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Rev.A.2610



Patent NO.:ZL2021206252482

Multi-functional Flow Control Valve for Swimming Pool System

51524 (TM. F139AS)

53524 (TM. F139A)

53524B-1 (TM. F139B-1)

53524B-2 (TM. F139B-2)

53524B-3 (TM. F139B-3)

53524C (TM. F139C)

53512C (TM. F138C)

53535B-1 (TM. F152B-1)

53535C (TM. F152C)

User Manual



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

0WRX.466.756

MODEL:F139AS/F139A/F139B-1/F139B-2/F139B-3/F139C/F138C/F152B-1/F152C

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

Filter System Configuration

Tank Size: Dia. _____ mm, Height _____ mm;

Refilled Filter Material _____ Kg;

Granularity of Filter Material _____ mm;

Control Valve Model _____; Number _____;

Pressure of Inlet Water _____ MPa;

Turbidity of Inlet Water _____ FTU.

Parameter Set

Parameter	Unit	Factory Default	Actual Value
Time of Day	h:m	Current Value	
Rinsing Time	/	02:00	
Rinsing Frequency	/	F-00	
Service Days (By Day)	D	10	
Backwash Time	min.	10	
Fast Rinse Time	min.	10	
Valve Address	/	1	

Catalogue

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Notice

- To ensure normal operation of the product, please consult with professional installation or repairing personnel before use it.
- If there are any of pipeline engineering and electric works, there must be finished by professional at the time of installation.
- Do not use the control valve with the water that is unsafe or unknown quality.
- Depending on the changing of working environment and water requirement, each parameter of filtration should be adjusted accordingly.
- Test water periodically to verify that system is performing satisfactorily.
- Do not put the valve near the hot resource, high humidity, corrosive, intense magnetic field or intense vibrations environment. And do not leave it outside.
- Forbidden to use the drain pipe or other connectors as support to carry the system.
- Please use this product under the water temperature between 5~30℃, water pressure < 0.25MPa. Failure to use this product under such conditions voids the warranty.
- If the water pressure exceeds 0.25MPa, a pressure reducing valve 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.
- Regularly check the filter material, it needs to be added in time if loss.
- 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 swimming pool filtration equipment.

1.2. Product Characteristics

●Simple structure and reliable sealing

It adopts hermetic head faces with high degree pottery and corrosion resistance for opening and closing. It combines with Filter, Backwash, Rinse, Waste, Recirculation and Closed.

●Manual function

Under unlock status, realize rinsing 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 be reset. The process will continue to work after powering 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.

●Remote handling connector

This connector can receive external signal and control the valve remotely. (The wiring refers to Figure 3-2)

●RS-485 port

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

●All parameters can be modified

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

●The service days can be set

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

1.3. Service Condition

This control valve should be used under the below condition.

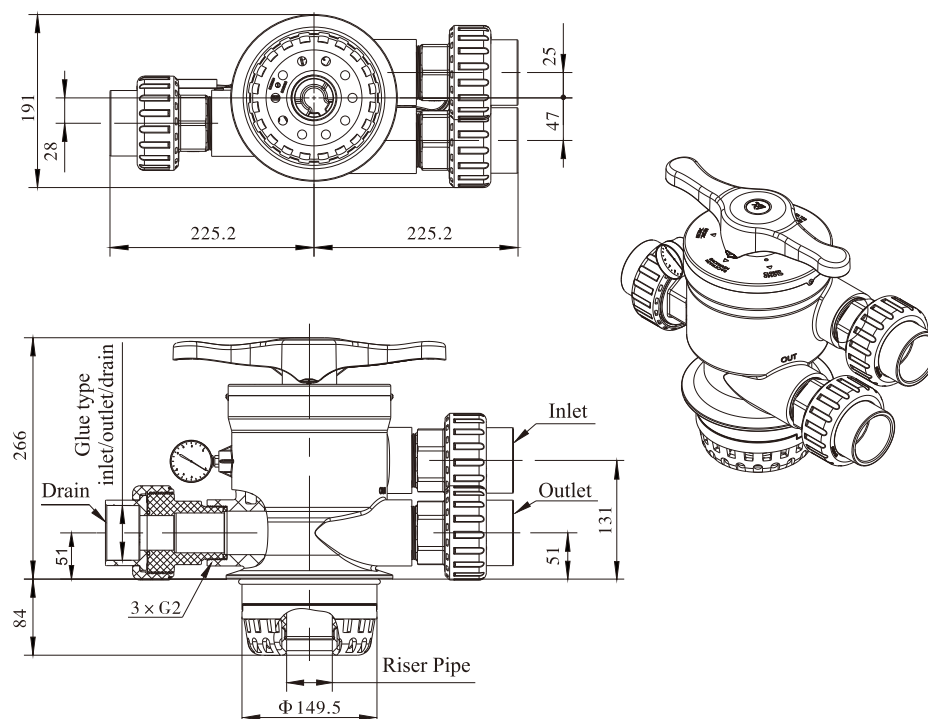
Item		Requirement
Working conditions	Water pressure	< 0.25MPa
	Water temperature	5℃ ~ 30℃

Working environment	Environment temperature	5℃ ~ 45℃
	Relative humidity	≤95% (25℃)
	Electrical facility	AC100 ~ 240V, 50/60Hz
Inlet water quality	Water turbidity	< 20FTU

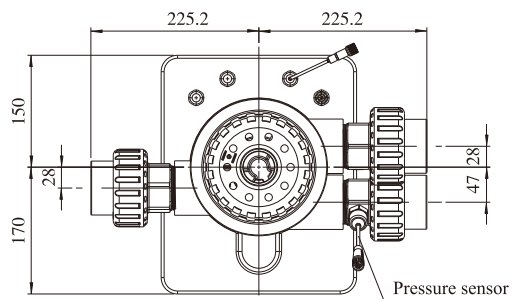
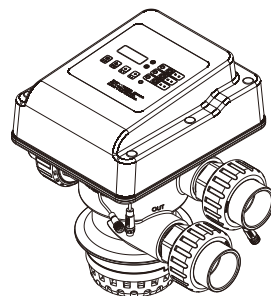
●When the water turbidity exceeds the conditions, the impurity in the inlet water should be coagulated and precipitated firstly.

1.4. Product Structure and Technical Parameters

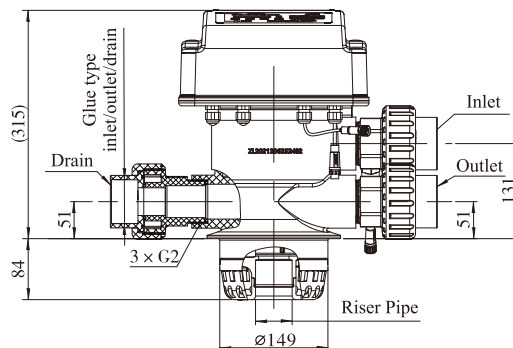
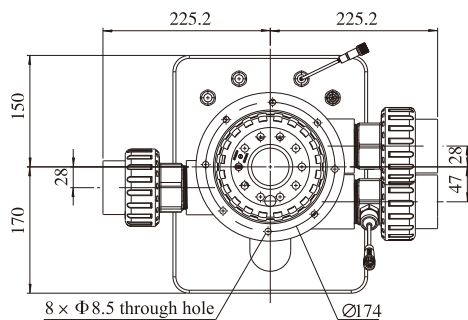
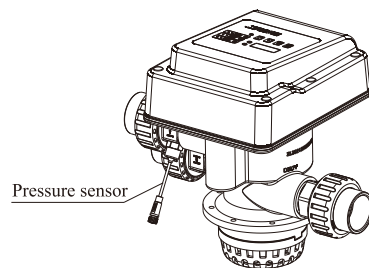
A.Dimension (The appearance is just for reference. It is subjected to the real product)



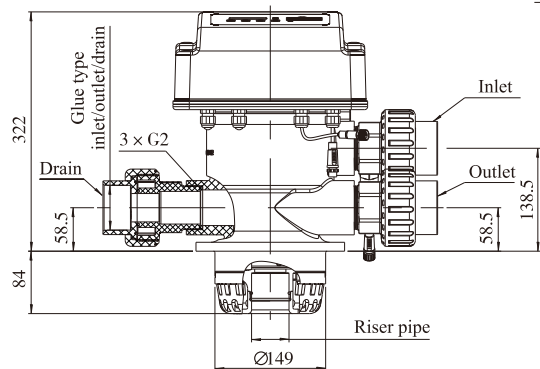
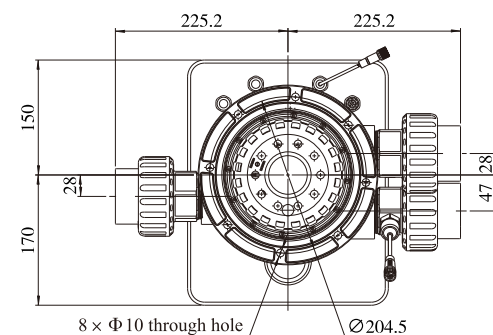
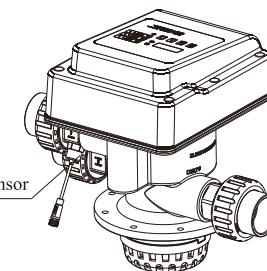
F139AS Structure chart



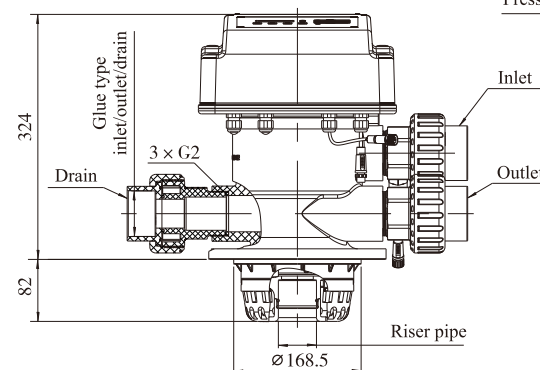
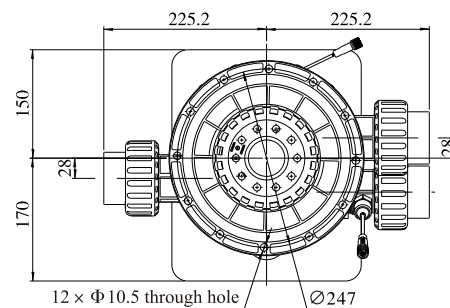
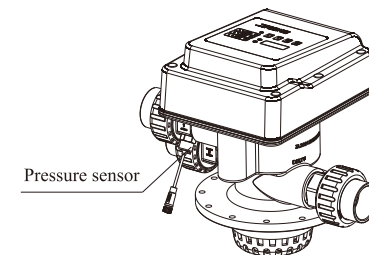
F139A Structure chart



