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# Flake Ice Machine Operation Manual

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## Warning

<b>Danger!!!</b>	Any violation operation can cause: equipment damage, personal disability, and even death!
<b>Note!!!</b>	Any improper operation can cause: equipment damage, personal disability and property loss!

**Danger!!!**

- ◆ When the machine is galvanical, any parts of body is prohibited to touch live part of the machine; when the live part is uncertain, it is totally prohibited to touch any metal parts of the machine.
- ◆ When the machine is working, any parts of human body is prohibited to approach the rotation or moving part of the machine.
- ◆ When main power line of the machine is not removed, human body is prohibited to enter into interior of the flake ice evaporator.
- ◆ During machine operating or stopping, it is prohibited to touch red tube, be careful of burns.
- ◆ If the machine is laid aside, does not work, please switch off main power to avoid electric shock hazard.
- ◆ Before starting up, please make sure that rotation direction of each motor is right, any reverse rotation of the motor is prohibited.
- ◆ Other current-using equipment is prohibited to be added or connected in the electric cabinet of the machine.
- ◆ If sudden stop of machine is encountered, it is prohibited to start up again without finding real stop reasons.

**Note!!!**

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- ◆ As long as the personnel go through special training and have experience in the maintenance and use of refrigeration equipment, they can operate the system.
  - ◆ Before starting up an ice machine, it is necessary to switch on power supply 8 hours in advance, turn on main switch of the power supply and all electric switches including emergency stop, to make the crankcase heater of compressor working, and make sure that the temperature in the crankcase will be 5°C (at least) higher than the ambient temperature. When starting up the ice machine with the lower temperature in the crankcase, the compressor will be badly damaged.
  - ◆ The ice machine can only be used in the standard atmospheric pressure, and pipeline system of the ice machine will be damaged in any high pressure or negative pressure environment.
  - ◆ Error or non-standard wiring causes short circuit, open circuit, electrical lesion and other accidents, so the maintenance personnel without electrical knowledge or non-refrigeration equipment maintenance personnel are forbidden to maintain the equipment.
  - ◆ The operator on duty should observe equipment running by the indicator light continuously, and solve found problems.
  - ◆ Carefully read this manual, and understand all provisions of the manual so as to properly install, connect, run, use and maintain the equipment. Abiding by the standard of this manual has important significance to realize rated operation effect of the machine and to protect safety of operating personnel.
  - ◆ Carefully read the manual, strictly abide by the standard, and maintain by suitable operators.
  - ◆ The technical standard data contained by the manual will change because of the development of the technology; without prior notice.
  - ◆ Please hand the manual over to terminal customers.

## **Use and Maintenance Profile**

The product is a fresh water flake ice machine of flake ice machine series of our company.

The machine has been installed completely and has passed various tests.

Our machines adopt worldwide brand refrigeration parts and electrical elements, go through engineer's 3D mapping, fitters' elaborate assembling, even if in the adverse environment the machine can also run normally, make customers use them safely. To have machines used better and reduce your repair, maintenance costs, so routine and preventative maintenance are also required.

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Dear users,

Please pay attention to: as long as read carefully and abide by the following instructions strictly, you can install your equipment properly. Please read our instructions carefully before operation. You will feel that one-time complete reading and remembering by heart will bring you a lot of convenience for your installation of machine, future use and maintenance.

## **1. Installation and Operation Personnel**

Please recruit or arrange the personnel with installation experience of refrigeration equipment to go to site for directing installation. Recruit or arrange qualified electricians to connect the cables between machines and power grids. In case customers choosing their own installation cause damage of equipment, which does not belong to warranty scope of our company.

Please recruit or arrange one or two personnel who has/have a sense of responsibility and ice-making experiences to switch on/off machine and take charge of daily patrol. The personnel have to know the whole start and stop sequence of machine, and are aware of simple trouble shooting.

When the machine breaks down, please recruit specialized maintenance personnel of refrigeration equipment or qualified electrician or engineer level personnel to maintain it. You can directly call the after-sale service department of our company for help. We will answer any question of the related ice machine of each customer in a patient and meticulous way.

Forbid strictly to demolish and install machines indiscriminately, unreasonable operation can seriously shorten service life of machines, and are likely to cause loss of life and property.

