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**PARTIAL  
NO FROST  
REFRIGERATORS**

**With electronic  
timer**

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## 1. INTRODUCTION

This manual describes the PARTIAL NO FROST refrigerators with electronic timer produced in the Susegana factory called ZS.

These models differ from the previous ones (see SM 599321723) since they do not feature the electromechanic timer because an electronic timer has been incorporated in the control and power board **ERF1050-01.X** (X indicates a variant of the board).

It is a NO FROST (KBIN295 IT) appliance with the following PNCs:

<b>PNC</b>	<b>Date</b>	<b>Model</b>	<b>Brand</b>
92577170000	20031212	JKG8498	Juno-Electrolux
92577170100	20040116	SN81840-4I	AEG
92577170101	20040716	SN81840-4I	AEG
92577170200	20031205	329.059 6/40199	Privileg
92577170201	20040716	329.059 6/40412	Privileg
92577170300	20040305	SN71840-4I	AEG
92577170301	20040716	SN71840-4I	AEG
92577170400	20040305	ERF2831	Electrolux
92577170600	20040305	ZI921/8FF	Zanussi
92577170700	20040227	FI22/10NFA	Rex-Electrolux
92577170701	20040910	FI22/10NFA	Rex-Electrolux
92577170900	20040409	ZI921/8FF	Zanussi

The controls of the appliance are inserted inside the middle crossbar.

The appliance consists of the following compartments:

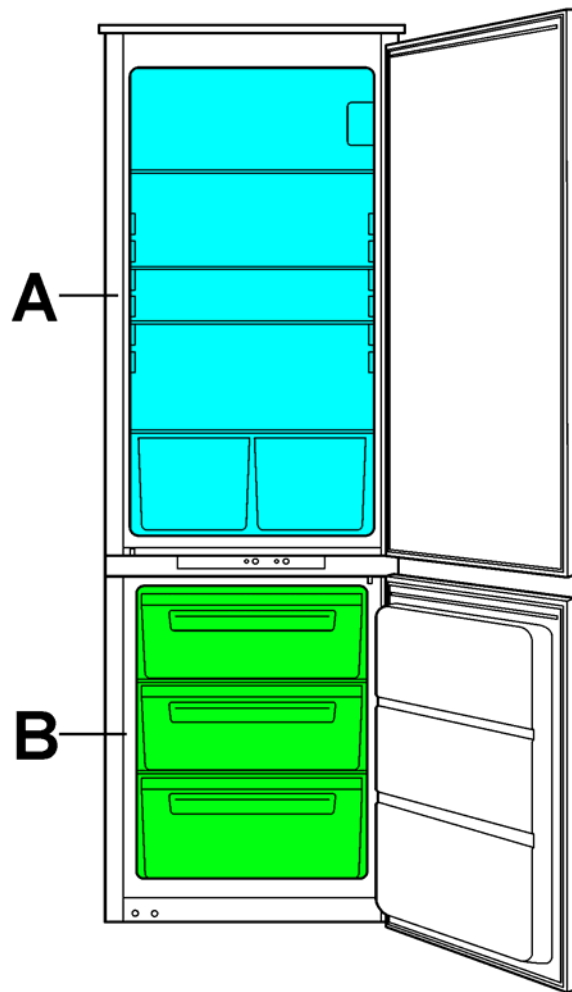
- freezer;
- cooler;

The evaporating circuit consists of:

- battery evaporator (freezer compartment);
- tube evaporator (cooler compartment).

Key:

A = cooler compartment;  
B = freezer compartment.

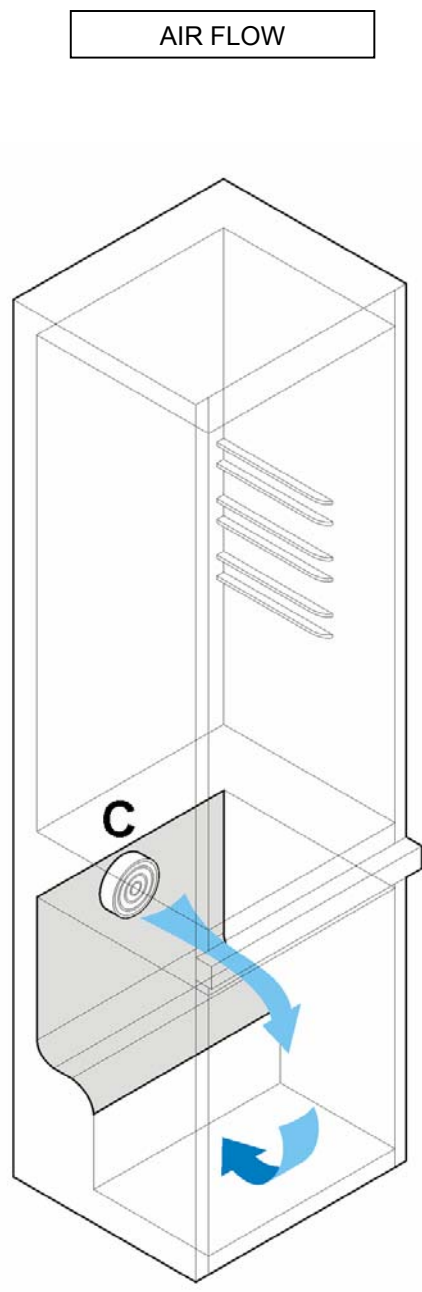


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Unlike the NO FROST refrigerators, in the PARTIAL NO FROST type the cooler and freezer compartments are separated physically.

The battery evaporator cools only the freezer compartment, while the tube evaporator cools only the cooler compartment.

The cold produced by the battery evaporator in the freezer compartment, is distributed by the fan placed behind the screen **C**.



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 **In case of door opening the fan stops.**  
**To simulate the door closed, press the button of the freezer door.**

The temperature measurement of the cooler compartment is performed by 1 sensor:

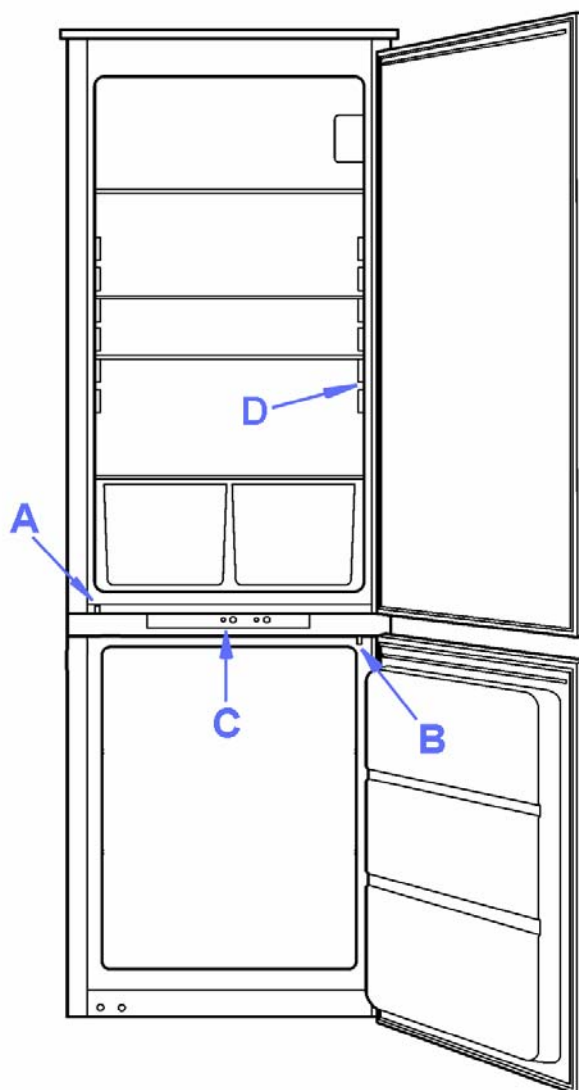
- cooler temperature sensor (placed on the cooler cell).

