# SIC-A-EB

## Budget Air-cooled

## Water Chiller

Date: Nov. 2023

Version: Ver.B

## Contents

## Table Index



## Picture Index

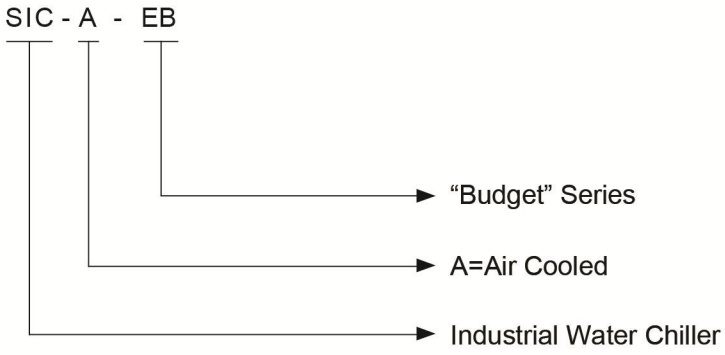
# 1. General Description

Please read through this operation manual before using and installation to avoid damage of the machine and personal injuries.

SIC-A-EB series are applicable for cooling molds to reduce products molding cycle, also they are available in the cooling of equipments in order to maintain a normal temperature. Besides, they are suitable for other industries with the need of cooling.

Picture 1-1: Budget Air-cooled Water Chiller SIC-10A-EB

## 1.1 Coding Principle




## 1.2 Features

1) Cooling range 7~25℃.
2) Stainless steel insulated water tank, with prolonged service life and free of contanmination.
3) Adopt R410A refrigerant with good refrigeration effect.
4) Refrigerating system adopts multiple precise controls that accurately control the system stability.
5) Compressor and pump overload protection.
6) Fin-style condenser with quick heat conduction and good dissipation effect.
7) Adopt tube evaporator.The copper pipe is directly mounted on water tank that is economical and practical.
8) Adopt renowned brand of original precision temperature-controlled.

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 7, 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.:

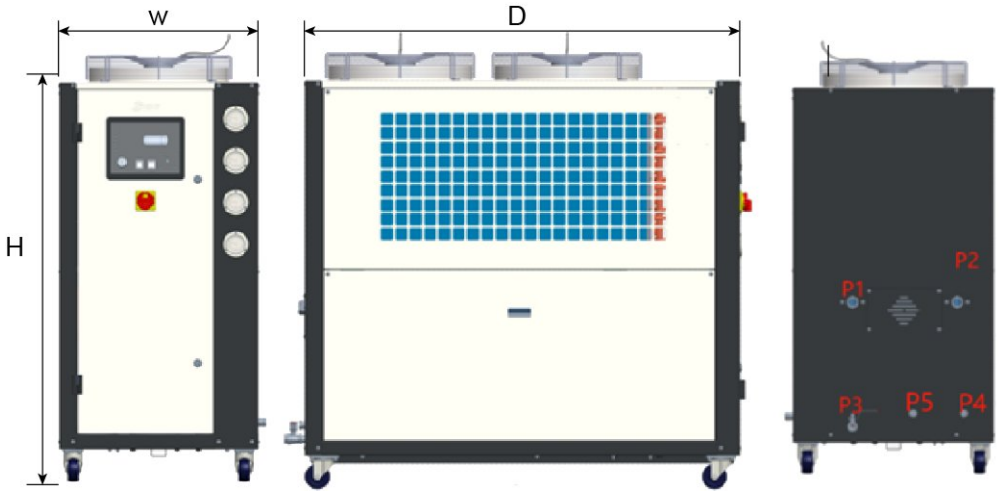
Tel: +86 (0)573 8522 5288

Shinden Precision Machinery (Chongqing), Inc.:

+86 (0)23 6431 0898

# 1.3 Technical Specifications

## 1.3.1 External Dimensions




Picture 1-2: Outline Dimensional Drawing

Table 1-1: Specifications

| Model | H (mm) | W (mm) | D (mm) | P1 Chilled Water Inlet (inch) | P2 Chilled Water Outlet (inch) | P3 Water Tank Outfall (inch) | P4 Water Tank Overfall (inch) | P5 Water Tank Refill Port (inch) | Weight (kg) |
|---|---|---|---|---|---|---|---|---|---|
| SIC-5A-EB | 1265 | 661 | 1344 | 1" | 1" | 1/2" | 1/2" | 1/2" | 240 |
| SIC-10A-EB | 1430 | 697 | 1490 | 1" | 1" | 1/2" | 1/2" | 1/2" | 310 |
| SCI-15A-EB | 1650 | 931 | 1853 | 1.5" | 1.5" | 1/2" | 1/2" | 1/2" | 420 |

