Refrigerator

KE 9600-0-2T

Küppersbusch

GB

Service Manual: H8-94-01

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Contents

1. Safety instructions

Danger!

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

It is essential that you observe the following instructions in order to prevent electric shocks:

- The casing and the frame may be live in the event of faults! Disconnect the appliance from the mains prior to carrying out any repair work!
- Touching live components inside the appliance may cause dangerous currents to flow through your body!
- Do not damage the parts where the refrigerant is circulating with drilling or cutting tools. The refrigerant that might blow out when the gas channels of the evaporator, pipe extensions or surface coatings are punctured may cause skin irritations and eye injuries.
- Disconnect the appliance from the mains prior to carrying out any repair work!
- Whein inspecting live parts, a residual current circuit breaker must always be used!
- Always ensure that an earthed conductor is properly connected! The ground wire resistance must not exceed that specified in the standard! It is vital for ensuring the safety of persons 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 instructions on electrostatic hazards!
- Wear safety goggles and protective gloves when handling refrigerants. Rinse your eyes with a lot of water if refrigerant splashes into them.

Caution!

It is essential that 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 circuit breaker.

Sharp edges: Use protective gloves.

Components may be electrostatic!
Observe handling regulations!

2. Repair instructions

- Never attempt to carry out repairs by “randomly replacing” components!
- Always proceed systematically and observe the technical documentation that goes with the appliance!
- Do not plug in your appliance before removing all packaging materials and protective transport elements.
- To prevent horizontal handling and in order to ensure complete distribution of the condenser oil, keep the appliance in upright position for 4 hours before operating.
- Electronic circuit boards are generally not repaired; instead they are completely replaced with original spare parts. Exceptions are documented separately.
- Pipe connections in cooling circuits are not to be soldered. Lokring connections are to be used.
- Carry out a leak test and a functional test on the cooling circuit.
- The dehumidifier is to be replaced before evacuation and filling during any intervention in the cooling circuit.
- It is essential to replace the compressor and the dehumidifier when repair work resulting from suction leaks in the cooling circuit is carried out. Humidity which gets into the cooling circuit will cause irreparable damage to the oil in the compressor.

3. Appliance dimensions

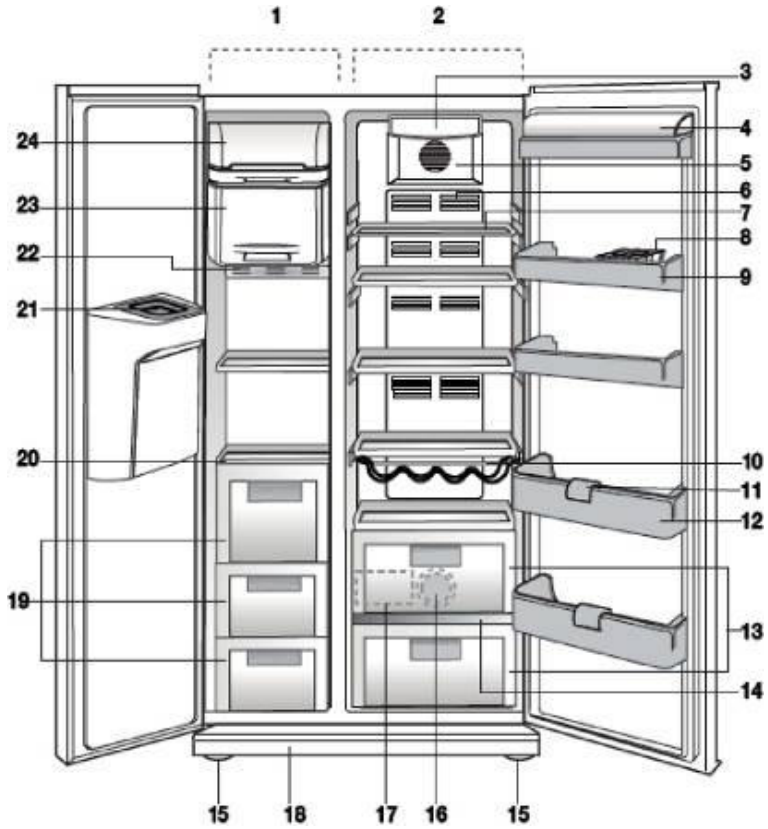
Depth: 740 mm

Width: 925 mm

Height: 1800 mm

4. Components of the refrigerator

1. Freezer compartment
2. Fridge compartment
3. Fridge compartment interior light
4. Butter and cheese lid
5. Fan
6. Ionizer
7. Fridge compartment glass shelves
8. Egg tray
9. Fridge compartment door racks
10. Wine rack
11. Bottle holder
12 Bottle shelves
13. Crisper compartments
14. Crisper cover
15. Adjustable front legs
16. Blue light
17. Water reservoir
18. Ventilation lid
19. Freezer compartment drawers
20. Freezer compartment glass shelves
21. Ice duct lid
22. Freezer compartment interior light
23. Fresh freeze compartment
24. Ice container



5. Instructions for handling and installation

Handling instructions

This appliance should be transported only in upright position. Delivery package should not be damaged during transportation.

If the appliance is to be transported in horizontal position, it should only be leaned towards left hand side when you are facing the front of the appliance. After bringing it into upright position, it should be left for at least 4 hours without being operated in order to have it settled.
Failure to obey above instructions may result in damage on the appliance. In case of failure to obey these instructions, producer shall not be held responsible.

The appliance must be protected against rain, humidity and other atmospheric effects.

Pay attention not to damage your floor, the pipes, wall coverings etc., when installing your appliance. The appliance should not be carried by pulling at the door or door handle.
Discharge the water in the drain tray before moving the appliance. For detailed information, see “Cleaning and Maintenance” section.
Do not sit or climb onto the appliance since the design of the appliance is not suitable for such actions. You may injure yourself or damage the appliance.

IMPORTANT: To prevent cutting or damaging the power cable, make sure that the cable is not pinched under the appliance during and after moving it.

Installation

The volume of the room where the product will be installed should not be less than 10 m³.

Do not install the appliance in a cold room where the temperature may fall below +4 °C at nights and/or especially in winter season.

This refrigerator/deep freezer has been designed to operate in ambient temperatures between +5 °C and +32 °C. For this reason, in case of installing the appliance in a cold place without heating facility (e.g. garage outside the house), it will not operate and the freezer compartment will get warmer which will end up with decreased preserving times for frozen foods.

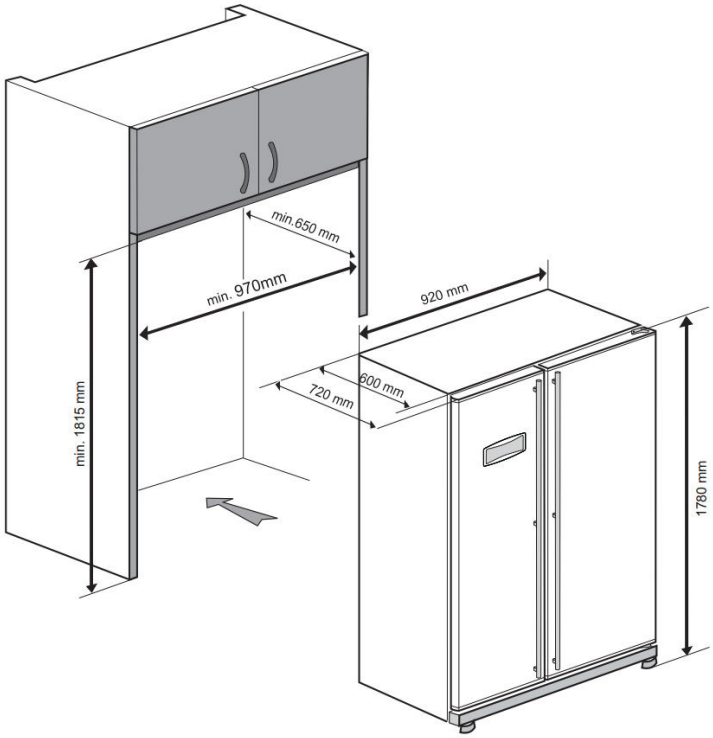
Do not install the appliance near ovens or radiators or under direct sunlight since they will cause the appliance operate more difficultly. In case of placing the appliance near a heat source or freezer, make sure that the following minimum clearances are provided:

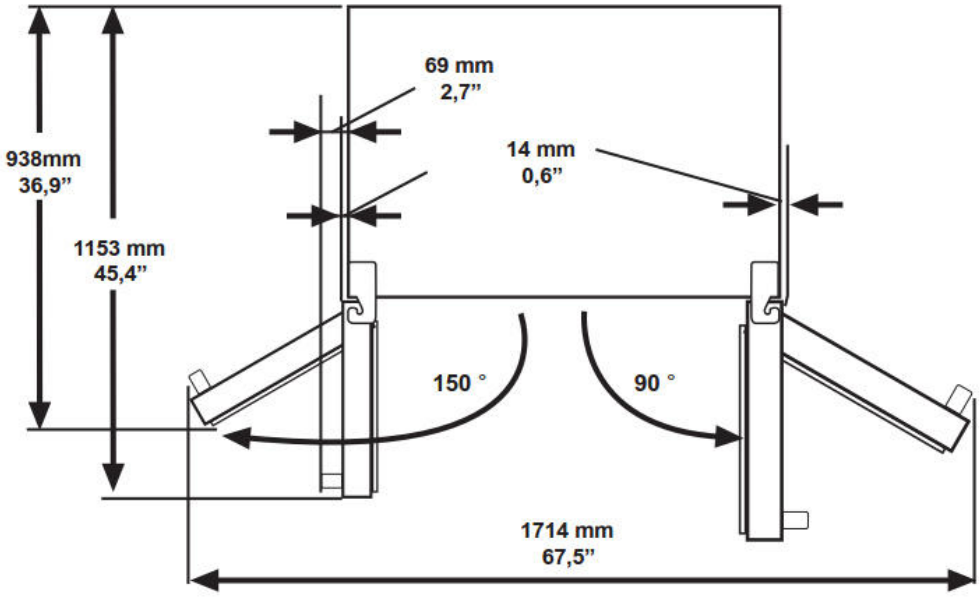
From ovens 50 mm

From radiators 25 mm

From freezers 25 mm

From the wall 50 mm





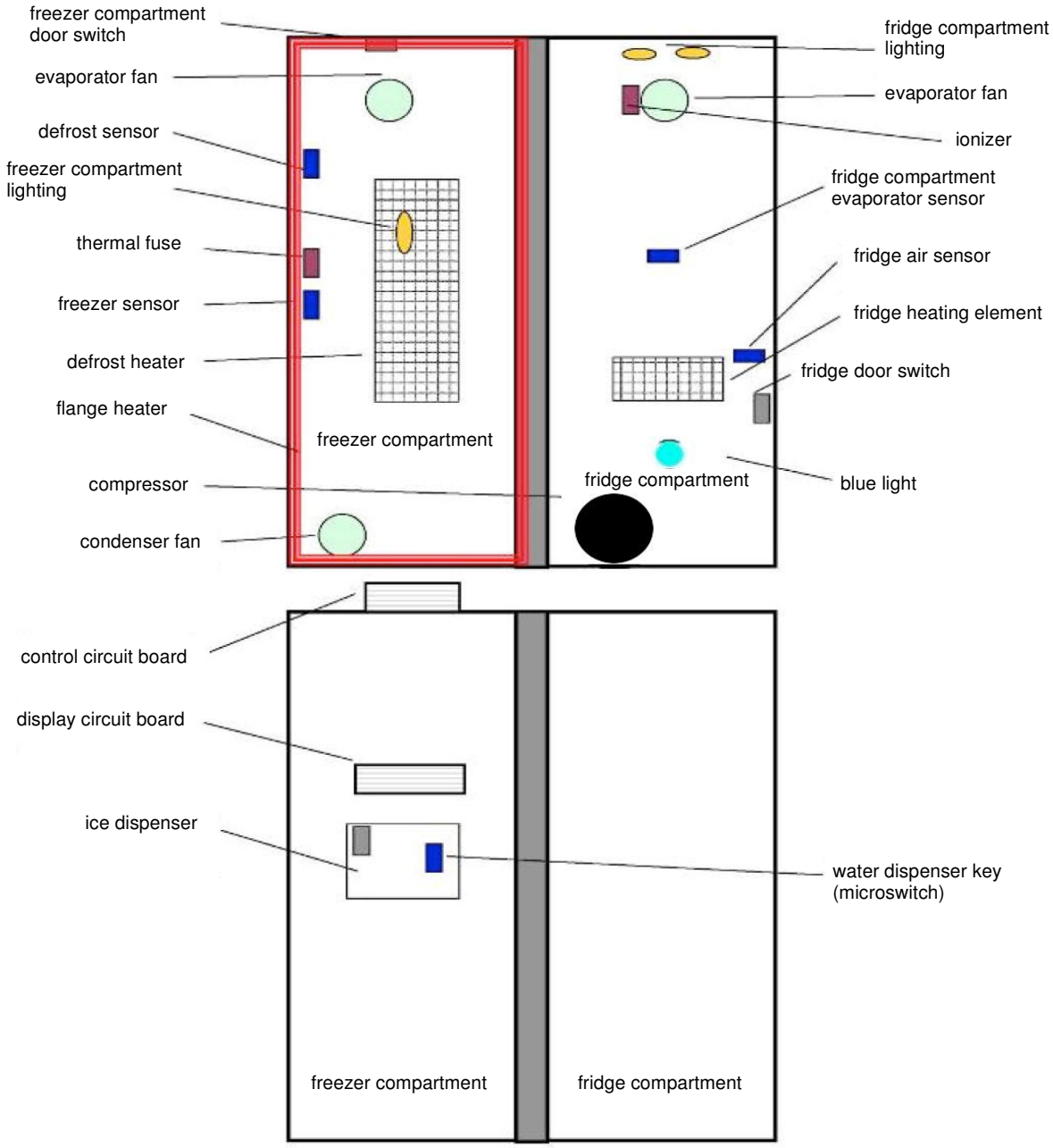
5.1 Introduction

The KE-9600-02T is a microprocessor-controlled, no-frost refrigerator with two compartments, namely the freezer and the fridge compartments. All functions and temperature controls of the refrigerator are made in accordance with the desire of the user thanks to the microprocessor. The software in the microprocessor controls the cooling and water system elements (compressor, fans, heaters, valves, ice box, solenoids, ice crusher motor and ionizer) of the refrigerator. Cooling of the refrigerator is provided by circulating the air in it continuously for the freezer and the fridge separately over the evaporators by means of the fan. No frosting or icing occurs inside the usable areas of no-frost refrigerators as it does in conventional refrigerators. The frosting that occurs on the evaporator which is out of the usable area is melted by means of heaters automatically activated under the control of the microprocessor at certain intervals to be determined by the control algorithm. Thus, the snow and the ice accumulated on the evaporator are melted without making any operation by the user to enable the refrigerator operate more efficiently.

