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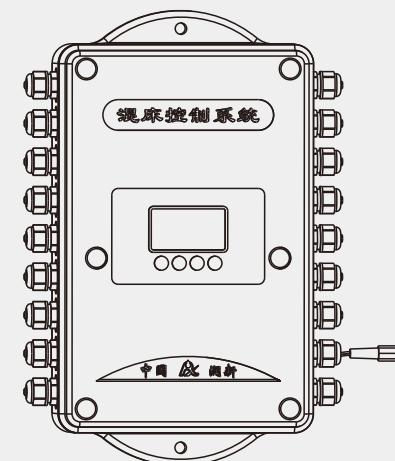


Ball Valve Controller for Filter & Softener /Floating Bed/ Mixed Bed Water Treatment Systems

Filter&Softener: 46030 (Old Model No.: TM. F109)

Floating Bed: 46080 (Old Model No.: TM. F109E)

Mixed Bed: 46040 (Old Model No.: TM. F109B)



User Manual



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

0WRX.466.638

Catalogue

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1. Product Overview

1.1. Main Application & Applicability

Ball valve controller is matched with our two-wire controlling electronic ball valves to be filter & softener systems or mixed bed demineralized systems or floating bed softening water treatment systems.

1.2. Product Characteristics

● Can be used with our electronic ball valve (DN15~DN100).

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

● Buttons lock

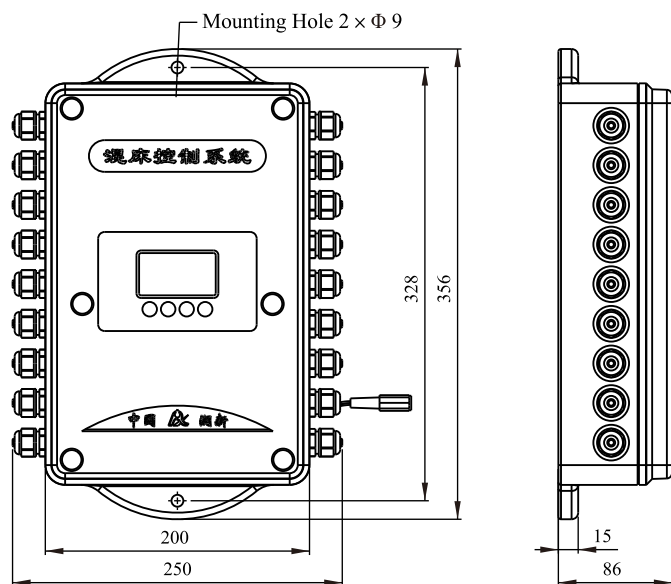
No operations to buttons on the controller within 1 minute, button lock indicator lights on which represents buttons are locked. Before operation, press and hold the  and  buttons for 5 seconds to unlock. This function can avoid incorrect operation.

● LCD display screen

LCD display screen is clear and simple.

1.3. Product Structure and Technical Parameters

A. Product Structure (This is only for reference.)

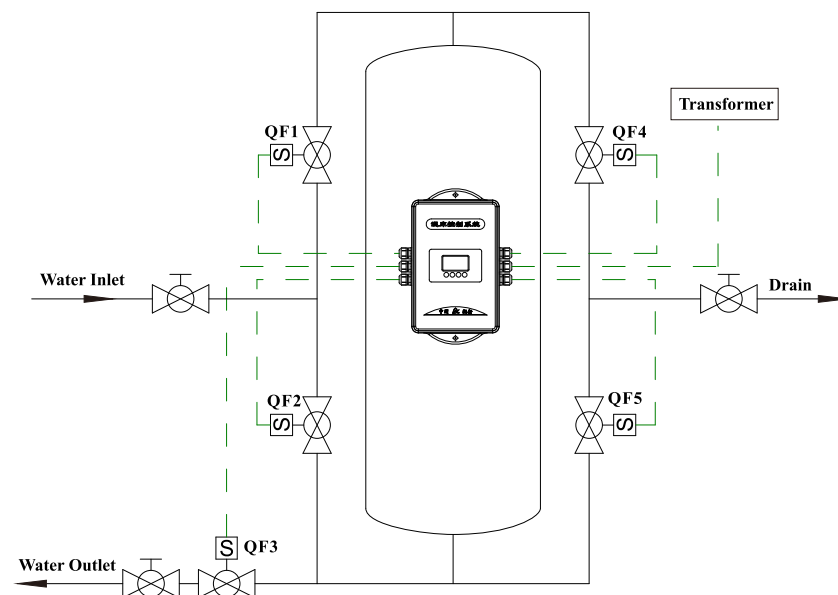


B. Technical Parameters

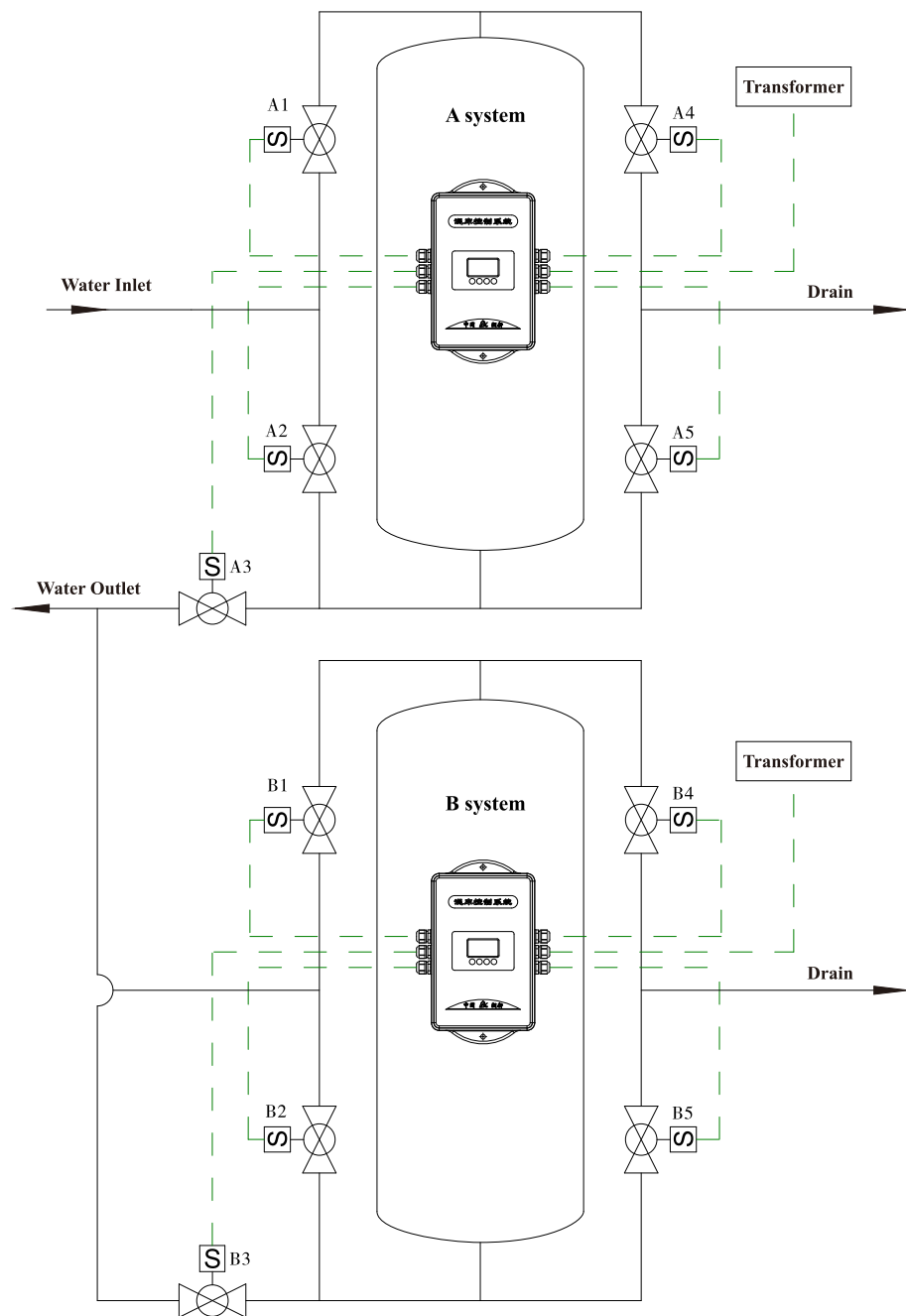
Model	Transformer Input	Transformer Output	Environment Temperature (°C)	Application
46030(F109)	AC100 ~ 240V/ 50 ~ 60Hz	DC24V, 4.0A	5~50℃	Filter & Softener
46080(F109E)				Floating Bed
46040(F109B)				Mixed Bed

1.4. Flow Chart and Electronic Ball Valve Open and Close Graph

A. 46030 (F109) Filter (The wire connection as Figure A shows)

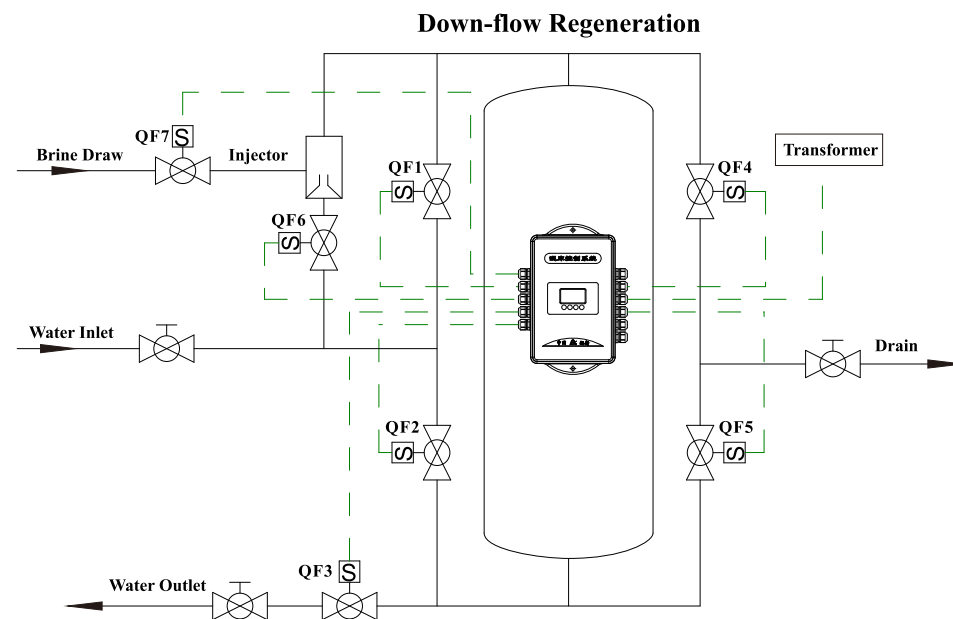


Working Position	QF1	QF2	QF3	QF4	QF5
Service	Open		Open		
Backwash		Open		Open	
Fast Rinse	Open				Open

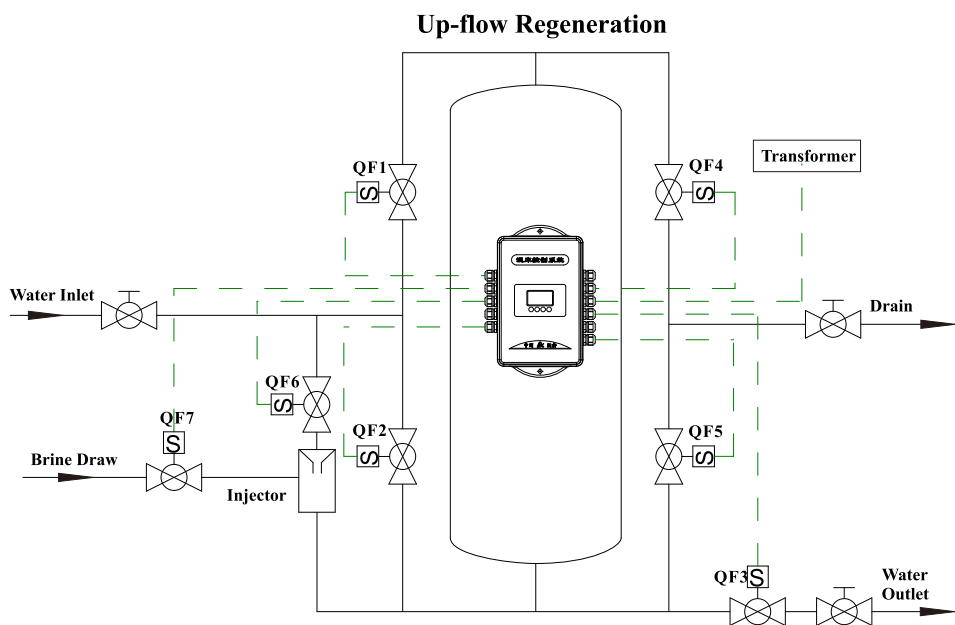
One in Service One Standby (Filter)

Working Position	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5
A Service, B Standby	Open		Open							
A Backwash, B Service		Open		Open		Open		Open		
A Fast Rinse, B Service	Open				Open	Open		Open		
A Standby, B Service						Open		Open		
A Service, B Backwash	Open		Open				Open		Open	
A Service, B Fast Rinse	Open		Open			Open				Open

