

Ice-O-Matic®

SERVICE PARTS MANUAL ICE UNDERCOUNTER SERIES CUBERS

MODELS

ICEU 045

ICEU 065

ICEU 085

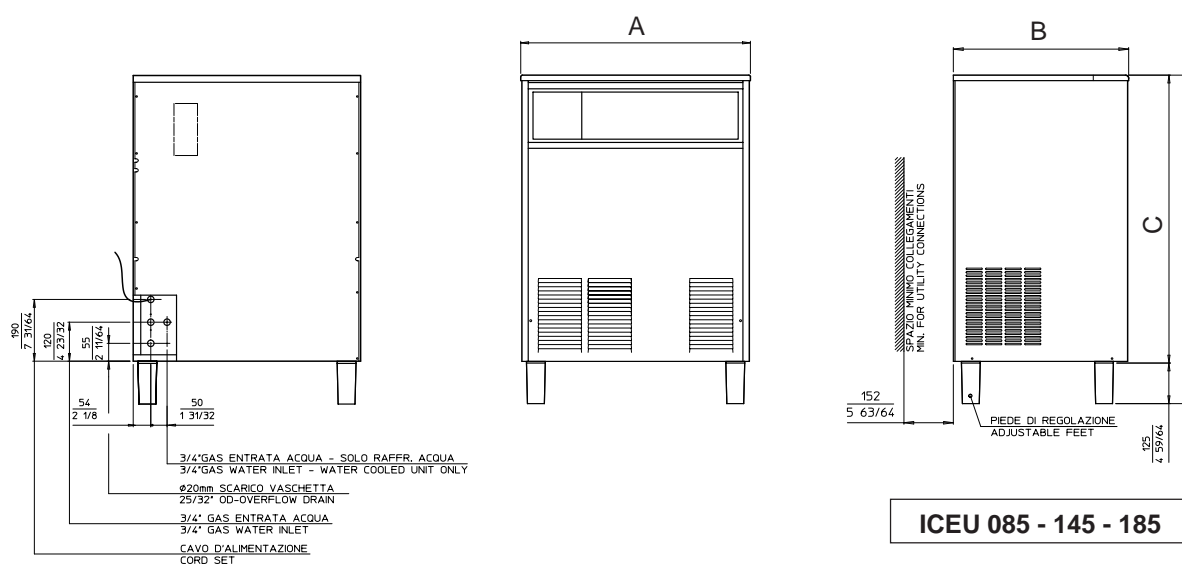
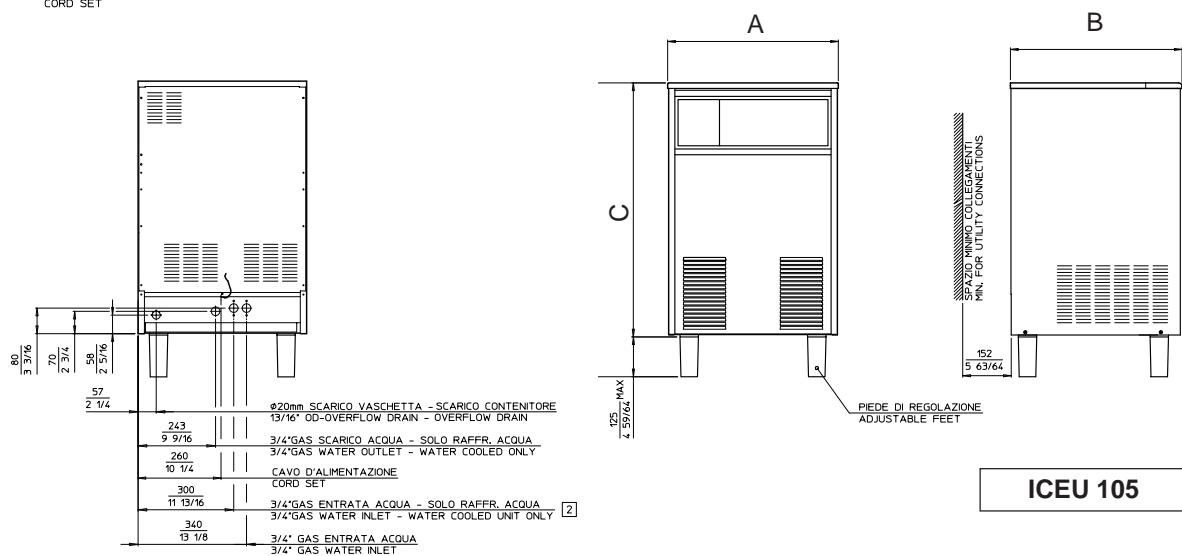
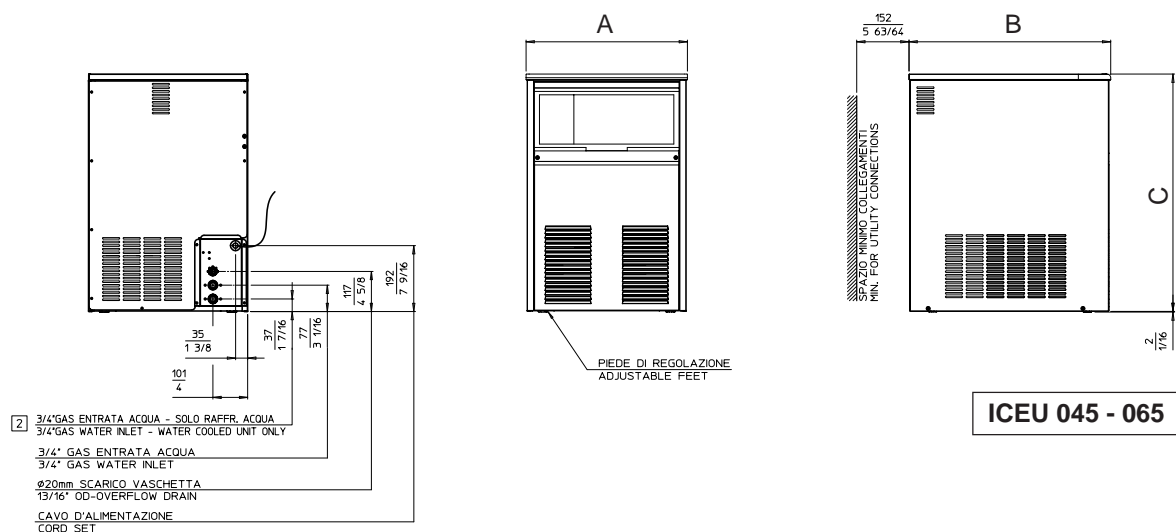
ICEU 105

ICEU 145

ICEU 185

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b)



| | ICEU 045 | ICEU 065 | ICEU 085 | ICEU 105 | ICEU 145 - 185 |
|----------|----------|----------|----------|----------|----------------|
| A | 389 mm | 465 mm | 529 mm | 529 mm | 699 mm |
| B | 515 mm | 586 mm | 525 mm | 535 mm | 536 mm |
| C | 640 mm | 690 mm | 815 mm | 796 mm | 885 mm |

FIG. A

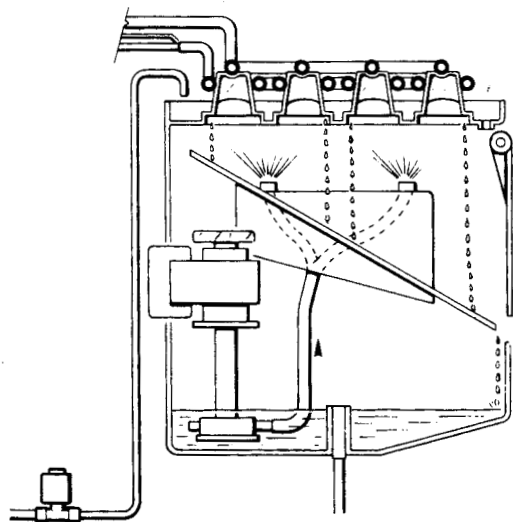


FIG. B

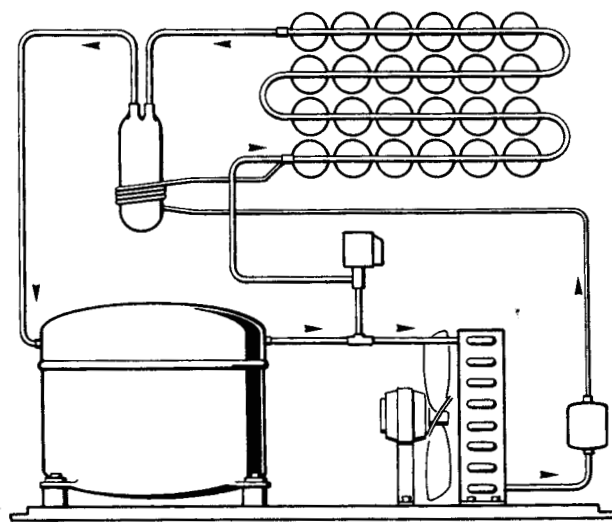


FIG. C

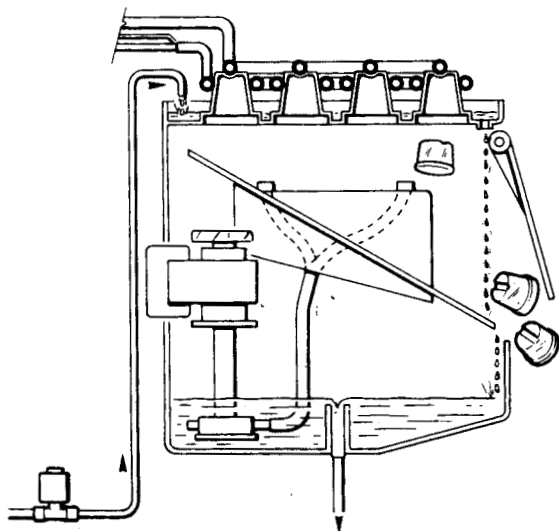
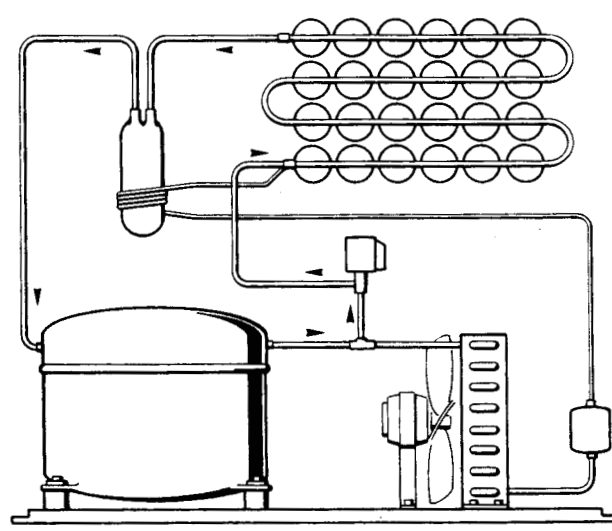


