

# REPAIR INSTRUCTIONS

Side-by-side combined refrigerator-freezer

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# 1 SAFETY

## 1.1 Safety instructions



### Danger!

- ▶ Repair work must be conducted only by service engineers trained by the manufacturer!
- ▶ Improperly conducted repair work can entail considerable risk, damage, and injury for the user!
- ▶ There may still be voltage applied across the housing and frame when the appliance is malfunctioning!
- ▶ Do not touch any of the components in the appliance! Also the modules may still be carrying current from the mains!
- ▶ Always disconnect the appliance from the mains before you commence repair work!
- ▶ Always use an earth leakage circuit breaker when testing components carrying current!
- ▶ The protective earth terminal is crucial for personal safety and the correct functioning of the appliance. The standardised values must not be exceeded!
- ▶ On conclusion of the repair work, the appliance and its functions must be tested in accordance with VDE 0701 or the equivalent stipulations applying in your country!
- ▶ Check that the refrigeration circuit functions correctly and does not leak.

## 1.2 Repair instructions



### Caution!

- ▶ Observe the instructions for components with electrostatic shock potential.
- ▶ Never attempt repairs by exchanging components indiscriminately!
- ▶ Always proceed systematically, and observe the technical documentation supplied with the appliance!
- ▶ As a rule, electronic control circuits are not repaired, but replaced completely with an original part. All exceptions to this rule must be documented separately.
- ▶ Wear protective goggles and gloves when handling refrigerants. Should spraying or splashing refrigerant come into contact with the eyes, they must be rinsed with copious amounts of water.
- ▶ Tube joints in refrigeration circuits must not be soldered. Instead, Lokring unions must be used.

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## **2    INSTALLATION**

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This section does not apply.

### 3 OPERATION

#### 3.1 Function buttons



Button	Function
	Display OFF
	ACK (acknowledge) button
	SUPER button for freezer compartment
	SUPER button for refrigerator compartment
	Holiday button


	Alarm OFF
	Disabling button for dispenser
	Select button for drinking water
	Select button for crushed ice
	Select button for ice cubes
	Dispenser lighting
	Setting buttons for refrigerator and freezer compartment temperatures

## 3.2 Special control features


The control panel is on the dispenser in the freezer compartment door.


The top row of buttons regulates the appliance's functions, the bottom row the functions for dispensing water and ice.





Every push of a button on the appliance must be confirmed with the **ACK button** . Confirmation emits an acoustic signal.

## 3.3 Switching ON and OFF the appliance



To switch OFF the appliance, press and hold down the button  for the freezer compartment until three dashes appear on the display.

Now press the button .

To switch the appliance back ON, press and hold down the button  for the freezer compartment, and set the temperature you wish.

Now press the button .


## 3.4 Setting the temperature

To change the set temperature for a compartment, you must press the arrows   next to the respective temperature display.


The temperature for the freezer compartment can be set from  $-15\text{ }^{\circ}\text{C}$  to  $-23\text{ }^{\circ}\text{C}$ .

The refrigerator compartment can be set from  $0\text{ }^{\circ}\text{C}$  to  $7\text{ }^{\circ}\text{C}$ .


## 3.5 Holiday circuit

The holiday circuit is switched ON at the button . The LED above the button lights up. Holiday mode initiates the next defrosting phase as planned. The next phase, however, is not initiated until the compressor has run for 96 hours. The holiday circuit is switched OFF when one of the appliance's two doors is opened or the button is again pressed.

## 3.6 SUPER program – freezer compartment

The button  initiates the SUPER program for the freezer compartment. The LED above the button lights up. The freezer compartment is regulated at  $-23\text{ }^{\circ}\text{C}$ . The SUPER program's runtime can be defined in the service program. When this button is pressed again or 24 hours have passed, the appliance returns to normal mode with the original settings. The SUPER program's runtime can be edited in the test program.