## **2. Basic Safety Instruction**

All personnel participating in the machine operation have to be familiar with safety operation specification for mechanical equipment, understand basic essentials of refrigeration equipment, and completely read this manual of our company. Make sure that these personnel understand thoroughly and fully comply with the manual.

1. Circulating parts of refrigerant bear high pressure. Please do not open pipelines, valves or other parts optionally;
2. When using machine, some parts could generate heat. When closing to red tube, be careful, burns might be appeared;
3. The personnel who go through specialized electric knowledge training are allowed to maintain electrical parts of machines;
4. Refrigeration personnel who have to go through refrigeration equipment

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knowledge training and have experience are allowed to maintain the refrigeration parts of machines;

5. Please recruit or arrange the basic operating personnel who have a sense of responsibility and understand refrigeration equipment to maintain routine use of machines;

6. The rooms which are installed ice machines are prohibited to smoke.

7. Gaseous refrigerant's density is higher than that of surrounding air, for preventing refrigerant leakage leading to oxygen deficiency, so the room that the machines are installed must be well ventilated.

When operating valves, buttons and switches, the following rules must be abided by:

1. You must know the function of the elements, and understand the results that the elements are switched off/on;
2. Part of pipelines of machines are high pressure pipes, when opening them suddenly, the very high air pressure is likely to outrush, so pay attention to life safety;
3. The pipes of machine are filled with refrigerant, opening pipes or valves at discretion can cause refrigerant leakage, and in severe cases that can lead to human death;
4. After refrigerant leakage, machine will lose ice-making capacity;
5. Switch of electric control equipment contain AC 400 Volt and even higher voltage, please do not operate it at random;
6. Firstly consider for 30 seconds before operating any element, ensure that operation can be carried out, and then start work;

Operating ice machine should specially abide by the following rules:

1. Before starting up ice machine, all switches in electric cabinet should be turned on 8 hours in advance, emergency buttons of electrical box operation platform (panel) are turned on, and power supply is switched on;
2. When maintaining ice machine, main power supply should be switched off;
3. When entering into evaporator for maintenance, power supply should be switched off, turn off the switch of main power supply in the electric cabinet, lock the door of the electric cabinet, and hang "someone operation, forbidding starting up" warning board on the door of the electric cabinet;
4. Before opening pipelines, please ensure that all refrigerants have been recycled to liquid storage tank, and have closed isolating valve so as to avoid refrigerant leakage;
5. When not using ice machine for a long time, please switch off main power supply, drain off the water in water tanks of ice machines and water pipes, recycle refrigerant to fluid storage tank, and close isolating valve. But when starting up, please remember connecting water, switching on and opening isolating valve;

### **3. Power Supply and Materials**

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### 3.1. Power Supply

According to different regions and customers, ice machine can use different voltages.

Electricity utilization standard of our machine as following:

Motive Power: AC 380V3P+N 50Hz

Control: AC 220V1P+N 50Hz

Control: DC 24V

Please ensure that the electric power of the field for installing machines is abundant, the voltage of main circuit can not less than 380V. When line voltage is less than 380V, ice making capacity of machine will be insufficient.

When line voltage is less than 360V, forbid to start up ice machine, low voltage (known as "undervoltage") easily burns compressor, electromotor and other equipments.

Specific voltage standard refers to duty plate, please.

- ◆ Burning down machine resulting from brown-out is beyond warranty scope of our company.

### 3.2 Water

#### 3.2.1 Cooling Water (Water-Cooled Machine)

Cooling water is used for lowering the temperature of the ice machine system, and it differs from the water for ice making. In principle, cooling water also needs tap water, but according to actual conditions, for saving cost, the cooling water can use alkali-free, salt-free, non-corrosive agent (content) other water. Such as well water, river water, mountain spring and natural water.

- ◆ Fresh water flake ice machine is strictly prohibited to use sea water or other containing salt, alkali, acid and other corrosive cooling water.

#### 3.2.2 Ice Making Water

Please use standard tap water, purified water, potable water and other fresh water for ice-making use water of machine.

To make flake ice drier and not be easy to melt, please add 3% to 5% saline water to fresh water.

