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Rev.A.2203

润新® RUNXIN

Multi-functional Flow Control Valve for Water Treatment Systems

17603 (Old Model: F73)

User Manual

Please read this manual in details before using this valve and keep it properly in order to consult in the future

0WRX.466.509

MODEL:17603-F73

Before the valve put into use, please fill in the below content so as to help us to refer in the future.

Softener System Configuration

Tank Size: Dia._____mm, Height_____mm;

Resin Volume _____L, Brine Tank Capacity_____L;

Hardness of Raw water_____mmol/L;

Pressure of Inlet Water_____MPa;

Control Valve Model_____; Number_____;

The Specification of Drain Line Flow Control_____;

Injector No._____.

Water Source: Ground-water☐ Filtered Ground-water ☐Tap Water ☐ Other_____.

Parameter Set

Parameter	Unit	Factory Default	Actual Value
Time of Day	Hour:Minute	Current Time	
Control Mode A-01/03/11/13	/	A-01	
Interval Backwash Times	/	F-00	
Water Treatment Capacity	m^3	10.00	
Resin Volume	L.	50L	
Feed Water Hardness	mmol/L	1.2mmol/L	
Regeneration Factor	/	0.65	
Unit Mode HU01/02/03	/	HU01	
Fast Rinse Time	min.	10	
Backwash Time	min.	10	
Brine & Slow Rinse Time	min.	60	
Brine Refill Time	min.	05	
Maximum Interval Regeneration Days	D.	30	
Signal Output Mode b-01 (02)	/	b-01	

●If there is no special requirement when product purchase, we choose 5# drain line flow control, and 8# injector for the F73 standard configuration.

Catalogue

MODEL:17603-F73

Notice

●To ensure normal operation of the valve, please consult with professional installation or repairing personnel before use it.

●If there are any of pipeline engineering and electric works, there must be finished by professional at the time of installation.

●Do not use the control valve with the water that is unsafe or unknown quality.

●Depending on the changing of working environment and water requirement, each parameter of softener should be adjusted accordingly.

●When the water treatment capacity is too low, please check the resin. If the reason is short of resin, please add; if the resin is turned to reddish brown or broken, please replace.

●Test water periodically to verify that system is performing satisfactorily.

●Sodium used in the water softening process should be considered as part your overall dietary salt intake. Contact doctor if you are on a low sodium diet.

●Ensure that there is solid salt all the time in the brine tank in the course of using, when this valve is used for softening. The brine tank should be added the crystalline coarse salt only, at least 99.5% pure, forbidding use the small salt.

●Do not put the valve near the hot resource, high humidity, corrosive, intense magnetic field or intense librations environment. And do not leave it outside.

●Forbidden to carry the injector body. Avoid to use injector body as support to carry the system.

●Forbidden to use the brine tube or other connectors as support to carry the system.

●Please use this product under the water temperature between 5～45℃, water pressure 0.15～0.6MPa. Failure to use this product under such conditions voids the warranty.

●If the water pressure exceeds 0.6MPa, a pressure reducing valve must be installed in front of the water inlet. While, if the water pressure is under 0.15MPa, a booster pump must be installed in front of the water inlet.

●Do not let children touch or play, because careless operations may cause the procedure changed.

●When the attached cables of this product and transformer are damaged, they must be changed to the one that is from our factory.

1. Product Overview

1.1. Main Application & Applicability

Used for softening or demineralization water treatment systems.

Be suitable for continuous water supply occasion.

1.2. Product Characteristics

●Simple structure and reliable sealing

It adopts hermetic head faces with high degree pottery and corrosion resistance for opening and closing. Using U1, U2 service tank for switching, it combines with Regeneration such as Standby, Fast Rinse, Backwash, Brine & Slow Rinse, Brine Refill.

●Meter type regeneration, single valve with double tanks to achieve continuous water supply.

●Manual function

Realize regeneration immediately by pressing  at any time.

●Long outage indicator

If outage overrides 3 days, the time of day indicator 12:12 will flash to remind people to reset new time of day. It's no need to reset parameters. The process will continue to work after power on.

●LED Dynamic Display Screen

The stripes on dynamic screen flash, which indicates the control valve is in service, otherwise, it is in regeneration cycle.

●Buttons lock

No operations to buttons within 1 minute, keyboard is locked automatically. Before operation, press and hold  and  buttons for 5 seconds to unlock. This function can avoid incorrect operation.

●Down-flow regeneration, up-flow regeneration can be interchanged in a valve.

Choose down-flow regeneration or up-flow regeneration by program selection.

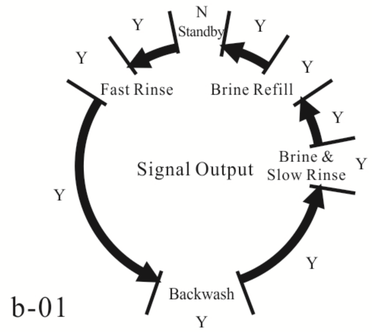
●Interval backwash times (Suitable for up-flow regeneration type)

It could set up interval backwash times for up-flow regeneration type, which means several times of services but one time of backwash. The setting of interval backwash times is depending on the local water turbidity. (The lower the turbidity is, the longer of the interval backwash time can be set)

●Signal output connector

There is a signal output connector on main control board. It is for controlling external wiring (Refer to figures from Figure 3-2 to Figure 3-8).

There are two kinds of output modes. b-01 Mode: Turn on start of regeneration and shut off end of regeneration; b-02 Mode: Signal available only at intervals of each status.



●Remote handling connector

This connector can receive external signal, used together with PLC, and computer etc. to control the valve. (Application refer to Figure 3-10)

●Pressure relief output

The valve will cut off feeding water to drain line when it switches in regeneration cycles (Same as signal output b-02). Thus in some water treatment system, e.g. Deep Well, one booster pump was installed on the inlet to increase the system water feeding pressure, this cut-off will cause pressure on inlet rising too fast to damage the valve. Pressure Relief Output can be used to avoid this problem. (Application refer to Figure 3-9)

●Maximum interval regeneration days

Under the situation of service reaching the setting days and the volume not yet, it could enter into regeneration process forcibly when current time is the same as regeneration time.

●All parameters can be modified

According to the water quality and usage, the parameters in the process can be adjusted.

1.3. Service Condition

Runxin valve should be used under the below conditions:

Items		Requirement
Working conditions	Water pressure	0.15MPa ~ 0.6MPa
	Water temperature	5℃ ~ 45℃
Working environment	Environment temperature	5℃ ~ 45℃
	Relative humidity	≤95%(25℃)
	Electrical facility	AC100 ~ 240V/50 ~ 60Hz
Inlet water quality	Water turbidity	Down-flow regeneration＜5FTU; Up-flow regeneration＜2FTU
	Water hardness	First Grade Na^+＜6.5mmol/L; Second Grade Na^+＜10mmol/L

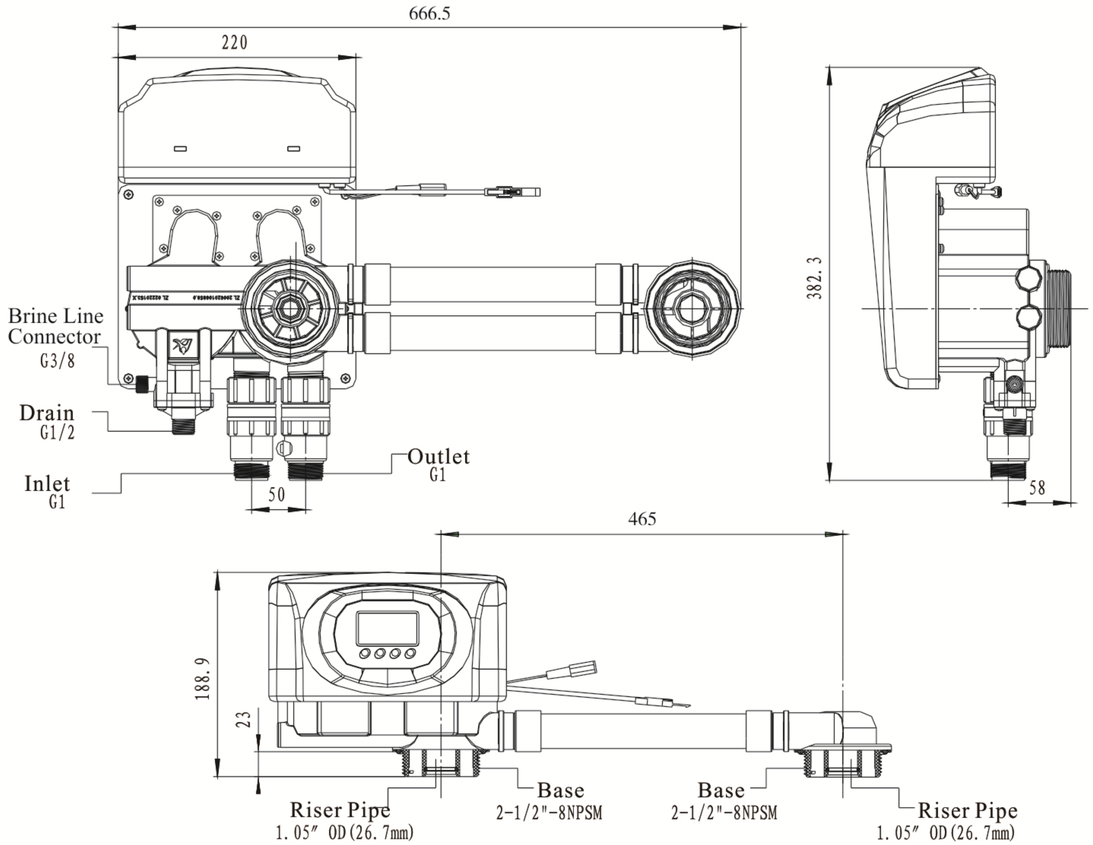
Inlet water quality	Free chlorine	< 0.1mg/L
	Iron2^{+}	< 0.3mg/L
	CODMn	< 2mg/L (O_2)

In the above table, First Grade Na^+ represents First Grade Na^+ Exchanger. Second Grade Na^+ represents Second Grade Na^+ Exchanger.

● When the water turbidity exceeds the conditions, a filter should be installed on the inlet of control valve.

● When the water hardness exceeds the conditions, the outlet water hardness will hardly reach the requirement of boiler feed water (0.03 mmol/L). It is suggested to adopt second grade softener.