## 3.7 SUPER program – refrigerator compartment

The button  initiates the SUPER program for the refrigerator compartment. The LED above the button lights up. The refrigerator compartment runs for ten hours at the coldest setting 9. When this button is pressed again or when ten hours have passed, the appliance returns to normal mode with the original settings. The SUPER program's runtime can be edited in the test program.

## 3.8 Alarm OFF button

The acoustic alarm can be switched OFF at the  button.


### 3.9 Display OFF button

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The temperature display can be switched ON and OFF at this button.

### 3.10 Disabling the dispenser buttons

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The button  disables the buttons for dispensing water and ice. The LED above the button lights up.

### 3.11 Select buttons for modes

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These buttons select the dispensing mode. The LED above the pressed button lights up.



The following functions are available:

-  for dispensing drinking water
-  for dispensing crushed ice
-  for dispensing ice cubes

### 3.12 Dispenser lighting



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The dispenser lighting is switched ON at the button . Next to the button is a light sensor that registers the ambient brightness. In darkness the dispenser lighting is regulated at half power. The dispenser lighting is regulated at full power for as long as the dispenser lighting button is pressed.

This auto function can be switched OFF when the buttons  and  for the freezer compartment are pressed at the same time.



### 3.13 Sabbath mode

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This function lets you switch OFF all displays and LEDs on the dispenser panel. To activate this function, press the buttons  and  at the same time for three seconds. Repeat the procedure to deactivate the function.



### 3.14 Disabling the control buttons

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All the buttons for operating the appliance in the top row can be disabled. To activate this function, press the buttons  and  at the same time for three seconds. Repeat the procedure to deactivate the function.

### 3.15 Filter display

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When the appliance is operating the green LED for the filter display lights up. After a throughput of 1,890 litres or a period of twelve months, the red LEDs light up. To reset the filter display after replacing a filter, press the buttons  and  at the same time for three seconds.

Changing the temperature display units



The temperature display can show values in °C or °F. Press the buttons  and  for the freezer compartment at the same time for three seconds.

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### 3.16 Display





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The right side shows the temperature in the freezer compartment, the left side the temperature in the refrigerator compartment.

The symbol  appears when a door is open, and the symbol  when the temperature in one of the two compartments has exceeded the alarm limit. Both symbols light up during the regulating process.

### 3.17 Demonstration circuit

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- ▶ Switch OFF the appliance.
- ▶ Press the buttons  and  at the same time for five seconds.
- ▶ To switch OFF the demonstration circuit, again press the buttons  and  at the same time for five seconds.

A power cut also switches OFF the demonstration circuit.

The control functions and lighting are in operating mode. No power-consuming components are activated.

### 3.18 Ice maker

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Pull down the wire frame on the ice maker to activate it. When the maximum supply quantity has been reached, the ice raises the wire frame and interrupts the ice making process. To switch OFF ice making, you must pull up the wire frame until it engages.

## 4 COMPONENTS

### 4.1 Electronic controller

The electronic controller is made up of two components, a power module and a control module.

The power module is installed against the left panel at the rear of the power room and is responsible for all power-consuming components. It also supplies the voltage for the control module.

The control module is installed behind the dispenser panel and receives the inputs from the NTC sensors and switches.

A serial data line connects both modules.

When the power module is supplied with voltage at 60 Hz, the temperature display is automatically set to °F. When the voltage is 50 Hz the temperature display shows °C.

