

SIC-A-R2

CFC-free Refrigerant Air-cooled Water Chiller

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Contents

1. General Description	6
1.1 Coding Principle.....	7
1.2 Main Features	7
1.3 Accessory Option.....	8
1.4 Exemption Clause.....	10
1.4.1 Safety Regulations	10
1.4.2 Signs and Labels.....	10
1.5 Exemption Clause.....	12
2. Structural Features and Working Principle.....	13
2.1 Main Function	13
2.1.1 Working Principle	13
2.2 Main Components and Function	14
2.2.1 Compressor.....	14
2.2.2 Fin-style Condenser	14
2.2.3 Drying Filter.....	15
2.2.4 Thermal Expansion Valve	15
2.2.5 Evaporator.....	16
2.2.6 High and Low Pressure Sensor.....	16
2.2.7 Refrigerant Indicator.....	17
2.2.8 Liquid Pipe Solenoid Valve (option)	17
2.2.9 Hot-gas By-pass Valve.....	18
2.2.10 Single-way pressure release valve.....	18
2.2.11 Disk Filter	18
2.2.12 Flow Switch	19
2.2.13 Water Tank Refrigerant Indicator	19
3. Installation and Debugging.....	21
3.1 Machine Positioning.....	21
3.2 Power Connection.....	21
3.3 Installation diagram.....	22
4. Application and Operation.....	23
4.1 Panel Description.....	23

4.1.1 Common Interface.....	23
4.1.2 Common Operation.....	24
4.1.3 User Menu.....	24
4.1.4 Parameter Operation.....	25
4.1.5 User Setting.....	25
4.1.6 Instrument Setting.....	26
4.1.7 Clock Setting.....	26
4.2 Startup Steps.....	26
4.3 Shutdown Steps.....	27
5. Troubleshooting.....	29
6. Repair and Maintenance.....	33
6.1 Components Maintenance.....	34
6.1.1 Condenser.....	34
6.1.2 Evaporator.....	34
6.1.3 Disk Filter.....	35
6.2 Maintenance Schedule.....	36
6.2.1 About the Machine.....	36
6.2.2 Check after Installation.....	36
6.2.3 Daily Checking.....	36
6.2.4 Weekly Checking.....	36
6.2.5 Monthly Checking.....	36
6.2.6 Tri-monthly Checking.....	37
6.2.7 Half-yearly Checking.....	37
6.2.8 Yearly Checking.....	37
6.2.9 3-year Checking.....	37

Picture Index

Picture 1-1: SIC-33A-R2.....	6
Picture 2-1: Working Principle.....	13
Picture 2-2: Compressor.....	14
Picture 2-3: Fin-style Condenser.....	15
Picture 2-4: Drying filter.....	15
Picture 2-5: Thermal Expansion Valve.....	16

Picture 2-6: Evaporator.....	16
Picture 2-7: High and Low Pressure Sensor.....	17
Picture 2-8: Refrigerant Indicator.....	17
Picture 2-9: Liquid Pipe Solenoid Valve.....	17
Picture 2-10: Hot-gas By-pass Valve.....	18
Picture 2-11: Single-way pressure release valve.....	18
Picture 2-12: Disk Filter	19
Picture 2-13: Flow Switch	19
Picture 2-14: Refrigerant Indicator.....	20
Picture 3-1: Machine Installation Location	22
Picture 4-1: Panel Description	23
Picture 4-2: Startup Step 1	27

1. General Description



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

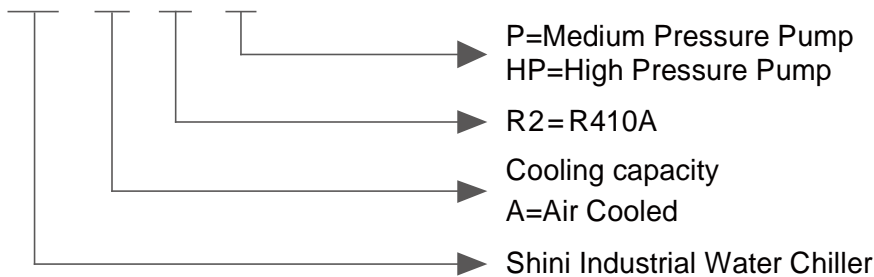
SIC-A-R2 series of air-cooled water chiller adopts air cooling method, and has compressor overheat protector, pump overload protector, phase reverse and shortage alarm, anti-freezing protector, and high and low pressure switch protector to ensure stable machine performance and long service life. It can cool down quickly and control the temperature stably, and the RS485 communication interface can meet the customer's demands. This series of product mainly uses the heating and cooling exchange principle to work, which is suitable for cooling in modern industry and is an indispensable in the application.



Picture 1-1: SIC-33A-R2

1.1 Coding Principle

SIC - xA - R2 - xx



1.2 Main Features

- I Cooling range 7~25°C;
- I R410A ozone-friendly refrigerant with a high efficient cooling result;
- I Plate evaporator ensures efficient heat exchanging, with a anti-freezing device;
- I Fin style condenser with internal thread copper pipe features rapid and well heat transfer, no need for cooling tower or water;
- I A well-known compressor that ensures low noise, energy-efficient, and long service life;
- I The refrigerating system has high and low pressure transmitter to read the system pressure accurately for better control and protection;
- I Circular stainless steel thermal insulated water tank, and unique cyclone design thermal insulated water in stainless for even distribution of chilling water;
- I Adopt high precision temperature controller with a display precision of $\pm 0.1^{\circ}\text{C}$;
- I It has a hot-gas bypass valve with a control accuracy of up to $\pm 0.1^{\circ}\text{C}$;
- I RS485 communication interface to realize centralized monitoring;
- I Water loop with a return water filter that adopts PVC-U water pipe to ensure the cleanliness of the water quality.
- I The inlet and outlet pipe adopt an adaptive bypass valve to ensure stable outlet water pressure.
- I Equipped with a flow switch to avoid the unit from operation without water flow;

- I The standard water tank level indicator for visualizing check of the water level;
- I Compact outline and small foot;

1.3 Accessory Option

- I High pressure pumps (about 4kgf /cm²) are optional to meet any pressure requirements.
- I Level sensor is optional to detect whether the water level is normal in the water tank;
- I The liquid pipe solenoid valve is opted to cut off the liquid and gas refrigerant pipeline during shutdown as to reduce the liquid hammer risks;
- I Level sensor can be opted to detect the refrigerant and ensure its quality and water ratio.

