

# TECHNICAL MANUAL

## MODELS

- FLAKES 90C
- NUGGETS 90C

## **CORRECT USE OF THIS MANUAL**

### **DESCRIPTION OF CONTENTS**

This manual has been created to provide the installer with information to carry out a correct installation and for effective maintenance of the machine.

In addition, the user will find in the document a section referring to the cause of possible incidents, as well as complete information on the resolution of such incidents.

Therefore, it is recommended to keep the manual in a safe place to resolve any issues related to the operation of the machine throughout its lifespan.

### **RECEIVING AND INSTALLATION**

The installation technician who will be in charge of the receiving and installation, will find in the first part of this document the keys to perform the correct connection of the machine to the electrical, water and drainage network, as well as the conditions and limitations. In addition, this manual has complete information about the installation of various stacked equipment.

### **OPERATION**

The document has been prepared so that anyone can easily understand the principles of operation of the machine and quickly identify each of its statuses. In addition, the manual provides valuable guidance on the various menus and explains in detail each of the messages on the display in a technical appendix at the end.

### **SPECIFICATIONS AND REGULATIONS**

The user of the manual can always consult the technical information related to machine settings, production ranges, pressure switch settings or electricity, water and refrigerant filling consumption.

### **MAINTENANCE AND CLEANING**

In order for this document to become a complete guide for the installer, it has been decided to include a section with periodic maintenance and cleaning instructions, as well as a detailed explanation of how to clean each of the elements. It is essential to use this manual to guarantee the correct working life of the machine.

### **PROBLEM SOLVING**

The user has a table to solve the most frequent problems and to provide customer service. It is a scheme for the diagnosis of breakdowns with the most likely solutions.

### **QUALITY AND CUSTOMER SERVICE GUIDELINES**

This machine has been manufactured in strict compliance with all quality requirements. In this regard, for any incident you can contact the company that has installed the machine or the Customer Service of the manufacturer:

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# 1. INTRODUCTION

Thank you for purchasing a 'NIQ' range ice cube machine. You have purchased one of the most reliable ice machines on the market today.

Please read the instructions contained in this manual carefully, they contain important information regarding safety during installation, use and maintenance.

## 1.1- CAUTIONS

- The installation of this machine must be carried out by the Technical Assistance Service.
- Always disconnect the machine from the power supply before carrying out any cleaning or maintenance operation.
- Any modification to the electrical installation that is necessary for the perfect connection of the machine must only be carried out by professionally qualified and authorized personnel.
- Any use of the ice cube producer other than to produce ice, using potable water, is considered unsuitable.
- Modifying or attempting to modify this machine, in addition to voiding any form of warranty, is extremely dangerous.
- The machine should not be used by young children or disabled people without supervision.
- It should not be installed outdoor or exposed to rain.
- This machine must be grounded to avoid possible shock to persons or damage to the equipment. The equipment must be grounded in accordance with local and/or national regulations and legislation in each case. The manufacturer will not be considered responsible for any damage caused by the lack of grounding of the installation.
- To guarantee the efficiency of this machine and its correct operation, it is essential to follow the manufacturer's instructions, particularly with regard to maintenance and cleaning operations, which should only be carried out by qualified personnel.
- This equipment must be installed with adequate backflow protection to comply with applicable federal, state and local regulations.
- ***WARNING: The intervention of unqualified persons, besides being dangerous, can cause serious damage. In case of breakdown, contact your dealer. We recommend that you always use original spare parts.***
- The company reserves the right to make changes in specifications and design without prior notice.
- WE REMIND YOU THAT MAINTENANCE AND CLEANING OPERATIONS ARE NOT INCLUDED IN THE WARRANTY AND WILL THEREFORE BE INVOICED BY THE INSTALLER.
-  This signal indicates "Risk of fire / Flammable materials" because of the use of flammable refrigerant.
- For compression-type appliances that use flammable refrigerants should additionally consider the substance of the warnings listed below:
  - o Keep ventilation openings, in the appliance enclosure or in the built-in structure, clear of obstruction.
  - o Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.
  - o Do not damage the refrigerant circuit.
  - o Do not use electrical appliances inside the food storage compartments of the appliance, unless they are of the type recommended by the manufacturer.

- Do not store explosive substances such as aerosol cans with a flammable propellant in this appliance.
- In case of refrigerant leakage:
  - Do not generate flames close to the appliance.
  - Do not switch on/off or plug in/off the appliance.
  - To ventilate immediately the area where appliance is located by opening doors and/or windows.
  - Place a call to an authorized technical service.

## **1.2- MACHINE DESCRIPTION**

- Compact ice machine
- AISI 304 stainless steel body
- 22" wide
- Electronic control with alarm diagnostics
- Control panel and front display
- Storage filling control by temperature probe

# 2.MACHINE RECEPTION

Inspect the exterior of the packaging. If it looks broken or damaged, make a CLAIM TO THE CARRIER.

To ascertain whether the machine is damaged, UNPACK IT IN THE PRESENCE OF THE CARRIER and make a note of any damage to the machine on the receipt or in a separate document. Since May 1, 1998 we have been complying with the European regulations on the management of packaging and packaging waste, placing the distinctive green dot on the packaging.

Always record the machine number and model. This number is printed in three places:

## 2.1.- PACKAGING

There is a label on the outside with the production (Image I)



Image I

## 2.2.- OUTSIDE OF THE UNIT

This is located on the back, with a label just like the one above.

## 2.3.- TYPE LABEL

This is located on the back of the machine. (Image II)

Check that the complete installation KIT is inside the machine, consisting of:

- The Manual
- Warranty card

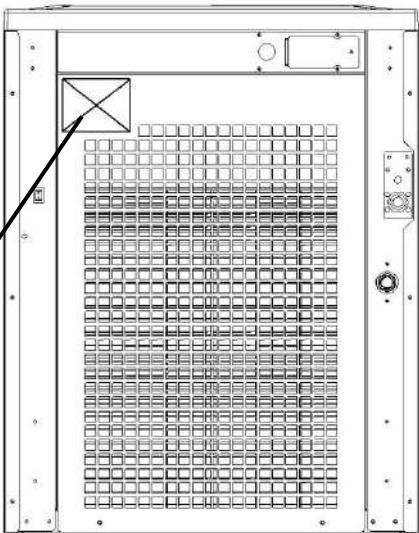
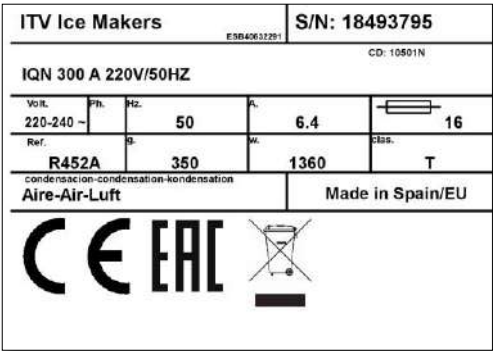


Image II



ATTENTION: ALL PACKAGING ELEMENTS (plastic bags, cardboard boxes and wooden pallets), MUST NOT BE LEFT IN THE REACH OF CHILDREN AS THEY ARE A POTENTIAL SOURCE OF DANGER.

## 3. INSTALLATION

THIS ICE MAKER IS NOT DESIGNED TO OPERATE OUTDOORS

Incorrect installation of the equipment may result in damage to persons, animals or property for which the manufacturer cannot be held responsible.

### 3.1.- LOCATION CONDITIONS

ATTENTION:

The machines are designed to operate at an ambient temperature between 5°C and 43°C (41°F and 109°F) and with water inlet temperatures between 5°C and 35°C (41°F and 95°F).

Below the minimum temperatures, the gear motor is overloaded. Above the maximum temperatures the life of the compressor is shortened and the output is considerably reduced.

Do not place anything on the maker or in front of the frontal grille.

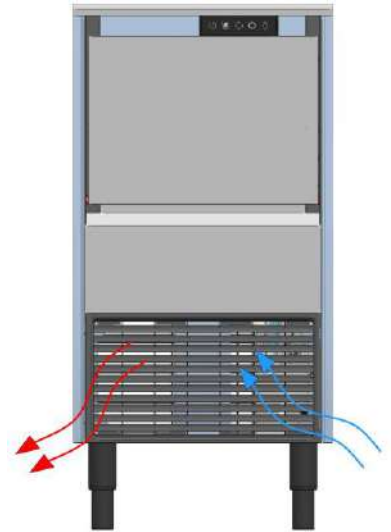


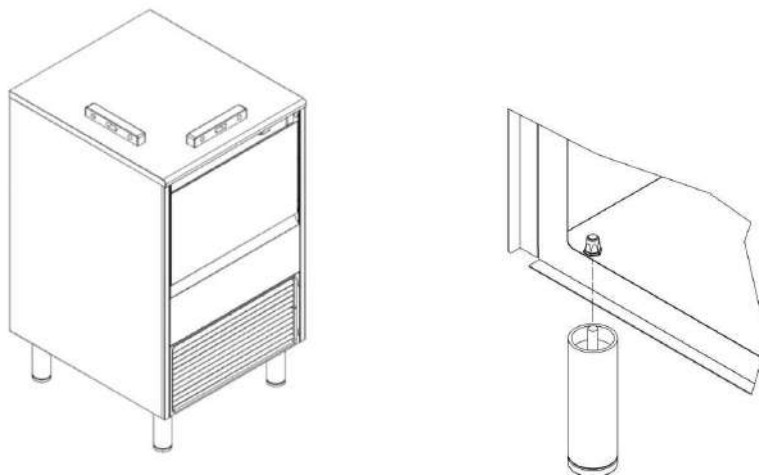
Image III

### 3.2- LEVELING

Use a level on top of the ice machine to ensure the unit is perfectly leveled.

Screw the leveling legs into the bottom of the ice machine as far as they will go. Place the machine in its final position.

