Multi-functional Control
Valve for Water Treatment Systems

53530 (Old Model No.: TM. F147B1)

53630 (Old Model No.: TM. F147B3)

63530 (Old Model No.: TM. F147A1)

63630 (Old Model No.: TM. F147A3)

73530 (Old Model No.: TM. F147D1)

73630 (Old Model No.: TM. F147D3)

User Manual

RoHS CE

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: Groundwater□; Filtered Ground-water□; Tap Water□; Other_____.

Filter System Configuration

Tank Size: Dia._____mm; Height_____mm;

Refilled Filter Materials_____Kg; Granularity of Filter Materials_____mm;

Turbidity of Inlet Water_____FTU; Pressure of Inlet Water_____MPa;

Control Valve Model_____; Number_____;

Water Source: Groundwater□; Filtered Ground-water□; Tap Water□; Other_____.

Parameter Set:

Parameter	Unit	Factory Default	Actual value
Control mode A-01/02/03/04 (63630/73630 available) 53630 A-01/02 only	/	A-01	
Water Treatment Capacity (Meter Type available)	m^3	200.0	
Service Days (Time Clock Type available)	D	03	
Regeneration Time	/	02:00	
Backwash time	min	10	
Backwash Interval Times (73530/73630 available)	/	F-00	
Brine Time (53530/53630 unavailable)	min	60	
Slow Rinse Time (53530/53630 unavailable)	min	45	
Brine Refill Time(53530/53630 unavailable)	min	05	
Fast Rinse Time	min	10	
Maximum Interval Regeneration Days (Meter Type available)	D	30	
Output Mode b-01/2	/	b-01	

●If there is no special requirement when product purchase, we choose 5# drain line flow control (with drilled six φ6 holes) and 5# injector (7705) for 63630/63530/73630/73530 as standard configuration.

Catalogue

Notice

●To ensure normal operation of the valve, please consult with professional installation or repairing personnel before using 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/filter 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 librations environment. And do not leave it outside.

●Forbidden to use drains, injector bodies, and other connectors as supports to carry the system.

●Please use this product under the water temperature between 5～50℃, water pressure 0.2～0.6MPa. 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 before the water inlet. While, if the water pressure under 0.2MPa, 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.

●At the end of the product lifetime, parts and components of the product are sorted and properly disposed in accordance with local laws and regulations.

1.Product Overview

1.1 Main Application & Applicability

Used for softening, desalination, or filtering water treatment system.

53530/53630 (Filter)

Be Suitable for swimming pool filtration equipment

Filtration system

RO pretreatment active carbon and sand filtration system, etc.

63530/63630 (Down-flow Regeneration)

73530/73630 (Up-flow Regeneration)

Applicable for the ion exchange equipment which hardness of the raw water ≤ 6.5 mmol/L

Boiler softening water system

RO pretreatment softening system,etc.

1.2 Product Characteristics

● Simple Structure and Reliable Sealing

The distribution valve adopts hermetic head faces with high degree pottery and corrosion resistance for opening and closing. It combines with Service, Backwash, Brine & Slow Rinse, Brine Refill and Fast Rinse.

● **No water passes the valve in rinsing in single tank type**

● **Brine Refill Controlled by Electronic Ball Valve**

Brine refill controlled by electronic ball valve, brine refill at the same time of service, reducing the regeneration cycle, 63530/63630 refill raw water, 73530/73630 refill soft water.

● **Down/Up Flow Softener Valve Can be Changed to a Filter Valve**

63530/73530 seal off brine line connector, and remove drain line connector, i.e. 53530.

63630/73630 seal off brine line connector, and remove drain line connector, i.e. 53630.

● **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 on the controller 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 all type by program selection**

When power on, press " ▣ " and " ⊡ " at the same time for more than 2 seconds to enter the model setting interface. Press " ▲ " or " ▼ " to select the model, then press " ▣ " to save the setting model. Screen lights on after repowering and then display the model.
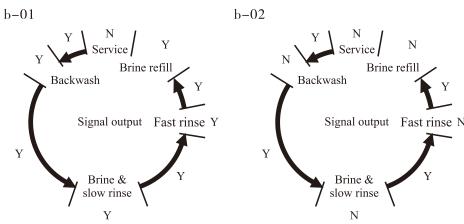
● **Interlock Function**

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 (63630/63530/73630/73530 available)**

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 two 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. As shown below:

b-01

Y — Y — N Service — Y
Y
Backwash — Brine refill
Signal output — Fast rinse — Y
Y
Brine & slow rinse — Y
Y

b-02

Y — Y — N Service — N
N
Backwash — Brine refill
Signal output — Fast rinse — N
Y
Brine & slow rinse — Y
N

● **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)

●**RS-485 Port**

　RS-485 port is a remote communication connector to realize remote collection and control of on-site date of the control valve. It can operate the control valve remotely matched with upper computer such as PLC. (Application refers to Figure 3-13/14)

●**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).

●**All Parameters can be Modified**

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

●**Four Kind of Meter Type can be selected (63630/73630 available)**

Mode	Name	Instruction
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.
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. Regeneration mode as same as A-01.
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. Regeneration mode as same as A-02.

　A-01, A-02 suitable for 53630

●**Maximum Interval Regeneration Day (Suitable for 53630/63630/73630)**

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

1.3 Service Condition

　Sodium ion exchanger matched with Runxin Valve should be used under the below conditions:
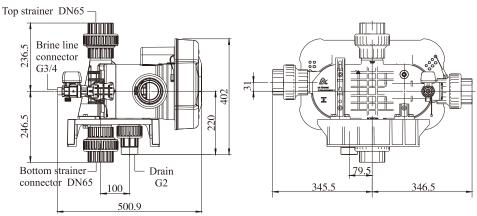
Item		Requirement
Working conditions	Water pressure	0.2MPa~0.6MPa
	Water temperature	5℃~50℃
Working environment	Environment temperature	5℃~50℃
	Relative humidity	≤95% (25℃)
	Electrical facility	AC100~240V/50~60Hz
Inlet water quality	Water turbidity	Down-flow softener (63530/63630) < 5FTU Up-flow softener (73530/73630) < 2FTU, Filter (53530/53630) < 20FTU
	Water hardness	First Grade Na^+ < 6.5mmol/L; Second Grade Na^+ < 10mmol/L
	Free chlorine	< 0.1mg/L
	$Iron^{2+}$	< 0.3mg/L
	CODMn	< 2mg/L (O_2)
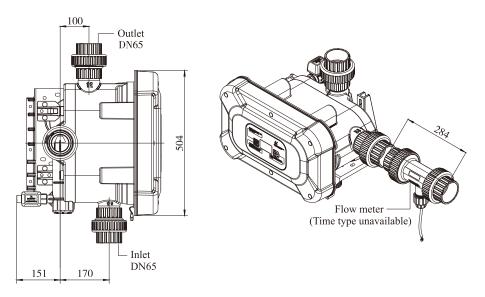
　In the above table, First Grade Na^+ represents First Grade Na^+ Exchanger. Second Grade Na^+ represents Second Grade Na^+ Exchanger.

●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

A. 63630 Structure Chart (The appearance is just for reference. It is subjected to the real product)

100
Outlet
DN65
504
284
Flow meter
(Time type unavailable)
Inlet
DN65
151   170

Notes:

●63630 without flow meter is 63530.

●63630 remove the electronic ball valve on brine line connector, seal it with a blind hole nut then removes the drain connector, it will be 63630.

●63530 remove the electronic ball valve on brine line connector, seal it with a blind hole nut then removes the drain connector, it will be 53530.

●The structural and external dimensions of 73630 and 63630 are identical (with a different internal structure of the valve body).