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.

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1.4 Exemption Clause

The user must conform to the following safety rules in the manual to avoid human injury and machine damage.

1.4.1 Safety Regulations



Attention!

Installation of the device is allowed only to the professional electrician.

Before maintaining and repairing the device, be sure to turn off the main switch and control switch.



Warning!

High Voltage!

This label is posted on enclosure of the electrical control cabinet!



Warning!

High Voltage!

This label is posted on enclosure of the electrical control cabinet!



Attention!

Drain the water inside when power off at the cold day to avoid freezing!



Attention!

No need for regular inspection because all the electrical parts in the control unit are fixed tightly!

1.4.2 Signs and Labels

	<p>This is for indicating motor rotating direction. This is for indicating fan rotating direction, please confirm. All our water chillers used blowers are suction type, and the wind direction is from the condenser's outside to the inside.</p>
	<p>Pump pressure gauge: display actual pressure of cold water system.</p>
	<p>Cold water return port (return from the mould)</p>
	<p>Cold water export (to the mould)</p>
	<p>Purified water filling port</p>
	<p>Water tank, plate exchanger and filter discharge port</p>
	<p>Overflow port</p>
	<p>Level indicator</p>

1.5 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:

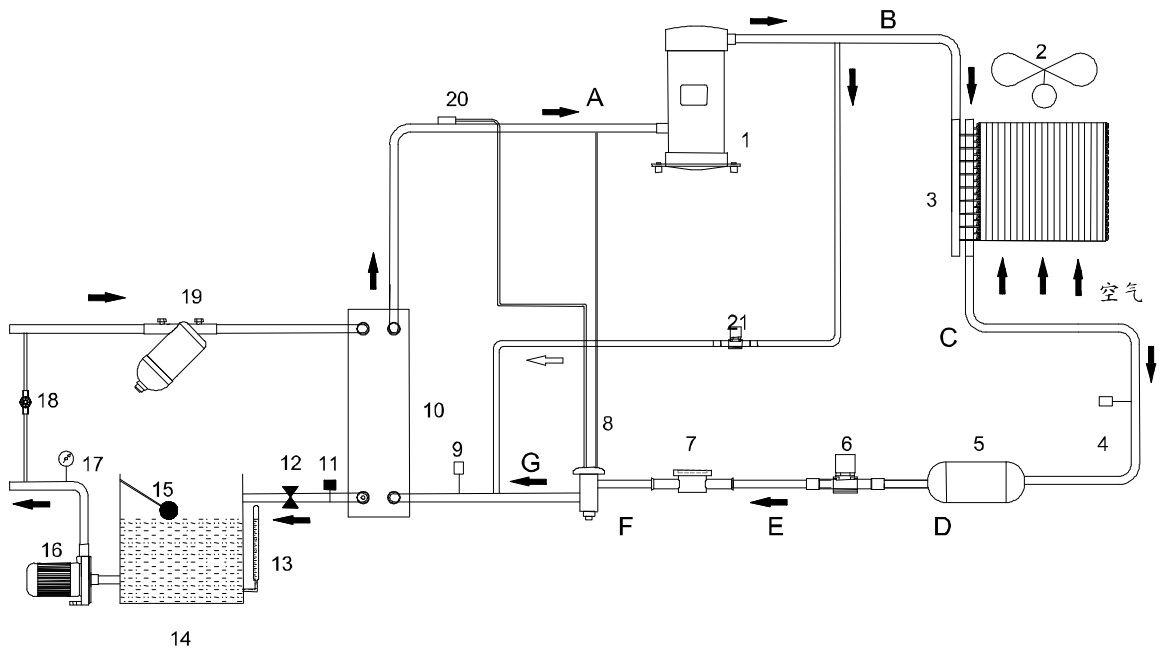
- 1) Any careless or man-made installations, operation and maintenances upon machines without referring to the Manual prior to machine using.
- 2) Any incidents beyond human reasonable controls, which include man-made vicious or deliberate damages or abnormal power, and machine faults caused by irresistible 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 Main Function

SIC-A-R2 air-cooled water chiller mainly comprised of the compressor, condenser, thermal expansion valve and the evaporator, which transforms from gas or liquid refrigerant by air cooling, and adopts heat absorbing and releasing to achieve the refrigerating effect.

2.1.1 Working Principle



- | | | |
|------------------------------|---------------------------------|--|
| 1.Compressor | 2.Fan | 3.Fin-style condenser |
| 4.High pressure monitor | 5.Drying filter | 6. Liquid pipe solenoid valve (option) |
| 7. Liquid indicator (option) | 8. Expansion valve | 9.Low pressure monitor |
| 10.Evaporator | 11.Flow switch | 12.Flow adjusting ball valve |
| 13.Water tank level sensor | 14.Water tank | 15.Float ball switch |
| 16.Pump | 17.Water pressure gauge | 18.Bypass valve |
| 19. Disc filter | 20.Expansion valve thermocouple | 21.Hot gas bypass valve |

Picture 2-1: Working Principle

After the air-cooled water chiller SIC-A-R2 is powered on, press button 16 to turn on the water pump firstly, and then press button to start the compressor 1 after water system circulation. The compressor 1 starts to work, the hot gas

bypass valve 21 opens, and the refrigerant changes the low-temp. and low-pressure gas into high-temp. and high-pressure gas under the action of compressor 1, which enters the condenser 3 in the BC direction. Under the action of fan 2, it will accelerate heat exchange with the air, and the refrigerant is changed from gaseous state to liquid state, meanwhile the heat is taken away by the air; In the C-D-E-F process, the liquid refrigerant from the condenser 3 passes through the drying filter 5, which is reached the expansion valve 8 through the liquid pipe solenoid valve 6 and liquid indicator 7 after drying and impurities filtering. In the F-G process, the high-pressure liquid refrigerant is depressurized by the thermal expansion valve 8 to decrease the temperature. In the G-A process, the low temp. and low-pressure refrigerant exchanges heat with the chilled water through the evaporator 10 to make chilled water reach the set temp.; The low-temp. gas refrigerant from the evaporator 10 will return to the compressor 1, and so on.

