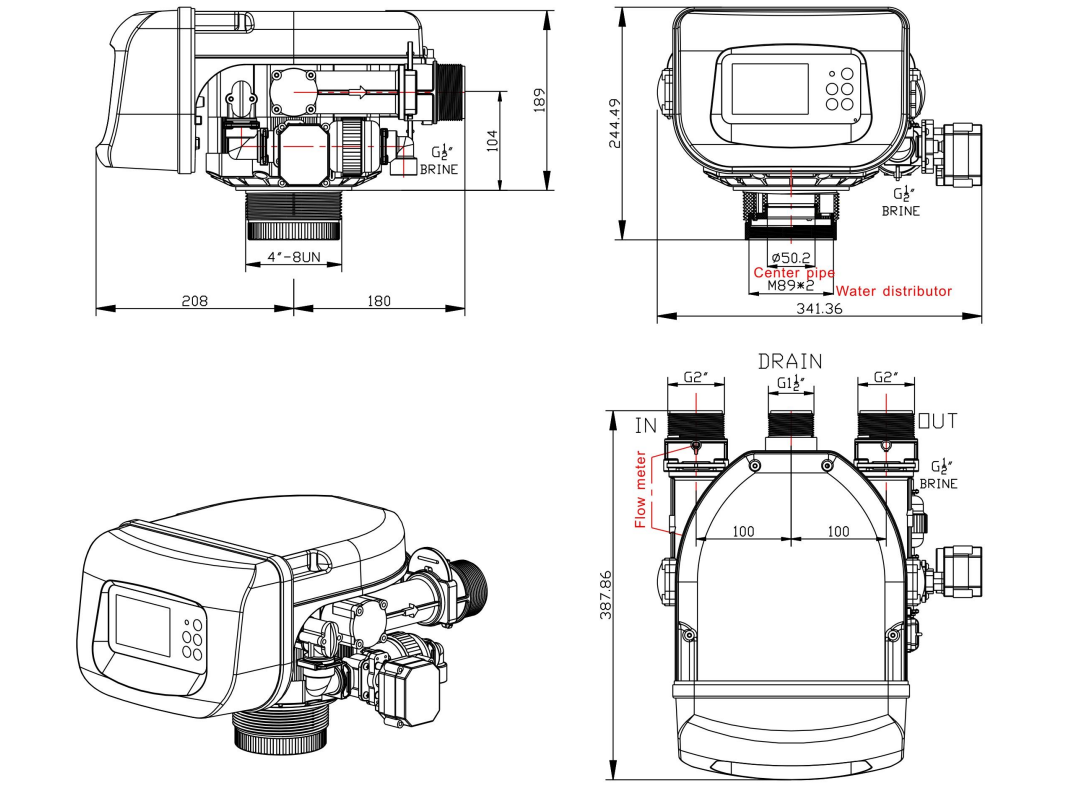



Figure 23：GR15T Top mounted valve geometry size

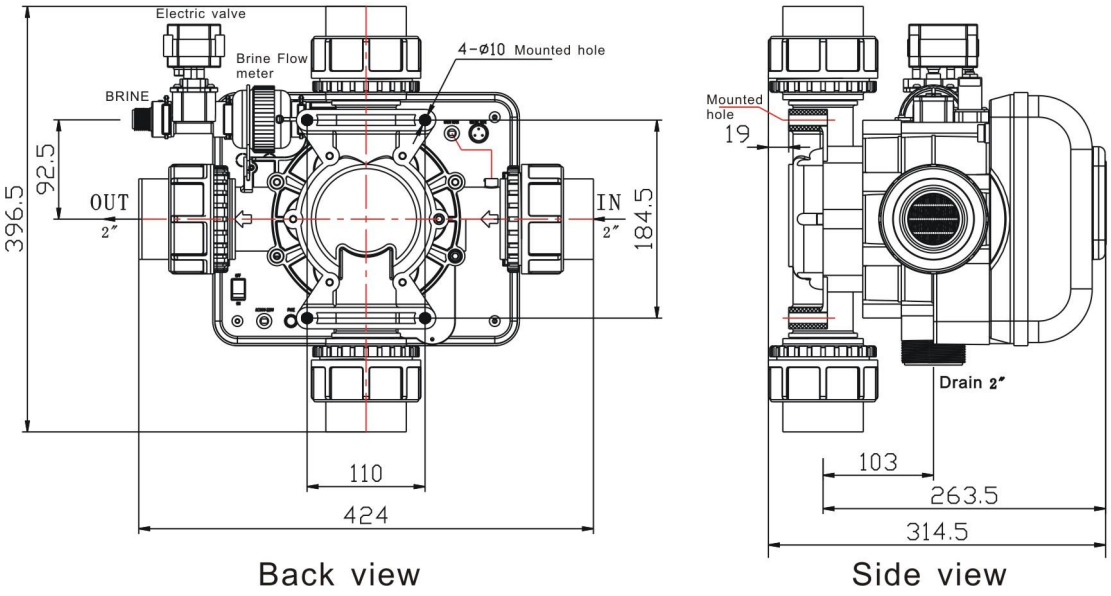



Figure 24：DR20/GR20 Side installation valve geometry size

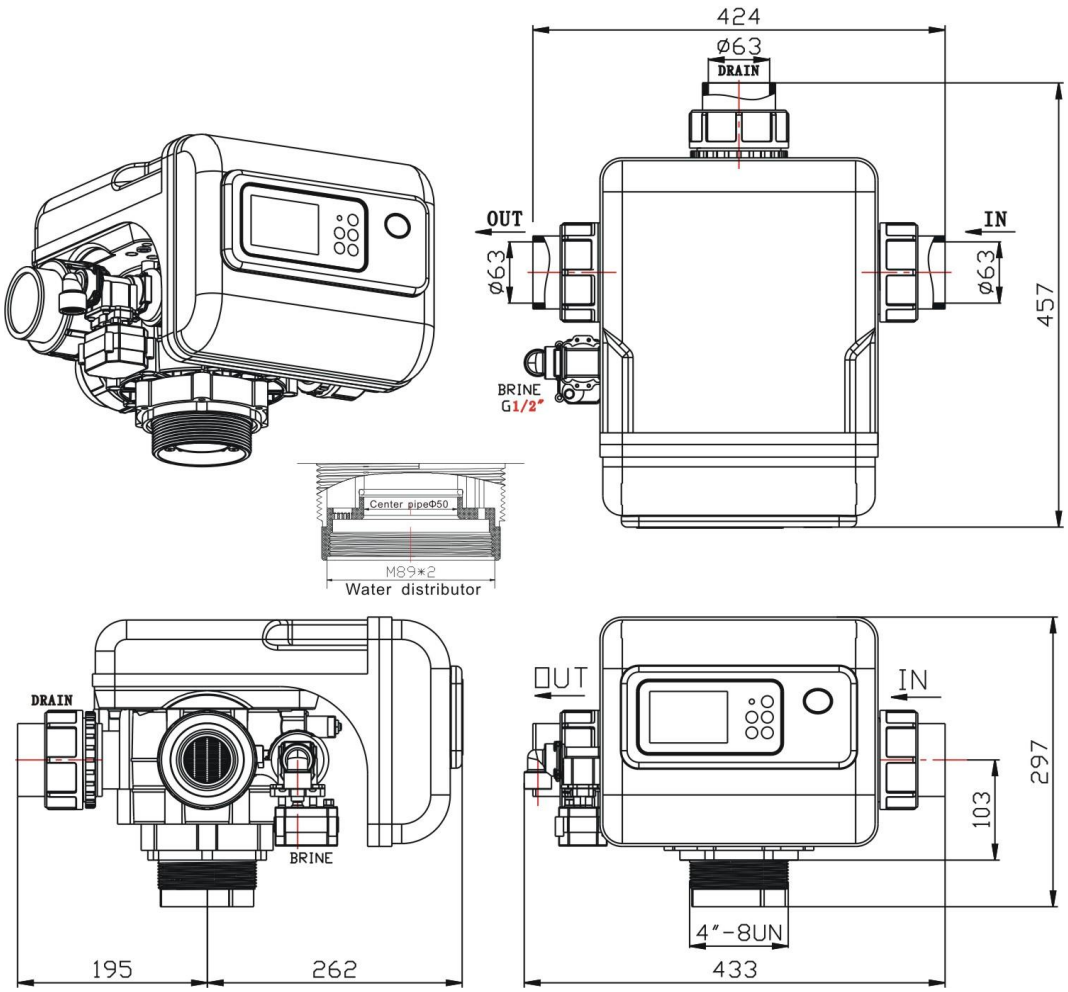



Figure 25：GR20T Top mounted valve geometry size

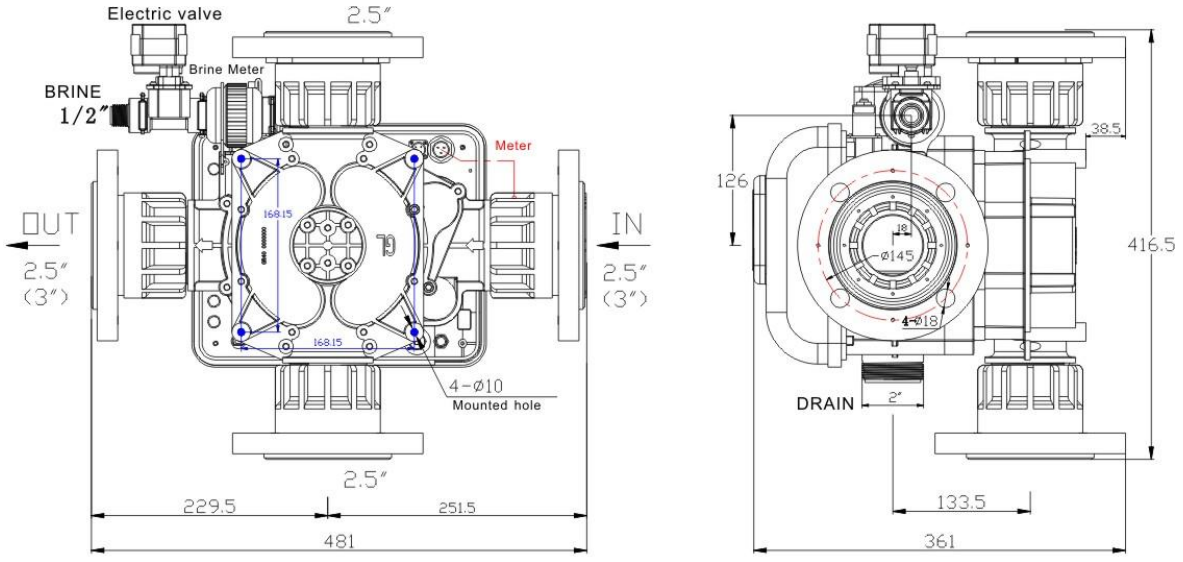



Figure 26：DR40/GR40 Side installation valve geometry size

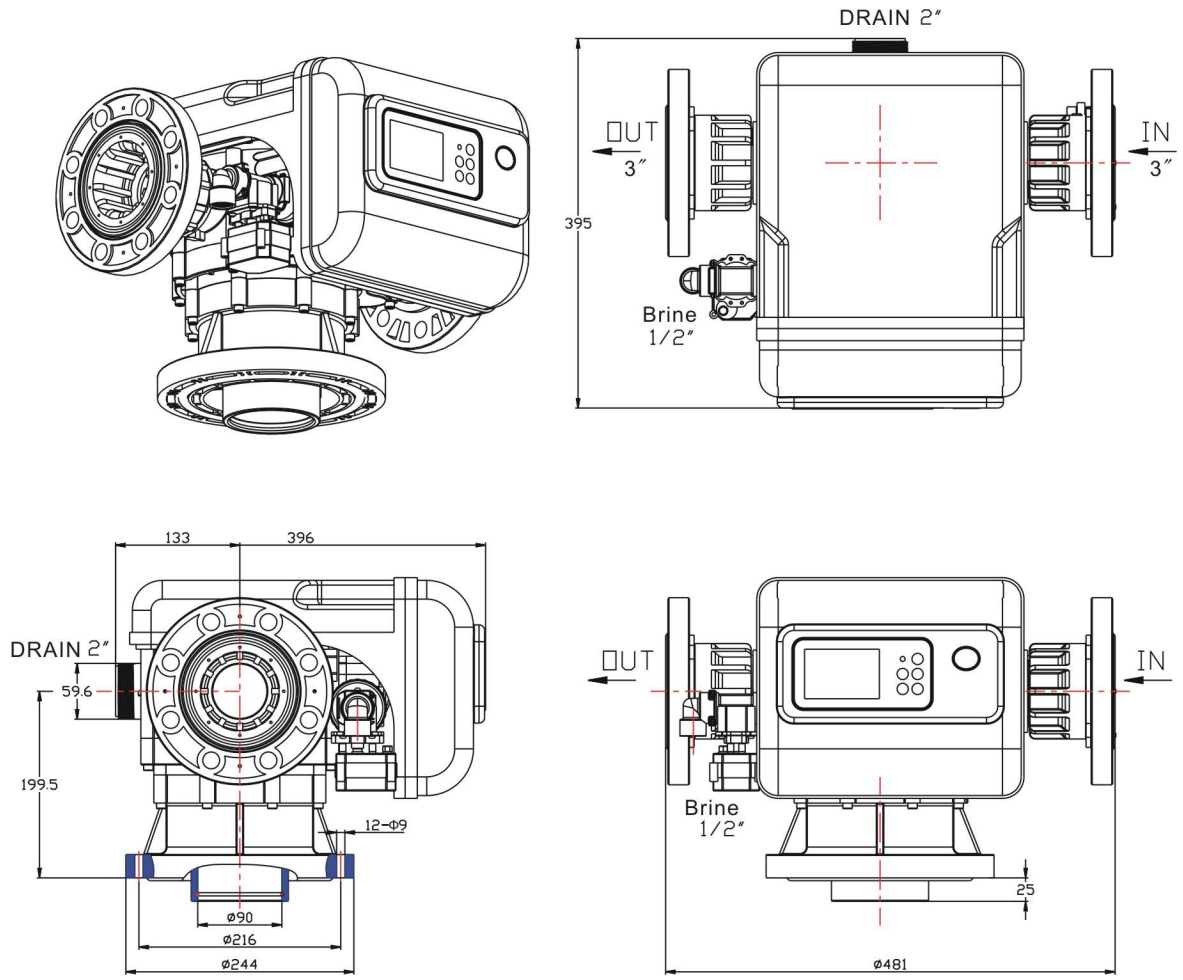



Figure 27：GR40T Top mounted valve geometry size

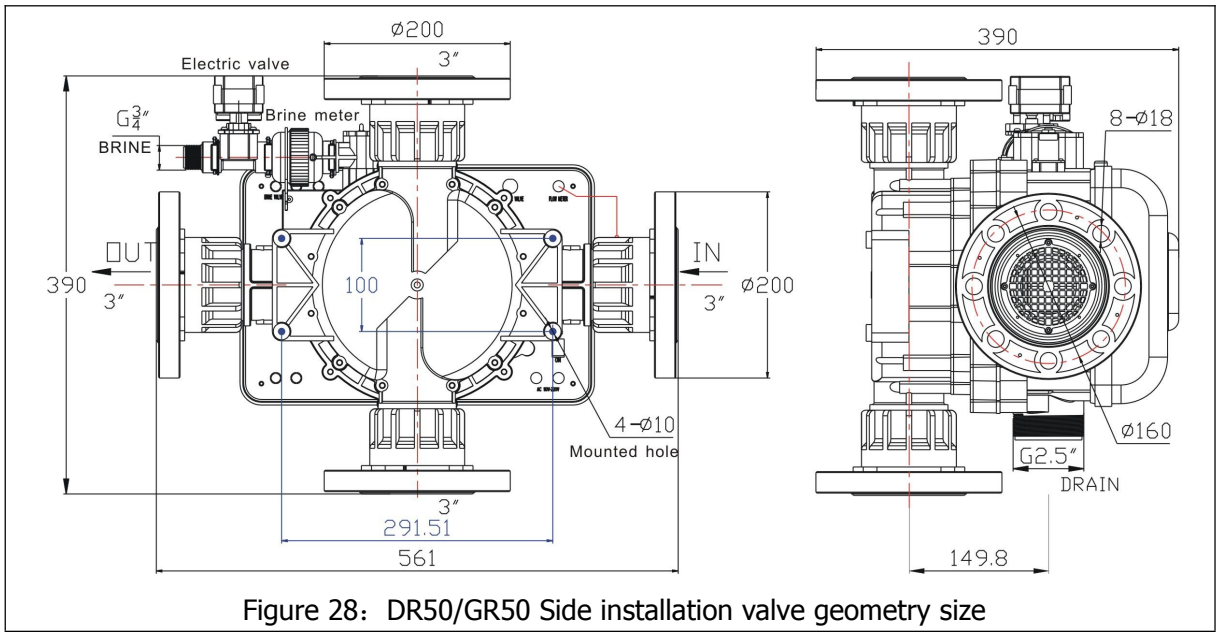



Figure 28：DR50/GR50 Side installation valve geometry size

# V. Tips and Precautions of Equipment

1. The equipment should use industrial salt with the size of more than 4mm to guarantee the smooth passage of water filling and salt absorbing. 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. The bottom of the salt tank needs to be checked frequently; the deposit and sludge need to be cleared out.
3. 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 water amount.

# VI .Conditions of use

1, The equipment must be installed the water filter in the feed water pipe to prevent clogging;
2, Feed water pressure should be kept constant, When the water source is well water or low water tank provided by the inlet pressure for the feed pump, A check valve shall be installed in the feed water line to prevent the feed water in the equipment from back flow when the pump stops. The outlet pressure of the equipment outlet pipe should be kept constant, and the inlet and outlet of the softening water tank should be higher than that of the equipment.
3, Equipment installed in the indoor, the working environment should be 1 ℃ → 45 ℃, humidity is not too high, there should be no corrosive chemical gases, control valve note waterproof. Strong electromagnetic interference may have influence on the normal work of the device. Environment should be tolerated to some extent the leaking equipment accident.
