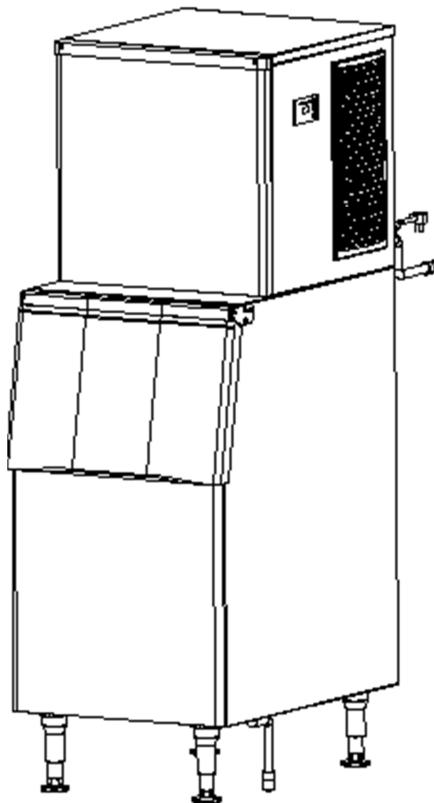


INSTRUCTION MANUAL

COMMERCIAL MODULAR CUBER



Models:

LUMIN COOL-IM350

LUMIN COOL-BIN350

• Note:

You should read this manual in its entirety prior to equipment setup, operation, and maintenance.

Warnings

DANGER – RISK OF FIRE OR EXPLOSION. FLAMMABLE REFRIGERANT USED. TO BE REPAIRED ONLY BY TRAINED SERVICE PERSONNEL. DO NOT PUNCTURE REFRIGERANT TUBING.

CAUTION – RISK OF FIRE OR EXPLOSION. FLAMMABLE REFRIGERANT USED. CONSULT REPAIR MANUAL/OWNER'S GUIDE BEFORE ATTEMPTING TO SERVICE THIS PRODUCT. ALL SAFETY PRECAUTIONS MUST BE FOLLOWED.

CAUTION – RISK OF FIRE OR EXPLOSION DUE TO PUNCTURE OF REFRIGERANT TUBING; FOLLOW HANDLING INSTRUCTIONS CAREFULLY. FLAMMABLE REFRIGERANT USED.

CAUTION – RISK OF FIRE OR EXPLOSION DUE TO FLAMMABLE REFRIGERANT USED. FOLLOW HANDLING INSTRUCTIONS CAREFULLY IN COMPLIANCE WITH LOCAL GOVERNMENT REGULATIONS.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety.

Children should be supervised to ensure that they do not play with the appliance.

Do not store explosive substances such as aerosol cans with a flammable propellant in this appliance.

WARNING: Keep clear of obstruction all ventilation openings in the appliance enclosure or in the structure for building-in.

WARNING: Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.

WARNING: Do not damage the refrigerating circuit.

WARNING: Do not use electrical appliances inside the food/ice storage compartments unless they are of the type recommended by the manufacturer.

Safety Tips

The climatic class of appliance is 4, the meaning of class 4 as below:

Test room climate class	Dry bulb temperature °C	Relative humidity %	Dew point °C	Water vapour mass in dry air g/kg
4	30	55	20,0	14,8

Flammable refrigerant used, this appliance is to be installed in accordance with the Safety Standard for Refrigeration Systems, ANSI/ASHRAE 15.



The triangle warning sign means “warning; Risk of fire / flammable materials”



means : connection to portable water supply

WARNING- Flammable refrigerant use, the component parts shall be replaced with like components so as to minimize

the risk of possible ignition due to incorrect parts.

If the SUPPLY CORD is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard

The new hose-sets supplied with the appliance are to be used and that old hose-sets should not be reused.



WARNING

Do not use means to accelerate the defrosting process or to clean, other than those recommended by the manufacturer. The appliance shall be stored in a room without continuously operating ignition sources (for example: open flames, an operating gas appliance or an operating electric heater).

Do not pierce or burn.

Be aware that refrigerants may not contain an odour.

MISE EN GARDE

Ne pas utiliser de moyens autres que ceux recommandés par le fabricant pour accélérer le processus de dégivrage ou pour nettoyer l'appareil.

L'appareil doit être entreposé dans un local ne contenant pas de sources d'inflammation permanentes (flammes nues, appareil à gaz ou dispositif de chauffage électrique en fonctionnement, par exemple).

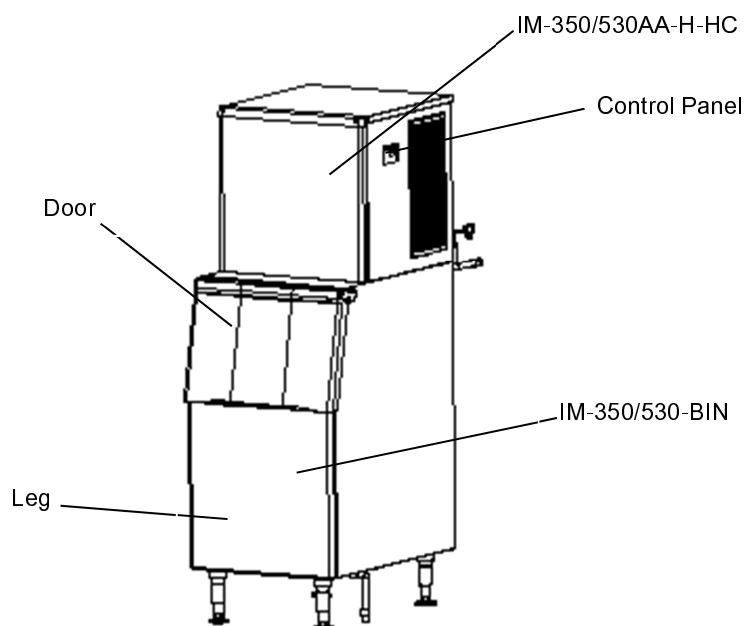
Ne pas percer ou brûler.

