

For Parts and Service, Contact Budzar Industries  
Phone: 440-918-0505 Fax: 440-918-0606/0707

# **SIC-A series**

Air-cooled Water Chillers

Date: May, 2008

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210-A Series

Air-cooled Water Chillers

Model VS 2 (1/2 ton)

Part No. 2000



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## 1. General Description

### 1. General Description



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

The SIC-A series of air-cooled water chillers use a single closed-loop design for pressurised refrigerant. All models are equipped with compressor and motor overload protection, phase shortage and reversal alarms, antifreeze thermostat, pressure gauges, solenoid valve for hot air by-pass, etc. They feature excellent performance and a long lifespan. The series of working flow is based on the basic principle of heat exchange. It is applicable to the industry that requires flow of precisely controlled chilled water, and considered as indispensable equipment for modern industry.



SIC-5A



## 1. General Description

### Main Features:

- 1) Cooling capacity from 38.8' F to 68.3' F.
- 2) Stainless insulated water tank.
- 3) Equipped with anti-freeze thermostat.
- 4) Refrigeration loop controlled by high and low pressure switches.
- 5) R22 refrigerant used as standard for efficient cooling.
- 6) Compressor and pump overload relays.
- 7) Tube-fin condenser design for excellent heat transfer and rapid cooling.
- 8) Tube-in-shell evaporator for excellent cooling.
- 9) Italian made temperature control can maintain accuracy of  $\pm 1F$ .
- 10) Hot air by-pass device makes the machine work more stably with more precise temperature control and longer service life.
- 11) Compact design, easy to operate and maintain.

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.

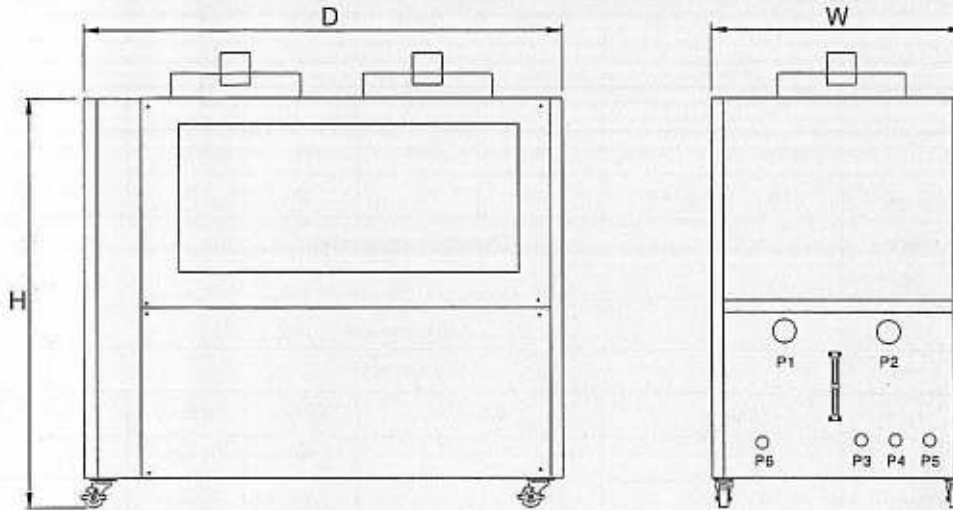
Hot service line, SHINI USA:  
Tel: 440-530-1000 / 440-382-1466



**2. Technical Specifications**

**2. Technical Specifications**

**2.1 SIC-A Series Outer Dimensions**



Model	P1 Process Water Inlet	P2 Process Water Outlet	P3 Water Tank Refill Port	P4 Water Tank Outlet Port	P5 Water Tank Overflow Port	P6 Evaporator Outlet Port	W (mm)	D (mm)	H (mm)	Weight (kg)
SIC-3A	1"	1"	1/2"	1/2"	1/2"	1/2"	740	1360	1410	250
SIC-5A	1"	1"	1/2"	1/2"	1/2"	1/2"	740	1360	1410	310
SIC-8A	1 1/2"	1 1/2"	1/2"	1/2"	1/2"	1/2"	900	1730	1410	426
SIC-10A	1 1/2"	1 1/2"	1/2"	1/2"	1/2"	1/2"	900	1730	1410	423
SIC-15A	2"	2"	1/2"	1/2"	1/2"	1/2"	900	1800	1580	670
SIC-20A	2"	2"	1/2"	1"	1/2"	1/2"	1100	2640	2040	1050
SIC-30A	2 1/2"	2 1/2"	1/2"	1"	1/2"	1/2"	1100	2640	2040	1220
SIC-40A	2 1/2"	2 1/2"	1/2"	1"	1"	1/2"	1300	3460	2040	1500

## 2. Technical Specifications



### 2.2 SIC-A Series Specification List

Item	Model Parameter	SIC-3A	SIC-5A	SIC-8A	SIC-10A	SIC-15A	SIC-20A	SIC-30A	SIC-40A	
(1) Refrigeration Capacity	kW	7.69	13.5	19.08	25.56	38.79	51.12	77.58	102.24	
	kcal/hr	6612	11607	16405	21976	33352	43943	66703	87906	
Compressor	Type	Scroll <sup>(2)</sup>			Scroll					
	Power	kW	2.2	3.7	6	7.5	11	15	22	30
		Hp	3	5	8	10	15	20	30	40
Refrigerant	Weight (kg)	4.0	4.5	7	9	13	18	28	36	
	Control Mode	Thermostatic expansion valve								
	Type <sup>(3)</sup>	R22								
Evaporator	Type	Tube-in-shell style								
Condenser	Type	Tube-fin style								
	Inlet Pipe	0.12×2		0.18×2		0.25×2	0.55×2	0.75×2	0.75×3	
Water Tank (L)		50		85	150	180	270	400		
Pump <sup>(6)</sup> (60Hz)	Power (kw) (50/60Hz)	1.5		1.5		2.2	4	4		
	Pump Flow (L/Mn)	100		100		117	216	267		
	Working Pressure (kg/cm <sup>2</sup> )	3.8			4.0			4.4		
Total Power (kW)		3.24	4.74	7.41	9.41	13.7	18.4	26.0	39.4	
Pipe Coupling (inch)	Cooling Water Outlet	1" × 1		1½" × 1		2" × 1		2½" × 1		
	Cooling Water Inlet	1" × 1		1½" × 1		2" × 1		2½" × 1		
	Drainage Port Of Water Tank	1/2"					1"			
	Overflow Port Of Water Tank	1/2"							1"	
Protections	Compressor	Overload relay / solenoid valve for hot air by-pass								
	Pump	Overload relay								
	Refrigerant Circuit	High and low pressure switch / anti-freezing switch / by-pass valve								
	Cooling Water Circuit	by-pass valve / Water level switch (Option)								
Power		3Φ, 460V, 60Hz								
Measures Exchange		1 kW = 860 Kcal/hr		1 RT = 3024 Kcal/hr		10000 Btu/hr = 2520 Kcal/hr				

Note: 1) Refrigeration capacity is tested under the condition that cold water outlet temperature is at 53.8°F and ambient temperature at 86°F.