1.4. Product Structure and Technical Parameters (The appearance is just for reference. It is subjected to the real product.)



Model	Applicable Power Adapter Output	Flow Rate m^3/h @0.3MPa	Regeneration Mode
17603(F73)	DC12V, 1.5A	3.5	Down-flow/Up-flow

1.5. Installation

A. Installation notice

Before installation, read all those instructions completely. Then obtain all materials and tools needed for installation.

The installation of product, pipes and circuits, should be accomplished by professional to ensure the product can operate normally.

Perform installation according to the relative pipeline regulations and the specification of Water Inlet, Water Outlet, Drain Outlet, Brine Line Connector.

B. Device location

①The softener should be located close to drain.

②Ensure the unit is installed in enough space for operating and maintenance.

③Brine tank need to be close to softener.

④The unit should be kept away from the heater, and not be exposed outdoor. Sunshine or rain will cause the system damage.

⑤Please avoid to install the system in one acid/alkaline, magnetic or strong vibration circumstance, because above factors will cause the system disorder.

⑥Do not install the filter or softener, drain pipeline in circumstance which temperature may drop below 5℃, or above 45℃.

⑦Install the system in the place where with the minimum loss in case of water leaking.

C. Pipeline installation

①Install control valve

a. As the Figure 1-1 shows, select the riser pipe with 26.7mm OD, glue the riser pipe to the bottom strainer and put it into the mineral tank, cut off the exceeding tube out of tank top opening.

b. Fill specified quantity of resin to the tank (The distance between two tank centers is 465mm).

c. Screw top strainer into valve.

d. Insert the riser pipe into control valve and screw tight control valve.

e. Install another tank with base connector as above steps.

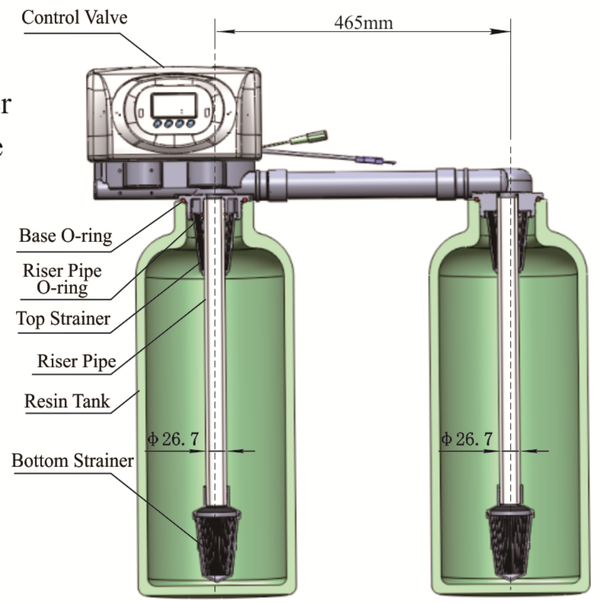


Figure 1-1

Notice:

● The length of riser tube should be neither higher 2mm nor lower 5mm than tank top opening height, and its top end should be rounded to avoid damage of O-ring inside the valve.

●Avoid filling floccules substance together with resin into resin tank.

●Avoid O-ring inside control valve falling out while rotating it on the tank.

②Install animated connector

As Figure 1-2 shows, put the sealing ring into nut of animated connector, and screw in water inlet.

③Install flow meter

As Figure 1-2 shows, put the sealing ring into nut of flow meter, screw in water outlet; insert the probe wire into flow meter.

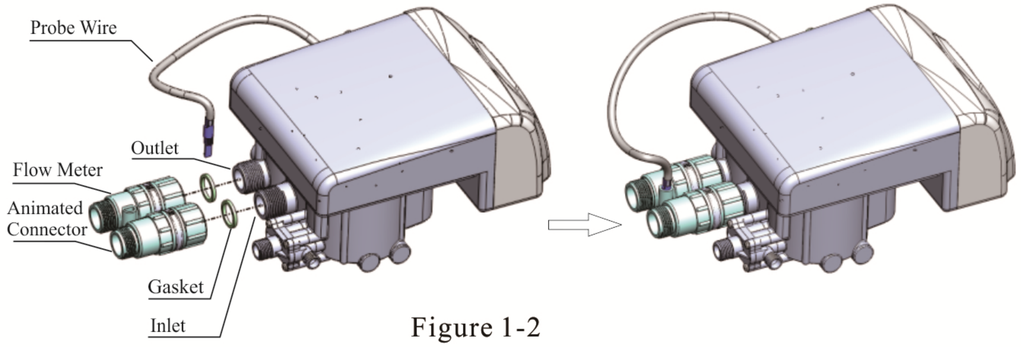


Figure 1-2

④Pipeline connection

a. As Figure 1-3 shows, install a pressure gauge in water inlet.

b. Install valve A, valve B, valve C and valve D in inlet, outlet and between the inlet and outlet pipeline. Valve D is a sampling valve. (Or adopt F70C bypass valve).

c. Inlet pipeline should be in parallel with outlet pipeline. Support inlet and outlet pipeline with fixed holder.

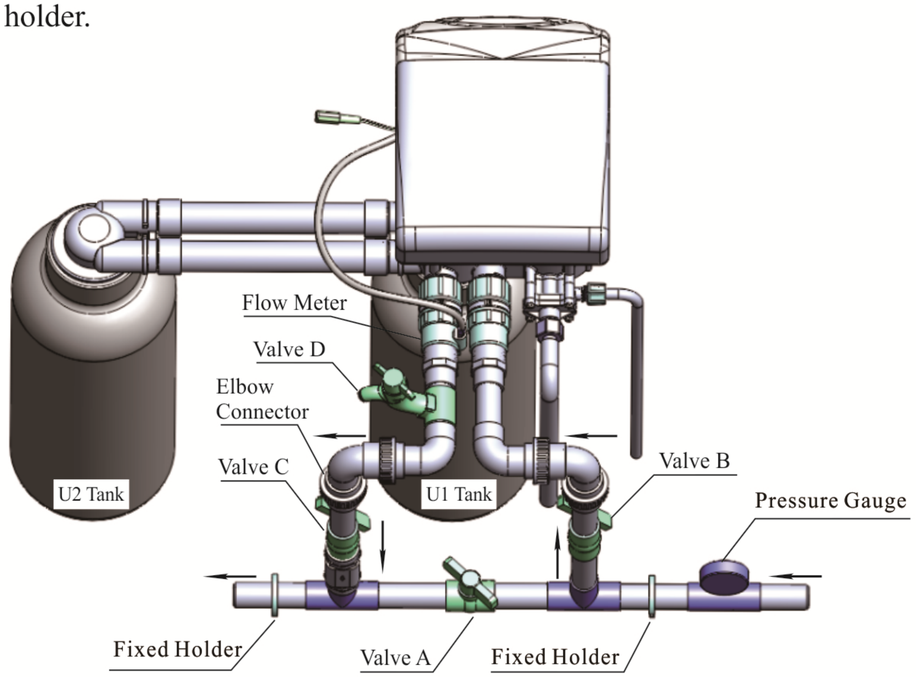


Figure 1-3

Notice

●If making a soldered copper installation should do all sweat soldering before connecting pipes to the valve. Torch heat will damage plastic parts.

●When turning threaded pipe fittings onto plastic fitting, use care not to cross thread or break valve.

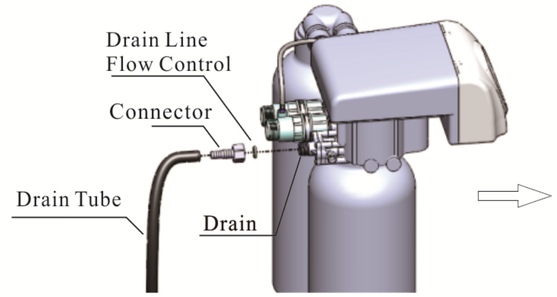
⑤Install drain pipeline

a. As the Figure 1-4 shows, slide the drain hose connector into drain outlet.

b. Insert drain line flow control into drain outlet.

c. Screw drain hose connector into drain outlet, and lock it.

d. Locate the drain hose well as the Figure1-4 shows.



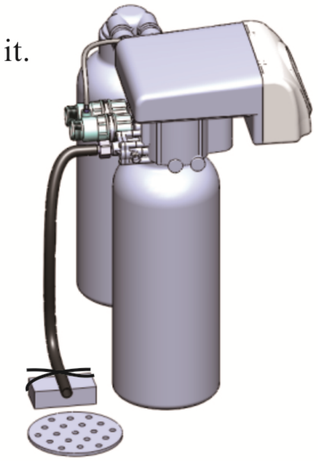


Figure 1-4

Notice:

●Control valve should be higher than drain outlet, and be better not far from the drain hose.

●Be sure not connect drain with sewer directly, and leave a certain space between them, to avoid wastewater being absorbed to the water treatment equipment, such as showed in the Figure 1-4.

●If necessary can use a container to take drainage, the drain hose should be kept in certain distance from container as well.

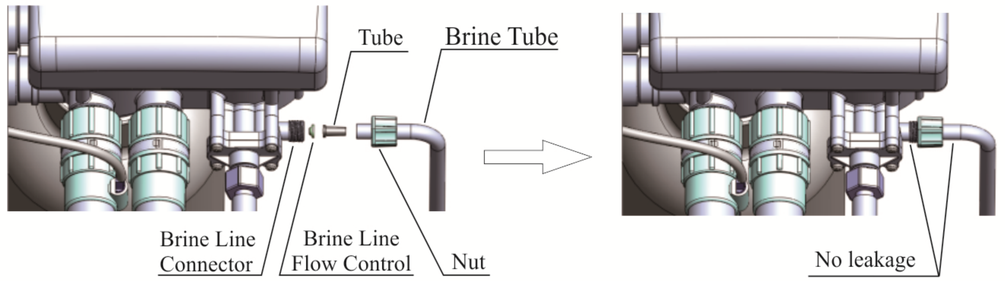


Figure 1-5

⑥Connect brine tube

a. As Figure 1-5 shows, slide 3/8" brine tube hose connector over end of brine tube.

b. Insert tube bushing into the end of brine tube.

