

REPAIR INSTRUCTIONS

KGN Added Value

1	SAFETY	2	5.12	Energy saving	14
1.1	Safety tips	2	5.13	Behavior in case of failure	15
1.2	Repair tips	2	5.14	Start-up Program	15
2	INSTALLATION	3	5.15	Show-room Program	16
2.1	Control panel disassembling	3	5.16	Self test Program	16
2.2	Control and Power module disassemble	3	5.17	Test Program	17
2.3	Door hinge change over	4	6	REPAIR	18
3	OPERATION	6	6.1	Opening the refrigeration circuit	18
3.1	Control Panel	6	6.2	Leaks on Intake Side	18
4	COMPONENTS	7	7	FAULT DIAGNOSTICS	19
4.1	Touch control	7	7.1	Appliance does not start	19
4.2	Power and control module	7	7.2	Refrigerator compartment not cold enough	20
4.3	Fan	7	7.3	Refrigerator compartment too cold	21
4.4	Motorized flap	8	7.4	Condensation formation in the refrigerator compartment	21
5	FUNCTIONS	9	7.5	Noise	22
5.1	Cooling System	9	7.6	Broken drainage tube	23
5.2	Electronic control	10	7.7	Gap between flap and chiller drawer	26
5.3	Refrigerator temperature control	10	7.8	Icing evaporator	27
5.4	Freezer temperature control	10	8	Technical Specifications	34
5.5	Motorized flap	11	8.1	NTC sensor values	34
5.6	Fan	11			
5.7	NTC sensor	11			
5.8	Freezer super function	12			
5.9	Refrigerator super function	12			
5.10	Defrost	13			
5.11	Alarm Functions	14			

1 SAFETY

1.1 Safety tips



Danger!

- ▶ The repairs must be carried out by specialised personnel.
- ▶ Inappropriate repairs may cause harm to the users.
- ▶ The housing and the frame may be submitted to voltage in the case of a fault.
- ▶ Do not touch any part inside the appliance, the electronic module could be subject to high voltage.
- ▶ Disconnect the appliance from the mains before dismantling it. On the inside there are parts subject to high voltages.
- ▶ Always use a current breaker if tests with voltage are required.
- ▶ The earth connection must not exceed the standardised values. This is extremely important for the safety of the people and functionality of the appliance.
- ▶ After the repair, VDE 0701 tests must be carried out, or following the specific standards of the country.
- ▶ Carry out a leaktightness and operation test on the cold system.

1.2 Repair tips



Warning!

- ▶ Never try to repair by indiscriminately exchanging components.
- ▶ Proceed systematically and bear in mind the technical documentation of the appliance.
- ▶ Electronic modules must not be repaired; they must be replaced by original parts. The exceptions are documented separately.
- ▶ If repairing the cold circuit, always wear protection goggles and gloves. In case of contact with eyes, rinse with plenty of water.

The pipes must be joined together by welding. To do so, Lokring connections must be used.

2 INSTALLATION

2.1 Control panel disassembling

The control panel is fixed with a double side sticker.



The disassembling of the control panel should start on the upper side of the part to avoid breaking it. First unclip one side.



And then the other.



2.2 Control and Power module disassemble

Disassemble the upper left cover and take out the fixing screw.



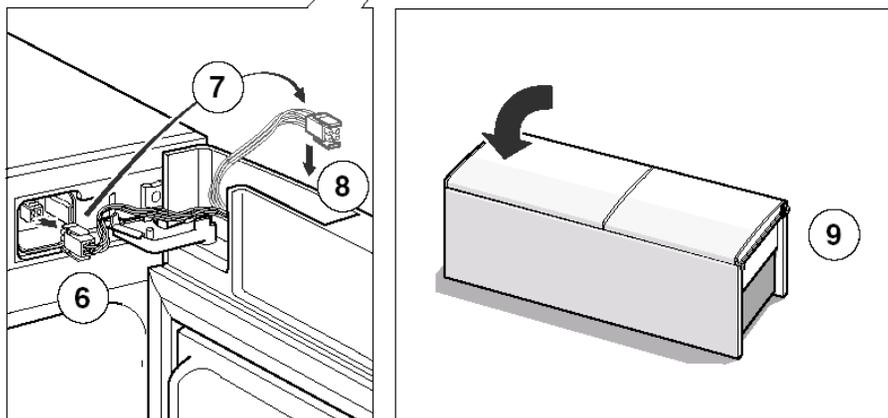
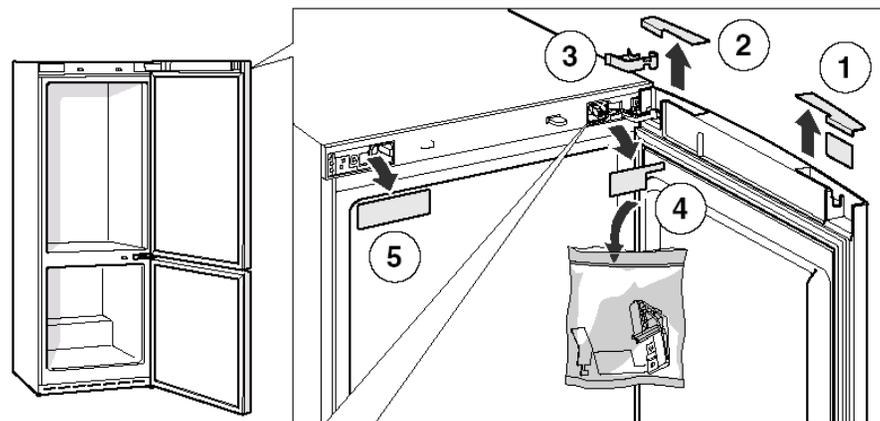
Use the two slots to unfix it.

The cover is blocked on the right side by the hinge. The only way to take it completely out is to disassemble also the doors.

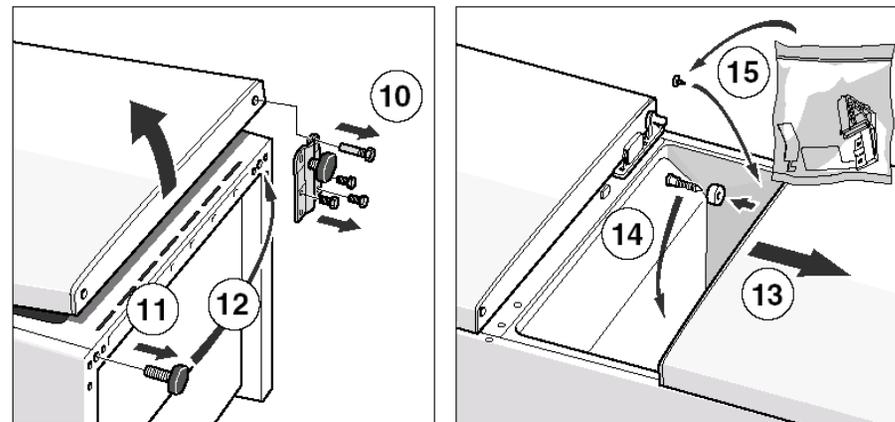


With the help of a tool, distance the cover from the appliance.
Loose the clips with a screwdriver and take out the module.