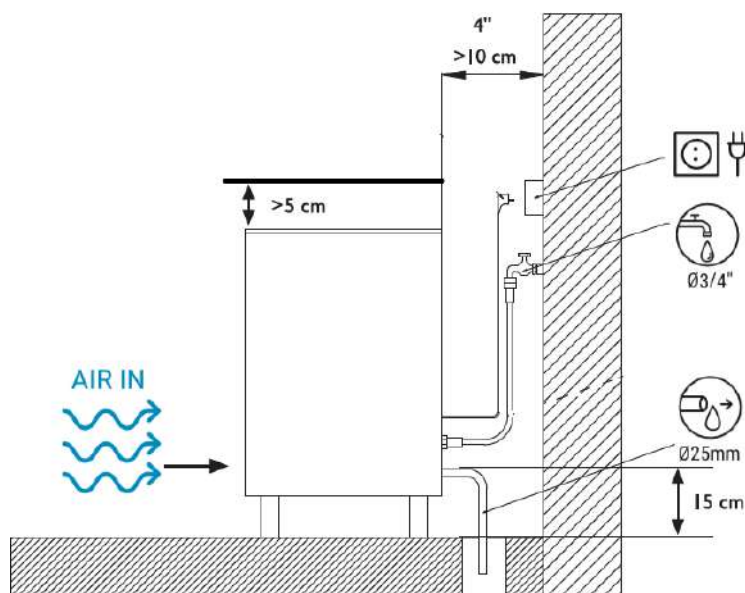
Adjust each leg as needed to level the ice machine from front to back and side to side.





### 3.3 -MINIMUM OBSTACLE DISTANCE

(Image IV)



### 3.4.- WATER NETWORK CONNECTION

The quality of the water has a significant influence on the appearance, hardness and taste of the ice and the water condensate on the life of the condenser. Consult a specialist for treatment and filtration requirements.

Use the 3/8 FPT connection. The water connection needs to be dedicated (the only piece of equipment hooked to the water line). Water line from the water valve to the ice machine needs to be 1/4" nominal ID tubing.

In order to comply with the federal, state and local regulations, the machine must be connected with a proper backflow protection.

It is important that the water line does not pass near heat sources, or that the flexible hose or filter receives hot air from the machine. This would cause production to decrease as the water would be heated.

	Minimum	Maximum
Water pressure	0.1 MPa (1 bar -14.5 psi)	0.6 MPa (6 bar - 85 psi)
Water temperature	5°C (41F)	35°C (109F)

If the pressure is higher, install a suitable pressure reducer.

### 3.5- DRAINAGE CONNECTION

In air condensation machines, under normal operation, 100% of the water is converted to ice. Therefore, no water should escape from the drainage system. Only if the safety overflow is activated is the water led to the drain to avoid internal spillage. Also, during cleaning operations. Use the 3/4 FPT connection.

The drain must be lower than the machine by at least 150 mm. It must always be downwards. It is advisable that the drainage pipe is of 25 mm (1 in) interior diameter and with a minimum gradient of 3 cm (1.18 in) per meter.

In water-condensing machines there is a separate outlet for this circuit.



### 3.6.- POWER CONNECTION

**THIS APPLIANCE MUST BE GROUNDED**

The ice machine must be grounded in accordance with national and local electrical codes

**THE MANUFACTURER SHALL NOT BE LIABLE FOR DAMAGE CAUSED BY FAILURE TO GROUND THE INSTALLATION.**

The machine's power supply is permanently connected.

All wiring must conform to local, state and national codes

It is advisable to install a remote switch for complete disconnection of the machine.

The voltage and current are shown on the type plate. Check that the mains voltage matches that of the appliance.

The maximum allowable voltage variation is  $\pm 10\%$  of the rated voltage on the ice machine model/serial number plate.

Voltage variations greater than 10% of that indicated on the plate may cause damage or prevent the machine from starting.

Install the fuse or protection element as indicated on the plate.

**ATTENTION:** The appliance requires an independent power supply of correct capacity. See the nameplate for electrical specifications. Failure to use an independent power supply of correct capacity can result in a tripped breaker, blown fuse, damage to existing wiring, or component failure. This could lead to heat generation or fire.

## 4. START-UP

### 4.1.- PRIOR CHECKING

- a) Is the machine leveled?
- b) Are the voltage and frequency the same as on the type plate?
- c) Are the water and drainage fittings connected and operating?
- d) In case of Air Condensation: Is the air circulation adequate?
- e) Is the temperature of the room and the water appropriate?

	ROOM	WATER
MAXIMUM	43°C / 109.4°F	35°C / 95°F
MINIMUM	5°C / 41° F	5°C / 41°F

- e) Is the water pressure adequate?

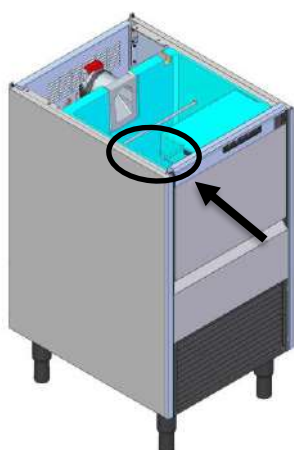
MINIMUM	0.1 MPa (1 Bar) / 15 PSI
MAXIMUM	0.6 MPa (6 Bar) / 87 PSI

- f) Water conductivity must be at least 10 microSiemens.

NOTE: If the inlet water pressure is higher than 6 Bar (87 PSI), install a pressure reducer.

### 4.2.- START-UP

1. Open the water valve and check for leaks.
2. Connect the machine to the power source. Turn on the switch on the side of the electrical panel, accessing through the door.



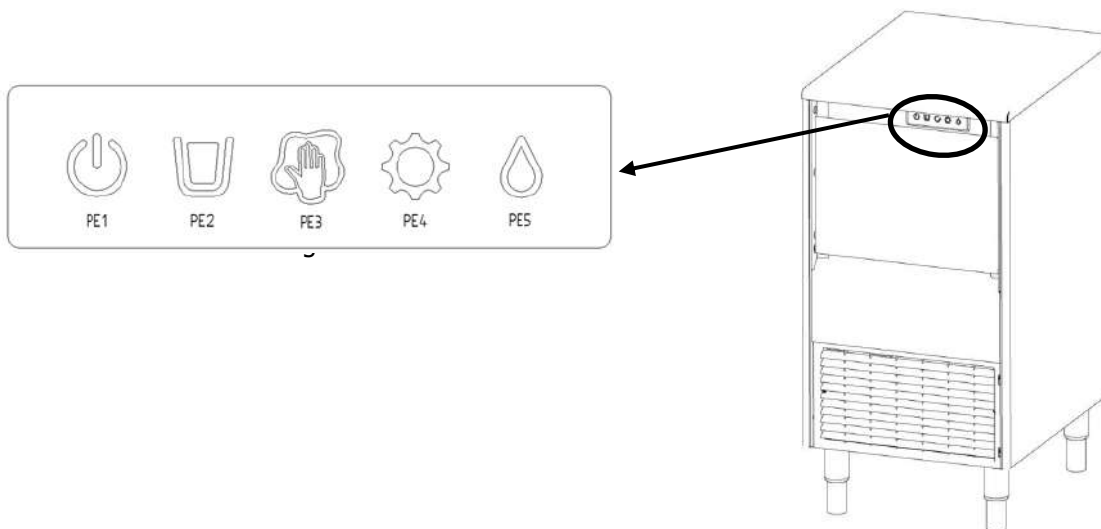
**ATTENTION:** this switch does not disconnect all the voltage inside the machine. Before handling, disconnect from the network.

3. The button on the control panel, PE1 (see image V), should be red, and when you press it, it will flash blue for 10 minutes.
4. After 10 minutes of the timer, the machine will start and PE1 will remain with a solid blue light.
5. Check that there is no rubbing or vibrating element.
6. Check that it produces ice correctly. \*It is normal that in the first moments some water falls instead of ice\*.
7. Check that there is no alarm on the control panel. If so, restart the machine. If the problem persists, call the technical service.

**ATTENTION:** this switch does not disconnect all the voltage inside the machine. Before handling, disconnect from the network.

## 5. CONTROL PANEL

The outer panel is located at the front of the machine in the upper left corner and has 5 buttons:



### 5.1. PE1.- Push button ON/ OFF

When the machine is switched on from the rear switch, PE1 will be lit in red, which means that the machine will be in standby mode. When pressing the PE1 button, it will go to the timing state and the LED will flash blue. Once the timing period has elapsed, the LED will remain permanently blue and the machine will start to operate.

If an alarm is detected on the machine, pressing and holding the button for more than 3 seconds restarts the machine.

### 5.2. PE2.- STORAGE FULL

This LED will light up when the machine has stopped when the bin is full.

### 5.3. PE3.- MAINTENANCE ALARM

This alarm indicates that the machine requires maintenance. Every 6 months of operation, the machine will turn on the PE3 LED. The machine will continue to produce ice, but the PE3 LED will remain on until a full maintenance cycle is completed.

### 5.4. PE4.-INTERNAL FAULT ALARM

This LED will remain on when there is an internal fault in the machine or a blockage at the evaporator outlet.

The machine with this alarm will remain stopped.

