ROTARY 5S U.L.

115V~ 60Hz

INSTRUCTIONS MANUAL

SUMMARY

Figure 1

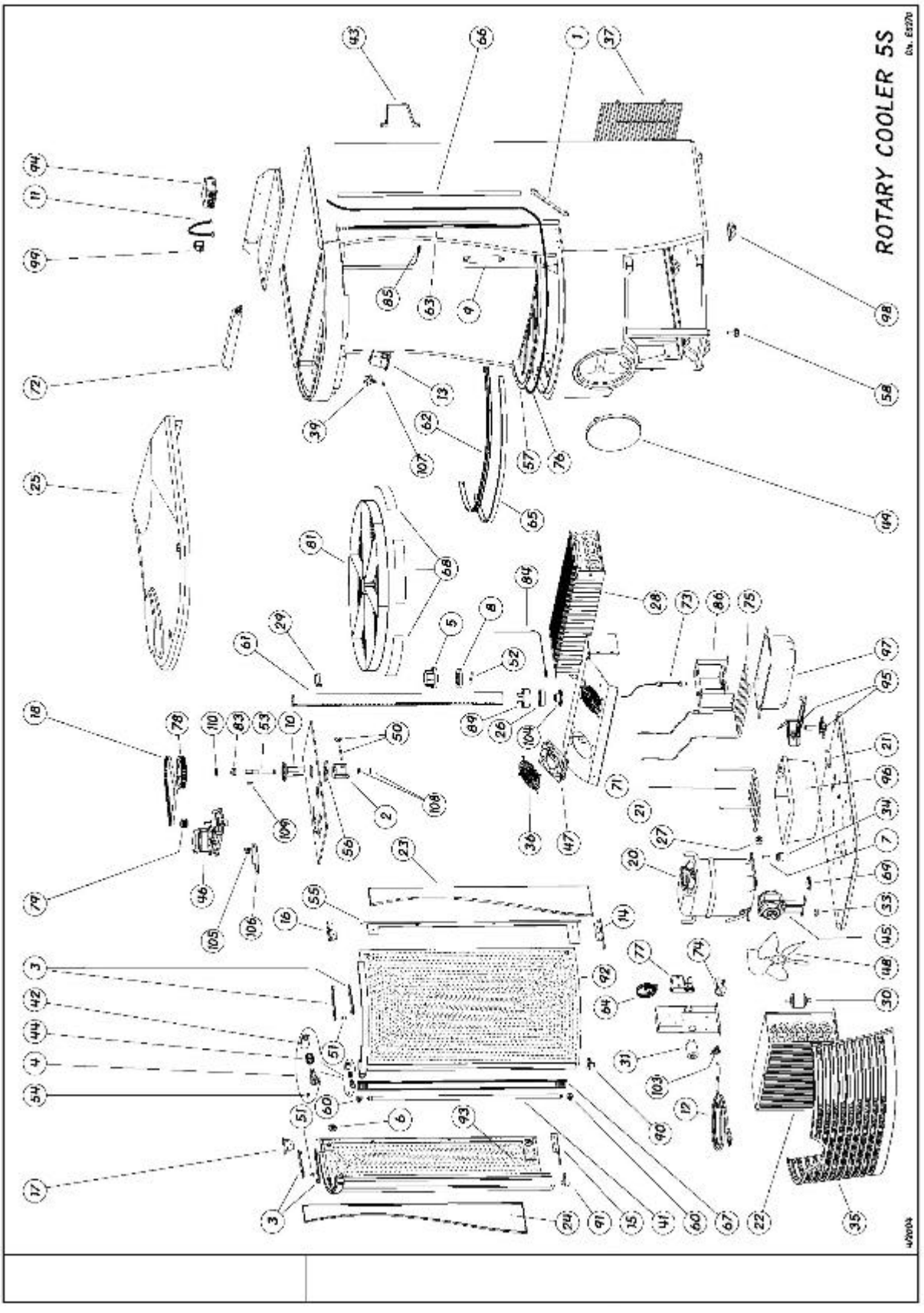


Figure 2

1 FUNCTIONAL DESCRIPTION OF THE UNIT

1.1 FOREWORD

The ROTARY 5S UL model is a vertical open display cooler with rotating shelves, capable of pulling down product temperature to 38 °F (3.3 °C) in a certain time prescribed by the specific climate class.
An electronic controller takes and displays the internal temperature, operates the thermostatic cycle of the compressor, controls the efficiency of the refrigerating circuit and periodically defrosts the evaporator by hot gas cycle. The resulting water from defrost is conveyed into a collecting plasting tray located in the compressor compartment, where is pre-heated and partially evaporated; in case the water production overflows the capacity of this tray it is drained into another stainless steel tray, where an automatic system with floater switch and electrical heater provides to evaporate it completely.
A lighting system, made by 2 fluorescent 14W tubes located vertically on the 2 glass doors, illuminates the product, inside the cooler.
It is possible to show an illuminated brand mark, placed in the bottom front of the cabinet.

1.2 REFRIGERATING CIRCUIT DESCRIPTION

Fig. 2 shows the exploded drawing of the unit. In the following description every component will be identified by its code in the wiring diagram in sec. 5.1 and by its number on the exploded drawing.

1.2.1 THERMODYNAMIC CYCLE

The refrigerating cycle used by Rotary 5S is by gas compression. With reference to the wiring diagrams in section 5.1 the main components are:

- Compressor (CO) (20) and compressor relay (RC) (74);
- Stainless steel tube for water pre-evaporation (71);
- Condenser (22) and condenser motor fan (MC) (45+48);
- Dryer (30);
- Refrigerant filter (21);
- Defrosting bypass valve (VS) (95);
- Capillary tube as expansion device;
- Evaporator (28) and evaporator motor fans (MI) (47);
- Liquid splitter (9).

The refrigerant used is R134a, CFC e HCFC free.

1.2.2 TEMPERATURE CONTROL

The inner temperature control is made by the electronic controller (CE) (13) acting directly on the compressor relay (RC) (74) and indirectly on the compressor (CO) (20).
Using keys on the electronic controller display, the set point temperature can be adjusted by the user, if the controller is programmed to do so (by factory default the controller is locked to the end user). When the inner temperature reaches the set point value, the compressor (CO) (20) and the condenser motor fan (MC) (45+48) stop, making the temperature rising. When the programmed differential value is reached they start again and the pause duration depends on the ambient temperature and on the quantity of product stored inside the unit.

1.2.3 DEFROSTING CYCLE

During cooling, the humidity present on air deposits on the evaporator becoming ice and making heat exchange more difficult.
In order to solve this problem an automatic defrosting system periodically melts ice on the evaporator forcing the compressor to make an hot gas cycle. The accumulated water is firstly

collected into the plastic tray (96), where a stainless steel tube connected to the high pressure line of the compressor warms it up, and subsequently into the stainless steel tray (97), where the electrical heater (RVR) (75), controlled by the level sensor (ILA) (73) and activated by the electronic relay (RE) (77), provides its evaporation.
The defrosting cycle is enabled by the controller (CE) (13) every 6 hours, and has a maximum duration of 20 minutes: the solenoid valve (VS) (95) is opened bypassing the compressed hot refrigerant directly into the evaporator, giving the necessary heat to defrost it.
During the defrosting cycle the evaporator motor fans are stopped, in order to reduce the product temperature rise.

1.2.4 OTHER FUNCTIONS

In abnormal ambient or working conditions, it is possible that an excessive ice formation on the evaporator will take place. The controller (CE) (13) will start the "Anti-Freeze" function, which monitors the compressor's continuous running time. If this time is greater than 1 hour the compressor is stopped for 7 minutes and the evaporator motor fans are kept running in order to reduce the ice formation and maintain the evaporator clean for maximum efficiency till the next defrosting cycle will take place.

1.3 ELECTRICAL WIRING DESCRIPTION

The electrical wiring drawing SE0356/00 of ROTARY UL 5S is shown in section 5.3: refer to this drawing during the following description.
The Rotary Electrical Wiring (EW) can be divided in the following sections:
- *Inner tank EW;*
- *Compressor compartment EW;*
- *Doors EW;*
- *Top cabinet EW.*

The *Inner tank EW* takes supply from the *Compressor compartment EW* and is located in the lower part of the inner tank (Fig. 3), enclosed by the evaporator cover panel (marked with "1"),

Figure 3

by the motor fan support panel (marked with "2") and by the tank plastic drain cover (marked with "3"); it gives the supply to the evaporator motor fans (MI) (47).
The *compressor compartment EW* gives supply to all other *EWs* and to the compressor relay (RC) (74), to the compressor (CO) (20), to the condenser motor fan (MC) (45 and 48), to the defrosting valve (VS) (95) and to the water evaporation system made by the water evaporation heater (RVR) (75), the level sensor floating switch (ILA) (73), the electronic relay (RE) (77) and the safety thermostat (KS) (64).
The *Doors EW* gives supply to the tank vertical fluorescent tubes (LV) (41) 14W rated, located inside the door side profiles and covered by the light covers (67).

The *Top cabinet EW* takes the supply from the *compressor compartment EW* and gives supply to all components located at the top cabinet, enclosed by the top cover (25).
It's made up of:
- *Electrical components support base plate* (Fig. 4*);*
- *Motor gear and transmission group for shelves rotation* (Fig. 31*);*
- *Controller and light switch support plate* (Fig. 7).

On the *Electrical components support base plate* you will find:
- Main switch (IG) (99);

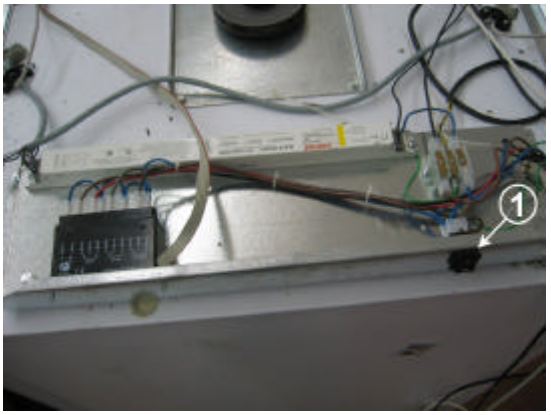


Figure 4

- Electronic ballast for lamps supply (BA) (72);
- Controller power unit (UP) (94);
- Wires terminal board;

The *Motor gear and transmission group for shelves rotation* is consisting of:
- Rotation Motor (M) (46) with gear box;
- Driving spool (79);
- Driving belt (18);
- Gearwheel for shelves rotation (78);
- Shaft (53) and gib (109);
- Sferical bearing (83);
- Articulated transmission joint (2).

On the *Controller and light switch support plate* you will find:
- Light switch (IL) (39) marked with 5 in fig. 5;
- Controller master unit with temperature display (CE) (13) marked with "1" in fig. 5.

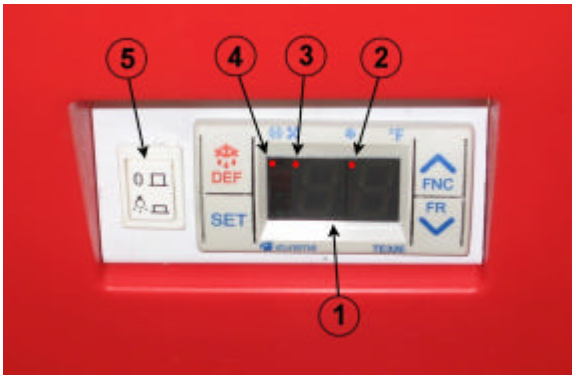


Figure 5

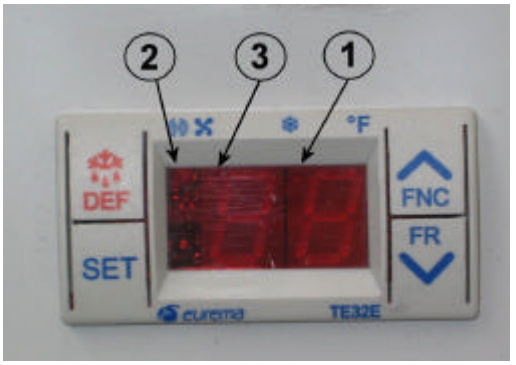


Figure 6

1.3.1 ELECTRICAL WIRING FUNCTIONALITY

A power cord with USA plug (CS) (12) rated 15 ampere allows the connection to main electrical net 115 Volt rated. By the main switch (IG) (99), located in the top back of the unit, the cooler, except for the compressor relay (RC) (74) which controls the compressor (CO) (20) and condenser motor fan (MC) (45+48), can be disconnected from supply.

By the light switch (IL) (39), located on the *Controller and light switch support plate,* the tank illumination can be switched on or off.
In order to comply to EMC directive, a capacitive filter (FRF) (31) is adopted.
The temperature regulation, evaporator defrosting and evaporation of condensate are automatically controlled.

1.3.2 COOLER'S MAIN COMPONENTS

The refrigerator's main devices can be divided into 4 categories:

- Control devices;
- Driving devices;
- Functional devices;
- Safety devices;
- Sensor and signalling devices.

- To the first category belong devices getting any signal and converting it in an electrical signal for driving devices;
- The Driving devices get a signal from one of the control devices and drive one of the Functional devices;
- The Functional devices are those necessary to make the specific functions;
- The Safety devices provide for the safety of the unit in abnormal conditions;
- The sensor and signalling devices measure a physical quantity and give a signal to the control devices or to the user, in order to identify the state of the system.

Control devices

- Electronic Controller Master Unit (CE) (13). It performs the following functions:
  - Product temperature regulation: this function is indirectly fulfilled by periodically switching on and off the compressor (thermostatic cycle). In order to perform this function, the temperature probe gets the internal temperature and informs the controller.
  - Evaporator defrosting: every 6 hours this function is enabled for a maximum duration of 20 minutes. The defrosting valve is enabled, the evaporator motor fans are switched off and the compressor works contunuously in order to produce the hot compressed gas necessary to melt the ice formed onto the evaporator. The end of defrosting probe gets the evaporator temperature and informs the controller when ice is completely melted, reducing the time necessary for defrosting to the minimum. The number of defrostings per day, and their duration, are programmable and can be modified at any time if necessary (see section 5.1).
  - Anti freeze function: if the compressor works more than 1 hour continuously it is automatically forced off for 7 minutes, in order to reduce the ice forming onto the evaporator and increase the heat exchange efficiency.
  - Evaporator motor fans control (MI) (47): they are disabled during the defrosting cycle.
- Water level floating switch (ILA) (73): it controls the water level in the stainless steel tray and enables the electronic relay (RE) (77) in order to activate the water heater (RVR) (75);
- Main switch (IG) (99): enables the functioning of all devices.
- Lights switch (IL) (39): enables the functioning of the tank lights.

Driving devices

- Controller power unit (UP) (94). Connected to the Master unit by the flat cable (11), it drives the following devices:
  - Defrosting valve (VS) (95): it swerves the refrigerant flow to the evaporator at every defrosting cycle;
  - Evaporator motor fans (MI) (47): are disabled during the defrsting cycle;
  - Compressor relay (RC) (74): it is activated every time the compressor has to work.

- Compressor relay (RC) (74): it drives the compressor on and off according to the signal coming from the power unit (UP) (94);
- Electronic relay (RE) (77): it switches the water heater (RVR) (75) on and off according to the signal coming from the level sensor floating switch (ILA) (73). In order to avoid too frequent cycles, due to vibrations of the water surface, it performs a 1 minute delay of response with respect to the floater signal.
- Lights ballast (BA) (72): it gives supply to the vertical fluorescent tubes.

Functional devices
- Compressor (CO) (20): pumps up the refrigerant pressure in order to permit the state change in the condenser (22);
- Condenser motor fan (MC) (45+48): permits the refrigerant state change in the condenser and fulfils the compressor cooling;
- Evaporator motor fans (MI) (47): they perform the internal air circulation and its cooling through the evaporator;
- Defrosting valve (VS) (95): it bypasses the capillary and let the hot compressed refrigerant enter directly into the evaporator;
- EMC filter (FRF) (31): it cuts electromagnetic noise off;
- Motor gear: by the driving belt (18) it puts in rotation the shelves support shaft (61);
- Inner lights (LV) (41): they are 2 fluorescent tubes T5 type (o.d. 16 mm) 14 W rated;
- Cabinet frame heater (RCA) (76): it avoids condensation on the external part of the cabinet exposed to the cold air circulation;
- Water heater (RVR) (75): it performs the condensate evaporation in the stainless steel collecting tray (97).

Safety devices
- Water evaporation safety thermostat (KS) (64): it monitors the water heater (RVR) (75) temperature and shuts it off in case of overheating. A pushbutton is available for thermostat reset.

Sensor and signalling devices
- Evaporator probe (H) (84): It monitors the evaporator temperature and send a signal to the controller master unit (CE) (13);
- Temperature probe (I) (85): it monitors the cooler's inner temperature and send a signal to the controller master unit (CE) (13);
- Master Unit Display: it integrates the following devices (see section 5.1):
  - Digital thermometer (marked with "1" in Fig. 5): it shows the cooler internal temperature and informs the user on the state of the cooler using special codes;
  - Compressor L.E.D. (marked with "1" in Fig. 6): it informs on the compressor's (CO) (20) state; it lights when the compressor is running, is switched off with compressor off and is flashing when the compressor is in stand-by;
  - Evaporator motor fans (MI) (47) L.E.D. (marked with "3" in Fig. 6): it informs on the evaporator motor fans (MI) (47) state; it lights with fans running, is switched off with fans off and is flashing when fans are in stand-by;
  - Alarm L.E.D. (marked with "2" in Fig. 6): flashing during a "warning phase", lit during an "alarm phase" and switched off in normal conditions.

1.3.3 ILLUMINATION

The cooler is provided with 2 fluorescent vertical tubes (LV) (41) 14W rated T5 type (o.d. 16 mm) located on the internal side of the doors. For wiring and component description see section 4. The lights are wired to the light switch (IL) (39) located on the top tank enclosure (Fig. 5) beside the controller master unit. The electronic ballast (BA) (72) provides supply to the tubes.

2 STRUCTURAL DESCRIPTION OF THE UNIT

2.1 EXTERNAL ASPECT

The external aspect is showed in fig. 1: the cabinet has an external and internal enclosure made of zinc coated and plasticized steel sheet and ABS panels, between them the insulating polyurethane is injected.
In the front side are present, from bottom to top:
- the compressor compartment front grill (35);
- the bottom tank front enclosure with the round logo (49) optionally illuminated;
- the rotating shaft (61) supporting the round shelves (81);
- the side glass doors (92 and 93);
- the top cabinet enclosure (25).

In the back side of the cabinet, from bottom to top, there are:
- the compressor compartment rear grill (37);
- the power cord with plug (12) to connect the unit to supply;
- 2 handles (43) to facilitate transportation;
- the main switch (IG) (99).

2.2 USER CONTROLS AND SETTINGS

The following controls are available to the user:
- Main switch (IG) (99) and (38) (marked with "1" in Fig. 4), placed in the top rear part of the cabinet.
- Light switch (IL) (39), placed in the tank top front enclosure beside the controller master unit;
- Controller Master Unit (CE) (13) with temperature display, located in the tank top front enclosure beside the light switch (Fig. 5); the display has four buttons for user interface: see section 5.1 for relative instruction.

2.3 ELECTRICAL AND MECHANICAL COMPONENTS IN THE TANK

The inner tank has a top front enclosure made of roto-moulded PET, which supports the *Controller and light switch support plate* where the electronic control (CE) (13) and the light switch (IL) (39) are located (fig. 5); the bottom enclosure is made of thermo-formed ABS; the sides, back and top enclosures are made by galvanized and plasticized steel sheet.
The product (cans or bottles) can be stored on round shelves, divided into 6 sectors (Fig. 7): their position can be adjusted by the user on the support shaft, following the procedure

Figure 7

indicated in section 2.3.1. On the external profile of each sector (see nr "1" in fig. 7) a label strip can be inserted and protected by transparent cover strips (68).