Exterior view

Interior view

5.2 Components of the electrical system



Component list

No.	Component	Pieces
1	Compressor	1
2	Defrost heater	1
3	Freezer fan	1
4	Condenser fan	1
5	Sensors (freezer evaporator, freezer air, fridge evaporator, fridge air, icematic)	5
6	Fresh food fan	1
7	Flange heater	1
8	Fridge evaporator heater	1
9	Thermal fuse	1
10	PTC relay	1
11	Thermic	1
12	Door switch (freezer, fridge)	2
13	Bulb and holder with O ring	2
14	Ionizer	1
15	Blue led board (optional)	1
16	Water valve group (inlet, water, ice)	1
17	Icematic motor	1
18	Ice selection solenoid	1
19	Ice lid solenoid	1
20	Ice lid heater	1
21	Water dispenser key (microswitch)	1
22	Ice pipe heater	1
23	Water dispenser heater	1
24	Ice crusher motor	1
25	Supply line filter	1

5.3 Compressor

Refrigerant circulation is enabled by the compressor. Electric supply is made via a protective thermic. The auxiliary coil which is activated for a short time during first start-up of the compressor is deactivated by PTC.

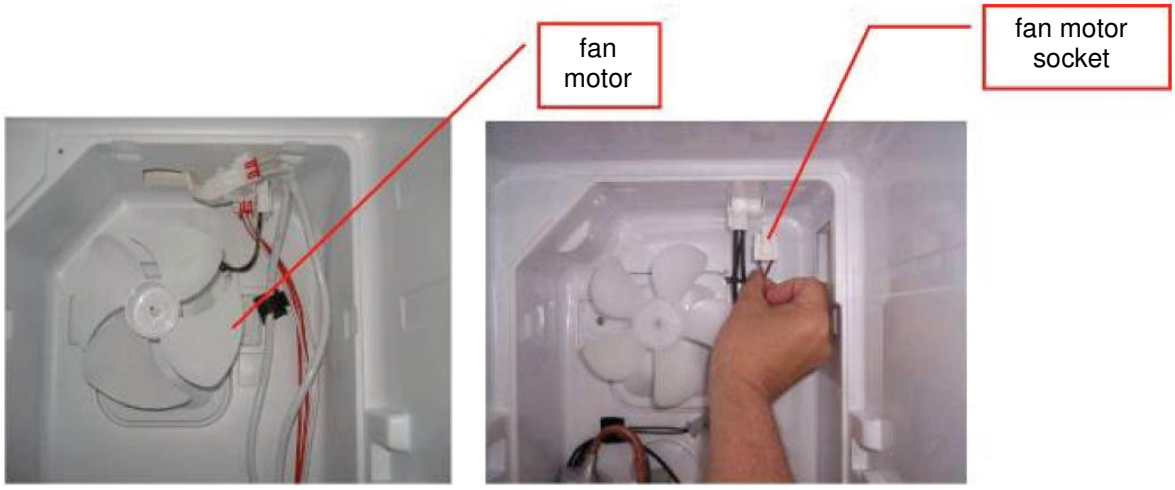
Power (W)	
Operating voltage	208 – 220 V
Operating current	
Full load current	
Starting current	

5.4 Freezer fan motor (Freezer compartment fan motor)

It is mounted on the inner body of refrigerator behind the rear cover of evaporator. It ensures circulation of the freezer compartment air in the freezer compartment by passing it continuously over the evaporator.

Voltage range	220 V, 50 Hz
Power	12 W

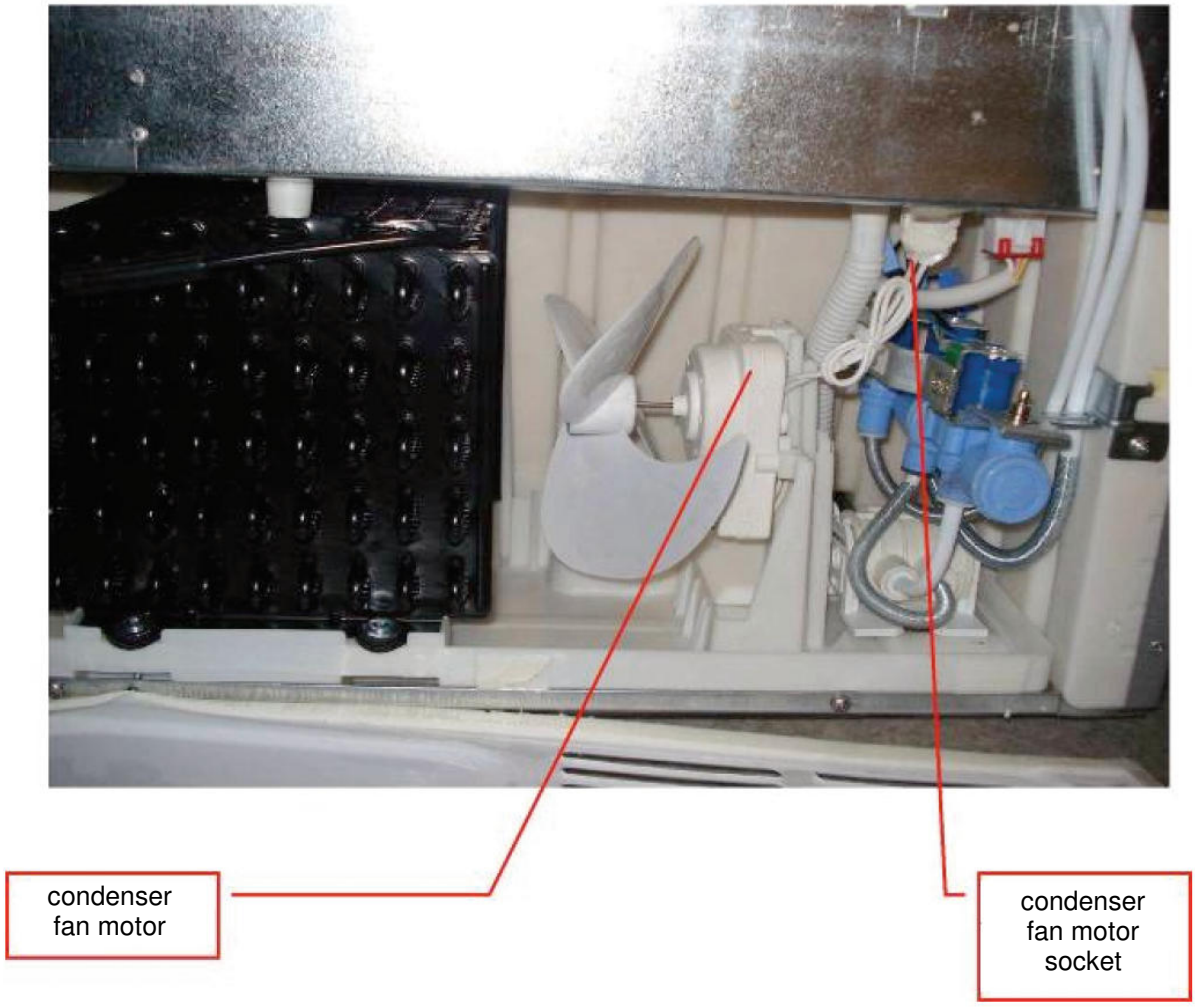
Voltage range	220 V, 50 Hz
Power	2 W



5.5 Condenser fan motor

It is located at the bottom of the cabin. It prevents excessive heating of the condenser and drops condensation pressure to increase the efficiency of the fridge. It is connected parallel to the compressor, runs when the compressor starts and stops when it stops.

Voltage range	220 V, 50 Hz
Power	3 W



5.6 Sensors

The sensor resistance decreases as the temperature rises. Sensors on the refrigerator body detect the temperature of their surrounding area and transmit this to the electronic control circuit board. Heat-resistance variance table for the sensors is below:

Temperature (°C)	RT/R25	R deviation	Resistance (kO)
-40	33.25	2.64	332.50
-35	24.01	2.40	240.10
-30	17.53	2.16	175.30
-25	12.93	1.93	129.30
-20	9.636	1.71	96.36
-15	7.249	1.49	72.49
-10	5.503	1.29	55.03
-5	4.214	1.08	42.14
0	3.251	0.89	32.51
5	2.532	0.70	25.32
10	1.986	0.52	19.86
15	1.568	0.34	15.68
20	1.248	0.17	12.48
25	1.000	0.00	10.00
30	0.8051	0.16	8.051
35	0.6528	0.32	6.528
40	0.5325	0.47	5.325
45	0.4368	0.62	4.368
50	0.3602	0.77	3.602
55	0.2986	0.91	2.986
60	0.2488	1.05	2.488
65	0.2083	1.18	2.083
70	0.1752	1.31	1.752
75	0.1480	1.44	1.480
80	0.1256	1.57	1.256
85	0.1070	1.69	1.070
90	0.09154	1.81	0.9154
95	0.07861	1.93	0.7861
100	0.06775	2.04	0.6775
105	0.05860	2.15	0.586
110	0.05086	2.26	0.5086
115	0.04430	2.37	0.443
120	0.03870	2.47	0.387
125	0.03391	2.57	0.3391
130	0.02931	2.67	0.2931
135	0.02628	2.77	0.2628
140	0.02323	2.86	0.2323
145	0.02059	2.95	0.2059
150	0.01831	3.05	0.1831
155	0.01631	3.15	0.1631

5.7 Freezer compartment sensor

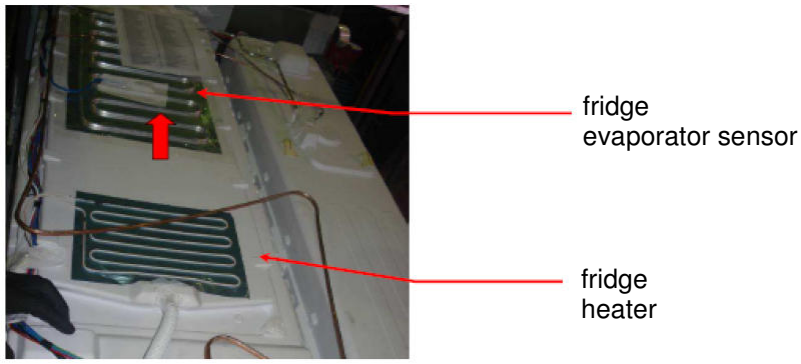
It detects the temperature in the freezer compartment and transmits this to the microprocessor. Values taken from this sensor are compared with the cut-in and cut-out values of the temperature set for the freezer compartment to run or stop the compressor and the freezer compartment fan motor.

5.8 Fridge compartment sensor

It detects the temperature in the fridge compartment and transmits this to the microprocessor. Values taken from this sensor are compared with the cut-in and cut-out values of the temperature set for the fridge compartment to run or stop the compressor, the fridge compartment fan motor and the fridge compartment rear wall heater.

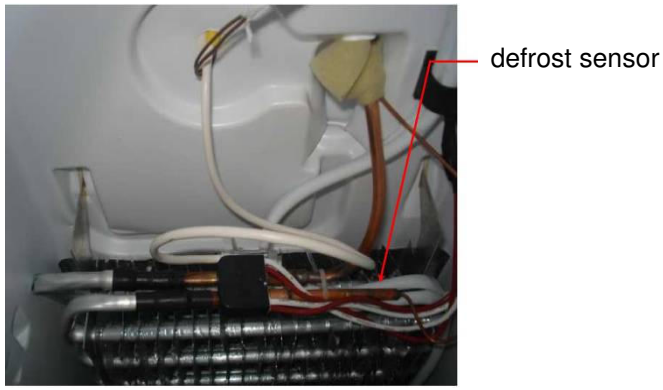
5.9 Fridge compartment evaporator sensor

It is located in the insulation and cannot be replaced. It is used to detect the tail evaporator temperature of the fridge compartment.



5.10 Defrost sensor

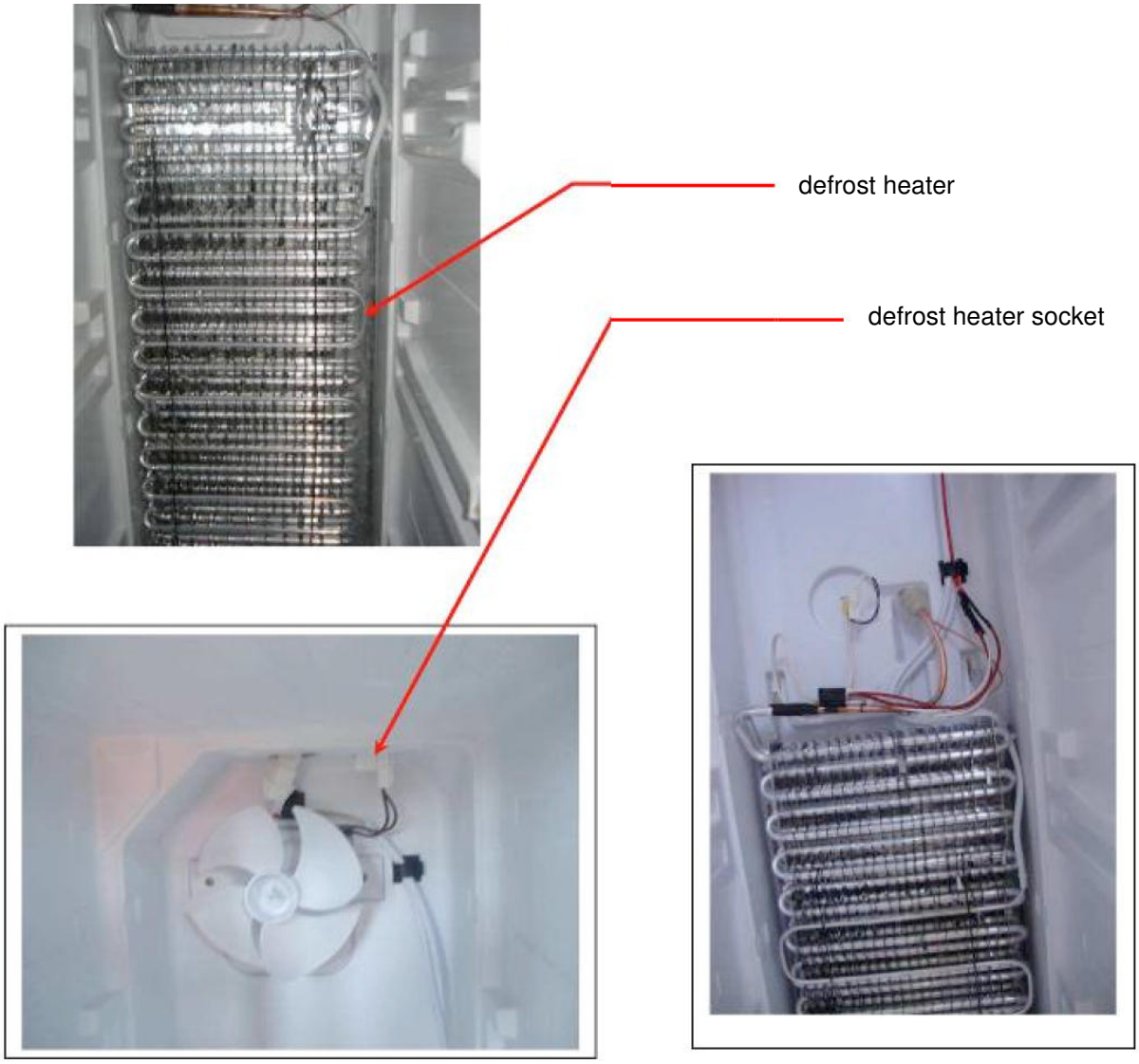
It is located on the evaporator at the capillary outlet. It detects the temperature on the evaporator and transmits this to the microprocessor. Defrost is terminated according to the temperatures received from this sensor. .