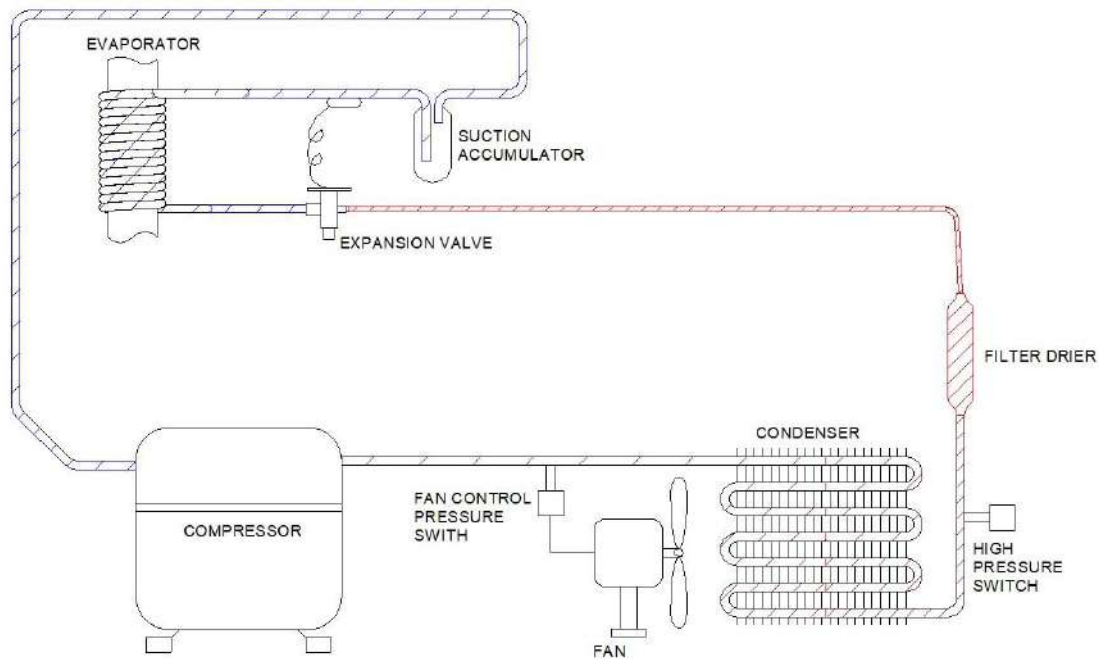
### 5.5. PE5.- WATER SUPPLY FAILURE ALARM

This LED indicates that there is no water supply and therefore the machine is stopped as it cannot make ice.

## 6. DESCRIPTION of COMPONENTS

### 6.1- Refrigeration equipment

Image VI



This consists of the following components:

- Compressor.
- Air condenser
- Evaporator. Stainless steel vertical tube with a cooling jacket. These are kept filled with water and an auger inside scrapes and removes the ice that forms.
- Capillary tube instead of a thermostatic expansion valve.
- Safety high pressure switch. For the machine if a pressure higher than this value is reached:
  - – R404A/R452 → 30 bar (435 psi)
  - -R290 → 25 bar (362 psi)
- Fan cycle switch. Controls the fan (condensed air) or valve (condensed water) to maintain the high pressure at the set level:
  - – R404A/R452 → 15.5-18 bar (225-261 psi)
  - -R290 → 11.5-13.5 bar (167- 196 psi)

## 6.2- Hydraulic equipment

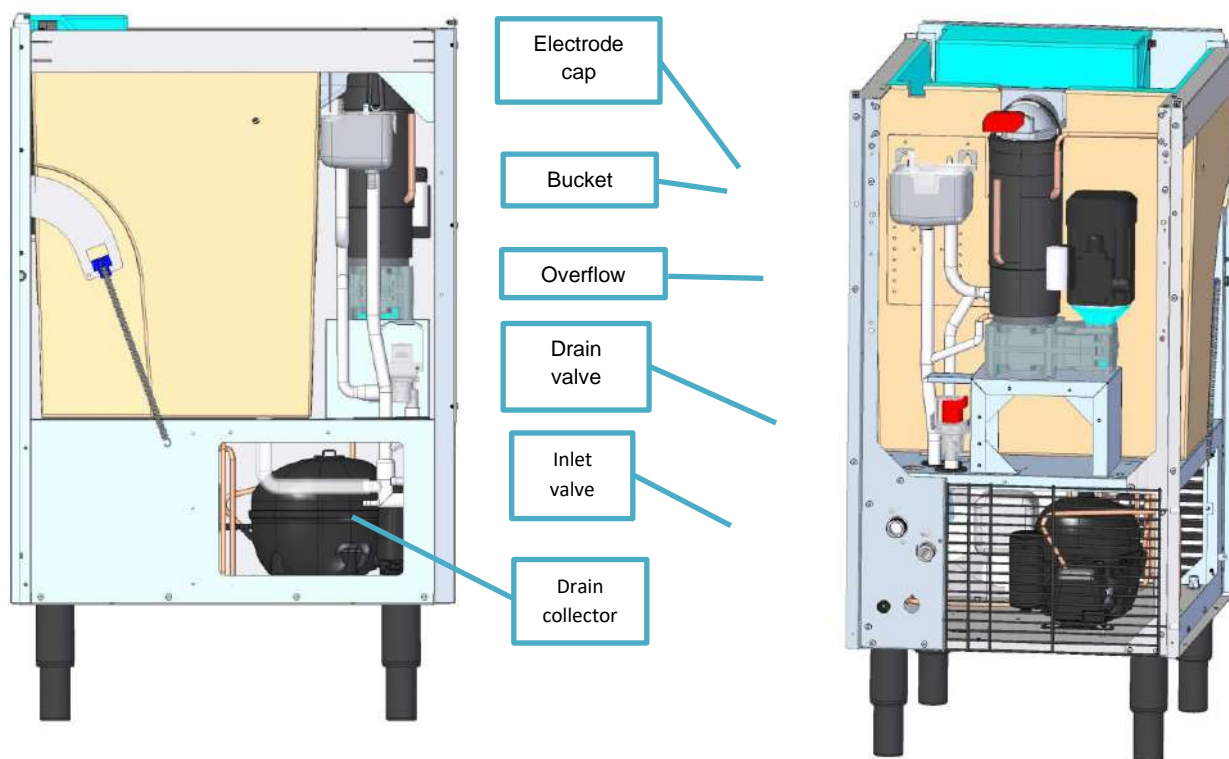


Image VII

- **Water inlet valve:** Controlled by the control board; supplies water from the reservoir.
- **Water reservoir/basin:** Maintains the water level inside the evaporator using the communicating vessels principle. Stainless steel electrodes signal the control board to maintain the internal level. An overflow safety device allows drainage to prevent internal spills in case of a malfunction.
- **Evaporator feed tube:** Connects the water reservoir to the evaporator. Includes a bypass to a drain valve that allows system emptying.
- **Discharge tube:** Carries the ice from the evaporator outlet to the ice bin.
- **Drain solenoid valve:** Controlled by the control board; discharges water from the reservoir.

## 6.2.1- Drainage by Pump

While the machine is operating, there is water that needs to be drained:

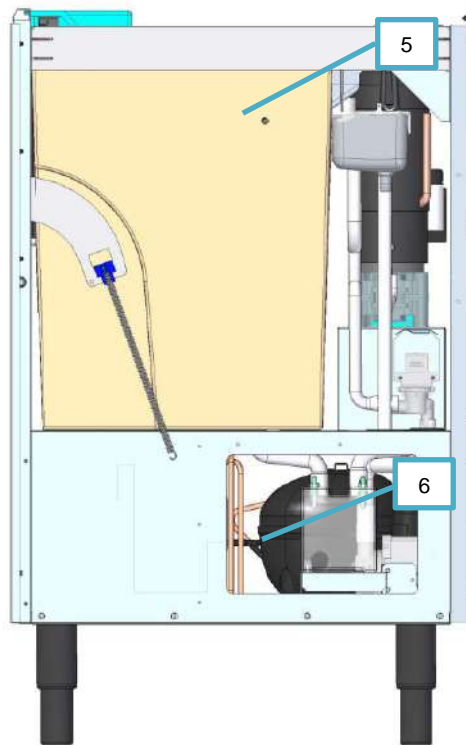
- Ice meltwater from the bin.
- Water from the drain valve that empties the system.
- Water from the potential overflow safety outlet.

When the water reservoir is filled and both electrodes (#5) are covered, the pump (#6) is activated and drains the water for 5 seconds. After 5 seconds, the pump turns off if the electrodes are no longer covered by water; otherwise, it starts again for another 5 seconds.

There is a check valve at the pump's discharge outlet that prevents backflow into the pipe when the pump stops.

If the system fails to operate correctly, water will flood the ice bin. A vent tube allows the system to release any air trapped in the water reservoir. This vent tube must always be positioned above the level of the front door opening.

If the pump runs continuously for 5 minutes, it will automatically stop for 5 seconds to cool down.

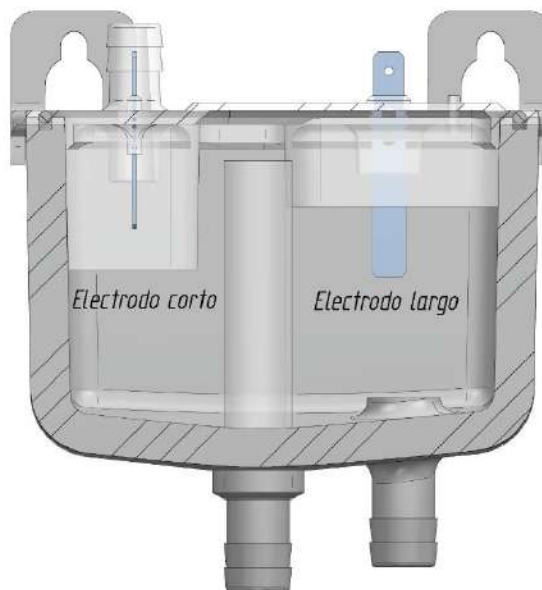




### 6.2.2- Water Level Control

The water level control system operates based on conductivity signal detection at the short electrode (LW).