Two rear panels (marked with “1” in Fig. 8) provide correct air circulation and distribution;

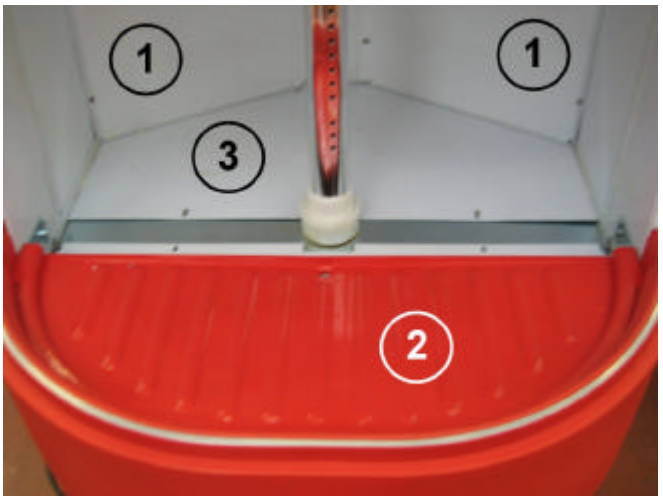


Figure 8

behind the left one the temperature probe (I) (85) is located.
The evaporator (28), the liquid splitter (9) and the evaporator probe (H) (84) are located in the

Figure 9

bottom tank and enclosed by the evaporator metal cover marked with “3” in fig. 8 and by the motor fans support plate, marked with “2” in fig. 9: the evaporator motor fans (MI) (47) and relative protection grills (36) are mounted on it. The red plastic cover (57), marked with “2” in fig. 8, has function to protect the evaporator motor fans from spillages and condensate.
The plastic tank floor works as a tray, collecting the condensate into the draining tube and subsequently to the evaporating trays (96) and (97), located in the compressor compartment.

2.3.1 INSTRUCTIONS TO ACCESS THE COMPONENTS

2.3.1.1 TOP COVER REMOVAL

To access the Controller Master Unit (CE) (13) and the Light Switch (IL) (39), remove the top plastic cover (25), by removing the 3 screws at the back of the unit marked with “1” in Fig. 10

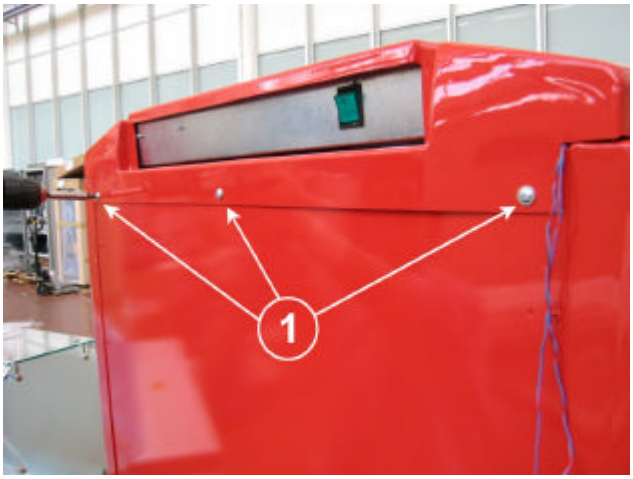


Figure 10

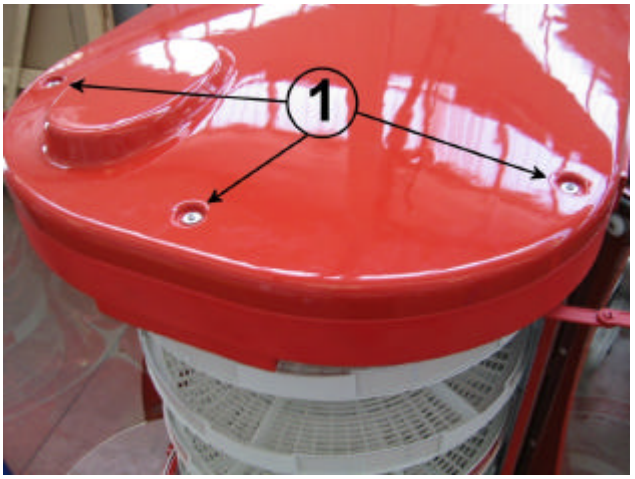


Figure 11

and the 3 top screw marked with “1” in Fig. 11.

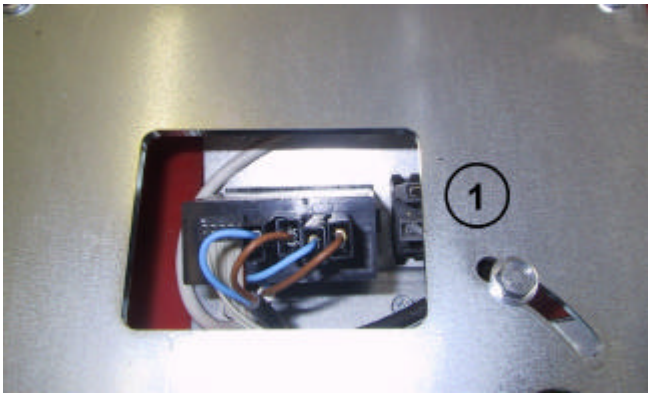


Figure 12

The Master Unit and the Light Switch are accessible through the opening marked with “1 in Fig. 12. The Master Unit and the light switch are snap fitted on the metal support: to replace them, you need to remove the support first, as described in section 4.1.1.4.
Under the top cover (25) are located too the motor gear and trasmission group and the electrical component top support: to replace any of them refer to section 2.5.

2.3.1.2 EVAPORATOR MOTOR FANS SUPPORT REMOVAL

To disassemble the evaporator motor fans support (marked with “2” in fig. 9), remove the red plastic cover (57) (marked with “2” in fig. 8) by unscrewing the screw marked with “1” in Fig. 13; then remove the motor fans support plate by unscrewing the 4 screws marked with “1” in Fig. 9. The evaporator motor fans (MI) (47) and relative protection grills (36) are fixed together by 4 screws each and one of them is also grounded. Remove these screws and the supply wires before the motor fan replacement (Fig. 14). On each of the new motor fans remember to ground one screw again.

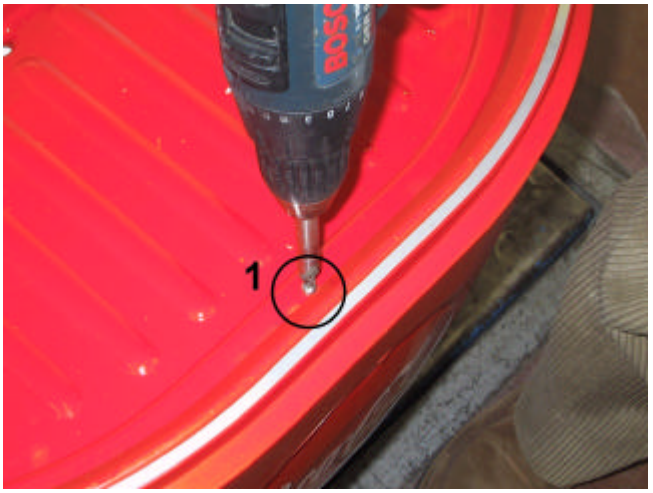


Figure 13

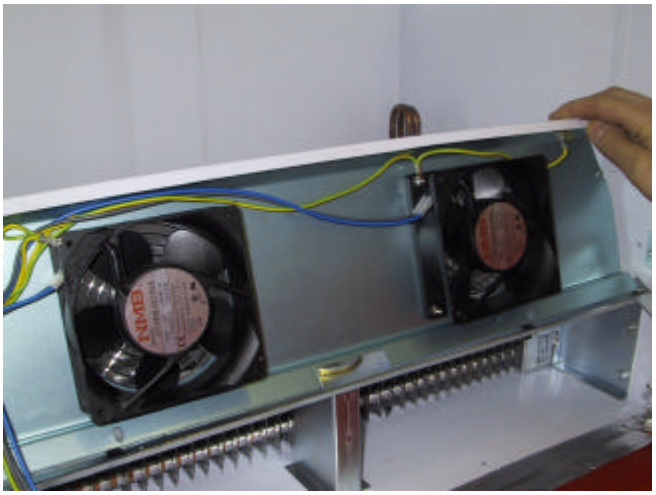


Figure 14

2.3.1.3 SHELF ADJUSTMENT

Remove the stopper (29) marked with “1” in figure 7. Referring to fig. 15 the shelf is held in position by the plastic collet (5) marked with “2” and by the support ring (8) marked with “1”. This ring is fixed at the shaft (61) by the pin (52) marked with “3”, and rotates with it. The shelf rotates as well too, thanks to the friction between the collet and the ring. If for any reason the shelf is stopped, the shaft and its motor are not forced, as they are free to rotate.
To adjust the shelf just fix the ring (8) marked with “3” in a different position by removing the pin (52) from its hole in the shaft and inserting it in the new position.

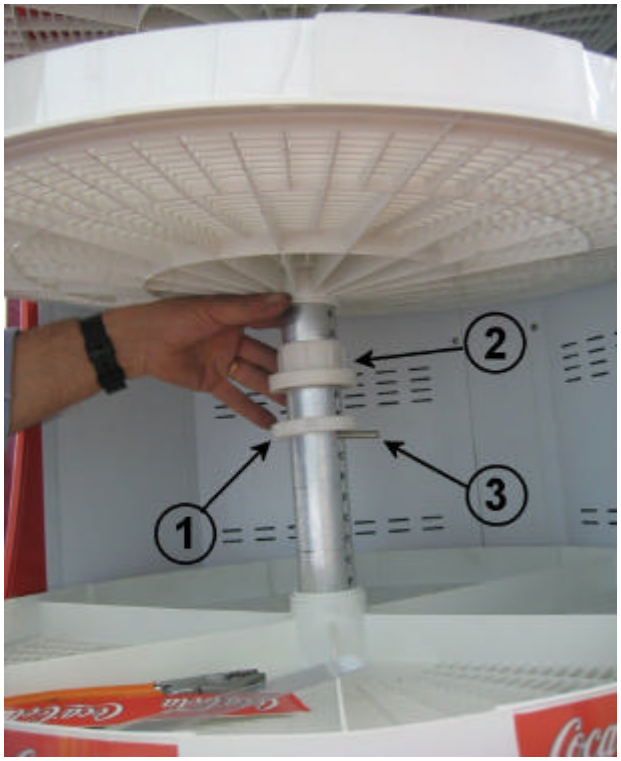


Figure 15

2.3.1.4 SHELVES SUPPORT SHAFT (61) REMOVAL

The shelves support shaft leans on the axial thrust-ball bearing (26) fixed on a brass swivel (nr 1 in fig. 16) that supports the entire load of the shelves, and it's protected by the plastic

Figure 16

Figure 17

cover (89) visible in fig. 17.
On the top the shaft is fixed by the pin (50) to the axial joint (2) of rotation transmission.
To remove the shaft with shelves from the axial joint (2), it must be oriented with it's open side

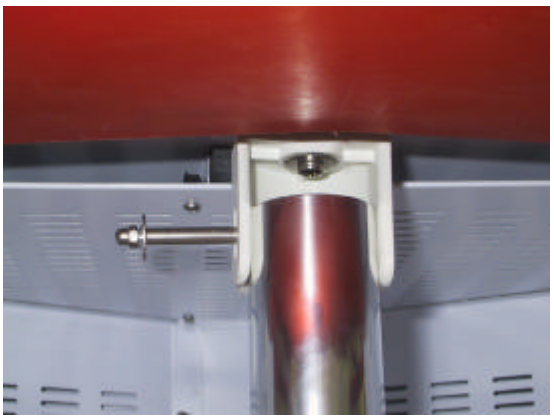


Figure 18

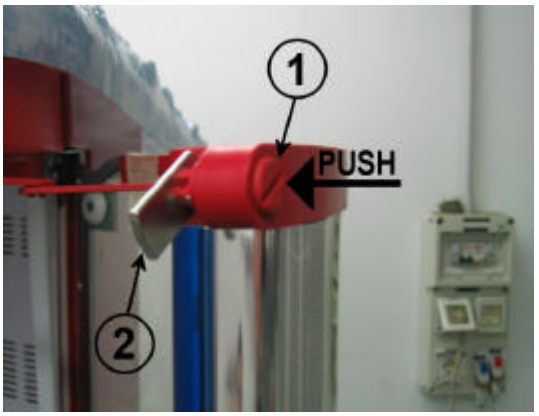


Figure 19

towards the front of the refrigerator, as par fig. 18.
Open the doors (92 and 93) completely, acting on the locking system of fig. 20 by pushing the button marked with "1" and rotating it counterclockwise, in order to release the locking

Figure 20

Figure 21

element marked with "2".
Then remove the red plastic cover (57) as described in the previous section.
Remove the pin (50), unscrewing one of the 2 locking nuts as indicated in Fig. 18 and finally remove the shaft as indicated in Fig. 20 and 21.

2.3.1.5 SHELF REPLACEMENT (81)

To replace or add shelves is necessary to remove the hole structure Shaft + Shelves as described in the previous section and then each shelf from the shaft, following the same procedure described in the section 2.3.1.3 for shelf adjustment.

2.3.1.6 BACK PANELS REMOVAL

To remove the tank back panels, marked with "1" in Fig. 8, firstly remove the shelves support shaft (61) as described in the previous section 2.3.1.4.
Loosen the screws marked with "1" in Fig. 22 and remove the panels starting from the bottom. In this way are accessible (see Fig. 23) the wires that give supply to the evaporator motor fans (MI) (47), to the compressor compartment components, to the temperature probe (I) (85) and to the evaporator probe (H) (84).

Figure 22

Figure 23

2.4 ELECTRICAL AND MECHANICAL COMPONENTS IN THE COMPRESSOR COMPARTMENT

The compressor compartment is located in the bottom part of the unit, protected in the front by the front grille (35) and at the back by the rear steel wire grille (37).

The grilles protect the components and avoid the possibility to reach live components: for safety reasons it's absolutely necessary to keep the grilles in their original positions and verify that nothing can obstruct them in order to leave the necessary air flow through the condenser.

In the compressor compartment there is a base plate upon which the following components are fixed:

- compressor (CO)(20) and relative start relay and start capacitor, bushes (7) and grommets (34);
- condenser (22);
- condenser motor fan (MC)(45) with aluminium blade (48) and grommet (33);
- Defrosting valve with coil (VS) (95) and relative filter (21);
- Dryer (30);
- Safety thermostat (KS) (64);
- Electronic relay (RE) (77);
- Compressor relay (RC) (74);
- Power cord with USA plug (CS) (12) and relative strain relief (103);
- Stainless steel piping (71) for water pre-heating with spacers (27);
- Plastic tray for settling and water pre-heating (96);
- Water level floating switch (ILA) (73);
- Water heater (75);
- Stainless steel tray (97) with relative fixing bracket (86).

To facilitate the servicing the base plate can be completely pulled out from the back of the cooler.

2.4.1 INSTRUCTIONS TO ACCESS THE COMPONENTS

All the cooling circuit piping connections are located in the rear side of the compressor compartment. To access them read the instructions in the following sections.

2.4.1.1 BACK GRILL REMOVAL

The back grill (37) can be removed unscrewing the 2 left screws marked with "1" in Fig. 24

Figure 24

and the 2 opposite on the right side.

2.4.1.2 COMPRESSOR BASE PLATE REMOVAL

Remove the back grill as described in the previous section 2.4.1.1: the compressor base plate can be pulled out by removing the screws marked with “1” in Fig. 25.

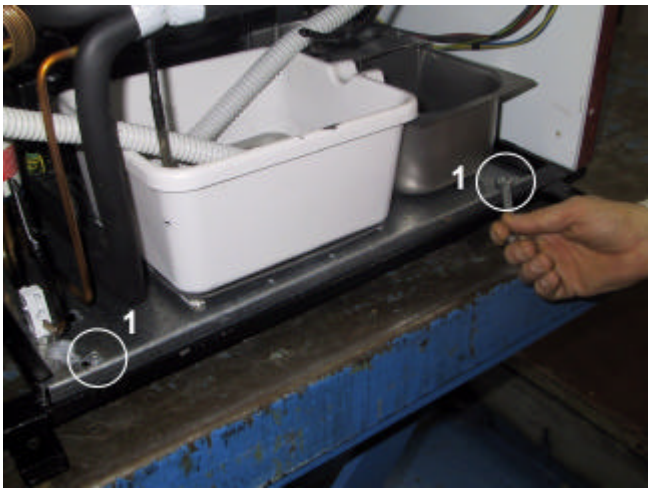


Figure 25

Figure 26

A top view of the base plate is represented in Fig. 26. From front to back are located the condenser (22), with the dryer (30) on the right. The condenser motor fan (MC) (45+48) is sucking air through the condenser and blowing it towards the compressor and the back grill.
On the left of the motor fan there is the electrical component support (Fig. 27 and 28), where the safety thermostat (KS) (64) (marked with “6” in fig. 27) with reset pushbutton (marked with “1” in Fig. 28), the electronic relay (RE) (77) (marked with “5” in fig. 27), the compressor relay

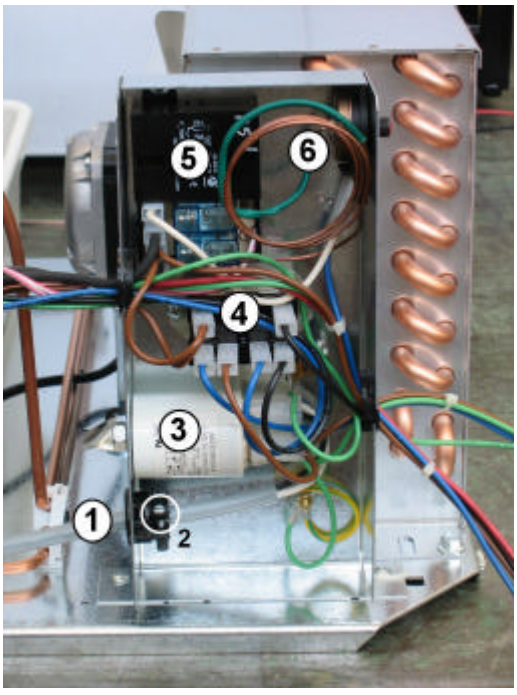


Figure 27

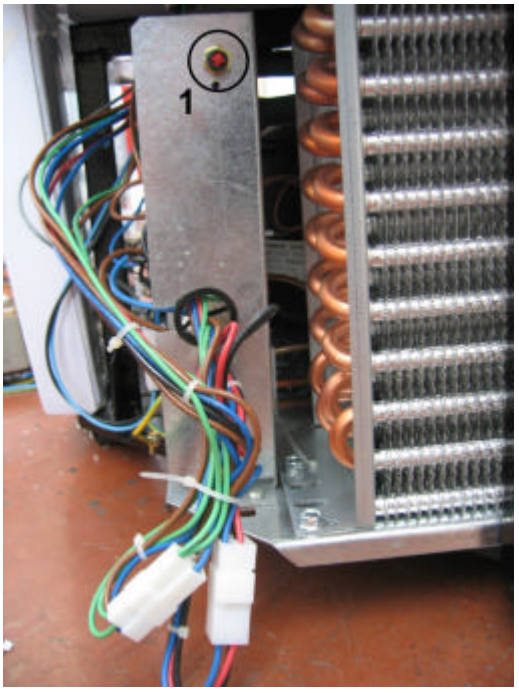


Figure 28

(RC) (74) (marked with “4” in fig. 27), the power cord (CS) (12) (marked with “1” in fig. 27) with relative strain relief (103) (marked with “2” in fig. 27) and the EMC filter (FRF) (31) (marked with “3” in fig. 27) are located.
The compressor (20) is located behind the condenser motor fan on the left. Behind the compressor is located the plastic tray for settling and water pre-heating (96) with its relative stainless steel pipe (71); the water overflowing from it is collected in the stainless steel tray

(97) with water heater (REV) (75), fixing bracket (86) and floater switch (ILA) (73). Behind the stainless steel tray (97) is the defrosting valve (VS) (95) with its coil.

2.4.1.3 FRONT GRILL AND FRONT LOGO REMOVAL

Unscrew the 2 screws marked with "1" in Fig. 29; the grill has 2 side guides for each side, in order to keep it in position (fig. 30).