## 1.3.2 Specification List

Table 1-2: Specification List

| Model | | SIC-5A-EB | SIC-10A-EB | SIC-15A-EB |
|---|---|---|---|---|
| Refrigerant capacity | kW | 10 | 20 | 30 |
| | Kcal/hr | 8,600 | 17,200 | 25800 |
| Compressor | Type | Scroll | | |
| | Output Power kW | 2.9 | 5.8 | 13.3 |
| Refrigerant | Filling volume(kg) | 7.5 | 15 | 11 |
| | Control mode | Capillary pipe | | Expansion valve |

| | | | | |
|---|---|---|---|---|
| | Type | R410 | | |
| Evaporator | Type | Tube style | | |
| Condenser | Type | Fin style | | |
| | Blower power(kW) | 0.19x2 | 0.25x2 | 0.8*2 |
| Water tank capacity(L) | | 55 | 145 | 161 |
| Water pump(50HZ) | Power (kWw) | 0.37 | 0.75 | 1.5 |
| | Pump flow(L/min) | 60 | | 133 |
| | Working pressure (kgf/cm²) | 2 | | 3 |
| Total power (kw) | | 3.65 | 7.05 | 16.4 |
| Pipe coupling （inch） | Chilled water outlet | 1" | | 1.5" |
| | Chilled water inlet | 1" | | 1.5" |
| | Water tank drainage Port | 1/2" | | |
| | Water tank overflow Port | 1/2" | | |
| Protective devices | Compressor | Built-in protective switch/Overload relay | | |
| | Pump | Overload relay | | |
| | Refrigeration loop | Hight and low pressure controller | | |
| Power | | 3Φ，400VAC，50Hz | | |
| Measures exchange | | 1KW=860kcal/hr 1RT=3,024kcal/hr 10.000Btu/hr=2,520kcal/hr | | |

Note:

1) The refrigeration capacity is measured based on the outlet temperature (20℃) of chilled water under the environment temperature of 35℃.
2) Special orders of machine voltage can be acceptable according to customers's request.

## 1.4 Safety Regulations

The user must conform to the following safety rules when operating the machine.

### 1.4.1 Security Labels

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! Be careful!

Pay more attentions at the places where this sign is attached!

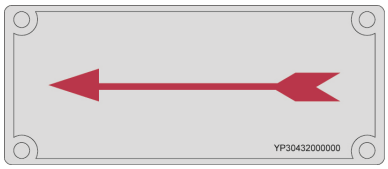
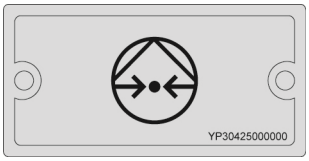
Attention!

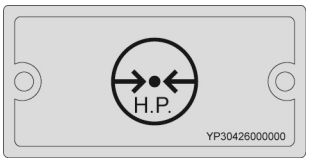
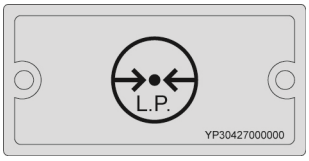
Drain the water inside when power off at the cold day to avoid freezing!

Attention!

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

### 1.4.2 Signs and Labels

| | |
|---|---|
|  | This is for indicating motor rotating direction.<br>When phase reversal happens, the alarm sounds and indicator on control panel will indicate. Please exchange the place of the two electrical wires to solve this problem. |
|  | Pump pressure gauge: display actual pressure of cold water system. |

| | |
|---|---|
|  | High pressure gauge: display pressure in the high-pressure side of refrigerant system. |
|  | Low pressure gauge: display pressure in the low-pressure side of refrigerant system. |
|  | Chilled Water Return(From Mould) |
|  | Chilled Water Outlet (To Mould) |
|  | Water Supply Inlet |
|  | Drain |
|  | Overflow |

## 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.

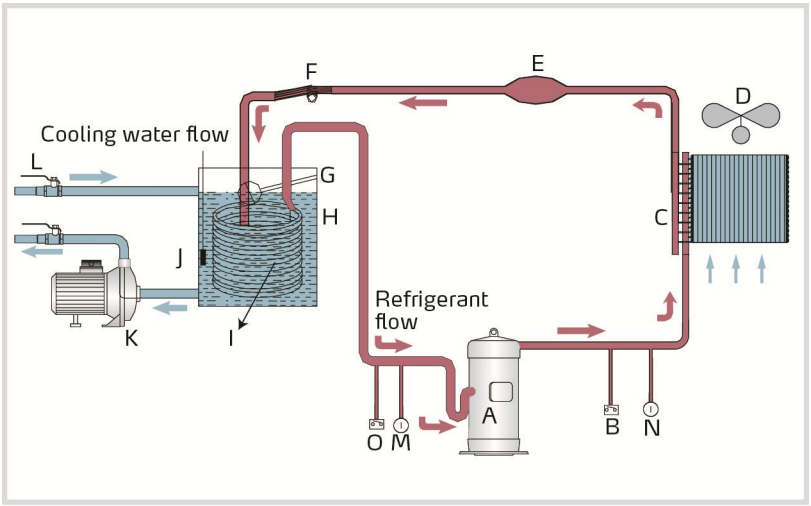
3. Any operational actions that are not authorized by Shini upon machine, including adding or replacing accessories, dismantling, delivering or repairing.
4. Employing consumables or oil media that are not appointed by Shini.

# 2. Structural Features and Working Principle

## 2.1 Main Functions

SIC-A-EB Budget Air-cooled Water Chiller is constituted by 4 parts: compressor, condenser, capillaries and tube evaporator. It adopts the single-stage vapour compression refrigeration system and obtains the rifregirating effect by refrigerant gas-liquid transformation and heat absorption and release principle.

