



# **SERVICE MANUAL**

## **SERIE FDHD**

### **ICE CUBE MAKERS - UNDERCOUNTER MODELS**

FDHD 50  
FDHD 70  
FDHD 100  
FDHD 150

### **ICE CUBE MAKERS - MODULAR MODELS**

FDHD 215  
FDHD 415

**INDEX**

1. *INTRODUCTION*..... 4

    1.1.- Warning..... 4

    1.2.-Reception of the machine ..... 6

2. *INSTALLATION* ..... 7

    2.1.- Placing of the ice maker ..... 7

    2.2.-Levelling of the ice maker ..... 7

    2.3.-Installation of modular equipments on top of bins ..... 8

    2.4.-Minimum distance to obstacles..... 8

    2.5.- Water supply connection ..... 9

    2.6.-Drain connection..... 9

        2.6.1 – DRAIN FORCED CONNECTION..... 10

    2.5.- Electrical connection..... 11

3. *PRIOR CHECKING AND START-UP*..... 12

    3.1.- Prior checking..... 12

    3.2.- Start-Up..... 12

4. *SEQUENCE OF OPERATION UNDERCOUNTER MODELS (NG)*..... 14

    4.1. Undercounter Control Board ..... 14

    4.2.- Alarms ..... 16

        4.2.1 Safety high pressure switch..... 17

        4.2.2 Long harvest ..... 17

        4.2.3 Ice production cycle timeout ..... 17

        4.2.4 Faulty temperature probe ..... 17

    4.3 PCB push button function ..... 17

    4.4 DRAIN FORCED ..... 18

        4.4.1 SEQUENCE OF OPERATION ..... 18

        4.4.2 CONTROL BOARD..... 20

5. *SEQUENCE OF OPERATION -MODULAR MODELS (MS)*..... 21

    5.1.- Initial Start-up ..... 21

    5.2.-MS Control Board ..... 23

    5.3.- Alarms ..... 24

    5.4.- Safety pressure ..... 24

    5.5.- Long harvest..... 25

    5.6.-Ice production cycle timeout ..... 25

5.7.-Short production cycle .....	25
5.8.-Water filling timeout .....	25
5.9.- Machine Stacking .....	26
6 Refrigeration diagram.....	27
7 MAINTENANCE AND CLEANING PROCEDURES.....	28
7.1.- Cleaning water distribution system for under counter models (NG).....	28
7.2.- Cleaning water distribution system for modular models (MS).....	31
7.3.- Cleaning the bins (for undercounter models) .....	35
7.4.- Cleaning the condenser.....	35
7.5.- External cleaning of the machine.....	36
7.6.- Water leakage checking .....	36
8 TECHNICAL SPECIFICATIONS .....	37
8.1.- Dimensions.....	38
8.2.- SPECIFICATION SHEETS .....	38
9 USER TROUBLESHOOTING GUIDE.....	39
9.1.- Undercounter models .....	39
9.2.- Modular models .....	40
10 WIRING DIAGRAMS.....	<b>¡Error! Marcador no definido.</b>
10.1.- undercounter models.....	<b>¡Error! Marcador no definido.</b>
10.2.- MODULAR ONE PHASE .....	<b>¡Error! Marcador no definido.</b>

## **1. INTRODUCTION**

You have purchased one of the most reliable ice-making products on the market today.

Carefully read the instructions contained in this manual since they provide important information relative to safety during installation, use, and maintenance.

### **1.1.- WARNING**

This appliance is intended to be used in household and similar applications such as staff kitchen areas in shops, offices and other working environments; farmhouses and by clients in hotels, motels and other residential type environments; bed and breakfast type environments; catering and similar non-retail applications.

The installation of this equipment should be done by the Service Department.

The socket should always be placed on an accessible location.

When positioning the appliance, ensure the supply cord is not trapped or damaged.

Do not locate multiple portable socket-outlets or portable power supplies at the rear of the appliance.

Always disconnect the power supply from the machine before any cleaning or maintenance service.

Any change needed on the electrical installation for the appropriate connection of the machine, should be exclusively performed by qualified and certified professional personnel only.

Any use by the ice maker not intended to produce ice, using potable water, is considered inappropriate.

It is extremely dangerous to modify or intend to modify this machine and will void warranty.

The appliance is not to be used 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.

Children being supervised not to play with the appliance.

Connect to potable water supply only. To see "Installation" chapter (5).

This machine is not intended to be used outdoors nor exposed to the rain.

The machine should be connected using the power cord supplied with the equipment.

It is mandatory to ground the equipment to avoid possible electric shock on individuals or damages to the equipment. The machine should be grounded pursuant local and/or national regulations. The manufacturer shall be held harmless in case of damages arising due to the lack of the ground installation. To see "Installation" chapter (7).

In order to assure the proper operation and efficiency of this equipment, it is extremely important to follow the recommendations of the manufacturer, especially those related to cleaning and maintenance operations, which should be performed by qualified personnel only.

**CAUTION:** The intervention of non-qualified personnel, besides of being dangerous, could result in serious malfunctioning. In case of damages, contact your distributor. We recommend always using original spare parts.

ICETECH reserves the right to make changes in specifications and design without prior notice.

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:

- Keep ventilation openings, in the appliance enclosure or in the built-in structure, clear of obstruction.
- Do not use mechanical devices or other means to accelerate the defrosting process, other than those recommended by the manufacturer.
- Do not damage the refrigerant circuit.
- 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 a flammable 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.
- To call to an authorized technical service.

Disposal of the ice maker: ICETECH encourages to follow the regulations of each country regarding eco-friendly disposal of electric and electronic devices such this one. User who is wanting to dispose of this equipment must contact the manufacturer and follow the method to appropriate differentiated collection for the subsequent treatments.

## 1.2.-RECEPTION OF THE MACHINE

Inspect the outside packing. In case of damages, make the corresponding claim to the carrier. To confirm the existence of damages, unpack the machine in the presence of the carrier and state any damage on the equipment on the reception document or freight document.

Always state the machine number and model. This number is printed on three locations:


(1) Packing: On the outside, it contains a label with the serial number.



(2) Exterior of the unit: On the back panel of the unit, there is a label with the same characteristics as the previous one.

(3) Nameplate: On the back of the machine.

ITV Ice Makers		S/N: 18425611	
ESB40632291		CD: 17090U	
SPIKA NG 100-A2H 220/50 R290			
Volt.	Ph.	Hz.	A.
220-240	~	50	3.75
Ref.		B.	clas.
R290		130	T
condensacion-condensation-kondensation		Made in Spain/EU	
AIRE-AIR-LUFT			

CE EAC 

Check that in interior of the machine the installation kit is complete and comprises:

- Ice scoop
- 3/4 inlet water hose
- 22 mm drain hose
- 1 filter
- User manual.
- Warranty and serial number.

**CAUTION:** All packing elements (plastic bags, carton boxes and wood pallets) should be kept outside the reach of children, as they are a source of potential hazard.

## 2. INSTALLATION

### 2.1.- PLACING OF THE ICE MAKER

This ice maker is not designed for outdoor operation. The icemaker should not be located next to ovens, grills or other high heat producing equipment.

The FDHD machines are designed to operate at room temperature between 10°C and 43°C . There may be some difficulties in ice slab removal under the minimum temperatures. Above the maximum temperature, the life of the compressor is shortened and the production is substantially lower.

The air cooled FDHD (undercounter) ice makers take the air through the front section, and drive it off through the back and also front louvers due to their new oblique condenser structure and placement . Do not place anything on the top of ice maker or facing the front grille. In case the front grille is either total or partially obstructed, or due to its placement it receives hot air from another device, we recommend, in case it is not possible to change the location, to install a water cooled machine.

The air cooled FDHD (modular) ice makers take the air through the back section and drive it off through the two lateral louvers. In the case it is not possible to respect the minimum distances recommended (see the picture in point 3.3) for these machines we recommend to install a water cooled unit.

The location must allow enough clearance for water, drain and electrical connections in the rear of the ice machine. It is important that the water inlet piping does not pass near sources of heat so as not to lose ice production.

### 2.2.-LEVELLING OF THE ICE MAKER

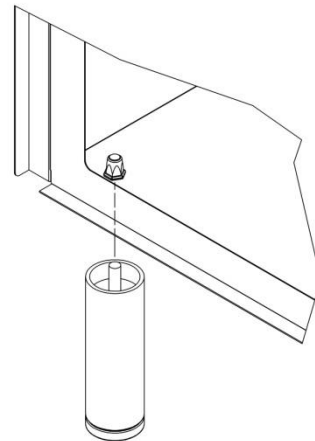
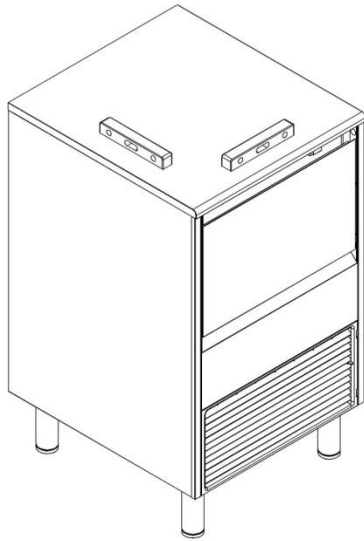
Use a level on top of ice machine in order to ensure the equipment is perfectly leveled.

Screw the leveling legs onto the bottom of the ice machine as far as possible.

Move the machine into its final position.

Use a level on top of the ice machine. Adjust each leg as necessary to level the ice machine from front to back and side to side.

**ATTENTION:** There is an optional 90mm high casters kit that can be used in substitution of the standard legs. These wheels are supplied with the corresponding installation instructions.



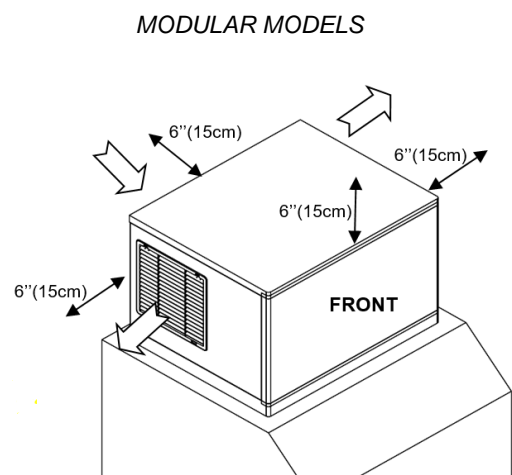
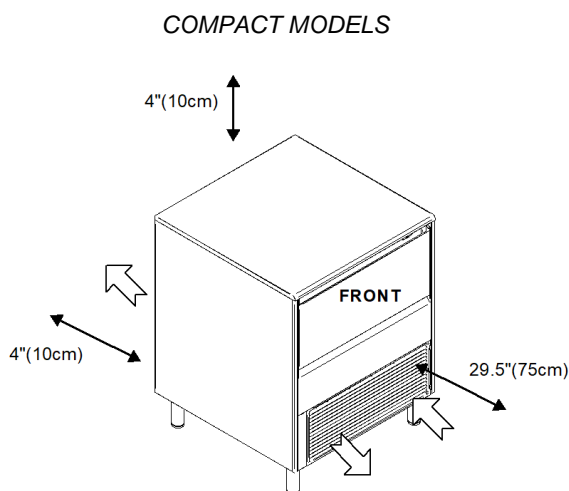
### 2.3.-INSTALLATION OF MODULAR EQUIPMENTS ON TOP OF BINS

Modular ice makers should be installed on top of bins, following the instructions contained in this manual.