2.2 Main Components and Function

2.2.1 Compressor

- 1) The low temp. and low pressure refrigerant air that sucked by the compressor, and the high temp. and high pressure refrigerant gas that discharged through the copper outlet pipe is the heart of the refrigerant system.
- 2) Our company uses the Copeland scroll compressor.



Picture 2-2: Compressor

2.2.2 Fin-style Condenser

- 1) It is the component to discharge the heat. The refrigerant absorbs the heat and discharges it through the condenser.
- 2) Our company's air-cooled water chiller uses the female thread fin-style condenser.



Picture 2-3: Fin-style Condenser

2.2.3 Drying Filter

- 1) Drying filter's function: Remove impurities in the refrigerant, absorb the free moisture in the refrigerant, and prevent blockage at the narrow section of the pipeline (especially at the valve port of thermal expansion valve).
- 2) The filter size is usually opted according to the water chiller's refrigerating capacity and refrigerant pipe diameter.
- 3) It is set in front of thermal expansion valve and liquid pipe solenoid valve.



Picture 2-4: Drying filter

2.2.4 Thermal Expansion Valve

- 1) The thermal expansion valve throttles and depressurizes the refrigerant and regulates the refrigerant flow into the evaporator.
- 2) Install in front of the evaporator.



Picture 2-5: Thermal Expansion Valve

2.2.5 Evaporator

- 1) Evaporator (plate exchange) is a device that outputs the refrigerating capacity. The refrigerant absorbs the water heat in the evaporator to achieve the refrigerating purpose.
- 2) Adopt plate evaporator that largely improves the heat transfer efficiency.



Picture 2-6: Evaporator

2.2.6 High and Low Pressure Sensor

- 1) The high and low pressure sensors are used to detect the working pressure of the compressor's suction air inlet and outlet.
- 2) It breaks when the high pressure is set as 4.0MPa, and it closes when the pressure is 2.5MPa; It breaks when the low pressure is 0.4MPa, and it closes when the pressure is 0.6MPa.
- 3) When the side high pressure is higher than 4.0Mpa, or the side low pressure is lower than 0.4MPa, the controller will alarm and the machine will stop running.



Picture 2-7: High and Low Pressure Sensor

2.2.7 Refrigerant Indicator



Picture 2-8: Refrigerant Indicator

- 1) Used to observe the refrigerant state at this position;
- 2) Used to observe the water content of the system;
- 3) Install in front of the expansion valve;

2.2.8 Liquid Pipe Solenoid Valve (option)



Picture 2-9: Liquid Pipe Solenoid Valve

- 1) Cut off the refrigerant circuit immediately after the machine stops.
- 2) Install in front of the expansion valve

2.2.9 Hot-gas By-pass Valve



Picture 2-10: Hot-gas By-pass Valve

- 1) Used to bypass the refrigerant gas when it gets close to the set temperature as to avoid compressor frequent start and achieve accurate temperature control;
- 2) Install on the connecting pipe between the compressor outlet and expansion valve outlet.

2.2.10 Single-way pressure release valve



Picture 2-11: Single-way pressure release valve

The single-way pressure release valve works through the spring force; When the system pressure is smaller than the set pressure, the diaphragm will block the pipeline under the action of spring force; When the system pressure is greater than the set pressure, the diaphragm compresses the spring, the pipeline is connected, and the liquid passes through the pressure release valve.

2.2.11 Disk Filter



Picture 2-12: Disk Filter

The disk filter is composed of the valve core and valve body. When filtering, press the disk tightly, the water flows through the disk, and the impurities are kept out of the disk or between the grooves, thus achieving the filtering purpose. The disk filter has deep filtering function and excellent blocking function, which features easy operation and maintenance.

2.2.12 Flow Switch



Picture 2-13: Flow Switch

- 1) The flow switch can be used to check whether the chilled water flow is sufficient.
- 2) Install on the water pipeline between the evaporator and water tank.

2.2.13 Water Tank Refrigerant Indicator



Picture 2-14: Refrigerant Indicator

Through the water tank refrigerant indicator, it can check whether the water level in the water is in normal range.

3. Installation and Debugging



Before installation, please read this chapter carefully and install according to the procedures as follows!

3.1 Machine Positioning

- 1) Install the water chiller near windows or places with good air flowing because air-cooled central water chiller needs a good heat-releasing condition. If the water chiller is installed inside the factory, then the surrounding temperature should not be higher than 43°C and there must have fans to make the airflow flow fluently or air tube piping the hot air produced by water chiller outside. If the water chiller is installed outdoor, a veil is needed to cover the top of the chiller.
- 2) Please keep at least 500mm space around the machine for installation and maintenance.