2.3 Door hinge change over

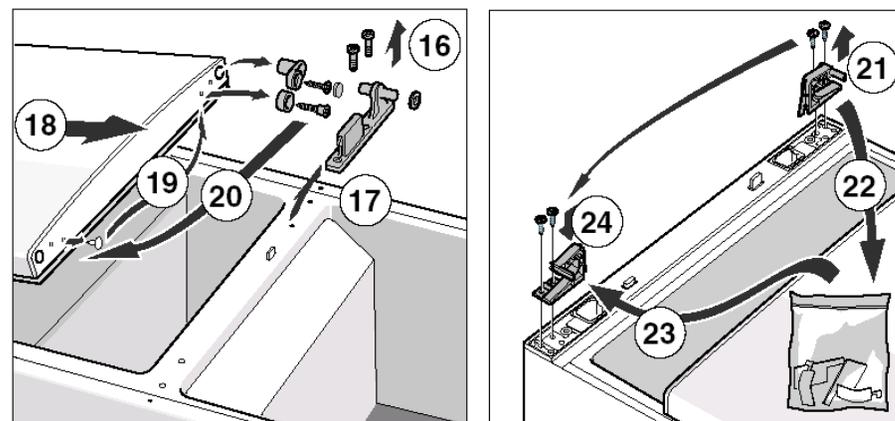


Remove the covers of the front panel, of the door and the hinge.
Disconnect the electrical connection of the door.
Lay the appliance



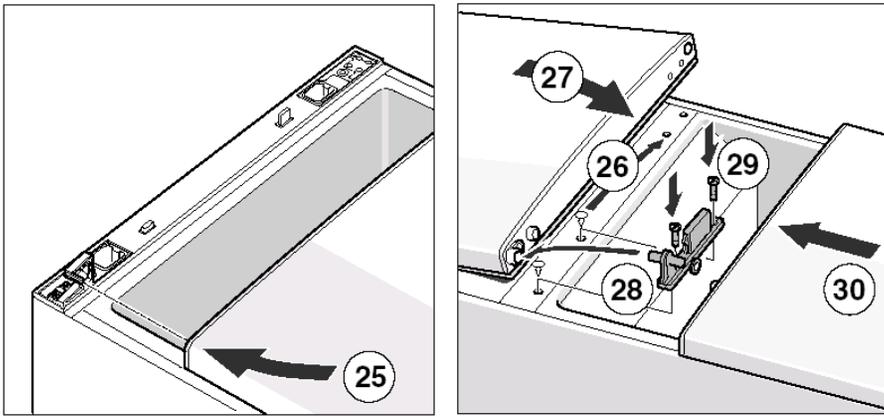
Remove the foot and the lower hinge.

Change the position of the door stopper and close the hole on the door.

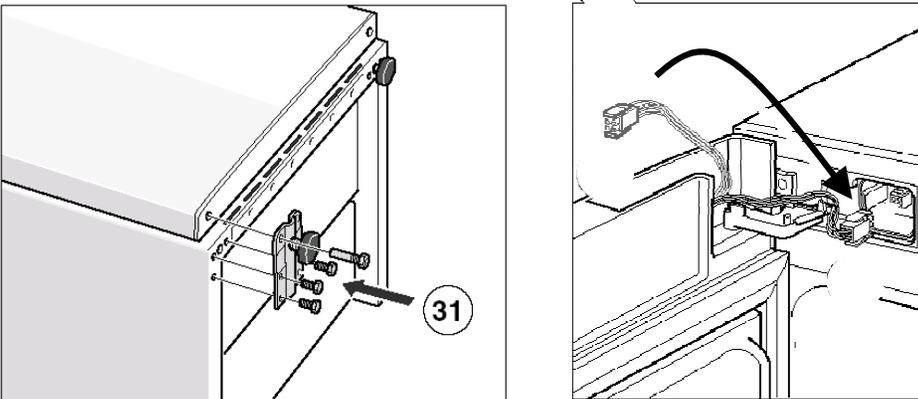


Remove the middle hinge.

Put the upper hinge included in the mounting kit.



Install the upper door and the middle hinge.

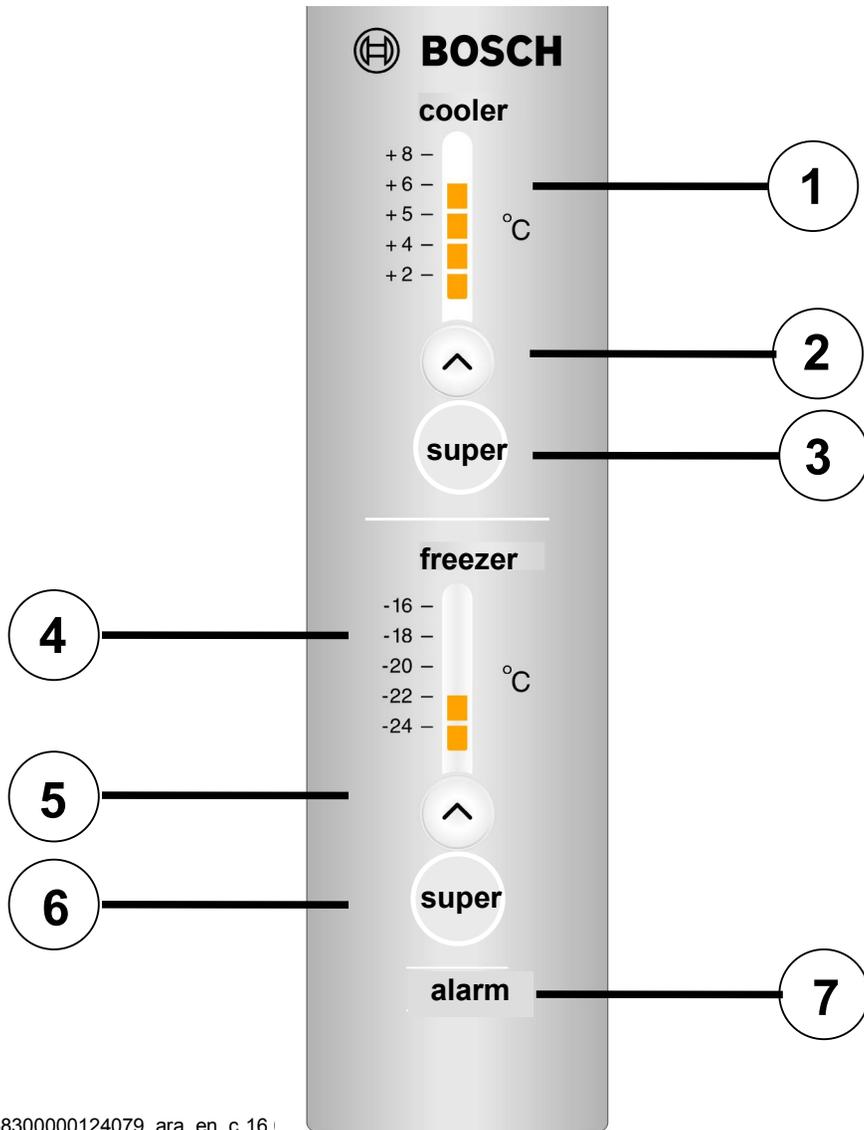


Install the lower hinge and the foot.