●The structural and external dimensions of 73530 and 63530 are identical (with a different internal structure of the valve body).

B. Technical Parameter

Transformer output: DC24V, 1.5A

Model	Connector Size				Flow rate m^3/h @0.15MPa	Remark
	Inlet/ Outlet	Drain	Brine line connector	Top/Bottom strainer		
53630	DN65	DN65	/	DN65	Refer to flow rate curve on P29	Filter, meter type
53530						Filter, time clock type
63630	DN65	2"M	3/4"M	DN65	30	DF softener, meter type
63530						DF softener, time clock type
73630	DN65	2"M	3/4"M	DN65	30	UF softener, meter type
73530						UF softener, time clock type

Remark: M-Male   F-Female

DN65 — UPVC pipe with an outer diameter of φ75.

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 regulation and the specification of water inlet, water outlet, drain outlet, and brine line connector.

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 45℃.

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

C. Support installation

Take out 8 pieces of support and door mats, and install them according to the Figure 1-1 (the parts description please refers to "5040009 support structure" on page 45)
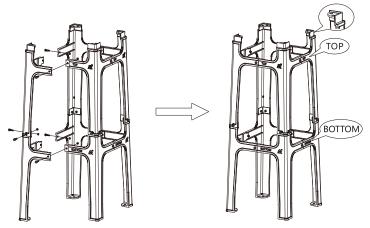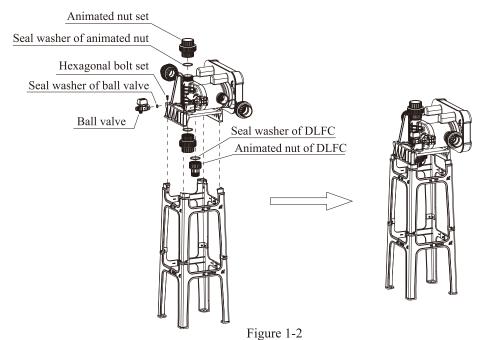

TOP

BOTTOM

Figure 1-1

D. Pipeline Installation (Take 63630 (F147A3) as sample)

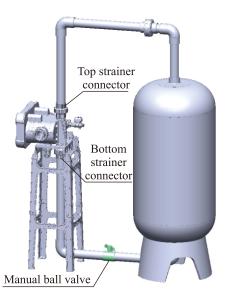① Install Control Valve and Flow Meter (as below Figure 1-2 shows)

Animated nut set

Seal washer of animated nut

Hexagonal bolt set

Seal washer of ball valve

Ball valve

Seal washer of DLFC

Animated nut of DLFC

Figure 1-2

a. Use the 4 pieces of hexagonal bolt sets and hexagonal nuts to install control valve in the support.

b. Put the sealing washer into flow meter connector, screw in water outlet; insert the sensor into flow meter. (without this step when the control valve is time clock type)

c. When install the ball valve, it needs to put in the sealing washer.

d. Tighten the drain line connector with seal ring to the drain outlet.

② Install Resin Tank and Top/Bottom strainer

a. Fill the resin to the tank, and the height is accordance with the design (the resin is filled up to the top viewport of the tank)

b. The pipeline connecting the top and bottom strainer is like Figure 1-3, install a manual ball valve bettween bottom strainer connetor and tank.

③ Install flow meter and the inlet/outlet pipeline

a. Install flow meter

Top strainer connector

Bottom strainer connector

Manual ball valve

Figure 1-3

Safety Notice

A. Before installation, make sure there is no pressure in pipeline and check if pressure released completely.

B. Before installation, make sure the tested liquid won't make corrosion for the probe. (The testing subject of the probe is water)

C. Before installation, make sure the temperature and pressure are complied with the probe's requirement. (The temperature of the liquid: 5～50℃. Testing pressure ≤ 0.6 MPa)

D. Before installation, make sure that the flow rate of the liquid won't exceed the probe's limit range. (Testing range: 1 ~ 5m/s)

E. Before installation, don't change the probe's shape structure and testing way.

F. Probe wiring couldn't connect with the transformer which has strong electric or voltage bigger than 12V. Otherwise, it will burn the electric board.

Probe Test Position Choosing:

A. The measure distance of tangential path behind flange should comply with 10 times front and 5 times back of pipeline diameter.

B. The measure distance of tangential path behind reducer (Only allow turn big to small, but not in reverse) should comply with 15 times front and 5 times back of pipeline diameter.

C. The measure distance of tangential path behind first class equal elbow should comply with 20 times front and 5 back of pipeline diameter.

D. The measure distance of tangential path behind coplanar second class continuous equal elbow should comply with 25 times front and 5 times back of pipeline diameter.

E. The measure distance of tangential path behind non-coplanar second class continuous equal elbow should comply with 40 times front and 5 times back of pipeline diameter.

F. The measure distance of tangential path behind valve should comply with 50times front and 5 times back of pipe diameter.

G. Suggest that install probe perpendicularly by pipeline, shouldn't be installed in the bottom of pipeline.

H. Probe can be installed in perpendicular pipeline which is upward flow direction, but also shall meet the above line requirement.

I. Probe can not be installed in perpendicular pipeline which is downward flow direction.

J. The water in tested pipeline should be full. Make sure no air in the pipeline.

Repair and maintenance of flow meter:

A. Before the installation of probe, make sure impeller rotates freely and there is no obvious block phenomenon.

B. When the flow meter stops measuring but the tested liquid still flowing, the working mode of probe can be checked online. Screw the probe nut A out, and check the working condition of the diode on the back of probe. If the diode always lights on or off, it indicates the impeller in pipeline stop rotating. It shall stop pipeline working, release pressure in pipeline, and disassemble the probe to check if there is any foreign matter impact impeller rotating. After cleaning, if it can rotate normally by manually, and the diode works normally, it can continue to use after confirming the installation correct. (As Figure 1-4)

C. If the impeller of probe is broken, the top bracket of probe is damaged, bearing is bent, the impeller still is unable to rotate freely, or the part in contact with liquid is corroded, or the installation screw thread is seriously damaged, it shall replace a new probe.

D. If the diode on the back of probe works normally, but the display board shows incorrect, please check if the probe wire has any damage and use a multi-meter to check the voltage between shielding and black wire if normally. If the diode lights on, there is no voltage output; and if the diode lights off, there is voltage output.

E. The impeller may not rotate smoothly due to the stains in the liquid, which may affect the precision of probe. Therefore, it is necessary to check and clean the impeller of probe periodically.

Nut A

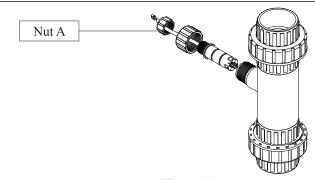Figure 1-4

b. As figure 1-5 shows, install a pressure gauge on the inlet.

c. Install valve A, B, C and D on the inlet, outlet, and the middle of the pipeline of inlet and outlet, valve D is a sampling valve.

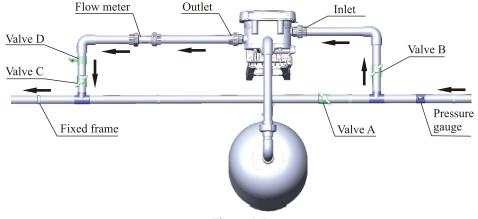d. Inlet pipeline should be in parallel with outlet pipeline. Support inlet and outlet pipeline with fixed frame.

Figure 1-5

Notice:

● If making a soldered copper installation, do all sweat soldering before connecting pipes to the valve. The temperature generated during soldering may damage plastic parts.

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

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

● If the valve is time clock type, there is no flow meter installation step.

● This flow meter error range ≤ 5%.