5.11 Freezer defrost heater

The heater under the freezer evaporator is activated and deactivated by the electronic board at times of defrost. Thus, it periodically defrosts icing accumulated on the evaporator.

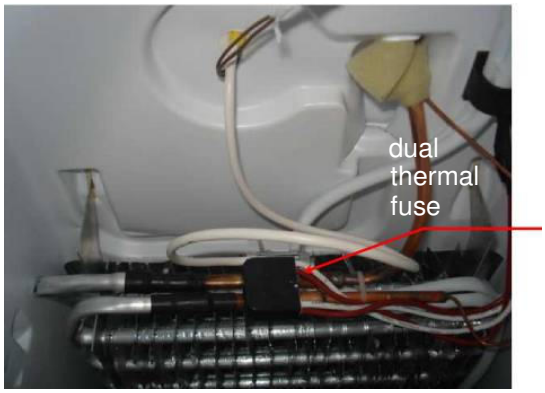
Voltage	220 V
Power	125 W



5.12 Thermal fuse

It is located on the evaporator. It cuts the current to the heater to deactivate the defrost heater in order to prevent the defrost heater remain activated continuously and cause damage on the refrigerator, environment and foods inside. The thermal fuse is disposable and therefore it must be replaced once it is blown.

Type	220 V 72 °C



5.13 PTC relay

Its resistance increases as the temperature rises. It ensures primary start-up of the compressor by activating the compressor's auxiliary coil, then it deactivates the auxiliary coil by being heated with the current flowing over it.

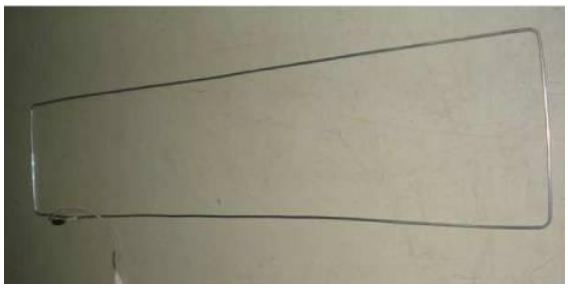
5.14 Thermic

It is a component that opens the circuit when heated. It opens the circuit at a certain temperature and cuts the current to the compressor in order to protect the compressor coils against excessive heating. When the temperature of the compressor drops below a certain value, it re-completes the circuit to operate the compressor.

Reaction time	5-15 seconds
Minimum time between two thermic blow-ups	211 seconds, constant cooling, voltage = 198 V

5.15 Flange heater

It is used to prevent perspiration on the contact surface of the freezer door seals.



5.16 Door switch

The freezer door switch is located on the upper plastic wall inside the freezer body, and the fridge door button is on the side plastic wall inside the fridge body. The freezer switch is normally closed circuit. When the freezer door is opened, it is short circuited and a signal goes to the control circuit board. Thus, the fan stops if it is running. If necessary, it runs again when the door is closed. The fridge switch is also a normally closed circuit. When the fridge door is opened, it is short circuited and a signal goes to the control circuit board. Thus, the fridge lamp lights and the fan stops if it is running. When the door is closed, the light goes off and the fan starts running if necessary.

5.17 Replacing the lamp

- Switch off the appliance and pull out the plug.
- Remove all the shelves and drawers.
- Use a flat screwdriver to carefully ease the lamp cover off on both sides. Make sure that the plastic casing and the sealing are not damaged.
- Replace the LED circuit board.
- Put the appliance plug into the socket again and switch the appliance on.
- If the lamp works, push the plastic casing back into the catches on the back.
- The control circuit board will need to be replaced if the lamp does not work. The control circuit board is located outside the appliance, in a plastic box on the top right.

5.18 Electronic control circuit board

The control circuit board is placed in the plastic box towards the rear wall on the upper plate of the fridge.

- The display is located on the water dispenser group on the freezer door.
- Sensor connector: for sensor connections.
  - Freezer sensor
  - Defrost sensor
  - Fridge sensor
  - Fridge evaporator sensor
  - Icematic sensor
- DC power connector:
  - Icemactic motor and key
  - For lid heater 12 V DC connection
- Power connector - 1
  - L
  - N
  - Freezer door switch
  - Fridge door switch
  - Compressor
  - Water pipe, flange, dispenser, lid heaters
  - Fridge fan
  - Defrost heater
  - Water dispenser key (microswitch)
  - Fridge heater
- Power connector - 2
  - Neutral wire
  - Main valve (inlet)
  - Water valve (water)
  - Ice valve
  - Ice crusher motor
  - Ice selection solenoid
  - Ice lid solenoid
  - Ionizer
- Display connector: provides the serial communication between the display and the control circuit board.
- Triacs are used to drive the components.
- Intenal/external memory (flash type microcontroller): used to store some data after power failure.
- Serial communication port (edge): used by the designers to enable communication with the PCB.

Control circuit board inputs/outputs

I/O	I/O type	I/O name	Connector
Input	Analogue (LV)	Freezer sensor	Sensor connector Molex 2223-3104 (10 pins)
		Defrost sensor	
		Fridge air sensor	
		Fridge evaporator sensor	
		Icematic sensor	
	220 V AC	Water dispenser key (microswitch)	Power connector 1 Molex 0967-4102 (10 pins)
		Freezer door switch	
		Fridge door switch	
		Line	
		Neutral	
Output		Compressor	
		Fridge fan	
		Defrost heater	
		Fridge heater	
		Neutral	Power connector 2 Molex 1063-1083 (8 pins)
		Water inlet valve	
		Water valve	
		Ice valve	
		Ice crusher motor	
		Ice selection solenoid	
		Ionizer	
Output	12 V DC	Ice lid heater (2 terminals)	DC power connector Molex 2203-5125 (12 pins)
		Icematic motor (2 terminals)	
Input	5 V DC	Ice level switch (2 terminals, inside the icematic motor)	
Inlet/ Outlet	Display	Serial communication connections	Display connector: Molex 2203-5095 (9 pins)
		Buzzer	
		Water dispenser illumination LED	
Inlet/ Outlet	Serial com	RX	Edge connector (4 pins)
		TX	
		GND	
		VCC	

5.19 Icematic sensor

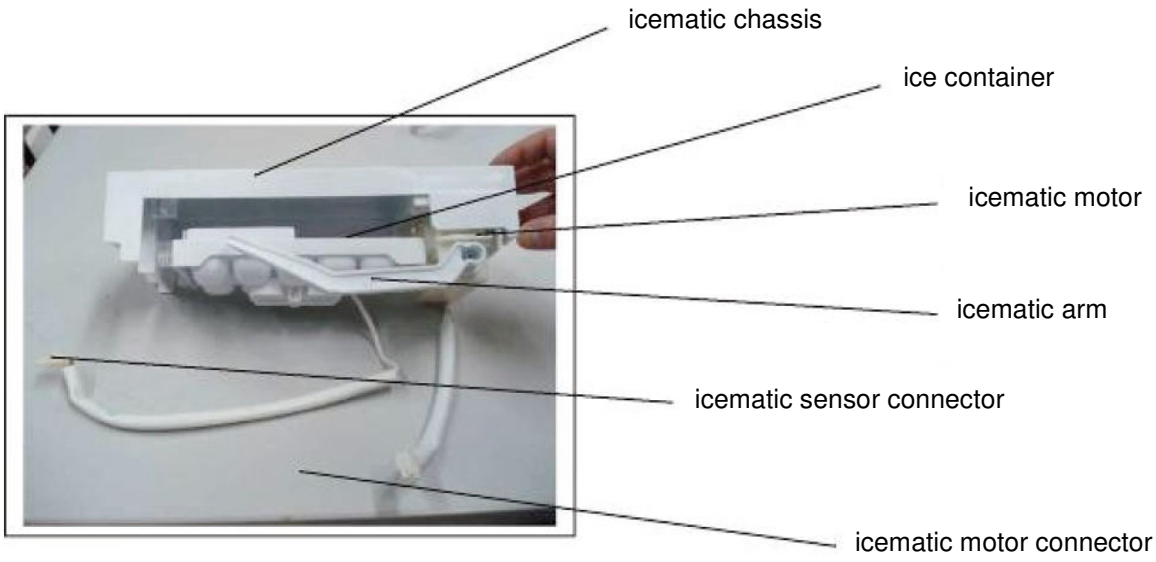
This is a sensor with flexible body under the ice box. It detects freezing of the water in the ice box and transmits this to the microprocessor. Thus the motor of the icematic starts to run according to the temperatures detected from the sensor.

5.20 Ice quantity sensor/Icematic switch/Icematic arm

It is used to detect the ice quantity in the ice box of the icematic accessory in the freezer compartment.

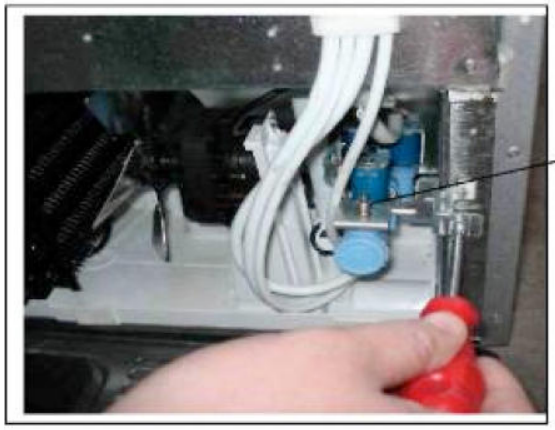
5.21 Icematic motor

It ensures pouring of the ice formed in the ice box into the ice container. Ice formation is determined with the information received from the icematic sensor; ice box motor is activated according to the time of ice formation and the ices are poured into the ice container. The icematic arm detects when the ice container is full and it does not pour more ice into the ice container than its capacity.

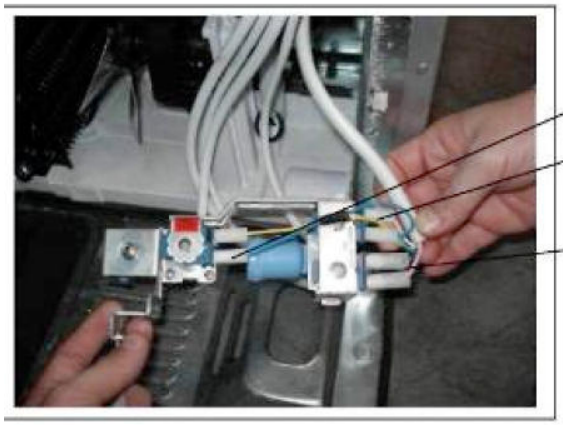


5.22 Water valve group

The water valve group allows sending of the water taken from the mains supply or from a jug by means of a pump to the water dispenser and to the ice box.



water valve group
connection screw



inlet valve electric connections

water dispenser valve
electric connections

ice valve electric connections

inlet valve outlet hose connection

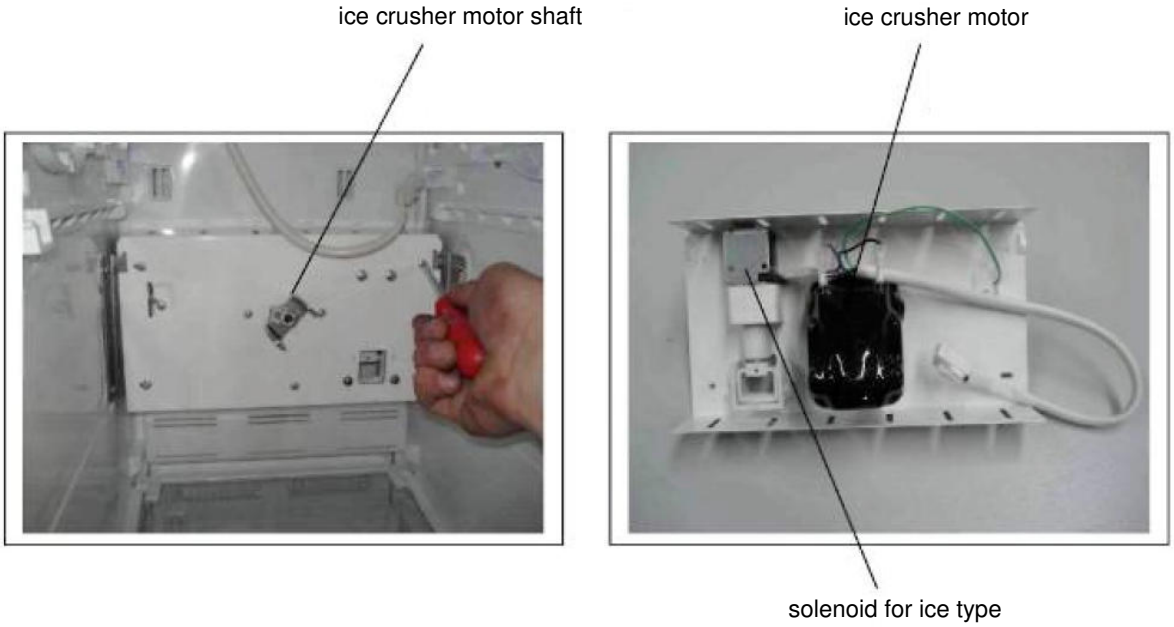
water/ice valve inlet
hose connection

ice valve outlet
hose connection

water dispenser valve outlet
hose connection

5.23 Ice crusher motor

It drives the accumulated ice in the ice container towards its outlet to help taking the ice. When ice is needed from the dispenser, the ice crusher motor drives the ice towards the mouth of the dispenser.