Brine pump is installed on a chilled water pump of flake ice machine, when adding saline water into chilled water storage tank, please set frequency of brine pump to 16~18.

- ◆ Different water specification can cause to accumulation of dirt of pipeline or rust in water cycle. And then be likely to make production efficiency of ice machine influenced badly.

### 3.3 Refrigerant

Our machines respectively use two types of refrigerants according to different designs (R22 and R404A). Your machine should use which type of refrigerant, please refer to duty plate or call our company for help.

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### 3.3.1 R22 Refrigerant

If R22 refrigerant leaks in the atmosphere, which can destroy ozone layer, and influence environment, but refrigeration performance and R404A's are very consistent, now in developed countries, it has not already been used, general developing countries usually use it, and the price is favorable.

### 3.3.2 R404a Refrigerant

R404A refrigerant is an environment protective type refrigerant, do not pollute air, the performance is superior, the operation is relatively safe, but the price is more expensive, and now European and American countries are basically using it.

- ◆ Strictly prohibit adding different types of refrigerant into same machine.

## 4. Starting up Ice Machine

To heat the refrigerant oil in a crankcase, to make the refrigerant mixed in the oil evaporating, have to switch on power supply at least 8 hours before running of compressor, turn on main switch of the power supply and other electrical switch including emergency stop switch, and ensure that the temperature in the crankcase of compressor is above 5°C of ambient temperature.

When starting up, please comply with the following steps:

1. Be sure to get water, electricity connected completely;
2. Be sure to have the temperature of the crankcase of the compressor exceed environment temperature;
3. Check each manual valve of the unit is in the right place;
4. Manually operate each step (if there is manual function), and they can all work properly;
5. Press reset button once before press start button

After starting up normally, it is necessary to observe running condition of machine at least 10 minutes, if you encounter abnormal noise, sound too loudly, strenuous vibration, etc., please press emergency button immediately. Do not start up before not solving fault.

- ◆ Repeatedly start up broken-down ice machine, resulting multi-damage of machine is beyond the warranty scope of our company.

## 5. Operation Monitoring of Ice Machine

Operation of ice machine needs to pay attention to the following matters:

1. Observe whether voltage and current are in the scope of the marked parameters in duty plate;
2. High pressure should be within 10~18bar, and low pressure should be within

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- 1.0~3bar;
  3. Compressor sound is not abnormal;
  4. Rotation of ice skate in the evaporator should has no abnormal noise, and producing ice should be homogeneous, successive;
  5. Condenser fan (air cooling) or chilled water pump and fan (water cooling) run normally;
  6. Flake ice should be homogeneous, dry, not carrying water.

## 6. Ice Machine Stop

Stop of ice machine is divided into three kinds of situations, i.e. emergency stop, normal stop and automatic stop.

### 6.1 Emergency Stop

1. The objective of emergency stop: only when occurring equipment and life safety hazard, emergency stop can be carried out;
2. The manner of emergency stop: pressing “Emergency Stop” button of any part can reach stopping machine objective;
3. When restarting up machine, please confirm emergencies have been eliminated before emergency stop, and the machine is in right status;
4. Please start up at least 5 minutes interval after emergency stop each time;

### 6.2 Normal Stop

Normal stopping ice machine means that when the machine is in normal ice-making situation, press “Stop” button, the machine stops each processing step gradually according to scheduled stop sequence and time.

Normal stop step as following (so the step shall be different due to different machines, please note):

1. Turn off liquid solenoid valve after pressing stop button for 2 seconds;
2. Turn off compressor after 2 minutes;
3. Turn off cooling water pump (water cooling) or condenser fan (air cooling) after 3 minutes;
4. Turn off ice cutter and chilled water pump after 4 minutes.

- ◆ Normal stop will not generate system pressure impact. So it is not recommended that machine is carried out emergency stop under normal circumstance.

### 6.3 Autostop

Autostop is non-artificial stop, but it is a stop mode according to normal stop sequence and time. Only one reason for the autostop of the flake ice machine, i.e. after the machines with full ice controller detected full ice.

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After autostop, ice-making indicator light of machine will flicker.

