SIFRA

Intelligent Flow Regulator

Date: Jul. 2023
Version: Ver. A (English)

SHINI

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1. General Description

Read this manual carefully before operation to prevent damage of the machine or personal injuries.

SIFR(A) series intelligent flow regulator is designed to work with water heater, water chiller or cooling tower that can connect with multiple mould interfaces. Its functions of temperature, flowrate monitoring and control can adapt to different working conditions.

Picture 1-1：Intelligent Flow Regulator SIFRA

1.1 Coding Principle

SIFR(A) - xx

→ The number of manifold loop*

→ Automatic

→ Shini Intelligent Flow Regulator
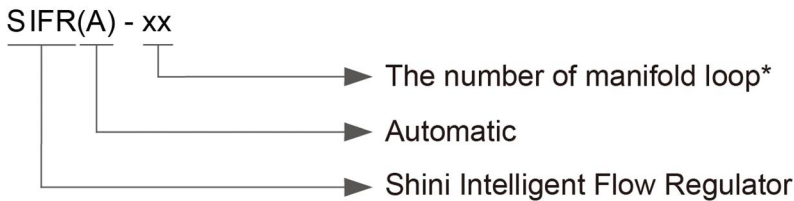
Notes: *

SIFR(A)-400, the number of manifold loop is 4, and the loop is 4-in 4-out.

SIFR(A)-800, the number of manifold loop is 8, and the loop is 8-in 8-out.

1.2 Feature

1) Digital flow and temperature monitoring system can monitor the flowrate, temperature and pressure of each pipe in real time, which can display instant mould loop blockage to avoid the rejects.

2) The automatic regulating valve in each return loop can adjust and control the flowrate precisely and intelligently according to the water loop demand.

3) 7" touch panel presents clear display of simple operations.

4) The display of graphic and numerical data enables more intuitive adjustment of the return loop.

5) Alarms for real-time flowrate and temperature monitoring indicate abnormalities in the loop in time.

6) RS485 communication interfaces make centralized monitoring with the host units available.

1.3 Options

1) The floor mount can be optional, add "FS" at the end of the model code.

1.4 Accessory

Options for the mould connector:

1) Quick hose connector M13.5×3/8"PT

2) Quick air pipe connectorΦ6~Φ16×3/8"PT

3) Teflon pipe connector 3/8"H×3/8"PT

All service work should be carried out by a person with technical training or corresponding professional experience. The manual contains instructions for both handling and servicing. Chapter 6, which contains service instructions intended for service engineers. Other chapters contain instructions for the daily operator.

Any modifications of the machine must be approved by SHINI in order to avoid personal injury and damage to machine. We shall not be liable for any damage caused by unauthorized change of the machine.

Our company provides excellent after-sales service. Should you have any problem during using the machine, please contact the company or the local vendor.

Shini Hotline Service:

Headquarter and Taipei factory：

Tel:+886 (0)2 2680 9119

Shini Plastics Technologies (Dongguan), Inc.：

Tel: +86 (0)769 8331 3588

Shini Plastics Technologies (Pinghu), Inc.：

Tel:+86 (0)573 8522 5288

Shinden Precision Machinery (Chongqing), Inc.:

+86 (0)23 6431 0898

1.5 Technical Specifications
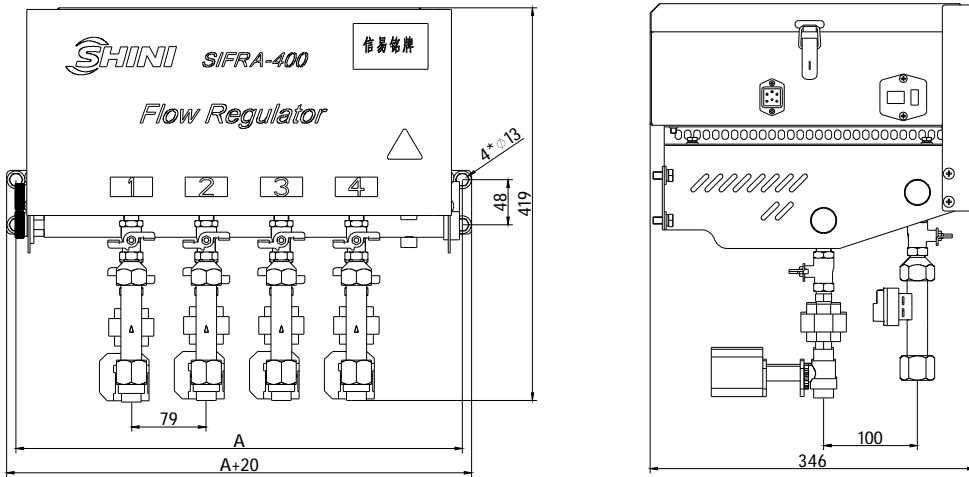
Picture 1-2：Out Dimensions

Table 1-1：Specifications

Item	Specifications
Version	A
Working temperature	0~120℃
Measuring range	1-18 L/min
Working pressure	0~100℃, max 16bar 100~120℃, max 8bar
To mould/return mould	3/8"PT
Main pipe in/out	3/4"PT
Power	1Φ 230V,50/60Hz

Table 1-2：Installation Dimension Table

Model	SIFRA-200	SIFRA-400	SIFRA-600	SIFRA-800	SIFRA-1000	SIFRA-1200
Dimensions A（mm）	476	476	636	796	956	1116

1.6 Safety Regulations

Strictly abide by the following safety regulations to prevent damage of the machine or personal injuries.

1.6.1 Safety Signs and Labels

⚠ Danger!

The unit is designed to endure high temp, and high pressure. For safe operation, do not remove the covers or switches.

⚠ Attention!

The unit should be operated by qualified personnel only.

During operation, avoid wearing gloves or clothes that may cause danger.

Turn off main switch when power supply is off.

Stop the unit when there may be power supply problems caused by static electricity.

Put on safety gloves and shoes during installation or relocation.

Components from our company can only be used for replacement.

⚠ Warning!

Do not touch the switch with wet object or hands.

Do not use the machine before fully aware of its performance.

Be careful not to touch or hit the switch or sensor.

Please keep enough operation space, and keep away obstacles.

To avoid producing statics, clean the floor from oil or water to keep a dry environment.

Protect the machine against severe vibration or collision.

Do not remove safety signs or make it dirty.

Drunken, medicine-taking, or men without proper judgement should not operate the machine.

⚠ Attention!

All screws of electrical components inside the electric control box are locked tightly, with no need of regular inspection!

1.7 Exemption Clause

The following statements clarify the responsibilities and regulations born by any buyer or user who purchases products and accessories from Shini (including employees and agents).

Shini is exempted from liability for any costs, fees, claims and losses caused by reasons below:

1) Any careless or man-made installations, operation and maintenances upon machines without referring to the Manual prior to machine using.
2) Any incidents beyond human reasonable controls, which include man-made vicious or deliberate damages or abnormal power, and machine faults caused by irresistible natural disasters including fire, flood, storm and earthquake.
3) Any operational actions that are not authorized by Shini upon machine, including adding or replacing accessories, dismantling, delivering or repairing.
4) Employing consumables or oil media that are not appointed by Shini.

