



**WENZHOU RUNXIN MANUFACTURING MACHINE CO., LTD.**

ADD.: NO.169, RUNXIN ROAD, SHANFU TOWN, WENZHOU, ZHEJIANG, CHINA.

TEL.: 0086-577-88630038, 88576512, 85956057 FAX: 0086-577-88633258

E-MAIL: sales@run-xin.com <http://www.run-xin.com>

Rev.A.2501



Chinese Patent No.: ZL201520680239.8

## **Multi-functional Flow Control Valve for Water Treatment Systems**

12504 (Old Model No.: F142A1, F142B1)

12604 (Old Model No.: F142A3, F142B3)

## **User Manual**



Please read this manual in details  
before using the valve and keep it properly  
in order to consult in the future  
0WRX.466.765

MODEL: F142A1/F142B1-12504 F142A3/F142B3-12604

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

#### Program model setting (operated by professionals)

When power on, press both  and  for 5 seconds to enter valve selection display. When setting the model, the corresponding model must be set with the control valve body.

#### 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
		F142A	F142B	
Control Mode A-01 (02, 03, 04) (Meter Type)	/	A-01	A-02	
Unit Mode HU-01 (02, 03) (Meter Type)	/	HU-01	HU-01	
Water Treatment Capacity (Meter Type)	m <sup>3</sup>	10.00	10.00	
Service Days (Time Clock Type by Days)	D	03	01	
Service Hours (Time Clock Type by Hours)	H	20	20	
Regeneration Time (Meter Type/Time Clock Type by Days)	/	02:00	/	
Backwash Time	min	10:00	10:00	
Brine & Slow Rinse Time	min	120	45:00	
Brine Refill Time	min	05:00	/	
Fast Rinse Time	min	10:00	10:00	
Maximum Interval Regeneration Days (Meter Type)	D	30	02	
Output Mode b-01/02/03	/	b-01	b-03	

● If there is no special requirement when product purchase, there is no DLFC, the injector No. is 5468246, BLFC is 8468055.

MODEL: F142A1/F142B1-12504 F142A3/F142B3-12604

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## Notice

- To ensure normal operation of the valve, please consult with professional installation or repairing personnel before using it.
- To ensure normal operation of the valve, please consult with professional installation or repairing personnel before use it.
- 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 shortage of resin, please add; if the resin turns 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 vibrations environment. And do not leave it outside.
- Forbidden to carry the injector body. Avoid using 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 5~50℃, water pressure 0.15~0.6 MPa. 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 before the water inlet. While, if the water pressure under 0.15MPa, a booster pump must be installed in front of the water inlet.
- It is suggested to install PPR pipe, corrugated pipe or UPVC pipe, instead of TTLSG pipe.
- Do not let children touch or play, because careless operation may cause the procedure changed.
- When the attached cables or transformer of this product are broken, they must be changed to the one that is from our factory.

## 1.Product Overview

### 1.1 Main Application & Applicability

Used for softening water treatment system of secondary sodium ion exchanger with raw water hardness less than 10mmol/L or demineralization water treatment systems.

F142A1/A3 is suitable for residential softening system

Ion exchange equipment

Boiler softening water system

RO pretreatment softening system, etc.

F142B1/B3 is suitable for iron and manganese removal water treatment system with ozone aeration.

### 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; two tanks achieve Service, Backwash, Brine & Slow Rinse, Brine Refill and Fast Rinse in series.

● **Two tanks are connected in series for water production and regeneration, suitable for softening high hardness raw water (suitable for F142A1/A3).**

● **Applied for ozone and filter duplex tanks for iron and manganese removal system working in series (suitable for F142B1/B3).**

#### ● 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. The other parameters do not need to reset. The process will continue to work after power on.



#### ● LED dynamic screen display

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, button lock indicator lights on which represents buttons are locked. Before operation, press and hold the  and  buttons for 5 seconds to unlock. This function can avoid incorrect operation.

#### ● It can choose time clock type or meter type by program selection

When power on, press both  and  for 5 seconds to enter valve selection display. When

# MODEL: F142A1/F142B1-12504 F142A3/F142B3-12604

setting the model, the corresponding model must be set with the control valve body (time clock type, by days or by hours or meter type). (Notice: compared with time clock type, for meter type valve, there are one more set of flow meter and probe wire)

## ● Four kinds of meter type can be selected

Mode	Name	Instruction	Remark
A-01	Meter delayed regeneration	Regenerate on the day although the available volume of treated water drops to zero (0). Regeneration starts at the regeneration time.	Suitable for F142A3, F142B3
A-02	Meter immediate regeneration	Regenerate immediately when the available volume of treated water drops to zero (0).	
A-03	Intelligent meter delayed regeneration	Meter delayed regeneration type, but by setting resin volume, feed water hardness, regeneration factor, the controller will calculate the system capacity.	Suitable for F142A3
A-04	Intelligent meter immediate regeneration	Meter immediate regeneration type, but by setting resin volume, feed water hardness, regeneration factor, the controller will calculate the system capacity.	

## ● There are two kinds of time clock types

When set the program as time clock type, by days (like F142A1), it can be chosen to be service by hours, by dialing the red switch on main control board to “I” (Refer figure on P17). Pointing to “ON” mean the time clock type service by days; “I” means the time clock type service by hours. (Attention: after dialing the switch, please restart the power).

## ● Interlock function

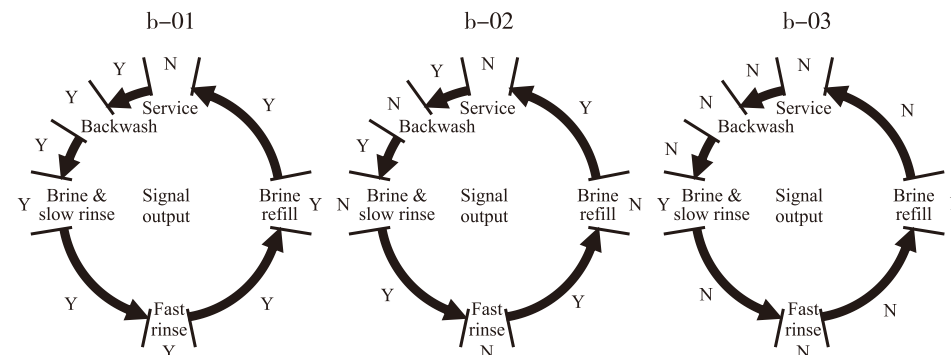
It has a function of interlock to realize only one valve in regeneration or rinsing, but the other valves are in service while there are several valves parallel in system. In multi-steps treatment systems such as RO pre-treatment, when several valves are in series, there is only one valve in rinsing to ensure pass water all the times while different valves in rinsing. (Application refers to Figure 3-9)

## ● Signal output

There is a signal output connector on main control board. It is applied for controlling external wiring (Refer to Figures from Figure 3-1 to Figure 3-8).

There are three kinds of output modes. b-01 Mode: signal turn on when start regeneration and shut off end of regeneration; b-02 Mode: Signal is available only at intervals of each status. b-03 Mode: signal turn on during Brine & slow rinse, and shut off at other status. Refer to below figures:

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## ● Remote handling connector

This connector can receive external signal, used together with PLC, and computer etc. to control the valve remotely. (Application refers to Figure 3-11)

## ● Pressure relief connector

The valve will cut off feeding water to drain line when it switches in rinsing 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 rinsing too fast to damage the valve. Pressure Relief Output can be used to avoid this problem. (Application refers to Figure 3-10).

## ● 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

A. Sodium ion exchanger matched with Runxin Valve should be used under the below conditions:

Items		Requirement
Working conditions	Water pressure	0.15MPa~0.6MPa
	Water temperature	5℃~50℃
Working environment	Environment temperature	5℃~50℃
	Relative humidity	≤95% (25℃)
	Electrical facility	AC100~240V/50~60Hz

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Inlet water quality	Water turbidity	< 5FTU
	Water hardness	First Grade $\text{Na}^+ < 6.5\text{mmol/L}$ ; Second Grade $\text{Na}^+ < 10\text{mmol/L}$
	Free chlorine	< 0.1mg/L
	Iron <sup>2+</sup>	< 0.3mg/L
	CODMn	< 2mg/L ( $\text{O}_2$ )

In the above table, First Grade  $\text{Na}^+$  represents First Grade  $\text{Na}^+$  Exchanger. Second Grade  $\text{Na}^+$  represents Second Grade  $\text{Na}^+$  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.

B. Iron and manganese removal water treatment system with ozone aeration which matched with Runxin Valve should be used under the below conditions:

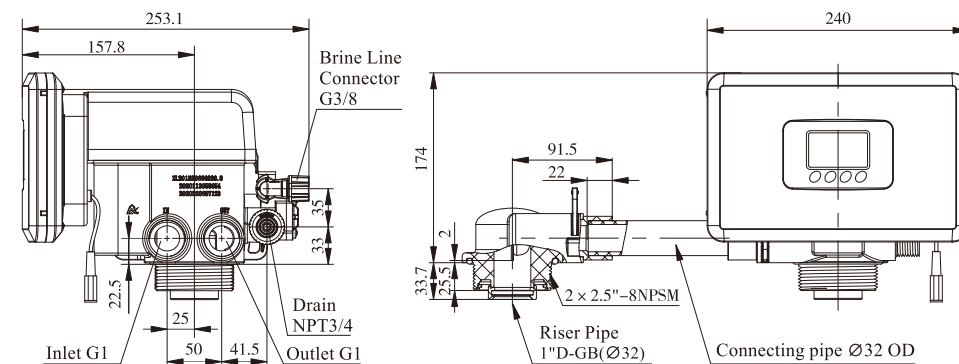
Items		Requirement
Working conditions	Water pressure	0.15MPa~0.6MPa
	Water temperature	5℃~50℃
Working environment	Environment temperature	5℃~50℃
	Relative humidity	≤95% (25℃)
	Electrical facility	AC100~240V/50~60Hz
Inlet water quality	It should meet the requirements of various iron and manganese removal filter materials for inlet water quality. The flow rate of the filter material shall be similar to the parameters of resin. It is recommended to use Cr26 filter material of Aldex company in Canada.	