FIG. D



TECHNICAL SPECIFICATIONS - SPECIFICHE TECNICHE - DONNÉES TECHNIQUE - TECHNISCHE ANGABEN

| | ICEU 045A 045W | | ICEU 065A 065W | | ICEU 085A 085W | | ICEU 105A 105W | | ICEU 145A 145W | | ICEU 185A 185W | |
|--|---|---------------------------------|---|---------------------------------|---|---------------------------------|---|---------------------------------|---|---------------------------------|---|---------------------------------|
| Electric voltage Alimentazione elettrica Alimentation électrique Netzspannung | 230/50/1 -10 + +10% | | 230/50/1 -10 + +10% | | 230/50/1 -10 + +10% | | 230/50/1 -10 + +10% | | 230/50/1 -10 + +10% | | 230/50/1 -10 + +10% | |
| Condensation Condensazione Condensation Kühlung | Air Aria Air Luft | Water Acqua Eau Wasser | Air Aria Air Luft | Water Acqua Eau Wasser | Air Aria Air Luft | Water Acqua Eau Wasser | Air Aria Air Luft | Water Acqua Eau Wasser | Air Aria Air Luft | Water Acqua Eau Wasser | Air Aria Air Luft | Water Acqua Eau Wasser |
| Bin capacity (kg) Capacità contenitore (kg) Capacité bac glaçons (kg) Lademenge (kg) | 8 | | 15 | | 16 | | 18 18 | | 30 | | 30 | |
| Net weight (kg) Peso netto (kg) Poids net (kg) Nettogewicht (kg) | 35 | | 39 | | 45 | | | | 61 | | 73 | |
| Cubes per cycle Cubetti per ciclo Glaçons par cycle Würfel per Zyklus | 18 | | 24 | | 24 | | 32 | | 48 | | 48 | |
| Compressor power HP Potenza compressore CV Puissance compresseur CV Kompressorleistung PS | 1/5 | | 1/4 | | 3/8 | | 3/8 | | 1/2 | | 3/4 | |
| Running amps Amperaggio di marcia Ampérage en marche Ampere | 2,2 | | 2,4 | | 3,2 | | 3,5 | | 3,8 | | 5,3 | |
| Start amps Amperaggio d'avv. Ampérage de démarr. Start Ampere | 9 | | 11 | | 17 | | 18 | | 20 | | 26 | |
| Power (Watts) Potenza (Watt) Puissance (Watts) Leistung (Watt) | 310 | | 380 | | 500 | | 550 | | 670 | | 830 | |
| Power cons. in 24 hrs (Kwh) Consumo elettr. in 24 ore (Kwh) Cons. electr. en 24 hrs (Kwh) Stromverbrauch in 24 Std. (kWh) | 6,3 | | 7,8 | | 10 | | 10 | | 13 | | 16 | |
| Wire size (mm ²) Sezione cavi (mm ²) Section fils (mm ²) Kabelstärke (mm ²) | 3 x 1,5 | | 3 x 1,5 | | 3 x 1,5 | | 3 x 1,5 | | 3 x 1,5 | | 3 x 1,5 | |
| Water consumption (lt/hr) Consumo acqua (lt/ora) Consommation eau (lt/hr) Wasserverbrauch (lt/std) | 3 | 11* | 4 | 12* | 6 | 16* | 8 | 30 * | 7 | 34* | 11 | 42* |
| Refrig. charge R 134 A (gr) Carica refrig. R 134 A (gr) Charge refrig. R 134 A (gr) Kühlmittel - Full. R 134 A (gr) | 250 | 250 | 260 | 250 | 290 | 250 | 320 | 250 | 450 | 300 | 450 | 330 |
| Refrigerant metering device Disp. espansione refrigerante Détente du Réfrigérant Kühlmittel - Expansionssystem | Capillary tube Tubo capillare Tube Capillaire Kapillarrohr | | Capillary tube Tubo capillare Tube Capillaire Kapillarrohr | | Capillary tube Tubo capillare Tube Capillaire Kapillarrohr | | Capillary tube Tubo capillare Tube Capillaire Kapillarrohr | | Capillary tube Tubo capillare Tube Capillaire Kapillarrohr | | Capillary tube Tubo capillare Tube Capillaire Kapillarrohr | |

Water - Acqua - Eau - Wasser: 15°C (60°F)

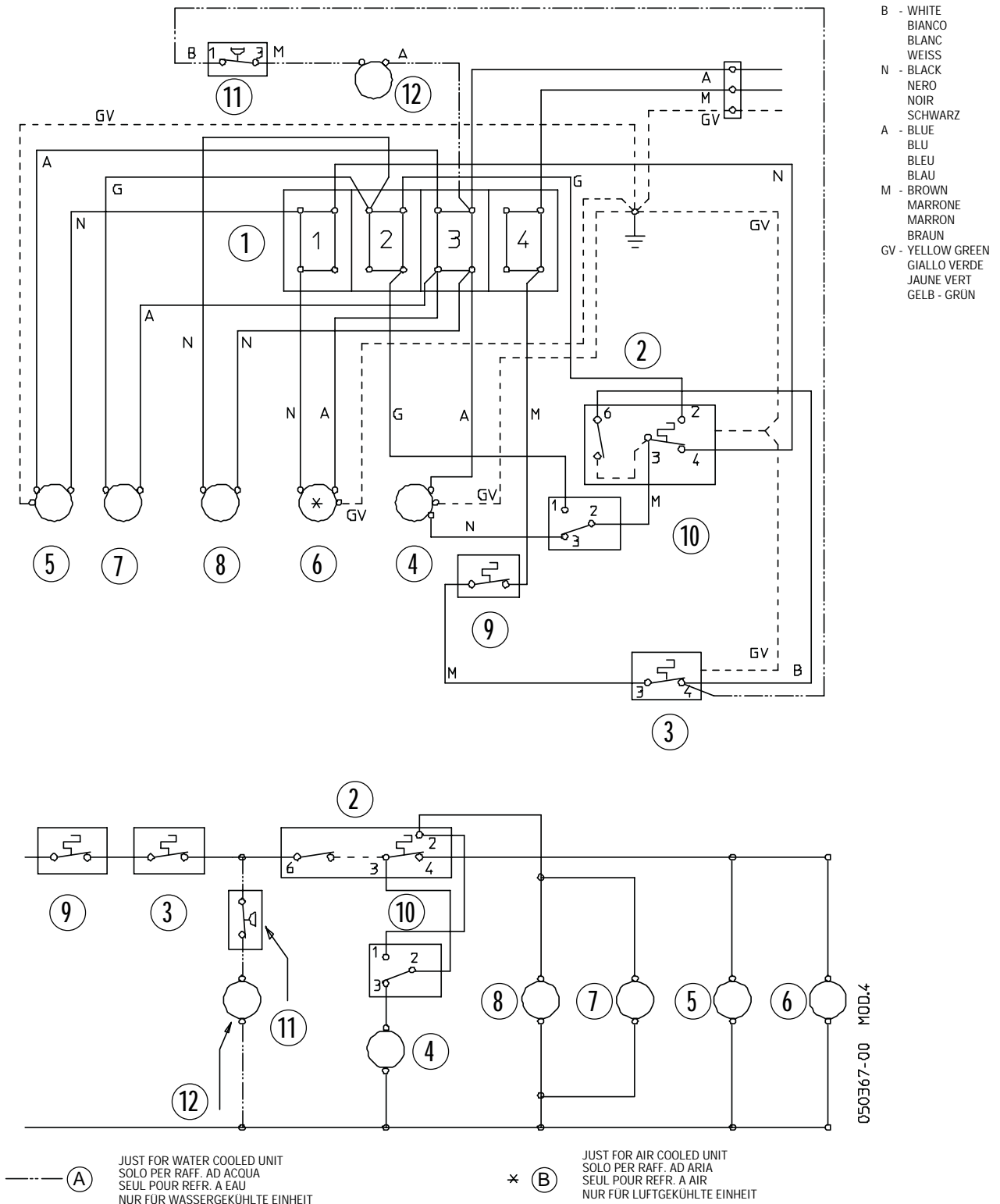
OPERATING PRESSURES - PRESSIONI DI FUNZIONAMENTO - PRESSIONES DE FONCTIONNEMENT - BETRIEBSDRÜCKE

| | | Discharge pressure - Pressione di mandata Haute pression - Hochdruckbereich | Suction pressure - Pressione di aspirazione Basse pression - Niederdruck |
|--|----------------------|--|--|
| | | Freezing cycle - Ciclo di congelamento Cycle de Congélation - Gefrierfase | End of freezing cycle - Fine ciclo di congelamento Fin du cycle de congélation - Ende der Gefrierfase |
| Air cooled - Raffr. ad aria Refroid. à air - Luftgekühlt | ICEU 045-065-085 | 7÷11 bar 100÷155 psig | 0÷0.1 bar 0÷1.5 psig |
| Air cooled - Raffr. ad aria Refroid. à air - Luftgekühlt | ICEU 105-145-185 | 8.5÷10 bar 120÷140 psig | 0.2÷0.3 bar 3÷4 psig |
| Water cooled - Raffr. ad acqua Refroid. à eau - Wassergekühlt | ICEU 045-065-085-105 | 8.5÷10 bar 120÷140 psig | 0÷0.1 bar 0÷1.5 psig |
| Water cooled - Raffr. ad acqua Refroid. à eau - Wassergekühlt | ICEU 145-185 | 9.5 bar 130 psig | 0.2÷0.3 bar 3÷4 psig |