2. Structural Features and Working Principle

2.1 Working Principle
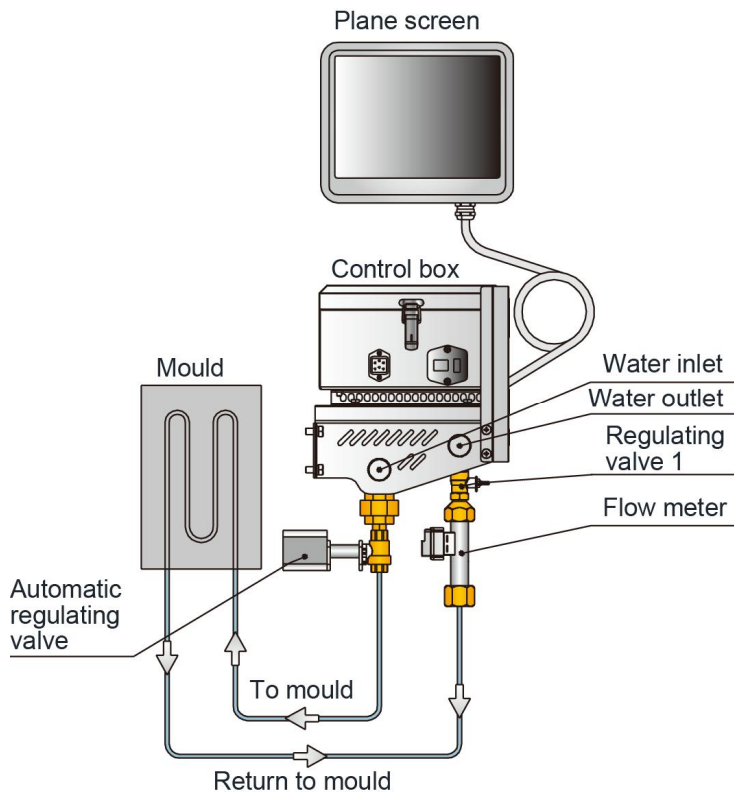
Picture 2-1：Working Principle

The circulating water enters the flow regulator through the water inlet;

The circulating water enters the mould through the regulating valve 1;

After circulating water enters the mould, it will enter the flow monitor through the regulator's auto regulating valve, and measure the water flow and temperature data.

The circulating water then flows back to the mould temperature controller, water chiller, or cooling water tower through the outlet;

After the control box processes the data detected by the flow meter, it will connect to the display screen.

3. Installation and Debugging

3.1 Attention

1) The maximum flow rate of the water inlet shall not be greater than the maximum throughput of the regulator (the maximum flow rate of each loop is 18L/min).

2) This regulator can only be used for water purification, not for other liquids or gases.

3) If the mould water flow demand is less than the flow rate of the water inlet, it is necessary to use pipelines to connect other pipes for shunt circulation.

4) The pressure of the circulating water must be stable. Otherwise, it will result in flow fluctuation and error detection.

5) When connecting the main loop inlet and outlet, please distinguish the water input and output direction. If the water direction is wrong, it will cause detection error and lead to machine failure;

6) When used in the water circulation with many impurities, it must install the water purifier in front of the water inlet of the flow regulator.

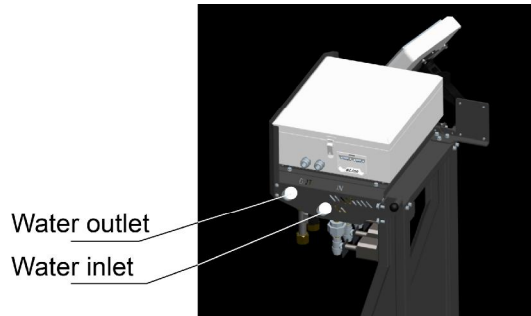## 3.2 Pipeline Connection

When connecting the port to the mould, it's necessary to use two spanners to fix the connector at the fixed side, and then tighten the connector at the connecting side. Otherwise, there's the water leakage.

1) To mould/ return to mould: 3/8 "PT inner teeth

Picture 3-1：To mould / Return to mould Pipeline Connection Diagram

2) Main pipeline inlet/outlet: 3/4 "male teeth

Water outlet

Water inlet

Picture 3-2：Main Pipeline Inlet / Outlet Connection Diagram

3.3 Power Connection

1) Make sure the voltage and frequency of the power source comply with those indicated on the manufacturer nameplate that attached to the machine.

2) Power cable and earth connection should conform to your local regulations.

3) Use independent electrical wires and power switch. Diameter of electrical wire should not be less than those used in the control box.

4) The power cable connection terminals should be tightened securely.

5) This series of power adopts single-phase power, and it connects (L1) to the live wire, N to the zero wire and earth wire (PE).

6) Power supply requirements:

    Main power voltage: +/- 5%

    Main power frequency: +/- 2%

7) ***Please refer to electrical drawing of each model to get the detailed power supply specifications.***

4. Operation

4.1 Operation Procedure for HMI

1) Do not use keen-edged object instead of hands to operate the touch screen, and prevent violent collision of it.

