Industrial scale ice machines
Service Manual
EVE COMPACT – Ed. 11/2005

Scotsman
Ice Systems - Industrial line

EVE Compact Units

I. Safety advices

Thank you for purchasing a Scotsman EVE machine, we would like to draw your attention to important safety precautions to be used when operating the equipment.

The refrigeration cycle operates by compression of vapour, with high and low pressure features and controlled refrigerant.
The plant has to be operated in accordance with the attached use and maintenance instructions.
Components such as pressure switches and safety valves should be checked periodically to ensure correct operation.
Maintenance on the equipment should only be carried out by qualified personnel, technical support is always available.
During design and construction of our equipment we evaluate the potential dangers, solve them where possible using normal safety practice and constructional standards but, some residual risks remain for example:

- Contact with refrigerant can cause freezing (scalds)
- Refrigerant leaks can cause suffocation in closed environments
- High temperatures are present on high pressure circuits
- Safety valves can vent refrigerant at high pressure and high temperature
- The plant has been designed for maximum ambient temperature of +40°C

On the serial number plate of the machine are indicated the pressure and temperature working limits (TS and PS).

If a check valve is installed before the safety valve on the liquid receiver, ensure that is always in open position.

The above is not an exhaustive list; risk assessments and evaluation of potential hazards should be carried out before any work is started.

INTRODUCTION

Linea.Net Milano Srl manufacture flake ice machines in various production capacities and configurations to suit the numerous market demands.

The agro-food industry (bread making, meat processing, cheese, etc.) and in particular the fishing industry, have found flake ice to offer many advantages over traditional ice cubes or crushed ice.

In the chemical and cement industry flake ice is used during production to avoid premature drying out or temperature control.

The following is an example of sectors that use ice:

- On board installations – Fishing
- Fishing industry - Processing
- Manufacture of fish products
- Fish markets
- Distribution of fresh fish

- Retailers of fish or fish products
- Supermarkets
- Delicatessens

- Meat markets
- Manufacture of poultry and game products
- Production of salamis and sausages
- Oven products and industrial bread-making
- Production of dairy products and cheeses

- Textile industry and paint production
- Chemical-pharmaceutical companies
- Building and construction companies (in compliance with European Standard EN206-1 : 2000)

Our vast experience (since 1973) allows us to offer machines with a high level of reliability, vouched for by numerous clients who are satisfied with the machines they have used.
These machines have been designed to work under stress and offer the following advantages:

- Reliability- Long-life – Reduced running and maintenance costs

Other than the advantage of reduced production costs when using ice, a "**dry and sub-cooled ice"** will last longer and therefore provide a longer thermal inertia. Being flat and free from sharp corners (unlike crushed ice) it will not damage the outside of the product with which it comes into contact which, on defrosting, will lead to a deterioration of the merchandise.

Example of model designation

EVE200 AS	=	Fresh water version – Land Based – Air cooled condenser
EVE200 LWS	=	Fresh water version – Land Based – Water cooled condenser
EVE200 WS	=	Fresh water version – On Board – Sea water cooled condenser
EVE200 AS SW	=	Sea water version - Land Based – Air cooled condenser
EVE200 LW SW	=	Sea water version - Land Based – Sea water cooled condenser
EVE201 WS SW	=	Sea water version – On Board – Sea water cooled condenser

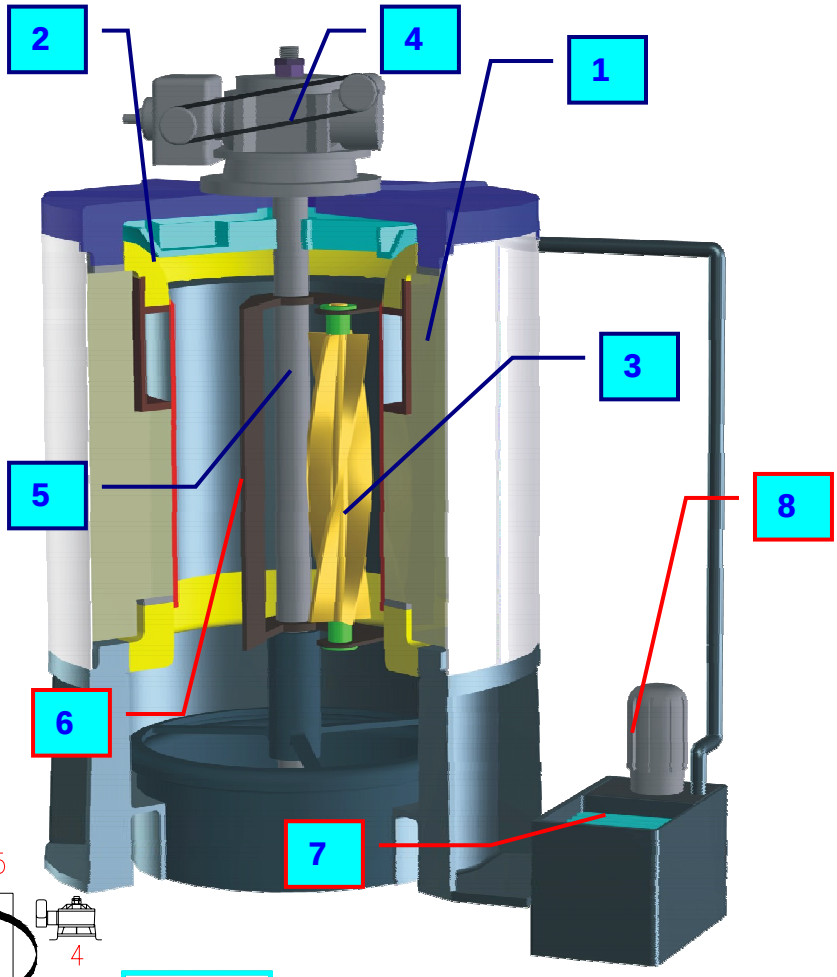
III. A working outline

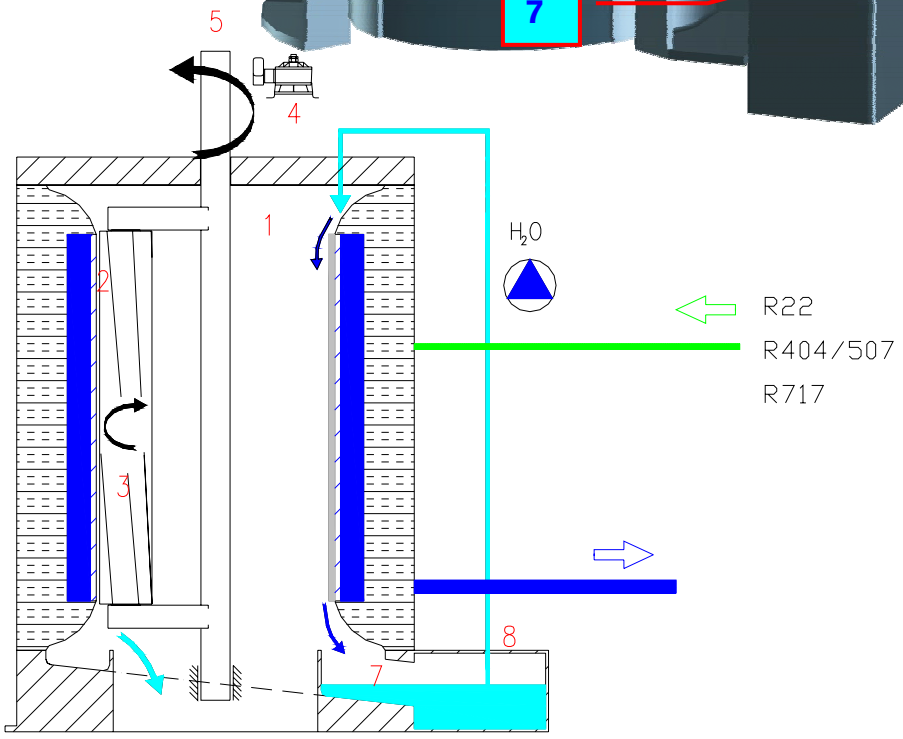
A fixed vertical evaporator (1) is cooled by the refrigerant fluid evaporating on the inside. Water is evenly distributed from above onto the internal surface (2), where it freezes once it comes into contact with the cold wall. A helicoidal ice-breaker (3) is positioned parallel to the cylinder axis, almost in contact with the internal surface and the gear reducer (4) causes the central shaft (5) to turn at a constant speed. The ice-breaker is connected to the central shaft with a satellite mechanism.

The ice-breaker rotates on the surface of ice; it removes it by breaking it into flakes which then fall by gravity. A flat, vertical blade (6) follows the ice-breaker cleaning the surface of possible residue.

Un-frozen water is returned to the reservoir (7).

Water pump (8) circulates water around the system.



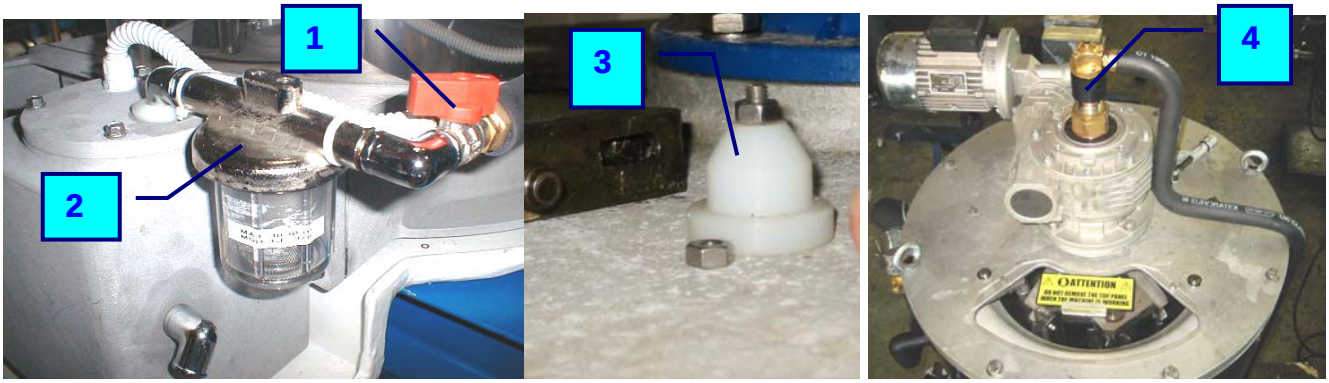


a. WATER SYSTEM

At the base of the machine is the water reservoir in which the stainless steel pump is immersed. Water is pumped to the distributor from which it falls by gravity; there is a filter (2) and shut-off valve (1) on the toroidal distributor which is positioned internally and integral with the central shaft.
Depending upon the application, there are two different types of distributor:

a) Peralluman pipe with regular perforations and supply from above (land version)

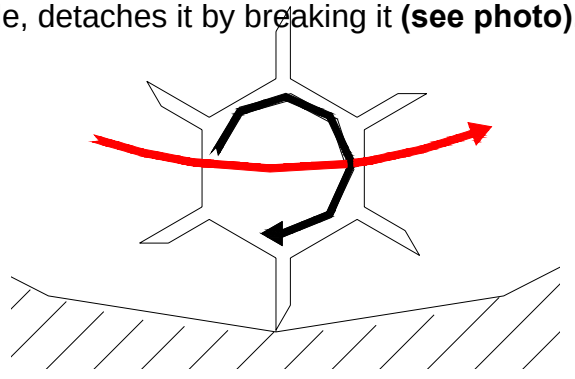
b) Stainless steel ring pipe with regular perforations and supply from the axis of the gear reducer (on board version)



In the LAND version, a level sensor (3) allows a check to be carried out on the water flow. The upper part of the cylinder is rounded at the end in order to channel the water towards the walls of the cylinder.
In the reservoir there is a float valve which regulates the flow of water from the external feed circuit in such a way that the level remains constant. The ice has to be dry and sub-cooled, for this the surface of the evaporator cylinder which is immediately in front of the scraper roller is not irrigated by the water distribution apparatus.

b. ICE OUTLET

The stainless steel shaft, positioned in the centre of the cylinder, is turned on its vertical axis by a gear reducer. Connected onto the shaft are two 'V' arms onto which the ice-breaker is fixed on one side and the scraping roller on the other. This collects and cleans the surface of ice. The ice-breaker, turning on its own axis and rotating over the ice formed on the inside, detaches it by breaking it **(see photo).**



A deflector prevents the ice from falling into the water reservoir.
Depending on the type of application and position of the machine, there must be adequate conveyors, containers or storage bins to collect the ice.
The rotation speed determines the thickness of the ice: a slower speed corresponds to an increased thickness and sub-cooling of the ice.
It is possible to alter the speed by applying a frequency converter (inverter) onto the electrical supply of the gear reducer.

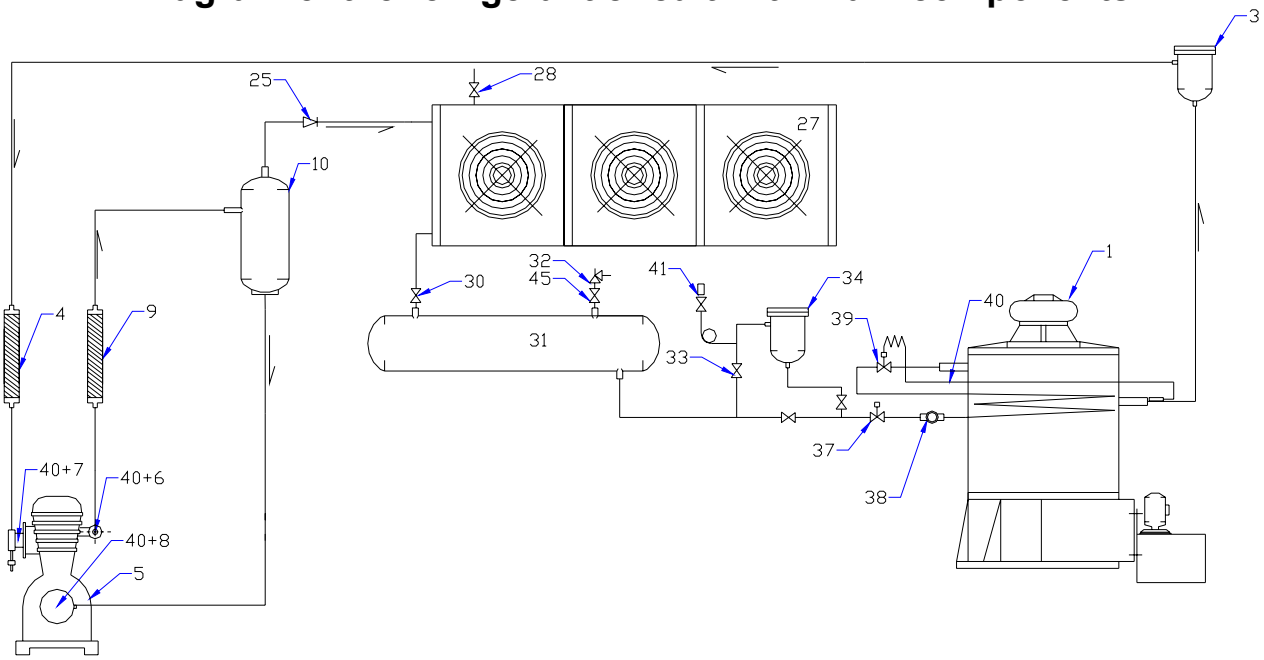
c. REFRIGERATION SYSTEM

The evaporator cylinder is the main element in the machine. In its internal chambers the cold refrigerant circulates and absorbs heat. The walls facing the outside are insulated with foamed polyurethane. At the base of the cylinder there is a system for the removal of oil should the machine need to be closed down for long periods or for use during maintenance visits.