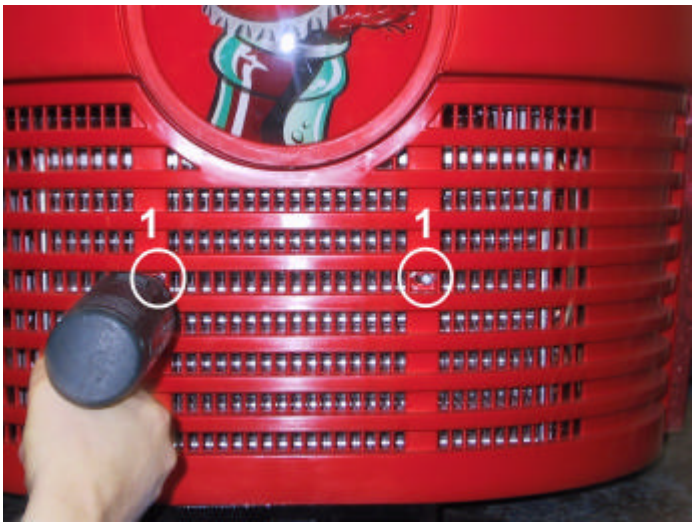


Figure 29

Figure 30

After the front grill removal the front logo (49) can also be romoved unscrewing the screw showed in fig. 31 and the other one in the opposite side.

Figure 31

2.5 ELECTRICAL AND MECHANICAL COMPONENTS IN THE TOP CABINET

On the top of the cabinet, under the top cover (25), is the *Top cabinet EW* made of:
- electrical components metal support (see fig. 5) where are assembled:
  - Main Switch (IG) (99);
  - Inner lights Ballast (BA) (72);
  - Controller Power Unit (UP) (94);
  - Terminal board.

Another base plate (see Fig. 32) supports the motor gear and transmission group for the shelf rotation. In particular:
- Rotation Motor (M) (46) with gear box;
- Driving spool (79);
- Driving belt (18);
- Gearwheel for shelves rotation (78).

2.5.1 INSTRUCTIONS TO ACCESS THE COMPONENTS

Remove the top plastic cover (25) as indicated in section 2.3.1.1.
Looking at the cooler from the rear, the supplying wires for the electrical components located in the inner tank and in the compressor compartment pass through the top wall in the top right position.

2.5.1.1 DRIVING BELT REMOVAL

Remove the top plastic cover (25) as indicated in section 2.3.1.1. The motor gear and transmission group is mounted on a base plate visible in fig. 32, fixed at the cabinet structure by 8 screws marked with “1”.

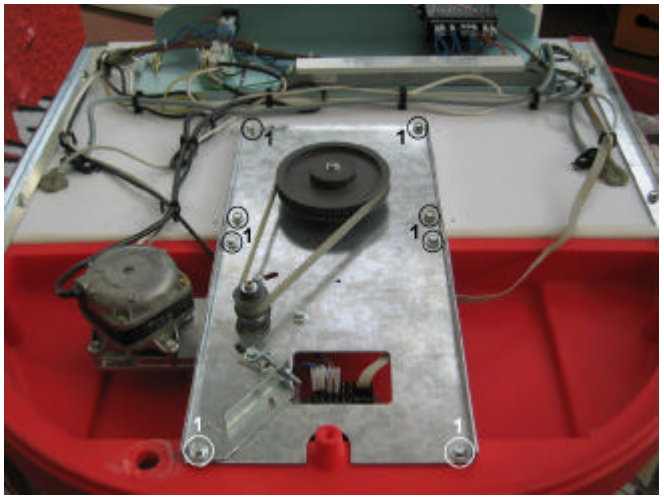


Figure 32

The motor gear group is made by the following components:
- Motor and gear box (46);
- Driving spool (79);
- Belt tensione r bracket (106) with tensioner hook (105);
- Driving cog-belt (18).

The transmission group is made by the following components:
- Transmission cog-wheel (78);
- Nylon bush (108);
- Plastic spherical bearing (83);
- Cog-wheel shaft (53) and shaft gib (109);
- Shaft support with flange (10);
- Shaft support fixing plate (56);

- Axial joint (2);
- Transmission pin with handle fixing nuts (50).

In order to remove any of the above components is necessary to previously remove the driving cog-belt (18).

Referring to fig. 33 unscrew the 2 nuts marked with “2”, used to fix and regulate the belt

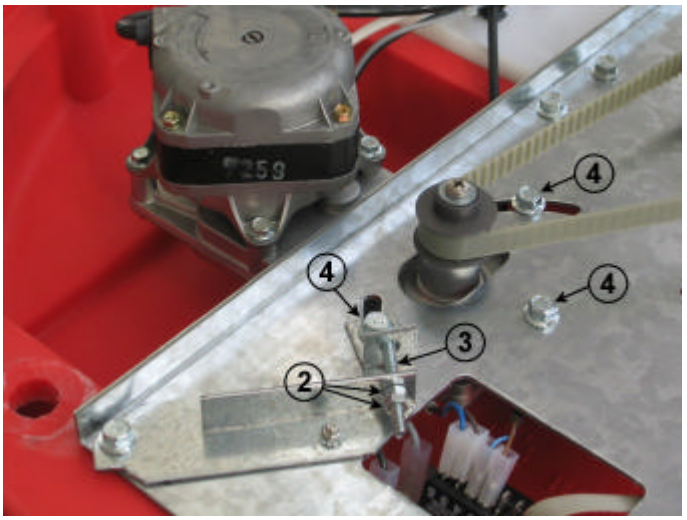


Figure 33

tension, and remove the setting screw marked with “3”; unloose the 3 screws marked with “4” and rotate the motor with gear box (46) clockwise in order to release the cog-belt, as par fig. 34.

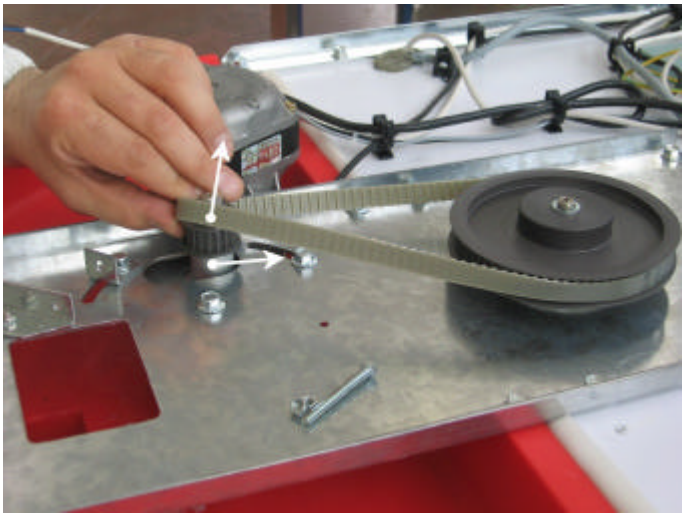


Figure 34

To reassemble the system keep the motor with gear box rotated and place the belt on driving spool and cog-wheel. Place the setting screw again in position and regulate the belt tension by rotating the motor with gear box by hand: the belt is correctly tensioned when apllying a radial force of 20 N in the middle it shifts 6 mm.

Use one of the nut marked with “2” to fix the motor in position and the secod to lock it; then tighten the 3 screws marked with “4”, starting from the furthest from the belt tensioner bracket.

2.6 ELECTRICAL AND MECHANICAL COMPONENTS ON THE CABINET

On the cabinet there is the Cabinet Frame Heater (RCA) (76) and the doors (92 and 93).
The cabinet frame heater takes the supply directly from the line and is controlled by the main switch (IG) (99). It's located in the aluminium profiles (62 and 63), marked with "1" in Fig. 35 and 36, and is protected by plastic cover profiles (1, 65 and 66), marked with "2" in the same

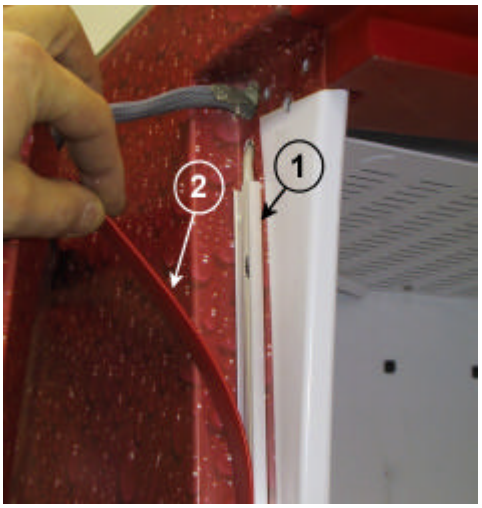


Figure 35

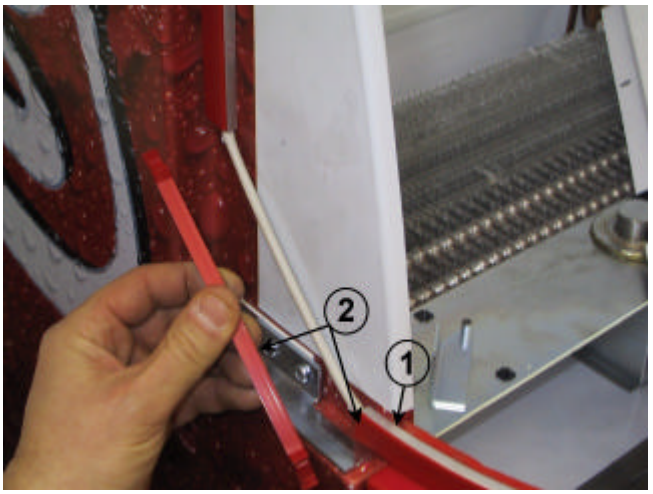


Figure 36

figures.
The doors (92 e 93) are made by a curved glass on top of which is glued a plastic header profile supporting the door locking system (see fig. 20). The door lock is made up of the nut

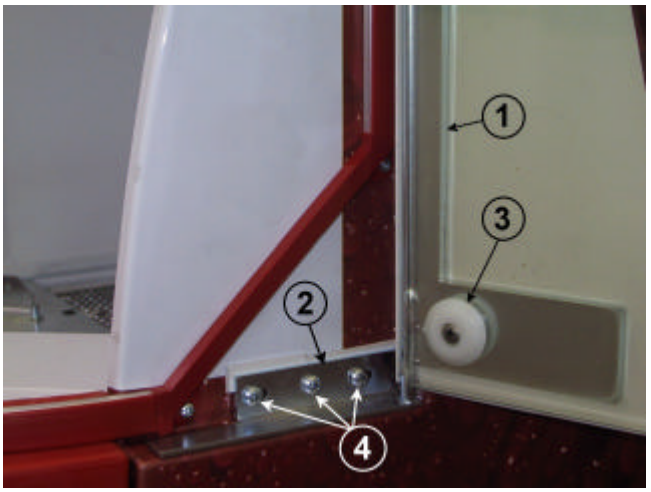


Figure 37

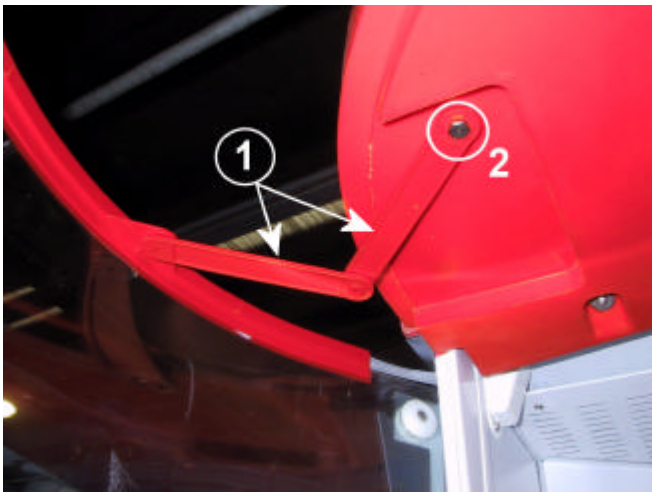


Figure 38

(4), the closing bracket (42), the spring (44) and the pin (54). An aluminium profile is fixed on the inner vertical side of the glass, closed at the bottom by the stopper (90), which supports the lamp (LV) (41).
With reference to the fig. 37, the glass is fixed to a galvanized steel frame (55) (marked with "1") by screws and plastic bushes, marked with "3".
The steel frame (55) is fitted to the lower hinge (14 and 15), marked with "2", and to the upper hinge (16 and 17), and is hidden by the plastic covers (23 and 24) stuck to the glass.
Two brackets (3), marked with "1" in fig. 38 and fixed to the cabinet by the pin (51) marked with "2", serve to limit the door opening.

The tank lamps (LV) (41), located inside the aluminium door side profiles and fixed by the lamp holders (60), are protected by the lamp over profiles (67), snap fitted to the aluminium

Figure 39

profiles (fig. 39).

2.6.1 INSTRUCTIONS TO ACCESS THE COMPONENTS

2.6.1.1 LAMP COVER PROFILE (67) REMOVAL

The lamp cover profiles (67) are snap fitted to the door aluminum profiles and can be removed by simply pulling them out using a flat screw-driver as a lever (Fig. 39).

2.6.1.2 DOOR REPLACEMENT (92 AND 93)

Remove the top cover (25) as described in the section 2.3.1.1 and then disconnect the lamp supply wires from the ballast (BA) (72) using a punch as indicated in fig. 40 and 41.
Then remove the plastic cover marked with “1” in fig. 42 by unscrewing the screw marked with

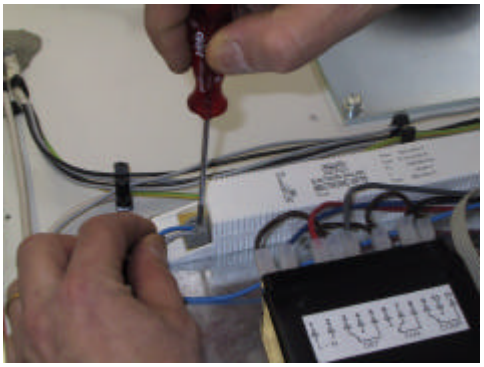


Figure 40

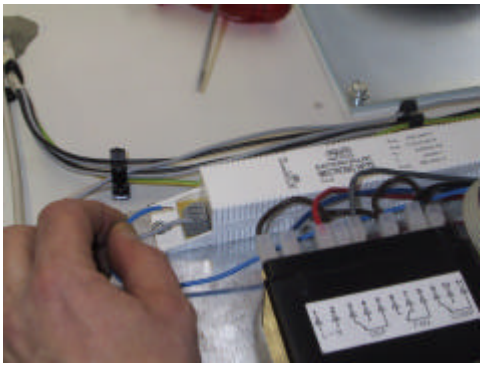


Figure 41

“2” in order to release the door supply wires.

Figure 42

Figure 43

Subsequently remove the door brackets by removing the screw marked with “1” in fig. 43.
Finally remove the lower hinge (14 and 15), unscrewing the screws marked with “4” in fig. 37.
Be sure to hold the door so as to avoid its falling down.

3 RULES FOR THE CORRECT FUNCTIONING

3.1 START-UP INSTRUCTIONS

After removing the packaging and installing the refrigerator in its final location, adjust the level feet (58) until the refrigerator is locked in place, on a flat surface.
Figure nr. 44 shows the front feet rested on the ground: make sure that the unit is perfectly

Figure 44

installed on a flat surface otherwise the door may not close properly or the drainage may be not correct.

Plug the power cord into an outlet able to receive the type of plug supplied with the unit.

Be sure that the electrical supply voltage matches the one shown on the rating plate of the refrigerator.

Upon plugging in the unit, the compressor and the condenser fan motor will start working, the lamps will be on and the shelving shaft will start to rotate; the internal fans may have a delay, relating to the evaporator temperature.
As soon as the internal temperature reaches the one set up on the display, the compressor will stop working and the thermostatic cycle will start.
The unit can bring down the temperature for a load of 420 0.355 l cans from 32°C to 3°C (38° F) in 16 hours maximum.

3.2 BASIC SAFETY RULES

The supply voltage net, to which the refrigerator shall be plugged, must have an additional safety earth circuit.

The unit must be plugged in an outlet with the earth pole protected by a differential magnetothermic switch with rated Power = 15A and differential Power = 30mA.

Do not use extension cords and/or multiple sockets.

Do not remove the protective grilles: no actions to solve possibile mulfunctions can be done by the user on the protected parts of the appliance.

Do not move the unit while plugged in.

Do not move the unit whit levelling feet extended.

Plug the power cord into the outlet accurately. If it doesn't fit, do not force it and plug the power cord into a different socket.
If no suitable socket is available, contact a skilled elettrician to install one.
Do not plug in the power cord and do not keep it plugged if the unit is not locked in place and levelled by its feet (58).
Handle the machine carefully. Avoid shocks or rough movements to the whole structure and in particular on the moving parts (doors, shelves).
The system, in the conditions it has been shipped from the factory, can guarantee an adeguate protection level against electric shocks provided all panels and protection grills remain intact in their original position.
It is highly recommended not to expose the glass doors to possibile shocks and not to force the doors whilst in their maximum open position.
Do not move the refrigerator when it is plugged into an electrical socket. In any case, avoid disassembling any part of the refrigerator until it has been disconnected.
While unplugging the unit, do not pull the power cord. Act directly on the plug. Never bend the power cord.
Do not put any connection device, such as multiple sockets, reduction gears, extensions and so on, between the power cord and the socket.
Do not lean against the upper part of the door until it is open.
Do not wash the unit with running water. In any case avoid direct jets of water toward the refrigerator.
Do not touch the unit with wet hands and/or feet.
Before carrying out any kind of maintenance operation disconnect the power cord from voltage.
For any maintenance operation, contact the technical assistance.

3.3 RULES TO IMPROVE THE EFFICIENCY OF THE SYSTEM

Since the machine is a glass door refrigerator, it must not be exposed directly to the sun rays, otherwise there would be an abnormal absorption of heat.
In any case, install the unit far away from heat sources.
Do not obstruct the external openings (front and back grills) so as to ensure the correct air circulation inside the compressor compartment. Be sure to leave enough space around the unit: at this purpose remember to fit the rear handles, that leave the correct space between the fridge and the back wall.
Clean the condenser from dirt and accumulated debris: a dirty condenser reduces performance and subsequently the life of the compressor. Depending on the environmental cleaning, the condenser should be cleaned at least once every 6 months.

4 MAINTENANCE INSTRUCTION

Before servicing make sure that the machine is not plugged in.

4.1 SERVICING OF THE CABINET

4.1.1 REPLACEMENT OF THE COMPONENTS ON THE UPPER SUPPORT

To access the upper electrical components support remove the top cover (25) as described in sec. 2.3.1.1 and refer to Fig. 4.

4.1.1.1 MAIN (GREEN) SWITCH (IG) (99)

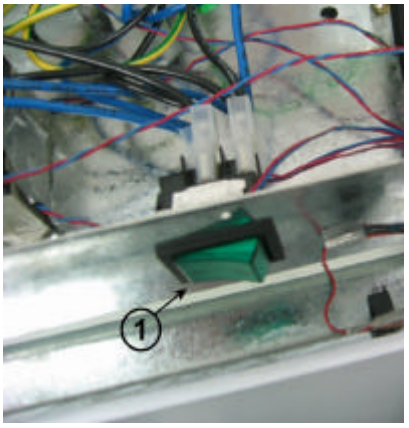


Figure 45

Fig. no. 45 shows the main switch (marked with "1") connected to the system through the spade connectors and snap fitted onto the components support. By pressing the lateral fins at the back and pulling them outwards it is possible to remove and replace it. Disconnect the connectors first.

4.1.1.2 ELECTRONIC BALLAST (BA) (72)

The electronic ballast (BA) (72) for the lamps (LV) (41) has a terminal box. The wires can be disconnected using a screwdriver or a center-punch. The ballast can be replaced by lifting the terminal box first, taking out the wires as described in section 2.6.1.2 (see Fig. 40 and 41) and finally unscrewing the screws that keep the ballast in position.