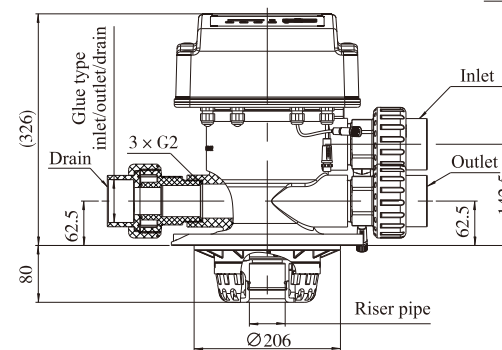
F139B-1 Structure chart

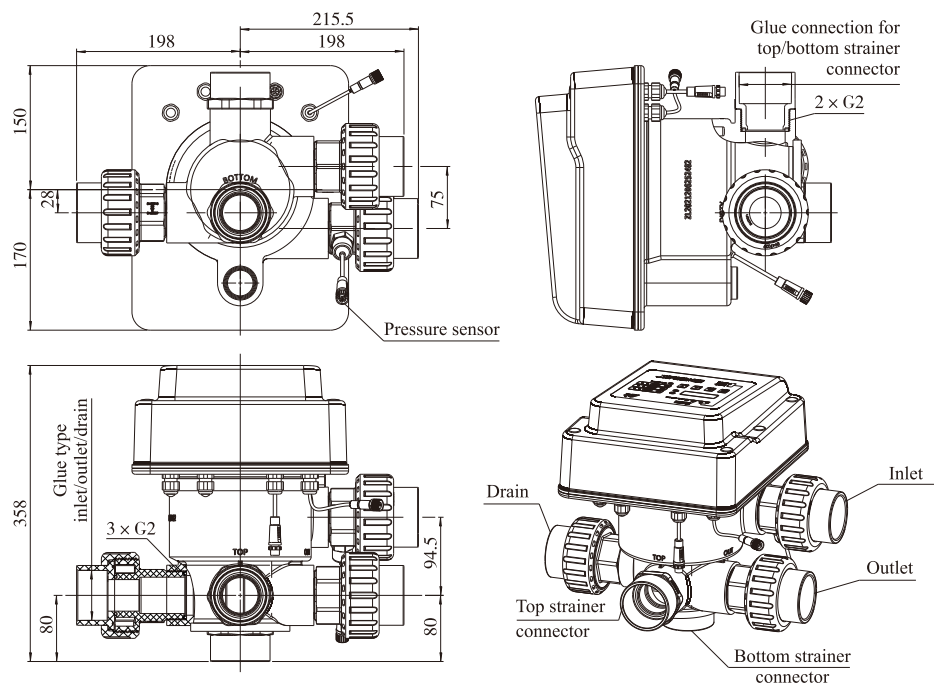


F139B-2 Structure chart

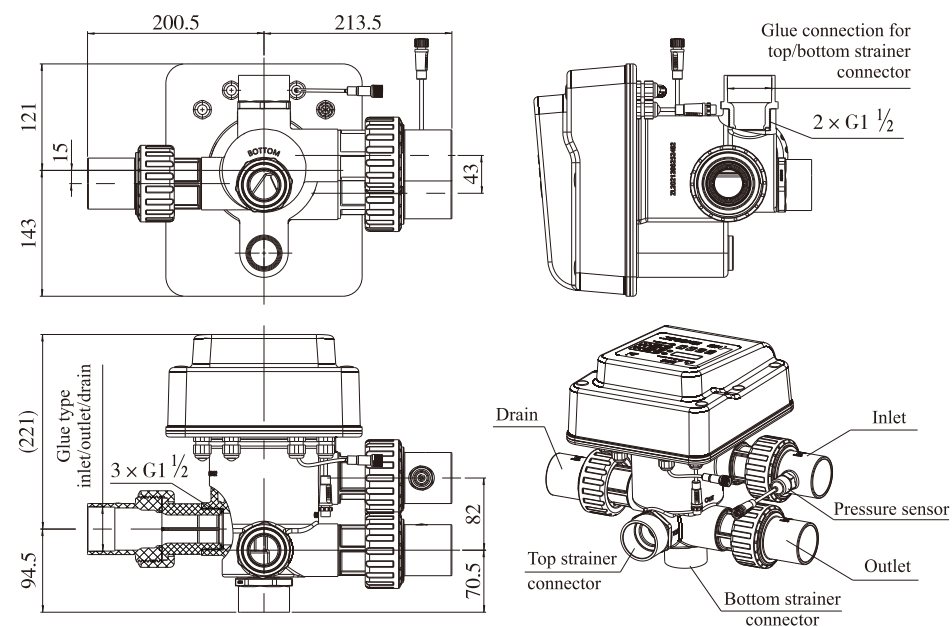


F139B-3 Structure chart

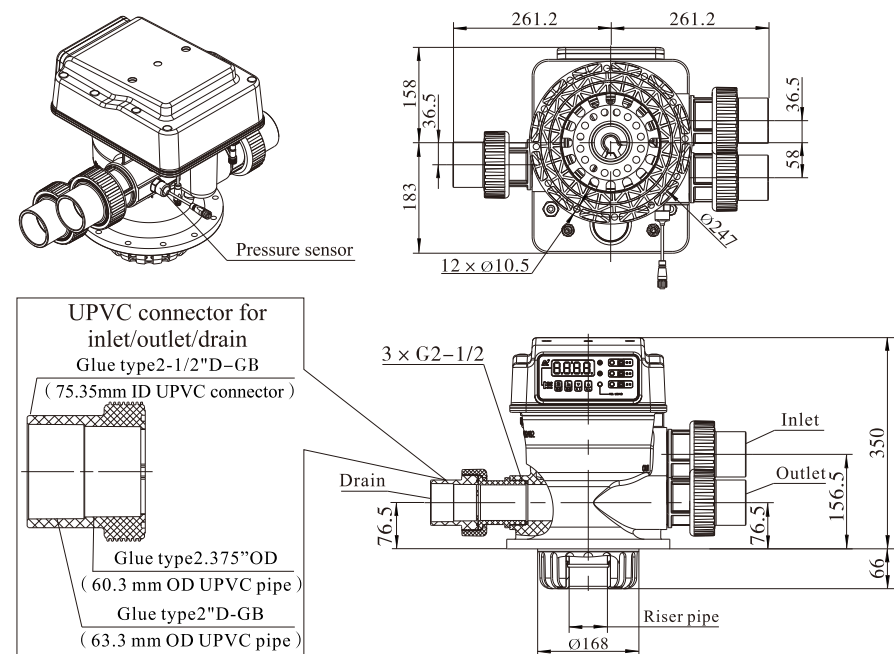




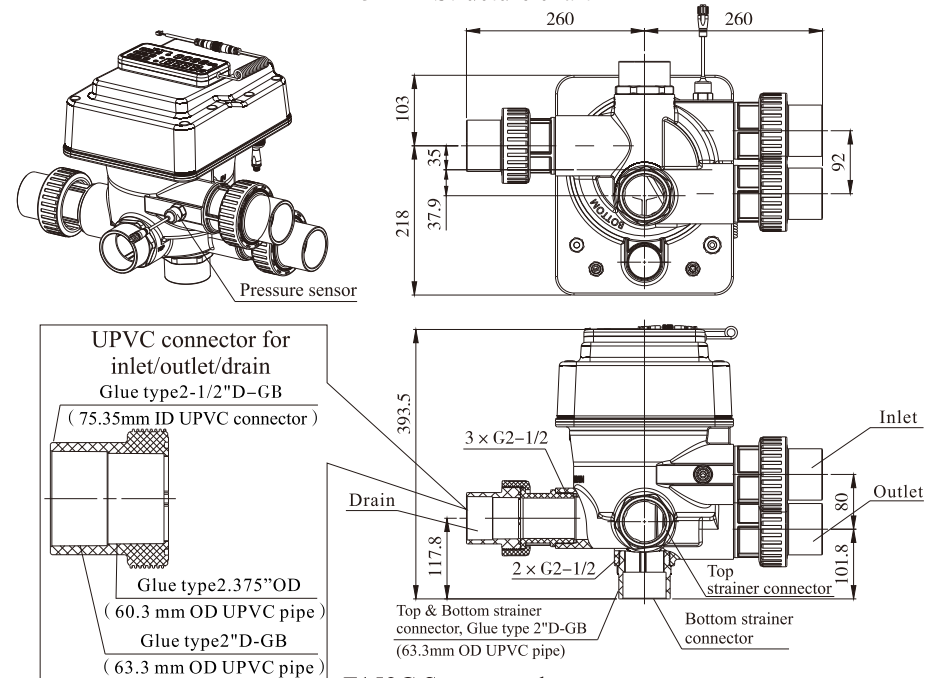
F139C Structure chart



F138C Structure chart



F152B-1 Structure chart



F152C Structure chart

B. Technical parameter

The suitable transformer output of control valve: DC24V, 1.5A.

Model	Connection Size				Backwash Flow Rate m ³ /h @0.1MPa	Remark
	Glue Connection for Inlet/Outlet/Drain	Glue connection for top/bottom strainer connector	Base	Riser Pipe		
F139AS	2"D-GB (OD:63.3 mm UPVC pipe) or 2.375"OD (OD:60.3mm UPVC pipe) or 1.5"D-GB (OD:50mm UPVC pipe) or 1.9"OD (OD:48.3mm UPVC pipe)	/	Clamp (Suitable for tank internal diameter with ≥150mm)	1.5"D-GB (OD:50mm) or 1.9"OD (OD: 48.3mm)	24	Top-mounted installation, manual
F139A						
F139B-1		/	Flange connection, 8pcs M8 screw bolts, and the center distance is 174mm. (suitable for tank diameter with ≥150mm)			Top-mounted installation, pressure or time to initiate backwash
F139B-2			Flange connection, 8pcs M8 screw bolts, and the center distance is 204.5mm. (suitable for tank diameter with ≥171.5mm)			
F139B-3		/	Flange connection, 12pcs M8 screw bolts, and the center distance is 247mm. (suitable for tank diameter with ≥209mm)	2"D-GB (OD:63mm) or 2.375"OD (OD: 60.3mm)		
F139C		2"D-GB (OD:63.3 mm UPVC pipe) or 1.5"D-GB (OD:50mm UPVC pipe)	/	/	19	Side-mounted installation, pressure or time to initiate backwash
F138C	1.5"D-GB (OD:50mm UPVC pipe)	1.5"D-GB (OD:50mm UPVC pipe)	/	/	12	

F152B-1	2"D-GB (OD:63.3 mm UPVC pipe) or 2.375"OD (OD:60.3mm UPVC pipe) or 2-1/2"-GB (ID 75.35 mm UPVC connector)	/	Flange connection, 12pcs M8 screw bolts, and the center distance is 247mm. (suitable for tank diameter with ≥209mm)	2"D-GB (OD:63.3 mm UPVC pipe) or 2.375"OD (OD:60.3mm UPVC pipe)	37	Top-mounted installation, pressure or time to initiate backwash
F152C	2"D-GB (OD:63.3 mm UPVC pipe)	/	/	/	29	Side-mounted pressure or time to initiate backwash

Remark:

- For F139A, F139AS, F139B-1 and F139B-2, there are two types of riser pipe: Chinese Standard 1.5"D-GB and American Standard 1.9"OD.
- For F139B-3, there are two types of riser pipe: Chinese Standard 2"D-GB and American Standard 2.375"OD.
- For F139A, F139AS, F139B-1, F139B-2, F139B-3 and F139C, there are four types of glue connection for Inlet/Outlet/Drain: Chinese Standard 2"D-GB, American Standard 2.375"OD, Chinese Standard 1.5"D-GB and American Standard 1.9"OD.
- For F139C, the glue connections for the top and bottom strainer are: 2"D-GB (UPVC pipe, OD 63.3mm) or 1.5"D-GB (UPVC pipe, OD 50mm).
- For F152B-1, there are two types of riser pipe: Chinese Standard 2"D-GB and American Standard 2.375"OD.
- For F152B-1 and F152C, there are three types of glue connection for Inlet/Outlet/Drain: Chinese Standard 2"D-GB, American Standard 2.375"OD and Chinese standard ID 2-1/2" D-GB.
- Please specify when ordering.

1.5. Installation

A.Installation notice

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

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

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

B.Device location

- ①The filter should be located closely to drain.
- ②Ensure the unit is installed in enough space for operating and maintenance.
- ③The unit should be kept away from the heater, and not be exposed outdoor. Sunshine or rain will cause the system damage.
- ④Please avoid installing the system in one acid/alkaline, magnetic or strong vibration circumstance, because above factors will cause the system disorder.
- ⑤Do not install the device, drain pipeline in circumstance which temperature may drop below 5℃, or above 45℃.
- ⑥Install the system in the place where with minimum loss in case of water leaking.

C. Pipeline installation

- ①Install control valve, take F139A as example

a. As the Figure 1-1 shows, glue the riser pipe and bottom strainer. Put it into the bottom of the tank, and then assemble the bottom strainer. The size from the mouth of the tank to the surface "A" end of the riser pipe is 42-52mm, and cut off excess riser pipe and round it.

b. Fill the filter material to the tank.

c. As the Figure 1-2 shows, slowly insert the top strainer into the riser pipe, and then install the control valve on the tank. Then install the clamp and the inlet, outlet, and drain connectors.

Note:

- Avoid filling floccules substance together with filter material to the mineral tank.
- Avoid O-ring of the base and riser pipe falling out while installing control valve.

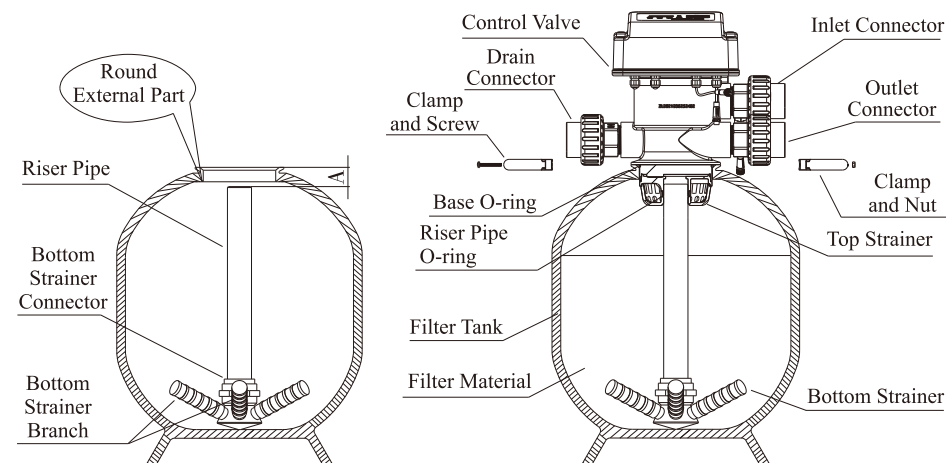


Figure 1-1

Figure 1-2

- ② As the Figure 1-3 shows, installation of Outlet/Inlet/Drain Pipeline.