The defrosting of the battery evaporator is controlled by the electronic board through the detection of the cooler and freezer door openings:

- cooler door button (placed on the left upper part of the control panel)
- freezer door button (placed on the right lower part of the control panel).

Key:

- A = cooler door button;  
B = freezer door button;  
C = control panel;  
D = cooler temperature sensor.

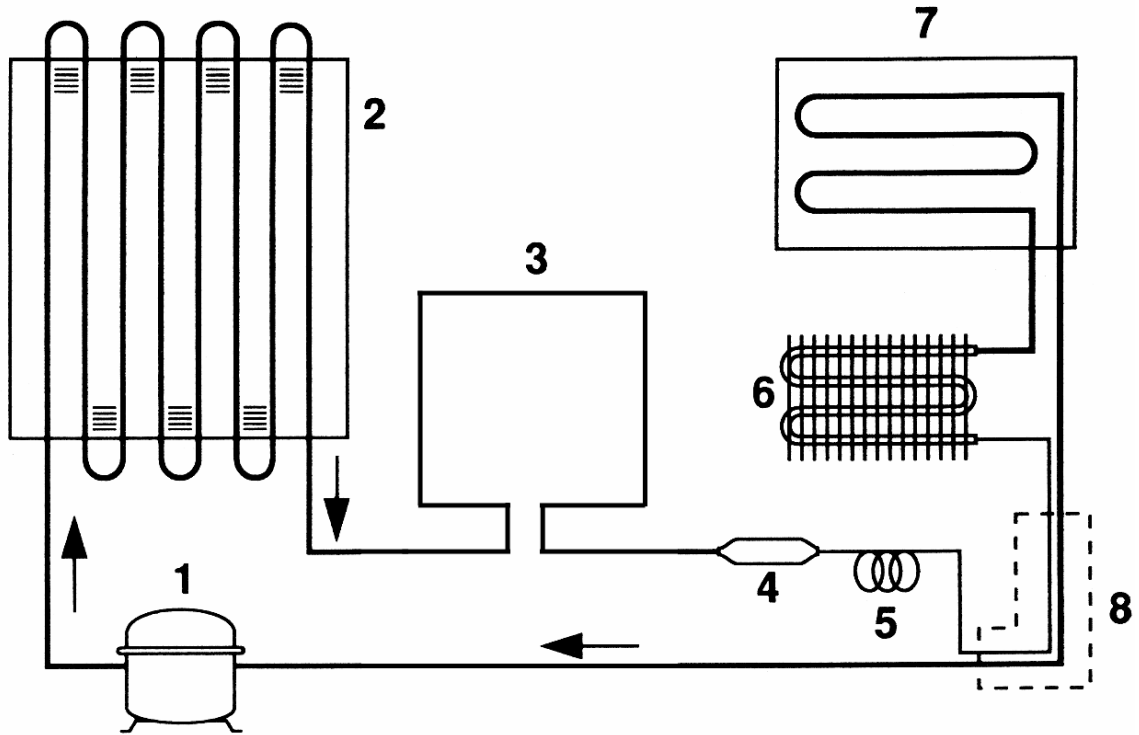


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The sensor D features the foamed cable inside the cabinet, therefore it is not replaceable.



## 2. REFRIGERATOR CIRCUIT



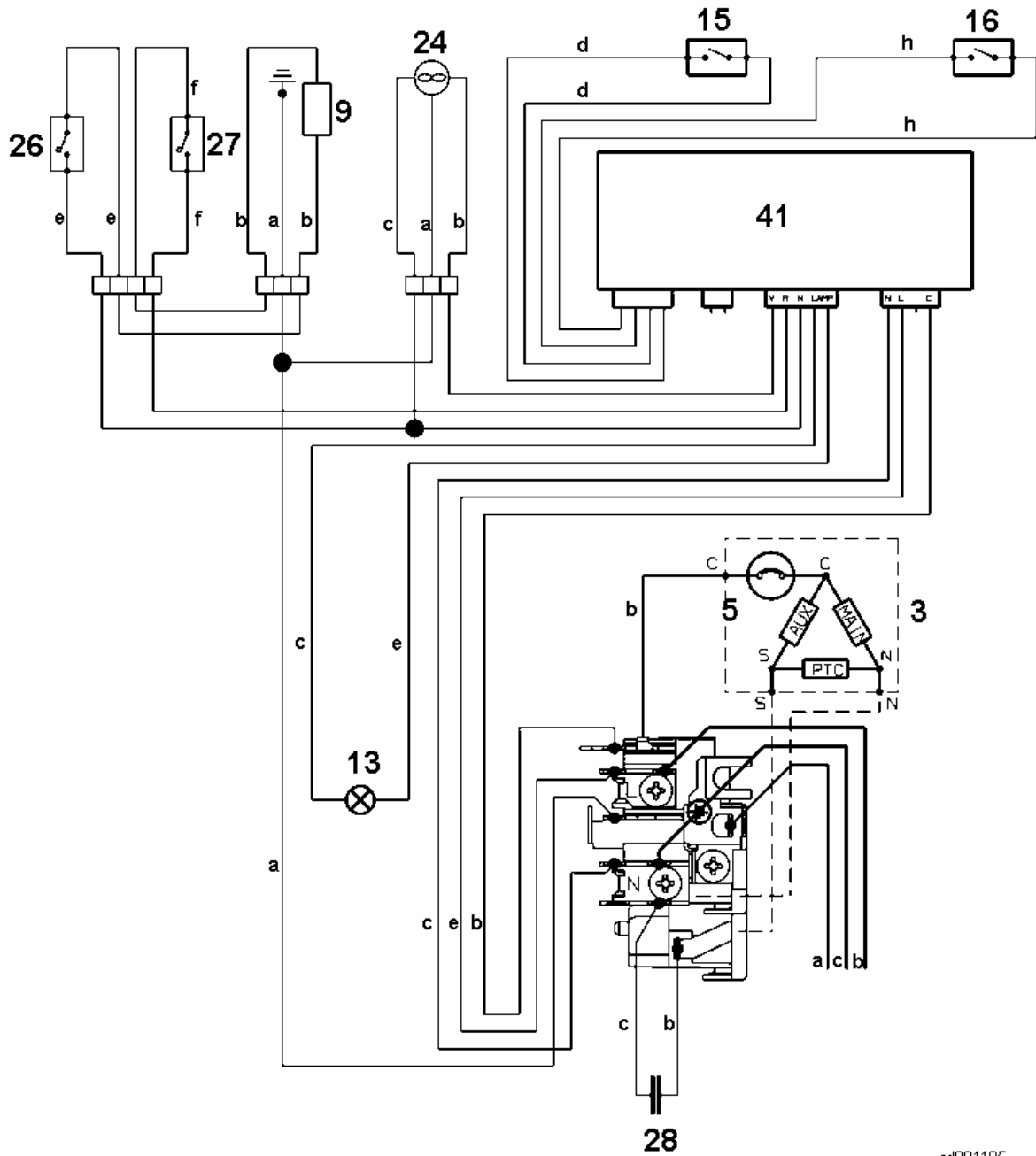
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### Key:

1. compressor;
2. condenser;
3. anti-condensation coil;
4. dehydrator filter;
5. capillary;
6. battery evaporator (freezer compartment);
7. tube evaporator (cooler compartment);
8. exchanger.