### 2.1.1 Working Principle




Picture 2-1: Working Principle

Parts name:

| | | |
|---|---|---|
| A. Compressor | B. High- pressure controller | C. Fin type condenser |
| D. Fan | E. Drying filter | F. Castanding poley |
| G. Floating-ball valve | H. Water tank | I. Evaporator |
| J. Thermocouple | K. Pump | L. Ball valve |
| M. Low pressure gauge | N. High pressure gauge | O. Low pressure controller |

When SIC-A-EB air-cooled water chiller starting up, compressor (A) starts working. Refrigerant is compressed into high temperature high pressure gas, and then be cooled when passing through condenser (C) and changed into liquid. Heat is taken away by the cooling air. The liquid high pressure refrigerant passes through the castanding poley (F), and partial refrigerant is changed into gas under reduced pressure. At this time, the refrigerant is mixed with gas and liquid, which cools down the chilled water into required temperature after passing through the

tube evaporator (I). By heat adsorption, the liquid refrigerant changes to gas and returns the compressor for this circulation.

### 2.1.2 Main Parts and Functions

#### 2.1.2.1 Compressor

1) Compressing and conveying the refrigeration steam and forming low pressure in evaporator and high pressure in condenser, the compressor is the core of the whole system.
2) SIC-A-EB adopts scroll compressor.

Picture 2-2: Compressor

#### 2.1.2.2 Condensor

1) Condenser is a heat output device which is used to discharge the heat absorbed by the evaporator and converted by the compressor to the cooling medium.
2) SIC-A-EB adopts fin-style condenser.

Picture 2-3: Condensor

#### 2.1.2.3 Drying Filter

1) The functions of the dry filter are: clean the impurity in the refrigerant, absorb the free moisture in the refrigerant, and prevent the narrow section (especially the valve port of the heat expansion valve) of the pipe from forming ice jam.

2) The size of the filter is usually chosen according to the caliber of the cooling agent pipe.

Picture 2-4: Drying Filter

2.1.2.4 Capilliary or Thermal Expansion Value

1) The capilliary or the thermal expansion valve throttles the refrigerant and reduces the pressure of it, as well as regulate the refrigerant flow which enters the evaporator.
2) Install it in front of the evaporator.

Picture 2-5: Caplillary or Thermal Expansion Valve

2.1.2.5 Evaporator

1) The evaporator is a device that outputs the refrigerant, which absorbs the heat of the cooled object in the evaporator, so as to achieve the refrigerating purpose.

2) Our company uses the tube evaporator.

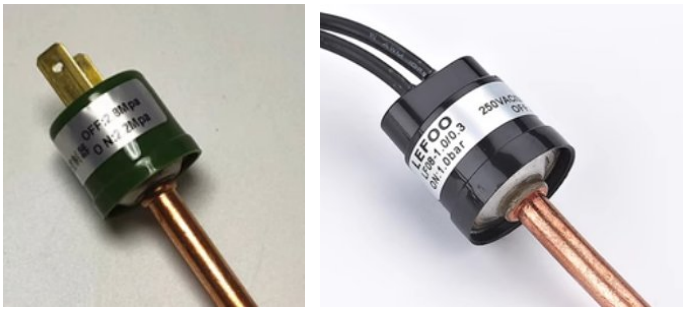
Picture 2-6: Evaporator

2.1.2.6 High and Low Pressure Controller

1) The high and low pressure controller is used to check the working pressure of the compressor's inlet and outlet.

2) The high-pressure controller is set to 37bar, and the low-pressure controller is set to 4bar.

3) It will give the alarm when the compressor outlet air pressure is higher than 37bar, or the compressor inlet air pressure is lower than 4bar.



Picture 2-7: High and Low Pressure Controller

# 3. Installation and Debugging

 Attention!

Read this chapter before installation. Install the machine according to following steps!

Air-cooled water chiller should be installed in an environment that has good ventilation, such as draughty area near the window. Ambient temperature should not be more than 43℃ if it is installed indoors. Use ventilator or exhaust pipe to conduct the hot air produced by the chiller to the outside. If the chiller is installed outdoors, protective cover should be used.

## 3.1 Installation Notices

1) Make sure that the voltage and frequency corresponds with the requirements on manufacturer's name plate.
2) Connection of the machine electrical wires and negative wire according to local rules and regulations.
3) Use independent electrical wires and switch. Diameter of electrical wire should not be smaller than that of the electric wire which is used for the electrical control box.
4) Wiring connections should be firmly fixed.
5) This series of water chillers adopts the three-phase five-wire power supply, which is connected to the live wire, (N) to the neutral wire, and (G) to the ground wire.
6) Power supply:
   Voltage deviation: Rated voltage on the nameplate: ±5%
   Frequency deviation: ±2%
7) ***Please refer to electrical drawing of each model to get the detailed power supply specifications***

 Electrical wire connection of water chiller should be done by qualified electrician!