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#### 1.4 Product dimension and parameter

A. Product dimension (The appearance is just for reference. It is subjected to the real product.)

Structure Chart of F142A1 and F142B1:



Note: F142A1 installed with flow meter is F142A3, F142B1 installed with flow meter is F142B3.

B. Technical Parameters

Model	Connector Size						Regeneration Type	Control mode
	Inlet	Outlet	Drain	Brine Line Connector	Base	Riser Pipe		
F142A1	G1	G1	NPT3/4	G3/8	2.5" -8NPSM	1"D- GB (Ø32)	Down-flow Brine Draw	Time Clock Type
F142A3								Meter Type
F142B1							Down-flow Air Draw	Time Clock Type
F142B3								Meter Type
Water treatment capacity m <sup>3</sup> /h				4 (at 0.2 MPa pressure drop)				
Transformer input				AC100~240V/50~60Hz				
Transformer output				DC12V, 1.5A				

**Note:** F142A1/A3 is applicable to series soften, and F142B1/B3 is applicable to iron removal by ozone aeration. The main difference of each control valve model is that the control program is different, and shall set corresponding model during installation.

#### 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, and Drain Outlet.

### B. Device location

- ①The filter or softener should be located closely to drain.
- ②Ensure the unit is installed in enough space for operating and maintenance.
- ③For softener, brine tank should be located closely to softener.
- ④The unit should be kept away from the heater, and not be exposed to outdoor. Sunshine or rain will cause the system damage.
- ⑤Please avoid installing the system in an acid/alkaline, magnetic or strong vibration circumstance, because above factors will cause the system disorder.
- ⑥Do not install the device, drain pipeline in circumstance which temperature may drop below 5℃, or above 50℃.
- ⑦Install the system in the place where with minimum loss in case of water leaking.

### C. Pipeline connection

#### ①Install control valve

a. As the Figure1 shows, put two resin tanks side by side, the center distance of the resin tank is reserved according to the actual. Select the riser pipe with 32mm OD, glue the riser pipe to the bottom strainer and put it into the resin tank, cut off the exceeding tube out of tank top opening and round it.

b. Fill the resin or filter media to the tank, and the height is accordance with the design.

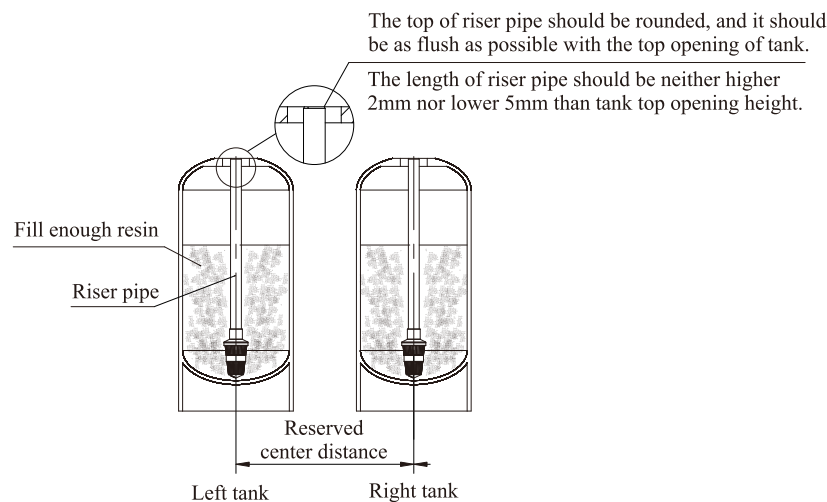


Figure 1

c. As Figure 2 shows, screw the top strainer to the valve and left tank valve body. Then insert the top strainer to control valve and left tank valve body, screw the control valve and left tank valve body tightly on the tank.

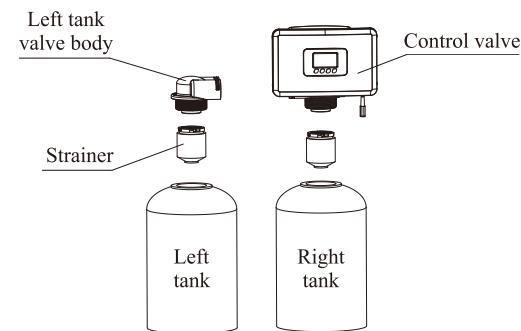


Figure 2

d. As Figure 3 shows, connect the control valve and left tank valve body with two UPVC pipes with 32mm OD, and insert clips.

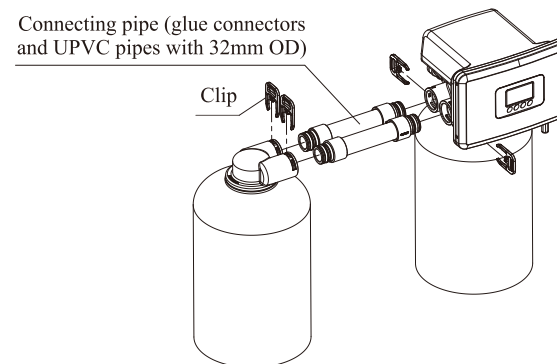


Figure 3

#### Note:

- The length of riser pipe 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 filter materials to the tank.
- Avoid O-ring inside control valve falling out while rotating it on the tank.
- When applied to the manganese removal water treatment system by ozone, in order to smoothly discharge iron and manganese oxides during backwash, the model and quantity of strainers in the left and right tanks are designed by users.

② Install flow meter and animated connector (suitable for F142A3 and F142B3)

As Figure 4 shows, put the seal ring into nut of flow meter and animated connector, respectively screw the animated connector and flow meter into inlet and outlet of control valve, then insert the probe wire into flow meter.

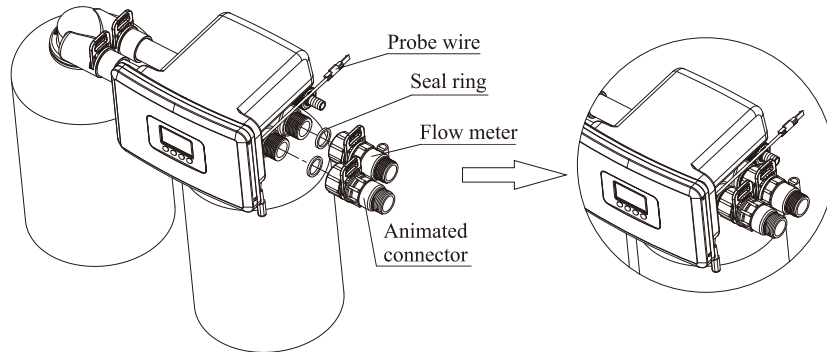


Figure 4

③ Install inlet and outlet pipeline

- As Figure 5 shows, install a pressure gauge in water inlet.
- Install valve A, B, C, D in inlet, outlet, inlet pipeline and outlet pipeline. Valve D is sampling valve.
- Install a check valve on outlet pipe.
- Inlet pipeline should be in parallel with outlet pipeline. Support inlet and outlet pipeline with fixed holder.

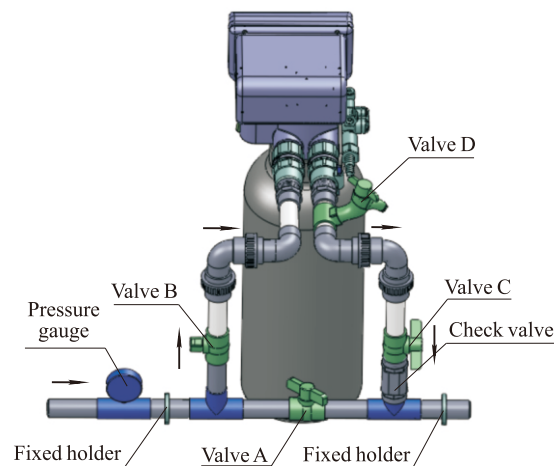


Figure 5

**Note:**

- If the water outlet or water tank is installed higher than control valve or is used in parallel interlock system with multi-outlets, a liquid level controller must be installed in brine tank or a check valve must be installed on outlet. Or else, the water in outlet or water tank will flow backwards into brine tank when backwash and flows to drain port when brine refill.
- If making a soldered copper installation, 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 broken valve.
- If the valve is time clock type, there are no step ②.

④ Install drain pipeline

As Figure 6 shows, insert one end of the drain flexible pipe into the drain connector; tighten the connector and drain outlet with animated nut; put the other end of the drain flexible pipe to the floor drain and fix it.

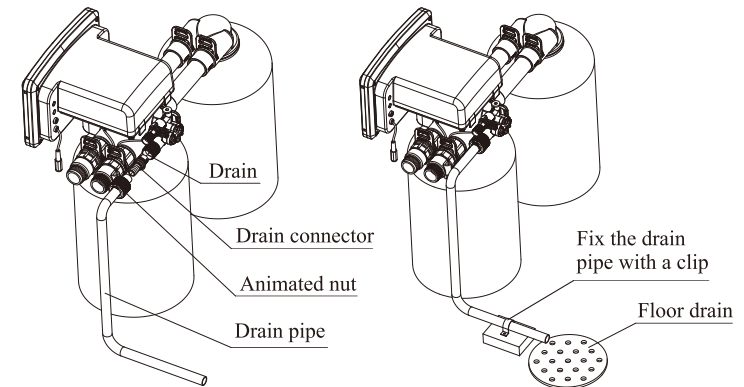


Figure 6

**Note:**

- Drain outlet should be lower than control valve as far as possible, it is allowed to lay out pipes 2m higher than the control valve, the drain flexible pipe should not exceeds 3m, otherwise it will affect the brine draw if it is too high or too long.
- Be sure not connect drain with sewer directly, and leave a certain space between them (as Figure 6 shows), to avoid waste water being absorbed to the water treatment equipment.