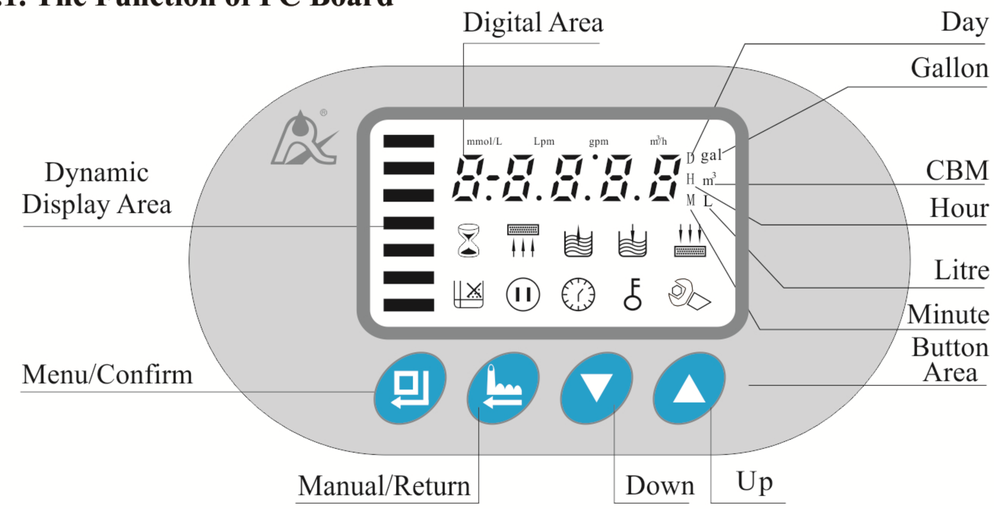
c. Insert the red brine line flow control into valve brine line connector (Attention: cone side of control should face into valve)

e. Connect the other end of brine tube with the brine tank. (The liquid level controller with air block function should be installed in the brine tank.)

Remark: The brine tube and drain pipeline should not be bended or plugged.

2. Basic Setting & Usage

2.1. The Function of PC Board



A. **Time of day indicator**

● Lights on, display the time of day.

● When "12:12" flashes, remind you to reset the time of day if electrical service is interrupted 3 days more (If electrical service is interrupted within 3 days, it doesn't need to reset the time.)

B. Button lock indicator

● Lights on, indicates the buttons are locked. At this moment, press any single button will not work (No operation in one minute, will light on and lock the buttons.)

● Solution: Press and hold both and for 5 seconds until the lights off.

C. Program mode indicator

● Lights on, enter program display mode. Press or to view all values.

● Flashes, enter program set mode. Press or to adjust values.

D. Menu/Confirm button

● In menu mode, press and lights on, then enter program display mode, viewing all values.

● In program display mode, press and lights on, then enter program set mode, adjusting all values.

● Press after all program are set, and then the voice "Di" means all settings are success and return program display mode.

E. Manual/Return button

● Press in any status, it can proceed to next step. (For example: if the outlet water is unqualified, after unlock buttons, press in Service status, it will start regeneration cycles instantly; During regeneration cycles, if you want to terminate a step in advance, press to move on to the next step.)

● Press in program display mode, and it will return to Service;

● Press in program set mode, and it will return program display mode.

● Press while adjusting the value, then it will return program display mode directly without saving value.

F. Down and Up

● In program display mode, press or to view all values.

● In program set mode, press or to adjust values.

● Press and hold both and for 5 seconds to unlock the Button Lock status.

2.2.Basic Setting & Usage

A. Parameter specification

Function	Indicator	Factory Default	Parameter Set Range	Instruction
Time of Day		Random	00:00~23:59	Set the time of day when use; ":" flashes.
Control Mode	A-01	A-01	A-01	Down-flow regeneration, regeneration immediately when the avaiable volume of treated water drops to zero(0).
			A-03	Intelligent Down-flow regeneration, regenerate starts when the available volume of treated water calculated according parameters drops to zero (0).
			A-11	Up-flow regenerate immediately when the available volume of treated water drops to zero (0).
			A-13	Intelligent Up-flow regeneration, regenerate starts when the available volume of treated water calculated according parameters drops to zero (0).
Interval Backwash Times	F-00	F-00	0~20	F-0X means X+1 cycles goes into 1 backwash.
Water Treatment Capacity	10.00	10.00	0~99.99	Water treatment capacity in one circle (m^3)
Unit Mode	HU-01	HU-01	01, 02, 03	01-m^3; 02-gal; 03-L
Resin Volume	50L	50L	5-500L	The resin volume in tank(L)
Feed Water Hardness	Yd1.2	1.2	0.1-9.9	Hardness of feed water (mmol/L)

Exchange Factor	AL.65	0.65	0.30-0.99	Relate to the raw water hardness. When hardness is higher, the factor is smaller.
Fast Rinse Time		10 min.	0~99	Fast rinse time (Minute)
Backwash Time		10 min.	0~99	Backwash time (Minute)
Brine & Slow Rinse Time		60 min.	0~99	Brine &Slow rinse time (Minute)
Brine Refill Time		5 min.	0~99	Brine refill time (Minute)
Maximum Interval Regener-ation Days	H-30	30	0~40	Regenerate on the day even though the available volume of treated water does not drop to zero (0).
Output Control Mode	b-01	01	01or 02	b-01: Signal will turn on during the regeneration. (Refer to P4). b-02: Signal is only available at intervals of regeneration cycles and in service. (Refer to P4).

B. Process Display

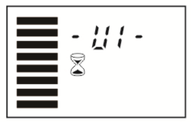


Figure A

Figure B

Figure C

Figure D

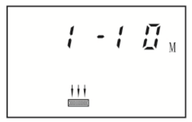


Figure E

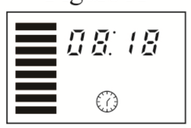


Figure F

Figure G

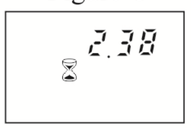


Figure H

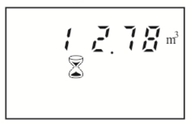


Figure J

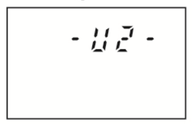


Figure I

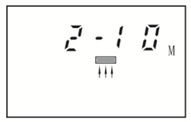


Figure L

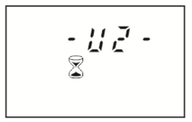


Figure M

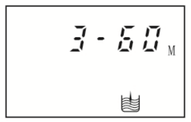


Figure N

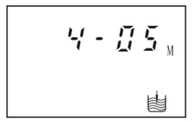


Figure O

Figure P

Figure Q

Notice:

●When tank U1 in Service while tank U2 is standby: Figure A/B/C/D display every 5 seconds in cycle.

●When tank U1 in Service while tank U2 in Fast Rinse: Figure E/F/G/H/J display every 5 seconds in cycle.

●Service tank switching from U1 tank to U2 tank display as Figure I; Service tank switching from U2 tank to U1 tank display as Figure Q.

●When tank U2 in Service while tank U1 in Backwash: Figure L/F/M/H/J display every 5 seconds in cycle.

●When tank U2 in service while tank U2 in Brine & Slow Rinse: Figure N/F/M/H/J display every 5 seconds in cycle.

●When U2 in Service while tank U2 in Brine Refill: Figure O/F/M/H/J display every 5 seconds in cycle.

●When tank U2 in Service while tank U1 is standby: Figure P/B/C/D display every 5 seconds in cycle.

●Display screen shows "-00-" or "F-00" when motor is switching.

●The time of day figure flashes continuously, such as "12:12" flashes, indicates long outage of power. It reminds to reset the time of day.

●The time of day figure flashes continuously, such as "12:12" flashes, indicates long outage of power. It reminds to reset the time of day.

●The display will show the error code, such as "-E1-" when the system is in error.

C. Usage

After being accomplished installation, parameter setting and trial running by professional, the valve could be put into use. In order to ensure the quality of outlet water can reach the requirement, the user should complete the below works:

①Ensure that there is solid salt all the time in the brine tank in the course of using when this valve is used for softening. The brine tank should be added the crystalline coarse salt only, at least 99.5% pure, forbidding use the small salt and iodized salt.

②Test the outlet water and raw water hardness at regular time. When the outlet water hardness is unqualified, please press the after unlock the buttons and the valve will temporarily regenerate again (It will not affect the original set operation cycle).

③When the feed water hardness change a lot, you can adjust the water treatment capacity as follow:

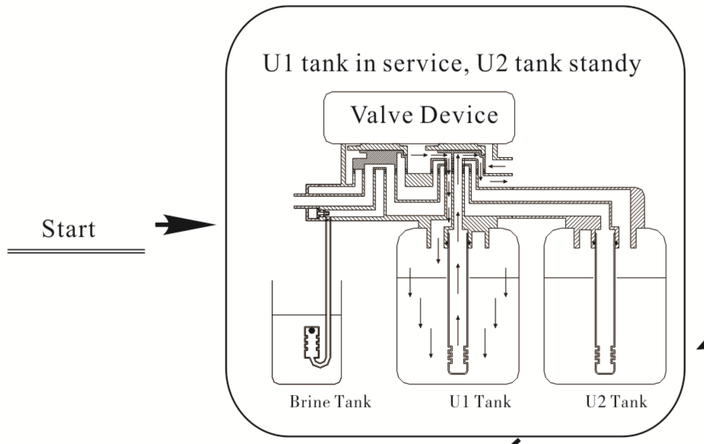
Press and hold both and for 5 seconds to unlock the lock status. Press , and the lights on, then press , the digital area show the control mode (Such as show A-01), then press and the digital area will show the given water treatment capacity; Press again, and digital number flash, enter water treatment capacity set mode. Press or continuously, reset the capacity value (Or water hardness). Press and hear a sound "Di", then finish the adjustment. Press exit and turn back the service status.

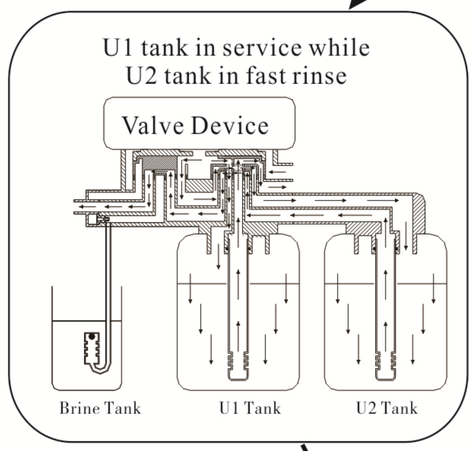
The estimates of cycle water treatment capacity value can refer to the professional application instruction. When select A-03 or A-13 as the control mode, controller will calculate the cycle water treatment capacity automatically by setting feed water hardness, resin volume and exchange factor.