The resistance and stability of the container-machine/s assembly should be verified as well as the fastening elements. Follow bin manufacturer instructions.

### 2.4.-MINIMUM DISTANCE TO OBSTACLES

Please see below the recommended minimum distances for proper operation and efficient service.

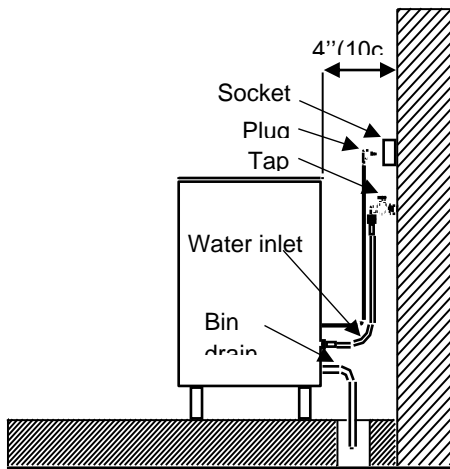


#### CONNECTION DIAGRAM:

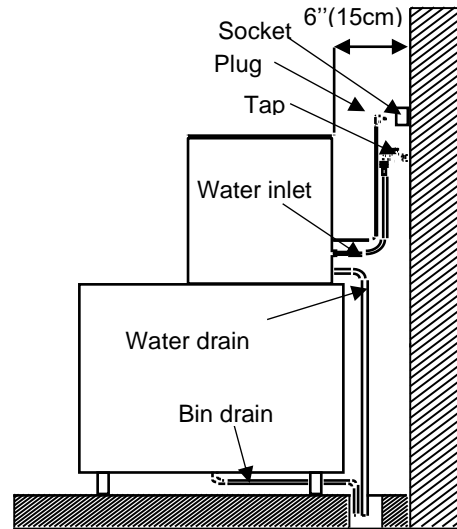
The location must allow enough clearance for water drain and electrical connections in the rear of the ice machine.



UNDERCOUNTER MODELS



MODULAR MODELS



## 2.5.- WATER SUPPLY CONNECTION

The quality of the water supplied to the ice machine will have an impact on the time between cleanings and ultimately on the life of the product (mainly in water cooled units). It also will have a remarkable influence on the appearance, hardness and flavor of the ice.

Local water conditions may require treatment of the water to inhibit scale formation, improve taste and clarity. If you are installing a water filter system, refer to the installation instructions supplied with the filter system.

Pressure should be between 0.1 and 0.6 MPa (1 - 6 bar). If pressure overpasses such values, install a pressure regulator.

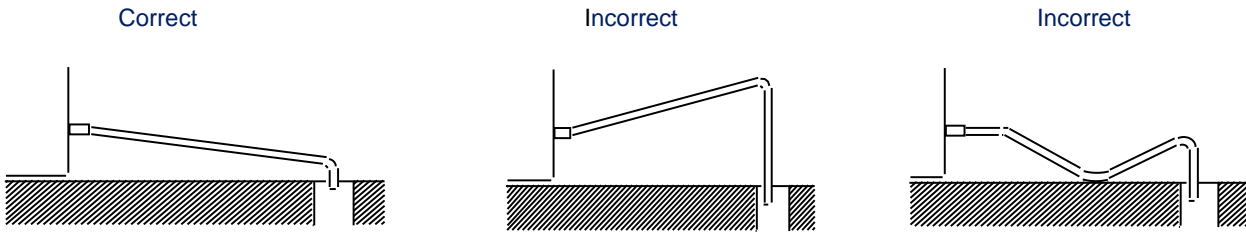
The water connection needs to be dedicated (only piece of equipment hooked to the water line). Water line from the water valve to the ice machine needs to be 1/4" nominal ID tubing.

**ATTENTION:** The machine shall be plumbed (with adequate backflow protection) according to applicable national and local regulations.

## 2.6.-DRAIN CONNECTION

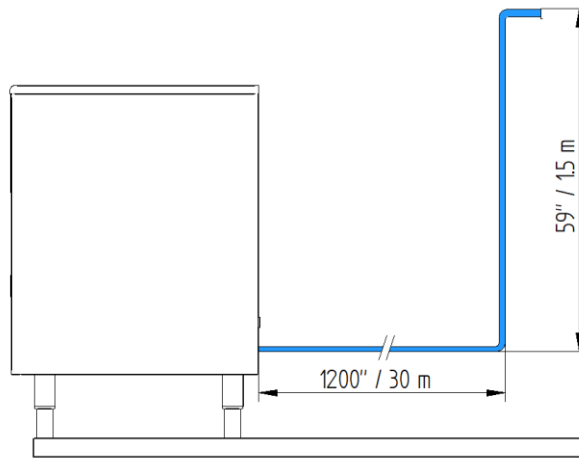
Drainage should be located lower to the machine level, at 150mm minimum.

It is convenient that the drain hose is 30mm inside diameter and with a minimum gradient of 3cm/metre, see figure.

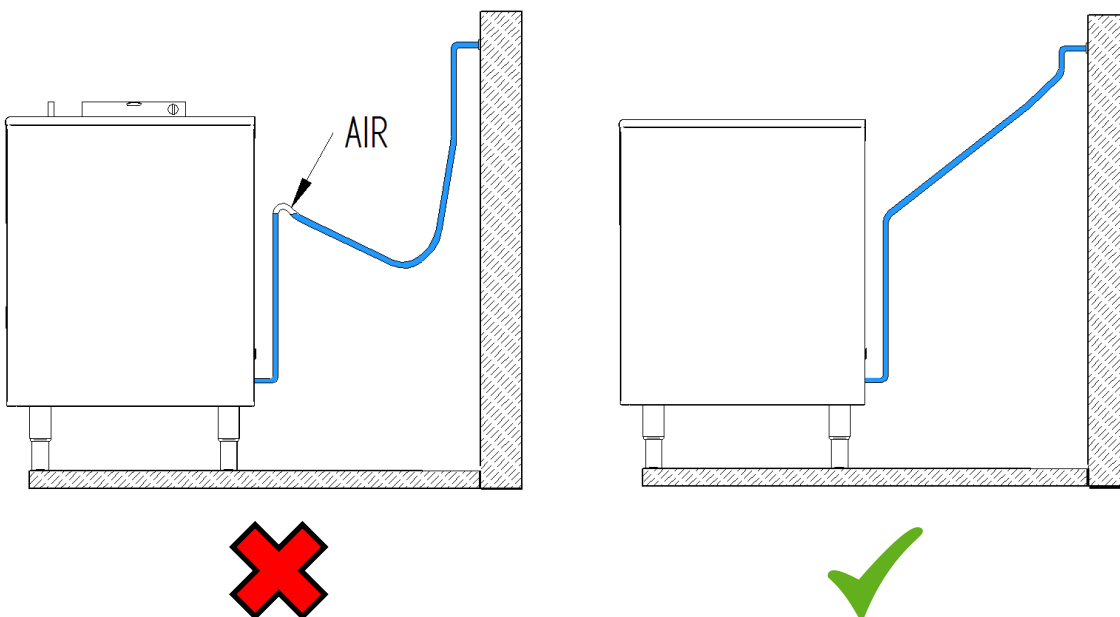


### 2.6.1 – DRAIN FORCED CONNECTION

This version of drain force allows an installation of the machine where the drain can be located 30 meters horizontally and 1.5 meters high from the machine's water outlet.



If the drain pipe runs incorrectly, the pump may not be able to drain the water, because the flow of the pump may be influenced due to the existence of stored air within the circuit.



## 2.5.- ELECTRICAL CONNECTION

It is mandatory to ground the equipment. To avoid possible electric shock on individuals or damages to the equipment, the machine should be grounded pursuant local and/or national regulations as the case may be.

The manufacturer shall be held harmless in case of damages arising due to the lack of the ground installation.

In case the supply cable is damaged, it should be replaced by a cable of special assembly to be furnished by the manufacturer or after-sales service. Such replacement should be performed by qualified technical service only.

The machine should be placed in such a way as to allow a minimum space between the back and the wall to allow an easy access and without risks to the cable plug.

Safeguard the socket. It is convenient to install adequate switches and fuses.

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

Voltage is indicated in the nameplate and on the technical specifications section of this manual. Variation on voltage above the 10% stated on the nameplate could result on damages or prevent the machine start-up.

### 3. PRIOR CHECKING AND START-UP

#### 3.1.- PRIOR CHECKING

- a) Is the machine leveled?
- b) Voltage and frequency are the same as those on the nameplate?
- c) Are the drains connected and operating?
- d) Will the ambient temperature and water temperature remain in the following range?

	ROOM	WATER
MAXIMUM	43°C	30°C
MINIMUM	10°C	10°C

- e) Is water pressure appropriate?

MINIMUM	0.1 MPa (1 bar)
MAXIMUM	0.6 MPa (6 bar)

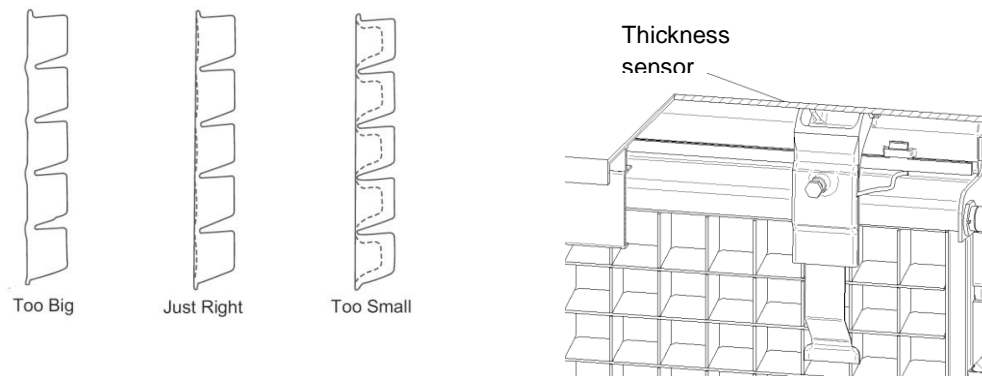
In case inlet water pressure is higher than 0.6 MPa (6 bar), install a pressure regulator.