WIRING DIAGRAM - SCHEMA ELETTRICO - SCHÉMA ÉLECTRIQUE - SCHALTUNGSSCHEMA

AIR & WATER COOLED - RAFFREDDAMENTO AD ARIA ED AD ACQUA.
REFROIDISSEMENT A AIR ET A EAU - LUFT- UND WASSERGEKÜHLT

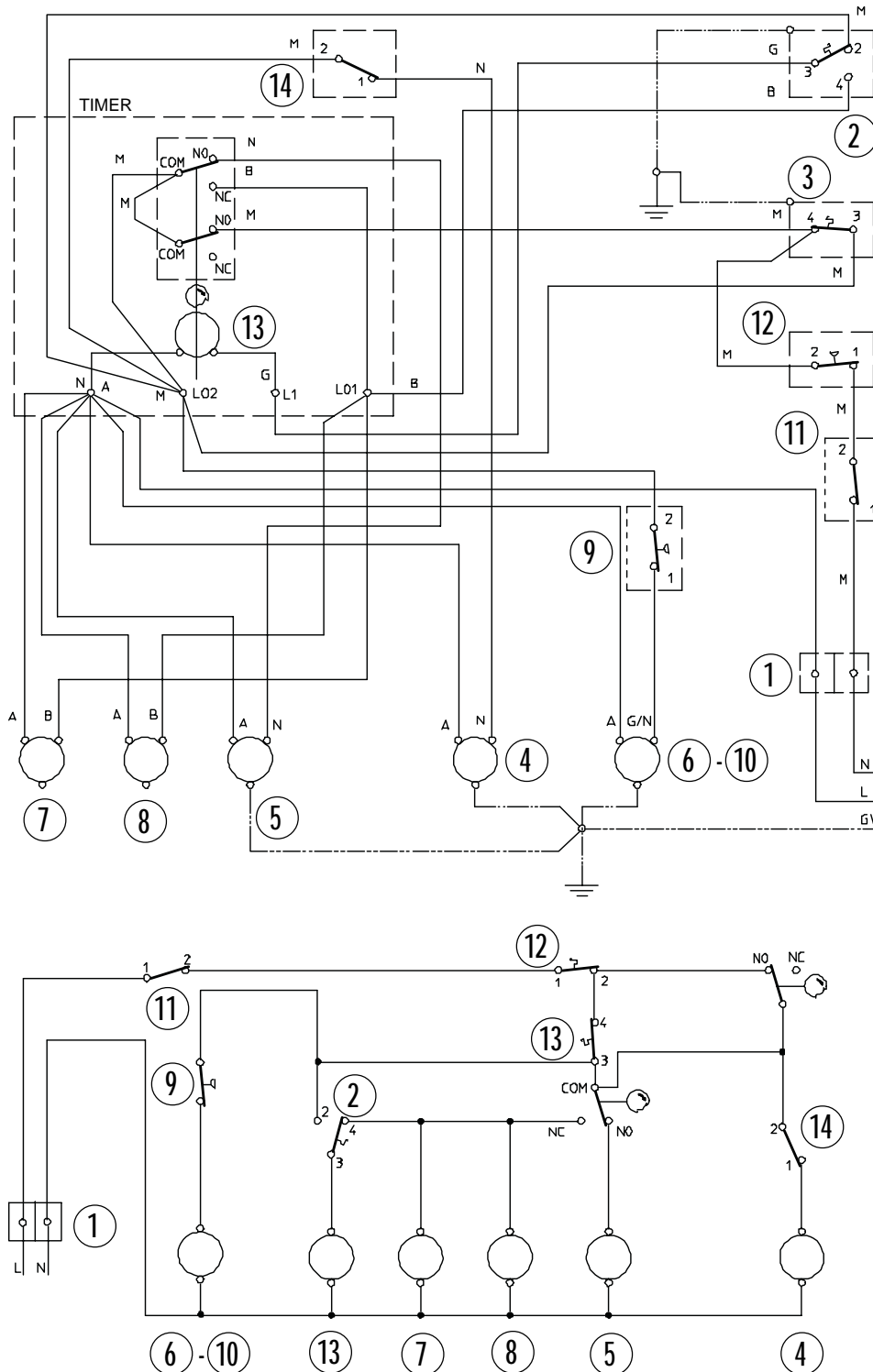
230/50-60/1

1 TERMINAL BOARD - MORSETTIERA
BORNIER - ANSCHLUSSKASTEN2 EVAPORATOR THERMOSTAT - TERMOSTATO EVAPORATORE
THERMOSTAT EVAPORATEUR - VERDAMPFER THERMOSTAT3 BIN THERMOSTAT - TERMOSTATO CONTENITORE
THERMOSTAT CABINE - SPEICHER THERMOSTAT4 COMPRESSOR - COMPRESSORE
COMPRESSEUR - KOMPRESSOR5 WATER PUMP - POMPA
POMPE A EAU - WASSERPUMPE6 FAN MOTOR - VENTILATORE
MOTOVENTILATEUR - LÜFTERMOTOR7 WATER SOL. VALVE - VALV. INGR. ACQUA
VANNE ARRIVEE EAU - WASSEREINLASSVENTIL8 HOT. GAS VALVE - VALVOLA GAS CALDO
VANNE GAZ CHAUDS - HEISSGASVENTIL9 HI TEMP. THERMOSTAT - TERMOSTATO DI MASSIMA
THERMOSTAT DE SECURITE - SICHERHEITSTHERMOSTAT10 FILLING SWITCH - INTERRUPTORE CARICO
INTERRUPTEUR CHARGEMENT EAU - FÜLLSCHALTER11 PRESSURE CTRL. - PRESSOSTATO
PRESSOSTAT - DRUCKSCHALTER12 COND. WATER SOL. VALVE - VALV. ALIM. ACQUA COND.
VANNE ARR. EAU CONDEN. - WASSEREINLASSVENTIL KOND.

WIRING DIAGRAM - SCHEMA ELETTRICO - SCHÉMA ÉLECTRIQUE - SCHALTUNGSSCHEMA

**AIR & WATER COOLED - RAFFREDDAMENTO AD ARIA ED AD ACQUA.
REFROIDISSEMENT A AIR ET A EAU - LUFT- UND WASSERGEKÜHLT**

230/50-60/1



A - BLUE
AZZURRO
BLEU
BLAU
B - WHITE
BIANCO
BLANC
WEISS
M - BROWN
MARRONE
MARRON
BRAUN
N - BLACK
NERO
NOIR
SCHWARZ
G - GREY
GRIGIO
GRIS
GRAU

