ODIMER
MACHINES À GLACE

# SEA WATER TYPE
# FLAKE ICE MACHINE
# MANUAL & OPERATION INSTRUCTION

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# INTRODUCTION

**This introduction outlines the correct procedures for operating and maintaining your refrigeration plant.**

This plant is a product of long-lasting experience of our engineers and technicians in the field of refrigeration technologies. It has been assembled with care at our modern manufacturing site. Although only high quality components were used which have proved to be highly reliable even under difficult operating conditions, a minimum of preventive maintenance is necessary in order to keep the plant operative and to minimize the costs for repair and maintenance.

Please bear in mind that, only when the following instructions are followed conscientiously can the rated performance of the installation be reached. Please read these instructions carefully before operating the plant.

You are sure to get satisfactory answers after carefully reading through these operating instructions.

## 1、Personnel

Appoint one capable chief operator who is fully responsible for the proper operation of the plant. The chief operator and other people in charge of repair, maintenance, starting and stopping the plant should be experienced in the field of refrigeration. Basic knowledge in the field of electric installations is highly recommended.

Improper manipulation of the major components of the plant especially the electrical ones can cause damage and reduce its efficiency.

## 2、Basic safety instructions

All staff involved with the operation of the plant must be made familiar with the safety regulations for refrigerant plants. Make sure that these persons understand and follow the instructions thoroughly.

1) Operation instructions for refrigerant plant operators and signs with safety hints have to be posted clearly visible in the machinery container.

2) Parts of the refrigerant cycle are under high pressure. Do not open pipes or components improperly.

3) Parts of the components heat up during operation. Be particularly careful when approaching components of the high-pressure discharge section of the compressor.

4) Manipulation at the refrigerant and electrical cycles must be carried out only by authorized and experienced staff.

5) Never work on any equipment without another person present.

6) Do not smoke in the refrigeration plant.

7) Gaseous refrigerant has a higher specific density than the ambient air. In case of refrigerant leakage the ground has to be ventilated in order to avoid building up of an oxygen-poor atmosphere.

Before any manipulation at active components and compressors particularly before opening of covers of active components, make sure that the appliance has been switched off correctly.

The following rules must be followed:

1) Switch off the component (main switch)

2) Secure against reconnection

3) Check for tension

4) Protect/cover adjacent components

Special procedures have to be followed for work at the ice generator.

1) Disconnect electricity and push the button of emergency stop for performing any maintenance to the ice machine.

2) When required to work inside the ice machine, there must be a standby person outside of the machine.

If air switches are stopped as a result of “overload stop” of the machine, check and correct before restarting.

## 3、Operating stuff and power supply

3.1. Water

In order to ensure the correct working of ice machines and pumps, only seawaterr in conformity with the required specifications can be used.

**CAUTION:** Different water specifications may cause build-up of scale and/or rust in the water circuit. Furthermore, the productivity of the ice plant may be severely affected.

3.2. Refrigerant

The ice plant is designed for use with refrigerant R22/R404A Never fill or refill other refrigerant than R22/R404A to the refrigeration cycle of the plant. Only use clean, oil-free and water-free refrigerant.

3.3. Refrigeration oil

The reciprocating compressors are charged with a kind of high quality refrigeration oil. For oil refill please refer to the Technical Information Bulletin of the compressor section. The chemical and physical properties of the refill oil must conform to the specifications of the original filling.

## 4、Start-up of the ice plant

4.1. Switch on the main switch at least 6 hours before starting ice water or ice production in order to heat up the oil in the crankcase, which will lead to evaporation of the refrigerant dissolved in the refrigeration oil.

4.2. Make sure that the suction and discharge valves of the compressors and the water inlet and outlet valves are opened.

4.3 Switch on the circulating pump and cooling fans.

4.4 Put the other switches to the “automatic” position.

4.5. Turn the ice generator switch to the “on” position in order to start the ice generator.

4.6 Observe the pressure shown by the pressure indicator at the gauge-panel. The compressor will be started with the pressure switch under the pressure of only about 4 bars.

## 5、Stopping the ice plant

**Attention!!!**

During the standstill periods the ambient temperature of the plant should not exceed 40 ℃. The plant surface should be regularly cleared of dust and dirt to remain clean. Particularly the surroundings of the plant must be kept clean and tidy.

Additional protection of the plant form direct solar radiation, e.g., by a shadow roof is highly recommended.

5.1. Short-term interruption of the ice production (automatic operation mode)

As soon as the water level and full ice switches release during the automatic procedure,

normal ice production will restart automatically after a delay of 10 minutes.

5.2. Medium and long term stop of the ice production

Long-term standstill of the ice plant, i.e., standstill of more than approx 6 hours, is perhaps caused by the following several reasons:

1) Repair of major components

2) Seasonal standstill

3) Decreasing demand for ice flakes due to national holidays

4) Transport of the ice plant

5）Others.

Put all switches to the “0” position.

## 6、Maintenance of the flake ice plant

Detailed Instructions for repair and maintenance of the major components of the flake ice plant can be found in this manual. Please refer to these documents in order to keep the plant in optimum operation conditions.

We recommend the following time schedule for maintenance work:

1) Twice a day, inspect the distribution pan of the ice machine for partially plugged nozzles from where water may drip into the storage bin. Clean the pan and nozzles as required.

2) Once a day, inspect the water tank for plugged water inlet pipes and abnormal water charge. Drain the water out of the water tank and flush it with clean water.

## 7、 Furthermore

1) Keep the interior and surroundings of the ice plant clean.

2) After every 500 operating hours and each major repair work at the compressor and refrigeration cycle, the refrigeration oil should be replaced.

## 8、 Trouble shooting

In case of breakdowns please contact

us.

E-mail：contact@odimer.com.com

# Important instruction in the manual

Thanks for buying our flake ice machine, which can work efficiently for several thousand hours consecutively without breakdown on the premise of correct use.