- a. Water pump should be installed at the inlet, and filter net should be installed in front of the water pump.
- b. The back end of the outlet pipeline can be connected to "other system", such as heating systems, disinfection systems, and so on.
- c. The drain pipeline is connected to the sewer, and there must be a certain gap between them.

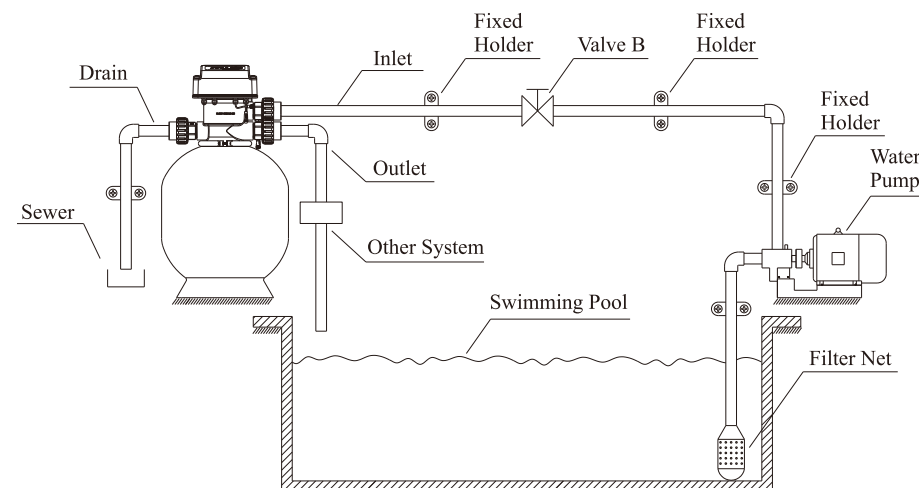


Figure 1-3

Note:

- When installing, make sure that each pipeline is horizontal and vertical, and must be supported and fixed with a fixed holder.
- When turning threaded pipe fittings onto plastic fitting, use care not to cross thread or broken valve.
- Control valve should be higher than drain outlet, and be better not far from the drain hose.
- For detailed pipeline installation and connection with "other system", please follow the recommendations of the complete equipment supplier!

Appendix: F138C side-mounted control valve after installation, as shown in Figure 1-4:

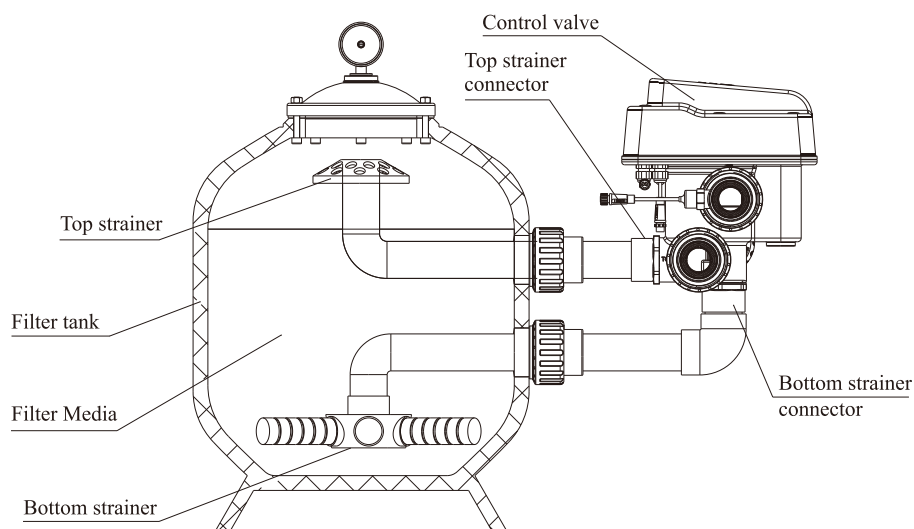
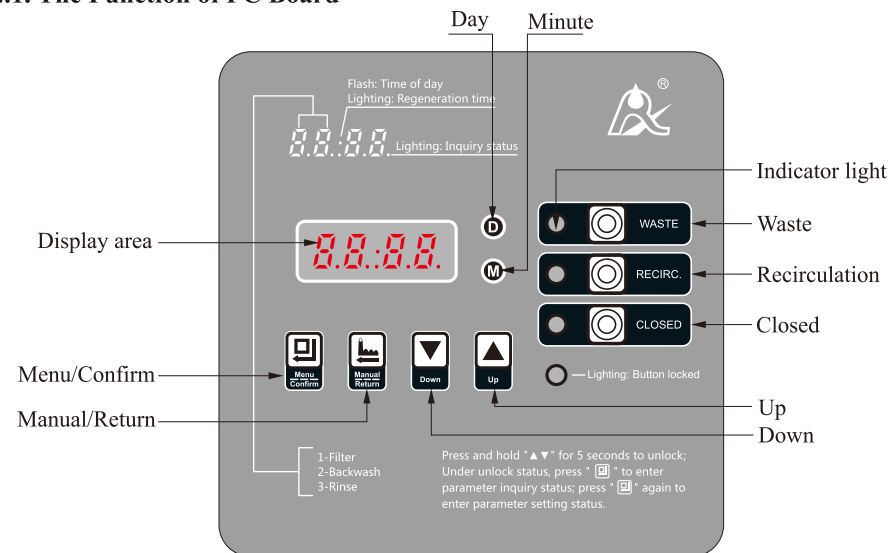


Figure 1-4

2. Basic Setting & Usage

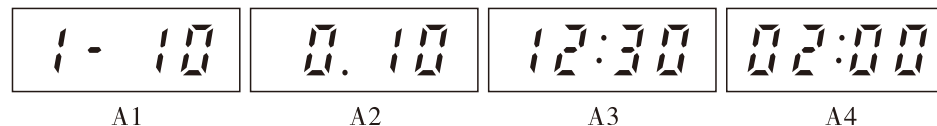
2.1. The Function of PC Board



① Process Display

When the power is on, the digital tube and all the indicators are displayed, and then the model "F139" is displayed, and it enters the working status after a few seconds.

② Filter status display

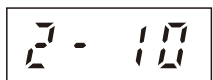


In filter status, the A1, A2, A3 and A4 interfaces are displayed separately for 15 seconds, and then displayed in a loop.

- A1 is the interface of remaining days in the service status, and 10 in 1-10 means there are 10 remaining service days. The indicator lights on and the other indicators light off.
- A2 is the interface of current pressure value in the service status, and 0.10 means that current pressure value in service status is 0.10MPa, is pressure unit, "MPa" lights on and the other indicators light off.
- A3 is time of day display interface in the service status, and 12:30 means that the current time is 12:30, ":" flashes.
- A4 is the display interface of the rinsing time in the service status, means rinsing time is 02:00, ":" is always displayed.

Operations of switching to other status operation under filter status.

- a) In the filter status, when the inlet water pressure reaches or exceeds the set value and this condition lasts for 1 minute or longer, the valve will switch from filtering to backwashing.
- b) In the unlocked filter status, press the manual button to switch the valve from the filter status to the backwash status.
- c) In the unlocked filter status, press the manual button to switch the valve from filter status to waste status.
- d) In the unlocked filter status, press the manual button to switch the valve from the filter status to the recirculation status.
- e) In the unlocked filter status, press the manual button to switch the valve from the filter status to the closed status.

③Backwash status display

B1



B2

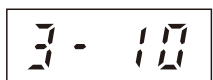
In backwash status, the B1 and B2 interfaces will be displayed separately for 15 seconds, and then displayed in a loop.

- a) B1 is the display interface for remaining minutes at the backwash status, and 10 in 2-10 means there are remaining 10 minutes at the backwash status. The minute indicator  lights on and other indicators lights off. When the time is less than 1 minute, the time is accurate to 0.1 minute.

- b) B2 is the current time display interface of the backwash status, and 12:30 means that the current time is 12:30, ":" flashes.

Operations of switching to rinse status under backwash status

In the unlocked backwash status, shortly press the manual button to switch from the backwash status to the rinse status.

④Display of rinse status

C1



C2

In the rinse status, the C1 and C2 interfaces will be displayed separately for 15 seconds, and then displayed in a loop.

- a) C1 is the display interface for remaining minutes at rinse status, and 10 in 3-10 means there are 10 minutes left at the rinse status. The minute indicator  lights on and the other indicators lights off. When the time is less than 1 minute, the time is accurate to 0.1 minute.

- b) C2 is the current time display interface of rinse status, and 12:30 means that the current time. ":" flashes.

Operations of switching to filter status under rinse status

In the unlocked rinse status, press the manual button to switch from the rinse status to the filter status.

Working process:

Filter→Backwash→Rinse→Filter

⑤Display of waste status

- a) The four-digit nixie tube displays the current time interface under waste status, with the ":" flashing.

- b) Waste indicator lights on and the other indicators light off.

- c) Switch from other status to the waste status, the four-digit nixie tube displays the D2 interface when the motor rotates, and the waste indicator flashes before reaching waste status. When the waste status is reached, the waste indicator lights on, other indicators lights off.

Operations of switching to other status under waste status.

- a) In the unlocked waste status, press the manual button to switch from the waste status to the filter status.

- b) In the unlocked waste status, press the recirculation button to switch the valve from the waste status to the recirculation status.

- c) In the unlocked waste status, press the closed button to switch the valve from the waste status to the closed status.

⑥Display of recirculation status

- a) The four-digit nixie tube at the recirculation status displays the current time interface. ":" flashes.

- b) Recirculation indicator lights on and the other indicators light off.

- c) Switch from other status to the recirculation status, the four-digit nixie tube displays the D2 interface when the motor rotates, and the recirculation indicator flashes before reaching the recirculation status. When the recirculation status is reached, the recirculation indicator lights on, other indicators light off.

Switch to other status operation under recirculation status.

- a) In the unlocked recirculation status, press the manual button to switch from the recirculation to the filter status.

b) In the unlocked recirculation status, press the waste button to switch the valve from the recirculation status to the waste status.

c) In the unlocked recirculation status, press the closed button to switch the valve from the recirculation status to the closed status.

⑦Display of closed status

a) The four-digit nixie tube at the closed status displays the current time interface. ":" flashes.

b) Closed indicator lights on and the other indicators light off.

C) Switch from other status to the closed status, the four-digit nixie tube displays the D2 interface when the motor rotates, and the closed indicator flashes before reaching the closed status. When the closed is reached, the closed indicator lights on, other indicators light off.

Operations of switching to other status operation under closed status.

a) In the unlocked closed status, press the manual button to switch from the closed to the filter status.

b) In the unlocked closed status, press the waste button to switch the valve from the closed status to the waste status.

c) In the unlocked closed status, press the closed button to switch the valve from the closed status to the recirculation status.

⑧Display of the motor rotating



D1



D2

Switching to backwash status under filter status or from rise to filter, display D1 when the motor is rotating; from other status switch to next status, display D2 when the motor is rotating.

2.2. Parameter setting

When the button lock indicator lights on, press and hold ▼ and ▲ for 5 seconds to unlock, and then press [Enter] to enter program inquiry mode. Press ▼ or ▲ to inquiry corresponding parameters according to the following sequence (press [Exit] to exit program inquiry mode).

In program inquiry mode, press [Enter] to enter program set mode.