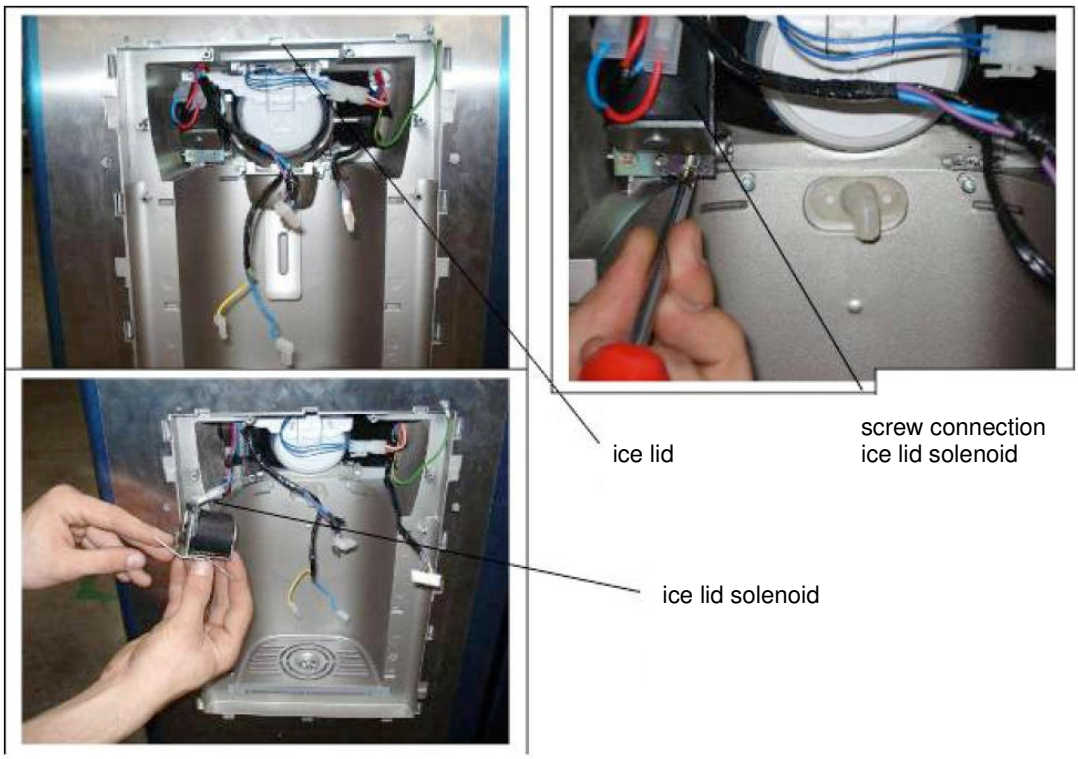
5.24 Solenoid for ice type

Solenoid is pulled to prevent passing of the ice through the blade when ice cube is selected and the ices sliding from the ice container towards the dispenser are poured into the dispenser without being broken directly.

5.25 Solenoid to open the ice lid

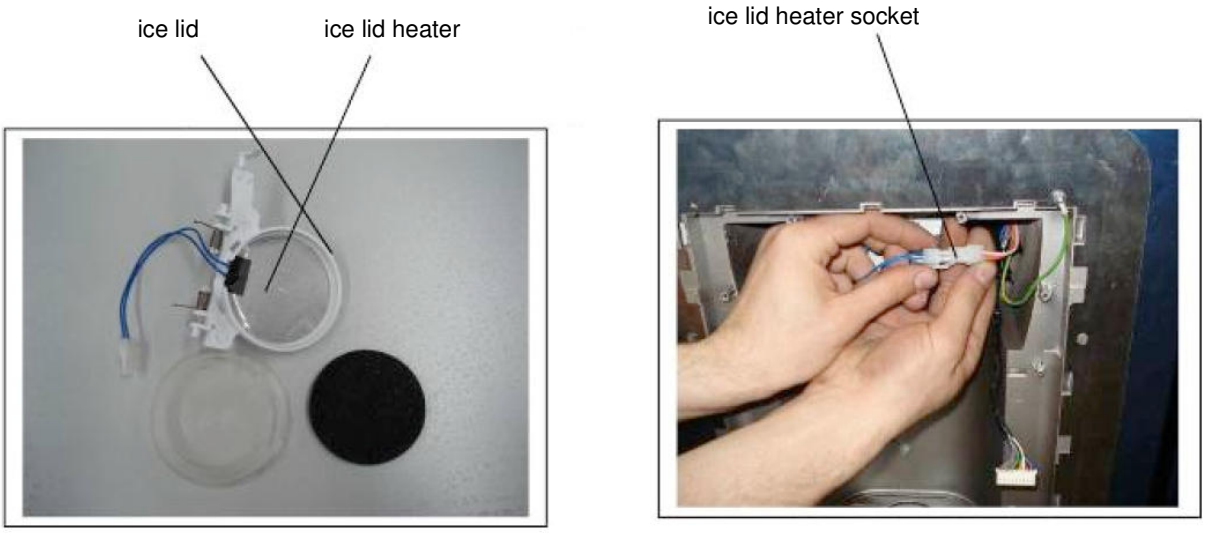
When cube or broken ice is selected, flap lid is opened to pour the ice from the container into the dispenser. This lid is opened by pulling the relevant solenoid.

When the trigger is released, solenoid lets go after 5 secs.

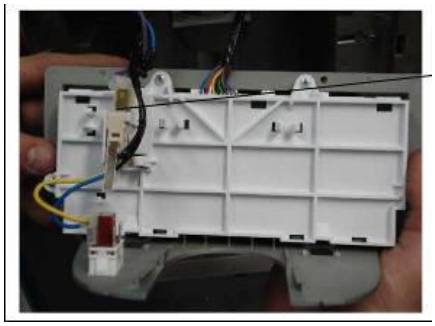


5.26 Ice lid heater

It is on the surface of the ice lid where the freezer compartment and ambient temperature encounter. It prevents perspiration.



It electrically transmits pushing of the water dispenser trigger to the control circuit board and ensures performing of the selected function.



5.27 Water dispenser heater switch

It electrically transmits pushing of the water dispenser trigger to the control circuit board and ensures performing of the selected function.

5.28 Blue light LED board

Blue light leds are used to ensure longer preservation of vegetables. It is located near the filter housing at the lower left part of the fridge compartment together with the ionizer.

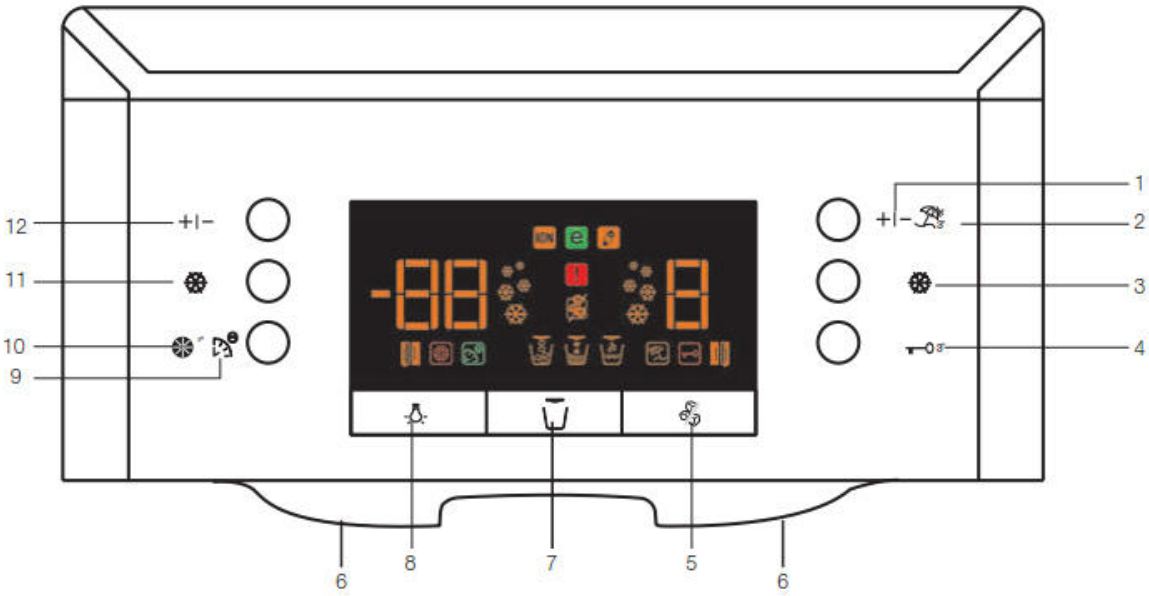
5.29 Ionizer

It periodically spreads ions into the fridge compartment in order to clean the air of this compartment. It is located near the filter housing at the lower left part of the fridge compartment together with the blue light led board.

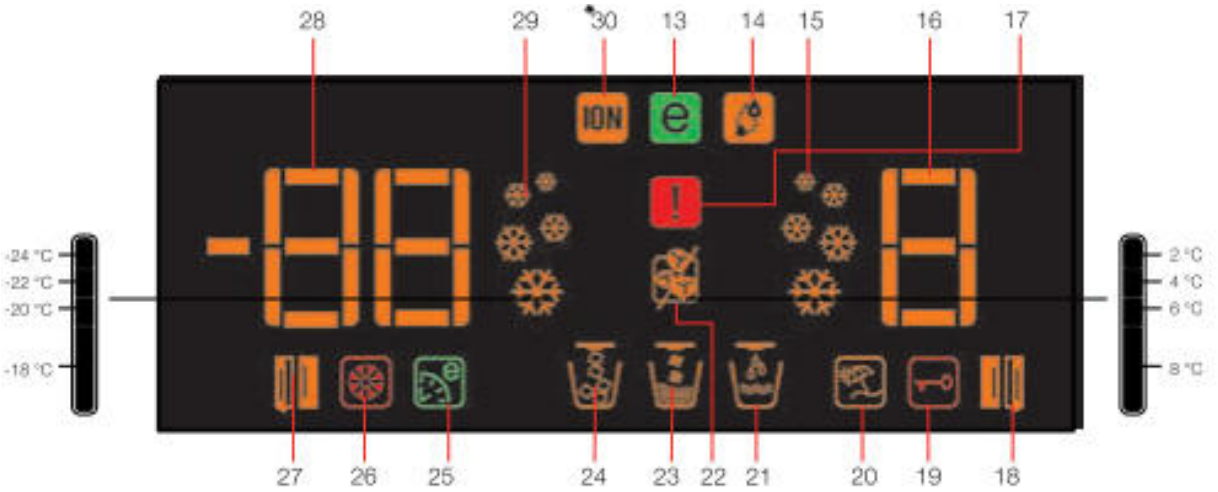
Caution!
The light will always shine when the power supply to the appliance is switched on!

5.30 Display

connector

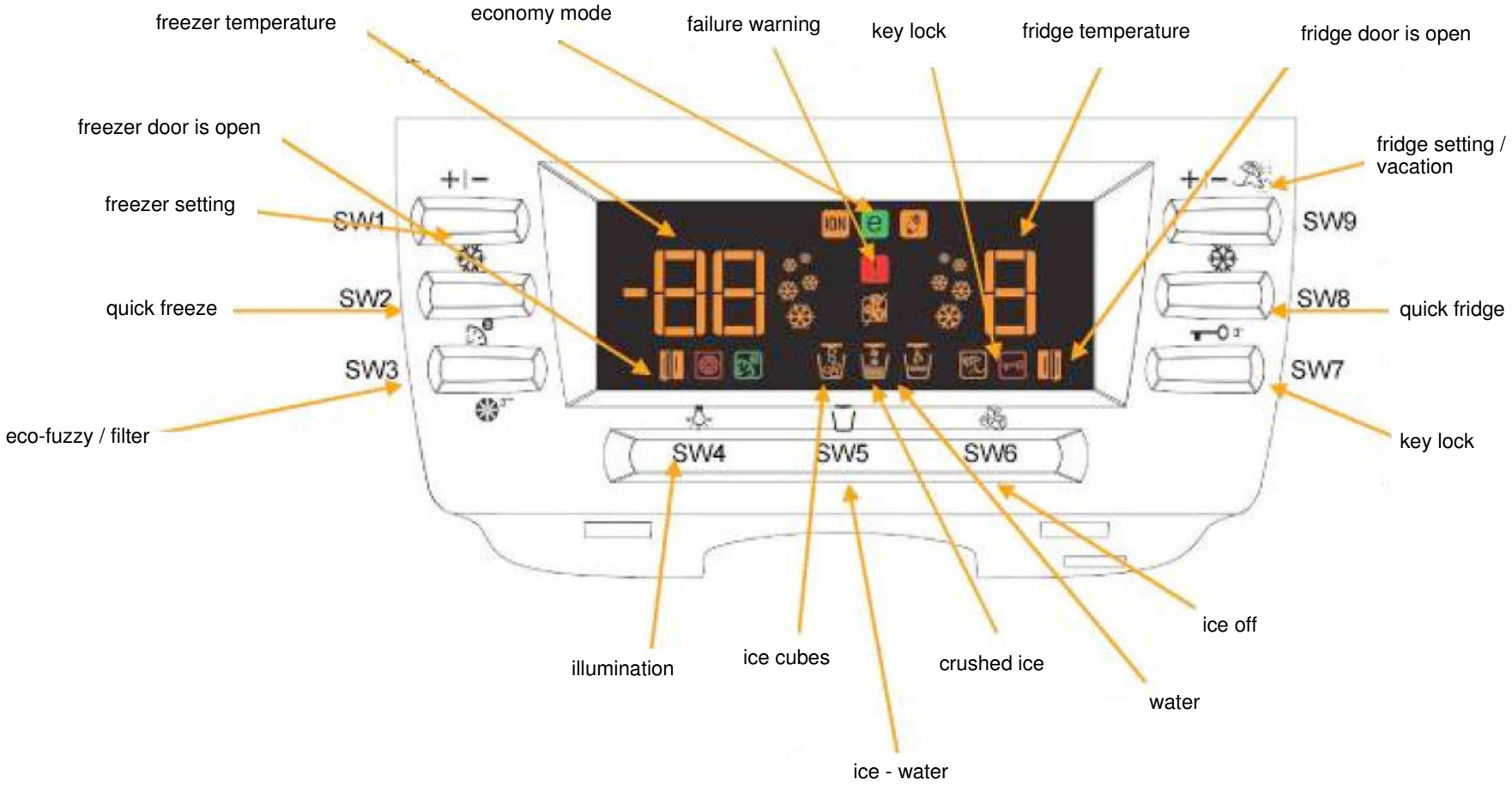


1	Fridge temperature button
2	Vacation button
3	Quickcool button
4	Key lock
5	Ice off button
6	Water dispenser icon
7	Ice/water
8	Water dispenser illumination
9	Eco-Fuzzy button
10	Filter reset button
11	Fast freeze button
12	Freezer temperature button



13	Economy mode
14	High humidity
15	Quick fridge - optional
16	Fridge temperature setting
17	High temperature / error warning
18	Fridge door open
19	Key lock
20	Vacation mode
21	Water
22	Ice Off
23	Crushed ice
24	Ice cubes
25	Auto-Eco
26	Filter reset
27	Freezer door open
28	Freezer temperature setting
29	Quick freeze
30	Ionizer - always lights

Illustrations and specifications in this manual are schematic and may differ from your product. If parts are not included with the acquired appliance, they apply to other models.