A complete ice machine consists of the following main components: evaporator (where ice flakes are produced), refrigeration system (including compressor, condenser, refrigeration fittings, etc.) as well as other connection piping, brackets and circuit control systems.

As a plant for production, this ice machine needs electricity as power, a complete refrigeration system, and water required for ice production to maintain normal functioning.

| | |
|---|---|
| **Danger !!** | **Improper handling may cause dangers, such as serious personal injuries and even death accidents.** |
| **Attention!!** | **Improper handling may cause dangers, such as light or moderate personal injuries and equipment accidents.** |

## Danger!!

- **Never enter the evaporator casually when the ice machine is running!**
- **While the ice machine is running or stopping, never approach the red pipes to avoid being scorched.**
- **In the course of service, never forget to ensure that the machine has completely stopped and the main power supply disconnected before performing other operations.**
- **In case of long-tem standstill, please disconnect the main power switch to avoid hazards of electric shock.**
- **In case of sudden external power cutoff, disconnect main power switch and check power supply. Electricity mustn't be recovered in case of abnormalities. Make sure that every motor rotates in the correct direction before starting.**

## Attention!!

■ **Only those specially trained and experienced in the maintenance and operation of refrigeration equipment can operate the system.**

■ **Carefully read through the instructions and understand all items contained so as to correctly install, connect, function, operate and maintain. Following the standards specified in the file is very important to realizing rated performance and keeping the operators safe.**

■ **Carefully read through the operating instructions, strictly follow standards and carry out maintenance and service in the charge of adequate operators.**

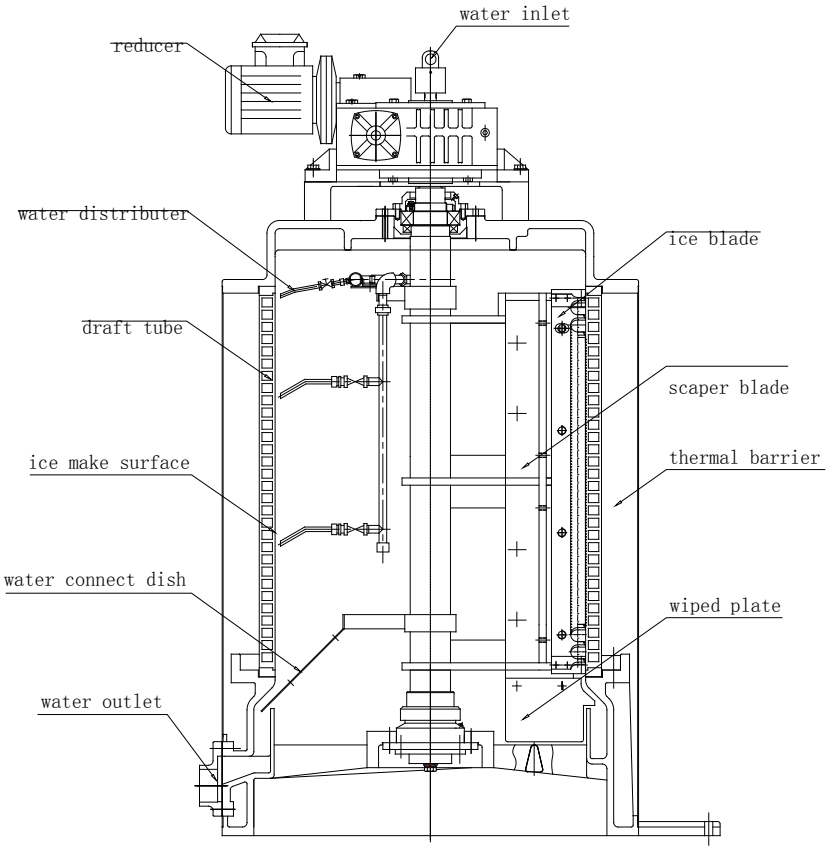
■ **This manual must be kept by the actual final user.**

■ **The technical standards contained herein are subject to change without separate notice.**

■ **The operator on duty should keep watching over the functioning of distribution box and operation table as well as failure indicator lights, and timely solve problems detected.**

## 1.1 Ice-making principle

The whole process of making ice with the ODIMER flake ice machine is very easy and direct. Just charge it with water, connect to the refrigeration system and switch on to start, and in 10 minutes ice flakes will be produced. You can refer to the following drawing for the detailed process of ice flake production inside the ice machine.




## 1.2 Structural principle

The ice machine body consists of 4 main parts.

### 1.2.1 Evaporator

It is in the evaporator that ice flakes are produced. The refrigerant in the refrigeration system exchanges heat with water through the inner wall of the evaporator. As a result, lots of heat is absorbed, then the temperature of the water flowing over the surface of the inner wall sharply reduces to below the freezing point and thus ice is immediately produced.

### 1.2.2 Unit of water feed and circulation

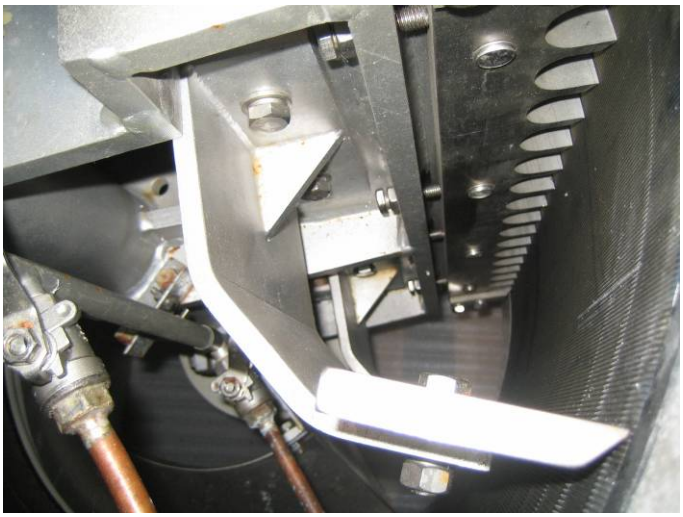
Unit of water feed and circulation consists of water tank, water pump, water supply line, water distributing pan, water connecting dish, and water guidance trough. The water flow line is detailed as follows: The water from external source flows into the water tank where there is a float valve for controlling interior water level. Too much water inside the water tank is discharged from the overflow opening, so a pipe must be connected to the opening to guide water to the discharging place. Then water is guided to the upper part of the ice machine body through the line by the pump

of the water tank, charged into the water distributing pan through the water supply opening in the upper part and evenly sprinkled onto the inner wall of the evaporator by water distributing pan. The water that doesn't freeze on the inner wall falls onto the water connecting dish, flows into the guidance trough and then into the water tank for recirculation.

