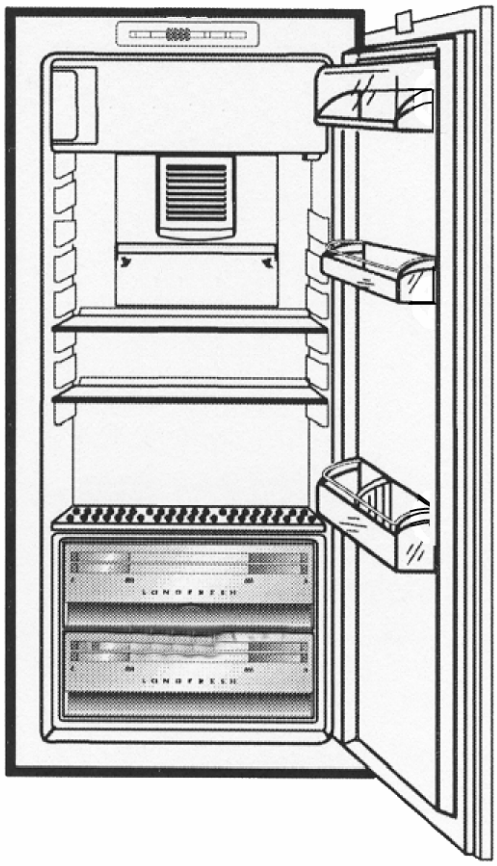

# Refrigerators
# IKEF 248-5
# IKEF 238-5

Küppersbusch

THE HEART OF A GOOD KITCHEN

GB

# Service Manual: H8-420-02-06


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# 1. Safety instructions

**Danger!**

***Repairs may only be carried out by a qualified electrician!***
***Inexpert repairs may lead to risks and damages for the user!***

**To prevent electric shocks, please observe the following tips:**

- In the event of faults, housing and frame may be live! Prior to repairs, disconnect the appliance from the mains!
- Touching live components inside the appliance may cause dangerous currents to flow through your body!
- Unplug the appliance before repair!
- When inspecting live parts, a residual current operated device must be used at all times!
- Always ensure that an earthed conductor is properly connected. The ground wire resistance must not exceed that specified in the standard! It is of vital importance for ensuring the safety of people and the functioning of the appliance.
- On completion of repairs, an inspection must be carried out in accordance with VDE 0701 [Association of German Electrical Engineers] or the corresponding regulations for your country! On completion of repairs, a function and impermeability inspection must be carried out.
- Do not touch any of the components in the appliance. The modules are also live!
- Observe ESD instructions.

**Attention!**

Make sure you observe the following instructions:

- The appliances must be disconnected from the mains prior to all repairs. If inspections must be carried out on live appliances, make sure you use a residual current operated device.

Sharp edges: Use protective gloves.

Components may be electrostatic!
Observe handling precautions!

# 2. Introduction

## 2.1 General

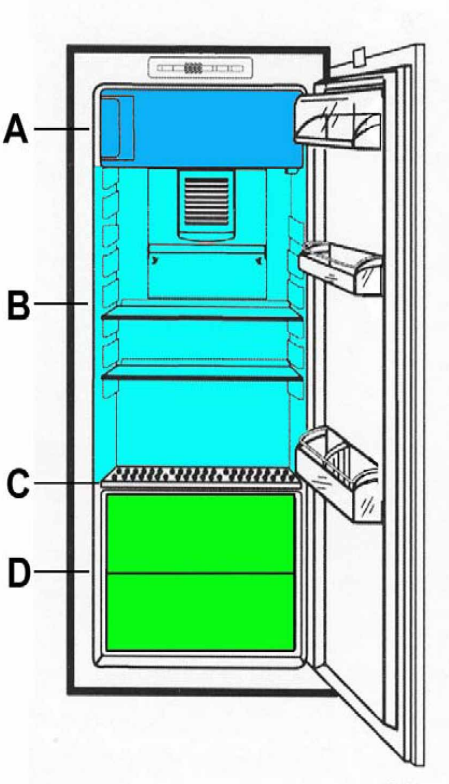
The IKEF 238-5 and IKEF 248-5 models are described in this manual.

The IKEF 238-5 is a refrigerator with a standard refrigerator compartment and a 4-star freezer compartment. The PNC is type 923457xxx (195 4S).

The IKEF 248-5 is a refrigerator with a standard refrigeration compartment and a 0° keep-fresh cooling zone. The PNC is type 923524xxx (210 CC).

The evaporator circuit of the IKEF 248-5 comprises a battery-driven evaporator in the keep-fresh cooling zone.
The evaporator circuit of the IKEF 238-5 comprises a battery-driven evaporator in the keep-fresh cooling zone and a tube evaporator in the 4-star freezer compartment.

The appliances are equipped with electronic controls of type ERF 2000.




Legend:

A = 4-star freezer compartment

B = Standard refrigerator compartment

C = Divider plate

D = Keep-fresh cooling zone (0°)

A divider plate is located between the standard refrigeration compartment and the keep-fresh cooling zone. The front of the divider plate is designed in such a manner that air can circulate between both zones.

Unlike the NO FROST refrigerator, the 0° appliance has a battery-driven evaporator without defrost resistance and without the respective thermo switches, since defrosting of the battery is carried out by fan operation when the compressor is switched off.

## 2.2 Measuring the temperature

The temperature is measured with 3 or 4 sensors:

- Refrigerator sensor (at the fan)
- 0° sensor (on the casing of the keep-fresh cooling zone)
- Sensor of the battery-driven evaporator (on the battery itself)
- Room temperature sensor (IKEF 238-5 only)
  This is part of the display electronic unit.