#### 3.2.- START-UP

Once the installation instructions are followed (ventilation, site conditions, temperatures, water quality, etc.), proceed as follows:

- 1.- Open the water inlet. Verify the no existence of leakages.
- 2.- For under counter models open the door and remove the protection elements on the shield. For modular models remove the two locking screws on top of machine, take off the front panel and remove protection elements on the shield and also on the thickness sensor.
- 3.- Verify that the shield moves freely. For modular models verify also the thickness sensor moves freely. And the water tray is in place

- 4.- Connect the machine to the power supply.
- 5.- For under counter models: push the switch on the machine front side. For modular models: push the switch found on the back of the machine and then set the ice-wash switch to the position ice.
- 6.- Verify that there are no vibrations or frictions on the elements.
- 7.- Verify that the water fall to the evaporator is occurring uniformly and all ice cubes are properly watered.
- 8.- Close door (for under counter models) / Replace the front panel in its place (for modular models).
- 9.- For modular models: Verify the ice slab with the pictures below. In case the thickness sensor needs to be regulated, rotate the thickness adjustment screw CW to increase bridge thickness. Rotate CCW to decrease bridge thickness. For under counter models adjust the cycle time dip switches (see point 4.1).



Damages due to the lack of maintenance and cleaning operations are not included on the warranty.

## 4. SEQUENCE OF OPERATION UNDERCOUNTER MODELS (NG)

Once you connect the machine there is a time delay of 2 minutes during which the water valve is activated to ensure the water tray is filled.

Once the time is up, the compressor starts and the pump which recirculates the water from the water tray to the upper distributor which provides a soft and uniform flow of water over the evaporator cells, in which the water starts freezing.

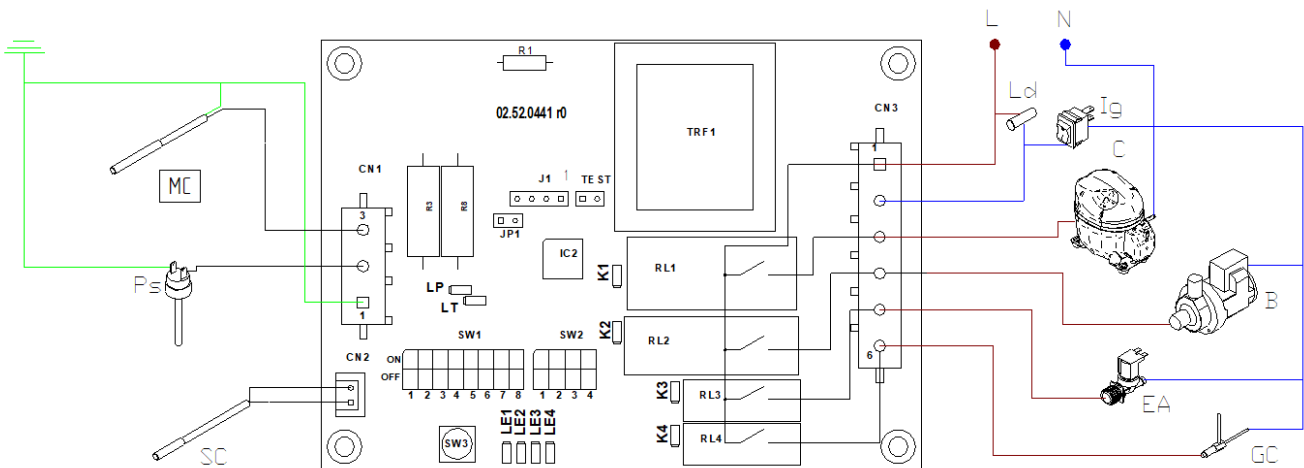
When the temperature probe at the end of the evaporator reaches an adjusted value  $T_c$  ( $-2/-4^{\circ}\text{C}$ ), the fabrication continues the fixed time with the combination of dip-switches 1-4 (see table). This way we can ensure the filling of the evaporator is correct in different working conditions.

Once the fabrication is over the harvest phase starts. The pump stops, the hot gas valve open and the water inlet valve open only during the time fixed in the dip-switches 5-7. Water is sprayed over the back of the evaporator helping unstick the slab and precooling it for the next cycle. This heat recover enhances the machine's energetic efficiency.

Once the ice slab falls into the bin, the evaporator curtain opens and closes. A magnet placed on the side of this curtain activates the sensor and ends the harvest cycle, advancing to the fabrication cycle.

Once the ice bin is full, the slab does not go out completely, and this prevents the curtain from closing. If it remains open more than 60 seconds the machine goes into full bin state. All the components shut down until the ice is retired, the curtain closes, and a new cycle starts.

### 4.1. UNDERCOUNTER CONTROL BOARD



PCB connections	
Outputs	
C	compressor
B	Water pump
EA	Water inlet valve
GC	Hot gas valve.
Inputs	
SC	Evaporator temperature NTC probe
P	Safety pressure switch
MC	Curtain switch
N	PCB push button

### LED signalling

Next to each out relay there is an orange led. Signals relay on

Next to each input terminal there is an orange led marking input active.

There are four additional red leds that signal machine status (continuous) or alarm (flashing)

Status signaling . Continuous led				
	LE1	LE2	LE3	LE4
Start up delay	X			
Ice cycle $T > T_c$	X	X		
Ice cycle $T < T_c$		X		
Harvest			X	
Full bin				X
Alarm signaling . Flashing led				
	LE1	LE2	LE3	LE4
Safety pressure switch	X			
Ice cycle timeout		X		
Harvest cycle timeout			X	
Faulty temperature probe				X

### Dip switches setting

dip	Descripción (* factory setting) comprobar
1-4	tf - ice production timer. See table
5-7	tw - Water input timer. See table.
8	Tc - Evaporator temperature for timer start. ON=-2°C / OFF=-4°C
9	Not used

10	<p>Safety high pressure switch trip function.</p> <p>ON= automatic reset (minimum stop 30 min.)</p> <p>OFF= manual reset (power OFF-ON)</p>
11	<p>Timeout alarms operation</p> <p>ON = activated</p> <p>OFF = unactivated</p>
12	<p>Software selection.</p> <p><b>Important: Always OFF for FDHD models</b></p>

ICE / WATER TIMER SETTING								
SW1				TF (MIN)	SW1			TW (SEG)
1	2	3	4		5	6	7	
OFF	OFF	OFF	OFF	4	OFF	OFF	OFF	30
ON	OFF	OFF	OFF	6	ON	OFF	OFF	40
OFF	ON	OFF	OFF	8	OFF	ON	OFF	50
ON	ON	OFF	OFF	10	ON	ON	OFF	60
OFF	OFF	ON	OFF	12	OFF	OFF	ON	70
ON	OFF	ON	OFF	14	ON	OFF	ON	80
OFF	ON	ON	OFF	16	OFF	ON	ON	90
ON	ON	ON	OFF	18	ON	ON	ON	100
OFF	OFF	OFF	ON	20				
ON	OFF	OFF	ON	22				
OFF	ON	OFF	ON	24				
ON	ON	OFF	ON	26				
OFF	OFF	ON	ON	28				
ON	OFF	ON	ON	30				
OFF	ON	ON	ON	32				
ON	ON	ON	ON	34				

### 4.2.- ALARMS

They detect operational malfunctions. They are indicated with the flashing status Leds LE1-4.

During some alarms a second operation retry attempt is carried out and if repeated again, the machine will stop. Signaling should be indicated since the first failure occurs. If the second retry attempt is ok, the signaling will switch off.

In case that a machine stop has been caused by alarm, the reset is done by switching OFF and ON the main switch. If the dip-switch 11 OFF, time alarms are not to be followed.



#### 4.2.1 SAFETY HIGH PRESSURE SWITCH

When the pressure contact (P) trips, instantly, all outputs switch over to off position.  
When it is closed again, there are two possibilities:

- Dip-switch 10 OFF. Manual reset. The machine remains stopped until reset to Initial start-up.
  - Dip-switch 10 ON. Automatic reset. The machine check pressure switch status every 30 min. When closed, the machine will continue at the position where it was.
- \* Signalling: Flashing LE1.

#### 4.2.2 LONG HARVEST

If the harvest time is longer than 4 min. without activation of the curtain micro contact (MC), the harvest is interrupted, switching over to the production cycle. If the same happens again at the next harvest, the machine will stop.

- \* Signalling: Flashing in LE3.

#### 4.2.3 ICE PRODUCTION CYCLE TIMEOUT

If during the production cycle, evaporator temperature probe has not reached the set temperature Tc in more than 60 min, the machine will stop until reset.

- \* Signalling: Flashing in LE2.

#### 4.2.4 FAULTY TEMPERATURE PROBE

If PCB detects that evaporator temperature probe is broken or unconnected, the machine will stop

- \* Signalling: Flashing in LE4.

Probe type is NTC and resistance value must be 10kΩ at 25°C.

### 4.3 PCB PUSH BUTTON FUNCTION

Function depends on the unit status:

- Start up timer: Finish initial delay y passes to ice production stage
- Ice production. Switches to harvest
- Harvest. Switches to Ice production

#### Wash cycle activation.

Keep pressed the button while switching on main front switch. Wash cycle is activated and only the water recirculation pump is running. There is a maximum time for this cycle of 30 min. After this time, pump stops.

Wash cycle is finished by switching off main power.

Read cleaning and sanitizing instructions for proper usage of this function.