**1.2.3 Part of main shaft drive**

The low speed counterclockwise rotation of main shaft is driven by the reducer with a motor.

**1.2.4 Ice-scraping part**



As shown in the diagrams, the ice blades secured by the brackets extending from the top and bottom ends of the main shaft fall into two types, or spiral and rake. These two types are used for ice machines with different structures. So please pay attention to the type of your machine.

The ice blades cut through the ice layer around the inner wall of the evaporator and peel off the ice of certain thickness from the wall, and then evenly-shaped ice flakes are formed and fall out of the ice drop opening of the ice machine body.

# 2. Installation and use

## 2.1 Choice of site location

The installation site should meet the following conditions:

1) The foundation at the installation site should be constructed to ensure weight-bearing and vibration absorption as required by our company;

2) While choosing a suitable installation site, how to convenience the use and transport of ice should be taken into full account,

3) The ice machine must be placed indoors. The ambient room temperature should range from 5 -35 °C and not under 0 °C all year long and be kept from rising excessively in summer.

4) Pay attention to lighting but avoid direct exposure to sunshine.

5）Enough space around the system for its inspection and maintenance.

## 2.2 Steps of lifting and unloading

Since the ice machine body is quite heavy, we require our users to provide facilities of lifting and transport in the course of unloading in accordance with the following instructions:

1) While unloading the ice machine from such vehicles as van and truck, please pay full attention to safety and secure against excessive inclination since the weight of the machine is unevenly distributed in every direction.

2) Upon unloading the machine, never haste to uncrate but move the machine together with the carton as near to the installation site as possible and then uncrate;

3) Check for fractures or damages while unpacking, and contact our company's after-sales service department upon finding any fractures or damages;

4) After unpacking, sort and count the whole set of equipment one by one according to the packing list inside the file delivered with the machine.

5) Due to constant swing of the ship .the cushion should be placed on the damping washer. The installation grade should exceed 8.8 grade with stainless steel bolt.

6) The ice machine is processed with so high precision that falls or impacts should be avoided as much as possible. Especially even if a tolerance of one thousandth of a millimeter happens to the central main shaft, the long-term use of the machine will be affected.

## 2.3 Test and use

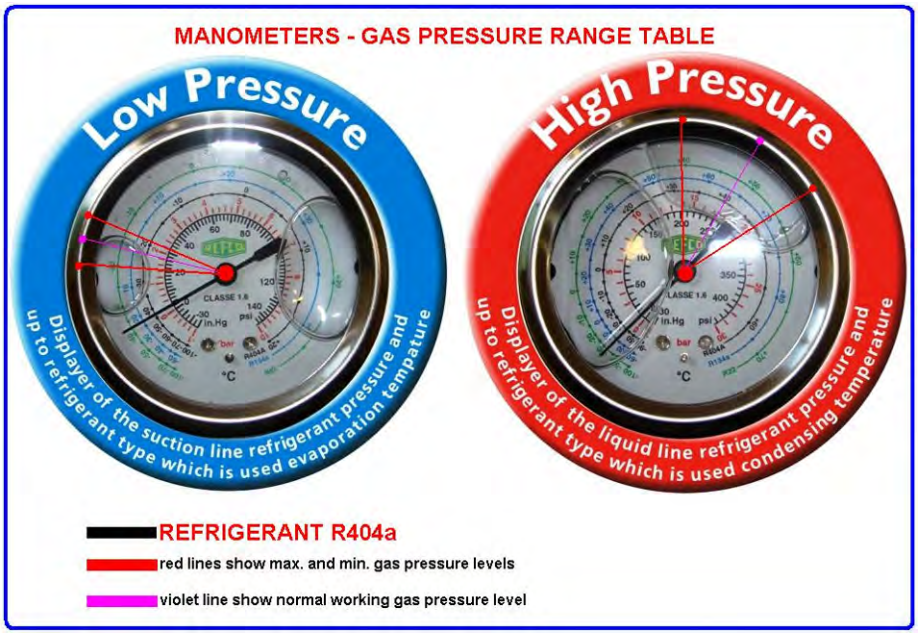
### 2.3.1 Refrigeration system test

Requirements for the refrigeration system: Please refer to refrigeration principle diagram for the refrigeration quantity and refrigeration line connection required for the evaporator.

**① Stain Removal**

Although the pipelines, condenser, compressor unit and ice flaker have gone through stain removal treatment before being connected, it is suggested to conduct a second-time overall stain removal treatment after they are connected.  Use the side hole (hereinafter called F charge valve) on the inhaling valve of the compressor unit for charging refrigerant

### ② Pressure Maintaining




Make sure that the system is clean, then, open the valve inside the system, and use F charge valve to charge nitrogen into the system to make pressure reach 18bar. Record pressure readings at the meter after the pressure in each meter keeps balance, or directly apply a black tape in horizontal along the needles on the meter. NOTE: When reading pressure at the meter or apply tape on the meter, you should look straight at the front side of the meter. During pressure maintaining, use soapy water to detect leaks for each welding spot and bulkhead position. Observe the pressure reading at the meter after 24 hours. Under the condition that the ambient environment change is smaller than 10℃, the float range of the meter pressure should not exceed 0.1bar. If the value exceeds 0.1ba, it indicates that there is leak and it is required to detect leakage thoroughly. When leakage is detected and properly handled, conduct pressure-maintaining process again. If no more leaks are detected, you can carry out heat preservation in the air return pipe.