⑤ Install Brine tube

- As Figure 7 shows, slide brine tube hose connector over end of brine tube.
- Insert tube bushing into the end of brine tube.
- Tighten brine draw hose connector into brine line connector.

d. 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.)

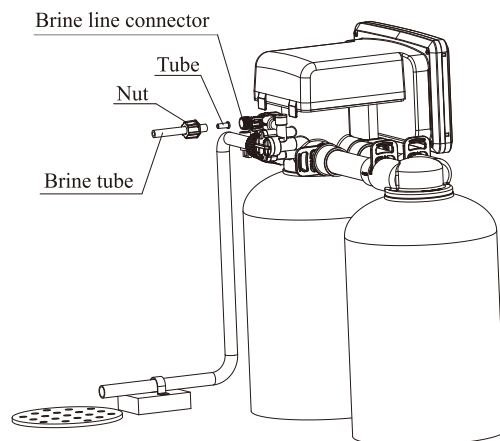


Figure 7

**Note:** 1. The brine tube should not be bent or plugged.

2. When applied to iron removal water treatment system by ozone aeration, the brine pipe is connected with the ozone generator.

⑥ Diagram of iron removal water treatment system by ozone aeration.

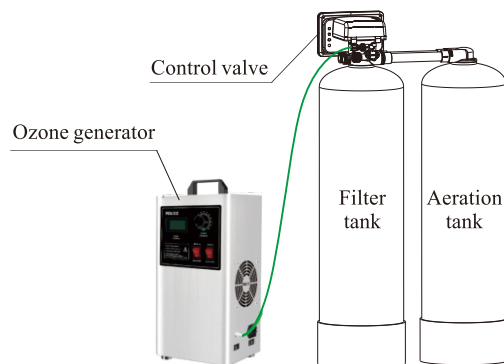
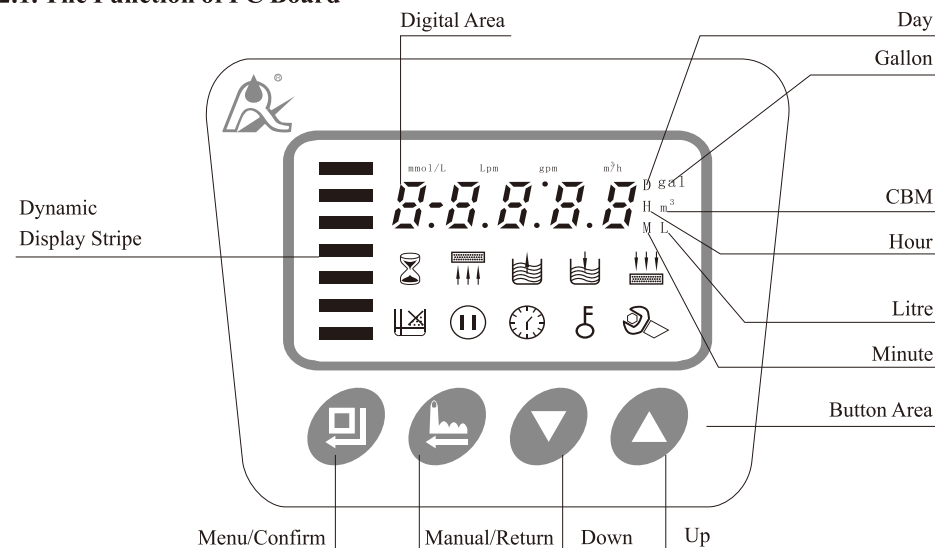


Figure 8




## 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, indicating that there has been a power failure for a long time (more than three days), and the time of day needs to be reset (short-term power failure, no need to reset).
- 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 🔒 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
  - Press 📁, 🔄 lights on, enter program display mode and press ▲ or ▼ to view all values.
  - In program display mode, press 📁, 🔄 flashes, enter program set mode, press ▲ or ▼ to adjust values.
  - Press 📁 after all program are set, and then the voice “Di” means all setting are success and return program display mode.

E.  Manual/Return button

● Press  in any status, it can proceed to next step. (Example: if the outlet water is unqualified, press  in Service status, it will start regeneration cycles instantly; Press  while it is in Backwash status, it will end Backwash and go to Brine & Slow Rinse at once.)

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

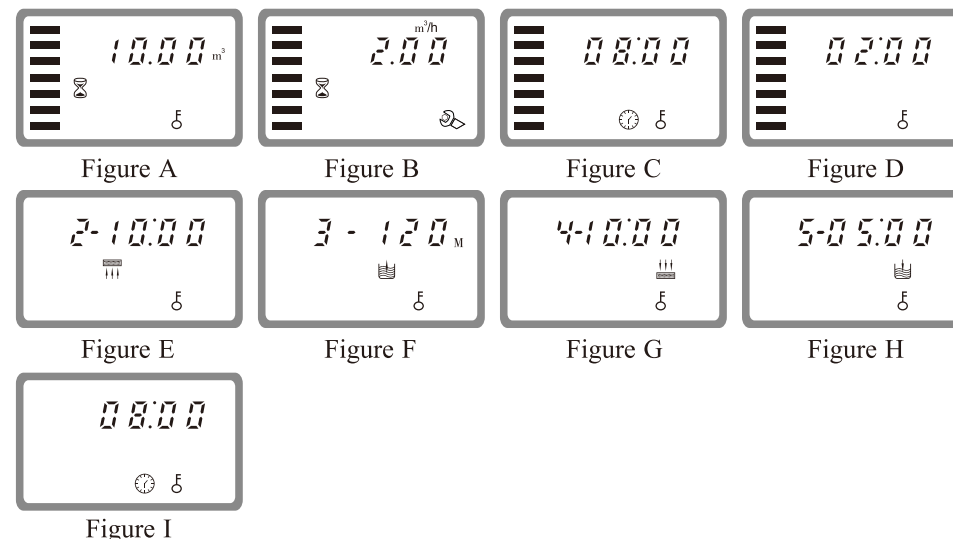
## 2.2 Basic Setting &amp; Usage

## 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	Meter Delayed: Regenerate on the day although the available volume of treated water drops to zero (0). Regeneration starts at the regeneration time.
			A-02	Meter Immediate: Regenerate immediately when the available volume of treated water drops to zero (0).
			A-03	Intelligent Meter Delayed: Meter Delayed Regeneration type, but by setting Resin Volume, Feed Water Hardness, Regeneration Factor, the controller will calculate the System Capacity.
			A-04	Intelligent Meter Immediate: Meter Immediately Regeneration Type, but by setting Resin Volume, Feed Water Hardness, Regeneration Factor, the controller will calculate the System Capacity.
Unit Mode	HU-01	HU-01	01, 02, 03	01-m <sup>3</sup> ; 02-gal; 03-L
Service Day		1-03D	0-99 Days	Only for Time Clock Type, regeneration by days.
Service Hour		1-20H	0-99 Hours	Only for Time Clock Type, regeneration by hours.
Regeneration Time	02:00	02:00	00:00 ~ 23:59	Regeneration time; “:” lights on

Resin Volume	50L	50L	5~500L	Resin volume in resin tank (L)
Feed Water Hardness	Yd1.2	1.2	0.1~9.9	Feed water hardness (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.
Water Treatment Capacity		10m <sup>3</sup>	0 ~ 99.99 m <sup>3</sup>	Water treatment capacity in one circle (m <sup>3</sup> )
Backwash		10:00	0~99:59	Backwash time (Minute: Second)
Brine & Slow Rinse		120min	0~200	Brine & Slow rinse time (Minute)
Fast Rinse		10:00	0~99:59	Fast rinse time (Minute: Second)
Brine Refill		5:00	0~99:59	Brine refill time (Minute: Second), for F142B1/B3, Brine refill time is zero.
Maximum Interval Regeneration 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	01, 02, 03	b-01: Signal will turn on during the regeneration (Refer to P4). b-02: Signal is only available at intervals of each status. (Refer to P4). b-03: signal turn on during Brine & slow rinse, (Refer to P4).

## B. Process Display (take A-01 of F142A3 as example)

















**Illustration:**

- In Service status, the figure shows A/B/C/D; In Backwash status, it shows figure E/I; In Brine& Slow Rinse status, it shows F/I; In Fast Rinse status, it shows figure G/I, In Brine Refill status, it shows figure H/I. In each status, every figure shows 15 seconds.
- Above displays are taking the Meter Type for example. For the Time Clock Type, it shows the remaining days or hours, such as 1-03D or 1-10H.
- The display screen will only show “-00-” when the electrical motor is running.
- 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.
- Softening in series working process: Service→ Backwash→ Brine & Slow Rinse→ Fast Rinse→ Brine Refill→ Service
- Iron removal by ozone aeration: Service→ Backwash→ Fast Rinse→ Air Draw→ Service.