2) In a dry environment, static electricity may accumulate on the touch screen. Use a metal wire to discharge it before operating.

3) Use alcohol or eleoptene to wipe off the pollutants on the screen. Other solvent may cause the color of the screen to fade out.

4) Do not tear down any parts of the touch screen or take away any PCBs attached to it.

4.2 Description of Touch Screen
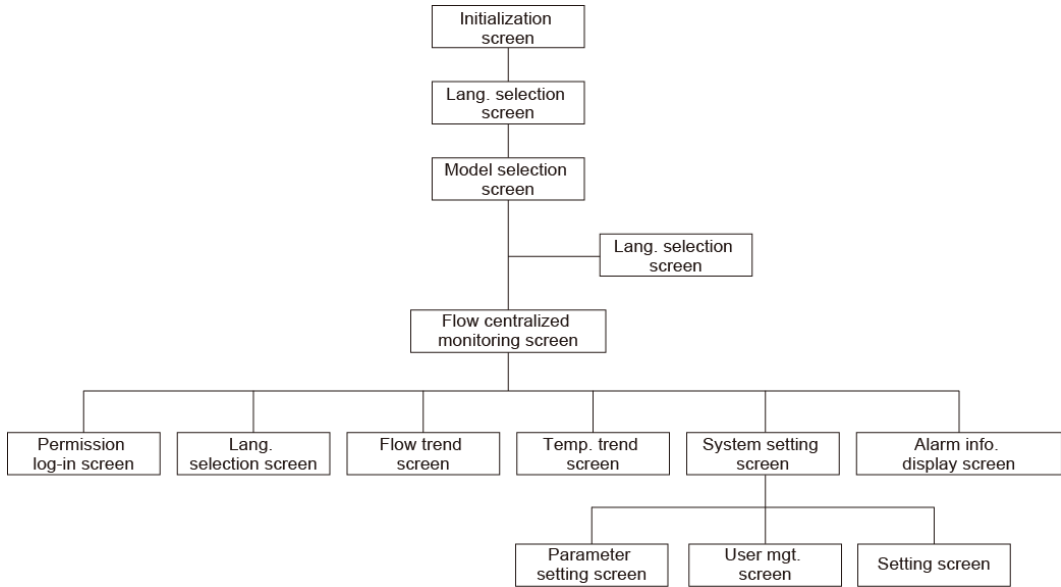
Picture 4-1：Description of touch screen

| Power terminal | DB9 serial port | USB Host | USB Slave | Ethernet port | 485 terminal |

Picture 4-2：Terminal wiring behind the touch-panel resistive screen

4.3 System Operation Flow

Picture 4-3：System Flow Chart

4.4 Specification

4.4.1 System Initialization Screen

After connecting through the power, the touch screen displays the "Initialization" screen and then it enters the "Language Selection" screen, as shown in the figure below:

Picture 4-4：Language Selection Screen

4.4.2 Centralized Flow Monitoring Screen

Select the Chinese or English by touching the <CHIN>or<ENG> button at the right bottom of the screen, and then enter the "Centralized Flow Monitoring" screen.
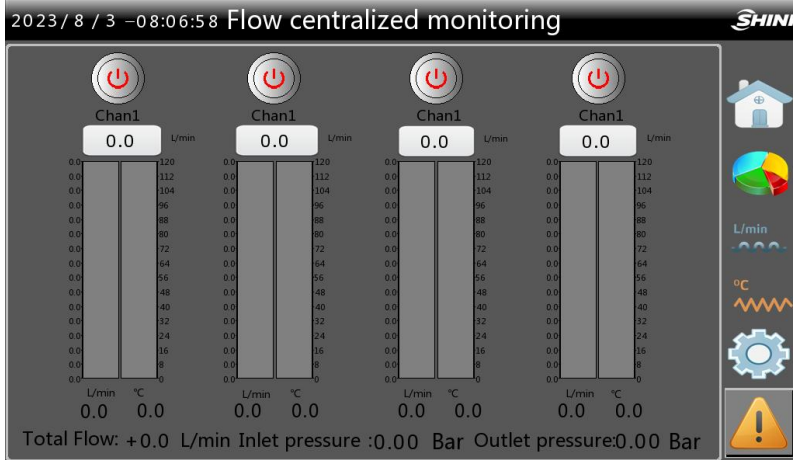
Picture 4-5： Centralized Flow Monitoring Screen