Electrical wiring circuit should not be modified unless authorized by our company. We shall not be reliable for machine damages caused by unauthorized

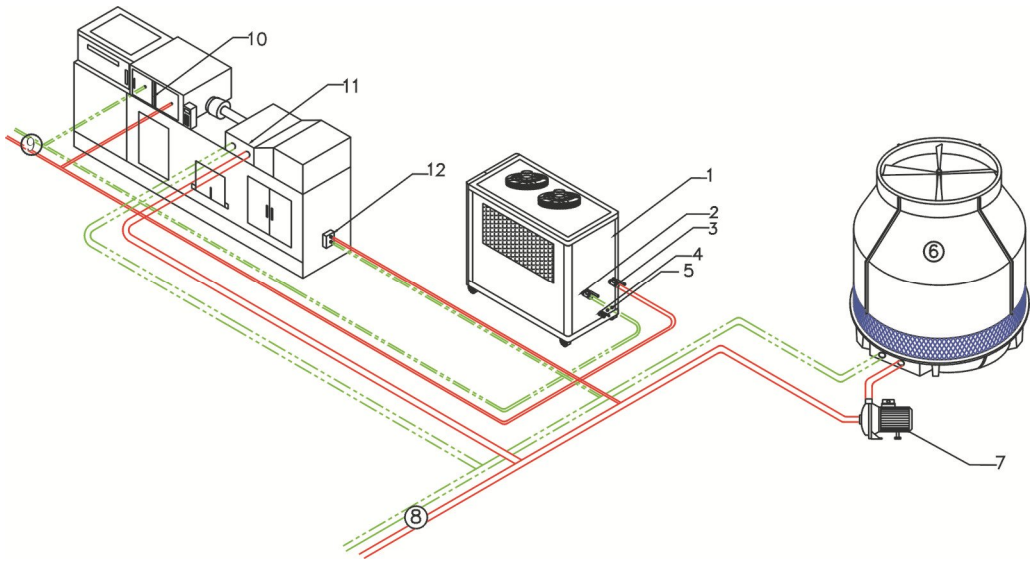
modification.

Attention!

Before connecting the machine with power supply, please make sure that main switch is turned off!

## 3.2 Schematic Drawing of Installation

1) Install the pipe system according to the installation and wiring diagram. Use heat insulating material to achieve heat preservation of chilled water pipe.
2) The pipe diameter of circulation pump should be no less than condenser adapter tube. (The in-and-out pipe system should be installed according to the wiring diagram). It should use large diameter pipes to connect the cooling water during long distance conveying.
3) Mount the water discharge valve at the lowest point of chilling water circulation system.
4) When water quality and environment around cooling tower is poor, the cooling water and chilling water circulation loop must be mounted with filter for regular cleaning.
5) Test if the pipe has leakage after installation. The chilling water circulation loop must be wrapped with insulation layer in case of heat loss and water leakage.




Picture 3-1: Installation Location

Parts Name ：

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

# 4. Application and Operation

## 4.1 Control Panel


Picture 4-1: Control Panel

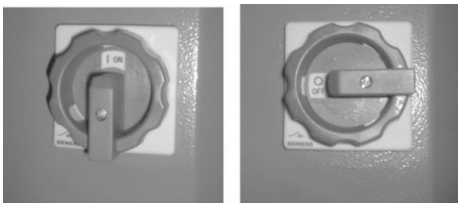
Table 4-1: Specification of Control Panel

| No. | Name | Functions | Remarks |
|---|---|---|---|
| 1 | Power indicator | After powering on, switch on the main power switch, the indicator will on. | Note: Don't try to disassemble any unit or touch any terminal after powering on, otherwise it may cause electric shock. |
| 2 | Power reverse phase alarm light | When the power phase sequence is incorrect or shortage, this light will on, and the buzzer will give an alarm. The system stops working. | After checking the power and exchanging the positions of any two power inlet cables to troubleshoot this fault. After troubleshooting, the lights and buzzers will reset. |

| | | | |
|---|---|---|---|
| 3 | Pump overload alarm light | When the pump current is too large, this light will be on and make the buzzer to sound an alarm. The system stops working. | Check if the motor is stuck or if the bearings are damaged. If the motor works normally, then check whether the set current of the thermal overload relay inside the control box is set too low again. After troubleshooting above faults, wait for about one minute and reset the thermal overload relay by pressing the blue reset "RESET" button to reset the alarm. |
| 4 | Compressor overload alarm light | When the compressor's working current exceeds the set value of the overheat switch, the light will on and it makes the buzzer to sound an alarm. The system stops working. | Check whether the value of current overheat switch is set reasonably. The current set value of overheat switch must be greater than the rated current of the compressor. |
| 5 | Too high pressure alarm light | When the compressor outlet's pressure exceeds the high-pressure controller, the light will light up and it makes the buzzer to sound an alarm. The system stops working. | Check whether the value of the high-pressure controller is set reasonably. The set value of the high-pressure controller is 30 bar. |
| 6 | Too low pressure alarm light | When the compressor inlet pressure is less than the set value of the low-pressure controller, the light will light up and it makes the buzzer to sound an alarm. The system stops working. | Check whether the value of the low-pressure controller is set reasonably. The set value of the low-pressure controller is 4bar. |
| 7 | Buzzer | When the system malfunctions, the buzzer will alarm. | |
| 8 | Compressor switch | For compressor start and stop. | Note: Turn on the pump, and then turn on the compressor. |
| 9 | Pump switch | For pump start and stop. | Note: The direction of pump operation must be correct. |
| 10 | Temperature controller | Temperature setting and control. | Please refer to Chapter 4-4 for detailed settings. |

## 4.2 Machine startup

1) Turn on the main switch.



ON OFF

Picture 4-2: Stepup Step

2) Turn on the pump.