2) A piston type compressor is used with 3Φ, 230V power supply(SIC-3A – SIC-5A).

3) Environment-friendly R470C refrigerant is optional. (Model denotes "U", such as SIC-5A-U)

4) It is standard high-pressure pumping.

5) Demands on special voltage of power supply could be satisfied.

6) Air-cooled chillers are best to be used in the environment with ambient temperature under 86°F.

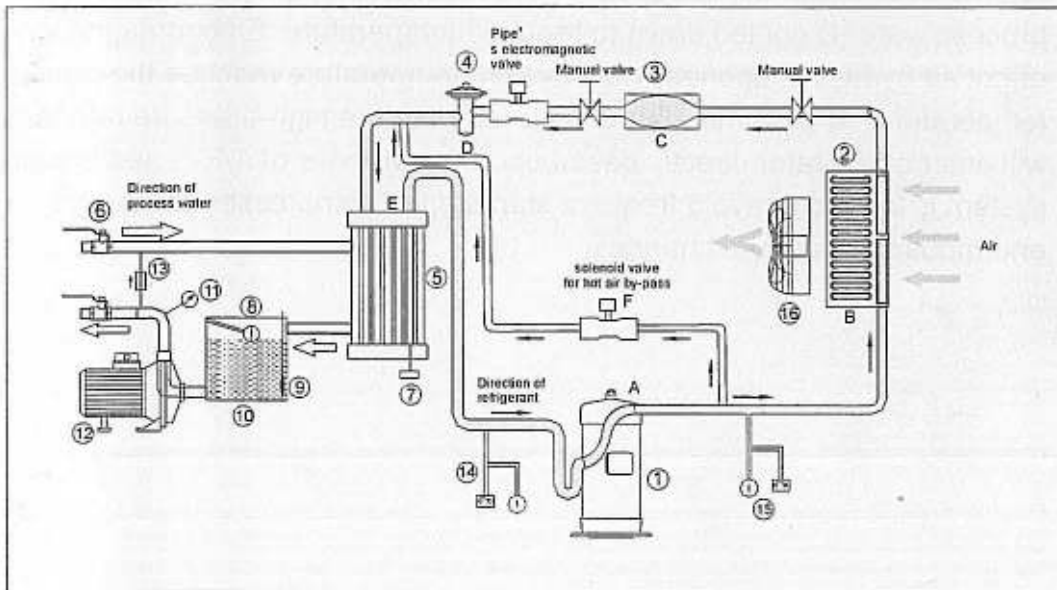


### 3. Main Functions

## 3. Main Functions

### 3.1 Working Principle

SIC-A air-cooled water chillers include compressor, condenser, thermostatic expansion valve, and evaporator four main components. The system adopts a single closed-loop design for refrigeration system. Refrigerant is alternatively changed from gaseous to liquid state to absorb or release heat thus a cooling effect is achieved.



Item	Description	Item	Description
①	Compressor	⑨	Temp. sensor
②	Condenser	⑩	Water tank
③	Dry filter	⑪	Pump pressure gauge
④	Expansion valve	⑫	Pump
⑤	Evaporator	⑬	By-pass valve
⑥	Ball valve	⑭	Low pressure switch
⑦	Anti-freezing switch	⑮	High pressures switch
⑧	Level sensor	⑯	Blower



### 3. Main Functions

When the machine is started, compressor (1) starts working. Refrigerant is compressed into high pressure and high temperature gas in the process from A to B. In the process from B to C and D, this high pressure and high temp. gas is cooled when it is passing through the condenser (2) and changed into liquid. Heat is taken away by the cooling water. In the process from D to E, the pressure of liquid refrigerant is reduced by expansion valve (4) and a part of the refrigerant is changed from liquid to gaseous state. In the process from E to A, refrigerant absorbs the heat of process water in the evaporator (5) and returns back to the compressor. This heat exchange process repeats until process water is cooled down to required temperature. Electromagnetic valve of hot air bypass is opened when system temperature reaches the preset temperature. At this time, part of high-temperature high-pressure refrigerant will enter evaporator directly based upon the process of A-F-E and balancing system is loaded to avoid frequent start/stop of compressor caused by enormous temperature changes.



## 4. Safety Regulations

### 4. Safety Regulations

Operation should be carried out according to the safety regulations this manual to avoid damage of the machine and personal injuries.

Abide by the following regulations during operation.

Electrical installation should be done by qualified electricians.



Main switch and control should be turned before service and maintenance.



Warning! High voltage!  
This sign is attached to the cover of control box!



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



## 4. Safety Regulations

### Transportation and storage of the machine

#### Transportation

- 1) SIC-A series are packed in crates or plywood cases with wooden pallet at the bottom, suitable for quick positioning by fork lift.
- 2) After unpacked, castors equipped on the machine can be used for ease of movement.
- 3) Do not rotate the machine and avoid collision with other objects during transportation to prevent improper functioning.
- 4) The structure of the machine is well-balanced, although it should also be handled with care when lifting the machine for fear of falling down.
- 5) The machine and its attached parts can be kept at a temperature from  $-25^{\circ}\text{C}$  to  $+55^{\circ}\text{C}$  for long distance transportation and for a short distance, it can be transported with temperature under  $+70^{\circ}\text{C}$ .

#### Storage

- 1) SIC-A series should be stored indoors with temperature kept from  $5^{\circ}\text{C}$  to  $40^{\circ}\text{C}$  and humidity below 80%.
- 2) Disconnect all power supply and turn off main switch and control switch.
- 3) Keep the whole machine, especially the electrical components away from water to avoid potential troubles caused by the water.
- 4) Plastic film should be used to protect the machine from dust and rains.

#### Working environment

The machine should be operated:

- 1) Indoors in a dry environment with max. temperature  $+45^{\circ}\text{C}$  and humidity no more than 80%.

Do not use the machine:

- 1) If it is with a damaged cord.
- 2) On a wet floor or when it is exposed to rain to avoid electrical shock.
- 3) If it has been dropped or damaged until it is checked or fixed by a qualified serviceman.



## 4. Safety Regulations

- 4) This equipment works normally in the environment with altitude within 3000m.
- 5) At least a clearance of 1m surrounding the equipment is required during operation. Keep this equipment away from flammable sources at least two meters.
- 6) Avoid vibration, magnetic disturbance at the operation area.

### Rejected parts disposal

When the equipment has run out its life time and can not be used any more, unplug the power supply and dispose of it properly according to local code.

### Fire hazard



In case of fire, CO<sub>2</sub> dry powder fire extinguisher should be applied.



## 5. Installation

### 5. Installation



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

Air-cooled water chillers should be installed in an environment that has good ventilation, such as draughty area against the window. Ambient temperature should not be more than 35°C if it is installed indoors. Use 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.