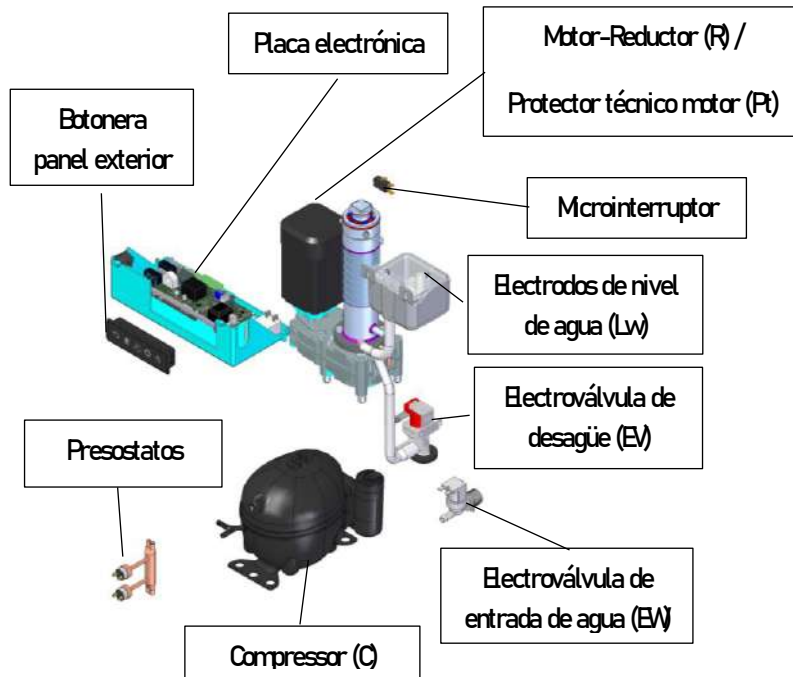
Two electrodes of different lengths are placed in the water basin (as shown in the following illustration), from which an analog conductivity signal (LW) is generated once the water reaches the short electrode.



#### Operating principle:

When the water level drops below the short electrode, the control board initiates a 5-second delay before closing the EW relay corresponding to the water inlet solenoid valve. After this delay, the valve opens and fills the hydraulic circuit until the LW signal is restored. The water inlet solenoid valve is not allowed to operate for more than 90 consecutive seconds—this is the defined maximum continuous operation time for the valve. If this time is exceeded, the machine will enter an alarm shutdown state due to low water level, as detailed in the section titled "**Shutdown Due to Low Water Level.**"

### 6.3- Electrical equipment



- **Gearmotor (R)** → A mechanical assembly consisting of an electric motor coupled to a speed reducer. It reduces input speed and increases torque based on the transmission ratio "i".
- **Water level electrodes (Lw)** → When the fluid reaches both electrodes, they signal the control board that the reservoir is full. Water conductivity must be lower than 10  $\mu\text{Si}$ .
- **Control panel button assembly** → Located on the front of the machine, it includes the power button and indicator lights.
- **Electronic control board (PCB control)** → The control board that receives input signals, processes them, and sends output signals, typically by activating relays.
- **Drain solenoid valve (EV)** → Allows the hydraulic circuit to be emptied.
- **Water inlet solenoid valve (EW)** → Maintains the water level in the evaporator feed basin.
- **Safety pressure switch (Pt)** → If the set pressure (25 bar) is reached, it completely shuts down the machine and triggers an alarm.
- **Condensation pressure switch (Pc)** → Starts or stops the fan or water inlet to maintain the desired high-side pressure.
- **Condensation pressure switch (Pc)** → Starts or stops the fan or water inlet to maintain the desired high-side pressure.
- **Microswitch** → Located at the outlet. Used in case the machine experiences a jam.

## 6.4- Ice making assembly.

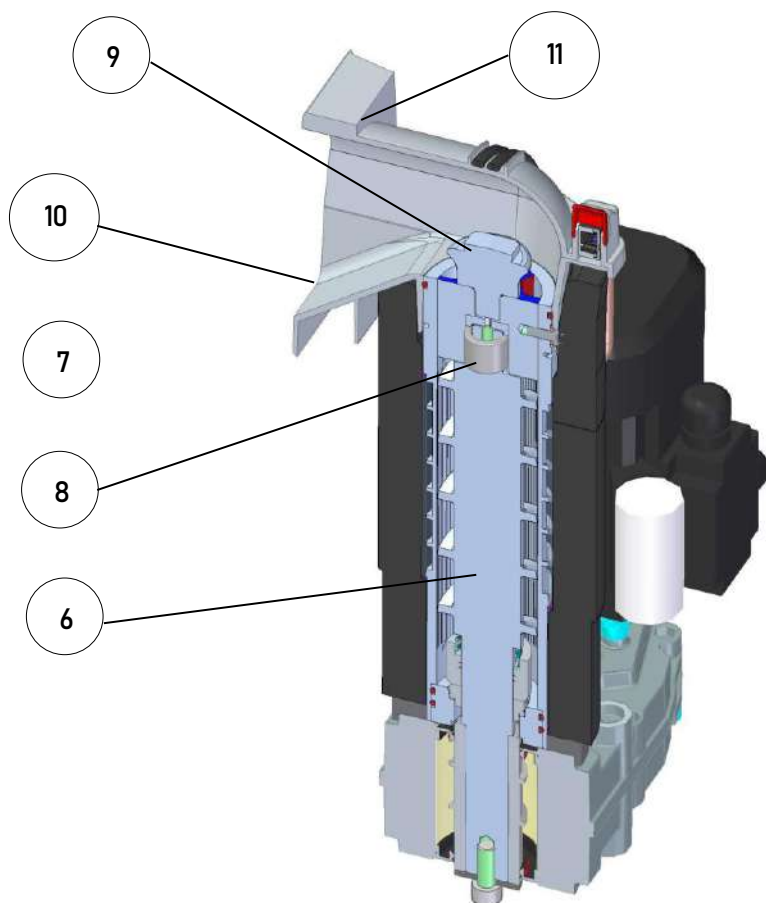


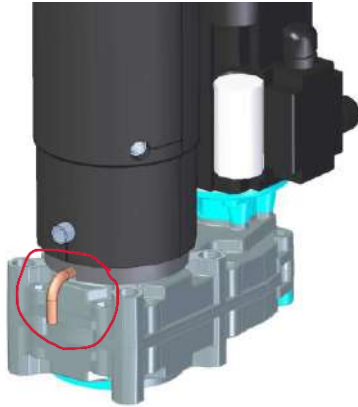
Image XI

- 6. Auger. Cuts the ice that forms inside the evaporator and removes it by compressing it on the extruder.
- 7. Extruder. It has a section-reduction nozzle. The number and shape depends on the machine and the type of ice produced.
- 8. Bearing. Located inside the extruder. Supports the upper radial load of the auger and keeps it centered in the evaporator. The lower loads of the screw are supported by the gearbox shaft.
- 9. Icebreaker. Splits the ice coming out of the extruder.
- 10. Mouth and 11. Outlet tube. They direct the ice towards the lower outlet on the machine base.

## RECOMMENDATIONS WHEN EVAPORATOR AND EXTRUDER IS DISASSEMBLED

When the evaporator and extruder are going to disassemble for a change, is recommended inspect or change the following parts:

- Inspect possible water leak at the marked zone of gearmotor: the water flows through this geometry of gearmotor if there was a water leak.



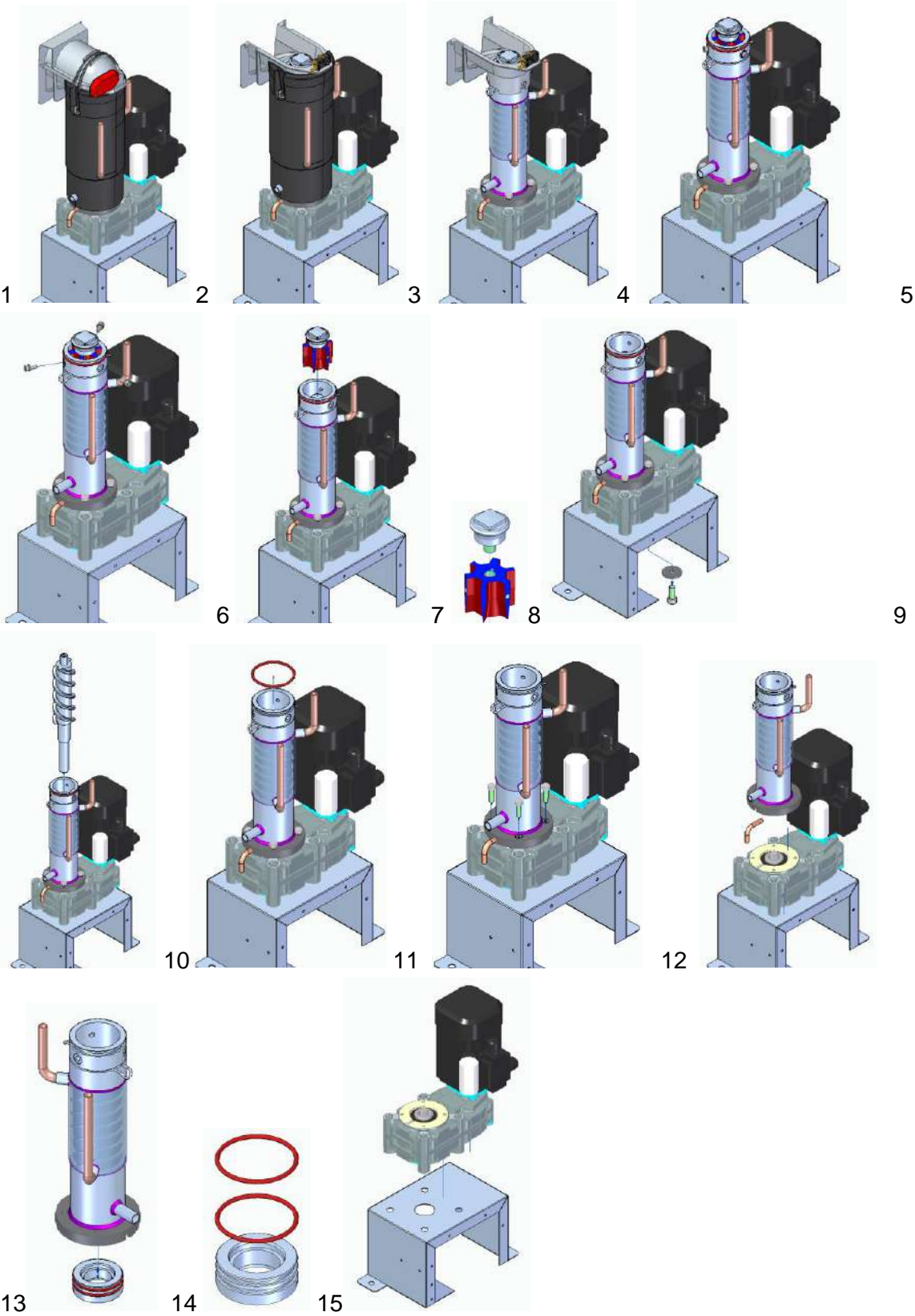
- O-rings: inspect
- Mechanical seal: replace