### 3. ELECTRIC WIRING

(check the specific diagram for each model!)



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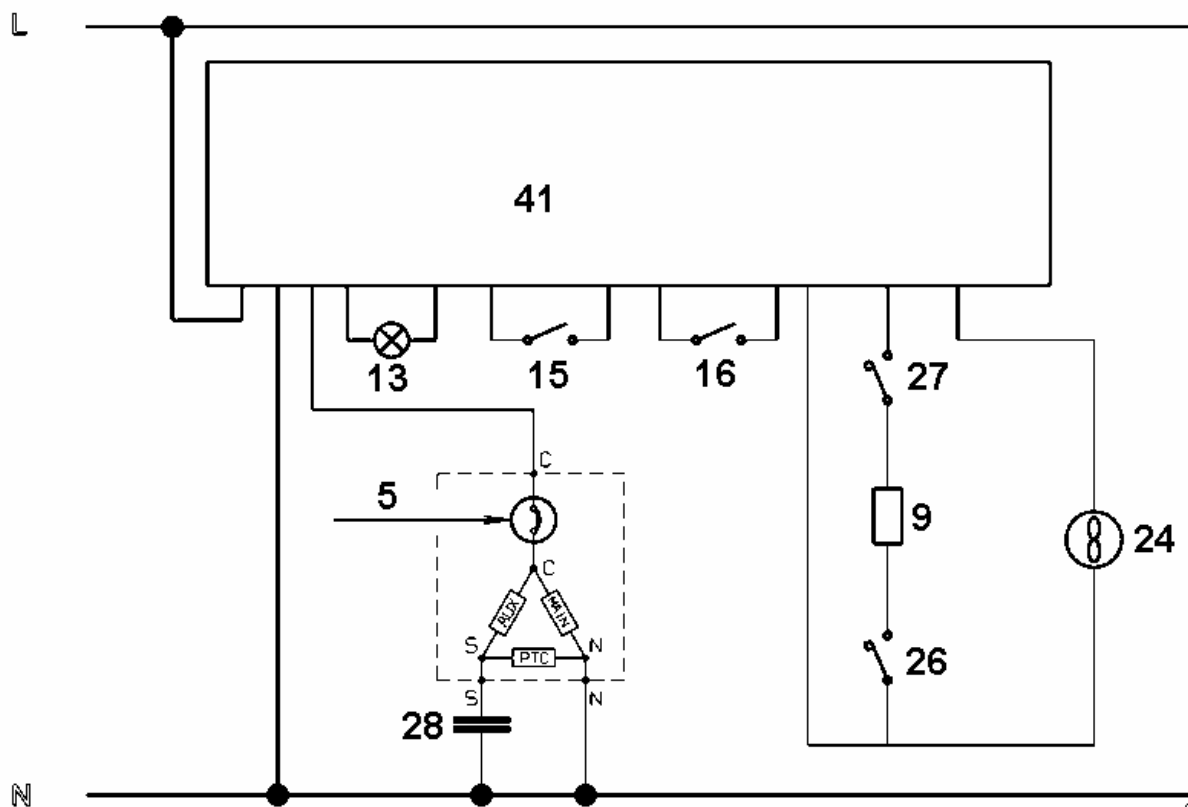
Key:

- 3. compressor;
- 5. motor protector;
- 9. defrosting heater;
- 13. lamp;
- 15. cooler door switch;
- 16. freezer door switch;
- 24. fan;
- 26. safety thermal switch (+40°C);
- 27. defrosting cut-out switch (+10°C);
- 28. running capacitor (only for the models which feature it);
- 41. electronic board.

- a. yellow-green;
- b. brown;
- c. blue;
- d. white;
- e. black;
- f. grey;
- g. red;
- h. orange.

#### 4. FUNCTIONAL DIAGRAM

(check the specific diagram for each model!)



#### Key:

- 3. compressor;
- 5. motor protector;
- 9. defrosting heater;
- 13. lamp;
- 15. cooler door switch;
- 16. freezer door switch;
- 24. fan;
- 26. safety thermal switch (+40°C);
- 27. defrosting cut-out switch (+10°C);
- 28. running capacitor (only for the models which feature it);
- 41. electronic board.

- a. yellow-green;
- b. brown;
- c. blue;
- d. white;
- e. black;
- f. grey;
- g. red;
- h. orange.

## 5. OPERATION

### a. Normal



**Warning:** the electronic board is powered with a 220-240V 50Hz voltage even if the thermostat knob is on (OFF) position. Therefore, disconnect the appliance from the electric power before operating with the electronic board.

When the thermostat knob is on (OFF) position it means that:

- the compressor is off;
- all Leds are off;
- the electronic board is powered (220-240V 50Hz !!!).

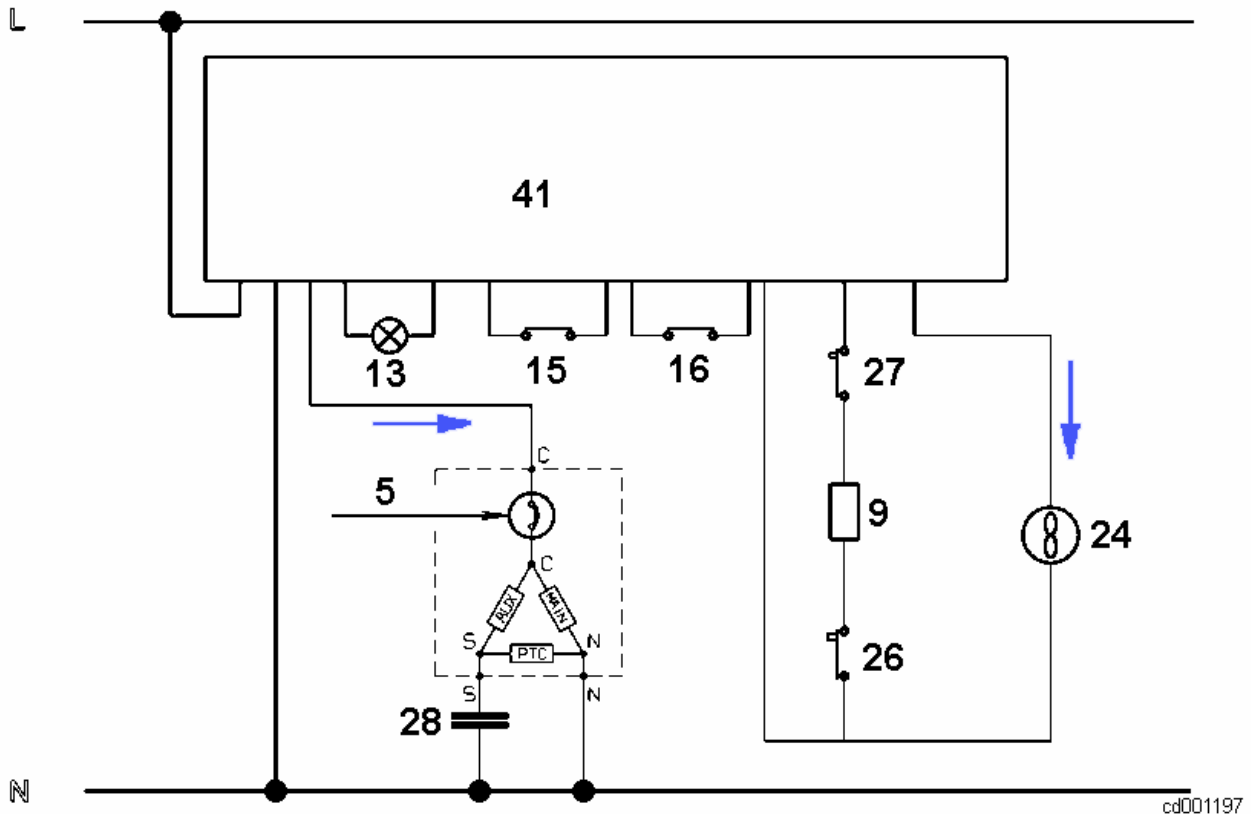
Rotating the thermostat knob clockwise the green LED ON lights.