Table 4-1： Centralized Flow Monitoring Screen Description

Icon	Name	Function Type	Description
	Pipeline switch	operate	Pipeline start /stop button
0.0 L/min	Flow setting	operate	Enter the set flow value
Total Flow: +0.0 L/min	Total flow display	display	Total flow of all pipelines
Inlet pressure :0.00 Bar	Water inlet pressure	display	Display value of water inlet pressure
Outlet pressure:0.00 Bar	Water outlet pressure	display	Display value of water outlet pressure
	HOME button	operate	After clicking, return to the main page
	Recipe button	operate	Click to enter the recipe setting page,
L/min	Flow chart button	operate	Click to enter the flow trend chart page
°C	Temp. chart button	operate	Click to enter the temp. trend chart page

	Setting button	operate	Click to enter the system setting screen
	Alarm Information button	operate, display	Click to enter the alarm setting screen

4.4.2.1 Flow trend chart screen

Press the <HOME> button in the "Centralized Flow Monitoring" screen to return to the "Language Selection" screen.

Press the < Flow Chart >button in the "Centralized Flow Monitoring" screen to enter the "Flow Trend Chart" screen.
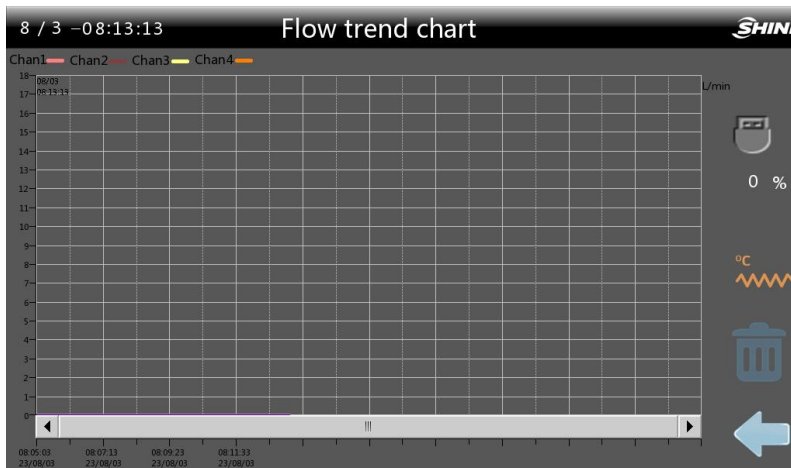
Picture 4-6：Flow Trend Chart Screen

Table 4-2：Flow Trend Chart Screen Description

Icon	Name	Function Type	Description
	Data import	Display	Data import record
	Flow chart button	Operate	Click to enter the flow trend chart page
	Temp. chart button	Operate	Click to enter the temp. trend chart screen
	Delete button	Operate	Delete the currently recorded data.
	Retreat button	Operate	Return to previous page.

4.4.2.1 Temperature trend chart screen

Press the < Temp. Chart > button in the "Centralized Flow Monitoring" screen to enter the "Temp. Trend "screen.
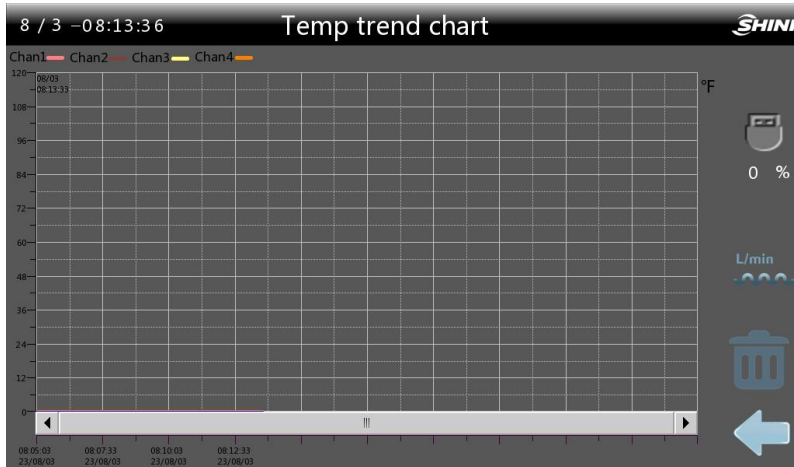
Picture 4-7：Temp. Trend Chart Screen