Item	Process steps	Symbol
Time of Day	When time of day "12:12" flashes continuously, it reminds to reset. Under unlock state: 1.Press [Enter] to enter time of day inquiry as Figure S1 shows, then press [Enter] to enter time of day set mode, the hour value flashes, press ▼ or ▲ to adjust the time of day hour value. 2.Press [Enter] again, the minute value flashes, press ▼ or ▲ to adjust the time of day minute value. 3.Press [Enter], then finish adjustment, then press [Exit] to turn back.	 S1
Rinsing Time	1.In program inquiry mode, press ▼ or ▲ to select rinsing time inquiry as Figure S2 shows, and it displays "02:00". Press [Enter] to enter the rinsing time set mode, the default 02 hour value flashes, press ▼ or ▲ to adjust the rinsing time hour value. 2.Press [Enter] again, the default 00 minute value flashes, press ▼ or ▲ to adjust the rinsing time minute value. 3.Press [Enter], then finish adjustment, then press [Exit] to turn back.	 S2
Rinsing Frequency	1.In program inquiry mode, press ▼ or ▲ to select rinsing frequency inquiry as Figure S3 shows, and it displays "F-00". Press [Enter] to enter the rinsing frequency set mode, the default 00 flashes, press ▼ or ▲ to adjust the rinsing frequency value. 2.Press [Enter] and hear a sound "Di", then finish adjustment, press [Exit] to turn back.	 S3
Service Day	1.In the program inquiry mode, press ▼ or ▲ to select the filter days inquiry as Figure S4 shows, and "1-10" is displayed. Press [Enter] to enter filter days set status, the default 10 flashes. 2.Press ▼ or ▲ to adjust filter days; 3.Press [Enter], then finish adjustment, then press [Exit] to turn back.	 S4
Rinsing Pressure	1. In the program inquiry mode, press ▼ or ▲ to select the rinsing pressure inquiry as Figure S5 show, and "0.20" is displayed. Press [Enter] to enter the rinsing pressure set mode, the default 0.20MPa flashes. 2. Press ▼ or ▲ to adjust rinsing pressure. 3. Press [Enter], then finish adjustment, then press [Exit] to turn back.	 S5
Backwash Time	1.In the program inquiry mode, press ▼ or ▲ to select the backwash time inquiry as Figure S6 shows, and "2-10" is displayed. Press [Enter] to enter the backwash time set mode, the default 10 flashes. 2.Press ▼ or ▲ to adjust backwash time. 3.Press [Enter], then finish adjustment, then press [Exit] to turn back. Note: When the time is less than 1 minute, the time is accurate to 0.1 minute.	 S6

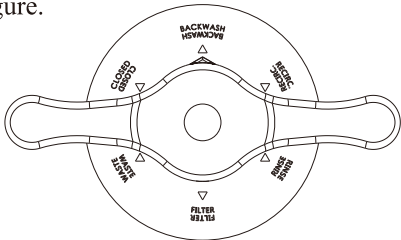
Rinse Time	1.In the program inquiry mode, press or to select the rinse time inquiry as Figure S7 shows, and "3-10" is displayed. Press to enter rinse time set mode, the default 10 flashes. 2.Press or to adjust the rinse time. 3.Press , then finish adjustment, then press to turn back. Note: When the time is less than 1 minute, the time is accurate to 0.1 minute.	 S7
Valve Address	1.In the program inquiry mode, press or to select the valve address inquiry as Figure S8 shows, and "1" is displayed. Press to enter valve address set mode, the default slave valve address 1 flashes. 2.Press or to adjust the valve address. 3.Press , then finish adjustment, then press to turn back.	 S8

For example, backwash time of a filter valve is 10 minutes. After each rinsing, if the turbidity of outlet water is higher than normal at the beginning of filter status, indicating that there is not enough time for backwash. It needs to lengthen the backwash time to 15 minutes, the modification steps as follows:

- ①Press and hold and to unlock the button (the buttons lock indicator lights off).
- ②Press key, the last decimal point of the four-digit nixie tube lights on.
- ③Press or continuously until the four-digit nixie tube displays "2-10", and M indicator lights on.
- ④Press , 10 flashes.
- ⑤Press continuously until 10 is changed to 15.
- ⑥Press the again, there is a sound "Di" and the number will stop flashing, and program back to enquiry status.
- ⑦If you want to modify other parameters, you can repeat the steps from 3 to 6; if you don't, press the key and quit from the inquiry status, the display will show the current service status.

2.3. Usage of Manual Handle

During operation of manual control valve F139AS, rotate the manual handle to make the pointer point to the relevant position to realize Filter, Backwash, Rinse, Waste, Recirculation and Closed as below figure.

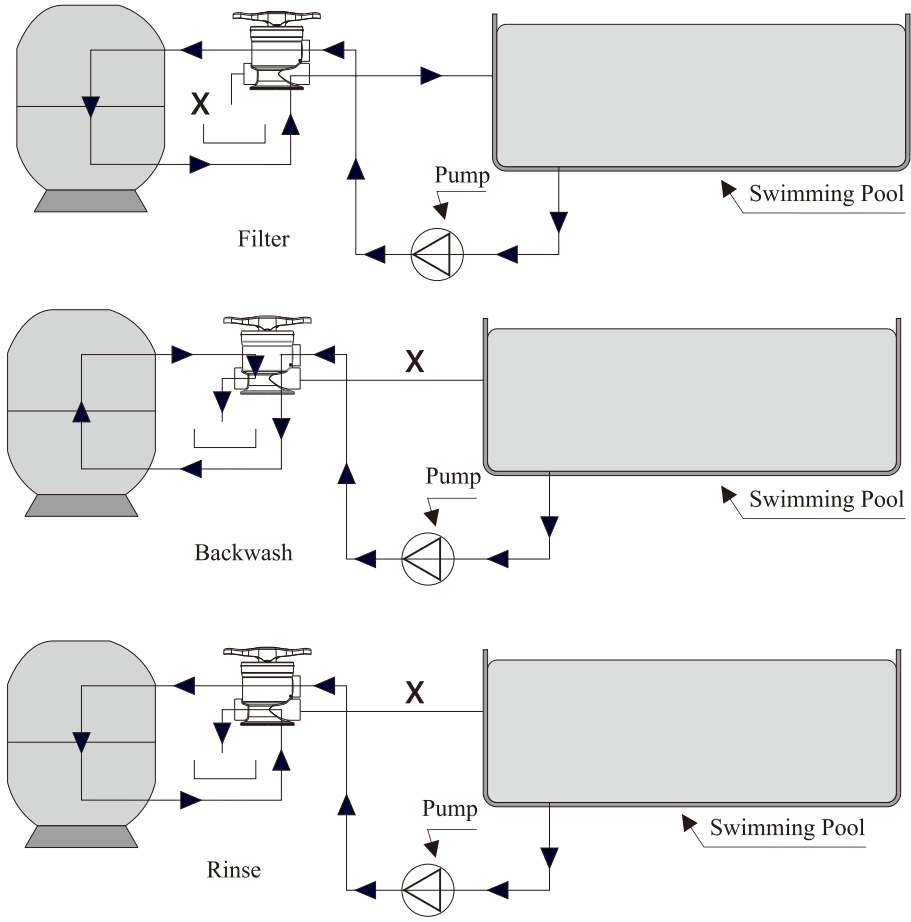


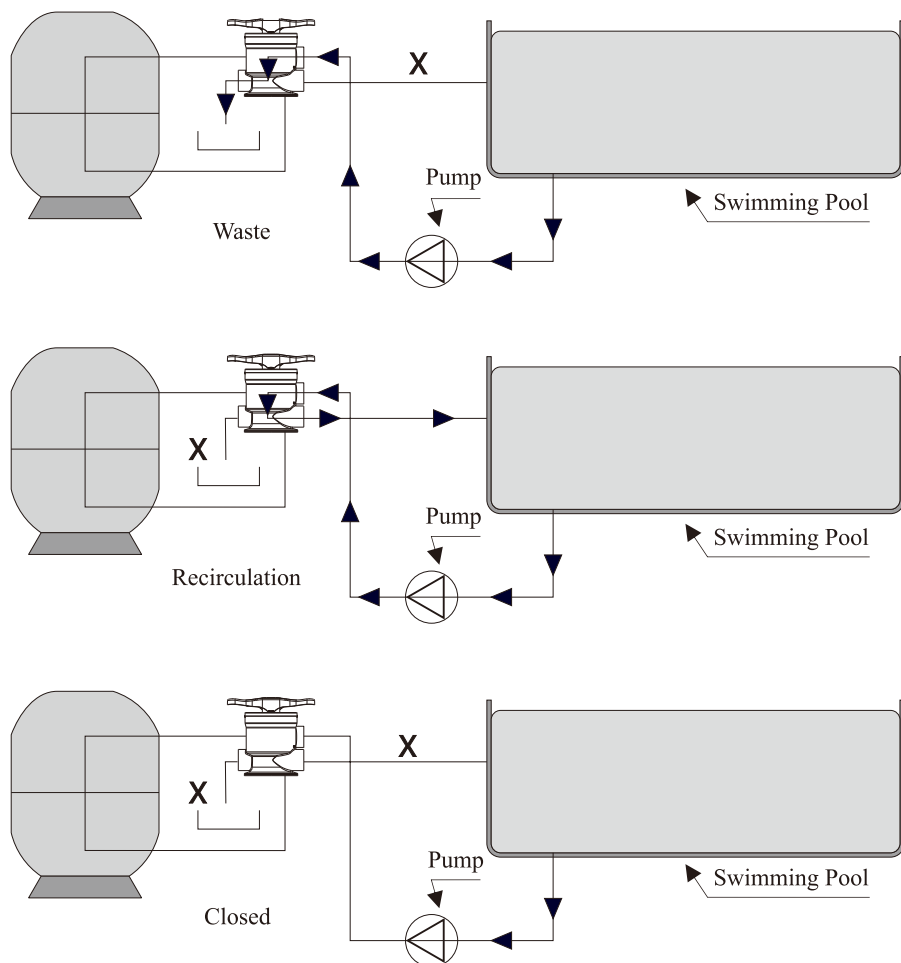
Meanings of Figures on F139AS Decorative Cover

English	Description
FILTER	Filter Status
BACKWASH	Backwash Status
RINSE	Rinse Status
WASTE	Waste Status
RECIRC.	Recirculation Status
CLOSED	Closed Status

3. Applications

3.1.Filter Flow Chart





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 Figure 3-1:

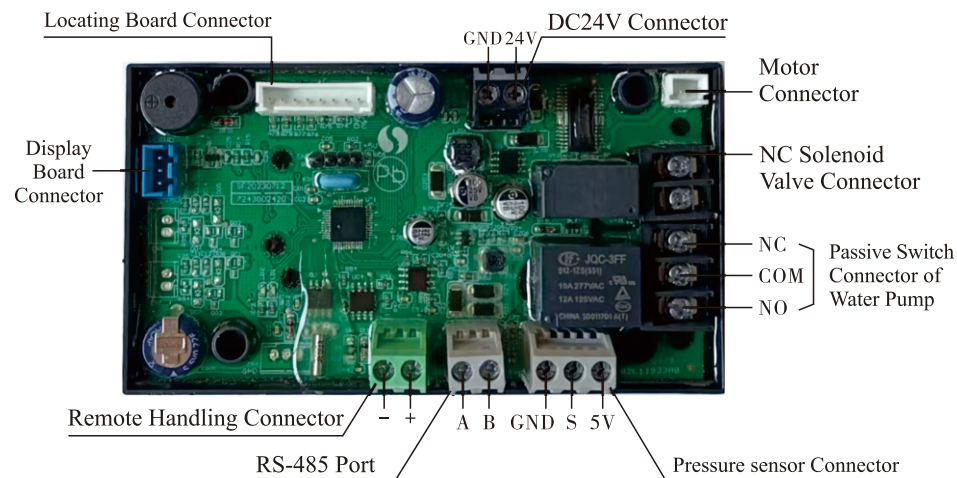


Figure 3-1

A.Remote Handling Connector

When the system needs to be rinsed, it can rinse immediately through remote control port on the main board. After receiving the signal, this port is equivalent to pressing the manual button. The wiring is as below Figure 3-2:



GND DC5-24V

Figure 3-2 Wiring of Remote Handling Connector

B. Passive Switch Connector of Water Pump

When the system needs to connect the water pump, it can be connected to passive switch connector of water pump, passive switch connector of water pump is passive signal (dry contact signal), NC with COM represent normally close, NO with COM represent normally open. The wiring is as below Figure 3-3:

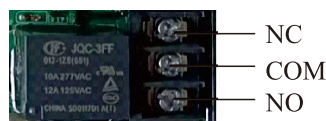


Figure 3-3 Wiring of Passive Switch Connector of Water Pump

Wiring method when the power of 220V water pump is below 1000W:

The AC 220V L-line is connected to the COM, the 220V water pump L-line is connected to the NO, and the AC 220V N-line is directly connected to the 220V water pump N-line

When the power of the 220V water pump is greater than 1000W, an intermediate relay or contactor should be added

C. RS-485 Communication between PLC and Single Valve

RS-485 communication between PLC and single valve. The wiring refers to Figure 3-4.

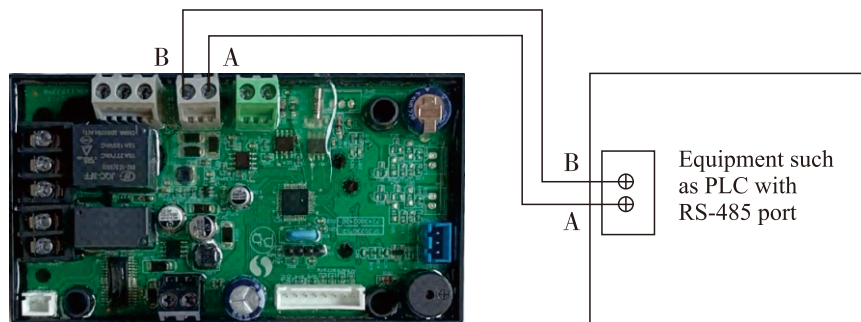


Figure 3-4 RS-485 Wiring diagram between PLC and Single Valve

Instruction:

- 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 cables for connection.
- 3) In case of far communication distance, a 120Ω1/4W 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.

D. RS-485 Communication among PLC and Multi-Valves

RS-485 communication among PLC and multi-valves. The wiring refers to Figure 3-5.