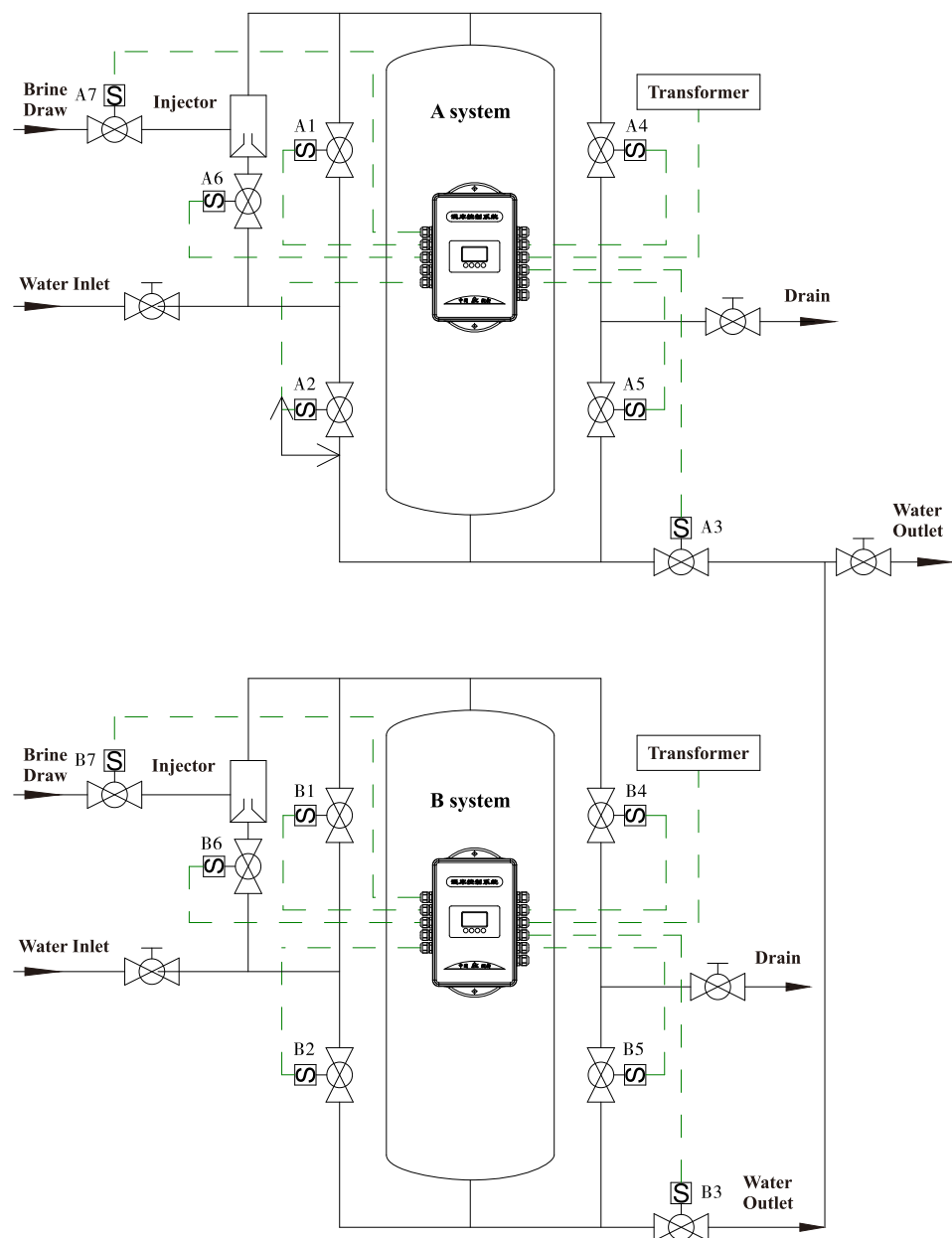
B. 46030 (F109) Softener (The wire connection as Figure A shows)



Working Position	QF1	QF2	QF3	QF4	QF5	QF6	QF7
Service	Open		Open				
Backwash		Open		Open			
Settling Bed							
Brine Draw					Open	Open	Open
Slow Rinse					Open	Open	
Fast Rinse	Open				Open		
Brine Refill	Open						Open

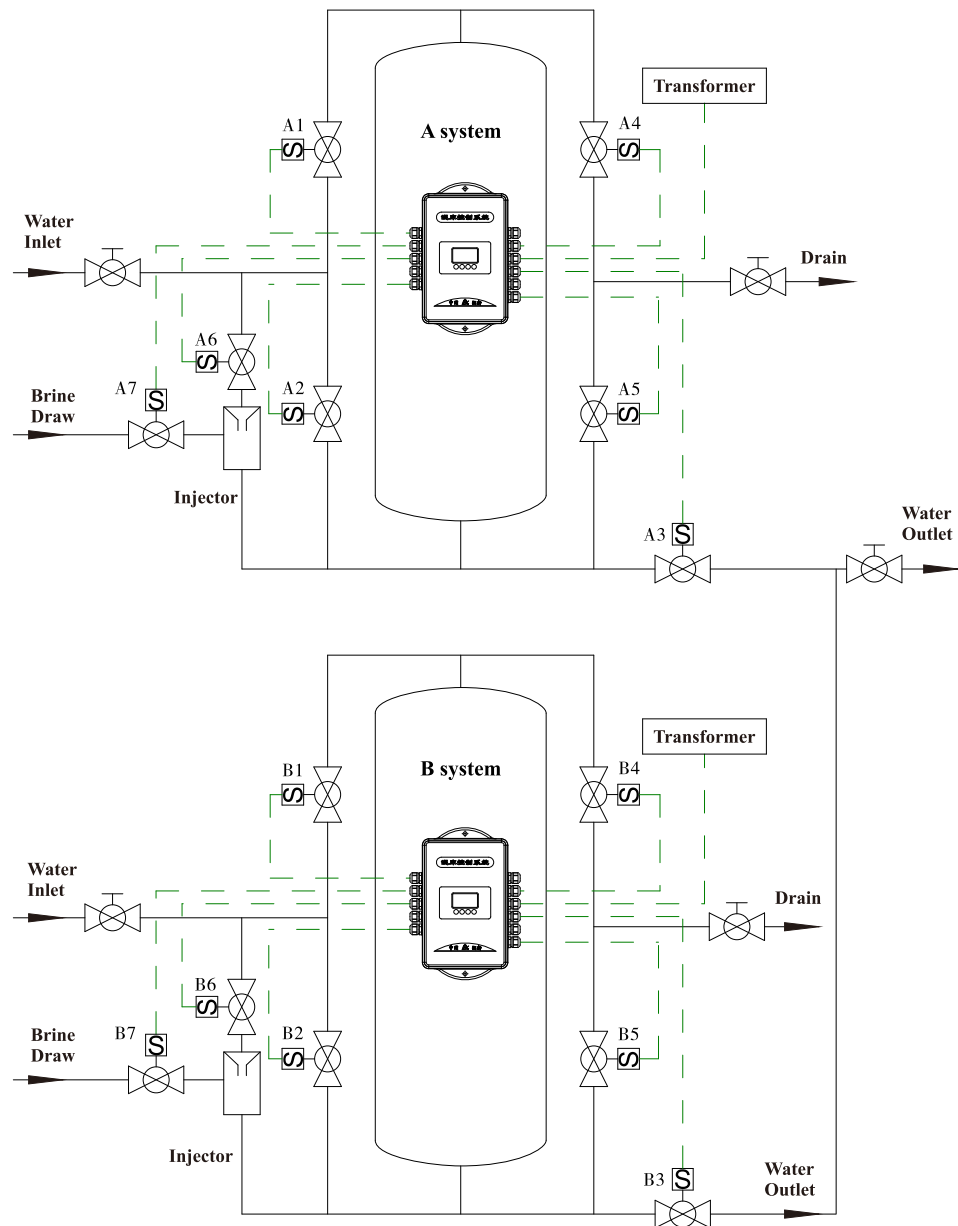


Working Position	QF1	QF2	QF3	QF4	QF5	QF6	QF7
Service	Open		Open				
Brine Draw				Open		Open	Open
Slow Rinse				Open		Open	
Backwash		Open		Open			
Fast Rinse	Open				Open		
Brine Refill	Open						Open

One in Service One Standby (Softener, Down-flow Regeneration)

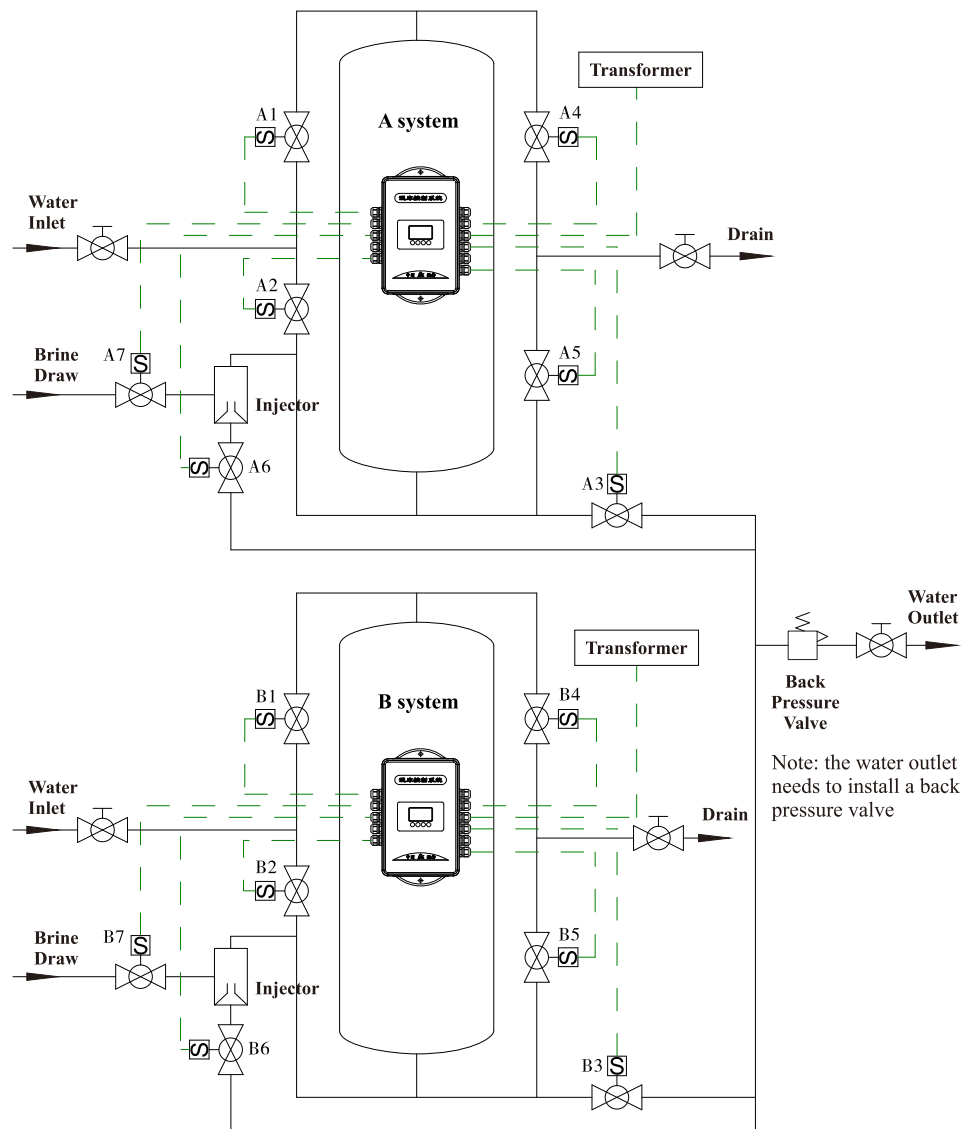
Working Position	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7
A Service, B Standby	Open		Open											
A Service, B Fast Rinse	Open		Open					Open				Open		
A Backwash, B Service		Open		Open				Open		Open				
A Settling Bed, B Service								Open		Open				
A Brine Down Flow B Service					Open	Open	Open	Open		Open				
A Slow Rinse, B Service					Open	Open		Open		Open				
A Brine Refill, B Service						Open	Open	Open		Open				
A Standby, B Service								Open		Open				
A Fast Rinse, B Service	Open				Open			Open		Open				
A Service, B Backwash	Open		Open							Open		Open		
A Service, B Settling Bed	Open		Open											
A Service, B Brine Down Flow	Open		Open									Open	Open	Open
A Service, B Slow Rinse	Open		Open									Open	Open	
A Service, B Brine Refill	Open		Open										Open	Open

**One in Service One Standby
(Softener, Up-flow Regeneration)**



Working Position	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7
A Service, B Standby	Open		Open											
A Service, B Fast Rinse	Open		Open					Open				Open		
A Brine Draw (UF), B Service				Open		Open	Open	Open		Open				
A Slow Rinse, B Service				Open		Open		Open		Open				
A Backwash, B Service		Open		Open				Open		Open				
A Brine Refill, B Service	Open						Open	Open		Open				
A Standby, B Service								Open		Open				
A Fast Rinse, B Service	Open				Open			Open		Open				
A Service, B Brine Draw (UF)	Open		Open								Open		Open	Open
A Service, B Slow Rinse	Open		Open								Open		Open	
A Service, B Backwash	Open		Open						Open		Open			
A Service, B Brine Refill	Open		Open					Open						Open

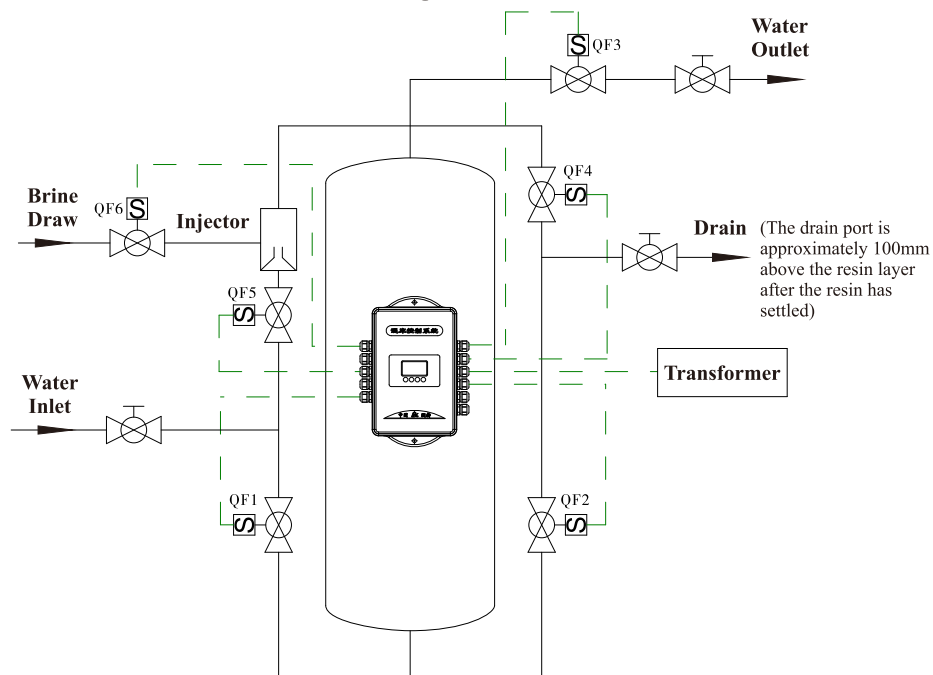
**One in Service One Standby
(Softener, Up-flow Regeneration, Brine Refill with Soft Water,
Brine Draw and Slow Rinse with Soft Water)**



