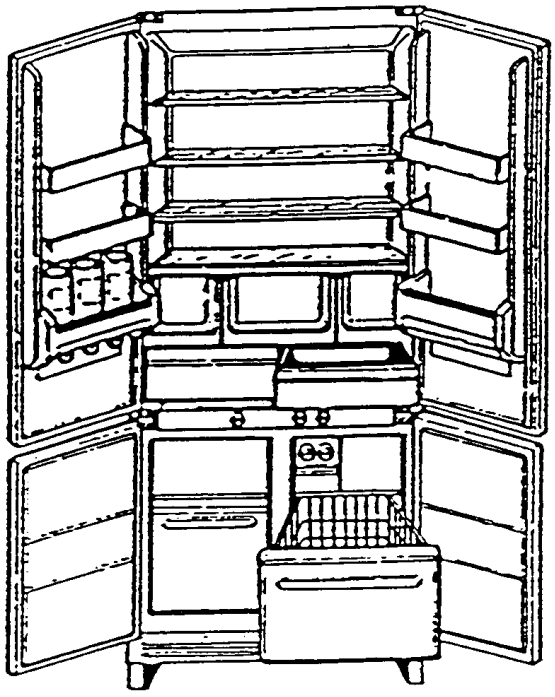
KÜPPERSBUSCH
After-Sales Service



Service Manual
IK 458.1 - 4T / IK 458.2 - 4T

VKS-H	Service Manual IK 458.1 - 4T / IK 458.2 - 4T	H8-420-03-01
Responsible: D. Rutz	Phone: (0209) 401-733	Date: 04.01.1995

Preface:

The need to supply consumer appliances which fulfil the requirements of the most modern criteria in food storage and which make optimum use of the available space has led to the development of the NO FROST refrigeration and freezing technology.

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1. General

1.1 The design of the NO FROST appliances

In principle there are no restrictions as regards the appliance design.

All the usual designs in the field of refrigeration and freezing technology can also be produced using NO FROST technology. The appliances are manufactured with up to a maximum of four doors. The doors can be arranged adjacently or one above the other. With most appliances it is possible to adjust the direction in which the door opens.

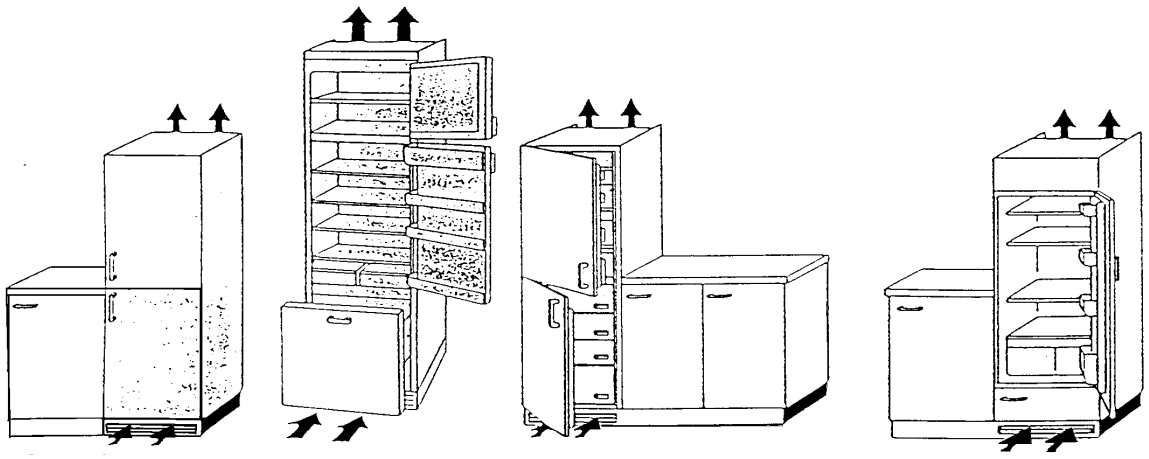
We distinguish between two types of upright appliances: built-under appliances and built-in appliances.

Built-under appliances can be equipped with a decorative top panel.

Built-in appliances are completely integrated and adapted to match the front of the kitchen furniture.

The furniture door is fastened directly to the door of the appliance or to the furniture itself using sliding hinges, all depending on the type of furniture.

Appliance design



Upright appliance (fridge-freezer)

Upright appliance (three-zone appliance)

Built-in appliance (integrated fridge-freezer)

Built-in appliance (integrated refrigerator)

1.2 Methods of refrigeration

At Küppersbusch we distinguish between 3 types of refrigeration:

a. Static refrigeration

Refrigeration by means of an evaporator, where the air flow factor is not increased by the auxiliary device. With static refrigeration we depend on the normal circulation of air inside the appliance.

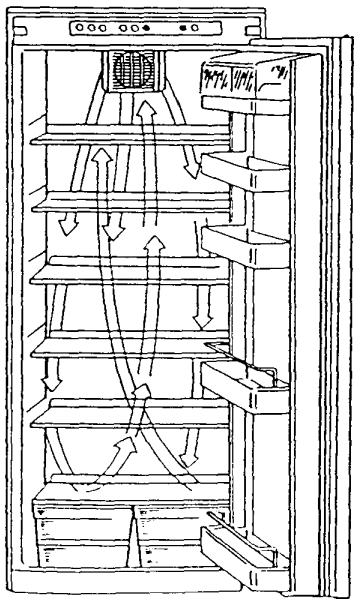
b. Dynamic refrigeration

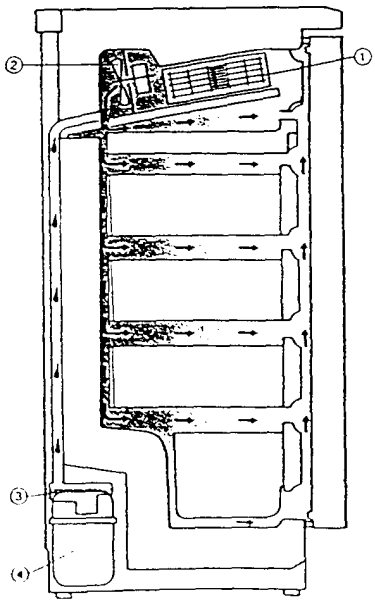
The air is moved around the refrigeration cavity by means of a ventilator. This makes it possible to achieve an even distribution of cold air inside the refrigeration cavity.

c. Refrigeration with circulating air

The air is distributed throughout the refrigeration cavity by means of a ventilator. The air is distributed in such a way that it is conducted through the evaporator. In this way moisture condenses on the evaporator so that the air inside the appliance remains dry.