- ◆ **Special Note: After autostop, if full ice exclusion, machine will automatically start at any moment, so when machine is switched on, please do not have any part of body approach fan, water pump, cutting skate, etc. at any time, parts will rotate instantly!!**

#### 6.4 Other Instructions about Stop

##### 1. Short Time Stop of Machine

Artificially stop the ice machine, stop time is not exceeds 24 hours, directly press stop button, but can not turn off power supply and emergency stop switch.

#### 6.5 Long Time Stop

Artificially stop ice machine, the stop time exceeds 24 hours and is less than 7 days, after pressing stop button, wait for complete stop of ice machine, then turn off power supply, turn on drain valve of lower tank, turn off water supply valve, and drain water in the water tank.

#### 6.6 Ultra-Long Time Stop

Artificially stop ice machine, stop time exceeds 7 days, after pressing stop button, wait for complete stop of ice machine, then turn off power supply, turn on drain valve of lower tank, turn off water supply valve, and drain water in the water tank. Clean entire machine body, and then use cover layer to cover entire unit.

- ◆ After long time stop and ultra-long time stop, before restarting, ice machine has to be energized 8 hours in advance

### 7. Routine Maintenance of Ice Machine

This manual provides detailed maintenance instruction for main parts of ice machine. Please comply with the instruction, and make machine keep optimum operation state. We suggest you arrange maintenance of machine according to the below schedule:

Rinse brine drum, brine pump and suction pipe every 15 days.

Rinse air-cooled condenser (air-cooled type) every 30 days.

Rinse inner skin of evaporator and water tray, water tank every 60 days.

Rinse water cooled condenser and cooling tower (water cooled type) every 90 days.

After unit has worked for 10,000 hours, gear oil of reducer should be replaced.

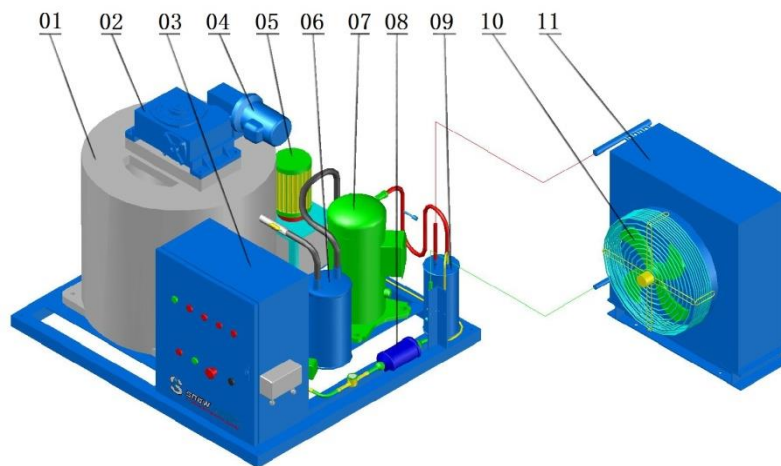
## Ice Machine Profile

### 1. Product Introduce

Flake ice machine is a kind of machine which can produce irregular scaly ice. Flake ice machine is widely used in dozens of industries, such as supermarket, fishing, medicine, food, architecture, etc.. Flake ice is easy to store, transport conveniently, large freezing area and other merits, so it enjoys great popularity of customers. Our flake ice machines are divided into according to tonnage: 0.5 tons, 1 ton, 2 tons, 3 tons, 5 tons, 10 tons, 15 tons, 20 tons, 25 tons, 30 tons and other types. It can be divided into according to cooling modes: air cooled, water cooled and evaporative cooling. According to water for ice making, it can be divided into: fresh water and sea water.

### 1.1 Ice Machine Structure

Refrigerating system generally is comprised of compressor, condenser, expansion valve and evaporator. Ice machine is not only uses the above parts, but also adds a series of refrigeration parts in the entire system, and each part plays an extremely important role in the ice-making process.



Flake Ice Machine (Air Cooling)

01. Evaporator      02. Ice Skate Reducer; 03. Electric Cabinet; 04. Cutting Ice Motor; 05. Chilled Water Pump; 06. Gas separator  
07. Compressor; 08. Dry Filter; 09. Oil Separator; 10. Condenser Fan; 11. Condenser

#### 1.1.1 Evaporator

Flake ice machine evaporator is also called ice bucket. Heat exchanges between water and refrigerant here. The refrigerant moving in evaporator chamber takes away the temperature of water flowing down along inner wall of evaporator, thus have water freeze.