In NOFROST freezers, the humidity inside the freezer compartment accumulates on the evaporator battery thanks to the air circulation, thus preventing the formation of frost on food.

During normal operation time the electronic board powers the compressor (**3**) and the fan (**24**) circuits. The fan is activated or deactivated with a 2 minute delay compared to the compressor.

The operation time which corresponds to the interval between the following defrosting lasts about 14 hours with normal opening of the door (it can last up to 71 hours if the door is never opened).

The arrows in the picture indicate the current path.



### **b. Normal with first switching on or power failure**

In case of fault when the appliance is switched on for the first time or in case of a power failure, one of the two conditions described below occurs:

1. If the internal temperature is higher or the same as the thermostat cut-in temperature (CUT-IN), when the power is restored, the electronic board activates the compressor and the fan till the set temperature is reached and after 5 hours the electronic board activates the defrosting procedure (after the compressor cut-out).
2. If the internal temperature is lower than the thermostat cut-in temperature (CUT-IN), when the power is restored, the compressor functions in thermostatic conditions and after 5 hours the electronic board activates the defrosting procedure (after the compressor cut-out).

The electronic board activates, in any case, the defrosting procedure 5 hours after the first switching on and after a power failure.



**Warning:** if the thermostat knob is turned anti-clockwise till the zero position (OFF), all counters will be reset and once the thermostat knob has been rotated clockwise at ON position, the compressor will function in thermostatic conditions.

### c. Defrosting

All the humidity in the compartment accumulates on the evaporator, which is the coldest part of the compartment; periodically, about every 14 hours with normal door opening (up to 71 hours if the doors never open!), it is then necessary to defrost the ice on the battery.

The defrosting starts after the compressor cut-out or if the compressor is on after 2,5 hours max.

The electronic board disconnects the circuit which powers the compressor (3) and the fan (24) and, after controlling the presence of the defrosting heater, it powers the circuit of the defrosting heater (9) for a minimum time of about 20 minutes. If the defrosting heater is interrupted or its connector is detached, the ON and SUPER LEDs flash and the defrosting heater lasts 1 hour.

**Important:** If the defrosting heater is interrupted or its connector is detached, the ON and SUPER LEDs flash and the defrosting phase lasts 1 hour.

Please refer also to Service Bulletin 599376174 since the failure signaling could be wrong due to a “bug” in the software of the electronic board.

The heat generated by the defrosting heater does not affect the freezer compartment temperature or the food packages temperature, because the thermal energy is consumed in the defrosting process of the evaporator ice.

After 20 minutes, the board detects the defrosting signal every minute to identify the defrosting switch cut-out (27).

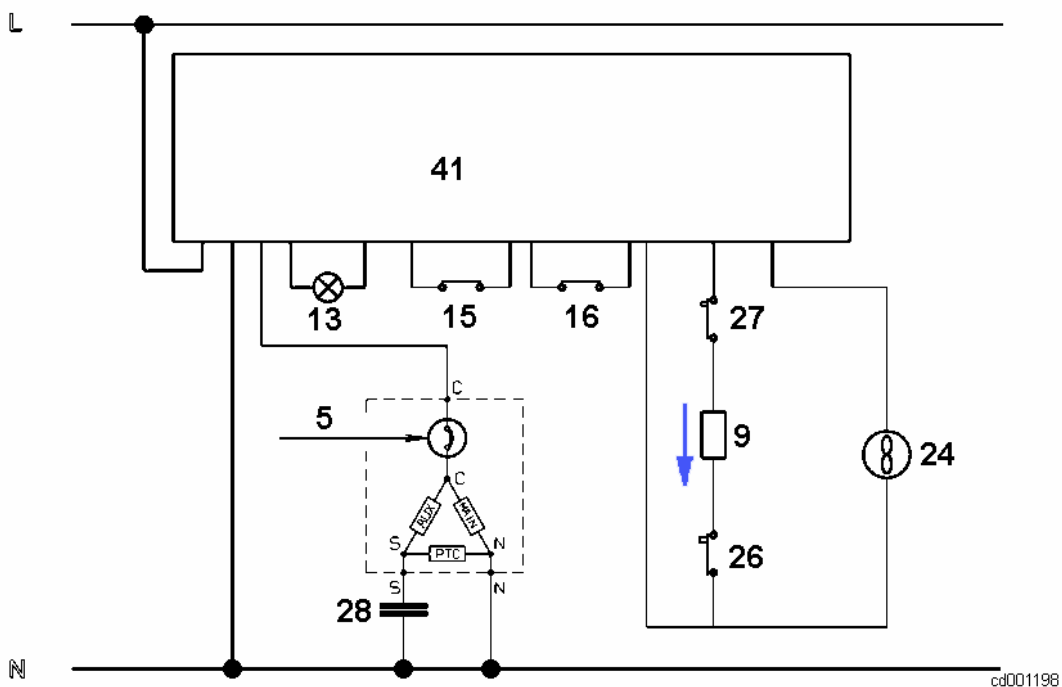
At the defrosting switch cut-out, the electronic board switches the compressor on (3) with a 5 minute delay.

After another 2 minute delay, when the air is already cold, the fan switches on too (24).