### ③ Vacuum Piping

After making sure that the system is free of leaks, evacuate the nitrogen from the system. Connect a good vacuum pump to F valve to pump vacuum. First, test the vacuum pump: start the vacuum pump, shut F valve and guarantee that the vacuum level is smaller than -0.085MPa. After verifying the performance of the vacuum pump, open F valve to pump vacuum. After a certain period of time, the system's vacuum level should reach below -0.08MPa. If the vacuum level cannot reach such value after a long time (depending on the system size; if the system is quite big and

there is much moisture, it will require more time to pump vacuum), it indicates that there are leaks in the system. Conduct pressure maintaining leak detection again. If it reaches the required value, continue to run the vacuum pump and maintain the system's vacuum level for 24 hours. The aim to pump vacuum is to ensure that there is no air and moisture inside the system and the system can maintain dry. Moisture can cause ice to clog the R22 system. And air is a kind of incondensable gas which will decrease the heat transfer effect of the evaporator and condenser.

Refrigerant charging and debugging: refrigerant charging (hereinafter called F) and debugging almost occur simultaneously:

1. Preparation before initial F charge: check carefully if all the valves in the system are in the positions when the system is in normal operation; prepare sufficient R22 refrigerant and weigh out the total weight of each bottle.

2. Connection between the system and R22 container: close the two valves on the manifold meter tight. Connect the middle pipe (usually blue) on the manifold meter to R22 container (hereinafter called steel cylinder). Open the steel cylinder valve and "drive away gas" in the pipe section where the manifold meter is located, and then connect the high pressure pipe (usually red) of the manifold meter to the system's high pressure. The low pressure pipe (usually yellow) is connected to the system's low pressure.

3. Initial F charge: open the valves connecting high and low pressure sides to the manifold meter, and then open the high and low pressure valves on the manifold meter to charge R22 into the system. After frost forms on the steel cylinder surface and melts, close the steel cylinder valve and the two valves on the manifold meter. After replacing the steel cylinder, continue to charge F. Decide system pressure according to the ambient temperature at that time. Charge more F to the high pressure side until the pressure keeps balance. The pressure on the low pressure side should be lower than 2-3bar, R22's saturation pressure under the ambient temperature at that time, so as to prevent R22 liquid from accumulating in the low pressure pipe section and damaging the compressors during debugging. When the designated pressure is reached, close the valve on the manifold meter and the valve on the steel cylinder, remove the manifold meter connecting to the system and calculate the total amount of R22 charge.

4. Checking before starting ice flaker: connect power to the system, check the water level in the ice flaker water tank and water supplement situation; adjust the pressure control value of the

compressor's high-low pressure controller (high pressure: 2bar, low pressure: 0.2bar); check the oil level in the compressor and oil reservoir; check tif the system valve is in its normal position.

5. F charge valve connection during operation: close the two valves on the manifold meter and connect the meter's high pressure pipe to the F charge valve (behind the TXV) on the bottom liquid pipe beneath the ice flaker. Place the steel cylinder upside down, and open the steel cylinder valve.

6. Test run and F recharge: turn the switch on the power box to the Auto position. The system will start to operate. After ice flaker speed reducer and circulation water pump start, open the high pressure valve on the manifold meter and begin to charge liquid refrigerant into the system. At the same time, the liquid supply solenoid valve on the compressor unit will automatically open and the fan on the condenser will start in the delayed mode, and finally the motor and compressors in the unit will be turned on, too. As the compressors operate, the pressure on low pressure side which originally has higher pressure will drop and finally reach a balance. The liquid refrigerant will continuously be charged into the system and the suction pressure will slowly rise. At this time, note that the suction pressure should be within 0.2-2bar. If it is higher than 2bar, each TXV must be closed 1-2 turns. If there is no change in pressure, continue to close the TXV. The discharge pressure should be less than 20bar. If it exceeds 20bar, check the condenser's operation right away. The oil pressure should be 3.5bar higher than the suction pressure. Observe the sight glass on the liquid tube (generally green). When it displays it is full, shut off F charge valve, steel cylinder valve and high pressure valve on the manifold meter, remove manifold meter and record the amount of F charge. Thus, the initial F charge completes. When the machine is turned on for the first time, the pressure on the low pressure side may be lower than 0.2bar, the low-pressure protection pressure for the compressor, and causes the compressor to stop for low pressure protection. At this time, turn the switch to the OFF position. After the alarm is cleared, turn the switch to the Auto position again and continue to charge F.

7. System debugging: when F charge completes, adjust the system to keep the system in the normal operating state. If there is any defect, identify and remove them first (see details in troubleshooting instructions). Adjust water flow according to the thickness of ice flakes and how the ice blade scrapes the ice. When the water flow is adjusted, proceed to adjust the TXV: Adjust the opening degree of each TXV according to the overheat degree of the return air in the return air manifold to maintain the overheat degree of the return air in each return air manifold at the same

degree. Then adjust the opening degree of TVX simultaneously to adjust the return air pressure to the set value of 1-1.2bar. Note that the overheat degree of the return air should not be too low.

**2.3.2 Requirements for electricity distribution**

Please refer to diagram of electrical principles for connection of distribution box and operating table.

**2.3.3 Pre-operation check**

Please recheck as follows after the ice machine is installed and prepared for formal operation:

1) Observe the sight glass of the reducer to see whether lubricant oil has been charged;

2) Check whether input power voltage is within the normal range;

3) Check whether the power connection wires of every motor are secured and reliably grounded;

4) Check whether all the setscrews are tightened;

5) Open the water inlet valve, feed water into the circulating water tank and keep the water level at about 2/3 of the water tank height;

6) Check whether the water supply pressure is within the range of standard pressure (0.1Mpa—0.6Mpa).