4, The water pressure 0.10MPa ~0.6 MPa, less than 0.10 MPa should add booster pump, above 0.6 MPa should add pressure reducing valve.
5, Brine absorption and water refilling are automatically controlled by the brine flow meter and electric valve. The salt valve serves as a safety protection for water refilling and has the function of filtering and water refilling and throttling.

# VII. Regular failure and failure elimination

**1、Soft water hardness become high**

| Phenomena/reasons | Solution |
|---|---|
| No salt in the brine tank | Add salt to the brine tank |
| Clogged salt filter in the salt tank | Clean it regularly and guarantee sufficient amount of water injection |
| Water rate is too large, running velocity is too high | Reduce the pressure difference between the inflow and outflow |
| No enough resin and too much space at the top of the swap tank | Add more resin to reduce the space |

**2 、Salt leaking out to the water outlet**

| | |
|---|---|
| Too little washing water | Set to increase washing water |
| No enough resin, existence of concentration water at the top of the swap tank and too much space cause incomplete cleaning | Add more resin and reduce the space |

**3 、Increase of the inflow pressure and decrease of the flow rate of outlet**

| | |
|---|---|
| Resin's being polluted by the suspended matter | Shorten the number of backwash cycles and increase the amount of backwash water |
| The upper water distributor is blocked by broken resin | Unload the water distributor and clean it |
| Outlet Water pipes system have blocking phenomenon | Check and eliminate the problem |