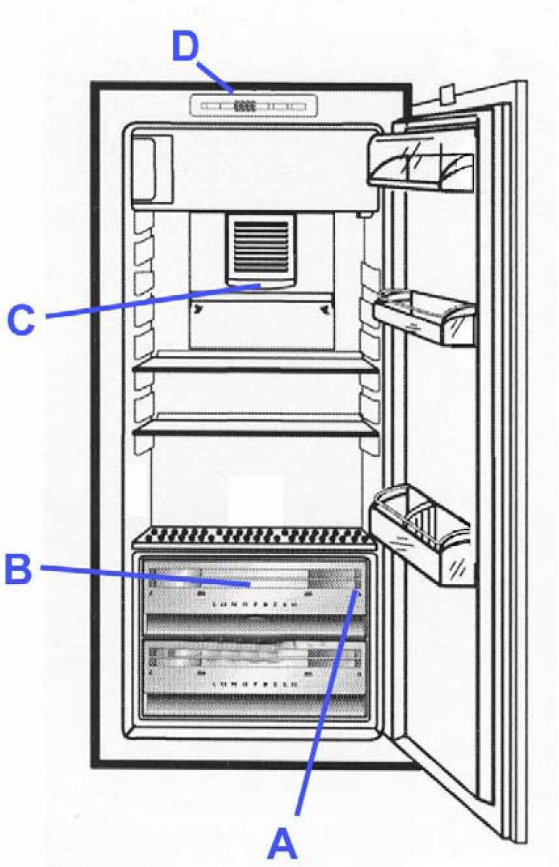
Legend:

A = 0° sensor

B = Sensor for the battery-driven evaporator

C = Refrigerator sensor

D = Room temperature sensor (IKEF 238-5)



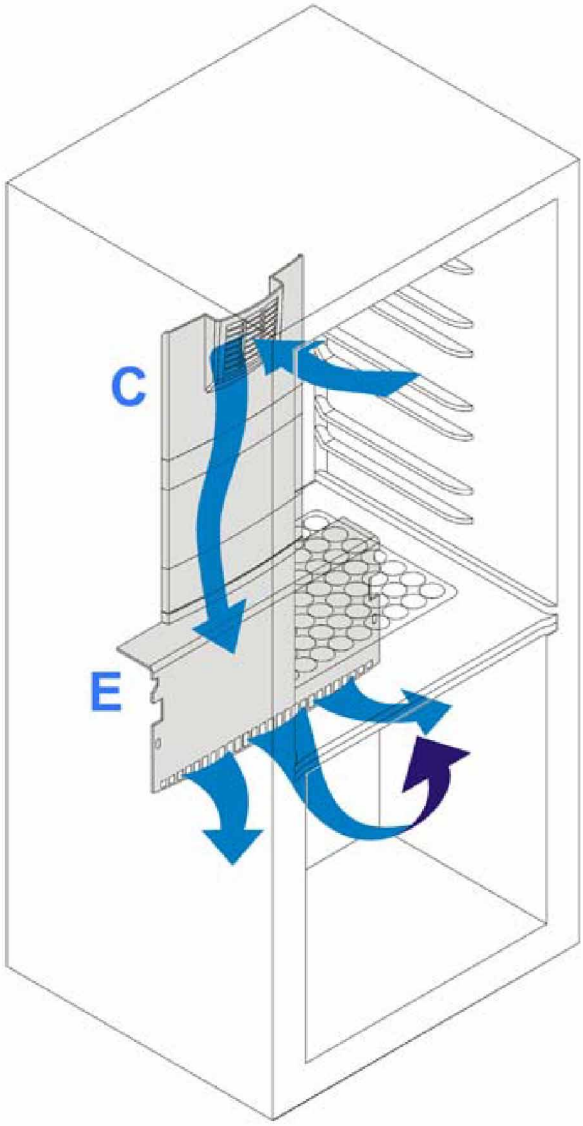

The cables of sensors A, B and C have been foamed in the inside of the casing and can hence not be replaced.

## 2.3 Air flow

The cold generated by the battery-driven evaporator (located in the keep-fresh cooling zone behind the evaporator cover E) is firstly spread by the fan located behind the fan casing C into the keep-fresh cooling zone and then into the standard refrigeration compartment.

The air is sucked in by the fan which is located in the top part of the refrigeration compartment. It flows through the channels and flows down to the battery-driven evaporator. The cold air is expelled from the bottom part of the battery-driven evaporator, makes contact with the two drawers of the keep-fresh cooling zone and travels upwards through the gap between the divider plate and the door into the standard cooling compartment.

***AIR FLOW***



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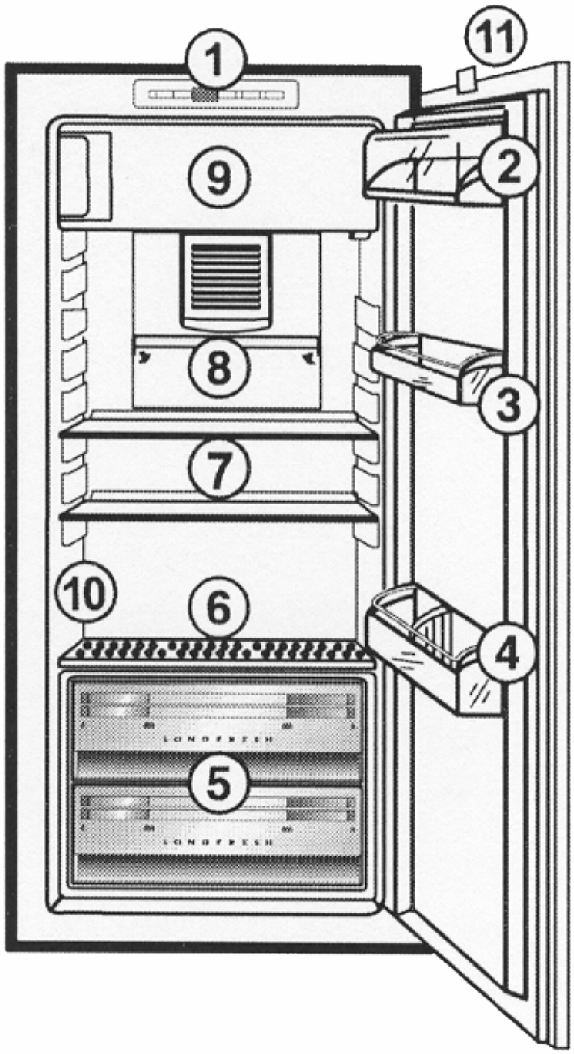
# 3. Appliance components