④ Connect Brine Tube

a. As Figure 1-6 shows, use DN20 UPVC pipeline and other pipeline to connect the brine valve and the brine line connector of the valve.

Notice:

● The brine pipeline should be as shorter as possible, and smooth. There are less four elbows in the pipeline, or it will make the brine sucking unsmooth.

● It must install brine valve in the brine tank.

⑤ Install Drain Pipeline

Brine line connector

Drain

Brine tank

Figure 1-6

a. According to P28, for 63630/63530, if the diameter of the tank is 1200mm, please do as step d; if the diameter of the tank is 1000mm, please request the supplier to provide a 7704 injector and matching flow control, and do as following step:

b. Replace 7705 injector in valve body with 7704 injector.

c. According to matching tank diameter size, use a φ6 drill for undrilled drain line flow control, as P28 table requested hole quantity.

d. Tighten the drain connector with seal ring to the drain of the valve.

e. Glue the DN50 (inner diameter) UPVC pipeline with the drain, drain pipeline should directly connect to the sewer, the sewer and the drain pipeline should be installed as Figure 1-7.

f. For 53630/53530 filter valve, there is no drain connector, please do as step e that glue the DN65 (Outer diameter is φ75) UPVC pipeline.
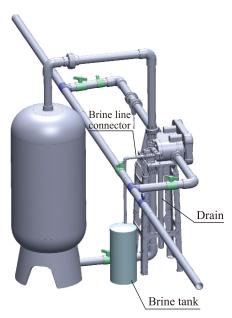
Notice
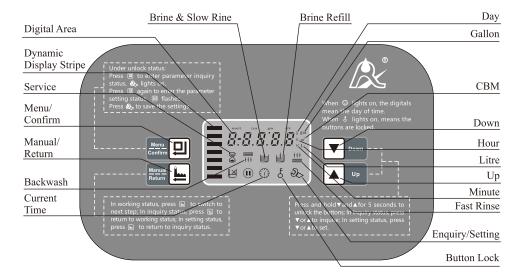
● The control valve should be higher than the drain and the pipeline distance between it and the drain should not be too long.

● Leave a certain space between the drain pipe and the sewer to prevent the sewage from siphoning into the water treatment equipment.

Figure 1-7

2. Basic Setting & Usage

2.1 The Function of PC Board

Digital Area

Dynamic Display Stripe

Service

Menu/Confirm

Manual/Return

Backwash

Current Time

Brine & Slow Rine

Brine Refill

Day

Gallon

CBM

Down

Hour

Litre

Up

Minute

Fast Rinse

Enquiry/Setting

Button Lock

Under unlock status:
Press 🔲 to enter parameter inquiry status, 🔑 lights on.
Press 🔲 again to enter the parameter setting status, 🔲 flashes.
Press 🔑 to save the settings.

Menu Confirm

Manual Return

When ⊙ lights on, the digitals mean the day of time.
When 🔒 lights on, means the buttons are locked.

Down

Up

In working status, press 🔲 to switch to next step; In inquiry status, press 🔲 to return to working status; In setting status, press 🔲 to return to inquiry status.

Press and hold ▼and▲for 5 seconds to unlock the buttons; In inquiry status, press ▼or▲to inquire; In setting status, press ▼or▲to set.

A. ⊕ Current Time indicator

● ⊕ Lights on, indicate the current time

B. ⌁ Button lock indicator

● ⌁ Lights on, indicate the button are locked. At this moment, press any single button will not work (No operation in one minute, ⌁ will lights 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 service mode, press ▣ , ⟋ lights on, enter program display mode, can view all values.

● In program display mode, press ▣ , ⟋ flashes, enter program set mode, can adjust values.

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

E. ⬓ Manual /Return button

● Press ⬓ in any mode, 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 draw 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 ▲ and ▼ to adjust values.

● Press and hold both ▲ and ▼ for 5 seconds to unlock the buttons.

2.2 Basic Setting & Usage

A. Parameter specification

Function	Indicator	Factory Default	Parameter Set Range	Instruction
Current time	⊕	Random	00:00 ~ 23:59	Set the current time when use; " : " flashes.

			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.
Control Mode	A-01	A-01	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. Regeneration mode same as A-01.
			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. Regeneration mode same as A-02.
Service Day	⧗	1-03D	0 ~ 99 Day	Only for Time Clock Type, regeneration by days
Regeneration Time	02:00	02:00	00:00 ~ 23:59	Regeneration time; ":" lights on
Resin Volume	500	500	20-2000	Resin volume in resin tank (L)
Feed Water Hardness	Yd1.2	1.2	0.1-30.0(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	⧗	200	0 ~ 9999.9	Water treatment capacity in one circle (m^3)
Interval Backwash Times	F-00	00	00 ~ 20	Only for 73530/73630
Rinsing Frequency	F-00	00	00 ~ 20	Only for 53530/53630
Backwash Time	▥	10	0 ~ 99	Backwash time (Minute: Second)
Brine Draw Time	▤	60	0 ~ 99	Brine draw time (Minute: Second)

| Slow Rinse Time	/	45	0 ~ 99	Slow rinse time (Minute: Second)
Brine Refill Time	〰	05	0 ~ 99	Brine refill time (Minute: Second)
Fast Rinse Time	〰	10	0 ~ 99	Fast rinse time (Minute: Second)
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 or 02	Mode b-01: Signal will turn on during the regeneration (refer to P5) Mode b-02: Signal is only available at intervals of regeneration cycles and in service. (refer to the P5)

B. Process Display (Take 63630 A-01 as an example)
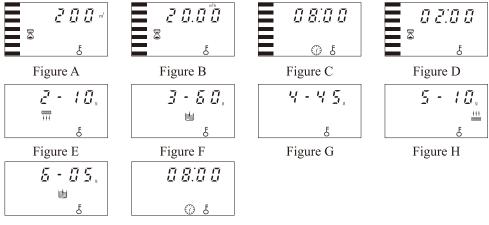
| Figure A | Figure B | Figure C | Figure D |

| Figure E | Figure F | Figure G | Figure H |

| Figure I | Figure J |

Illustration:

● In service status, the figure shows A/B/C/D; In backwash status, it shows Figure E/J; In brine draw status, it shows F/J; In slow rinse status, it shows G/J; In fast rinse status, it shows Figure H/J; In brine refill status, it shows figure I/J. In each status, every figure shows 15 seconds.

● Above displays are taking meter type for example. For time clock type, it shows the rest days, such as 1-03D.

● The display screen will only show "-00-" when the electrical motor is running.

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

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

● Working process: Service → Backwash → Brine Draw → Slow Rinse → Fast Rinse → Brine Refill → Service.

C. Usage

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, the user should complete the below works:

① Ensure that there is solid salt all the time in the brine tank 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 raw 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 回 , and the ⌲ will light on, the press ▼ , the digital area shows the control mode. If it shows A-01 or A-02, press ▼ to let the digital area 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 feed water hardness); Press 回 again, ⌲ and digital number flash. Press ▲ or ▼ continuously to reset the capacity value (Or water hardness). Press 回 and hear a sound "Di", then finish the adjustment. Press ⌲ turn back the service status.
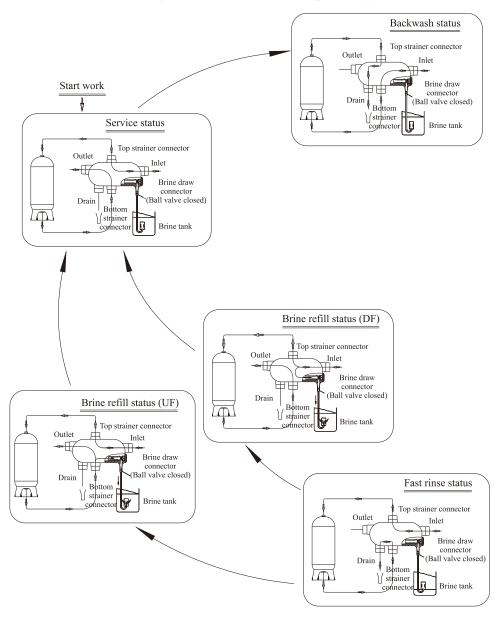
④ The estimation of water treatment capacity, you can refer to the professional application specification. When select A-03 or A-04 intelligent control mode, the controller will automatically calculate the water treatment capacity by setting resin volume, feed water hardness and regeneration factor.