**4、Poor brine absorption of the controlling valve**

| Phenomena/reasons | Solution |
|---|---|
| drainage pipe has jam | Check whether the exit of the drain pipe is clogged |
| Clogged ejector | Remove the water injector end cover, check the jet nozzle and clean. |

**5、The value of inlet flow parameter does not decrease**

| | |
|---|---|
| The equipment has water flow out, the inlet flow parameter value does not decrease, the main valve does not switch. | If the impeller of the inlet flow meter is stuck by foreign matter or foreign matter is absorbed by the magnet, which causes rotation failure, remove the inlet flow meter and clean up |
| | Abnormal flow sensor or sensor wire plug comes off |
| During regeneration, the brine flow value does not decrease | The impeller of the brine flow meter is stuck by foreign matter or foreign matter is attracted on the magnet, which causes the rotation to be ineffectual. |

**6、Abnormal discharge**

| Phenomena/reasons | Solutions |
|---|---|
| Water is discharged from the drainage pipe all the time when it is servicing | If there is any foreign matter or damage in the valve core, ceramic ring or silica gel ring,open the main valve, remove and repair it and check whether the front filter is abnormal. |

# VIII、DR floating bed resin scrub

During the long-time use of DR floating bed water softener, the suspended substance, turbidity and iron deposition in the raw water will condense into viscous pollutants around the resin, leading to the decrease of water quality, the increase of water pressure and the decrease of water flow rate. At this time, the resin needs to be scrubbed. Scrubbing process can be part of the resin out of the tank, respectively stirring, recoil, rinse, borrow the device itself.