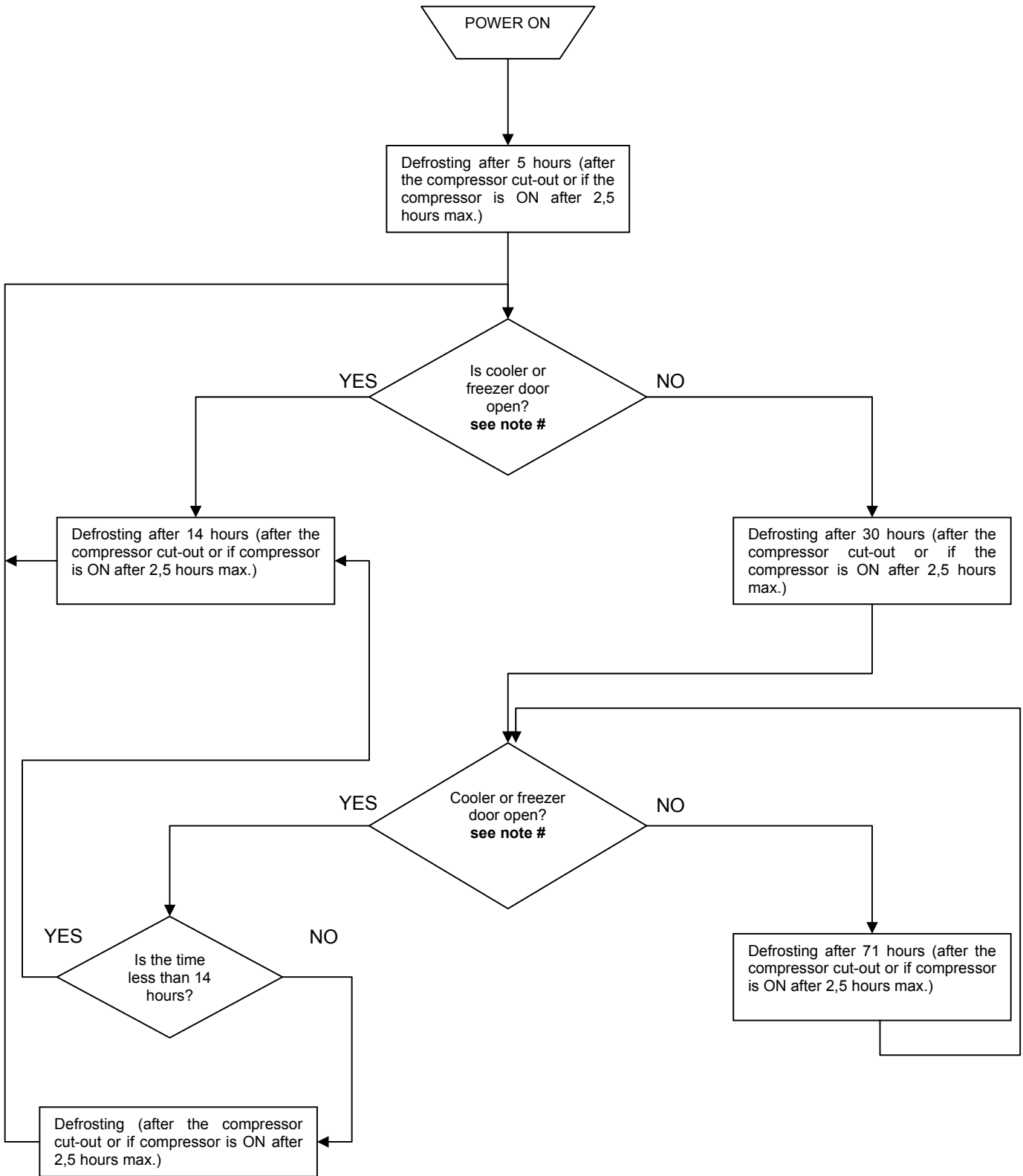
If for any reason, the defrosting cut-out switch (27) does not switch on and the battery temperature rises up to 40 °C, the defrosting heater (9) will be switched off by the safety thermal switch (26).

If 1 hour after the starting of the defrosting, the thermal switches did not cut out, the electronic board switches the defrosting heater off and continues its operation.

The arrows in the picture indicate the current path.



**d. Flow chart for the defrosting management**





**NOTE #:**

When the cooler or freezer door is open it means that one of the two doors is opened for more than 1 minute. At every defrosting the time is cancelled.

**e. SUPER function**

The SUPER function is activated by pushing the SUPER button therefore:

- The yellow LED corresponding to the SUPER function is on;
- The compressor functions in thermostatic conditions and not continuously (as the thermostat knob were in max. position) for a duration of about 52 hours, and then it deactivates automatically.

If the button is pressed again, the SUPER function is deactivated:

- The corresponding yellow LED is switched off;
- The compressor functions in thermostatic conditions.

The defrosting can occur with the SUPER function on.

### f. Malfunctioning of temperature sensor

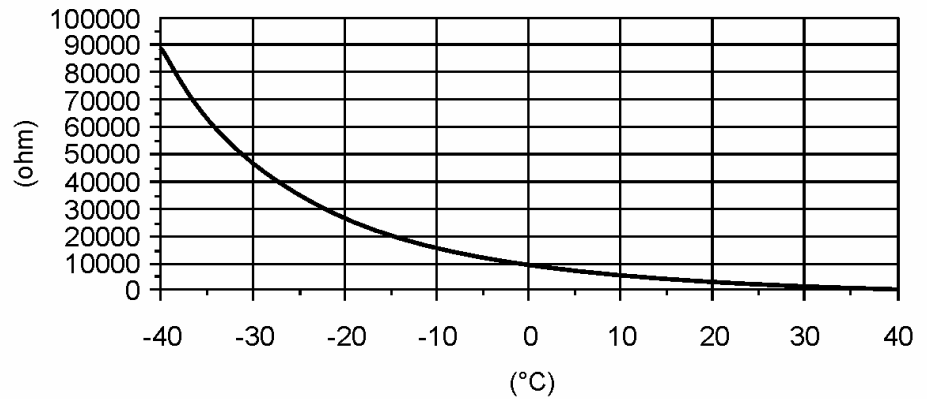
If during the normal operation a failure of the NTC temperature sensor occurs (the signal coming from the sensor is out of range), then:

- The appliance functions with a pre-definite cycle where the compressor is powered for 30 minutes and remains off for 45 minutes alternatively;
- The defrosting procedure is activated every about 14 hours.

When the sensor operates again normally the above two mentioned conditions are cancelled.

#### NTC sensor characteristics:

T (°C)	ΔT (± °C)	Rn (Ω)
10	±0.6	5337
9	±0.6	5600
8	±0.5	5877
7	±0.5	6171
6	±0.5	6481
5	±0.5	6809
4	±0.5	7156
3	±0.5	7523
2	±0.4	7911
1	±0.4	8322
0	±0.4	8758
-1	±0.4	9218
-2	±0.4	9705
-3	±0.4	10222
-4	±0.5	10770
-5	±0.5	11352
-6	±0.5	11969
-7	±0.5	12624
-8	±0.5	13320
-9	±0.5	14059
-10	±0.5	14845
-11	±0.5	15678
-12	±0.6	16564
-13	±0.6	17506
-14	±0.6	18509
-15	±0.6	19577
-16	±0.6	20715
-17	±0.6	21928
-18	±0.6	23221
-19	±0.6	24600
-20	±0.6	26072
-21	±0.7	27637
-22	±0.7	29307
-23	±0.7	31092
-24	±0.7	32999
-25	±0.7	35039
-26	±0.7	37221
-27	±0.7	39556
-28	±0.7	42056
-29	±0.8	44735
-30	±0.8	47606
-31	±0.8	50668
-32	±0.8	53952
-33	±0.8	57475
-34	±0.8	61258
-35	±0.8	65320
-36	±0.8	69686
-37	±0.8	74381
-38	±0.8	79431
-39	±0.9	84867
-40	±0.9	90721



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## 6. ACCESSIBILITY FREEZER COMPARTMENT

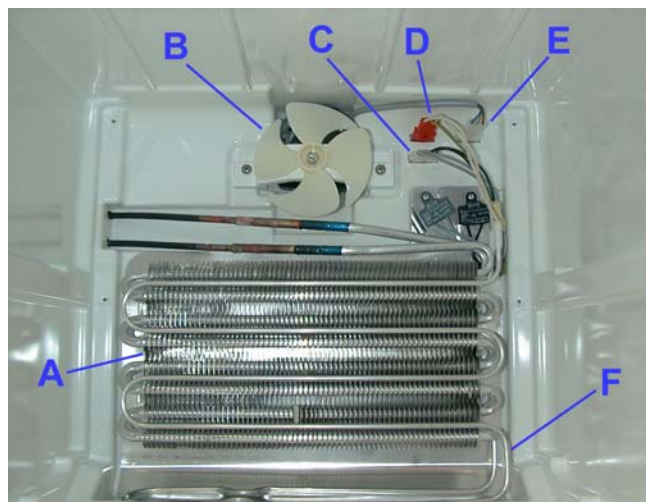
### a. Battery evaporator and fan

To access the battery evaporator and the fan perform the following operations:

a) Remove the freezer drawers;



b) Remove the fixing screws of the evaporator shield; remove the isolating panel;



c) components:

- A) Battery evaporator;
- B) Fan;
- C) Thermal switches connectors +10 / +40 °C;
- D) Defrosting heater connector;
- E) Fan connector.
- F) Defrosting heater.