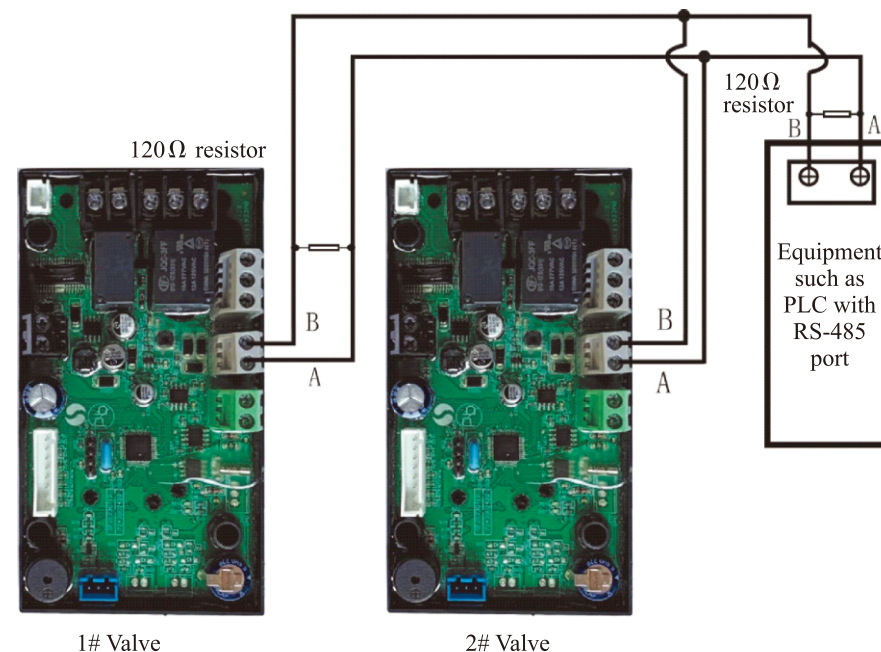


Figure 3-5 RS-485 Wiring diagram among PLC and Multi-Valves

Instruction:

- 1) RS-485 port A and B of PLC are respectively connected to RS-485 port A and B of 1# valve. It is as the main wire. Port A and B of 2# valves and other valves are directly connected to A and B main wire in parallel.
- 2) In case of far communication distance, a 120Ω1/4W resistor should be connected in parallel to RS-485 port A and B of PLC as well as port A and B of 1# valve. There is no required to connect resistor for port A and B of 2# and other valves.
- 3) RS-485 main communication wire can be connected with 32 sets of RS-485 valves or equipment at most. If connecting more RS-485 valves, a 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.

E. NC Solenoid Valve Connector

NC solenoid valve connector receives passive signal, which connects the positive pole or GND of the external DC normal closed solenoid valve. When control valve is in the backwash, rinse, motor rotation and waste positions, the water inlet is connected with

water outlet. If there is water at inlet and the system is powered off, water will always be discharged from the water outlet during backwash, rinse, motor rotation and waste. This will cause waste of water resources. The solenoid valve connector is designed to prevent this phenomenon.

3.3. RS-485 Port

A. RS-485 communication protocol

- 1) 485 communication protocol: It adopts international MODBUS RTU.
- 2) Information transmission: Half-duplex mode, in bytes.
- 3) Transmission speed: fixed 9600bps 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.

B. Read control valve on-site data (0x03)

The equipment such as PLC is the master, the valve is the slave, the data of slave valve can be read from PLC.

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

MODBU Address	Instruction	Unit	Data Definition	Comment
0x2003	Backwash / rinse remaining Time	Second	0 ~ 5940	Read backwash / rinse remaining time
0x2004	Remaining Time	Day	0 ~ 99	Read service remaining day
0x2005	Fault Status	/	0x0000: Normal 0x0001: E1 0x0002: E2 0x0003: E3 0x0004: E4	Read valve status
0x2007	Current Status	/	0x0001: Filter 0x0003: Backwash 0x0007: Rinse 0x0009: Waste 0x000A: Recirculation 0x000B: Closed 0x0010: Switching	Read the current status of valve

0x2008	Inlet Pressure	MPa	0~0.60	Read the inlet pressure value.
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C. Write Data for Valve (0x10)

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

MODBU Address	Instruction	Unit	Data Definition	Comment
0x3018	Switch working position	/	0~1 Variation	Filter, backwash, rinse status switching, forced rinsing

3.4. Product System Configuration and Flow Rate Curve

A.Product Configuration

Product configuration with tank, filter material:

Tank Size	Weight of Filter Material	Sand Filter		Suitable valve			
		Filtering Flow Rate	Backwash Flow Rate				
mm	kg	m ³ /h	m ³ /h				
φ 1100	900	38	40	/	F152B-1	/	/
φ 1000	600	33	35	/		/	/
φ 900	350	30	31	/		F152C	/
φ 800	250	25	26	/			F139B-3
φ 700	210	19	21	/	F139AS F139A F139B-1 F139B-2 F139C	/	
φ 635	155	16	17	/		/	/
φ 534	85	12	12	F138C		/	/
φ 454	40	8	8			/	/
φ 410	30	6	7			/	/

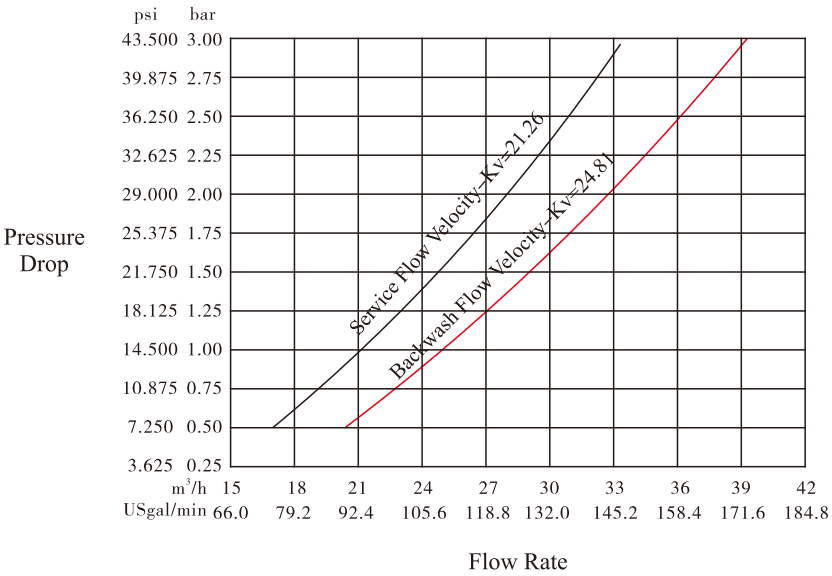
Remark:

●When configuring tanks with different diameters, it need to control the flow rate of filtering and backwash. The specific values are shown in the above table. A flow control can be added on the water outlet for "Filtering Flow Rate", and add a flow control at the drain for "Backwash Flow Control".

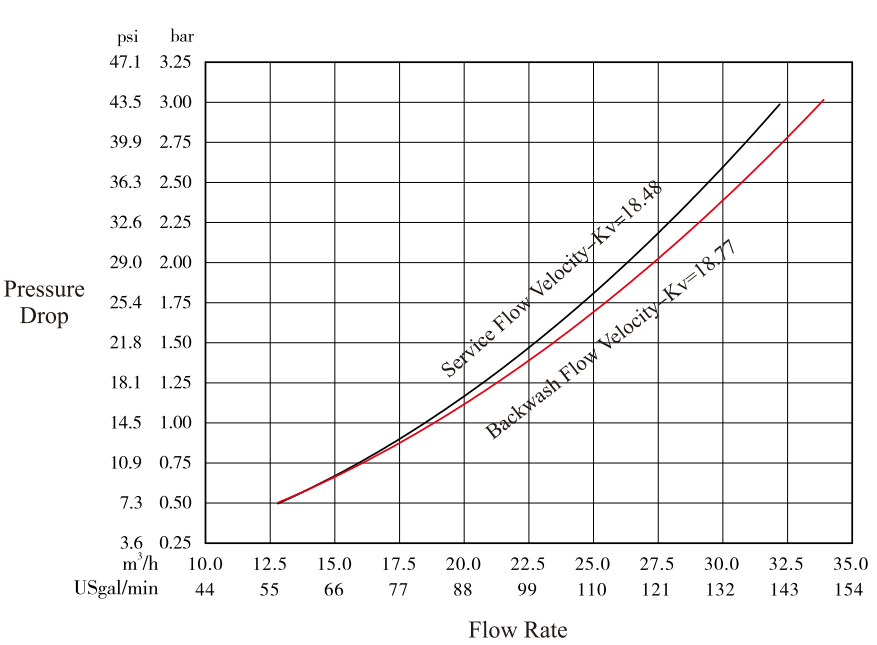
●If the flow rate of backwash exceeds the value specified by the corresponding tank, the filter material (quartz sand) will be rushed from the tank, and then flow out from the drain port!

B.Flow Rate Characteristics

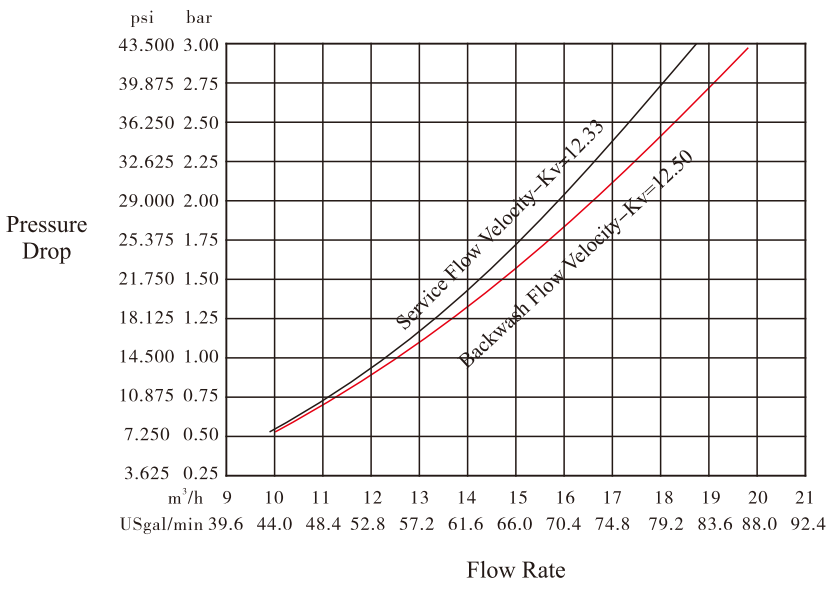
1). F139A/B Pressure-flow rate curve



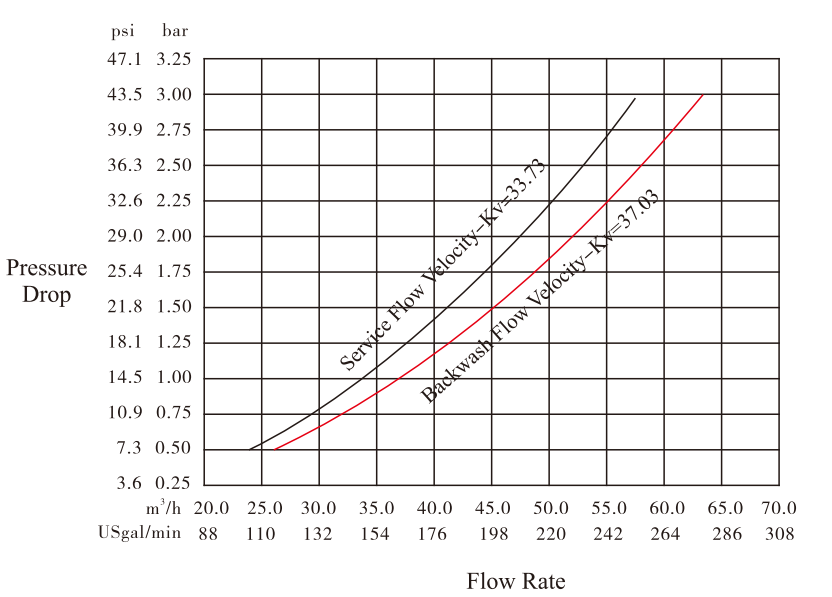
2). F139C Pressure-flow rate curve



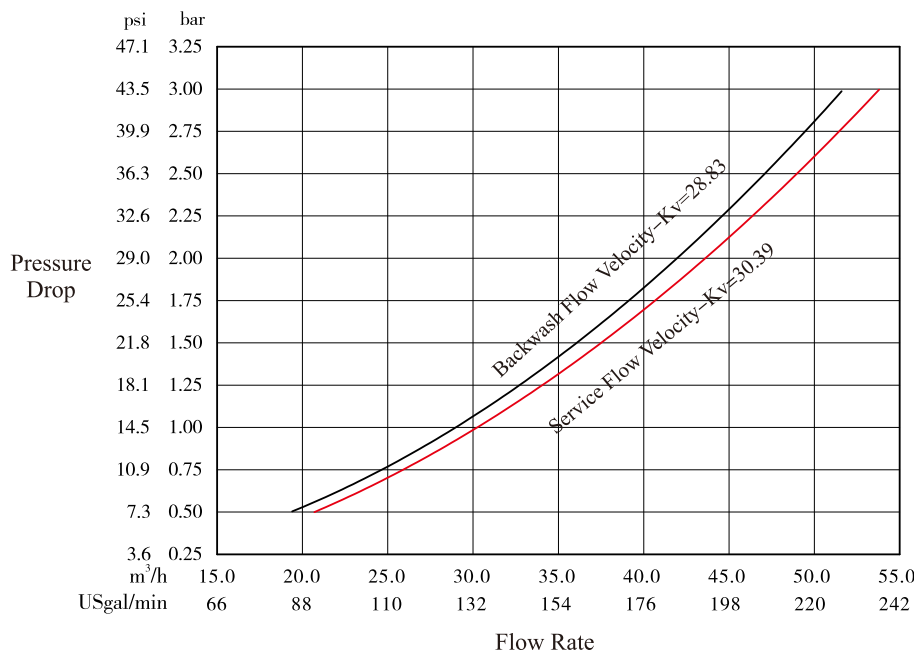
3). F138 Pressure-flow rate curve



4). F152B Pressure-flow rate curve



5). F152C Pressure-flow rate curve



3.5.Trial Running (Take F139A as an example)

1. After power on and setting up relevant parameters of the control valve, please conduct the trial running as follows:

A. Press and enter into Backwash position, and slowly open the inlet "valve B" as "Figure 1-3" shows to the 1/4 position, making the water flows into the tank. You can hear the sound of air-out from the drain pipeline. After all air is out of pipeline, then open inlet "valve B" completely and clean the filter materials in the tank until the outlet water is clean (It can be observed from the transparent joint of the drain). It will take 8~10 minutes to finish the whole process.