**2.3.4 Functioning and operation**

**Preparation work before running**

Due to the shaking and vibration in the transportation process, please check whether the internal wiring is loosened before switching the power supply into the electrical cabinet; the power line of the motor requires careful inspection, and the power supply line can be switched in after having checked no loosening phenomenon.

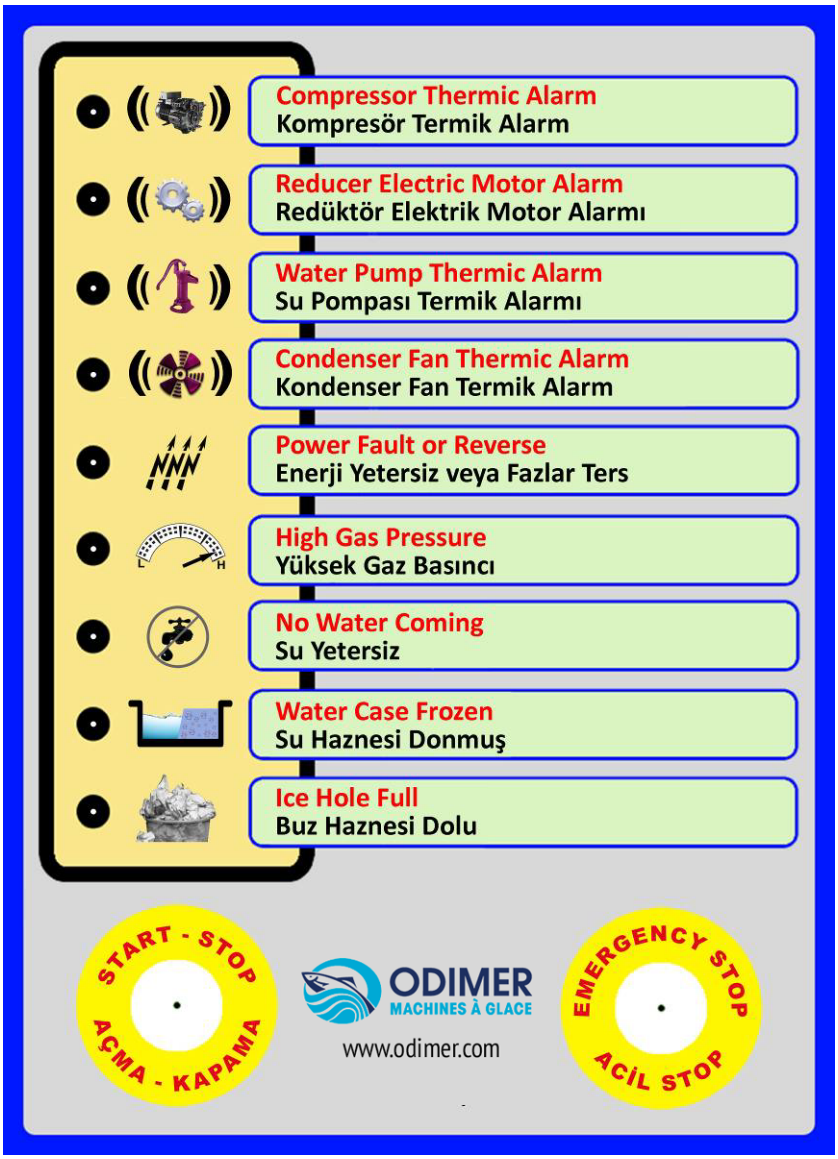
Check whether the power line and the power supply switched in meet the requirements of our ice maker.

Turn on all power supply switch in the control cabinet, and the correct sequence as follows: turn on main power supply switch QF1 first, then turn on the power supply switch QF2, and reverse operation is required for turning off the power supply.

All personnel should leave rotating part of the equipment and other dangerous part with high temperature and high voltage, etc. before starting the equipment.

## Switchboard Instruction

1. Compressor Thermic Alarm
2. Reducer Electric Motor Alarm
3. Water pump Thermic alarm
4. Power fault or reverse
5. High gas pressure alarm
6. Water is not coming or not enough
7. Water case is frozen
8. Ice Hole is full
9. Start-Stop button
10. Emergency Stop Button




## Control Cabinet Inner Connection Instruction

1. Main power supply input breaker
2. Power control breaker
3. Fuses
4. The transformer of control power T1
5. The compressor contactor
6. The reducer / water pump contactor
7. The compressor thermal overloads relay.
8. The reducer thermal overloads relay.
9. The water pump thermal overloads relay.
10. The protector for phase-sequence EP
11. Grounding terminal
12. Connection terminal

**Electrical control system operation instruction**

1、 read this manual carefully before operating the machine；

2、 Be careful of the equipment inside; only professionals are allowed to open the control box.；

3、 To avoid causing any problems and damages of the machine, do not change any of the control system without our consent.

4、 For long life of the components, do not knock on them with any tough objects.

5、 Be careful of the high temperature pipes (red color), Never get close to them or it may cause injuries to people.

6、 In case of long-term standstill, disconnect all the power supply inside the control box to avoid electric shocks; disconnect all the power supply while repairing and maintaining.

## 3. Safety points for attention

This product is manufactured in strict accordance with the related state standards and safety requirements, so it is safe and reliable on the premise of correct operation. The following points should be paid special attention to while testing, operating and servicing the ice machine:

1) Never put your body or other foreign matters into the observation hole;

2) Ensure that the machine has stopped and the main power supply disconnected before performing maintenance;

3) In case of long-term standstill, disconnect power supply to avoid electric shocks;

4) In case of external power cutoff, disconnect main power switch, observe ice freezing on the evaporator and check to ensure power supply isn't abnormal before power recovery. Make sure that the reducer rotates in the correct direction after starting.