# IX、Control valve decomposition figure

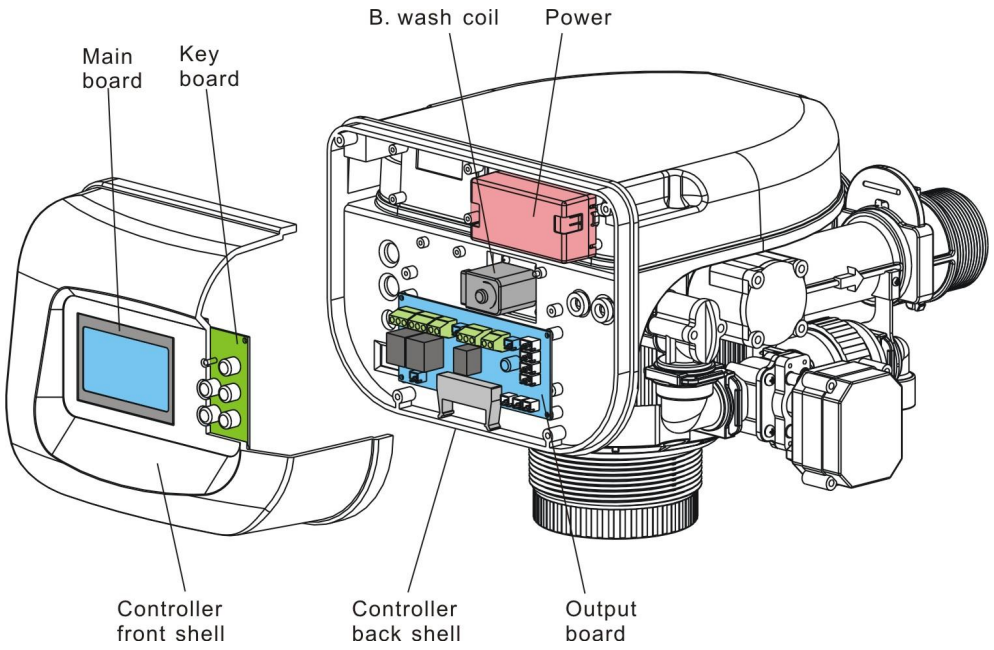



Figure29：GR15T Controller

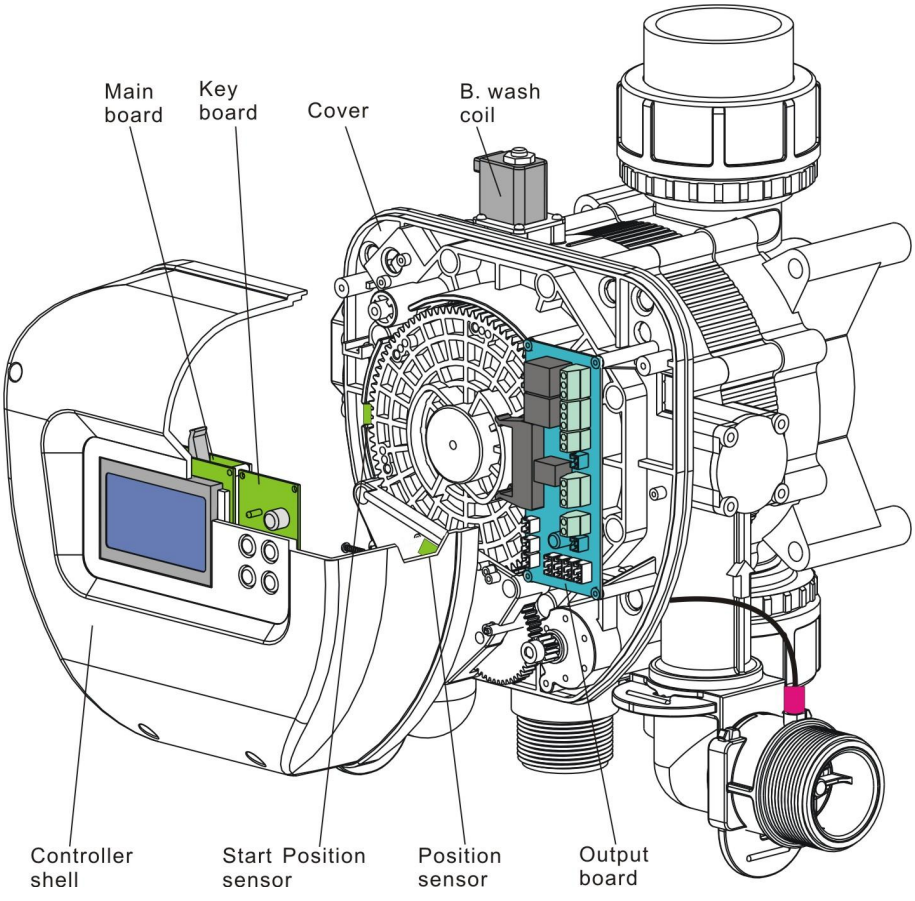



Figure30：GR15\DR15 Controller

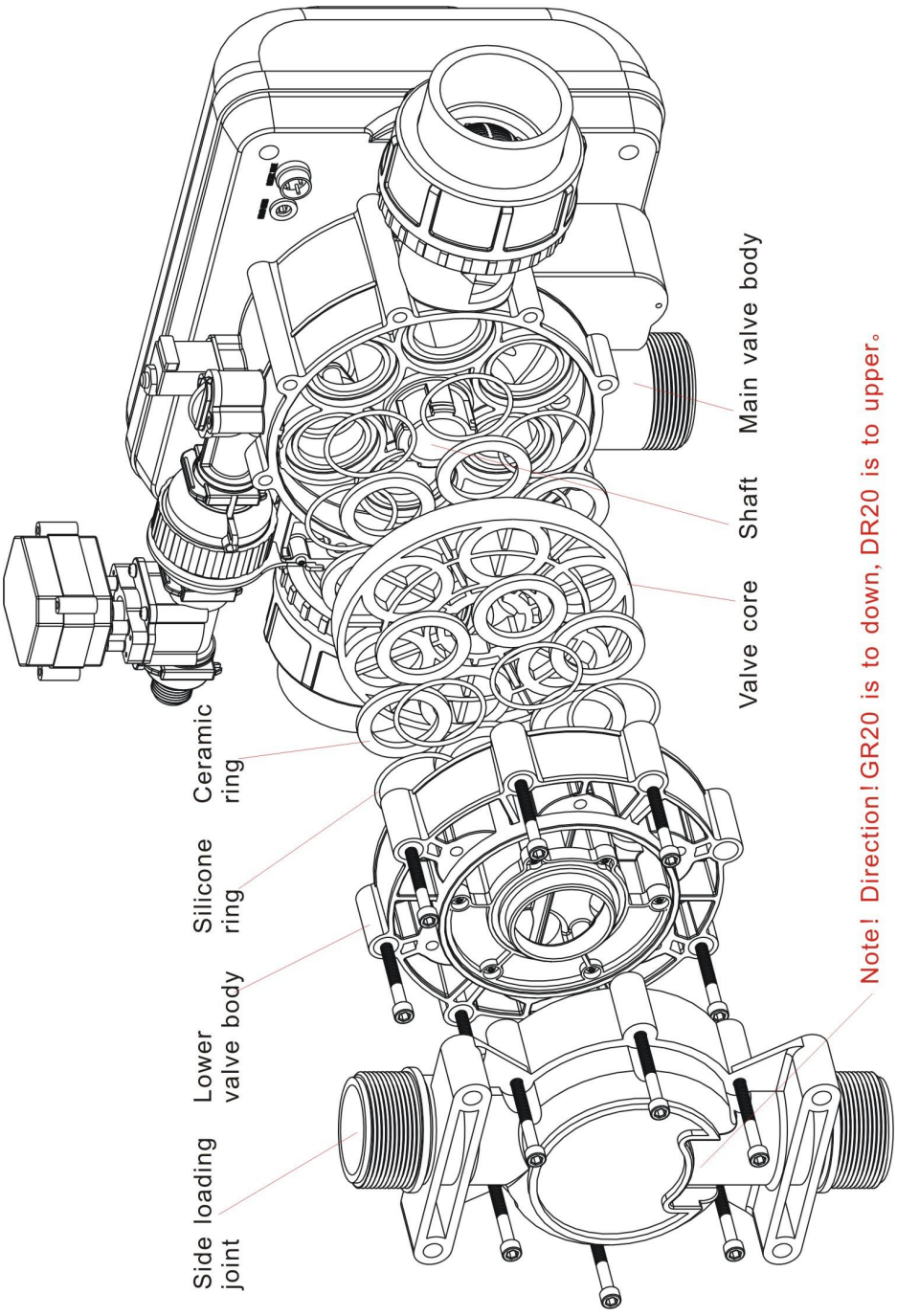



Figure 31： Valve core (GR20 example)