Types of refrigeration





1 Evaporator
2 Ventilator
3 Evaporation unit for condensed water
4 Compressor

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1.3 NO FROST fridge-freezers

With NO FROST appliances we distinguish between models with only one compressor and models with separate cooling circuits which have two compressors.

a. All NO FROST appliances with a refrigeration unit belonging to the Küppersbusch family of domestic appliances are characterised by the same thermo-dynamic design. They differ only in terms of capacity, dimensions and aesthetics.

The upper part of the appliance operates using the cyclic (static) refrigeration method; the lower part of the appliance works by using the NO FROST method.

The temperature in both parts of the appliance is regulated by means of a thermostat fitted in the refrigerator section.

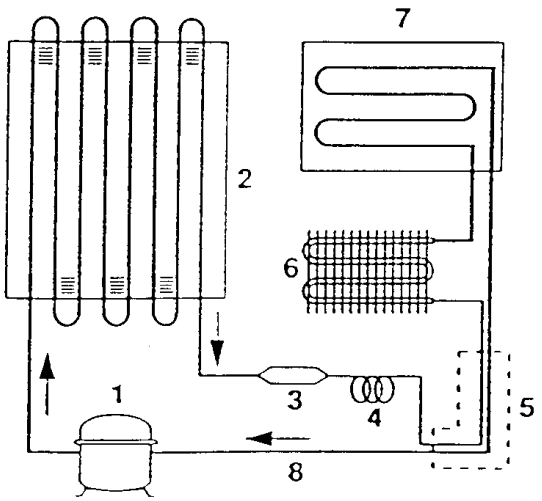
The cooling circuit consists of the evaporator, which is fitted in the refrigerator section (also completely integrated, depending on the model), and a battery evaporator which is fitted in the freezer section.

The circuit is completed by a compressor, the condenser and two thermostats with capillaries of varying lengths.

Due to the different capillaries, the appliances have different evaporator zones.

The first and absolute evaporator zone is located in the refrigerator section and the second in the freezer section (battery evaporator).

The cooling circuit in the single-compressor version



1. Compressor
2. Condenser
3. Dehydration filter
4. Capillary tube
5. Exchanger
6. Battery evaporator in freezer section
7. Countersunk roll bonding evaporator in refrigerator section
8. Return pipe

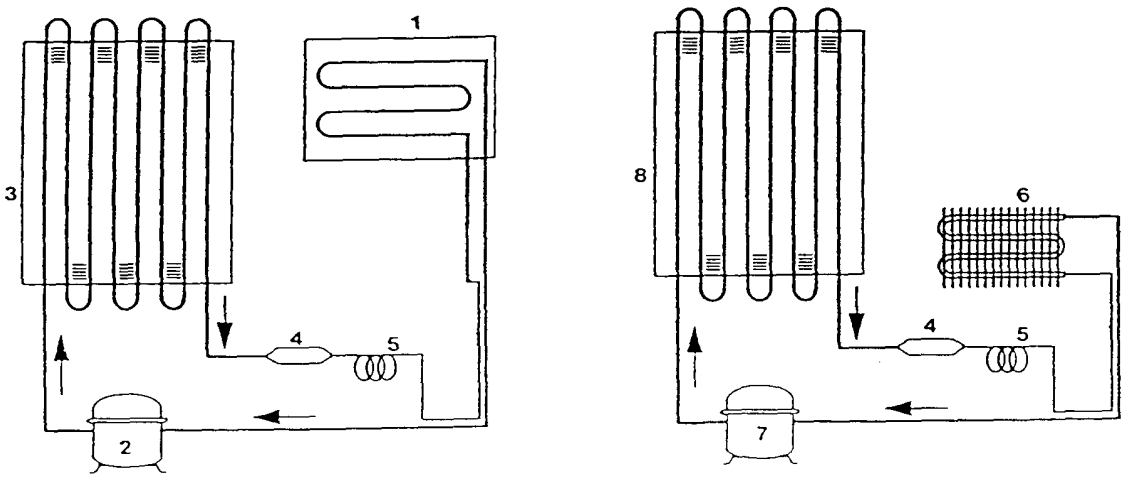
b. In addition to the NO FROST fridge-freezer appliances with one cooling unit, KÜPPERSBUSCH also manufactures models with two compressors. These are appliances with a capacity of 300 l and with 3 or 5 doors.

These models have two different cooling circuits.

The refrigerator section operates by means of cyclical cooling with one cooling unit and separate temperature adjustment. A second cooling unit controls the NO FROST operation of the freezer section and the 0° zone.

The temperature of each cooling circuit is controlled directly and separately by means of a thermostat.

NO FROST – the dual-compressor version



1. Evaporator of the refrigerator section
2. Compressor of the refrigerator section
3. Condenser of the refrigerator section
4. Dryer
5. Capillary tube
6. Evaporator of the freezer section
7. Compressor of the freezer section
8. Condenser of the freezer section (compressor area)

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1.4 Installation and connection

Dry, well ventilated rooms present the best conditions for installing the fridge-freezers. In order to keep electricity consumption low, the appliances should not be installed next to a cooker or a radiator. Avoid direct sunlight.

When installed in a kitchen, fridge-freezers are arranged to fit in with normal work routines. It must be ensured that the direction in which the door opens is the right one for the type of work carried out in the kitchen.

Freezers – particularly freezer chests – can also be installed in a basement or cellar, in a basement corridor or in a larder. If these rooms are damp, it is advisable to use an appliance with a condenser on the outside wall.

Fridge-freezers are available in a number of different temperature groups which determine under what ambient temperatures the appliances function to optimum satisfaction:

- Normal "N": Ambient temperature of between +16 °C and +32 °C
- Extended normal "SN": Ambient temperature of between +10 °C and +32 °C
- Subtropical "ST": Ambient temperature of between +18 °C and +38 °C
- Tropen "T": Ambient temperature of between +18 °C and +43 °C

(Source: DIN 8950)

The sign indicating these limits appears on the rating label. The fridge-freezers used in Germany almost all belong to class "N", i.e. avoid installing them in a room where a temperature of less than +16 °C or more than +32 °C can be reached as the temperature regulation device of the appliances will then fail to function correctly. This has particularly adverse effects in refrigerators with an evaporator compartment and in fridge-freezers with only one cooling circuit.