- Extruder kit: replace



STEPS TO DISASSEMBLE EXTRUDER AND EVAPORATOR



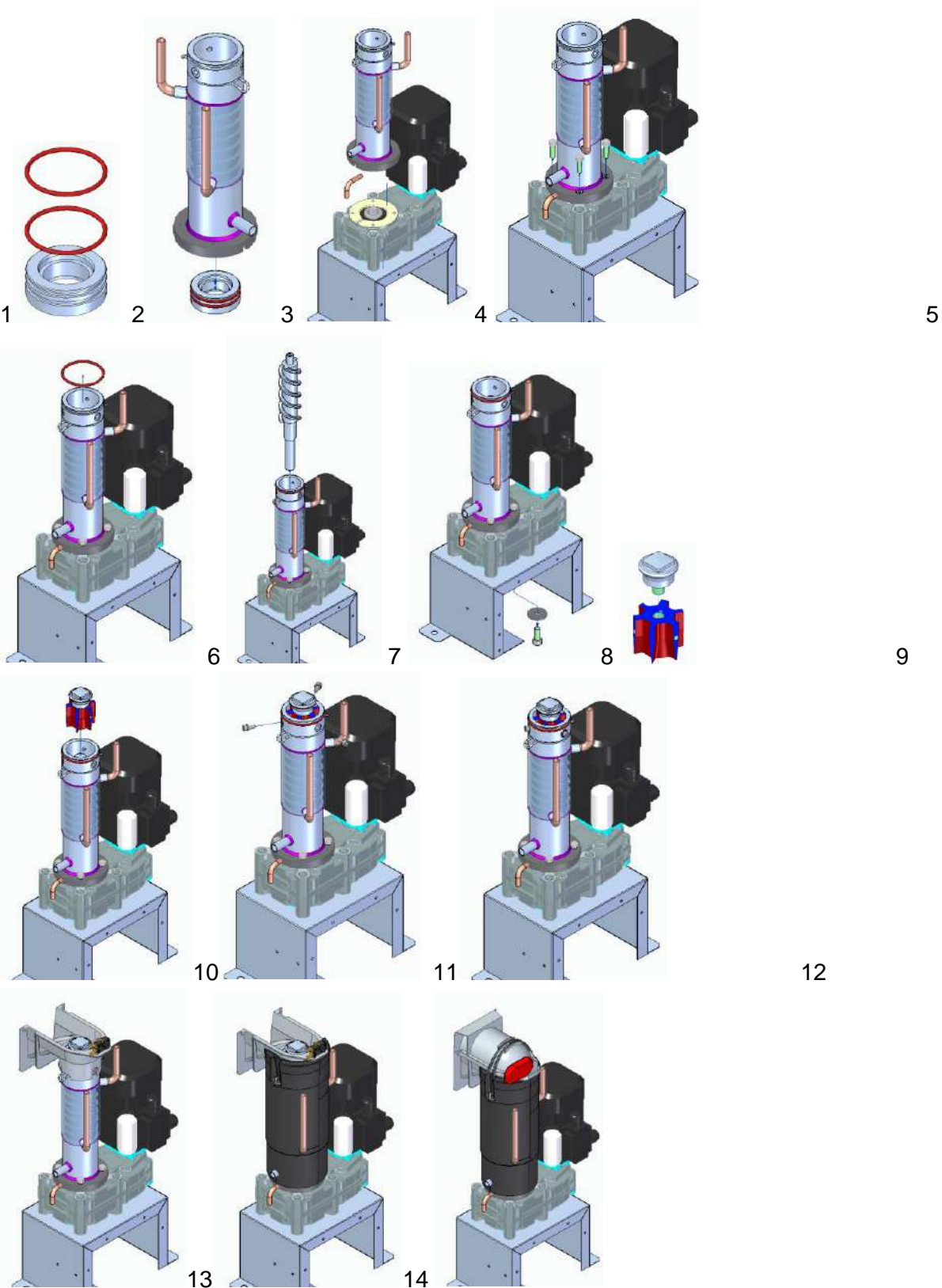
1. Remove the machine's external panels to access the evaporator.
2. Remove the ice outlet cover.
3. Remove the evaporator insulation.
4. Remove the ice outlet spout.
5. Remove the screws securing the extruder assembly.
6. Remove the extruder assembly.
7. Separate the ice breaker from the extruder assembly.
8. Remove the screw and washer from the bottom of the evaporator.
9. Remove the auger; the extruder screw can be used to easily pull it out.
10. Remove the O-ring from the top of the evaporator.
11. Remove the screws that attach the evaporator to the gearmotor.
12. Lift the evaporator off the gearmotor shaft (be careful with the copper tubes to avoid damaging the refrigeration circuit).
13. Remove the evaporator's retaining ring.
14. Remove the two O-rings from the retaining ring.
15. The gearmotor can now be removed from the machine.

## **STEPS TO REPLACE THE EXTRUDER KIT**

- If the unit is running, turn it off using the main switch (located on the back).
- Open the plastic cover at the ice outlet to access the evaporator.
- Remove any ice inside.
- Remove the ice outlet spout.
- Remove the three Allen screws securing the extruder assembly to the evaporator.
- Remove the extruder assembly.
- Detach the ice breaker from the extruder assembly.
- Clean any ice from inside the evaporator. **WARNING!** The auger has sharp edges—never reach inside without using cut-resistant gloves.
- Install the ice breaker onto the new extruder assembly.
- Reinstall the new extruder assembly.
- Tighten the three Allen screws and reattach the spout and plastic cover over the evaporator.



STEPS TO FOLLOW FOR ASSEMBLING THE EVAPORATOR AND EXTRUDER



1. Place the two O-rings on the retaining ring and clean them with alcohol.



2. Clean this part of the mechanical seal with alcohol, avoiding direct contact with your hands..



Place the part onto the retaining ring.



Apply NSF-approved food-grade lubricant, or a local equivalent, to the two O-rings to aid evaporator assembly.

3. Apply lubricant to the evaporator as well and install the retaining ring onto it. Make sure the locating pin fits into its slot.



4. Clean the mechanical seal with alcohol.



Apply lubricant to the auger and install the previously cleaned mechanical seal by screwing it in slightly for easier insertion. Push in until the spring touches the auger's cutting edge.





5. Insert the auger into the evaporator and temporarily install the washer and screw at the top to assist alignment.



6. Loosely place the washers and screws to position the evaporator onto the gearmotor.



7. Insert the drain tube into the lower groove of the evaporator and tighten the screws. Ensure the tube is firmly secured in place.



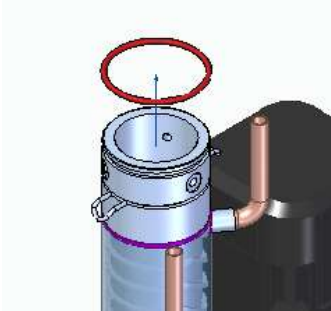
8. Using the screw and washer installed in step 5, align both keyways and insert the key into position.



9. Install the washer and screw at the bottom of the gearmotor



10. Place the retaining ring and O-ring on top of the evaporator.



11. Install the ice breaker onto the extruder kit assembly.



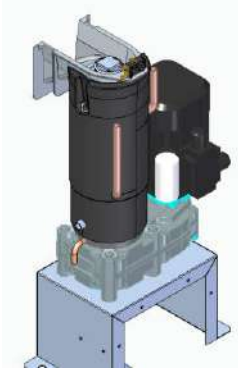
12. Mount the extruder onto the evaporator until you can thread in one screw.



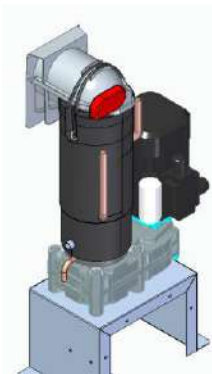
13. Install the washers and screws to secure the extruder assembly.



14. Install the ice outlet spout and insulation. Secure the insulation with cable ties..



Attach the plastic cover and elastic bands.



## **7. OPERATION**

### **7.1 - OPERATING PRINCIPLE**

Water enters the water reservoir through a solenoid valve. The electronic control board activates the valve to maintain the internal water level at the height of the upper electrode in the basin. A safety overflow directs excess water to the drain if this level is exceeded.

A flexible hose supplies water to the evaporator. The same water level is maintained in the evaporator through the principle of communicating vessels, just like in the reservoir. Water freezes on the inner surface of the evaporator. The auger carries the ice upward to the extruder. As it passes through the extruder nozzles, the ice is compressed, compacted, and partially dewatered. The shape of the extruder varies depending on the type of ice to be produced.