## 4.4 DRAIN FORCED

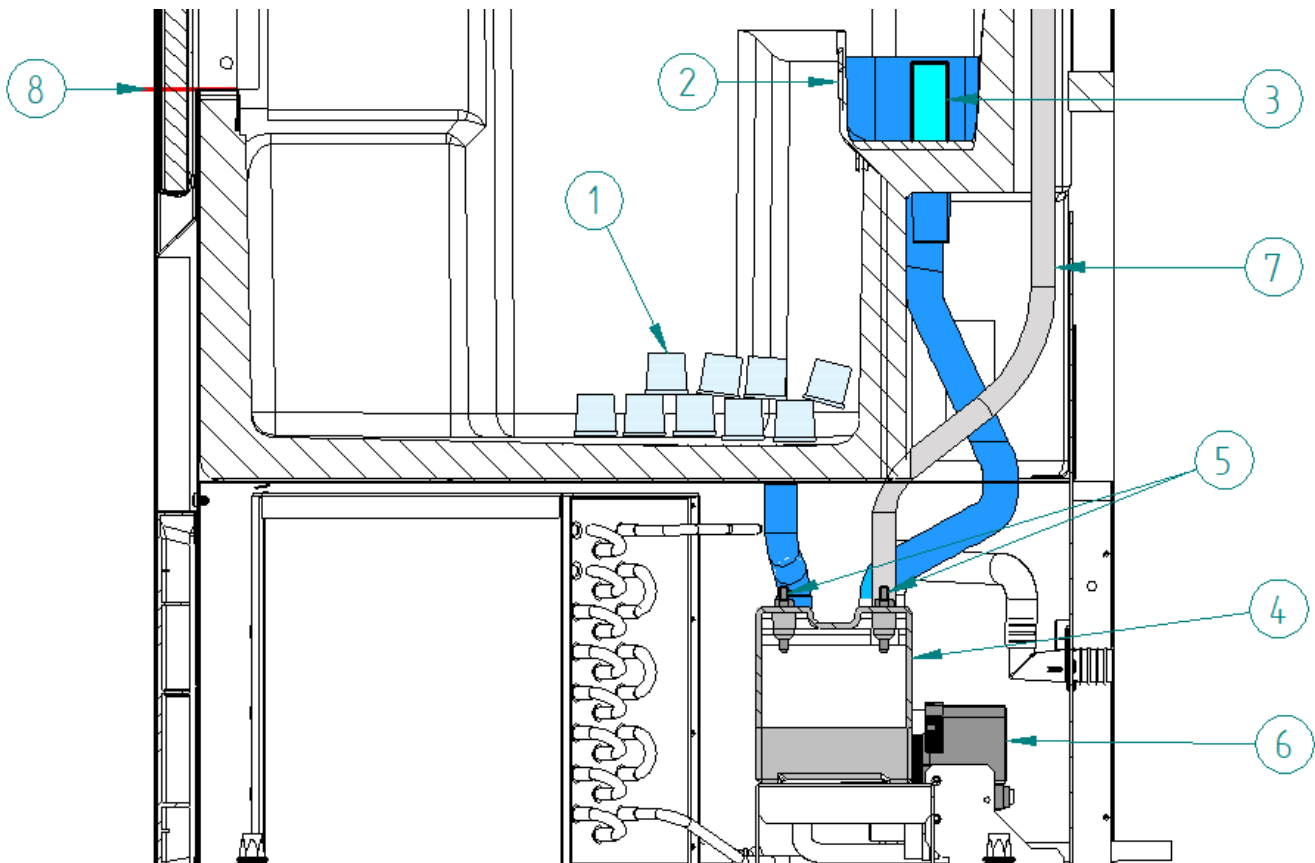
### 4.4.1 SEQUENCE OF OPERATION

While the machine is turn on, there is water that need to be evacuated between each cycle. There are 2 possible outlet water, one is if the ice in the storage bin melts (#1) and the other is when the production time ends, the water electro valve opens and fills the water tray(#2) to renovate the water. The excess of water goes out by the overflow (#3) to the drain force water reservoir (#4).

When the water reservoir is full of water covering the 2 electrodes (#5), the pump (#6) turns on and evacuates water for 5 seconds. After 5 seconds, the pump turns off if the electrodes are not covered by the water, otherwise, the pump will start again for 5 seconds.

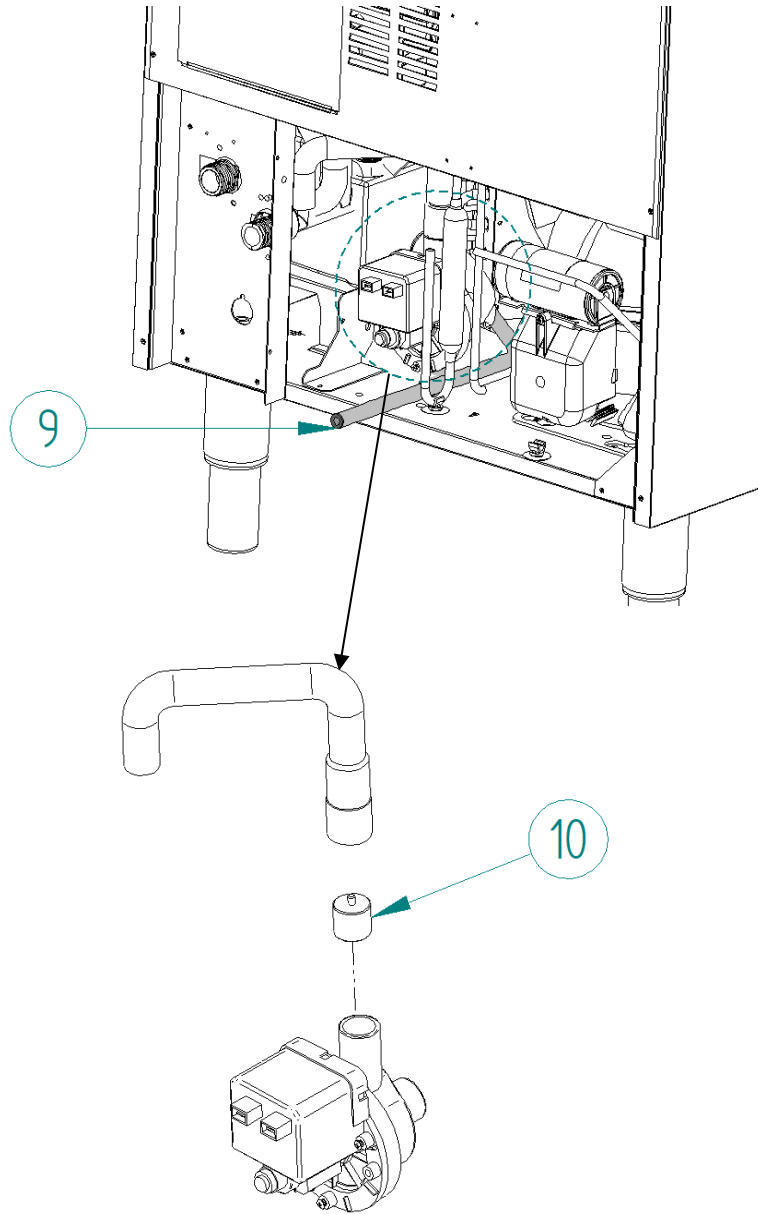
In case that the system does not work for any issue, the water will flood the ice bin. There is a ventilation tube (#7) that allows the system to remove any air that may remain in the water reservoir. The Vent tube must be always over the mouth of the front door (#8).

In case that the pump works for 5 minutes continuously, it will stop for 5 seconds automatically in order to refrigerate.

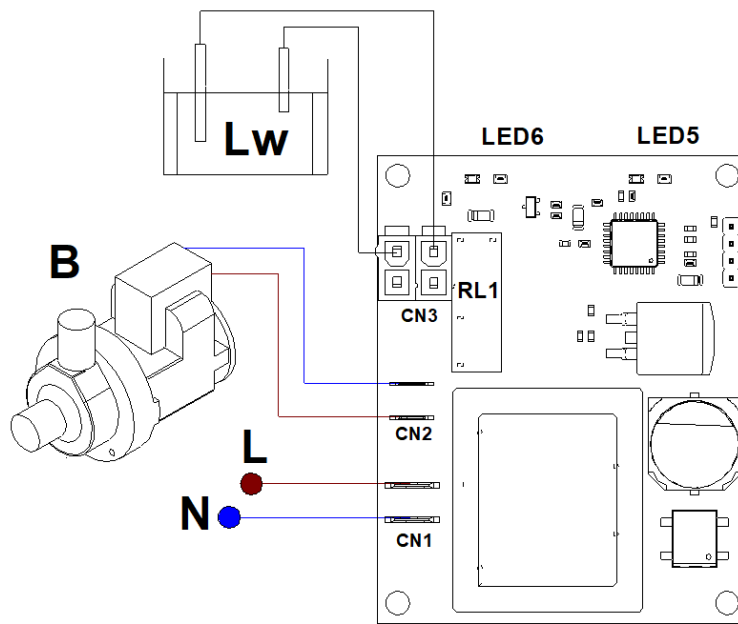


The system has a way to evacuate the water inside the water reservoir in a manual way. There is a plug (#9) in one of the plastic tube, by retiring this plug, it is possible to evacuate all the water.

Also, the system has a Check valve(#10) that does not allow the water to came back to the water reservoir.



**4.4.2 CONTROL BOARD**



PCB connections	
<b>Outputs</b>	
<b>B</b>	Water pump
<b>Inputs</b>	
<b>Lw</b>	Water Level Sensor

**LED signalling**

There are two LEDs that signals machine status

Status signaling. Continuous led		
	LED5	LED6
<b>PUMP RUNNING</b>	X	
<b>WATER LEVEL SENSOR ON</b>		X

## 5. SEQUENCE OF OPERATION -MODULAR MODELS (MS)

**Initial Start-up:** The pump and the drain electro valve are energized during 30 seconds to empty the water tray preventing the scale build-up in water. Then the pump and the drain electro valve are de-energized, and the water inlet valve is energized filling the water tray until the water level sensor detects the water reaches the appropriate level. Then the freeze sequence starts.

**Freeze sequence:** The compressor is energized and the water pump is energized after 30 seconds. The water inlet valve is also energized at the same time that the water pump to replenish water level and then de-energized. The compressor and water pump will continue energized until the thickness sensor detects the thickness of the ice slab is the appropriate. Then the harvest sequence starts.

**Harvest sequence:** The compressor will continue energized. The hot gas valve is energized throughout the harvest phase to divert hot refrigerant gas into the evaporator. The water pump and the drain electrovalve are energized during 45 seconds to empty the water tray and remove mineral deposits. After this (water pump and drain electrovalve de-energized) the water inlet valve is energized filling the water tray until the water level sensor detects water reaches the level. The ice slab slides off the evaporator and into the bin. The momentary opening and re-closing of the shield indicates the harvest sequence has finished and goes to the freeze sequence. If curtain remains opened for more than 30" the machine switch to the status of full bin stand-by

### 5.1.- INITIAL START-UP

It is carried out at machine work start in following cases (being all outputs switched off):

- when machine is connected to power supply.
- when the switch is turned to the ICE position
- after a stop due to full storage

During start-up time  $t_4$  the pump (B) and the drain valve (EP) are activated. Subsequently, B and EP are closed and the water inlet valve (EW) is opened until the level sensor (NW) indicates that the storage reservoir is filled with water. At this point, the production phase starts.

**Please note:** If at this stage the curtain (MC) is open, the indicated machine status is switched to full storage (full).

## Production

Following outputs are activated:

- Compressor (C).
- Pump (B). It is activated with delay time t11.
- Water inlet valve (EW). It is kept active during time t8, beginning with the start of B.

This phase is maintained until the thickness detection sensor gives a signal (which is maintained during time t2). At this stage, the harvest phase starts.

**Please note:** during this time the opening of the curtain (MC) has no consequences.

## Harvest

Outputs:

- Compressor (C). It is still in operation.
- Hot gas valve (GC). It is active during the whole operation launching time.
- Pump (B) and drain water valve (EP) are active during time t6
- Water inlet valve (EW) is activated when time t6 is over (when the pump is stopped)

The harvest ends when the ice sheet falls down and the curtain micro contact (MC) is activated.