B. Press , turning the position from Backwash to Rinse, It will take 10~15 minutes to finish the whole process.

C. Take out some outlet water for testing: if the water reaches the requirement, press to finish the Rinse; then the control valve will turn to Filter Status.

Note: In the process of rinsing, the program will be finished automatically in accordance with the setting time; press , it can end one step in advance and proceed to the next step.

Note:

- If water inflows too fast, the filter material in tank will be damaged. When water inflows slowly, there is a sound of air emptying from drain pipeline.
- After changing the filter materials, please operate from steps A to C.
- In the process of trial running, please check the water situation in all position, and ensure there is no filter materials leakage.
- The time for Backwash and Rinse can be set and executed according to the suggestions from the control valve suppliers.

2.The function of the pressure sensor:

For example, for the first time to load quartz sand or change sand, after steps A to C, the actual pressure of the control valve is 0.15MPa. If adjust the rinsing pressure of the control valve to 0.20MPa. when the tank is in the filter status for a long time, and the quartz sand is too dirty, the pressure of filter tank increases to 0.22MPa (greater than or equal to "rinsing pressure set value 0.20MPa") **and lasts for 1 minute**. At this time, the control valve will immediately turn from the filter status to backwash status, after completing the set time of backwash, it will then switch from the backwash status to the rinse status, finally the valve will turn from rinse status to filter status.

Note:

- Rinsing pressure value (factory default is 0.20MPa), please readjust according to user needs before use.

3.6. Trouble-shooting**A.Control Valve Fault**

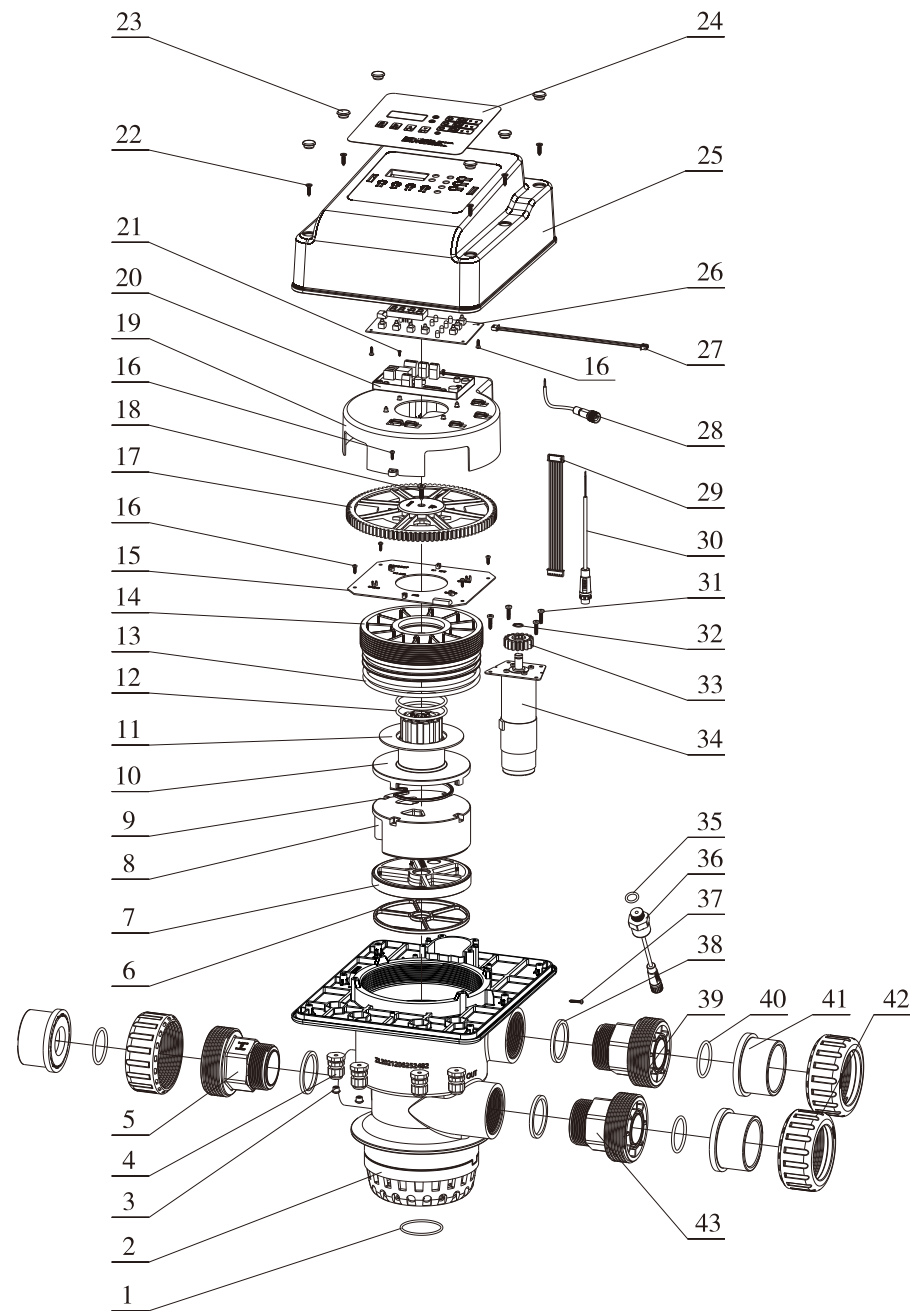
Problem	Cause	Correction
1.Filter fails to rinse.	A. Pressure sensor sets are broken. B. The rinse time is not set correctly. C. The main board is damaged.	A. Change pressure sensor set. B. Reset time. C. Replace the main board.
2.Filter supplies raw water.	A. Riser pipe leaks. B. Interval valve leaks.	A. Make sure riser pipe and O-ring are not cracked. B. Check or change valve body.
3.Water pressure is lost.	A. Iron is massed in the water supply pipe. B. Iron is massed in the filter.	A. Clean the water supply pipeline. B. Clean valve and add filter materials cleaning chemical, increase frequency of rinsing.
4.Loss of filter materials through drain line.	A. There is air in the system. B. The flow rate of backwash is too big.	A. Assure that well system is dry and has proper air eliminator control. B. Reduce the flow rate of backwash.
5.Control valve cycles continuously.	A. Wire of locating board breaks down. B.The controller is damaged. C. Foreign material stuck the driving gear.	A. Check and connect wire of locating board. B. Replace the controller C. Take out foreign material.
6. Drain flows continuously.	A. Internal valve leaks. B. Electricity fails to supply when the valve is in backwash or rinse status.	A. Check and repair valve body or replace it. B. Turn off bypass valve and restart when power on.

B.Controller Part

Problem	Cause	Correction
1.The nixie tube and indicator light on the display board.	A. Wire between display board and control board is damaged. B. The control board is damaged. C. The power adapter is damp or damaged. D. Unstable voltage E. The display board is damaged	A. Replace wire. B. Replace the control board. C. Check or replace the power adapter D. Check and adjust the power supply. E. Replace the display board.
2.No display on the display board.	A. Wire between display board and control board is damaged. B. Display board is damaged. C. The control board is damaged. D. The power adapter is damaged.	A. Replace wires. B. Replace display board. C. Replace control board. D. Check power adapter.
3.E1 Flashes.	A.Wire between locating board and control board is damaged. B. Locating board is damaged. C. Motor gear and big gear is damaged. D.The control board is damaged E.Wire between motor and control board is damaged. F. Motor is damaged.	A. Replace wires. B. Replace locating board. C. Check motor gear and big gear. D. Replace control board E.Replace wire between motor and control board. F. Replace the motor
4.E2 Flashes.	A. Wire between locating board and control board is damaged. B. The locating board is damaged. C.The control board is damaged.	A. Replace wire B. Replace locating board. C. Replace control board.
5.E3 or E4 Flashes.	A.The control board is damaged.	A.Replace the control board.
6.RS-485 Cannot communicate	A. Wrong wiring of the RS-485. B. The valve address of PLC and other equipment is set incorrectly.	A. Check and reconnect the wire of the RS-485. B. Check and reset the address of PLC and other equipment.

3.7.Assembly & Parts

F139A, F139B-1, F139B-2, F139B-3 Valve Body Assembly

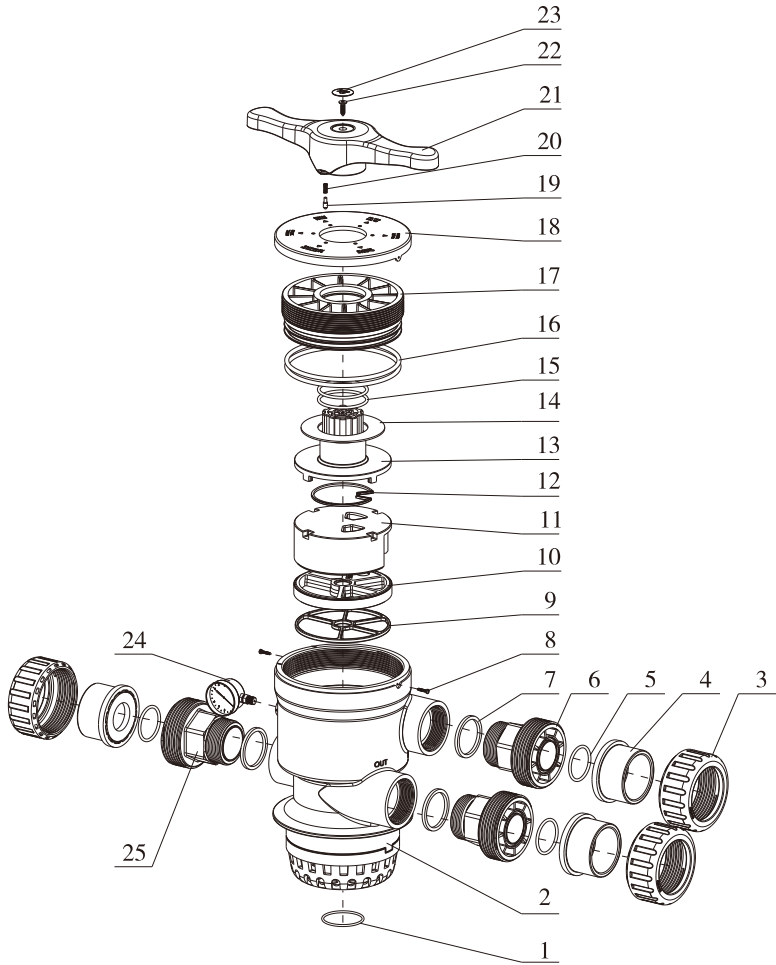


F139A, F139B-1, F139B-2, F139B-3 Valve Body Components:

Item No.	Description	Part No.	Quantity	Item No.	Description	Part No.	Quantity
1	O-ring 50.47×2.62 (Chinese standard)	8378308	1	15	Locating board	6380087	1
	O-ring 47.7×3.55 (US standard)	8378124		16	Screw, cross ST2.9×9.5	8909008	9
	F139B-3 O-ring 50.47×2.62 (Chinese standard)	8378163		17	Big gear	8241040	1
	F139B-3 O-ring 47.7×3.55 (US standard)	8378110		18	Screw, Cross ST4.8×19	8909018	1
2	F139A Valve body (Chinese standard)	5022210	1	19	Fixed base	8109168	1
	F139A Valve body (US standard)	5022210A		20	Control board	6382315	1
	F139B-1 Valve body (Chinese standard)	5022246		21	Screw, Cross ST2.2×6.5	8909004	2
	F139B-1 Valve body (US standard)	5022246A		22	Screw, Cross ST3.9×16	8909014	6
	F139B-2 Valve body (Chinese standard)	5022261		23	Decorative Cap	8084027	6
	F139B-2 Valve body (US standard)	5022261A		24	Label (Chinese)	8865198	1
	F139B-3 Valve body (Chinese standard)	5022262			Label (English)	8865688	
	F139B-3 Valve body (US standard)	5022262A		25	Dust cover	8005115	1
3	Plug	8323032	2	26	Display board	6381075	1
4	Cable gland	5457048	4	27	Wire for display board	5512001	1
5	Connector (transparent PC)	8458339	1	28	Wire for power	5513071	1
6	Seal ring	8370166	1	29	Wire for locating board	5511005	1
7	Fixed disk	8469126	1	30	Wire for pressure sensor	6386036	1
8	Moving disk	8459116	1	31	Screw, Cross ST3.9×16	8909044	4
9	Seal ring	8370018	1	32	Pin	8994009	1
10	Shaft	8258037	1	33	Small gear	8241008	1
11	Anti-friction washer	8216028	1	34	Motor	6158038	1
12	O-ring 59.92×3.53	8378110	2	35	O-ring 12.5×2.65	8378442	1
13	O-ring 142.24×5.33	8378245	2	36	Wire for pressure sensor	6386035	1
14	Fitting nut	8092043	1	37	Screw, cross ST2.9×16	8909010	3

38	Seal washer	8371050	3	42	Animated nut	8947029	1
39	Connector (ABS+GF10)	8458356	1	43	Connector	8458318	1
40	O-ring 47.7×3.55	8378124	3				
41	Connector (Chinese standard)	8457276	3				
	Connector (US Standard)	8458417					

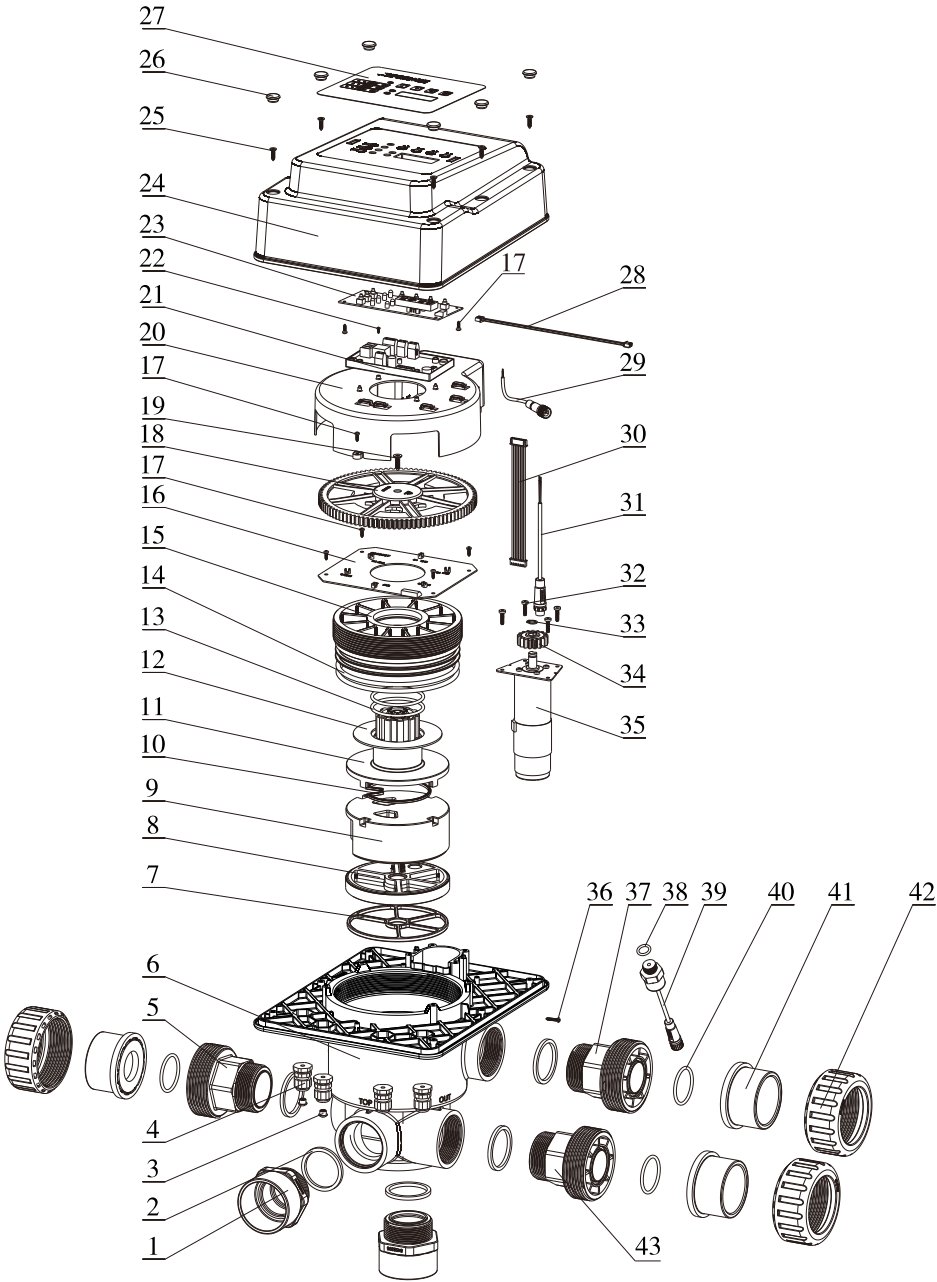
F139S Valve Body Assembly:



F139S Valve Body Components:

Item No.	Description	Part No.	Quantity	Item No.	Description	Part No.	Quantity
1	O-ring 50.47×2.62 Chinese standard	8378308	1	12	Seal washer	8370018	1
	O-ring 47.7×3.55 US standard	8378124		13	Shaft	8258037	1
2	Valve body (Chinese standard)	5022222	1	14	Anti-friction washer	8216028	1
	Valve body (US standard)	5022222A	1	15	O-ring 59.92×3.53	8378110	2
3	Animated nut	8947029	3	16	O-ring 142.24×5.33	8378245	2
4	Connector (Chinese standard)	8457276	3	17	Fitting nut	8092043	1
	Connector (US Standard)	8458417		18	Decorative cover	8444038	1
5	O-ring 47.7×3.55	8378124	3	19	Locating Part	8271012	1
6	Connector (ABS+GF10)	8458318	2	20	Spring	8282002	1
7	Seal washer	8371050	3	21	Manual handle	8253094	1
8	Screw, cross ST2.9×16	8909010	2	22	Screw, Cross ST4.8×19	8909018	11
9	Seal ring	8370166	1	23	Logo	8860029	1
10	Fixed disk	8469126	1	24	Pressure gauge	8342001	1
11	Moving disk	8459116	1	25	Connector (Transparent PC)	8458339	1

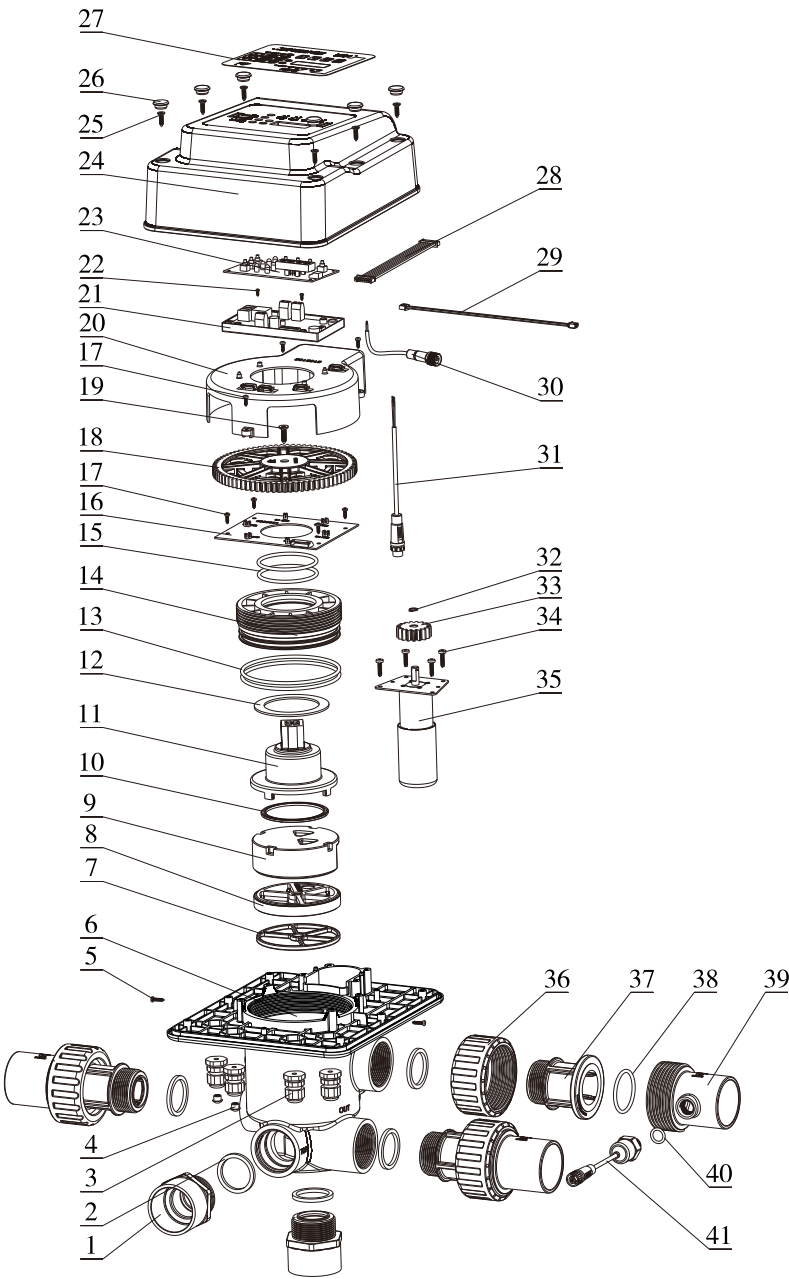
F139C Valve Body Assembly:



F139C Valve Body Components:

Item No.	Description	Part No.	Quantity	Item No.	Description	Part No.	Quantity
1	Connector	8458396	2	24	Dust cover	8005115	1
2	Seal washer	8371050	5	25	Screw, Cross ST3.9×16	8909014	6
3	Plug	8323032	2	26	Decorative Cap	8084027	6
4	Waterproof Connector	5457048	4	27	Label (Chinese)	8865198	1
5	Connector	8458339	1		Label (English)	8865688	
6	Valve body	8022307	1	28	Wire for display board	5512001	1
7	Seal ring	8370166	1	29	Wire for power	5513071	1
8	Fixed disk	8469126	1	30	Wire for locating board	5511005	1
9	Moving disk	8459116	1	31	Wire for pressure sensor	6386036	1
10	Seal ring	8370018	1	32	Screw, cross ST3.9×16	8909044	4
11	Shaft	8258037	1	33	Clip	8994009	1
12	Anti-friction washer	8216028	1	34	Small gear	8241008	1
13	O-ring 59.92×3.53	8378110	2	35	Motor	6158038	1
14	O-ring 142.24×5.33	8378245	2	36	Screw, cross ST3×16	8909010	2
15	Fitting nut	8092043	1	37	Connector	8458356	1
16	Locating board	6380087	1	38	O-ring 12.5×2.65	8378442	1
17	Screw, cross ST2.9×9.5	8909008	9	39	Wire for pressure sensor	6386035	1
18	Gear	8241040	1	40	O-ring 47.7×3.55	8378124	3
19	Screw, cross ST5×20	8909018	1	41	Connector (Chinese standard)	8457276	3
20	Fixed base	8109168	1		Connector (US standard)	8458417	
21	Control board	6382315	1	42	Animated nut	8947029	3
22	Screw, Cross ST2.2×6.5	8909004	2	43	Connector	8458318	1
23	Display board	6381075	1				