Connect the electrical connection on the upper door.

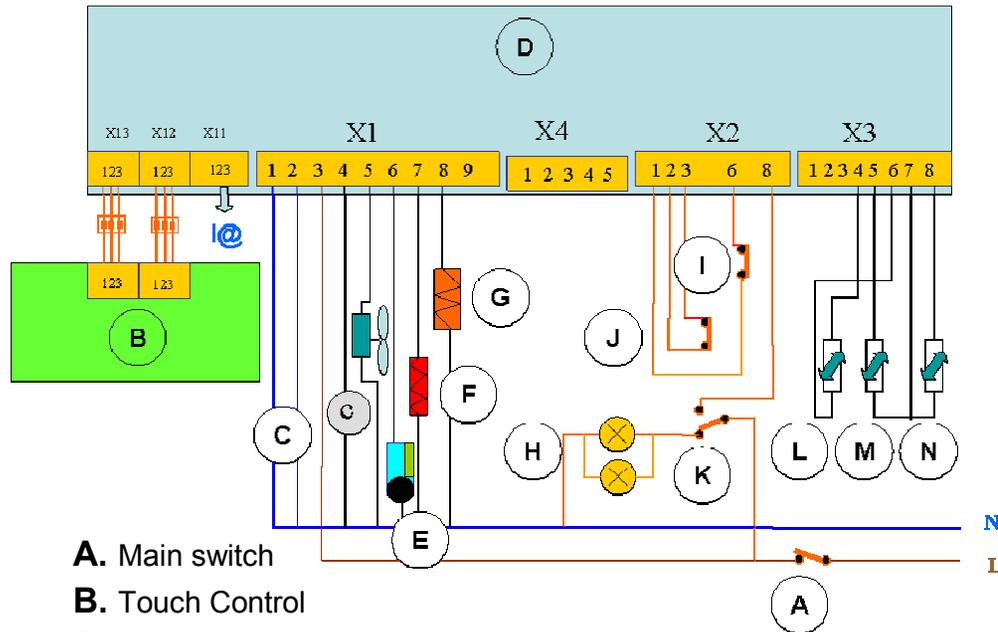
3 OPERATION

3.1 Control Panel



- 1.-Refrigerator Temperature indicators
- 2.-Touch control buttons for refrigerator temperature selection
- 3.-Refrigerator super button
- 4.-Freezer Temperature indicators
- 5.-Touch control buttons for freezer temperature selection
- 6.-Freezer super button
- 7.-Alarm button

4 COMPONENTS



- A. Main switch
- B. Touch Control
- C. Compressor
- D. Power and control module
- E. Motorized flap
- F. Flap heater
- G. Defrost heater
- H. Lamps
- I. Freezer door switch
- J. Flap switch
- K. Refrigerator door switch
- L. Evaporator sensor
- M. Freezer sensor
- N. Refrigerator sensor

4.1 Touch control

The touch control (9V) is used to select the desired temperature on both compartments, freezer and refrigerator.

4.2 Power and control module

The control and power module control all the components of the appliance to regulate the temperature in both compartments. It also controls when a defrost cycle should begin.

With the values of temperature given by the NTC, the appliance regulates the exact selected temperature by starting and disconnecting the compressor, the fan, the flap motor and the defrost heater.

4.3 Fan

A fan moves the cold air produced in the freezer into the refrigerator through a motorized flap.



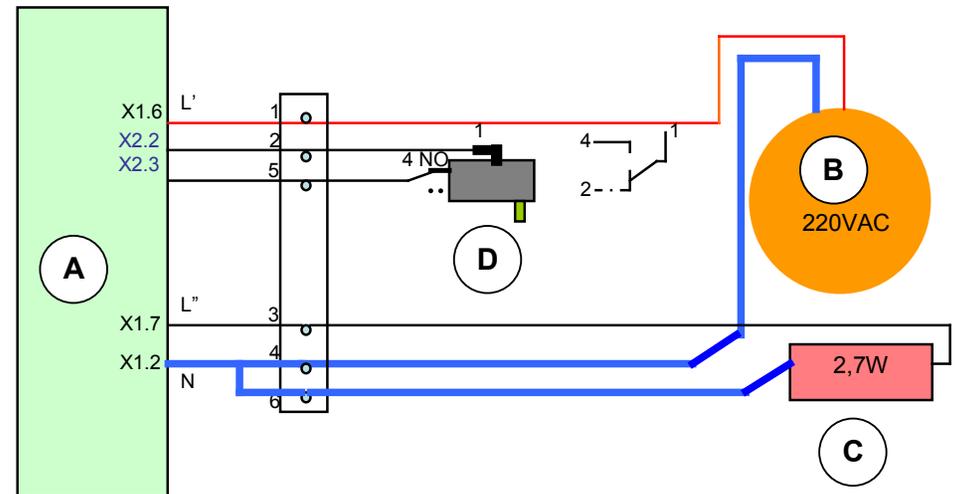
4.4 Motorized flap



An electrical motor opens the air channel that connects the freezer and the refrigerator together and allows the movement of cold air from the freezer to the refrigerator.

It is placed in the lower part of the refrigerator air channel.

An electrical heater of 2,7W prevents the ice building on the flap while it remains closed.



A. Control and power module

B. Motor

C. Flap heater

D. Micro switch

An electrical motor opens and closes the flap.

When the flap is open, it presses a micro switch that informs the control mode about the position of the flap.

The flap remains open when the refrigerator needs to be cold and always during 30 seconds after closing any door of the appliance.

While the compressor is out of function, the flap opens always when the fan is switched on.