   Noets:

   a) When the operation pressure is lower than the values in the table above, the motor of the pump may be damaged because of large water flow.

   b) When the operation pressure is higher than the vaues in the table above, the water flow may be insufficient and the machine may need a pump replacement to ensure high pressure.

3) Set chilling water temperature (Neglect this step if temperature is already set).Setting details please refer to 4.4 Chapter Temperature Controller. For this series of water chiller, lowest process temperature should be set as 7℃.

4) Turn on the compressor.

Attention!

Pump rotating direction should be correct.

Attention!

Before starting the system, make sure that cooling water pump is turned on. Check the water tank of the chiller. Do not start the machine when there is no water left in water tank. We shall not be liable for any damages caused by this reason.

Attention!

In order to reduce the possibilities of machine damage and prolong the life, start

the machine with correct methods.

 Attention!

Anti-freezing switch and high/low pressure controller have been set in the factory, which forbids random adjustment without the company's permission. Otherwise, we are not liable for the responsibility of any machine damage.

 Attention!

The compressor can't be started frequently because of its characteristics (Frequent start will shorten its service life.). Therefore, the compressor will work about 3 minutes later after turning on the water pump. The parameter of temperature controller shall not be adjusted freely since it is already set.

## 4.3 Machine Shutdown

1) Turn off the compressor.
2) Turn off the pump. (Better to wait for 30 seconds after the compressor shutdown to ensure that the refrigerant in the evaporator is completely evaporated.)
3) Turn off the main switch.

 Attention!

Avoid electrical shock when main switch is turned on.

 Attention!

In order to reduce the possibilities of machine damage and prolong the life, shut off the machine with correct methods.

## 4.4 Temperature Controller


Picture 4-1: Temperature Controller

### 4.4.1 Temperature Setting Method

1) Press the set button for 3 secs., and the screen will show a number that indicates current temperature set value.
2) Use the power or cold defrost key to modify the set temperature value, which has been limited to 7~25 ℃ at the factory. Finally, press the set key to confirm the modification (Return to the parameter menu).

### 4.4.2 Factory Parameters Setting Table

Table 4-2: Factory Parameters Setting Table

| No. | Parameter | Parameter Meaning | Factory Setting | Remarks |
|---|---|---|---|---|
| 1 | / | OUT1 set value | 7 | Unit: ℃ |

Note: This parameter is only applicable to temperature controller PZXNS0G001(CAREL). Please don't use this parameter to set other model or version.

Notice!

Don't attempt to enter any other parameter, otherwise if you modify any other parameter values by accident, it may result in machine abnormalities.

Table 4-3: Alarm List

| Alarm Code | Buzzer and Alarm Delay | LED | Description | Parameters Involved |
|---|---|---|---|---|
| E0 | Enable | ON | Sensor 1 error = control | |
| E1 | Disable | ON | Sensor 2 error = defrost | [d0=0/ [d0=0/1] |
| E2 | Disable | ON | Sensor 3 error = condenser | [A4=10] |
| IA | Enable | ON | External alarm | [A4=1][+A7] |
| dOr | Enable | ON | Door opening alarm | [A4=7/8][+A7] |

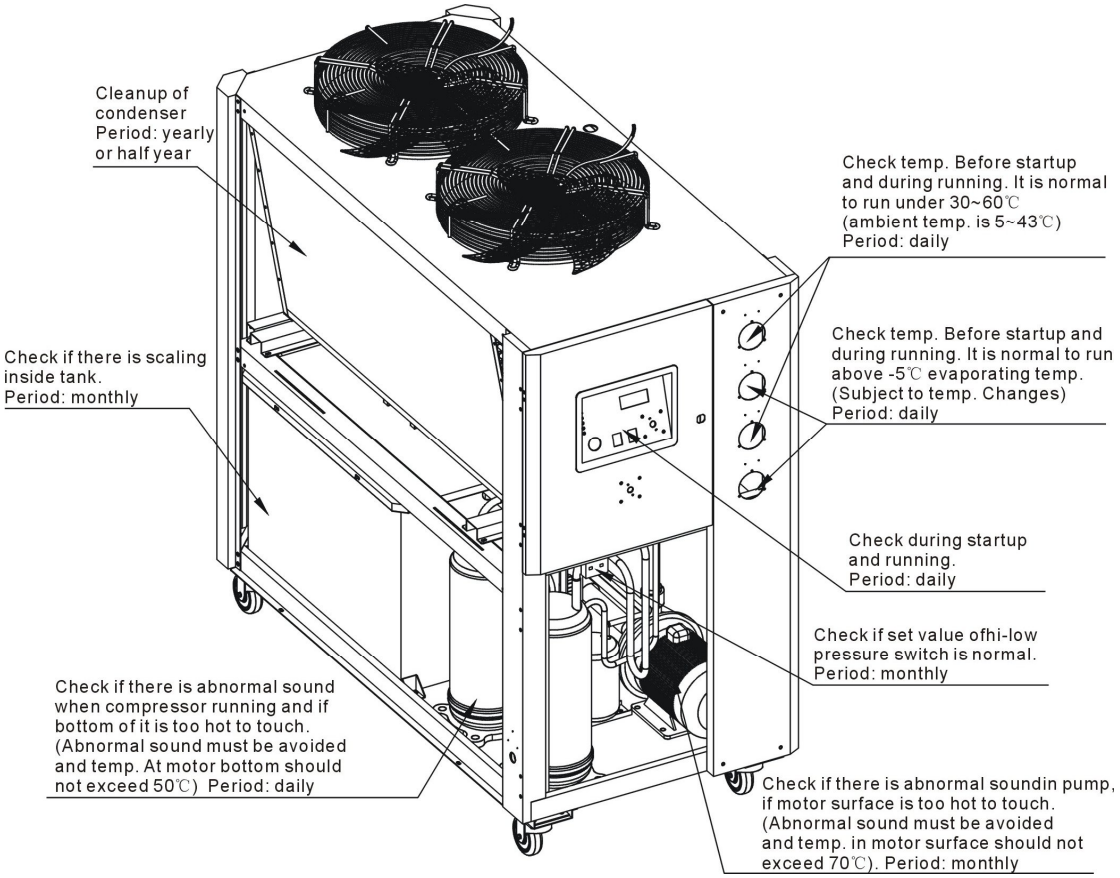
| | | | | |
|---|---|---|---|---|
| LO | Enable | ON | Low temp. alarm | [AL][Ad] |
| HI | Enable | ON | High temp. alarm | [AH][Ad] |
| EE | Disable | ON | Equipment parameter error | - |
| EF | Disable | ON | Running parameter error | - |
| Ed | Disable | ON | Stop defrosting based on timeout | [dP][dt][d4][A8] |
| dF | Disable | OFF | Defrost running | [d6=0] |
| cht | Disable | ON | Condenser dirt warning | [A4=10] |
| CHt | Enable | ON | Condenser dirt alarming | [A4=10] |
| EtC | Disable | ON | Clock alarm | If the clock is enabled |