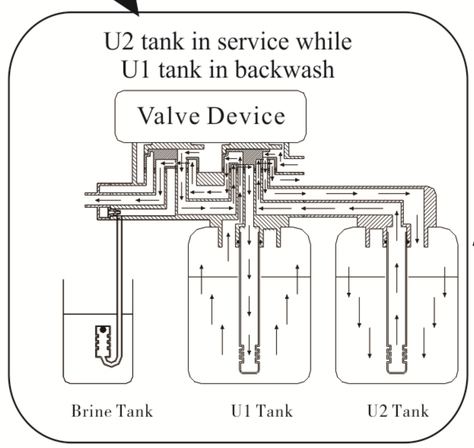
The regeneration parameters have been set when control valve left factory. Generally, it does not need to reset. If you want enquiry and modify the setting, you can refer to the professional application specification.

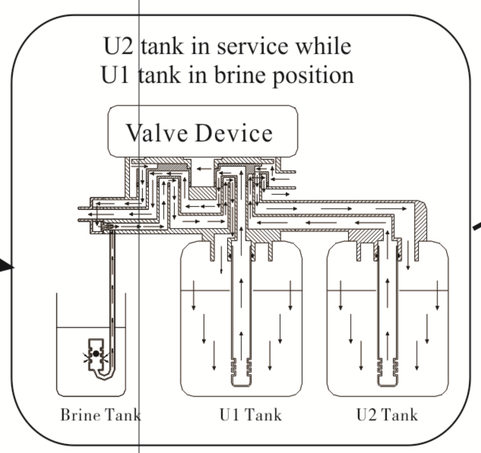
3.Applications

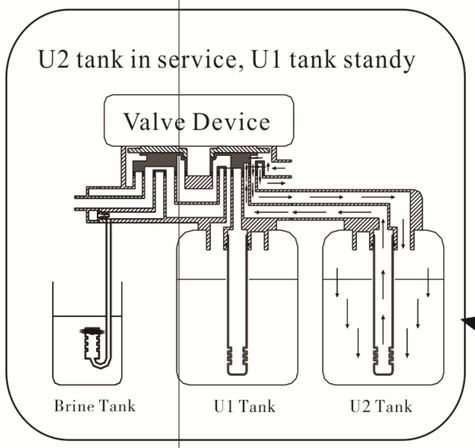
3.1. Softener Flow Chart

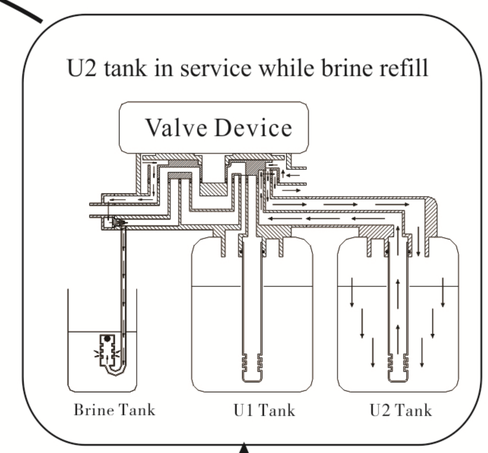


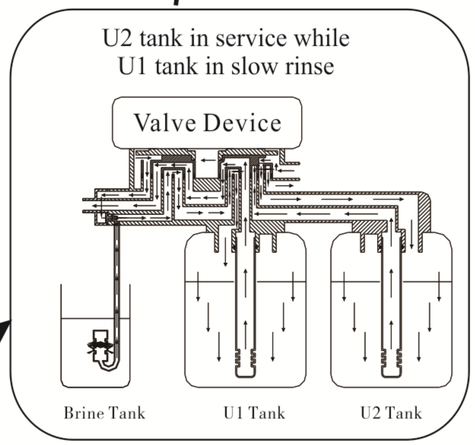












MODEL:17603-F73

3.2. The Function and Connection of PC Board

Open the front cover of control valve, you will see the main control board and connection port as Figure 3-1:

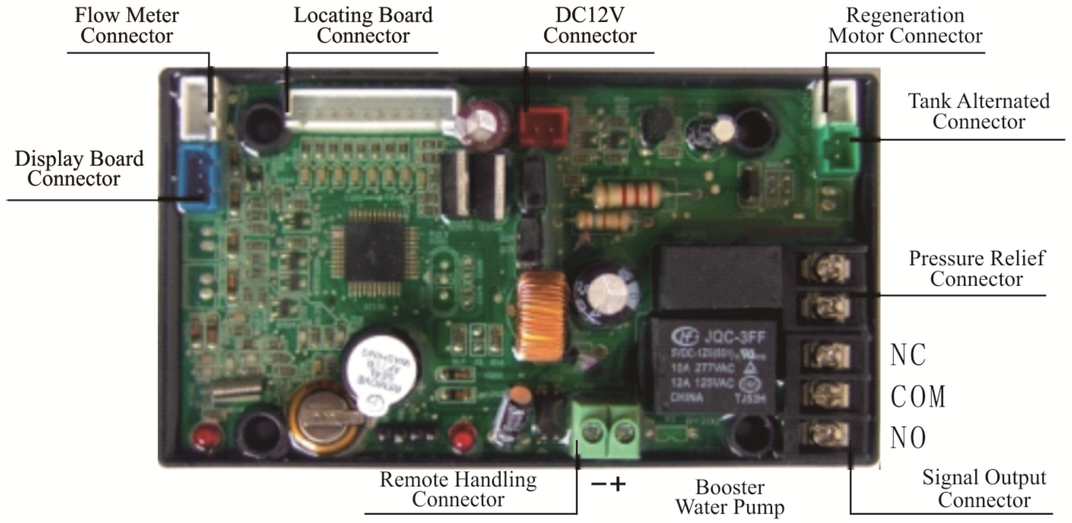


Figure 3-1

The main functions on main control board:

Function	Application	Explanation
Signal output connector b-01	Outlet solenoid valve	Used in strict requirements regarding no hard water flowing from outlet or controlling the liquid level in water tank.
	Inlet pump	Increase pressure for regeneration or washing. Use the liquid level controller to control inlet pump to ensure there is water in tank.
Signal output connector b-02	Inlet solenoid valve or inlet pump	When inlet pressure is high, it needs to close water inlet to protect motor when valve is rotating.
Pressure relief connector	Control the inlet bypass to release pressure	When valve is rotating, pressure relief connector is opened to prevent pressure increasing rapidly.
Interlock connector	To ensure only one control valve regenerate or wash in system.	Use in RO Pre-treatment, water supply together but regeneration in turn. Second grade ion exchange equipment, etc.
Remote handling connector	Receive signal to make the control valve rotate to next circle	It is used for online inspection system, connected with PC to realize automatically or remote controlling valve.

A. Signal Output Connector

1） Control Outlet Solenoid Valve (Set b-01)

①Solenoid Valve on Outlet Controls Water Level in Water Tank.

Instruction: If system strictly requires no hard water flowing from outlet in regeneration cycle (Mainly for no hard water flows out when valve is switching or valve in backwash or brine drawing positions), a solenoid valve could be installed on outlet, the wiring refers to Figure 3-2.

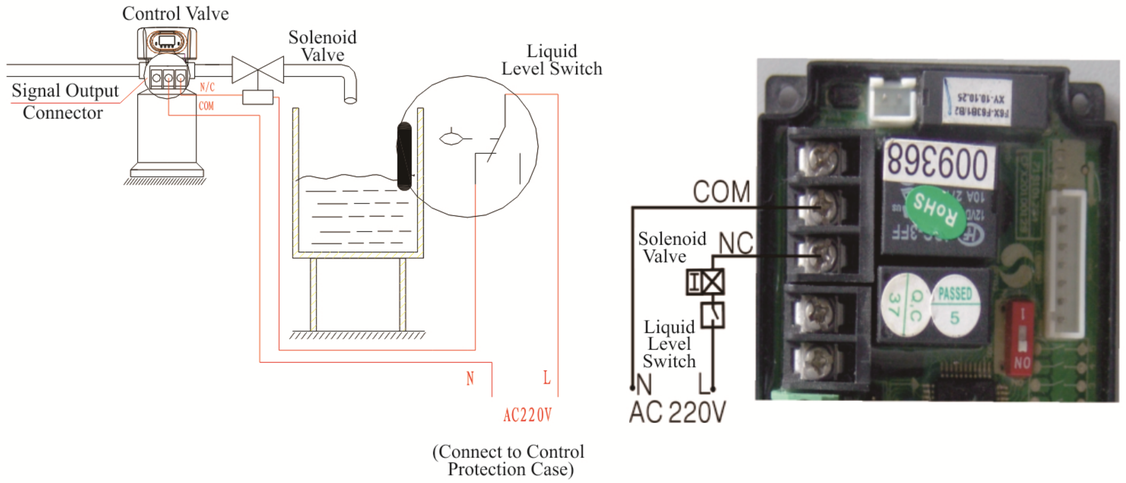


Figure 3-2 Wiring of Outlet Solenoid Valve

Function:

When valve is in service status, if soft water tank is short of water, solenoid valve will open to supply soft water, but if water tank has enough water, solenoid valve will close, so no soft water is supplied to the tank.

When the valve is in backwash status, there is no signal output. So, solenoid valve is closed, and no raw water flows into soft water tank.

②Control Inlet Solenoid Valve (Set b-02)

Instruction: When inlet pressure exceeds 0.6MPa, install a solenoid valve on inlet. Control mode is b-02. Pressure is relieved when valve switching, the wiring refers to Figure 3-3. As Figure 3-4 shows, it also can use the pressure relief port to work.