#### 5.1 Installation Instructions

- 1) Make sure that the voltage and frequency corresponds with the requirements on manufacturer's name plate.
- 2) Connect the machine with electrical wires and negative wire according to local code.
- 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) The chillers use three phase & five core wire. Connect wire N to negative wire, PE to earth wire, and others to live wire.
- 6) Power supply:  
Voltage deviation: Rated voltage in the nameplate:  $\pm 10\%$   
Frequency deviation: The rated frequency in the nameplate:  $\pm 2\%$
- 7) According to the installation configuration diagram to install the pipe system, and use thermal insulation materials to protect the refrigerated water pipe.
- 8) Circulation pipe diameter of the pump should not less than that of condenser inlet pipe. Circulation pipe with larger diameter should be used for long distance transportation of process water.
- 9) Automatic exhaust tap should be installed at the top of circulation pipe, and at the lowest part drainage valve should be installed.
- 10) Water filter should used in the process water and cooling water circulation pipe if water quality and surroundings of cooling tower is bad.
- 11) After the installation is completed, check if there are leakages in the circulation system. Cold water circulation pipe should be covered with a layer of insulated material to avoid temperature increasing and water drops forming on the surface of circulation pipe.



## 5. Installation



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.

### 5.2 Installation Space

During installation of the machine, keep at least 500mm installation space around the machine as shown by the picture. Do not install the machine in a position crowded with other objects. This would cause inconvenience to operation, maintenance and repair.

Do not sit on the machine.

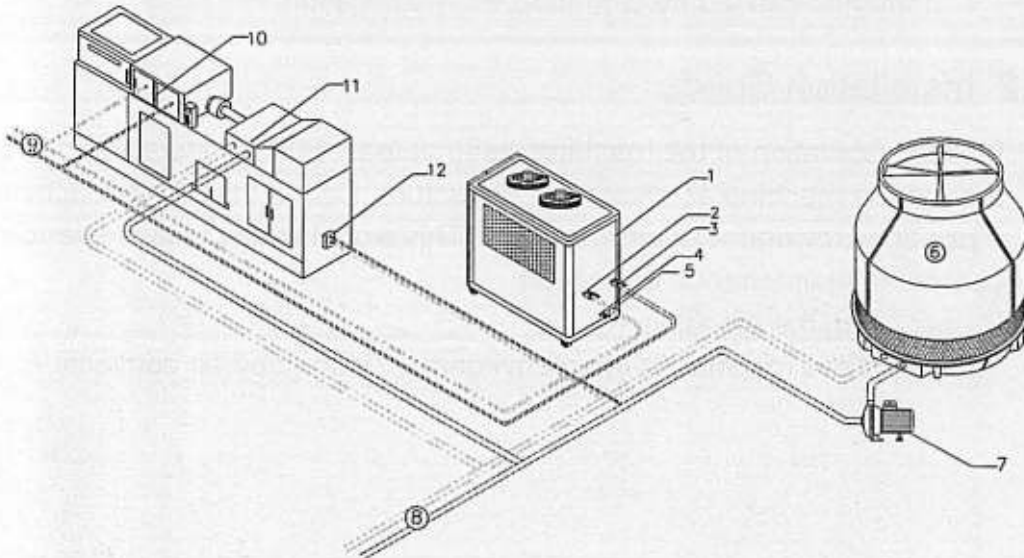
Make sure the machine is in an environment with good air convection.



## 5. Installation



### 5.3 Schematic Drawing of Installation



①	Water chiller	⑦	Cooling water pump
②	Process water outlet	⑧	Cooling water circulation
③	Process water inlet	⑨	Cold water circulation
④	Water discharge port	⑩	Mould cooling
⑤	Water refill port	⑪	Cooling chamber
⑥	Cooling tower	⑫	Hydraulic oil cooling

### 5.4 Power Supply

Make sure that power supply is the same as required before installation.  
 SIC-A series should be connected with 3Φ 400V power supply and earth wire.



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



6. Operation Guide

6. Operation Guide

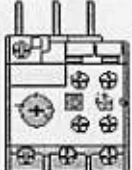
6.1 Control Panel



No.	Name	Functions	Remarks
1	Power indicator	Connect through power supply and turn on the main switch, the indicator will becomes bright.	Note! Do not disassemble any electrical components or terminals in case of electrical shock.
2	Anti-phase indicator	It is used to indicate phase reversal or phase shortage. The buzzer sounds and system stops working.	Check the power supply and exchange two of the live wires to reset the alarm.

6. Operation Guide



No.	Name	Functions	Remarks
3	Pump/compressor overload indicator	When pump / compressor current exceeds the limits, this indicator becomes bright. The buzzer sounds and system stops working.	<p>Check if the setting current of overheat relay is correct. Setting current of overheat relay should be bigger than the rated current of the compressor. Check if the motor is blocked or the bearing is broken. If motor works normally, please check if the setting current of the overload relay in the control box is set too low. After the above measures are taken, wait for about 1 minute, then press the blue "reset" button to reset the alarm.</p> 
4	Solenoid valve for hot air by-pass	When the solenoid valve for hot air by-pass turn, the indicator will become bright.	
5	High pressure alarm	When the outlet pressure of the compressor is higher than setting value of high-pressure switch, the alarm will be raised. The buzzer sounds and system stops working.	High-pressure switch setting value should be correctly set as 25 bar.
6	Low pressure alarm	When the inlet pressure of compressor is lower than setting value of low-pressure switch, the alarm will be raised. The buzzer sounds and system stops working.	Low-pressure switch should be correctly set as 2 bar.
7	Buzzer	The buzzer makes audible alarm when problems is detected.	
8	Compressor switch	The start & stop of the compressor.	Note! Before turning on the compressor, turn on the pump first.
9	Pump switch	The start & stop of the pump.	Pump rotating direction should be correct.
10	Main switch	Turn on/off main power.	
11	Temperature controller	Temperature setting and control.	Please refer to page 6-4 for details.

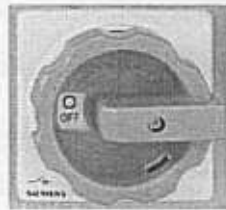
## 6. Operation Guide

### 6.2 System Startup



- 1) Turn on the main switch.



ON



OFF

- 2) Turn on the pump.
- 3) Turn on the compressor.
- 4) Set process water temperature (Neglect this step if temperature is already set). Press   to increase or decrease water temperature. For this series of water chillers, process water temperature should be set as 45°F (never set below 41°F).
- 5) System overcooling setting: system is equipped with anti-freezing switch (value is set as 41°F) and system compressor will stop working when temperature of frozen water is lower than 41°F.



**Note!**  
Pump rotating direction should be correct.



**Note!**  
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.



**Note!**  
In order to reduce the possibilities of machine damage and prolong the life, start the machine with correct methods.



**Note!**  
Temperature setting value should not be lower than 41°F. Temperature of anti-freezing switch and high and low pressure switch is already set before delivery. We shall not be liable for any damage caused by unauthorized change of the setting.

## 6. Operation Guide

### 6.3 Machine Shut Off

- 1) Turn off the compressor.
- 2) Turn off the pump.
- 3) Turn off the main switch.



Note!