4.1.1.3 POWER UNIT (UP)(94)

Since the power unit (Fig. 46) is fitted to the electric components support by two screws and electrically connected to the system through spade terminals and to the control board (CE) (13) through the connection cable (11), it can be replaced after disconnecting all the

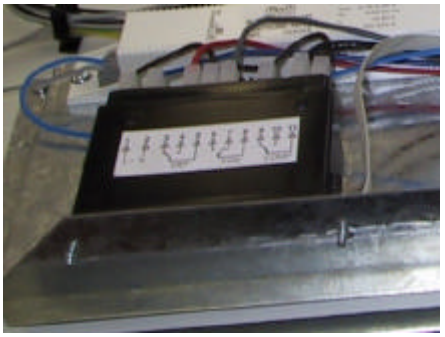


Figure 46

connections and unscrewing the fixing screws.

4.1.2 ELECTRONIC CONTROLLER (CE) (13) AND LIGHT SWITCH (IL) (39) REPLACEMENT

To acces both the electronic controller (CE) (13) and the light switch (IL) (39) the top cover (25) must be removed firstly, according to the instructions of section 2.3.1.1.

Figure 47

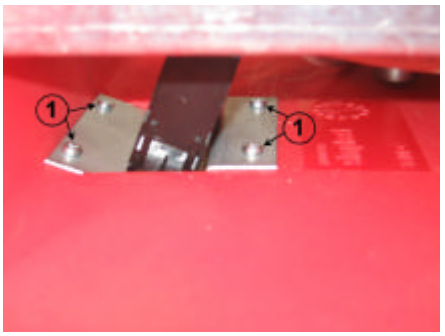


Figure 48

Then the support plate of fig. 47 must also be removed, with controller and switch mounted, disconnecting from the controller the end of defrosting probe (H) (84), the temperature probe (I) (85) and the flat cable (11) and from the switch the input and the output wires.

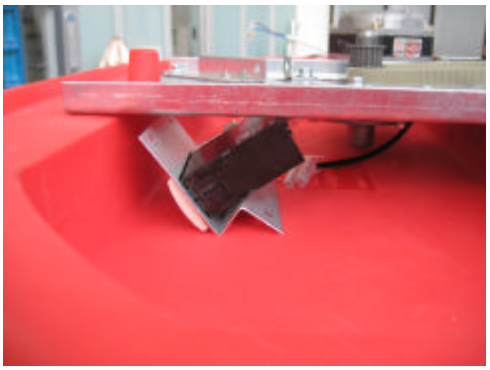


Figure 49

Figure 50

Unscrew the 4 screws marked with “1” in fig. 48, accessible through the opening marked with “1” in fig. 12, move the support up and then sideways under the metal plate as described in fig. 49.

To replace the switch remove manually the front key, insert a flat screwdriver into the switch housing in order to remove the switch body pulling it contemporary from the back as par fig.

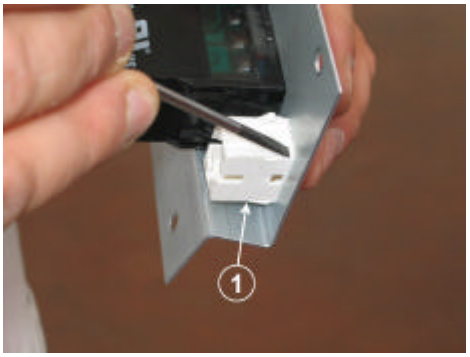


Figure 51

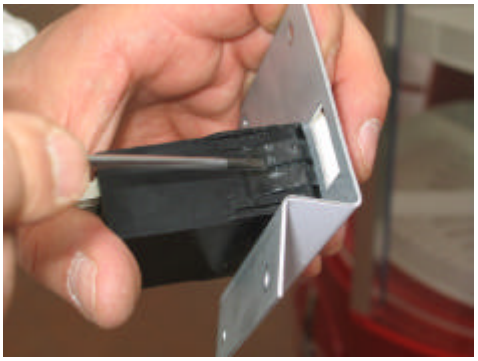


Figure 52

50.

To remove the switch housing (marked with “1” in fig. 51) push on the side hookings using a flat screwdriver as par fig. 51.

To replace the electronic control proceed in the same way of the switch, pushing on the side hooking with a flat scredriver as par fig. 52.

4.1.3 MOTOR GEAR AND TRANSMISSION GROUP DISASSEMBLING

In order to access the components of the motor gear and transmission group remove the top cover (25) as par section 2.3.1.1 and the cog-belt (18), as described in section 2.5.1.1.
All the components, except for the motor gear (M) (46), can be replaced without removing the base plate visible in fig. 32, fixed at the cabinet structure by 8 screws marked with “1”.

4.1.3.1 TRANSMISSION GROUP REPLACEMENT

An exploded view of the transmission group is represented in fig. 53. Referring to that figure we have the cog-wheel (78), the cog-wheel shaft (53), the shaft support with flange (10), the shaft gib (109), the nylon bush (110), the spherical plastic bearing (83), the axial joint (2) with

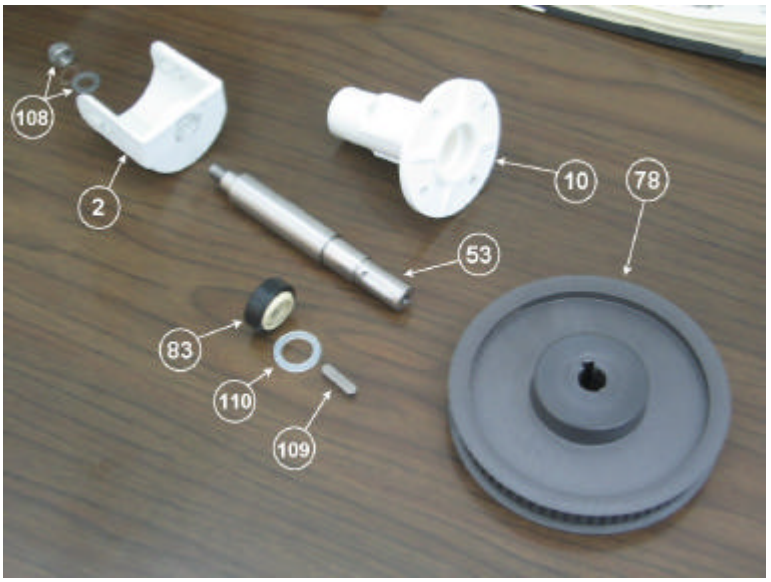


Figure 53

relative fixing nut and bush (108).
To disassemble the transmission group remove firstly the transmission cog-wheel (78),

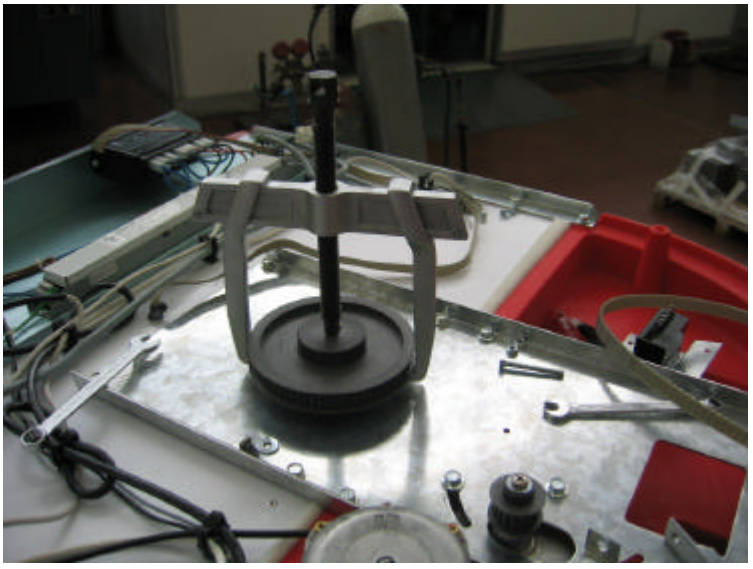


Figure 54

unscrewing its fixing screw and relative bush and using a stripper to remove the wheel from the shaft, as par fig. 54; subsequently remove the gib (109) and the bush (110) from the shaft. The shaft (53) can be removed together with the axial joint (2) by pulling it down from the inner tank: for this purpose the shelf shaft (61) must be moved ahead, positioning the axial joint with its open side in front of the door (just acting on one shelf) and removing the pin (50), unscrewing one of the 2 locking nuts as indicated in Fig. 18.

Remove the spherical bearing (83) from the shaft support (10) and unscrew the screws marked with “1” in fig. 55 to remove the support (10).

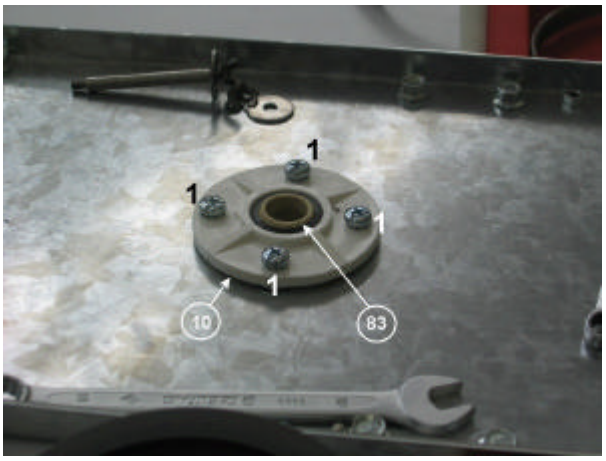


Figure 55

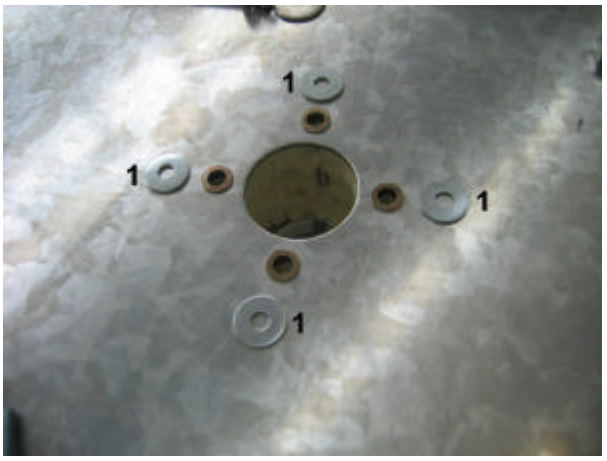


Figure 56

Proceed in the opposite way to reassemble the hole group, positioning the bushes marked with “1” in fig. 56 under the flange of the support (10).

4.1.3.2 MOTOR GEAR REPLACEMENT

To replace the motor gear the base plate visible in fig. 32, fixed at the cabinet structure by 8 screws marked with “1”, needs to be romoved; for this purpose the transmission group must be removed first, following the instructions in the previous section. Remove the driving spoon (79) using a stripper (see fig. 54) and then the motor gear unscrewing the screws marked with “4” in fig. 33.

4.1.4 DOORS

4.1.4.1 LOCK SYSTEM REPLACEMENT (4+42+44+54)

To replace the door lock system open the door use a flat head screwdriver and key (as shown in Fig. 57) and turn them in opposite directions.

Figure 57

4.1.4.2 LAMPS REPLACEMENT (LV) (41)

The lamps installed in the unit are T5 type with G5 attachment, 14W. Their ballast is located on the upper electric components support (see par. 2.5).
To replace the lamp (LV) (41) remove firstly the lamp cover (67) as described in section 2.6.1.1 and then turn the tube on its axis half round.

4.1.4.3 LAMP HOLDERS (60) REPLACEMENT

After removing the lamp (LV) (41) as indicated above, remove the lamp-holder by pressing it down.

4.1.4.4 DOOR (92 and 93) REPLACEMENT

To replace the door refer to par. 2.6.1.2. Before taking out each door, remove the tubes (LV) (41).

4.1.4.5 DOOR BRACKET REPLACEMENT (3+51)

In order to replace the door braket it is necessary to unscrew the screw-rod (51) (shown as "2" in Fig. 38) and press the plastic nut marked with "1" in fig. 43, in order to pull it out from its location on top of the door.

4.1.5 FRONT GRILL REPLACEMENT (35)

Refer to par. 2.4.1.3.

4.1.6 BACK GRILL REPLACEMENT (37)

Refer to par. 2.4.1.1.

4.1.7 CABINET FRAME HEATER REPLACEMENT (RCA) (76)

In order to reach the cabinet frame heater (RCA) (76) it is necessary to remove the top cover (25), as explained in par. 2.3.1.1, the wiring cover located on the inner upper side of the tank (Fig. 42) and the doors (92 and 93) as indicated in par. 2.6.1.2.
Then remove the side (66) and front (65) profiles (Fig. 35) (snap fitted on the aluminum profiles 63 and 62) and the heater covers (1) (Fig. 36) by unscrewing the two screws shown as "1" in Fig. 58; then disconnect the heater terminals from the terminal board located on the upper electric components support.

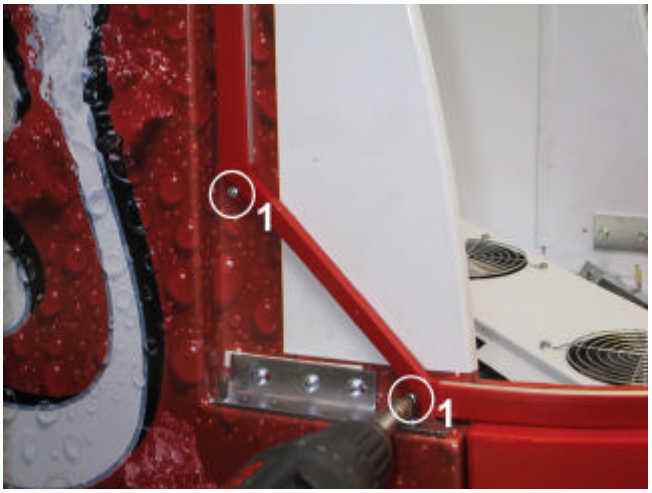


Figure 58

4.2 SERVICING OF THE INNER TANK

4.2.1 INTERNAL FAN MOTOR (MI) (47) AND GRILLE (36) REPLACEMENT

Remove the red water drip panel (57) and the evaporator cover, proceeding as explained in par. 2.3.1.2 (see fig. 59).

Figure 59

4.2.2 EVAPORATOR REPLACEMENT (28)

Before the replacement it's necessary to remove the shelves' support shaft (61), as indicated in par. 2.3.1.4, the motor fans support (upon disconnecting the fan motor cables), as indicated

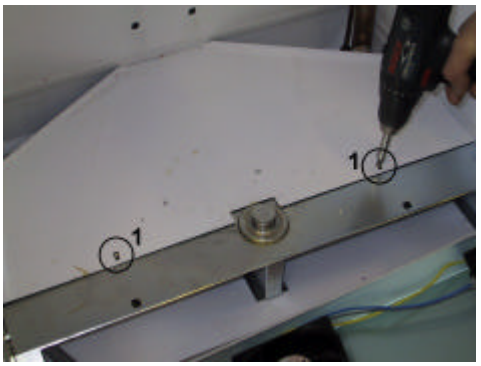


Figure 60

Figure 61

in par. 2.3.1.2, the back panels of the inner tank as shown in par. 2.3.1.6 and the evaporator cover by unscrewing the two screws indicated as "1" in Fig. 60.
The evaporator is now completely accessible, as par fig. 62.
Empty the refrigerant circuit and recover the refrigerant.

Figure 62

Figure 63

Unscrew the two evaporator fixing screws from the shaft support bracket ("1" in Fig. 61); slide the defrosting probe (H) (84) out from its location on the evaporator (Fig. 62).

Unweld the pipes connecting the evaporator to the circuit: these pipes are located in the back left part of the compressor compartment, behind the rear grill and covered by insulating material, as par fig. 64.

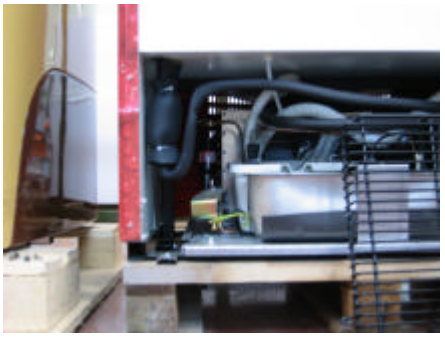


Figure 64

Remove the insulating material, disconnect the pipes and replace the evaporator.

4.2.3 END OF DEFROSTING WHITE PROBE REPLACEMENT (H) (84)

Remove the top of the unit (25) as explained in par. 2.3.1.1, the shelves shaft as explained in par. 2.3.1.4, the back panels of the inner tank as explained in par. 2.3.1.6 and the evaporator cover as explained in the previous par. 4.2.2.
Slip off the probe from the sensor holder located on the evaporator (Fig. 63), disconnect the terminals from the control board (CE) (13) (Fig. 12) and remove it.

4.2.4 TEMPERATURE BLACK PROBE REPLACEMENT (I) (85)

In order to have access to the black probe (I) (85) (Fig. 23) remove the top of the unit (25) as described in par. 2.3.1.1, the shelves shaft (61) as per par. 2.3.1.4 and the left back panel of the inner tank as indicated in par. 2.3.1.6. Open the strip supporting the probe bulb, disconnect the probe from the control board (CE) (13) (Fig. 12) and remove it.

4.2.5 SHELVES SHAFT REPLACEMENT (61)

Refer to par. 2.3.1.4.

4.2.6 SHELVES SHAFT AXIAL JOINT (2) AND FIXING PLASTIC PLATE (56) REPLACEMENT

To reach the axial joint (2), which transmit the rotation to the shelving support shaft (60), and its fixing plate (56), located on the upper section of the inner tank, it is necessary to remove the shaft as per section 2.3.1.4 and unscrew both the fixing screw and relative bush indicated as “1” in Fig. 65 and the two screws indicated as “2”.

Figure 65

4.2.7 CONTROL BOARD (CE)(13) AND LIGHT SWITCH REPLACEMENT (IL)(39)

Refer to par. 4.1.2.

4.3 SERVICING OF THE COMPRESSOR COMPARTMENT

In order to access the components in the compressor compartment the compressor base plate needs to be pulled out: refer to section 2.4.1.2 for this purpose.

4.3.1 POWER CORD (12) AND STRAIN RELIEF (103) REPLACEMENT

The strain relief, marked with “2” in fig. 66, is snap fitted to the electric components metal

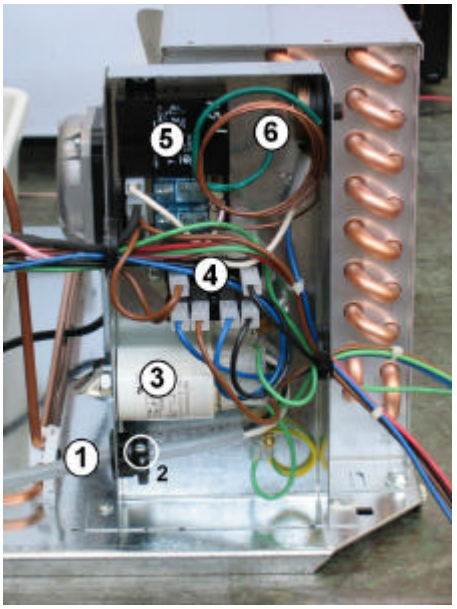


Figure 66

support: unloose the screw fastening the power cord and remove it. To remove the power cord, marked with “1” in fig. 66, disconnect the terminals from the EMC filter (marked with “3”).

4.3.2 EMC FILTER (FRF) (31) REPLACEMENT

Marked with “3” in fig. 66 is electrically connected to the wiring by spade terminals: disconnect the terminals and loosen the nut at its bottom to replace it.

4.3.3 COMPRESSOR RELAY (RC) (101) REPLACEMENT

Marked with “4” in fig. 66 is electrically connected to the wiring by spade terminals: disconnect the terminals and unscrew the 2 fixing screws to replace it.

4.3.4 COMPRESSOR FAN MOTOR REPLACEMENT (MC) (45+48)

Disconnect the fan motor terminal junction block and unscrew the hexagonal head screws shown as “1” in Fig. 67 fixing the motor support to the base plate. Move the fan motor to the compressor side. To replace the blade (48) unscrew the hexagonal screws connecting it to the motor (45).