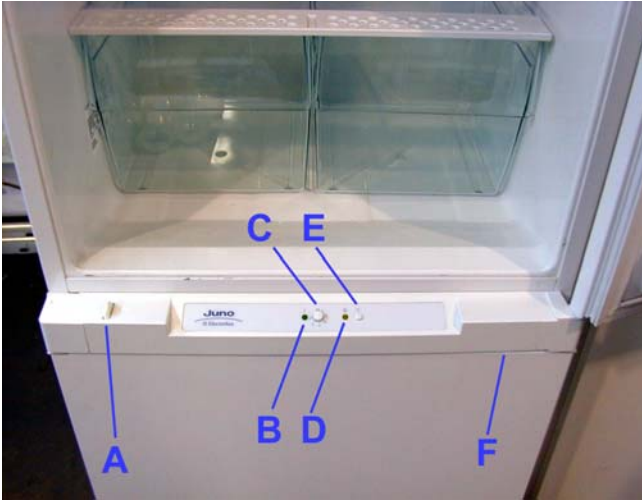
**In case of replacement of the fan it is necessary to ensure that the fan does NOT function with the suction.**

#### Note:

The thermal switches (+10 / +40°C) are connected together therefore they are not available as single spare parts.

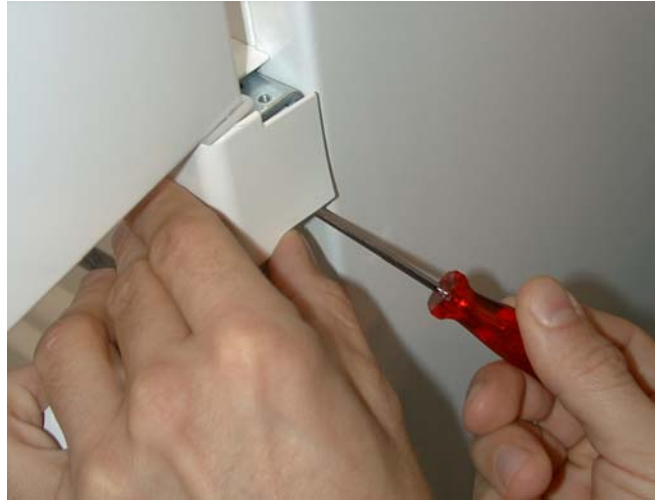
## 7. ACCESSIBILITY TO CONTROL PANEL

To access the control panel and its components (power/display board, cooler/freezer switches and electric connectors) perform the following operations:

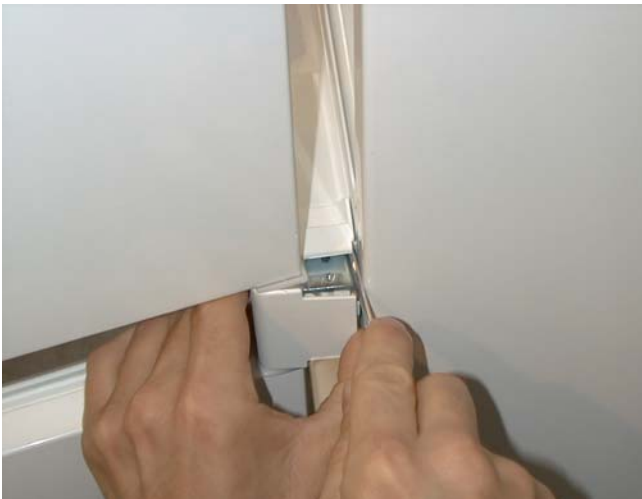


a) components:

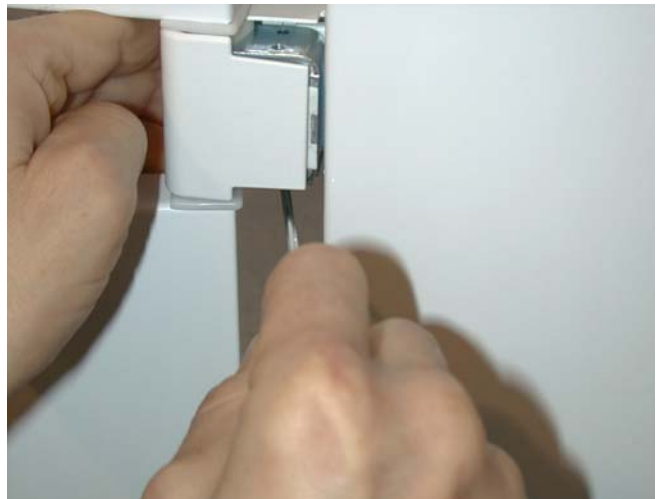
- A) Battery evaporator;
- B) Fan;
- C) Thermal switches connectors +10 / +40 °C;
- D) Defrosting heater connector;
- E) Fan connector.
- F) Defrosting heater.



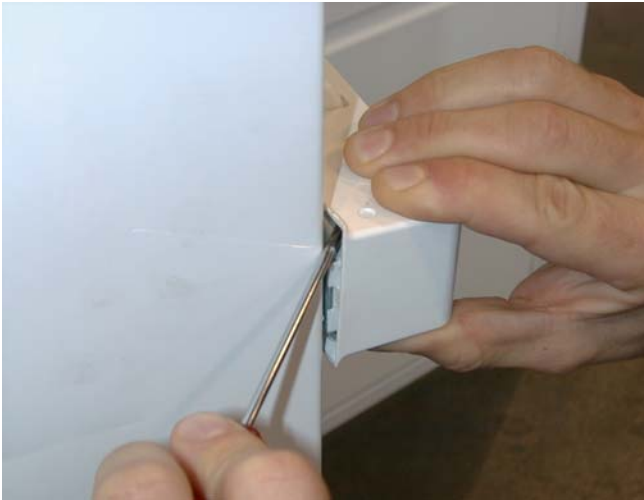
b) Remove the hinge cover of the opposite side of where the hinge is placed by using a cutting screwdriver as indicated in picture;



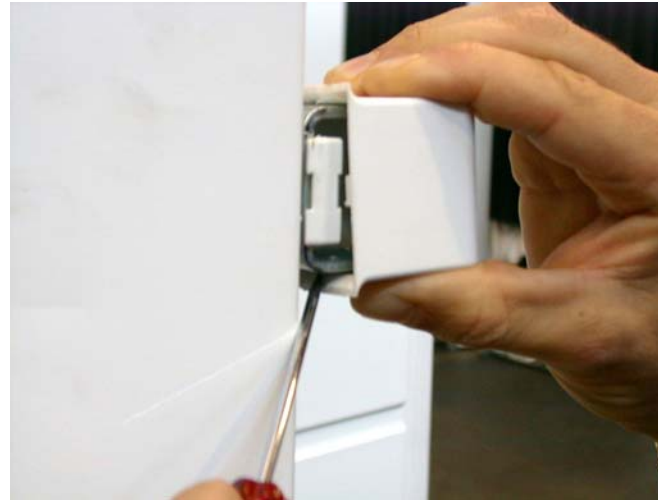
c) Remove the hinge cover of the opposite side of where the hinge is placed by using a cutting screwdriver as indicated in picture;



d) Remove the hinge cover of the opposite side of where the hinge is placed by using a cutting screwdriver as indicated in picture;



e) Remove the hinge cover of the opposite side of where the hinge is placed by using a cutting screwdriver as indicated in picture;



f) Remove the hinge cover of the opposite side of where the hinge is placed by using a cutting screwdriver as indicated in picture;



g) Remove the fixing screws of the control panel;



h) Remove the control panel from the intermediate crossbar;



a) While remounting the control panel be careful with the wiring because it could interfere with the board connectors;



b) Remove the wiring as indicated in picture;