### 4.1.1 Control module terminals

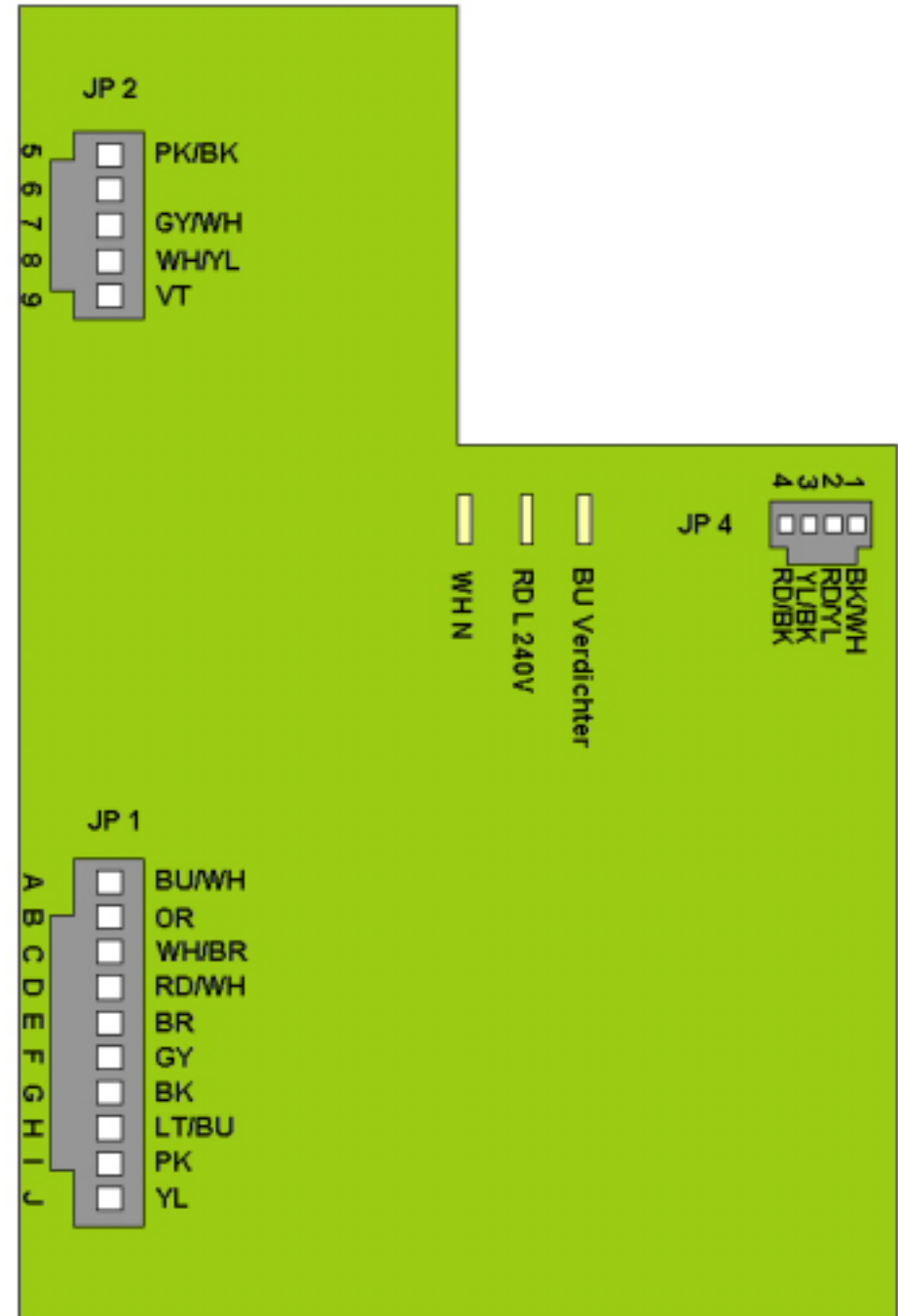
1	Earth
2	Data line to power module – receive
3	Data line to power module – send
4	+24 Vdc
5	NTC sensor – freezer compartment
6	NTC sensor – refrigerator compartment
7	Common terminal for NTC sensors
8	Dispenser switch
9	
0	Dispenser switch