DIRECT EXPANSION WITH THERMOSTATIC VALVE
The refrigerant liquid is circulated through a coil on the inside of the cylinder (acting as heat exchanger), then with the use of a thermostatic valve is injected into the evaporator where it absorbs heat and evaporates. The vapour is recovered using the suction pipe as indicated in the technical diagrams.

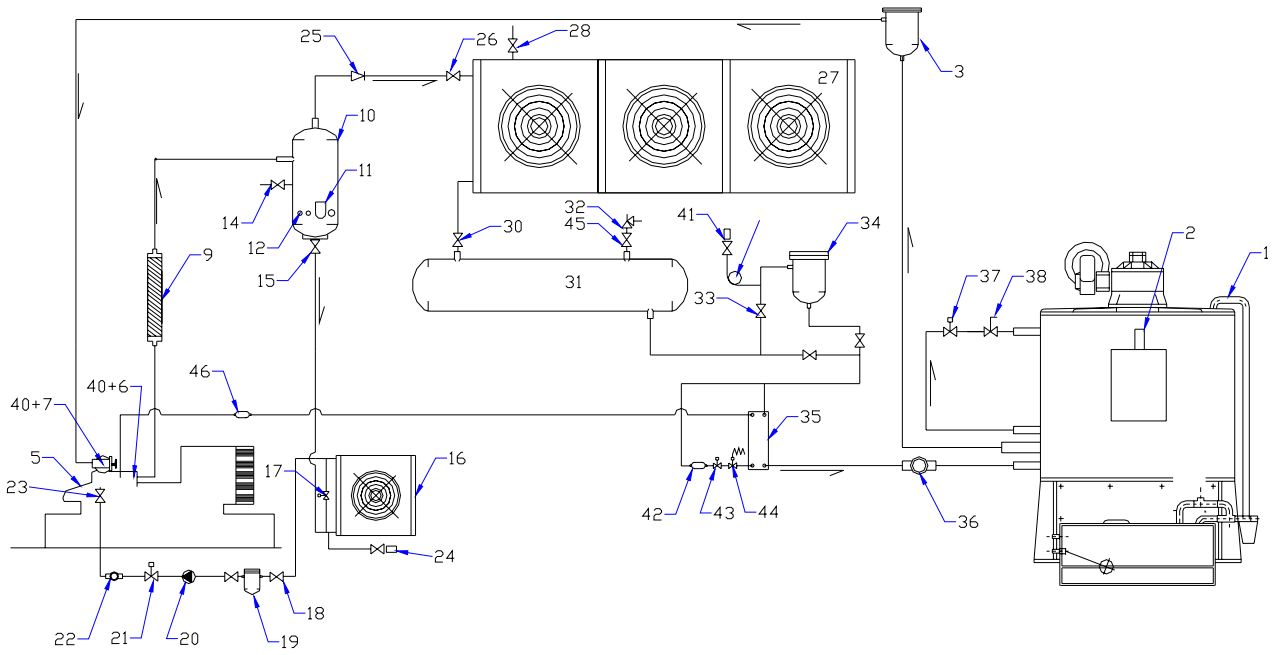
i. DIRECT EXPANSION through FLOODING with LEVEL CONTROL
The refrigerant liquid flows through the pipe for sub-cooling with the use of a solenoid valve and a regulating valve (for the fall in pressure). It then floods the evaporator's internal chambers, where the expansion phase takes place. If the machine is not completely flooded, the level control is carried out with an electronic controller (FTL) which controls the solenoid valve. The variation in pressure between the liquid and suction must have an **ΔP no lower than 12 bar** to guarantee an adequate supply of refrigerant.

Diagram of the refrigerant circuit with main components



Pos.	component	Pos.	component
1	Evaporator/ice machine	30	rotalock tap
3	F1 = mechanical cartridge filter	31	liquid receiver
4	Vibration eliminator	32	Safety valve
5	reciprocating compressor	33	globe tap
6	high pressure switch	34	Solid cartridge filter
7	low pressure switch	37	Solenoid valve
8	Oil pressure switch	38	Liquid gauge
9	Vibration eliminator	39	Thermostatic Valve
10	oil separator	40	high pressure flexible pipe
25	Non return valve	41	wheel tap
27	Air cooled condenser	45	Lead sealed tap (open)
28	pressure switch		

Diagram of the refrigerant circuit with main components (level control and screw compressor version)



Pos.	component	Pos.	component
1	Evaporator/ice machine	22	Liquid gauge
2	FTL level control	24-41	wheel tap
3	Mechanical cartridge filter	25	Non return valve
5	screw compressor	26-33	globe tap
6	high pressure switch	27	Air cooled condenser
7	low pressure switch	28	pressure switch
9	Vibration eliminator	31	liquid receiver
10	oil separator	32	Safety valve
11	Oil thermostat	34	Solid cartridge filter
12	oil resistance	35	plate exchanger
13	oil level indicator	36	dampness indicator
14-15 23-30	rotalock tap	40	high pressure flexible pipe
16	Oil cooler	42	mechanical filter
17-21 37-43	solenoid valve	44	Thermostatic Valve
18-38	Globe valve	45	Lead sealed tap (open)
19	mechanical cartridge filter	46	mechanical filter
20	Flow meter		

d. INLET WATER

The structural differences between sea and fresh water versions are minimal:

1) Scraping blade is in plexiglass (more rigid) instead of rubber.
2) Surface of the evaporator in contact with the water has a horizontally grooved surface to improve the thermal exchange.

When using fresh water, the ice will vary depending on the hardness of the water, i.e.:

a. Almost pure water such as rain water produces ice which is partly transparent and firmly attached to the cylinder wall
b. Water with a high lime content causes a calcareous sediment to collect on the cylinder that also causes the ice to stick

In both cases, the scraping roller breaks the layer of ice which forms on the wall of the cylinder, but a loss in quality may be experienced.

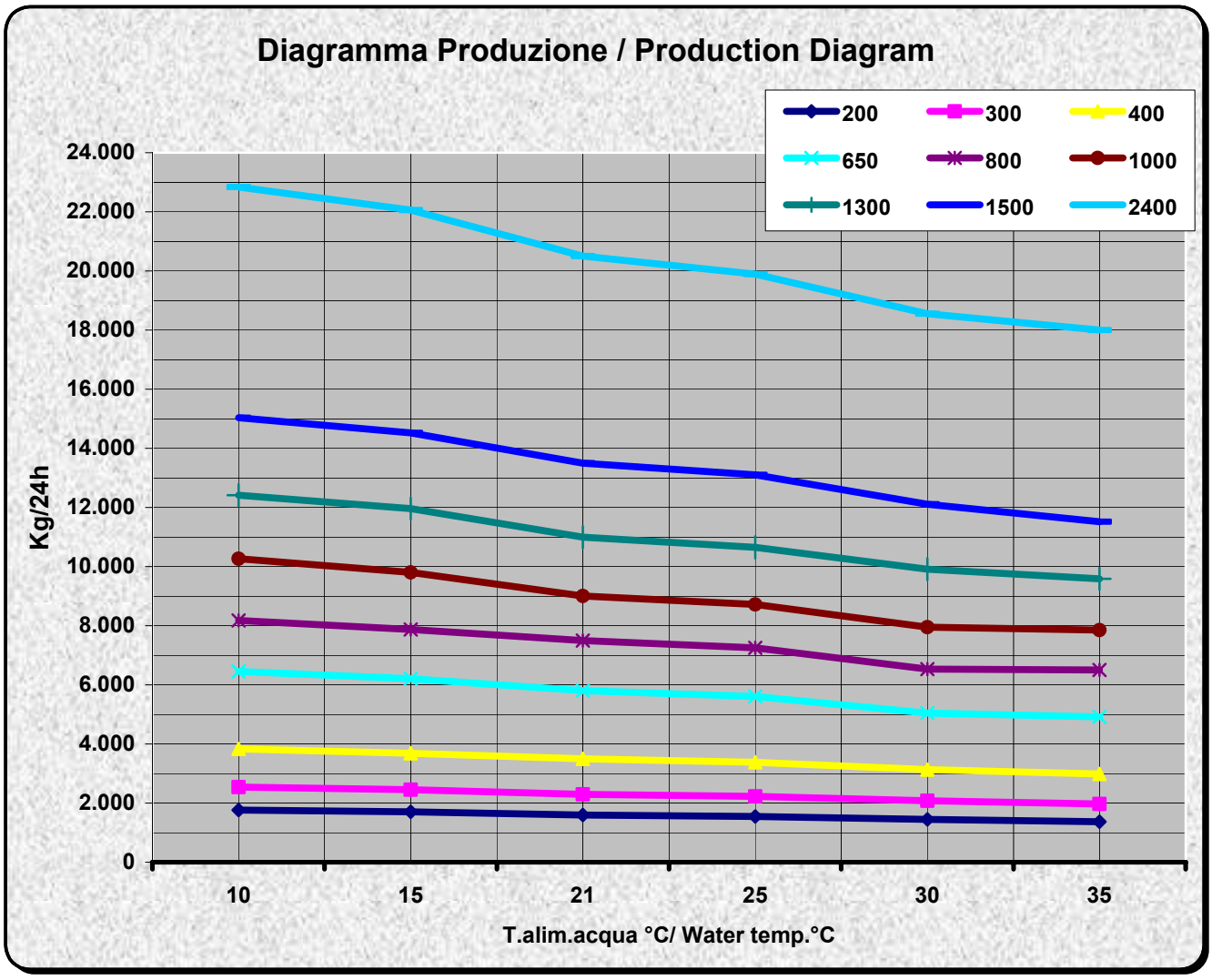
Our experience has demonstrated that the addition of a small amount of salt (sodium chloride), eliminates these problems; the ice is compact and it breaks up into larger pieces.

The amount of salt used however so low that it is not possible to taste it in the ice and it will not affect food products.
The salt can be dosed with automatic measuring devices, or by a system that automatically regulates the conductivity of the water (average 1500 uS at +17°C).

When using sea water, after checking that the machine is suitable for this type of use, it will be necessary to select a lower evaporating temperature than that used for fresh water, in order to obtain a good quality flake (normally between 4 and 8°C lower). The salinity of the water used is very important for the correct operation of the machine and often an adjustment made whilst in the harbour will provide different results when out to sea, due to different levels of salinity.

Construction Differences	FRESH WATER LAND	FRESH WATER ON-BOARD	SEA WATER LAND	SEA WATER ON-BOARD
Evaporator internal surface	AISI304 smooth	AISI304 smooth	AISI304 rifled	AISI304 rifled
Scraper material	Rubber	Rubber	plexiglass	plexiglass
Water distributor	Open, made of aluminium	Closed ring, in AISI304	Open, made of aluminium	Closed ring, in AISI304
Water sensor level	provided	Not provided	provided	Not provided
Supply for water distributor	By gravity, from upper cover	Through shaft and rotating coupling	By gravity, from upper cover	Through shaft and rotating coupling
Refrigeration Power	100%	100%	115%	115%
Evaporating Temperature	-28°C	-28°C	-35°C	-35%

IV. Production Diagram



Models	Ice production Kg/24h Thick. 1.8-2.2mm Water temp. 22°C, amb.temp. 35°C	Ice production Kg/24h Max production Water temp. 15°C, amb.temp. 25°C	Evaporating Temperature fresh water °C	Evaporating Temperature sea water °C
EVE200AS	1.600	1.750	-28	-35
EVE300AS	2.300	2.550	-28	-35
EVE400AS	3.500	3.700	-28	-35
EVE650AS	5.800	6.200	-28	-35
EVE800AS	7.500	7.870	-28	-35
EVE1000AS	9.000	9.800	-28	-35
EVE1300AS	11.000	12.000	-28	-35
EVE1500AS	13.500	14.500	-28	-35
EVE2400AS	21.000	22.060	-28	-35

V. TECHNICAL CHARACTERISTICS

The machine is intended to be used at room temperature.

Do not install in refrigerated rooms or in places where the temperature is too low.

If this is unavoidable, provision must be made to protect the electrical parts from possible dampness and to ensure that the water in the reservoir does not freeze.

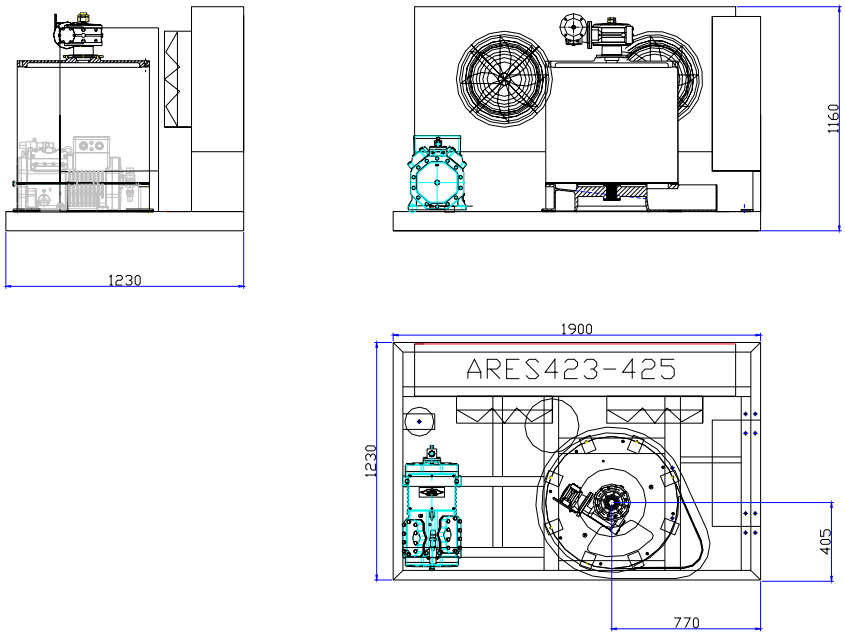
The guarantee is no longer valid when there are signs that the machine has been used in conditions/environments outside the following:

Conditions of use:

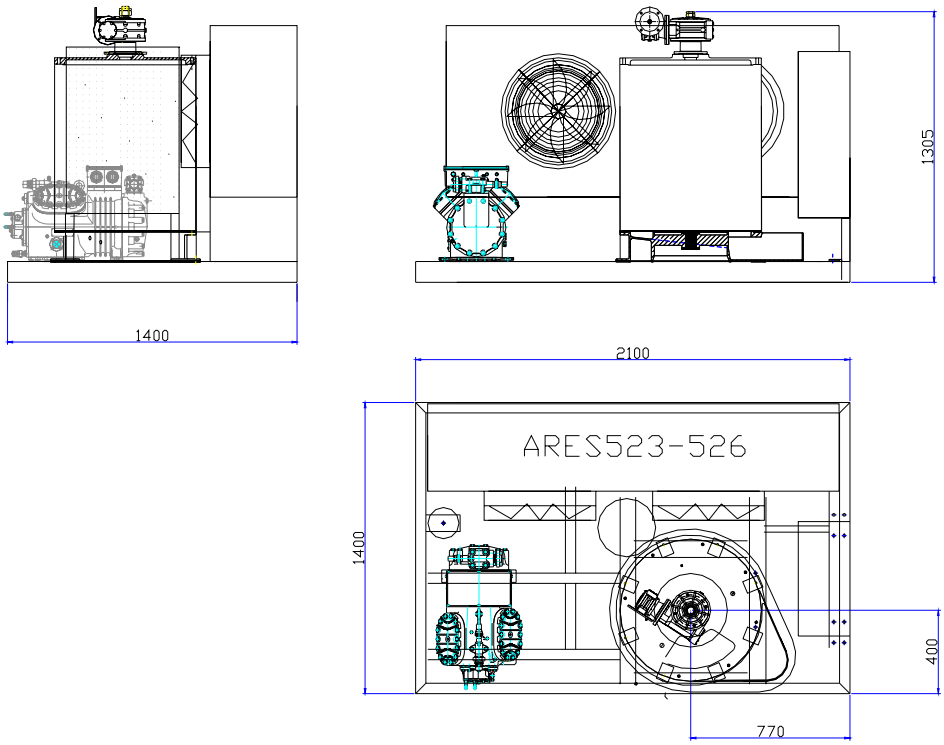
	Minimum	Maximum
Room temperature	2°C (36°F)	40°C (104°F)
Temperature of inlet water (Fresh).	5°C (41°F) #	35°C (95°F)*
Temperature of inlet water (Sea)	2°C (36°F) #	35°C (95°F)*
Electrical voltage	-10%	+10%
Water pressure	1 bar / 14 psi	5 bar / 70 psi