## 3.1 Front view

The most important appliance components are:




1. Control panel
2. Butter compartment
3. Door compartment
4. Bottle shelf
5. Keep-fresh cooling zone drawer (see note a)
6. Divider plate
7. Shelves
8. Air filter (special fitting, see note b)
9. Freezer compartment door
10. Model identification plate
11. Magnet holder

**Note:**

a) The drawers of the keep-fresh cooling zone have regulating flaps for the humidity control function

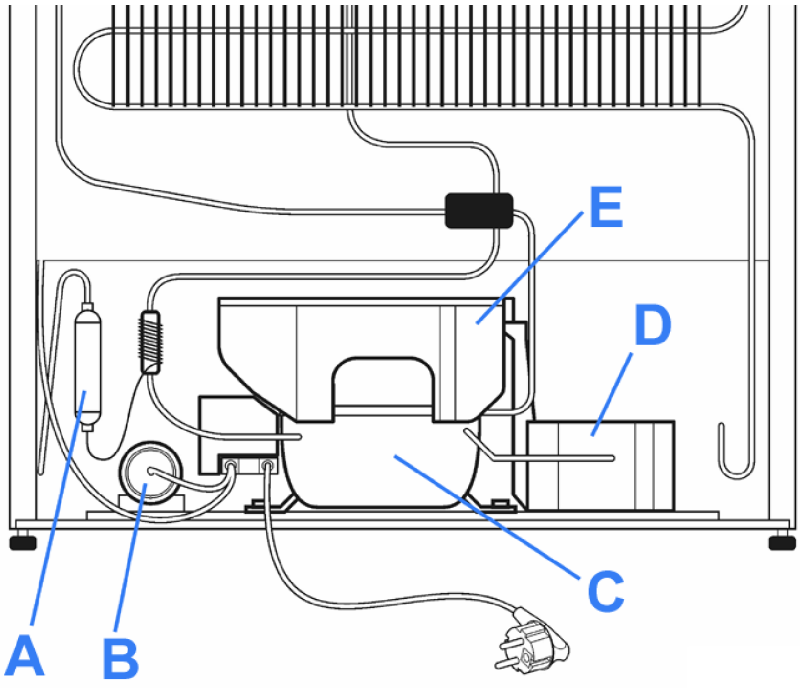
- Regulating flap closed to maintain level of humidity.
- Regulating flap open to reduce level of humidity.

It is vital that the drawer covers be positioned correctly for the „humidity control" function to operate properly.

b) Depending on the model, a channel may be present instead of the air filter. The channel contains an insulation panel made of polystyrene.

## 3.2 Rear view

The most important appliance components are:




A Drainage filter

B Operating condensor

C Compressor

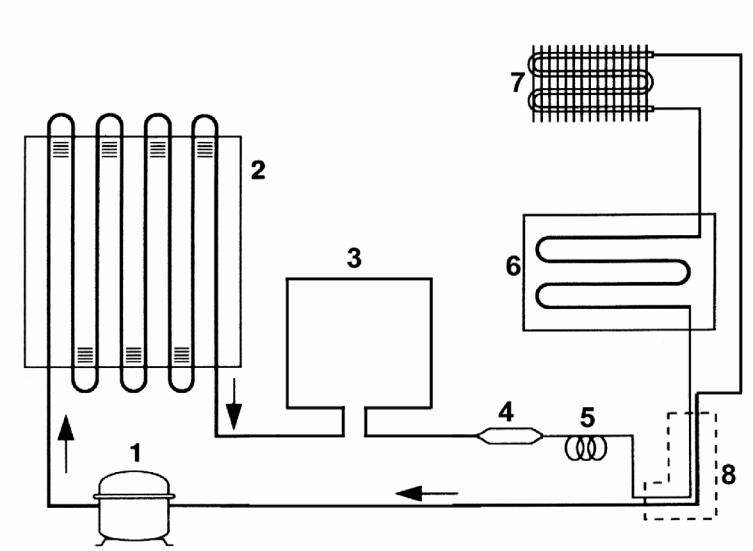
D Additional drip cup for water (IKEF 248-5 only)

E Drip cup for water

# 4. Cooling circuit

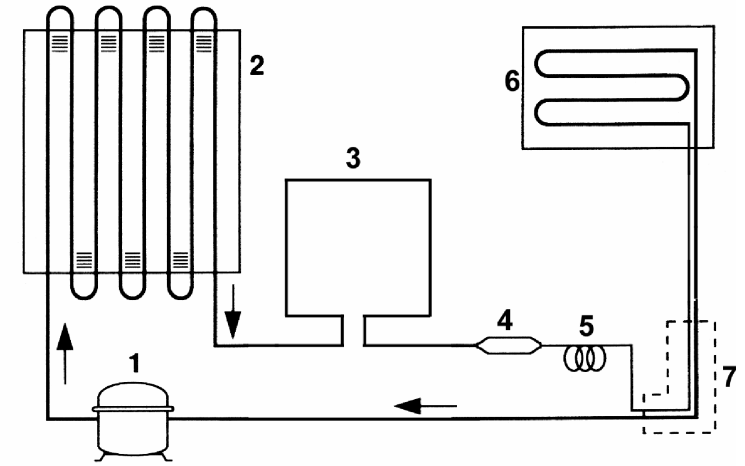
**IKEF 238-5**

1. Compressor
2. Evaporator
3. Frame heater
4. Dryer
5. Capillary tube
6. Tube evaporator
7. Battery-driven evaporator (keep-fresh cooling zone)
8. Heat exchanger