5 FUNCTIONS

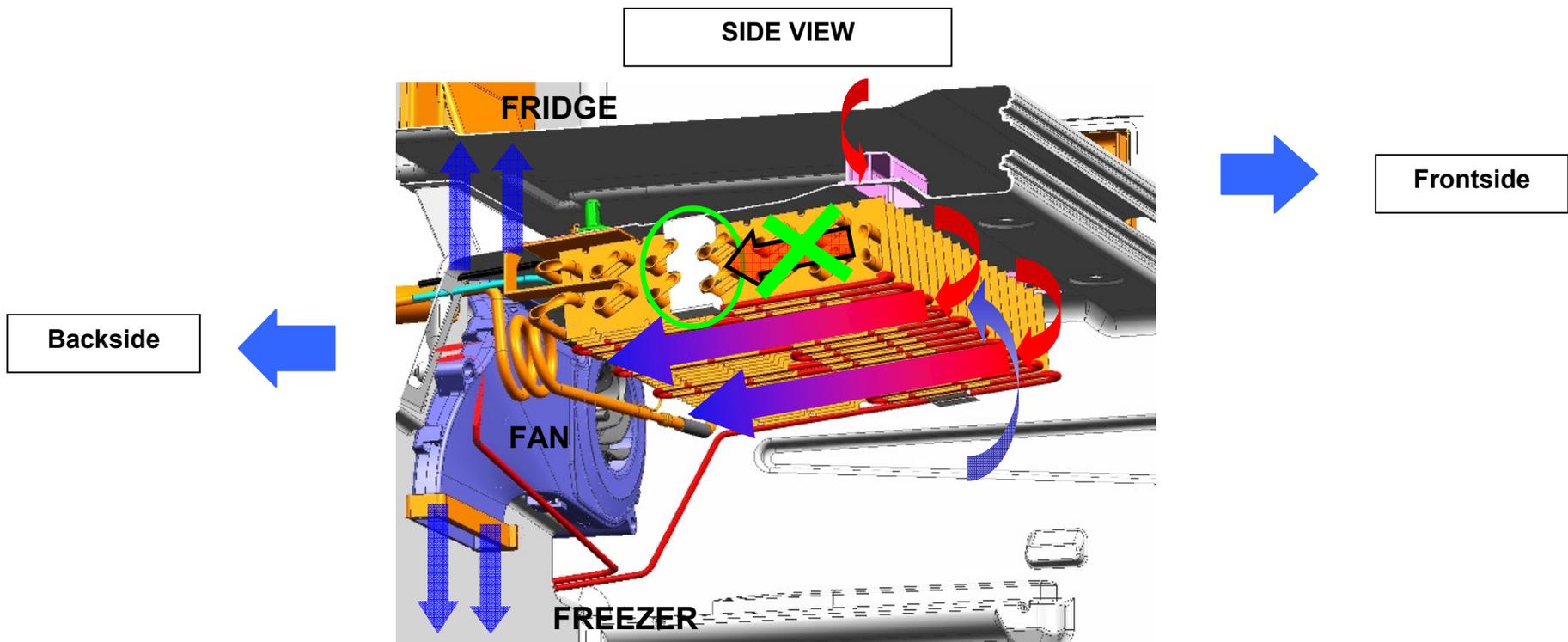
5.1 Cooling System

The lamellar evaporator features an electric heater and a circulating air fan. By using a defrost heater the evaporator is automatically defrosted. Behind the evaporator a radial fan is located, which assures the supply of cold air to the cooling system.

By means of the defrosting heater, snow/ice on the evaporator is defrosted. The defrosting of the evaporator is controlled automatically.

Air blowing into the fridge compartment is recessed by a motorized flap.

The compressor works when one of the compartments demands cold.

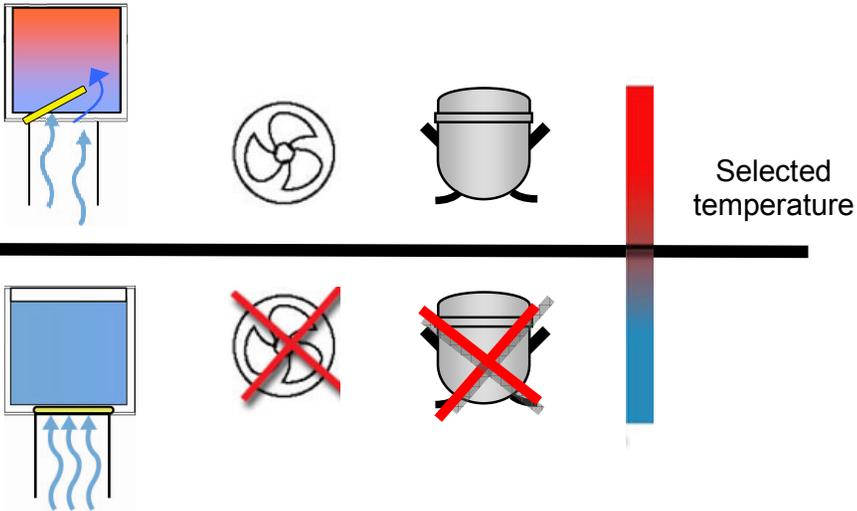


5.2 Electronic control

The appliance has two NTC's to control the temperature of the refrigerator and the freezer.

5.3 Refrigerator temperature control

When the refrigerator temperature rises, the control module connects the flap motor that opens the air channel from the freezer, the fan and the compressor. Once the selected temperature is reached, it disconnects the fan and the compressor and also closes the flap.



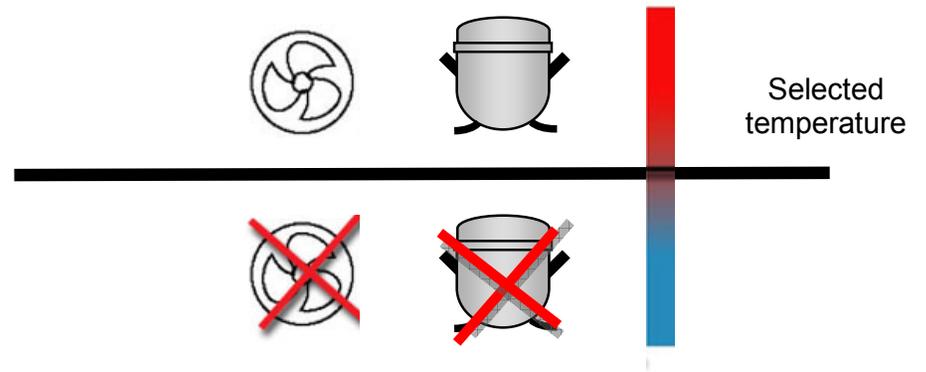
	T ^a connection	T ^a disconnection
T ^a refrigerator	$\geq T^a \text{ selected} + 3K + \text{hysteresis}$	$\leq T^a \text{ selected}$

The compressor has 10 minutes restart delay.
The fan works parallel to compressor.

5.4 Freezer temperature control

When the freezer temperature rises, the control module connects the fan and the compressor. Once the selected temperature is reached, it disconnects both components.