At the extruder outlet is the ice breaker, a device that divides the ice into a uniform size.

The spout delivers the ice to the bottom of the ice storage bin. The spout cover is held in place by an elastic band. In case of a blockage, a safety microswitch detects the displacement of the cover and stops the machine.

The auger is driven by a gearmotor located at the bottom of the assembly. An axial seal, its housing, and gaskets prevent water leakage.

In the event of a gearmotor blockage, the machine will immediately shut down via the thermal protector when the current exceeds preset values.

Inside the ice bin is the thermostat tube. When the ice reaches it, the tube cools down and the temperature probe detects this, causing the machine to stop and triggering the full stock alarm.

### **7.2 - OPERATING SEQUENCE**

When the rear switch is turned on, the machine enters standby mode. The front operation light turns red.

A short press on it activates the machine. The light changes to flashing blue, and a 10-minute timer begins.

During this period, the water inlet valve activates until the water level in the evaporator and basin reaches the upper electrode. The machine performs a drain cycle, and the fill-and-drain process repeats as a rinsing operation.

After this time, the gearmotor starts. One minute later, the compressor is activated. Shortly after, ice will begin to exit the machine. The first ice may be soft and mixed with some water until normal operating conditions are reached.

Ice production gradually lowers the water level in the reservoir. When the upper electrode loses contact, a 5-second delay triggers the solenoid valve to restore the level. This cycle repeats continuously while the machine is running.

When the probe reaches the programmed temperature, the machine stops and the corresponding LED on the front panel lights up.

When ice is removed from the bin and the probe temperature rises, the machine restarts. If the stop duration was longer than 10 minutes, the restart is immediate. If it was shorter, the machine will remain off until the minimum 10-minute stop time is completed.

During machine shutdowns (except alarm-triggered stops), the auger continues to run for 3 minutes to clear any remaining ice from the evaporator.

To manually stop the machine, simply press the front button. It will turn red.

In the event of an alarm shutdown, the corresponding warning light will turn on. A long press on the start button can reset the machine. If the issue persists, the problem must be resolved before restarting.

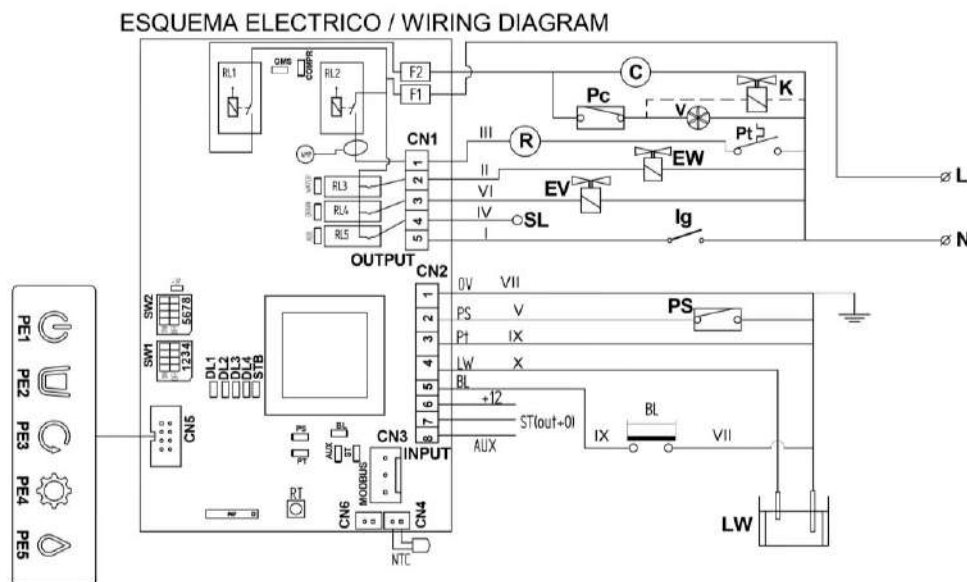
The machine can also be turned on in "**Gearmotor Only**" mode, where only the gearmotor runs (the rest of the machine remains off). This is used to empty ice from the evaporator or to test the gearmotor.

To activate this mode, the machine must be in standby (with the start button red). Then, press and hold the start button on the display until all five display buttons flash.

To deactivate this mode, press the start button again until the machine returns to standby.

# 8.ELECTRONIC CONTROL

Receives information from the machine components and controls the operation of the equipment.



## DIP Switches (\*Factory set)

- S1-ON** Paro con temporización / Stop with time delay  
**OFF** Paro instantáneo sin temporización / Instant stop without time delay  
**S2-3** Configuración paro por stock / Configuration stop by stock  
**S4-ON** Stock funciona NA / Stock works as NO  
**OFF** Stock funciona NC / Stock works as NC  
**S6-7-8** Configuración límites r.p.m. motor-reductor/ Setting gearmotor r.p.m. limits

- Ps-** Presostato de seguridad / High Pressure Control  
**Pc-** Presostato Condensación / Fan cycle control  
**Pt-** Protector termico / Motor Thermal Protection  
**C-** Compresor / Compressor  
**V-** Ventilador / Fan  
**LW-** Sonda nivel agua / Water level probe  
**Ig-** Interruptor On-Off / On-Off Switch  
**R-** Motor reductor / Gearmotor  
**BL-** Bloqueo salida hielo / Ice outlet block  
**EW-** Electroválvula entrada agua / Water inlet valve  
**EV-** Electroválvula vaciado / Drain valve  
**K-** Electroválvula Condensación / Cooling valve  
**NTC-** Sonda stock / Stock Sensor  
**RT-** Pulsador / Push-button  
**RL-** Relé / Relay  
**SL-** Salida libre (5A) / Free output (5A)  
**ST-** Parada stock / Stock stop

## Colores / Colors

- |     |                |      |                   |
|-----|----------------|------|-------------------|
| I   | Azul /Blue     | VI   | Violeta /Violet   |
| II  | Rojo / Red     | VII  | Blanco / White    |
| III | Marrón / Brown | VIII | Verde / Green     |
| IV  | Negro / Black  | IX   | Naranja / Orange  |
| V   | Gris / Grey    | X    | Amarillo / Yellow |

## LEDS trabajo normal (fijos) / normal work (fixed)

- DL1** - Retardo de arranque / Start delay  
**DL2** - Marcha / On ice  
**DL3** -Parada stock lleno / Stop delay  
**DL4** - Stock lleno / Full stock

## LEDS alarmas (intermitente) / alarms (flashing intermittent)

- DL1** -Presostato de alta Ps / High pressure control  
**DL2** -Baja intensidad del reductor / Low intensity on gearmotor  
 -Alta intensidad del reductor (2 intermitentes) / High intensity on gearmotor ( 2 intermittents)  
 -Entrada Pt del reductor ( 3 intermitentes) / Pt from gearmotor ( 3 intermittents)  
**DL3** -Atasco salida hielo / Ice outlet block  
**DL4** -Falta de nivel agua / Water level problem  
 -Falta consumo de agua(2 intermitentes) / Water consume problem ( 2 intermittents)  
**DL1+2** - NTC corto/Short NTC  
 -NTC abierta( 2 intermitentes) / Open NTC (2 intermittents)

## Paneles externos / External panels

- PE1** - Pulsador / Push ON/ OFF + LED bicolor  
 Rojo - Apagado / Red - Off  
 Azul fijo - Encendido / Fixed blue - On  
 Azul Intermitente-Temporización / Blue Flashing-Timing
- PE2** - LED fijo almacén lleno / Fixed LED Full Stock
- PE3** - LED Fallo del motorreductor por velocidad o sentido giro / LED Gear motor failure by speed or reverse rotation
- PE4** - LED Fallo de presostato, atasco boca de salida o falta de consumo de agua / LED Pressure switch fault, ice outlet block or lack of water consum
- PE5** - LED Falta de agua / LED Lack of water

## **8.1 Connectors:**

- Relay supply and output (mains voltage):
- L-N: Power supply
- C: Compressor
- R: Gearbox
- W: Water inlet solenoid valve
- Inputs (low voltage):
- P: Safety.
- St-E : External stock stop (thermostat, photocell, etc.)
- BL : Safety micro by closing the outlet.
- Ext: External machine shutdown.
- Lw: Water level probe in the tank.
- External pilot panel
- Gear motor speed and direction of rotation sensor
- Optical storage filling sensor.

## **8.2 WARNING LEDS**

The following tables describe the signals provided by the different LEDs on the control board. Whenever there is voltage there must be a green indicator LED (STB) active voltage of 5V.

### **8.2.1- Input LEDS**

The input LEDs are positioned next to each of their corresponding inputs. Green LED color with active signal.

### **8.2.2- OUTPUT LEDS**

The output LEDs are positioned next to their corresponding relays. Orange LED color with active signal.

### **8.2.3- STATUS LEDS. NORMAL WORK (FIXED LEDs)**

The status LEDs serve as indicators on the control board of both the normal operation of the machine and the alarm states that can be generated:

- DL1 → Start delay
- DL2 → Working
- DL3 → Stock full stop
- DL4 → Stock full

The following table shows the operation of the 4 LEDs for this effect: DL1, DL2, DL3 and DL4 in normal working mode. In these cases, the LEDs turn on with a steady light, without flashing:

LED rojo continuo	DL1	DL2	DL3	DL4
Machine on: start timing until the compressor starts	X			
Machine running: compressor running		X		
Full warehouse stop timing			X	
Sign that stock is full				X

### 8.2.4- STATUS LEDS. ALARM (FLASHING LEDS)

The following table defines the alarm states of the machine, which can be differentiated with the following flashing of the status LEDs:

Intermittents	Flashing red LED	DL1	DL2	DL3	DL4	DL1+2
Reducer current R	Below the lower limit		1			
	Above the upper limit		2			
NTC	open					2
	Short					1
Water	Lack of water level				1	
	Lack of water consumption				2	
High pressure switch (PS)	Failed	1				
BL ice outlet	Blocking			1		
Reducer technical protector (pt)	Failed		3			

1-2-3 number of flashes

### 8.3 SETTING THE DIP SWITCHES

The following table describes the functionality of the micro-switches that the table has, that is, the work options that the combinations of these can provide:

DIP Switches	Description
S1-ON	Timed stop
OFF	Instant stop without delay
S2-3	Stock stop configuration
S4	Free
S6-7-8	Motor - reducer current limit configuration

The following table shows the default intensity configuration in each of the possible combinations allowed by the switches on the control board (S5, S6, S7 and S8).