#### 4.1.2 Power module connections

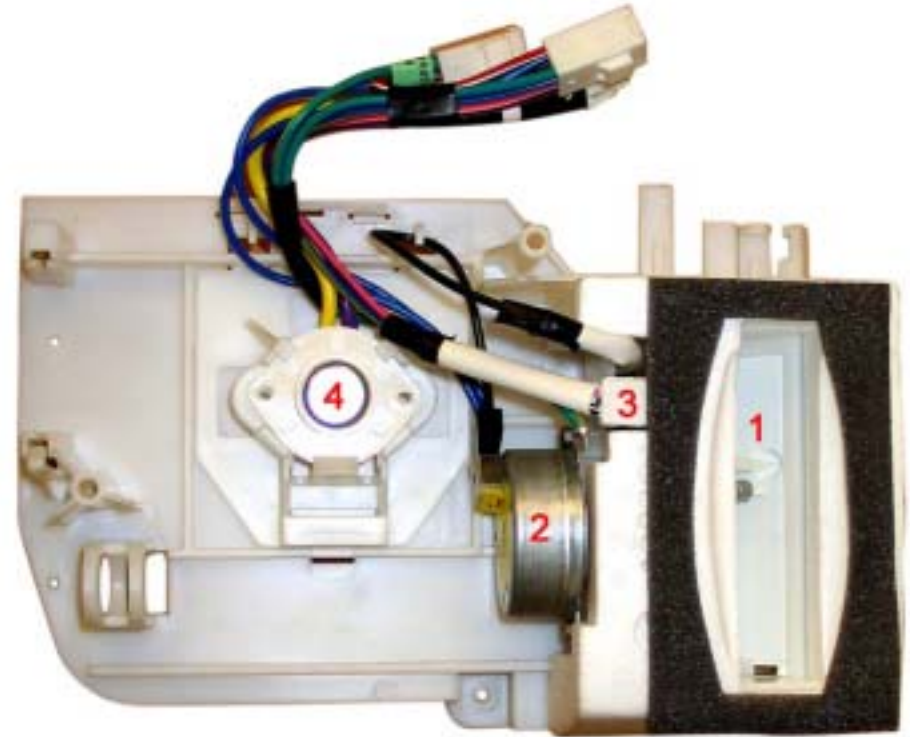
1	Earth
2	Data line to control module – receive
3	Data line to control module – send
4	+24 Vdc
5	Input for dispenser relay
6	
7	Ice dispenser flap
8	Water valve
9	Dispenser lighting, 130 V or 240 V
A	Spindle motor – clockwise
B	Spindle motor – anticlockwise
C	Door switch – refrigerator compartment
D	Defrosting heater
E	Door switch – freezer compartment
F	Defrosting END thermostat
G	Condenser fan
H	Open flap thermostat
I	Close flap thermostat
J	Evaporator fan



## 4.2 Electromechanical flap thermostat

An electromotive flap thermostat is used to regulate the temperature in the refrigerator compartment. This flap thermostat is installed beneath a cover at the top left of the refrigerator compartment, on the air duct from the freezer compartment.

The electromotor moves the push rod to open and close the air flap. The air flap's position is monitored by a limit switch with the two statuses open and closed. The motor continues opening the air flap until the limit switch is activated. The same applies to closing the air flap, when the second limit switch is activated.



- 1 regulating flap
- 2 drive motor
- 3 limit switch
- 4 NTC sensor

### 4.3 Defrosting heater

The evaporator in the freezer compartment is fitted with an electric heater installed underneath. A baffle plate behind the heater deflects heat to both the defrosting channel and drain.

The defrosting heater features in addition a safety temperature limiter. This cuts off the voltage supply to the heater when the temperature reaches 72 °C. When this limiter has been activated, it must be replaced. The new limiter's fuse link must be connected to the white marker on the defrosting heater:

defrosting heater            230 V / 435 W

resistance                    121 Ω



## 4.4 Ice and water dispenser

The ice and water dispenser is in the door to the freezer compartment. The dispenser is activated at the switch (1) on the dispenser's base. Switch (2) on the panel activates the drinking water dispenser at any time, irrespectively of the selected dispenser mode. The dispenser flap for ice cubes is opened and closed mechanically. A damper ensures that the flap is closed after a delay.

These units are fitted with a water tank for chilled drinking water. This water tank is installed behind the pull-out trays in the refrigerator compartment. The tank's contents may lose their freshness, i.e. taste insipid, when no water has been drawn off for long periods. In this event, empty the reservoir by drawing off about fifteen glasses of water.