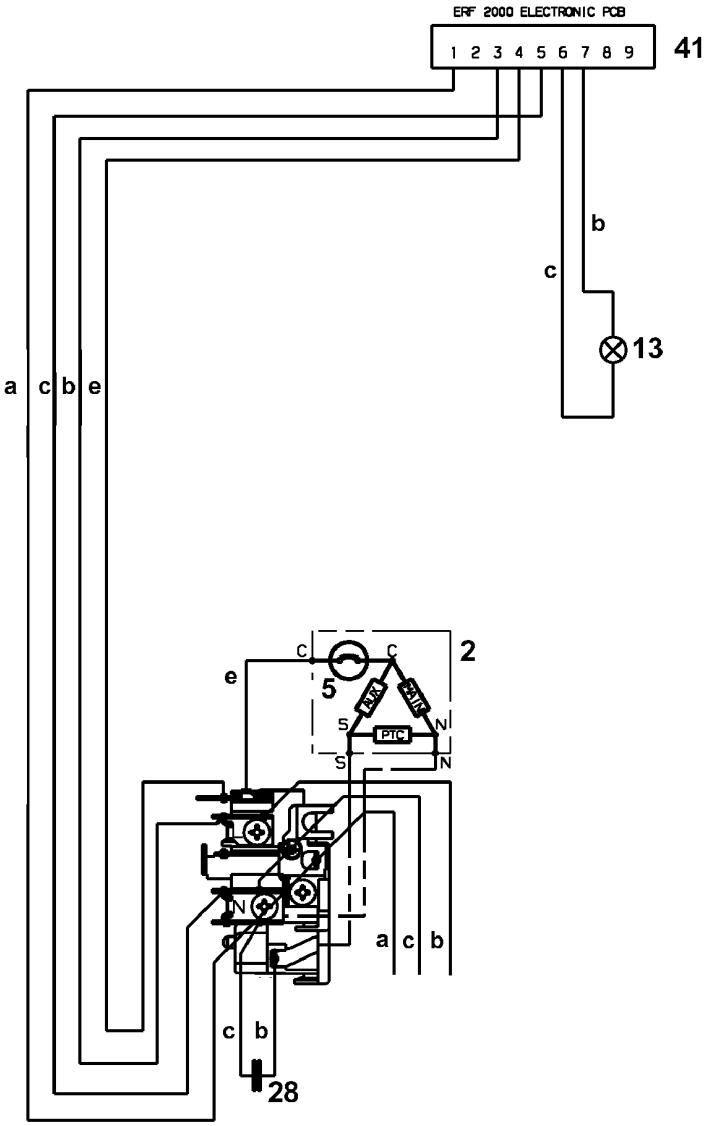

**IKEF 248-5**

1. Compressor
2. Condensor
3. Frame heater
4. Dryer
5. Capillary tube
6. Battery-driven evaporator (keep-fresh cooling zone)
7. Heat exchanger



# 5. Electric system

Please observe the circuit diagrams for the respective models.




2 Compressor
5 Protective motor switch
13 Lamp
28 Operating condensor
41 ERF 2000 electronic unit

a yellow-green
b brown
c blue
d white
e black



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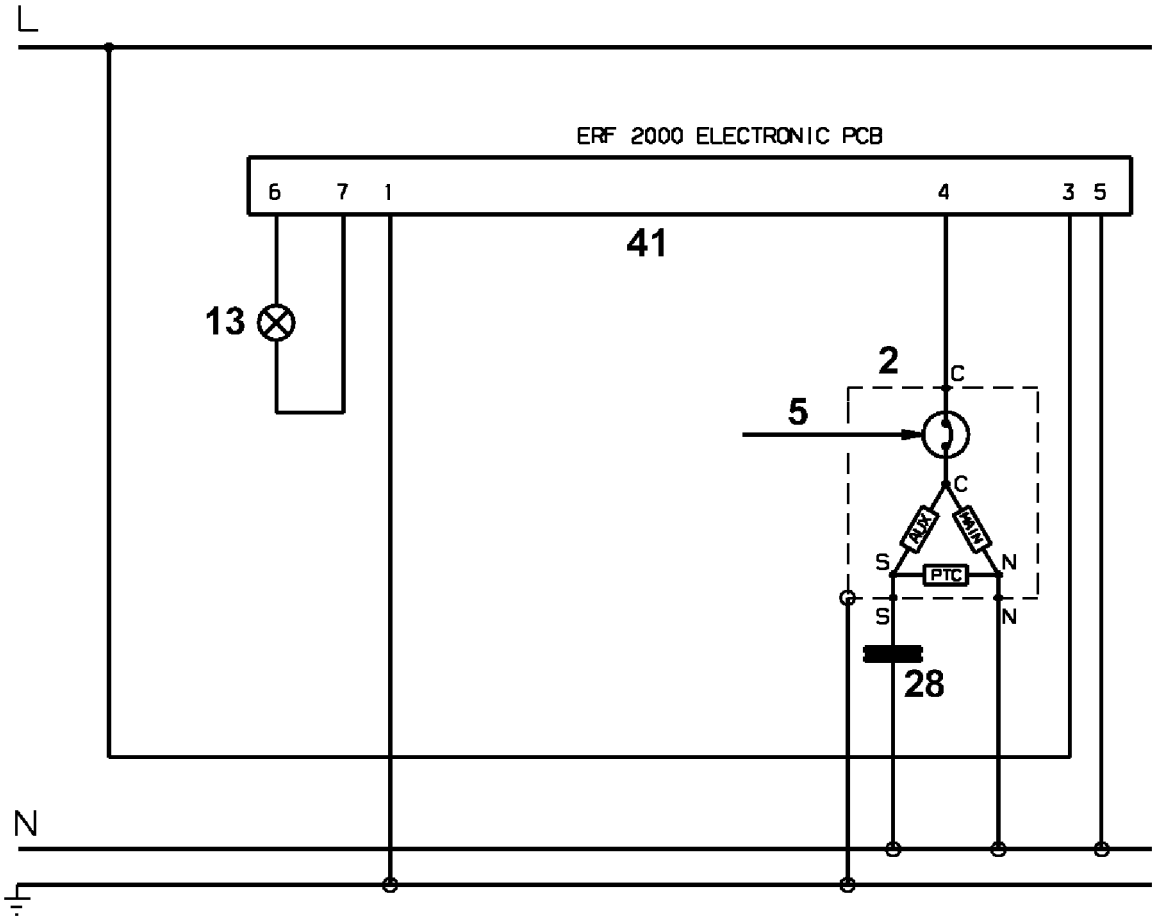
# 6. Function chart

Please observe the circuit diagrams for the respective models.