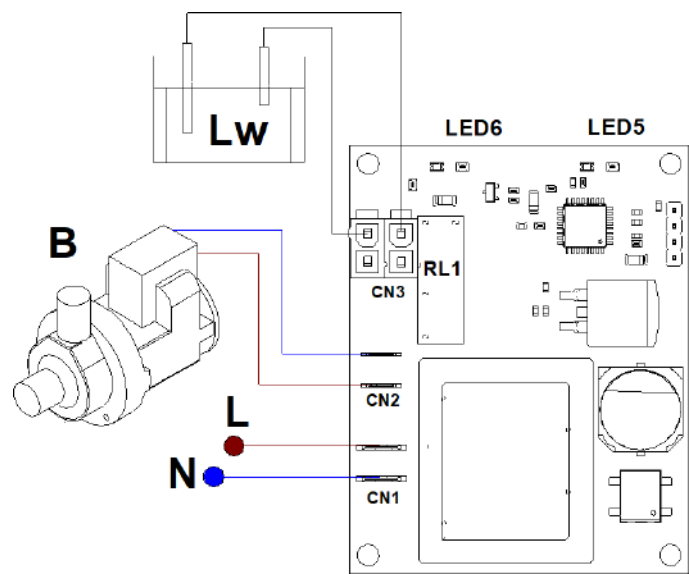
Nº valor	SWITCH				Intensit y Range (A)
	S 5	S 6	S 7	S 8	
1	of f	of f	of f	of f	0,2 - 1
2	of f	of f	of f	o n	0,5 – 1,2
3	of f	of f	o n	of f	0,5 – 1,5
4	of f	of f	o n	o n	0,5 - 2
5	of f	o n	of f	of f	0,7 – 1,5
6	of f	o n	of f	o n	0,7 – 2
7	of f	o n	o n	of f	0,8 – 1,8
8	of f	o n	o n	o n	1 – 2,1
9	o n	of f	of f	of f	1,2 – 2,3
10	o n	of f	of f	o n	1,8 - 3
11	o n	of f	o n	of f	2,2 – 3,5
12	o n	of f	o n	o n	2,4 – 4,2
13	o n	o n	of f	of f	2,6 - 4
14	o n	o n	of f	o n	2,8 – 4,5
15	o n	o n	o n	of f	0,5 – 5
16	o n	o n	o n	o n	0,3 – 6

The following table shows the machine stop configuration due to temperature:

SWITCH		Temperature °C
S2	S3	
off	off	Nulo
off	On	2
On	off	5*
On	On	8

\* Factory settings

8.4 ELECTRONIC BOARD FOR DRAINAGE BY PUMP



PCB conexiones	
Salidas	
B	Bomba de agua
Entradas	
Lw	Sensor de nivel de agua

LED signage

There are two LEDs that indicate the status of the machine.

Status signaling. Continuous LED	LED5	LED6
Pump running	X	
Water level sensor on		X

## 8.5 MODBUS

Modbus is an open communication protocol, used to transmit information over serial networks between electronic devices. The device that requests the information is called the Modbus master and the devices that supply the information are the Modbus slaves.

For its physical connection, it must be connected to CN4 and CN6 of the electronic board. The outputs that Modbus will give us are the following:

ADDRESS	MEANING	ADDRESS	MEANING
0	firmware revision: major * 256 + minor	13	NTC ADC value (0-4095)
1	machine ON	14	NTC volt value (0.1V)
2	machine blocked	15	NTC temperature status (see table)
3	machine status (see table)	16	motor current (0.001A)
4	EV filling	17	motor current ADC value (0-4095)
5	EV drain	18	motor current volt value (0.1V)
6	motor	19	dip switch bit mask [sw2-4 ..... Sw1-1]
7	compressor	20	active alarm code (see table)
8	aux out	21	history alarm 1
9	water level status (see table)	22	history alarm 2
10	water ADC value (0-4095)	23	history alarm 3
11	water volt value (0.1V)		
12	NTC temperature (0.1°)[SIGNED INT 16 VALUE]		

MACHINE STATUS		WATER LEVEL STATUS		ALARM CODE		NTC TEMPERATURE STATUS	
VALUE	MEANING	VALUE	MEANING	VALUE	MEANING	VALUE	MEANING
0	boot	0	water level undefined	1	ice full	0	probe error
1	start Up	1	water level ok	2	pressure	1	temperature over threshold
2	ice making	2	water level low	3	ice blocked	2	temperature over threshold
3	washing			4	motor overtemp		
4	blocked			5	motor current low		
				6	motor current high		
				7	water level		
				8	water consumption		

## 9.ALARMS

They detect malfunctions. These are indicated by flashing status LEDs DL1-4.

For some alarms, a second retry attempt is made and if it is repeated again, the machine stops. If the second retry attempt is successful, the signaling is turned off.


In case the machine stop was caused by an alarm, the resetting is done by turning the main switch off and on.

### 9.1 HIGH PRESSURE SAFETY SWITCH

If the pressure switch is actuated (contacts open), the control board input (Ps) opens, generating this shutdown state. At this moment, all the outputs of the control board are opened.

When the Ps pressure switch contact is closed again, the machine will start with the start-up timing sequence. Minimum stop time 30 min unless a restart is done manually.

Signaling:


- Internal LED LE1 flashing.
- External panel PE4 pilot light  fixed on.

### 9.2 MOTOR-GEARED ALARMS

#### 9.2.1- Temperature Geared Motor Stop

In the event of a temperature higher than that of the electric motor thermal protector, the entry of the control plate by motor thermal protector (Pt) is opened, generating this state of stop of the machine until a manual reset is performed.

Signage:

- LE2 Triple Flashing Plate LED
- PE4 Pilot External Panel  Fixed On

### **9.2.2- Downtime of the geared motor due to current below the lower limit**

If the measured current value of the step-down motor R is below the lower limit of the interval specified in the switch configuration table (section 5.4.4) for a period of 5 consecutive seconds, the machine is stopped until a manual restart is performed.


Signage:

- LE2 Single Flashing Plate LED
- External panel PE4 pilot  light fixed on.

### **9.2.3- Stop of the geared motor due to current below the lower limit**

If the measured current value of the geared motor R is below the lower limit of the range specified in the switch setting table (section 5.4.4) for a time of 5 consecutive seconds, the machine stops until a restart is performed manually.

Signaling:

- LE2 board LED single blinking
- External panel PE3 pilot  light fixed on

The machine will make 2 restart attempts every 30 minutes, with a waiting period between each attempt. If the alarm is triggered 3 consecutive times, the machine will shut down completely.

This shutdown state, along with its corresponding LED indicators, will remain unchanged until the machine is restarted (either by pressing the internal reset button Rt or PE1), or by turning the machine off and back on again.

If the machine operates normally during the second or third attempt and the overcurrent alarm does not reoccur within 1 hour, the alarm repetition counter will reset to zero, and the machine will continue running normally.

### 9.3 SHUTDOWN DUE TO LOW WATER LEVEL


This alarm occurs when the water inlet valve is open for 90 seconds and the electrodes do not detect filling of the tank, causing the machine to stop.

The main reasons for this alarm are:

- Lack of water supply
- Internal leak in the circuit
- Fault in the inlet solenoid valve

When the alarm is triggered, every 30 min it will make a filling attempt again. So when the water supply returns, the machine will start making ice.

Signaling:


- LED LE4 board flashing
- External panel PE5 pilot light fixed  on

### 9.4 SHUTDOWN DUE TO LACK OF WATER CONSUMPTION

This stop occurs when, after 2 minutes, the machine does not consume water and therefore the water inlet solenoid valve is not activated.

All outputs are set to OFF except the gear motor, which continues to run for 10 minutes. In this way we detect that ice is not being produced and there is an anomaly (during the initial 20 min of start-up this alarm is not considered).

After 30 min from the alarm, it restarts and if the alarm occurs again, the machine is permanently stopped. Signaling:

- LE4 board LED double flashing
- External panel PE4 pilot light  fixed on


## 9.5 NTC SENSOR ALARM

Only on compact machines that operate with temperature probe magazine control.

Two types of faults are detected:


- Probe shorted
- Probe not connected or open

Signaling:

- External panel PE4  pilot light fixed on
- Internal:
  - Probe not connected or open: LED1+2 with 2 flashing lights.
  - Probe short-circuited: LED1+2 with 1 flashing light

## 9.6 BLOCKING ALARM

It is not used as standard on the machine, but it can be wired for any external alarm that you want to manage. The machine stops completely until it is reset with the following signalization:

- Single flashing LE3 board LED
- External panel PE4 pilot light  fixed on

## 9.7 SHUTDOWN BY PHASE SEQUENCE

It occurs when the connections of the extension cord to the plug are reversed in phase. Once the gearmotor starts and rotates in the opposite direction to the working direction, the machine will signal phase sequence error. Once the geared motor is started, after a few seconds, if it rotates in the opposite direction to the working direction, the machine will indicate the error on the display by flashing PE3+PE4+PE5.

On the board we will recognize the error by the LED3 with two flashing lights.