All of the materials used for the drinks dispenser and water tank are odourless and tasteless. Should the water have acquired a foreign taste, this can have the following causes:

- ▶ mineral and chlorine content of the drinking water
- ▶ material of the domestic water and mains line
- ▶ water filter not replaced at the specified intervals



Pressing and holding down the dispenser button for longer than three seconds switches OFF and disables the dispenser. The LED above the disabling button lights up.





## 4.5 Water filter system

The appliance features an integrated water filter installed in the supply line to the ice maker and the drinking water tank. The filter cartridge is installed at the top right of the refrigerating compartment.

The filter must be replaced after a water throughput of 1,890 litres or after twelve months. A display on the dispenser panel will remind you to replace the filter, the green LED goes out, and the red LED lights up.

When the filter is not used, the lines are connected with a length of tube.

When a filter has not been installed, you can deactivate the filter display by pressing the buttons  and  at the same time for three seconds.



It is imperative that you observe the intervals for replacing the water filter!



## 4.6 Ice crusher unit

The spindle motor is installed behind the reservoir. The armature connected to the motor engages in the driving ring and rotates the screw in the ice cube reservoir. The ice crusher unit and the grinder are installed behind the cover on the front of the ice cube reservoir.

In **crushed ice** mode, the spindle is rotated clockwise, and the ice cubes are crushed between the jagged blades.

In **ice cube** mode, the spindle is rotated anticlockwise, and the flat sides of the blades convey ice cubes out of the unit:

spindle motor      230 V, 170 W  
                                 17 rpm

### Spindle motor's sense of rotation

- ▶ voltage across the blue and white line: clockwise as seen on the drive shaft
- ▶ voltage across the white and orange line: anticlockwise as seen on the drive shaft



## 5 FUNCTIONS

### 5.1 Refrigerator system

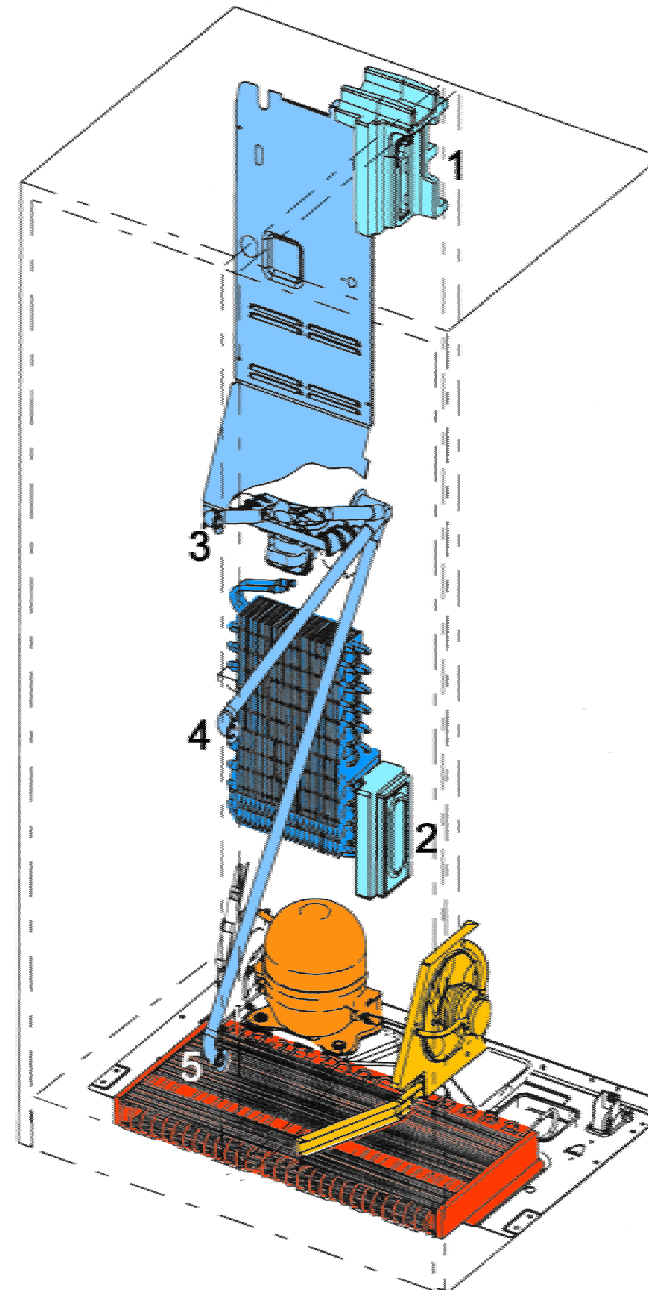
These appliances feature a single-circuit refrigerator system based on No Frost technology. The evaporator is installed behind the air guide in the freezer compartment. With this refrigerator system, a fan pumps cold air from around the evaporator and into the refrigerator and freezer compartments.