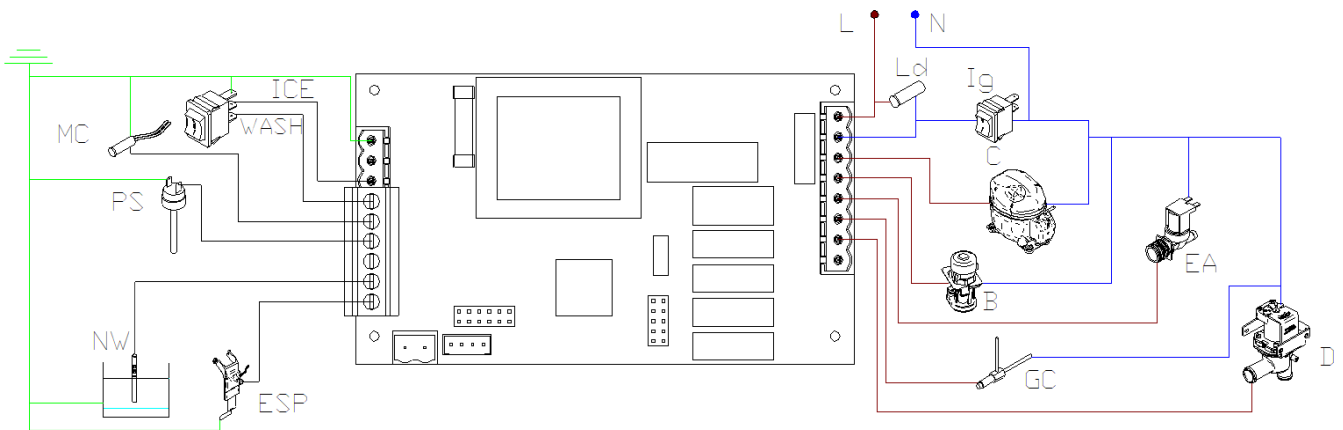
Two possibilities:

- 1) MC is active during a time less than t3 □ when the MC signal stops, the production phase will start.
- 2) MC is active during a time more than t3 □ machine will be stopped due to full storage (all outputs are switched off / LED LE3 continuously switched on). When the curtain (MC) is closed again, the initial start-up phase will be re-initiated.

time	description	time
t1	Continuous signal time for water level	5"
t2	Continuous signal time for ice thickness	10"
t3	Open curtain time to activate full storage indication	30"
t4	Start-up timing time	30"
t5	Harvest maximum time	180"
t6	Draining time during operation launching	20"
t7	Production minimum time	120"
t8	Water inlet valve e/w time during production	30"

t9	Water inlet valve e/w timeout	180"
t10	Production maximum timeout	3600"
t11	Pump start-up delay time	30"
t12	Draining time at cleaning cycle	60"
t13	Retry time due to water inlet valve e/w timeout	3600"
t14	Upper unit change	60"
t15	Maximum time to reset due to security pressure switch	600"

### 5.2.-MS CONTROL BOARD



PCB connections	
<b>Outputs</b>	
C	compressor
B	Water pump
EW	Water inlet valve
GC	Hot gas valve.
EP	Drain valve
SL	Free
<b>Inputs</b>	
ICE	Ice position switch
WASH	Wash position switch
P	Safety pressure switch / NC contact
MC	Curtain micro relay contact NC
EL	Free
ESP	Thickness detection sensor
NW	Water level in reservoir
CO1	Connector for staking machines

### LED signalling

By each out relay there is a red led. Signals relay on

By each input terminal there is a green leed marking input active.

There are four additional leds what signals machine status (continuous) or alarm (flashing)

LED	continuous	flashing
0	Stand by	Long harvest timeout
1	Ice	Long ice cycle timeout
2	Wash	Short ice cycle timeout
3	Fill bin	Water filling timeout
0-1-2-3	--	Safety pressure switch

Dip switch setting	
J1	Safety pressuure switch reset
	On - automatic
	Off - manual
J2	Timeout alarms function
	On - actives
	Off - unactives
J4	Timeout water filling
	On - 1h automatic reset
	Off - manual reset
J5	Stacked machines configuration
	On - Master unit (lower)
	Off - Slave unit (upper)

### 5.3.- ALARMS

They detect operational malfunctions. They are indicated with the flashing status LEDs LE1-4. During some alarms a second operation retry attempt is carried out and if repeated again, the machine will stop. Signalling should be indicated since the first failure occurs. If the second retry attempt is ok, the signalling must be switched off.

In case that a machine stop has been caused by alarm, the resetting is done by disconnecting or by switching over to position 0. If the dip-switch 2 ON, time alarms are not to be followed.

### 5.4.- SAFETY PRESSURE

When the pressure contact (P) is open, instantly, all outputs switch over to off position. When it is closed again, there are two possibilities:



- Dip-switch 1 OFF. Manual reset. The machine remains stopped until reset → Initial start-up.
- Dip-switch 1 ON. Automatic reset. The machine will continue at the position where it was.
- \* Signalling: Flashing in the four LEDs.

### **5.5.- LONG HARVEST**

If the harvest time is longer than 3 min. without activation of the curtain micro contact (MC), the harvest is interrupted, switching over to the production cycle. If the same thing happens again at the next harvest, the machine will stop.

- \* Signalling: Flashing in LE0.

### **5.6.-ICE PRODUCTION CYCLE TIMEOUT**

If the production cycle time is more than 60 min without receiving any thickness detector signal (ESP) the machine will stop.

- \* Signalling: Flashing in LE1.

### **5.7.-SHORT PRODUCTION CYCLE**

If during two consecutive cycles the production cycle time is less than 2 min, the machine will stop.

- \* Signalling: Flashing in LE2.

### **5.8.-WATER FILLING TIMEOUT**

Occurs when the water valve (EW) is activated to refill the water tray but the level sensor (NW) has no signal for 3 min.

Two possibilities:

- Dip-switch 4 OFF → Machine stops and, after 1 hour, the startup is re-initiated
  - \* Signalling: Flashing in LE3
- Dip-switch 4 ON → Only the water inlet valve remains ON till lever sensor detects water. Then the machine continues operation in the same stage where was stopped. This option could be usefull in places with a very low water pressure supply.
  - \* Signalling: Alternative flashing LE1+LE2

## 5.9.- MACHINE STACKING

It is possible to install two modular machines stacked one above the other with the ICETECH stacking kit (part number 6586).

The switchboard must have a connector permitting to connect the boards of both machines with a single cable and also a jumper with the indication:

- Closed jumper → upper machine
- Open jumper → lower machine

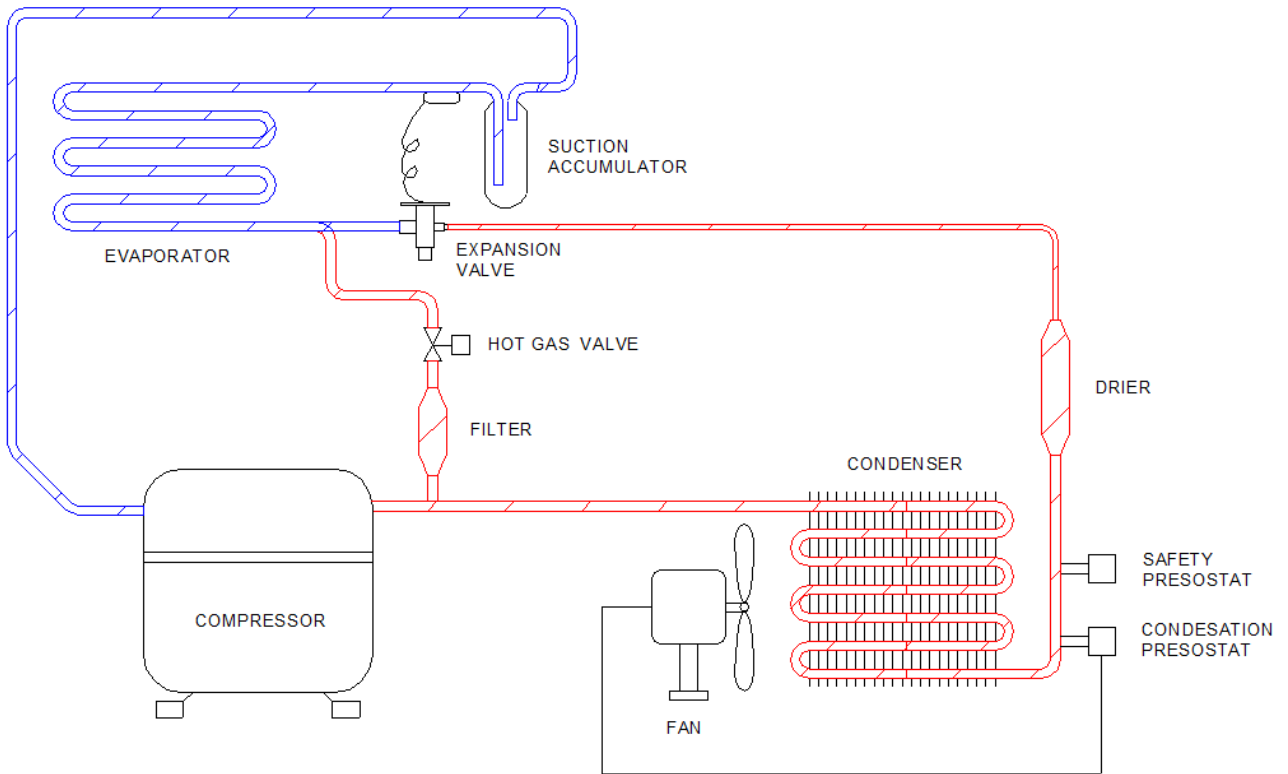
The lower machine works in the same way as if operating alone.

The upper machine operates normally except when the lower machine is stopped due to full storage (full), at this moment, the upper machine will also stop and pass over to the same status (full).

When the curtain of the lower machine is closed again, it re-initiates the start-up sequence, likewise the upper machine, but with a 1' delay.

Full instructions for stacking are supplied with the kit

## 6 Refrigeration diagram



## 7 MAINTENANCE AND CLEANING PROCEDURES

It is the User's responsibility to keep the ice machine and ice storage bin in a sanitary condition. Ice machines also require occasional cleaning of their water systems with a specifically designed chemical. This chemical dissolves mineral build up that forms during the ice making process. Sanitize the ice storage bin as frequently as local health codes require, and every time the ice machine is cleaned and sanitized.

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

**CAUTION:** Do not mix Ice Machine Cleaner and Sanitizer solutions together.

**WARNING:** Wear rubber gloves and safety goggles when handling Ice Machine Cleaner or Sanitizer.

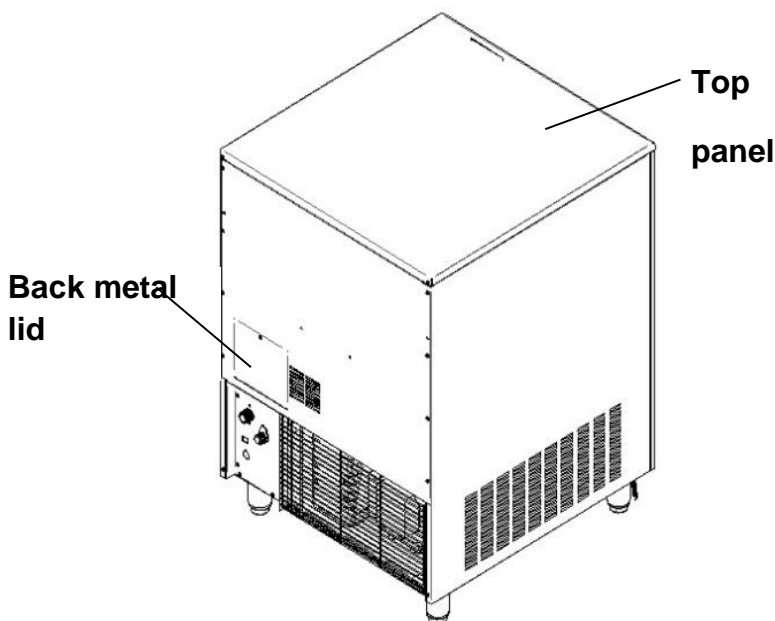
**WARNING:** Unit should always be disconnected during maintenance/cleaning procedures.