This stop state with its corresponding LED signals will remain unchanged until the machine is restarted or switched off and on again.

## 9.8 OPERATION ALARM HISTORY

It will be possible to consult the history of the last 3 alarms that the machine has had, signaling LED1, LED2, LED3 and LED4 with the corresponding flashing of each alarm.

Activation: when the machine is switched off Power off is activated by holding down the internal pushbutton on the Rt board and switching on the machine Power on. The machine remains at standstill and only the signaling is shown on the board (**external signal PE1 in steady red**).

Signaling: the last alarm will be displayed first, a short press on the Rt pushbutton will display the second to last alarm, and a further short press will display the second to last alarm. This sequence will be repeated successively with each press. As an aid, to know which alarm is being displayed, **PE1 in purple color**, will light up, with one flash for the last alarm, two flashes for the penultimate alarm and three flashes for the antepenultimate alarm.

Reset of alarms: pressing the internal pushbutton on the Rt board for more than 5 seconds resets the alarm history, turns off PE1 and switches the machine to Stand-by.

Automatic deactivation: after 10 minutes of inactivity, the alarm history is reset.

Manual deactivation: by POWER OFF.



## 10. MAINTENANCE AND CLEANING INSTRUCTIONS

It is the responsibility of the user to maintain the ice machine and ice storage bin in a hygienic condition.

Ice machines also require occasional cleaning of their water systems with a specifically designed chemical. This chemical dissolves mineral buildup that forms during the ice making process.

Disinfect the ice storage bin as often as required by local sanitary codes, and each time the ice machine is cleaned and disinfected.

The ice machine water system should be cleaned and sanitized at least twice a year.

**CAUTION:** Do not mix ice machine cleaner and sanitizer solutions.

**WARNING:** wear rubber gloves and safety glasses when handling ice machines cleaner or disinfectant.

**WARNING:** The unit should always be disconnected during maintenance/ cleaning procedures.

**RUBBER GLOVES AND SAFETY GOGGLES SHOULD BE WORN WHEN HANDLING ICE MACHINE CLEANER OR SANITIZER**

### 10.1 CLEANING OF AIR CONDENSER

1. Disconnect the power supply of the machine.
2. Close the water inlet valve or the faucet.
3. Clean with the aid of a vacuum cleaner, non-metallic brush or low-pressure air.
4. Open the water inlet valve or faucet.
5. Turn on the power supply to the machine.


## 10.2 CLEANING CYCLE

This mode of operation of the machine is used to clean the hydraulic circuit (evaporator, bucket and feed tube). There is no cold generation and therefore the compressor will be deactivated throughout the cycle.

First, the water inlet tap must be turned off. For emptying and cleaning, the following procedure is carried out:

The machine is emptied automatically by activating the EV drain solenoid valve for one minute to empty the water from the machine.

### 10.2.1 Descaling process

First, close the water inlet tap and leave the machine on Stand-by (PE1 button in red ) , it is activated by holding down the PE1 button on the display for 7 seconds.

When activated, only the R gearmotor starts for 30 minutes, during which time the user fills the bucket with the cleaner (50% phosphoric acid and water, or use an anti-limescale cleaning product such as Calklin. Do not use sulfamán or hydrochloric acid) and the circuit is cleaned.

During the 30 minutes, the 5 icons on the display board will dynamically light up one after the other from left to right and from right to left.

Once the 30 minutes have passed, the machine must be stopped and turned on again (open the tap again). In compact machines, the EV drain solenoid valve will make 3 water drains and in modular machines, the drain must be emptied manually by removing the plug from the drain tube.

Form Auto-generated description: manteniendo pulsado el pulsador PE1 del display durante más de 7 segundos la máquina pasa a Stand-by.

With this process, the descaling of the machine has been carried out.

### 10.2.2 Desinfection process

Disinfectant solution: mix a solution of disinfectant using an agent approved for food equipment. It is recommended to use cleaning product or, failing that, sodium hypochlorite can be used to form a solution with 200 ppm of free chlorine, dilute 35 ml of this solution of 5.25% sodium hypochlorite (household bleach) with 10 liters of water.

Repeat the steps described in point "8.4.1 Decalcification process

In compact machines, use this same solution to clean the inside of the stock tank.

**IMPORTANT:** Start the machine and discard the ice produced during the first 30 min.

## 10.3 MAINTENANCE TABLE

ACTION	MONTHLY	QUARTERLY	SEMESTERLY	ANNUAL	BIENNIAL	T UNIT
Cleaning air condenser						30 minutes
Descaling						45 minutes
Disinfection						30 minutes
Exterior cleaning						--

	Depending on the characteristics of the environment
	Indispensable/Essential
	Depending on water quality
	Performed by owner

Maintenance and cleaning procedures, as well as problems resulting from their non-performance, **ARE NOT COVERED BY THE GUARANTEE.** Service personnel will bill you for travel expenses, time spent and materials required for maintenance and cleaning of the unit.

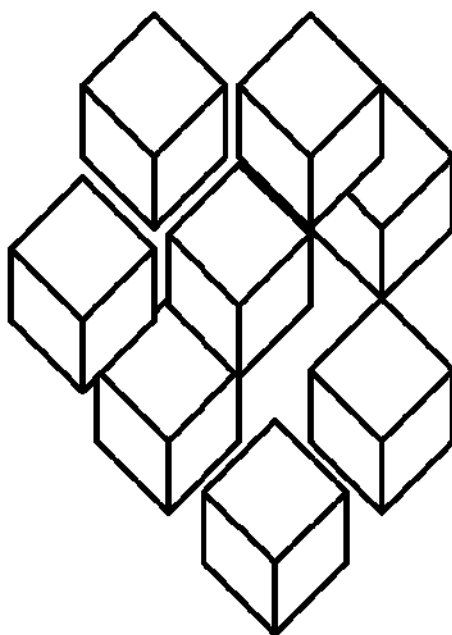
# 11. Troubleshooting

PROBLEMS	POSSIBLE CAUSES	SOLUTION
None of the electrical systems work. Front display off	No power.	Check power supply and connection
	Switch OFF Compact: side electrical panel Modular: rear part	Power on
	Display connector loosened	Check. Insert
<b>PCB ALARMS</b> See section 7		
Safety pressure switch	Dirty condenser	Clean the condenser
	Poorly positioned machine	Change location.
	Defective ventilator	Check. Replace
	Water machine: water valve broken	Check. Replace
	Defective safety pressure switch	Check. Replace
NTC probe error	Defective probe	Check. Replace
	Faulty probe plug connection	Check
Lack of water consumption	Poor cooling system performance	Check/replace
	Dirty electrodes/bucket	Clean electrodes/bucket
	Evaporator water inlet clogging	Check/clean
Low water level	Lack of water supply	Check power supply Check filter gasket
	Evaporator inlet tube loose	Adjust pipe
	Loose internal overflow	Adjust overflow
	Dirty electrodes	Clean electrodes
	Defective solenoid valve	Check. Replace
Gear motor shutdown due to temperature	Condenser deterioration	Check. Replace
	Incorrect switch configuration	Check and change
	Internal probe failure	Check. Replace
Gear motor shutdown due to low current	No voltage to motor	Check wiring and plate output
	Motor with open winding	Replace geared motor
	Incorrect configuration of switches S6-7-8	Check
Gear motor stop due to high current	Over-stressing/blocking of the gear unit	Check evaporator (condition and cleanliness)
	Deterioration of condenser	Check. Replace
	Defective geared motor	Check. Replace
	Incorrect configuration of switches S6-7-8	Check
<b>OTHER ALARMS</b>		
Compressor does not run, but voltage is supplied	Compressor/electrical equipment defective	Check/replace
Compressor runs, but does not cool	Refrigeration system not working properly	Check load and components
Plate is energized, but does not turn on	Internal board fuse open	Replace (0.5 A)
Shutdown due to full store, but no ice	Compact: failure of NTC probe	Replace probe
	Compact: NOK positioning of NTC probe	Place probe in the center of the stainless steel tube
	Compact: misconfiguration of switches S2-3	In cold places it may be necessary to lower the set temperature to 2°C.
	Modular: stop rocker stays up. Modular: faulty micro	Check that it moves freely. Substitute

PROBLEMS	POSSIBLE CAUSES	SOLUTION
<b>Very wet ice</b>	Very high ambient temperature (> 35° C)	Change the location of the machine, if possible.
	Very high water temperature (> 30° C)	Check the piping and filter in case condensation air or other heat source heats up the water in the pipes.
	Low water quality (> 1500)	Lower the position of the water tank. Install water treatment equipment.
	Dirty condenser	Clean
	Lack of compressor cooling	Substitute
<b>Water leakage in the lower bearing</b>	Refrigerant leakage	Refill and in case of leakage, repair.
	Defective O-rings	Replace and possibly siliconize.
<b>Abnormal noise in the machine</b>	Fan or fan blades in bad condition or loose	Fix or substitute
	Vibrating pipes or components	Reposition and/or fix
	Noise in compressor	Substitute
<b>Abnormal noise in the gear motor</b>	Loose rear fan	Fix
	Defective ball bearings	Replace damaged bearing or replace motor
<b>Noise in the gearbox</b>	Defective ball bearing, no end or crowns in bad condition	Replace gearbox
<b>Noise in the evaporator</b>	Evaporator with scale buildup	Clean
	Scratched spindle and/or evaporator	Check and replace if necessary
	Evaporating temperature very low	Check cooling system
<b>DISCHARGE PUMP (compact only)</b>		
<b>Ice storage is flooded</b>	Check if valve is blocked	Clean or replace it
	Pump is broken	Replace pump
	Control board defective	Replace PCB
	Electrodes do not detect water	Disassemble and clean
<b>Pump is always on</b>	Electrodes detect water, even if there is no water	Disassemble and clean electrodes



FLAKES



NUGGET