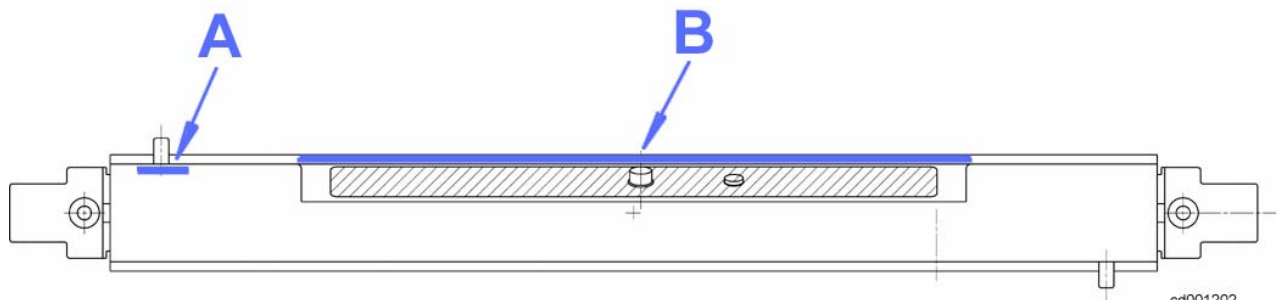
c) Put the control panel close to the intermediate crossbar and keep the wiring aside;

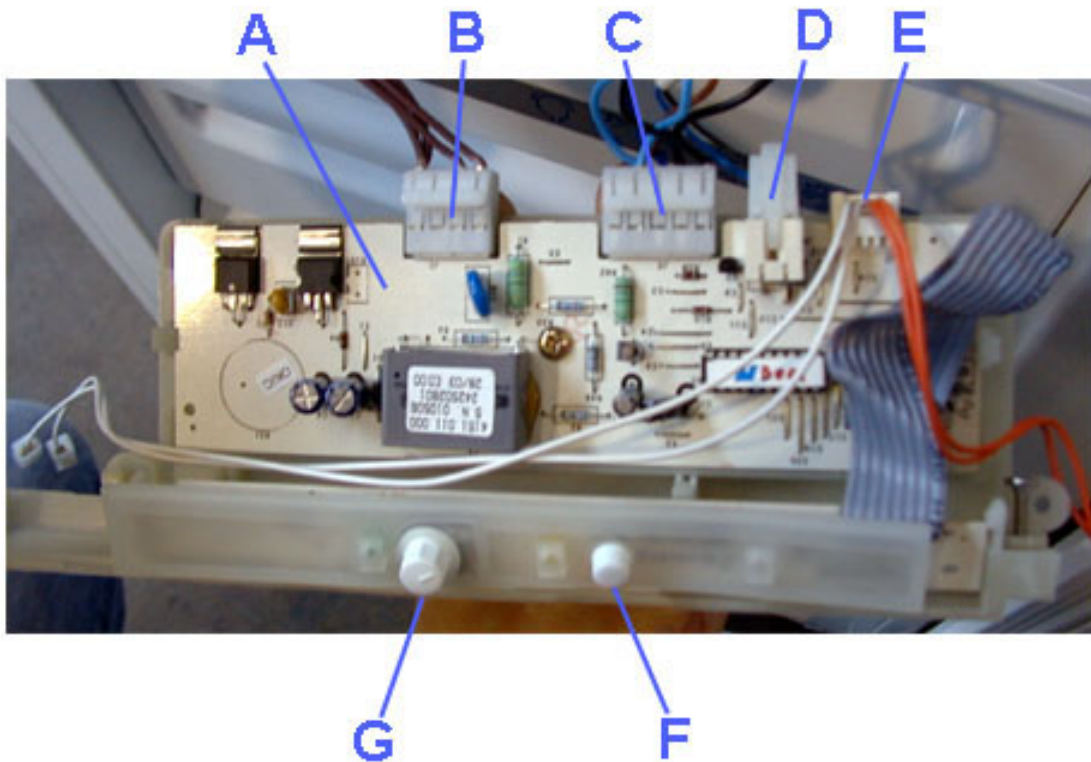


d) Put the control panel close to the intermediate crossbar and keep the wiring aside;



**IMPORTANT:** to avoid the liquid infiltrations there are some adhesive gaskets ( A and B ) and a polyester boss inside the control panel.  
**In case of replacement of the components of the control panel it is obligatory to put the gaskets and the boss at the same place.**  
**The adhesive gasket A must be applied only on the cooler door button.**





g) components:

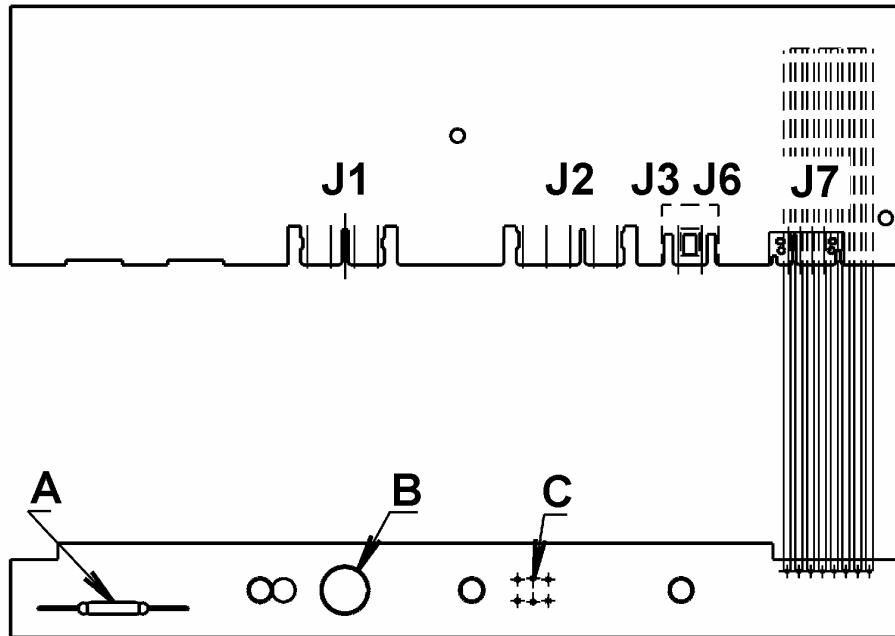
- A) Electronic board;
- B) Connector **J1** electronic board supply and compressor control;
- C) Connector **J2** components supply (fan, defrosting heater and lamp);
- D) Connector **J3/J6** temperature sensor;
- E) Connector **J7** cooler and freezer door switch;
- F) SUPER button;
- G) Electronic thermostat knob.



**IMPORTANT:** the electronic board features a protection that ensure that the compressor does not switch on before than 5 minutes from the last switching off !

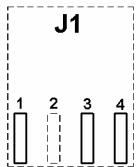
### a. Power and display board

- View of the electronic board (welding side):



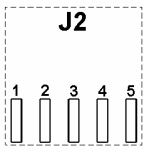
Optional components:  
- A reed element

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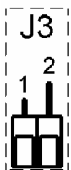
1. compressor
2. free
3. line
4. neutral

cd001052



1. lamp
2. neutral
3. neutral
4. defrosting heater
5. fan

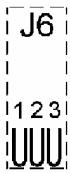
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1. NTC
2. NTC

cd000997





cd000998

1. NTC
2. free
3. NTC



cd001054

1. freezer door switch
2. freezer door switch
3. freezer door switch
4. freezer door switch

To identify the functions of the electronic boards, please refer to the following table (for the part nos. see the spare part lists of the specific model):

Electronic board	Thermal	Buzzer	Green LED	Yellow LED	Red LED	Reed element	SUPER button
ERF1050-01.F	B	NO	YES	YES	NO	NO	YES

Thermal type	Pos. min		Pos. int		Pos. max	
	Cut-in	Cut-out	Cut-in	Cut-out	Cut-in	Cut-out
	[°C]	[°C]	[°C]	[°C]	[°C]	[°C]
B	+11.5	+8	+8	+5	+4.5	+3



## 8. TROUBLESHOOTING



### WARNING !

Switch off the power to the appliance before operating.