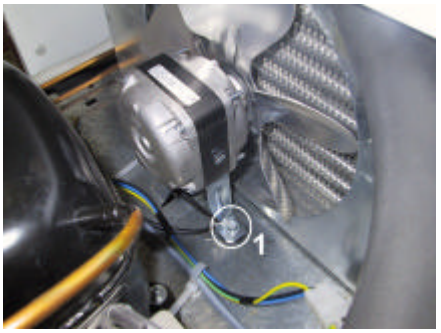


Figure 67

4.3.5 WATER EVAPORATION GROUP

The water evaporation system is made by (fig. 26):

- Plastic drain tray (96) for condensate collecting, settling and pre-heating;
- Hot piping (71) for condensate pre-heating;
- Stainless steel evaporation tray (97);
- Water level floating switch (ILA) (73);
- Floating switch support with tray fixing bracket (86);
- Electrical heater (RVR) (75);
- Water heater electronic relay (RE) (77) (marked with “5” in fig. 66) located in the electrical component support;
- Safety thermostat (KS) (64) (marked with “6” in fig. 66) with reset push-button (marked with “1” in fig. 28), located in the electrical component support;
- Tube (T) for thermostat sensor location, brazed onto the heater.

A plastic tube collects the condensate coming from the evaporator into the plastic drain tray (96), where is pre-heated by a hot stainless steel pipe (71) directly connected to the compressor delivery; when this tray is full, the water flows into the second stainless steel tray (97), where an automatic system with floater and electrical heater evaporates it.
The heater (RVR) (75)minals are connected to the spade terminals of the electronic relay (RE) (77) (“5” fig. 66) located on the electronic components.
The heater is locked inside the inox tray (97) by a braket (86) supporting the water level float (ILA) (73); the bracket fixes the inox tray (97) to the compressor support basement too.
The safety thermostat (KS) (64) avoid any overheating due to a mulfunction of the system by disconnecting the heater from supply; it’s sensor is located inside an inox pipe (fig. 68) brazed

Figure 68

onto the heater and detects any overheating due to mulfunction either of the electronic relay or the floating switch.
When the safety thermostat cuts off the heater there is always an overheating due to a malfunction of the system: for this reason it’s functionality must be manually restored only after having eliminated the cause of the problem, by pressing the thermostat reset button placed on the electrical component support in the compressor compartment (Fig. 28 nr 1).

4.3.5.1 FLOATING SWITCH REPLACEMENT (ILA) (73)

Disconnect the electrical terminals directly wired to the electronic relay (see the wiring diagram SE0356/00).

Remove the water evaporator tray fixing bracket (86) from the inox tray by unscrewing the screws indicated as “1” in Figure 69.
To remove the switch (ILA) (73) unscrew the fixing nut shown as “1” in Fig. 70.

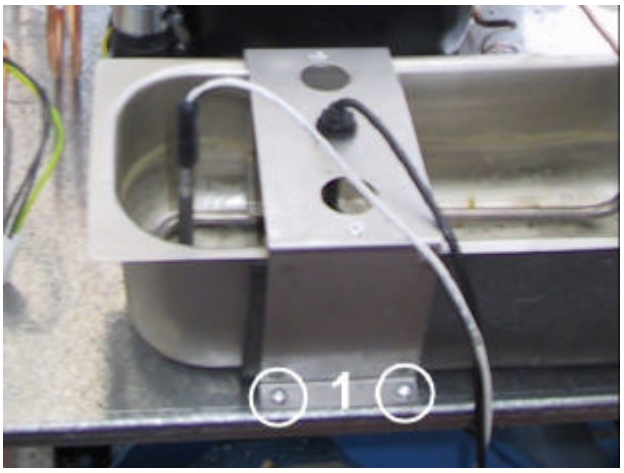


Figure 69

Figure 70

4.3.5.2 ELECTRONIC RELAY REPLACEMENT (RE) (77)

In order to replace the electronic relay (RE) (77) (marked with “5” in Fig. 66) it is necessary to disconnect the heater terminals and the floater junction block; then unscrew the two screws, fixing it to the component support, and replace it.

4.3.5.3 SAFETY THERMOSTAST REPLACEMENT (KS) (64)

Disconnect the spade terminals of the thermostat (“6” in Fig. 66), remove the fixing nut shown as “1” in Fig. 28 and remove the thermostat sensor from the tube where is located (Fig. 68).
Inserting the sensor again in its location make sure that it reaches the end of the tube otherwise in case of overheating it might not correctly work.

4.3.5.4 WATER HEATER REPLACEMENT (RVR) (75)

In order to replace the water heater (RVR) (75) located inside the inox tray (97) (Fig. 68 and 70) it is necessary to remove the fixing bracket (86) supporting the floating switch (ILA) (73) as indicated in par. 4.3.5.1. Remove the thermostat sensor from its location: inserting the sensor in the new heater pipe make sure that it reaches the end of the pipe otherwise eventual overtemperature cannot be correctly detected. Before removing the heater disconnect the heater terminals from the electronic relay (RE) (77) located on the electronic components support inside the compressor compartment (“5” in Fig. 66).

4.3.5.5 WATER EVAPORATION SYSTEM FUNCTIONAL SAFETY CHECK

After replacing any of the water evaporation system components it is necessary to check its

Figure 71

correct functionality: **this procedure is mandatory in order to guarantee the safety of the unit.** After cleaning the inox tray from eventual accumulated debris, insert a voltmeter parallel to the heater as shown in Fig. 71: an alternative solution is the use of an amper clamp-meter as shown in the same figure.

This test must be conducted in dry condition only: be sure that no water is present in the stainless steel tray.

Plug the unit, turn it on and lift the floating switch up using a stick-tool as shown in Fig. 72: the water heater will be enabled after a delay of roughly a minute by the electronic relay. Check

Figure 72

using the voltmeter if there is voltage on the heater terminals (115V) or check using the ampere-meter the current consumption (around 3.8 Amp). Keep the floater up for approximately 5 minutes, till the thermostat cuts off the supply to the heater: check with the voltmeter or the Ampere-meter that there is absence of voltage or current effectively.

The test is finished: disconnect the cooler from power supply.

After this test the safety thermostat needs to be reset: wait for approximately 15 minutes and then press the reset button located on the electric components support, shown as “1” in Fig. 28; the thermostat sensor needs to reach ambient temperature before resetting: to speed the process some water can be added into the tray.

If the thermostat is not reset the heater will never be activated again and water can overflow onto the floor during the cooler normal functioning.

5 UTILITIES

5.1 ELECTRONIC CONTROL BOARD MANUAL (CE) (13) MS20_04

UNIVERSAL ELECTRONIC CONTROLLER

FOR REFRIGERATING APPLIANCES

WITH TEMPERATURE ALARM

HACCP

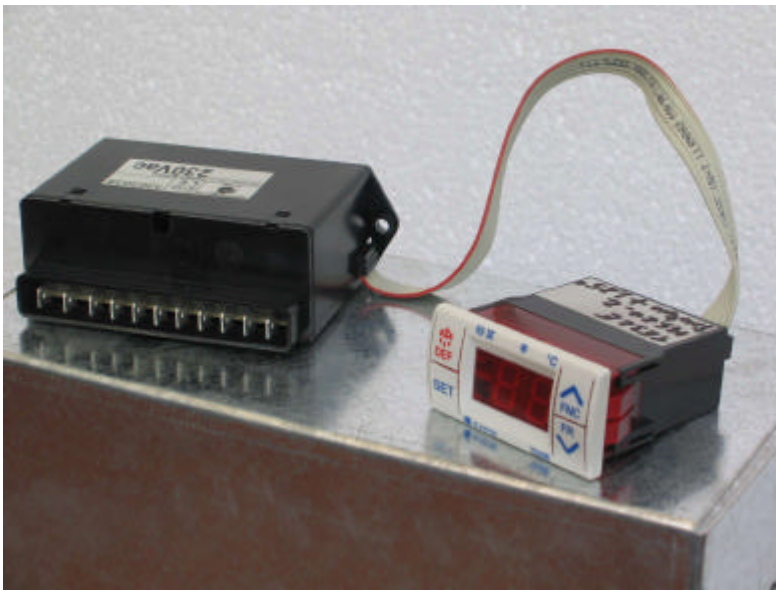
MS20 IARP

ELETTRONIC CONTROLLER MS20 IARP
MASTER UNIT

TE32E Eurema Display

ELETTRONIC CONTROLLER MS20 IARP
SLAVE UNIT

ELETTRONIC CONTROLLER MS20 IARP
MASTER AND SLAVE UNIT ASSEMBLED



MASTER UNIT TECHNICAL SPECIFICATION

Housing
- ABS self extinguishing - 32x64 mm
- Depth 83 mm max; Frontal protection: IP 65.

Mounting system
- Snap fitted - panel hole dimension 25x58 mm

Connections
- Fast-on 4.5x0.8 mm for temperature probes and digital input
- 5 pins connector for connection to slave unit type COMATEL 476.0395.105.440

Supply
- By 5 wires flat cable from slave unit

Keyboard
- 4 keys type

Display
- Two digits and one led for minus sign (–); 3 leds for compressor, evaporator metor fan and alarm.
- Display height 13 mm. Red led as standard.

Analogical input
- 1 Temperature PTC probe and 1 evaporator PTC probe (end of defrosting control)

Digital input
- To control the evaporator motor fans by door switch

Temperatures
- Functioning: [-10...+50] °C / [+14...+122] °F
- Storing: [-20...+60]°C / [-4...+140] °F

Measuring and regulating field
- [-50 ...+50]°C / [-58...+122] °F

Resolution
- 1°C / 1.8 °F

Precision
- ± 2 °C / ± 3.6 °F within the measuring field

SLAVE UNIT TECHNICAL SPECIFICATION

Housing
- ABS self extinguishing
- Protection IP 20

Fixing system
- by 2 screws

Connections
- Faston 6.3 x 0.8 mm to loads
- 5 wires flat cable to Master Unit by connector COMATEL 476.0395.105.440

Supply
- 230 Vac 50/60Hz +/-15% terminals 1 and 2
- 115 Vac 50/60Hz +/-15% on request with UL specifications

Digital output
- Compressor: 1 relay SPDT 16A terminals 9 nc, 10 no and 11com)
- Defrosting: 1 relay SPDT 8A terminals 3 nc, 4 no and 5 com
- Evaporator motor fan: 1 relay SPDT 5A terminals 6 nc, 7 no e 8 com

Temperatures
- Functioning: [-10°...+55]°C / [+14...+122] °F
- Storing: [-20...+60]°C / [-4...+140] °F

ALARM UNIT TECHNICAL SPECIFICATION (OPTIONAL)

Housing

- ABS self extinguishing
- Protection IP 20

Fixing system

- by 2 screws

Connections

- Alarm relay with fast-on 6.3 x 0.8 mm
- 5 wires flat cable to Slave Unit by connector COMATEL 476.0395.105.440
- 5 wires flat cable to Master Unit by connector COMATEL 476.0395.105.440

Supply

- By 5 wires flat cable from Slave unit

Digital output

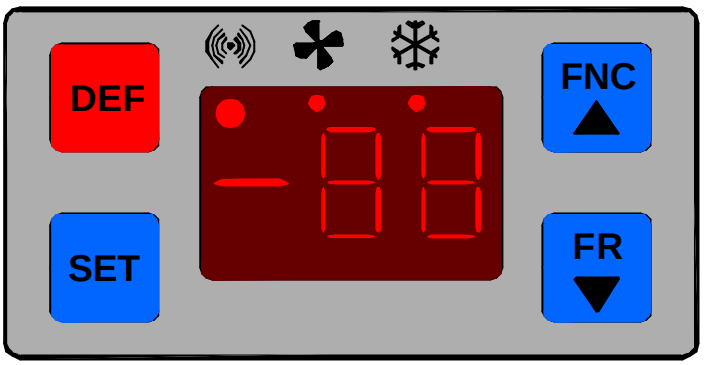
- Alarm relay: 1 relay SPST 5A terminals 1 no, 2 com

Signal output

- Pulsating buzzer

Temperatures

- Functioning: [-10°...55]°C / [+14...+122] °F
- Storing: [-20...+60] °C / [-4...+140] °F



SET *key functions*

- Keeping pushed for 3 sec. it shows the Set point value blinking. The value may be increased by the ***UP*** ? (***FNC***) key and decreased by the ***DOWN*** ? (***FR***) key. The new value is automatically recorded by exiting the Set point mode (time-out: 10 sec) or by pressing the ***SET*** button again.
- Keeping pressed together with the ***FNC*** key for 3 sec., within 30 sec. from the on-switch, it enables the ***Vector*** programming mode. During the programming mode has confirmation function.
- Pressing it together with the ***FNC*** key for 3 sec., after 30 sec. from the on-switch, enables the ***Single value*** programming mode. During the programming mode has confirmation function.
- Pressing it together with the ***DEF*** key for 6 sec deletes the alarms (buzzer, relay and led) and the relative code (***AO*** or ***AA***).
- Pressing it together with the ***FR*** key for 6 sec reset all the parameters to the default values and the last programmed vector.

FNC *key functions*

- Keeping pushed for 1 sec. deletes the ***Ct*** code (max. time for compressor on) or the ***dt*** code (anomalous defrosting stopped by time) or the ***CL*** code (extended warning phase for product loading).
- Keeping pushed for 3 sec., within 60 sec. from the on-switch, disables the on-switch alarm and shows the ***Pd*** code (extended warning phase at refrigerator on-switch for temperature Pull Down).
- Keeping pushed for 3 sec., after 60 sec. from the on-switch, enables the extended warning phase for product loading and the ***CL*** code is lighting alternate with the inner temperature value throughout the pre-alarm time ***A2***. An extra push of the key disables the function and the ***CL*** code.
- Keeping pressed together with the ***SET*** key for 3 sec., within 30 sec. from the on-switch, enables the ***Vector*** programming mode.
- Pressing it together with the ***SET*** key for 3 sec., after 30 sec. from the on-switch, enables the ***Single value*** programming mode.
- Pressing it together with the ***DEF*** key for 6 sec resets the controller (time, mode and alarm): stops the defrosting (if running) and resets the defrosting time counter, deletes the alarms (buzzer, relay and led) and the relative code (***AO*** or ***AA***) and resets the A2 time counter, disables the *Deep freeze*, *Anti freeze* and *Test* functions (if enabled).

DEF *key functions*

- Keeping pushed for 3 sec enables the defrosting cycle (when programmed).
- Pressing it together with the ***FNC*** key for 6 sec resets the controller (time, mode and alarm): stops the defrosting (if running) and resets the defrosting time counter, deletes the alarms (buzzer, relay and led) and the relative code (***AO*** or ***AA***) and resets the A2 time counter, disables the *Deep freeze*, *Anti freeze* and *Test* functions (if enabled).
- Pressing it together with the ***SET*** key for 6 sec deletes the alarms (buzzer, relay and led) and the relative code (***AO*** or ***AA***).

FR *key functions*

- Keeping pushed for 3 sec. enables the ***deep freeze*** function and the ***Fr*** code or the ***Pull Up*** function and the ***PU*** code. To disable the function press the ***FR*** key again.
- Keeping pushed for 3 sec. within 60 sec. from the end of the ***Vector*** programming mode, enable the *production end test* function. To disable the function press the ***FR*** key again.
- Pressing it together with the ***SET*** key for 6 sec resets all the parameters to the default values and the last programmed vector.

Relay displaying mode

- **Decimal point on right**: lighting = compressor on; flashing = waiting; off = compressor stopped
- **Decimal point on left**: lighting = inner fans on; flashing = inner fans waiting by door switch; off = inner fans stopped.
- **Minus sign**: flashing = *vector* programming mode enabled.
- **Alarm led**: flashing = Pre-Alarm mode; lighting = alarm mode.
- **All leds and digits**: flashing = Master unit not programmed.

User interface function keys summary
The keys combinations are summarized as follows:

Programming functions
- ***Vector*** programming mode: ***SET + FNC*** for 3 sec. within 30 sec. from refrigerator on-switch;
- ***Single Value*** programming mode: ***SET + FNC*** for 3 sec. after 30 sec. from refrigerator on-switch.

Cooling functions
- *Thermostatic cycle set point:* ***SET*** for 3 sec.;
- *Thermostatic cycle set point adjustment:* ***UP*** ? (***FNC***) to increase ***DOWN*** ? (***FR***) to decrease;
- *Defrosting cycle*: ***DEF*** for 3 sec.;
- *Deep Freeze or Pull Up* function: ***FR*** for 3 sec.;
- *Test function (for production test only)*: ***FR*** for 3 sec. within 60 sec. after a ***Vector*** programming.

Reset functions
- ***Ct***, ***dt*** *and* ***CL*** *codes reset:* ***FNC*** for 1 sec.;
- *Controller mode, time and alarm reset:* ***DEF + FNC*** for 6 sec.;
- *Controller reset to factory default parameters:* ***SET + FR*** for 6 sec.
- *Alarm signal reset*: ***SET + DEF*** for 6 sec.

Alarm functions
- *Extended warning phase at refrigerator on-switch*: ***FNC*** for 3 sec. within 60 sec. after a refrigerator on-switch;
- *Extended warning phase for product loading*: ***FNC*** for 3 sec., after 60 sec. from a refrigerator on-switch;
- *Alarm signal reset*: ***SET + DEF*** for 6 sec.

PROGRAMMING FUNCTIONS

Generalities

The MS20 IARP controller is made by 1 Master Unit and 1 Slave Unit, connected togheter by a 5 pins flat cable; optionally an Alarm Unit can be inserted between the 2 units in order to acoustically advise of an occurred alarm.

The Master unit has 29 programmable parameters, 9 "Standard" and 20 "Customized": the 9 standard parameters are common to all models of IARP refrigerating appliances, whereas the 20 customized one are different model by model. The customized parameters are mustered in vectors, each of them represents one refrigerator: all the vectors are memorized in the Master unit memory, so that just one Master unit code is necessary for all IARP products.

The universal Master unit is blank by default and must be programmed when assembled on the refrigerator: the 9 standard parameters are joined to the 20 stored in vectors when one of them is selected and activated by the "*Vector programming procedure*". The last selected vector is kept in memory as the factory default and the master unit can be refreshed to this default value at any time by pressing and keeping pressed contemporary for 6 sec. the ***SET*** + ***FR*** keys: following to this operation the display blinks 2 times to confirm the selection.

A blank Master unit does not enable any load when switched on: the display shows all leds and digits flashing and any function is disabled except the ***SET*** and ***FNC*** keys which, pressed together, allow the ***Vector*** programming mode.

Vector *programming mode*

To enter the ***Vector*** programming mode on blank Master units keep pushed together the ***SET*** and ***FNC*** keys for 3 sec.; with master unit already programmed keep pushed together the ***SET*** and ***FNC*** keys for 3 sec. within 30 sec. from the on-switch. The ***minus sign start blinking*** in order to identify this programming mode and the display shows the default vector number (from ***01*** to ***23***). Any vector has 20 parameters (E_{01}–E_{20}) which define the control and functioning on the specific refrigerator: refer to section 11 for parameters value. By the UP ? (***FNC***) and down ? (***FR***) keys the Vectors are displayed shifting. No vector modification will be enabled without confirmation: the vector is enabled by pressing for 1 sec the ***SET*** key; the new value will blink 2 times to confirm the recording. After 10 sec. from the last input (time out) the control automatically exits from Vector programming mode, leaving any not confirmed modification.

There is no necessity for the final user to enter this programming mode and for this reason it is strongly recommended to distribute already programmed units only: the particular procedure needed to enter it (double keys with time, reduced operating time, switching off and request of confirmation conditions), makes highly unlikely the possibility to unintentionally modify the already programmed vector.

Single value *programming mode*

When the controller has already been programmed, it is anyway possible to modify each of the 20+9 parameters by the ***Single Value*** programming mode: to enter it keep contemporary pushed for 3 sec. ***SET*** and ***FNC*** keys after 30 sec. from the on-switch. The parameters code A_1, $A_2 \ldots A_i \ldots B_j \ldots C_k$, will appear in sequence by pressing the UP ? (***FNC***) and DOWN ? (***FR***) key. The correspondent parameter value will be shown by pressing the ***SET*** key. By the ? (***FNC***) and ? (***FR***) keys it will be possible to increase or decrease this value. No modification will be enabled if not confirmed: the new value will be recorded in memory only by pressing for 1 sec. the ***SET*** key: the new value will blink 1 time to confirm the right procedure and the display will show the next parameter A_{n+1}. After 10 sec. from the last input (time out) the control automatically exits from the programming mode, leaving any not recorded changement.