⑤ For A-01 or A-03 control mode (Delayed regeneration 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 buttons, press 回 , the ⌲ and ⌚ light on. Then press 回 , the ⌲ and hour value flashes. Press ▲ and ▼ continuously, reset the hour value; Press 回 again, ⌲ and minute value flash. Press ▲ or ▼ continuously, reset the minute value; Press 回 and hear a sound "Di", then finish the adjustment. Press ⌲ turn back the service status.
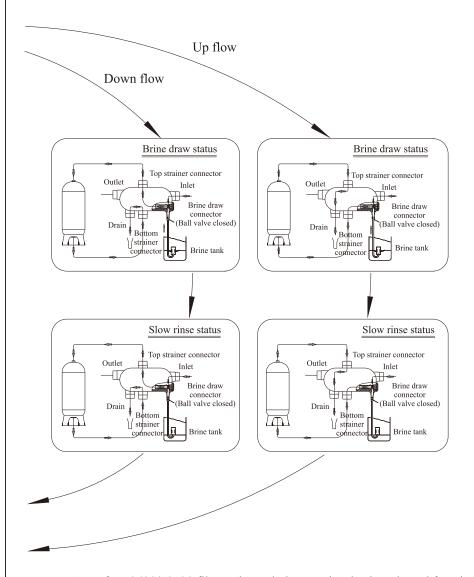
The regeneration parameters have been set when control valve left factory. Generally, it does not need to reset. If you want enquiry and modify the setting, you can refer to the professional application specification.

3. Applications

3.1 Flow Chart

Flow chart for down-flow regeneration 63630/63530 and up-flow regeneration 73630/73530:

Backwash status

Outlet
Top strainer connector
Inlet
Drain
Brine draw connector (Ball valve closed)
Bottom strainer connector
Brine tank

Start work

Service status

Outlet
Top strainer connector
Inlet
Drain
Brine draw connector (Ball valve closed)
Bottom strainer connector
Brine tank

Brine refill status (DF)

Outlet
Top strainer connector
Inlet
Drain
Brine draw connector (Ball valve closed)
Bottom strainer connector
Brine tank

Brine refill status (UF)

Outlet
Top strainer connector
Inlet
Drain
Brine draw connector (Ball valve closed)
Bottom strainer connector
Brine tank

Fast rinse status

Outlet
Top strainer connector
Inlet
Drain
Brine draw connector (Ball valve closed)
Bottom strainer connector
Brine tank

Up flow

Down flow

Brine draw status

Outlet
Top strainer connector
Inlet
Drain
Brine draw connector (Ball valve closed)
Bottom strainer connector
Brine tank

Brine draw status

Outlet
Top strainer connector
Inlet
Drain
Brine draw connector (Ball valve closed)
Bottom strainer connector
Brine tank

Slow rinse status

Outlet
Top strainer connector
Inlet
Drain
Brine draw connector (Ball valve closed)
Bottom strainer connector
Brine tank

Slow rinse status

Outlet
Top strainer connector
Inlet
Drain
Brine draw connector (Ball valve closed)
Bottom strainer connector
Brine tank

Note: for 53630/53530 filter valve only has service, backwash, and fast rinse status.

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 below:
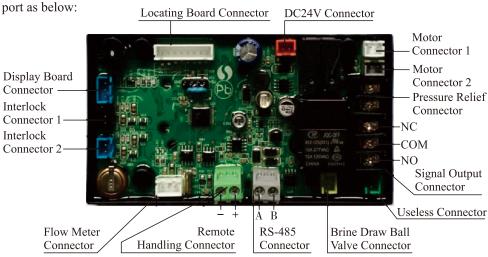
Locating Board Connector   DC24V Connector

Motor Connector 1
Motor Connector 2
Pressure Relief Connector

Display Board Connector

Interlock Connector 1
Interlock Connector 2

NC
COM
NO

Signal Output Connector

Useless Connector

Flow Meter Connector   Remote Handling Connector   RS-485 Connector   Brine Draw Ball Valve Connector

A B

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 flow 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 when valve is rotating to prevent motor can't rotate.
Pressure relief connector	Control the inlet bypass to release pressure	When valve is rotating, pressure relief connector 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 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 brine tank

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

Control Valve   Signal Output Connector
Inlet
N/C Solenoid valve
Liquid level switch
Water tank

COM
Solenoid valve   NC
Liquid level switch
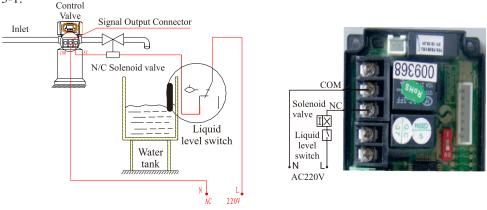AC220V

N   L
AC   220V

Figure 3-1 Wiring of Solenoid Valve on Outlet

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.

② Control 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 3-2. As Figure 3-3 show, it also can use the pressure relief port to work.

Signal Output Connector   Control Valve
Inlet   Outlet   (Connect to Control Protection Case)
N/C Solenoid valve   COM   NC   L
AC220V
N

Signal Output Connector   Control Valve
Inlet
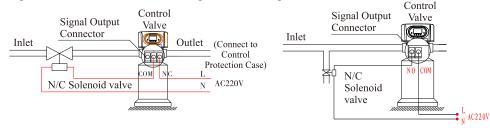N/C Solenoid valve   NO   COM
L
N   AC220V

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 Draw, Slow Rinse, Brine Refill and Fast Rinse. 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$^+$ system. The wiring refers to the Figure 3-4:
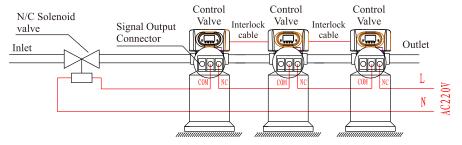
Figure 3-4 Wiring of Solenoid Valve on Inlet

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:
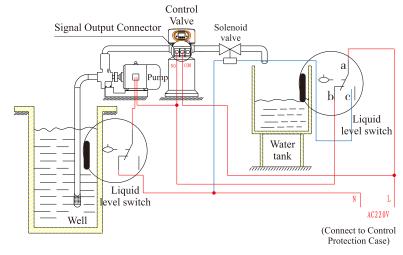
Figure 3-5 Wiring of Liquid Level Switch in Water Tank Controls Inlet Pump

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 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 ensures no water fill into brine tank.

3) Liquid Level Switch in Water Tank Controls Inlet Pump (Three-phase, refer to Figure 3-6) (Set b-01)
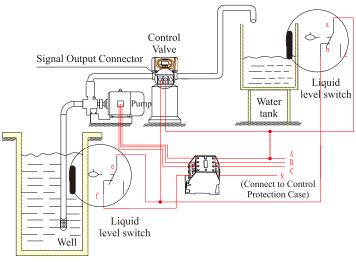
Figure 3-6 Wiring of Liquid Level Switch in Water Tank Controls 380V Inlet Pump

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. Interlock

Instruction: In the parallel water treatment system, it ensures only one valve in regeneration or washing cycle and (n-1) valves in service, realizing the function of supplying water simultaneously and regenerating individually.
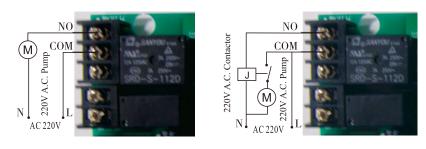
In the series and parallel water treatment system (Second grade Na^+ Exchanger or RO pretreatment system), it ensures only one valve in regeneration or washing cycle and there is water in service. Refer to Figure 3-9.