4.4.2.2 Alarm record screen

Press the < Alarm Information > button in the "Centralized Flow Monitoring" screen to enter the "Alarm Information Display" screen.

Picture 4-8：Alarm Record Screen

Table 4-3：Press Buttons on the Alarm Record Screen

Icon	Name	Function Type	Description
	reset button	operate	It means reset

| | volume button | Operate | It means mute |

4.4.2.3 Alarm recipe setting screen

Press the <Recipe> button in the "Centralized Flow Monitoring" screen to enter the "Alarm Recipe Setting" screen (Temp. unit:℃, Flow unit: L /min.).

8 / 3 −08:14:39		Alarm parameter setting							SHINI
Recipe name:									
High flow alarm 1	0.0	Low flow alarm 1	0.0	High temp. alarm 1	0.0	Low temp. alarm 1	0.0		Pervions Group
High flow alarm 2	0.0	Low flow alarm 2	0.0	High temp. alarm 2	0.0	Low temp. alarm 2	0.0		
High flow alarm 3	0.0	Low flow alarm 3	0.0	High temp. alarm 3	0.0	Low temp. alarm 3	0.0		0
High flow alarm 4	0.0	Low flow alarm 4	0.0	High temp. alarm 4	0.0	Low temp. alarm 4	0.0		Next Group
									Download

Picture 4-9：Alarm Recipe Parameter Setting Screen

Alarm parameter recipe setting:

1) Define a recipe name
2) Set the alarm parameters;
3) Press the download button to download to the PLC;
4) Check or create recipes for different groups under the same name and recipes for different groups with different names through the button of previous and next group.

4.4.2.4 System Settings Screen

Press the<Settings>button in the "Centralized Flow Monitoring" screen to enter the "System Setting" screen.
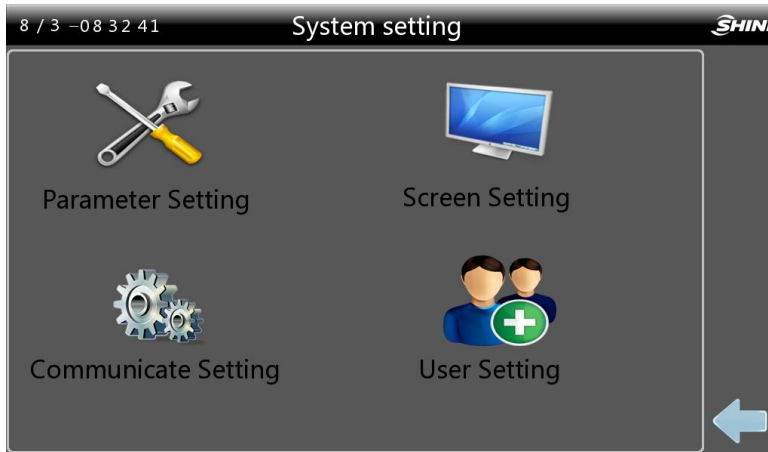
Picture 4-10：System Setting Screen