2 Compressor
5 Protective motor switch
13 Lamp
28 Operating condensor
41 ERF 2000 electronic unit

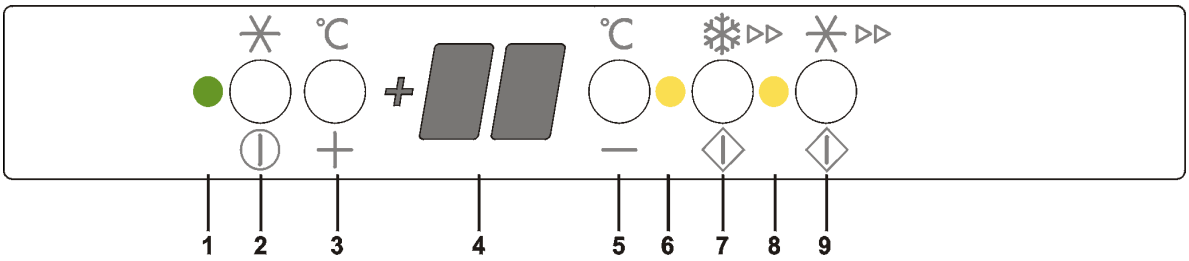
a yellow-green
b brown
c blue
d white
e black

L Cable
N Neutral wire

# 7. How the refrigerators operate

## 7.1 IKEF 238-5

### 7.1.1 Refrigerator compartment control panel




1 = Performance display (green)

2 = Cooling/OFF button

3 = Button for setting the temperature (for higher temperatures)

4 = Temperature display

5 = Button for setting the temperature (for lower temperatures)

6 = Display for activated superfrost function (yellow) for rapid freezing in the freezer compartment

7 = Superfrost button

8 = Display for activated rapid-cool function (yellow) for intensive refrigeration

9 = Rapid-cool refrigeration button

### 7.1.2 Putting the appliance into operation

The buttons for setting the temperature are located at the top of the appliance on the control panel.

- Insert the plug into the wall socket.
- Press the ON/OFF button (2). The green LED (1) for power control will light up. The appliance has now been switched on and can be switched off at any time by pressing the ON/OFF button again. The green LED (1) will then go off.
- Press one of the plus or minus buttons (3/5). The temperature display (4) will switch over and the PRE-SET temperature will blink.

### 7.1.3 Temperature setting

- Pressing on one of the plus or minus buttons will switch the temperature display over from the ACTUAL temperature (temperature display lights up consistently) to the PRE-SET temperature (temperature display blinks).
- Each time one of the two buttons is pressed the PRE-SET temperature moves on by 1°C.
- If neither of the buttons is pressed, the temperature display will soon (after approx. 5 seconds) switch over automatically onto the ACTUAL temperature.
  The PRE-SET temperature is the temperature that the inside of the refrigerator should have. The PRE-SET temperature is indicated by numbers which blink.
  The ACTUAL temperature is the temperature which is actually present in the inside of the refrigerator at any given time. The ACTUAL temperature is indicated by numbers which light up consistently.

### 7.1.4 Temperature display

The temperature display (4) indicates several functions:

- For standard operation the ACTUAL temperature will be shown.
- While the temperature is being adjusted, the refrigerator temperature which has currently been set will blink (pre-set temperature).

***Attention! It is quite normal for the temperature display to indicate the actual temperature with a slight delay.***

### 7.1.5 Rapid-cool function

The rapid-cool function can be used to cool large quantities of food in the refrigerator quickly, e.g. for drinks or salads for a party.
The rapid-cool function is activated by pressing button 9. The yellow display 8 will light up and the rapid-cool function will now cool the refrigerator down intensively. On doing so, a pre-set temperature of +3°C will automatically be set. After 6 hours the rapid-cool function will switch itself off. The original pre-set temperature is then set again and the temperature display will show the current temperature in the refrigerator.
The rapid-cool function can be switched off again manually at any time by pressing the rapid-cool button 9 once again. The yellow display 8 goes off.

### 7.1.6 Need for refrigeration in the keep-fresh cooling zone only

If there is only a need for refrigeration in the keep-fresh cooling zone:

- The compressor will operate
- The fan will rotate at a **low** speed (approx. 1,500 rev/min.)
  - at pulse operation (8 s. ON / 8 s. OFF) when the surrounding temperature is lower than 35 °C.
  - at continuous operation when the surrounding temperature exceeds 35 °C.

### 7.1.7 Need for refrigeration for the standard refrigeration compartment and the keep-fresh cooling zone

If there is a need for refrigeration in the keep-fresh cooling zone and the standard refrigeration compartment:

- The compressor will operate
- The fan will rotate at a **high** speed (approx. 1900 rev/min.)
  - at pulse operation (8 s. ON / 8 s. OFF) when the surrounding temperature is lower than 35 °C.
  - at continuous operation when the surrounding temperature exceeds 35 °C.

### 7.1.8 Need for refrigeration in the standard refrigeration compartment only

If there is only a need for refrigeration in the standard refrigeration compartment:

- The compressor will not operate
- The fan will rotate at a **high** speed (approx. 1900 rev/min.)
  - at pulse operation (8 s. ON / 8 s. OFF) when the surrounding temperature is lower than 35 °C.
  - at continuous operation when the surrounding temperature exceeds 35 °C.

### 7.1.9 Defrosting the battery-driven evaporator

The ice which builds up on the battery-driven evaporator needs to be defrosted at regular intervals. The battery-driven evaporator is defrosted every 4 hours of compressor operation. The defrost phase commences when the compressor is switched off.

During the defrost phase:

- The compressor will not operate
- The fan will rotate consistently at a **high** speed
- The temperature in the refrigerator will drop
- The battery-driven evaporator will heat up.

The defrost phase ends when the evaporator sensor measures a temperature of +4 °C.