#### 1.1.2 Ice Skate Reducer

Ice skate reducer is a power unit of ice skate. Rotation of ice skate is driven by upper-level cutting ice motor of reducer, cutting ice skate driven by the reducer uniformly rotates along the inner wall of evaporator, thus cut off the ice of the inner wall of

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evaporator.

#### 1.1.3 Electric Cabinet

Electric cabinet is a control system of ice machine. There are electric execute components, program processing unit inside and various control alarm of the machine complete here.

#### 1.1.4 Cutting Ice Motor

Cutting ice motor is used for driving reducer, and then ice skate is driven by the reducer to work.

#### 1.1.5 Chilled Water Pump

Chilled water pump directly sends water in cooling water tank to sprinkling tray of evaporator top by a pipe, and has water of sprinkling tray flow into inner wall of evaporator. Water of the cooling water tank is used for producing ice, so it should be clean and non-polluted.

#### 1.1.6 Gas separator

Gas-liquid separator is called "gas separaotr" for short. It is used for separating the liquid and gas of the refrigerant which would back to the compressor, ensure that there is no unevaporated liquid in the refrigerant entering into compressor, thus protect the compressor, and will not appear "liquid impact" phenomenon.

#### 1.1.7 Compressor

Compressor is heart of entire unit and power source of refrigeration equipment; it inhales low temperature and low pressure refrigerant, discharge high temperature and high pressure refrigerant gas, and lead to the condenser

#### 1.1.8 Dry Filter

Inlet of dry filter is crude metal net, outlet is fine metal net, and can efficiently filter impurities. Filled with good moister-absorption property molecular sieve as drying agent so as to absorb moisture in refrigerant, and ensure that capillaries are unblock and refrigerating system work normally. When the drying agent loses efficacy because of absorbing water too much, and should be replaced timely.

#### 1.1.9 Oil Separator

Oil separator installed between outlet of compressor and inlet of condenser. By separating, heat transfer effects in condenser and evaporator are improved; meanwhile, it is separated out, returns to compressor, and continuously lubricates moving parts of compressor.

#### 1.1.10 Condenser Fan

Important component of air-cooled condenser, high-speed rotation of fan blade accelerate air movement, and make heat transfer effect of condenser better.

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### 1.1.11 Condenser

Condenser can transfer heat in a tube to air nearby pipe in a rapid way. High temperature and high pressure gas refrigerant in inside of condenser condenses liquid due to lose heat.



### 1.2 Ice-making Principle

After compressor running, go through suction-compression-exhausting-condensing (liquefaction)-throttling— $20^{\circ}\text{C}$  to  $-25^{\circ}\text{C}$  low temperature evaporation heat absorption vaporization in evaporator. Chilled water in  $0^{\circ}\text{C}$  water temperature constantly condenses ice layers in lower temperature evaporator

surface. When the ice layers condense certain thickness, they are scrapped off by constantly rotating ice skate, and become usable flake ice.

### 1.3 Production Technology of Machine

- Design

All machines that our company produces are designed meticulously by engineers' using CAD, Solidwork and 3D cartographic software. The design engineers have consummate refrigeration technology and rich design experiences. When drafting, through repeat mapping, comparison, trial assembly and other design means, accurately complete assembly drawing of each machine.

We have professional electrical design engineers, the engineers not only design control system diagram, but also can skillfully use PLC, touch screen and other modern automatic control technology.

Mechanical and electrical perfect combination achieves Snow Amber's high quality ice machine system.

- Selecting Materials

World-renowned parts are bound to achieve a well-known equipment brand. Machines of our company all use world's top parts, and escort for long term stable operation of ice machine.

In refrigeration, our using brands have but not limit to Bitzer, Hanbell and Danfoss.

In electronic control, our using brands have but not limit to Schneider, Siemens and Omron.

- Assembly

Assembly is divided into steel frame welding and part installation.