**C. Usage (Take F142A1/A3 as example)**

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

- ① 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 and iodized salt.
- ② Test 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.)
- ③ When the feed water hardness changes a lot, you can adjust the water treatment capacity as follow:

Press and hold both  and  for 5 seconds to unlock the buttons. Press , and the  lights on, then press , screen will show A-01 or A-02, then press  three times, and the digital area will show the given water treatment capacity( if the control mode shows A-03 or A-04, then press  four times, the digital area will show the raw water hardness); Press  again,  and digital number flash, press  or  continuously to 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.

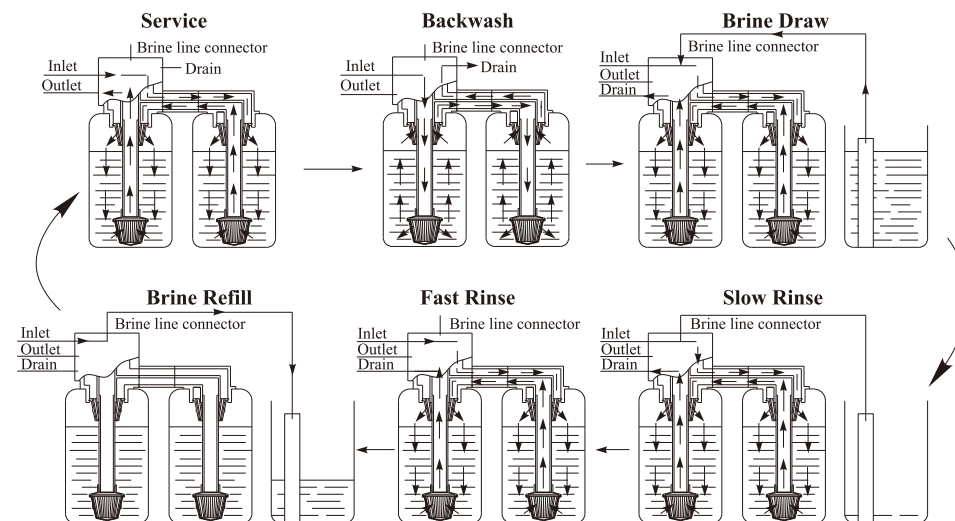
The estimation of water treatment capacity value, you can refer to the professional application specification. When select A-03 or A-04 intelligent control mode, the control will automatically calculate the water treatment capacity by setting resin volume, raw water hardness and regeneration factor.

- ④ For A-01 or A-03 control mode (Regeneration delayed type), please pay attention to whether it is current time or not. If the time is not right, you can adjust as follow: After unlock the buttons, press , the  and  light on. Then press , the  and hour value flash, press  or  continuously to reset the hour value; Press  again,  and minute value flash, press  or  continuously to reset the minute value; Press  and hear a sound “Di”, then finish the adjustment. Press  exit and turn back the service status.

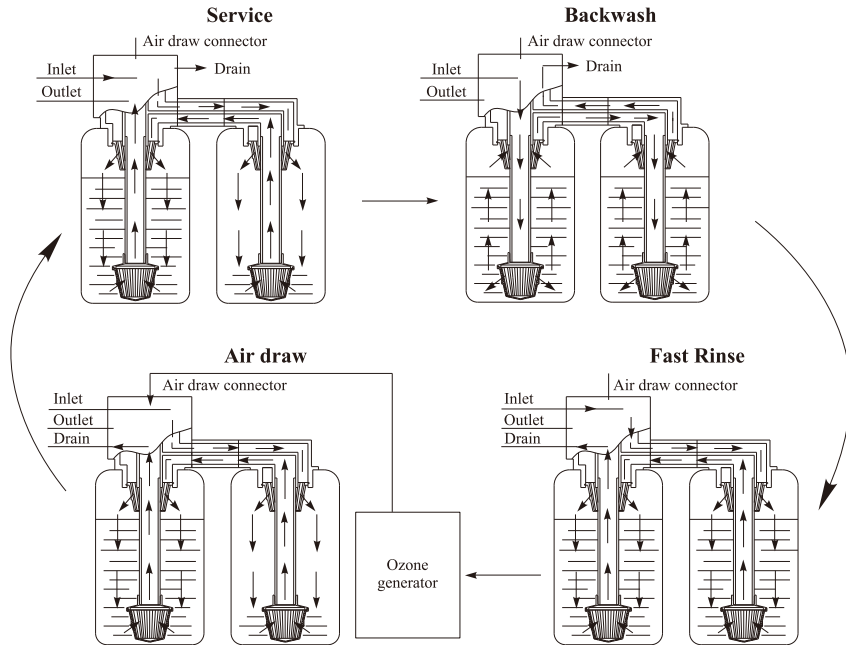
The regeneration parameters have been set when control valve left factory. Generally, it does not need to reset. If you want enquiry and modify the setting, you can refer to the professional application specification.

### 3. Applications

#### 3.1 F142A1/A3 Softener Flow Chart

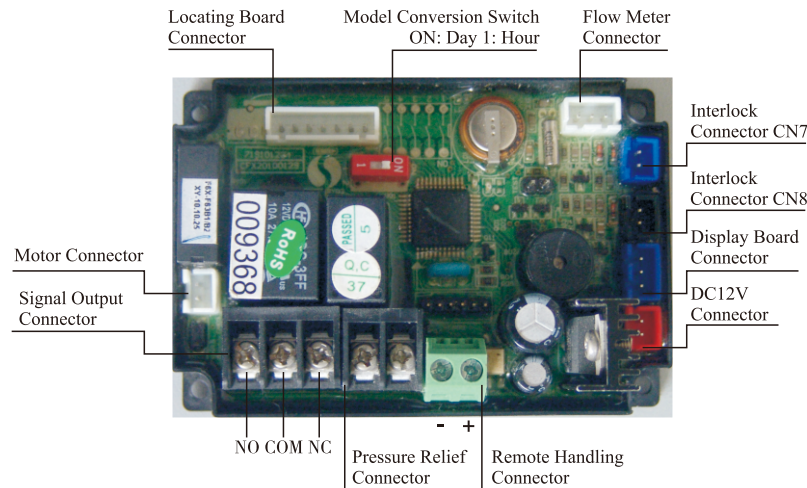


### 3.2 F142B1/B3 Iron removal by ozone aeration working process



### 3.3 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 below:



### 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 flows from outlet or controlling the liquid level in water tank.
	Inlet pump	Increase pressure for regeneration or rinsing. 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 when valve is rotating prevent motor can't rotate.
Signal output connector b-03	Open and close the ozone generator	Used for Air draw of iron and manganese removal.
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 regeneration or rinsing in system	Used 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 status	It is used for on-line inspection system, connected with PC to realize automatically or remote controlling valve.

### A. Signal Output Connector

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

① Solenoid Valve on Outlet Controls Water Level in Water Tank (Set b-01)

**Instruction:** If system strictly requires no unfiltered water flowing from outlet in rinsing cycle (Mainly for no unfiltered water flows out when valve is switching. When valve in backwash positions, there is no unfiltered water flows from outlet), a solenoid valve could be installed on outlet, the wiring refers to Figure 3-1.

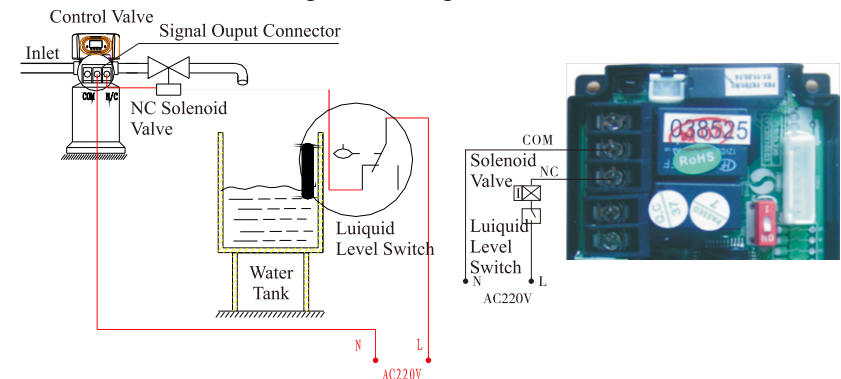


Figure 3-1 Wiring of Solenoid Valve on Outlet

### Function:

In service status, if 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 the 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 is switching, the wiring refers to Figure 3-2. As Figure 3-3 shows, it also can use the pressure relief connector to work.

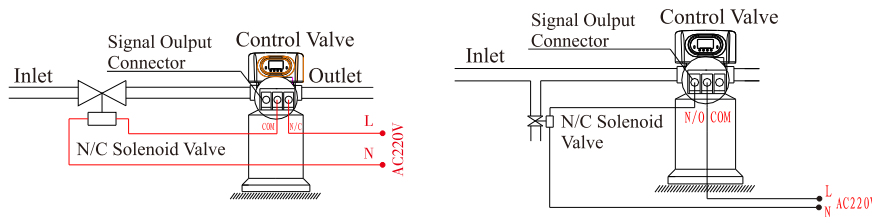


Figure 3-2 Wiring of Solenoid Valve on Inlet

Figure 3-3 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 status of Service, Backwash, Brine& Slow Rinse, Fast Rinse and Brine Refill. When valve is switching, solenoid valve is closed, no water flows into valve to ensure valve switching properly. It could prevent the problem of mixing water and water hammer.