Attention, les fluides frigorigènes peuvent ne pas dégager d'odeur.

WARNING - keep any required ventilation openings clear of obstruction.

Installation Instructions

1. Construction



[IM-350AA-H-HC]
 [IM-350AA-HC]
 [IM-420AA-H-HC]
 [IM-420AA-HC]
 [IM-530AA-H-HC]
 [IM-530AA-HC]

2. ACCESSORIES

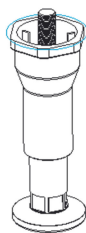
Accessory	IM-350/530AA-H-HC	Accessory	IM-350/530-BIN
Instruction Manual	1	Instruction Manual	0
Scoop	0	Scoop	1
Leg	0	Leg	4
Connector	0	Connector	5
Inlet pipe	0	Inlet pipe	2
Drain-pipe	1	Drain-pipe	1
Filter component	0	Filter component	1
Drain-pipe Connector	0	Drain-pipe Connector	1



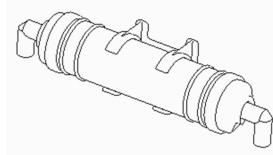
Instruction Manual



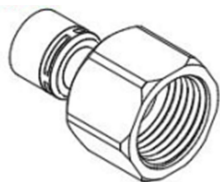
Scoop



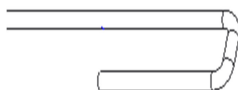
Leg



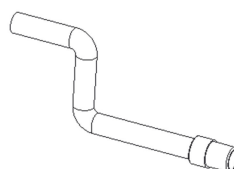
Filter component



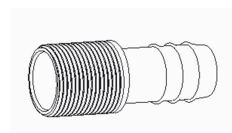
Connector



Inlet pipe



Drain-pipe



Drain-pipe Connector

3. UNPACKING

• This product cannot be used in outdoor environments. Not intended for use by children, persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge.

• The installation, repair or maintenance of this ice machine must be carried out by professional and qualified personnel. Electric shock, fire, personal injury may result from incorrect operation.

• After the ice machine is delivered, please keep the machine upright for at least 24 hours to have the refrigerant be fully precipitated before startup. Otherwise the compressor may be damaged.

• When handling, keep the cabinet upright with the inclination not exceeding 45 degrees. Do not invert the machine or lay it horizontally. This ice machine should not be placed in wet or easily splashed areas.

• The grounding of this ice machine cannot be connected to a gas pipe, water pipe, telephone line or lightning rods, etc.

• There are rotating components in this ice machine. Do not insert slim objects into ventilation or exhaust ports, or serious mechanical damage and injury may occur.

• Do not store volatile or flammable substances in this ice machine or it may result in an explosion or fire.

• Do not store any sundries or freeze any food in the storage bin. Keep the ice scoop clean.

• The ice machine must be placed on a floor sufficient enough to support its weight. An insufficient base may cause the equipment to fall over and cause injury.

• There should be sufficient ventilation space around the ice machine. See page 4 for clearance requirements.

• Only the power supply specified on the machine nameplate can be used with this ice machine.

• This ice machine cannot be connected to hot water.

• Outlet for this ice maker must be reliably grounded with leakage protection.

• The ice machine must be disconnected from power before manual cleaning, repairing and maintenance.

• Before cleaning, repairing and maintenance, the remaining ice in the ice bin should be removed from the ice machine to avoid contamination to ice.

• Do not splash water directly onto the surface of the ice machine during the cleaning process; otherwise it may cause short circuit, leakage or other faults.

• Flammable foaming agent is used during the foaming process. The ice maker should be disposed of and recycled by qualified personnel and institutions.

• The ice machine should be properly managed to ensure that children will not play with the machine.

• When the ice machine malfunctions, turn off the power and contact professional personnel to be repaired.