4.4.2.4.1 Parameter setting screen

Press the < Parameter Setting> button in the "System Setting" screen, input the password and enter the "Parameter Setting" screen. In this screen, customers can set high and low alarm values for flow or temperature as needed, as well as deviation values (temp.). (Tem. unit: ℃, flow unit: L/min).
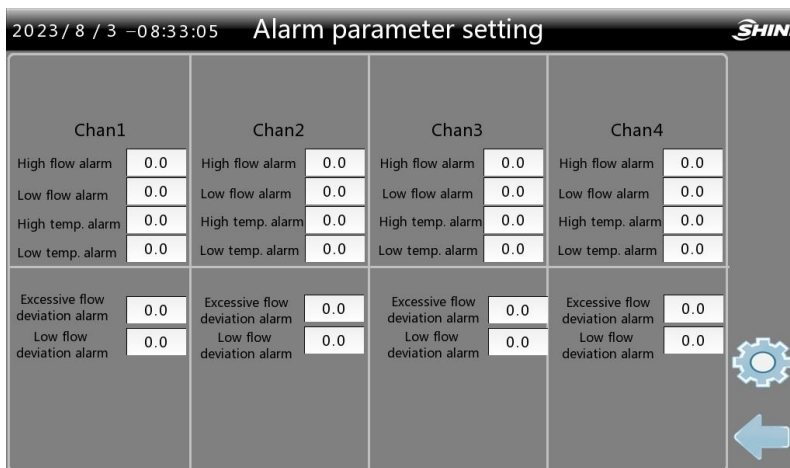
Picture 4-11：Alarm Parameter Setting Screen

4.4.2.4.2 Communication Settings

Press the<Comm. Settings>button in the "System Setting" screen to enter the "Comm. Parameter Setting" screen. In this screen, customers can set the communication parameters as needed.
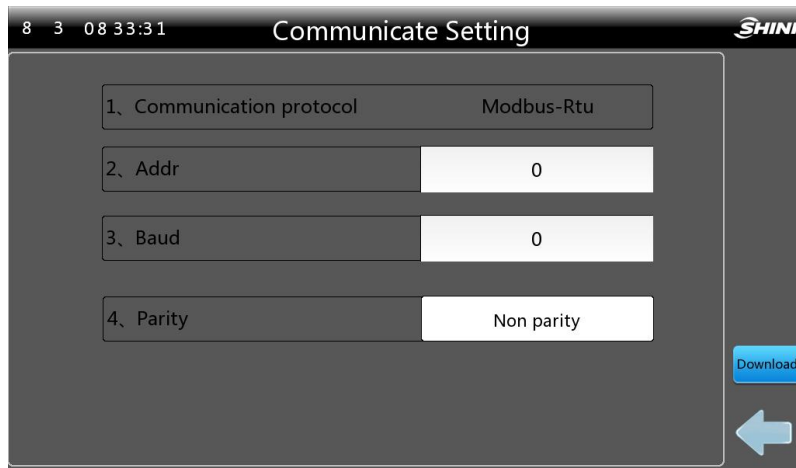
Picture 4-12：Comm. Parameter Setting Screen

Table 4-4：Comm. Address

Comm. protocol	MODBUS-RTU
Comm. unit No.	1
Comm. speed	19200
Check bit	None
Stop bit	1

Note: Please refer to the Appendixes for the controller's comm. address.

5. Trouble-shooting

Table 5-1：Trouble-shooting

Symptom	Possible causes	Solution
After powering on, the touch panel has no display.	1.Main power switch broken 2.Power circuit fault	1. Replace the power switch. 2. Check the power circuit and replace the fuse
Flow/temp displays "0"	1.Sensor fault 2.Poor grounding	1. Check the sensor circuit and sensor. 2. Check if the main power supply is properly grounded.
Flow no variation	1. Valve damage. 2.Abnormal circuit	1. Check the sensor and valve actuators.

6. Maintenance and Repair

1) When inspecting the machine, it is necessary to cut off the power supply, discharge the pressure and water first, and ensure the inspection and maintenance space before operation.

2) In order to prolong the service life of the system and safety accidents, it must carry out regular inspection.

3) The monitoring components are plastic parts, please disassemble them strictly according to the requirement in order to avoid damage during maintenance.

6.1 Flow Regulator Disassembly

1) Loosen the left fixed nut on the water manifold, push the regulating water manifold to the right slightly, and then take out the water manifold.

2) Take out the middle clamp and then the flow sensor in vertical.