Interlock Cable   Interlock Cable
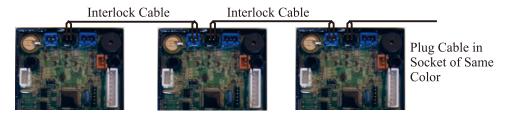
Plug Cable in Socket of Same Color

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 system.

C. Pressure Relief Output

The 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 3-10.
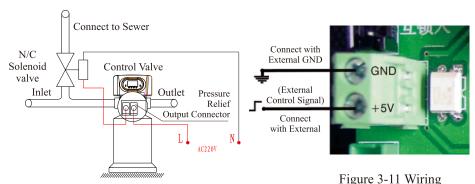
Figure 3-10 Wiring of Pressure Relief Output

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

At least 2 valves are interlocked connecting in one system and all valves are in service but regenerate individually. The wiring refers to figure 3-12:
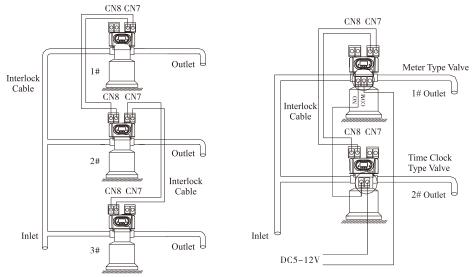
Figure 3-12 Interlock System

Figure 3-13 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 conne-ctor of the time-type valve. That can realize the function of supplying water simultaneously and regenerating orderly. The wiring refers to Figure 3-13.

3.3 System Configuration and Flow Rate Curve

A. Product Configuration

   63530/63630/73730/73630 Softener control valve 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
φ900×2400	900	16.0	φ1080×1460	135.00	7703
φ1000×2400	1100	20.0	φ1240×1575	165.00	7704
φ1200×2400	1500	28.0	φ1360×1690	225.00	7705

Note: The flow rate calculation is based on linear velocity 25m/h; the minimum salt consu-mption for regeneration calculation is based on salt consumption 150g/L (resin).

53530/53630 Filter control valve configuration with tank, filter material.

Tank Size	Volume of Filter Material	Carbon Filter		Sand Filter	
		Filtering Flow Rate	Backwash Flow Rate	Filtering Flow Rate	Backwash Flow Rate
mm	L	m^3/h	m^3/h	m^3/h	m^3/h
φ750 × 1800	450	5.3	15.9	11	23.8
φ900 × 2400	900	7.6	22.9	15.9	34.3
φ1000 × 2400	1100	9.5	28.2	/	/

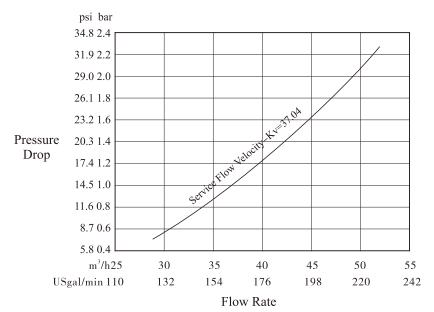**Note:** The filtering flow rate of carbon filter is calculated based on the 12m/h operation rate; the backwash flow rate is calculated on the 10L/(m²*s) backwash intensity; the filtering flow rate of sand filter is calculated based on the 25m/h operation rate; the backwash flow rate is calculated based on the 15L/(m²*s) backwash intensity.
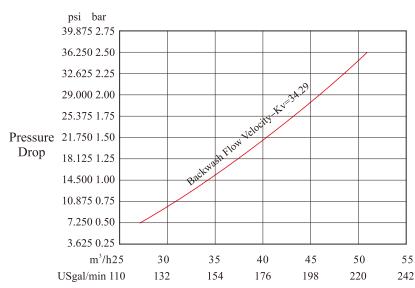
B. Flow Rate Characteristic (Empty Tank Test)

1) Pressure-Flow Rate Curve

Softener Valve: 63630/63530/73630/73530

Filter Valve: 53530/53630

2) Injector Parameter Table (63630/63530/73630/73530)

Inlet Pressure	Draw Rate (L/M)		
MPa	7703 Yellow	7704 Blue	7705 White
0.20	42.30	49.35	61.70
0.25	47.45	58.25	68.20
0.30	53.85	65.00	75.20
0.35	58.20	71.70	79.30
0.40	61.90	76.30	84.50
0.45	66.85	79.50	88.15
0.50	70.35	82.90	91.60
0.55	73.50	86.05	94.75

3) Configuration for Standard Injector and Drain Line Flow Control (63630/63530/73630/73530)

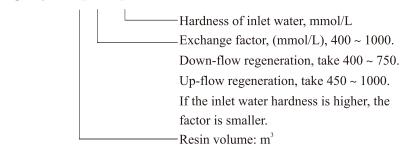| Tank Dia. mm	Injector Model	Injector Color	Draw Rate	Slow Rinse	Brine Refill	DLFC & Holes Quantity	Backwash / Fast Rinse
			L/m	L/m	L/m		t/h
900	7703	Yellow	53.85	33.25	52.02	$1×φ6$	9
1000	7704	Blue	65.00	40.80	52.02	$3×φ6$	12
1200	7705	White	75.20	48.70	52.02	$6×φ6$	17

Note:

●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.

●Above parameter is tested under 0.3MPa inlet pressure.

●The hole is made depending on the size of matched tank practical application. Diameter of hole is φ6, the number refers to above table.

●Injector 7704 and 7705, the corresponding material codes are 5468020 and 5468021.
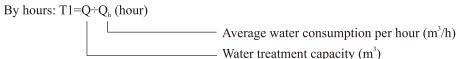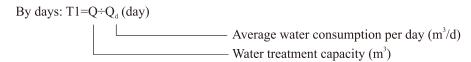
3.4 Parameter Settlement

① Service time T1

Water treatment capacity: $Q=V_R×K÷Y_D$ (m³)

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: m³

By hours: $T1=Q÷Q_h$ (hour)

Average water consumption per hour (m³/h)

Water treatment capacity (m³)

By days: $T1=Q÷Q_d$ (day)

Average water consumption per day (m³/d)

Water treatment capacity (m³)

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 had better to install a filter in front of the exchanger.

③ Brine & slow rinse time T3

$T3=(40 ~ 50)×H_R$ (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: $T4 = 0.45×V_R÷$brine refill speed (min)

Up-flow regeneration: $T4 = 0.34×V_R÷$brine refill speed (min)

In this formula, V_R——resin volume (m³)

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. (If there is a brine valve installed in the brine tank)

⑤ Fast rinse time T5

$T5=12×H_R$ (min)

Generally, the water for fast rinse is 3-6 times of resin volume. It is suggested to be set 10-16 minutes, but it should be washed until the outlet water meet the requirement of qualified outlet.

⑥ Exchange factor

Exchange factor=E/(k×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.
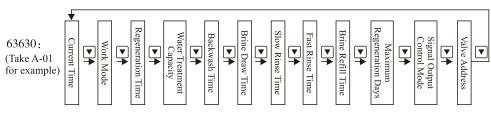
⑦ Regeneration time: the whole cycle for regeneration is about two hours. Please try to set up the regeneration time when you don't need to use water according to the actual situation.
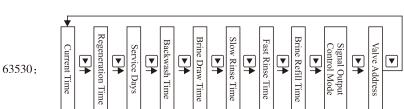
The calculation of parameters for each step is only for reference, the actual proper time will be determined after adjusting by water exchanger supplier. This calculation procedure of softener is only for industrial application; it is not suitable for small softener in residential application.