6. Function

The Electronic NF refrigerator is a no-frost refrigerator with two compartments, namely the freezer and the fridge compartment, which is cooled by a no-frost evaporator and a tail evaporator that are serially connected to each other and controlled by a microprocessor. All functions and temperature controls of the refrigerator are made in accordance with the desire of the user thanks to the microprocessor. Cooling system elements of the refrigerator (compressor, fan and heaters) are controlled by means of the software of the microprocessor. Cooling of the refrigerator is provided by circulating the air in it continuously over the evaporator by means of the fan. No frosting or icing occurs inside the usable areas of no-frost refrigerators as it does in conventional refrigerators. The frosting that occurs on the evaporator which is out of the usable area is melted by means of heaters automatically activated under the control of the microprocessor at certain intervals to be determined by the control algorithm. Thus, the snow and the ice accumulated on the evaporator are melted without making any operation by the user to enable the refrigerator operate more efficiently.

6.1 Defrosting

The refrigerator melts the snow on the evaporators periodically to maintain the cooling performance. This process is called defrosting.

6.1.1 Freezer defrosting

Conditions to defrost depend on many other conditions to achieve the optimum point in efficiency. However, the general condition is as follows: The refrigerator performs normal defrost if 15 hours of Evaporator Fan Run Time or 26 hours of real time have elapsed.

6.1.2 Fridge defrosting

To take a defrost decision:
Number of fridge cooling cycles (FreshFood_CycleCounter) and fridge cooling real time (FreshFood_CutinTimer) are calculated separately.

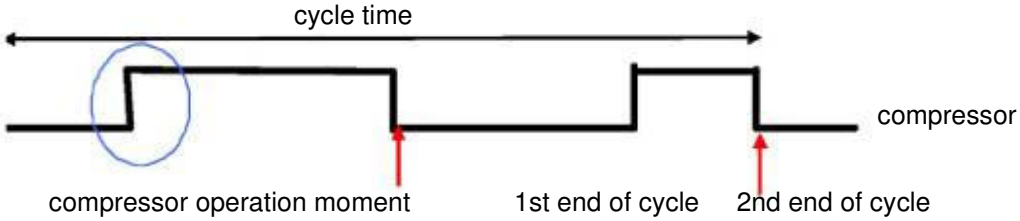
6.1.3 Calculating the cycle time and cycle number

Each operation and stop round of the compressor is called a cycle. The number of cycle is calculated at each stop of the compressor, that is, at the end of each cycle.

On the other hand, the maximum time required to complete the aimed cycle number is called the cycle time. Cycle time is calculated until the aimed cycle number is completed.
Cycle time and cycle number data is used to determine the fridge compartment defrost.

Cycle time and cycle number data may be reset at any operation moment of the compressor due to the fridge evaporator sensor's value. If the fridge evaporator sensor temperature is higher than the fridge defrost cut-in value, cycle time and cycle number shall be reset.

A sample 2-round cycle



When a number of fridge cooling cycles or fridge cooling real time elapses, fridge defrost decision is taken.

If there is any fridge evaporator sensor failure (E2), fridge defrost is not performed.

Also, in cases where the compressor runs 100% for a long time (100Comp_max_operatingTime), if the fridge evaporator sensor value is colder than a certain limit value, fridge defrost is made.

After the number of fridge cooling cycles is complete, fridge defrost starts at the moment when compressor comes to a stop.

When the real time for fridge defrost has elapsed, compressor is stopped to start fridge defrost.

Number of fridge cooling cycles *(FreshFood_CycleCounter)*	4 cycles
Fridge cooling real time *(FreshFood_CutinTimer)*	430 minutes
Number of fridge cooling cycles when the door closed cooling algorithm is active *(FreshFood_CycleCounter)*	10 cycles
Fridge cooling real time when the door closed cooling algorithm is active *(FreshFood_CutinTimer)*	600 minutes
Maximum run time of compressor (100%) *(Comp_max_operatingTime)*	120 minutes
Maximum run time of compressor (100%) when door is closed *(Comp_max_operatingTime)*	240 minutes
For fridge defrost; fridge evaporator limit value	<= -25°C (if sensor colder than -25°C)
Maximum fridge defrost time	130 minutes

The above counters are reset in each case where compressor makes cut-in because of fridge evaporator sensor.

Notes: There is no relation between NF defrost and FF defrost.
Fridge ambient heater does not work during fridge defrost.
Fridge defrost is not performed in case of alarm.
If the operation rate is in the range of minDuty and maxDuty while the door closed algorithm is activated, the fridge ambient heater does not work during fridge defrost. (only for SBS)

6.2 Initial operation and power failure

A functional test is made when components are activated one by one after the initial operation or a power failure. 1-second delay is given between the operation of two components. The sequence is as below:

- All components 0 – 3 seconds OFF
- Evaporator heater 3 – 5 seconds (140W ± 10%)
- All components 1 second OFF
- Fridge-fab, ionizer 6 – 8 seconds (7.9 W ± 10 %)
- All components 1 second OFF
- Fridge-fab, ionizer 9 – 11 seconds (12.5 W ± 10 %)
- All components 1 second OFF

- Flange, DID, dispenser, water pipe heaters 12 – 14 seconds (45 W ± 10 %)
- All components 1 second OFF
- Compressor (AVK) 15 – 20 seconds (180 W)

In case of initial start-up after the functional test, the compressor goes on running; other components operate in accordance with the factory setting values (-18, 4, water selected).

The compressor does not work for 15 minutes in case of any sensor failure. In case of a power failure after the functional test, the refrigerator works in accordance with the last set values; the compressor works following a 6-minute stop time, if necessary.

6.3 Fast freeze

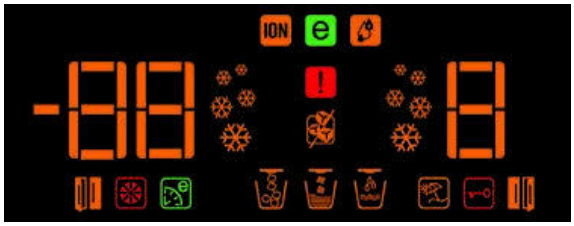
The compressor and the evaporator fan run for 12 hours according to the fast freeze cut-out and cut-in values when the fast freeze function is activated. It performs defrost after 4 hours. The fridge compartment works according to the normal set values. The fast freeze icons go off after 12 hours, and the appliance continues to operate according to the last set values.

Fast freeze icons start lighting in an animated manner in 1-second intervals.

If the fast freeze button is pressed again during the fast freeze function, the refrigerator goes out of this function and switches into normal operation conditions. Relevant leds go off.

6.4 Quick cool

Quick cool icons start lighting in an animated manner in 1-second intervals when the quick cool button is pressed.



The fridge compartment works according to the quick cool cut-in and cut-out values. Quick cool mode is abandoned at the end of 2 hours. Leds related to quick cool go off and control continues working according to previous set values; if the quick cool button is pressed again, this function is abandoned, leds related to quick cool go off and control continues to work according to the previous set values.

6.5 High temperature alarm

High temperature alarm is activated when the freezer temperature of the refrigerator is above the value it should be and this is shown by the alarm led (“!”). This led lights continuously. Alarm disappears when the refrigerator is cooled again.

6.6 Vacation

In cases where it is not going to be used for a long time, the fridge compartment can be cancelled. To activate this, the fridge adjustment button is pressed for 2 seconds to switch the fridge compartment to vacation mode and thus the usage of the compartment is cancelled.

6.7 Eco-Fuzzy (special economy function)

Eco-Fuzzy function is activated when the Eco-Fuzzy button is pressed. If the door of the fridge compartment is kept closed for a long time when this function is selected, the fridge compartment will switch to a more economic value and keep on running. When the Eco-Fuzzy button is pressed again, this function is deactivated.

6.8 Key lock

The key lock is activated when this button is pressed and all buttons and the dispenser latch will not work.

6.9 Water dispenser illumination

When the water dispenser illumination button is pressed, the water dispenser lamp will light up and it will go off when the button is pressed again. This illumination will also light up when the water dispenser latch is pressed, and it will go off delayed when the latch is released.

6.10 Water/Ice type selection

With this button, either one of “water” or “ice cube” or “crushed ice” options is selected.

6.11 Water/Ice dispenser

It is used to obtain water or ice. When the latch is pushed, it is possible to get water or ice according to the water/ice option selected beforehand.

If the latch is pressed with water option selected beforehand, cold water is obtained. Water or ice can be taken for maximum 90 seconds at every press.

When the freezer door is open, the dispenser will not give any water/ice.

6.12 Ice Off

To stop ice formation, the “ice off” button is pressed. When ice off is selected, no water will be taken into the Icematic. However, already existing ice can be taken from the dispenser. To restart ice formation, the “ice off” button must be pressed again.

6.13 Water filter

The water filter should be replaced every 6 months. The water filter warning starts lighting after 168 days. The filter should be replaced after the filter warning has started lighting. This warning is cancelled by pressing the “Eco-Fuzzy” button for 5 seconds after replacing the filter.

Filter countdown time should also be reset by pressing the “Eco-Fuzzy” button if the filter has been changed at any time (without any alarm).

6.14 Setting the water amount for the Icematic

Factory default setting is 5 sec. for water intake.

“Water/Ice Type” button is pressed for 3 seconds within the first 30 seconds of the start-up to enter into adjustment mode. (Buzzer sounds for 1 sec.)

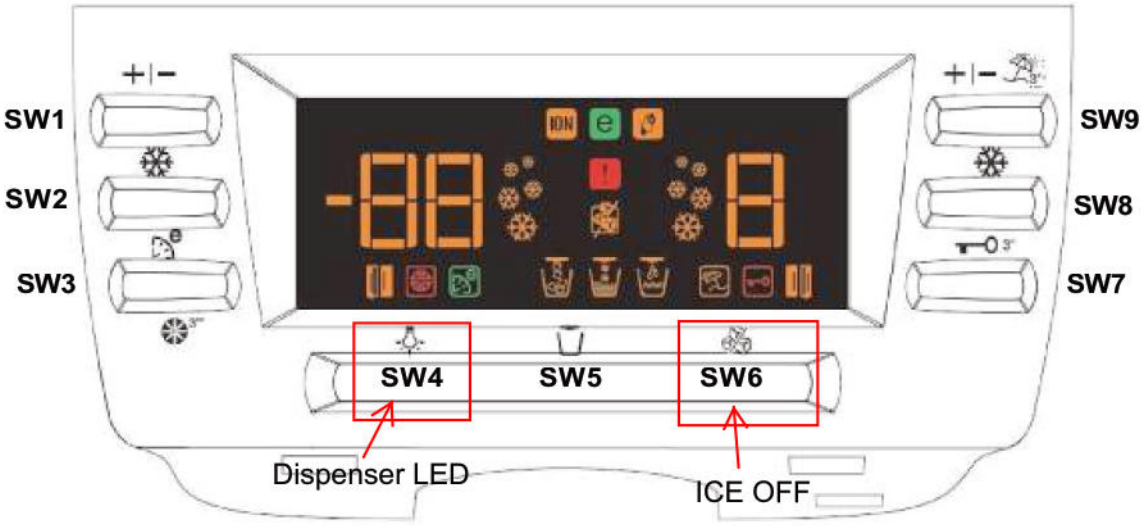
In this mode, the current water intake time flashes in the fridge section, segment 7. (E.g. 70 = 7 sec.) This time changes whenever the ice off button is pressed. (Can be set between 3.5 seconds to 7.5 seconds.)

The last selected water intake time is saved in the memory by pressing the Water/Ice Type button for 3 seconds.

6.15 Making ice

If the Icematic sensor reaches -8 °C 130 minutes after the water is taken into the Icematic, Icematic is turned to pour the ice cubes into the ice box. Otherwise, it checks every 20 minutes if the Icematic sensor has reached -12 °C, and pours the ice cubes when -12 °C is reached. The Icematic does not pour any new ice when the ice box is full.

7. Service test



Service test mode is entered by pressing the “Dispenser Led” and “Ice Off” buttons simultaneously for 3 seconds within the first 30 seconds after energizing.

All leds: 0.5 seconds ON, 0.5 seconds OFF.

The freezer set digits show the software version number and the fridge set digit shows the software revision number once any button is pressed. Once any button is pressed again, sensor temperature values are shown alternately. Each sensor temperature is shown for 2 seconds.