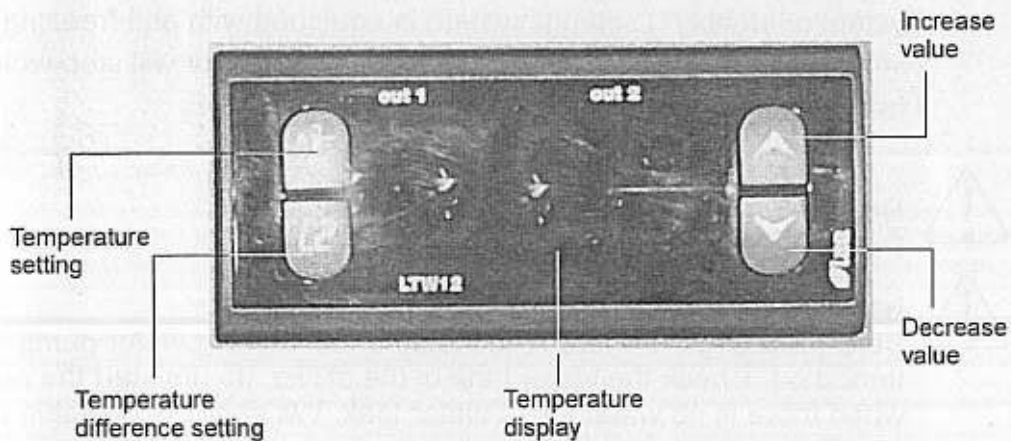
Avoid electrical shock when main switch is turned on.



Note!

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

### 6.4 Temperature Controller













#### 6.4.1 Temperature setting method

- 1) User can set the temperature of the ice water by pressing and or when the ice water machine is turned on.
- 2) Ice water temperature range is set between 45 to 95°F and its maximum value and minimum value have been set in SETUP and user may change the values according to 6.4.2.



## 6. Operation Guide

### 6.4.2 Parameter setting method

- 1) Press ,  and  in sequence for 3 seconds when the ice water machine is turned on and user will enter the item for parameter alteration. Then user should press  or  and  adjust it to SPL. User may check parameters by pressing  and user should press  and  or  to change the minimum value of ice water temperature.
- 2) Similarly, user may change the maximum value of ice water temperature by selecting the parameter item of SPH.
- 3) It will automatically quit parameter setting system if 30S system of keyboard does not operate.



Notice: minimum value of ice water shall never be lower than 41°F.



Notice: parameters of temperature controller has already been set when it leaves the factory and it is forbidden to re-set the values of the parameters only in case of special occasions.

User shall undertake any consequence resulting from re-setting the values of parameters without permission.



## 7. Service & Maintenance



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 as 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 press down 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 periodically 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 vent.
- 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!)

### 7.1 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.

7. Service & Maintenance



The air return pipe      The end cap of the liquid filling thimble valve      The evaporation



The vacuum pump

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. In the condition of the starting up, the shown pressure of the high pressure gage should be about 13 to 15 bar; and shown pressure of the low pressure gage should be about 3 to 5 bar. (Note: the temperature of the environment should be 30°C, and the temperature of the frozen water should be 12°C.)

SIC-A series filled weight

The model of the machine	The filled weight of the refrigerant (kg)	The model of the machine	The filled weight of the refrigerant (kg)
SIC-3A-P	4.0	SIC-20A-P	18
SIC-5A-P	4.5	SIC-25A-P	20
SIC-8A-P	7.0	SIC-30A-P	26
SIC-10A-P	9.0	SIC-40A-P	34
SIC-12.5A-P	10	SIC-45A-P	42
SIC-15A-P	13	SIC-50A-P	48

## 7. Service & Maintenance



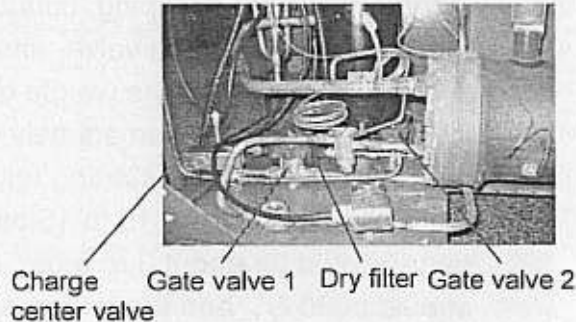
The electronic scale    The coolants tank



### 7.2 Replacement of Dry Filter

Screw tightly gate valve 1 and 2 during the replacement of dry filter. Open the charge center valve and recover the cooling medium. Unscrew trumpet nuts at the two ends of the filter, replace dry filter, screw tightly the trumpet nuts, open the charge center valve, open gate valve

2 a little bit to release cooling medium and discharge air between gate valve 1 and gate valve 2. fully open gate valve and inspect leakage after air is discharged.



### 7.3 Maintenance of the Subassemblies

#### 7.3.1 Condenser

SIC-A series water chillers use the air cooled condenser with ferrule installed openly, in the using time, it 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.



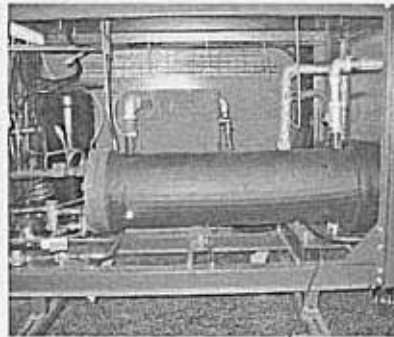
## 7. Service & Maintenance



Note: 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 scurviness environment you had better see the situation to do the work.

### 7.3.2 The 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. Open the pollution discharge porthole on the bottom of the evaporator<sup>1</sup>, and spray rinse the heat emission pipe from the outer flank to the innerflank, the water incrustation will be discharged from the pollution discharge porthole.



Porthole



Note: Drain the water inside the evaporator and the condenser away, when the machine stop running under 0 °C.



**8. Trouble Shooting**

**8. Trouble Shooting**

Faults	The action of the protection units	The possible fault analysis	Solution
1. No power supply display or phase reversal	The protection units have no action	A. The power supply is not switched on B. The fuse wire of the control loop is burned out C. The linear ordering of the power supply is in the reverse order D. The fault of the main switch or circuit	A. Power on after checking B. Check the protection loop C. Change the wires in order of two random power supply wires D. Check or replace
2. The pump over loading	The loader trips	A. Over current B. The fault of the pump C. The fault of the pump over loading controller	A. Reset the over loader B. Replace after checked and repaired C. Replace after checked and repaired
3. The compressor over loading	The loader trips	A. Over current B. The fault of the compressor C. The fault of the compressor over loading controller	A. Reset the over loader B. Replace after checked and repaired C. Replace after checked and repaired
4. The high pressure is too high	The high pressure switch trips	A. The refrigerant is too much B. The amount of blast to the condenser is not enough C. The sediment incrustation of the condenser is too much D. The dry filter is blocked up E. The open scale of the expansion valve is too narrow F. The fault of the expansion valve G. The fault of the fan H. The fault of the high pressure switch I. The condenser is beaten by the sun shine	A. Discharge some of the refrigerant B. Increase the amount of blast to the condenser C. Clean the condenser D. Clean the dry filter E. Adjust the open scale properly F. Replace after checked and repaired G. Replace after checked and repaired H. Replace after checked and repaired I. Prevent the condenser from beingbeaten by the sun shine
5. The high pressure is too low	The protection units have no action	A. The cooling action is not enough B. The vanes of the compressor are spoiled C. The amount of the cooling water is too big	A. Reset the temperature valve to a new one B. Replace after checked and repaired C. Adjust the flow quantity of the water valve
6. The low pressure is too low	The low pressure switch trips	A. The refrigerant is not enough B. The dry filter is blocked up C. The open scale of the expansion valve is too small D. The fault of the expansion valve E. The fault of the low pressure switch	A. Check the system pipe lines, weld pipe lines, and supply refrigerant. B. Clean the dry filter C. Adjust the open scale properly D. Replace after checked and repaired E. Replace after checked and repaired