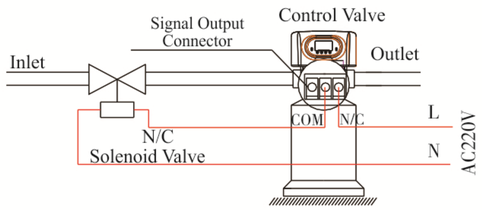


Figure 3-3 Wiring of Solenoid Valve on Inlet

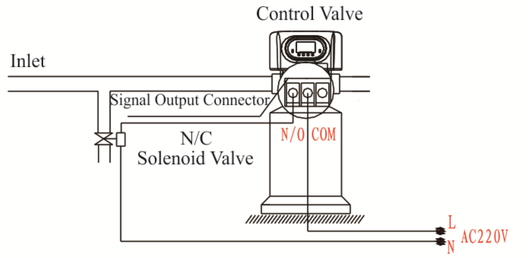


Figure 3-4 Wiring of Pressure Relief Connector

Function:

When inlet pressure is high, install a solenoid valve on inlet to ensure valve switches properly. The solenoid valve will open when valve is exactly at position of U1 tank in service while U2 tank standby, U1 tank in service while U2 tank in fast rinse, U2 tank in service while U1 tank in backwash or other status of service. When valve is switching, solenoid valve is closed, no water flows into valve to ensure valve switching properly.

2) Liquid Level Controller Controls Inlet Pump (Two-phase motor) (Set b-01)

Instruction: For the system using underground water or middle-tank supplying water, users can turn on and turn off the pump by operating the switch of liquid level controller and control valve. The wiring refers to Figure 3-5:

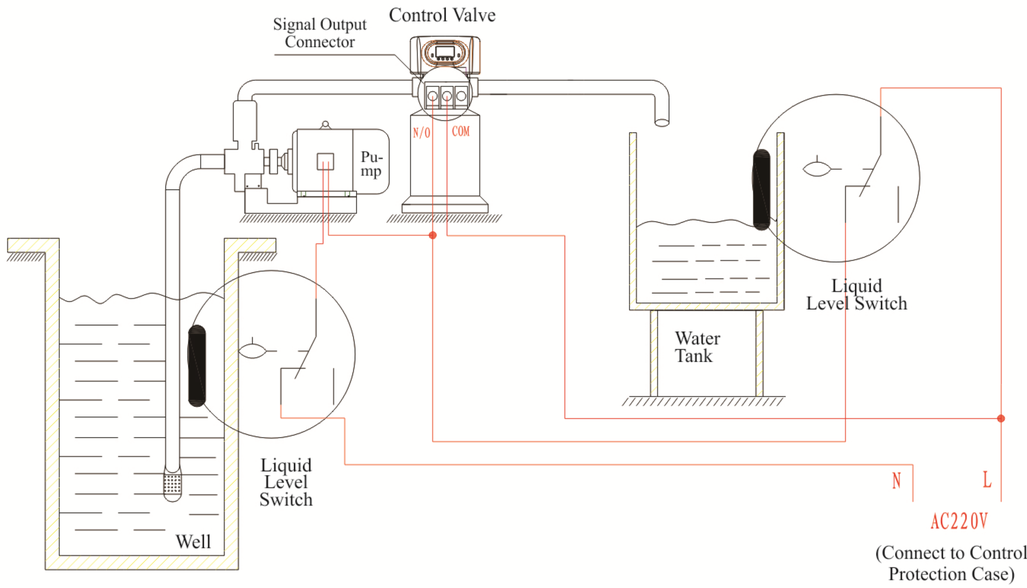


Figure 3-5 Wiring of Liquid Level Controller Controlling Inlet Pump

Function:

When valve is in standby status, if water tank is short of water, pump starts working, but if water tank has enough water, the switch of liquid level controller is closed, so pump doesn't work.

When valve in regeneration cycle, inlet always has water no matter what water condition in water tank is. As Runxin valve no water pass outlet in regeneration cycle, it ensure no lots of water fill into water tank.

A liquid switch at the top opening of well or in middle water tank in RO system protect pump from working without water in case of out of raw water.

3) Liquid Level Switch in Water Tank Controls Inlet Pump (Three-phase motor) (Set b-01)

This application applies the same principle as two-phase motor, only the single-phase pump is replaced by a three-phase motor with an AC contactor (Figure 3-6).

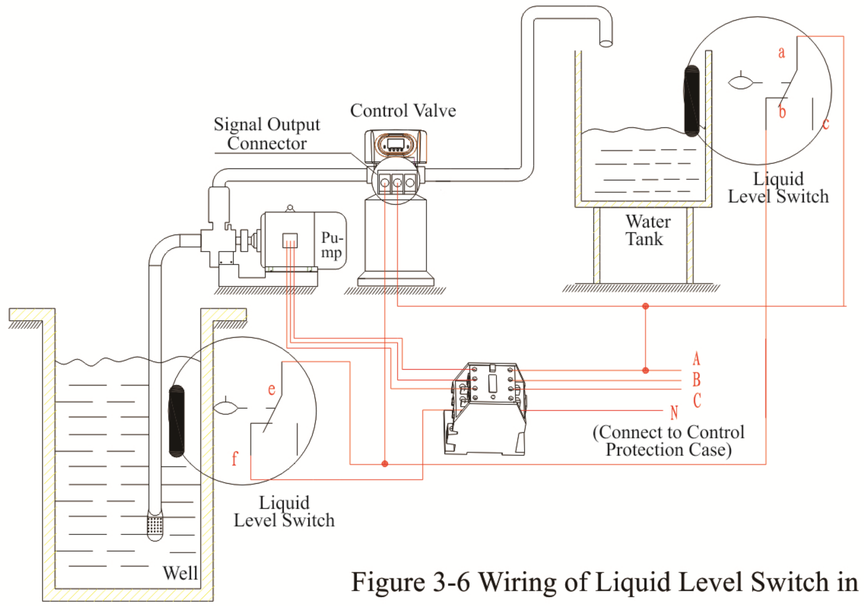


Figure 3-6 Wiring of Liquid Level Switch in Water Tank Controls 380V Inlet Pump

4) Control Inlet Booster Pump (Set b-01 or b-02)

Instruction: If inlet water pressure is less than 0.15MPa, which makes backwash or brine drawing difficult, a booster pump is suggested to be installed on inlet. Set control mode as b-01. When system in regeneration cycle, booster pump opens, the wiring refers to Figure 3-7. If the booster pump current is bigger than 5A, system need to install a contactor, the wiring refers to Figure 3-8.

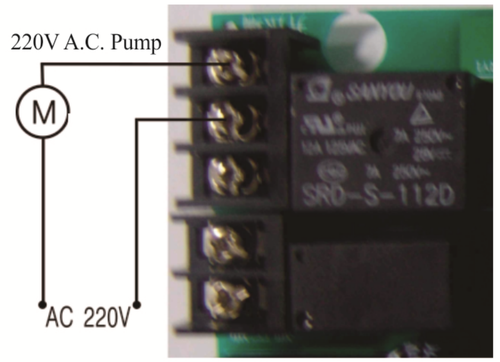


Figure 3-7 Wiring of Booster Pump on Inlet

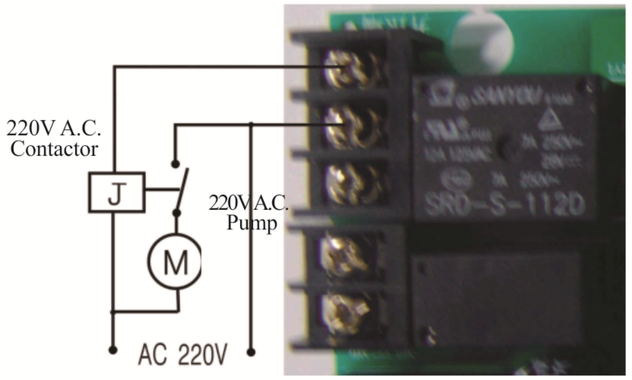


Figure 3-8 Wiring of Booster Pump on Inlet

B. Pressure Relief Connector

Runxin valve will cut off feeding water to drain line when it switches in regeneration cycles. Thus in some water treatment system, e.g. Deep Well, one booster pump was installed on the inlet to increase the system water feeding pressure, this cut-off will cause pressure on inlet rising too fast to damage the valve. Pressure Relief Output can be used to avoid this problem. The wiring refers to Figure 3-9.

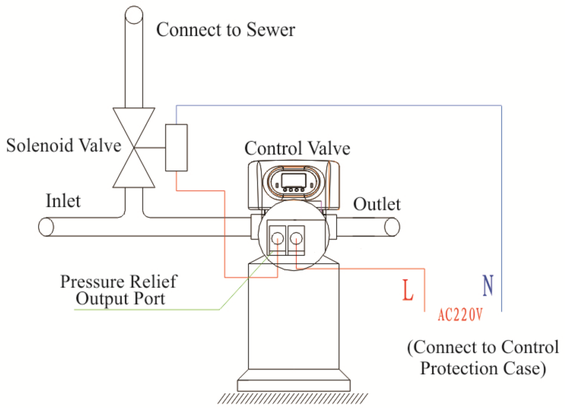


Figure 3-9 Wiring of
Pressure Relief Connector

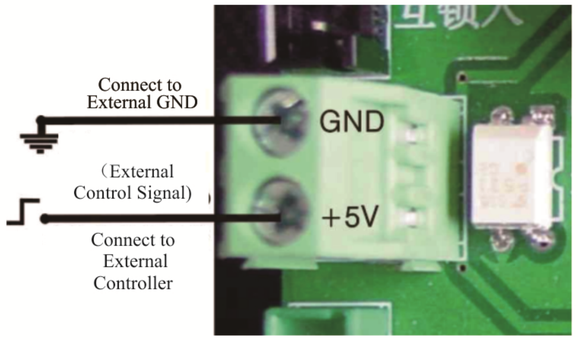


Figure 3-10 Wiring of Remote
Handling Connector

C. Remote Handling Connector

When the valve is used to make pure water or other system that can be monitored online or connected to a PC, etc., when the conductivity or other parameters reach the set value or the PC sends a signal and needs system regeneration, it can be provide a signal to remote handling connector of main control board by the signal line, which can make the valve regenerate immediately. The connector receiving the signal is equivalent to pressing the manual button. The wiring refers to Figure 3-10.