- Freezer sensor value is shown by the freezer set digits; “r” is written in the fridge set digit.
- Fridge sensor value is shown in the freezer set digits; “F” is written in the fridge set digit.
- Freezer evaporator sensor value is shown in the freezer set digits; “d” is written in the fridge set digit.
- Fridge evaporator sensor value is shown in the freezer set digits; “E” is written in the fridge set digit.
- Icematic sensor value is shown in the freezer set digits; “I” is written in the fridge set digit.

Once any button is pressed, freezer set digits show “--” and fridge set digit shows “-” icons.

Components may be turned ON or OFF by pressing buttons.

Button	Display	Output	Display code
Freezer Set SW1	!	Compressor	CO
Quick Freeze SW2	Economy	Defrost heater	HE
Eco-Fuzzy SW3	Eco-Fuzzy	FF_FAN	FF
Lamp SW4	Ion	Ionizer	IO
Type Select SW5	Humidity	Ice flap	IF
Ice Off SW6	Ice Off	Icematic motor	IH
Lock SW 7	Lock	Ice valve + water valve	U3
Quick Fridge SW8	Filter reset	Fridge heater	FH
Fridge set SW9	Vacation	DID, water pipe, dispenser, heater, flange heater	H3

If more than one component is activated, display codes are shown in the display freezer set digits in one-second intervals.

8. Error codes

Error codes are shown in the freezer display. At the same time, the “!” led flashes continuously. Real freezer set value and error code are displayed alternately.

Sensor failures (E0, E1, E2, E3, E8)

Failure warning is given when a sensor is open or short circuit. When a failure occurs, cooling is maintained as follows:

1. **E0**
   Freezer sensor error: At times without defrost, compressor is continuously ON for 30 mins. and OFF for 20 mins. If there is an E0 failure, E0 label and set value are shown on the freezer 7 segment display alternately and the “!” sign lights.
2. **E1**
   Defrost sensor error: When it is time for defrost, the heater is activated for 25 mins. If there is an E1 failure, E1 label and set value are shown on the freezer 7 segment display alternately and the “!” sign lights.
3. **E2**
   Fridge evaporator sensor error: Compressor works as to be ON for 30 mins., and OFF for 20 mins. If there is an E2 failure, E2 label and set value are shown on the freezer 7 segment display alternately and the “!” sign lights.
4. **E3**
   Fridge sensor error: At times without defrost, fan works as to be ON for 30 mins. and OFF for 20 mins. All fridge bars can light or go off. If there is an E3 failure, E3 label and set value are shown on the freezer 7 segment display alternately and the “!” sign lights.
5. **E8**
   Icematic sensor error: Icematic does not work. E8 failure and set value are shown alternately, the “!” sign lights.

Defrost heater error (E4)

If defrost time takes 60 minutes for 3 consecutive times, heater error is displayed. However, when defrost time comes, it re-activates the defrost heater. Cooling goes on normally. If there is an E4 failure, -E4 label and set value are shown on the freezer 7 segment display alternately and the “!” sign lights.

Icematic error (E9)

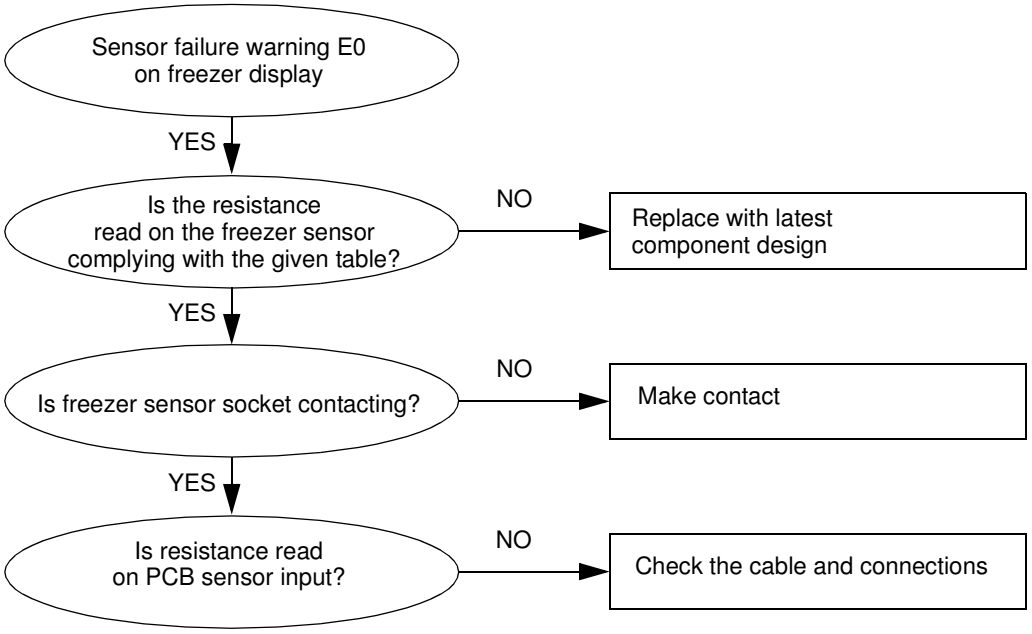
If the Icematic switch is not recognised, an Icematic failure is displayed. E9 failure and set value are shown alternately, the “!” sign lights. E9 goes off when Ice Off is pressed; the failure, if any, will be displayed again when ice is selected.

If more than one error occur concurrently, error codes and set value are shown alternately.

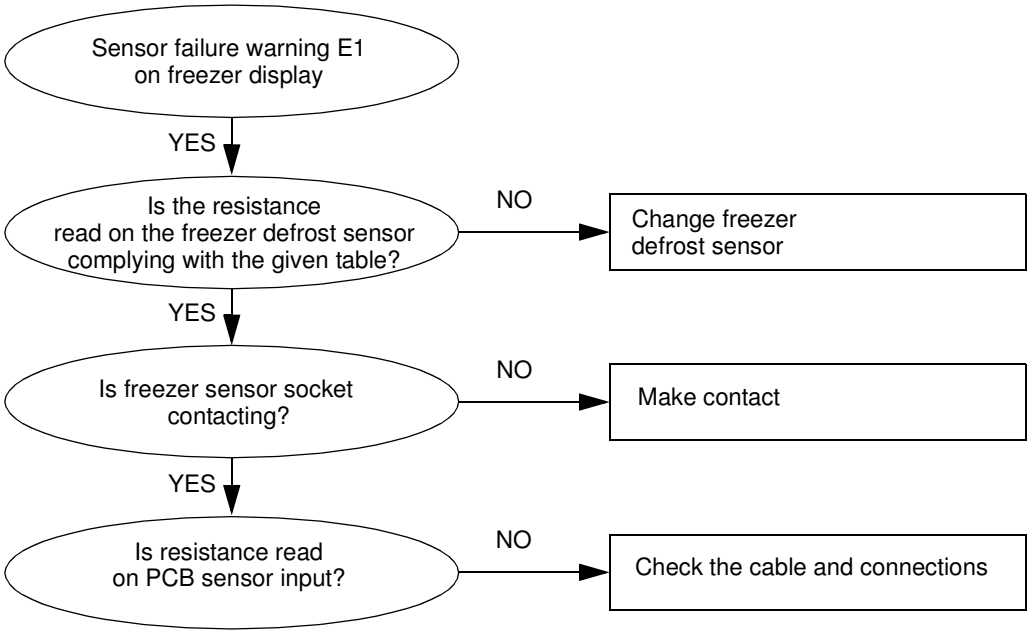
If the error is eliminated, error code on the display disappears. Refrigerator goes back to normal operation.
Error codes are recalled when power restores after a power failure. During the initial operation, only the heater error is recalled and others are cleaned. Error codes are cleaned after a self-test.