Working Position	A1	A2	A3	A4	A5	A6	A7	B1	B2	B3	B4	B5	B6	B7
A Service, B Standby	Open		Open											
A Service, B Fast Rinse	Open		Open					Open				Open		
A Brine Draw (UF), B Service				Open		Open	Open	Open		Open				
A Slow Rinse, B Service				Open		Open		Open		Open				
A Backwash, B Service		Open		Open				Open		Open				
A Brine Refill, B Service	Open						Open	Open		Open				
A Standby, B Service								Open		Open				
A Fast Rinse, B Service	Open				Open			Open		Open				
A Service, B Brine Draw (UF)	Open		Open								Open		Open	Open
A Service, B Slow Rinse	Open		Open								Open		Open	
A Service, B Backwash	Open		Open						Open		Open			
A Service, B Brine Refill	Open		Open					Open						Open

C. 46080(F109E) Floating Bed (The wire connection as Figure A shows)

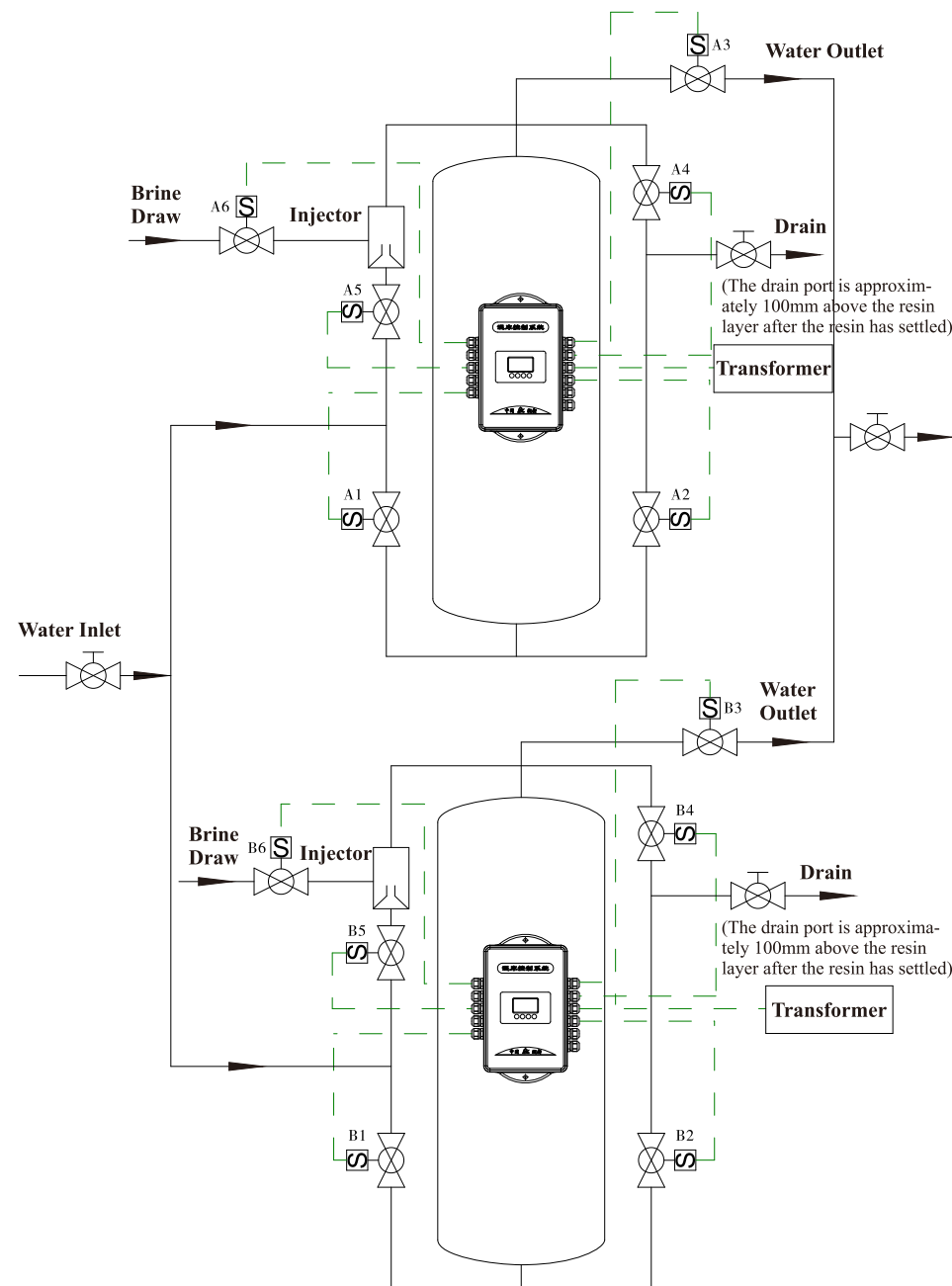
Floating Bed



Working Position	QF1	QF2	QF3	QF4	QF5	QF6
Service	Open		Open			
Settling Bed		Open		Open		
Brine Draw		Open			Open	Open
Slow Rinse		Open			Open	
Fast Rinse	Open			Open		
Brine Refill	Open		Open			Open

Note: the drain port is approximately 100mm above the resin layer after the resin has settled.

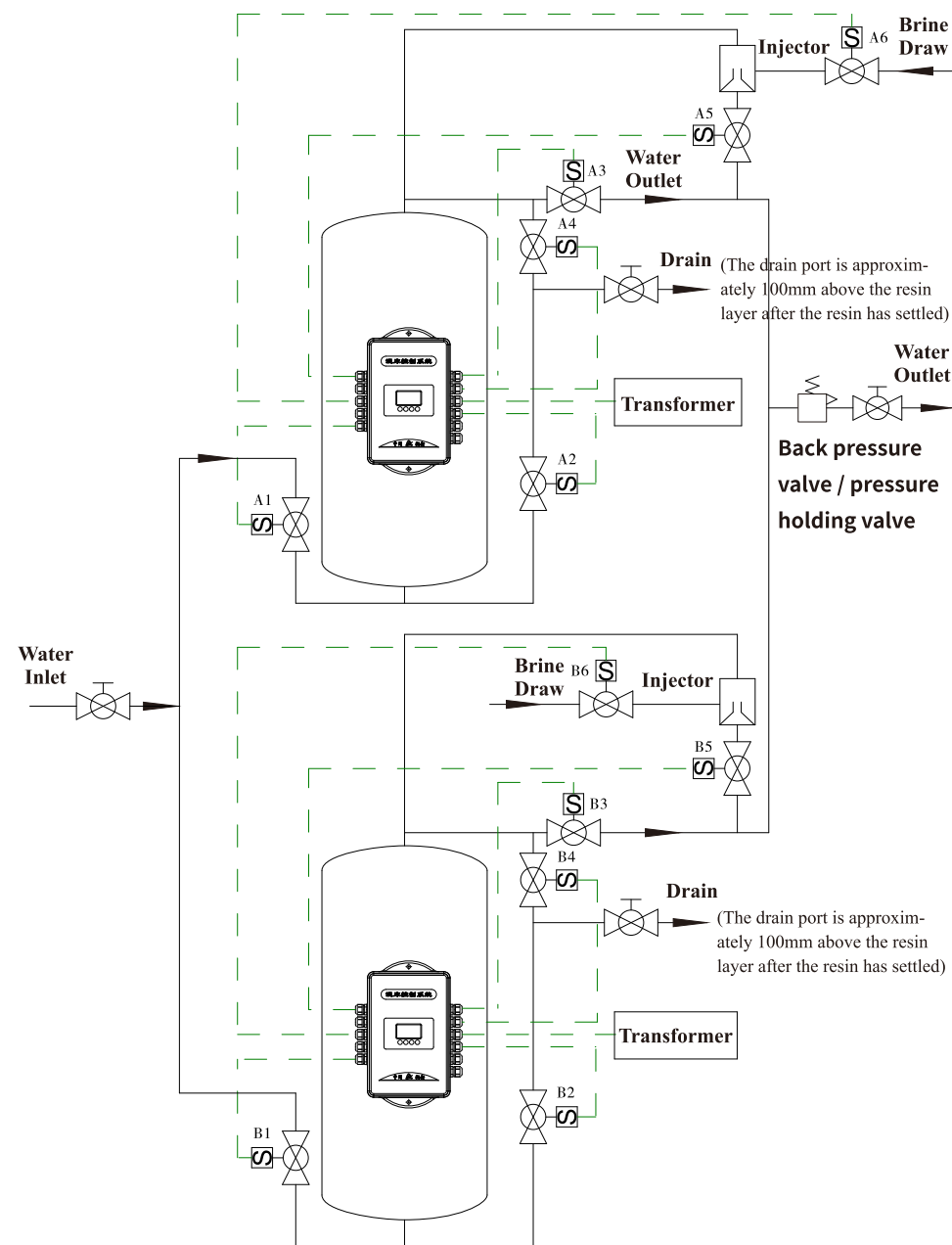
One in Service One Standby (Floating Bed, Brine Refill with Soft Water)



Working Position	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6
A Service, B Standby	Open		Open									
A Service, B Fast Rinse	Open		Open				Open			Open		
A Settling Bed, B Service (Brine Refill)		Open		Open			Open		Open			Open
A Brine Draw B Service		Open			Open	Open	Open		Open			
A Slow Rinse, B Service		Open			Open		Open		Open			
A Standby, B Service							Open		Open			
A Fast Rinse, B Service	Open			Open			Open		Open			
A Service (Brine Refill), B Settling Bed	Open		Open			Open	Open		Open			
A Service, B Brine Draw	Open		Open					Open			Open	Open
A Service, B Slow Rinse	Open		Open					Open			Open	

Note: the drain port is approximately 100mm above the resin layer after the resin has settled.

**One in Service One Standby (Floating Bed,
Brine Refill with Soft Water, Brine Draw and Slow Rinse with Soft Water)**

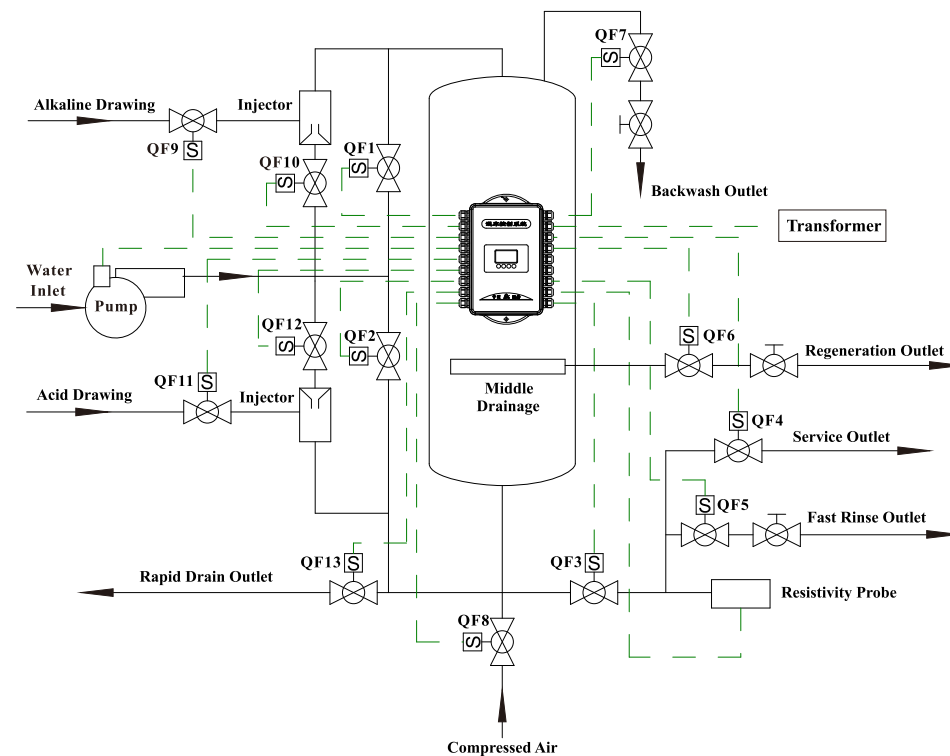


Working Position	A1	A2	A3	A4	A5	A6	B1	B2	B3	B4	B5	B6
A Service, B Standby	Open		Open									
A Service, B Fast Rinse	Open		Open				Open			Open		
A Settling Bed, B Service (Brine Refill)		Open		Open			Open		Open			Open
A Brine Draw B Service		Open			Open	Open	Open		Open			
A Slow Rinse, B Service		Open			Open		Open		Open			
A Standby, B Service							Open		Open			
A Fast Rinse, B Service	Open			Open			Open		Open			
A Service (Brine Refill), B Settling Bed	Open		Open			Open		Open		Open		
A Service, B Brine Draw	Open		Open					Open			Open	Open
A Service, B Slow Rinse	Open		Open					Open			Open	

Note: the drain port is approximately 100mm above the resin layer after the resin has settled.