A regulating flap (1) diverts the cold air into the refrigerator compartment to maintain the temperature set there. The heated air from the refrigerator compartment returns through an air duct (2) to the freezer compartment. The greater part of the generated cold air enters the freezer compartment. The evaporator is defrosted by an electric heater activated by the electronics. The moisture generated by defrosting collects in a basin beneath the condenser.

Exclusively the air flap (1) is used to regulate the temperature in the refrigerator compartment. In addition, an unregulated supply of cold air leaves the freezer compartment through the air ducts and enters the meat keeper drawer (5) and the drinks compartments (2 and 3) in the door. Choosing a lower temperature in the freezer compartment extends the compressor's operating time.



**The meat keeper drawer and the provision compartments in the door can also experience temperatures under 0 °C!**



## 5.2 Temperature control

The temperatures in the appliance are regulated electronically. NTC sensors for detecting temperatures are installed in both compartments. The NTC sensor for the refrigerator compartment is installed on the flap thermostat unit, the NTC sensor for the freezer compartment behind the ice reservoir.

The temperature in the refrigerator compartment is regulated by an electromotive flap thermostat. When the refrigerator compartment requests refrigerating capacity, the flap thermostat opens and the evaporator fan in the freezer compartment activates, irrespectively of whether the compressor is running. In this manner the cold air from the freezer compartment enters the refrigerator compartment. Once the temperature set for the refrigeration compartment has been reached, the flap thermostat is closed and the fan switched OFF, provided that the freezer compartment does not in the meantime request refrigerating capacity.

The temperature in the freezer compartment is regulated by the compressor's runtime.

## 5.3 Temperature display

The displayed temperatures are mean actual temperatures.

The displayed value is always the mean temperature of the last thirty minutes. This prevents the temperature display from jumping between adjacent values.

## 5.4 Alarm function

The temperatures in the compartments are monitored by the electronics.

When the temperature in the **freezer compartment** exceeds  $-9\text{ °C}$  for two hours, both the alarm display and the display for the refrigerator compartment temperature flash.

When the temperature in the **refrigerator compartment** exceeds  $15\text{ °C}$  for two hours, both the alarm display and the display for the refrigerator compartment temperature flash.

The temperature must fall below the alarm threshold temperatures for two hours before the alarm status is ended.

## 5.5 Adaptive defrosting control

An electric heater is installed beneath the fin coil evaporator. After a certain time the evaporator is heated electrically and defrosted.

The defrosting heater is activated until the thermostat registers  $7.2\text{ °C}$ .

The smallest possible interval between defrosting processes is six hours, the largest 72 hours.

The defrosting interval is defined by an electronic system. This defined interval allows a defrosting time of fifteen minutes.

When the heating time of fifteen minutes is exceeded during the defrosting process, the interval to the next defrosting process is reduced by one hour for every extra minute the thermostat remains closed for defrosting.

When defrosting takes less than fifteen minutes of heating time, the interval to the next defrosting process is increased by one hour for every minute the thermostat has been opened before time.