 # for lower temperatures it is advised to use a pre-heating system.

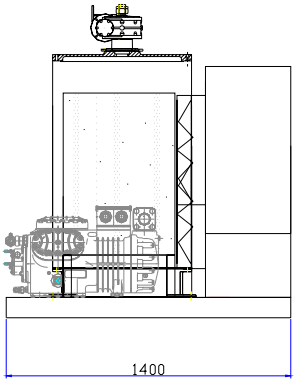
*** to obtain a good quality ice it will be necessary to reduce the water temperature to less than 25°C.**

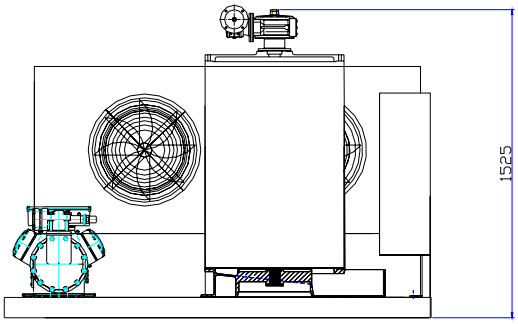


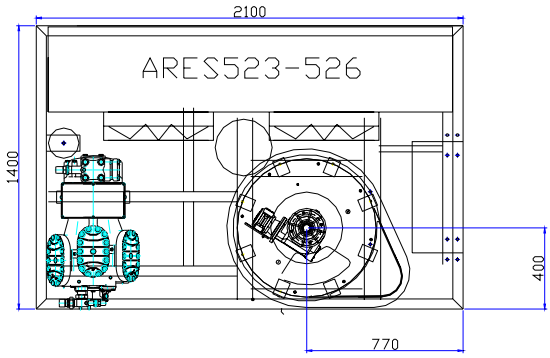
EVE200AS



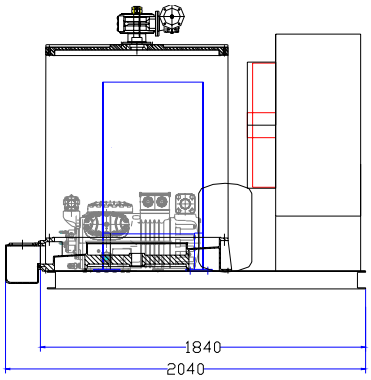
EVE300AS

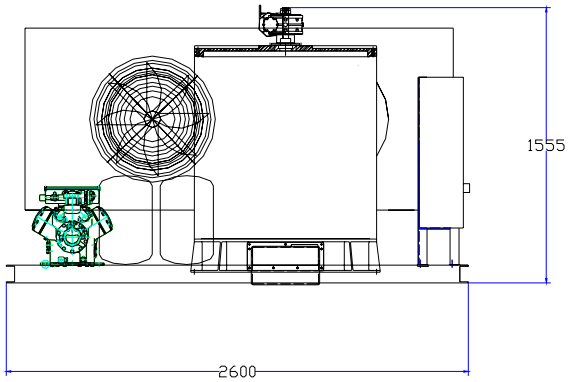


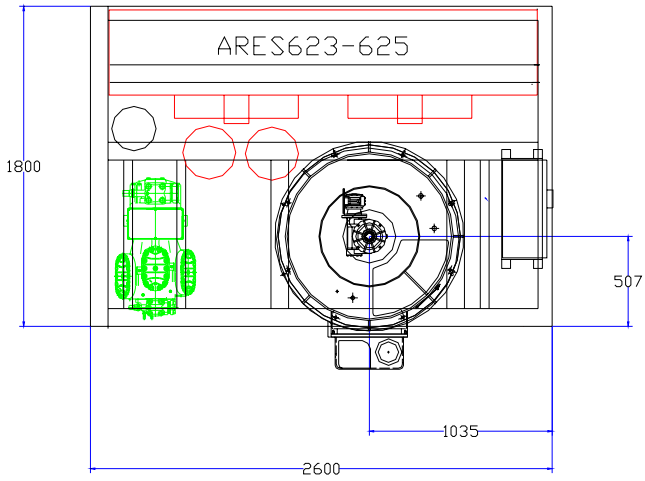




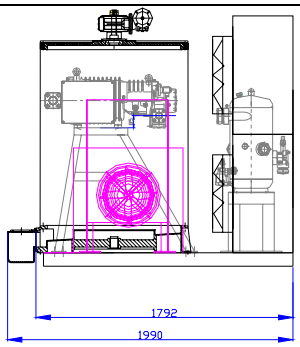
EVE400AS

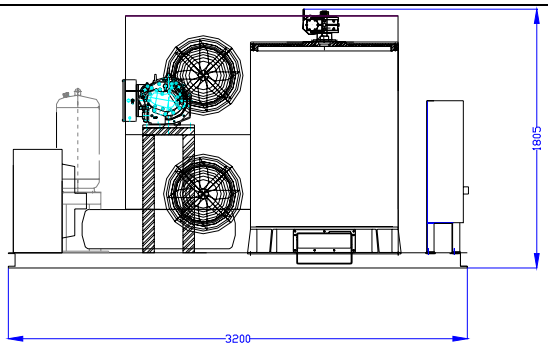


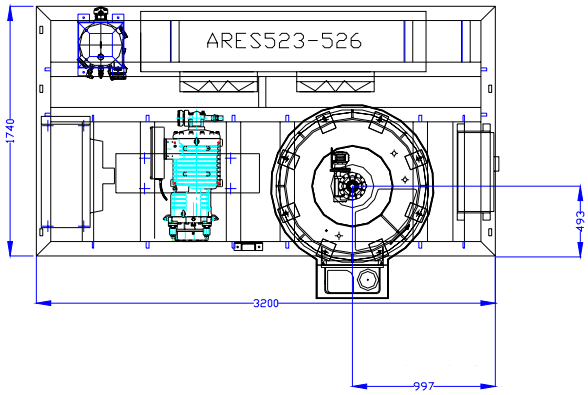




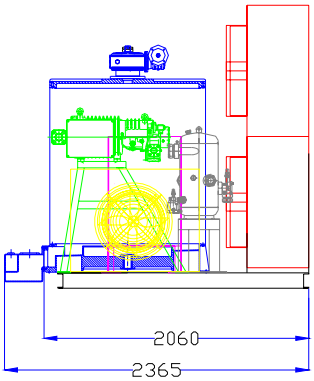
EVE650AS

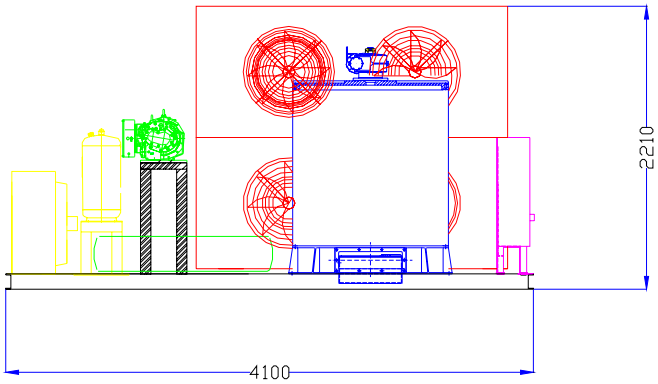


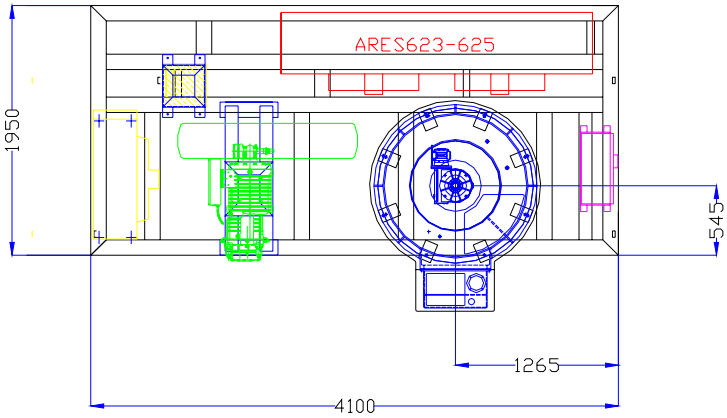




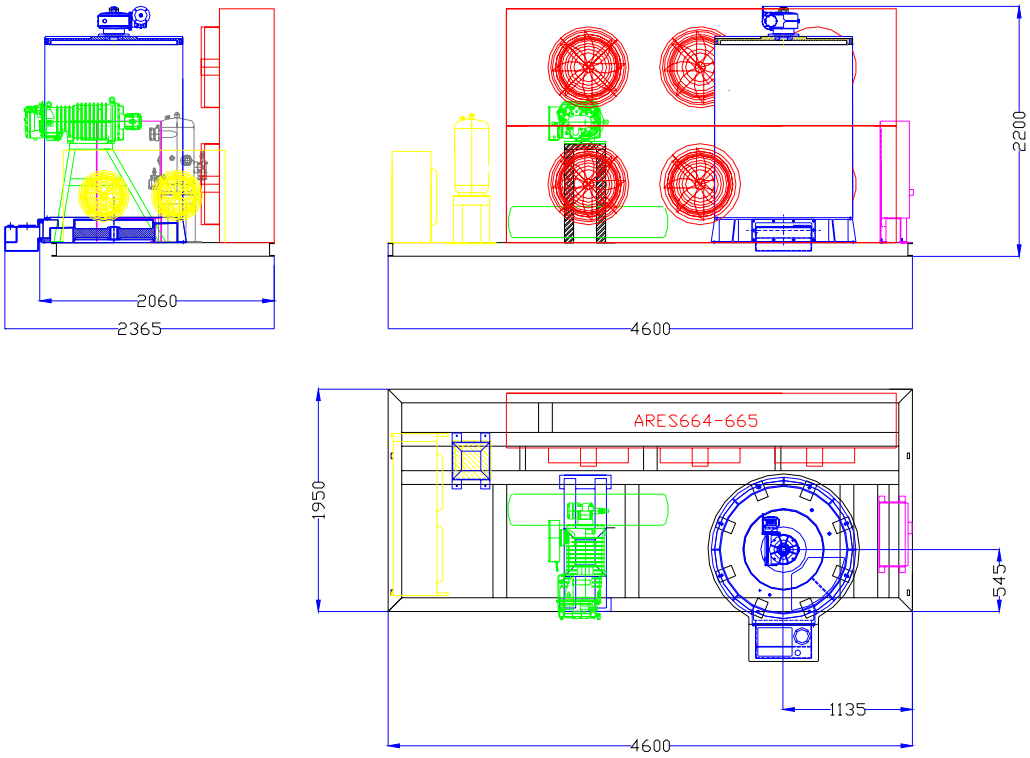
EVE800AS



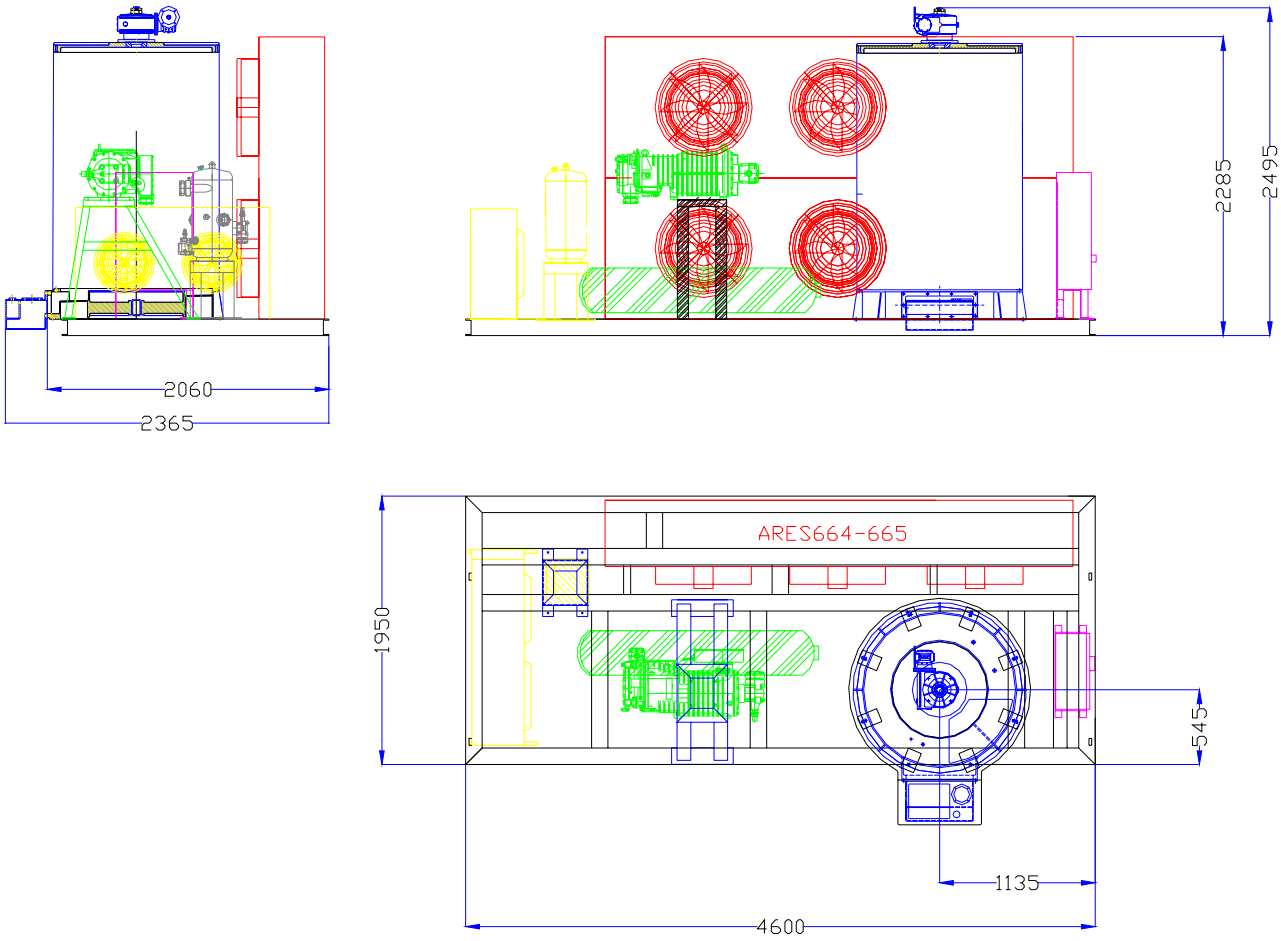




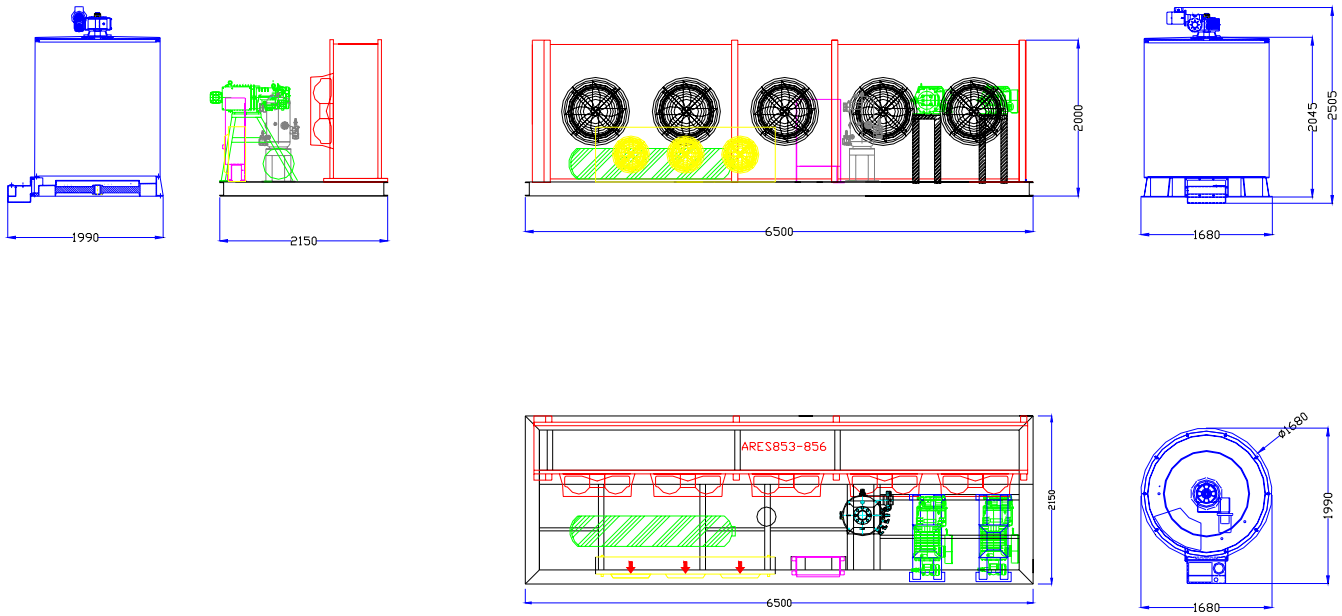
EVE1000AS



EVE1300AS



EVE1500AS



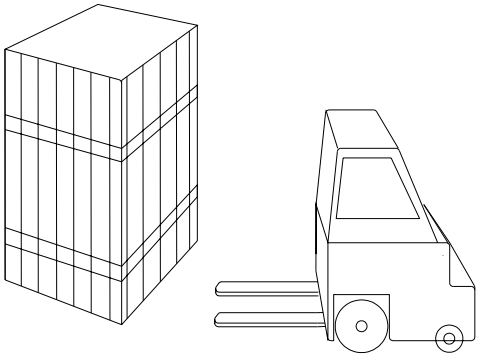
EVE2400ASR

Model	W mm.	D mm.	H mm.	Net Weight Kg	Ice Outlet mm.	Inlet water Inches	Overflow Inches	Packing Dimensions WxDxH	Air freight packing dimensions WxDxH
EVE200AS	1900	1230	1160	780	335	1/2	3/8	2250x1530x1400	-
EVE300AS	2100	1400	1305	800	335	1/2	3/8	2450x1700x1500	-
EVE400AS	2100	1400	1525	1150	335	1/2	3/8	2450x1700x1710	-
EVE650AS	2600	2040	1555	2000	540	1/2	3/8	2900x2140x1750	-
EVE800AS	3200	1990	1805	2200	540	1/2	3/8	3500x2140x2000	-
EVE1000AS	4100	2365	2210	2950	655	3/4	3/8	4400x2340x2390	4400x2250x2300 +2750x700x580
EVE1300AS	4600	2365	2200	3750	655	3/4	3/8	4900x2340x2390	4900x2250x2300 +2750x700x580
EVE1500AS	4600	2365	2495	4300	655	3/4	3/8	4900x2340x2470	4900x2250x2300 +2750x700x580
EVE2400AS	6500 1990	2150 1680	2000 2505	5050 2400	1030	3/4	3/8	6800x2340x2200 2250x2100x2200	-

Specification and/or dimensions may change without prior notification.

VI. INSTALLATION

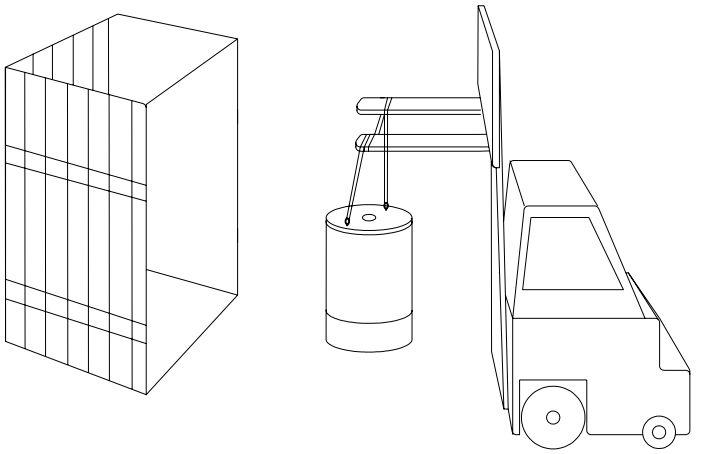
a) Handling, unpacking and disposal of packing

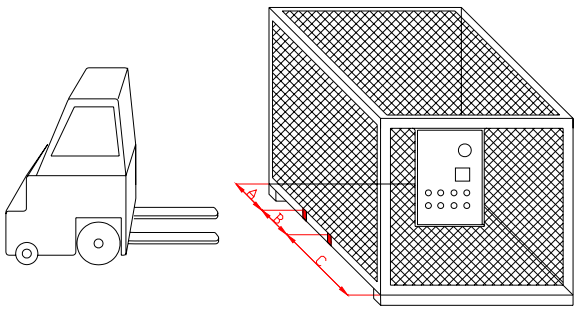


Check that the packaging has not been damaged during transportation.
Proceed carefully with the unpacking, and then place the machine in its final position.

To lift the equipment, secure the machine equally on all sides and lift using the rings which are fixed on the upper cover (EVE200 –EVE400) or the basement holes (EVE650-800). Avoid passing under the machine when lifted.
It is possible to move the machine with a fork-lift lifting from the base (pay attention to the centre of gravity and the weight of the machine).

All damage caused to the machine during transportation should be reported immediately to the deliverer and noted on the delivery slip.
The crate is made of a recyclable material (wooden cage + polyethylene film); dispose of it via an ecological waste disposal company dealing in the recovery of prime materials and waste disposal.





a) Positioning, levelling and access for maintenance

The equipment is factory assembled and ready to be connected to power and water.
Position the equipment and ensure it is level (front to back and left to right).
Remember to leave adequate space between walls etc. and other equipment, for maintenance and to ensure adequate air circulation.

The ice outlet must be accessible for maintenance/repair procedures

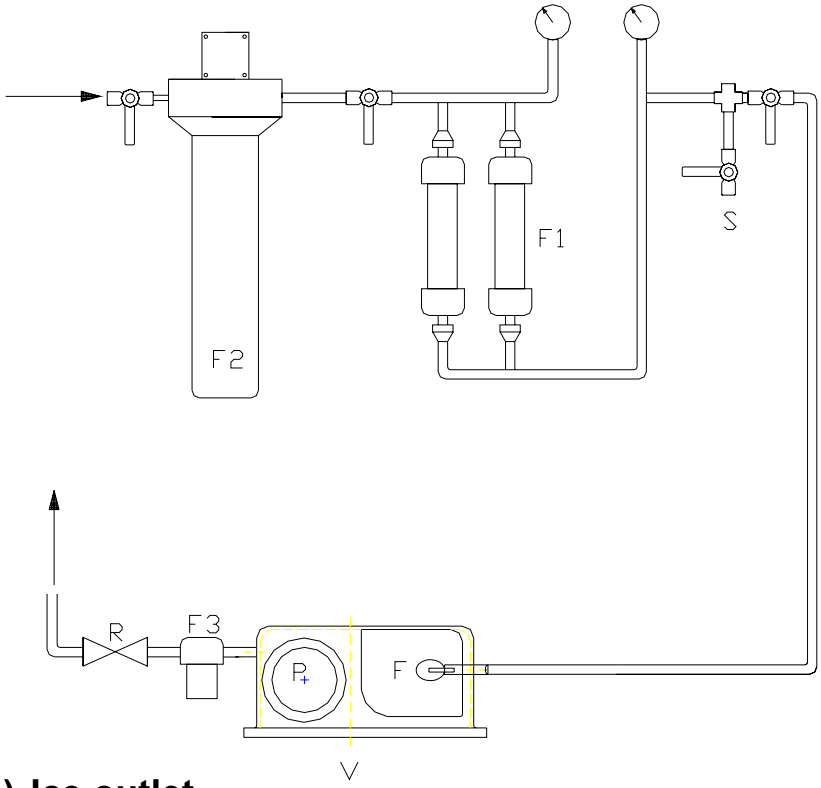
Ensure that the air cannot re-circulate from the ice outlet.

b) Water inlet connection

The water used for the formation of ice, must be connected to the reservoir, an overflow pipe must also be connected.

If the temperature of the water is close to 0°C, it is advisable to pre-heat to avoid the formation of ice in the pipes and inside the reservoir.
If the water is not completely pure, we advise applying a filter system for the purification.

DIAGRAM with WATER INLET FILTER



R= regulating tap for distributor water
F3= mechanical filter
P = pump
F = ballvalve
V = water reservoir
S =water outlet
F1 = cartridge filters
F2 = pre-filter

c) Ice outlet

The discharge of the ice takes place at the base of the evaporator; dimensions of the outlet are indicated in the technical tables.
It is possible to aim the outlet of ice with a stainless steel conveyor, made to measure, depending on the specific requirements.

When the machine is positioned on a storage bin, it is possible to control the filling with the use of mechanical or optical sensors or a timer that allows the machine to be stopped and started on demand.