D. 46040(F109B) Mixed Bed (The wire connection as Figure B shows)

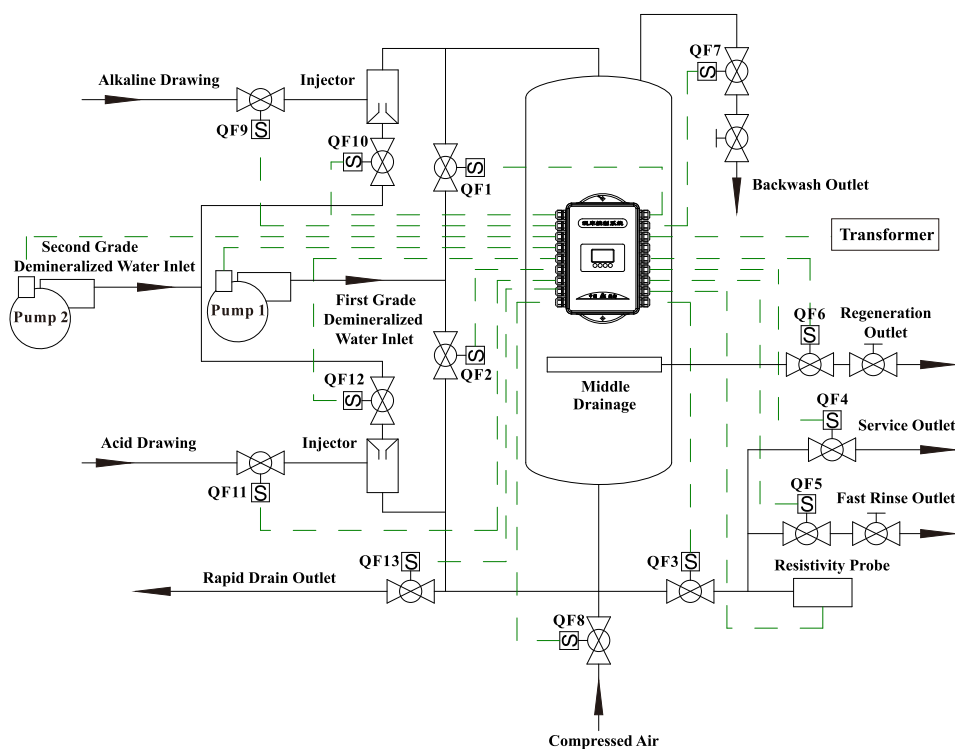
Adopt First Grade Demineralized Water to Regenerate Mixed Bed



Working Position	QF1	QF2	QF3	QF4	QF5	QF6	QF7
Service	Open		Open	Open			
Backwash		Open					Open
Settling Bed						Open	Open
Alkaline Predrawing						Open	
Acid-Alkaline Drawing						Open	
Acid-Alkaline Rinse						Open	
Drainage						Open	Open
Mixing					Open		Open
Rapid Drain			Open		Open		Open
Air Drain	Open		Open		Open		Open
Fast Rinse	Open		Open		Open		

Working Position	QF8	QF9	QF10	QF11	QF12	QF13	Pump
Service							Open
Backwash							Open
Settling Bed							
Alkaline Pre-drawing		Open	Open		Open		Open
Acid-Alkaline Drawing		Open	Open	Open	Open		Open
Acid-Alkaline Rinse			Open		Open		Open
Drainage							
Mixing	Open						
Rapid Drain						Open	
Air Drain							Open
Fast Rinse							Open

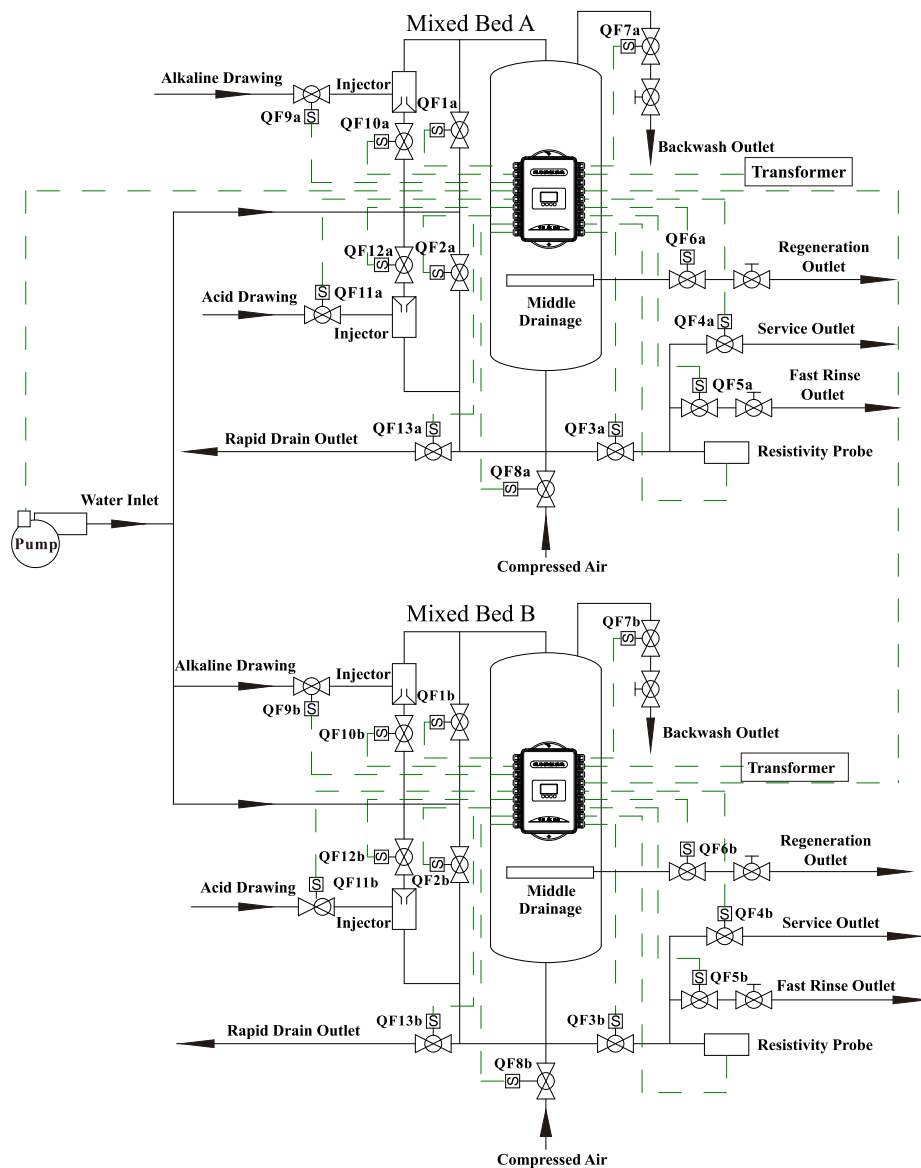
Adopt Second Grade Demineralized Water to Regenerate Mixed Bed



Working Position	QF1	QF2	QF3	QF4	QF5	QF6	QF7
Service	Open		Open	Open			
Backwash		Open					Open
Settling Bed						Open	Open
Alkaline Predrawing						Open	
Acid-Alkaline Drawing						Open	
Acid-Alkaline Rinse						Open	
Drainage						Open	Open
Mixing					Open		Open
Rapid Drain			Open		Open		Open
Air Drain	Open		Open		Open		Open
Fast Rinse	Open		Open		Open		

Working Position	QF8	QF9	QF10	QF11	QF12	QF13	Pump1	Pump2
Service							Open	
Backwash							Open	
Settling Bed								
Alkaline Pre-drawing		Open	Open		Open			Open
Acid-Alkaline Drawing		Open	Open	Open	Open			Open
Acid-Alkaline Rinse			Open		Open			Open
Drainage								
Mixing	Open							
Rapid Drain						Open		
Air Drain							Open	
Fast Rinse							Open	

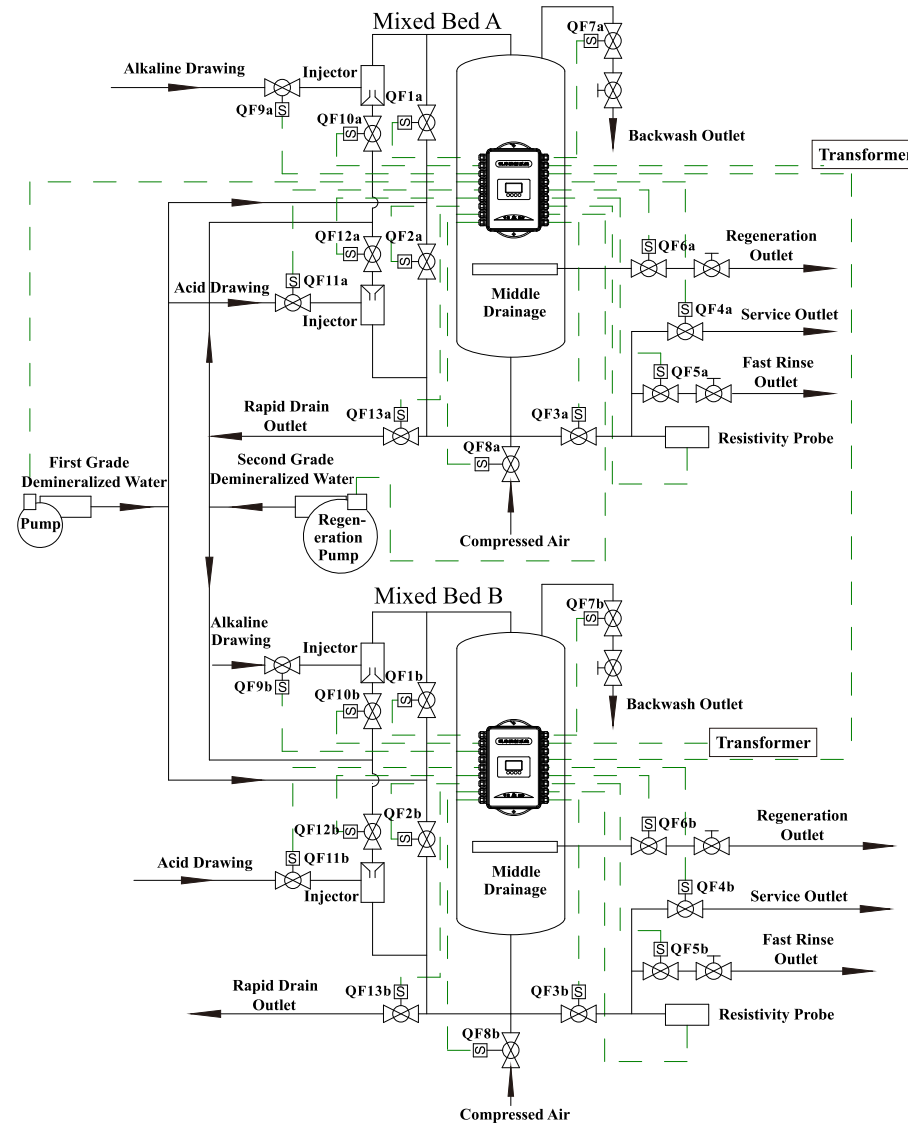
**One in Service One Standby
(Adopt First Grade Demineralized Water to Regenerate Mixed Bed)**



When the mixed bed A is in service status, mixed bed B is in regeneration until fast rinse finished. Close QF5b, it is in standby status. When mixed bed A outlet water is unqualified, mixed bed B is in fast rinse until the drain water qualified then into service, mixed bed A

starts to regenerate until fast rinse finished, close QF5a, it is in standby status. So the system continuous water supplying.

**One in Service One Standby
(Adopt Second Grade Demineralized Water to Regenerate Mixed Bed)**



The regeneration pump is turned on only at Alkaline Pre-drawing, Acid-Alkaline Drawing and Acid-Alkaline Rinse positions.

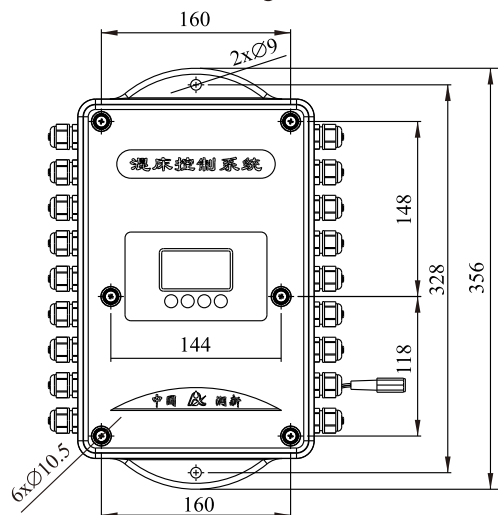
1.5. Installation

A. The valve pipeline installation

Please refer to the above corresponding flow chart to install the pipeline and the valve. The above flow charts make the demonstration of electronic ball valve and effluent limiting valve. The other pipeline and instrument can be designed according to the necessary.

B. Controller fixing

Please install and fix the controller by mounting hole $2 \times \Phi 9$ according to the below figure, and avoid to cover 6 pieces holes of $6 \times \Phi 10.5$ on back, keeps the space for screwdriver to disassemble the control box and wiring.



C. Wiring

The function and wiring of 46030 (F109) filter & softener and 46080 (F109E) floating bed control board.

QF1: Means connect with ball valve QF1, others are the same
B: Means connect with black wire of ball valve;
R means connect with red wire of ball valve;

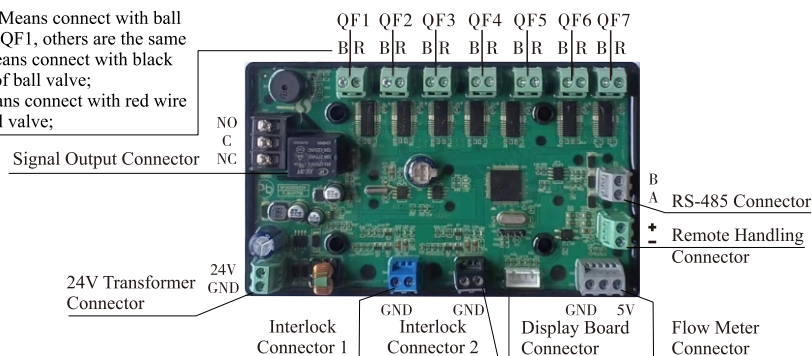


Figure A

The function and wiring of 46040 (F109B) mix bed system control board. (B means black wire, R means red wire.)