## 8. Trouble Shooting

Faults	The action of the protection units	The possible fault analysis	Solutions
7. The low pressure is too high	The protection units have no action	A. The cooling load is too big B. The power of the compressor decreases C. The open scale of the expansion valve is too big D. The packed weight of the refrigerant is excessive	A. Adjust the cooling load B. Replace after checked and repaired C. Adjust the open scale of the expansion valve D. Discharge some of the refrigerant
8. The compressor overheat	The protection units have no action	A. The heat degree of the refrigerant in the air return pipe is too high B. The high pressure is too high C. The low pressure is too low	A. Adjust the open scale of the expansion valve properly B. Check, repair and improve 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 big B. The refrigerant is too much C. The heat load is too small	A. Adjust the open scale of the expansion valve properly B. Discharge some of the refrigerant C. Increase the heat load
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 B. The temperature control instrument is not set up properly C. The over loading protector is not reset	A. Check and connect the wires according to Specifications B. Reset the temperature control instrument C. Reset the over loading protector
	The freeze protection switch trips	A. The amount of the ice water is too much and bring about that the water temperature is too low B. The temperature control is set too low or has some faults 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 B. Correct the set point or change 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 B. The water quantity and water supply in the cooling system is abnormal C. The fans run abnormally D. The filter is blocked up E. The configure of the cooling pump is not prope F. The cooling water pipe is not configured according to the standard	A. Discharge the air B. Control the water level of the water supply tank C. Check and repair D. Clean the filter E. Choose the pump up to the mustard (flow quantity and delivery lift)

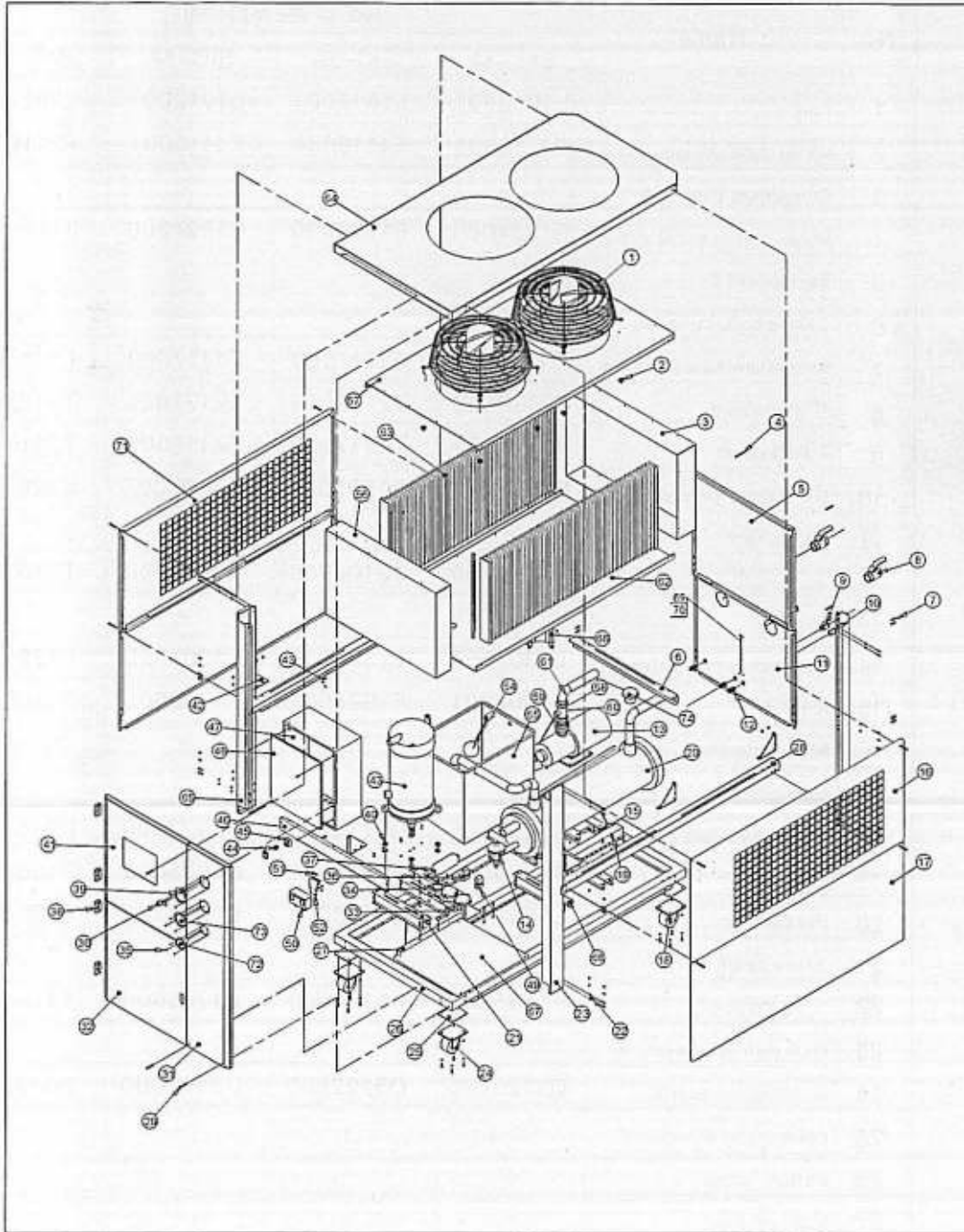


**9. Assembly Drawing**

## 9. Assembly Drawing

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### 9.1 SIC-3A/5A/8A/10A Series System Construction Diagram