Freezers only function correctly in an ambient temperature of approx. 0 °C.

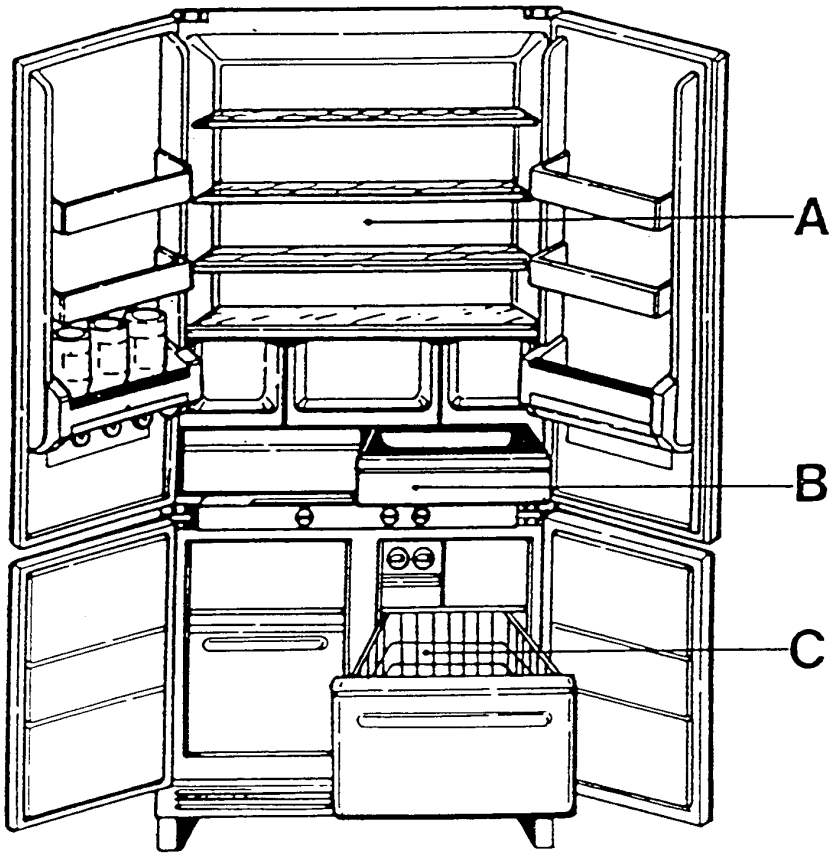
On no account should the appliance be installed in a place where the temperatures exceed +32 °C.

Fridge-freezers are supplied ready to plug in and are connected to a protected socket. For refrigerators the wattage is roughly between 100 W and 240 W and between 145 W to 265 W for fridge-freezers.

Freezers have a wattage of between 100 W and 300 W. For reasons of safety the freezer should have a separate electricity circuit. This ensures that it will continue to operate when the circuit becomes overloaded due to other appliances being connected or when the electricity circuit is interrupted due to another appliance becoming defective.

2. The fully integrated 3-zone fridge-freezer (Küppersbusch)

2.1 The various zones



A - Refrigerator

B - 0°C zone

C - Freezer

Multi-zone appliances enable the customer to make use of 3 refrigeration zones for optimum storage of all types of food.

The refrigeration sections in detail:

Refrigeration section A:

Here an ideal environment is created for the storage of fresh food. This section employs an evaporator made of an integrated aluminium sheet and the temperature is controlled by means of an adjustable thermostat on the operation fascia.

Refrigerator section B:

This refrigeration section has even temperatures of between 0 °C and 3 °C. Refrigeration is by means of the enforced convection of air from the lower freezer section. The temperature control in this section is regulated by means of a special flap thermostat (mechanically). Even temperatures are guaranteed, even during defrosting.

Freezer section C:

The cold air is generated by a battery evaporator and the enforced convection of the air is effected by means of a ventilator.
This means that moist air in the form of frost only condenses on the evaporator and not on the walls of the freezer section or on packages of food. A timer switches on a defrost resistor at regular intervals (every 14 hours) and it is not possible for the compressor to start. As soon as the temperature of the evaporator reaches +10 °C, the power supply of the heating resistor is interrupted by a thermal switch during defrosting.

A further safety thermal switch interrupts the power supply to the thermal resistor when the temperature of the battery evaporator rises to abnormal levels (+30 °C/40 °C) due to a malfunction.

The temperature in the freezer is clearly indicated by means of various LEDs on an electronic thermometer located on the operation fascia.

The temperature is regulated by means of an adjustable thermostat on the operation fascia.

The 3-ZONE appliance has two cooling circuits.

2.2 Technical data

General features

Dimensions (H x W x D)	190 / 86 / 55 cm
Gross capacity:	
Refrig. / freezer / 0°-zone	274 / 128 / 45 l
Performance:	
Refrig. / freezer / 0°-zone	cyclical / **** / 0 - 3 °C
Amount of cooling agent R12:	
Refrig. / freezer	90 / 160 g
Class	N