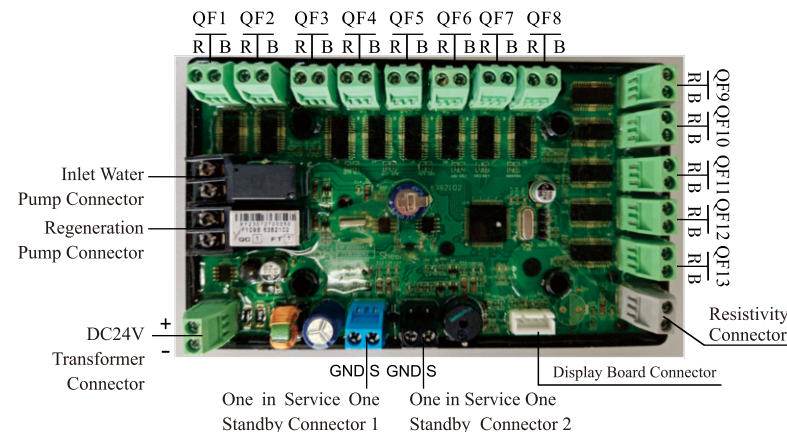
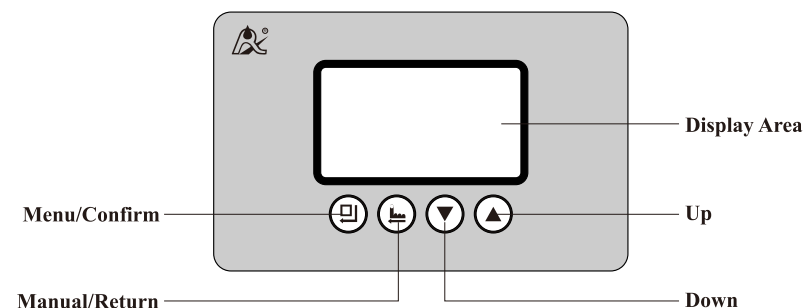


Figure B

2. Basic Setting & Usage

2.1. The Function of PC Board



A.

● Lights on, indicates the buttons are locked. At this moment, none of button works (no operation within one minute, will light on and the buttons locked.)

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

B.

● Press , enter program display mode and view all values.

● In display mode, press , enter program set mode, and modify values.

● Press when all the values completed setting, then hearing the voice “Di” means all the setting are complete and return to program display mode.

C. 

● Press  in any status can proceed to next step directly. (Example: If outlet water is unqualified, unlock the buttons and press  to start regeneration.)

● Press  in display mode, it will return to service status; Press  in set mode, it will return to display mode.

● Press  while modifying the values, it will return to display mode directly without saving any values.

D.  and 

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

● In set mode, press  or  to modify values.

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

2.2. 46030 (F109) Filter & Softener Controller Setting and Usage

A. The background setting (as shown in Figure 1~Figure 6)

When power on, the display shows as Figure 1-1 or Figure 1-2, within 6 seconds press and hold  and  for more than 2 seconds to enter the background setting status, the display shows as Figure 2.

```
*****
F109 Softener Valve
*****
```

Figure 1-1

```
*****
F109 Filter Valve
*****
```

Figure 1-2

```
» Set Language
Set Mode
Set Type
Set Program Type
```

Figure 2

```
Set Language
⊕中文
○English
```

Figure 3

```
Set Mode
⊕Softener Valve
○Filter Valve
```

Figure 4

```
Set Type
⊕Meter Type
○Day Time Type
○Hour Time Type
```

Figure 5

```
Set Program Type
○Interlock
○Alternate Interlock
```

Figure 6

a) During the Figure 2 status, press  enter “Set Language” as Figure 3 shows, press  or  to select the language. Press  to save the setting and return to Figure 2.

b) During the Figure 2 status, press  or  to select “Set Mode” and press  enter “Set Mode” menu as Figure 4 shows, press  or  to select the necessary mode (if the mode is softener valve, Figure 1-1 display shows softener valve; if the mode is filter valve, Figure 1-2 display shows filter valve), press  to save the setting and return to Figure 2.

c) During the Figure 2 status, press  or  to select “Set Type”, and press  entering

“Set Type” as the Figure 5 shows, press  or  to select the necessary type, press  to save the setting and return to Figure 2.

d) During the Figure 2 status, press  or  to select “Set Program Type”, and press  entering “Set Program Type” as the Figure 6 shows, press  or  to select the necessary type, press  to save the setting and return to Figure 2.

Note: If you choose "Day Time Type" or "Hour Time Type", it only have "Interlock" program type can choose; if you choose "Meter Typ", then you can choose "Interlock" or "Alternate Interlock" program type.

B. Set flow coefficient K value (only available for Meter Type)

When power on, the display shows as Figure 1-1 or Figure 1-2, within 6 seconds press and hold  and  for more than 2 seconds to enter the K Value setting status, the display shows as Figure 7.

```
Set K Value
4.194
```

Figure 7

When the integer value is flashing, press  or  to set the integer value, press  to confirm the integer value setting and enter the decimal value setting. When the decimal value is flashing, press the  or  to set the decimal value, and then press the  to save the value. Set the value and return to the working state.

C. The foreground setting

In the working status (when buttons are unlocked), press  to enter the foreground parameter setting, and the menu will be displayed as below Figure 8-1, Figure 8-2, and Figure 8-3 shows (note: different modes and different types have different menu items). Select the parameter that need to be set, enter the parameter setting menu as shown in Figure 9 to Figure 28, and modify the factory default value. The operation method is similar to the background parameter setting.

```
» Set Time of Day
Set Brine D. Type
Set Regen. Type
Set Regen. Time
Set Water Capacity
```

Figure 8-1

```
» Set Backwash Time
Set Settling Bed Time
Set Brine D. Time
Set Slow Rinse Time
Set Fast R. Time
```

Figure 8-2

```
» Set Brine R. Time
Interval Regen. D.
Set Signal Output
Set Time Duration
Set Valve Address
```

Figure 8-3

Set Time of Day 10 :30	Set Brine D. Type ⊕ Down-flow ○ Up-flow	Set Regen. Type ⊕ A-01 ○ A-02	Set Rinsing. Type ⊕ A-01 ○ A-02
Figure 9	Figure 10 (Softener)	Figure 11 (Meter Type Softener)	Figure 12 (Meter Type Filter)
Set Regen. Time 02 :00	Set Rinsing. Time 02 :00	Set Water Capacity 500.00 m ³	Set Service Days 3 days
Figure 13 (Softener)	Figure 14 (Filter)	Figure 15 (Meter Type)	Figure 16 (Day Time Type)
Set Service Hours 10 hours	Set Rinsing Times F-00	Interval B.W Times F-00	Set Backwash Time 10 min.
Figure 17 (Hour Time Type)	Figure 18 (Filter)	Figure 19 (Softener)	Figure 20
Set Settling Bed Time 10 min	Set Brine D. Time 60 min.	Set Slow Rinse Time 30 min.	Set Fast R. Time 10 min.
Figure 21	Figure 22 (Softener)	Figure 23 (Softener)	Figure 24
Set Brine R. Time 05:00 min.: sec.	Interval Regen. D. 30 days	Set Signal Output ⊕ b-01 ○ b-02	Set Time Duration 25 sec
Figure 25 (Softener)	Figure 26	Figure 27	Figure 28
Set Valve Address 1			
Figure 29			

- a) Time of day setting, as shown in Figure 9.
- b) For “Brine Draw Type” setting, this menu is only available for softener valve, as shown in Figure 10, select down-flow or up-flow.
- c) For “Regeneration Type” setting is suitable for the meter type softener, as shown in Figure 11, select A-01 meter delayed type or A-02 meter immediate type.
- d) For “Rinsing Type” setting, suitable for meter type filter, as shown in Figure 12. Select A-01 meter delayed type or A-02 meter immediate type.
- e) For “Regeneration Time” setting is suitable for meter type softener (when choose A-01 meter delayed type), as shown in Figure 13. When the residual water reach 0 and the cur-

rent time is the same as the regeneration time, regeneration is initiated.

- f) For “Rinsing Time” setting is suitable for meter type filter (when choose A-01 meter delayed type), as shown in Figure 14. When the residual water reach 0 and the current time is the same as the rinsing time, rinsing is initiated.
- g) For “Water Capacity” setting is suitable for meter type softener or filter, as shown in Figure 15. According to the process calculation to set the water capacity.
- h) For “Service Days” setting is suitable for day time type softener or filter, as shown in Figure 16. According to the process calculation to set the service days.
- i) For “Service Hours” setting is suitable for hour time type softener or filter, as shown in Figure 17. According to the process calculation to set the service hours.
- j) For “Rinsing Times” setting is suitable for filter valve, as shown in Figure 18. The rinsing times is set according to the process calculation. The default setting is F-00, which means that one backwash and fast rinse are performed in one operation cycle. For example, when it is set to F -01, it means that two times of backwash and fast rinse are performed in one operation cycle.
- k) For “Interval Backwash Times” setting is suitable for softener valve, as shown in Figure 19. The interval backwash times is set according to the process calculation. The default setting is F-00, which means that one backwash is performed in one operation cycle. For example, when it is set to F -01, it means that one backwash is performed in two operation cycle.
- l) For “Backwash Time” setting is suitable for softener valve or filter valve, as shown in Figure 20. According to process calculation to set backwash time.
- m) For "Settling Bed Time" setting is suitable for softener valve or filter valve, as shown in Figure 21. According to process calculation to set settling bed time.
- n) For “Brine Draw Time” setting is suitable for softener valve, as shown in Figure 22. According to process calculation to set brine draw time.
- o) For “Slow Rinse Time” setting is suitable for softener valve, as shown in Figure 23. According to process calculation to set slow rinse time.
- p) For “Fast Rinse Time” setting is suitable for softener valve or filter valve, as shown in Figure 24. According to process calculation to set fast rinse time.
- q) For “Brine Refill Time” setting is suitable for softener valve, as shown in Figure 25. According to process calculation to set brine refill time.
- r) For “Interval Regeneration Day” setting is suitable for meter type softener valve or filter valve, as shown in Figure 26. When the residual water do not drop to 0, but the service day reach the setting value of interval regeneration day, the regeneration or rinsing will be triggered.

s) For “Signal Output Mode” setting is suitable for softener valves or filter valves, as shown in Figure 27. b-01: COM and NO port disconnect when in service and settling bed, COM and NO port will connect in other status or when ball valve is switching status. If a fault occurs, COM and NO port will disconnect. b-02: COM and NO port will connect when ball valve is switching status, COM and NO port will disconnect in other states.

t) For “Time Duration” setting, as shown in Figure 28, the default time is 0, which means there is always voltage on the power line of the ball valve. If the value is set to 20, it means that when all the ball valves are opened and closed, the ball valve power line has voltage only for 20 seconds, and no voltage at other times. It should be noted that the setting value should be ≥ 20 .

u) For “Valve Address” setting, which is suitable for setting the communication address of RS-485 of multiple sets of ball valve controllers, as shown in Figure 29.

D. Working process display (take meter type softener valve with down-flow brine draw type and A-01 mode, as an example)

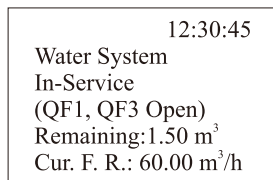


Figure 30

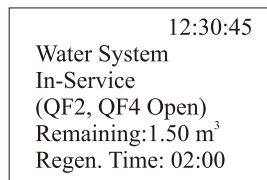


Figure 31

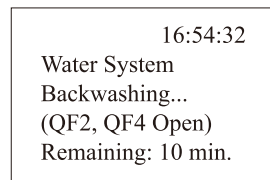


Figure 32

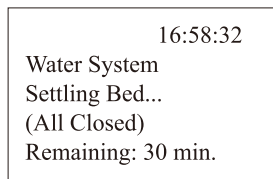


Figure 33

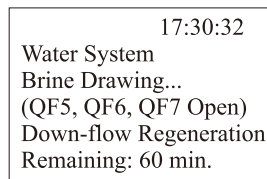


Figure 34

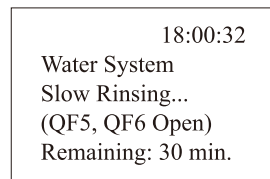


Figure 35

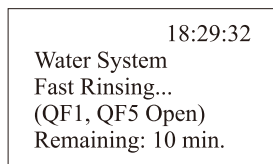


Figure 36

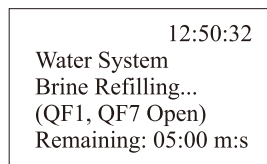


Figure 37

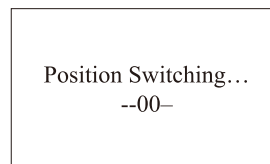


Figure 38

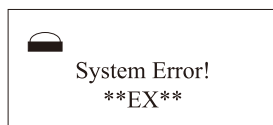


Figure 39

Illustration:

- In service status, the display circularly shows as Figure 30 and Figure 31;
- In backwash status, the display shows as Figure 32;
- In settling bed status, the display shows as Figure 33
- In brine draw status, the display shows as Figure 34;
- In slow rinse status, the display shows as Figure 35;
- In fast rinse status, the display shows as Figure 36;
- In brine refill status, the display shows as Figure 37;
- When the motor is running, the display shows as Figure 38;
- When the system is faulted, the display shows as Figure 39. The “X” of “EX” refers to number 3~4.

E. RS-485 introduction

a) RS-485 communication protocol

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

Information transmission: half-duplex mode, in bytes.

Transmission speed: fixed 9600bps baud rate.

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.

b) Read signal of ball valve controller (the read function code is 0×03)

The equipment such as PLC is the master, and ball valve controller is the slave. The data of ball valve controller can be read by PLC. The ball valve MODBUS communication address and corresponding data are defined as follows:

MODBUS Address	Instruction	Unit	Data Definition	Comment
0x2002	Remaining Water	Integer	0~9999	Read remaining water 0~9999.99m ³
0x2003	Remaining Water	Decimal	0~99	
0x2004	Remaining Time	Day/Hour /Minute	0~99	Read remaining Day/Hour/Minute
0x2005	Normal / Fault Status	/	0x0000: Normal 0x0003: E3 0x0004: E4	Read valve status
0x2006	Current Flow Rate	0.01m ³ /h	0~500	Read current flow rate

0x2007	Current Status	/	0x0001: Service 0x0003: Backwash 0x0004: Brine Draw 0x0005: Settling Bed 0x0006: Slow Rinse 0x0007: Fast Rinse 0x0008: Brine Refill 0x0010: Switching	Read the current status of valve
--------	----------------	---	--	----------------------------------

c) Write data to the ball valve controller (write single data function code is 0×06, and continuous write multiple data function code is 0×10)

The equipment such as PLC is the master, the ball valve controller is the slave. The PLC can write the data of ball valve.