3.2 Power Connection

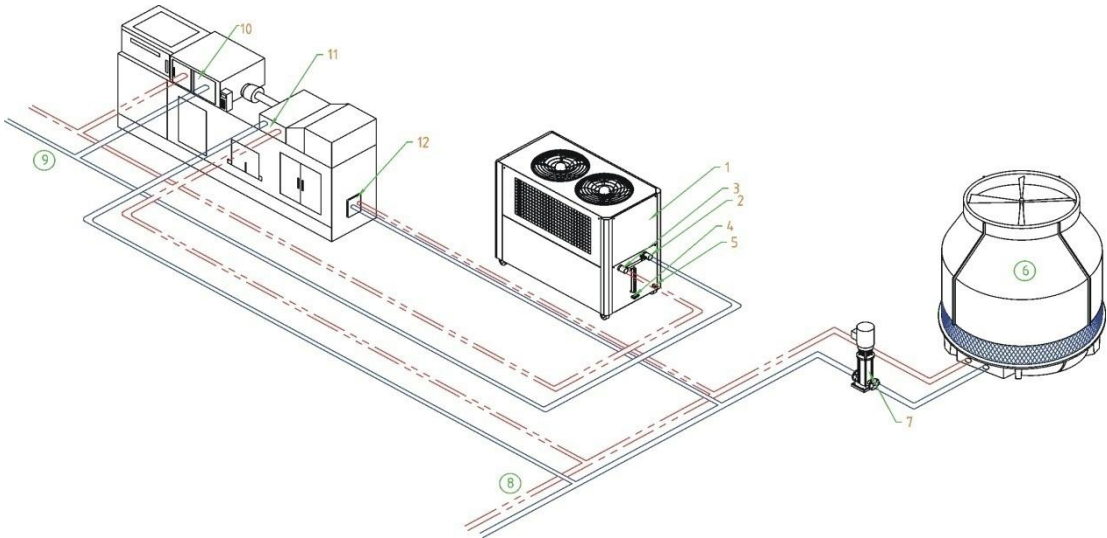
- 1) Make sure the voltage and frequency of the power source comply with those indicated on the manufacturer nameplate that attached to the machine.
- 2) Power cable and earth connection should conform to your local regulations.
- 3) Use independent electrical wires and power switch. Diameter of electrical wire should not be less than those used in the control box.
- 4) The power cable connection terminals should be tightened securely.
- 5) The machine requires 3-phase 4-wire power source, connect the power lead (L1, L2, L3) to the live wires, and the earth (PE) to the ground.
- 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***



Power connection must be conducted by professional electricians!

Do not change the circuit of the water chiller without our company's authority. If the machine is damaged by unauthorized change we are not responsible for this.

3.3 Installation diagram



Names of Parts :

- | | | |
|------------------------|------------------------------|-------------------------------|
| 1. Water chiller | 2. Chilling water inlet | 3. Chilling water outlet |
| 4. Water drainage port | 5. Water-refill port | 6. Cooling water tower |
| 7. Cooling water pump | 8. Cooling water circulation | 9. Chilling water circulation |
| 10. Mould cooling | 11. Cooling tank | 12. Oil cooling |

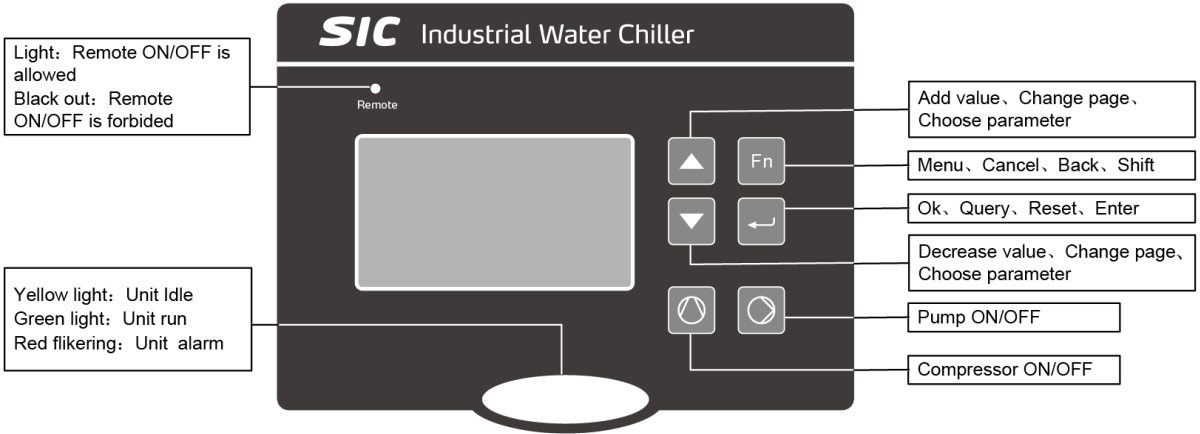
Picture 3-1: Machine Installation Location

Notices for Installation:

- 1) Install the pipe system according to the wiring diagram, and take insulation measures of the chilled water pipes with thermal insulated materials.
- 2) Install the drain valve at the lowest point of the chilled water circulating system.
- 3) As the water source quality is poor, it must clean the filter in the chilled water loop regularly.
- 4) Install the pipes and test is for leakage. The chilled water loop must be covered with insulation layer to avoid refrigerant losses and pipe drips.

4. Application and Operation

4.1 Panel Description



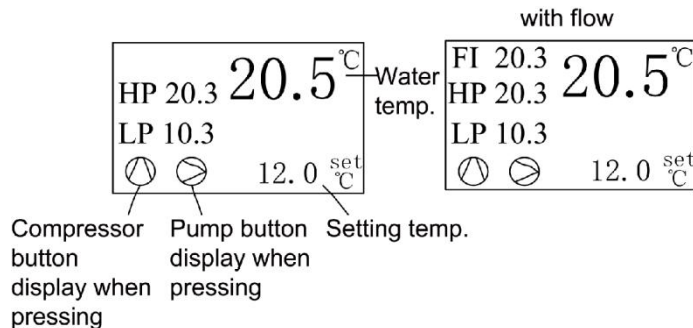
Picture 4-1: Panel Description



4.1.1 Common Interface

The common interfaces include main interface and alarm interface.