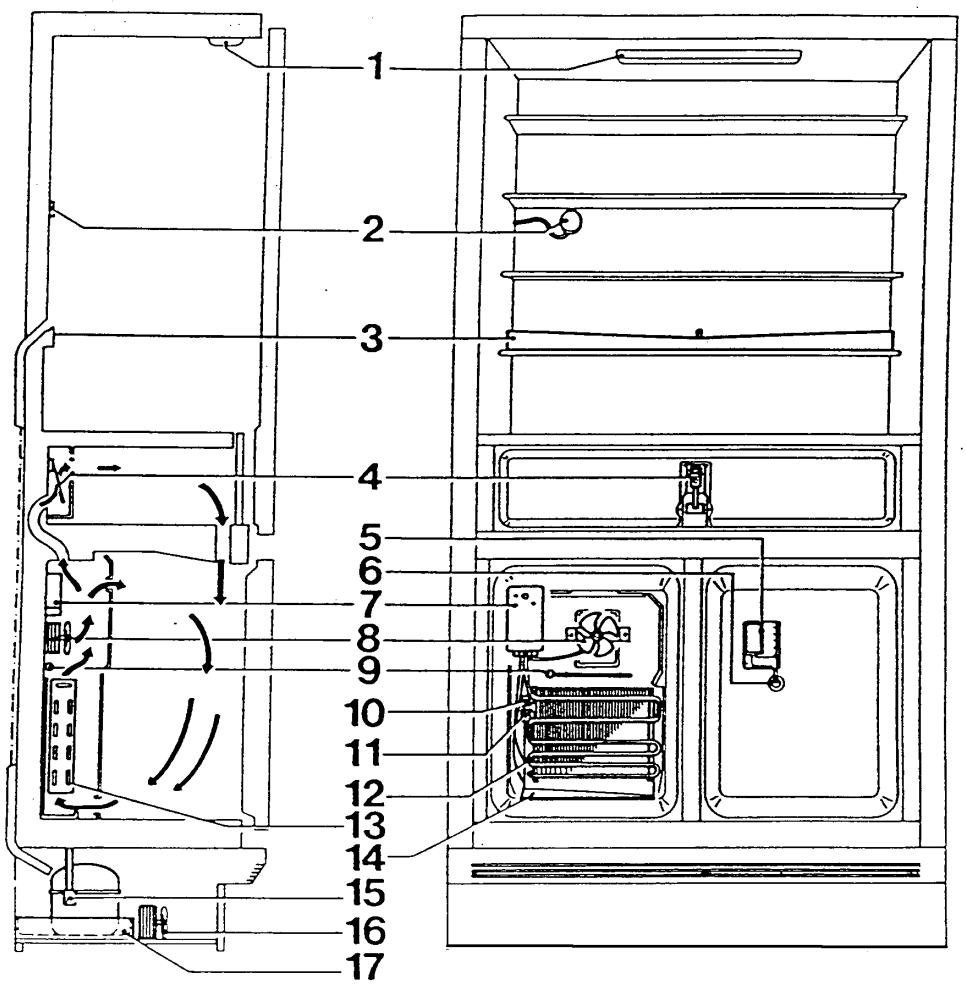
Refrigerator

Thermostat	
Minimum setting:	
switches on/switches off	+4,5 / -12 °C
Maximum setting:	
switches on/switches off	+4,5 / -22 °C
Motor compressor	
Operating voltage	220 - 240 / 50 V/Hz
Power of motor	1/8 PS
Power consumption	93 W
Nominal current and starting current	0,6 / 3,5 A
Resistance of main and auxiliary winding	20/21 ohms
Cooling output	83 Kcal/h

Freezer

Thermostat	
Minimum setting:	
switches on/switches off	-11 / -20 °C
Maximum setting:	
switches on/switches off	-26 / -34 °C
Motor compressor/ KS	
Operating voltage	220 - 230 / 50 V/Hz
Power of motor	1/5 PS
Power consumption	150 W
Nominal current and initial current	0,7 / 4,7 A
Resistance of main and auxiliary winding	12/14 ohms
Cooling output	175 Kcal/h
Operating condenser	5 µF

2.3 System components



1. Lighting
2. Thermostat sensor
3. Drainage system
4. Flap thermostat
5. Cold storage unit
6. Thermometer probe
7. Timer
8. Ventilator of freezer section
9. Thermostat sensor of freezer section
10. Defroster - thermal switch
11. Safety thermostat
12. Heating resistor of evaporator
13. Battery evaporator
14. Drainage system incl. heating resistor
15. Drainage valve
16. Ventilator of compressor
17. Drainage bowl

2.3.1 Components of the refrigerator section

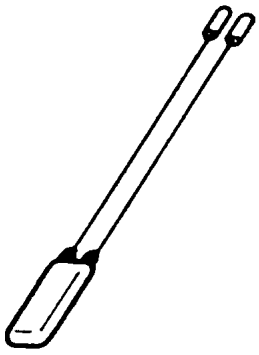
Thermostat

The temperature in this section is regulated by means of a thermostat which is located behind the operation fascia.
The probe of this thermostat projects through a small tube embedded in foam into the inner area of the appliance at the point where the evaporator is fastened.

Thermal protection (lamps)

The new lighting system in the refrigerator section comprises two lamps. These lamps are located at the top of the refrigerator section.
In order to avoid the housing of the lamp overheating when the door is opened, there is a thermal cut-out in the row to the two lamps.
As soon as the temperatures around this sensor exceed 70 °C, the power supply of the lamps is cut off.
The lamps will switch on again at a temperature of approx. 45 °C when the door is opened.

Thermal cut-out



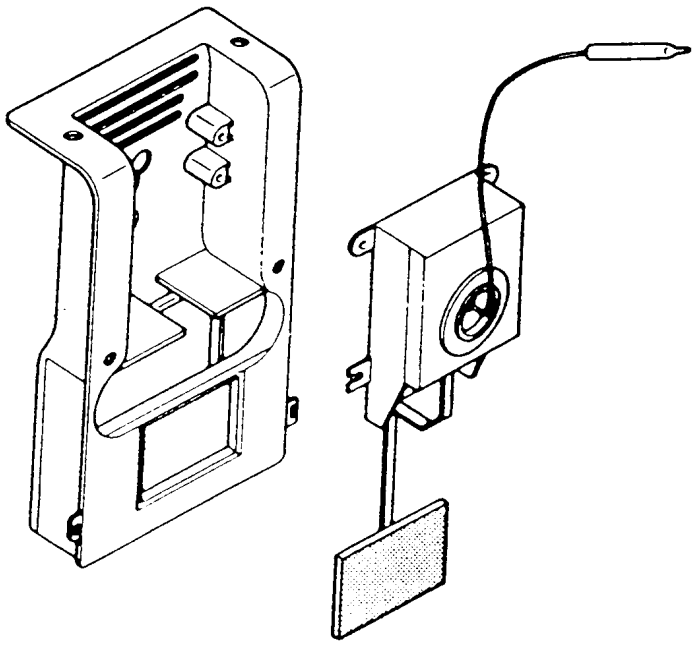
2.3.2 Components of the 0 °C zone

At the rear of the inner housing of this compartment there is a flap thermostat enclosed in a transparent protector.
The sensor is fastened under the top of the inner housing.

The thermostat opens up or blocks the entry of cold air from the freezer located below.
The ventilator of the freezer section is one of the factors responsible for maintaining an even temperature in the 0 °C zone.
This ventilator ceases to operate during defrosting.