MODBUS Address	Instruction	Unit	Data Definition	Comment
0x3018	Switch working position	/	0~1 One pulse	Force to regenerate

d) Equipment such as PLC connect with single ball valve controller with RS-485.

The wire connection is as follows:

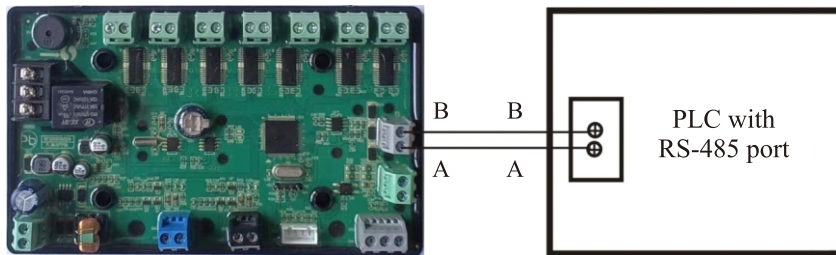
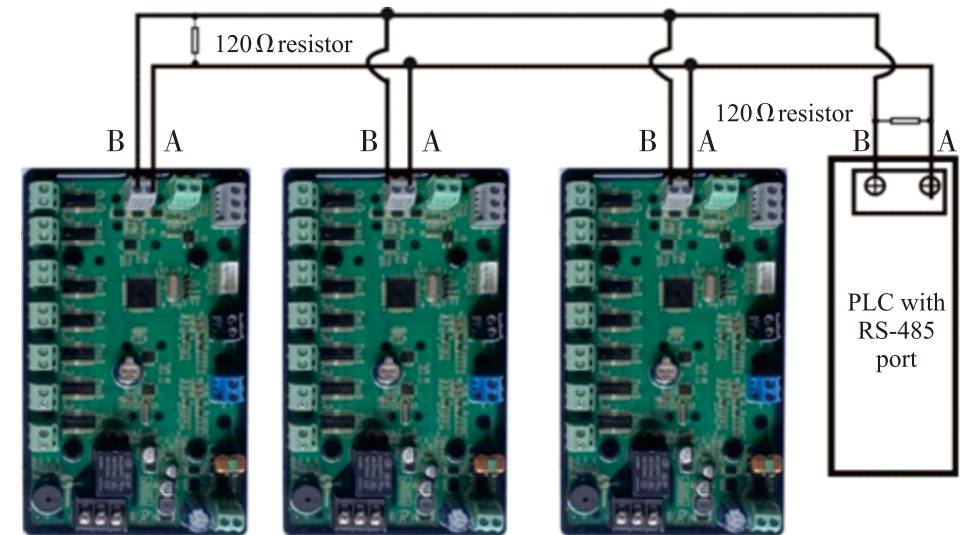


Illustration:

- 1) Ball valve's RS-485 port A and B respectively connect to PLC's RS-485 port A and B.
- 2) Use twisted pair wires for connection.
- 3) In case of far communication distance, a 120 Ω 0.25W resistor should be connected in parallel to A and B terminals of PLC and valve.
- 4) Keep away from the high voltage wire when wiring the RS-485 communication wire, and do not bundle the high voltage power wire with RS-485 communication wire together.
- 5) As the ball valve controller is slave, and its address range is 1~247. The default address is 1. Reading or writing data of control valve from PLC should correspond to the address of valve.

e) Equipment such as PLC connect with several ball valve controllers with RS-485.

The wire connection is as follows:



1# Ball valve controller 2# Ball valve controller 3# Ball valve controller

Illustration:

- 1) RS-485 port A and B of PLC are respectively connected to RS-485 port A and B of 1# ball valve controller. It is the main wire. Port A and B of 2# valve and 3# valve are directly connected to A and B main wire in parallel.
- 2) In case of far communication distance, a 120 Ω 0.25W 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# and 3# valve.
- 3) RS-485 main communication wire can be maximally connected with 32 sets of RS-485 valves or equipment. If connection more than 32 sets, a 485 repeater should be connected to the main communication wire.
- 4) As the ball valve controller is slave, and its address range is 1~247. The default address is 1. Reading or writing data of control valve from PLC should correspond to the address of valve.

2.3. 46080 (F109E) Floating Bed Controller Setting and Usage

A. The background setting (as shown in Figure 40~Figure 45)

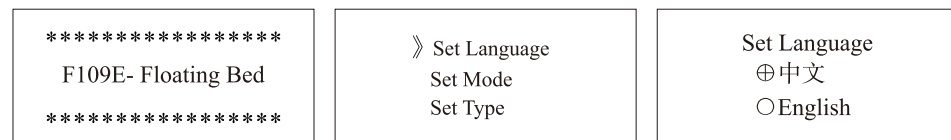


Figure 40

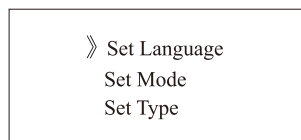


Figure 41

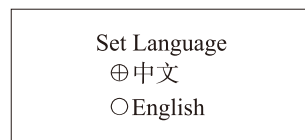


Figure 42

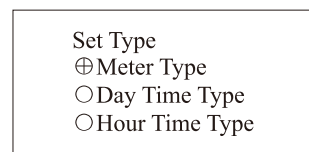


Figure 43

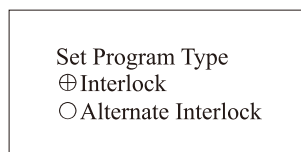


Figure 44

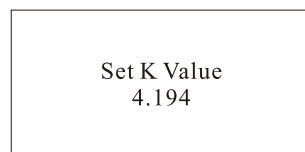


Figure 45

When power on, the display shows as Figure 40, within 6 seconds press and hold and for more than 2 seconds to enter the background setting status, the display shows as Figure 41.

- During the Figure 41 status, press enter “Set Language” as Figure 42 shows, press or to select the language. Press to save the setting and return to Figure 41.
- During the Figure 41 status, press or to select “Set Mode” and press enter “Set Mode” menu as Figure 43 shows, press or to select the necessary mode, press to save the setting and return to Figure 41.
- During the Figure 41 status, press or to select “Set Type”, and press entering “Set Type” as the Figure 44 shows, press or to select the necessary type, press to save the setting and return to Figure 41.

Note: If you choose “Day Time Type” or “Hour Time Type”, it only have “Interlock” program type can choose; if you choose “Meter Type”, then you can choose “Interlock” or “Alternate Interlock” program type.

B. Set flow coefficient K value (only available for Meter Type)

When power on, the display shows as Figure 40, within 6 seconds press and hold and for more than 2 seconds to enter the K Value setting status, the display shows as Figure 45.

When the integer value is flashing, press or to set the integer value, press to confirm the integer value setting and enter the decimal value setting. When the decimal value is flashing, press the or to set the decimal value, and then press the to save the value. Set the value and return to the working state.

C. The foreground setting

In the working status (when buttons are unlocked), press to enter the foreground parameter setting, and the menu will be displayed as below Figure 46-1, Figure 46-2, and Figure 46-3 shows (note: different modes and different types have different menu items). Select the parameter that needs to be set, enter the parameter setting menu as shown in Figure 47 to Figure 61, and modify the factory default value. The operation method is similar to the background parameter setting.

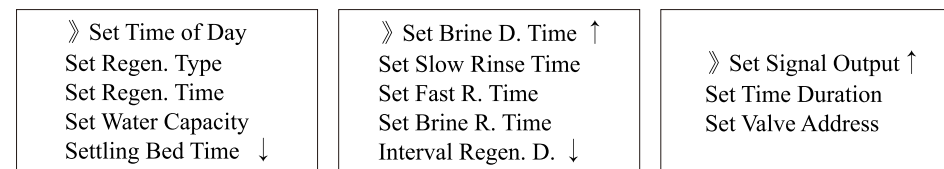


Figure 46-1

Figure 46-2

Figure 46-3

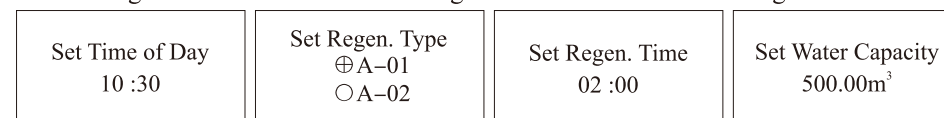


Figure 47

Figure 48

Figure 49 Meter type (A-01)

Figure 50 (Meter Type)



Figure 51 (Day Time Type)

Figure 52 (Hour Time Type)

Figure 53

Figure 54

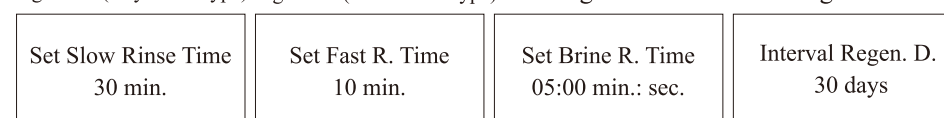


Figure 55

Figure 56

Figure 57

Figure 58

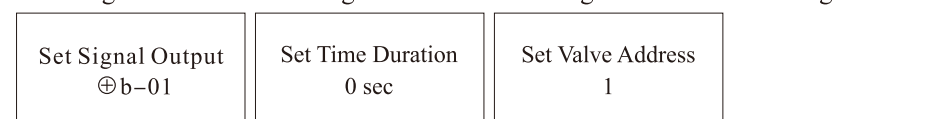


Figure 59

Figure 60

Figure 61

- Time of day setting, as shown in Figure 47.
- For “Regeneration Type” setting is suitable for the meter type floating bed, as shown in Figure 48, select A-01 meter delayed type or A-02 meter immediate type.
- For “Regeneration Time” setting is suitable for meter type floating bed, as shown in Figure 49. When the residual water reach 0 and the current time is the same as the regeneration time, regeneration is initiated.

- d) For “Water Capacity” setting is suitable for meter type floating bed, as shown in Figure 50. According to the process calculation to set the water capacity.
- e) For “Service Days” setting is suitable for day time type floating bed, as shown in Figure 51. According to the process calculation to set the service days.
- f) For “Service Hours” setting is suitable for hour time type floating bed, as shown in Figure 52. According to the process calculation to set the service hours.
- g) For “Settling Bed”, as shown in Figure 53, the time is set according to process calculation.
- h) For “Brine Draw Time”, as shown in Figure 54, the time is set according to process calculation.
- i) For “Slow Rinse Time”, as shown in Figure 55, the time is set according to process calculation.
- j) For “Fast Rinse Time”, as shown in Figure 56, the time is set according to process calculation.
- k) For “Brine Refill Time”, as shown in Figure 57, the time is set according to process calculation.
- l) For “Interval Regeneration Day” setting is suitable for meter type floating bed, as shown in Figure 58. When the residual water do not drop to 0, but the service day reach the setting value of interval regeneration day, the regeneration will be triggered.
- m) For “Signal Output”, it is shown in Figure 59. b-01: signal is available in “Service”, “Brine Draw”, “Slow Rinse”, “Fast Rinse” and “Brine Refill” positions; it is not available in “Setting Bed” position.
- n) For “Time Duration” setting, as shown in Figure 60, the default time is 0, which means there is always voltage on the power line of the ball valve. If the value is set to 20, it means that when all the ball valves are opened and closed, the ball valve power line has voltage only for 20 seconds, and no voltage at other times. It should be noted that the setting value should be ≥ 20 .
- o) For “Valve Address” setting, which is suitable for setting the communication address of RS-485 of multiple sets of ball valve controllers, as shown in Figure 61.

D. Working process display (take meter type floating bed with A-01 mode, as an example)

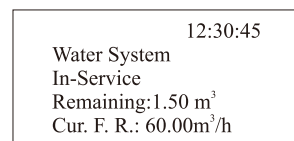


Figure 62

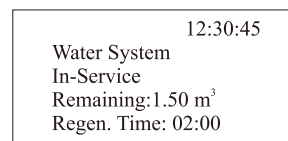


Figure 63

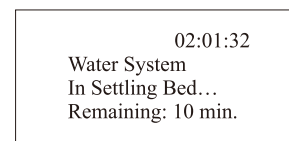


Figure 64

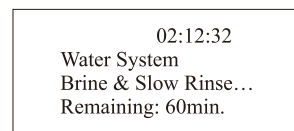


Figure 65

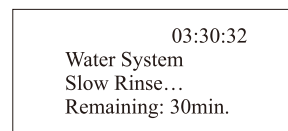


Figure 66

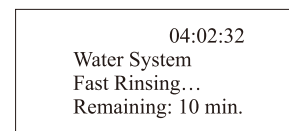


Figure 67

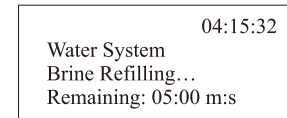


Figure 68

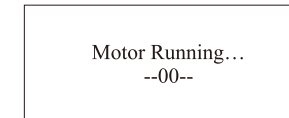


Figure 69

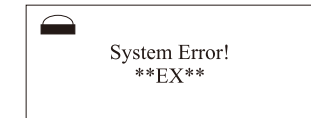


Figure 70

Illustration:

- In service status, the display circularly shows as Figure 62 and Figure 63;
- In settling bed status, the display shows as Figure 64;
- In brine draw status, the display shows as Figure 65;
- In slow rinse status, the display shows as Figure 66;
- In fast rinse status, the display shows as Figure 67;
- In brine refill status, the display shows as Figure 68;
- When the motor is running, the display shows as Figure 69;
- When the system is faulted, the display shows as Figure 70. The “X” of “EX” refers to number 3~4 .

E. RS-485 introduction

a) RS-485 communication protocol

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

Information transmission: half-duplex mode, in bytes.

Transmission speed: fixed 9600bps baud rate.