3.3. System Configuration and Flow Rate Curve

A. Product Configuration

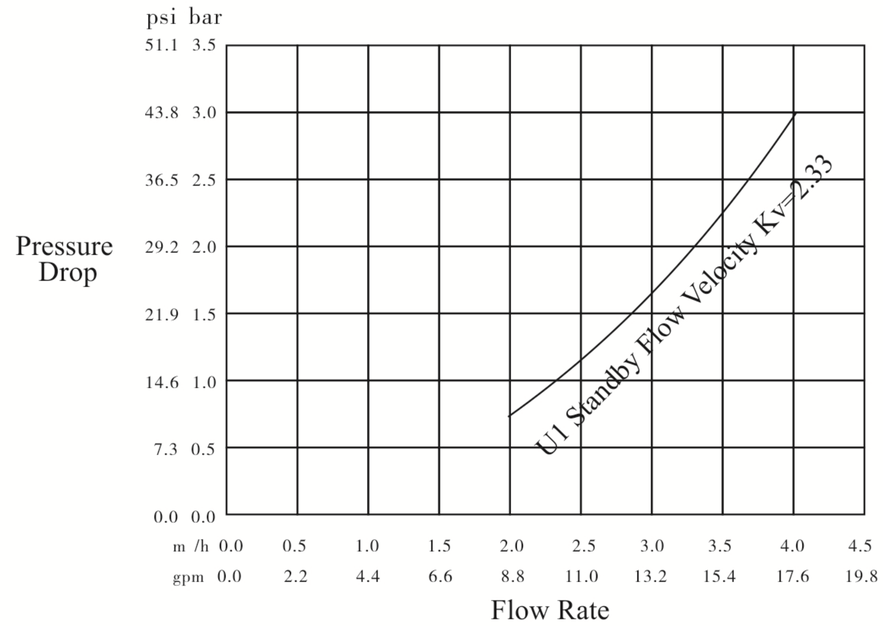
Product configuration with tank, resin volume, brine tank and injector

Tank Size (mm)	Resin Volume (L)	Flow Rate (t/h)	Brine Tank Size (mm)	The Minimum Salt Cons-umption for Regeneration (Kg)	Injector Model
ϕ300 × 1650	60	1.8	ϕ450 × 940	9.00	6306
ϕ355 × 1650	100	2.5	ϕ500 × 1060	15.00	6308

Attention: The flow rate calculation is based on linear velocity 25m/h; the minimum salt consumption for regeneration calculation is based on salt consumption 150g / L (Resin).

B. Flow Rate characteristic

1) Pressure-flow rate curve



2) Injector parameter table

Inlet Pressure	Draw Rate (L/M)									
MPa	6301 Coffee	6302 Pink	6303 Yellow	6304 Blue	6305 White	6306 Black	6307 Purple	6308 Red	6309 Green	6310 Orange
0.15	0.81	1.12	1.58	2.21	2.45	3.30	3.44	4.08	5.19	5.69
0.20	0.95	1.41	1.87	2.53	2.89	3.88	4.21	4.83	5.36	6.80
0.25	0.99	1.61	2.08	2.79	3.30	4.30	4.66	5.39	6.86	7.65
0.30	1.30	1.81	2.18	3.05	3.66	4.74	5.15	5.95	7.50	8.60
0.35	1.45	1.96	2.39	3.27	3.94	5.02	5.55	6.51	8.30	9.57
0.40	1.56	2.12	2.55	3.50	4.25	5.41	5.88	6.77	8.74	9.90

3) Configuration for Standard Injector and Drain Line Flow Control

Tank Dia. mm	Injector Model	Injector Color	Draw Rate	Slow Rinse	Brine Refill	DLFC	Backwash / Fast Rinse
			L/min	L/min	L/min		L/min
300	6306	Black	4.74	3.32	4.2	3#	14.4
350	6308	Red	5.95	4.0	4.0	4#	22.8

Remark: Above data for the product configuration and relevant characteristics are only for reference. When put in practice, please subject to the different requirements of raw water hardness and application.

3.4. Parameter settlement

①Service Time T1

Water Treatment Capacity:

$Q=V_R \times K \div Y_D\ (m^3)$

- Y_D — Hardness of Inlet Water (mmol/L)
- K — Exchange factor (mmol/L) 400～1000. Down-flow regeneration, take 400～750. Up-flow regeneration, take 450～1000. If the inlet water hardness is higher, the factor is smaller.
- V_R — Resin volume (m^3)

By hours： $T1=Q \div Q_h$ (hour)

- Q_h — m^3/h, Average water consumption per hour
- Q — m^3, Water treatment capacity

By days： $T1=Q \div Q_d$ (day)

- Q_d — m^3/d, Average water consumption per day
- Q — m^3, Water treatment capacity

② Backwash time T2

It is subject to the turbidity of inlet water. Generally, It is suggested to be set 10~15 minutes. The higher the turbidity is, the longer backwash time can be set. However, if the turbidity is more than 5FTU, it should be better to install a filter in front of the exchanger.

③Brine & slow rinse time T3

$T3=(40～50) \times H_R$ (min.)

Generally, $T3=45H_R$ (min.)

In this formula, H_R——The height of resin in exchange tank (m).

④ Brine refill time T4

Down-flow regeneration: $T4=0.45 \times V_R \div$ Brine refill speed

Up-flow regeneration: $T4=0.34 \times V_R \div$ Brine refill speed

In this formula, V_R——Resin volume (m^3).

The Brine refill speed is related to inlet water pressure. It is suggested to lengthen 1~2 minutes of calculated brine refilling time to make sure there is enough water in tank. (The condition is that the there is a brine valve installed in the brine tank）

⑤ Fast rinse time T5

$T5=12 \times H_R$ (min.)

Generally, the water for fast rinse is 3~6 times of resin volume. It is suggested to be set 10~16 minutes, but subject to the outlet water reaching the requirement.

⑥Exchange factor

Exchange factor = $E/(k \times 1000)$

In this formula, E——Resin working exchange capability (mol/m^3), it is related to the quality of resin. Down-flow regeneration, take 800～900. Up-flow regeneration, take 900～1200.

K——Security factor, always take 1.2～2. it is related to the hardness of inlet water: the higher the hardness is, the bigger the K is.

⑦Set up interval backwash times (Only for Mode A-11, A-13)

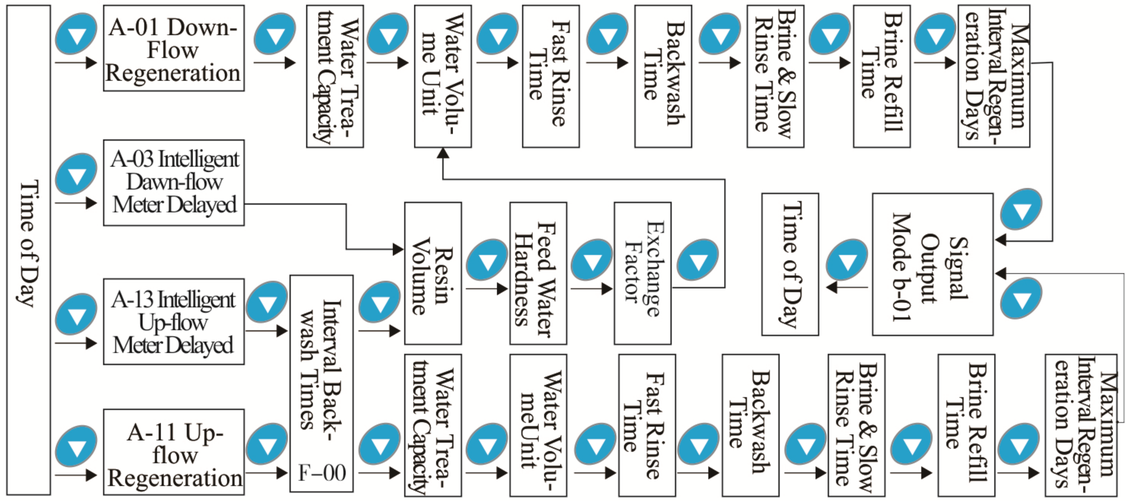
When the turbidity of raw water is higher, the interval backwash time could be set F-00. That is, backwash in each regeneration; when the turbidity is lower, the interval backwash time could be set F-01(Or other number value), it is to say that backwash in every two regeneration. Thus, Standby→Fast Rinse→Brine& Slow rinse→Brine refill→ Standby→ Fast rinse→Backwash →Brine& slow rinse →Brine refill →Standby.

The calculation of parameters for each step is only for reference, the actual proper time will be determined after adjusting by water exchanger supplier. This calculation procedure of softener is only for industrial application; it is not suitable for small softener in residential application.

3.5. Parameter Enquiry and Setting

(1) Parameter Enquiry

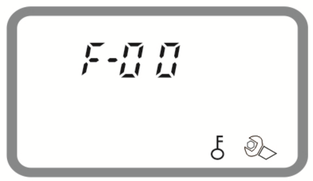
When lights on, press and hold both and for 5 seconds to unlock buttons; then press and lights on, enter into program display mode; press or to view each value according to below process. (Press exit and turn back to service status)

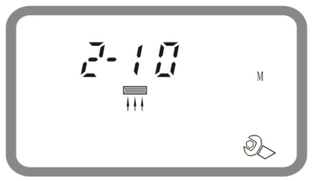


(2) Parameter Setting

In program display mode, press and enter into program set mode. Press or to adjust the value.

(3) Parameter Setting Steps

Item	Process Step	Symbol
Time of Day	When time of day "12:12" continuously flashes, it reminds to reset. 1. Press to enter into program display mode; both and symbol light on, ":" flashes. 2. Press to enter program set mode, both and hour value flash, through or to adjust hour value. 3. Press again, both and minute value flash, through or to adjust the minute value. 4. Press button to finish adjustment then press to return back.	
Control Mode	1. Press in control mode enquiry status to enter into setting status, then and 01 flash. 2.Press or ， set the value to be A-01, A-03, A-11 or A-13 control mode. 3. Press button to finish adjustment then press to turn back.	
Interval Back-wash Times	1. In Interval backwash times display status, it shows F-00. Press and enter into program set mode. and 00 value flash. 2． Press or to adjust the interval backwash times value. 3. Press to finish adjustment then press to turn back.	
Water Treat-ment Capacity	1. In water treatment capacity display status, it shows and 10.00. Press and enter into program set mode. and 10.00 flash. 2.Press or to adjust the water treatment capacity value (m^3). 3. Press to finish adjustment then press to turn back.	