3.5. Parameter Inquiry and Setting
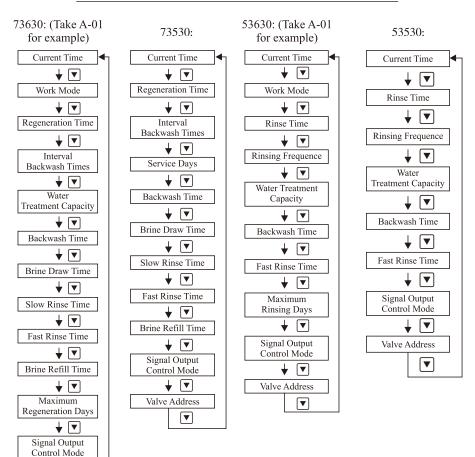
(1) Parameter Inquiry

When ⚡ lights up, press and hold both ▼ and ▲ for 5 seconds to unlock buttons; then press 🔲 , 🔧 light up, enter program display mode; press ▼ or ▲ to view each value according to below process. (press 🔲 exit and turn back to service status)

63630：
(Take A-01 for example)

Current Time → Work Mode → Regeneration Time → Water Treatment Capacity → Backwash Time → Brine Draw Time → Slow Rinse Time → Fast Rinse Time → Brine Refill Time → Maximum Regeneration Days → Signal Output Control Mode → Valve Address

63530：

Current Time → Regeneration Time → Service Days → Backwash Time → Brine Draw Time → Slow Rinse Time → Fast Rinse Time → Brine Refill Time → Signal Output Control Mode → Valve Address

73630: (Take A-01 for example)

Current Time → Work Mode → Regeneration Time → Interval Backwash Times → Water Treatment Capacity → Backwash Time → Brine Draw Time → Slow Rinse Time → Fast Rinse Time → Brine Refill Time → Maximum Regeneration Days → Signal Output Control Mode → Valve Address

73530:

Current Time → Regeneration Time → Interval Backwash Times → Service Days → Backwash Time → Brine Draw Time → Slow Rinse Time → Fast Rinse Time → Brine Refill Time → Signal Output Control Mode → Valve Address

53630: (Take A-01 for example)

Current Time → Work Mode → Rinse Time → Rinsing Frequence → Water Treatment Capacity → Backwash Time → Fast Rinse Time → Maximum Rinsing Days → Signal Output Control Mode → Valve Address

53530:

Current Time → Rinse Time → Rinsing Frequence → Water Treatment Capacity → Backwash Time → Fast Rinse Time → Signal Output Control Mode → Valve Address

(2) Parameter Setting (take 63630 A-01 mode as example)

In program display mode, press ▣ and enter program set mode, press ▼ or ▲ can adjust the value.

Items	Process steps	Symbol
Current Time	When time of day "12:12" continuously flash, it reminds to reset; 1. Press ▣ to enter program display mode, both ✍ and ⊕ symbol light up, ":" flash. Press ▣ , to set "Current Time" mode, both ✍ and hour value flash, through ▼ or ▲ to adjust the hour value. 2. Press ▣ again, both ✍ and minute value flash, through ▼ or ▲ to adjust minute value. 3. Press ▣ to finish adjustment, press ⬓ to turn back.	12:12
Work Mode	1. In program display status, press ▣ and enter program set mode, ✍ and 01 value flash. 2. Press ▼ or ▲ , set the value to be A-01/02 mode. 3. Press ▣ to finish adjustment, press ⬓ to turn back.	A-01
Regeneration Time	1. In regeneration time display status, press ▣ and enter program set mode. Shows "02:00", ✍ and 02 flash, press ▼ or ▲ to adjust the minute value. 2. Press ▣ again, and 00 flash, press ▼ or ▲ , to adjust the minute value. 3. Press ▣ to finish adjustment, press ⬓ to turn back.	02:00
Water Treatment Capacity	1. In water treatment capacity display status, it shows ⧖ and 200.0, press ▣ and enter program set mode. ✍ and 200 flash. 2. Press ▼ or ▲ to adjust the water treatment capacity value. 3. Press ▣ again, decimal value flashes, press ▼ or ▲ to adjust the decimal value. 4. Press ▣ to finish adjustment, press ⬓ to turn back.	200.0 m³
Backwash Time	1. In backwash time display status, it shows ⦚ and 2-10:00, press ▣ and enter program set mode, ✍ and 10 flash. 2. Press ▼ or ▲ to adjust the backwash time (minute) 3. Press ▣ to finish adjustment, press ⬓ to turn back.	2-10 M

Brine Draw Time	1. In brine draw time display status, it shows ⌇ and 3-60, press ▣ and enter program set mode, ✍ and 60 flash. 2. Press ▼ or ▲ to adjust the brine draw time (minute). 3. Press ▣ to finish adjustment, press ⬓ to turn back.	3-60 M
Slow Rinse Time	1. In slow rinse time display status, it shows 4-45, press ▣ and enter program set mode, ✍ and 45 flash. 2. Press ▼ or ▲ to adjust the slow rinse time (minute). 3. Press ▣ to finish adjustment, press ⬓ to turn back.	4-45 M
Fast Rinse Time	1. In fast rinse time display status, it shows ⦚ and 5-10, press ▣ and enter program set mode, ✍ and 10 flash. 2. Press ▼ or ▲ to adjust the fast rinse time (minute). 3. Press ▣ to finish adjustment, press ⬓ to turn back.	5-10 M
Brine Refill Time	1. In brine refill time display status, it shows ⌇ and 6-05, press ▣ and enter program set mode, ✍ and 05 flash. 2. Press ▼ or ▲ to adjust the brine refill time (minute) 3. Press ▣ to finish adjustment, press ⬓ to turn back.	6-05 M
Maximum Interval Regeneration Days	1. In maximum interval regeneration days display status, it shows H-30, press ▣ and enter program set mode, ✍ and 30 flash. 2. Press ▼ or ▲ to adjust the maximum interval regeneration days (day) 3. Press ▣ to finish adjustment, press ⬓ to turn back.	H-30 D
Signal Output Mode	1. In signal output mode display status, it shows b-01, press ▣ and enter program set mode, ✍ and 01 flash. 2. Press ▼ or ▲ to adjust the signal output mode. 3. Press ▣ to finish adjustment, press ⬓ to turn back.	b-01
Valve Address	1. In valve address display status, it shows 1, press ▣ and enter program set mode, ✍ and 1 flash. 2. Press ▼ or ▲ to adjust the valve address. 3. Press ▣ to finish adjustment, press ⬓ to turn back.	1

   For example, a softener has set fast rinse time as 12 minutes, after regeneration, the chloride ion in the outlet water is always higher than normal, which indicates that the fast rinse time is too short. If you want to set the time as 15 minutes, the modification steps as follows:

1. Press and hold both ▼ and ▲ to unlock the button (⚲ lights off);

2. Press 回 , ✍ lights on;

3. Press ▼ and ▲ continuously until ⊞ lights on, the digital display area shows: 5-12M;

4. Press 回 , ✍ and 12 flash;

5. Press ▲ continuously until 12 changes to 15;

6. Press 回 again and hear a sound "Di" and the figure stop flashing, the program returns to inquiry status.

7. If you want to adjust other parameters, you can repeat the steps from 2-5 steps. If you don't, press ⌂ to exit the program inquiry status. The display will shows the current service status.