Steel Frame Welding Process:

Material preparation——Rust

Removal——Welding——Polishing——Pickling——Phosphating——Spraying

plastics——High Temperature firing——Feeding to Assembly Workshop

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Part Installation:

Received Finished Steel

Frame—Evaporator—Compressor—Condenser—Other Refrigeration  
Parts—Connecting Tube—Wiring—Pressure  
Maintaining—Vacuumizing—Filling Refrigerant—Commissioning

● Commissioning

Before it leaves the factory, each machine of our company needs to strictly commissioning and to accept qualified finished equipment. Our commissioning projects are as follows:

- 1) Pipe pressure test : Filling with nitrogen in refrigeration system, keep 18bar pressure, ambient temperature change is within 10°C after 24 hours, and floating range of pressure gauge should not exceed 0.1 bars.
- 2) Current test : When compressor works in extreme environment, system current can not exceed rated current of compressor
- 3) Pressure resistance test : electrified metal part of machine and shell impedance of machine should not below 4MΩ.
- 4) Ice-making output test : When test machine is in environment temperature 25°C , water inlet temperature 16°C , whether test machine can reach rated output of machine.

## 2. Transportation

After finishing commissioning of our machines, use wooden case or stretch film to pack. After machine leaves the factory, deliver to designated place of customer by land, sea or air transportation.

During transportation, likely occur vibration, scraping and collision; please pay attention to the following problems when receiving goods:

- ◆ Whether packing cases (films) are opened, or have opened traces
- ◆ Whether packing cases (films) have breakage and deformation
- ◆ Whether shells of machines have deformation of unevenness
- ◆ Whether steel frames of machines have rupture and deformation

After receiving machines, if the above situation occurs, please call our company, we will assist you in solving all occurring problems during transportation.

## 3. Equipment Installation

### 3.1 Selection of Installation Field

Installing ice machine must satisfy the following conditions

1. Field foundation must satisfy load bearing and vibration absorption requirements of our company.
2. After selecting a suitable field, still require considering whether ice use and transportation exist convenient problem.
3. Ice machine should be placed in the indoor; indoor temperature should be 5°C~35°C, and prevent summer indoor temperature too high.
4. Full of light, but avoids direct sunlight or splashed wet of rain.
5. Keep enough space for check and maintenance.

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### 3.2 Moving and Unloading

To safe moving and unloading of machines, please strictly comply with the following steps.

1. During machines are unloaded from container, freight car or truck, forklift truck should be use for unloading, please take safety measure with all one's strength to prevent machine incline. Because various parts of weights distribution of machine are uneven.
  2. When unloading machines, do not open cases in a hurry, transfer whole machine to the place away from installation field as near as possible, and then open the case.
  3. When opening, check whether machines have fracture or damage. Once fractures or damages are found, please contact after sales service department of our company.
  4. When opening, please classify and make an inventory to a complete set of machine according to the packing list transported with machine.
  5. Machines are high precision processing, so strictly forbid tumble or damage.
  6. When hoisting machine, lifting rope should be fixed to designated place of machine hoist, during hoisting process, should check whether lifting rope tension will damage the equipment in the machine, especially electric cabinet part, when lifting, should pad a piece of thick wood block on the bottom of electric cabinet, and prevent the electric cabinet from squeezing by lifting rope.
- ◆ Note: 4 lifting ropes should be used for hoisting equipment, and make sure that Length and strength of 4 lifting ropes are consistent.

### 3.3 Installation and Connecting Pipe

1. If ice machines are placed on support steel frame, it is necessary to use screw to fasten steel frames of ice machines and supporting steel frame, and ensure the strength and anti vibration capability; if directly place it in the ground, please embed retaining screws for fastening steel frame of ice machine on the ground, right ahead of air cooled condenser must keep 1 meter space, and ensure ventilation.
2. Water supply pipe front of Ice machine would better add a water filter purifying ice making water, and avoid water route and water tank of ice machine to scale.
3. If water cooled machine still connects cooling water pipe, when connecting cooling water pipe, please pay attention to do not connect inlet and outlet pipes inversely.