For safety reasons an ice level sensing device must be used on the outlet of the evaporator cylinder to avoid ice entering the machine and damaging the shaft and other rotating elements.

1) Electrical connection

The electrical connection should be carried out by specialised and qualified personnel. Installation must conform to all local standards of the country in question.

The machine is provided with a main power isolator to cut-off the electrical supply.

Safety first!
For a correct and secure installation use the right tools and protection.

For the electrical connections please proceed as follows:

- Drill the electrical board bottom part
- Pass through the cables on the previous hole done applying a gasket to tighten
- Connect cables to the terminal board

VII. START-UP and ADJUSTMENT

First start-up and adjustment

Once water and electrical connections have been completed, the ice machine can be switched-on. In case of malfunction the electrical controls will protect the machine from damage and the corresponding alarm light(s) will be illuminated.

IN COLD ENVIRONMENTS ENSURE EQUIPMENT IS NOT STARTED UNTILL CRANK-CASE HEATER HAS WARMED THE OIL SUFFICIENTLY

Check that the working suction pressure is as shown in the technical specifications.

In all systems it is necessary to top up the lubricating oil, due to the combination of oil/refrigerant in the circuit. A few hours after the start-up of the system, it is advised, as a precaution, to check that the level of oil compressor is normal.

At start-up, check the rotating direction of the shaft (anti-clockwise).

In case of wrong rotation reverse two of the electrical supply phases.

Open the water supply valves.
The machine initially may produce low quality ice and should be adjusted as required.

One hour after start-up check the following parameters:

- Working pressures (high and low)
- Water freezing level inside evaporator surface (if not completely frozen adjust the expansion valve)
- Quality and ice thickness
- Base deflector and ice scraper are clear of any ice build up

SWITCH OFF and RE-STARTING

When the machine is switched off using the STOP button provided in the electrical board.
The liquid line solenoid valve will close and the equipment will enter a PUMP DOWN phase. At the end of this phase the rotating shaft and the water pump continues to operate to clear any ice residue from the evaporator surface (a timer defines when the drive-motor and the pump will stop).
The machine will stop at the end of the pre-set time and is then ready to re-start.
To start push the START button.

Only in cases of emergency use the red button EMERGENCY-STOP

RE-START PROCEDURE AFTER SUPPLY INTERUPTION or EMERGENCY STOP

In the event of the machine experiencing an unexpected loss of power, the machine stopping because the gear reducer is blocked with ice or it was stopped unexpectedly for safety reasons; the evaporator will be flooded with refrigerant.
On the re-start of the refrigerant system the presence of liquid in the suction line can seriously damage the compressor (especially with the ammonia models).
To avoid this problem, we suggest you proceed as follows:

- Check that the ice-breaker is free from ice (possibly by rinsing with water)
- Empty the refrigerant out of the cylinder using a Pump-down procedure, having firstly partially closed the suction valve.
  Re-start the machine in normal working mode with all valves returned to their normal position.
-

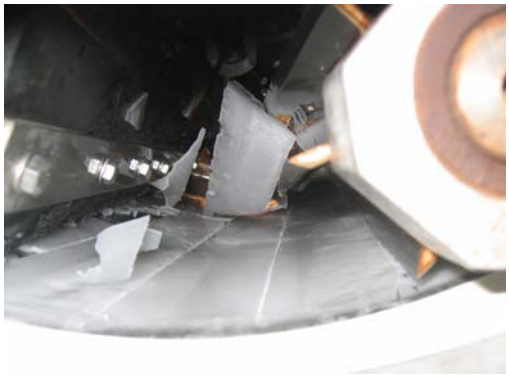
If the system initially produces low quality ice, it will be necessary to make some adjustments.

a. completely open the downstream tap on the recirculation pump; close the tap slowly, until there is a constant level of water in the distribution channel without spillage and excessive return of water into the reservoir (LAND version) and the vertical distributor sprays the cylinder surface from all holes

b. Salt addition – fresh water:

Low salt dosing: ice is very dry and breaks in to small pieces; the machine becomes noisy and the ice breaks before the scraper arrives at the right position. Mechanical stress increases on the shaft with potential intervention of gear-motor overload protection device, and possible damage to the bushes.

High salt dosing: ice is very soft and not really sub-cooled; there are areas where the ice did not detach; blocking the shaft.



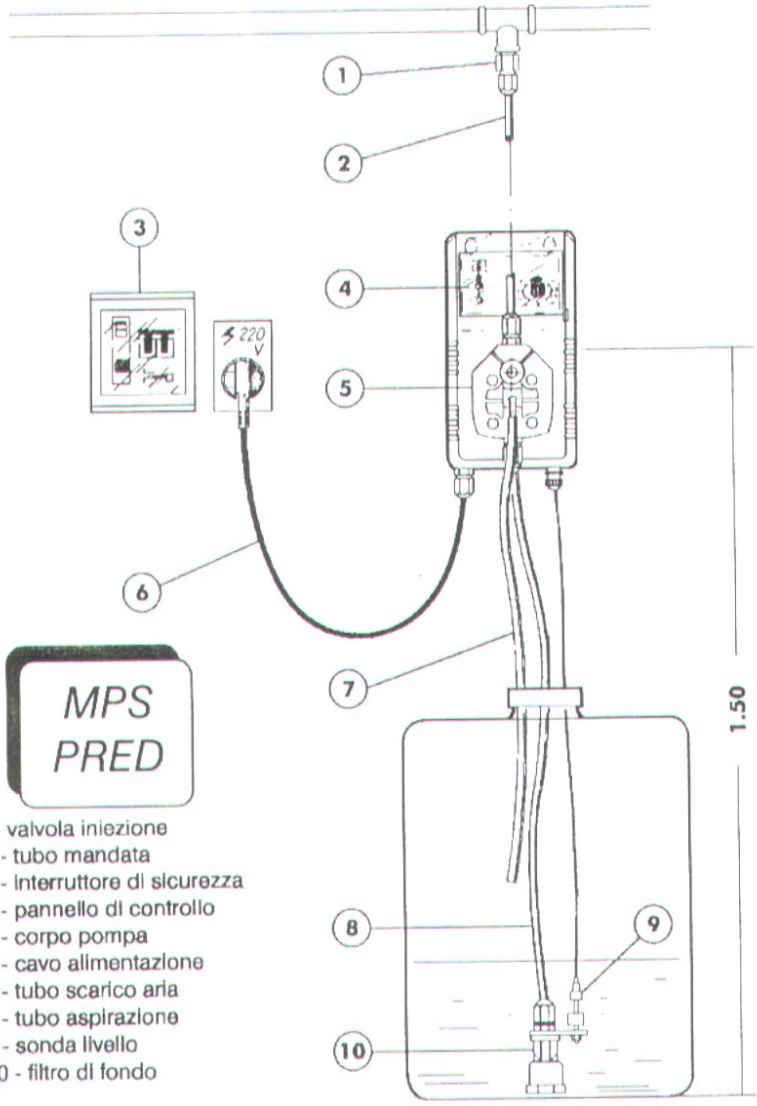
To rectify the problem it is suggested that salt is

added manually or with pump system.