When the thermostat remains closed for longer than the maximum defrosting time of thirty minutes, the interval between defrosting processes is reduced to six hours.

The defrosting intervals are defined by the electronics and cannot be modified.

When the compressor has been constantly running for six hours, the defrosting interval is immediately reduced to six hours.

When the door to the freezer or fresh refrigerator compartment is open for longer than ten minutes, defrosting is immediately initiated.

The compressor is not activated until six minutes after defrosting.



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## **6 REPAIRS**

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### **6.1 Initiating defrosting manually**

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You can initiate defrosting independently of adaptive defrosting control.

Press the switch in the freezer compartment door five times in succession within six seconds.

## 7 TROUBLESHOOTING

### 7.1 Error messages

The NTC sensors are monitored by the electronics. When an error has been detected, the appliance is regulated on the basis of the last five runtime cycles in memory. This means that the compressor's calculated runtime effectively doubles after defrosting.

#### 7.1.1 Sensor break

An error message is generated when the sensor or supply line is cut off.

The temperature display flashes on the compartment affected by the NTC sensor with the detected error. The error message **EO** appears.

A digital display showing the temperature -18 and the error code EO.

#### 7.1.2 Sensor short circuit

An error message is generated when the sensor or supply line short-circuits.

The temperature display flashes on the compartment affected by the NTC sensor with the detected error. The error message **ES** appears.

A digital display showing the temperature -18 and the error code ES.

#### 7.1.3 Communication error

An error message is also generated when there is no communication between the control and power modules.

When this error is detected for longer than one minute, the error is stored in the controller. When the error has not been eliminated after one hour, an error message appears on the display.

A digital display showing the word Error.

When an error has been detected, the appliance is regulated on the basis of the last five runtime cycles in memory.

Once communication has been reinstated between the modules, the error message disappears and the appliance returns to normal mode.

## 7.2 Service program

The controller comes with a service program divided into two subprograms: program A and program B.

All temperatures shown in the service program are in °F.


## 7.3 Conversion table: °F to °C


°F	°C
-22	-30
-13	-25
-8	-22
-4	-20
0	-18
5	-15
14	-10
23	-5
32	0
41	5
50	10
59	15
68	20


Formula for converting °F to °C:


$$^{\circ}\text{C} = \frac{^{\circ}\text{F} - 32}{1.8}$$

## 7.3.1 Invoking the service program

First of all, switch OFF the appliance. To do so, press and hold down the button  for the freezer compartment until three dashes appear on the display.

Now press the button .

Press the buttons  and  for five seconds. This is confirmed by three acoustic alarm signals.

Now press the buttons  and  for five seconds. This is confirmed by three acoustic alarm signals.

The temperature display switches to service mode.



**S** service program

**A** mode A

**01** position

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### 7.3.2 Navigating in the service program

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The temperature setting buttons for the refrigerator compartment jump back and forth in the service program.



The button  executes the test step.

The temperature setting buttons for the freezer compartment switch between the modes A and B.

Modifying a value in mode B must be confirmed within ten seconds at the button .

### 7.3.3 Exiting the service program

---

Press the buttons  and  to exit the test program. All modifications are stored. This is confirmed with three acoustic alarm signals.

When no button has been pressed for thirty minutes, the appliance returns automatically to normal mode.

## 7.4 Service program A

### 7.4.1 Program step 1, error displays

The appliance's functions are monitored when it is operating. Any errors occurring are stored by the electronics and appear on the right side of the display in this program step.

Display	Error
00	No error stored
CP	Compressor function
Cd	Condenser fan function
EF	Evaporator fan function
dP	Flap thermostat function
CL	Electronic modules communication
dH	Defrosting heater function
dC	Defrosting thermostat closed
dO	Defrosting thermostat open



Pressing this button clears the error memory.  
This is confirmed by three acoustic alarm signals.

### 7.4.2 Program step 2, compressor runtime

The compressor's mean run- and idle times appear on the display. These values are based on the last five switching cycles.