9. Assembly Drawing



9.2 SIC-3A/5A/8A/10A Series Parts List

No.	Name	No. of the materiel			
		SIC-3A	SIC-5A	SIC-8A	SIC-10A
1	Fan	L1912001	L1912001	L1912001	L1912001
2	M8*20 Outer hexagon screw	F1119001	F1119001	F1119001	F1119001
3	Condenser back board	-	-	-	-
4	M6*50 Thick-headed screw	F1324000	F1324000	F1324000	F1324000
5	Back board 2	-	-	-	-
6	Centre bottom-beam	-	-	-	-
7	M6*20 Outer hexagon screw	F1117000	F1117000	F1117000	F1117000
8	1" Ball valve	T2127000	T2127000	T2127000	T2127000
9	4 Ball valve	T2117000	T2117000	T2117000	T2117000
10	1/2" Direct connection	D1203007	D1203007	D1203007	D1203007
11	Back board	-	-	-	-
12	4" Copper connection with external teeth at the two ends	T2108000	T2108000	T2108000	T2108000
13	Pump	-	-	-	-
14	Heat expansion valve	L1301050	L1301050	L1301050	L1301050
15	M8 Nut	F1908001	F1908001	F1908001	F1908001
16	Right side plate	-	-	-	-
17	Below board	-	-	-	-
18	3" Braking trukle	D3123000	D3123000	D3123000	D3123000
19	M6 Nut	F1908000	F1908000	F1908000	F1908000
20	Evaporator	L1505000	L1505000	L1505000	L1505000
21	Below beam	-	-	-	-
22	5*10 Washer	F1705000	F1705000	F1705000	F1705000
23	Front right upright column	-	-	-	-
24	3" Movable truckle	D3122000	D3122000	D3122000	D3122000
25	Castor installation board	-	-	-	-
26	Bottom frame	-	-	-	-
27	Middle beam	-	-	-	-



9. Assembly Drawing

No.	Name	No. of the materiel			
		SIC-3A	SIC-5A	SIC-8A	SIC-10A
28	Middle side beam	-	-	-	-
29	M6*45 Thick-headed screw	F1326000	F1326000	F1326000	F1326000
30	Door lock	T4142000	T4142000	T4142000	T4142000
31	Dash board	-	-	-	-
32	Left below door plate	-	-	-	-
33	Manual valve	L1302080	L1302080	L1302080	L1302080
34	Level indicator cover	L1304001	L1304001	L1304001	L1304001
35	M4*5 Screw	F1405004	F1405004	F1405004	F1405004
36	Solenoid valve	L1320000	L1320000	L1320000	L1320000
37	Dryer filter	L1308400	L1308400	L1308400	L1308400
38	Hinge	D3320301	D3320301	D3320301	D3320301
39	High pressure switch	L1303501	L1303501	L1303501	L1303501
40	M8*50 Outer hexagon screw	F1107000	F1107000	F1107000	F1107000
41	Left top door board	-	-	-	-
42	Tripod	-	-	-	-
43	Compressor	L1700500	L1700500	L1700500	L1700500
44	Freeze protection switch	L1307110	L1307110	L1307110	L1307110
45	Plastic shield	L1309000	L1309000	L1309000	L1309000
46	Middle baem	-	-	-	-
47	Electric control box	-	-	-	-
48	Bottom plate of the controller	-	-	-	-
49	Solenoid valve	L1320001	L1320001	L1320001	L1320001
50	Pressure gauge	L1308301	L1308301	L1308301	L1308301
51	M5*10 Thick-headed screw	F1319000	F1319000	F1319000	F1319000
52	Pressure gauge fixing plate	-	-	-	-
53	M5*10 Thick-headed screw	F1319000	F1319000	F1319000	F1319000
54	1/2" Ball valve	L1304000	L1304000	L1304000	L1304000
55	Water tank	-	-	-	-
56	Condenser front panel	-	-	-	-

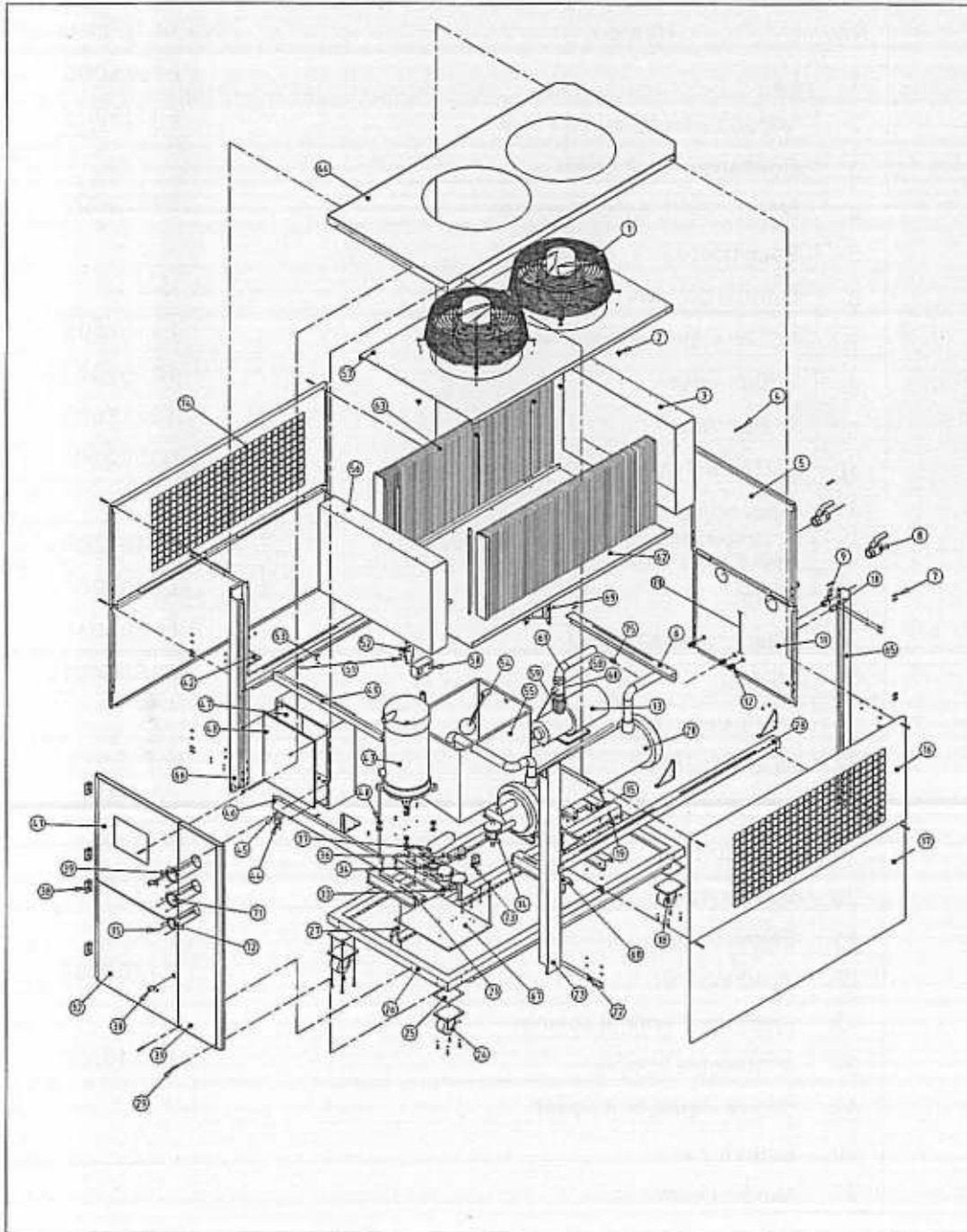


**9. Assembly Drawing**

No.	Name	No. of the materiel			
		SIC-3A	SIC-5A	SIC-8A	SIC-10A
57	Condenser cover plate	-	-	-	-
58	1 inch union	A2210001	A2210001	A2210001	A2210001
59	1**1/2 galvanized triple-branch	L9000021	L9000021	L9000021	L9000021
60	1 inch galvanized outer teeth connector	D1203006	D1203006	D1203006	D1203006
61	1 inch galvanized elbow	L9000009	L9000009	L9000009	L9000009
62	Condenser ground plate	-	-	-	-
63	Condenser	L1603050	L1603050	L1603050	L1603050
64	Top plate	-	-	-	-
65	Left front standing column	-	-	-	-
66	Back standing column	-	-	-	-
67	Solenoid valve	-	-	-	-
68	Evaporator	-	-	-	-
69	Level indicator	T3112001	T3112001	T3112001	T3112001
70	Glass pipe	T3207003	T3207003	T3207003	T3207003
71	Left side plate	-	-	-	-
72	Water pressure gauge	L2201000	L2201000	L2201000	L2201000
73	Low pressure gauge	L1301502	L1301502	L1301502	L1301502
74	Single check valve 1/2"	D2121002	D2121002	D2121002	D2121002