Automatic salt feeder pump: MPS 03 07 PRED (IP65)

Electrical supply 230V/50-60/1 (198-242 VAC) – Do not install directly on inductive load – provide electrical contactor. The pump should be protected by a fuse 230VAC/630mA 16W.

The water supply pipe sends the brine (solution of water and Sodium Chloride-NaCl) directly into the water reservoir through the injection valve.
Suction pipe should be placed in the brine tank together with the level control probe and the water drain.
Between water tank base and salt feeder pump the difference in level should not be more than 150 cm.



Operation/connections: connect transparent suction pipe to suction link (bottom valve on pump body) taking care to connect the pipe before the metal ring and pipe-stop; then connect the cone to the end. Check the valve O-ring and tighten the metal ring by hand. Place the suction filter on the water tank bottom. Suction pipe has to be short and straight to avoid bending that can prevent the pump working correctly.

The pump body has a manual venting valve. To prime the pump proceed as follows:
Place one side of the transparent pipe onto the valve pipe connector and the other side into the brine tank. Turn the handle on the pump body anticlockwise to open the valve. Start the pump and turn the flow to 50%, the air in the pump body will be pushed by the membrane out through the valve. Once the air is removed and the brine flows from the valve, close the valve.

To help with the priming if the brine solution is very concentrated, remove the air from the valve pipe with a 20 cc syringe after having started the pump and opened the valve.

The feeder pump is provided with a level alarm. When the brine falls below the minimum level, a red LED will light and the pump will stop.

The dosage is constant, with the possibility of modifying the flow rate from zero to 100%. The front panel handle allows modification of the electronic system. It is advisable not to adjust the pump flow from 0 to 10% because this may cause an irregular flow rate.

The bottom part of the filter should be cleaned once a year but if there are crystals present, it is suggested that cleaning should be carried out more frequently.

WATER/BRINE TANK

To avoid saturation of brine do not add more than 30% of salt by weight.
As adjustment of the pump regulates the brine flow rate it is possible to meet the majority of customers' requirements in respect of ice hardness and temperature.

b2. manual dispenser pipe in Plexiglas: compressed salt tablets should be inserted and the hole at the bottom of the pipe should be gradually enlarged until the correct dosage is reached, this depends on the water hardness.
NOTE: When the machine is stopped for a long period, the Plexiglas pipe should be removed to avoid re-starting with increased concentration of salt. This may lead to a formation of ice that is too soft and could block the ice-breaker.

b3. manual dispenser drawer with double basin: add salt to the external basin; regulate the flow of water until the desired condition is achieved.

With sea water machines it is not necessary to use these methods.

<u>If a variation in the quality of the ice (temperature) is required, it is not necessary to make alterations to the refrigerant system, it is enough to close the last holes in the distributor (closest to the ice-breaker) thereby obtaining a greater sub-cooling surface.</u>

However, on all machines, the opening of the thermostatic valve or damper can be regulated to alter the expansion temperature for a greater or lower sub-cooling of the ice.
If the ice production is too low, proceed as follows:

- from the inspection window check the frosting on the evaporator surface if this is not complete, open the thermostatic valve to increase the quantity of refrigerant
- re-check the level of frosting, proceeding as above until maximum production is reached.
- if necessary add more refrigerant (sight glass with presence of bubbles)

If you wish to use the ice machine to obtain a daily amount which is lower than its capacity, it is advisable not to alter the refrigerant system but to stop the machine when the required amount of ice has been produced (timer or manual operation by the operator).

Only in cases when the reduction has to be referred to the hourly production is it advisable to make alterations to the refrigerant circuit, reducing the refrigerant power of the compressor (partialisation or variation of a number of turns) and at the same time reducing

the quantity of water which flows over the evaporator surface (it is sufficient to close some holes of the water distribution channel).
The stopping of the production can be done at any time without experiencing problems, providing the time is less than 10-15 minutes. If however, the machine needs to be stopped for over an hour, it is necessary to empty the gas contained in the evaporator cylinder by using the pump-down facility.

A problem may occur when the machine is off for a long period and the temperature of the room where the machine is installed drops below 0°C. In such a case, it will be necessary to empty the water reservoir and all associated piping from the water supply, alternatively heat the area where the machine is installed.

N.B. After 48 hours of working, it is advised that you substitute/clean the suction line filter in order to remove any oxidisation from brazing/welding or impurities that were present in the systems components.

Water quality varies from area to area.
It is recommended that a chemical analysis is carried out to ensure that correct cleaning/filtering/feeding systems are installed to prolong equipment life.

SALT DOSAGE	gr. NaCl in 24h (t.water +15°C)	
Model	MIN.	MAX.
EVE 200/201	90	210
EVE 300/301	130	320
EVE 400/401	200	430
EVE 650/651	300	700
EVE 800/801	400	850
EVE 1000/1001	500	1.100
EVE 1300/1301	600	1.400
EVE 1500/1501	800	1.700
EVE 2400/2401	1.200	2.600

SCRAPING ROLLER

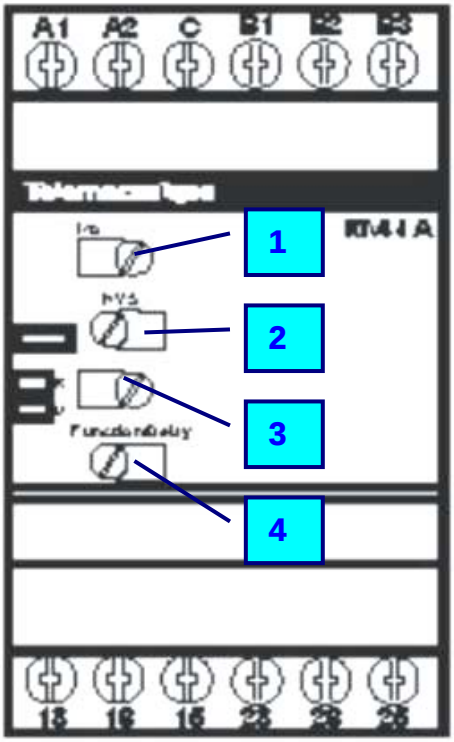
It is advisable to check that the position of the scraping roller corresponds to the original position during assembly. Its distance from the wall of the cylinder must be 0,4 mm, at room temperature of approximately 20°C.
The roller must never touch the surface of the evaporator, contact will damage the surface.
The adjustment of this distance is achieved by loosening the bolts that keep the box supports fixed, (positioned on the upper and lower part of the roller holder arm) and by moving the roller until it reaches the required distance. After carrying out the adjustment, ensure that the roller does not move whilst retightening the fixings.

GEAR REDUCER PROTECTION – RM4JA32

- ***Gear reducer of the rotating shaft***
  Electrical supply: 400/50/3

the **measuring relay** (over current protection) is supplied with the machine, to protect the gear reducer and shaft.

The control relay (control RM4JA32) measures the current on the power supply to the motor and controls its operation (see electrical circuit diagram).



In order to avoid an excessive formation of ice before the restart, the measuring relay has to close down the water inlet and refrigerant inlet.

The current relay (gear-motor protection), has to be installed as follows:
A1-A2 electrical supply 24~240V
C+B1 supply phase drive-motor (EVE201-301-401-651-801)
C+B2 supply phase drive-motor (EVE1001-1301-1501-2401)
15 +18 supply relay with manual restart for plant control

SET UP:
1) Current absorbed in normal working conditions increased by 5%;
2) Hysteresis = calibration 15%
3) Timer = calibration 50%
4) Motor function/delay = calibration to >1 sec

SET-UP and WORKING DATA

R22		EVE 200 AS (Bitzer)	EVE 300 AS (Bitzer)	EVE 400 AS (Bitzer)	EVE 650 AS (Bitzer)	EVE 800 AS (Bitzer)	EVE 1000 AS (Bitzer)	EVE 1300 AS (Bitzer)	EVE 1500 AS (J&Hall)	EVE 2400 AS (Bitzer)
Working conditions	High pressure	16-17	16-17	16-17	16-17	16-17	16-17	16-17	16-17	16-17
Working conditions	Low pressure	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8
Working conditions	Oil pressure	2-4	2-4	2-4	2-4	13-15	13-15	13-15	13-15	13-15
Working conditions	Electrical consumption KW									
Working conditions	Power installed kVA									
Working conditions	Current consumption A					54,0			125,0	162,0
Condenser	Air flow m^3/h	10.200	16.960	15.240	19.140	30.480	38.280	61.500	57.400	110.500
Charge	Oil	3	3	4	4	32	32	50-60	50-60	60
Charge	Refrigerant									
Set-up	Oil differential pressure switch	0,8	0,8	0,8	0,8	-	-	-	1 / 2,5	-
Set-up	High pressure switch	22	22	22	22	22	22	22	22	22
Set-up	Low pressure switch	0	0	0	0	0	0	0	0	0
Set-up	Pressure switch Condenser 1	12	12	12	12	12	12	12	12	12
Set-up	Pressure switch Condense 21	15	15	15	15	15	15	15	15	15
Set-up	Economizer pressure switch	-	-	-	-	1,5	1,5	1,5	1,5	1,5
Set-up	Timer shaft, pump, water level	3’	3’	3’	3’	3’	3’	3’	3’	3’
Set-up	Timer S/T or PW	-	-	-	-	1	1	1	3	1
Set-up	Timer flow switch	-	-	-	-	10	10	10	-	10
Set-up	Timer oil level	-	-	-	-	10”	10”	10”	10”	10”
Set-up	Thermostat oil – 1°step	-	-	-	-	40	40	40	40	40
Set-up	Thermostat oil – 2°step	-	-	-	-	50	50	50	50	50
Set-up	Thermostat oil – 3°step	-	-	-	-	80	80	80	80	80
Set-up	Voltage limiter – 1	+10	+10	+10	+10	+10	+10	+10	+10	+10
Set-up	Voltage limiter – 2	-10	-10	-10	-10	-10	-10	-10	-10	-10
Set-up	Current limiter/shaft – 1									
Set-up	Current limiter/shaft – 2	15	15	15	15	15	15	15	15	15
Set-up	Current limiter/shaft – 3	50	50	50	50	50	50	50	50	50
Set-up	Current limiter/shaft – 4	>1	>1	>1	>1	>1	>1	>1	>1	>1
General Electrical supply	fuses	40A	40A	100A	100A	125A	160A	200A	200A	400A

SET-UP and WORKING DATA

R404a		EVE 200 AS (Bitzer)	EVE 300 AS (Bitzer)	EVE 400 AS (Bitzer)	EVE 650 AS (Bitzer)	EVE 800 AS (Bitzer)	EVE 1000 AS (Bitzer)	EVE 1300 AS (Bitzer)	EVE 1500 AS (J&Hall)	EVE 2400 AS (Bitzer)
Working conditions	High pressure	16-17	16-17	16-17	16-17	16-17	16-17	16-17	16-17	16-17
Working conditions	Low pressure	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8	0,4-0,8
Working conditions	Oil pressure	2-4	2-4	2-4	2-4	13-15	13-15	13-15	13-15	13-15
Working conditions	Electrical consumption KW									
Working conditions	Power installed kVA									
Working conditions	Current consumption A	16,0	22,0	30,0	51,0	70,0				
Condenser	Air flow m^3/h	10.200	16.960	15.240	19.140	30.480	38.280	61.500	57.400	110.500
Charge	Oil	3	3	4	4	32	32	50-60	50-60	60
Charge	Refrigerant									
Set-up	Oil differential pressure switch	0,8	0,8	0,8	0,8	-	-	-	1 / 2,5	-
Set-up	High pressure switch	22	22	22	22	22	22	22	22	22
Set-up	Low pressure switch	0	0	0	0	0	0	0	0	0
Set-up	Pressure switch Condenser 1	12	12	12	12	12	12	12	12	12
Set-up	Pressure switch Condense 21	15	15	15	15	15	15	15	15	15
Set-up	Economizer pressure switch	-	-	-	-	1,5	1,5	1,5	1,5	1,5
Set-up	Timer shaft, pump, water level	3’	3’	3’	3’	3’	3’	3’	3’	3’
Set-up	Timer S/T or PW	-	-	-	-	1	1	1	3	1
Set-up	Timer flow switch	-	-	-	-	10	10	10	-	10
Set-up	Timer oil level	-	-	-	-	10”	10”	10”	10”	10”
Set-up	Thermostat oil – 1°step	-	-	-	-	40	40	40	40	40
Set-up	Thermostat oil – 2°step	-	-	-	-	50	50	50	50	50
Set-up	Thermostat oil – 3°step	-	-	-	-	80	80	80	80	80
Set-up	Voltage limiter – 1	+10	+10	+10	+10	+10	+10	+10	+10	+10
Set-up	Voltage limiter – 2	-10	-10	-10	-10	-10	-10	-10	-10	-10
Set-up	Current limiter/shaft – 1									
Set-up	Current limiter/shaft – 2	15	15	15	15	15	15	15	15	15
Set-up	Current limiter/shaft – 3	50	50	50	50	50	50	50	50	50
Set-up	Current limiter/shaft – 4	>1	>1	>1	>1	>1	>1	>1	>1	>1
General Electrical supply	fuses	40A	40A	100A	100A	125A	160A	200A	200A	400A

VIII. CLEANING, MAINTENANCE and REPLACEMENT PROCEDURES

Maintenance is minimal, but should be carried out regularly, paying attention to any abnormalities, thereby avoiding small malfunctions becoming major break-downs.

Maintenance is as follows:

1. check the distance of the scraping roller and scraping blade to wall of the evaporator and check the two bushings, adjust/replace as necessary.

2. cleaning of the filter with compressed air. Normally dirty filters lead to a shut-down of the machine, caused by an intervention from the control system

3. drain the evaporator of oil. First stop the system and empty the machine of the refrigerant liquid, wait a few hours, to allow the oil to warm up, and then open the release tap.
This operation gives excellent results, if repeated several times at hourly intervals.
The accumulation of oil in the evaporator can over time, lead to poor machine performance (production decrease), leave a deposit on the level regulator (FTL), thermostatic and other devices, with consequent malfunctions.

4. replacement of the ice-breaker shaft bushing (advised once a year)

5. Cleaning
   It is advisable to clean all parts that come into contact with water, at least once a year (internal surfaces, water distributor, piping, pump and filter).
   If the water is extremely impure and very calcareous, it may be necessary to carry out cleaning more regularly
   Use Scotsman CLEANER diluted in warm water (30-35°C), in the following quantity:
   1 part water to 3 parts cleaner
   Allow only the pump and reducer to work for a minimum of 30 minutes, maximum 2 hours, depending on amount of contamination
   Once the cleaning stage has come to an end, circulate water only for 15-20 minutes to rinse the machine and remove traces of cleaner.