Use interlock cable to realize valves in parallel and series in same system which is suited for RO pretreatment system or second grade Na<sup>+</sup> system. The Wiring refers to Figure 3-4:

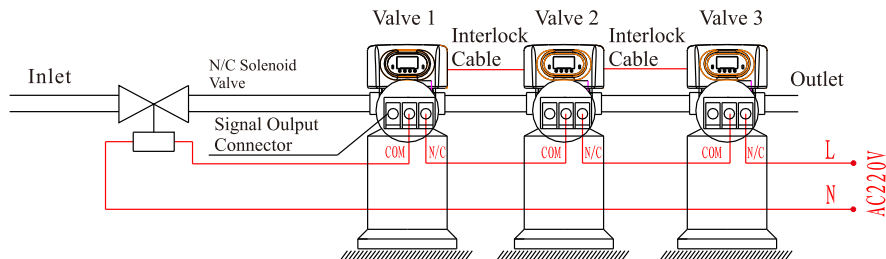


Figure 3-4 Wiring of Solenoid Valve on Inlet

### 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:

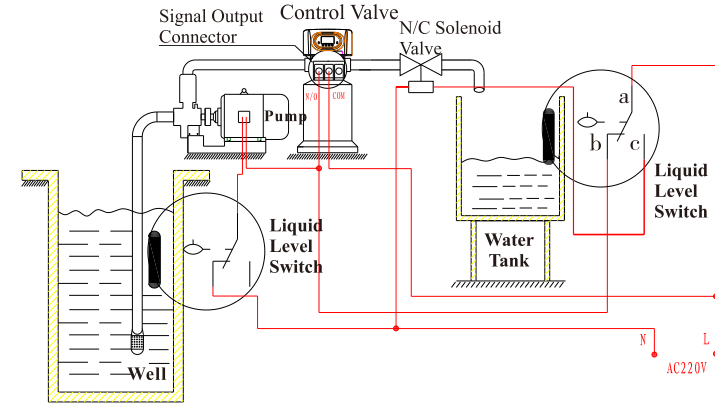


Figure 3-5 Wiring of Liquid Level Controlling Inlet Pump

### Function:

When valve is in service 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 is in backwash cycle, inlet always has water no matter what is water condition in water tank. As Runxin valve no water passes outlet in regeneration cycle, it ensure no water fill into brine tank.

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

### 3) Liquid Level Switch in Water Tank Controls Inlet pump (Three-phase, Figure 3-6) (Set b-01)

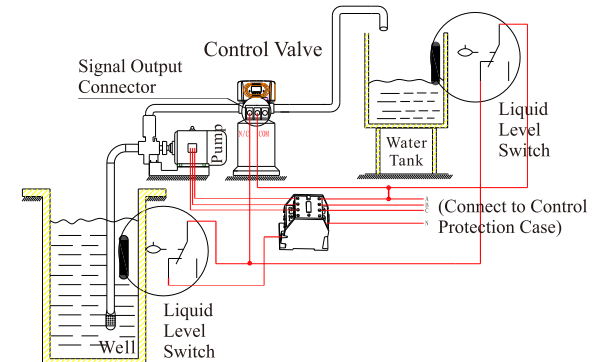


Figure 3-6 Wiring of Liquid Level Switch in Water Tank Controls Inlet Pump

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

**Instruction:** If inlet water pressure is less than 0.15MPa, which makes rinsing 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.

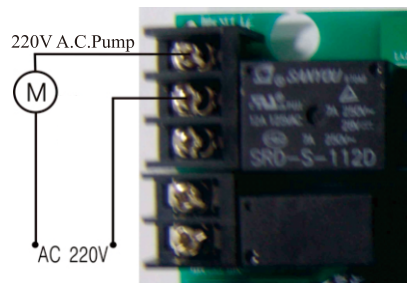


Figure 3-7 Wiring of Booster Pump on Inlet

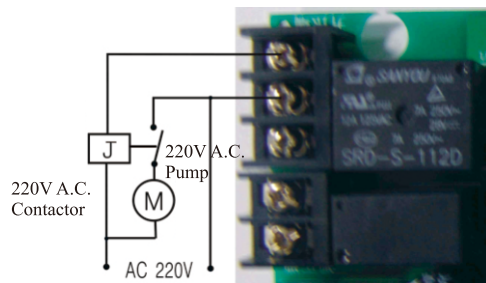


Figure 3-8 Wiring of Booster Pump on Inlet

#### B. Interlock

**Instruction:** In the parallel water treatment system, it ensure only one valve in regeneration or rinsing cycle and (n-1) valves in service, that is, realizing the function of supplying water simultaneously and rinsing individually.

In the series water treatment system (Second grade Na<sup>+</sup> Exchanger or RO pre-treatment system), it ensure only one valve in rinsing cycle and there is/are water(s) in service. The wiring refer to figure 3-9:

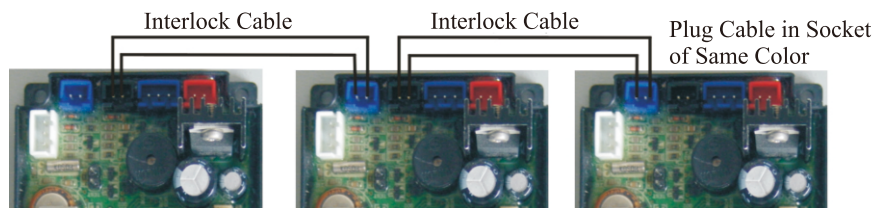


Figure 3-9 Network System Wiring with Interlock Cable

Use interlock cable to connect CN8 to CN7 on next valve in the loop.

One system with several valves, if interlock cable is disconnected, the system is divided into two individual systems.

#### C. Pressure Relief Connector

Runxin valve will cut off feeding water to drain line when it switches in rinsing cycles. Thus in some water treatment system, e.g. Deep Well, one booster pump is installed on the inlet to increase the system water feeding pressure, this cut-off will cause pressure on inlet

rinsing too fast to damage the valve. Pressure Relief Connector can be used to avoid this problem. The wiring refers to Figure 3-10:

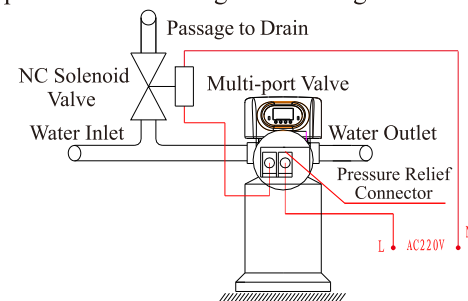


Figure 3-10 Wiring of Pressure Relief Connector

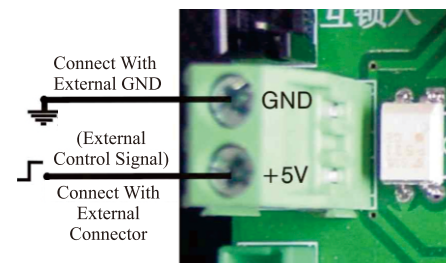


Figure 3-11 Wiring of Remote Handling Connector

#### D. 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 3-11:

#### E. Interlock System

2 or more than 2 valves are interlocked connecting in one system and all valves are in service but regenerate individually. The wiring refers to Figure 3-12.

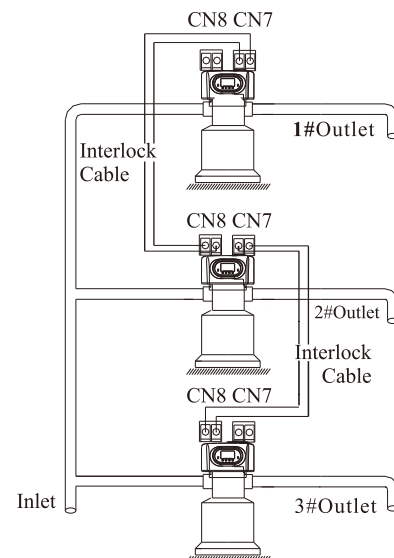


Figure 3-11 Interlock System

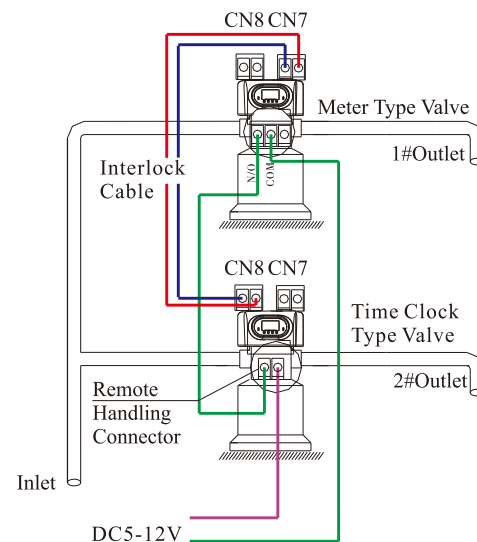


Figure 3-12 Series System

## F. Series System

This is a 2 or more than 2 valves system, all in service, with one flow meter for the entire system. For the time type valve, the regeneration time should be set and adjusted to the Max; for the meter type valve, connect its signal output connector with the remote handle connector of the time clock type valve. That can realize the function of supplying water simultaneously and regenerating orderly. The wiring refers to Figure 3-13.

### 3.4. System Configuration and Flow Rate Curve

#### A. Product Configuration

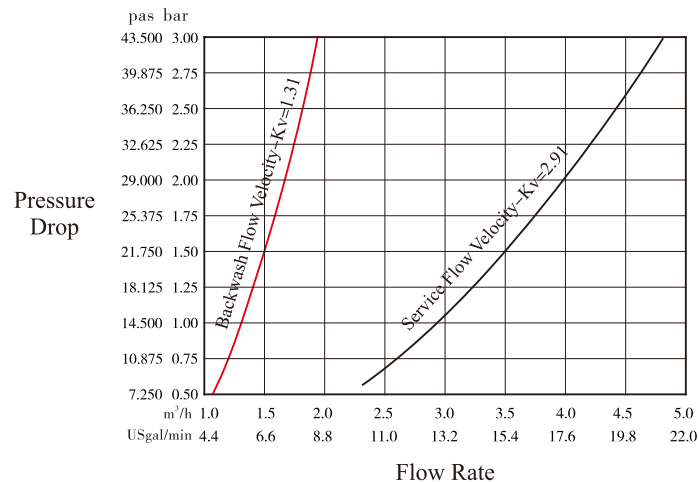
Product configuration with tank, resin volume, brine tank and injector.