4. Water filters

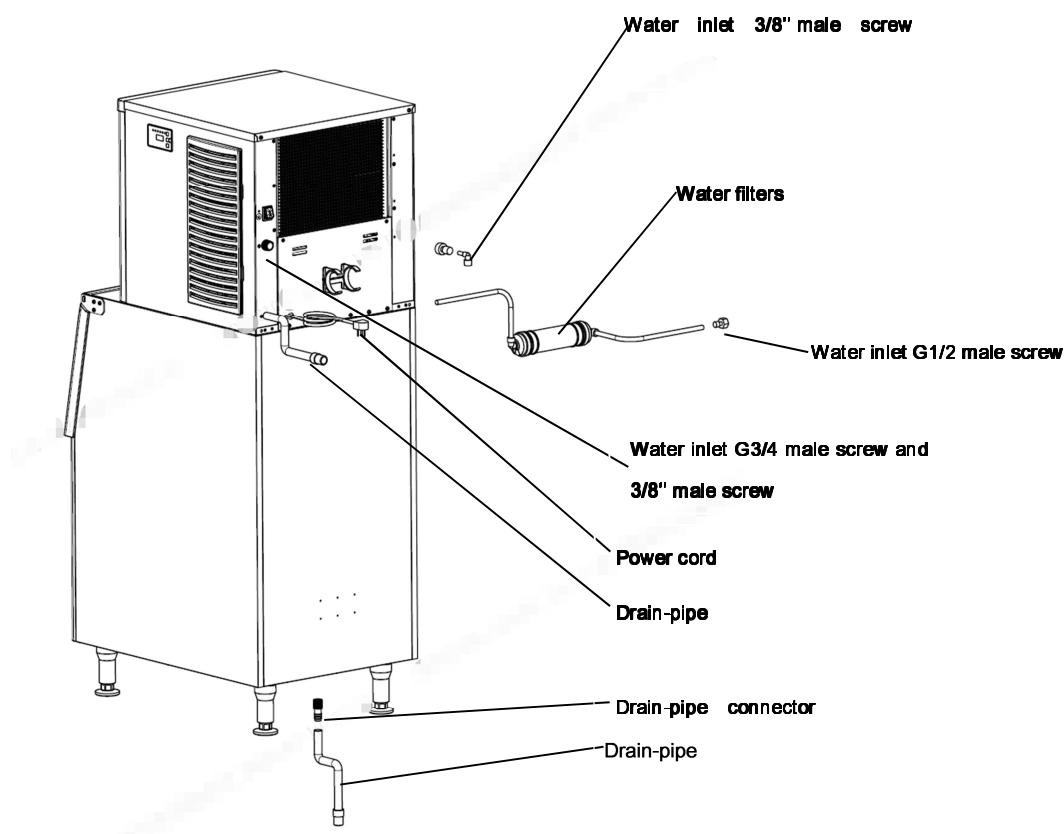
Water filters to be used with common restaurant equipment, ensuring that the water utilized by the equipment is both clean and clear.

5. Location

- Power supply: the rated voltage indicated on the machine nameplate $\pm 6\%$;
- Water source: potable water, with water pressure from 18 psig to 80 psig; water temperature: 5-32°C;
- The ice machine should be kept away from heat sources, and should pay attention to safety when using;
- extremely high or low temperature environment, and should avoid direct sunlight;
- There should be sufficient ventilation space around the ice machine; the distance from the ice;
- make to the wall should be no less than 12" for the front, 6" for the sides, and 8" for the rear;
- The ice machine must be placed on a floor sufficient to support its weight;
- The socket for the ice maker must be reliably grounded and leakage protection;
- Proper floor drainage must be provided near the installation location of the ice machine.

6. Installation Steps

1. Check to see if the ice machine is in good condition and the accessories are all present; check the machine model and the machine nameplate.
 2. Clean the ice storage bin and the food area inside with a sponge soaked in warm water and soap. Then rinse with potable water and dry.
 3. Place the ice machine in the operation area; ensure that the machine is placed on a leveled floor so the water flows evenly into the evaporator.
 4. The compressor chamber is located below the front of the ice bin where the compressor and condenser are installed. It requires good ventilation so the ice maker must have ventilation space of more than 8" in the rear, 6" on the sides, and 12" in the front.
 5. The bottom of the ice machine is equipped with adjustable legs for level adjustment and clearance for floor cleaning.
 6. Connect the machine's inlet water filter and water line referring to the installation instructions of your water filter brand; if the installation site is already equipped with a drinking water system, the water filter may not be needed.
 7. Connect the machine to the water supply using the 3/4" inlet fitting supplied with the machine. It is recommended to install a water ball valve (not supplied with this machine) on the water supply line.
 8. Connect the drain line to the drain connector. To achieve a proper draining, it is recommended that the drain pipe should have a difference in level of more than 1" per 3'; and confirm that the drain line is not blocked. It is recommended that the drain line be connected to an open drainage port.
 9. Any joint in the drain line must not be higher than the machine drainage port; any joint in the drain line cannot be higher than the previous joint.
 10. Confirm the power requirements stated in the machine's nameplate; ensure that the power supply meets the requirements.
 11. A circuit breaker or switch with leakage protector and reliable grounding is required.
 12. Turn off the switch on the power line and connect the machine to the power source.
- NOTE: The filter flow direction should be correctly installed as per the direction marker on the filter head cover or the filter body. The filter cartridge should be replaced every 3 to 6 months.
13. Schematic Diagram



NOTE: The installation plates and brackets used to fix the unit and the storage refrigerator together are not included.

Operating Instructions

1. Start-up

1. Before you start up the machine, please check and confirm:

- That the packaging tape inside the ice machine has been removed.
- The accessories or items in the ice bin have been taken out.
- The ice machine has been adjusted to a leveled state.
- The water line has been connected and the water valve is open.
- The plug has been connected to the power supply and the power switch is off.
- The ambient temperature, water temperature, and pressure of the water supply meet the above requirements.