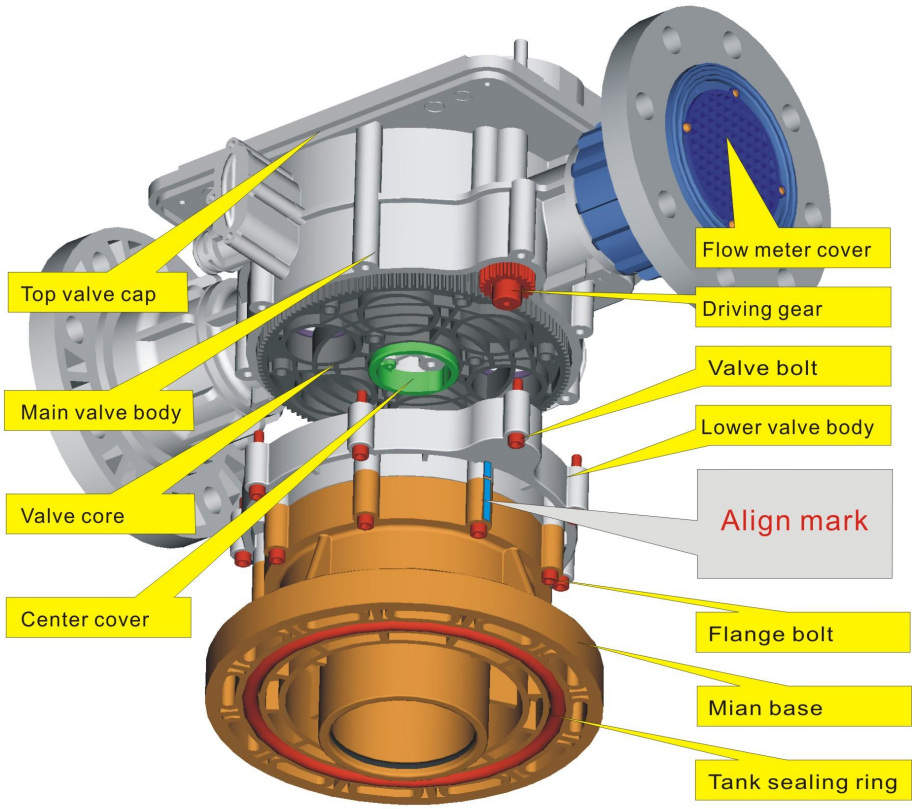



Figure32：GR40T valve core and valve seat

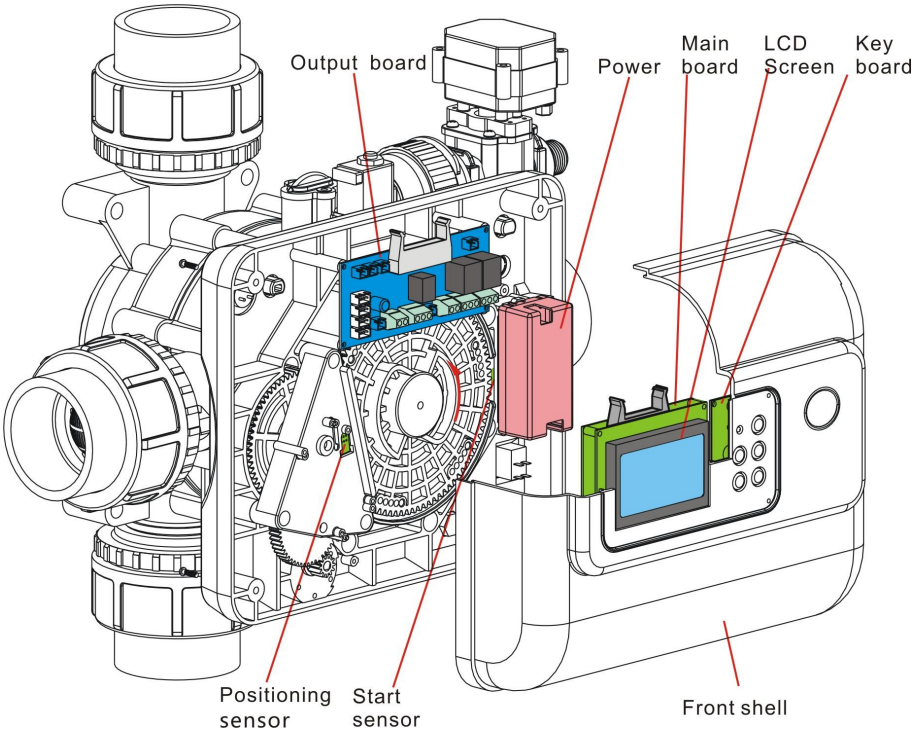



Figure33:Side loading controller front shell disassembly

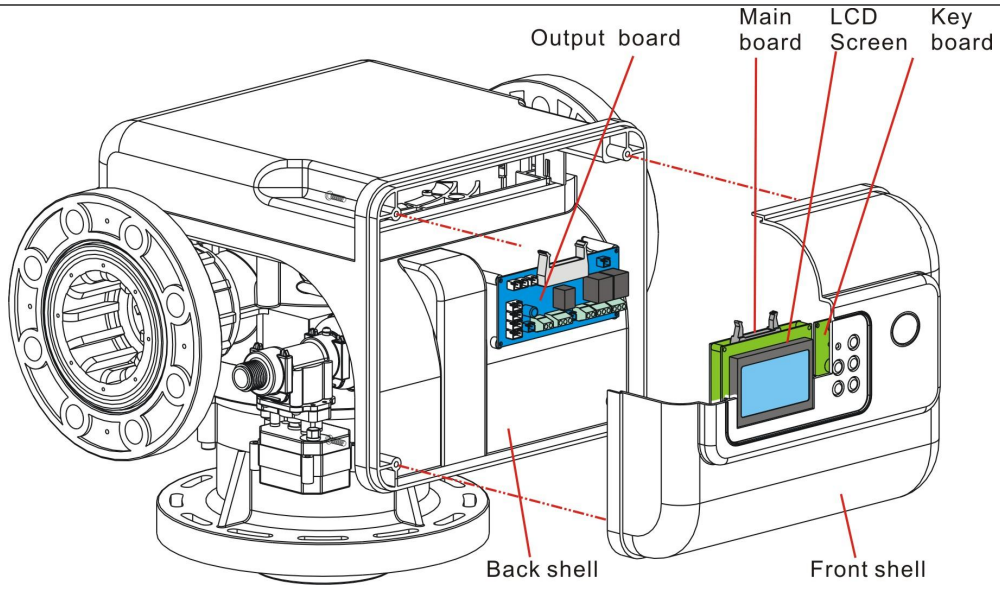



Figure34:Top loading controller back shell disassembly

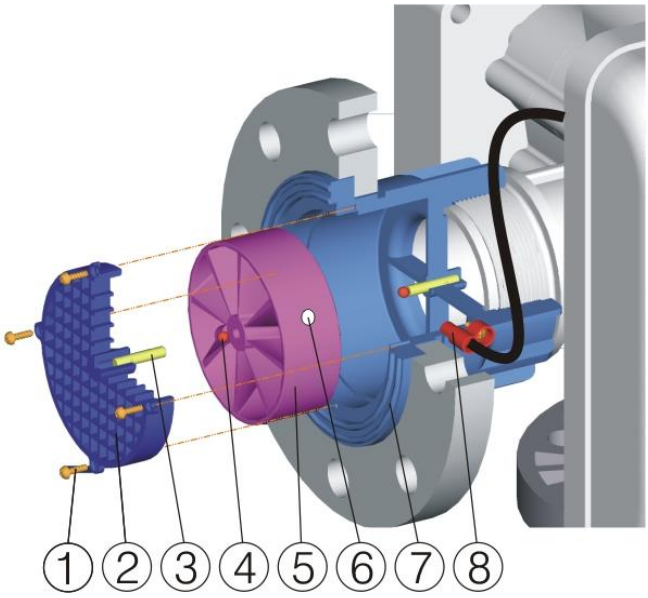



Figure 35： Inflow meter

1, Screw; 2, Grid mesh; 3, Ceramic shaft; 4, Ceramic beads; 5, Impeller; 6, Magnets; 7, Flange Sleeve; 8;Sensor