The flap thermostat can be regulated by means of a screw, but *please refrain from making use of this option.*

Flap thermostat



2.3.3 Components of the left freezer section

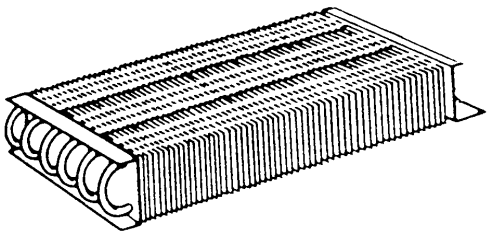
The various components of the system are located in the inner cavity.

The following elements are fastened at the rear of the inner housing behind a protector:

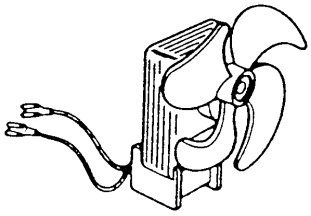
- Battery evaporator
- Ventilator
- Defrosting timer
- Thermostat sensor
- Thermal switch
- Heating resistor and drainage system

The battery evaporator has a high refrigeration power, although it occupies only little space.
Due to the enforced convection of the air, moisture condenses on the evaporator, which is the coldest part of the inner cavity. This enforced convection is generated by a ventilator located above the evaporator.

Battery evaporator

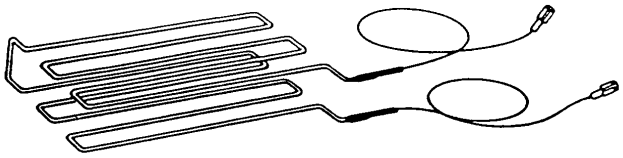


Ventilator

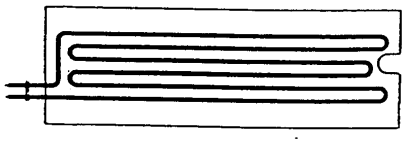


The ice on the evaporator must be defrosted at regular intervals. For this purpose every 14 hours the timer switches on a heating resistor which is in contact with the battery evaporator.
At the same time, power is supplied to a heating resistor which is adhesively secured to the drainage system.

Defroster heating resistor

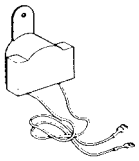


Heating resistor drainage system



A safety thermal switch is connected to the evaporator. This switches both heating resistors off as soon as the evaporator reaches a temperature of more than +30 °C due to a malfunction. The +10 °C thermostat switch first switches off the heating element on the battery evaporator.

Thermal switch



The water from defrosting is conducted outside the appliance by means of a special silicon rubber valve attached to the drainage system.
The structure of this rubber valve enables the water from defrosting to drain away smoothly. During the cooling phase the pressure of the vacuum causes the valve to close. This prevents air from being sucked in from outside the appliance

Rubber valve

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2.3.4 Components of the right freezer section

The following elements are located on the side wall:

- The temperature probe, OTC, for the electric thermometer
- The cold storage unit

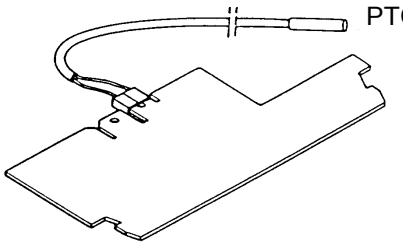
The electronic thermometer

An electronic board in the operation fascia indicates the temperature in the freezer by means of 6 LEDs which light up in sequence.
The same board controls an ON/OFF LED, a super LED and an ALARM LED.

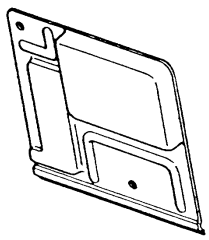
The board is controlled by a PTC probe. The electronics control the optical displays on the operation fascia.

The PTC probe is located at the side of the inner cavity and connected to a cold storage unit (buffer effect), which ensures constant display on the part of the LED diodes and avoids any abnormal display due to brief fluctuations in temperature.

Electronics

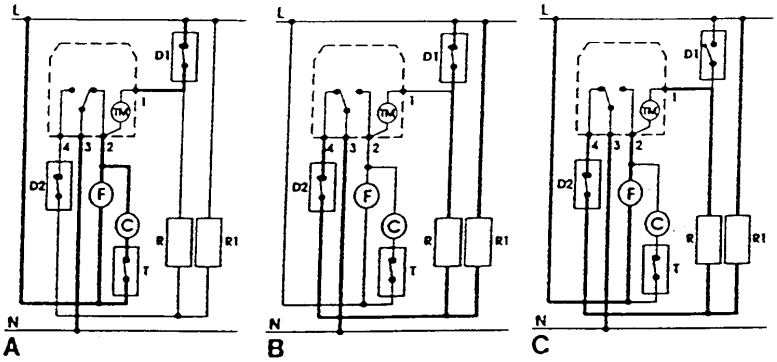


Cold storage unit



2.4 The function of the defroster heating element

The heat generated by the defroster heating element has no influence on the temperature in the freezer or on that of the packages of food after the total thermal power has been consumed when the ice on the evaporator has been defrosted.



TM Timer
F Ventilator
T Thermostat - freezer section
C Compressor - freezer section
R Defroster heating resistor = 303 Ω
R1 Heating resistor water duct 2.679 Ω
D1 Defroster thermal switch
D2 Safety thermal switch

Figure A illustrates the normal operating conditions when contacts 2 - 3 of the timer are closed.