2. Start up: turn on the power switch. After power-on, the machine begins to make ice automatically.

3. For normal operation, please confirm:

- There is water in the water trough and no overflow occurs.
- The pump is working properly and water is flowing evenly in the evaporator.
- The compressor is running normally, the temperature of the evaporator and the ice making water is gradually decreasing.
- For air cooled machines, make sure the fan is running normally, and there is stable air flow in the inlet and outlet of the ice machine.
- The ice machine has no abnormal noise.
- The ice machine has no abnormal vibration.
- It takes about 10 to 20 minutes to make one batch of ice, depending on the ambient temperature and the temperature of the water. The higher the temperature is, the longer the ice making will take.
- Ice cubes can be properly harvested from the machine.

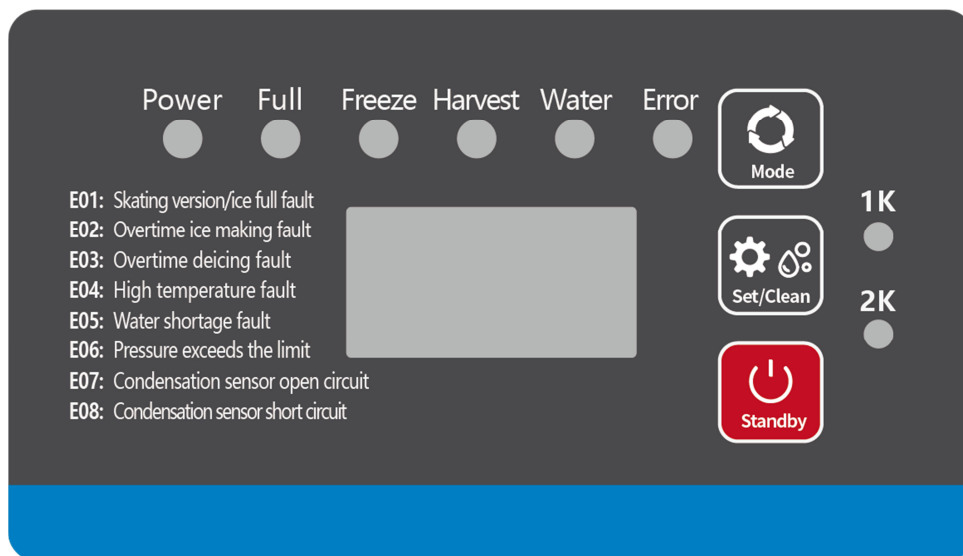
2. Operation

- **Startup:** after proper installation, connect the water source and turn on the power supply to turn on the machine. Please confirm that the machine is operating normally when you turn it on for the first time.
- **Self-check:** with power on for the first time, the ice maker will do a self-check.
- **Preparing:** after the ice machine completes the self-test, the water valve is opened and the water is flooded. At the same time, the ice machine will defrost once
- **Ice making:** after pre-cooling for 30 seconds, the water pump starts, the water flows through the evaporator smoothly and evenly, the ice cubes are gradually formed in the ice cube tray.
- **Ice harvest (Drop):** after the ice making process finishes and the water pump is turned off, the defrosting valve is turned on.

After the hot gas enters into the evaporator for about 1-2 minutes the ice cubes slide from the evaporator into the storage bin. **Warning:** Do not put your hand into the ice storage bin during the ice-falling process to prevent the ice from hitting your hand!

- **Shutdown:** The ice maker will stop working when you push the "Standby" button on the control panel during the running process.
- **Bin full stop:** Once the ice storage bin is filled to a certain height, the ice making process will stop. There is a sensor at the Ice guide which will trigger this stop in production. In order to maximize the bin space make sure to spread around the ice that piles up in front of the sensor.
- **Repeat ice-making:** When the ice cubes triggering this sensor are moved or taken away, the ice maker will go back to the ice making process within seconds.

3. Control Panel



1. LED Display:

- **Preparing:** Counts (in seconds) forwards.
- **Ice making:** Counts (in seconds) forwards, display "Freeze" .
- **Ice Harvest:** Counts (in seconds) forwards, display "Harvest".

2. **Ice cube thickness adjustment:** During the ice making process, if you are not satisfied with the ice thickness, press the "Set/Clean" button, then click the button "Mode" or "Set/Clean" on the panel to adjust the thickness of ice cube.

Note: By clicking the "Mode" or "Set/Clean" button one time, the ice making time is extended or shortened by 10 seconds.

3. **Cleaning:** During the normal operation, hold the "Set/Clean" button for 6 seconds to enter the cleaning process. During the entire cleaning process, cleaning agents and disinfectants need to be put into the water tank. When the cleaning process is finished, the ice maker will go to the ice making process.

Note: All cleaning and sanitizing chemicals used must be nickel safe.

4. **Standby:** Press this button to switch the machine standby.

5. Please open and close the storage bin door gently. Do not slam the door. Keep door closed when not removing ice.

6. If the ice maker is not in use for a long time, it should be energized and run for 2 to 4 hours every 2 months.

4. Other Special Protection - Shutdown

- If the ice machine has not detected ice harvest in three cycles, it will shut down for safety and protection. The ice maker needs to be checked.
- If the ice machine detects that the ambient temperature is too high it will stop for safety and protection.
- The fault code and its comments are displayed as follows:

Code	Fault	Cause	Action
E01	Skating version /ice full fault	1.The ice guide is missing 2.The ice full switch is faulty 3.The magnetic induction element is reversed polarity	Inspection and repair
E02	Overtime ice making fault	1.The ice is becoming too thick on the evaporator 2.Hot gas valve is faulty 3.The ice guide won't open 4.Control board fault	1. Verify compressor operation. 2. Verify hot gas valve operation.
E03	Overtime deicing fault	1.The hot gas valve is faulty 2.The condensing temperature is low 3.The ice set is too thin 4.The water volume is too low	1.Check the hot gas valve 2.Circuit or water intake system
E04	High temperature fault	1.The fan motor is not functioning 2.Air filter or condenser is dirty 3.Ambient temperature is too high	1.Check if the fan blade is stuck, if not, please replace the fan. 2. Please clean air filter or condenser
E05	Water shortage fault	1.No or low pressure water supply 2.Water valve may be faulty	1.may need to replace your water filter cartridge. otherwise there is an issue with your incoming water line 2.check if the water inlet light flashes. For new machines, when you restart the machine please check if the water inlet light flashes. If no it does not and there is no water in the water tank, please replace the water valve. If it flashes but is no/little water in the water tank, please check the water source, there may be no water supply or the water filter is blocked
E06	Pressure exceeds the limit	The condensation temperature is too high or the cooling system is blocked	1.Check if the fan does not work, If the cooling fan works properly, the high pressure switch may be faulty. Use a multimeter to measure the on/off status of the pressure switch . 2. check if the cooling system is blocked
E07	Condensation sensor open circuit	The sensor is damaged or the connector is faulty	Verify probe wires have a good connection in the controller by disconnecting probe leads from controller and reconnecting leads to controller Use a multimeter set to Ohm setting and verify resistance value of the probe in 77F hot water. Value should be with $10\text{ k}\Omega\pm1\%$.
E08	Condensation sensor short circuit	The sensor is damaged or the connector is faulty	Verify probe wires have a good connection in the controller by disconnecting probe leads from controller and reconnecting leads to controller Use a multimeter set to Ohm setting and verify resistance value of the probe in 77F hot water. Value should be with $10\text{ k}\Omega\pm1\%$.

Maintenance Cleaning

NOTE: Maintenance must be done by a qualified technician.

WARNING: Before maintenance or manual cleaning, be sure to shut off the water source and power supply.

Exterior Cleaning

- Frequently clean the environment around the ice machine to keep it clean. Do not block the vents.
- The outer enclosure should be cleaned with a mild detergent and then wiped clean. If necessary, use commercial stainless steel cleaners and polishes. **NOTE:** Stainless steel may rust without proper maintenance.

Water Filter

- If a water filter is installed, the water filter should be inspected regularly. It is recommended to replace the filter cartridge every 3 to 6 months.

Interior Cleaning

- The inside of the ice storage bin can be washed with water and cleaner solution. Rinse thoroughly with water. Repeat this process with a water and sanitizer solution.
- **Note:** Check and confirm the water pressure is lower than the maximum allowed pressure. Do not flush the part above the water pump or the evaporator directly for water protection.

Condenser

- For the air-cooled ice maker, the condenser should be cleaned every month. Use a soft brush or a vacuum cleaner with a brush to brush it up and down along the fin direction, to avoid damage to the fins and further affecting the cooling effect.
- The condenser filter should be cleaned every 2 weeks.

NOTE: Be careful when cleaning the condenser as the edges of the fins are sharp.

Water Pipe

- In order to ensure food safety, the water pipe of the ice machine should be cleaned regularly.

Winterizing

- Turn off the water and power supply, drain the residual water from the water trough inlet pipe and drain pipe

NOTE: The maintenance of the ice machine is not covered by the manufacturer's warranty!

Monthly Clean Function

NOTE: Please empty the bin of ice in advance.

NOTE: Please clean and sanitize the bin and do a complete rinsing.

NOTE: Please clean and sanitize the ice guide, water pipe, water pump, then do a complete rinsing.

- Turn on the ice maker; push "set/clean" button for 6 seconds, the ice maker will begin the cleaning process.
- The water valve will run for 85 seconds (time can be set) until the normal working water level is reached.
- At the same time, the proper amount of cleaning liquid is manually poured into the water tank and spray on the evaporator to ensure thorough cleaning.
- The water pump will run for 15 minutes. after the pump runs for 5 minutes, manually put the proper amount of disinfectant into the water tank and spray on the evaporator according to the instructions to ensure thorough disinfection.
- Then both the pump and the water valve run for 15 minutes and the machine enters the rinsing process.
- The ice maker will go back to making ice as soon as the cleaning process ends.
- Please throw away the next batch of ice in case of residual cleaner.
- Refer to your cleaner and sanitizer for proper mixing & coding instructions.

Month Manual Cleaning & Sanitizing

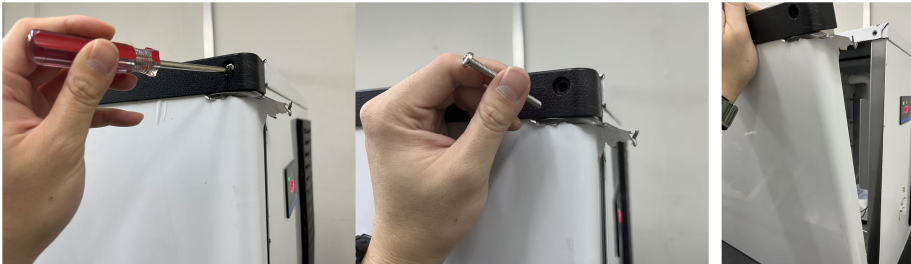
Attention: Month Manual Cleaning & Sanitizing must be carried out by the manufacturer, its service agent or similarly qualified persons.