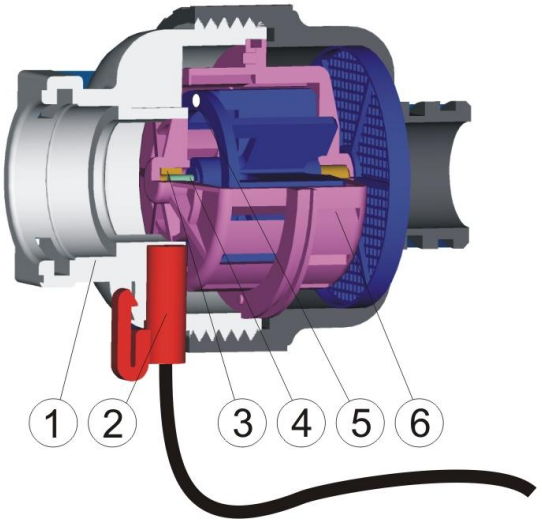



Figure 36：Brine flow meter

1、Shell;　2、Sensor;　3 Sleeves;　4、Axis;　5 、Magnet;　6、Eddy current detector

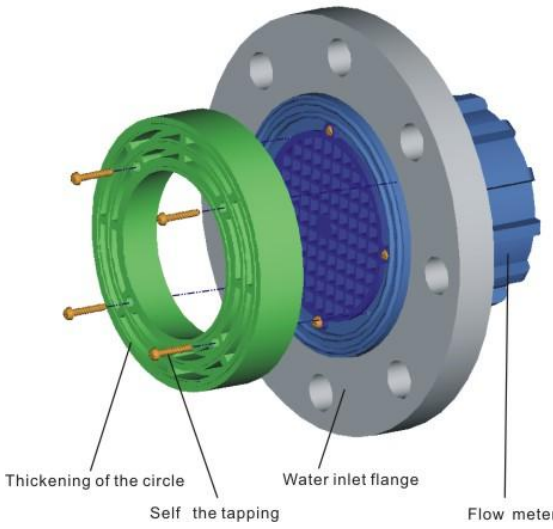



Figure 37：Thickening of the inlet butterfly valve

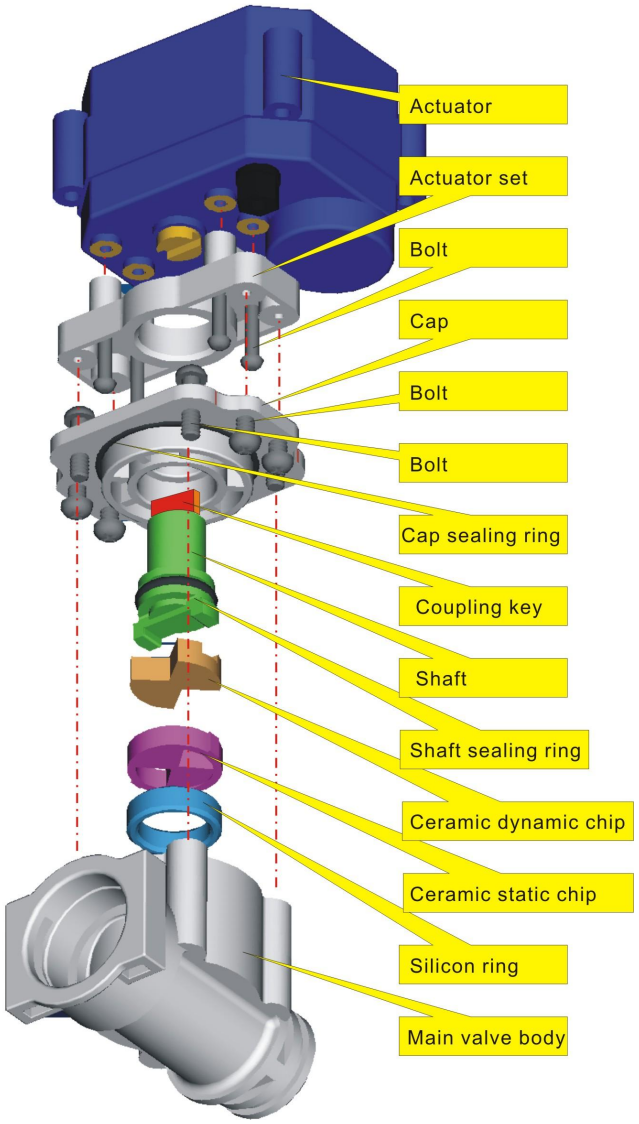