Tank Size (mm)	Resin Volume (L)	Flow Rate (t/h)	Brine Tank Size (mm)	The Minimum Salt Consumption for Regeneration (Kg)	Injector Model	Related Control Valve
φ 255 × 1390	40	1.2	φ 390 × 810	6.00	5468241	F142
φ 300 × 1650	60	1.8	φ 450 × 940	9.00		
φ 355 × 1650	100	2.5	φ 500 × 1060	15.00		
φ 400 × 1650	120	3.5	φ 500 × 1160	18.00		
φ 450 × 1650	150	4.5	φ 500 × 1160	22.50		

**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



Note: Backwash Flow Velocity is tested without DLFC at drain outlet.

## 2) Injector parameter table

Inlet Pressure	Total Flow Rate on Injector (L/M)											
MPa	6820 Grey	6821 Cyan	6801 Coffee	6802 Pink	6803 Yellow	6804 Blue	6805 White	6806 Black	6807 Purple	6808 Red	6809 Green	6810 Orange
0.15	0.61/0.48	0.88/0.63	1.30/0.76	1.45/1.17	2.00/1.65	2.68/2.28	2.72/2.67	3.72/3.11	4.52/3.55	4.85/3.86	5.75/4.71	6.00/4.78
0.20	0.70/0.56	1.03/0.74	1.52/0.87	1.73/1.38	2.37/1.84	3.16/2.54	3.27/2.93	4.27/3.40	5.03/3.81	5.70/4.25	6.40/5.15	6.26/5.41
0.25	0.79/0.60	1.14/0.83	1.77/0.98	1.90/1.47	2.70/1.97	3.46/2.71	3.78/3.13	4.80/3.68	5.65/4.11	6.22/4.61	7.19/5.57	7.13/5.89
0.30	0.87/0.65	1.27/0.91	1.93/1.06	2.26/1.56	3.00/2.12	3.80/2.91	4.30/3.39	5.23/3.93	6.20/4.43	6.80/4.88	7.97/6.00	8.53/6.51
0.35	0.95/0.72	1.35/0.99	2.08/1.12	2.20/1.67	3.23/2.23	4.05/3.09	4.50/3.62	5.57/4.17	6.67/4.71	7.27/5.16	8.50/6.27	8.80/6.97
0.40	1.00/0.77	1.43/1.05	2.23/1.14	2.27/1.75	3.46/2.35	4.38/3.24	4.88/3.78	5.95/4.35	6.95/4.99	7.63/5.41	8.80/6.66	9.30/7.28

## 3) Configuration for Standard Injector and Drain Line Flow Control

Tank Dia. mm	Regeneration type	Injector Model	Nozzle/ Throat Model	Nozzle/ Throat/ Plug Color	BLFC No.		DLFC No.
					Standard	Optional	
150	Down-flow Regeneration	5468237	6821	Cyan	8468057	8468076, 8468075	8468064
	Up-flow Regeneration	5468247	6820	Grey			
175	Down-flow Regeneration	5468238	6801	Coffee	8468057	8468076, 8468075	8468043
	Up-flow Regeneration	5468248	6821	Cyan			
200	Down-flow Regeneration	5468239	6802	Pink	8468056	8468076, 8468075, 8468057	8468042
	Up-flow Regeneration	5468249	6821	Cyan			
225	Down-flow Regeneration	5468240	6803	Yellow	8468056	8468076, 8468075, 8468057	8468060
	Up-flow Regeneration	5468250	6801	Coffee			
250	Down-flow Regeneration	5468241	6804	Blue	8468052	8468076, 8468075, 8468057, 8468056	8468061
	Up-flow Regeneration	5468251	6802	Pink			
300	Down-flow Regeneration	5468242	6806	Black	8468053	8468076, 8468075, 8468057, 8468056, 8468052	8468077
	Up-flow Regeneration	5468252	6803	Yellow			
325	Down-flow Regeneration	5468243	6807	Purple	8468053	8468076, 8468075, 8468057, 8468056, 8468052	8468044
	Up-flow Regeneration	5468253	6804	Blue			

MODEL: F142A1/F142B1-12504 F142A3/F142B3-12604

350	Down-flow Regeneration	5468244	6808	Red	8468054	8468076, 8468075, 8468057, 8468056, 8468052, 8468053	8468062
	Up-flow Regeneration	5468254	6805	White			
400	Down-flow Regeneration	5468245	6809	Green	8468055	8468076, 8468075, 8468057, 8468056, 8468052, 8468053, 8468054	8468063
	Up-flow Regeneration	5468255	6806	Black			
450	Down-flow Regeneration	5468246	6810	Orange	8468055	8468076, 8468075, 8468057, 8468056, 8468052, 8468053, 8468054	Without DLFC
	Up-flow Regeneration	5468256	6807	Purple			

**Remark:** Above data for the product configuration and relevant characteristics are only for industrial reference. When put in practice, please subject to the different requirements of raw water hardness and application. If it is used for residential application, considering that the ratio of height to diameter of resin bed is small, the optimal configuration should be selected through experimental verification, and a smaller flow rate of brine draw (1-2m/h) is recommended.

#### 4). Configuration for BLFC (Only for 6800 Injector)

Part Number		8468076	8468075	8468057	8468056	8468052	8468053	8468054	8468055
Color		Red	Purple	Black	White	Coffee	Pink	Yellow	Blue
Flow Rate	L/m	0.38	0.68	0.98	1.21	1.66	2.73	4.92	5.86
	gal/min	0.10	0.18	0.26	0.32	0.44	0.72	1.30	1.55

#### 5). Configuration for DLFC (Only for 6800 Injector)

Part Number		8468064	8468043	8468042	8468060	8468061	8468045	8468077	8468044	8468062	8468063	Without DLFC
Color		Green	Pink	Coffee	White	Black	Blue	Orange	Yellow	Purple	Red	/
Flow Rate	L/m	3.33	4.31	7.15	7.64	10.82	18.10	15.96	19.91	24.97	30.64	32.00
	gal/min	0.88	1.14	1.89	2.02	2.86	4.78	4.22	5.26	6.60	8.10	8.45

**Remark:** Above data for the product, configuration and relevant characteristics are only for reference. In actual use, it is subject to the different requirements of raw water hardness and application.

MODEL: F142A1/F142B1-12504 F142A3/F142B3-12604

### 3.5. Parameter Settlement

#### ①Service time T1

Water treatment capacity

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

Hardness of Inlet Water (mmol/L)

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.

Resin volume (m<sup>3</sup>)

By hours:  $T1 = Q \div Q_h$  (Hour)

Average water consumption per hour (m<sup>3</sup>/h)

Water treatment capacity (m<sup>3</sup>)

By days:  $T1 = Q \div Q_d$  (Day)

Average water consumption per day (m<sup>3</sup>/d)

Water treatment capacity (m<sup>3</sup>)

#### ②Backwash 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

$$T3 = (40 \sim 50) H_R (\text{min})$$

Generally,  $T3 = 45 H_R$  (min)

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

#### ④Brine refill time T4

Down-flow regeneration:  $T4 = 0.45 \times V_R \div \text{Brine refill speed} (\text{min.})$

Up-flow regeneration:  $T4 = 0.34 \times V_R \div \text{Brine refill speed} (\text{min.})$

In this formula:  $V_R$  — Resin volume (m<sup>3</sup>)

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 there is a level controller installed in the brine tank).

#### ⑤Fast rinse time T5

$$T5 = 12 \times H_R (\text{min})$$

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<sup>3</sup>) 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.

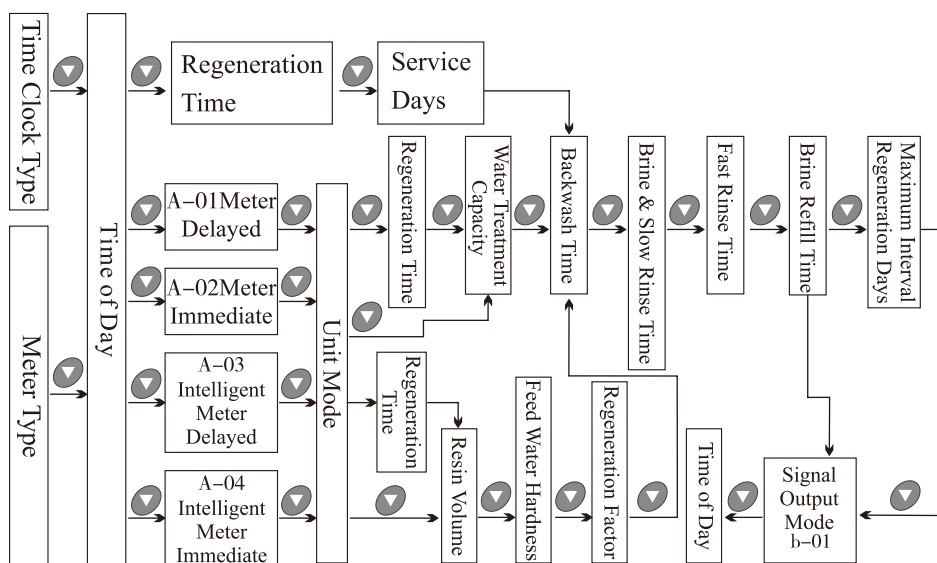
⑦Regeneration time: The entire cycle of regeneration takes about two hours. According to the actual situation of the user, the regeneration time should be set as long as possible when the user does not use water.