5) When the machine is working, never put your head or hands near the discharge piping of the compressor to avoid injuries;

6) Conscientiously check the refrigeration piping to timely detect refrigerant leakage and take preventive measures. Ensure that the site is well ventilated and replenish mechanical ventilating equipment if necessary.

# 4. Maintenance

## 4.1 Evaporator cleaning

To keep the evaporator in peak performance, the ice flaker should be cleaned with an approved ice machine cleaner at least twice a year (more often if water conditions cause mineral build up) using an approved food grade ice machine cleaner. The water pump is used to circulate ice machine cleaner through the system. 。

## 4.2 Ice machine cleaning instruction

An important part of ice flaker maintenance is to clean it frequently so that the water passages are not clogged and the freezing surface is clear and free of scale caused by calcium and iron deposits. Frequency of cleaning depends upon the quality of water. In extreme hard water areas, it may be necessary to clean the flaker as often as every 2 months, whereas in normal or “soft” water areas twice a year may be sufficient.

When cleaning is necessary, proceed as follows:

1. Turn off refrigeration compressor. If flaker is connected to a compressor rack, close the liquid line shutoff valve.

2. Turn off the ice flaker switch.

3. Close water supply shutoff valve.

4. Drain water from the drain connection in water tank. Some models are equipped with a drain valve, while others have a drain plug located below the water float valve connection.

5. Prepare the cleaning solution following the instructions on the bottle.

**Caution**

Use approved ice machine cleaners only. Mix solutions in accordance with the manufacturer’s instructions. Ice machine cleaners contain acids, which may cause burns. Handle with care. In case of external contact, follow first aid instructions on the bottle. If swallowed, seek immediate medical attention.

**Caution**

6. Pour solution of ice machine cleaner into tank to normal operating level. Do not overfill, as the water may overflow into the ice storage bin.

7. Start the reducer power and water pump by turning the switches on and then immediately off.

This will allow the gear motor & water pump to run for approximately 30 minutes without refrigeration, to circulate cleaning solution over the freezing surface and all water passages. Operate until all scales are removed. This may require from half an hour up to 2 hours if scale build-up is heavy.

8. When the system is clean, drain cleaning solution and rinse with 2 or more complete rinses to ensure that cleaning solution is flushed away thoroughly. At each rinse, fill tank with fresh water and run drive motor and water pump for a few minutes, then drain.

9. Mix a solution of approved sanitizer, or mix 0.028kg of household bleach with 8 liter of warm water at 32-45 ℃.

10. Pour solution into tank to normal operating level (as in #7 above), then re-circulate sanitizing solution for approximately 20 minutes, by turning on drive motor & water pump.

11. Drain solution and rinse thoroughly with fresh water at least twice, following procedure described in # 9 above.

12. After ice flaker is thoroughly rinsed, restore machines to normal operation by opening water supply valve, restoring refrigeration and turning the machine back to ON.

### 4.3 Water distribution tubes cleaning

Water distribution tubes should be kept clean and free of mineral buildup. When they do accumulate mineral deposits, the flaker must be thoroughly cleaned. Remove each tube and clean with cleaning solution and small tubing brush. Carefully inspect each distribution tube and fitting for leaks or cracks. Replace defective tubes when necessary.

### 4.4 Water tank cleaning

Water tank and pump should be kept clean and free of any mineral buildup. When mineral deposits accumulate the machine must be thoroughly cleaned. The water tank will be cleaned when you normally clean the equipment by circulating the ice machine through the water system. In extreme cases of mineral or slime buildup, shut off the main power and remove the top covers from the tank, and using the ice machine cleaner and a scrub brush clean the aluminum tank body until the deposits is removed.

## 4.5 Lubrication

**1）Bearing & seals**

Main bearings on the ice flaker should be greased every three months using food grade edible grease. The grease fittings are easily accessible from the front of the flaker; the top bearing is lubricated through a greasing fitting accessible through the inspection (service) opening. The bottom bearing is lubricated through a greasing fitting on the outer edge of the bottom casting.

**Note**: one pump of a grease gun is normally adequate to grease the bearing. Do not over-grease, as this may damage the grease seals at the bearings.

**2）Speed reducer**

Some speed reducer is installed with fittings that are used for lubricating top bearing of low-speed gear. This bearing should be lubricated with standard bearing oil (not food-grade) once every 6 months.

After 250 hours of operation, the oil of new speed reducer should be changed .Usually, after first oil change, oil needs changing every 2500 hours or every 6 months( whichever comes first). Regularly test oil sample collected from equipments to fix moderate time interval. When operated under low temperature conditions（ below 50℉）, the speed reducer needs synthetic oil.

## 4.6 Preventative maintenance

The ice flaker should be visually checked daily by a designated employee. This inspection should ensure that:

- Bin doors are working ( closing ) properly;
- Ice quality (size of ice flakes) appears normal;
- Ice quantity appears normal;
- No bubbles are visible in the sight glass;
- The flaker is clean;
- No unusual noise is present.

**Preventative Maintenance Schedule**

| ITEM | 3 months | 6 months | 9 months | 12 months |
|---|---|---|---|---|
| Check ice machine* | | | | √ |
| Check ice harvesting | √ | | | |
| Check flaker for damaged parts** | √ | | | |
| Inspect water float valve | √ | | | |
| Inspect deflector scraper | √ | | | |
| Grease top & bottom bearings | √ | | | |
| Check and replace speed reducer oil (standard oil)*** | √ | | | |
| Check and replace speed reducer oil (synthetic oil)*** | | √ | | |
| Grease speed reducer bearing★ | | √ | | |
| Sanitize ice machine* | | | | √ |
| Check bearing wear★★ | | | | √ |
| Check cutting blade clearance★★★ | | | | √ |

* Clean and sanitize at least yearly, more frequently if necessary.