6. Check and unblock obstructed holes in the water distributor

8. Clean the condenser air/water cooled twice a year if possible

9. Verify working conditions (pressures and electrical consumption) each 3-4 months

10. Check oil level compressor

11. Safety pressure valve does not guarantee a double intervention; in case the valve has opened it is necessary to replace it

12. For compressor maintenance please refer to manufacturer service manual

a) REPLACEMENT OF GEAR REDUCER and MOTOR

To replace gear reducer proceed as follows:

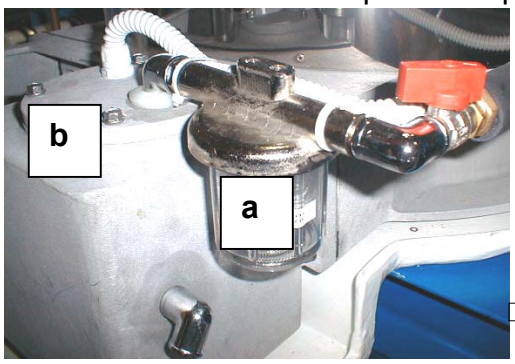
a. disconnect/switch off the electrical supply for the general circuit
b. disconnect the electrical cables from the gear-reducer
c. remove the nut and locknut from the machine's rotating shaft
d. remove the four screws from the gear-reducer cover
e. with an extractor remove the gear reducer from the rotating shaft
f. fit the new gear reducer by reversing the procedure
g. when starting the machine check that the shaft is rotating in the direction indicated by the arrow (anti clockwise)

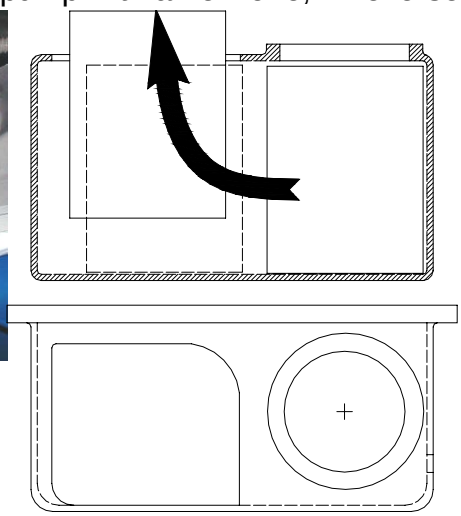
The oil used in the reducer is "long life" and it is not expected that it will have to be changed during the life of the reducer; in cases of accidental spillage it is standard practice to re-use it. If this is not possible, it is advisable to completely replace it with another similar type of oil. Each producer of lubricant has a comparison table and any synthetic oil with 220-320 grade can be used.

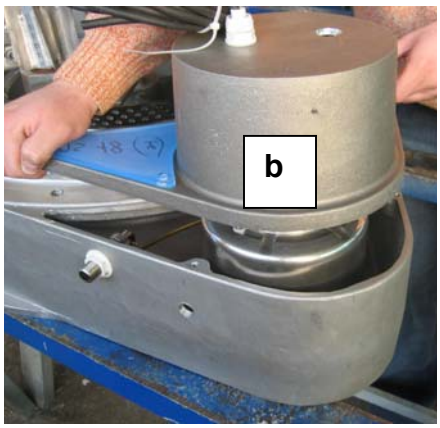
AGIP TELIUM OIL SC320
SHELL TIVELA OIL SC320
KLUBER SYNTHESO D 200 EP
FINA GIRAM S320
ESSO GLICOLUBE RANGE 220

b) WATER PUMP REPLACEMENT

Disconnect/switch off electrical supply to pump circuit. Disconnect the electrical cable from the connector block, disconnect the copper pipe, the filter and coupling that enter the water reservoir (a); remove the pump cover unscrewing the bolts, (b); remove the pump from inside the reservoir. Replace the pump with a new one, in reverse order.

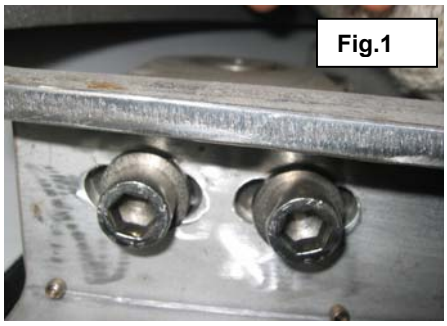




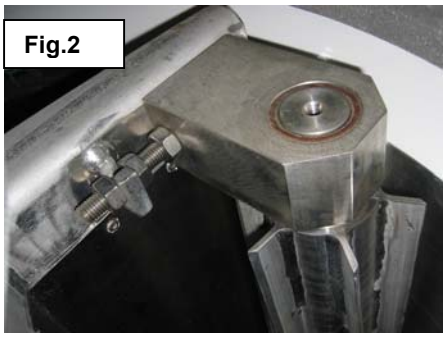


c) REPLACEMENT of ICE-BREAKER BUSH and SCRAPER

Stop the scraping roller in a position that enables you to access it from the upper access area.

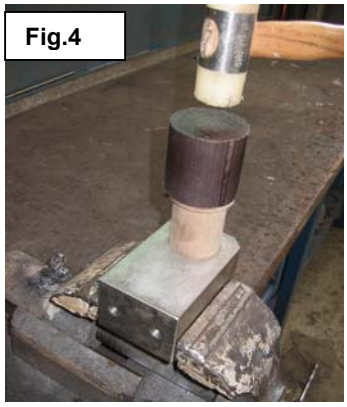


Slacken the two socket head screws behind the ice-breaker support (fig.1).
Slacken the adjusting screw (fig.2)



Remove the support, place in a vice and with a hammer and plastic cylinder, apply pressure until the bush is removed.

Insert the new bush with a wooden cylinder or similar to distribute the mechanical pressure during the forced insertion. (fig.3/4).
Re-position the upper support fixing it loosely with the socket head screws. Before unscrewing the lower support, the shaft should be secured with an eyebolt (fig.5) so that it does not fall.



Repeat the same operation as used for the upper support, tighten all screws
Check that the roller rotates freely (without coming into contact with the evaporator); if it is off-axis, proceed by loosening the adjustment screws and adjust as required, (see start-up and adjustment).

For the replacement of the ice-breaker follow the same procedure. Slacken the screws on the upper support; remove the roller and the upper and lower supports. The lower support is accessible from the ice outlet.


Lower support registration screw


lower support - socket head fixing screws

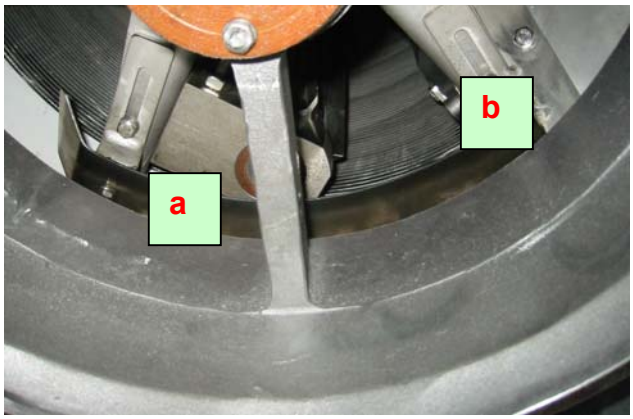
d) REPLACEMENT OF THERMOSTATIC VALVE / FTL

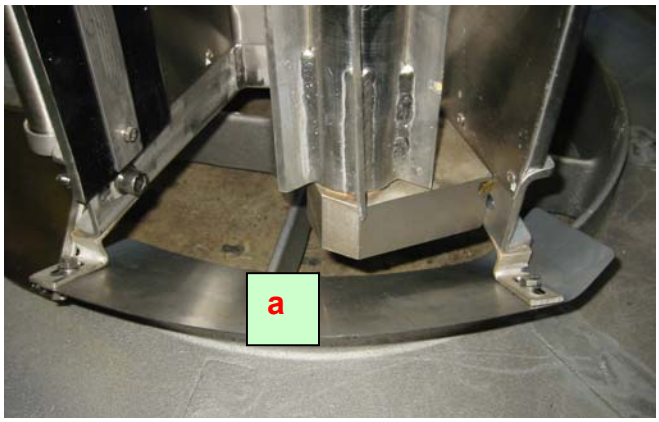
Before replacing the part, check that there is no refrigerant in the evaporator.
Proceed with the necessary operations in order to bring the valve / FTL to a state of good working order.

Maintenance has to be done by qualified personnel and complying to the standards of the country where the machine is installed.

e) REPLACEMENT OF DEFLECTOR

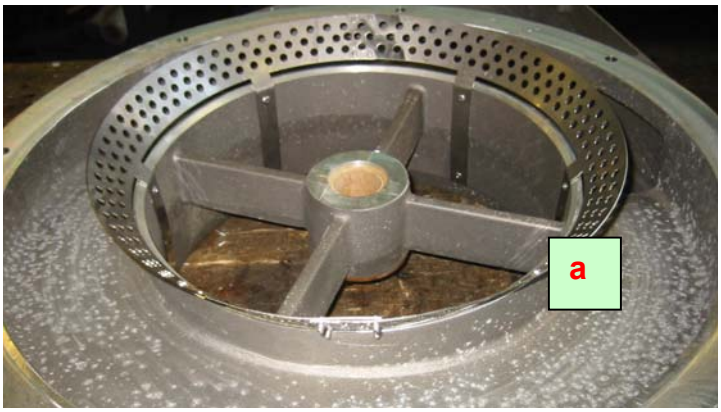
The lower deflector (a) is fixed onto the V support arms of the rotating shaft and the scraper with two M8 screws (b). The disassembly of the deflector should be carried out from the lower part of the ice outlet by unscrewing the two screws. This will allow removal of the deflector and fitting of replacement.

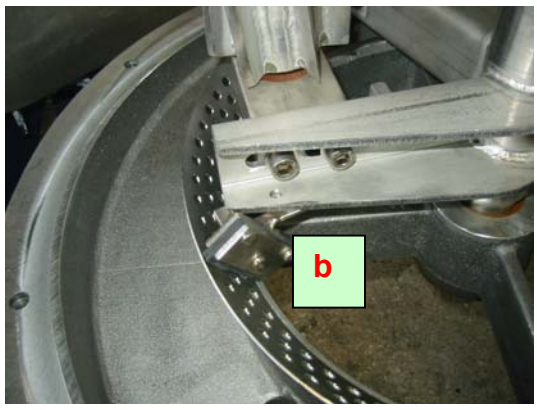


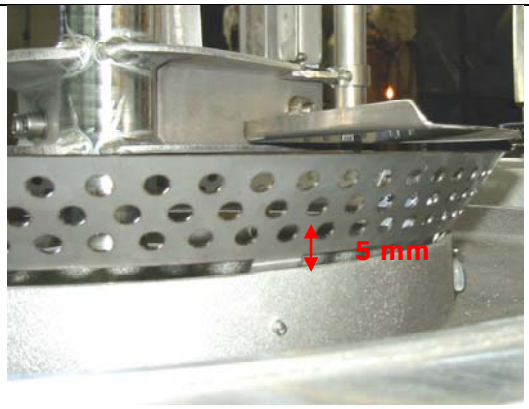


f) REPLACEMENT DEFLECTOR and DRIP TRAY

The deflector is manufactured in two parts fixed together with rivets (a).
The deflector brush (b) is placed in contact with the deflector and fixed with M8 screws to the V arm of the rotating shaft.





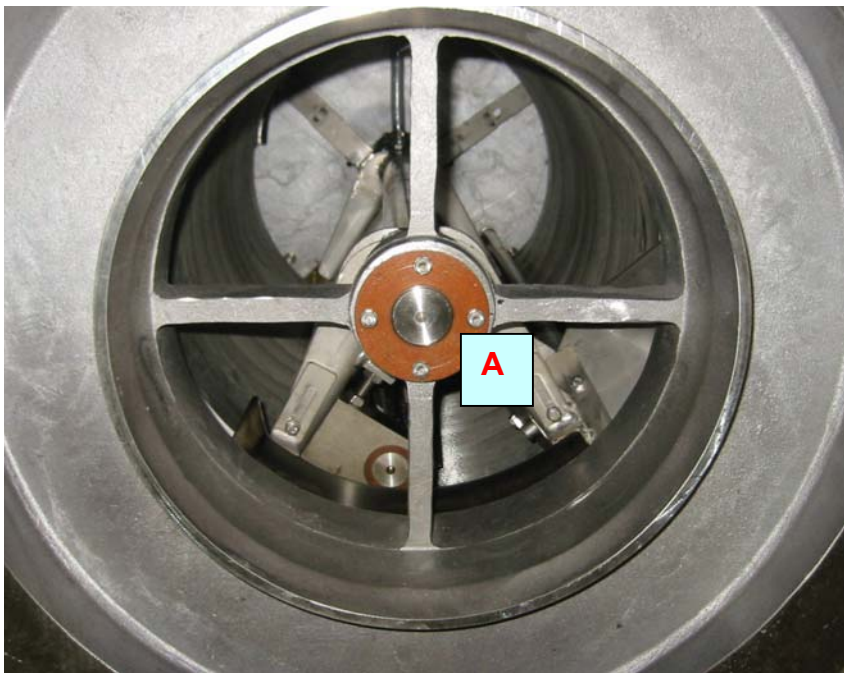


The drip tray is placed few millimetres above the deflector to collect water not frozen on the cylinder surface.
It is very important that this component is draining the water toward the external side of the machine (water reservoir) .This position must be re-checked every time the drip tray is removed/replaced.

Dismantling of deflector has to be carried out from the lower part/ice chute, by removing the rivets and the two parts of the deflector.
A small drill or flexible drive will assist with the removal of the rivets, especially for the small machines: EVE201-301-401.

Positioning a new deflector has to be carried out by positioning the two parts, then fix together with rivets and finally fix on to the base. Leave a 5mm space between base and deflector.

g. REPLACEMENT SHAFT BUSHING
The lower shaft bush (A) is positioned on the outside of the shaft support base.
The disassembly procedure is carried out from below the machine by unscrewing the 4 fixing screws, to extract the bush from this lower part, use a pipe wrench or similar and turn the bush in an anti-clockwise direction.



IX. CLEANING and MAINTENANCE CONDENSING UNIT

1. CONDENSER/OIL COOLER: cleaning and fans replacement

Remove manually thick dust presence than proceed with a bristle brush or compressed air, to clean the fins completely.
For water cooling it is necessary to remove lime-scale and/or other solid parts by de-scaling and water pressure.
Before replacing the fan motor always isolate the electrical supply from the machine.

Safety first!
For a correct and secure installation use the right tools and protection.

Open the electrical box and disconnect the supply wiring. Loosen the fixing screws of the fan condenser. Take away the fan kit then remove the blade from the motor. At this point replace the faulty motor with the new one following the reverse procedure.

2. COMPRESSOR (see attached service manual)

Please follow the manufacturer instructions

Safety first!
For a correct and secure installation use the right tools and protection.

3. LIQUID RECEIVER: safety pressure valve

When the liquid receiver is operating in normal conditions, does not need maintenance.
Do not attempt to open the receiver when under pressure. Accessories and modification on the liquid receiver has to be approved by the manufacturer.
In case of replacement it is necessary to empty it and drop the pressure to atmospheric level. Any residual oil must be collected and disposed of by specialised personnel.

WARNING! Safety pressure valves do not need maintenance.
Cover or seal removal are not permitted; this will result in the manufacturers warranty being null and void.

Safety valve inspections are restricted to authorized companies and conformity to specific standards in force in the country of installation.

4. FILTERS: oil, suction and liquid line

The cartridge filters can be easily replaced..
Close the check valves before and after the filter; unscrew the screws fixing the filter's closure flange. Unscrew the cover of the coupling flange, than remove the basket, the spring and the plastic cover. Remove the screw to unlock the cartridge. Take away the cartridges and gaskets. Fit the new cartridges and follow the reverse procedure.

5. VALVES: SOLENOID, THERMOSTATIC, CHECK, NON RETURN

Check valves and valves do not need maintenance.
Do not over tighten the valve shaft.
When replacing welded valves cover it with a wet rag to avoid damage to the gaskets/washers, when possible remove these parts before welding.

Replacement of solenoid valve coil: remove the locknut and the fixing screw. Remove the wiring from the terminal board after having isolated power supply. Install the new coil following the reverse procedure.