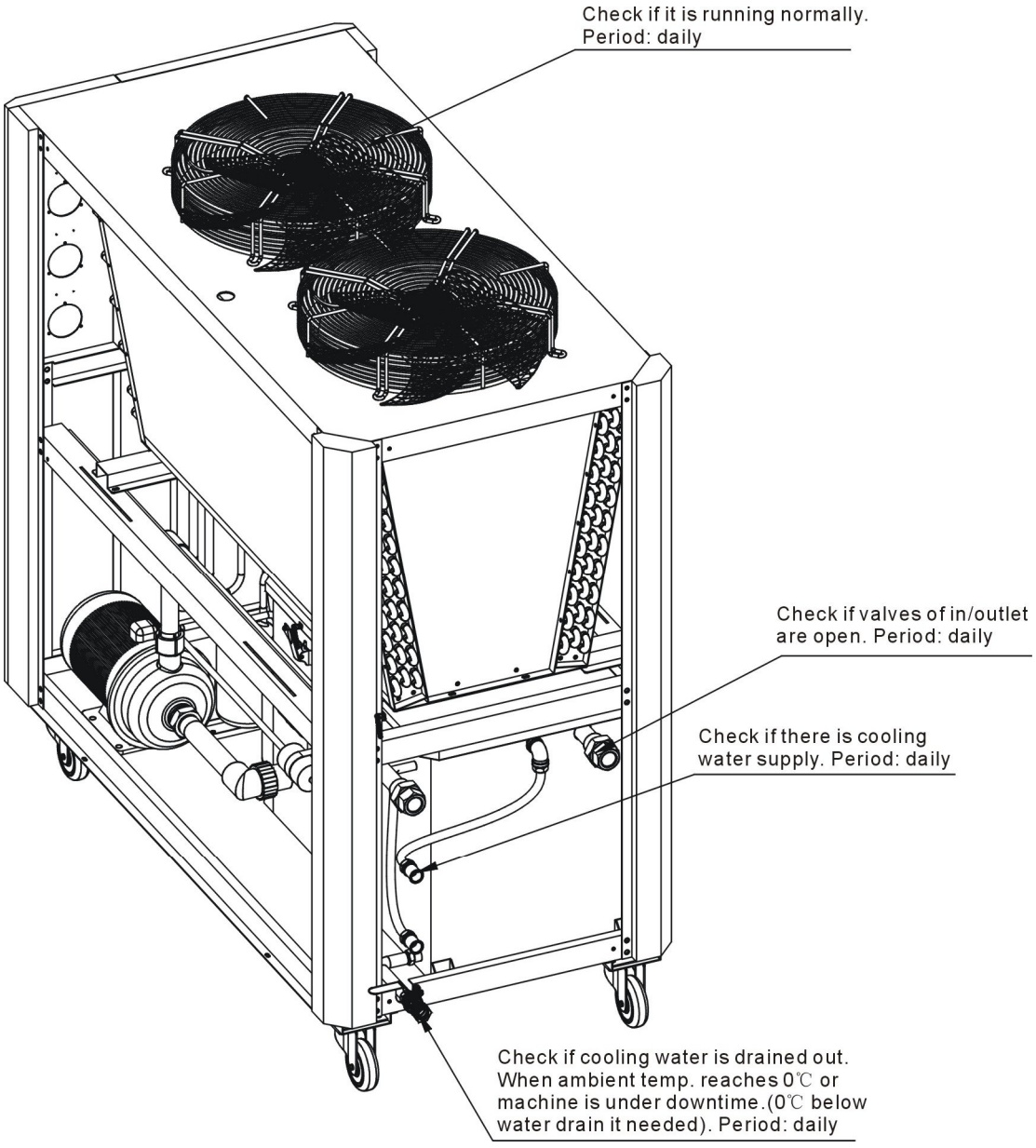
# 5. Trouble-shooting

| Faults | The action of the protection units | The possible fault analysis | Solutions |
|---|---|---|---|
| 1. No power supply display or phase reversal | The protection units have no action | A. The power supply is not switched on<br>B. The fuse wire of the control loop is burned out<br>C. The linear ordering of the power supply is in the reverse order<br>D. The fault of the main switch or circuit | A. Power on after checking<br>B. Check the protection loop<br>C. Change the wires in order of two random power supply wires<br>D. Check or replace |
| 2. Pump overload | The loader trips | A. Over current<br>B. The fault of the pump<br>C. The fault of the pump over loading controller | A. Reset the over loader<br>B. Replace after checked and repaired<br>C. Replace after checked and repaired |
| 3. Compressor overload | The loader trips | A. Over current<br>B. The fault of the compressor<br>C. The fault of the compressor over loading controller | A. Reset the over loader<br>B. Replace after checked and repaired<br>C. Replace after checked and repaired |
| 4. The high pressure is too high | The high pressure switch trips | A. The refrigerant is too much<br>B. The amount of blast to the condenser is not enough<br>C. The sediment incrustation of the condenser is too much<br>D. The dry filter is blocked up<br>E. The open scale of the expansion valve is too narrow<br>F. The fault of<br>F. The fault of the fan<br>G. The fault of the high ressure switch<br>I. The condenser is beaten by the sunshine | A. Discharge some of the refrigerant<br>B. Increase the amount of blast to the condenser<br>C. Clean the condenser<br>D. Clean the dry filter<br>E. Adjust the open scale properly<br>F. Replace after checked and repaired<br>G.. Replace after checked and repaired<br>H. Replace after checked and repaired<br>I. Prevent the condenser from being beaten by the sunshine |
| 5. The high pressure is too low | The protection units have no action | A. The regrigerant is not enough.<br>B. The vanes of the compressor are spoiled<br>C. Ambient temperatute is too low | A. Check the system pipeline and weld pipeline, add refrigerant.<br>B. Replace after checked and repaired.<br>C. Ward off part of the condenser to ensure high pressure above 27bar. |
| 6. The low pressure is too low | The low pressure switch trips | A. The refrigerant is not enough<br>B. The dry filter is blocked up<br>C. The open scale of the expansion valve is too small<br>D. The fault of the expansion valve<br>E. The fault of the low pressure switch | A. Check the system pipe lines, weld pipelines, and supply refrigerant.<br>B. Clean the dry filter<br>C. Adjust the open scale properly<br>D. Replace after checked and repaired<br>E. Replace after checked and repaired |