	T ^a connection	T ^a disconnection
T ^a freezer	$\geq T^a \text{ selected} + 3K + \text{hysteresis}$	$\leq T^a \text{ selected}$



5.5 Motorized flap

The flap remains open when the refrigerator needs to be cold and always during 30 seconds after closing any door of the appliance.

While the compressor out of function, the flap opens always when the fan is switch on.

5.6 Fan



The fan runs always when the compressor is running.
When any door is open, the fan stops.

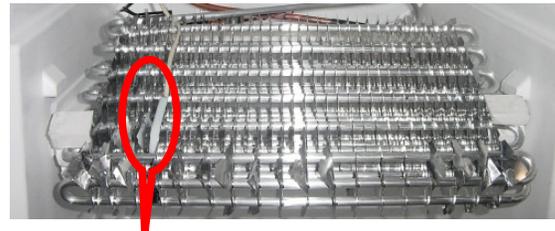
After closing the door of the appliance, it remains 30 seconds running.
After a defrost cycle, it only starts if the evaporator is colder than -18°C or 60 minutes after the end of this defrost cycle.

When the compressor has not been running for longer than 60 minutes the fan starts working on cycles, 2 minutes ON and 15 minutes OFF.

5.7 NTC sensor

The appliance features three changeable NTC sensors.

The freezer evaporator (defrost sensor) ends the defrosting automatically. By looking from the front, the sensor is located between the 3rd and 4th left sided lamella of the evaporator.



Freezer sensor: controls the temperature on the freezer.

Refrigerator sensor: controls the temperature on the refrigerator.

5.8 Freezer super function

Activated by touching the freezer super button.

The appliance runs as the selected temperature was -32°C. The refrigerator remains in normal mode.

If the super function is activated while the appliance is defrosting, it will just start after the defrosting has ended.

During the super function, the defrost cycles are started as usual.

5.9 Refrigerator super function

Activated by touching the refrigerator super button.

The appliance runs as the selected temperature was 4°C. The freezer remains in normal mode.

The super function ends when the super button is touched again, or after 6 hours.

If the super function is activated while the appliance is defrosting, it will just start after the defrosting has ended.

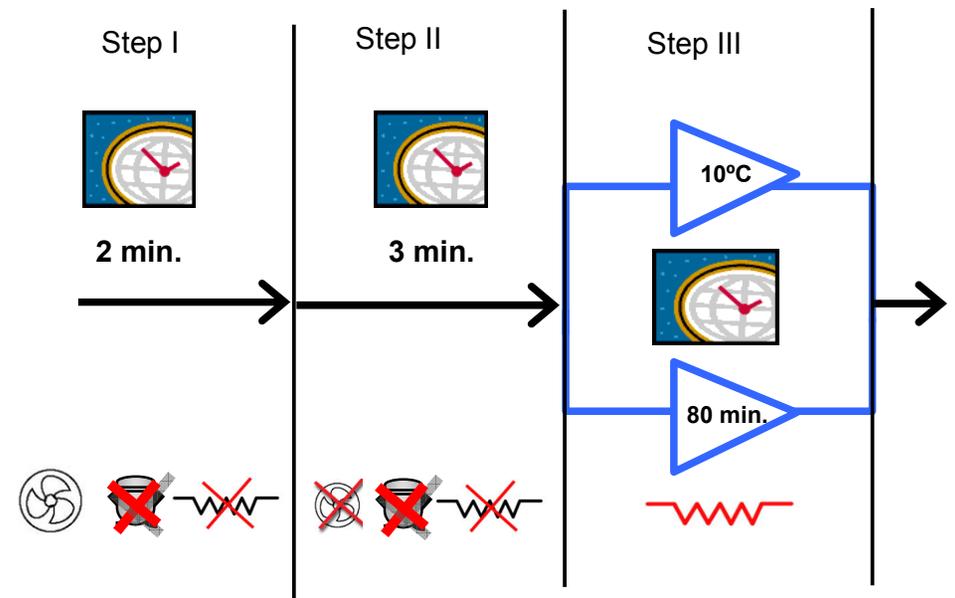
During the super function, the defrost cycles are started as usual.

5.10 Defrost

A defrost cycle is started depending on these factors:

- Duration of the last defrost cycle,
- The added compressor running time.
- The duration of a compressor running time
- The door openings.

A defrost cycle is started a minimum of 8 hours after the last defrost or a maximum time of 72 hours.



Defrost process

If a defrost cycle should start while the compressor is running, it will be delayed until the compressor stops or a maximum of 20 minutes.

STEP I: For 2 Minutes, runs only the fan.

STEP II: For 3 minutes all the components are switched off.

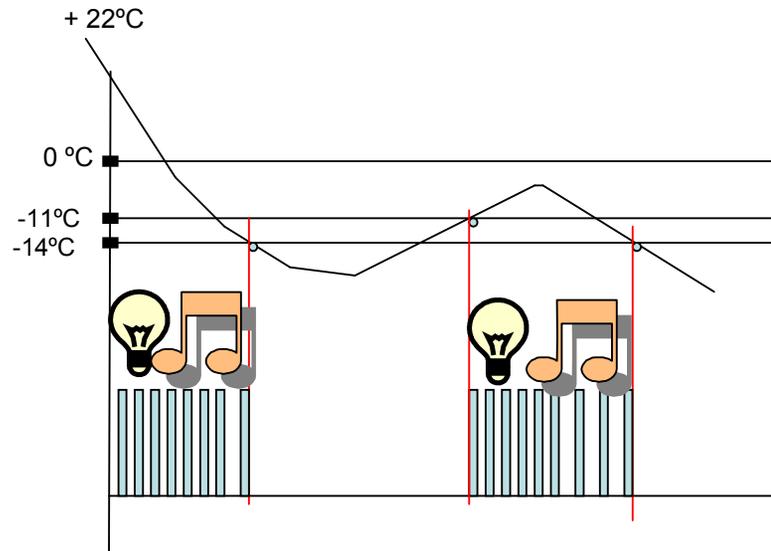
STEP III: The defrost heater is switch on until the evaporator temperature reaches 10°C or a maximum of 80 minutes.

Afterwards, the appliance is switched to regular operation. The fan can only start if the evaporator temperature reaches -14°C or after 60 minutes are passed.

5.11 Alarm Functions

The appliance has two alarms, a temperature alarm and a door alarm.

5.11.1 Temperature alarm



The temperature alarm **starts** when the refrigerator sensor detects temperature lower than -11°C during at least 45 minutes.

It activates the alarm buzzer and the alarm LED blink.

The buzzer can be deactivated by touching the alarm LED.

The temperature alarm is **deactivated** once the freezer reaches -14°C.

5.11.2 Door alarm

The **acoustic signal is activated** when the refrigerator door remains more than **120 seconds** open or when the freezer door remains more than **60 seconds** open.

The alarm **deactivates** when the door is closed or after 1 hour.