**NOTE!**

**If the door is opened the fan will come to a standstill.**
**A magnet must be used to simulate that the door is closed. It must be installed at the Reed element.**

### 7.1.10 Activating the compensating heating element

The compensating heating element serves the purpose of raising the temperature in the refrigerator compartment in order to be able to regulate the temperature at +3 °C to +8 °C if the surrounding temperature is between 10 °C and 38 °C.
The mode of function of the compensating heating element depends on the appliance settings (pre-set temperature) and the surrounding temperature (which is measured by the environmental sensor).
The compensating heating element is foamed into the interior of the casing and can hence not be replaced.

a View of the refrigerator interior (approximate position of the compensating heating elements)

b Rear view of the refrigeration compartment (prior to foaming the casing)

## 7.2 IKEF 248-5

The operation of the refrigerator varies depending on the refrigeration requirement of the keep-fresh cooling zone and the standard refrigeration compartment.

There are three possible combinations for standard operation:

- Need for refrigeration in the keep-fresh cooling zone only
- Need for refrigeration in the standard refrigeration compartment and the keep-fresh cooling zone
- Need for refrigeration in the standard refrigeration compartment only

The following situation may also occur:

- Activation of the defrost procedure of the battery-driven evaporator

### 7.2.1 Need for refrigeration in the keep-fresh cooling zone only

If there is only a need for refrigeration in the keep-fresh cooling zone:

- The compressor will operate
- The fan will rotate at a **low** speed (approx. 1,500 rev/min.)

### 7.2.2 Need for refrigeration in the standard refrigeration compartment and the keep-fresh cooling zone

If there is a need for refrigeration in the keep-fresh cooling zone and the standard refrigeration compartment:

- The compressor will operate
- The fan will rotate at a **high** speed (approx. 1900 rev/min.)

### 7.2.3 Need for refrigeration in the standard refrigeration compartment only

If there is only a need for refrigeration in the standard refrigeration compartment:

- The compressor will not operate
- The fan will rotate at a **high** speed (approx. 1900 rev/min.)

### 7.2.4 Defrosting the battery-driven evaporator

The ice which builds up on the battery-driven evaporator needs to be defrosted at regular intervals. The battery-driven evaporator is defrosted every 4 hours of compressor operation. The defrost phase commences when the compressor is switched off.

During the defrost phase:

- The compressor will not operate
- The fan will rotate consistently at a **high** speed
- The temperature in the refrigerator will drop
- The battery-driven evaporator will heat up.

The defrost phase ends when the evaporator sensor measures a temperature of +4 °C.

**NOTE!**
**If the door is opened the fan will come to a standstill.**
**A magnet must be used to simulate that the door is closed. It must be installed at the Reed element.**

## 7.3 Acoustic alarm (both models)

The alarm buzzer is activated if the appliance door is left open for longer than 3 minutes.

The alarm stops sounding when the appliance door is closed.

# 8. Accessing the components in the keep-fresh cooling zone

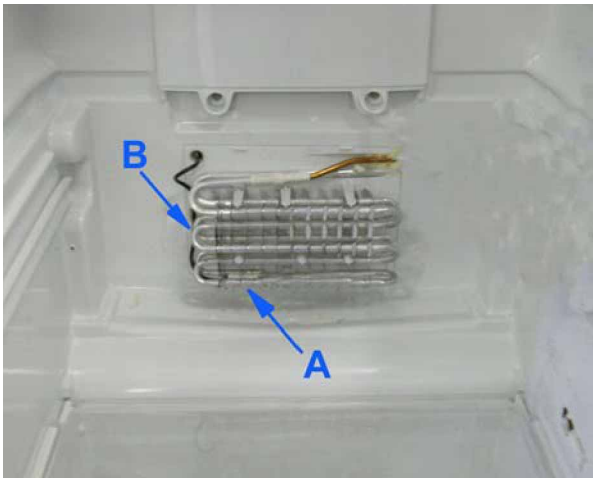
## 8.1 Battery-driven evaporator and evaporator sensor

Proceed as follows in order to access the battery-driven evaporator and the temperature sensor:

1. Remove the top cover of the 0° drawer.
2. Remove the 0° drawer.
3. Remove the divider plate.

4. Loosen the two fastening screws of the evaporator cover.

5. Pull the cover of the evaporator towards you, remove it and take out the insulation panel made of polystyrene.




A) Sensor for the battery-driven evaporator

B) Battery-driven evaporator

## 8.2 0° sensor

Proceed as follows in order to access the 0° sensor:

1. Remove the top cover of the 0° drawer.
2. Remove the 0° drawer.

3. Use a screwdriver with a flat edge and remove the protective grating of the 0° sensor


A 0° sensor

# 9. Accessing the components in the refrigerator

## 9.1 Fan and refrigerator sensor

**First remove the cover of the evaporator**. Then proceed as follows:

1. Remove the top cover of the 0° drawer.
2. Remove the 0° drawer.
3. Remove the divider plate.

4. Remove the two fastening screws of the evaporator cover.

5. Pull the cover of the evaporator towards you, and remove it.

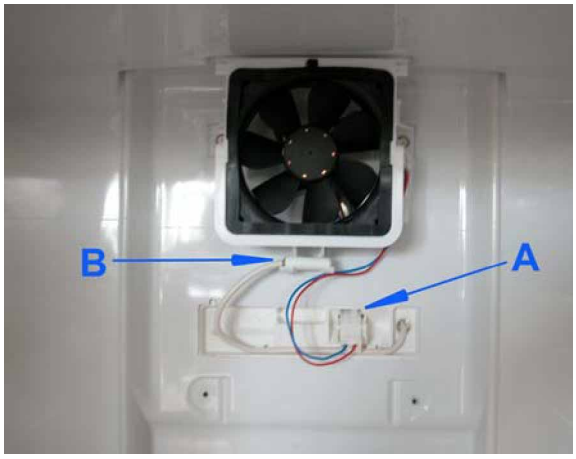
**Now remove the channel or the filter channel (if present) as follows:**

1. Loosen the two fastening screws of the channel (or the filter channel, if present); Pull the channel downwards to remove it

2. Remove the insulation panel made of polystyrene (not present in appliances with air filters)

**Now remove the fan casing as follows:**

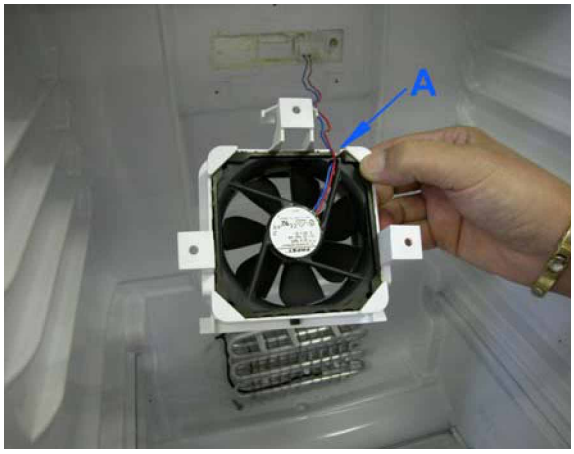
1. Loosen the two fastening screws of the fan casing and pull the casing out downwards.