1 TERMINAL BOARD - MORSETTIERA
BORNIER - ANSCHLUSSKASTEN

2 EVAPORATOR THERMOSTAT - TERMOSTATO EVAPORATORE
THERMOSTAT EVAPORATEUR - VERDAMPFER THERMOSTAT

3 BIN THERMOSTAT - TERMOSTATO CONTENITORE
THERMOSTAT CABINE - SPEICHER THERMOSTAT

4 COMPRESSOR - COMPRESSORE
COMPRESSEUR - KOMPRESSOR

5 WATER PUMP - POMPA
POMPE A EAU - WASSERPUMPE

6 FAN MOTOR - VENTILATORE
MOTOVENTILATEUR - LÜFTERMOTOR

7 WATER SOL. VALVE - VALV. INGR. ACQUA
VANNE ARRIVÉE EAU - WASSEREINLASSVENTIL

8 HOT. GAS VALVE - VALVOLA GAS CALDO
VANNE GAZ CHAUDS - HEISSGASVENTIL

9 PRESSURE CTRL. - PRESSOSTATO
PRESSOSTAT - DRUCKSCHALTER

10 COND. WATER SOL. VALVE - VALV. ALIM. ACQUA COND.
VANNE ARR. EAU CONDEN. - WASSEREINLASSVENTIL KOND.

11 SWITCH - INTERRUTTORE
INTERRUPTEUR - SCHALTER

12 HI THERMOSTAT - TERMOSTATO DI SICUREZZA
THERMOSTAT DE SECURITE - SICHERHEITSTHERMOSTAT

13 TIMER - TIMER
PENDULE - ZEITHUR

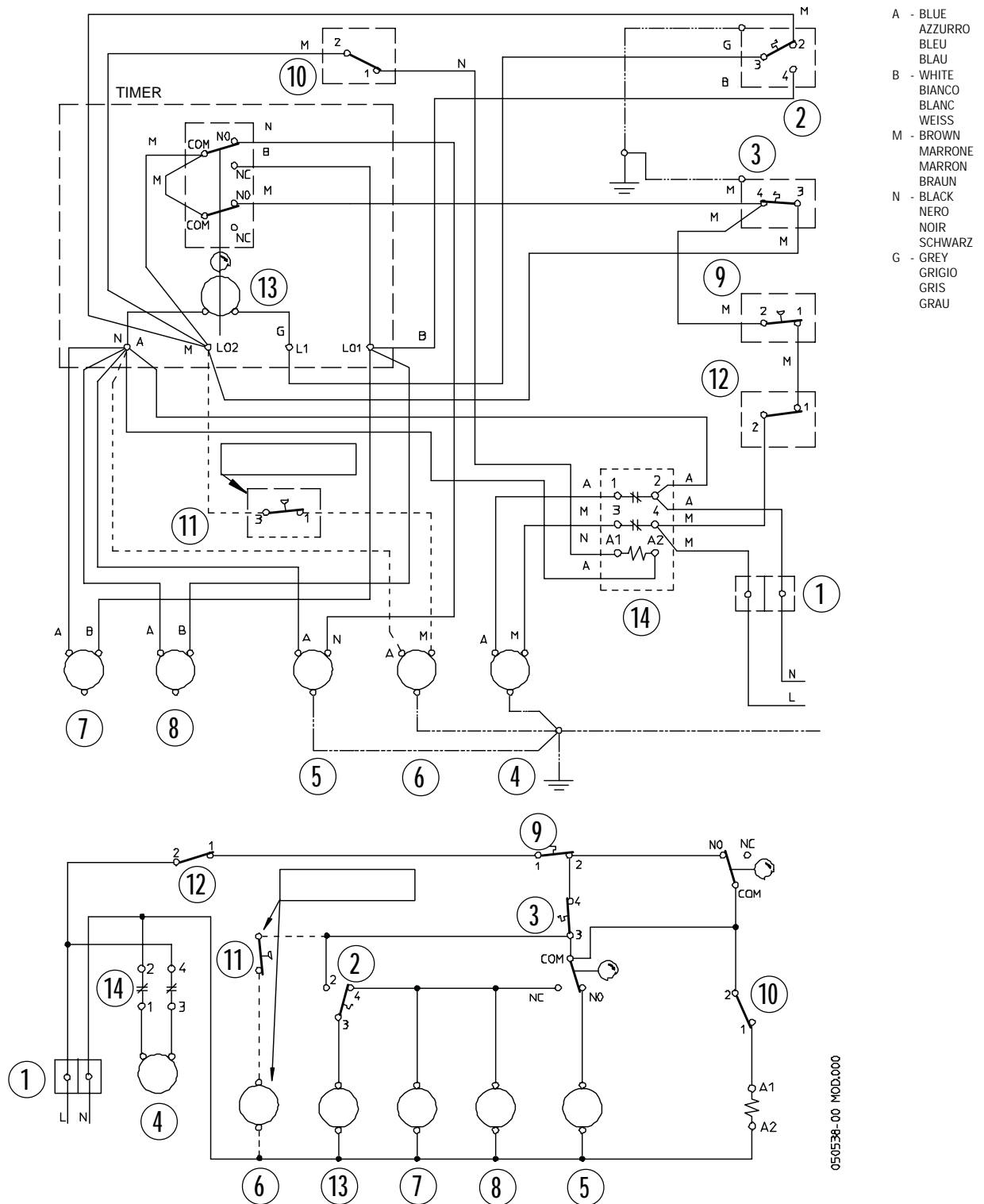
14 COMPRESSOR SWITCH - INTERRUTTORE COMPRESSORE
INTERRUPTEUR COMPRESSEUR - KOMPRESSORSCHALTER

050538-01 MOD.000

WIRING DIAGRAM - SCHEMA ELETTRICO - SCHÉMA ÉLECTRIQUE - SCHALTUNGSSCHEMA

**AIR & WATER COOLED - RAFFREDDAMENTO AD ARIA ED AD ACQUA.
REFROIDISSEMENT A AIR ET A EAU - LUFT- UND WASSERGEKÜHLT**

230/50-60/1



050538-00 MOD.000

1 TERMINAL BOARD - MORSETTIERA
BORNIER - ANSCHLUSSKASTEN

2 EVAPORATOR THERMOSTAT - TERMOSTATO EVAPORATORE
THERMOSTAT EVAPORATEUR - VERDAMPFER THERMOSTAT

3 BIN THERMOSTAT - TERMOSTATO CONTENITORE
THERMOSTAT CABINE - SPEICHER THERMOSTAT

4 COMPRESSOR - COMPRESSORE
COMPRESSEUR - KOMPRESSOR

5 WATER PUMP - POMPA
POMPE A EAU - WASSERPUMPE

6 FAN MOTOR - VENTILATORE
MOTOVENTILATEUR - LÜFTERMOTOR

7 WATER SOL. VALVE - VALV. INGR. ACQUA
VANNE ARRIVEE EAU - WASSEREINLASSVENTIL

8 HOT. GAS VALVE - VALVOLA GAS CALDO
VANNE GAZ CHAUDS - HEISSGASVENTIL

9 HI TEMP. THERMOSTAT - TERMOSTATO DI MASSIMA
THERMOSTAT DE SECURITE - SICHERHEITSTHERMOSTAT

10 COMPRESSOR SWITCH - INTERRUPTORE COMPRESSORE
INTERRUPTEUR COMPRESSEUR - KOMPRESSORSCHALTER

11 PRESSURE CTRL - PRESSOSTATO
PRESSOSTAT - DRUCKSCHALTER

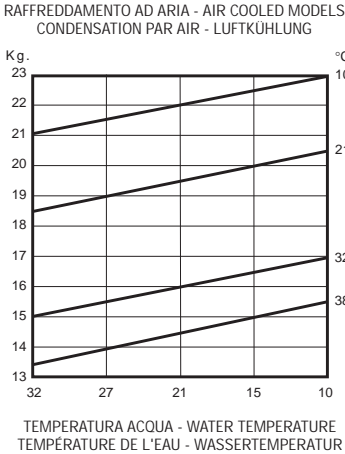
12 SWITCH - INTERRUPTORE
INTERRUPTEUR - SCHALTER

13 TIMER - TIMER
PENDULE - ZEITHUR

14 CONTACTOR - TELERUTTORE
CONTACTEUR - SCHALTSTUTZ

Capacità di produzione - Ice making capacity - Capacité de production - Eisproduktionskapazität

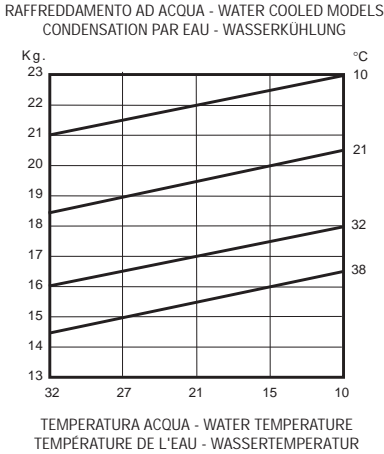
PRODUZIONE GHIACCIO PER 24 ORE - ICE PRODUCED PER 24 HRS.
PRODUCTION DE GLACE PAR 24 HEURES - EISWÜRFELPRODUKTION IN 24 STD.



TEMPERATURA AMBIENTE - AMBIENT TEMPERATURE
TEMPÉRATURE AMBIANT - RAUMTEMPERATUR

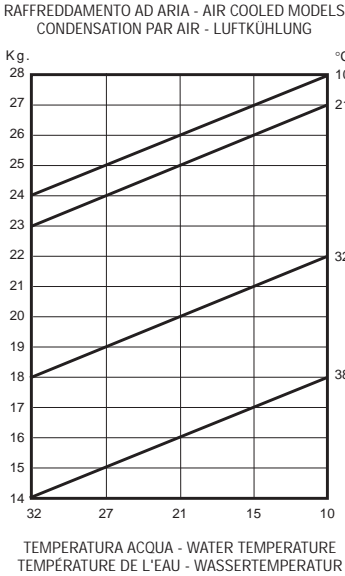
ICEU 045

PRODUZIONE GHIACCIO PER 24 ORE - ICE PRODUCED PER 24 HRS.
PRODUCTION DE GLACE PAR 24 HEURES - EISWÜRFELPRODUKTION IN 24 STD.



TEMPERATURA AMBIENTE - AMBIENT TEMPERATURE
TEMPÉRATURE AMBIANT - RAUMTEMPERATUR

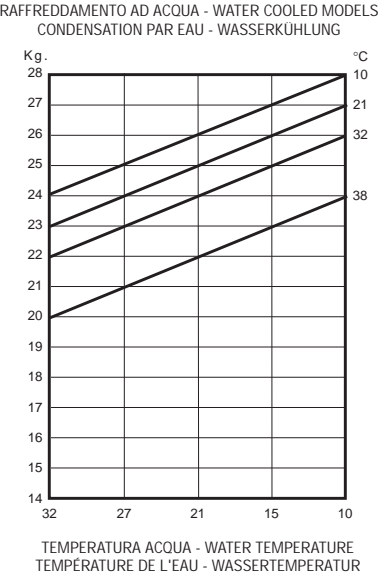
PRODUZIONE GHIACCIO PER 24 ORE - ICE PRODUCED PER 24 HRS.
PRODUCTION DE GLACE PAR 24 HEURES - EISWÜRFELPRODUKTION IN 24 STD.



TEMPERATURA AMBIENTE - AMBIENT TEMPERATURE
TEMPÉRATURE AMBIANT - RAUMTEMPERATUR

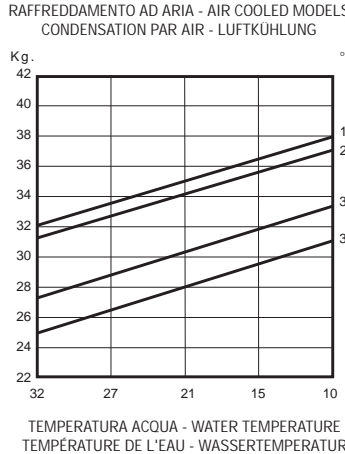
ICEU 065

PRODUZIONE GHIACCIO PER 24 ORE - ICE PRODUCED PER 24 HRS.
PRODUCTION DE GLACE PAR 24 HEURES - EISWÜRFELPRODUKTION IN 24 STD.



TEMPERATURA AMBIENTE - AMBIENT TEMPERATURE
TEMPÉRATURE AMBIANT - RAUMTEMPERATUR

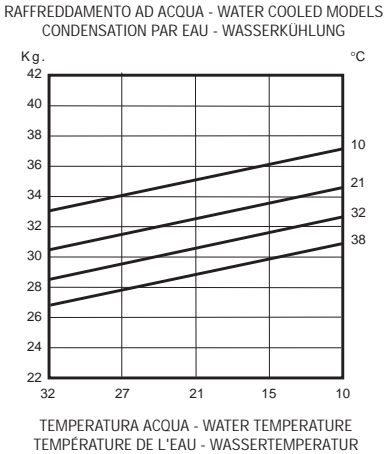
PRODUZIONE GHIACCIO PER 24 ORE - ICE PRODUCED PER 24 HRS.
PRODUCTION DE GLACE PAR 24 HEURES - EISWÜRFELPRODUKTION IN 24 STD.