### 7.1.- CLEANING WATER DISTRIBUTION SYSTEM FOR UNDER COUNTER MODELS (NG)

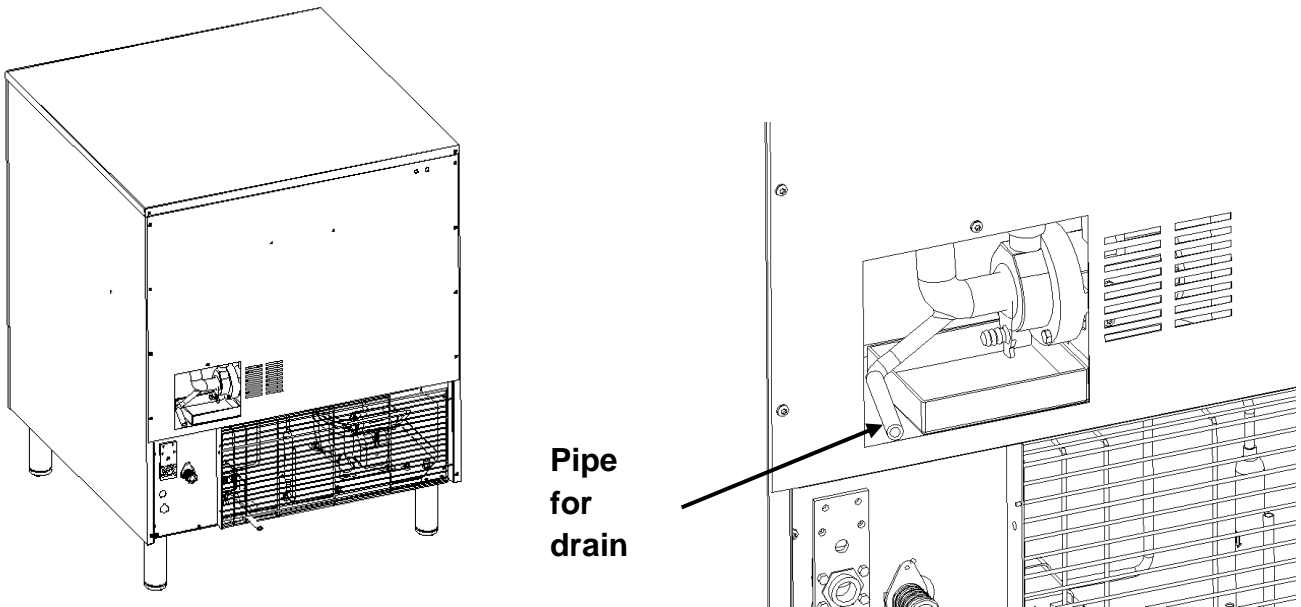
- a) Set the switch to the OFF position after ice falls from the evaporator at the end of a harvest cycle, or set the switch to the OFF position and allow the ice to melt off the evaporator.

**CAUTION:** Never use anything to force ice from the evaporator.

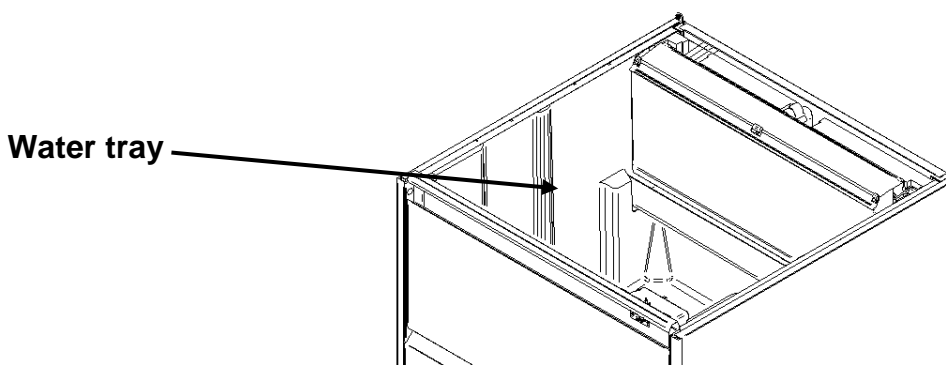
- b) Remove all ice from the bin.



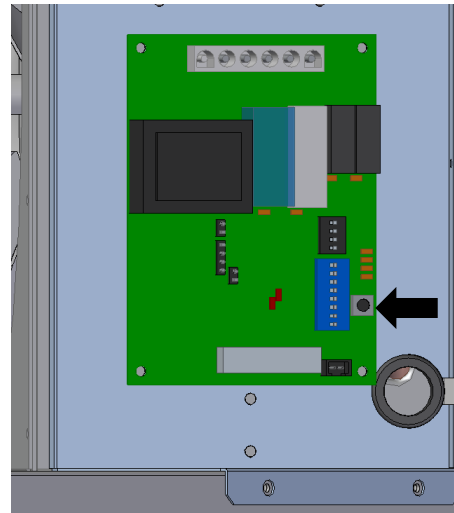
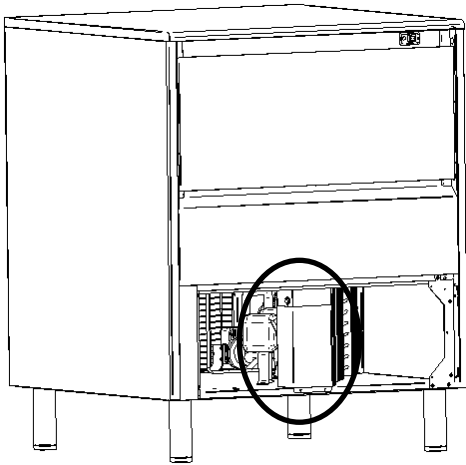
- c) Remove the back metal lid and the top panel (if it need be to make easier the cleaning operations).
- d) Remove the auxiliary pipe for drain operations near the pump and empty the water tray. Return it to their original position to avoid water spill.



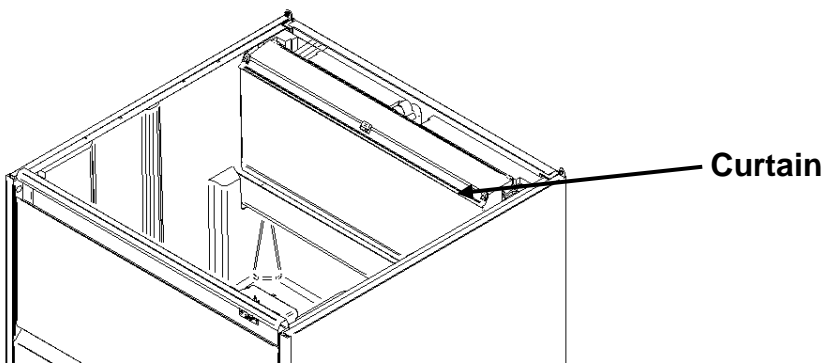
- e) Prepare a solution of an appropriate product for the cleaning of ice machines (lime). Do not use hydrochloric acid. We recommend the use of any NSF approved scale removal product prepared according to the manufacturer's instructions.
- f) Fill water tray with the solution



- g) Disconnect power. Turn on the machine pushing SW3 (see picture). Let solution stand for 30-40 minutes and then switch off the machine. Disconnect power



- h) Disconnect power.
- i) Remove the auxiliary pipe to drain and purge out the ice machine scale remover and residue. Replace it.
- j) Mix enough cleaning solution (as in point e) to clean parts and interior food zone surfaces.
- k) Remove curtain.



- l) Clean all surfaces of the shield with the cleaner solution using a brush (not a wire brush) or cloth. Rinse all areas with water.
- m) Clean all the interior surfaces of the freezing compartment (including storage bin) with the cleaner solution using a brush or cloth. Rinse all areas with water.
- n) Mix a solution of sanitizer using approved (EPA/FDA) sodium hypochlorite food equipment sanitizer to form a solution with 100 - 200 ppm free chlorine yield. Below an example to calculate the proper quantity of sanitizer to add to the water, for a household bleach 12,5%:

$$\text{bleach to add} \Rightarrow \frac{15}{\%dis} = \frac{15}{12.5} = 1.2 \text{ gr/L} \rightarrow *0.133 = 0.16 \text{ oz/gal}$$

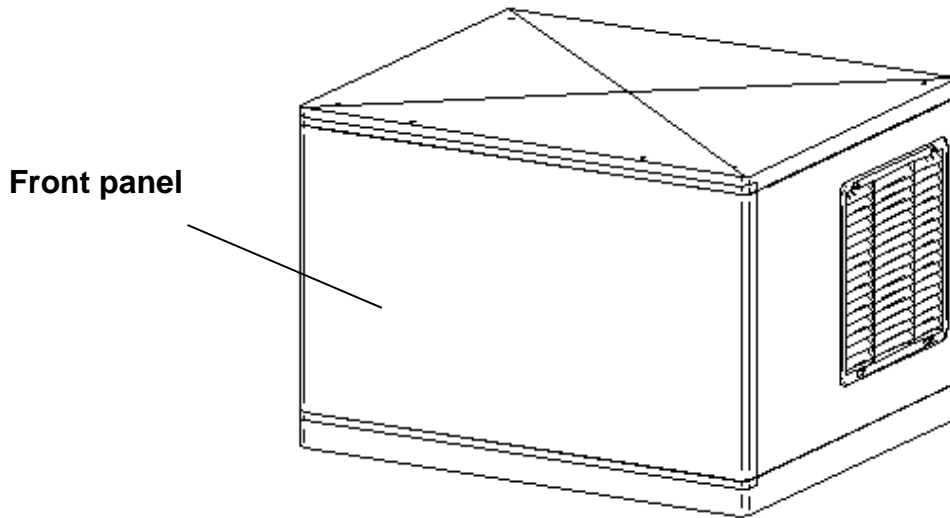
- o) Sanitize all surfaces of the shield applying liberally the sanitizer solution using a cloth or sponge.
- p) Sanitize all the interior surfaces of the freezing compartment (including the storage bin) applying liberally sanitizer solution, using a cloth or sponge.
- q) Return shield to its position.
- r) Connect power and water supplies.
- s) Fill water reservoir with the sanitizer solution.
- t) Switch on machine in order to run water pump. Let solution stand for 20 minutes and switch off.
- u) Remove the auxiliary pipe to drain and purge out the sanitizer solution and residue. Replace it. Fill the water reservoir with water and switch on the machine to allow water to circulate for 5 minutes and then stop the machine. Repeat this operation two more times to rinse thoroughly.
- v) Remove the auxiliary hose to drain the water. Replace it and fill the tray with water to ensure the pump works properly.
- w) Switch on compressor switch (I position)
- x) Return the back metal lid and the top panel to their position.
- y) Switch on machine and discard the first two harvests.