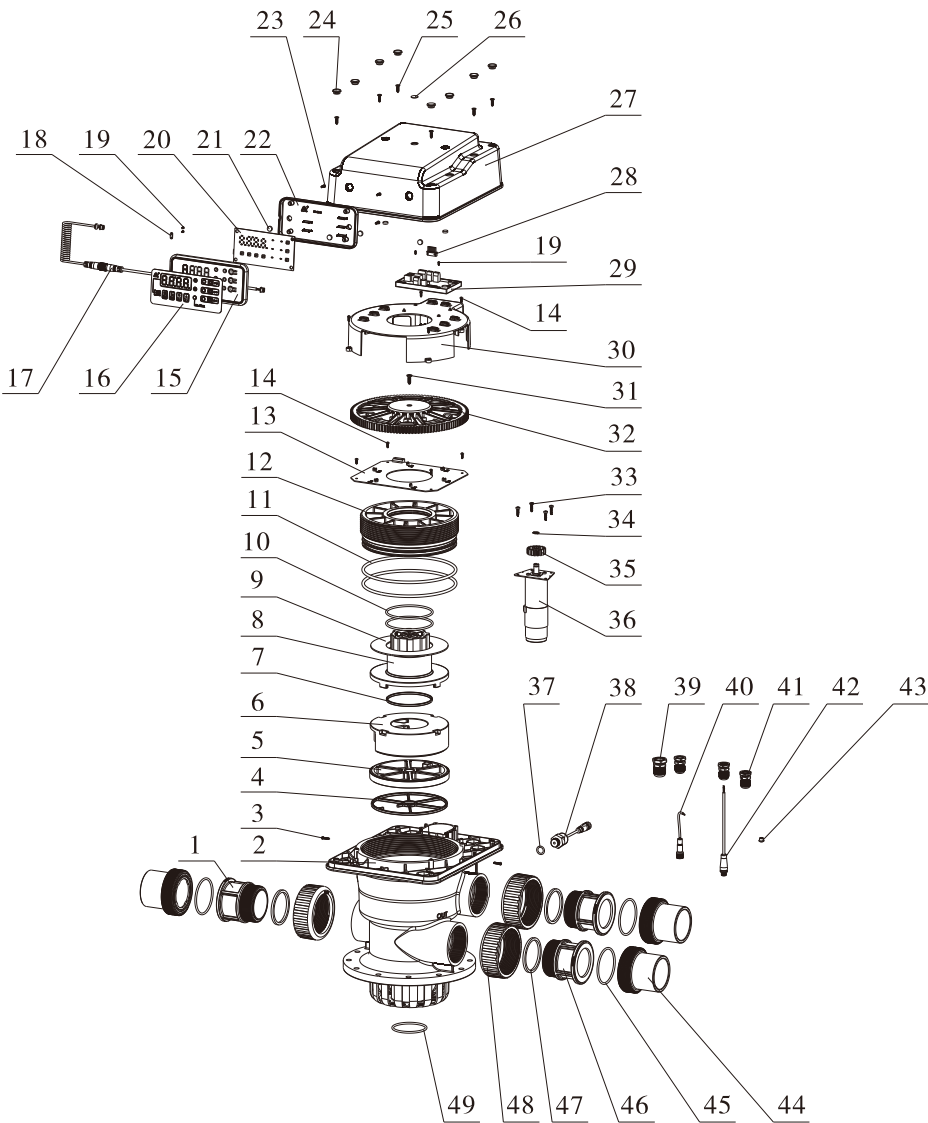
F138C Valve Body Assembly:



F138C Valve Body Components:

Item No.	Description	Part No.	Quantity	Item No.	Description	Part No.	Quantity
1	Connector	8458382	2	24	Dust cover	8005143	1
2	Seal washer	8371030	5	25	Screw, Cross ST3.9×16	8909014	6
3	Cable gland	5457048	4	26	Decorative cap	8084027	6
4	Plug	8323032	2	27	Label (Chinese)	8865210	1
5	Screw, Cross ST2.9×13	8909023	2		Label (English)	8865725	1
6	Valve body	8022299	1	28	Wire for locating board	5511005	1
7	Seal ring	8370175	1	29	Wire for display board	5512001	1
8	Fixed disk	8469130	1	30	Wire for power	5513071	1
9	Moving disk	8459120	1	31	Wire for pressure sensor	6386036	1
10	Moving seal ring	8370023	1	32	Pin	8994026	1
11	Shaft	8258051	1	33	Small gear	8241054	1
12	Anti-friction washer	8216006	1	34	Screw, Cross ST3.9×16	8904044	4
13	O-ring 103×3.55	8378130	2	35	Motor	6158081	1
14	Fitting nut	8092055	1	36	Animated nut	8947028	3
15	O-ring 59.92×3.53	8378110	2	37	Connector (ABS+GF10)	8458377	2
16	Locating board	6380091	1		Connector (transparent PC)	8458378	1
17	Screw, Cross ST2.9×9.5	8909008	7	38	O-ring 41.7×3.5	8378201	3
18	Gear	8241068	1	39	Connector	8458379	2
19	Screw, Cross ST4.8×19	8909018	1		Connector (with thread)	8458380	1
20	Fixed base	8109192	1	40	O-ring 12.5×2.65	8378442	1
21	Control board	6382315	1	41	Wire for pressure sensor	6386035	1
22	Screw, Cross ST2.2×6.5	8909004	1				
23	Display board	6381083	1				

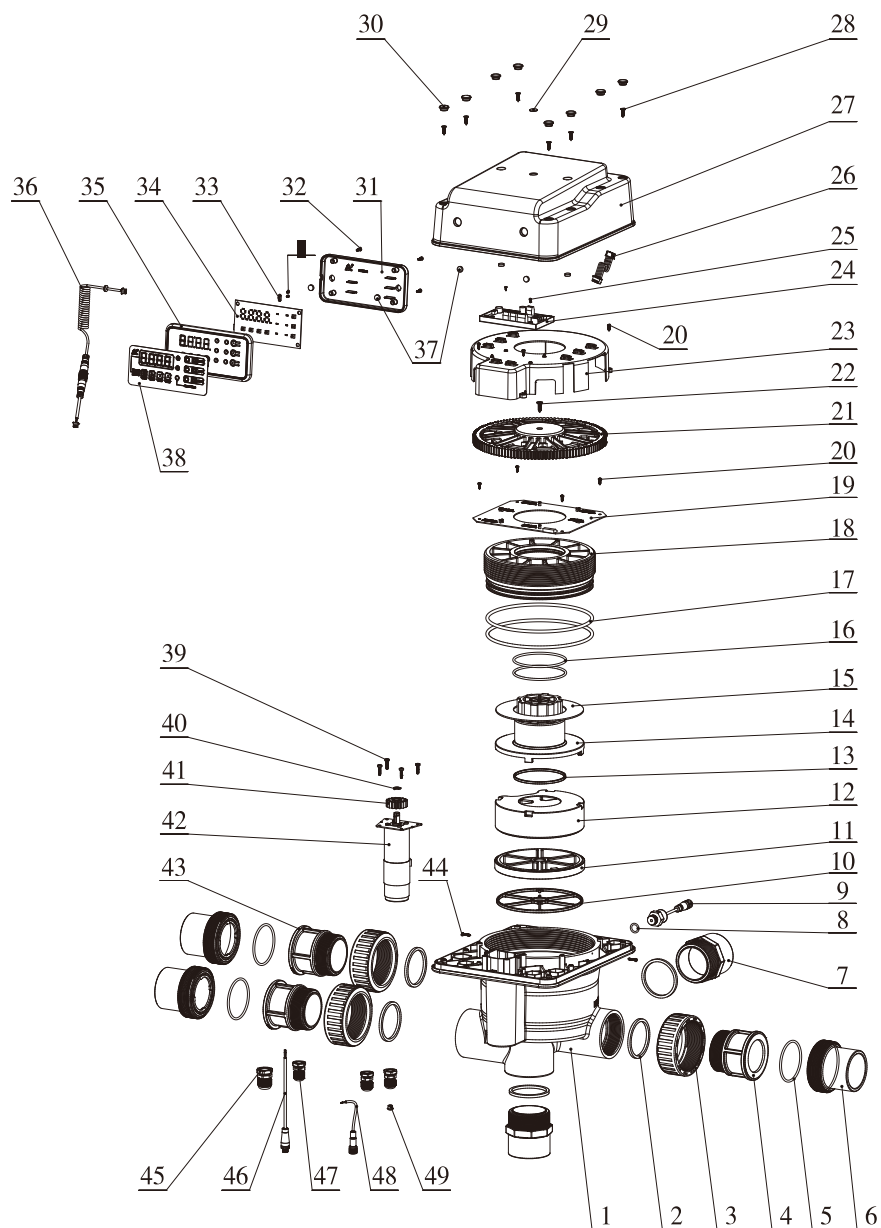
F152B-1 Valve Body Assembly:



F152B-1 Valve Body Components:

Item No.	Description	Part No.	Quantity	Item No.	Description	Part No.	Quantity
1	Connector	8458464	1	25	Screw, cross ST3.9×16	8909014	6
2	Valve body (US standard)	5022317A	1	26	Logo	8860024	1
	Valve body (Chinese standard)	5022317		27	Dust cover	8005190	1
3	Screw, Cross ST2.9×16	8909010	2	28	Wire for Locating board	5511005	1
4	Seal ring	8370223	1	29	Control board	6382315	1
5	Fixed disk	8469171	1	30	Fixed base	8109262	1
6	Moving disk	8459148	1	31	Screw, cross ST4.8×19	8909018	1
7	Moving Seal ring	8370184	1	32	Gear	8241075	1
8	Shaft	8258068	1	33	Screw, cross ST3.9×16	8909044	4
9	Anti-friction washer	8216070	1	34	Pin	8994009	1
10	O-ring 90×3.55	8378180	2	35	Small gear	8241008	1
11	O-ring 180 × 5.30	8378502	2	36	Motor	8158038	1
12	Fitting nut	8092077	1	37	O-ring 12.5×2.65	8378442	1
13	Locating board	6380098	1	38	Wire for pressure sensor	6386035	1
14	Screw, cross ST2.9×9.5	8909008	8	39	Waterproof connector	5457168	1
15	Front cover	8300089	1	40	Wire for power	5513071	1
16	Label	8865255	1	41	Waterproof connector	5457048	3
17	Wire for display board	5512043	1	42	Wire for pressure sensor	6386036	1
18	Wire clip	8126001	1	43	Plug	8323032	1
19	Screw, cross ST2.2×6.5	8909004	4	44	Connector	8458465	3
20	Display board	6381123	1	45	O-ring 69×3.55	8378171	3
21	Magnet	8610013	6	46	Connector	8458463	2
22	Cover	8315342	1	47	Seal washer	8371131	3
23	Screw, cross ST2.9×13	8909023	4	48	Animated nut	8947007	3
24	Decorative Cap	8084027	8	49	O-ring 63×3.55 (Chinese standard)	8378163	1
					O-ring 59.92×3.53 (US standard)	8378110	

F152C Valve Body Components:



F152C Valve Body Components:

Item No.	Description	Part No.	Quantity	Item No.	Description	Part No.	Quantity
1	Valve Body	8022377	1	26	Wire for Locating board	5511005	1
2	Seal washer	8371131	5	27	Dust cover	8005192	1
3	Animated nut	8947007	3	28	Screw, cross ST3.9×16	8909014	6
4	Connector	8458464	1	29	Logo	8860024	1
5	O-ring	8378171	3	30	Decorative cap	8084027	8
6	Connector	8458465	3	31	Cover	8315342	1
7	Connector	8458517	2	32	Screw, cross ST2.9×13	8909023	4
8	O-ring 12.5×2.65	8378442	1	33	Wire clip	8126001	1
9	Wire for pressure sensor	6386035	1	34	Display board	6381123	1
10	Seal ring	8370223	1	35	Front cover	8300089	1
11	Fixed disk	8469171	1	36	Wire for display board	5512043	1
12	Moving disk	8459148	1	37	Magnet	8610013	6
13	Moving Seal ring	8370184	1	38	Label	8865255	1
14	Shaft	8258068	1	39	Screw, cross ST3.9×16	8909044	4
15	Anti-friction washer	8216070	1	40	Pin	8994009	1
16	O-ring	8378180	2	41	Small gear	8241008	1
17	O-ring	8378502	2	42	Motor	6158038	1
18	Fitting nut	8092077	1	43	Connector	8458463	2
19	Locating board	6380098	1	44	Screw, cross ST2.9×16	8909010	2
20	Screw, cross ST2.9×9.5	8909008	8	45	Waterproof connector	5457168	1
21	Gear	8241075	1	46	Wire for pressure sensor	6386036	1
22	Screw, cross ST4.8×19	8909018	1	47	Waterproof connector	5457048	3
23	Fixed base	8109262	1	48	Wire for power	5513071	1
24	Control board	6382315	1	49	Plug	8323032	1
25	Screw, cross ST2.2×6.5	8909004	4				

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 from the valve manufacturing date);
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 Control Valve for Swimming Pool System			
Model		Code of Valve Body		
Purchase Company Name		Tel/Cel.		
Problem				
Solution				
Date of Repairing		Date of Accomplishment		Maintenance Man Signature

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

End-user Company Name			Tel/Cel.	
Purchase Company Name			Tel/Cel.	
Model	Code of Valve Body			
Tank Size ϕ	$\times$	Filter Material	kg	Water Source: Ground-water ☐ Tap Water ☐
Service Time	D	Backwash Time	min	Rinse Time min
Problem Description				