There is no necessity for the final user to enter this programming mode: the particular procedure needed to enter it (double keys with time and request of confirmation conditions), makes unlikely the possibility to unintentionally modify the parameters.

REFRIGERATING UNIT CONTROL FUNCTIONS

Generalities

The Master unit control is able to fulfill the following functions :

- ***Temperature control;***
- ***Defrosting cycle;***
- ***Deep freeze or Pull Up cycle;***
- ***Evaporator ice build-up (anti freeze) control;***
- ***Compressor protection off-switch minimum time;***
- ***Evaporator motor fans control;***
- ***Refrigerator test cycle;***
- ***Audible Temperature Alarm;***
- ***Digital label for high temperature alarm;***
- ***Digital label for Black out alarm;***
- ***Digital label for door open alarm;***
- ***Digital output Alarm relay (for modem or similar devices);***
- ***Reset to factory default values;***
- ***Auto detection temperature sensors failure.***

Bad events managing

The Master Unit is able to detect and manage some bad happenings that could compromise the right functioning logic:

- Black out during a writing procedure on the Eeprom;
- Time and mode memory after a voltage black out;
- Lost data on memory (code *EE* blinking alternating with temperature): in this case the compressor starts the protection cycles with On and Off periods defined by the *B2* parameter. In order to restore the right data is necessary to call the service centre.
- S1 probe failure (short circuited or disjointed): ***E1*** code is shown, fixed if displayed temperature is S1 (***A4***=0) alternate with temperature if displayed temperature is S2 (***A4***=1).
- S2 probe failure (short circuited or disjointed): ***E2*** code is shown, fixed if displayed temperature is S2 alternate with temperature if displayed temperature is S1.

Temperature scale

The controller is available with thermometer scale either in Celsius or in Fahrenheit degrees unit. Due to the fact that 2 digits are available on display, temperatures greater than 99 Fahrenheit (37.2 °C) are displayed by using letters with the following criterion: 100=a, 110=b, 120=c; for instance we can have the following values on temperature display: a3=103°F (39.4°C); a8=108°F (42.2°C); b7=117°F (47.2°C), c0=120°F (48.9°C); c2=122°F (50.0°C). The same is also used for the parameters values.

Displayed Set point temperature managing

When the thermostatic temperature is much different from the product average temperature, the ***B0*** parameter may show the thermostat set point by a non-dimensional scale: if ***B0 = 0*** the shown value is in °C (or °F) and corresponds to ***SET***, whilst if ***B0 = 1*** the shown value is:

A9 (Set Point upper limit) - SET + 1

and can be considered only a number without dimensional unit. In this way the number 01 is always representing the 'warm' limit of the set point (***SET = A9***) and for every degree of temperature reduction (***SET < A9***) there is an increase of 1 unit. For example, if A8= -30°C and A9= -10°C and the desired temperature is –10°C, the set point must be positioned on 01; if the desired temperature is –30°C the set point must be 21 (-10 +30 +1); with set point positioned on 11 the correspondent temperature is –20°C.

By setting ***C7=1*** the user access to the Set Point adjustment can be inhibited: in this way the final user is not able to modify the set temperature. The default value is ***C7=0*** (free access to the set point adjustment): in order to modify this value enter the Single Value programming mode.

Compressor managing

Thermostat function

The set point enables the compressor off-switch temperature; the compressor on-switch temperature is set by the ***A7*** + **SET**. The final user can access and adjust by default (***C7=0***) the set point between a max and a min defined by the ***A8*** and ***A9*** parameters: to modify the set point press for 3 sec. the ***SET*** key and the display will show the set point value blinking. By the UP ? (***FNC***) and DOWN ? (***FR***) keys this value can be increased or decreased: the new value is automatically recorded (no confirmation required) after 10 sec. (time out) or by pressing the ***SET*** key again for 3 sec.

To inhibit the Set Point adjustment to the final user, enter the Single Value programming mode and set ***C7=1***.

Short compressor off-switch period protection

The ***B1*** parameter set the delay time in minutes for compressor on-switch between one stop and the following compressor restart. In order to avoid a not necessary pause after the first on-switch of the refrigerating unit, the ***B1*** parameter is connected to the ***C3*** parameter (evaporator motor fan delayed by temperature), so that if the defrosting probe reads a temperature ***Pt2*** > ***C3*** the compressor starts immediately.

When the temperature probe is disabled (***C1*** ≥ 50°C or ***C1*** ≥ 120°F) on the first on-switch the compressor always makes the delay set by ***B1***. With Fahrenheit scale the evaporator probe is disabled setting ***C1*** ≥ c0 °F (120°F).

Anti freeze function

The ***B3*** parameter, in tenth of minutes, set the maximum allowable running time for the compressor, useful in case of open units where the ice formation on the evaporator can quickly decrease the cooling performances: if ***B3=0*** the function is disabled. If ***B3?0*** you can choose what to do when the compressor runs more than ***B3*** tenth of minutes by the ***B4*** parameter, in minutes: if ***B4=0*** the controller makes a defrosting cycle whilst if ***B4?0*** the control makes a compressor stop for a period in minutes set by the ***B4*** parameter itself: during this mode the displayed temperature value is alternated to the ***Ct*** (compressor time) code.

Deep Freeze or **Pull Up** function

By keeping pushed the ***FR*** key for 3 sec, the compressor is forced ON or OFF for a period in tenth of minutes set by the absolute value of ***B5*** parameter, neglecting the set point value; if ***B5=0*** the function is disabled; if ***B5>0*** the compressor is forced ***ON*** for ***B5*** tenth minutes and the display shows the code ***FR*** alternate with temperature, whilst if ***B5<0*** the compressor is forced ***OFF*** for $|B5|$ minutes and the display shows the code ***PU*** alternate with temperature. In case the function is enabled the controller makes a defrosting cycle (if necessary and if programmed) in order to have the maximum cooling capacity for the Pull Down or to help the Pull Up, and the display shows the ***dF*** code alternate with ***Fr*** or ***PU*** code. If the defrosting cycle is not necessary (for example on the first starting when ***Pt2*** > ***C1*** or with defrosting disabled), the *Deep Freeze* or Pull Up function is immediately enabled and the display shows the ***Fr*** or ***PU*** code alternate with the internal temperature. By pressing again the ***FR*** key for 3 sec the function is disabled.

Defrosting managing

The defrosting cycles are periodically and automatically executed for a maximum time in minutes set by the ***B8*** parameter. The period in hours, between two consecutive defrosting cycles, is set by the ***B7*** parameter: if ***B7=0*** the defrosting cycle is disabled, whilst if ***B7?0*** and ***B8=0*** the controller will apply just the dripping period set by ***B9***. You can also start a defrosting cycle at any time by keeping pressed the ***DEF*** button for 3 sec. During a defrosting cycle and for the further dripping period (***B9*** parameter) and internal motor fans delay period (***C3*** parameter), the the ***df*** code appears fixed on the display. By the ***C1*** parameter you can enable or disable the end of defrosting probe: setting ***C1*=50°**C in case of Celsius scale or ***C1*=120°**F in case of Fahrenheit scale the controller consider the evaporator probe ***S2*** disabled. With evaporator probe ***S2*** enabled, the defrosting cycle ends when the ***S2*** probe reads the evaporator temperature bigger than ***C1***: this is the standard behaviour, as the maximum time is normally grater than necessary to clean the evaporator; for this reason, when the defrosting cycle ends on maximum time (***B8*** parameter), the ***dt*** code appears alternate with the temperature. The code disappears automatically at the next defrosting ended by the evaporator probe or by keeping pushed for 1 sec. the ***FNC*** key. If the end of defrosting probe is disabled (***C1*=50**°C or ***C1*=120**°F) the defrosting cycles continues for the entire ***B8*** period and the ***dt*** code will not appear; if the S2 probe is faulty the defrosting cycles continues for the entire ***B8*** period and the ***dt*** code will appear together with the ***E2*** code.

The ***B6*** parameter set the defrosting type: if ***B6***=0 the defrosting is made by electrical heater and the compressor is forced off during all the defrosting period, whilst if ***B6***=1 the defrosting is made by hot gas, and the compressor is forced on.

Defrosting types

Manual defrosting:	By keeping pushed the ***DEF*** key for 3 sec.
Automatic defrosting:	starts every **B7** hours.
Forced defrosting:	starts when the ***Deep Freeze*** or ***Anti Freeze*** function are enabled if ***B4=0.***

The time elapsed from the last defrosting is monitored and If a voltage black out occurs the controller keeps in memory this value: at the voltage restoring the controller will count down the time remaining to complete the ***B7*** period; the defrosting time counter is reset after a manual or automatic or forced defrosting and on the restoring of the voltage if the ***Pt2*** temperature (***S2*** probe) exceeds the end of defrosting temperature, or after a controller reset (by keeping pushed the ***DEF*** and ***FNC*** keys contemporary for 6 sec).

Displayed temperature managing

By the ***A4*** parameter we can choose which temperature is to be displayed: if ***A4=0*** the display shows the temperature corresponding to the probe ***S1*** (thermostat probe), whilst if ***A4=1*** the display shows the temperature corresponding to the probe ***S2*** (evaporator probe). The ***A5*** parameter (Offset of the displayed temperature) acts in order to vary the displayed temperature and the Set Point values. The Set Point temperature values in the vectors, include the offset: as a consequence the set point value always corresponds to the displayed one. When the setpoint scale is absolute (***B0=1***) the setpoint value is obviously independent from the offset.

Displayed temperature filter

By the ***C6*** parameter great excursions of displayed temperature due to big differential value (***A7*** par.) can be reduced: as a consequence the display will show shorter temperature excursions compared with the set point value.
Due to the different mass thermal capacities between air and stored product, the displayed temperature may vary much more than the stored product temperature, though having the same average values: in order to reduce this difference a simulated mass thermal capacity can be added to the temperature probe by the ***C6*** parameter: its value in minutes gives the response delay of the display to a temperature increase. No delay is given to a temperature decrease: as a consequence the average displayed temperature will appear slightly colder than normal. Above –5°C (or +23 °F) the function is automatically disabled and If ***C6=0*** the filter is always disabled.

Evaporator motor fans managing

The evaporator motor fans may function in parallel with the compressor or continuously or may be disabled by the ***C2*** parameter: if ***C2=0*** the fans are disabled (static cooling units); if ***C2=1*** they are independent from the compressor (High internal humidity) and if ***C2=2*** they are in parallel with the compressor (Low internal humidity). A motor fans set point

temperature, set by the ***C3*** parameter (motor fans starting by temperature on the evaporator probe) with Histeresys ***C4***, is available in order to avoid dangerous thermal overloads on the evaporator.
If the end of defrosting probe is disabled, the motor fans control is independent from ***C3***.
During defrosting and for the following dripping period the fans are controlled by ***C5*** parameter: if ***C5=0*** the fans are stopped and if ***C5=1*** the fans are running.

Door switch digital input
The **A6** parameter enable the door switch function. If ***A6=0*** the function is disabled; if ***A6=1*** the evaporator motor fans are connected to a NO switch (fans stopped with open circuit), and if ***A6=2*** the switch is NC (fans stopped with closed circuit). When a door switch stops the internal fans the fan led is blinking. An alarm function is connected to the door switch: every time the door is opened the alarm led starts flashing and if the door is leaved open for more than 60 sec. the *door open alarm* will start.

TEMPERATURE MONITORING AND ALARM FUNCTIONS

Generalities
The alarm functions are performed by showing alarm codes on the display and optionally by a warning buzzer located in the alarm unit: this unit can be connected at any moment, as it must be inserted in series between the Master unit and the Slave unit, it does not need independent electric supply, because takes it from the Slave unit.
The temperature monitoring and alarm functions are performed monitoring 2 variables: one *temperature*, defined by ***A1*** and ***A3*** parameters, and one *time*, defined by the ***A2*** parameter. An internal temperature is considered dangerous when 2 conditions happen: it overcomes the *max temperature threshold value* (TTV) set at ***A1*** + ***set point*** and persists in this condition for a period longer than ***A2*** (Alarm delay time = ADT).
Consequently the control philosophy is based on 2 phases: the ***Warning phase***, if temperature overcomes the TTV, and the ***Alarm phase***, if the warning phase persists for a period longer than ADT.
In order to detect possible product overheating due to voltage black out, the controller, at its on-switch, sets an *extended temperature threshold value* (ETTV) to ***A3*** + ***set point*** (bigger than TTV = ***A1 set point***), connected to a fixed period of 60 seconds as ADT: this function is called ***On-switch Warning phase***. To avoid unwanted alarms when the refrigerator is switched on the first time, a special procedure shuts off the alarm phase and start the ***Extended On-switch Warning phase***.
A similar condition, that could result in unwanted alarms, comes true during refrigerator product loading operations, where the door remains opened for a relatively long time: in this situation is possible to run the ***Extended Warning phase for product loading***, that delays the eventual alarm phase.
With door switch enabled (A6?0), if the door is kept open more than 60 sec. a ***Door open alarm*** will start.

Warning phase
When the internal temperature exceeds TTV (***A1*** + ***set point)***, the control starts the *warning phase*: the alarm led on the display is blinking for a period not bigger than ADT (parameter ***A2***) afterwards the control starts the *alarm phase*. If during a standard warning phase the temperature goes below the TTV, the warning phase ends and the ADT counter is reset to 0.

On-switch warning phase
When, following to a refrigerator on-switch, the internal temperature is higher than ETTV (***Set point + A3***) the controller starts the *on-switch warning phase*: this phase has a shortened ADT of 60 sec., as it is not possible to measure the lehgth of the voltage black out period; the alarm led on the display is blinking for 60 seconds afterwards the control starts the *alarm phase*.
As at the first installation the internal temperature will surely be higher than TTV, the controller will start an *On-switch warning phase*: if you do not want an alarm follow the instructions of the next section 7.4 in order to start a pull down phase and inhibite the alarm.
If, during the *on-switch warning phase*, the temperature goes below TTV, the warning phase automatically ends and the ADT counter is reset to 0.

Extended On-switch warning phase (On-switch alarm inhibition)* – Pull Down *phase
During the 60 seconds period of an *on-switch warning phase* it is possible to avoid the alarm by extending the ADT to the ***A2*** value and avoid an unwanted alarm by pushing the ***FNC*** key for 3 sec.: when "**- - -**" appears on display release the key. After this procedure the display shows the code ***Pd (Pull Down)*** alternating with temperature till the ADT time is elapsed.
This function is useful to avoid an unwanted alarm at the first installation of the unit: the operator must be informed on the enabling procedure.
By this procedure the warning phase is extended from the standard 60 sec. to the ***A2*** value. After a time equal to ***A2*** is elapsed and in case temperature is higher than ETTV, the control goes in *Alarm phase*; on the contrary, if temperature is lower than ETTV but bigger than TTV, the control starts a *warning phase* for another ***A2*** period: practically the refrigerator has a period equal to 2*A2 in order to pull down temperature below the TTV. At last, if after a 2*ADT period temperature is still higher than TTV, the control enters the *Alarm phase*.
The *Extended on-switch warning phase* ends when temperature falls below TTV.

Extended warning phase on product loading (Product loading alarm inhibition)
After 60 sec are elapsed from an on-switch, by pressing the ***FNC*** key for 3 seconds, the *Extended warning phase* is enabled: when "**- - -**" appears on display the key can be released. Enabling this procedure the display shows the code ***CI*** (Cooler loading) alternating with temperature till the ADT time is elapsed.
This function is useful to avoid an unwanted alarm during product loading operations: the operator must be informed on the enabling procedure. This function can not be enabled during a warning or alarm phase.
By this procedure the warning phase is enabled when temperature exceeds the ETTV (***A3+set point***) instead of TTV (***A1+set point***) value. After a time equal to A2 is elapsed and in case temperature is still higher than ETTV, the control enters the *Alarm phase*; if temperature is still within ETTV and TTV, the control starts the *warning phase* for another ADT period: practically the refrigerator has a time equal to 2 * A2 value to pull down the temperature below the TTV. At last, if after a 2*ADT period temperature is still higher than TTV, the controller enters the *Alarm phase*. The *Extended warning phase* ends when temperature falls below TTV.

Alarm phase
When the ADT is elapsed during a warning phase and temperature is still over TTV or ETTV the control enters the *Alarm phase*: the display shows the ***AO*** code alternating with temperature and the alarm led on display stops flashing and lights continuously; if an alarm unit is connected the buzzer blows and the alarm relay is enabled.
The alarm phase ends automatically when temperature falls below the TTV: it is possible to shut down the alarm phase by the *alarm reset* (***DEF*** + ***SET*** for 6 sec.) or the *controller reset* (***DEF*** + ***FNC*** for 6 sec.) procedures, but the controller will restart a warning phase, as temperature is bigger than TTV.
During the alarm phase the displayed temperature is refreshed only if the new value is bigger than the previous one: in this way **the display is always showing the max temperature during the alarm phase**.

Door open alarm
When the refrigerator door is opened the controller immediately starts a *warning phase* (alarm led flashing) for 60 seconds: if the door is kept open for more than 60 sec. the controller enters the *door open alarm phase*: the display shows the ***dO*** code alternated with temperature and the alarm led lights continuously; if an alarm unit is connected, the buzzer blows and the alarm relay is enabled.
The *door open alarm phase* ends automatically when the door is closed again. With door switch disabled (***A6=0***) the door open alarm is disabled too.

Alarm inhibition
By setting ***A1=0*** the monitoring function is excluded and all the alarms, included the door open one, are disabled. Since ***A3*** parameter cannot be smaller than ***A1***, any modification on the ***A1*** parameter is submitted to the control ***A1 = A3***: when this condition is confuted the control automatically refresh the ***A3*** value, setting ***A3 = A1***.

Alarm reset
By pressing contemporary the ***SET*** and ***DEF*** keys for 6 sec. the controller exits the alarm mode and the alarm code is deleted. The same result is obtained with the controller reset procedure, by contemporary pressing the ***DEF*** and ***FNC*** keys for 6 sec.: in this case all the time counters and the controller mode are reset too.

TEST FUNCTION

Generalities
This function helps the test of the unit at the end of production process. It's enabled by pressing the ***FR*** key for 3 sec. only within 60 sec. after a Vector programming has been executed: by pressing the ***FR*** key again the function is disabled. By pressing the ***FR*** key after 60 sec. from a Vector programming, the *Deep Freeze* function will be executed.
When the *Test function* is enabled the monitoring and alarm function is disabled for all the test duration.
The test has 2 phases:

Test function phase		Duration
• ***F1 =***	Pull Down Phase	***A2 * 10*** minutes
• ***F2 =***	Defrosting phase	max ***B8 + B9*** minutes

Phases F1 and F2
At the test starting the ***F1*** phase is enabled: the control forces the compressor on for a period equals to ***A2 *** 10 minutes, bypassing the set point:, in order to control the max cooling power of the unit. At the end of ***F1*** phase, the *F2* phase starts, and the controller forces a defrosting cycle only if ***B7?0***: if no defrosting is programmed the ***F2*** phase is jumped and the function ends at the end of phase ***F1***.
After the test function has been executed the controller turns the refrigerator to the normal functioning, driving the internal temperature to the set point value. During all the Test function period the display shows the code of the relative phase *F1* or *F2* alternate with temperature.