## 7.2.- CLEANING WATER DISTRIBUTION SYSTEM FOR MODULAR MODELS (MS)

**WARNING:** Wear rubber gloves and safety goggles when handling Ice Machine Cleaner or Sanitizer.

- 1) Remove the front panel.
- 2) Set Ice-wash switch to the OFF position (position 0) after ice falls from the evaporator at the end of a harvest cycle, or set the ice-wash switch to the OFF position and allow the ice to melt off the evaporator.

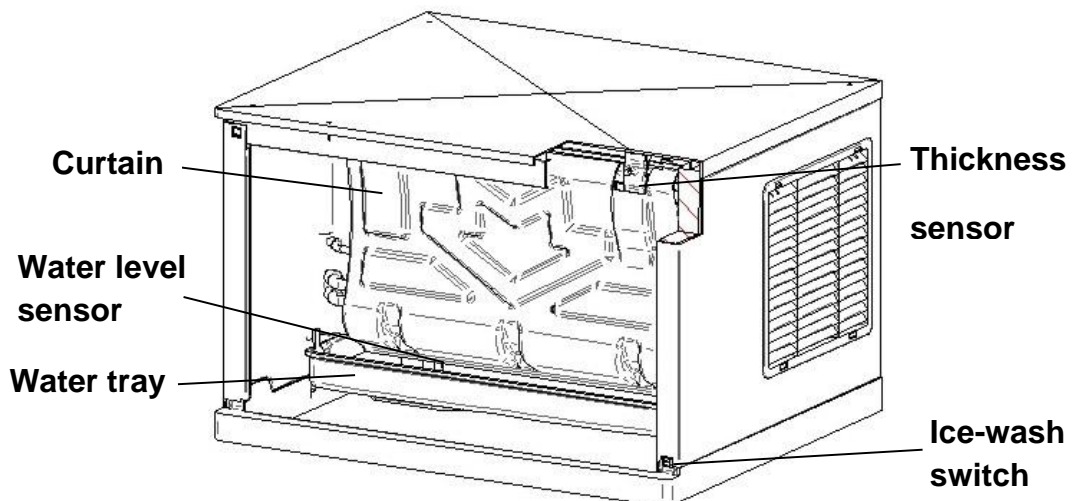
**CAUTION:** Never use anything to force ice from the evaporator. Damage may result.



- 3) Prepare a solution of an appropriate product for the cleaning of ice machines (lime). Do not use hydrochloric acid. We recommend the use of any NSF approved scale removal product. In modular machines the water bucket is filled automatically so we recommend to prepare a previous solution

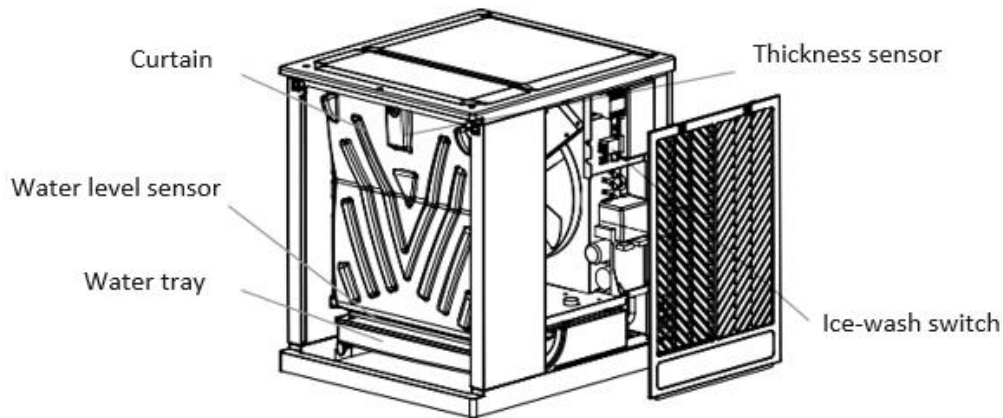
To start a cleaning cycle, move the ice-wash switch to the WASH position (position II). The machine will drain the reservoir and refill it. Pour the scale remover solution into the reservoir.

**MS 220**

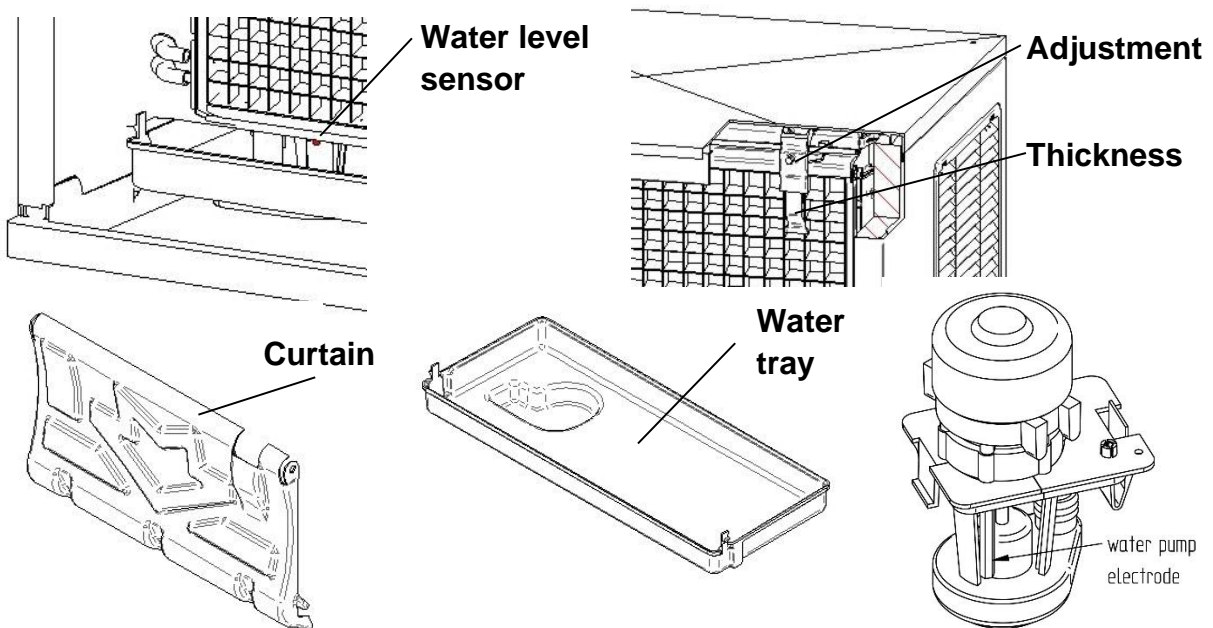




**MS 400- 22**



- 4) Allow the solution to circulate in the water system for 30-40 minutes and then set the ice-wash switch to the OFF position.
- 5) To purge out the ice machine scale remover and residue move the ice-wash switch to the WASH (the machine will drain the reservoir and refill it) and then set the ice-wash switch to the OFF position.
- 6) Disconnect power and close water supplies.
- 7) Mix a cleaning solution.
- 8) Remove water pump, curtain and water tray.
- 9) Clean the metal surfaces of the thickness sensor, water level sensor, the adjustment screw, water pump electrode, the curtain and the water tray with the cleaner solution using a brush (not a wire brush) or cloth.



- 10) Clean the interior surfaces of the freezing compartment (including walls, plastic parts of the evaporator, distributor...) and the front panel with the cleaner solution using a brush or cloth.
- 11) Mix a solution of sanitizer using approved sodium hypochlorite food equipment sanitizer to form a solution with 100 to 200 ppm free chlorine yield. Below an example to calculate the proper quantity of sanitizer to add to the water, for household bleach 12,5%:

$$\text{bleach to add} \Rightarrow \frac{15}{\%dis} = \frac{15}{12.5} = 1.2 \text{ gr/L} \rightarrow *0.133 = 0.16 \text{ oz/gal}$$

- 12) Sanitize all surfaces of the ice thickness sensor, water level sensor, water pump electrode, curtain and water tray applying liberally the sanitizer solution using a cloth or sponge.
- 13) Sanitize the interior surfaces of the freezing compartment (including walls, plastic parts of the evaporator, distributor...) and the front panel applying liberally the sanitizer solution using a cloth or sponge.
- 14) Return water pump, the water tray and curtain to their normal positions.
- 15) Connect power and water supplies.
- 16) To start a sanitation cleaning cycle, move the ice-wash switch to the WASH position. The machine will drain the reservoir and refill it. Pour the sanitizer into the water reservoir to get a solution as in the point 10.
- 17) Allow the solution to circulate in the water system for 20 minutes and then set the ice-wash switch to the OFF position.
- 18) To purge out the sanitizer solution and residue move the ice-wash switch to the WASH position (drain and refill) and allow the water to circulate for 5 minutes and then move the switch to the OFF position (drain). Repeat this operation two more times to rinse thoroughly.
- 19) Return the front panel to their position.
- 20) Set the ice-wash switch to the ON position (position I) and discard the first two harvests.

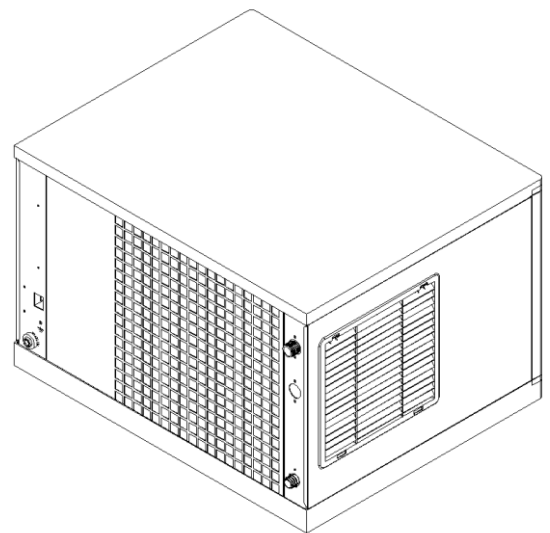
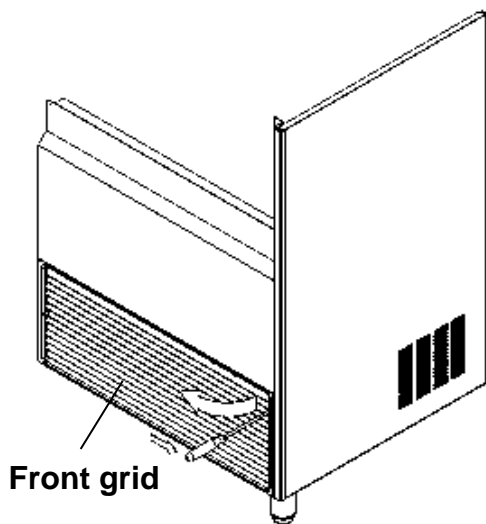
### 7.3.- CLEANING THE BINS (FOR UNDERCOUNTER MODELS)

- 1) Disconnect the machine, close water faucet and empty storage bin of ice
- 2) Use the cleaner/water solution to clean all surfaces of the bin. Use a nylon brush or cloth. Then rinse all areas thoroughly with clean water.
- 3) Use the sanitizer/water solution to sanitize all surfaces of the bin. Use a nylon brush or cloth.
- 4) Rinse with plenty of water, dry, run the machine and open water faucet.