| 7. The low pressure is too high | The protection units have no action | A. The cooling load is too big<br>B. The power of the compressor decreases<br>C. The open scale of the expansion | A. Adjust the cooling load<br>B. Replace after checked and repaired<br>C. Adjust the open scale of the expansion valve |

| | | | |
|---|---|---|---|
| | | valve is too big<br>D. The packed weight of the refrigerant is excessive | D. Discharge some of the refrigerant |
| 8. Compressor overheat | The protection units have no action | A. The heat degree of the refrigerant in the air return pipe is too high<br>B. The high pressure is too high<br>C. The low pressure is too low | A. Adjust the open scale of the expansion valve properly<br>B. Check, repair and improve<br>C. Check, repair and improve |
| 9. The chassis of the air return pipe and the compress or frost over | The protection units have no action | A. The open scale of the expansion valve is too small<br>B. The refrigerant is too much<br>C. The heat load is too small<br>D. Bad efficiency of evaporator. | A. Adjust the open scale of the expansion valve properly<br>B. Check the system pipeline and weld pipeline, add refrigerant.<br>C. Increase the heat load.<br>D. Clean the evaporator. |
| 10. The compressor can not start up or trips after starting up | The protection units have no action | A. The power supply wire is broken or the voltage is off normal<br>B. The temperature control instrument is not set up properly<br>C. The over loading protector is not reset | A. Check and connect the wires according to Specifications<br>B. Reset the temperature control instrument<br>C. Reset the over loading protector |
| | The freeze protection switch trips | A. The amount of the ice water is too little and bring about that the water temperature is too low<br>B. The temperature control is set too low or has some faults<br>C. The freeze protection switch is not properly set or has some faults | A. Check the pump and discharge the air in the water pipe<br>B. Correct the set point or change<br>C. Check, weld and repair |
| 11. The cooling capacity can not get up to the standard | | A. There is some air in the cooling system<br>B. The water quantity and water supply in the cooling system is abnormal<br>C. The fans run abnormally<br>D. The filter is blocked up<br>E. The configure of the cooling pump is not prope<br>F. The cooling water pipe is not configured according to the standard.<br>G. Bad efficiency of the evaporator and condenser.<br>H. Expansion valve is blocked.<br>I. Inaccurate refrigerant fillig. | A. Discharge the air<br>B. Control the water level of the water supply tank<br>C. Check and repair<br>D. Clean the filter<br>E. Choose the pump up to the standard (flow quantity and delivery lift)<br>F. Configure water pipe according to the standard<br>G. Clean the evaporator and condenser.<br>H. E. Replace after checked and repaired.<br>I. Accurately supply the refrigerant. |

# 6. Maintenance and Repair






Attention!