The calculation of the above steps is for reference only, and the actual time is determined by the dealer after debugging. The above calculations are only applicable to standard resin tanks for industrial softeners, not for residential small softeners.




## 3.6. Parameter Enquiry and Setting

## 3.6.1. Parameter Enquiry (take F142A as example)




























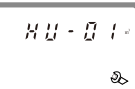


























When  lights on, press and hold both  and  for 5 seconds to unlock buttons; then press  and  lights on, enter to program display mode; press  or  to view each value according to below process. (Press  exit and turn back to service status).














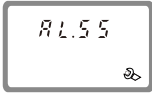























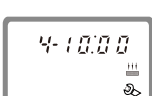














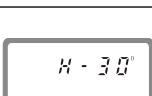






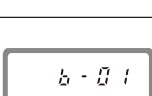


## 3.6.2. Parameter Setting (take F142A as example)

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

## 3.6.3. The Steps of Parameter Setting














Items	Process steps	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  , both  and hour value flash, through  or  to adjust the hour value; 3. Press  again, both  and minute value flash, through  or  to adjust the minute value; 4. Press  and hear a sound "Di", then finish adjustment, press  to turn back.	
Control Model	1. In control mode display status, press  and enter into program set mode,  and 01 value flash; 2. Press  or  , set the value to be A-01, A-02, A-03 or A-04 control mode; 3. Press  and hear a sound "Di", then finish adjustment, press  to turn back.	
Unit Mode	1. In unit mode display status, press  and enter into program set mode,  and 01 value flash; 2. Press  or  , and choose from the m <sup>3</sup> /L/gal; 3. Press  and finish adjustment, press  to turn back.	
Regeneration Time	1. In regeneration time display status, press  and enter into program set mode.  and 02 flash; Press  or  to adjust the hour value; 2. Press  again,  and 00 flash, press  or  to adjust the minute value; 3. Press  and hear a sound "Di", then finish adjustment, press  to turn back.	
Water Treatment 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 <sup>3</sup> ); 3. Press  and hear a sound "Di", then finish adjustment, 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  and hear a sound "Di", then finish adjustment, press  to turn back.	

Feed Water Hardness	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  and hear a sound "Di", then finish adjustment, press  to turn back.	
Exchange Factor	1. In exchange factor display status, it shows AL.55. Press  and enter into program set mode.  and 55 flash; 2. Press  or  to adjust the exchange factor value; 3. Press  and hear a sound "Di", then finish adjustment, press  to turn back.	
Backwash Time	1. In backwash time display status, it shows  and 2-10. Press  and enter into program set mode.  and 10:00 flash; 2. Press  or  to adjust the backwash time (minute); 3. Press  and hear a sound "Di", then finish adjustment, press  to turn back.	
Brine& Slow Rinse Time	1. In brine& slow rinse time display status, it shows  and 3-120. Press  and enter into program set mode.  and 120 flash; 2. Press  or  to adjust the brine & slow rinse time (minute); 3. Press  and hear a sound "Di", then finish adjustment, press  to turn back.	
Fast Rinse Time	1. In fast rinse time display status, it shows  and 4-10:00. Press  and enter into program set mode.  and 10:00 flash; 2. Press  or  to adjust the fast rinse time (minute); 3. Press  and hear a sound "Di", then finish adjustment, press  to turn back.	
Brine Refill Time	1. In brine refill time display status, it shows  and 5-05:00, Press  and enter into program set mode.  and 05:00 flash; 2. Press  or  to modify the brine refill time (minute); 3. Press  and hear a sound "Di", then finish adjustment, press  to turn back.	
Maximum Interval Regeneration 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  and hear a sound "Di", then finish adjustment, 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 01 flash; 2. Press  or  to adjust the signal output mode (b-02); 3. Press  and hear a sound "Di", then finish adjustment, press  to turn back.	

Under A-01/A-02 mode, F142A3 do not have parameters of Resin Volume, Feed Water Hardness and Exchange Factor.

For example, the fast rinse time of a softener is 12 minutes. After regenerating, 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:



- ① Press and hold both  and  to unlock the button (  lights off);
- ② Press  , and  lights on;
- ③ Press  or  continuously until  lights on. Then the digital area shows: 4-12M;
- ④ Press  ,  and 12 flash;
- ⑤ Press  continuously until 12 is changed to 15;
- ⑥ Press  , there is a sound "Di" and the figure stop flashing; the program back to enquiry status;
- ⑦ If 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 stat, the display will show the current service status.



### 3.7. Trial running (Take F142A1/A3 as example)



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 valve and outlet valve B & C, and open the by-pass valve A. After cleaning the foreign materials in the pipe, close the bypass valve A. (As Figure 1-3 shows).



B. Add calculated water to the brine tank and adjust the air check valve. Then add solid salt to the tank and dissolve the salt as much as possible.

C. Switch on power. Press  and go in the Backwash position; when  lights on, slowly open the inlet valve B to 1/4 position, making the water flow into the resin tank; you can hear the sound of air-out from the drain pipeline. After all air is out of pipeline, then open inlet valve B completely and clean the foreign materials in the resin tank until the outlet water is clean. It will take 8~10 minutes to finish the whole process.


D. Press  , turning the position from Backwash to Brine& Slow Rinse;  lights on and enter in the process of Brine& Slow Rinse. The air check valve close when control valve finished sucking brine, then slow rinse start to work. It is about 60~65minutes for whole process.

E. Press  , turning to Fast Rinse position.  lights on and start to fast rinse. After 10~15minutes, take our some outlet water for testing: if the water hardness reaches the requirement, and the chloridion in the water is almost the same compared with the inlet water, then go to the next step.

F. Press  to Brine refill position.  lights on and it indicates the brine tank is being refilled with water to the required level. It takes about 5~6 minutes, then add solid salt to the brine tank.

G. Press  , making the control valve return to Service Status;  lights on and starts to running.

**Note:**

● When the control valve enters into the regeneration status, all program can be finished automatically according to the setting time; if you want one of steps to be terminated earlier, you can press  .

● 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 position, ensuring there are no resin leakage.

● The time for Backwash, Brine& Slow Rinse, Fast Rinse and Brine Refill position can be set and executed according to the calculation in the formula or suggestions from the control valve suppliers.

**3.8. 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 cycles. C. Check or replace controller. D. Check or replace motor.
2.Regeneration time is not correct.	A.Time of Day 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 open or leaking. B. No salt in brine tank. C. Injector 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 or O-ring is not cracked. Check o-ring and tube pilot. F. Check or change valve body. G. Set correct regeneration cycles or water treatment capacity. H. Add resin to resin tank and check whether resin leaks. I. Reduce the inlet turbidity, clean or replace turbine.

4.Softener fails to draw brine.	A. 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 leaks. F. Drain line is plugged. G.Sizes of injector and DLFC are not match with tank.	A. Increase line pressure. B. Clean brine line. C. Replace brine line. D. Clean or replace a new injector. E. Check or replace valve body. F. Clean drain line flow control. G. Select correct injector size and DLFC according to the P24 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.
6.Excessive water in brine tank.	A. Overlong refilling time. B. Remain too much water after brine draw. C. Foreign material in brine valve. D. Power outage when brining and system without liquid level controller. E. Brine refill is out of control.	A. Reset correct refilling time. B. Check the injector and make sure no stuff the brine pipe. C. Clean brine valve and brine line. D. Stop water supplying and restart after power on or install safety brine valve in salt tank. E. Repair or replace safety brine valve.
7.Pressure lost or iron in conditioned water.	A. Rust in the water supply pipe. B. Rust mass in the softener. C. Fouled resin bed. D. Too much iron 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. D. Rust removal equipment is required to install before softening.
8.Loss of mineral through drain line.	A. Air in water system. B. Strainer is broken. C. Drain flow rate is too high when backwash.	A. Exhaust air exist in system. B. Replaca new bottom strainer. C. Check for proper drain flow rate.
9.Control valve 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 program setting and reset.
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 when electricity supply is normal.
11.Interrupted or irregular brine.	A. Water pressure is not stable or too low. B. Injector is plugged or faulty. C. Air in resin tank. D. Floccules in resin tank during up-flow backwash.	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 flow 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. D. Under the Backwash position, the outlet line and brine line are connected.	A. Clean foreign material in valve body. B. Change valve core or sealing ring. C. Reduce water pressure or use pressure release function. D. Install a check valve, solenoid valve in front of the outlet or install a liquid level controller in the brine tank.