6.2 Flow Sensor

Remove the flow sensor from the regulator, and clean the sensor detection unit.

6.3 Maintenance Schedule

6.3.1 General Machine Information

Model _____ SN _____ Manufacture date _____

Voltage_____ Φ _____ V   Frequency _____ Hz   Power _____ kW

6.3.2 Installation & Inspection

☐ Check the pipes are correctly connected.

Inspection of Electric Components

☐ Voltage _____ V _____ Hz

☐ Fuse melt current：1 Phase _____ A   3 Phases _____ A

☐ Check phase sequence of the power supply.

6.3.3 Daily Checking

☐ Check the switch of the machine.

☐ Check all the electrical wires.

6.3.4 Weekly Checking

☐ Check loose electrical connections.

☐ Check the flow sensor

☐ Check whether the pipe connector is loose

6.3.5 Monthly Checking

☐ Check the sensitivity of the flow sensor

☐ Clean the flow sensor

6.3.6 Half-yearly Checking

☐ Check whether the pipe connector is loose

☐ Check whether the indicator is working properly.

☐ Clean the circulation pipeline

6.3.7 Yearly Checking

☐ Check whether the pipeline is damaged or not

☐ Check whether all circuit connectors are in good condition

Appendix

Table 6-1：Comm. Address

D-Map（40000+i）	Name	Range	Type
1	The 1st circuit flow	1-18L/min	read only
2	The 2nd circuit temp.	0-120℃	read only
3	The 2nd circuit flow	1-18L/min	read only
4	The 2nd circuit temp.	0-120℃	read only
5	The 3rd circuit flow	1-18L/min	read only
6	The 3rd circuit temp.	0-120℃	read only
7	The 4th circuit flow	1-18L/min	read only
8	The 4th circuit temp.	0-120℃	read only
9	The 5th circuit flow	1-18L/min	read only
10	The 5th circuit temp.	0-120℃	read only
11	The 6th circuit flow	1-18L/min	read only
12	The 6th circuit temp.	0-120℃	read only
13	The 7th circuit flow	1-18L/min	read only
14	The 8th circuit temp.	0-120℃	read only
15	The 8th circuit flow	1-18L/min	read only
16	The 8th circuit temp.	0-120℃	read only
17	The 9th circuit flow	1-18L/min	read only
18	The 9th circuit temp.	0-120℃	read only
19	The 10th circuit flow	1-18L/min	read only
20	The 10th circuit temp.	0-120℃	read only
21	The 11th circuit flow	1-18L/min	read only
22	The 11th circuit temp.	0-120℃	read only
23	The 12th circuit flow	1-18L/min	read only
24	The 12th circuit temp.	0-120℃	write only
25	The 1st circuit flow setting	1-18L/min	read /write
26	The 2nd circuit flow setting	1-18L/min	read /write
27	The 3rd circuit flow setting	1-18L/min	read /write
28	The 4th circuit flow setting	1-18L/min	read /write

29	The 5th circuit flow setting	1-18L/min	read /write
30	The 6th circuit flow setting	1-18L/min	read /write
31	The 7th circuit flow setting	1-18L/min	read /write
32	The 8th circuit flow setting	1-18L/min	read /write
33	The 9th circuit flow setting	1-18L/min	read /write
34	The 10th circuit flow setting	1-18L/min	read /write
35	The 11th circuit flow setting	1-18L/min	read /write
36	The 12th circuit flow setting	1-18L/min	read /write

D-Map（40000+i)	Name	Range	Type
37	Switch parts settings 1	bit 9= the 1st circuit switch	read /write
		bit 10= the 2nd circuit switch	read /write
		bit 11= the 3rd circuit switch	read /write
		bit 12= the 4th circuit switch	read /write
		bit 13= the 5th circuit switch	read /write
		bit 14= the 6th circuit switch	read /write
		bit 15= the 7th circuit switch	read /write
		bit 0= the 8th circuit switch	read /write
		bit 1= the 9th circuit switch	read /write
		bit 2= the 10th circuit switch	read /write
		bit 3= the 11th circuit switch	read /write
		bit 4= the 12th circuit switch	read /write