** Inspection should include, at a minimum, the following parts: deflector scraper, water distribution tubes and float valve.

*** Speed reducer oil should be changed every 2500 hours of operation (5000 hours with synthetic oil), or every six months, whichever occurs first. The above chart assumes continuous operation of the ice flaker.

★ Only required on speed reducers equipped with greasing fittings at the bearings. Use food-grade grease such as Chevron FM or equal.

★★ Use an industrial feeler gauge, if wear is greater than 0.007″， bearings may be wearing excessively. Contact factory for guidance.

★★★ Use an industrial feeler gauge. Check blade at top and bottom, in at least four locations around the evaporator (quarter points). Clearance should be 0.004″-0.006″. If clearance isn't within these parameters, contact factory for guidance

# 5. Service & Adjustment

Fittings of ice machine have 1 year warranty. Under correct using and maintenance conditions, term of using year will be longer. After warranty year, the fittings will be sold at actual leaving factory price. Following is term of replacement year of main easily wearing parts under usual conditions.

| Part name | Term of years |
|---|---|
| Floating ball valve | 2～4 years |
| Main shaft | 3～7 years |
| Reducer motor | 4～7 years |
| Water pump | 2～4 years |
| Ice blade | 3～8 years |
| Brine pump | 2～4 years |
| Full ice controller | 2～4 years |
| Solenoid valve | 2～4 years |
| Pressure controller | 2～4 years |
| Expansion valve | 2～4 years |
| Air suction filter | 2～4 years |
| Dry filter | 2～4 years |

## 5.1 Replacement of full ice control

1. Turn off the main power;

2. The full ice control is located inside the foundation steel channel of the ice machine;

3. Loosen the plastic nuts fixed onto the full ice control and remove the control;

4. Disconnect the lead of a new full ice control on the electrical control cabinet from the wire-connecting terminal;

5. Install the new control at the original location and connect the lead;

6. Turn on the main power.

7. Check alignment of the sensors. When proper alignment is achieved, the LED on the receiver will light. Adjust the mounting brackets as necessary to ensure that the sensors are properly aligned.

### 5.2 Replacement of water pump

1. Turn off the main power to the flaker;

2. Drain off the water tank;

3. Remove the cover from the electrical junction box of the pump, and disconnect the water pump wires from the terminal strip;

4. Pull up with proper force the water pump on the water tank and water distribution PVC tube so as to separate PVC tube from the water pump.

5. Remover the setscrews on the flange of the water pump and remover the pump;

To install the new pump, simply reverse the above procedure. Use caution when routing the new cables to insure they are secured to avoid accidental damage.

### 5.3 Replacement and adjustment of water float valves

1. Shut off the water supply to the ice flaker and drain the supply line;

2. Loosen and remove the compression fitting at the float valve;

3. While holding the float valve body with pliers or a crescent wrench, remove the water float valve fitting from the valve body;

4. Using a socket, remove the locking nut from the valve body (you may need to hold the valve body to keep it from turning);

5. Remove the old valve and fiber washer. Install new valve (with fiber washer on the inside of the water tank) and tighten the locking nut with a socket. The valve bogy should be held in place with the discharge port facing straight down;

6. Re-install the float valve fitting and reattach the water supply line. Turn on water shutoff valve and check for leaks at the compression fitting and at the float valve fitting. The water level should be maintained to the point just below the lower edge of the water return trough while the flaker is operating. To adjust the operating level, hold the float in one hand, and push or pull on the brass shaft (depending on whether the water level is too high or too low). Watch the operation for a while to verify the water level. If the water level is still not where it should be, readjust the float valve.

## 5.4 Replacement of speed reducer motor

1. Cut off the main power of ice flaker and take out the circuit cover of the speed reducer and the power conductor that connects the terminal；

2. Speed reducer is connected to the gear case by four bolts through the mounted panel. Dismount the four bolts and take out the motor from the gear case. Without a setscrew or shaft coupling, the shaft of motor is inserted into the hollow high-speed input shaft of the speed reducer with a 1/4″ bond. If the old motor is hard to take out, please find the two screwed holes on the mounted panel. They are on both sides of horizontal midline. Fasten an erection bolt into the holes to push the motor (Rolling the enclosure of motor may help the bolt to suppress the mounting flange of the motor so as to ensure the bolt not to be embedded to the thread of flange). Please fasten the two bolts by hands and alternative rotate in a 1/2 circle until the motor is easy to take out by hand;

3. When installing a new motor, place the 1/4″bond on the shaft. Lubricate the surface of the shaft of motor roughly and insert it into the hole of high-speed shaft to align the keyway with the bond. After the motor is installed, rotate it until the mounting flange is aligned with the four holes of mounting panel of the speed reducer. Insert a bolt to each hole and align them；

4. Reconnect the elastic cable to the motor and connect the electrical conductor to the connection terminal. Check to make sure that the circuit connection is properly energized and the motor rotates correctly (CCW). For information on correct connection, please refer to line connection description on the nameplate of motor.

5. After installing and connecting the motor, switch on power and check its operation by an ammeter on the circuit so as to ensure that the motor works within the current range specified on the label.

### 5.5 Replacement of air suction filter

1. Close the stop ball valve of liquid pipe.

2. Start the compressor and press the refrigerant in the system into the high-pressure end. As the high pressure gauge comes to 0bar, turn off the air-suction valve of the compressor to stop the compressor.

3. Dismount the end shield of air suction filter and replace the filter elements. If the entire part shall be replaced, replace the hull by acetylene welding.

4. After overhaul, connect the bypass hole on the air-suction valve of the compressor to the air-extracting opening of the vacuum pump. Make vacuum of the section by pumping from the stop ball valve to the air-suction valve of the compressor.