8.1 Failure diagrams

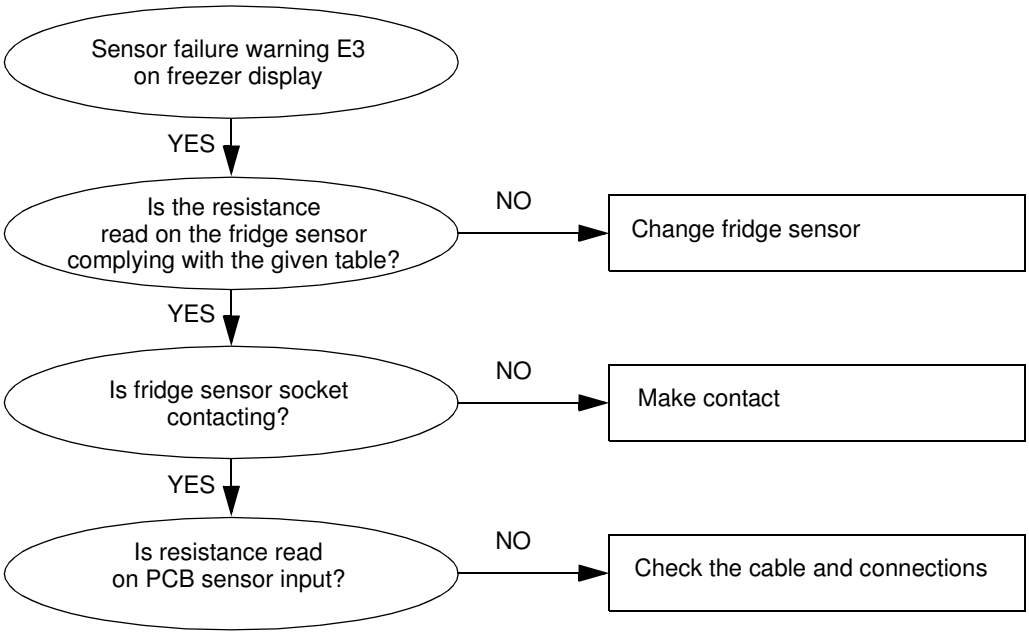
E0 error



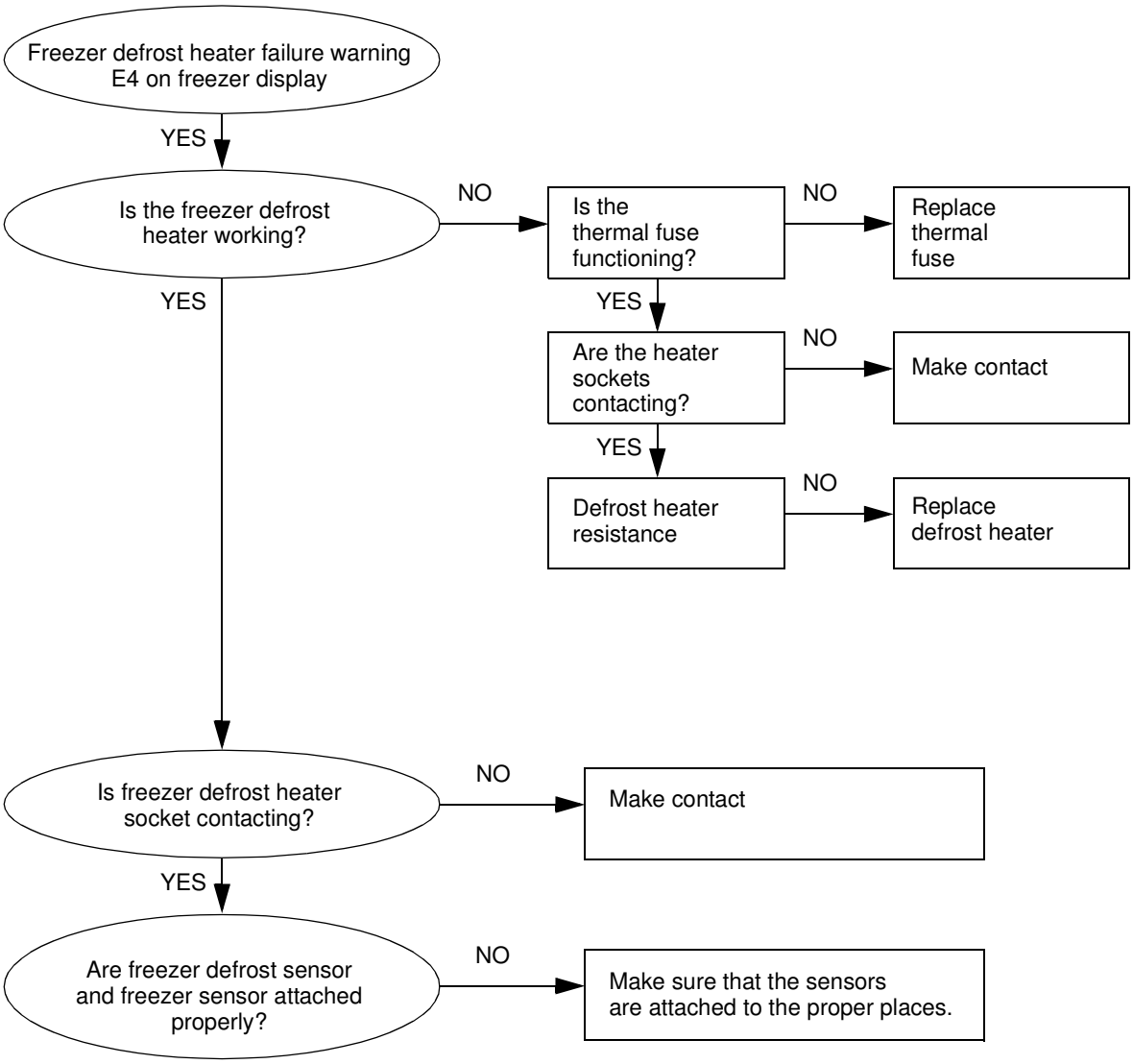
E1 error



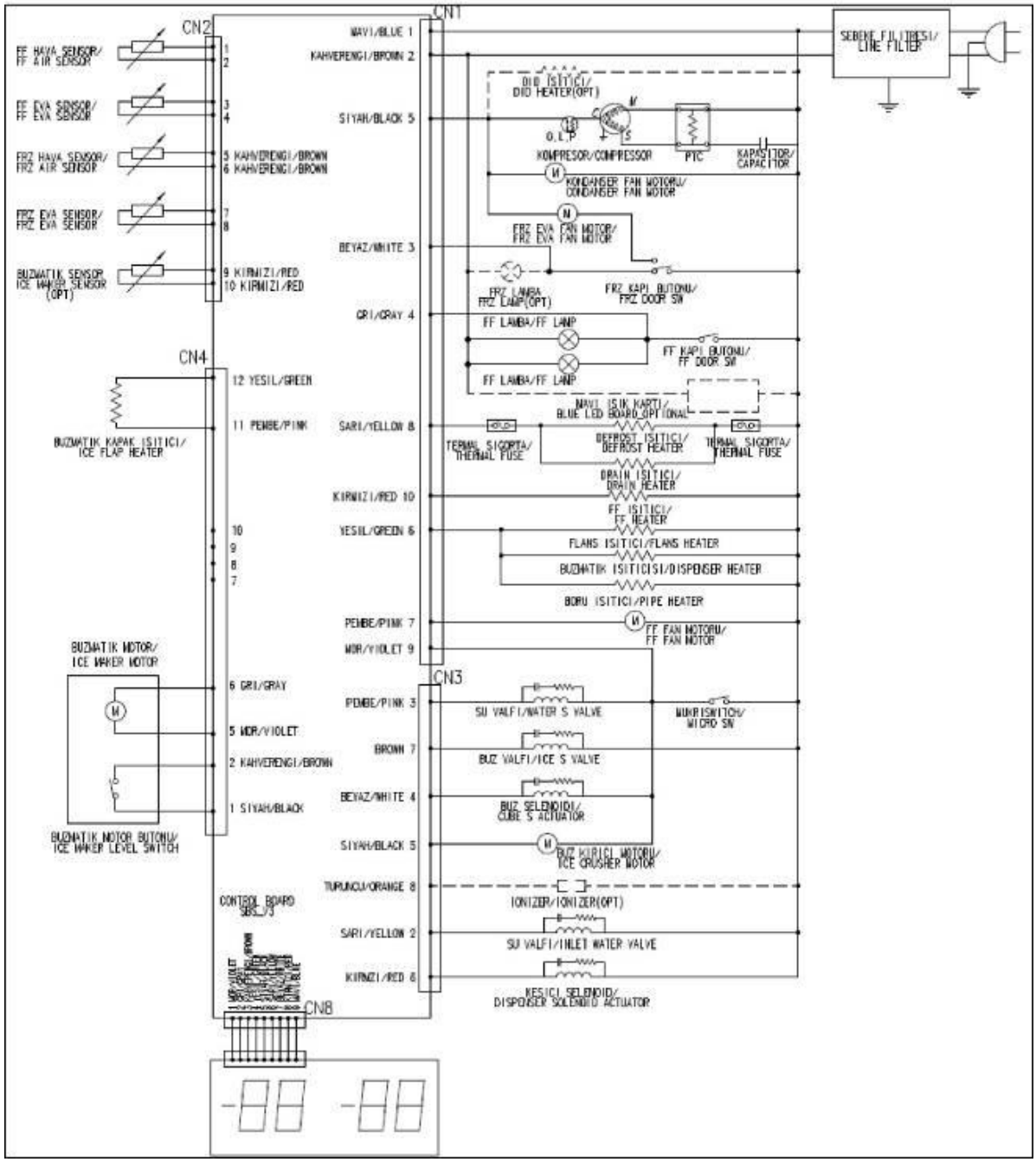
E3 error


Sensor failure warning E3
on freezer display
YES
Is the resistance
read on the fridge sensor
complying with the given table?
NO
Change fridge sensor
YES
Is fridge sensor socket
contacting?
NO
Make contact
YES
Is resistance read
on PCB sensor input?
NO
Check the cable and connections

E4 error


Freezer defrost heater failure warning
E4 on freezer display
YES
Is the freezer defrost
heater working?
NO
Is the
thermal fuse
functioning?
NO
Replace
thermal
fuse
YES
YES
Are the heater
sockets
contacting?
NO
Make contact
YES
Defrost heater
resistance
NO
Replace
defrost heater
YES
Is freezer defrost heater
socket contacting?
NO
Make contact
YES
Are freezer defrost sensor
and freezer sensor attached
properly?
NO
Make sure that the sensors
are attached to the proper places.

8.2 Refrigerator - Electrical circuit diagram



8.3 Possible failures

8.3.1 The appliance does not cool

Inadequate cooling (refrigerant leak, interim compartment blocked, etc.)

Doors not fully closed

Illumination lights are on

Evaporator fan does not work (socket loose, cable broken, etc.)

Condenser fan does not work (socket loose, cable broken, etc.)

PCB failure

8.3.2 PCB failure

Sockets are loose

Socket ends removed from the housing

Cable broken

PCB failure

8.3.3 No image on the display

Sockets are loose

Socket ends removed from the housing

Connection on the door hinge is wrong

Display failure

8.3.4 Sensor failure

Sensor sockets removed from the housing

Socket ends removed from the housing

Sensor failure

Sensor cable broken

8.3.5 Heater failure

Thermal fuse blown

Sockets are loose

Socket ends removed from the housing

Cable broken

Heater failure

9. Structural parts of the refrigerator

9.1 Water and ice dispenser

1. To remove the dispenser frame, first of all lift the frame up by placing a fine-headed screwdriver into the gaps under it. Then, pull it towards yourself by holding it from both sides and take it out.


2. Remove the two screws under the display by means of a Phillips screwdriver to take out the display. Then, pull the display towards yourself, remove the sockets behind it and take it out.



3. To remove the dispenser latch and water/ice outlet, remove the two screws at both sides of the latch by using a Phillips screwdriver, then take out the latch and the outlet by pulling them towards yourself.

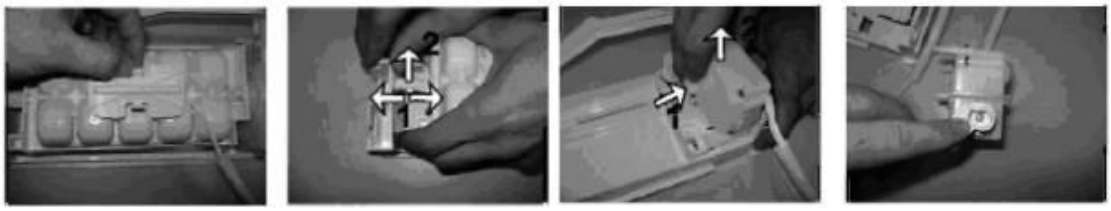
4. To remove the ice cube dispensing solenoid, remove the two screws under it, pull it towards yourself and take it out by removing the sockets. As for the dispenser flap, first take out its socket and pull it to left hand side as shown in the figure, then pull it towards yourself and remove it.


9.2 Icematic

1. To remove the Icematic assembly, first of all remove the whole freezer cover, tray and ice box assembly as shown in the figure.

2. Then, remove the socket lid by the aid of a Phillips screwdriver and take out the sockets. After removing the water pipes which are shown in the middle figure below and which are located on the upper left corner of the refrigerator, hold the Icematic assembly at the upper side, pull it towards you and take it out.

3. To disassemble the Icematic group into its components, release the sensor cover behind it from the tabs and pull it towards yourself. To remove the ice box, pull it towards yourself and lift it up. As for the ice box motor, pull it backwards as shown in the figure and take it out. You can also remove the ice level detection arm by means of a Phillips screwdriver.



9.3 Ice stock drive assembly

When we remove the ice stock drive assembly, we will see 2 bolts on the side wall of inner reservoir.

1. We will remove them by means of a fillister head screwdriver.

1. There are 2 more bolts holding the decorative cover when the reservoir is turned upside down

2. and as we remove these too, we will see the ice crusher section which is also fitted by 2 screws. We will remove these also.

3. Then, we will remove the 2 rings at the connection part of the ice drive shaft to the ice crushing section, by pulling them out by means of a screwdriver.

4. Then the arm going to the ice crusher will be pulled from its tabs and separated from its housing to remove it. Result can be reached by performing the installation operations in the reverse order.

9.4 Ice drive motor assembly

4 screws are holding the ice drive motor assembly. These screws shall be removed first as shown in the first picture. Then the flap is removed by holding the motor shaft by holding it with pliers as shown in the pictures below and rotating it in the counterclockwise direction of the motor.

There are 3 more screws to remove the motor which can be taken out with the aid of a fillister head screwdriver. The remaining 2 screws are holding the Icematic solenoid. After removing them also, the ice drive motor is detached.

Now, only the sockets connecting the motor to the solenoid and the ground cable on the socket are left. After taking them out, the ice crusher piston assembly is also removed from its housing for servicing. The ice drive motor assembly can also be reassembled by following the same operations in reverse order.





9.5 Freezer fan

The freezer fan is seated in its housing. The component is attached to the inner body by means of 2 screws at the left and right. The fan socket is attached to the rightmost socket housing on the inner body. The freezer fan can be removed from its place by following these operations in reverse order.


9.6 Fridge fan

The fridge fan is seated in its housing. The component is attached to the inner body by means of 2 screws at the left and right. The fan socket is attached to the rightmost socket housing on the inner body. The fridge fan can be removed from its place by following these operations in reverse order.


9.7 Home freezer (HF)

When service is given to the HF section, the HF cover is removed first. One of the pins at the left and right holding the cover in its place is removed to take out the cover. The rest of the HF section is first pressed downwards and then pulled towards yourself to complete removing operation.



9.8 Multiflow and diffuser cover

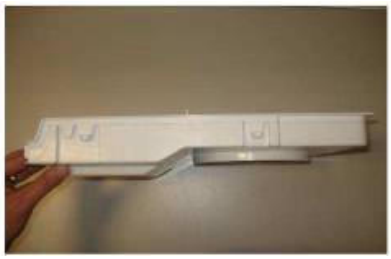
There are tabs at the left and right of the multiflow cover in the fridge compartment.

First the tabs of one side are seated into their housings and the tabs on the other side are placed by pressing onto their housings. Then, they are fitted by means of 2 screws at the bottom. There is the fridge fan space on top of the multiflow cover. Diffuser cover is attached here. When attaching this cover, the tabs on one side are fitted first and the tabs on the other side are pressed to fit them in the same way.



9.9 Freezer upper evaporator cover

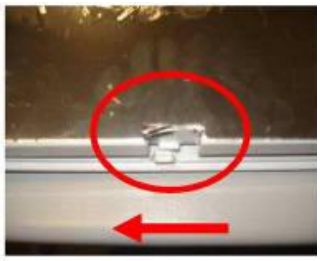
To remove the freezer evaporator upper cover, pull it towards yourself from upper side of the cover. The cover can be split into 2 parts by lifting the tabs up from their places.


9.10 Freezer lower evaporator cover

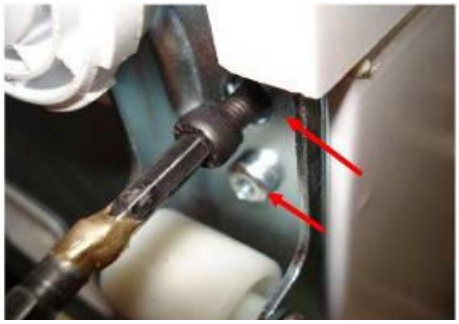
The freezer lower evaporator cover is also removed by pulling towards yourself from top in the same way. When attaching it, the lower side is seated first, then the 1 pc screw which connects it to the other cover is removed. Light holder cable is taken out through the hole. Then they are pushed in opposite directions to release from the tabs between the 2 covers and service is given as desired.



9.11 Front legs and lower door hinge

The refrigerator has front legs which allow it to stand upright, balanced and sound. When giving service to these legs, the screws holding the front legs are removed first as shown in the picture. Then it is pulled in the direction of the arrow in picture nr. 2 to remove the front leg plate. It can be replaced by performing these operations in reverse order. Refrigerator's balance and height adjustment is made on the wheels on the front leg plate. .




Refrigerator door's lower connection is made by means of the lower door hinge. The screws on the lower door hinge are removed for servicing.


9.12 Lower ventilation cover

The lower ventilation cover is seated under the refrigerator as to have its spaces align with the front legs. Then, it is fastened by means of the 3 reverse screws holding it. Removing is performed in reverse order.


9.13 Water valve - Jug and tap connections

The water valve is a blue piece at the compressor zone. It is used to send water to the water dispenser. It can supply water in two ways: first is by a water pump from a jug and the second is from mains supply by means of a tap connection adapter.

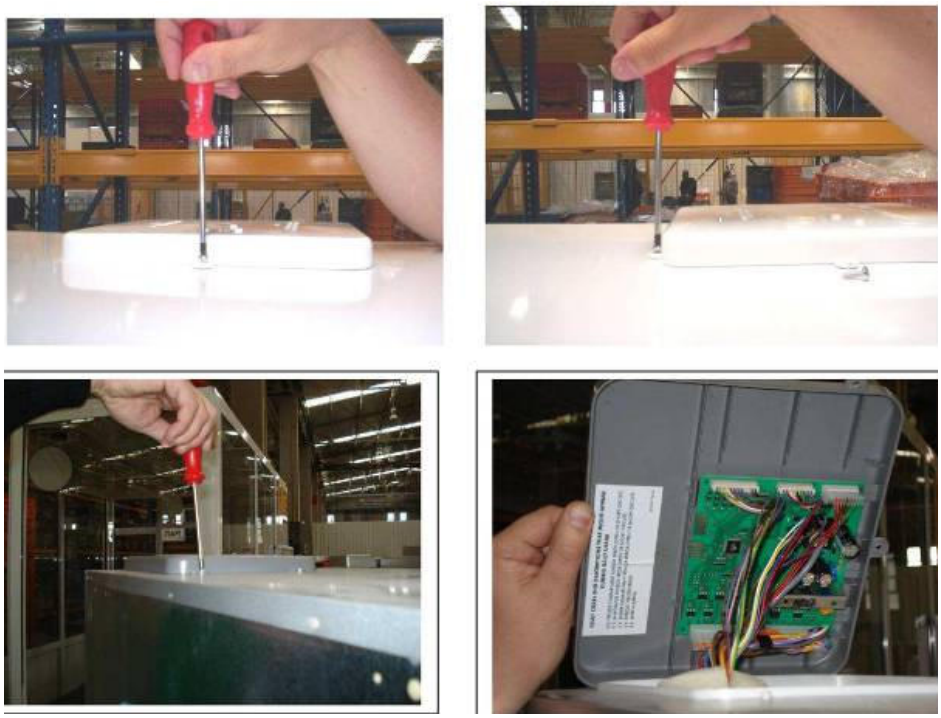
To send water from a jug, first of all the other end of the thick hose from the pump is connected to the jug's head. The thin hose coming out of the pump is attached to the water valve at the back of the refrigerator by means of a connection adaptor and the water pump is plugged in.