### 3.4 Electrical Connection

1. Before switching on power, ground lead of machine should firstly be connected well, the ground lead adopts yellow and green, two colors lines to connect with embedded steel of earth, and ground resistance can not exceed 4Ω.
2. Please choose the standard cables equal to or greater than rated current of machine to connect main power supply.
3. Please connect same power supply to rated voltage of duty plate.
4. After connecting power supply, press "Reset" button of electric box panel once, if "power supply anomaly" indicator light flicks continuously, please exchange phase

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and sequence of power supply.

5. Machine must be connected neutral line (i.e. zero line).

### 3.5 Adding Refrigerant

1. Preparation before beginning to intake refrigerant: carefully check and ensure all valves in the system are in the starting position when system operates normally; prepare adequate R22 or R404A refrigerant, and weigh each bottle.
2. System connects with liquid storage pot of refrigerant: fasten up the two valves on the manifold gauge. The middle of that tube on the gauge (usual yellow) is connected to refrigerant cylinder. Open the valve on the cylinder, turn on the valves on the manifold gauge by a microscale manner one by one, then turn off rapidly, evacuate air in the pipes of the manifold gauge, finally link the low pressure pipe (usual blue) on the manifold gauge to low pressure side of ice machine (on the evaporator), and link the high pressure pipe (usual red) to high pressure side of ice machine (dry filter of fluid supply pipe).
3. Refrigerant cylinder has to be placed in the opening upwards direction (standing upside down the cylinder can accelerate fluorinated speed, but it is dangerous, and do not recommend to use), turn on the two valves on the manifold gauge, inject refrigerant into refrigerating system, after waiting pressure for reaching 8-10bar, and start up ice machine.
4. Test running and intake refrigerant again: convert switch to automatic running place, start up ice machine, compressor starts to run, lower the pressure of low pressure side, and inject refrigerant into low pressure side continuously. Until liquid level of liquid storage pot of ice machine (small machine has no liquid storage pot) keep the middle of first visual liquid lens and second visual liquid lens, and the liquid level represents refrigerant has been filled up.

### 3.6 Check before starting up

1. Check whether reducers, oil sight glass of compressor, oil level are in the right place;
2. Check whether input power voltage is consistent with voltage in duty plate;
3. Check whether power supply wiring of each motor is safe and grounded;
4. Check whether all set screws are tightened;
5. Turn on inlet valve, draw water to water tank, and keep water level reaching 3/4 height of water tank;
6. Check whether water press is normal range (0.1MPa-0.6MPa);
7. Check whether each manual valve is in the right place;
8. Check whether electric cabinet platform (panel) has fault alarm indication;
9. Whether installation and fixation of entire machine is firm;

## 4. Indicator Light and Button Instructions

To identify operating state of ice machine more accurately, ice machines produced by

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our company have been set different functional indicator lights in control system. Specific functions of the indicator lights are as follows:

Power indicator Red Constant light means that main power has been switched on, if machines do not run, and crankcase of compressor is heating at the moment.

Power fault light yellow Constant light means that power phase is mistake or lack phase, undervoltage.

Ice-making indicator light Green Constant light means machines are making ice.

System fault light Red Fault can be viewed in the touch screen.

- ◆ Note: Fault indicator light can be different according to different machines, please refer to random electric drawing, or this instruction back enclosed electric reference diagram.
- ◆ The ice machine with touch screen totally sets a fault indicator light, all faults will display in the touch screen.

Button Instruction:

Start Button Green Using for starting up ice machine

Stop Button Red Using for stopping work of machine, press the button, then the machine will stop on the basis of scheduled sequence and time

Reset Button White/Black After troubleshooting, pressing reset button can start up machine.

Emergency Button Red Pressing the button can stop machine instantly when machine occurs emergency circumstance.

- ◆ Note: Please do not use emergency button under the normal operation situation of machine.

## **5. Routine Maintenance of Ice Machine**

To have ice machine run in the optimum state, extend service life of ice machine, please keep machine clean daily.

### **5.1. Cleaning of Machine Body**

Please keep the machine body clean. The cleaning should not only remove dust of machine body surface, but also clean scale of condenser, cooling water tank, sprinkling water tray and water pipe, and should also require using a soft cloth to dip in dedicated scrubbing solution of stainless steel for cleaning machine case, body.