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.

b) Read signal of ball valve controller (the read function code is 0×03)

The equipment such as PLC is the master, and ball valve controller is the slave. The data of ball valve controller can be read by PLC. The ball valve MODBUS communication address and corresponding data are defined as follows:

MODBUS Address	Instruction	Unit	Data Definition	Comment
0x2002	Remaining Water	Integer	0~9999	Read remaining water 0~9999.99m ³
0x2003	Remaining Water	Decimal	0~99	
0x2004	Remaining Time	Day/Hour/Minute	0~99	Read remaining Day/Hour/Minute

0x2005	Normal / Fault Status	/	0x0000: Normal 0x0003: E3 0x0004: E4	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 0x0004: Brine Draw 0x0006: Slow Rinse 0x0007: Fast Rinse 0x0008: Brine Refill 0x0010: Switching	Read the current status of valve

c) Write data to the ball valve controller (write single data function code is 0×06, and continuous write multiple data function code is 0×10)

The equipment such as PLC is the master, the ball valve controller is the slave. The PLC can write the data of ball valve.

MODBUS Address	Instruction	Unit	Data Definition	Comment
0x3018	Switch working position	/	0~1 One pulse	Force to regenerate

d) Equipment such as PLC connect with single ball valve controller with RS-485

The wire connection is as follows:

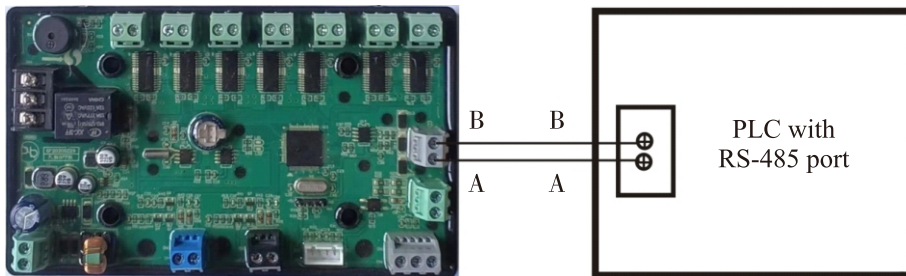
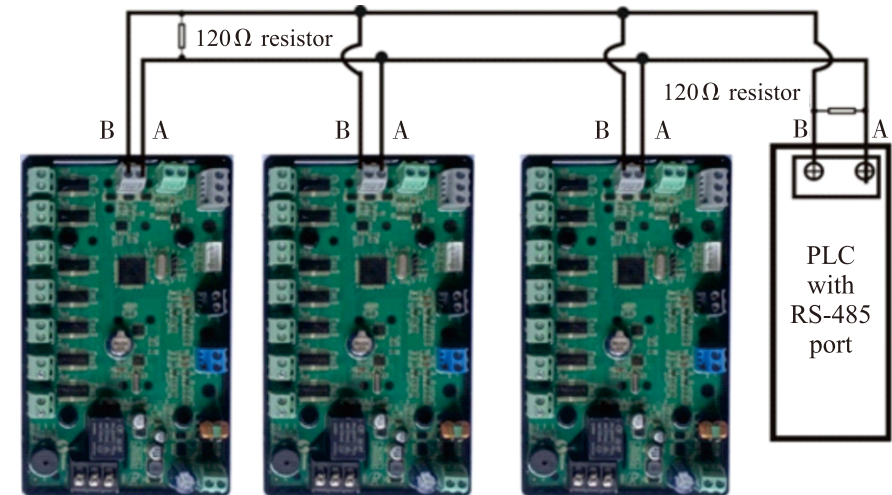


Illustration:

- 1) Ball valve's RS-485 port A and B respectively connect to PLC's RS-485 port A and B.
- 2) Use twisted pair wires for connection.
- 3) In case of far communication distance, a 120Ω0.25W resistor should be connected in parallel to A and B terminals of PLC and valve.

- 4) Keep away from the high voltage wire when wiring the RS-485 communication wire, and do not bundle the high voltage power wire with RS-485 communication wire together.
- 5) As the ball valve controller is slave, and its address range is 1~247. The default address is 1. Reading or writing data of control valve from PLC should correspond to the address of valve.

e) Equipment such as PLC connect with several ball valve controllers with RS-485
The wire connection is as follows:



1# Ball valve controller 2# Ball valve controller 3# Ball valve controller

Illustration:

- 1) RS-485 port A and B of PLC are respectively connected to RS-485 port A and B of 1# ball valve controller. It is the main wire. Port A and B of 2# valve and 3# valve are directly connected to A and B main wire in parallel.
- 2) In case of far communication distance, a 120Ω0.25W 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# and 3# valve.
- 3) RS-485 main communication wire can be maximally connected with 32 sets of RS-485 valves or equipment. If connection more than 32 sets, a 485 repeater should be connected to the main communication wire.
- 4) As the ball valve controller is slave, and its address range is 1~247. The default address is 1. Reading or writing data of control valve from PLC should correspond to the address of valve.

2.4.46040 (F109B) Mixed Bed Controller Setting and Usage

A. The background setting

When power on, display shows as Figure 71, within 6 seconds press and hold  and  for more than 2 seconds to enter the background setting menu, display shows as Figure 72. Press  or  to set the required program, press  to save the setting and return to working status.

```
*****
F109B
*****
```

Figure 71

```
Set Control Program
⊕ 1st Demineralized Water for Regen.
○ 2nd Demineralized Water for Regen.
```

Figure 72

B. Factory default parameters

Set Items	Parameter Setting Range	Factory Default	Remark
Time of Day	00:00~23:59	Current Value	
Service Days	0~99 Days	60	
Regeneration Time	00:00~23:59	02:00	
Backwash Time	01:00~99:59 min.: sec.	05:00	
Settling Bed Time	00:00~99:59 min.:sec.	03:00	
Alkaline Pre-drawing Time	00:00~99:59 min.:sec.	35:00	
Acid-Alkaline Drawing Time	00:00~99:59 min.:sec.	65:00	
Acid-Alkaline Rinse Time	00:00~99:59 min.:sec.	35:00	
Drainage Time	00:00~99:59 min.:sec.	00:07	
Mixing Time	00:00~99:59 min.:sec.	00:40	
Rapid Drain Time	00:00~99:59 min.:sec.	00:10	
Air Drain Time	00:00~99:59 min.:sec.	05:00	
Fast Rinse Time	01:00~99:59 min.:sec.	10:00	

C. Process display (Take mixed bed with single tank as an example)

```
12:30:45
Water System
In-Service
Remaining:60 days
Regen. Time: 02:00
```

Figure 73

```
12:54:32
Water System
Backwashing...
Remaining: 05:00 min.: sec.
```

Figure 74

```
12:59:32
Water System
Settling Bed...
Remaining: 03:00 min.: sec.
```

Figure 75

```
13:02:32
Water System
Alkaline Pre-drawing...
Remaining: 35:00 min.:sec.
```

Figure 76

```
13:37:32
Water System
Acid-Alkaline Drawing...
Remaining: 65:00 min.:sec.
```

Figure 77

```
14:42:32
Water System
Acid-Alkaline Rinsing...
Remaining: 30:00 min.:sec.
```

Figure 78

```
15:12:32
Water System
Draining...
Remaining: 00:07 min.:sec.
```

Figure 79

```
15:12:52
Water System
Mixing...
Remaining: 00:040 min.:sec.
```

Figure 80

```
15:12:58
Water System
Rapid Draining...
Remaining: 00:10 min.:sec.
```

Figure 81

```
15:18:32
Water System
Air Draining...
Remaining: 05:00 min.:sec.
```

Figure 82

```
15:23:32
Water System
Fast Rinsing...
Remaining: 10:00 min.:sec.
```

Figure 83

```
Position Switching...
--00--
```

Figure 84

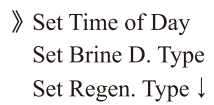
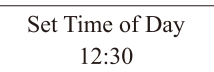
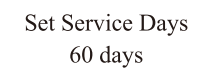
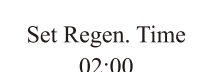
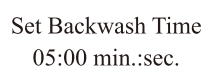
Illustration:

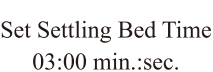
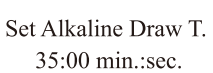
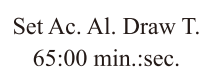
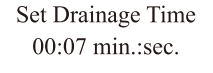
- In service status, the display shows as Figure 73;
- In backwash status, the display shows as Figure 74;
- In settling bed status, the display shows as Figure 75;
- In alkaline pre-drawing status, the display shows as Figure 76;
- In acid-alkaline drawing status, the display shows as Figure 77;
- In acid-alkaline rinse, the display shows as Figure 78;
- In drainage status, the display shows as Figure 79;
- In mixing status, the display shows as Figure 80;
- In rapid drain status, the display shows as Figure 81;
- In air drain status, the display shows as Figure 82;

● In fast rinse status, the display shows as Figure 83;

● In motor running status, the display shows as Figure 84.

D. Operation parameters setting process

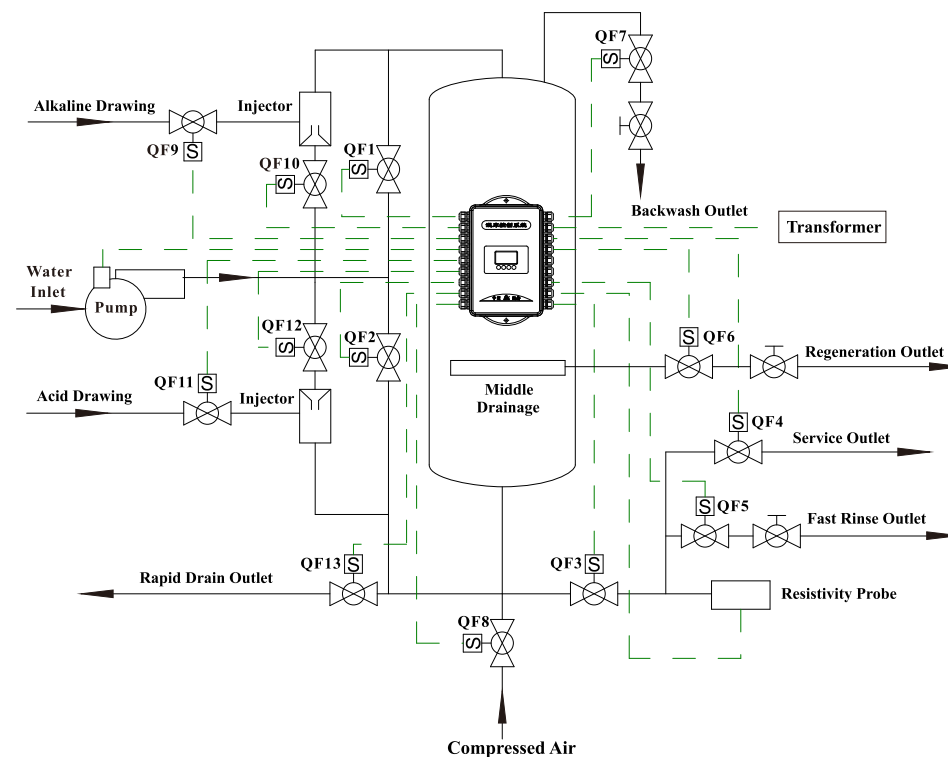
Items	Process Steps	Symbol
Before parameters setting, if  light on, press and hold both  and  for 5 second to unlock.		
Time of Day	1. Press  and enter the menu, as the Figure 85 shows, select the item for the “Set Time of Day”. 2. Then press  , and the display will show as the Figure 86, the hour value “12” flashes, press  or  to modify the hour value. 3. Then press  again, the minute value “30” flashes, press  or  to modify the minute value. 4. Press  and hearing “Di” means the setting complete.	 Figure 85  Figure 86
Service Days	1. In Figure 85 status, press  and select the item of “Set Service Days”; Then press  , the display will show as Figure 87. 2. Press  or  to set the service days. 3. Press  and hearing “Di” means the setting complete.	 Figure 87
Regeneration Time	1. In Figure 85 status, press  and select the item of “Set Regen. Time”; Then press  , the display will show as Figure 88, the hour value “02” flashes, press  or  to modify the hour value. 2. Then press  , the minute value “00” flashes, press  or  to modify the minute value. 3. Press  and hearing “Di” means the setting complete.	 Figure 88
Backwash Time	1. In Figure 85 status, press  and select the item of “Set Backwash Time”; Then press  , the display will show as Figure 89 the minute value “05” flashes, press  or  to modify the minute value. 2. Then press  , the second value “00” flashes, press  or  to modify the second value. 3. Press  and hearing “Di” means the setting complete.	 Figure 89

Settling Bed Time	1. In Figure 85 status, press  and select the item of “Set Settling Bed Time”; Then press  , the setting interface will show as Figure 90, the minute value “03” flashes, press  or  to modify the minute value. 2. Then press  , the second value “00” flashes, press  or  to modify the second value. 3. Press  and hearing “Di” means the setting complete.	 Figure 90
Alkaline Pre-drawing Time	1. In Figure 85 status, press  and select the item of “Set Alkaline Draw T.”; Then press  , the display will show as Figure 91, the minute value “35” flashes, press  or  to modify the minute value. 2. Then press  , the second value “00” flashes, press  or  to modify the second value. 3. Press  and hearing “Di” means the setting complete.	 Figure 91
Acid-Alkaline Drawing Time	1. In Figure 85 status, press  and select the item of “Set Ac. Al. Draw T.”; Then press  , the display will show as Figure 92, the minute value “65” flashes, press  or  to modify the minute value. 2. Then press  , the second value “00” flashes, press  or  to modify the second value. 3. Press  and hearing “Di” means the setting complete.	 Figure 92
Acid-Alkaline Rinse Time	1. In Figure 85 status, press  and select the item of “Set Ac. Al. Rinse T.”; Then press  , the display will show as Figure 93, the minute value “30” flashes, press  or  to modify the minute value. 2. Then press  , the second value “00” flashes, press  or  to modify the second value. 3. Press  and hearing “Di” means the setting complete.	 Figure 93
Drainage Time	1. In Figure 85 status, press  and select the item of “Set Drainage Time”; Then press  , the display will show as Figure 94, the minute value “00” flashes, press  or  to modify the minute value. 2. Then press  , the second value “07” flashes, press  or  to modify the second value. 3. Press  and hearing “Di” means the setting complete.	 Figure 94