TEMPERATURA AMBIENTE - AMBIENT TEMPERATURE
TEMPÉRATURE AMBIANT - RAUMTEMPERATUR

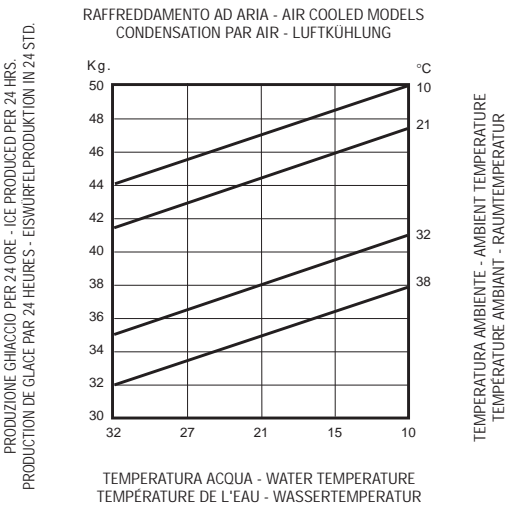
ICEU 085

PRODUZIONE GHIACCIO PER 24 ORE - ICE PRODUCED PER 24 HRS.
PRODUCTION DE GLACE PAR 24 HEURES - EISWÜRFELPRODUKTION IN 24 STD.

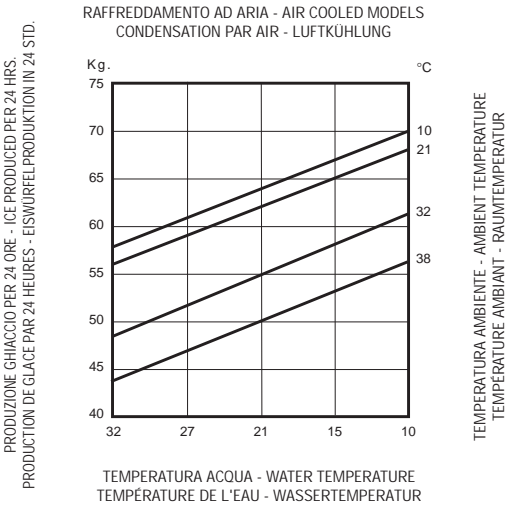
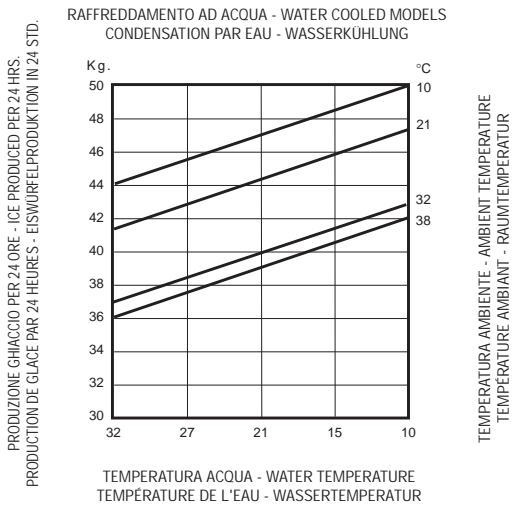


TEMPERATURA AMBIENTE - AMBIENT TEMPERATURE
TEMPÉRATURE AMBIANT - RAUMTEMPERATUR

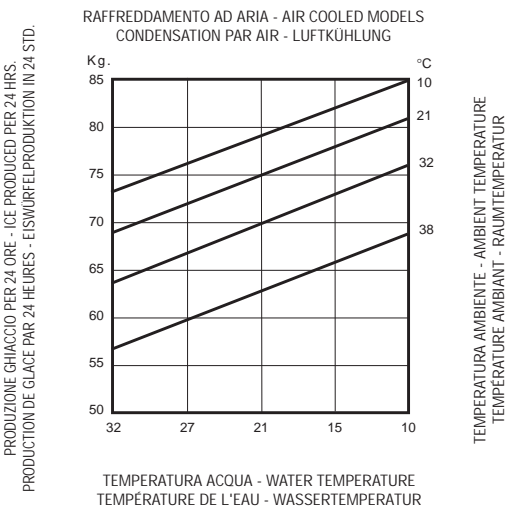
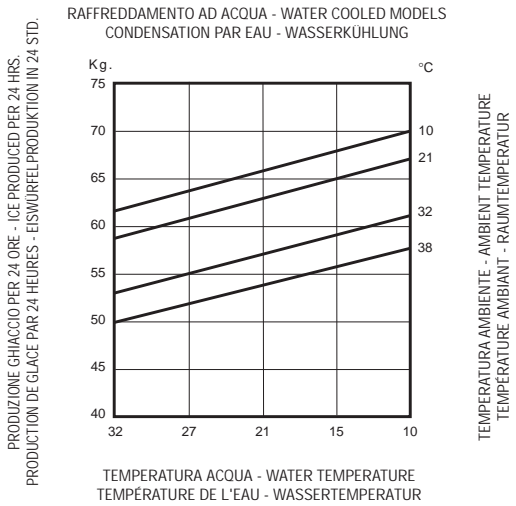
Capacità di produzione - Ice making capacity - Capacité de production - Eisproduktionskapazität



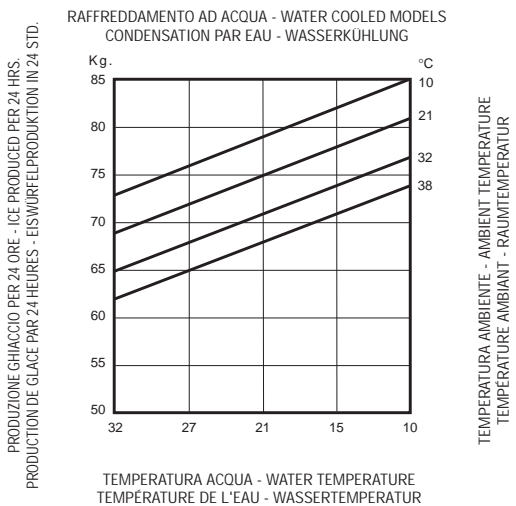
ICEU 105



ICEU 145



ICEU 185



GENERAL INFORMATION AND INSTALLATION

A. INTRODUCTION

These Cubers are quality designed, engineered and manufactured.

Their ice making systems are thoroughly tested providing the utmost in flexibility to fit the needs of a particular user.

These ice makers have been engineered to our own rigid safety and performance standards.

NOTE. *To retain the safety and performance built into this icemaker, it is important that installation and maintenance be conducted in the manner outlined in this manual.*

B. UNPACKING AND INSPECTION

1. Visually inspect the exterior of the packing and skid. Any severe damage noted should be reported to the delivering carrier and a concealed damage claim form filled in subject to inspection of the contents with the carrier's representative present.

2. a) Cut and remove the plastic strip securing the carton box to the skid.

b) Cut open the top of the carton and remove the polystyrene protection sheet.

c) Pull out the polystyrene posts from the corners and then remove the carton.

3. Remove the front and the rear panels of the unit and inspect for any concealed damage. Notify carrier of your claim for the concealed damage as stated in step 1 above.

4. Open the bin door and remove all internal support packing and masking tape.



5. Check that refrigerant lines do not rub against or touch other lines or surfaces, and that the fan blade moves freely.

6. Use clean damp cloth to wipe the surfaces inside the storage bin and the outside of the cabinet.

7. See data plate on the rear side of the unit and check that local main voltage corresponds with the voltage specified on it.

CAUTION. *Incorrect voltage supplied to the icemaker will void your parts replacement program.*

8. Remove the manufacturer's registration card from the inside of the User Manual and fill-in all parts including: Model and Serial Number taken from the data plate.

Forward the completed self-addressed registration card to the factory.

C. LOCATION AND LEVELLING

WARNING. *This Ice Cuber is designed for indoor installation only. Extended periods of operation at temperatures exceeding the following limitations will constitute misuse under the terms of the Manufacturer's Limited Warranty resulting in LOSS of warranty coverage.*

1. Position the unit in the selected permanent location.

Criteria for selection of location include:

a) Minimum room temperature 10°C (50°F) and maximum room temperature 40°C (100°F).

b) Water inlet temperatures: minimum 5°C (40°F) and maximum 35°C (90°F).

c) Well ventilated location for air cooled models. Clean the air cooled condenser at frequent intervals.

d) Service access: adequate space must be left for all service connections through the rear of the ice maker. A minimum clearance of 15 cm (6") must be left at the sides of the unit for routing cooling air drawn into and exhausted out of the compartment to maintain proper condensing operation of air cooled models.

NOTE. *With the unit in "built-in" conditions, the ice production is gradually reduced in respect to the levels shown in the graph, up to a maximum of 10% at room temperatures higher than 32°C.*

The daily ice-making capacity is directly related to the condenser air inlet temperature, water temperature and age of the machine.

*To keep your **CUBER** at peak performance levels, periodic maintenance checks must be carried out as indicated on Cleaning Section of this manual.*

2. Level the unit in both the left to right and front to rear directions.

D. ELECTRICAL CONNECTIONS

See data plate for current requirements to determine wire size to be used on electrical connections. All icemakers require **a solid earth wire.**

The ice machines are supplied from the factory completely pre-wired and require only electrical power connections to wire cord provided on the back of the unit.

Make sure that the ice machine is connected to its own circuit and individually fused (see data plate for fuse size).

The maximum allowable voltage variation should not exceed -10% and +10% of the data plate rating. Low voltage can cause faulty functioning and may be responsible for serious damage to the overload switch and motor windings.

NOTE. All external wiring should conform to national, state and local standards and regulations.

Check voltage on the line and the ice maker's data plate before connecting the unit.

E. WATER SUPPLY AND DRAIN CONNECTIONS

General

When choosing the water supply for the ice cuber consideration should be given to:

- a) Length of run
- b) Water clarity and purity
- c) Adequate water supply pressure

Since water is the most important single ingredient in producing ice you cannot emphasize too much the three items listed above.

Low water pressure, below 1 bar may cause malfunction of the ice maker unit.

Water containing excessive minerals will tend to produce cloudy coloured ice cubes, plus scale built-up on parts of the water system.