6. ELECTRICAL CONTROL PANEL: wiring diagram (reciprocating compressors)

GENERAL POWER 0/1: when it is in position “1” (ON) the machine is energized and the crank-case heater warms the compressor oil

VOLTAGE ON (white lamp): the machine is energized

EMERGENCY PUSH-BUTTON (STOP): push this push-button to stop immediately the machine, for emergency needs

RUN (push-button START): when oil compressor has reached the temperature and water supply is connected, push this button to start the machine. The machine will operate as follow:

- open solenoid valve
- start rotating shaft/gear-motor and water pump
- start compressor and condenser fans

ON CYCLE (green lamp): the machine is working

STOP (push-button): push this button to stop the machine normally.
The machine will operate as follow:

- solenoid valve closes refrigerant supply and starts PUMP DOWN phase (vacuum process)
- when PUMP DOWN phase has ended, rotating shaft and water pump still continue working to clear the evaporator of any ice residue; this function is regulated by a timer with a delay of average 5 minutes. Once this time is passed, gear-motor and water pump stops.
- The machine at the moment is ready for a new production cycle

STOP CYCLE (red lamp): the machine is stopped manually by operator

WATER PROBE RESET (push-button and blue lamp): in case of low water level in the water distributor, the machine stops and the blue lamp is illuminated. Verify water supply and pressing of the push-button (RESET) the machine restarts.

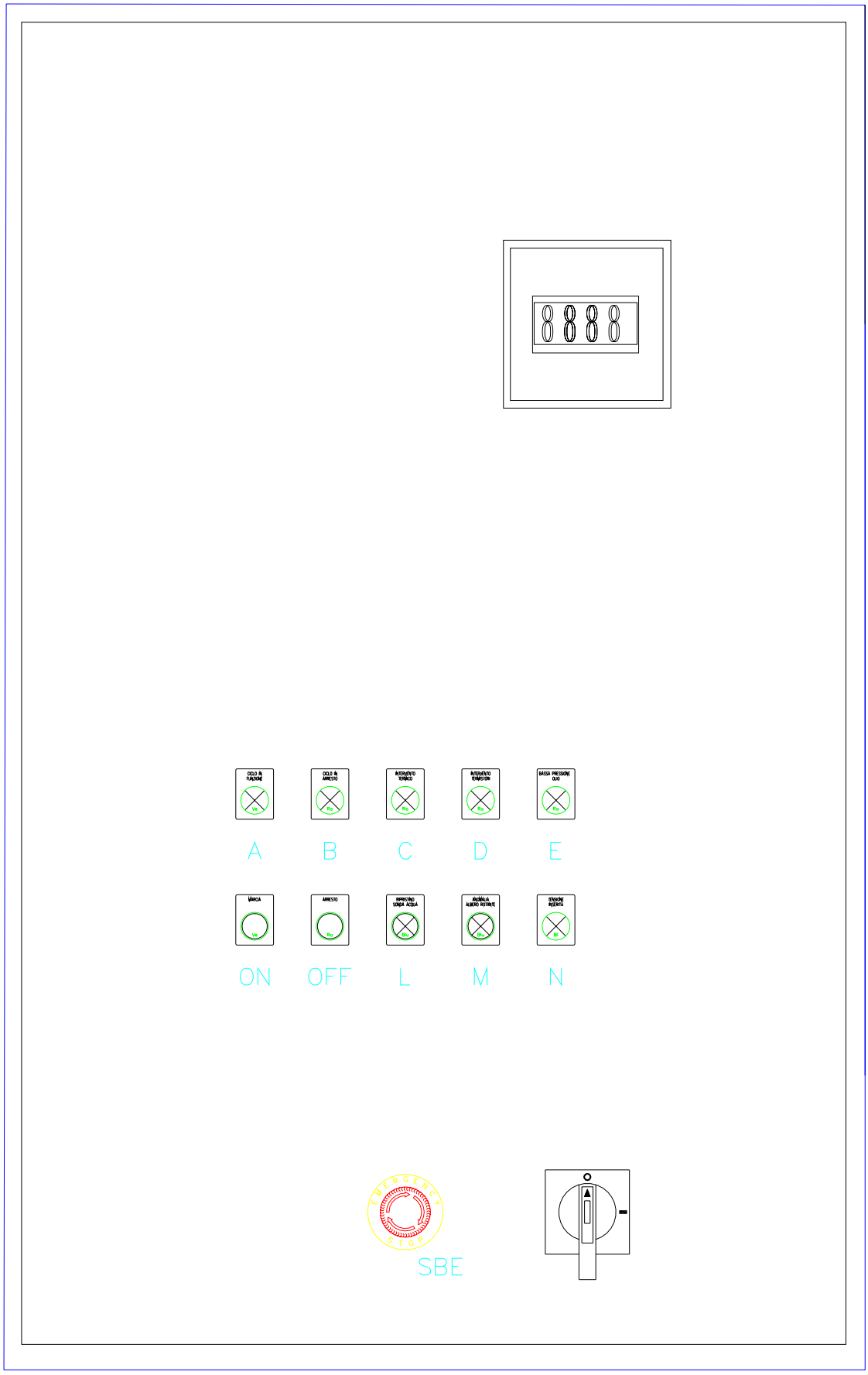
ROTATING SHAFT RESET (push-button and blue lamp): in case of gear-motor overload, the relay measuring the over-current stops the drive-motor and the rotating shaft illuminating the blue lamp. Verify that the ice scraper and the scraper blade are free from ice blocks and/or obstacles than proceed to restart pressing the push-button (RESET)

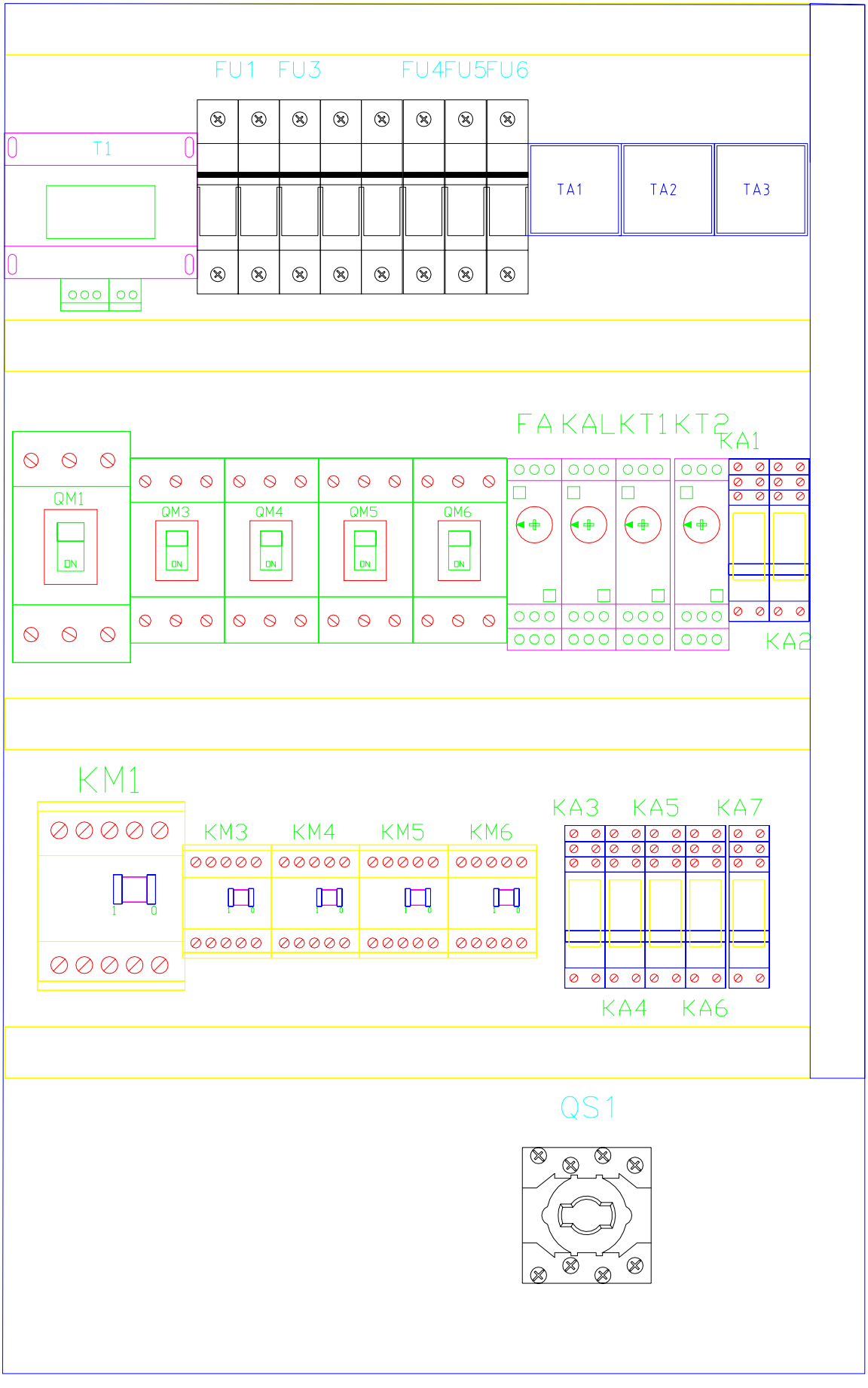
THERMAL PROTECTION (red lamp): should a fault occur with compressor, condenser fan, water pump, gear-motor this lamp is illuminated

THERMISTOR PROTECTION (red lamp): when compressor temperature rises to its pre-set limit this protection will stop the machine and the lamp is illuminated
LOW OIL PRESSURE (red lamp): when oil pressure drops under pre-set level, the machine will stop and the lamp is illuminated

DIGITAL VOLTMETER/AMMETER measures Voltage, Amp current, Electrical supply

Control Panel/Electrical wiring (reciprocating compressors)




FU1 FU3 FU4FU5FU6
T1
TA1
TA2
TA3
FA KAL KT1 KT2
KA1
QM1
QM3
QM4
QM5
QM6
ON
KA2
KM1
KM3
KM4
KM5
KM6
KA3 KA5 KA7
KA4 KA6
QS1

7. ELECTRICAL CONTROL PANEL: wiring diagram (screw compressors)

GENERAL POWER 0/1: when it is in position “1” (ON) the machine is energized and the crank case heater warms the compressor oil

VOLTAGE ON (white lamp): the machine is energized

EMERGENCY PUSH-BUTTON (STOP): push this push-button to stop immediately the machine, for emergency needs

RUN (push-button START): when oil compressor has reached temperature and water supply is connected, push this button to start the machine. The machine will operate as follow:

- open solenoid valve
- start rotating shaft/gear-motor and water pump
- start compressor and condenser fans

ON CYCLE (green lamp): the machine is working

STOP (push-button): push this button to stop the machine.
The machine will operate as follow:

- solenoid valve closes refrigerant supply and starts PUMP DOWN phase (vacuum process)
- when PUMP DOWN phase has ended, rotating shaft and water pump still continue working to clear the evaporator of residual ice; this function is regulated by a timer with a delay of average 5 minutes. Once this time is passed, gear-motor and water pump stops.
- The machine at the moment is ready for a new production cycle

STOP CYCLE (red lamp): the machine is stopped manually by operator

WATER PROBE RESET (push-button and blue lamp): in case of low water level in the water distributor, the machine stops and the blue lamp is illuminated Verify water supply and press the push-button (RESET), the machine restarts.

ROTATING SHAFT RESET (push-button and blue lamp): in case of gear-motor overload, the relay measuring the over-current stops the drive-motor and the rotating shaft illuminating the blue lamp. Verify that the ice scraper and the scraper blade are free from ice and/or obstacles then proceed to restart by pressing the push-button (RESET)

THERMAL PROTECTION (red lamp): when a fault occurs with compressor, condenser fan, water pump, gear-motor this lamp is illuminated

COMPRESSOR FAILURE (push-button and red lamp): when compressor temperature rises to its pre-set limit (discharge gas and winding) this protection will stop the machine and the lamp is illuminated

LUBRICATION ALARM (red lamp): when oil return is low, flow or oil differential pressure switches are activated, the machine will stop and red lamp is illuminated

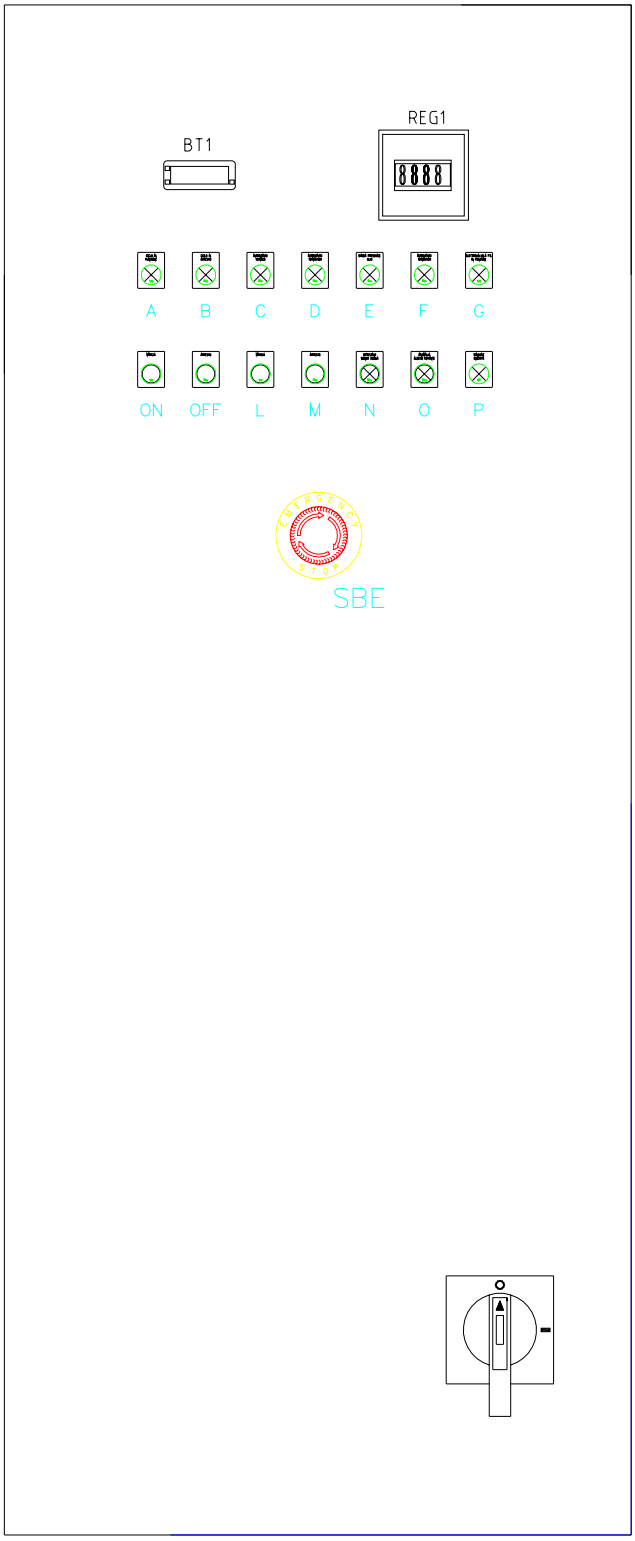
LOW OIL PRESSURE (red lamp): when oil pressure drops below pre-set level, the machine will stop and the lamp is illuminated