### **5.2. Routine Inspection of Evaporator**

From viewport, observe whether water source is supplied continuously, water level of distributive tray is normal, if not, please adjust valves of water supply pipes.

### **5.3. Routine Inspection of Compressor**

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Listen to whether compressors have abnormal noise.

The compressors with visual oil lens can be observed whether height of oil level is normal.

#### 5.4. Routine Inspection of Condenser

Air-cooled condenser checks whether direction of rotation of condenser fan is right, and whether airflow of air outlet is unobstructed;

Whether air inlets are covered by foreign matters, and whether heat exchange fins accumulate dust thickly and filth blockage;

Water-cooled condenser needs ensure that water quality is clean, and water circuit has no solid blockage.

#### 5.5. Replacement of Dry Filter

Unit will be replaced brand new dry filter after commission in the factory firstly, during each year normal maintenance and repair of the unit, please inspect differential pressure of the both ends of the dry filter, if it exceeds 0.5 bar, it needs replacing; if wetness indicating system of visual liquid lens alarms, it needs replacing.

#### 5.6. Other Matters Needing Attention

The ice machine is equipped with ice storage bin, when opening and closing the refrigerator door, the action should be tender, and do not kick or slam the door.

Never pile up any article around ice machine to avoid impeding ventilation and deteriorating sanitary conditions.

When starting up for the first time or non use for a long time, before starting up compressor, heater of the compressor should be energized for 8 hours, and then start button is turned on.

When cleaning machines, do not have dust enter into flake ice machines by vents.

## Breakdown and Troubleshooting

Breakdown	Display Status	Troubleshooting
Motor overload	Unit are in emergency stop, overload indicator of motor (Motor overload) or system failure indicators flicker or are normally on	<ol style="list-style-type: none"> <li>1. Check whether three-phrase winding of motor balances;</li> <li>2. Whether driving positions get stuck, have stator phrases, undervoltage state, and the connections between all low pressures electrical equipments loosen.</li> </ol>
High and low voltage failure	Units are in emergency stop, system failure indicator (System Error) flickers or are normally on.	<ol style="list-style-type: none"> <li>1. Check whether pressure of group of machines is slightly higher or lower;</li> <li>2. Whether electrical connection parts break, high-low pressure switch contacts are intact.</li> </ol>
Water shortage failure	Units are in emergency stop, system failure indicator (System Error) flicker or are normally on.	<ol style="list-style-type: none"> <li>1. Check whether water tank is lack of water;</li> <li>2. Whether Liquid level switch is intact, and electrical connections break or not.</li> </ol>

Full ice	Units are in an automatic stop state,	<ol style="list-style-type: none"> <li>1. Check whether filled ice controller is damaged;</li> <li>2. Whether power supply of filled ice control storage tank is abnormal.</li> <li>3. Whether the ice storage tank is full or not.</li> </ol>
Unable to start up	Complete machine is unable to start	<ol style="list-style-type: none"> <li>1. Check whether power supply of equipment are abnormal, fuse is burned down, button contact is intact;</li> <li>2. Whether motors overload, each connection between electrical equipments break or loose, and PLC has electricity (PLC has AC and DC power supplies)</li> </ol>
Condenser fan does not rotate under normal condition	Other motors run normally, only condenser fan has not rotated for a long time	<ol style="list-style-type: none"> <li>1. Check whether single high pressure switch contact is intact;</li> <li>2. Whether connecting wire is open (note: after short stop, automatically start-up is stop of single high pressure in protection state, it belongs to normal phenomenon, and does not require handling with).</li> </ol>

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Power indicator does not shine	After switching on, power indicator does not shine, and the system can not be started up	1. Check three-phase supply of the system whether it is abnormal, emergency switch is intact.
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- ◆ Regular maintenance of equipment can decrease greatly failure occurrence, for instance, regularly patrol, whether motor sound is abnormal, often inspect whether connecting wires of all parts loosen, and keep equipment surface clean, etc..
- ◆ Failure indication of various series of ice machines that our company produces differ according different machine types, and please refer to random instruction, electrical drawings for details or call directly after-sale service department of our company.

Electrical Schematic Diagram (Enclosed)