Water supply

Connect the 3/4" male fitting of the solenoid water inlet valve, using the flexible hose supplied, to the cold water supply line with regular plumbing

fitting and a shut-off valve installed in an accessible position between the water supply line and the unit.

Water supply - Water cooled models (ICEU 145, 185 only)

The water cooled versions of series 65 and 90 require two separate inlet water supplies, one for the water sprayed for making the ice cubes and the other for the water cooled condenser.

Connect the 3/4" male fitting of the water regulating valve using the flexible hose supplied with the unit to the cold water supply line with regular plumbing fitting and a shut-off valve installed in an accessible position between the water supply line and the unit.

Water drain

The recommended drain tube is a plastic or flexible tube with 18 mm (3/4") I.D. runs to an open trapped and vented drain. When the drain is a long run, allow 3 cm pitch per meter (1/4" pitch per foot).

A vertical open vent, at the unit drain connection, is also required for proper sump drainage.

Water drain - Water cooled models

The water drain line from the condenser, on water cooled versions, is internally connected with the drain fitting of the unit.

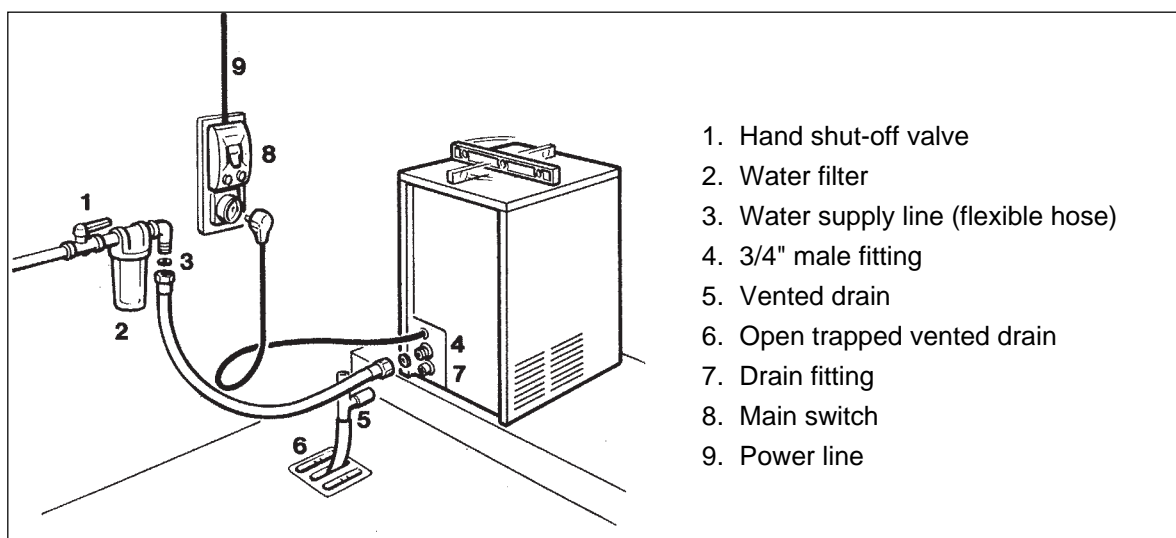
It is strongly recommended therefore to install a vertical open vent on unit drain line high point to ensure good draining and to direct the drain line to a trapped and vented floor drain receptacle. This to make sure of the proper flow of the drained water as, in case of poor drainage, the water running out from the condenser may inopportunely flow, through the unit drain tubing, into the ice storage bin.

NOTE. The water supply and the water drain must be installed to conform with the local code. In some case a licensed plumber and/or a plumbing permit is required.

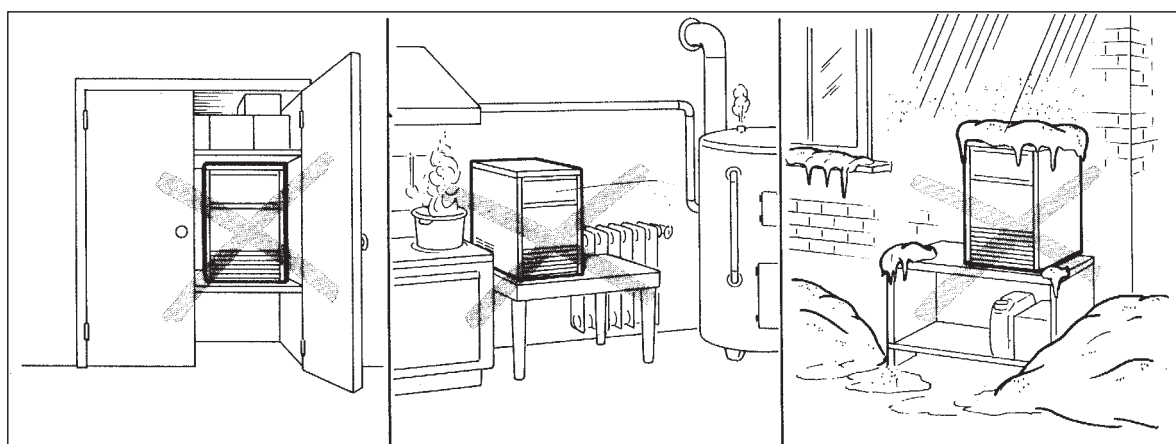
F. FINAL CHECK LIST

1. Is the unit in a room where ambient temperatures are within a minimum of 10°C (50°F) even in winter months?
2. Is there at least a 15 cm (6") clearance around the unit for proper air circulation?
3. Is the unit level? (IMPORTANT)
4. Have all the electrical and plumbing connections been made, and is the water supply shut-off valve open?
5. Has the voltage been tested and checked against the data plate rating?
6. Has the water supply pressure been checked to ensure a water pressure of at least 1 bar (14 psi).
7. Check all refrigerant lines and conduit lines to guard against vibrations and possible failure.
8. Have the bin liner and cabinet been wiped clean?
9. Has the owner/user been given the User Manual and been instructed on the importance of periodic maintenance checks?
10. Has the Manufacturer's registration card been filled in properly? Check for correct model and serial number against the serial plate and mail the registration card to the factory.
11. Has the owner been given the name and the phone number of the authorized Service Agency serving him?

G. INSTALLATION PRACTICE



WARNING. This icemaker is not designed for outdoor installation and will not function in ambient temperatures below 10°C (50°F) or above 40°C (100°F). This icemaker will malfunction with water temperatures below 5°C (40°F) or above 35°C (90°F).



OPERATING INSTRUCTIONS

START UP

After having correctly installed the ice maker and completed the plumbing and electrical connections, perform the following "Start-up" procedure.

ICEU 045 - 065 - 085

A. Remove the unit front panel and locate the cleaning switch on the control box.

B. Set the cleaning switch in the cleaning position (II). This will close the electrical circuit to the water inlet valve and to the hot gas valve.

C. Switch ON the power line disconnect switch. Unit will start up in water filling phase mode. During this phase the components energized are:

WATER INLET SOLENOID VALVE
HOT GAS SOLENOID VALVE

The **Water pump** and the **Fan motor** are also in operation.

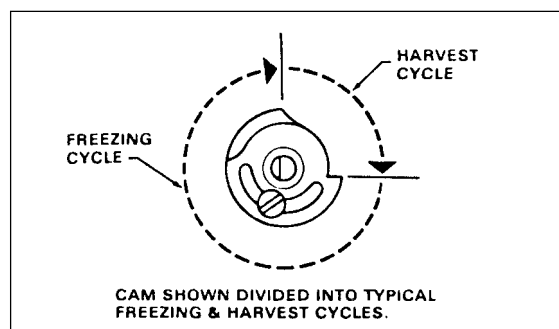
D. Let unit stay in water filling phase mode for about three/four minutes till water is coming out from the drain hose, then move the cleaning switch to the operation position (I).

ICEU 105 - 145 - 185

A. Remove the unit front panel and locate the timer shaft on the control box.

B. Check that master and the compressor switch located on the lower left hand side of the control box are both in the OFF position.

C. Rotate the timer shaft protruding through the front of the control box clockwise, until an audible click is heard indicating that the actuator arm of the microswitch has dropped into the cam slot (Fig. A).



D. Set the master switch to the ON position. The compressor switch must stay in the OFF position. This will close the electrical circuit to the water inlet valve and to the hot gas valve.

E. Switch ON the power line disconnect switch. Unit will start up in defrost cycle mode.

During this cycle the components energized are:

WATER INLET SOLENOID VALVE
HOT GAS SOLENOID VALVE
TIMER MOTOR

F. After completion of harvest cycle (about three minutes) move the compressor switch to ON position.

NOTE. During the defrost cycle, the water inlet solenoid valve is energized. The water flows through the valve to the back side of the evaporator platen and then down to fill up the icemaker sump tank for the next freezing cycle.

OPERATIONAL CHECKS

A. The unit now starts its first freezing cycle with the following components in operation:

COMPRESSOR

WATER PUMP

FAN MOTOR in air cooled version

B. Check to see through the ice discharge opening that the spray system is correctly seated and that the water jets uniformly reach the interior of the inverted cup molds; also make sure that the plastic curtain is hanging freely and there is not excessive water spilling through it.

C. The ice making process takes place thereby, with the water sprayed into the molds that gets gradually refrigerated by the heat exchanged with the refrigerant flowing into the evaporator serpentine.

D. On units ICEU 045 - 065 - 085 when the evaporator temperature reaches a preset value the evaporator thermostat or cube size control changes its contacts; the freezing cycle ends and starts the defrost or harvest cycle.

E. On units ICEU 105 - 145 - 185 the time clock does not rotate at the end of the harvest cycle. It starts later when the cube size thermostat control bulb (pig tail) located on the evaporator coil reaches a temperature of approx. -15°C (5°F).

Freezing time will range between 20 and 22 minutes in a 21°C ambient temperature, longer if above this temperature and shorter if below. The average complete cycle time is between 23 and 25 minutes.

F. Check, during the first defrost/harvest cycle, that the incoming water flows correctly into the sump reservoir in order to re-fill it and the surplus overflows through the overflow drain tube.