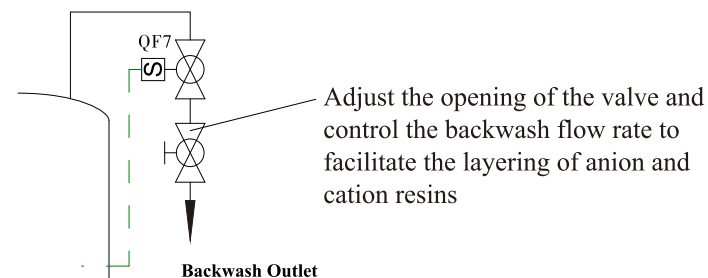
Mixing Time	1. In Figure 85 status, press and select the item of “Set Mixing Time”; Then press , the display will show as Figure 95, the minute value “00” flashes, press or to modify the minute value. 2. Then press , the second value “40” flashes, press or to modify the second value. 3. Press and hearing “Di” means the setting complete.	Set Mixing Time 00:40 min.:sec. Figure 95
Rapid Drain Time	1. In Figure 85 status, press and select the item of “Set Rapid Drain Time”; Then press , the display will show as Figure 96, the minute value “00” flashes, press or to modify the minute value. 2. Then press , the second value “10” flashes, press or to modify the second value. 3. Press and hearing “Di” means the setting complete.	Set Rapid Drain Time 00:10 min.:sec. Figure 96
Air Drain Time	1. In Figure 85 status, press and select the item of “Set Air Drain Time”; Then press , the display will show as Figure 97, the minute value “05” flashes, press or to modify the minute value. 2. Then press , the second value “00” flashes, press or to modify the second value. 3. Press and hearing “Di” means the setting complete.	Set Air Drain Time 05:00 min.:sec. Figure 97
Fast Rinse Time	1. In Figure 85 status, press and select the item of “Set Fast Rinse Time”; Then press , the display will show as Figure 98, the minute value “10” flashes, press or to modify the minute value. 2. Then press , the second value “00” flashes, press or to modify the second value. 3. Press and hearing “Di” means the setting complete.	Set Fast Rinse Time 10:00 min.:sec. Figure 98

E. Instruction of debugging (taking the mixed bed with first grade demineralized water for regeneration)

Adopt First Grade Demineralized Water to Regenerate Mixed Bed



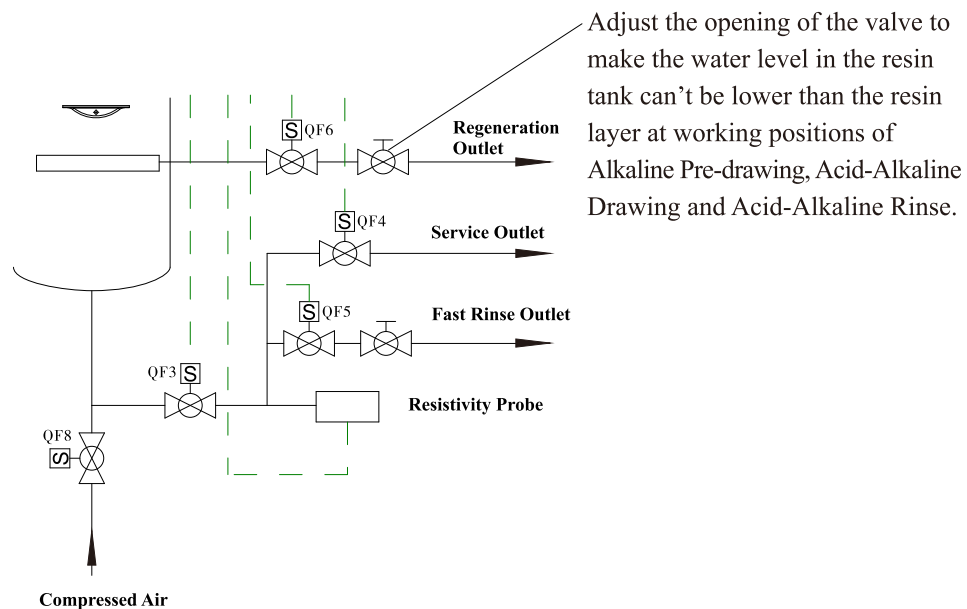
1). Adjustment of backwash flow rate



The backwash water drainage pipeline should be connected separately to the drainage ditch, with a certain distance to the liquid level of the drainage ditch. The drainage pipeline should be smooth to release water (air), and there should be no U-shaped pipes or other

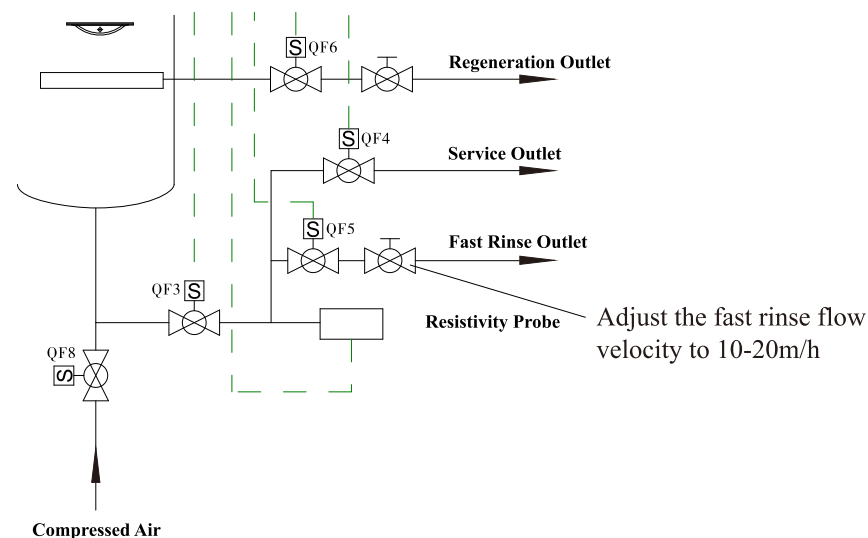
structures forming a water seal to avoid sealing when the process needs to be connected to the atmosphere. The backwash flow velocity is about 10m/h, and make the expansion rate of 50-70% for the entire resin layer. The backwash time is generally 10-15 minutes, depending on the layering of the anion and cation resins.

2). Adjustment of middle drainage flow rate



The Alkaline Pre-drawing and Acid-Alkaline Drawing time are set during debugging. Generally, under Acid-Alkaline Drawing position, it is better to draw the acid and alkali synchronously. The mass concentration of the acid and alkali solution is controlled at 3-5%, and the regeneration flow velocity is 2-4m/h. The Acid-Alkaline Rinse time depends on the PH value of the discharged water from middle drainage.

3). Adjustment of fast rinse flow rate



4). Time setting of Drainage position

During debugging, stop draining until the water level is around 100mm above the resin surface, record the time and set it as the Drainage time.

5). Mixing position

It is necessary to provide sufficient pressure and volume of oil-free compressed air to ensure a thorough and even mixing of anion and cation resins.

6). Time setting of Rapid Drain position

During debugging, observe the rapid drop of resin and set it as the Rapid Drain time.

3. System Configuration

3.1. Controller Configuration Table

Description	F109	F109B	F109E	Quantity
	Part No.	Part No.	Part No.	
Dust Cover	8005065	8005065	8005065	1
Front Cover	8300049	8300049	8300049	1
Display Board	6381006	6381006	6381006	1
Control Board	6382101	6382102	6382362	1
Wire for Display Board	5512002	5512002	5512002	1
Label	8865084	8865084	8865084	1
Cable Joint	5457139	5457139	5457139	18
Screw, Cross	8909021	8909021	8909021	6
Transformer	6379024	6379024	6379024	1
Label	8868160	8868162	/	1
Label	8868161	8868163	/	1
O-ring	8378428	8378428	8378428	1
Decorative Part	8084027	8084027	8084027	6
Screw, Cross	8909005	8909005	8909005	4
Wire for Power	5513011	5513011	5513011	1
Label	8860045	8860046	8860121	1
Plastic Pin	8993011	8993011	8993011	17

3.2. Filter System Configuration Table

RXF-65 0.1MPa Pressure Drop Backwash Flow Rate 80m ³ /h			RXF-80 0.1MPa Pressure Drop Backwash Flow Rate 150m ³ /h		
Configuration	Model	Quantity	Configuration	Model	Quantity
Ball Valve Controller	F109	1	Ball Valve Controller	F109	1
DN65 Ball Valve	Q931513-65	5	DN80 Ball Valve	Q931513-80	5
Main Pipeline	Suggest to use size bigger than DN80		Main Pipeline	Suggest to use size bigger than DN100	

RXF-100 0.1MPa Pressure Drop Backwash Flow Rate 300m ³ /h		
Configuration	Model	Quantity
Ball Valve Controller	F109	1
DN100 Ball Valve	Q941513-100	5
Main Pipeline	Suggest to use size bigger than DN125	

Note: Due to the large pressure loss of elbow, tee and other pipeline accessories, the pipe diameter of the main pipeline shall be designed to be large enough to reduce the impact of pressure loss on the flow, and the reducing connection shall be adopted to connect with the ball valves.

3.3. Softener System Configuration Table

RXS-65 0.1MPa Pressure Drop Flow Rate 80m³/h			RXS-80 0.1MPa Pressure Drop Flow Rate 150m³/h		
Configuration	Model	Quantity	Configuration	Model	Quantity
Ball Valve Controller	F109	1	Ball Valve Controller	F109	1
DN65 Ball Valve	Q931513-65	5	DN80 Ball Valve	Q931513-80	5
DN32 Ball Valve	Q931513-32	2	DN40 Ball Valve	Q931513-40	2
Main Pipeline	Suggest to use size bigger than DN80		Main Pipeline	Suggest to use size bigger than DN100	
RXS-100 0.1MPa Pressure Drop Flow Rate 300m³/h					
Configuration		Model	Quantity		
Ball Valve Controller		F109	1		
DN100 Ball Valve		Q941513-100	5		
DN50 Ball Valve		Q931513-50	2		
Main Pipeline		Suggest to use size bigger than DN125			

Note: Due to the large pressure loss of elbow, tee and other pipeline accessories, the pipe diameter of the main pipeline shall be designed to be large enough to reduce the impact of pressure loss on the flow, and the reducing connection shall be adopted to connect with the ball valves.

3.4. Floating Bed System Configuration Table

RXD-65 0.1MPa Pressure Drop Flow Rate 80m³/h			RXD-80 0.1MPa Pressure Drop Flow Rate 150m³/h		
Configuration	Model	Quantity	Configuration	Model	Quantity
Ball Valve Controller	F109E	1	Ball Valve Controller	F109E	1
DN65 Ball Valve	Q931513-65	4	DN80 Ball Valve	Q931513-80	4
DN32 Ball Valve	Q931513-32	2	DN40 Ball Valve	Q931513-40	2
Main Pipeline	Suggest to use size bigger than DN80		Main Pipeline	Suggest to use size bigger than DN100	
RXD-100 0.1MPa Pressure Drop Flow Rate 300m³/h					
Configuration		Model	Quantity		
Ball Valve Controller		F109E	1		
DN100 Ball Valve		Q941513-100	4		
DN50 Ball Valve		Q931513-50	2		
Main Pipeline		Suggest to use size bigger than DN125			

Note: Due to the large pressure loss of elbow, tee and other pipeline accessories, the pipe diameter of the main pipeline shall be designed to be large enough to reduce the impact of pressure loss on the flow, and the reducing connection shall be adopted to connect with the ball valves.

3.5. Mixed Bed System Configuration Table

RXH-10 0.1MPa Pressure Drop Flow Rate 10m³/h			RXH-20 0.1MPa Pressure Drop Flow Rate 20m³/h		
Configuration	Model	Quantity	Configuration	Model	Quantity
Ball Valve Controller	F109B	1	Ball Valve Controller	F109B	1
DN 25 Ball Valve	QQ931513-25	5	DN 32 Ball Valve	Q931513-32	5
DN 20 Ball Valve	QQ931513-20	8	DN 25 Ball Valve	QQ931513-25	8
Resistivity Meter	2976073	1	Resistivity Meter	2976073	1

Injector		2	Injector		2
Main Pipeline	Suggest to use size bigger than DN32		Main Pipeline	Suggest to use size bigger than DN40	
RXH-30 0.1MPa Pressure Drop Flow Rate 30m³/h			RXH-45 0.1MPa Pressure Drop Flow Rate 45m³/h		
Configuration	Model	Quantity	Configuration	Model	Quantity
Ball Valve Controller	F109B	1	Ball Valve Controller	F109B	1
DN40 Ball Valve	Q931513-40	5	DN50 Ball Valve	Q931513-50	5
DN32 Ball Valve	Q931513-32	8	DN32 Ball Valve	Q931513-32	8
Resistivity Meter	2976073	1	Resistivity Meter	2976073	1
Injector		2	Injector		2
Main Pipeline	Suggest to use size bigger than DN50		Main Pipeline	Suggest to use size bigger than DN65	

Note: Due to the large pressure loss of elbow, tee and other pipeline accessories, the pipe diameter of the main pipeline shall be designed to be large enough to reduce the impact of pressure loss on the flow, and the reducing connection shall be adopted to connect with the ball valves.

3.6. Flow Coefficient K Value Reference Table

Part No.	Size	Flow Coefficient K Value
5WRX.447.020	3/4"	83~84
5WRX.447.018	1"	43~44
5WRX.447.010	1.5"	18~19
5WRX.447.003	2"	8~9
5WRX.447.004	2.5"	9~10
5WRX.447.013	3"	6~7

4. Warranty Card

Dear client:

This warranty card is the guarantee proof of ball valve controller. It is kept by client self. You could get the after-sales services from the supplier which is nominated 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 nominated 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	 Ball Valve Controller				
Model		Code of Valve Body			
Purchase Company Name		Tel/Cel.			
Problem					
Solution					
Date of Repairing		Date of Accomplishment		Maintenance Man Signature	

When product needs warranty service, please contact with your direct supplier first, after got permission, then fill in the below content and sent 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		
Problem Description					