Figure 38: Brine Electric valve

## X Curve of Flow and Pressure for the Valve

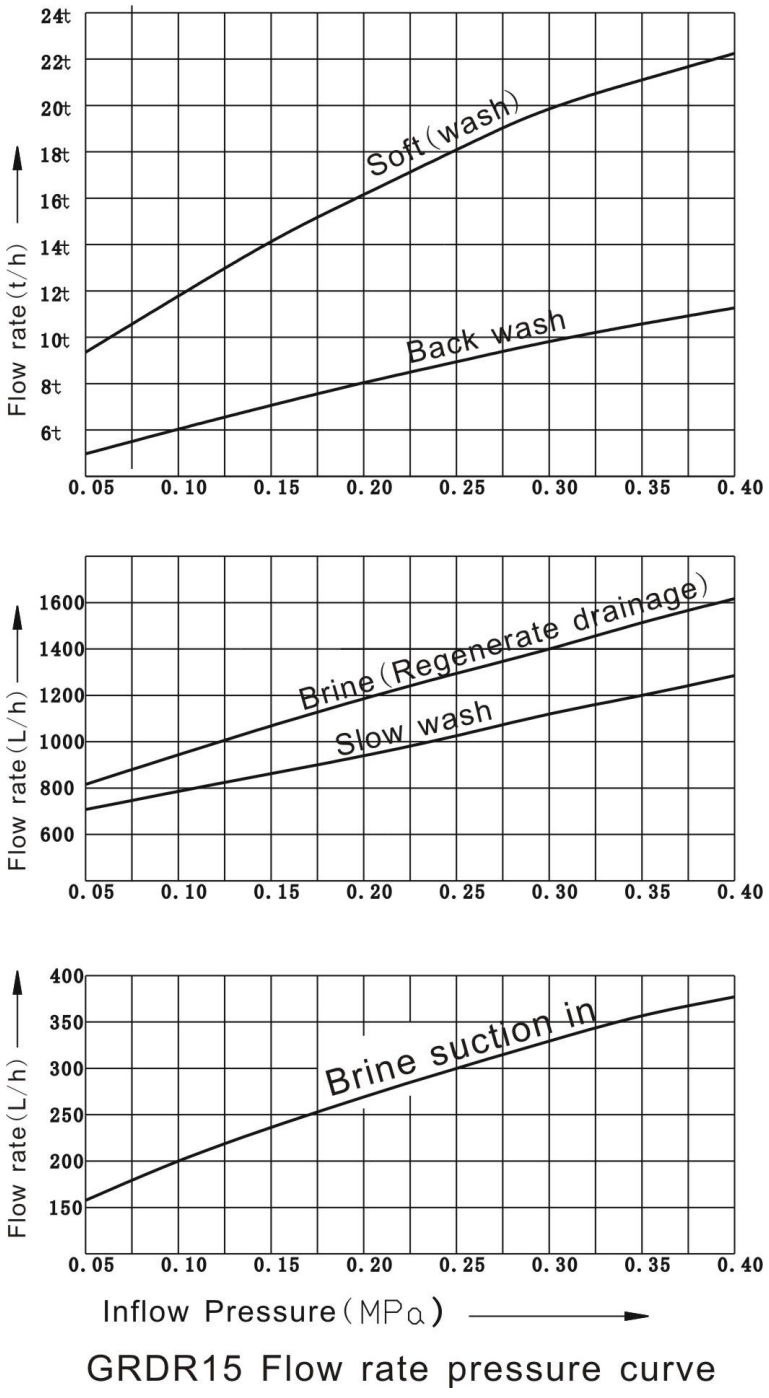



Figure39:Curve of Flow and Pressure for the Valve GR15/DR15

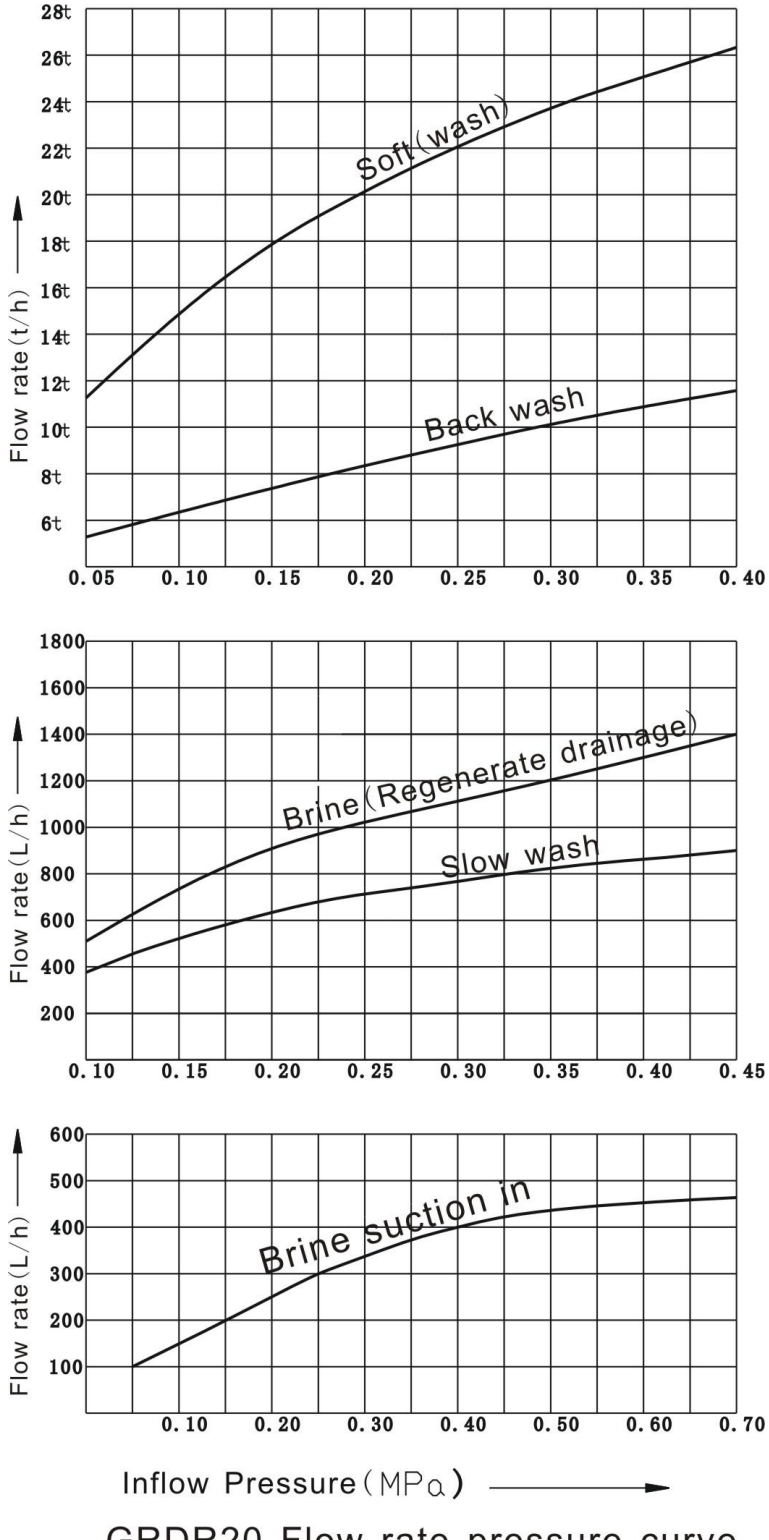
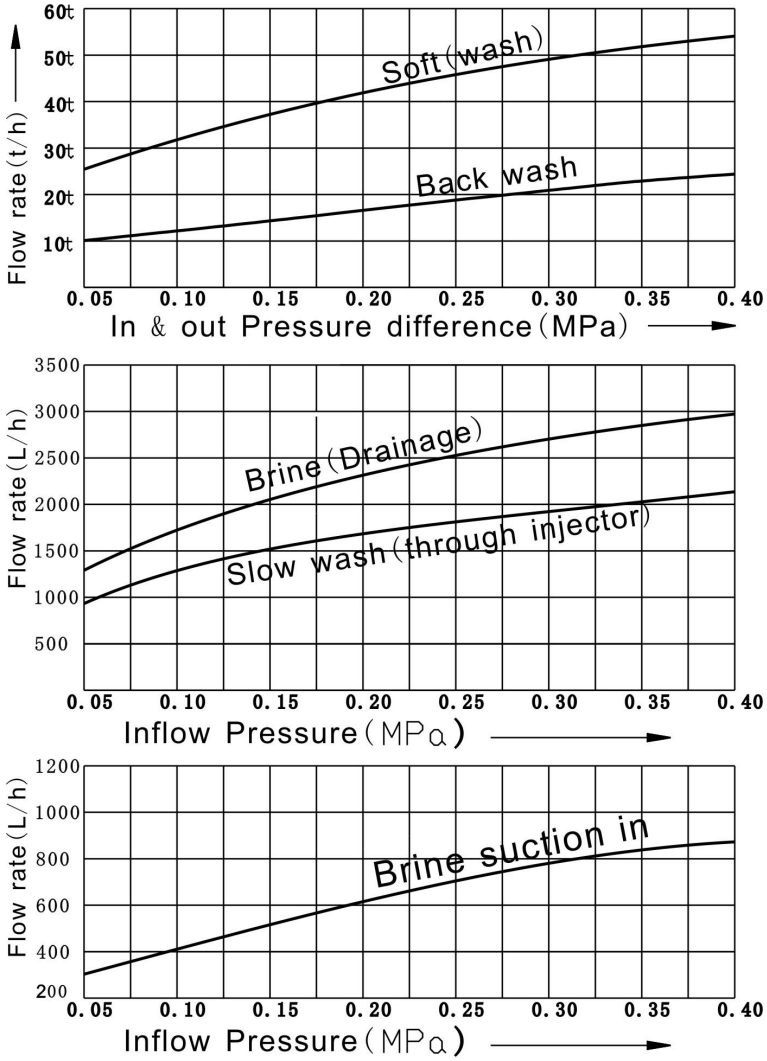