1. Main Interface

After the countdown, the main interface will be displayed as follows:

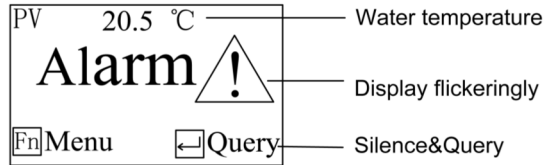


In the main interface, press the  to quickly check the pressure, flow value and temperature quickly, and press  to quickly check the temperature, flow and pressure, as shown below:

Water temp.	20.0 °C
Ambient temp.	25.0 °C
Anti-freezing temp.	8.0 °C
Fn Return	(1/2)

2. Alarm Interface

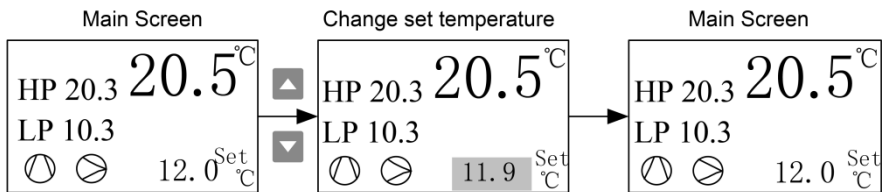
When the unit fails, the alarm interface is as follows:



4.1.2 Common Operation

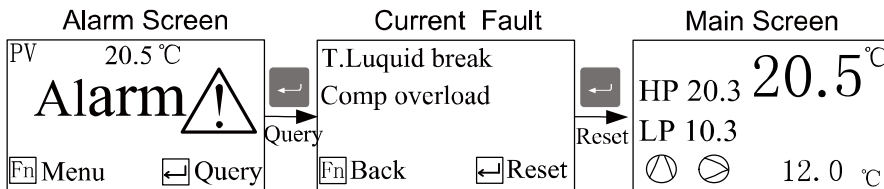
1. Quickly modify the set temperature

If the user parameter [lock temp.] is set to "No", the set temp. can be directly modified in the main interface, and the operation is as follows:



Note: It can also modify the set temperature in the user parameters.

2. Query / Reset Fault



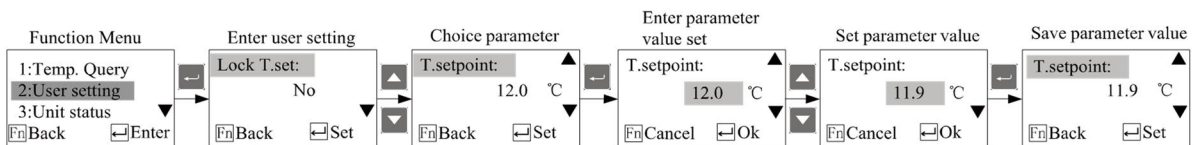
4.1.3 User Menu

In the main interface, press **Fn** key to enter the function menu, which has five items as below:

No.	Menu Item	Function	Remark
1	User setting	Setting user parameters	Refer to 6.2 User Parameter Table for the number and meaning of each parameter.
2	Machine unit status	Display current status of the machine units	No display of the current value when not use the current module.
3	Instrument setup	Set the language, backlight, time, communication configuration and other information	
4	Temp. query	The water temp. and anti-freeze temp. can be queried.	If it only detects the water temp., there's no display of the menu item.
5	Pressure flow query	The sensor flow value, water pressure, high pressure and low pressure can be queried.	The menu item is not displayed when both flow and water pressure is "disabled".

4.1.4 Parameter Operation

Parameter value modification and operation, and take the operation and modification of the set temperature as an example.



4.1.5 User Setting

The meaning of each parameter in user parameters is as follows:

No.	Parameter Name	Factory Default	Setting Range	Remarks
1	Lock the temp.	No	Yes~No	Yes: After locking, it can't modify the set temp. on the main interface. No: It can set the temp. on the main interface.
2	Set the temp.	20.0°C	5.0~30.0°C	The setting range is limited by the manufacturer's parameters [set temp. upper limit] and [set temp. lower limit].

3	Start method	Local	Local: local + remote; remote	Local: The unit can only be started / stopped locally. Local + remote: Both local and remote control can start and stop the unit. Remote: The unit can only be started and stopped remotely.
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4.1.6 Instrument Setting

There are six items in the instrument setting, as shown in the table below:

No.	Name	Functions	Remarks
1	Language	Set the language for the interface display.	
2	Backlight time	When there is no key operation beyond the set time, the backlight will be turned off. The settable range is 0-255 mins.	When it is set to 0, the backlight is not turned off.
3	Using time	Check the total service time of the compressor.	
4	Instrument Information	Check the instrument version.	
5	Current time	Check and set the time.	
6	Comms setup	Set comm. baud rate (9600), check bit (-), stop bit (1) and comm. address.	

4.1.7 Clock Setting



Notes: When setting the clock, press key to exit the clock setting quickly, and save the parameters being set when exiting.



Note

Don't try to enter any other parameter settings. Otherwise, if you modify any other parameter values accidentally, it will cause machine abnormality.



4.2 Startup Steps

- 1) Turn on the main power switch to "ON".



ON

Picture 4-2: Startup Step 1

- 2) Turn on the pump switch  to start the pump.
- 3) Turn on the compressor switch .



Notes

The running direction of the pump must be correct.



Notes

Please confirm to start the chilled water pump before startup; Check the water tank of the chiller, and don't operate the system without water. Otherwise, our company will not be responsible for the machine damage.



Notes



In order to reduce the damage to the machine and prolong its life span, please start the machine according to the correct steps.



Note

The compressor can't be started frequently due to its characteristics (frequent start and stop will affect the service life), so the compressor will delay 3 mins. before its start after turned on the pump. The temperature controller parameters have been set, which shall not be adjusted freely.