Cleaning Instructions

1. Remove all ice from the ice bin to avoid contamination.



2. Remove the door.



3. Empty the water from the tank.



4. Remove the pump and pull out the upper pipe of the pump circulation.



5. Remove screws which are securing the spray pipe. Remove the spray pipe and the upper pipe.



6. Disassemble fixed screws which are in the spray pipe. Dismantle the spray pipe.



7. Mix a solution of cleaner and water according to your ice machine cleaner instructions. Ensure the cleaning agent dissolves completely. Soak the water pipe, inlet and outer spray pipe, head, spray pipe fixing seat and screws, etc. in the cleaning solution for 5 minutes (or 15 minutes for heavily scaled components). Rinse all components thoroughly with clean water.



8. After soaking, scrub the spray pipe, water curtain and pump base bracket with cleaning solution, and rinse with clean water.



9. Spray the cleaning solution into the evaporator and wipe clean. Repeatedly wipe the water tank, ice plate and its plastic parts, side plates, ice buckets and other sanitary areas with cleaning solution. Rinse all areas thoroughly with clean water.



Disinfection Instructions



1. Mix disinfectant and water according to the instructions for ice maker disinfectant. Make sure the disinfectant is completely dissolved. Soak the water pipe, inner and outer nozzle, head nozzle fixing base and screws in the solution for 5 minutes. If a no-rinse disinfectant is used, flushing is not required.
2. Spray the spray pipe, ice guide and pump support with disinfectant. If a no-rinse disinfectant is used, flushing is not required.



1. Spray the disinfectant into the evaporator and its plastic parts with a spray bottle. Spray the water tank, ice bin and other sanitary areas with disinfectant. If using a no-rinse disinfectant, there is no need to rinse.
2. Allow the dismantled spray pipe, water pump, water pipe, and ice guide to dry. Then install them back to their original position.

Attentions of flammable refrigerants

Servicing shall be performed only as recommended by the manufacturer.

Qualification of workers

Every working procedure that affects safety means shall only be carried out by competent persons that qualification of the working personnel for maintenance, service, and repair operations.

Examples for such working procedures are

- a) breaking into the refrigerating circuit;
- b) opening of sealed components;
- c) opening of ventilated enclosures.

Checks to the area

Prior to beginning work on systems containing FLAMMABLE REFRIGERANTS, safety checks are necessary to ensure that the risk of ignition is minimised.

Work procedure

Work shall be undertaken under a controlled procedure so as to minimise the risk of a flammable gas or vapour being present while the work is being performed.

General work area

All maintenance staff and others working in the local area shall be instructed on the nature of work being carried out. Work in confined spaces shall be avoided.

Checking for presence of refrigerant

The area shall be checked with an appropriate refrigerant detector prior to and during work, to ensure the technician is aware of potentially toxic or flammable atmospheres. Ensure that the leak detection equipment being used is suitable for use with all applicable refrigerants, i.e., nonsparking, adequately sealed, or intrinsically safe.

Presence of fire extinguisher

If any hot work is to be conducted on the refrigerating equipment or any associated parts, appropriate fire extinguishing equipment shall be available on hand. A dry chemical or CO2 fire extinguisher should be adjacent to the charging area.

No ignition sources

No person carrying out work in relation to a REFRIGERATING SYSTEM which involves exposing any pipe work shall use any sources of ignition in such a manner that it may lead to the risk of fire or explosion. All possible ignition sources, including cigarette smoking, should be kept sufficiently far away from the site of installation, repairing, removing and disposal, during which refrigerant can possibly be released to the surrounding space. Prior to work taking place, the area around the equipment shall be surveyed to make sure that there are no flammable hazards or ignition risks. "No Smoking" signs shall be displayed.

Ventilated area

Ensure that the area is in the open or that it is adequately ventilated before breaking into the system or conducting any hot work. A degree of ventilation shall continue during the period that the work is carried out. The ventilation should safely disperse any released refrigerant and preferably expel it externally into the atmosphere.

Checks to the refrigerating equipment

Where electrical components are being changed, they shall be fit for the purpose and to the correct specification. At all times, the manufacturer's maintenance and service guidelines shall be followed. If in doubt, consult the manufacturer's technical department for assistance.

The following checks shall be applied to installations using FLAMMABLE REFRIGERANTS:

- a) the actual REFRIGERANT CHARGE is in accordance with the room size within which the refrigerant containing parts are installed;
- b) the ventilation machinery and outlets are operating adequately and are not obstructed;
- c) if an indirect refrigerating circuit is being used, the secondary circuit shall be checked for the presence of refrigerant;
- d) marking to the equipment continues to be visible and legible. Markings and signs that are illegible shall be corrected;
- e) refrigerating pipe or components are installed in a position where they are unlikely to be exposed to any substance which may corrode refrigerant containing components, unless the components are constructed of materials which are inherently resistant to being corroded or are suitably protected against being so corroded.

Checks to electrical devices:

Repair and maintenance to electrical components shall include initial safety checks and component inspection procedures. If a fault exists that could compromise safety, then no electrical supply shall be connected to the circuit until it is satisfactorily dealt with. If the fault cannot be corrected immediately but it is necessary to continue operation, an adequate temporary solution shall be used. This shall be reported to the owner of the equipment, so all parties are advised.