Resin Volume	1. In resin volume display status, it shows 100L. Press and enters into program set mode. and 100 value flash. 2. Press or to adjust the volume value (L). 3. Press to finish adjustment then press to turn back.	
Feed Water Hard-ness	1. In feed water hardness display status, it shows yd1.2. Press and enter into program set mode. and 1.2 value flash. 2. Press or to adjust the hardness value (mmol/L). 3. Press to finish adjustment then press to turn back.	
Exch-ange Factor	1. In exchange factor display status, it shows AL.65. Press and enter into program set mode. and 65 flash. 2. Press or to adjust the exchange factor value. 3. Press to adjust the exchange factor value then press to turn back.	
Water Volume Unit	1. In water volume unit display status, press and enter into program set mode, and 01value flash. 2. Press or ， and choose from m^3/L/gal. 3. Press to finish adjustment then press to turn back.	
Fast Rinse Time	1. In fast rinse time display status, it shows and 1-10. Press and enter into program set mode. and 10 flash. 2. Press or to adjust the fast rinse time (minute). 3. Press to finish adjustment then press to turn back.	
Back-wash Time	1. In backwash time display status, it shows and 2-10. Press and enter into program set mode. and 10 flash. 2. Press or to adjust the backwash time (minute). 3. Press to finish adjustment then press to turn back.	

Brine & Slow Rinse Time	1. In brine& slow rinse time display status, it shows and 3-60. Press and enter into program set mode. and 60 flash. 2. Press or to adjust the brine time (minute) 3. Press to finish adjustment then press to turn back.	
Brine Refill Time	1. In brine refill time display status, it shows and 4-05, Press and enter into program set mode. and 05 flash. 2. Press or to modify the brine refill time (minute). 3. Press to finish adjustment then press to turn back.	
Maxi-mum Interval Regen-eration Days	1. In maximum Interval regeneration days display status, it shows H-30. Press and enter into program set mode. and 30 flash. 2. Press or to adjust the Interval regeneration days. 3. Press to finish adjustment then press to turn back.	
Signal Output Mode	1. In signal output mode display status, it shows b-01. Press and enter into program set mode. and 01flash 2. Press or to adjust the signal output mode (b-02). 3. Press to finish adjustment, then press to turn back.	

For example, the fast rinse time of a softener is 12 minutes. After regeneration, the chloridion in the outlet water is always higher than normal, indicating that there is not enough time for fast rinse. If you want the time to set to 15 minutes, the modification steps as follows:

①Press and hold both and to unlock the button (lights off).
②Press , and lights on.
③Press or continuously until lights on. Then the digital area shows: 1-12M.
④Press , and 12 flash.
⑤Press continuously until 12 is changed to 15.
⑥Press , there is a sound "Di" and the figure stop flashing; the program back to enquiry status.

⑦If you want to adjust other parameters, you can repeat the steps from ② to ⑤. If you don't, press and quit from the enquiry status, the display will show the current service status.

3.6. Trial running

After installing the multi-functional flow control valve on the resin tank with the connected pipes, as well as setting up the relevant parameter, please conduct the trial running as follows:

A. Close the inlet and outlet valve B & C, and open the bypass valve A. After cleaning the foreign materials in the pipe, close the bypass valve A. (As Figure 5 shows)
B. Make tank U1 in "Service" position and tank U2 in "Standby" position.
C. Slowly open the inlet valve B to 1/4 position, making the water flow into the U1 resin tank; turn on the outlet valve C after the flow stops. After all air is out of pipeline, close the outlet valve C and check if there is a leakage, if yes, solve the problem immediately.
D. Fully open the inlet valve (valve B).
E. Press button to make valve switch tank U2 into service position and tank U1 in backwash position. To make sure water flows out from drain pipe for 3~4 minutes.
F. Using hose or measure implement add water to brine tank until water reach to the top of air check valve. Then add required salt into brine tank as make it dissolved as far as possible.
G. Press button to make valve turn to brine & slow rinse position to regenerate U1 tank. Air check valve turns off and valve turns to slow rinse process for several minutes.
H. Press button to make valve turn to "Standby" position.
I. Press button to make valve turn to "Fast Rinse" position.
J. Take out some outlet water for testing. If it is qualified, press button to switch U1 tank in "Service", U2 tank in "Backwash" position. To make sure water flows out from drain pipe for 3~4 minutes.
K. Repeat above step 6 to step 9 to make U1 tank in "Service" position, U2 tank in "Standby" position. Then system can be come into use.

Notice:

●If water inflows too fast, the media in tank will be damaged. When water inflows slowly, there is a sound of air emptying from drain pipeline.
●After changing resin, please empty air in the resin according to the above Step C.
In the process of trial running, please check the water situation in all positions, ensuring there is no resin leakage.
●The time for Backwash, Brine & Slow Rinse, Brine Refill and Fast Rinse position can be set and executed according to the calculation in the formula or suggestions from the control valve suppliers.

3.7. Trouble-Shooting

A. Control Valve Fault

Problem	Cause	Correction
1.Softener fails to regenerate.	A. Electrical service to unit has been interrupted. B. Regeneration cycles set incorrect. C. Controller is defective. D. Motor fails to work.	A. Assure permanent electrical service (Check fuse, plug, pull chain or switch). B. Reset regeneration time. C. Check or replace controller. D. Check or replace motor.
2.Regeneration time is not correct.	A. Time of Day does not set correctly. B. Power failure more than 3 days, the time of day is incorrect.	A. Check program and reset time of day. B. Reset time of day.
3. Softener supply hard water.	A. Bypass valve is opened or leaking. B. No salt in brine tank. C. Injector is plugged. D. Insufficient water flows into brine tank. E. Leak at O-ring on riser pipe. F. Internal valve leaks. G. Incorrect regeneration time or raw water quality deterioration. H. Shortage of resin. I. Bad quality of feed water or turbine is blocked.	A. Close or repair bypass valve. B. Add salt to brine tank and maintain salt level above water level. C. Change or clean injector. D. Check brine tank refill time. E. Make sure riser pipe and O-ring is not cracked. F. Check valve body and change if necessary. G. Set correct regeneration time or water treatment capacity. H. Add resin to mineral tank and check whether resin leaks. I. Reduce the inlet turbidity, clean or replace turbine.
4. Softener fails to draw brine.	A. Inlet line pressure is too low. B. Brine line is plugged. C. Brine line is leaking. D. Injector is plugged or broken down. E. Internal control valve leaks. F. Drain line is plugged. G. Sizes of injector and DLFC are not matched with tank.	A. Increase inlet line pressure. B. Clean brine line. C. Replace brine line. D. Clean or replace injector. E. Check valve baby and change if necessary. F. Clean drain line flow control. G. Select correct injector size and DLFC according to the P20 requirements.
5. Unit used too much salt.	A. Improper salt setting. B. Excessive water in brine tank.	A. Check salt usage and salt setting. B. See problem no.6.

Control Valve Fault (Continue)

6. Excessive water in brine tank.	A. Overlong refilling time. B. Remain too much water after brine draw. C. Foreign material in brine valve and plug drain line flow control. D. Not install safety brine valve but power failure whiling salting. E. Brine refill is out of control.	A. Reset correct brine refilling time. B. Check the injector and make sure no stuff in the brine pipe. C. Clean brine valve and brine line. D. Turn off inlet valve and restart after power on or install safety brine valve in salt tank. E. Repair or replace safety brine valve.
7. Pressure lost or rust in pipe line	A. Rust in the water supply pipe. B. Rust mass in the softener. C. Fouled resin bed. D. Too much rust in the raw water.	A. Clean the water supply pipe. B. Clean valve and add resin cleaning chemical, increase frequency of regeneration. C. Check backwash, brine draw and brine tank refill. Increase frequency of regeneration and backwash time. D. Rust removal equipment is required to install before softening.
8. Loss of resin through drain line.	A. Air in water system. B. Bottom strainer is broken. C. Backwash flow rate is too high.	A. Exhaust air exist in system. B. Replace new strainer. C. Check for proper drain flow rate.
9. Control cycle continuously.	A. Locating signal wiring breaks down. B. Controller is faulty. C. Foreign material stuck the driving gear. D. Time of regeneration steps were set to zero.	A. Check and connect locating signal wiring. B. Replace controller. C. Take out foreign material. D. Check and reset program setting.
10. Drain flows continuously.	A. Internal valve leaks. B. Power off when valve is in backwash or fast rinse status.	A. Check and repair valve body or replace it. B. Adjust valve to service position or turn off bypass valve and restart after electricity supply is normal.
11.Interrupted or irregular brine.	A. Water pressure is too low or not stable. B. Injector is plugged or faulty. C. Air in resin tank. D. Floccules in resin tank during up-flow regeneration.	A. Increase water pressure. B. Clean or replace injector. C. Check and find the reason of air intake. D. Clean the floccules in resin tank.
12.Water flows out from drain or brine pipe after regeneration.	A. Foreign material in valve which makes valve can't be closed completely. B. Hard water mixed in valve body. C. Water pressure is too high which result in valve doesn't get the right position.	A. Clean foreign material in valve body. B. Change valve core or sealing ring. C. Reduce water pressure or use pressure relief function.

Control Valve Fault (Continue)

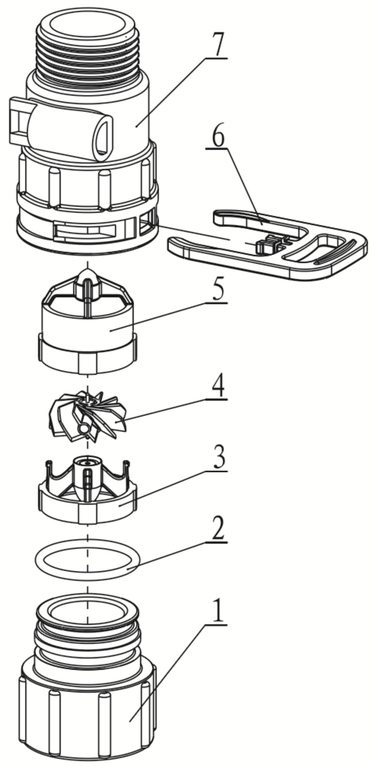
13. Salt water in soften water.	A. Foreign material in injector or injector fails to work. B. Brine valve cannot be shut-off. C. Time of fast rinse is too short.	A. Clean and repair injector. B. Repair brine valve and clean it. C. Extend fast rinse time.
14. Unit capacity decreases.	A. Doesn't regenerate properly. B. Fouled resin bed. C. Salt consumption is not proper. D. Softener setting is not proper. E. Raw water quality deterioration. F. Turbine in flow meter was stuck.	A. Regenerate according to the correct operation requirement. B. Increase backwash flow rate and times then clean or change resin. C. Readjust salt consumption. D. According to the test of outlet water, recount and reset. E. Regenerate unit by manual temporarily then reset regeneration cycle. F. Disassemble flow meter and clean it or replace a new flow meter.