4.3 Shutdown Steps

- 1) Turn off the compressor switch .
- 2) Turn off the pump switch . If the moulding cycle is quick, and cooling water temp. is low, keep water pump run continuously until the mould temp. rises to a value without condensation, and then turn off the pump switch.
- 3) Turn the main power switch to OFF.



OFF



Note

When the main power switch is at ON position, please be careful of the electric shock hazard.



Note

In order to reduce the damage to the machine and prolong its life span, please turn off the machine according to the correct steps.

5. Troubleshooting

Faults	The Action of the Protection Units	The Possible Fault Analysis	Solutions
1. No power display or phase reverse	The protective device can't work	Power is not on. The control circuit fused The phase sequence of power line is reversed The main power or circuit failure.	Check before power is on. Check the protection loop. Replace any two of the power incoming wires. Check or replace.
2. Pump overload	Loader trips	High transient current Pump failure Pump loader failure	Reset the loader. Repair or replace Repair or replace
3. Compress or overload	Loader trips	A. High transient current B. Compressor failure C. Compressor loader failure	A. Reset the loader B. Repair and replace C. Repair and replace
4. Over high-pressure	High-pressure switch trips	The air temp. around the machine continued to rise significantly. The local ambient temp. is too high Too much dust on the condenser Drying filter blocked The opening of the expansion valve is too small Expansion valve fault. Fan fault High-pressure controller fault. Condenser direct sun light The liquid solenoid valve not opened.	A. Place the machine in a well ventilated place or discharge the hot air from the fan. B. Decrease the air temperature around the machine. C. Clean the condenser. Replace the drying filter. Adjust the opening properly. Repair and replace Repair and replace Repair and replace Protect the condenser from direct sunlight. Repair the circuit and coil and troubleshoot.

<p>5. Low high-pressure</p>	<p>Protective device no action</p>	<p>Insufficient refrigerant The compressor valve plate is damaged. C. The ambient temperature is too low.</p>	<p>A. Check the system pipe, weld the pipe and refill the refrigerant. B. Repair and replace C. Block part of the condenser to ensure the high pressure above 27bar.</p>
<p>6. Low low-pressure</p>	<p>Low-pressure switch trips</p>	<p>A. Insufficient refrigerant B. Drying filter blocked. The opening of the expansion valve is too small. Expansion valve fault. Low pressure controller fault. The liquid solenoid valve not opened.</p>	<p>A. Check the system pipe, weld the pipe and refill the refrigerant. B. Replace the drying filter. C. Adjust the opening properly D. Repair and replace E. Repair and replace F. Repair the circuit and coil and troubleshoot.</p>
<p>7. Low high-pressure</p>	<p>Protective device no action</p>	<p>Too large cooling load. Compressor capacity reduced. The opening of the expansion valve is too large. The refrigerant is overfilled.</p>	<p>Adjust the load. Repair and replace C. Adjust the opening properly D. Discharge part of the refrigerant.</p>
<p>8. Compressor overload</p>	<p>Protective device no action</p>	<p>The heat of the return pipe refrigerant is too high. The high pressure is too high. The low pressure is too low.</p>	<p>Adjust the opening of the expansion valve properly. Repair and improve C. Repair and improve</p>
<p>9. Return air pipe and compressor shell condensed</p>	<p>Protective device no action</p>	<p>The chilled water temp. is set too low. The expansion valve opening is too small. Too little refrigerant. The thermal load is too small. Poor evaporator heat</p>	<p>A. Adjust the chilled water temp. B. Adjust the opening of the expansion valve properly. Check the system pipe, weld the pipe and refill the refrigerant. Increase the heat load. E. Clean the evaporator.</p>

		transfer effect.	
10.Compressor no start or tripped after startup	Protective device no action	Power wire breaks or abnormal voltage Improperly setting of the temperature controller. Overload protector not reset.	Check and connect the wire according to specifications. Reset the temperature controller. C. Reset the overload protector.
11. Anti-freezing switch alarm	Anti-freezing switch trips	A Low water temperature due to low amount of the chilled water. The temperature switch is set too low or fault. Anti-freezing switch is set improperly or fault.	Repair the water pump and remove the air from the water pipe. Correct the set point or replace. Check, and repair.
12.Refrigerating capacity can't reach the standard	Protective device no action	Air in the chilled water system. Abnormal chilled water volume and refilling water. Abnormal fan running. Filter blocked. Improperly setting of the chilled water pump. The chilled water pipe is not configured as standard. Poor heat exchange of the evaporator and condenser. Expansion valve blocked. Too much or too little refrigerant.	Discharge the air. Control the water level of the refilling tank. Repair Clean the filter. Properly select the water pump meeting the standard (flow and lift). Configure the chilled water pipe as the standard. Clean the evaporator and condenser. Replace after repair. The refrigerant is controlled at the appropriate filling amount.
13.Water temp. probe breaks	Controller shows the water temp. probe breaks	A. The probe broken or loose wiring.	A. Check whether the temp. probe is in good contact.
14.Anti-freezing probe breaks	Controller shows the anti-freezing	A. The probe broken or loose wiring.	A. Check whether the temp. probe is in good contact.

	probe breaks		
15.Ambient temp. probe breaks	Controller shows the ambient temp. probe breaks	A.The probe broken or loose wiring.	A.Check whether the temp. probe is in good contact.
16.Too high ambient temp.	Controller shows the ambient temp. is too high.	A. The ambient temp. is higher than the set value of ambient temp. overheat alarm.	A. Check whether the ambient temp. is higher than the set value of ambient temp. overheat alarm.
17.Too low ambient temp.	Controller shows the ambient temp. is too low.	A. The ambient temp. is lower than the set value of too low ambient temp. alarm.	A. Check whether the ambient temp. is lower than the set value of too low ambient temp. alarm
18.Too low water temp.	Controller shows the water temp. is too low.	A. The water temp. is lower than the set value of low temp. protection.	A. Check whether the water temp. is lower than the set value of low temp. protection.
19.Too high water temp.	Controller shows the water temp. is too high.	A. The water temp. is higher than the set value of low temp. protection.	A. Check whether the water temp. is higher than the set value of overheat protection.
20.Too low anti-freezing temp.	Controller shows the alarm of anti-freezing temp.	A. The anti-freezing temp. is lower than the set value of anti-freezing alarm.	A. Check whether the water temp. is higher than the set value of anti-freezing alarm.