TABLE OF MESSAGES

Message	Displayed Code	Limits	Delay or duration	Message type	Enabling way	Enabling procedure
Standard High temperature alarm	***AO*** ***+ alarm led lighting***	TTV = [SET + A 1]	ADT = A2 * 10 min.	***Alternated with temperature***	***Automatic***	***Automatic if programmed***
On-switch High temperature alarm	***AA*** ***+ alarm led lighting***	ETTV = [SET + A 3]	60 sec.	***Alternated with temperature***	***Automatic***	***Automatic if programmed***
Door open alarm	***dO*** ***+ alarm led lighting***	door open more than 60 sec.	60 sec.	***Alternated with temperature***	***Automatic***	***Automatic if programmed***
Standard warning phase	***alarm led blinking***	ETTV = [SET + A 1]	ADT = A2 * 10 min.	-	***Automatic***	***Automatic if programmed***
Standard on-switch warning phase	***alarm led blinking***	ETTV = [SET + A 3]	60 sec.	-	***Automatic***	***Automatic if programmed***
Extended on-switch warning phase - Pull Down phase (On-switch alarm inhibition)	***Pd*** ***+ alarm led blinking***	ETTV = [SET + A 3]	max 2****A2 min.***	***Alternated with temperature***	***Manual***	*FNC for 3 sec within 60 sec from on-switch*
Extended warning phase during product loading (Product loading alarm inhibition)	***CL*** ***+ alarm led blinking***	ETTV = [SET + A 3]	max 2****A2 min.***	***Alternated with temperature***	***Manual***	*FNC for 3 sec after 60 sec from on-switch*
Compressor on	***compressor led lighting***	-	-	-	***Automatic***	***Automatic***
delayed compressor on-switch	***compressor led blinking***	***B1 ? 0 and Off time < B1***	Max ***B1*** min.	-	***Automatic***	***Automatic***
Evaporator motor fans on	***motor fan led lighting***	-	-	-	***Automatic***	***Automatic***
Delayed evaporator motor fans on-switch	***motor fan led blinking***	***Pt2 > C3***	variable	-	***Automatic***	***Automatic***
Evaporator motor fa ns forced off by door switch	***motor fan led blinking***	-	-	-	*Door switch*	***Automatic at door opening***
Defrosting	***df***	T = ***B7*** *and* ***Pt2 < C1***	max ***B8*** min + ***B9*** min. + evap. motor fans delay	*Fixed*	*Automatic*	*Automatic if programmed*
		Pt2 < C1			*Manual*	***DEF*** *for 3 sec if programmed*
		B3?0 *and* ***B4=0*** *and* ***Pt2 < C1***			*Forced by Deep freeze*	***FR*** *for 3 sec if programmed*
		B5 ? 0 *and* ***Pt2 < C1***		*Alternated with* ***Fr*** *or* ***PU***	*Forced by Anti-freeze or Pull Up*	*Automatic if programmed*
Long defrosting	***dt***	Defr. duration = ***B8***	-	***Alternated with temperature***	*Automatic*	*Automatic if programmed*
Deep Freeze or Pull Up function	***Fr***	***B5 > 0***	***B5****10 min*	***Fr Alternated with temp.***	*Manual*	***FR*** *for 3 sec if programmed*
	PU	***B5 < 0***	***|B5| ****10 min*	***PU Alternated with temp.***		
Anti Freeze function	***Ct***	*t_on* = ***B3***	***B4*** min. or max ***B8*** min	***Alternated with temperature***	*Automatic*	*Automatic if programmed*
Test function	***F1***	-	A2 * 10 min.	***Alternated with temperature***	*Manual*	***FR*** *for 3 sec within 60 sec after a vector programming*
	F2	***B8 ? 0***	max ***B8*** min			
Programming mode	*Minus sign blinking*	-	-	-	*Manual*	***Vector*** *Programming:* ***SET+ FNC*** *for 3 sec within 60 sec from on-switch*
						Single value *Programm.:* ***SET*** + ***FNC*** *for 3 sec after 60 sec from on-switch*
Defective temperature probe	***E1***	-	-	***Fixed or Alternating with temperature***	*Automatic*	*Automatic*
Defective evaporator probe	***E2***					
Defective eeprom	***EE***	-	-	***Fixed or Alternated with temperature***	*Automatic*	*Automatic*
Blank memory	*All leds blinking*	***Vector not programmed***	-	-	*Automatic*	*Automatic*

TABLE OF PARAMETERS

Code	Parameter function	Unit	Range	STP	Vx
	Alarm				
A1	Temperature Threshold Value (TTV) respect to set point for Alarm function	°C	00 = disabled	-	**E01**
A2	Alarm Delay Time (ADT)	min*10	-	06	-
A3	Extended Temperature Threshold Value (ETTV) respect the set point for Alarm function	°C	-	-	**E02**
	Display				
A4	Displayed temperature: Pt1 or Pt2	flag	00 = Pt1 01 = Pt2	-	**E03**
	Temperature offset				
A5	Displayed temperature offset	°C		-	**E04**
	Digital Input				
A6	Door switch input	flag	00 = disabled 01 = enabled NO 02 = enabled NC	-	**E05**
	Compressor				
A7	Histeresys (differential Start/stop)	°C		-	**E06**
A8	Lower set point limit	°C		-	**E07**
A9	Upper set point limit	°C		-	**E08**
B0	Absolute Set point	flag	00 = no 01 = yes	-	**E09**
B1	Compressor minimum off-switch period	min	00 =disabled	03	-
B2	Minutes of compressor start and stop when Pt1 probe is defective	min		05	-
B3	Max allowable time for compr. continuous running for ***anti freeze*** function	min*10	00 = disabled	-	**E10**
B4	Compressor functioning mode after an ***anti freeze*** function intervention	min	00 = defrosting 01 ÷ 255 pause	-	**E11**
B5	Time of compressor forced on for ***deep freeze*** function or off for ***Pull Up*** function	min*10	00 = disabled B5>0 compr. On B5<0 compr. Off	24	**-**
B6	Compressor functioning mode during defrosting (Electrical or Hot gas defrosting)	flag	00 = off 01 = on	-	**E12**
	Defrosting				
B7	Time between 2 consecutive defrosting	hours	00 = disabled	-	**E13**
B8	Maximum duration of defrosting	min		-	**E14**
B9	Dripping period	min		03	**-**
C1	End of defrosting temperature for evaporator probe Pt2	°C	Pt2 disabled if >= 50	-	**E15**
	Evaporator motor fans				
C2	Motor fans functioning mode during cooling respect to compressor	flag	00 = excluded 01 = continuous 02 = parallel	-	**E16**
C3	Motor fans maximum starting temperature	°C		-	**E17**
C4	Motor fans off-switch temperature differential respect to C3	°C		08	**-**
C5	Evaporator motor fans functioning mode during defrosting	flag	00 = off 01 = on	-	**E18**
	Displayed temperature				
C6	Filter on temperature increase	min	00 = excluded	-	**E19**
C7	Set Point user access inhibition	flag	00 = off 01 = on	00	**-**
SET	Set point (not included in the parameter menu)	-		-	**E20**

Note: The highlighted parameters are common to all the refrigerating units and are not included in the vectors $\mathbf{E_x}$ (1<x<20). The STP column gives the factory default values.

VECTORS TABLE

Code	Unit	Description	V01		V02		V03	
			AB 400 PV - AB 500 PV		*B02 - MAD*		*IDEA 60 - IDEA 100*	
			°C	°F	°C	°F	°C	°F
A1	°C	Temperature differential to the set point for Alarm function	7	13	7	13	12	23
A3	°C	Extended temperature differential to the set point for Alarm function	12	22	11	20	17	32
A4	flag	Displayed temperature: Pt1 or Pt2	00	00	00	00	00	00
A5	°C	Offset displayed temperature	00	00	00	00	00	00
A6	flag	Door switch enabling	01	01	00	00	00	00
A7	°C	Histeresys (differential Start/stop)	2	4	3	5	5	9
A8	°C	Lower set point limit	-5	+23	-30	-22	-5	+23
A9	°C	Upper set point limit	+10	+50	-15	+5	+10	+50
B0	flag	Absolute Set point	0	0	0	0	0	0
B3	min*10	Max time of compressor on for ***anti freeze*** function	00	00	00	00	7	7
B4	min	Compressor functioning mode after an ***anti freeze function intervention***	00	00	00	00	15	15
B6	flag	Compressor functioning mode during defrosting (Electrical or Hot gas defr.)	01	01	01	01	00	00
B7	hours	Time between 2 consecutive defrost.	06	06	06	06	06	06
B8	min	Maximum duration of defrosting	20	20	20	20	20	20
C1	°C	End of defrosting temperature for Pt2	+15	+59	+12	+54	+10	+50
C2	flag	Motor fans functioning mode during cooling respect to compressor	01	01	00	00	01	01
C3	°C	Evap. motor fans starting temperature	+7	+45	-50	-40	+10	+50
C5	flag	Evap. motor fans functioning mode during defrosting	00	00	00	00	01	01
C6	flag	Filter on temperature increase	0	0	0	0	0	0
SET	°C	Set point	0	+32	-23	-9	+2	+35

Code	Unit	Description	V04		V05		V06	
			EIS 25-45–55 HGD – EFX N		*EIS 23*		*EIS 21 – K2*	
			°C	°F	°C	°F	°C	°F
A1	°C	Temperature differential to the set point for Alarm function	10	18	8	15	8	15
A3	°C	Extended temperature differential to the set point for Alarm function	15	27	12	22	12	22
A4	flag	Displayed temperature: Pt1 or Pt2	00	00	00	00	00	00
A5	°C	Offset displayed temperature	+3	+6	+3	+5	00	00
A6	flag	Door switch enabling	01	01	00	00	00	00
A7	°C	Histeresys (differential Start/stop)	6	11	4	7	2	4
A8	°C	Lower set point limit	-35	-31	-35	-31	-5	+23
A9	°C	Upper set point limit	-10	+14	-15	+5	+10	+50
B0	flag	Absolute Set point	0	0	0	0	0	0
B3	min*10	Max time of compressor on for ***anti freeze*** function	00	00	00	00	00	00
B4	min	Compressor functioning mode after an ***anti freeze function intervention***	00	00	00	00	00	00
B6	flag	Compressor functioning mode during defrosting (Electrical or Hot gas defr.)	01	01	01	01	01	01
B7	hours	Time between 2 consecutive defrost.	06	06	00	00	08	08
B8	min	Maximum duration of defrosting	15	15	0	0	15	15
C1	°C	End of defrosting temperature for Pt2	+9	+48	+50	c0	+15	59
C2	flag	Motor fans functioning mode during cooling respect to compressor	01	01	00	00	00	00
C3	°C	Evap. motor fans starting temperature	+1	+34	-50	-40	-50	-40
C5	flag	Evap. motor fans functioning mode during defrosting	00	00	00	00	00	00
C6	flag	Filter on temperature increase	8	8	8	8	0	0
SET	°C	Set point	-22	-8	-23	-9	+2	+35

Code	Unit	Description	V07		V08		V09	
			SHOT COOLER *		COUNTER U		ARTICA HGD	
			°C	°F	°C	°F	°C	°F
A1	°C	Temperature differential to the set point for Alarm function	00	00	00	00	8	15
A3	°C	Extended temperature differential to the set point for Alarm function	00	00	00	00	13	24
A4	flag	Displayed temperature: Pt1 or Pt2	01	01	01	01	00	00
A5	°C	Offset displayed temperature	-2	-4	+2	-4	+2	+4
A6	flag	Door switch enabling	00	00	00	00	00	00
A7	°C	Histeresys (differential Start/stop)	8	14	4	7	3	6
A8	°C	Lower set point limit	-35	-31	-30	-22	-35	-31
A9	°C	Upper set point limit	-15	+5	-11	+12	-10	+14
B0	flag	Absolute Set point	1	1	1	1	0	0
B3	min*10	Max time of compressor on for ***anti freeze*** function	00	00	00	00	00	00
B4	min	Compressor functioning mode after an ***anti freeze function intervention***	00	00	00	00	00	00
B6	flag	Compressor functioning mode during defrosting (Electrical or Hot gas defr.)	01	01	01	01	01	01
B7	hours	Time between 2 consecutive defrost.	00	00	00	00	08	08
B8	min	Maximum duration of defrosting	0	0	0	0	20	20
C1	°C	End of defrosting temperature for Pt2	00	+32	00	+32	+15	+59
C2	flag	Motor fans functioning mode during cooling respect to compressor	00	00	00	00	00	00
C3	°C	Evap. motor fans starting temperature	-50	-40	-50	-40	-50	-40
C5	flag	Evap. motor fans functioning mode during defrosting	00	00	00	00	00	00
C6	flag	Filter on temperature increase	10	10	22	22	0	0
SET	°C	Set point	11 (-25)**	19 (-13)**	04 (-14)	06 (+7)	-20	-4

Code	Unit	Description	V10		V11		V12	
			AB PV PHARMACY		ROTARY UL 5S HGD		ASIA 2T	
			°C	°F	°C	°F	°C	°F
A1	°C	Temperature differential to the set point for Alarm function	00	00	00	00	10	18
A3	°C	Extended temperature differential to the set point for Alarm function	00	00	00	00	15	27
A4	flag	Displayed temperature: Pt1 or Pt2	00	00	00	00	00	00
A5	°C	Offset displayed temperature	0	0	+3	+6	+4	+7
A6	flag	Door switch enabling	01	01	00	00	00	00
A7	°C	Histeresys (differential Start/stop)	2	4	5	9	4	7
A8	°C	Lower set point limit	0	+32	-10	+14	-35	-31
A9	°C	Upper set point limit	+15	+59	+10	+50	-15	+5
B0	flag	Absolute Set point	0	0	0	0	0	0
B3	min*10	Max time of compressor on for ***anti freeze*** function	00	00	6	6	00	00
B4	min	Compressor functioning mode after an ***anti freeze function intervention***	00	00	7	7	00	00
B6	flag	Compressor functioning mode during defrosting (Electrical or Hot gas defr.)	00	00	01	01	00	00
B7	hours	Time between 2 consecutive defrost.	4	4	6	6	8	8
B8	min	Maximum duration of defrosting	20	20	20	20	20	20
C1	°C	End of defrosting temperature for Pt2	+50	c0	+10	+50	+12	+54
C2	flag	Motor fans functioning mode during cooling respect to compressor	02	02	01	01	00	00
C3	°C	Evap. motor fans starting temperature	+40	+99	+15	+60	-50	-40
C5	flag	Evap. motor fans functioning mode during defrosting	01	01	00	00	00	00
C6	flag	Filter on temperature increase	0	0	0	0	0	0
SET	°C	Set point	+2	+35	0	+32	-20	-4

*** = green led and green cover*

Code	Unit	Description	V13		V14		V15	
			COUNTER N		SHELLY 70		ROTARY ED	
			°C	°F	°C	°F	°C	°F
A1	°C	Temperature differential to the set point for Alarm function	00	00	00	00	00	00
A3	°C	Extended temperature differential to the set point for Alarm function	00	00	00	00	00	00
A4	flag	Displayed temperature: Pt1 or Pt2	01	01	01	01	00	00
A5	°C	Offset displayed temperature	+4	+7	+2	+4	+2	+4
A6	flag	Door switch enabling	00	00	00	00	00	00
A7	°C	Histeresys (differential Start/stop)	8	14	9	16	6	11
A8	°C	Lower set point limit	-39	-38	-10	+14	-10	+14
A9	°C	Upper set point limit	-19	-2	+10	+50	+10	+50
B0	flag	Absolute Set point	01	01	01	01	00	00
B3	min*10	Max time of compressor on for ***anti freeze*** function	00	00	5	5	6	6
B4	min	Compressor functioning mode after an ***anti freeze function intervention***	00	00	12	12	7	7
B6	flag	Compressor functioning mode during defrosting (Electrical or Hot gas defr.)	01	01	00	00	00	00
B7	hours	Time between 2 consecutive defrost.	00	00	6	6	6	6
B8	min	Maximum duration of defrosting	00	00	20	20	20	20
C1	°C	End of defrosting temperature for Pt2	00	+32	+49	+99	+6	+43
C2	flag	Motor fans functioning mode during cooling respect to compressor	00	00	01	01	01	01
C3	°C	Evap. motor fans starting temperature	-50	-40	+40	+99	+6	+43
C5	flag	Evap. motor fans functioning mode during defrosting	00	00	01	01	01	01
C6	flag	Filter on temperature increase	10	10	0	0	0	0
SET	°C	Set point	11 (-29)	19 (-20)	14 (-3)	23 (+26)	+1	+34

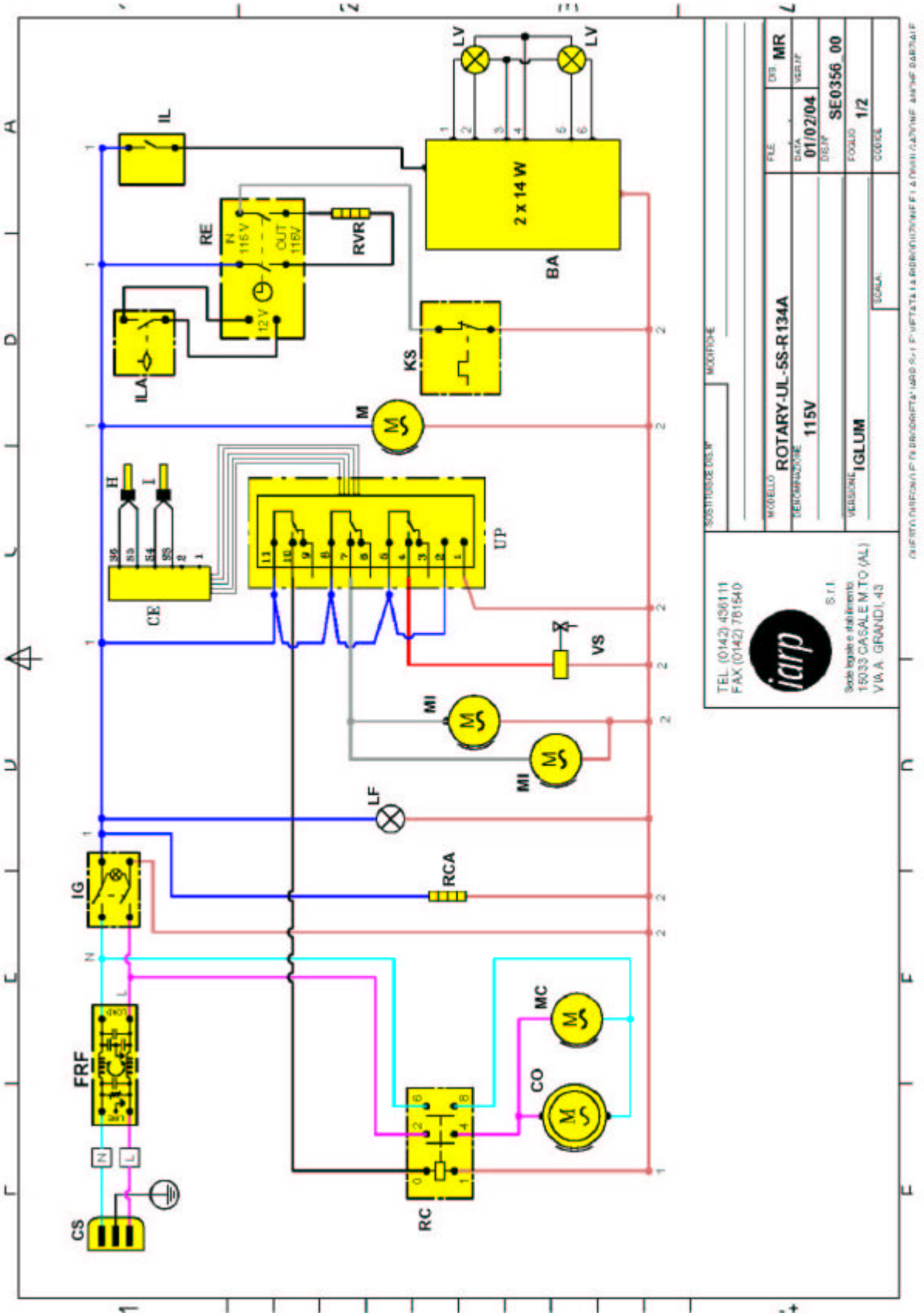
Code	Unit	Description	V16		V17		V18	
			IMPULS N – JAZZ N		IMPULS P - ECX P–JAZZ P		STOK BT	
			°C	°F	°C	°F	°C	°F
A1	°C	Temperature differential to the set point for Alarm function	00	00	00	00	7	14
A3	°C	Extended temperature differential to the set point for Alarm function	00	00	00	00	11	21
A4	flag	Displayed temperature: Pt1 or Pt2	00	00	00	00	00	00
A5	°C	Offset displayed temperature	+8	+14	+3	+6	-2	-4
A6	flag	Door switch enabling	00	00	00	00	01	01
A7	°C	Histeresys (differential Start/stop)	8	14	6	11	3	5
A8	°C	Lower set point limit	-40	-40	-15	+5	-30	-22
A9	°C	Upper set point limit	-10	+14	+5	+41	-10	+14
B0	flag	Absolute Set point	0	0	0	0	0	0
B3	min*10	Max time of compressor on for ***anti freeze*** function	00	00	00	00	00	00
B4	min	Compressor functioning mode after an ***anti freeze function intervention***	00	00	00	00	00	00
B6	flag	Compressor functioning mode during defrosting (Electrical or Hot gas defr.)	01	01	01	01	00	00
B7	hours	Time between 2 consecutive defrost.	12	12	8	8	6	6
B8	min	Maximum duration of defrosting	20	20	20	20	17	17
C1	°C	End of defrosting temperature for Pt2	+10	+50	+6	+43	+10	+50
C2	flag	Motor fans functioning mode during cooling respect to compressor	01	01	01	01	01	01
C3	°C	Evap. motor fans starting temperature	0	+32	+2	+36	0	+32
C5	flag	Evap. motor fans functioning mode during defrosting	00	00	00	00	00	00
C6	flag	Filter on temperature increase	6	6	6	6	0	0
SET	°C	Set point	-28	-18	-2	+28	-24	-11