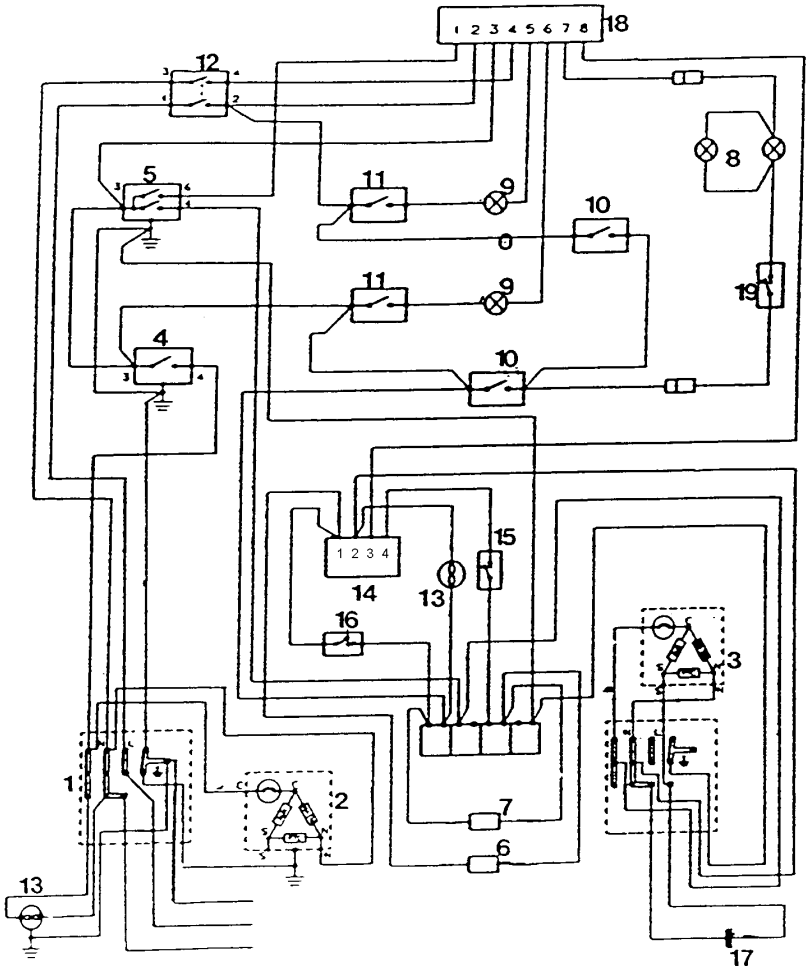
After 14 hours the cams of the timer interrupt contacts 2 - 3 and switch on contacts 3 - 4, resulting in the condition shown in figure B:
The power supply to the motor of the timer, to the compressor and the ventilator is interrupted and, at the same time, the heating resistor of the battery evaporator and that of the water drainage system are activated.

The thermal switch is activated as soon as the evaporator has reached a temperature of +10 °C.
It interrupts the power supply to the heating resistor of the evaporator and the timer is under voltage again.

After the appliance has been in operation for approx. 10 mins. it returns to the conditions shown in figure A. During this time, the heating resistor of the water drainage system remains switched on to ensure that the water from defrosting is drained away correctly.

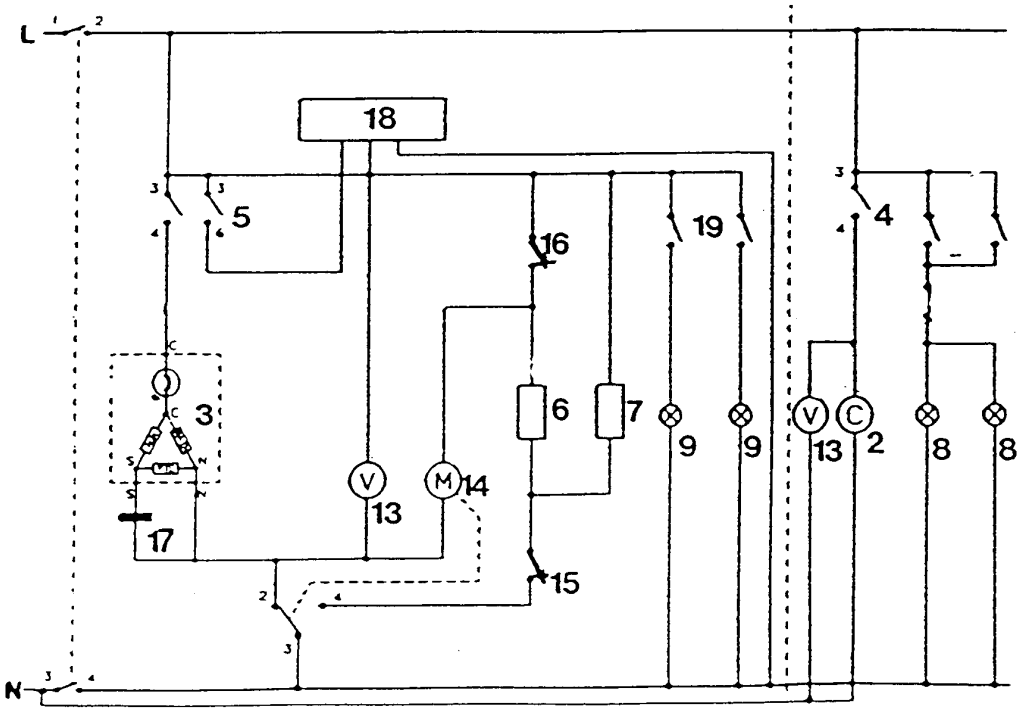
2.5 The electronic circuit

2.5.1 Wiring diagram



1. Terminal board
2. Compressor refrigerator section
3. Compressor freezer section
4. Thermostat refrigerator section
5. Thermostat freezer section
6. Defroster heating resistor
7. Heating resistor water drainage system
8. Lamp of refrigerator
9. Lamp of freezer
10. Door switch of refrigerator
11. Door switch of freezer
12. ON/OFF switch
13. Ventilator of evaporator
14. Timer
15. Safety thermostat
16. Defroster thermal switch
17. Condenser
18. Electronic thermometer
19. Thermal switch of lamps