#### a. Excessive ice formation on the battery:

If the rubber valve remains open, the humid air outside the freezer compartment is ducted inside and it accumulates too much ice on the battery. The valve remains open if there are foreign bodies or if it loses elasticity; therefore, in the first case the foreign bodies must be removed, while in the latter the rubber valve must be replaced.

#### b. Failed defrosting:

In case of failed defrosting, the possible causes are:

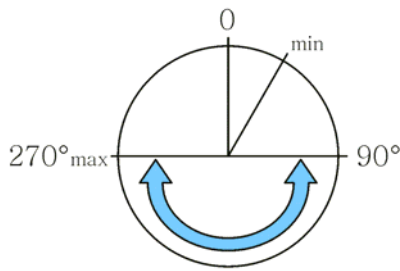
Sequence n°	POSSIBLE CAUSES	HOW TO CONTROL	SOLUTION
1	The defrosting heater is interrupted	Detach the power plug of the appliance, remove the connector of the heater and verify with the tester the correct resistance value to the connector clamps	If the resistance value does not correspond to the technical data, replace the heater
2	One or both switches of the thermal protectors are open	Frost the battery, then detach the power plug of the appliance, remove the connector of the thermal switches and verify with the tester the correct resistance value to the connector clamps	If the resistance value does not correspond to 0 (zero Ohm) replace the thermal switches

### c. Manual defrosting procedure

To execute the testing and the service, a manual defrosting procedure has been introduced that has to be carried out with cold internal temperatures (this is to avoid the possible opening of the thermal protector of the defrosting heater).

To start the manual procedure, ensure that:

- the electronic board is powered with thermostat knob ON, position 5 (or anyway in a position between 90° and 270°);



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- the cooler door switch must be pressed (door closed).

Perform the 3 following operations:

1. turn the thermostat knob to OFF position;
2. press the cooler door switch for 4 times (let pass at least 1 second between every opening/closure);
3. turn the thermostat knob to ON, position 5 (or anyway to a position between 90° and 270°);

At this point the electronic board verifies the thermal cut-outs and all LEDs flash for 5 seconds; then if there aren't any faults, the manual defrosting phase starts. If a fault occurs, the LEDs continue to flash.

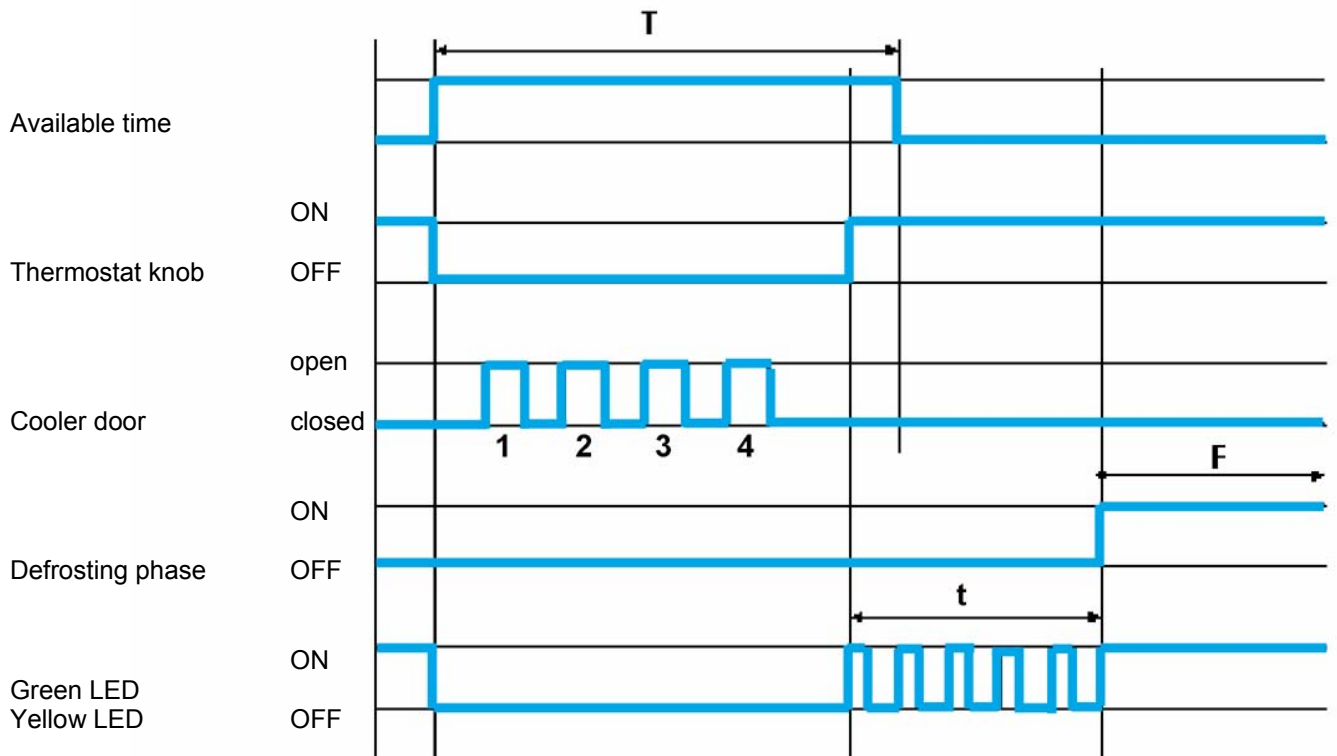
**WARNING:** after placing the thermostat knob in OFF position (operation 1), there are 15 seconds to perform the other 2 operations (operation 2-3) in the correct sequence.

In case of error or incorrect execution of the operations, before executing once again the manual defrosting procedure, it is necessary to reset the standard functions switching off the power to the appliance (detach the power cable).

The manual defrosting phase consists of:

- defrosting heater ON;
- green ON/OFF LED on;
- compressor and fan OFF;

In this case the electronic board performs the defrosting phase as a standard function and then continues to operate normally.



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Key:

- $T$  = 15 seconds;
- $t$  = 5 seconds (to check thermal protections);
- $F$  = standard function.

#### d. ON and SUPER LEDs flashing

The ON and SUPER LEDs flash and the defrosting phase lasts 1 hour if the defrosting heater is interrupted or its connector is detached.

Please refer also to Service Bulletin 599376174 since the failure signaling could be wrong due to a “bug” in the software of the electronic board.

## 9. TECHNICAL FEATURES

1) fan:

Type	Voltage [V – Hz]	Power [W]	Speed [rpm]
F64-10..	220 - 50	3,1	2000

2) Power and display board:

Software version	Board version
B100	ERF1050-01.F

3) Defrosting heater:

Voltage [V]	Resistance [Ohm]	Power [W]
240	510	113

4) Thermal switches:

Type of thermal protector	Cut-in temperature	
	Opening	Closing
DEFROSTING	+ 10 °C	- 1 °C
SAFETY	+ 40 °C	+ 30 °C