A Fan terminal
B Refrigerator sensor

**Now the fan and the refrigerator sensor can be removed as follows:**

1. Remove the refrigerator sensor from the holder and loosen the 3 fastening screws of the fan.




2. The fan cables must be lead through the groove (A) of the fan holder.

**NOTE!**
**Should the fan need to be replaced, make sure that the suction functions.**

**A magnet must be used to simulate that the door is closed. It must be installed at the Reed element.**

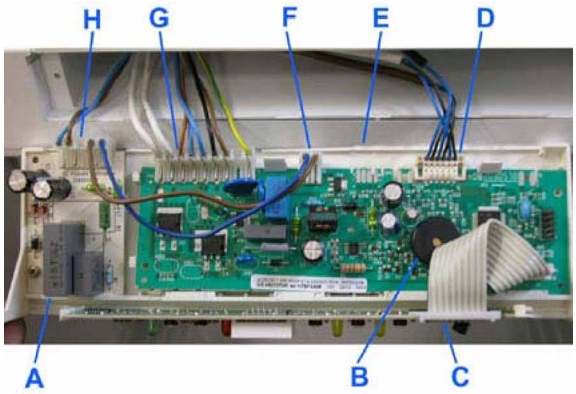
## 9.2 Control panel

In order to gain access to the control panel and its components (power electronics unit, display electronics unit, electronic unit of the fan and the terminals), proceed as follows:

1. Remove the two screw covers and remove the two fastening screws of the control panel support.

2. Remove the protective sheet.

3. Pull the control panel support towards you.



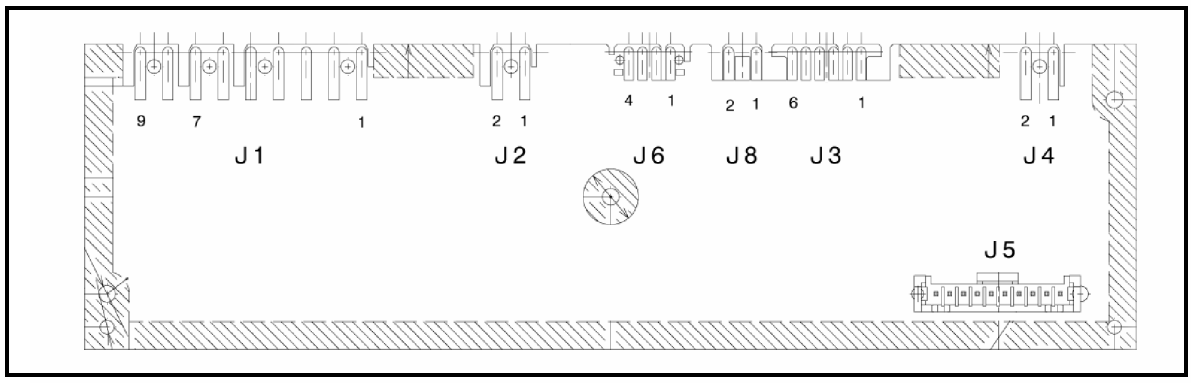

A Electronic unit for the fan
B Buzzer
C Display electronic unit
D Sensor terminal
- Refrigerator sensor = white cable
- Sensor for the battery-driven evaporator = black cable
- 0° sensor = brown cable

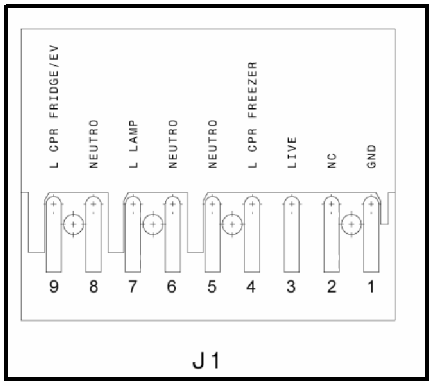
E Power electronics unit
F Terminal of the electronic unit for the fan
G Terminal for the electrical equipment
- Compensating heating elements
- Lamp
- Compressor
- Power supply electronics unit

H Fan terminal

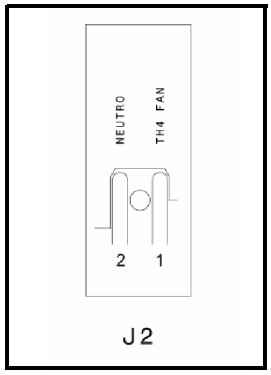
### 9.2.1 Power electronic unit

**View of the electronic unit (components side):**

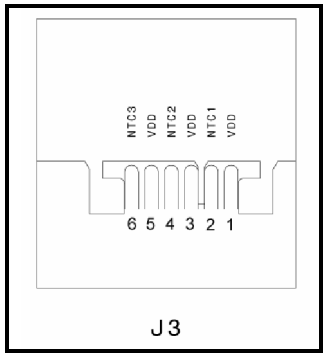


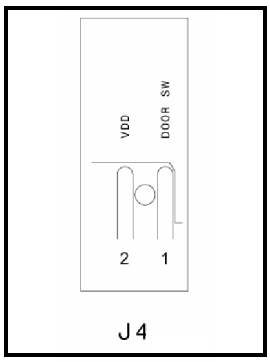

1. Earthing contact
2. unoccupied
3. Cable
4. Compressor
5. Neutral wire
6. Neutral wire
7. Lamp
8. Unoccupied (IKEF 248-5)
   Neutral wire (IKEF 238-5)
9. Unoccupied (IKEF 248-5)
   Compensating heating elements (IKEF 238-5)