2.5.2 Circuit diagram



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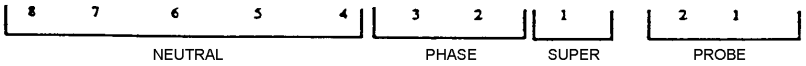
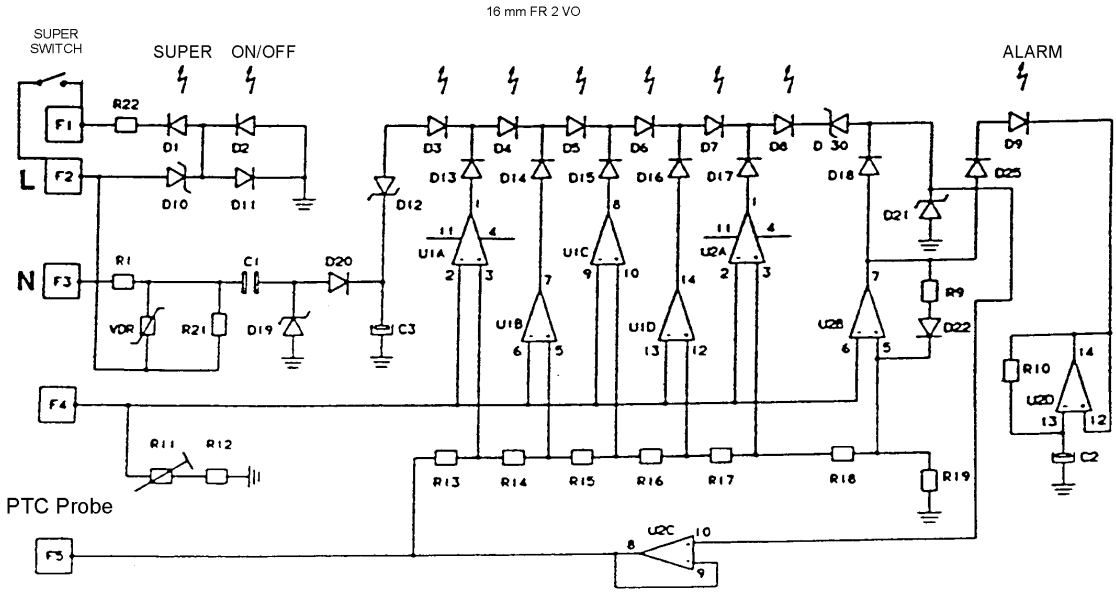
2.5.3 The electronics

Input contacts of printed circuit board FR 2 VO



Electronic thermometer (printed circuit board)

16 mm FR 2 VO

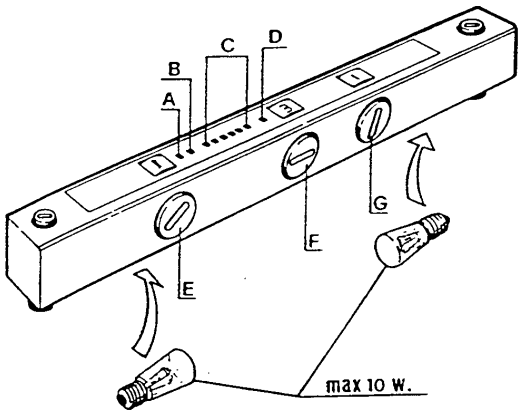


F1 INPUT FAST FREEZE – YELLOW LED (contact no. 1 on printed circuit board)
F2 PHASE VOLTAGE (contact no. 2 on printed circuit board)
F3 NEUTRAL VOLTAGE (contacts nos. 4 - 8 on printed circuit board)
F4 + F5 - PROBE (contacts nos. 1 - 2 on printed circuit board)

2.6 Disassembling the individual components

2.6.1 Components in the vicinity of the operation fascia

A. Operation control lamp
B. Alarm display
C. Electronic thermometer
D. Fast freeze display (S)
E. Button of main switch
F. Button of freezer thermostat and fast freeze S (super)
G. Button of thermostat of refrigerator section

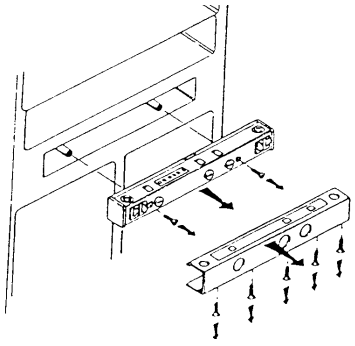


Removing the operation fascia

In order to access the components located on the operation fascia, please proceed as follows:

- Unscrew the 5 screws fastening the cover of the operation fascia and remove the operation fascia, pulling out the lower part.
- We recommend pressing in the door contact switch buttons and arresting them by rotation. This makes it easier to remove the operation fascia.
- Unscrew the 2 screws fastening the operation fascia to the housing. Rotate the housing downwards and remove.

When reassembling the components it must be ensured that the sealing between the operation fascia and the cover is reinserted correctly.



The electronic board

If the board of the electronic timer is to be removed, first of all remove the thermostat of the freezer, which prevents the board from falling out, and then unscrew the two screws fastening the holder to the front of the operation fascia.
The correct voltage can be measured at some points of the contacts of the board. Some contacts are used as connections (terminal board function contacts 5, 6, 7, 8 for other components of the circuit.

If the appliance is switched off and the connectors are disconnected, the heating resistance of the temperature probe can be ascertained by measurement.

The resistance at room temperature (18 °C) should be some 1878 Ω. This measurement should fall on cooling.

Removing the thermostats

The sensor must be detached from the inner housing. In the refrigerator section it is sufficient to remove the board fastening the sensor.
In the refrigerator section the evaporator protector must be removed first; bend the end part of the capillary tube straight and withdraw. The capillary tubes of both thermostats are conducted through a tube embedded in polyurethane.

2.6.2 Components in the refrigerator section

In order for the lamps to be accessible, the screw fastening the cap of the top to the holder must be unscrewed.

In order for the thermal switch to be accessible, both screws fastening the lamp holder to the top of the inner housing must be unscrewed.

2.6.3 Components of the 0 °C Zone

The flap thermostat has a transparent housing and is located on the rear wall of the inner cavity.

To remove the flap thermostat the sensor and the capillary tube which are fastened to the top of the inner cavity must be detached carefully. Remove the fastening screws of the sensor.

The new thermostat is supplied complete with protector. This protector must not be dismounted in order not to impair the functioning of the device.

2.6.4 Components of the left freezer section

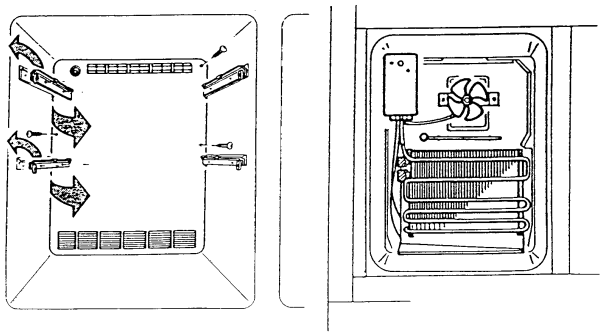
At the top right of the evaporator protector there is a hole sealed by a stopper. Behind this stopper is the axis of the defrost timer. Rotating this axis places the timer into a defrost or non-defrost position.