5. After vacuum pumping, open the air-suction valve of the compressor and the stop ball valve of the liquid pipe.

6. Check if the junctions are leaky by smearing soap solution.

### 5.6 Replacement of drying filter

1. Close the discharge valve of the reservoir

2. Close the stop ball valve of liquid pipe.

3. Dismount the end cap of the filter and replace the filter elements. If the entire part shall be replaced, replace the hull by acetylene welding.

4. Place back the end cap of rear cover and fasten the screws. Open the discharge valve of reservoir slightly to feel with hands the cold air coming out in the end shield. Close the end shield of filter immediately. Screw down the screws on the end cap. Reopen the discharge valve of reservoir.

5. Check if the junctions are leaky by smearing soap solution.

### 5.7 Replacement of pressure gauge and dual-pressure controller

1. Turn off the air-suction valve of the compressor.

2. Turn off the air-discharge valve of the compressor.

3. Replace the damaged pressure gauge or dual-pressure controller.

4. Turn on the air-suction valve and air-discharge valve of the compressor.

5. Check if the junctions are leaky by smearing soap solution.

### 5.8 Replacement of solenoid valve

1. Ensure that the flaker has stopped and disconnect main power;

2. Turn the front and rear shutoff valves of the solenoid valve to the stop position;

3. Cut out or de-solder the solenoid valve from the liquid line and remove the old valve;

4. Install and solder the new valve into the refrigeration line (please determine the direction of the new valve);

5. Install solenoid valve coils and energize the solenoid valve separately;

6. Using a high-quality vacuum pump, evacuate the refrigeration line to remove any moisture that may have entered the system while the line was opened to the atmosphere.

7. Reconnect armored cable and solenoid valve wires;

8. Check for leaks at the soldering points at both ends of the solenoid valve;

9. Turn on main power, turn on ice flaker switch and check operation of the solenoid valve.

### 5.9 Replacement and adjustment of expansion valve

1. Stop the ice flaker and disconnect main power;

2. Close the two valves nearest to the expansion valve on the liquid supply line and suction line and drain off the refrigerant inside the valve;

3. Carefully cut back the insulation on the suction line, loosen the setscrews of the temperature-sensing packet and remove the expansion valve with a spanner;

4. Remove the old expansion valve;

5. Install the new valve;

6. Reattach the temperature-sensing packet into the suction line at the original position and fasten it with two copper straps;

7. Re-insulate the suction line;

8. Using a high-quality vacuum pump, evacuate the liquid line to remove any moisture that may have entered the system while the line was open to the atmosphere;

9. Open all closed shutoff valves; energize the solenoid valve to give the expansion valve pressure. Then begin to check for leakage and start the machine after confirming that there is no leakage;

10. To adjust the TXV, remove the adjustment stem cover and turn the adjustment stem 1/8 to 1/4 turn at a time (clockwise to close the valve if it was overfeeding, counterclockwise to open the

valve). Wait for 5-10 minutes to allow the system to stabilize. Repeat this step until ice is produced and harvested all the way to the bottom of the evaporator. Note: balanced-port expansion valves are more sensitive than standard TXVs, so adjustment of the stem should be limited to 1/8 turn at a time.

## 6. Remedies for ordinary breakdowns

| Failures | Possible causes | Solutions |
|---|---|---|
| After pressing start button, the ice maker running indicating light is not on and the ice maker is not started up. | 1 No power supply | Check whether the electrical source breaks off. Please connect it. |
| | 2 Power supply control switch is not closed. | Close the power supply switch |
| | 3 The fuse is burned out. | Check the fuse FU1，and replace the burned out one. |
| | 4 Emergency stop button pressed | Rotate and loosen the Emergency stop button clockwise. |
| | 5 The stop button is damaged. | Replace the stop button |
| | 6 The emergency stop button is damaged | Replace the “Ice maker start-up ”button |
| | 7 No voltage output at power supply module | Check whether there is output at power supply module; power supply is broken if input is detected while output is not, replace the power supply module |
| | | |
| “System protect” pilot lamp is on | 1 power supply under voltage or over voltage, or power supply phase sequence is reversed | Press “Ice maker shut-down” button when power supply is recovered. |
| | | |
| | 3 "Ice full protect Led" Ice full protect | Clean the ice at the ice outlet of the ice maker, and after the protection is removed, the system automatically reset ,and is automatically started after standby for 10 minutes; or press “Ice maker shut-down” button to reset，then press “Ice maker start-up” to directly start the ice maker. |

| | | |
|---|---|---|
| | 4Water flow abnormal protect | Check water way supply. The water flow returns to normal when water ways supply is recovered. The system will automatically reset, and will be started after standby for 10 minutes; or press the stop button “Ice maker shut-down” to reset，then press “Ice maker start-up” button to directly start the ice maker. |
| | 5 INT69VS protection | Check the INT69VS protection, check the cooling system, and press “Ice maker shut-down” button when failure is removed, after reset, press “Ice maker start-up” button to directly start the ice maker. |
| | 6 compressor dual pressure protection | Check dual pressure failure causers. If low pressure failure is found, remove the failure and press “Ice maker shut-down” button to reset, and press “Ice maker start-up” to directly start the ice maker. If high pressure failure is found, remove the failure and press “Ice maker shut-down” button at the dual pressure controller to reset, and press “Ice maker start-up” to directly start the ice maker. |
| “Compressor overload” pilot lamp is on | 1 compressor motor thermal overload System overload”。 | Check the reasons of motor overload. Press the thermal overload relay for resetting. |
| | 2 The motor circuitry is abnormal or the motor is damaged. | Check the motor circuitry or replace the motor. |
| “Motor/pump overload” pilot lamp is on | 1 reducer motor thermal overload System overload”。 | Check the reasons of motor overload. Press the thermal overload relay for resetting. |
| | 2 water pump thermal overload System overload”。 | Check the reasons of motor overload. Press the thermal overload relay for resetting. |
| | 3 The motor circuitry is abnormal or the motor is damaged. | Check the motor circuitry or replace the motor. |