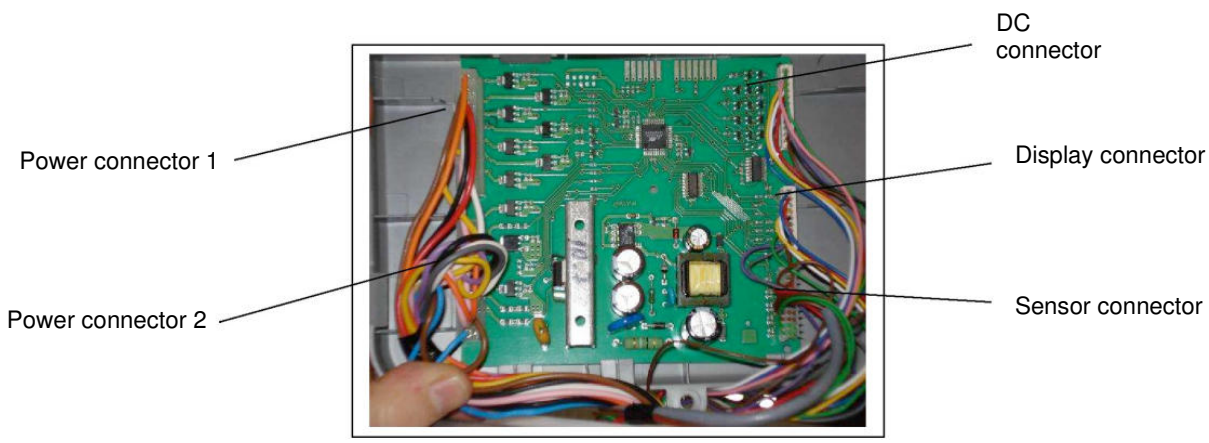


No pump is used for water feeding from the mains supply. Connection is made behind the tap by means of a tap connection piece. The other end of the hose is attached to the water valve again by means of the connection piece and the tap is opened.




9.14 Attaching and removing the control circuit board





9.15 Servicing the drain heater

At the factory a drain heater is stuck on the refrigerator before the polyurethane. In cases where the drain heater fails to work, the heater supplied from the service is adhered to the drain channel area to give service to the refrigerator.

10. Troubleshooting and failure identification

Problem	Possible cause	Solution
Noise		
The operation noise increases when the refrigerator is running.	Storage capacities of today's No-Frost refrigerators have been increased and they can work under lower temperatures.	It is normal and not a fault.
Vibrations or noise.	The floor is not even or it is weak. The refrigerator rocks when moved slowly.	Make sure that the floor is level, strong and capable to carry the refrigerator.
	The objects placed on top of the refrigerator rock.	Remove the objects on it.
Water/condensation/ice in the refrigerator.		
Condensation on the inner walls of the refrigerator.	Hot and humid weather increases icing and condensation.	It is normal and not a fault.
	The doors are ajar.	Make sure that the doors are closed fully.
	Doors might have been opened very frequently or they might have been left open for a long time.	Open the door less frequently.
Water/condensation/ice on the outside of the refrigerator.		
Humidity occurs on the outside of the refrigerator or between the doors.	High humidity.	This is quite normal in humid weather. When the humidity is less, condensation will disappear.
	The Inside of the refrigerator must be cleaned.	Clean the inside of the refrigerator with a sponge, warm water or carbonated water.
	There might be food with pungent odour inside the refrigerator.	Pack the food.
	Some containers or packaging materials might be causing the smell.	Use a different container or different brand packaging material.
Opening and closing of the doors		
The door(s) is (are) not closing.	Food packages may prevent the door's closing.	Replace the packages that are obstructing the door.
	The refrigerator is probably not completely vertical on the floor and it might be rocking when slightly moved.	Adjust the elevation screws.
	The floor is not level or strong.	Make sure that the floor is level and capable to carry the refrigerator.
Drawers are stuck.	The food might be touching the ceiling of the drawer.	Rearrange food in the drawer.
	The roller wheel on which the drawer slides might have been soiled or jammed.	Clean the roller wheel.
Ice dispenser		
Ice dispenser does not work.	Ice off mode is active.	Exit from the mode.
	Water supply line turned off or not connected.	Check/connect the water supply line.
	There is folding on water pipes between refrigerator and water line.	Check the water pipes.
	Water pressure is not enough.	Use an impulsive pump.
	Freezer compartment is too warm.	Set the temperature of the freezer compartment as described in the user manual.
	After first installation, 12-24 hours are required for ice formation.	Wait about 24 hours.
	Ice cubes stuck together in the ice box.	This happens when the ice dispenser was not used for a long time. Empty/clean the ice box.
Freezing of the food in the bottom drawer (crisper/ chiller).	This is normal if the adjustment slider is at Chiller Compartment (0 °C) position. Ambient temperature is very low (around or lower than 10 °C).	* Switch the adjustment slider to the crisper position. * Move the vegetables from this compartment to the upper crisper. * Icing upon the outer surfaces of food such as meat is normal.
Condensation on the side wall of the fridge compartment.	* Very cold ambient conditions. * Frequent opening and closing of the door. * Very humid ambient conditions. * Storage of food containing liquid in open containers. * Leaving the door ajar.	* Switch the thermostat to a colder degree. (2 °C) * Decrease the time the door is left open or use it less frequently. * Cover the food stored in open containers with a suitable material. * Wipe the condensation using a dry cloth and check if it persists.

Problem	Possible cause	Solution
Compressor is not running	The fridge is in defrost cycle.	This is normal for a full-automatically defrosting refrigerator. Defrosting cycle occurs periodically.
	The appliance is not plugged into the socket.	Make sure that the plug is properly fit into the socket.
	There is a power failure.	Call your electricity supplier.
The fridge is running frequently or for a long time.	Your new refrigerator may be wider than the previous one.	This is quite normal. Large refrigerators operate for a longer period of time.
	The ambient room temperature may be high.	This is quite normal.
	The refrigerator might have been plugged in recently or might have been loaded with food.	Cooling down of the refrigerator completely may last for a couple of hours longer.
	Large amounts of hot food might have been put in the refrigerator recently.	Hot food causes the refrigerator to run longer until they reach the safe storage temperature.
	Doors might have been opened frequently or left ajar for a long time.	The warm air that has entered into the refrigerator causes the refrigerator to run for longer periods. Open the doors less frequently.
	Freezer or fridge compartment door might have been left ajar.	Check if the doors are closed completely.
The fridge is running frequently or for a long time.	The refrigerator is adjusted to a very low temperature.	Adjust the refrigerator temperature to a warmer degree and wait until the temperature is achieved.
	Door seal of the fridge or freezer may be soiled, worn out, broken or not properly seated.	Clean or replace the seal. A damaged/ broken seal causes the refrigerator to run for a longer period of time in order to maintain the current temperature.
The temperatures are too low.		
Freezer temperature is very low while the fridge temperature is sufficient.	The freezer temperature is adjusted to a very low temperature.	Adjust the freezer temperature to a warmer degree and check.
Fridge temperature is very low while the freezer temperature is sufficient.	The fridge temperature is adjusted to a very low temperature.	Adjust the fridge temperature to a warmer degree and check.
Food kept in the fridge compartment drawers are freezing.	The fridge temperature is adjusted to a very low temperature.	Adjust the fridge temperature to a warmer degree and check.
Meat kept in the chiller compartment freezes.	The meats must be kept just below the freezing point of water to have them retain their freshness for a long time.	Formation of ice crystals is normal because of the water content in the meat.
The temperatures are too high.		
Temperature in the fridge or freezer is very high.	The fridge temperature is adjusted to a very high degree.	Change the temperature of the fridge or freezer until the fridge or freezer temperature reaches to a sufficient level.
	The fridge temperature is adjusted to a very high degree. Fridge adjustment has an effect on the temperature of the freezer.	Change the temperature of the fridge or freezer until the fridge or freezer temperature reaches to a sufficient level.
	Doors might have been opened frequently or left ajar for a long time.	Warm air rushes into the fridge or freezer when the doors are opened. Open the door less frequently.
	The door might be left ajar.	Close the door completely.
	Large amounts of hot food might have been put in the refrigerator recently.	Wait until the fridge or freezer reaches the desired temperature.
	The refrigerator might have been plugged in recently.	Cooling down of the refrigerator completely takes time because of its size.
Fridge temperature is very high while the freezer temperature is at sufficient level.	The fridge temperature is adjusted to a very low temperature.	Adjust the fridge to a warmer temperature.
Ice cubes are melting, slushy.	Freezer compartment is too warm or freezer compartment door was not properly closed.	Set the temperature of the freezer compartment as described in the user manual and check the freezer compartment door.
	Power failure	Wait for ice until freezer compartment reaches to set temperature.
Ice cube option is selected but crushed ice is dispensed.	Just before the ice cube option, crushed ice was dispensed.	This is normal. After 2-3 seconds, cube ice would be dispensed.
	One or two ice cubes may pass crusher side and can be crushed by the crusher when the cube ice option is selected.	This is normal.

Problem	Possible cause	Solution
Ice cube formation is slow.	Freezer compartment door is not closed properly or freezer compartment is used very frequently.	Check the door closing.
	Temperature control of freezer compartment is not set cold enough.	Reduce the set temperature of the freezer compartment cold enough.
Water dispenser		
Water dispenser does not work.	There is folding on water pipes between refrigerator and water line.	Check the water pipes.
	Water supply line turned off or not connected.	Check/connect the water supply line.
	Water pressure is not enough.	Use an impulsive pump.
	Air is entrapped in the system.	Press the latch for at least one minute.
First glass of water is warm.	Water dispenser is not used for a long time.	Dispense water until cool water is dispensed.
Water dispenser does not work but ice dispenser works.	Water in the system is frozen.	Be sure the anti-condensation switch is pressed and set the refrigerator to a warmer temperature.
Poor taste/odour		
Ice cubes/water have a poor taste/odour.	Dispenser was not used for a long time.	Dispense water until all the water in the system is replenished.
	Quality of the water in the main water supply line is low.	Use filter or water containers with impulsive pump.
	Ice box is not clean.	Empty and clean the ice box.l
Sound and noise come from the dispenser		
Whirring sound	Sounds of water flowing in the dispenser.	This is normal.
Rumbling sound.	Noise produced by ice dropping and hitting to the ice box.	This is normal.
Whizz and click sound.	The sound comes from the motor and the solenoids.	This is normal.
Minibar		
Refrigerator gives door open warning.	Make sure that the Mini Bar door is fully closed.	Open and close the Mini Bar door.

11. Installing the wall spacer

Wrong

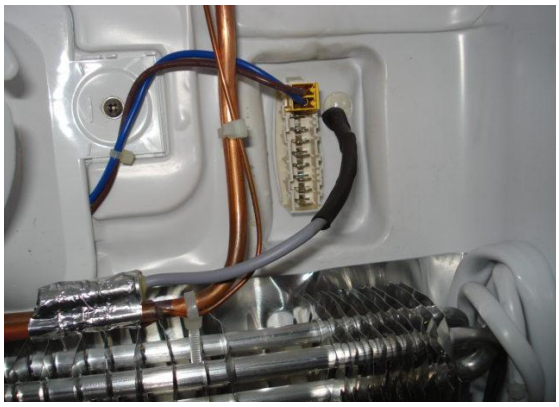
Correct on the left hand corner

12. Changing the evaporator sensor

Evaporator sensor with thick insulation, spare-part no. 441830

Air sensor without insulation, spare-part no. 441831

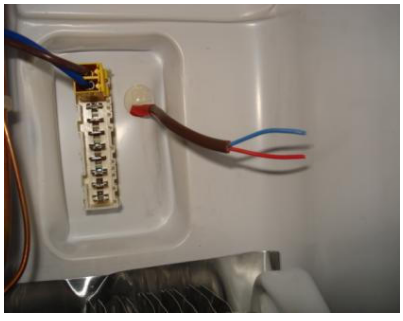
Before



After

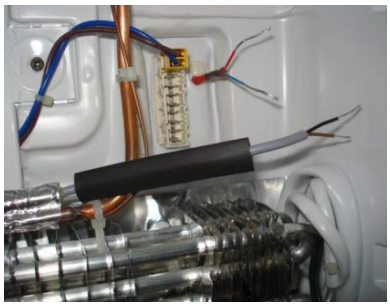
Procedure

1. Cut off the old sensor cable and remove 40 - 50 mm of the insulation material.



2. Cut 4 to 5 mm off the thin cables.

3. Connect the new sensor and the cables.



4. Replace the insulations.

5. Use hot air to shrink them.

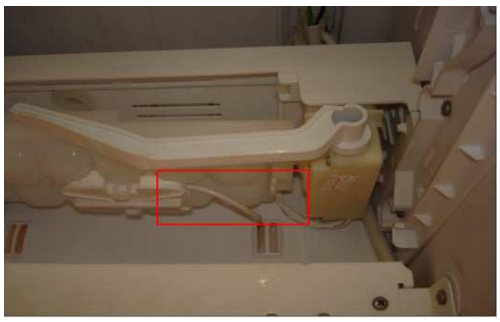
6. All the evaporator sensor insulations must be shrunk with hot air.

13. Icematic sensor problem

Several parts must be replaced in order to ensure that the cables of the icematic sensor **(spare-part no. 440084)** are not deformed, because the cable does not fit through the cable holder below the ice box. Instead it is lead between the icematic and the evaporator cover, without getting into the cable holder below the ice box.

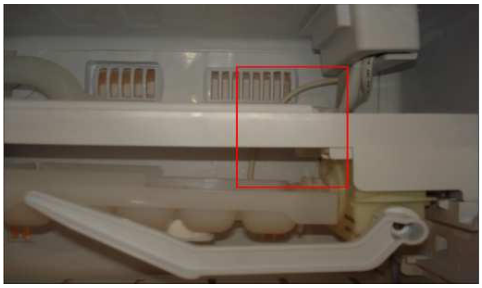
Another critical point is that the sensor cable must not make contact with any other cable (motor cable of the icematic, motor cable of the ice crusher) so that it cannot get caught in these cables (before February 2009).

A new silicon cable that fits into the cable holder was introduced in February 2009.



After February 2009

Before February 2009



Cable may not get caught