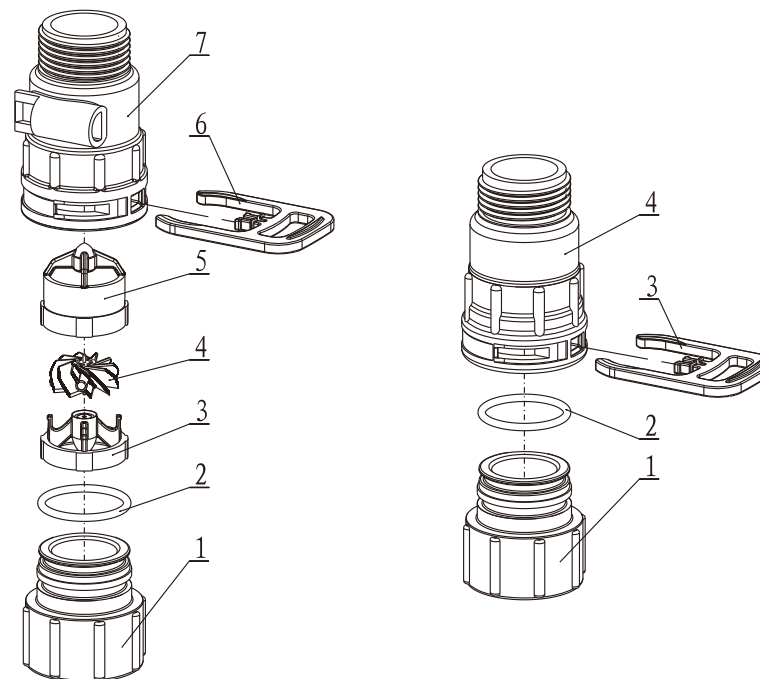
13. Salt water in soften water.	A. Foreign material in injector make it fails to work. B. Brine valve cannot be shut-off. C. Time of fast rinse is too short.	A. Clean and repair injector. B. Repair brine valve and clean it. C. Extend fast rinse time.
14. Unit capacity decreases.	A. Doesn't regenerate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

#### B. Controller Fault

Problem	Cause	Correction
1. All indicators display on front panel.	A. Wiring of display board with control board fails to work. B. Control board is faulty. C. Transformer is damaged. D. Electrical service 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 control board fails to work. B. Display board is damaged. C. Control board is damaged. D. Electrical service has been interrupted.	A. Check and replace wiring. B. Replace display board. C. Replace control board. D. Check electricity.
3. E1 Flashes	A. Wiring of locating board with control board is broken. B. Locating board is damaged. C. Mechanical driven failure. D. Control board is damaged. E. Wiring of motor with control board is fault. 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 Flashes	A. Hall component on locating board is damaged. B. Wiring of locating board with controller fails to work. C. Control board is faulty.	A. Replace locating board. B. Replace wiring. C. Replace control board.
5. E3 or E4 Flashes	A. Control board is faulty.	A. Replace control board.

### 3.9. Assembly & Parts

#### Flow Meter Connector & Animated Connector

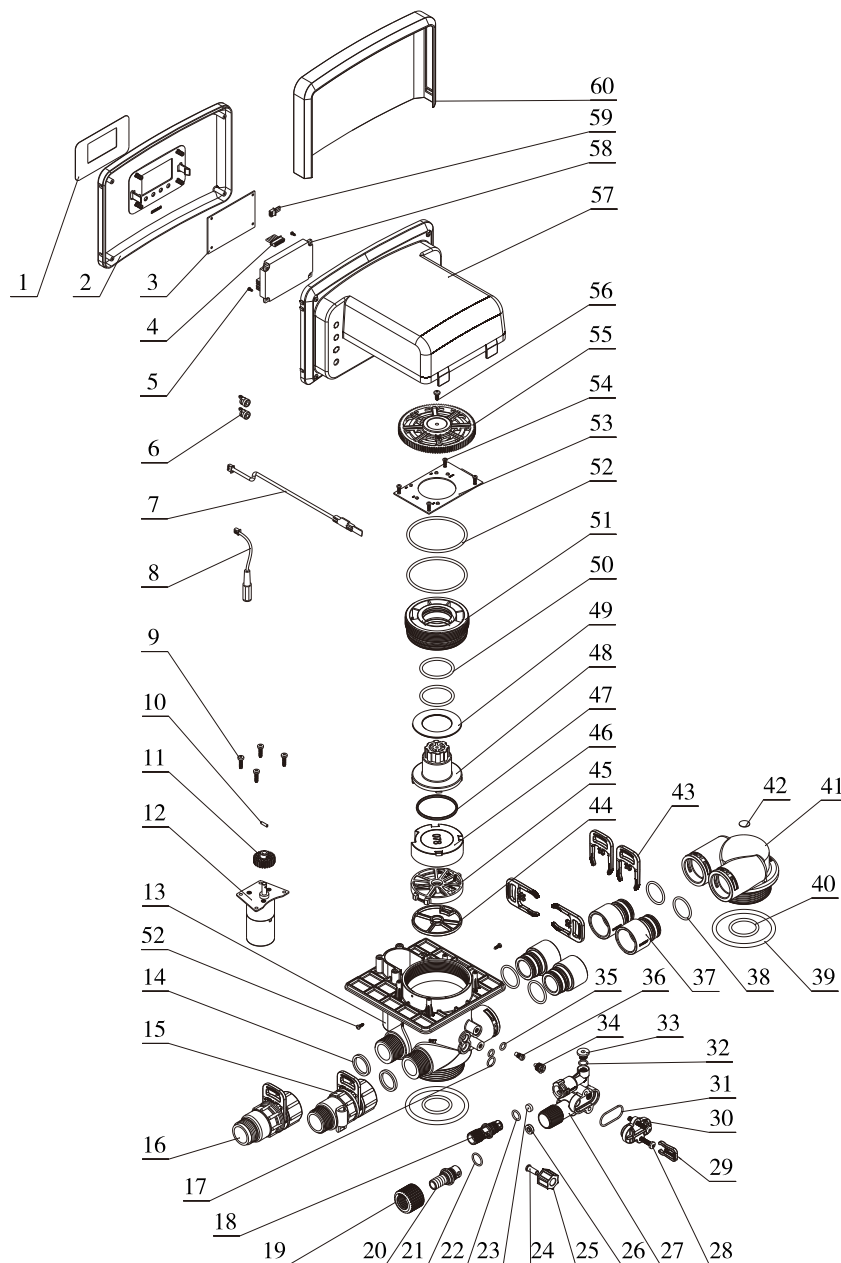


5447018 Flow Meter

5457002 Animated Connector

5447018 Flow Meter				5457002 Animated Connector			
Item No.	Description	Part No.	Quantity	Item No.	Description	Part No.	Quantity
1	Animated Nut	8945001	1	1	Animated Nut	8945001	1
2	O-ring	8378081	1	2	O-ring	8378081	1
3	Impeller Supporter	5115022	1	3	Clip	8270004	1
4	Impeller	5436010	1	4	Connector	8458038	1
5	Impeller Supporter	5115021	1				
6	Clip	8270004	1				
7	Shell	8002001	1				

F142A3/F142B3 Structure Chart



Spare Parts Description and Part No. for F142A3 (B3)

Item No.	Description	Part No.	Quantity	Item No.	Description	Part No.	Quantity
1	Label	8865202	1	31	O-ring 29.87x1.78	8378025	1
2	Front Cover	8300068	1	32	Seal Ring	8370003	1
3	Display Board	6381003	1	33	Plug	8323002	1
4	Wire for Locating Board	5511023	1	34	Nozzle	8454009	1
5	Screw, Cross ST2.2x6.5	8909004	2	35	O-ring 7.5x1.8	8378016	2
6	Wire Clip	8126004	2	36	Throat	8467009	1
7	Probe Wire	6386014	1	37	Connector	8458207	4
8	Wire for Power	5513001	1	38	O-ring 28x2.65	8378081	4
9	Screw, Cross ST3.9x16	8909044	4	39	O-ring 73x5.3	8378143	2
10	Pinφ2.5×12	8993003	1	40	O-ring 32.5x3.55	8378116	2
11	Small Gear	8241003	1	41	Valve Body (ABS+GF10)	5022214	1
12	Motor	6158073	1		Valve Body (PPO+GF10)	5022215	
13	Valve Body (ABS+GF10)	5022216	1	42	Trademark	8860024	1
	Valve Body (PPO+GF10)	5022217		43	Clip	8270004	4
14	Washer	8371001	2	44	Seal Ring	8370170	1
15	Flow Meter	5447018	1	45	Fixed Disk	8469079	1
16	Animated Connector	5457002	1	46	Moving Disk	8459078	1
17	O-ring 10.82x1.78	8378012	1	47	Moving Seal Ring	8370001	1
18	Connector	8458068	1	48	Shaft (ABS+GF10)	8258004	1
19	Animated Nut	8945025	1		Shaft (PPO+GF10)	8258053	
20	Connector	8458064	1	49	Anti-friction Washer	8216004	1
21	O-ring 15x1.8	8378179	1	50	O-ring 38.7x3.55	8378184	2
22	O-ring 11x2	8378169	1	51	Fitting Nut	8092004	1
23	Brine Line Flow Control	8468055	1	52	O-ring 73x3.55	8378128	2
24	Tube	8457004	1	53	Locating Board	6380044	2
25	Hexagonal Nut	8940001	1	54	Screw, Cross ST2.9x9.5	8909008	4
26	Drain Line Flow Control	/	1	55	Gear	5241023	1
27	Injector Body	8008010	1	56	Screw, Cross ST3.9x13	8909013	1
28	Screw, Cross	8902017	2	57	Dust Cover	8005125	1
29	Clip	8270010	1	58	Control Board	6382113	1
30	Cover, Injector	8315001	1	59	Wire for Display Board	5512001	1
				60	Protecting Cover	8300069	1


Note: For F142A1 (B1), there is no item No.14, 15 and 16.

#### 4. Warranty Card

Dear client:

This warranty card is the guarantee proof of 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.

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

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.

<b>End-user Company Name</b>				<b>Tel/Cel.</b>	
<b>Purchase Company Name</b>				<b>Tel/Cel.</b>	
<b>Model</b>		<b>Code of Valve Body</b>			
<b>Tank Size</b> $\phi$ ×	<b>Resin Tank Size</b> L		<b>Raw Water Hardness</b> mmol/L		
<b>Water Source:</b> Ground-water <input type="checkbox"/> Tap Water <input type="checkbox"/>	<b>Water Treatment Capacity</b> m <sup>3</sup>		<b>Backwash Time</b> min		
<b>Brine Rinse Time</b> min	<b>Slow Rinse Time</b> min	<b>Brine Refill Time</b> min	<b>Fast Rinse Time</b> min		
<b>Problem Description</b>					