3.6 RS-485 Communication between PLC and Single Valve

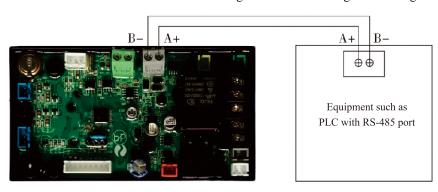•RS-485 communication between PLC and single valve. The wiring refers to Figure 3-14:

Figure 3-14

Illustration:

1) Control valve's RS-485 port A and B are respectively connected to PLC's RS-485 port A and B.

2) Use twisted pair wire for connection.

3) In case of far communication distance, a $120\,\Omega\,1/4$W resistor should be connected in parallel to A and B terminals of PLC and valve.

4) Keep away from the high voltage cable when wiring the RS-485 communication cable, and do not bundle the high voltage power cable with RS-485 communication cable together.

5) As control valve is matched in system, its address range is 1~247 and the default address

is 1. Reading or writing data of control valve from PLC should correspond to the number of valve.

3.7 RS-485 Communication among PLC and Multi-Valves

RS-485 communication among PLC and multi-valves. The wiring refers to Figure 3-15:
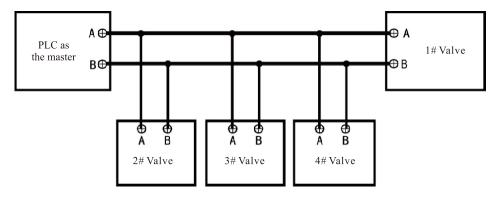

Figure 3-15

Illustration:

1)RS-485 port A and B of PLC are respectively connected to RS-485 port A and B of 1# valve. It is the main wire. Port A and B of 2# and 3# valve are directly connected to A and B main wire in parallel.

2)In case of far communication distance, a $120\,\Omega/0.25$W resistor should be connected in parallel to RS-485 port A and B of PLC as well as port A and port B of 1# valve. There is no required to connect resistor for port A and port B of 2# , 3# and other valve.

3)RS-485 main communication wire can be maximally connected with 32 sets of RS-485 valve or equipment. If connection more than 32 sets, a RS-485 repeater should be connected to the main communication wire.

4)As control valve is matched in system, its address range is 1~247 and the default address is 1. Reading or writing data of control valve from PLC should correspond to the number of valve.

3.8 RS-485 Port

•RS-485 Communication Protocol

1. RS-485 communication protocol: it adopts the international MODBUS RTU.

2. Information transmission: half-duplex mode, in bytes.

3. Transmission speed: fixed 9600 bps baud rate.

4. Byte format: 1 start bit, 8 data bits, 1 stop bit, no parity bit. The start bit is 0 and the stop bit is 1.

●**Read one or multiple registers, the function code is 0x03**

a)The equipment such as PLC is the master, and valve is the slave. PLC to read the data of slave valve

b)The MODBUS communication address and corresponding data are defined as follows:

MODBU Address	Instruction	Unit	Data Definition	Comment
0x2002	Remaining Water	Integer m^3	0 ~ 9999	Read remaining water
0x2003	Remaining Water	Decimal 0.1m^3	0 ~ 9	
0x2004	Remaining Time	Day/Minute	0 ~ 99	Read remaining time
0x2005	Normal/ Fault Status	/	0x0000:Normal 0x0003:E3 0x0004:E4 0x0005:E11 0x0006:E12 0x0007:E21 0x0008:E22	Read valve status
0x2006	Current Flow Rate	0.01m^3/h	0 ~ 500	Read current flow rate
0x2007	Current Status	/	0x0001: Service 0x0002: Settling bed 0x0003: Backwash 0x0004:Brine Draw 0x0005: Soak 0x0006: Slow rinse 0x0007: Fast Rinse 0x0008: Brine Refill 0x0010: Switching	Read the current status of valve

●**0x10 Write one or multiple registers, the function code for writing one data is 0x06; the function code for writing multiple data is 0x10.**

The equipment such as PLC is the master, and valve is the slave. The PLC can write the data to valve.

MODBU Address	Instruction	Unit	Data Definition	Comment
0x3018	Switch working position	/	0~1 One pulse Namely a change from 0 to1	Force to regenerate

Problem: RS-485 communication doesn't work

Reasons:

A. Wrong connection of RS-485 port wires.

B. Valve address of PLC is incorrect.

Solutions:

A. Reconnect RS-485 port wires.

B. Reset the valve address of PLC as the same as that on the valve.

3.9 Trial Running (Take 63630/63530 as an example)

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

A. Close inlet/outlet valve B and C, and turn on the bypass valve A, after cleaning the impurity in the pipe, turn off the bypass valve A. (As figure 1-5 shows)

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

C. Switch on power. Press ⌷ and turn to the backwash status; when ⌷ lights on, slowly open the inlet valve B to 1/4 position, making the water flows into the resin tank. You can hear a sound of air out from the drain pipeline. After all air is out of pipeline, then turn on inlet valve B completely and clean the impurity in the resin tank until the outlet water is clean. It will take 8-10 minutes to finish the whole process.

D. Press ⌷ , and turn the status from backwash to brine draw. When ⌷ lights on and enter in the process of brine draw. It is about 35-55 minute.

E. Press ⌷ , and turn the status from draw to slow rinse. No symbol lights on. It is about 15-25 minute.

F. Press ⌷ , and turn the status from slow Rinse to fast rinse. ⌷ lights it takes about 10-15 minutes, take out some outlet water for testing: if the water hardness reaches the requirement, and the chloridoid in the water is almost the same compared with the inlet water, then go to the next step.

G. Press ⌷ , and turn the status from fast rinse to brine refill. ⌷ lights on and it indicates the brine tank is being refilled with water to the required level. It takes about 15~40 minutes, then add solid salt to the brine tank.

H. Press ⌷ , making the control valve return to service status. When ⌷ lights on and start to be running.

Note:

●When the control valve enters the regeneration status, all programs can be finished automatically according to the setting time. If you want one of steps terminated early, 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 positions, and ensure there is no resin leakage.

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

3.10 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 does not set correctly. B. Power failure more than 3 days, the current time is not correct.	Check program and reset current time
3. Softener supply hard water.	A. Bypass valve is open or leaking. B. No salt in brine tank. C. Injector is plugged. D. Insufficient water flows into brine tank. E. Internal valve leaks. F. Incorrect regeneration time or raw water quality deterioration. G. Shortage of resin. H. Bad quality of raw 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. Change valve body. F. Set correct regeneration time or water capacity treatment. G. Add resin to mineral tank and check whether resin leaks.. H. 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 valve leaks. F. Drain line is plugged. G. Sizes of injector and DLFC are not matched with tank. H. Ball valve or cable breaks down.	A. Increase inlet line pressure. B. Clean brine line. C. Replace brine line. D. Clean or replace new injector. E. Replace valve body. F. Clean drain line flow control. G. Select correct injector size and DLFC according to the instruction manual. H. Replace ball valve or cable.
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. C. Foreign material in brine valve. D. Not install safety brine valve but power failure while salting. E. Brine refill is out of control. F. Ball valve doesn't close.	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. Stop water supplying and restart or install safety brine valve in salt tank. E. Repair or replace safety brine valve. F. Replace ball valve.
7. Pressure lost or rust in pipeline	A. Iron in the water supply pipe. B. Iron 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 and backwash time. D. Iron removal equipment is required to install before softening.
8. Loss of mineral through drain line.	A. Air in water system. B. Strainer broken. C. Improperly sized drain line control.	A. Assure that well system has proper air eliminator control. B. Replace new bottom strainer. C. Check for proper drain rate.
9. Control cycle continuously.	A. Locating signal wring breakdown. 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 leak. B. Power off when in backwash or fast rinse.	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.
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. E. Strainers are plugged.	A. Increase water pressure. B. Clean or replace injector. C. Check and find the reason. D. Clean the floccules in resin tank. E. Remove broken resin
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 results in valve not getting the right status. D. Ball valve doesn't shut-off completely.	A. Clean foreign material in valve body. B. Change valve core or sealing ring. C. Reduce water pressure or use pressure relief function. D. Repair or replace ball valve.
13. Salt water in outflow pipeline.	A. Foreign material in injector or injector fails to work. B. Brine valve can't 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. Regenerate not properly. B. Fouled resin bed. C. Salt setting is not proper. D. Softener setting is not proper. E. Raw water quality deteriorated. F. Turbine of flow meter has already gotten stuck.	A. Regenerate according to the correct operation requirement. B. Increase backwash flow rate and times, 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 flow meter.
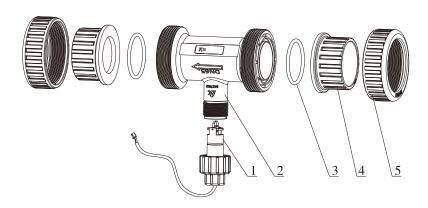
B. Controller Fault