5.12 Energy saving

After 24 hours without opening any door, the control panel switches automatic to the energy saving modus. The control panel will be illuminated with less intensity.

5.13 Behavior in case of failure

5.13.1 NTC Failure

NTC	Temperature	Behavior
RCS	$\geq 60^{\circ}\text{C}; \leq -55^{\circ}\text{C}$	20 min: ON 15 min: OFF
FCS	$\geq 60^{\circ}\text{C}; \leq -55^{\circ}\text{C}$	20 min: ON 15 min: OFF
FCES	$\geq 60^{\circ}\text{C}; \leq -55^{\circ}\text{C}$	Defrost cycle: heater always 45 minutes ON

5.13.2 Flap micro switch failure

Error: status of the contact did not change after the flap motor has run for 1 minute.

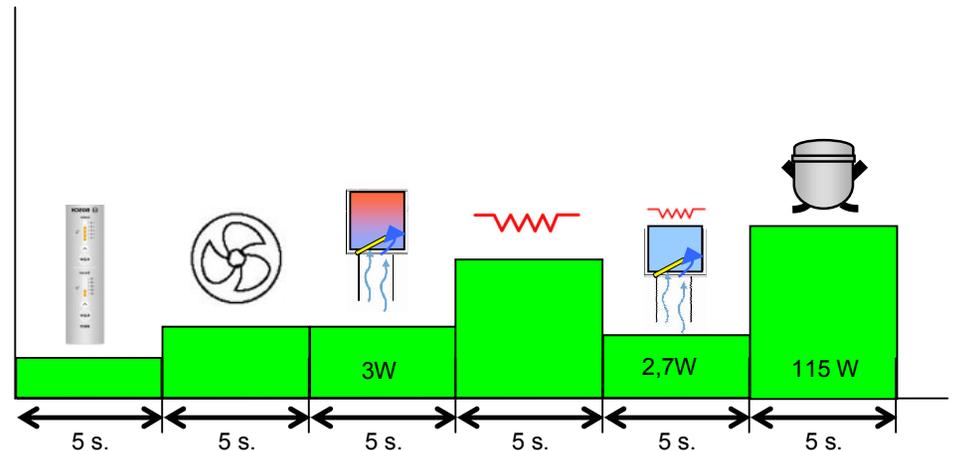
Behavior: the flap motor is switched off. The motor will not be activated after a minimum of 30 minutes

5.13.3 Door micro switch failure

Error: the electronic detects a door open longer than 60 minutes.

Behavior: the appliance works as if the door was closed.

5.14 Start-up Program



The start-up program is activated if all temperature sensors measure temperatures between 10°C and 60°C while switching on the appliance.

Each load of the appliance is switched on during 5 seconds:

1. Electronic modules
2. Fan
3. Motorized flap
4. Defrost heater
5. flap defrost
6. Compressor
7. Begin the normal function.

To the consumption value of each individual component, it must be added the consumption of the electronics.

5.15 Show-room Program

START

Touch the super button for 10 seconds until 1 acknowledge tone sound. The showroom mode will be activated.

DEACTIVATION:

Switch off the appliance

The show room mode activates just the fan and the inner illumination of the appliance.

5.16 Self test Program

The self-test program can just be activated within 10 seconds after switching on the appliance.

START: Touch the refrigerator or freezer **super** button for 8 seconds until **2 acknowledge tone** sound. The self test begins.

Loose the button and wait for the result:

- 2 acknowledge tones → No failure
- 5 acknowledge tones → the appliance has detected a failure

This program detects if there is a failure on the NTC's, on the flap motor or the electronic modules, but not if there is a failure with the power consumption of this components.

5.17 Test Program

The test program can just be activated within 10 seconds after switching on the appliance.

START: Touch the refrigerator or freezer **super** button for 10 seconds until **3 acknowledge tone** sound. The test begins.

Loose the button, the LED for the lowest temperature is illuminated.

Step activation

Touch the super button

Move to the next step

Touch the temperature selection button.

DEACTIVATION:

- Disconnection of the appliance, o
- 5 minutes alter touching no button o
- Alter the defrost step has finished.

Paso 1: NTC verification

If the Alarm LED starts blinking, the appliance has detected a failure in one of the NTC's, it is shortcut or open.

Step 2: Fan LED -24

Touch super button to activate the fan.

Step 3: Motorized flap LED -22

Touch the super button to open and close the flap. When it is open, the alarm LED will be illuminated.

Step 4: Defrost heater LED -22 and -24

Touch the super button to activate the defrost heater.

Step 5: Flap heater LED -20

Touch the super button to activate the flap heater.

Step 6: Compressor LED -20 and -24

Touch the super button to activate the compressor

Step 7: Defrost LED -20 and -22

Touch the super button to activate a defrost cycle, which is described on the defrost chapter.

6 REPAIR

6.1 Opening the refrigeration circuit



Whenever the refrigeration circuit is opened, always replace the drier before evacuating and filling the refrigeration circuit.

6.2 Leaks on Intake Side

If the refrigeration circuit leaks on the intake side, resulting in repairs, always replace the compressor and drier.



If atmospheric humidity penetrates the refrigeration circuit, the oil in the compressor will be contaminated.

7 FAULT DIAGNOSTICS

7.1 Appliance does not start

Consequence	Cause / Measures	Remedial action
	Power supply – No power supply – Power supply = 160 V	If the power supply is in working order, replace the electronics module
	Main switch does not actuate	Replace the main switch
	Check wiring	Repair the wiring
	Check compressor	
	Check temperature sensors	Change sensors if necessary

7.2_Refrigerator compartment not cold enough

Consequence	Cause / Measures	Remedial action
No air circulation in the refrigerator and freezer compartments when the compressor is running	Check the fan	
	Check power supply to the fan	Replace fan
	Fan mechanically blocked	Eliminate cause of the blockage
	Incorrect or no connection	Repair connection
	Function of the light switch	Replace switch
	Check the flap	
	Function of the flap thermostat	Replace flap motor
	Flap mechanically blocked	Eliminate cause of the blockage
	Check evaporator area	Evaporator area and air ducts must be free of ice, see Checking the evaporator
	Flap micro switch	Replace micro switch
	NTC defect	Replace sensor
Fan noises	Check position and attachment of the fan (fan blade touching fan housing cover)	If required, re-attach fan
High condensation in the area of the air outlets in the refrigerator compartment	Air outlets have been blocked by stored food	Advise customer.
Inadequate cooling capacity despite air circulation	Check selected damper thermostat position	select colder position, advise to read the manual
	Check air duct seal	If required, replace the seal and attach the air duct

7.3_Refrigerator compartment too cold

Consequence	Cause / Measures	Remedial action
Too cold temperatures.	Selected temperature too cold	Advice customer
	Defect flap	Replace flap
	Temperature sensor defect	Replace temperature sensor
Food frozen in the refrigerator compartment	Check whether the food has been stored directly in front of the air outlets	Advise customer.
	flap blocked in open position	Remove the blockage

7.4_Condensation formation in the refrigerator compartment

Consequence	Cause / Measures	Remedial action
Condensation formation inside the refrigerator compartment and on the internal equipment	Check cooling capacity in the refrigerator compartment	
	Check current input of the compressor	If required, replace compressor
	Check refrigeration circuit for leaks	Eliminate leaks and repair refrigeration circuit
	Check the door seal	If required, replace the defective seal
Condensation formation on some items of food and on parts of the internal equipment	Refrigerator compartment overloaded	Advise customer.
	Air outlets have been blocked by stored food	Advise customer.