6. Repair and Maintenance

Check whether the displayer and buttons work normally.

Cycle: Daily

Check whether the pressure value is kept around the target value.

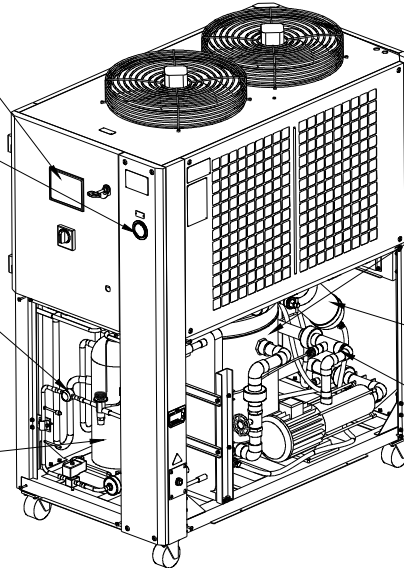
Cycle: Daily

Check whether there are bubbles in the sight glass, and whether the moisture indicator color exceeds the standard. If it exceeds the standard, replace the dry filter.

Cycle: Monthly

Check whether there is abnormal noise and vibration during the compressor operation. To avoid hand hurt as the compressor bottom, the bottom temperature can't exceed 50 °C.

Cycle: Daily



Check whether the blower operates normally.

Cycle: Daily

Check whether there's pollution and scaling inside the water tank, and the water quality is dirty or polluted.

Cycle: Monthly

Check whether it is blocked or fully opened (the water pressure is abnormal, and the system water flow is abnormal). If it is blocked, remove the valve body and clean the diaphragm.

Discharge cycle: Weekly;

Check the water system has leakage or abnormal discharge;

Cycle: Monthly;

Check the screen dust content to ensure the ventilation effect.

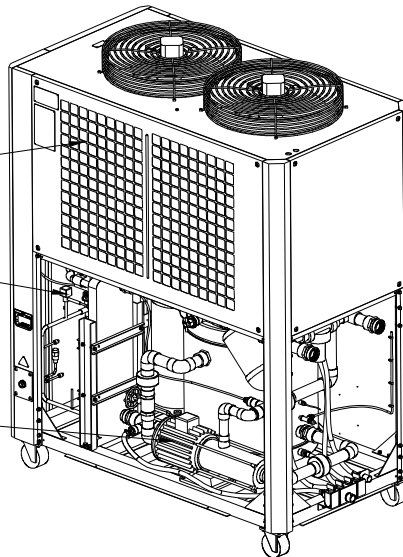
Cycle: Monthly.

Check whether the bypass solenoid valve can open normally and whether there is abnormal sound and vibration.

Cycle: Daily;

Check whether there is abnormal noise and vibration during pump operation. The pump surface temperature shall not exceed 70 °C.

Cycle: Daily;



Attention!

All repair work should be done by qualified personnel only to avoid damage to the machine or personnel injury.

In order to operate the machine rightly and safely, please caution the matter follows:

- 1) Don't turn off the main power switch to stop the machine, except emergency situation.
- 2) When the machine shuts down and alarms, check the fault causes, and don't start the machine forcibly before troubleshooting.
- 3) Please check periodically to prolong the machine's service life and prevent the safety accident.
- 4) The water used in the system must have water treatment, because the high alkaline water will accelerate the corrosion of the copper pipe, and reduce the service life of the heat exchanger. The PH value of water is in the range of 7.0-8.5.
- 5) Keep the machine room dry, clean and well ventilated.
- 6) The operation and service of the machine should be done by qualified technician only (Please take notice that the disassembly and the inspection of the machines are hazardous when the machines are running!)

6.1 Components Maintenance

6.1.1 Condenser

The fin-style condenser of the SIC-15A-R2 series is installed in an open way. In the use process, it will inevitably adhere to dust and sundries, which reduces the heat exchange rate. The condenser should be cleaned regularly so that the machine can run stably. Use a brush, dust collector or compressed air to clean the dust and sundries on the condenser fins and copper pipe, and then use the clean water to clean them up.



Attention!

Do the cleaning work every half-year in the environment with little dust, but you must do the work every month in the environment with a great deal of dusts, and under the severe environment you had better see the situation to do the work.

6.1.2 Evaporator

The inner tank of the heat emission pipe will pile up a great deal of water scale

after a long time use of the evaporator, which will influence the heat emission effect, so it is necessary to clean the evaporator at fixed periods in order to keep its working performance. If the circulation has been under water treatment, it is advised that firstly use hydrogen peroxide to kill bacteria and then use a high pressure water rifle to flush it, at last check whether there is still scale scale. If the circulation is not processed under water treatment, clean it with citric acid and sulfamic acid along with inhibitor, and then flush it with a high pressure water rifle. Passivation is need after acid washing, and the passivator can be purchased for relevant treatment.

The cleaning of the evaporator:

- 1) Connect the inlet and outlet of the machine's chilled water with a hose.
- 2) Mix the bactericide and water in a certain proportion (The specific proportion should be mixed according to the requirements) into a solution, pour it into the machine water tank, and start to clean the pump of the machine.
- 3) After cleaning and removing the bactericide solution, it's necessary to add running water into the water tank for several times and clean repeatedly to ensure that there is no residual bactericide solution in the system.