Code	Unit	Description	V19		V20		V21	
			STOK PN		STOK P		EIS 25-45-55 ED	
			°C	°F	°C	°F	°C	°F
A1	°C	Temperature differential to the set point for Alarm function	6	12	6	12	10	19
A3	°C	Extended temperature differential to the set point for Alarm function	10	20	10	20	15	27
A4	flag	Displayed temperature: Pt1 or Pt2	00	00	00	00	00	00
A5	°C	Offset displayed temperature	-1	-2	-1	-2	+3	+6
A6	flag	Door switch enabling	01	01	01	01	01	01
A7	°C	Histeresys (differential Start/stop)	2	4	2	4	6	11
A8	°C	Lower set point limit	-5	+23	+1	+34	-35	-31
A9	°C	Upper set point limit	+15	+59	+15	+59	-10	+14
B0	flag	Absolute Set point	0	0	0	0	0	0
B3	min*10	Max time of compressor on for ***anti freeze*** function	00	00	00	00	00	00
B4	min	Compressor functioning mode after an ***anti freeze function intervention***	00	00	00	00	00	00
B6	flag	Compressor functioning mode during defrosting (Electrical or Hot gas defr.)	00	00	00	00	00	00
B7	hours	Time between 2 consecutive defrost.	6	6	6	6	6	6
B8	min	Maximum duration of defrosting	17	17	17	17	18	18
C1	°C	End of defrosting temperature for Pt2	+15	+59	+50	c0	+12	+54
C2	flag	Motor fans functioning mode during cooling respect to compressor	01	01	01	01	01	01
C3	°C	Evap. motor fans starting temperature	+15	+59	+15	+59	+1	+34
C5	flag	Evap. motor fans functioning mode during defrosting	00	00	01	01	00	00
C6	flag	Filter on temperature increase	0	0	0	0	8	8
SET	°C	Set point	-2	+28	+2	+35	-22	-8

Code	Unit	Description	V22		V23		V24	
			AB 700 P		ARTICA ED		AFRIKA 2C HGD	
			°C	°F	°C	°F	°C	°F
A1	°C	Temperature differential to the set point for Alarm function	00	00	8	15	8	15
A3	°C	Extended temperature differential to the set point for Alarm function	00	00	12	23	13	23
A4	flag	Displayed temperature: Pt1 or Pt2	00	00	00	00	00	00
A5	°C	Offset displayed temperature	0	0	+2	+4	+2	+4
A6	flag	Door switch enabling	00	00	00	00	00	00
A7	°C	Histeresys (differential Start/stop)	2	4	3	6	3	6
A8	°C	Lower set point limit	0	+32	-35	-31	-35	-31
A9	°C	Upper set point limit	+15	+59	-10	+14	-10	+14
B0	flag	Absolute Set point	0	0	00	00	00	00
B3	min*10	Max time of compressor on for ***anti freeze*** function	00	00	00	00	00	00
B4	min	Compressor functioning mode after an ***anti freeze function intervention***	00	00	00	00	00	00
B6	flag	Compressor functioning mode during defrosting (Electrical or Hot gas defr.)	00	00	00	00	01	01
B7	hours	Time between 2 consecutive defrost.	04	04	12	12	08	08
B8	min	Maximum duration of defrosting	20	20	20	20	15	15
C1	°C	End of defrosting temperature for Pt2	+50	c0	+10	+50	+15	+59
C2	flag	Motor fans functioning mode during cooling respect to compressor	01	01	00	00	01	01
C3	°C	Evap. motor fans starting temperature	+40	+99	-50	-40	+50	C2
C5	flag	Evap. motor fans functioning mode during defrosting	01	01	00	00	00	00
C6	flag	Filter on temperature increase	0	0	0	0	0	0
SET	°C	Set point	+2	36	-18	0	-20	-4

5.2 WIRING DIAGRAM

Here below the wiring diagrams SE0311/00 (if the unit has a H/P pressostat (PAP) (105)) and SE0311/02 describe how the unit works.



REF.	DEVICE	DISPOSITIVO
BA	Ballast	Reattore
CE	Electronic control board dysplay	Display entralina elettronica
CO	Compressor	Compressore
CS	Power supply cord	Cavo spina
FRF	EMC filter	Filtro EMC
H	Defrosting probe	Sonda sbrinamento
I	Thermostat probe	Termostato controllo temperatura
IG	Main switch	Interruttore generale
IL	Light switch	Interruttore luci
ILA	Floater switch	Interruttore livello acqua
KS	Safety thermostat	Termostato di sicurezza
LF	Optional frontal neon lamp	Lampada frontale optional
LV	Door lamp	Lampada vasca
M	Shelves Rotation motor	Motore di rotazione ripiani
MC	Condenser motor fan	Motoventola condensatore
MI	Evaporator motor fan	Motoventola evaporatore
RC	Compressor relay	Relay compressore
RCA	Frame heater	Resistenza cornice mobile
RE	Water evapor. electronic relay	Relay elettronico evaporazione acqua
RVR	Evaporation water heater	Resistenza evaporazione acqua
UP	Power unit	Unità di potenza
VS	Defrosting valve	Valvola di sbrinamento

TEL. (0142) 436111
FAX (0142) 781540

iarp S.r.l.

Sede legale e stabilimento:
15033 CASALE M.TO (AL)
VIA A. GRANDI, 43

SOSTITUISCE DIS.N°

MODIFICHE

MODELLO: ROTARY-UL-5S-R134A

FILE

DIS.: MR

DENOMINAZIONE: 115V

DATA: 01/02/04

VER.N°

DIS.N°: SE0356_00

VERSIONE: IGLUM

FOGLIO: 2/2

SCALA:

CODICE

5.2.1 SPARE PARTS LIST

Model: ROTARY COOLER UL 5S COCA COLA USA 2004 Cod9232202 ES270

GENERAL LIST

Ref.	Description	Qty	Code	Euro €
1	ANG.COP.RESIST.ROTARY BAYBLEND BAYBLEND HEATER COVER ANGLES	2	0431147	
2	ATTACCO PER ALBERO RIP.VASCA SHELVES SHAFT COUPLING SLEEVE	1	0431207	
3	BIELLA ARRESTO VETRI ROTARY STOP GLASS CONNECTING ROD	4	0530101	
4	BLOCCO CHIUS.VETRO ROTARY ROTARY GLASS STOP BLOCK	2	0423066	
5	BOCCOLA FISS.RIPIANO VASCA SHELF FIXING BUSH	2	0534030	
6	BOCCOLA NYLON FISSAGGIO VETRO FIXING GLASS NYLON BUSH	4	3302441	
7	BOCCOLA PER GOMMINO 4016950 BUSH 4016950	4	0534003	
8	BOCCOLA SUPP.RIPIANI ROTARY ROTARY SHELVES SUPPORT BUSH	2	0534029	
9	BOYLER 30X140 F.8,2-8,2 LIQUID RECEIVER 30X140 H.8.2	1	0140060	
10	CANOTTO SUPP.PERNO ALBERO RIP. JOURNAL SHAFT BUSH SUPPORT	1	0543104	
11	CAVO CONNESSIONE MASTER SLAVE MASTER SLAVE CONNECTING CABLE	1	3303049	
12	CAVO SPINA 3X1,5 MM2500 USA USA PLUG CABLE 3X1,5 MM2500	1	3302992	
13	CENTRALINA UNIV.MASTER U.L. UNIV.MASTER ELECTR. BOARD	1	0233092	
14	CERN.INF.VETRO MINIROTARY DX ROTARY RIGHT GLASS LOWER HINGE	1	0415191	
15	CERN.INF.VETRO MINIROTARY SX ROTARY LEFT GLASS LOWER HINGE	1	0415192	
16	CERN.SUP.VETRO MINIROTARY SX ROTARY LEFT GLASS UPPER HINGE	1	0415190	
17	CERN.SUP.VETRO MINIROTARY DX ROTARY RIGHT GLASS UPPER HINGE	1	0415189	
18	CINGHIA DENTATA 250XL L.12MM TOOTHED BELT MOD.GATES250XL037	1	0325042	
20	COMPR.SC15G 115/60 HST HBP/LBP COMPR.SC15G 115/60 HST HBP/LBP	1	0210181	
	RELAY 117 U 6020 RELAY 117 U 6020	1	0210233	
	COND.DI SPUNTO 117 U 5023 STARTING CAPACITOR 117 U 5023	1	0210416	
21	FILTRO MECCANICO D.MM17X74 MECHANICAL FILTER D.MM17X74	1	0145001	
22	CONDENS.ALETT.36T.EIS55 U.L. FINNED CONDENSER 36T.EIS55 UL	1	0130091	

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GENERAL LIST

Ref.	Description	Qty	Code	Euro €
23	COP.VETRO DX MINIROTARY CCOLA MINIOTARY ABS RIGHT GLASS COV	1	3700703	
24	COP.VETRO SX MINIROTARY CCOLA MINIOTARY ABS LEFT GLASS COV	1	3700704	
25	CUPOLINO MINIROTARY ABS ROSSO MINIROTARY TOP	1	3700706	
26	CUSCINETTO 7206B-RS BALL BEARING 7206B-RS	1	0530090	
27	DISTANZ.TUBO INOX EVAP.ACQUA NYLON SPACER TUBE INOX	9	0544003	
28	EVAP ALETT.18T.ROTARY U.L. FINNED EVAPORATOR 18T.	1	0119168	
29	FERMARIPIANO ROTARY NYLON 6.6 ROTARY NYLON 6.6 FIXING SHELF	3	0312365	
30	FILTRO CARTUCCIA SOLIDA DCL32S SOLID CORE DRYER DCL32S	1	0145031	
31	FILTRO EMC FNC 16.10.474.472 FILTER EMC FNC 16.10.474.472	1	3302470	
33	GOMMINO AMMORT.D.24X6 NERO BLACK MOTOR SHOCK ABSORB.D24X6	1	0403007	
34	GOMMINO 4016910 NECCHI COMPR.SHOCK ABSORB.4016910 NEC	4	0403017	
35	GRIGLIA ANT.ROTARY ABS ROSSO ROTARY RED ABS FRONT GRID	1	0440321	
36	GRIGLIA MOTOVENTOLA B02/AB PV MOTOR FAN GRATE	2	0427017	
37	GRIGLIA POST.ROTARY 2003 NERA ROTARY 2003 BLACK REAR GRID	1	0427627	
39	INTERR.UNIP.SERIE CM A1012 U.L WHITE CR1 SINGLE-POLE SWITCH	1	0202085	
41	LAMPADA 14W D.16 MM 549 T5/FHE NEON 14W D.16 MM 549	2	0200069	
42	LEVA PER CHIUSURA VETRO ROTARY ROTARY GLASS LOCK LEVER	2	0423067	
43	MANIGLIA GIADA'2000 POSTERIORE REAR HANDLE GIADA '2000	2	0400082	
44	MOLLA RITORNO BLOCCO CHIUSURA LOCK SYSTEM RETURN SPRING	2	0541029	
45	MOTORE 9W20 T3 115/60 UL C500 MOTOR FAN 9W20 T3 115/60ULC500	1	0220078	
	STAFFA MOTOV.TIPO B DIR.H.72 MOT.FAN BRACKET T.B VERT.H.72	1	0221044	
46	MOTORIDUTTORE RN 9-20-2,7/301 GEAR MOTOR RN 9-20-2,7/301	1	0221124	
47	MOTOVENTOLA 4710 PS12TB30 115V MOTOR FAN 4710 PS12TB30 115V	2	3301254	

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GENERAL LIST

Ref.	Description	Qty	Code	Euro €
48	PALA ALLUMINIO A 230-34 ALUMINIUM FAN BLADE A 230-34	1	0407013	
49	PANN.ANT.MOB.MINIROTARY CCOLA ROTARY FRONT LOGO'S PANEL	1	3700705	
50	PERNO FISS.ALBERO RIPIANI SHELVES SHAFT BLOCKING JOURNAL	1	0530099	
	DADO 4MA INOX AD ALETTE UNI7474-75 4MA INOX NUT	2	0505023	
51	PERNO FISS.BIELLA ARR.VETRI STOP GLASS CONNECTING ROD BOLT	2	0530102	
52	PERNO FISS.BOCCOLA SUPP.RIP. SHELVES SUPPORT BUSH BOLT	2	0530089	
53	PERNO MOV.ALBERO RIPIANI VASCA SHELVES SHAFT MOVEMENT BOLT	1	0530119	
54	PERNO PER BLOCCO CHIUSURA LOCKING SYSTEM BOLT	2	0530100	
55	PERNO PER VETRO CURVO MINIROT. ROTARY CURVED GLASS JOURNAL	2	3303411	
56	PIASTRINA BLOCCAGGIO CANOTTO DRAINING TUBE FIXING PLATE	1	0543022	
57	PIATTELLO VASCA MINIROTARY ROTARY RED WATER DRIP	1	3700702	
58	PIEDINO ESAGONALE 10MAX43 R128 HEXAG.ADJUST.FEET 10MAX43R128	2	0403014	
60	PORTALAMPADA G5 108661 U.L. G5 108661 U.L. LAMP-SOCKET	4	3301793	
61	PROF.ALL.ALBERO RIP.MINIROTARY ALUMINUM PROFILE SHELVES SHAFT	1	3602715	
62	PROF.ALL.PORTARESIS.MINIROTARY FRONT CURV.HEATER HOLDER PROF.	1	3602717	
63	PROF.ALL.PORTARESIS.MINIROTARY SIDE HEATER HOLDER ALUM. PROF.	2	3602716	
64	TERMOSTATO LM7-P8030000 UL THERMOSTAT LM7-P8030000 UL	1	3303343	
65	PROF.BAYBLEND P1574 MM1045ROSS BAYBLEND RED PROF P1574 MM1045	1	3602719	
66	PROF.BAYBLEND P1574 MM 713ROSS BAYBLEND RED PROF P1574 MM713	2	3602718	
67	PROF.POLIC.COPRILAMPADA MM 807 POLIC.NEON COVER PROF. MM 807	2	0320960	
68	PANN.COP.ETICHETTA RIPIANO PETG SHELF LABEL COVER	18	0440427	
69	PROF.PVC PO928 AMMORTIZZ.MOTOV MOTORFAN SHOCK ABSORB.PVC PROF	Mt.0,05	0320140	
71	RACCORDERIA EV.ACQUA INOX EVAPOR.WATER INOX PIPE-FITTING	1	3602225	

Model: ROTARY COOLER UL 5S COCA COLA USA 2004 Cod9232202 ES270

GENERAL LIST

Ref.	Description	Qty	Code	Euro €
72	REATTORE ELETT.BAAA2028Q01 ELECTRONIC BALLAST	1	3303412	
73	REG.DI LIV.L143 1V UG N060HGY2 WATER LEVEL REGULATOR L143	1	3303448	
74	RELE'G7L-2A-TUB 120VCA RELAY G7L-2A-TUB 120VCA	1	3301807	
75	RES.COR.INOX 345W EVAP.ACQUA WATER EVAP.INOX ARM.HEAT.345W	1	0205430	
76	RES.PVC 10W/MT CORNICE MOB. CABIN. FRAME PVC HEAT.10W/MT	1	0163112	
77	RITARDATORE TIMER FTIMERB 115V TIMER DELAYER FTIMERB 115V	1	3302513	
78	RUOTA DENTATA ALB.RIP(II)VERS. SHELVES SHAFT STEP WHEEL	1	0402034	
79	RUOTA DENTATA MOTORIDUTTORE GEAR MOTOR STEP WHEEL	1	0402029	
81	RIPIANO VASCA MINIROTARY MINIROTARY SHELF	3	0440409	
83	SNODO SFERICO AUTOLUBRIFICANTE SELF-LUBRIFICATING BALL-JOINT	1	0530092	
84	SONDA PTC GRIGIA MM3500 PTC GREY PROBE MM3500	1	0205389	
85	SONDA PTC NERA MM1700 PTC BLACK PROBE MM1700	1	0205383	
86	STAFFA FISS.VASCH.EV.ACQUA WATER EVAP.TRAY FIXING BRACKET	1	3602768	
89	TAPPO INF.ALBERO RIPIANI SHELVES SHAFT BOTTOM PLUG	1	0430089	
90	TAPPO INF.PROF.PORTALAMPADA DX RIGHT SUPPORT LAMP BOTTOM PLUG	1	3302443	
91	TAPPO INF.PROF.PORTALAMPADA SX LEFT SUPPORT LAMP BOTTOM PLUG	1	3302445	
92	PROF.ALL.27455 MM 813 ARGENTO ALUM. PROFILE MM 813 27455	1	3403372	
	TESTAT.SUP.VETRO ROTARY DX ROTARY RIGHT GLASS TOP PROFILE	1	3302444	
	VETRO 1 STRATO MINIROTARY MINIROTARY CURVED GLASS	1	3303410	
93	PROF.ALL.27455 MM 813 ARGENTO ALUM. PROFILE MM 813 27455	1	3403372	
	TESTAT.SUP.VETRO ROTARY SX ROTARY LEFT GLASS TOP PROFILE	1	3302446	
	VETRO 1 STRATO MINIROTARY MINIROTARY CURVED GLASS	1	3303410	
94	UNITA'DI POT.SLAVE 115V 3R UL 115V 3R SLAVE POWER UNIT	1	3303046	

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GENERAL LIST

Ref.	Description	Qty	Code	Euro €
95	VALVOLA SOL.EVR3 115/60 U.L. SOLENOID VALVE EVR3 115/60 UL	1	0189033	
	BOBINA PER VALVOLA SOL.EVR3 COIL FOR SOLENOID VALVE EVR3	1	3301892	
96	VASCHETTA EV.ACQUA IDEA60 WATER EVAPORATOR TRAY IDEA60	1	0425041	
97	VASCHETTA EV.ACQUA ROTARY WATER EVAPORATOR TRAY ROTARY	1	0425074	
98	RUOTA UNIDIREZIONALE UNIDIRECTIONAL WHEEL	5	0402005	
99	INTERR.BIP.LUM.VERDE C.NERA BIPOLAR LUMIN. GREEN SWITCH	1	0202080	
103	SERRACAVO PA107 S/VITI CABLECLAMP PA107 WITHOUT SCREW	1	3300866	
104	PERNO SEDE CUSCINETTO ALBERO STOP GLASS CONNECTING ROD BOLT	1	0530121	
105	STAFFA FISS.TENDICINGHIA BLOCKING TONGUE	1	7071850	
106	TENDICINGHIA MINIROTARY L.ZN. BLOCKING TONGUE	1	7071849	
107	TASTO PER INTERRUTTORE D13 WHITE CR1 SINGLE-POLE SWITCH	1	0202095	
108	DADO 8MA INOX AISI304 AUTOBL. UNI7474-75 8MA INOX NUT	1	0505021	
	RONDELLA PIANA INOX 8,6X15X1 INOX WASHER 8,6X15X1	1	0520014	
109	CHIAVETTA 5X5X20 UNI6604-69304 UNI6604-69 5X5X20 KEY	1	3301966	
110	RONDELLA NYLON D. 22X 15,1X2 NYLON WASHER 22X15,1X2	1	0521019	