### 9.3 SIC-15A Series System Construction Diagram





**9. Assembly Drawing**

**9.4 SIC-15A Series Parts List**

No .	Name	No. of the materiel
1	Fan	L1925000
2	M8*20 Outer hexagon screw	F1119001
3	Condenser back board	-
4	M6*50 Thick-headed screw	F1324000
5	Back board 2	-
6	Centre bottom-beam	-
7	M6*20 Outer hexagon screw	F1117000
8	2" Ball valve	T2202001
9	4" Ball valve	T2117000
10	1/2" Direct connection	D1203007
11	Back board	-
12	4 " Copper connection with external teeth at the two ends	T2108000
13	Pump	L1408300
14	Heat expansion valve	L1301015
15	M8 Nut	F1908001
16	Right side plate	-
17	Below board	-
18	4 " Braking truckle	D3111000
19	M6 Nut	F1908000
20	Evaporator	L1515002
21	Below beam	-
22	5*10 Washer	F1705000
23	Front right upright column	-
24	4" Movable truckle	D3110000
25	Castor installation board	-
26	Bottom frame	-
27	Middle beam	-



9. Assembly Drawing

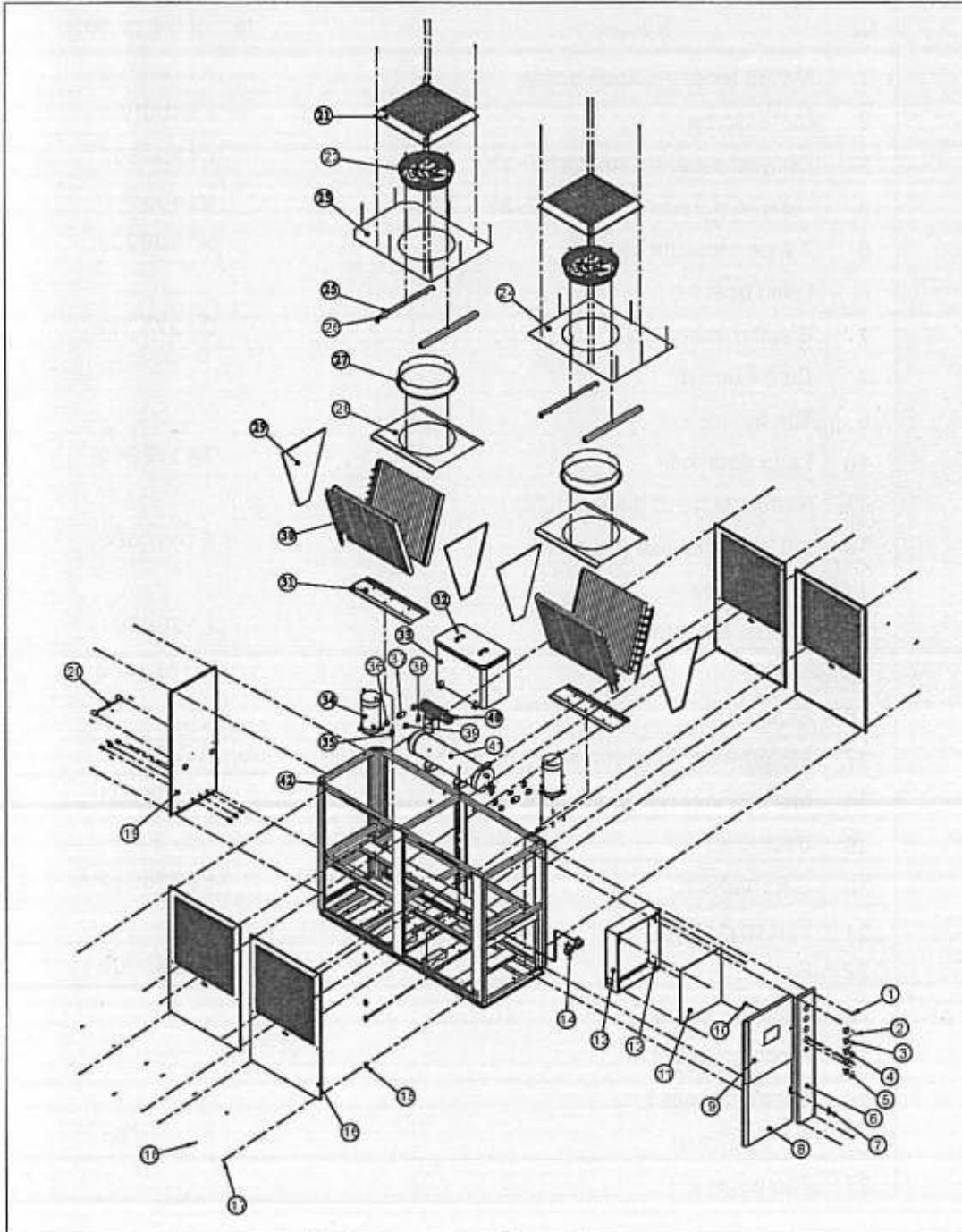
No .	Name	No. of the materiel
28	Middle side beam	-
29	M6*45 Thick-headed screw	F1326000
30	Door lock	T4142000
31	Dash board	-
32	Left below door plate	-
33	Manual valve	L1302014
34	Level indicator cover	L1307080
35	M4*5 Screw	F1405004
36	Solenoid valve	L1320002
37	Dryer filter	L1303050
38	Hinge	D3320301
39	High pressure switch	L1303500
40	M8*50 Outer hexagon screw	F1107000
41	Left top door board	-
42	Tripod	-
43	Compressor	L1701502
44	Freeze protection switch	L1307110
45	Plastic shield	-
46	Middle baem	-
47	Electric control box	-
48	Bottom plate of the controller	-
49	Solenoid valve	-
50	Pressure gauge	L1308301
51	M5*10 Thick-headed screw	F1319000
52	Pressure gauge fixing plate	-
53	M5*10 Thick-headed screw	F1319000
54	1/2" Ball valve	L1304000
55	Water tank	-
56	Condenser front panel	-