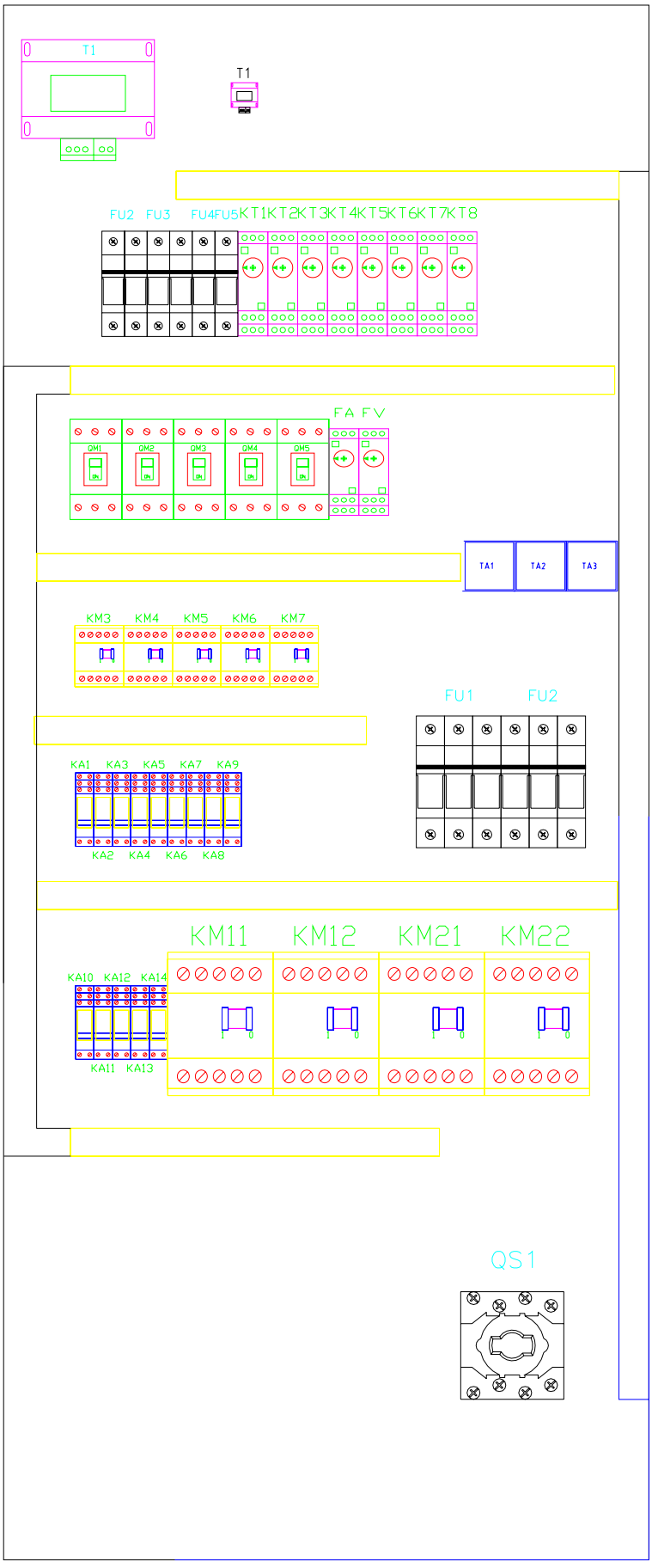
SOLENOID VALVE ON (green lamp): when solenoid valve is energized (open) the lamp is illuminated

DIGITAL OIL THERMOSTAT it is measuring the oil temperature; the machine will not run until the minimum oil temperature has been reached

DIGITAL VOLTMETER/AMMETER measures Voltage, Amp current, Electrical supply

Control Panel/Electrical wiring (screw compressors)




T1
T1
FU2 FU3 FU4FU5KT1KT2KT3KT4KT5KT6KT7KT8
FA FV
QM1 QM2 QM3 QM4 QM5
TA1 TA2 TA3
KM3 KM4 KM5 KM6 KM7
FU1 FU2
KA1 KA3 KA5 KA7 KA9
KA2 KA4 KA6 KA8
KM11 KM12 KM21 KM22
KA10 KA12 KA14
KA11 KA13
QS1

X. FAULT ANALYSIS

Following is a list of the most common faults; for each fault the probable cause is indicated and the operations to carry out on the system's components to achieve normal working.

a. LACK OF ICE:

Ice production will normally only stop whilst the system is operational due a fault associated with either a reduction in refrigerant at the evaporator or excessive discharge temperature/pressure. This will be indicated by either a low suction pressure or high discharge pressure. It is possible however, that the cause may be of a lack of water in the system as the electronic controls would have stopped the equipment (LAND version).
A reduction in refrigerant can be caused by a faulty FTL (check the electrical supply) or a fault on the thermostatic valve that controls the flow of liquid.
In either case the repair is simple: i.e. replace the faulty component (solenoid coil, capillary, FTL).
To check if the FTL is faulty, connect a tester (Ohm resistance meter) onto contacts 1 and 3; immerse the FTL in a bowl of water and see if by changing its position in respect to the water level, the tester shows a variation in the continuity (ON/OFF).

b. NON UNIFORM FREEZING

There are various possible solutions:
b1. Vertical lines: the water is badly distributed by the distributor (blocked holes, dirty water filter, etc.).
For this repair these components should be unblocked or cleaned.

b2. Lack of ice in the upper part of the cylinder: the flow of refrigerant is insufficient
Adjust the regulation tap or the thermostatic valve and if still insufficient add more refrigerant.

b3. Discoloured, thinner ice: there is oil in the evaporator cylinder
Therefore it is necessary to remove it by using the appropriate release tap (see cleaning and maintenance)

b4. Excessive thickness of ice: results in an irregular movement of the scraping roller and the rotating shaft. This is caused by too much refrigerant entering the evaporator, adjust/replace expansion valve or check operation of FTL Another cause is the speed of the rotating shaft, check operation.

c. REDUCED PRODUCTION

c1. It is mainly caused by a reduction in thermal exchange a dirty FTL or thermostatic valve usually due to the presence of oil in the evaporator. Remove the oil as described in cleaning and maintenance.

c2. Insufficient input of refrigerant liquid.

d) ICE WHICH IS DIFFICULT TO BREAK:

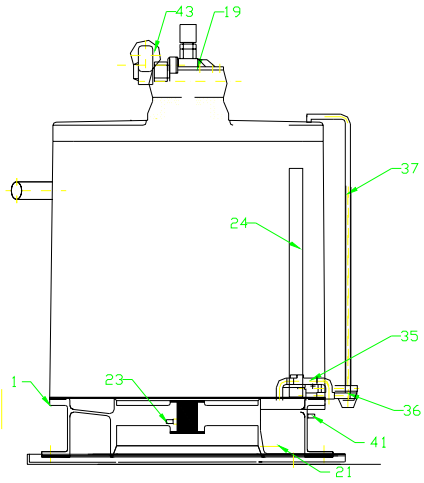
Check the distance between the scraping roller and scraping blade and adjust as required, if the problem persists add some salt to the water, see start-up and adjustment.

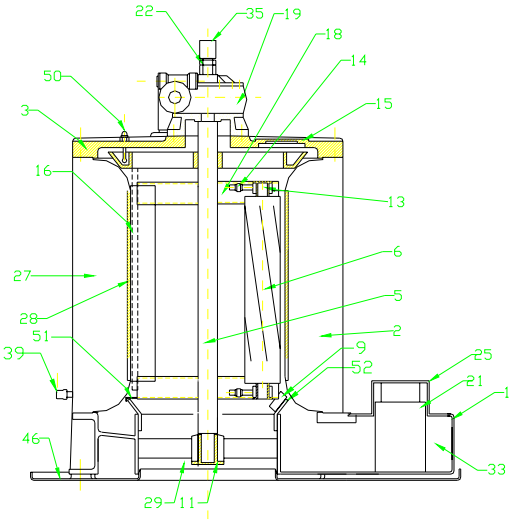
e) LIQUID RETURN TO THE COMPRESSOR:

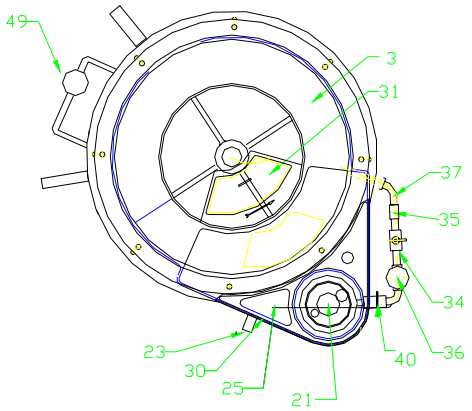
The evaporator is being overfed; it is necessary to adjust the regulation tap (FTL) or the thermostatic valve.

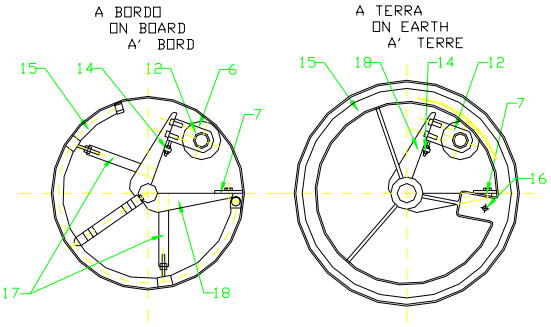
This could also occur when the machine has not been shut-down according to the correct procedure.

XI. EXPLODED VIEWS and PARTS LIST



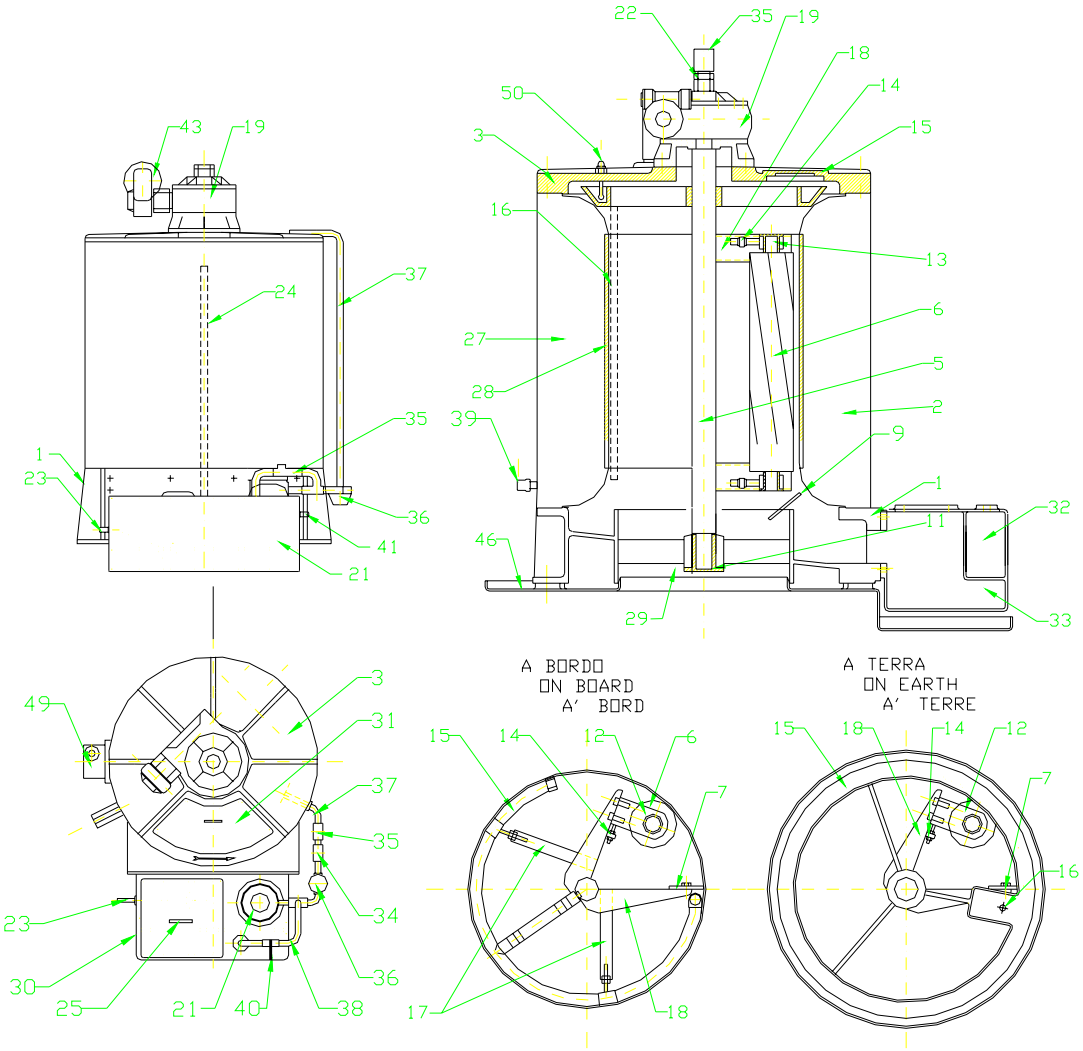






EVE200 – 300 - 400

Pos.	component	q.ity	Pos.	component	q.ity
1	Base	1	27	Insulation	-
2	Evaporator cylinder:	1	28	Internal screw base	-
3	Upper cover	1	29	Ice outlet hole	-
5	Rotating Shaft	1	30	Water drawer	1
6	Scraping roller – ice-breaker	1	31	Upper cover inspection hatch	1
7	scraping blade	1	32	Water and salt reservoir	-
9	Deflector kit + drip tray	1	33	Water accumulation reservoir	-
11	Small-end bushing rotating Shaft	1	34	Water regulation tap	1
12	Scraping roller support	2	35	Water input rotating coupling	1
13	Scraping roller bushing	2	36	Water filter	1
14	Scraping roller register screws	2	37	Delivery piping to the distributor	-
15	Raceway/water distribution ring	1	38	Delivery piping to the salt drawer	-
16	Vertical water distributor	1	39	Oil release tap	1/2
17	Water distributor ring support board versions	-	40	Salinity regulation tap	-
18	Scraping roller / scraping blade door brackets	-	41	Overflow piping attachment	-
19	Gear reducer	-	43	Electrical motor	1
21	Water pump	1	46	Drip pan	1
22	Rotating shaft nut and lock nut tightening	1+1	49	thermostatic valve or electrical level regulator FTL	1
23	Solenoid valve	1	50	Water level probe	1
24	Salt door tube	1	51	Shaft Drip tray	1
25	Water accumulation reservoir hatch	1	52	Brush deflector	1



EVE650 – 800 – 1000 – 1300 – 1500 - 2400

Pos.	component	q.ity	Pos.	component	q.ity
1	Base	1	27	Insulation	-
2	Evaporator cylinder:	1	28	Internal screw base	-
3	Upper cover	1	29	Ice outlet hole	-
5	Rotating Shaft	1	30	Water drawer	1
6	Scraping roller – ice-breaker	1	31	Upper cover inspection hatch	1
7	scraping blade	1	32	Water and salt reservoir	-
9	Deflector kit + drip tray	1	33	Water accumulation reservoir	-
11	Small-end bushing rotating Shaft	1	34	Water regulation tap	1
12	Scraping roller support	2	35	Water input rotating coupling	1
13	Scraping roller bushing	2	36	Water filter	1
14	Scraping roller register screws	2	37	Delivery piping to the distributor	-
15	Raceway/water distribution ring	1	38	Delivery piping to the salt drawer	-
16	Vertical water distributor	1	39	Oil release tap	1/2
17	Water distributor ring support board versions	-	40	Salinity regulation tap	-
18	Scraping roller / scraping blade door brackets	-	41	Overflow piping attachment	-
19	Gear reducer	-	43	Electrical motor	1
21	Water pump	1	46	Drip pan	1
22	Rotating shaft nut and lock nut tightening	1+1	49	thermostatic valve or electrical level regulator FTL	1
23	Solenoid valve	1	50	Water level probe	1
24	Salt door tube	1			
25	Water accumulation reservoir hatch	1			

1) COMPRESSOR GROUP
2) OIL COOLING GROUP
3) AIR/WATER COOLING GROUP
4) LIQUID RECEIVER GROUP
5) ECONOMIZER GROUP
6) GAUGES GROUP
7) ELECTRICAL CONTROL BOARD GROUP
8) OIL FILTER
9) LIQUID LINE FILTER
10) OIL SEPARATOR GROUP
11) THERMOSTATIC AND SOLENOID VALVE
12) SALT FEEDING PUMP
13) SUCTION FILTER
14) EVAPORATOR GROUP

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