7.5_Noise

Consequence	Cause / Measures	Remedial action
Noise	Fan motor Noise	Exchange fan
	Fan blade goes to fan housing	Exchange fan
	Fan Vibrations	Press screws (KGN) / to change joint
	Fan blade goes to wires / pipes	Put correctly the different parts
Crackling noises	Normal noise generation during the defrosting phase	Advise customer

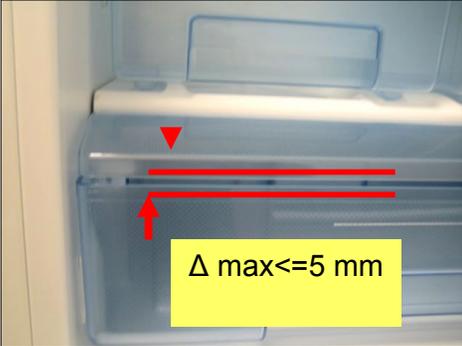
7.6 broken drainage tube

Consequence	Cause / Measures	Remedial action
Water leakage from the rear side of the appliance.	Broken drainage tube	<p>Step 1:The repair set (613832) consist of</p> <ul style="list-style-type: none">a) Elastic tube 350 mm which has at the end a sealing bearing.b) Plastic socket for adapting the water soft pipe.  <p>Step 2: Cut out any remains from old plastic adaptor</p> 

Consequence	Cause / Measures	Remedial action
		<p>Step 3: Apply silicon at the end of elastic bearing to seal the dew hole and from the other side apply baseline/grease in order to push easily the tube inside the hole .</p>  <p>Step 4: Push all the length of tube inside the water outlet hole and press with finger to be full fixed inside the cone of dew water hole .After pushing the tube inside the adaptor apply silicon at all perimeter of the adaptor and tube and then apply silicon on the bearing to be fixed well with the metal reinforcement</p> 

Consequence	Cause / Measures	Remedial action
		<p>Step 5: From rear side pull the tube in the adaptor part until it will be fixed to the metal reinforcement . After you cut the rest tube 20 mm after the end of adaptor.</p> 

7.7 Gap between flap and chiller drawer

Consequence	Cause / Measures	Remedial action
Gap between flap and chiller drawer		<p>The gap between flap and chiller drawer is tested and approved that has no functional influence. It is an optical effect and accepted from factories according drawing up to 5 mm.</p> 

6.3 Icing evaporator - Defrost and rework KGN appliances with frozen evaporator / drain hose

7 PREPARATION

Please wear Kevlar Palm Coated gloves where necessary to avoid cuts and take the necessary precautions to avoid water damage to the customers floor. Please wear safety shoes



Remove the drawers of freezer compartment.



Remove the screws of the evaporator cover.
Attempt to remove the evaporator cover.



Bang against the evaporator cover to loosen the ice.



Unplug the appliance.

To loosen the evaporator cover push down and rattle the cover (picture 1).
Then separate the evaporator cover with the heater from the evaporator (picture 2).

Advance to Step 2. If the cover cannot be taken out go to **Step 1.**

STEP 1 DEFROSTING WITH ADDITIONAL HOT WATER

Ensure that the appliance is unplugged from the mains.



Force hot water into the evaporator grill cover using the syringe with a hose attached until the cover is loose. Remove the cover by pulling it forwards, then disconnect the heater plug at the rear.

STEP 2 DEFROSTING OF THE EVAPORATOR

Bring the evaporator into the position and defrost the evaporator with hot water. Collect the melted water with one of the freezer trays.



Important



It is not allowed to use a hair drier or other electrical tool to defrost the evaporator

Precautions when repairing the refrigerant circuit in refrigerators containing refrigerant R 600A

R 600A is highly flammable, however explosive only in contact with air, within the limit values 1.3–8.5 % by vol. With the usual amounts which we use it would take a series of very unfortunate circumstances to ignite this mixture, however the following precautions must be taken when handling R 600A :

- provide good ventilation in the appropriate rooms (open windows and doors)
- keep ignition sources away (ignition temperature = 460 °C)
- No smoking!
- No naked flames (e.g. gas cooker, candle)

STEP 3 CHECK THE DRAIN TUBE



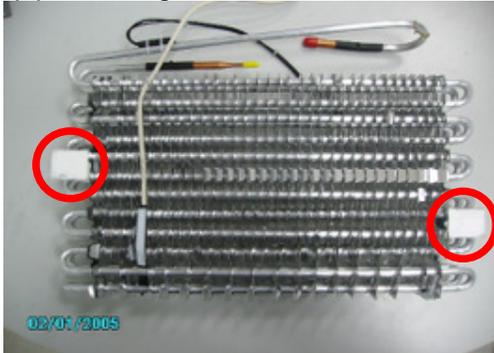
If drain tube is clear, advance to step 5
If drain tube is blocked advance to step 4

STEP 4 REWORK OF THE APPLIANCE

FOR APPLIANCES WITH FD <= 8706

Important note

Great care must be taken when moving the evaporator to avoid refrigerant flow restrictions or pipe breakages.



Check the polystyrene spacers to ensure correct location and that they have not been damaged on the evaporator prior to fixing the Aluminum sheet.



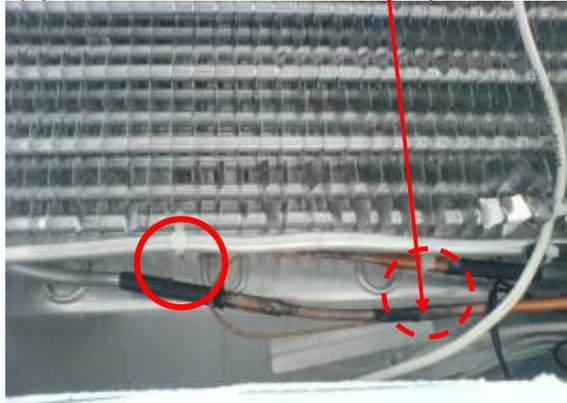
Check the heater cables. If there are any signs of damage to the cable/s replace the heater.



Remove the evaporator holders by pulling them out by hand only.