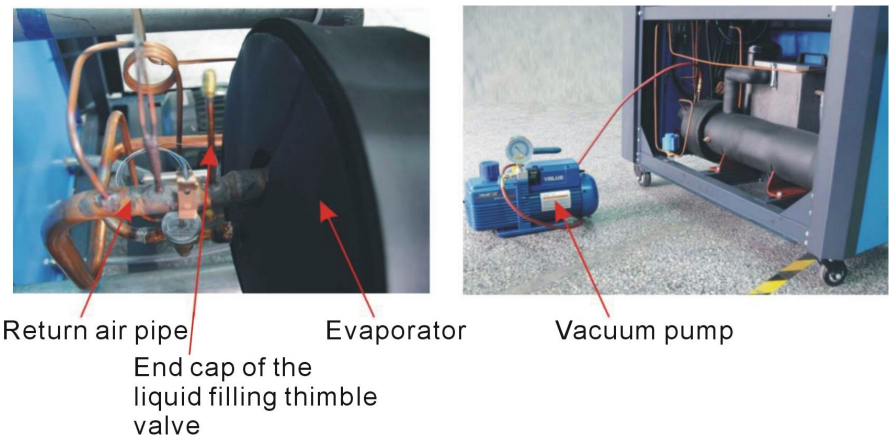
All repair work should be done by qualified personnel only to avoid damage to the machine or personnel injury.

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

1) Do not turn off the main power switch to stop the machine, except emergency situation.
2) When failures set in and the machine stop work with buzzer sound, first turn off the main power switch of the machine (alarm indicator will die), then go to check the reason of the failures, do not force the machine on before remove the failures.
3) Please check periodicaly to prolong the life of the machine and prevent the safety accident to appear.
4) Water supply should be processed, because the high PH can corrode the copper pipe acute. This must reduce the life of the heating and cooling implement, PH of the water supply must be between 7.0~8.5.
5) Keep the machine room dry, clean and draughty.
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 Fill in the Refrigerant

1) Screw off the end cap of the liquid filling thimble valve, and connect the air suction pipe of the vacuum pump to the liquid filling thimble valve to take the vacuum pumping, and this process may take one to two hours. The high & low pressure gauge dispalys -76mmHg。




Picture 6-1: Fill in the Refrigerant (1)

2) After the vacuum pumping, connect the air pipe of the refrigerant tank to the liquid filling thimble valve, and fill the refrigerant into the air return pipe. Watch the change of the weight displayed by the electronic scale, and stop filling the refrigerant immediately when receiving the schedule weight. Make sure that the filling refrigerant must be liquid and be filled when the machine stops.
In the condition of the starting up, the shown pressure of the high pressure gage should be about 29 to 31 bar; and shown pressure of the low pressure gage should be about 7 to 8 bar. (Note: the ambient temperature should be35℃, and the temperature of the chilled water should be 12℃/7℃.)


Picture 6-2: Fill in the Refrigerant (2)

Table 6-1: Filling Quantity

| Model | Filling Quantity of Refrigerant (kg) |
|---|---|
| SIC-5A-EB | 3.5 |
| SIC-10A-EB | 5.0 |

## 6.2 Components Maintenance

### 6.2.1 Condenser

SIC-A-EB series water chiller use the air cooled fin style condenser which installed openly, in the using time, it is hard to avoid any dust and sundries, which will influence the heat emission effect, so it is necessary to clean the condenser at fixed periods in order to keep its working performance. Use brush, dust catcher or compressed air to clean the wings and copper pipe. Then use the low pressure water to cascade the tray pipe. Note: do not let the water to cascade on the surface of the fan motor.

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.

### 6.2.2 Evaporator

The inner flank of the heat emission pipe will pile up a great deal of water incrustation 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 incrustation scale. If the circulation is not processed under water treatment, clean it with citric acid and sulfamic acid along with inhibiter, and then flush it with a high pressure water rifle. Passivation is need after acid washing, and the dirt will be diacharged from the water outfall.

Attention!

Drain the water inside the evaporator and the condenser away when the machine stop running under 0℃.

Picture 6-3: Water Drainage Port

## 6.3 Maintenance Schedule

### 6.3.1 About the Machine

Model _____ SN _____ Production date _____

Voltage _____Φ _____ V Frequency _____ Hz

Total power _____ kW

### 6.3.2 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 welding joint.

#### Electrical Installation

☐Voltage: _____ V _____ Hz

☐Fuse specification: 1 Phase _____A 3 Phase _____ A

☐Check phase sequence of power supply.

### 6.3.3 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.

### 6.3.4 Weekly Checking

☐Check electrical connections.

☐Check protection & alarm function.

☐Check whether set point of hi-low pressure switch is normal.

### 6.3.5 Montly Checking

☐Check refrigerant circulation pipe.

☐Check whether there are bubbles in liquid indicator.

☐Check whether there is abnormal sound in pump.

☐Check whether there is scale formation in tank.

### 6.3.6 Trimonthly Checking

☐Check whether condenser is under blockage.

### 6.3.7 Half-yearly Checking

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

### 6.3.8 Yearly Checking

- ☐ Check whether the contactor is normal.

### 6.3.9 3 year Checking

- ☐ PC board renewal.
- ☐ No fuse breaker renewal.