### 7.4.- CLEANING THE CONDENSER

#### AIR CONDENSER

- 1) Disconnect machine and close water faucet.
- 2) For undercounter models remove the front grid by pressing the two clips placed at right side (see figure).  
For modular models remove the back panel (see figure).



- 3) Clean condenser using a vacuum cleaner, soft brush or low pressure air. Clean from top to bottom, not side to side. Be careful not to bend the condenser fins.

## WATER CONDENSER

The water condenser may require cleaning due to scale build-up. The cleaning procedures require special pumps and cleaning solutions. They must be performed by qualified maintenance or service personnel.

### **7.5.- EXTERNAL CLEANING OF THE MACHINE**

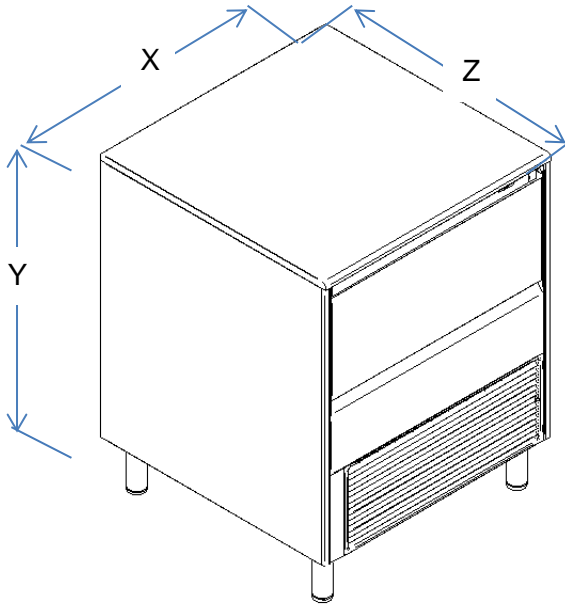
Clean the area around the ice machine as often as necessary to maintain cleanliness. Sponge any dust and dirt off the outside of the ice machine with mild soap and water. Wipe dry with a clean soft cloth. A commercial grade stainless steel cleaner/polish can be used as necessary.

### **7.6.- WATER LEAKAGE CHECKING**

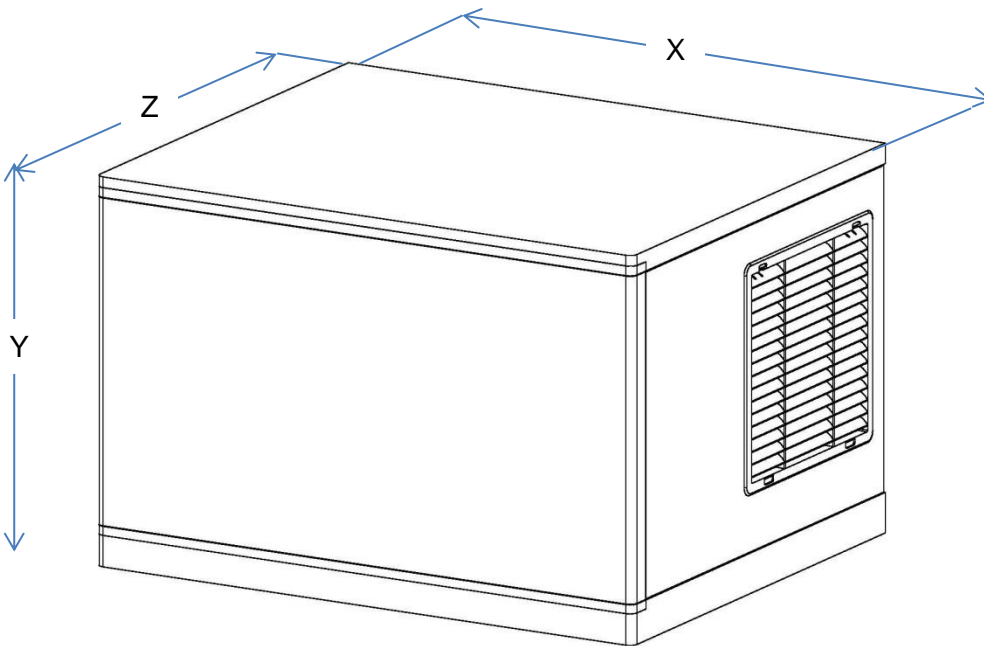
This must be done whenever maintenance is carried out on the machine: check all water connexions, braces, tubes and hoses in order to eliminate leaks and prevent breakages and flooding.

## 8 TECHNICAL SPECIFICATIONS

- NG UNDER COUNTER



- MODULAR



## 8.1.- DIMENSIONS

FDHD-MODULAR							
MODELOS	REFRIGERACIÓN	DIMENSIONES MÁQUINA			DIMENSIONES EMBALAJE		
		mm			mm		
		ANCHO X	PROF. Z	ALTO Y	ANCHO X	PROF. Z	ALTO Y
<b>FDHD 50</b>	Aire	536	594	795	620	660	919,5
<b>FDHD 70</b>	Aire	536	594	795	620	660	919,5
<b>FDHD 100</b>	Aire	660	701	838	744	769,5	970
<b>FDHD 150</b>	Aire	762	762	838	835,5	835,5	970
<b>FDHD 215</b>	Aire	762	620	500	835,5	635	625
<b>FDHD 400-22</b>	Aire	559	620	658	650	708,5	820,5

## 8.2.- SPECIFICATION SHEETS

FDHD 50 :

[https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict\\_fdhd50\\_r290\\_ft2301p50\\_enes.pdf](https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict_fdhd50_r290_ft2301p50_enes.pdf)

FDHD 70: [https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict\\_fdhd70\\_r290\\_ft2301p50\\_enes.pdf](https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict_fdhd70_r290_ft2301p50_enes.pdf)

FDHD 100:

[https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict\\_fdhd100\\_r290\\_ft2301p50\\_enes.pdf](https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict_fdhd100_r290_ft2301p50_enes.pdf)

FDHD 150:

[https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict\\_fdhd150\\_r290\\_ft2301p50\\_enes.pdf](https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict_fdhd150_r290_ft2301p50_enes.pdf)

FDHD 215:

[https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict\\_fdhd215\\_r290\\_ft2301p50\\_enes.pdf](https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict_fdhd215_r290_ft2301p50_enes.pdf)

Esquema eléctrico FDHD bajo mostrador:

[https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict\\_fdhd\\_r290\\_diag\\_esen.pdf](https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict_fdhd_r290_diag_esen.pdf)

Esquema eléctrico FDHD modular:

[https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict\\_fdhd\\_modular\\_r290\\_diag\\_esen.pdf](https://icetechice.com/cd2/bkofcd/imgs/userfiles/docs/fd/ict_fdhd_modular_r290_diag_esen.pdf)

## 9 USER TROUBLESHOOTING GUIDE

### 9.1.- UNDERCOUNTER MODELS

PROBLEM	PROBABLE CAUSE	SOLUTION
None of the electrical parts work. Front switch on but pilot is off	The machine is unplugged.	Plug in the machine and verify socket power
Front pilot on but none is working	Curtain not properly closed	Check curtain free movement and closed position
	PCB alarm	Switch unit off-on. If continues see PCB alarms diagnosis in this table
No water in tray	Not incoming water	Check water supply
	Inlet strain at water valve blocked	Check and clean
	Not enough water time	Increase water time. dip 5-7 (table xx)
Ice slab empty or too thick	Desadjusted cycle time	Adjust cycle timer dip 1-4 (table xx)
	Desadjusted cycle cut temperature Tc	Adjust dip 8 (ver punto xx)
	TXV bulb faulty contact	check
Difficult to release ice slab at harvest	Unit bad leveled (tilted to back)	Level; down front
	Dirty or scaled evaporator	Perform descaling procedure
	Not enough water time	Increase water time. dip 5-7 (table xx)
Not uniform flow pattern at evaporator	Dirty or scaled distributor	Perform descaling procedure.  Remove and clean distributor (pull from two clips at distributor sides)
PCB alarms. See point 4.1		
High pressure switch	Dirty condenser	Clean condenser
	Defective fan	Check. Replace
	Defective pressure switch	Check. Replace
NTC probe error	Defective probe	Check. Replace
	Defective probe plug connection	Check
Ice cycle timeout	No frozen evaporator	Check compressor and refrigeration system
	NTC probe faulty contact	Check probe fitting and insulation
Harvest cycle timeout	Ice slab not released	Faulty hot gas valve Bad leveled unit. check water time too short. Increase
	No ice on evaporator	No water in tray. - check water supply - check water valve and strainer - check water leaks Faulty pump. Verify
	Faulty curtain sensor	Check sensor and wiring
For further problems call aftersales service		

### 9.2.- MODULAR MODELS

PROBLEM	PROBABLE CAUSE	SOLUTION
None of the electrical parts work.	The machine is unplugged.	Plug in the machine and verify socket power
	Rear switch OFF	Switch ON
	Front switch position 0	Move to ICE (behind front panel)
All the electrical parts work but not compressor. (water doesn't freeze)	Front switch position WASH.	Move to ICE (behind front panel)
No water in tray	Not incoming water	Check water supply
	Inlet strain at water valve blocked	Check and clean
Not enough water to end cycle	Water level probe too low	Move up (steel rod beside pump)
	Defective drain valve (check drain leak during ice stage)	Disassemble and clean
	Shield splash leaks	Check shield position
Water overflows tray	Level probe too high or scaled	Adjust / clean
Ice slab empty or too thick	Desadjusted/scaled thickness probe	Adjust / clean
Difficult to release ice slab at harvest	Unit bad leveled (tilted to back)	Level; down front
Not uniform flow pattern at evaporator	Dirty or scaled distributor	Perform descaling procedure.  Remove and clean distributor (pull from two clips at distributor sides)
Low production	Dirty condenser	Clean (check also incoming water/air temperature)
Unit stops after few time running	Safety pressure switch opens	Clean air condenser (back)
For further problems call aftersales service		