Initial safety checks shall include:

- a) that capacitors are discharged: this shall be done in a safe manner to avoid possibility of sparking;
- b) that no live electrical components and wiring are exposed while charging, recovering or purging the system;
- c) that there is continuity of earth bonding.

Repairs to sealed components:

During repairs to sealed components, all electrical supplies shall be disconnected from the equipment being worked upon prior to any removal of sealed covers, etc. If it is absolutely necessary to have an electrical supply to equipment during servicing, then a permanently operating form of leak detection shall be located at the most critical point to warn of a potentially hazardous situation.

Particular attention shall be paid to the following to ensure that by working on electrical components, the casing is not altered in such a way that the level of protection is affected. This shall include damage to cables, excessive number of connections, terminals not made to original specification, damage to seals, incorrect fitting of glands, etc.
Ensure that the apparatus is mounted securely.

Ensure that seals or sealing materials have not degraded to the point that they no longer serve the purpose of preventing the ingress of flammable atmospheres. Replacement parts shall be in accordance with the manufacturer's specifications.

Repair to intrinsically safe components:

Do not apply any permanent inductive or capacitance loads to the circuit without ensuring that this will not exceed the permissible voltage and current permitted for the equipment in use.

Intrinsically safe components are the only types that can be worked on while live in the presence of a flammable atmosphere. The test apparatus shall be at the correct rating.

Replace components only with parts specified by the manufacturer. Other parts can result in the ignition of refrigerant in the atmosphere from a leak.

Cabling:

Check that cabling will not be subject to wear, corrosion, excessive pressure, vibration, sharp edges, or any other adverse environmental effects. The check shall also take into account the effects of aging or continual vibration from sources such as compressors or fans.

Detection of flammable refrigerants:

Under no circumstances shall potential sources of ignition be used in the searching for or detection of refrigerant leaks. A halide torch (or any other detector using a naked flame) shall not be used.

The following leak detection methods are deemed acceptable for all refrigerant systems.

Electronic leak detectors may be used to detect refrigerant leaks but, in the case of FLAMMABLE REFRIGERANTS, the sensitivity might not be adequate, or might need recalibration. (Detection equipment shall be calibrated in a refrigerant-free area.) Ensure that the detector is not a potential

source of ignition and is suitable for the refrigerant used. Leak detection equipment shall be set at a percentage of the LFL of the refrigerant and shall be calibrated to the refrigerant employed, and the appropriate percentage of gas (25 % maximum) is confirmed.

Leak detection fluids are also suitable for use with most refrigerants but the use of detergents containing chlorine shall be avoided as the chlorine can react with the refrigerant and corrode the copper pipe-work.

If a leak is suspected, all naked flames shall be removed/extinguished.

If a leakage of refrigerant is found which requires brazing, all of the refrigerant shall be recovered from the system. Removal of refrigerant shall be according to instruction of removal and evacuation.

Removal and evacuation:

When breaking into the refrigerant circuit to make repairs – or for any other purpose –conventional procedures shall be used. However, for flammable refrigerants it is important that best practice be followed, since flammability is a consideration. The following procedure shall be adhered to:

- a) safely remove refrigerant following local and national regulations;
- b) purge the circuit with inert gas;
- c) evacuate (optional for A2L);
- d) purge with inert gas (optional for A2L);
- e) open the circuit by cutting or brazing.

The refrigerant charge shall be recovered into the correct recovery cylinders if venting is not allowed by local and national codes. For appliances containing flammable refrigerants, the system shall be purged with oxygen-free nitrogen to render the appliance safe for flammable refrigerants. This process might need to be repeated several times. Compressed air or oxygen shall not be used for purging refrigerant systems.

For appliances containing flammable refrigerants, refrigerants purging shall be achieved by breaking the vacuum in the system with oxygen-free nitrogen and continuing to fill until the working pressure is achieved, then venting to atmosphere, and finally pulling down to a vacuum (optional for A2L). This process shall be repeated until no refrigerant is within the system (optional for A2L). When the final oxygen-free nitrogen charge is used, the system shall be vented down to atmospheric pressure to enable work to take place.

Ensure that the outlet for the vacuum pump is not close to any potential ignition sources and that ventilation is available.

Charging procedures:

In addition to conventional charging procedures, the following requirements shall be followed.

- a) Ensure that contamination of different refrigerants does not occur when using charging equipment. Hoses or lines shall be as short as possible to minimise the amount of refrigerant contained in them.
- b) Cylinders shall be kept in an appropriate position according to the instructions.

- c) Ensure that the REFRIGERATING SYSTEM is earthed prior to charging the system with refrigerant.
- d) Label the system when charging is complete (if not already).
- e) Extreme care shall be taken not to overfill the REFRIGERATING SYSTEM.

Prior to recharging the system, it shall be pressure-tested with the appropriate purging gas. The system shall be leak-tested on completion of charging but prior to commissioning. A follow up leak test shall be carried out prior to leaving the site.

Decommissioning:

Before carrying out this procedure, it is essential that the technician is completely familiar with the equipment and all its detail. It is recommended good practice that all refrigerants are recovered safely. Prior to the task being carried out, an oil and refrigerant sample shall be taken in case analysis is required prior to re-use of recovered refrigerant. It is essential that electrical power is available before the task is commenced.