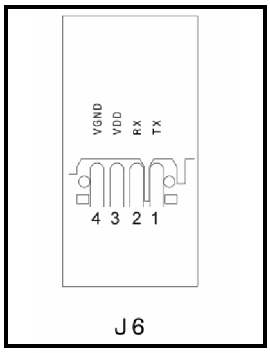

1. Electronic unit for the fan
2. Neutral wire



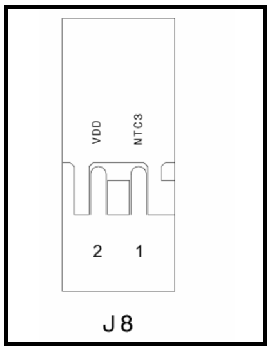

1. Refrigerator section sensor:
2. Refrigerator section sensor
3. Sensor for the battery-driven evaporator
4. Sensor for the battery-driven evaporator
5. 0° sensor
6. 0° sensor




1. Unoccupied
2. Unoccupied

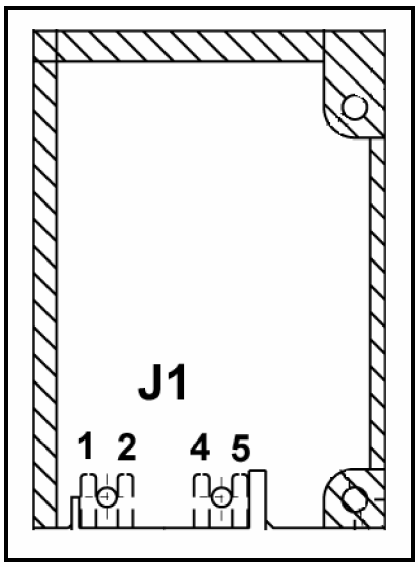



1. Unoccupied
2. Unoccupied
3. Unoccupied
4. Unoccupied




1. Unoccupied
2. Unoccupied

### 9.2.2 Electronic unit for the fan



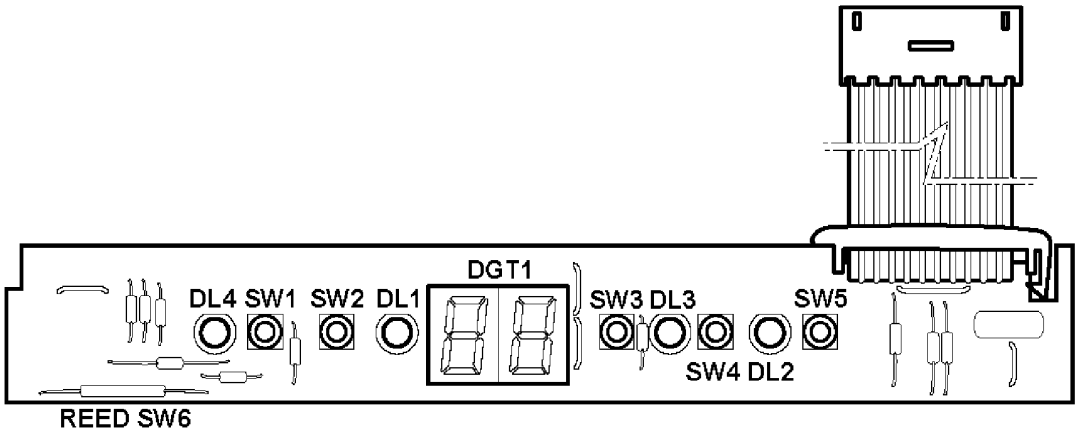

1. Cable (power supply electronic unit);
2. Neutral wire (power supply electronic unit);
4. + Vcc (fan power supply);
5. Earth wire (fan power supply);

The output voltage + Vcc is as follows:

+15 . . +18 V DC, in order to allow the fan to operate at **slow** speed;

+22 . . +26 V DC, in order to allow the fan to operate at **high** speed.

### 9.2.3 Display electronic unit




| | | IKEF 248-5 | |
|---|---|---|---|
| SW1 | ON/OFF button | SW1 | ON/OFF button |
| SW2 | Button to raise the temperature | SW2 | Button to raise the temperature |
| SW3 | Button to reduce the temperature | SW3 | Button to reduce the temperature |
| SW4 | FROSTMATIC button | SW4 | COOLMATIC button |
| SW5 | COOLMATIC button | SW5 | not present |
| SW6 | Reed element | SW6 | Reed element |
| DGT1 | Display | DGT1 | Display |
| DL1 | Minus sign LED | DL1 | Minus sign LED |
| DL2 | COOLMATIC LED | DL2 | not present |
| DL3 | FROSTMATIC LED | DL3 | COOLMATIC LED |
| DL4 | ON/OFF LED | DL4 | ON/OFF LED |

# 10. Design for models with an air filter

Depending on the model, the middle channel will be replaced by a filter channel.

Middle channel

Filter channel

Open the flap and replace the charcoal filter at least once a year.

It is recommended that a charcoal filter be used for models with an air filter.

# 11. Technical features

## 11.1 IKEF 238-5

**Fan:**

Type: .....3414 NMR-418
Voltage [V DC].....18 . . 26
Power[W].....1.8
Speed (rev/min.).....2300

**Power electronic unit:**

Software version.....NFBF4A0N
Electronic unit version .....ERF2000P-01.A

**Display electronic unit:**

EEPROM.....F00F2
Electronic unit version .....ERF2000D-06.A

## 11.2 IKEF 248-5

**Compensating heating element:**

Voltage (V) .....240
Power [W].....4
Resistance [ohm].....14400

**Fan:**

Type: .....3414 NMR-418
Voltage [V DC].....18 . . 26
Power [W].....1.8
Speed (rev/min.).....2300

**Power electronic unit:**

Software version.....NFBF4A0N
Electronic unit version .....ERF2000P-01.A

**Display electronic unit:**

EEPROM.....F00F2
Electronic unit version .....ERF2000D-06.A