The components are made accessible by removing the protective device on the rear wall. Please proceed as follows:

- Remove the left-hand basket rails
- Unscrew the screws of the protective device and pull them towards the front.

This makes the following elements accessible:

- Thermal switch
- Timer
- Ventilator
- Thermostat sensor
- Battery evaporator
- Heating resistor of the evaporator
- Heating resistor of the water duct



The various electric components of the compartment are connected to a terminal board in the **interior** of the timer housing.

In order for the heating resistor of the drainage system to be accessible, the evaporator must be removed and the drainage system withdrawn. When being replaced, the drainage system must be inserted accurately and fastened with metal-coated adhesive tape.

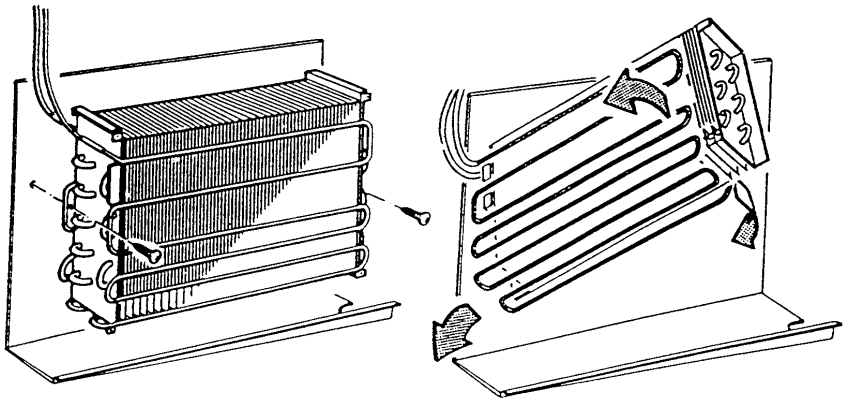
Ventilator

The ventilator is stored in dampers and fastened to the rear wall of the inner cavity. The two dampers must be correctly positioned when being reinstalled.
The blade must be flush with the axis. If the blade is pushed in too far, this results in a disadvantageous air flow.

Defroster resistor – Battery evaporator

Unscrew the screws fastening the evaporator to the rear wall of the freezer section.

If it should be necessary to push the battery evaporator towards the front, press on the suction pipe from the back.
The heating resistor is inserted into the hollow grooves of the battery blades.



Note: In order to exchange some components they must be removed through the opening in the rear wall. It is important that the openings are correctly sealed after the components have been replaced (cold kit).

2.6.5 Components of the compressor cavity

In order to access the compressor cavity, the front ventilation rail which is fastened to the housing by six crosshead screws must be removed.

Four screws are arranged vertically. These screws can be accessed through slits on the base of the rail. The other two screws fasten the rail at the sides.

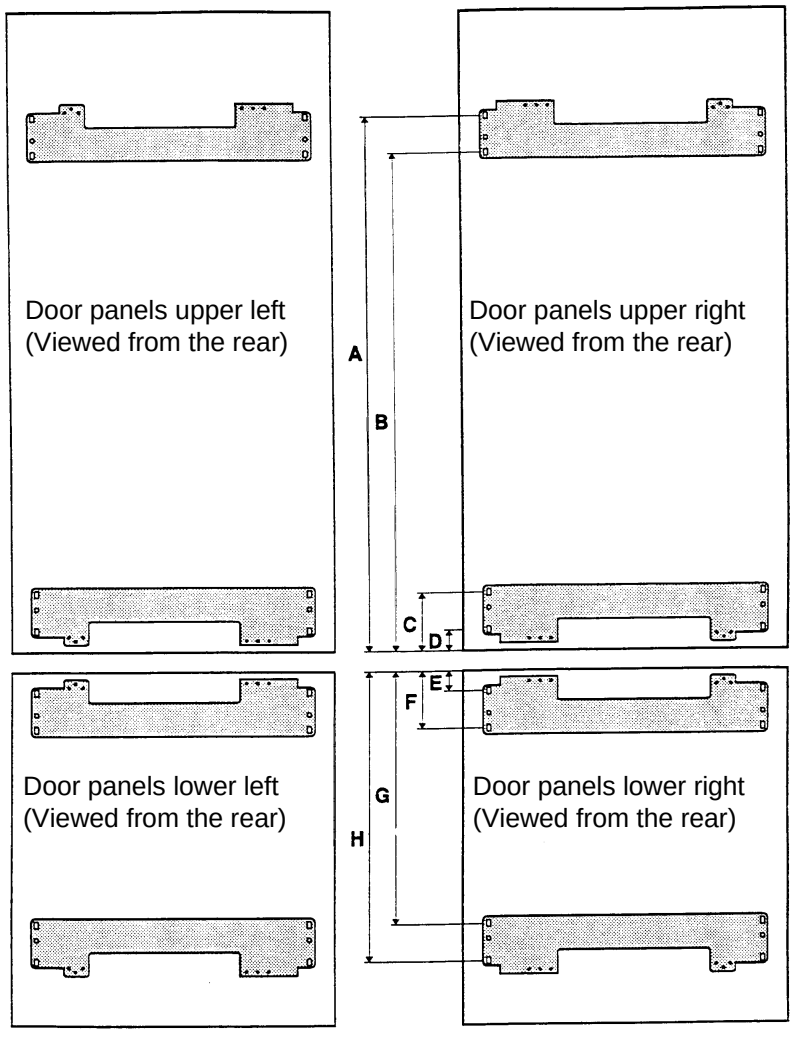
The inner cavity contains the two compressors, the operating condenser of the freezer compressor, the bowl for receiving the water from defrosting and the cooling ventilator of the compressors of the condenser.

Note: Please note that the terminal board in the compressor of the freezer is under voltage. Disconnect the power from the mains in order to ensure safety!!

2.7 Installation

Please see "Operating instructions" and "Installation instructions"

2.8 IK 458.2 - 4T – Distancers for the door panels with filling



When installing door panels with filling the distancers on the right must be inserted between the door and the door panel.

A	**1051 mm**	**E**	**25,5 mm**
B	**1000 mm**	**F**	**76,5 mm**
C	**76,5 mm**	**G**	**525 mm**
D	**25,5 mm**	**H**	**576 mm**