- a) Become familiar with the equipment and its operation.
- b) Isolate the system electrically.
- c) Before attempting the procedure, ensure that:
 - i) mechanical handling equipment is available, if required, for handling refrigerant cylinders;
 - ii) all personal protective equipment is available and being used correctly;
 - iii) the recovery process is supervised at all times by a competent person;
 - iv) recovery equipment and cylinders conform to the appropriate standards.
- d) Pump down refrigerant system, if possible.
- e) If a vacuum is not possible, make a manifold so that refrigerant can be removed from various parts of the system.
- f) Make sure that cylinder is situated on the scales before recovery takes place.
- g) Start the recovery machine and operate in accordance with instructions.
- h) Do not overfill cylinders (no more than 80 % volume liquid charge).
- i) Do not exceed the maximum working pressure of the cylinder, even temporarily.
- j) When the cylinders have been filled correctly and the process completed, make sure that the cylinders and the equipment are removed from site promptly and all isolation valves on the equipment are closed off.
- k) Recovered refrigerant shall not be charged into another REFRIGERATING SYSTEM unless it has been cleaned and checked.

Labelling:

Equipment shall be labelled stating that it has been de-commissioned and emptied of refrigerant. The label shall be dated and signed. For appliances containing FLAMMABLE REFRIGERANTS, ensure that there are labels on the equipment stating the equipment contains FLAMMABLE REFRIGERANT.

Recovery:

When removing refrigerant from a system, either for servicing or decommissioning, it is recommended good practice that all refrigerants are removed safely.

When transferring refrigerant into cylinders, ensure that only appropriate refrigerant recovery cylinders are employed. Ensure that the correct number of cylinders for holding the total system charge is

available. All cylinders to be used are designated for the recovered refrigerant and labelled for that refrigerant (i.e., special cylinders for the recovery of refrigerant). Cylinders shall be complete with pressure-relief valve and associated shut-off valves in good working order. Empty recovery cylinders are evacuated and, if possible, cooled before recovery occurs.

The recovery equipment shall be in good working order with a set of instructions concerning the equipment that is at hand and shall be suitable for the recovery of all appropriate refrigerants including, when applicable, FLAMMABLE REFRIGERANTS. In addition, a set of calibrated weighing scales shall be available and in good working order. Hoses shall be complete with leak-free disconnect couplings and in good condition. Before using the recovery machine, check that it is in satisfactory working order, has been properly maintained and that any associated electrical components are sealed to prevent ignition in the event of a refrigerant release. Consult manufacturer if in doubt.

The recovered refrigerant shall be returned to the refrigerant supplier in the correct recovery cylinder, and the relevant waste transfer note arranged. Do not mix refrigerants in recovery units and especially not in cylinders.

If compressors or compressor oils are to be removed, ensure that they have been evacuated to an acceptable level to make certain that FLAMMABLE REFRIGERANT does not remain within the lubricant. The evacuation process shall be carried out prior to returning the compressor to the suppliers. Only electric heating to the compressor body shall be employed to accelerate this process. When oil is drained from a system, it shall be carried out safely.

Service Call

If the ice machine works abnormally, please confirm below before making a service call:

1. Check the water supply
 - Whether there is water in the water trough.
 - Whether the water pressure is 18 psig to 80 psig; the water temperature is 5-32°C.
 - Whether the water valve is open.
 - Whether there is no water leakage.
2. Check the power
 - Whether the indicator on the display panel is ON.
 - Whether the panel display does not display the OFF standby state.
 - If the LED on the display panel is not ON, check whether the plug and socket are normal, and whether the power supply switch is ON.
3. Check nameplate and serial number
 - Check the nameplate located on the side or back of the ice machine and record the model and series number of the ice machine. Note: If the machine fails due to the user's faults, such as failure to use and maintain a water filter, no supply of water, electricity or environmental factors, rather than the fault of the ice maker, the door-to-door service will be charged.

Troubleshooting

Code	Comments	Machine Action
Not working	Power switch not turned on	Turn on the power switch
Indicator is OFF	Plug is loose	Check plug and socket
Shutdown every 3 minutes after startup	The ambient temperature is too high	Normal working temperature range of 5-38°C
The display shows E04 high temperature	Condenser is dirty and blocked high pressure switch wires fallen of	Clean the condenser
The display shows E06 high pressure protection	Fan does not start	Check and correct high pressure switch wires
Ice defrost abnormal	Ambient temperature too low	Normal working temperature range of 5-38°C
	Defrost valve does not start normally	Check and correct the defrosting valve
	Ice thickness too thin or too thick	Check and correct ice thickness setting
Poor transparency of ice cubes; ice cubes too thin or incomplete	Ice thickness is too thin	Check and correct ice thickness setting
	Water pressure is too low	Check that the water supply pressure is 18 psig to 80 psig
	Inlet water valve is dirty and blocked	Normal working temperature range of 5-32°C
	inlet water filter has not been replaced for a long time	Check and correct the inlet water valve
	Inlet water valve is dirty and blocked	Check whether water leaks and correct
	Water leaking	Check and correct the inlet water filter and water connection
	Inlet water filter has not been replaced for a long time	
Too slow in ice making	The condenser or air filter is dirty	Clean the condenser and filter screen
	High ambient temperature	Normal working temperature range of 5-38°C
	Poor ventilation	Check the environment around the ice machine
	Water temperature is too high	Check the water supply temperature of 5-32°C
Too much noise	The ice machine is not placed in a leveled foundation or the ice maker is not leveled	Level the ice machine