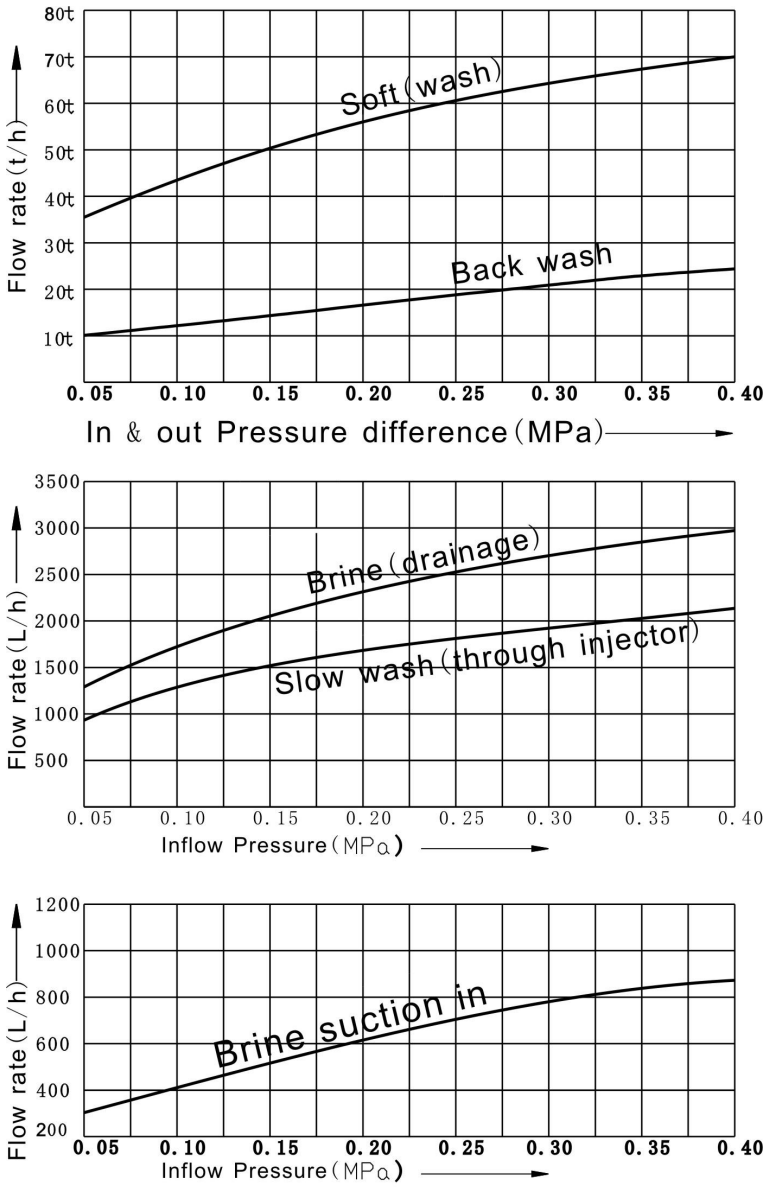



Figure 40: Curve of Flow and Pressure for the Valve GR20/DR20




GRDR40 Flow rate pressure curve

Figure41:Curve of Flow and Pressure for the Valve GR40/DR40




GRDR50 Flow rate pressure curve (Φ6×Φ10)

Figure 42:Curve of Flow and Pressure for the Valve GR50/DR50