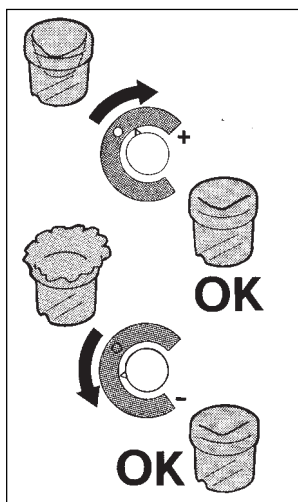
G. Check the texture of ice cubes just released. Right size must have a small depression (about 5-6 mm) in their crown.

If not, wait for the second defrost/harvest cycle before performing any adjustment.

H. If required on model ICEU 045, 065 and 085, the length of the freezing cycle can be modified by turning the knob of the cube size control or evaporator thermostat located in front of the control box until the desired size is achieved.

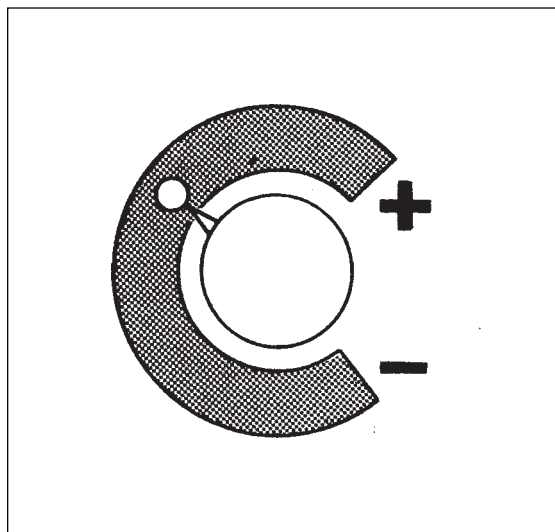
- If the temperature of the room in which the machine is placed is below 20°C, the cubes will tend to be partly hollowed out (see fig. on right).

- If, on the other hand, the room temperature is above 30°C the cubes produced will have a jagged rim of ice around the crown.



If it is thought necessary, the above situations can be rectified by, in the first case, turning the control knob (as little or as much as is required) clockwise and, in the second case, turning the knob to the right counterclockwise.

It should, however, be remembered that if the room temperature returns later to the 20 ÷ 30°C range, the knob indicator must once again be turned to point to the dot (see fig. below).



If the ice cubes are shallow and cloudy, it is possible that the ice maker runs short of water during the end of the freezing cycle or, the quality of the supplied water requires the use of an appropriate water filter or conditioner.

I. At the end of the defrost or harvest cycle hold a handful of ice cubes against the bulb of the storage bin thermostat; the icemaker switch OFF in about one-two minutes. Take out the ice from the storage bin thermostat. The ice maker should restart automatically in three-four minutes.

NOTE. The bin thermostat is factory set at 1°C (35°F) OUT and 4°C (39°F) IN.

K. Re-fit the unit front panel then instruct the owner/user on the general operation of the ice machine and about the cleaning and care it requires.

PRINCIPLE OF OPERATION

How it works

In the ice makers the water used to make the ice is kept constantly in circulation by a water pump which primes it to the spray system nozzles from where it is diverted into the inverted cup molds of the evaporator (Fig. A).

A small quantity of the sprayed water freezes into ice; the rest of it cascades by gravity into the sump assembly below for recirculation.

FREEZING CYCLE (Fig. B)

The hot gas refrigerant discharged out from the compressor reaches the condenser where, being cooled down, condenses into liquid. Flowing into the liquid line it passes through the drier/filter, then it goes all the way through the capillary tube where it loses its pressure.

Next the refrigerant enters into the evaporator serpentine (which has a larger diameter than the capillary tube) and starts to boil off; this reaction is emphasized by the heat transferred by the sprayed water.

The refrigerant then increases in volume and changes entirely into vapor.

The vapor refrigerant then passes through the suction accumulator (used to prevent that any small amount of liquid refrigerant may reach the compressor) and through the suction line. In both the accumulator and the suction line it exchanges heat with the refrigerant flowing into the capillary tube (warmer), before to be sucked in the compressor and to be recirculated as hot compressed refrigerant gas.

The freezing cycle on ICEU 045 - 065 - 085 is controlled by only the evaporator thermostat which has its bulb in contact with the evaporator serpentine while in ICEU 105 - 145 - 185 there is a second phase controlled by a timer.

The electrical components in operation during the freezing cycle are:

COMPRESSOR

WATER PUMP

FAN MOTOR (in air cooled version)

On ICEU 045 - 065 - 085 air cooled versions the refrigerant head pressure is gradually reduced from a value of approx. **11 bars (155 psig)** at the beginning of the freezing cycle with the unit at 21°C (70°F) ambient temperature, to a minimum value of approx. **7 bars (100 psig)** just at the end of the freezing cycle few seconds before the starting of the defrost cycle.

On ICEU 105 - 145 - 185 air cooled versions the refrigerant head pressure is kept between two pre-set values (**10÷8,5 bar - 140÷120 psig**) with the unit at 21°C (70°F) ambient temperature.

The declining of the pressure is related to the reduction of the evaporating pressure, caused by the progressive growth of the ice thickness into the inverted cup molds and to the flow of air

drown through the air cooled condenser by the fan motor. The above values are in relation as well to the ambient temperature of the ice maker site and they are subject to rise with the increase of this temperature.

On ICEU 045 - 065 - 085 - 105 water cooled versions the refrigerant head pressure ranges between **8.5 and 10 bars (120÷140 psig)** being controlled by an automatic high pressure control that energizes a water solenoid valve located on the water line to the condenser, which rates the cooling water to the condenser.

On ICEU 145 - 185 water cooled versions the head pressure is constant at **9.5 bar (135 psig)** controlled by a water regulating valve.

At starting of freezing cycle the refrigerant suction or low-pressure lowers rapidly to **1.0 bar - 14 psig** then it declines gradually - in relation with the growing of the ice thickness - to reach, at the end of the cycle, approx. **0÷0.1 bar - 0÷1.5 psig** on the models 045, 065 and 085 and **0.2÷0.3 bar (3÷4 psig)** on models 105 - 145 and 185 with the cubes fully formed in the cup molds.

The total length of the freezing cycle ranges from 23 to 25 minutes.

DEFROST OR HARVEST CYCLE (Fig. D)

On ICEU 045 - 065 - 085 the temperature of the evaporator thermostat, in contact with the evaporator serpentine, drops to a pre-set value it changes its electrical contacts energizing the herebelow shown components.

(On ICEU 105 - 145 - 185 when the timer microswitch drops down into the lower portion of the cam it changes its electrical contacts energizing the same components).

COMPRESSOR

WATER INLET SOLENOID VALVE

HOT GAS SOLENOID VALVE

The incoming water, passing through the water inlet valve and the flow control, runs over the evaporator platen and then flows by gravity through the dribbler holes down into the sump/reservoir (Fig. C).

The water filling the sump/reservoir forces part of the surplus water from the previous freezing cycle to go out to the waste through the overflow pipe. This overflow limits the level of the sump water which will be used to produce the next batch of ice cubes.

Meanwhile the refrigerant, as hot gas discharged from the compressor, flows through the hot gas valve directly into the evaporator serpentine bypassing the condenser.

The hot gas circulating into the serpentine of the evaporator warms up the copper molds causing the harvest of the ice cubes. The ice cubes, released from the cups, drop by gravity onto a slanted cube chute, then through a curtained opening they fall into the storage bin.

On ICEU 045 - 065 - 085 when the temperature of the evaporator thermostat bulb reaches the value of $+3\div+4^{\circ}\text{C}$ their electrical contacts move back to the previous position activating a new freezing cycle and deenergizing both the hot gas and the water inlet valves (closed).

On ICEU 105 - 145 - 185 as soon as the timer microswitch completes the bottom part of the cam and it is pushed again, it activates a new freezing cycle deenergizing both the hot gas and the water inlet valves (closed).

NOTE. On models 045, 065 and 085 the length of the defrost/harvest cycle (not adjustable) changes according to the ambient temperature (shorter for hi ambient temperature and longer for low one).

COMPONENTS DESCRIPTION

A. WATER PUMP

The water pump operates continually throughout the freezing cycle. The pump primes the water from the sump to the spray system and through the spray nozzles sprays it into the inverted cup molds to be frozen into crystal clear ice cubes.

B. WATER INLET SOLENOID VALVE - 3/4 MALE FITTING

The water inlet solenoid valve is energized only during the defrost cycle.

When energized it allows a metered amount of incoming water to flow over the evaporator cavity to assist the hot gas in defrosting the ice cubes. The water running over the evaporator cavity drops by gravity, through the dribbler holes of the platen, into the sump reservoir.

On 045 - 065 - 085 - 105 water cooled versions the water inlet solenoid valve has one inlet and two outlets with two separate solenoids energized the first (ice production) by the contacts 3-2 of the evaporator thermostat and the second (water cooled condenser) by a specific hi pressure control.

C. HOT GAS SOLENOID VALVE

The hot gas solenoid valve consists basically in two parts: the valve body and the valve coil.

During the defrost cycle the hot gas valve coil is activated so to attract the hot gas valve piston in order to give way to the hot gas discharged from compressor to flow directly into the evaporator serpentine to defrost the formed ice cubes.

D. BIN THERMOSTAT

The bin thermostat control body is located in the front of control box behind the front panel.

The thermostat sensing tube is located into a bulb holder on the side wall of the ice storage bin where it automatically shuts the icemaker OFF when in contact with the ice and re-starts the icemaker when the ice is removed. Factory settings are 1°C (35°F) OUT and 4°C (39°F) IN.

E. CUBE SIZE CONTROL (EVAPORATOR THERMOSTAT)

ICEU 045 - 065 - 085

The cube size control (evaporator thermostat) body is located in the control box behind the front panel; it's basically a reverse acting temperature control which closes the contacts 3-2 when its temperature decreases and closes the opposite contacts 3-4 when the temperature rises.

The thermostat sensing bulb is located into a plastic tube (bulb holder) secured by two clips directly to the evaporator serpentine.

This control determines the length of the freezing cycle and correspondingly the size of the cubes. A lower setting will produce a larger cube (oversize) while a higher setting a smaller cube (shallow size).