6.1.3 Disk Filter

After using the built-in disk filter in the water system for a period of time, it must be cleaned, and the displayer will have clear indication. At this time, please remove the machine's side plate, and open the manual valve at the drain outlet of the disk filter to discharge for 5 mins. After treatment, close the manual valve at the filter drain outlet, and restore the side plate to run the water chiller continuously.



Note

In the environment of temperature below 0°C, when shut down or store the machine, drain the water in the water tank through the outlet. If the evaporator freezes, it needs to melt the ice before startup.

6.2 Maintenance Schedule

6.2.1 About the Machine

Model _____ SN _____ Production Date _____

Voltage _____ Φ _____ V Frequency _____ Hz

Total power _____ kW

6.2.2 Check after Installation

- Check the pipes are all correctly connected.
- Check if there are leakages in the piping system.
- Check if there are breaks in the welding joint.

Electrical Installation

- Voltage _____ V _____ Hz
- Fuse specification: 1phase _____ A 3 phase _____ A
- Check phase sequence of power supply.

6.2.3 Daily Checking

- Check switch functions.
- Check all the electrical wires.
- Check whether pressure gauges are accurate.
- Check whether compressor temperature is normal.
- Check whether cooling water circulation is normal.

6.2.4 Weekly Checking

- Check electrical connections.
- Check protection & alarm function of the water chiller.
- Check whether set point of high-low pressure switch is normal.

6.2.5 Monthly Checking

- Check whether the circulation pipeline has leakage.
- Check whether there are bubbles in liquid indicator.
- Check whether there is abnormal sound in pump.
- Check whether there is scale formation in tank.

6.2.6 Tri-monthly Checking

- Check whether condenser is under blockage.

6.2.7 Half-yearly Checking

- Check and clean the filter and expansion valve.
- Check system performance.
- Clean condenser.

6.2.8 Yearly Checking

- Check whether the contactor is normal.

6.2.9 3-year Checking

- PC board renewal.
- No fuse breaker renewal.

Appendix:

SIC-A-R2 Comm. Address Table

Address (holding registers) (decimal system)	Parameters	Read R/ Write W	Default Parameters	Minimum	Minimum	Unit	Remark
1	unit running status	R	/			/	
	0: idle						
	1: ready to start						
	2: running						
	3: delayed shutdown						
	4: fault						
2	switching value input status 1	R	/	0	1	/	0: no fault, 1: fault
	bit 0 remote input						
	bit 1 compressor 1 high pressure						
	bit 2 compressor 1 low pressure						
	bit 3 compressor 1 overload						
	bit 4 Circulating pump overload						
	bit 5 Blower 1 overload						
	bit 6 Water level switch						
	bit 7 Water flow switch						
	bit 8 Anti-freezing switch						
	bit 9 3 phase						

	power switch						
	bit 10 compressor 2 high pressure						
	bit 11 compressor 2 low pressure						
	bit 12 compressor 2 overload						
	bit 13 blower 2 overload						
3	relay status	R	/	0	1	/	0: close, 1: open
	bit 0 blower 2						
	bit 1 compressor 2						
	bit 2 bypass valve						
	bit 3 High and low speed switching						
	bit 4 blower 1						
	bit 5 compressor 1						
	bit 6 circulating pump						
	bit 7 alarm						
4	Fault info.1	R	/	0	1	/	0: no fault, 1: fault
	bit 0 compressor 1 high pressure						
	bit 1 compressor 1 low pressure						
	bit 2 compressor 1 overload						
	bit 3 water level fault						
	bit 4 water flow fault						
	bit 5 circulating pump overload						
	bit 6 blower 1 overload						
	bit 7 anti-freezing fault						
	bit 8 power fault						

	bit 9 Too low liquid temp.						
	bit 10 Too high liquid temp.						
	bit 11 Liquid temp. probe breaks						
	bit 12 Liquid temp. probe short circuit						
	bit 13 Abnormal parameters						
	bit 14 Compressor running timeout						
	bit 15 Too high ambient temp.						
=	Fault info. 2	R	/	0	1	/	0: no fault, 1: fault
	bit 0 Ambient temp. probe breaks						
	bit 1 Ambient temp. probe short circuit						
	bit 2 Anti-freezing probe breaks						
	bit 3 Anti-freezing probe short circuit						
	bit 4 Too low anti-freezing temp.						
	bit 5 Compressor 2 high pressure						
	bit 6 Compressor 2 low pressure						
	bit 7 Compressor 2 overload						
bit 8 Blower 2 overload							
6	Fault info. 3	R	/	0	1	/	0: no fault,

	Backup						1: fault
7	Liquid temp. (water outlet temp. C)	R	/			Unit: 0.1°C	
8	Liquid temp. (water outlet temp. F)	R	/			Unit: 0.1°F	
9	Ambient temp.	R	/			Unit: 0.1°C	
10	Ambient temp.	R	/			Unit: 0.1°F	
11	Anti-freezing temp.	R	/			Unit: 0.1°C	
12	Anti-freezing temp.	R	/			Unit: 0.1°F	
13	backup	R	/			/	
14	backup	R	/			/	
15	backup	R	/			/	
512	Pump start command	W	/	0	1	/	1: valid, 0: invalid
513	Compressor start command	W	/	0	1	/	1: valid, 0: invalid
514	Muting command	W	/	0	1	/	1: valid, 0: invalid
515	Reset command	W	/	0	1	/	1: valid, 0: invalid
1024	Locking temp.	R/W	/	0	1	/	0: Able to modify the set temp. on the main screen.

1025	Setting temp.	R/W	/	min	max	°C	min=[set lower temp. limit] max=[set upper temp. limit]
1026	Setting temp.	R/W	/	min	max	°F	min=[set lower temp. limit] max=[set upper temp. limit]
1027	Start/stop method	R/W	/	0	2	/	0: local: Unit ON/OFF can only be controlled locally
1028	Backlight off time	R/W	/	0	255	Min.	
1029	Multilingual	R/W	/	0	1	/	