| Problem	Cause	Correction
1. All indictors 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 is not stable. E. Display board is faulty.	A. Check and replace the wiring. B. Replace control board. C. Check and replace transformer. D. Check and adjust electrical service. E. Replace display board.
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. Adapter is damaged.	A. Check and replace wiring. B. Replace display board. C. Replace control board. D. Replace adapter.
3. E1 Flashes	A. Wiring of locating board with control board fails to work. B. Locating board damaged. C. Mechanical driven failure. D. Faulty control board. E. Wiring of motor with control board is fault. F. Motor 1 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 1.
4. E21 Flashes	A. Wiring of locating board with control board fails to work. B. Locating board damaged. C. Mechanical driven failure. D. Faulty control board. E. Wiring of motor with control board is fault. F. Motor 2 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 2.
5. E12 or E22 Flashes	A. Hall component on locating board is damaged. B. Wiring of locating board with controller fails to work. C. Control board is damaged.	A. Replace locating board. B. Replace wiring. C. Replace control board.
6. E3 or E4 Flashes	A. Control board is faulty.	A. Replace control board.
7. Cannot RS-485 communication	A. RS-485 wire is connected incorrectly. B. Valve address of Equipment (such as PLC) is set incorrectly.	A. Correctly reconnect the RS-485 wire. B. Valve address of Equipment (such as PLC) reset the same as the address in valve.

3.11 Assembly & Parts

5447004 Flow Meter Structure:
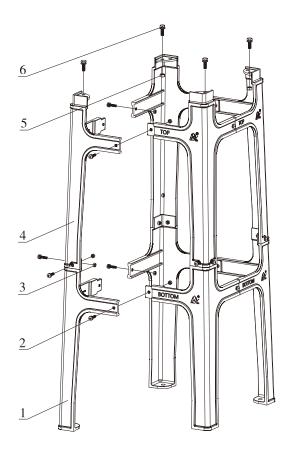
5447004 Flow Meter Components and Part No.:

Item No.	Description	Part No.	Qua-ntity	Item No.	Description	Part No.	Qua-ntity
1	Turbine	5295004	1	4	Connector	8457166	2
2	Flow Meter Shell	8457010	1	5	Animated Nut	8947051	2
3	O-ring 67×5.3	8378323	2				
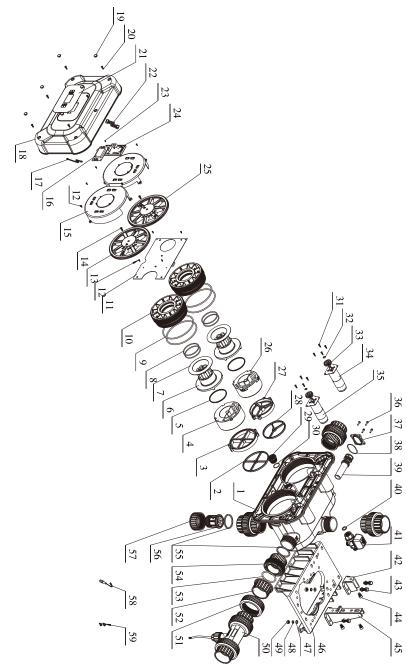
5040009 Support Structure:

5040009 Support Components and part No.:

Item No.	Description	Part No.	Qua-ntity	Item No.	Description	Part No.	Qua-ntity
1	Support	8040030	4	4	Support	8040031	4
2	Screw, Cross	5851012	16	5	Hexagonal Nut	8940021	4
3	Hexagonal Nut	5851020	16	6	Hexagonal Bolt Set	5851002	4

65630 Structure:

63630 Components and Part No.:

Item No.	Description	Part No.	Qua-ntity	Item No.	Description	Part No.	Qua-ntity
1	Valve Body	5022254	1	23	Screw, Cross ST2.2×6.5	8909004	2
2	Seal Ring	8370182	1	24	Control Board	6382189	1
3	Fixed Disk	8469138	1	25	Gear	5241028	1
4	Moving Disk	8459126	1	26	Moving Disk	8459125	1
5	Moving Seal Ring	8370184	2	27	Fixed Disk	8469137	1
6	Shaft	8258063	2	28	Seal Ring	8370181	1
7	Anti-friction Washer	8216054	2	29	Plug	8323059	1
8	O-ring 80×3.55	8378309	4	30	O-ring 28×2.65	8378081	1
9	O-ring 160×5.3	8378252	4	31	Screw, Cross ST3.9×16	8909044	8
10	Fitting Nut	8092066	2	32	Pin	8994009	2
11	Locating Board	6380092	1	33	Small Gear	8241008	2
12	Screw, Cross ST2.9×9.5	8909008	14	34	Motor 1	6158038	1
13	Gear	5241028.11	1	35	Motor 2	6158039	1
14	Screw, Cross ST4.8×19	8909018	2	36	Screw, Cross M5×20	8902064	4
15	Fixed Base	8109204	2	37	Injector Cover	8315007	1
16	Display Board	6381007	1	38	O-ring 52×3	8378096	1
17	Wire for Display Board	5512001	1	39	Injector	5468021	1
18	Dust Cover	8005157	1	40	Seal Ring	8371019	1
19	Decorative Cover	8084027	6	41	Ball Valve	6922075	1
20	Screw, Cross ST3.9×19	8909015	6	42	Fixer	8109206	1
21	Label	8865224	1	43	Hexagonal Bolt Set M10×40	8920013	4
22	Wire for Locating Board	5511016	1	44	Screw, Cross M10×16	8902046	3

45	Fixer	8109043	1	53	O-ring 67×5.3	8378323	4
46	Fixer	8109062	1	54	Connector	8458407	4
47	Washer	8952006	4	55	Seal Washer	8371131	5
48	Washer	8953006	4	56	Flow Control	8468269	1
49	Hexagonal Nut	8940013	4	57	Animated Nut	8947073	1
50	Flow Meter	5447004	1	58	Wire for Power	5513001	1
51	Animated Nut	8947051	4	59	Cable Clip	8126004	2
52	Connector	8457166	4				

Note:

● 63530 there is no item 50 compared to 63630.

● 73630 there is change Part No. of item 1 to valve body 5022255.

● 73530 there is no item 50 compared to 73630.

● 53630 there is no item 55, 56, 57 compared to 63630 and change Part No. of item 41 to blind hole nut 8940004.

● 53530 there are no item 50 compared to 53630.

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.

Product Name		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 control valve needs to send back for repair, 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 Volume	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					