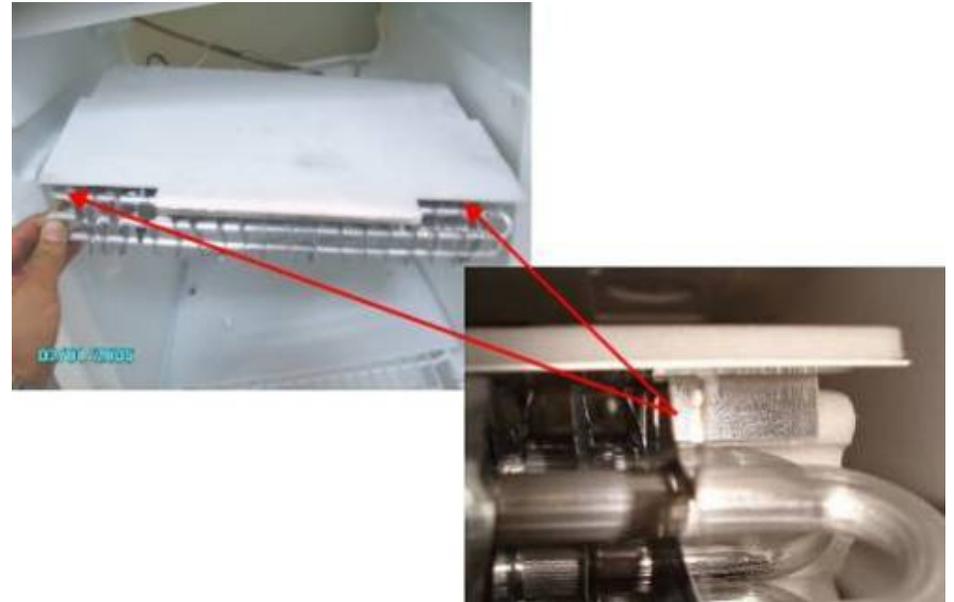
Fix the injection pipe to the bottom tube of the evaporator with a cable tie.



Fix the suction pipe to the top tube of the evaporator with the second cable tie.

Important:

Make sure, that there is no contact between the copper and aluminum tube (contact between copper pipe and fins are allowed). Ensure that the locks of the cable ties are facing upwards. See above picture.



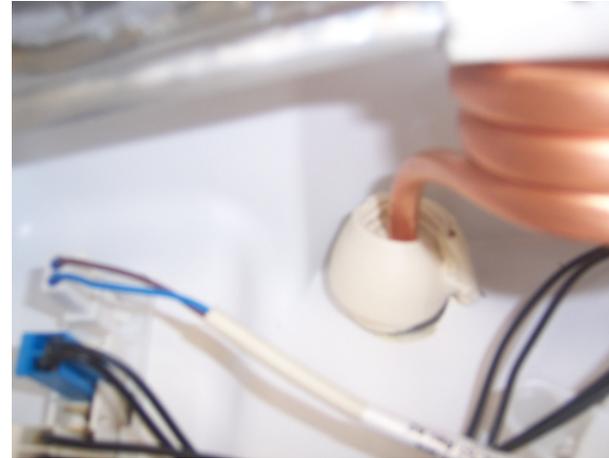
Place the Aluminum sheet on top of the evaporator; make sure, that the polystyrene spacer is positioned correctly in the designated area of the Aluminum sheet.



Bend the clips at both sides around the evaporator pipes.



Step 5
Evaporator cover with additional new bigger heater and aluminium sheet with screw.
See picture
Make sure that the heater,has contact to the aluminium tray.

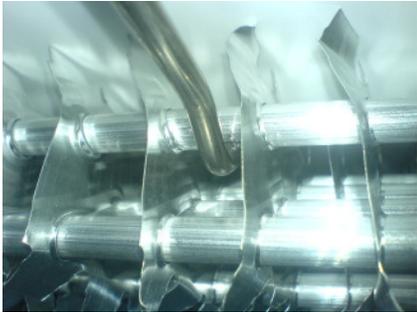


Evaporator suction tube outlet insulate with mass.

STEP 6 REASSEMBLE



Place the tool in the centre of the middle traverse. Pull the evaporator and hang the front tube into the hooks of the assembly tool.



Assemble the evaporator cover. Hold the evaporator cover and pull out the assembly tool.

Take care but you don't cut yourself with the thick



Refit the evaporator cover. Ensure that screws are reinserted into the nylon bush.

Step 7 Exchange of electronic

Remove the Cover part from the appliance (thin screw driver)
Remove the plug
Remove the PCB and replace it with the new one.

For Details, look in the repair instruction



USE THE WRIST STRAP PROVIDED TO ENSURE NO DAMAGE TO THE PCB BY ELECTROSTATIC DISCHARGE

Remake all connections. And refit the electronic to the Appliance

With FD>8706

Fitting only new evaporator cover with additional new bigger heater, according to the rework instruction.

Do not exchange the PCB

Step 8 Final test

Carry out the test program to ensure that all components are working correctly.

Use a water resistant pen and change the Appliance Index

Example : KI 01 then 90+1= KI 91

8 TECHNICAL SPECIFICATIONS

8.1 NTC SENSOR VALUES

Temp. °C	Res. kΩ								
-50	338,3	-29	83,42	-8	24,84	13	8,63	34	3,41
-49	314,8	-28	78,43	-7	23,54	14	8,23	35	3,27
-48	293,8	-27	73,78	-6	22,32	15	7,86	36	3,13
-47	274,1	-26	69,42	-5	21,17	16	7,50	37	3,01
-46	256,9	-25	65,35	-4	20,09	17	7,16	38	2,89
-45	237,7	-24	61,55	-3	19,06	18	6,84	39	2,77
-44	221,7	-23	57,99	-2	18,10	19	6,54	40	2,67
-43	206,9	-22	54,66	-1	17,19	20	6,25	41	2,56
-42	193,2	-21	51,54	0	16,33	21	5,97	42	2,46
-41	180,5	-20	48,61	1	15,52	22	5,71	43	2,37
-40	169,2	-19	45,88	2	14,75	23	5,46	44	2,28
-39	158,3	-18	43,31	3	14,03	24	5,23	45	2,19
-38	148,2	-17	40,90	4	13,35	25	5,00	46	2,10
-37	138,8	-16	38,64	5	12,70	26	4,79	47	2,02
-36	130,0	-15	36,52	6	12,09	27	4,58	48	1,94
-35	121,9	-14	34,52	7	11,51	28	4,39	49	1,87
-34	114,3	-13	32,65	8	10,96	29	4,20	50	1,80
-33	107,2	-12	30,89	9	10,44	30	4,03	55	1,495
-32	100,6	-11	29,24	10	9,95	31	3,86		
-31	94,49	-10	27,68	11	9,49	32	3,70		
-30	88,76	-9	26,22	12	9,05	33	3,55		