9. Assembly Drawing

No .	Name	No. of the materiel
57	Condenser cover plate	-
58	2 inch union	L9000010
59	2 inch union	D1229001
60	2 " *1/2 galvanized triple-branch	F1203013
61	2 inch galvanized outer teeth connector	T2202008
62	1inch galvanized elbow	-
63	Condenser ground plate	L1615002
64	Condenser	-
65	Top plate	-
66	Left front standing column	-
67	Back standing column	-
68	Solenoid valve	-
69	Evaporator	-
70	Level indicator	T3207003
71	Glass pipe	L1301502
72	Left side plate	L2201000
73	Water pressure gauge	L1320004
74	Low pressure gauge	-
75	Single check valve 1/2"	D2121002

### 9.5 SIC-20A Series System Construction Diagram





## 9.6 SIC-20A Series Parts List

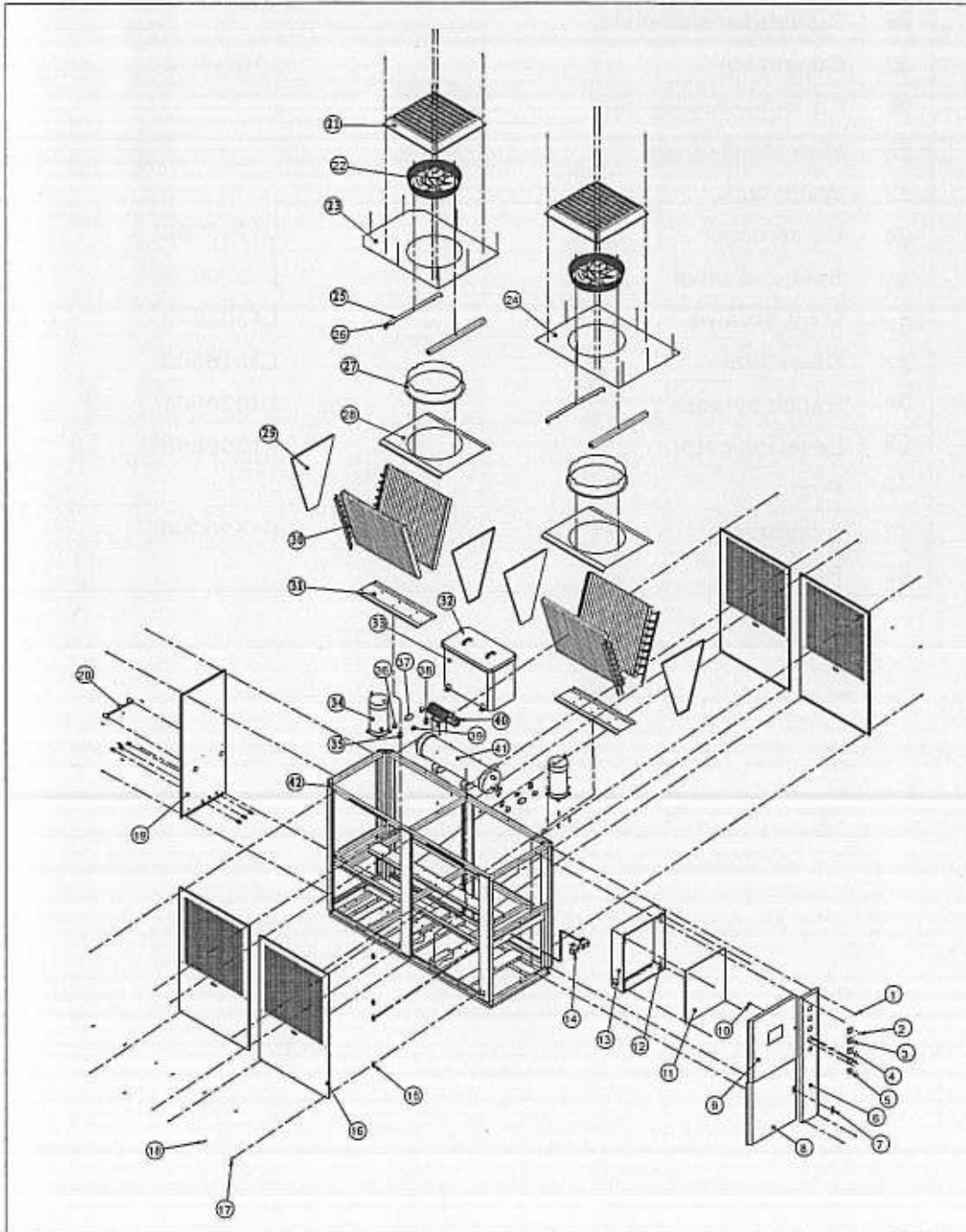
No .	Name	No. of the materiel
1	M6*65 Inner hexagon screw	F1206650
2	M4*5 Screw	F1405004
3	Oil type pressure switch MF-15	L1301502
4	Oil type pressure switch MF-35	L1303500
5	T type pressure switch	N1809002
6	Dash board	-
7	Electric frame lock	D1271711
8	Below board	-
9	Top board	-
10	Long door lock	T4142000
11	Bottom plate of the controller	-
12	M6*10 Lentil-headed screw	F1410000
13	Control box	-
14	Pressure controller	L1308301
15	Hinge	D3320302
16	Side plate	-
17	M6*50 Inner hexagon screw	F1221012
18	M6*16 Inner hexagon screw	F1215001
19	Back plate	-
20	Gate Valve1"	L9000013
21	Fan cover 1	-
22	Fan	L1955000
23	Back top board	-
24	Front top board	-
25	Support beam 1	-
26	M8*20 Screw	F1119001
27	Fan cover 2	-



9. Assembly Drawing

No.	Name	No. of the materiel
28	Condenser cover plate	-
29	Condenser side plate	-
30	Condenser	L1620002
31	Condenser sole plate	-
32	Water tank cover	-
33	Water tank	-
34	Compressor	L1710000
35	Solenoid valve	L1320003
36	Manual valve	L1302010
37	Dryer filter	L1316500
38	Hot air by-pass	L1320001
39	Level indicator	L1305080
40	Pump	-
41	Evaporator	L1520000
42	Frame	-

### 9.7 SIC-30A Series System Construction Diagram







9. Assembly Drawing

9.8 SIC-30A Series Parts List

No.	Name	No. of the materiel
1	M6*65 Inner hexagon screw	F1206650
2	M4*5 Screw	F1405004
3	Oil type pressure switch MF-15	L1301502
4	Oil type pressure switch MF-35	L1303500
5	T type pressure switch	N1809002
6	Dash board	-
7	Electric frame lock	D1271711
8	Below board	-
9	Top board	-
10	Long door lock	T4142000
11	Bottom plate of the controller	-
12	M6*10 Lentil-headed screw	F1410000
13	Control box	-
14	Pressure controller	L1308301
15	Hinge	D3320302
16	Side plate	-
17	M6*50 Inner hexagon screw	F1221012
18	M6*16 Inner hexagon screw	F1215001
19	Back plate	-
20	Gate Valve 1"	L9000013
21	Fan cover 1	-
22	Fan	L1975000
23	Back top board	-
24	Front top board	-
25	Support beam1	-
26	M8*20 Screw	F1119001
27	Fan cover 2	-