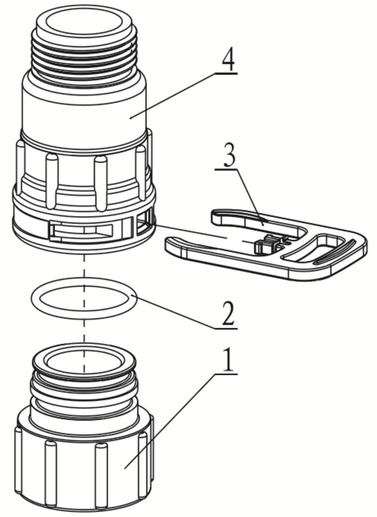
B. Controller Fault

Problem	Cause	Correction
1. All indictors display on front panel.	A. Wiring of display board with controller fails to work. B. Control board is faulty. C. Transformer is damaged. D. Electrical service is not stable.	A. Check and replace the wiring. B. Replace control board. C. Check and replace transformer. D. Check and adjust electrical service.
2. No display on front panel.	A. Wiring of display board with controller fails to work. B. Display board is damaged. C. Control board is damaged. D. Electricity is interrupted.	A. Check and replace wiring. B. Replace display board. C. Replace control board. D. Check electricity.
3. E1 Flash	A. Wiring of locating board with control board fails to work. B. Locating board is damaged. C. Mechanical driven failure. D. Control board is damaged. E. Wiring of motor with control board is faulty. F. Motor is damaged.	A. Replace wiring. B. Replace locating board. C. Check and repair mechanical part. D. Replace control board. E. Replace wiring. F. Replace motor.
4. E2 Flash	A. Hall component on locating board is damaged. B. Wiring of locating board with control board fails to work. C. Control board is faulty.	A. Replace locating board. B. Replace wiring. C. Replace control board.
5. E3 or E4 Flash	A. Control board is faulty.	A. Replace control board.

3.8. Assembly& Parts

Flow Meter Connector & Animated Connector Structure & Part No.:



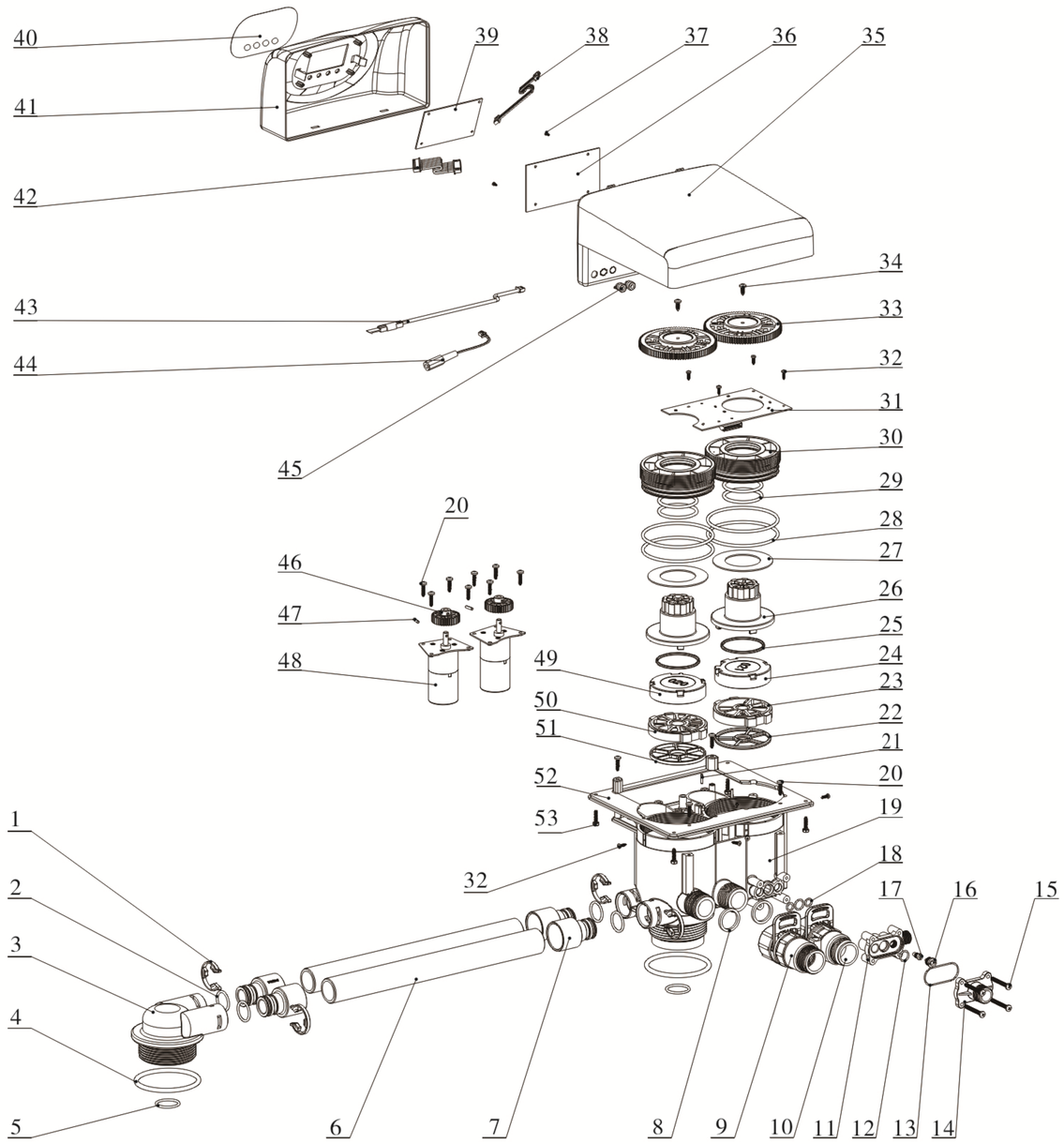


5447018 Flow meter

5457002 Animated connector

5447018 Flow meter				5457002 Animated connector			
Item No.	Description	Part No.	Qua-ntity	Item No.	Description	Part No.	Qua-ntity
1	Animated Nut	8945001	1	1	Animated Nut	8945001	1
2	O-ring	8378081	1	2	O-ring	8378081	1
3	Impeller Support	5115022	1	3	Clip	8270004	1
4	Turbine	5436010	1	4	Connector	8458038	1
5	Impeller Support	5115021	1				
6	Clip	8270004	1				
7	Shell	8002001	1				

17603(F73) Valve Body Assembly:



Component and part No. for 17603 (F73):

Item No	Description	Part Number	Quantity
1	Clip	8270005	4
2	O-ring 21.89×2.62	8378064	4
3	Valve Body	5022183	1
4	O-ring 73×5.3	8378143	2
5	O-ring 25.8×2.65	8378078	2
6	Pipe	8457007	2
7	Connector	8458015	4
8	O-ring φ30×φ24×3.3	8371001	2
9	Flow Meter	5447018	1
10	Animated Connector	5457002	1
11	Injector Body	8008004	1
12	O-ring 10.82×1.78	8378012	2
13	O-ring 35×1.5	8378170	1
14	Cover, Injector	8315005	1
15	Screw, Cross ST3.9×38	8909017	4
16	Nozzle, Injector	8454008	1
17	Throat, Injector	8467008	1
18	O-ring 7.5×1.8	8378016	2
19	Valve Body	5022055	1
20	Screw, Cross ST3.9×16	8909044	12
21	Pin 2.5×12	8993004	2
22	Seal Ring	8370041	1
23	Fixed Disk	8469020	1
24	Moving Disk	8459021	1
25	Moving Seal Ring	8370001	2
26	Shaft	8258011	2
27	Anti-friction Washer	8216012	2

Item No	Description	Part Number	Quantity
28	O-ring 84×3.5	8378102	4
29	O-ring 43.7×3.55	8378123	4
30	Fitting Nut	8092012	2
31	Locating Board	6380010	1
32	Screw, Cross ST2.9×9.5	8909008	10
33	Gear	5241013	2
34	Screw, Cross ST3.9×13	8909013	2
35	Dust Cover	8005009	1
36	Control Board	6382017	1
37	Screw, Cross ST2.2×6.5	8909004	2
38	Wire for Display Board	5512001	1
39	Display Board	6381003	1
40	Sticker	8865007	1
41	Front Cover	8300007	1
42	Wire for Locating Board	5511007	1
43	Probe Wire	6386014	1
44	Wire for Power	5513001	1
45	Wire Clip	8126004	2
46	Small Gear	8241012	2
47	Pin	8993003	2
48	Motor	6158073	2
49	Moving Disk	8459020	1
50	Fixed Disk	8469019	1
51	Seal Ring	8370040	1
52	Connecting Board	8152006	1
53	Screw, Cross ST3.9×16	8909016	4

4. Warranty Card

Dear client:

This warranty card is the guarantee proof of Runxin brand multi-functional flow control valve. It is kept by client self. You could get the after-sales services from the supplier which is appointed by Runxin manufacturer. Please keep it properly. It couldn't be retrieved if lost.It couldn't be repaired free of charge under the below conditions:

1. Guarantee period expired.(One year)；
2. Damage resulting from using, maintenance, and keeping that are not in accordance with the instruction；
3. Damage resulting from repairing not by the appointed maintenance personnel；
4. Content in guarantee proof is unconfirmed with the label on the real good or be altered；
5. Damage resulting from force majeure.

Product Name	润新 RUNXIN Multi-functional Flow Control Valve for Water Treatment Systems				
Model		Code of Valve Body			
Purchase Company Name		Tel/Cel.			
Problem					
Solution					
Date of Repairing		Date of Accomplishment		Maintenance Man Signature	

When product needs warranty service, please fill in the below content and send this card together with the product to the appointed suppliers or Runxin company.

End-user Company Name		Tel/Cel.	
Purchase Company Name		Tel/Cel.	
Model	Code of Valve Body		
Tank Size ϕ ×	Resin Tank Size L	Raw Water Hardness	mmol/L
Water Source: Ground-water□ Tap Water□	Water Treatment Capacity m^3	Backwash Time	min
Brine & Slow Rinse Time min	Brine Refill Time min	Fast rinse Time	min
Problem Description			