When closed on contacts 3-2 it activates the defrost or harvest cycle components.

The cube size control is set up in the factory (knob in the black dot position) and doesn't require any adjustment when the ambient temperature remains between 20 and 30°C (70 and 90°F).

ICEU 105 - 145 - 185

The evaporator thermostat with its sensing bulb intimately in contact with the refrigerant outlet tube from the evaporator senses the evaporating refrigerant temperature (which declines in the course of the freezing cycle) and when this one reaches the pre-set value, it switches its contacts from 3-4 to 3-2 to activate the finishing cycle (2nd phase) which has a pre-set extension determined by the large diameter lobe of the timer cam.

F. FAN MOTOR (Air cooled version)

The fan motor on 045 - 065 - 085 is electrically connected in parallel to the water pump and it operates continuously only during the freezing cycle keeping the proper head pressure by circulating air through the condenser fins.

On 105 - 145 - 185 the operation of fan motor is controlled by a fan pressure control adjusted at preset values.

G. COMPRESSOR

The hermetic compressor is the heart of the refrigerant system and it is used to circulate and retrieve the refrigerant throughout the entire system. It compresses the low pressure refrigerant vapor causing its temperature to rise and become high pressure hot vapor (hot gas) which is then released through the discharge valve.

H. WATER SPRAY SYSTEM

Through its nozzles it sprays the water in each individual cup to be frozen into ice.

I. SAFETY HI TEMPERATURE THERMOSTAT

Located in the control box it is a manual reset switch that trips OFF the operation of the machine when its bulb (located on the liquid line just before the drier) reaches the temperature of 70°C (158°F).

J. CLEANING SWITCH (only 045 - 065 - 085)

Located on the bottom left side of the control box is used to energize the water inlet and the hot gas valves so to charge the water into the sump tank of the machine.

K. HI PRESSURE CONTROL (Water cooled version)

Used only on 045 - 065 - 085 - 105 water cooled versions it operates to keep between 8.5 and 10 bars (120 ÷ 140 psig) the hi-side or discharge pressure of the refrigerant system by energizing the coil of the water inlet solenoid valve that control the cooling water flow to the condenser.

L. TIMER (only 105 - 145 - 185)

Equipped with two microswitches which plungers ride one timer cam, the timer is located inside the control box.

The function of the timer begins when activated by the cube size control (evap. thermostat).

The large diameter lobe of its cam determines the length of the 2nd portion of the freezing cycle, while the cam small diameter lobe, determines the time cycle for the harvest sequence.

The timer cam can be adjusted to vary the defrost time as required.

WARNING. Never set the defrost time for longer than 4 minutes as this will jeopardize the compressor motor windings.

It goes without saying that an extension of the defrost period will directly reduce the timed portion of the freezing cycle and viceversa.

Consequently any variation made at the timer cam setting requires a compensation adjustment, very fine and very accurate, of the evaporator thermostat.

M. MASTER SWITCH (only 105 - 145 - 185)

Fitted in the control box the master switch has to be used to start-up and to stop the ice maker operation.

N. COMPRESSOR SWITCH (only 105 - 145 - 185)

Located in the control box is used to de-energized the compressor during the cleaning.

O. FAN PRESSURE CONTROL (only 105 - 145 - 185)

Used on air cooled ice makers to maintain the head pressure within the preset values.

P. WATER REGULATING VALVE (only 145 - 185 Water cooled version only)

This valve controls the head pressure in the refrigerant system by regulating the flow of water going to the condenser.

As pressure increases, the water regulating valve opens to increase the flow of cooling water.

Q. CONTACTOR (145 - 185 only)

It operates in order to close or open the electrical circuit to the compressor.

MAINTENANCE AND CLEANING INSTRUCTIONS

CLEANING INSTRUCTIONS OF WATER SYSTEM

1. Remove the front and top panels to gain access either to the control box and to the evaporator.
2. Make sure that all ice cubes have been released from their cups, then switch OFF the machine at main power switch, on models 045 - 065 - 085, and on compressor and master switches on models 105 - 145 - 185.
3. Scoop out all the ice cubes stored into the bin in order to prevent them from being contaminated with the cleaning solution.
4. On ICEU 045 - 065 remove the plastic cup located on the bottom of sump/freezing chamber to drain out all water and scale deposits.
5. Remove the curtain then, using a bottle, pour fresh water into the bottom of the sump/freezing chamber to clean out any possible scale deposit.
6. Install again the curtain as well as the bottom plastic cup.
7. On all other models, flush out the water from the sump reservoir by removing the overflow stand pipe.
8. Prepare the cleaning solution by diluting in a plastic container one or two liters of warm water (45°-50°C) with a 0,1-0,2 liters of Ice Machine Cleaner (on 045 - 065 - 085) and 0,2-0,3 liters on 105 - 145 - 185.

WARNING. The Ice Machine Cleaner contains Phosphoric and Hydroxyacetic acids.

These compounds are corrosive and may cause burns if swallowed, DO NOT induce vomiting. Give large amounts of water or milk. Call Physician immediately. In case of external contact flush with water. KEEP OUT OF THE REACH OF CHILDREN.

9. Remove the evaporator cover then slowly pour onto the evaporator platen the cleaning solution. With the help of a brush dissolve the most resistant and remote scale deposits in the platen.

045 - 065 - 085

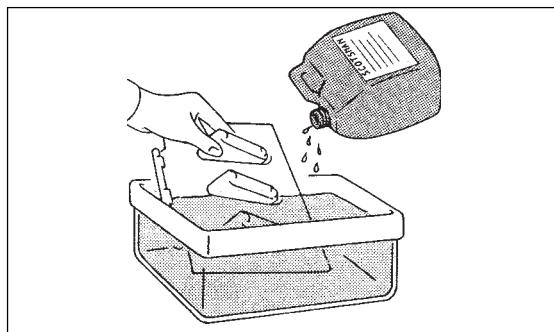
1. On 045 - 065 - 085 switch ON again the machine at main power switch to start the icemaking process.

Allow the ice maker to operate for about 20 minutes. Then turn the cleaning toggle switch to the "cleaning" position (II) till the release of the ice cubes from their cups.

NOTE. *The amount Cleaner and the time needed for the cleaning of water system depends of the water conditions.*

2. Turn the cube size control knob counterclockwise to the OFF position to shut-off the ice maker then flush out the cleaning solution from the sump reservoir then pour onto the evaporator cavity two or three liters of clean potable water to rinse the mold cups and the platen.

3. If necessary remove the water spray platen to clean it separately.



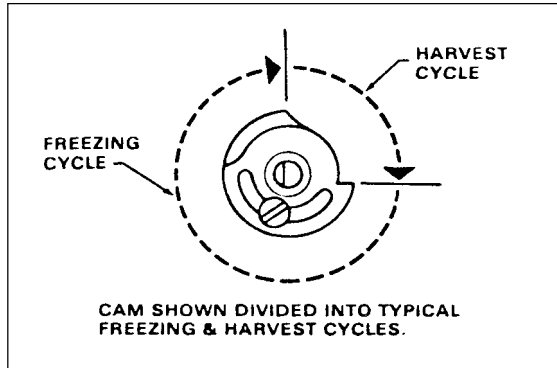
4. Turn again the cube size control knob to the normal operating position (black dot). The water pump is again in operation to circulate the water in order to rinse the entire water system. Do the operation as per steps 8 and 9 twice so to be sure no more traces of descaling solution remains into the sump. Pour on the upper side of the evaporator platen fresh water with a capfull of disinfectant solution then turn again the machine in normal operating mode so to sanitize all the water system for approx. 10 minutes.

NOTE. *Do not mix descaling with disinfectant solution to avoid the generation of a very aggressive acid.*

5. Flush out the disinfectant solution from the sump reservoir then with the switch in "cleaning" position, turn the cube size control knob to the normal operating position. When water starts overflowing through the drain line, set the switch to "operation" position. The unit is now ready to resume normal operation.

105 - 145 - 185

1. On 105 - 145 - 185 slowly rotate the clock knob clockwise with the aid of a screwdriver until the microswitch actuator arm is at the start position of the freezing cycle.



Immediately set the master switch to the ON position. Leave the compressor switch in the OFF position.

2. Allow the system to operate for about 20 minutes into the freezing cycle. No ice will be produced because the compressor is not in operation.

3. At the end of this period set the master switch to the OFF position to shut off the icemaker.

4. Remove the overflow drain tube from its seat to drain out all the cleaning solution and most of the mineral concentration through the drain tube and then replace it in its seat.

5. Pour onto the evaporator cavity two or three liters of clean potable water to rinse the mold cups and the platen.

6. If necessary remove the water spray platen to clean it separately.

7. Set again the master switch in ON position. The water pump is again in operation to circulate the water in order to rinse the entire water system.

8. Pour on the upper side of the evaporator platen fresh water with a capfull of disinfectant solution then put again the master switch in ON position so to sanitize all the water system for approx. 10 minutes.

NOTE. Do not mix descaling with disinfectant solution to avoid the generation of a very aggressive acid.

9. Flush out the disinfectant solution from the sump reservoir. Slowly rotate the time clock knob clockwise until the microswitch actuator arm is in the START position of the harvest cycle and then set the master switch to the ON position. Let the unit run normally through this part of the cycle. When the defrost has been completed rotate the time clock knob manually until the defrost cycle starts again. Do this two times. Once the water reservoir is properly filled up, set the compressor switch to the ON position. The unit is now ready to resume the normal operation.

10. Place again the evaporator cover and the unit service panels.

11. Place again the evaporator cover and the unit service panels.

12. At completion of the freezing and harvest cycle make sure of proper texture and clearness of the ice cubes and that, they do not have any acid taste.

ATTENTION. In case the ice cubes are cloudy-white and have an acid taste, melt them immediately by pouring on them some warm water. This to prevent that somebody could use them.

13. Wipe clean and rinse the inner surfaces of the storage bin.

REMEMBER. To prevent the accumulation of undesirable bacteria it is necessary to sanitize the interior of the storage bin with an anti-algae disinfectant solution every week.