An **O** for the compressor runtime or an **F** for the compressor idle time appears on the left side of the display. The two temperature setting buttons for the refrigerator compartment toggles between the two.

### 7.4.3 Program step 3, supply to both compartments

The compressor is activated, and both compartments are supplied with the maximum refrigerating capacity. There is no regulation of temperature.

**Pd** lights up on the refrigerator compartment display.

### 7.4.4 Program step 4, fan control

The fan controller can be run in two modes selected at the temperature setting buttons for the refrigerator compartment.

Mode **I** (independent control)

The fan is activated when the refrigerator or freezer compartment requests refrigerating capacity.

Mode **d** (dependent control)

The fan is activated only when the freezer compartment requests refrigerating capacity.

#### 7.4.5 Program step 5, current temperature display

The current sensor temperatures in the refrigerator and freezer compartments appear on the display in °F.

#### 7.4.6 Program step 6, compressor activation

The ACK button activates the compressor for four minutes. The reactivation lock for the electronics is disabled.



Before activating the compressor a second time, first wait for at least six minutes to prevent the motor protection switch from triggering.

#### 7.4.7 Program step 7, compressor fan activation

The ACK button activates the condenser fan.

#### 7.4.8 Program step 8, evaporator fan activation

The ACK button activates the evaporator fan.

#### 7.4.9 Program step 9, regulating flap activation

The ACK button activates the regulating flap of the refrigerator compartment thermostat in both directions in succession with a short period between.

#### 7.4.10 Program step 10, opened door display

The number of times both doors have been opened over the last 168 hours appears on the display. Also displayed are the number of times the doors have been opened for longer than fifteen seconds and the longest time a door has been opened in minutes.

When a door has been open the longest at more than 99 minutes, - - appears on the display.

d	Number of opened doors
F	Doors opened longer than 15 s
L	Longest opened time

#### 7.4.11 Program step 10, defrosting thermostat status

The defrosting thermostat's switched status appears on the display.

dC	Thermostat contacts closed
DO	Thermostat contacts open

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## 7.5 Service program B

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### 7.5.1 Program step 1, correction value for freezer NTC

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The offset temperature for the NTC sensor can be modified at the setting button for the refrigerator compartment.

Setting range –8 to +8.

### 7.5.2 Program step 2, correction value for refrigerator NTC

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The offset temperature for the NTC sensor can be modified at the setting button for the refrigerator compartment.

Setting range –8 to +8.

### 7.5.3 Program step 3, defrosting control toggle

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You can toggle between adaptive and conventional defrosting control.

<b>A</b>	Adaptive defrosting control
<b>C</b>	Conventional defrosting control

Default is **A**, the adaptive control

### 7.5.4 Program step 4, SUPER refrigeration

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The program runtime for SUPER refrigeration can be changed in one-hour steps.

Default is ten hours.

### 7.5.5 Program step 5, SUPER freezing

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The program runtime for SUPER freezing can be changed in one-hour steps.

Default is 24 hours.

### 7.5.6 Program step 6, door alarm

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You can modify the delay until the door alarm activates. This is set in minutes with a maximum value of ten minutes.

Default is three minutes.

### 7.5.7 Program step 7, water filter capacity

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You can set the capacity of the water filter. The displayed value is in gallons.

Default is 500.

500 gallons	1,890 litres
1000 gallons	3,780 litres

### 7.5.8 Program step 8, ON and OFF freezer temperature difference

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You can modify the difference between the ON and OFF temperatures for the freezer compartment.

Changing this value affects the compressor's runtime, and therefore the regulation of temperature in the appliance.

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### 7.5.9 Program step 9, ON and OFF refrigerator temperature difference

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You can modify the difference between the ON and OFF temperatures for the refrigerator compartment.

Changing this value affects the regulation of temperature in the refrigerator compartment.

### 7.5.10 Program step 10, factory settings

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All values modified in the service program can be restored in this step. The controller returns to the factory settings.



The factory settings for offset, ON, and OFF temperatures are not restored!



## 8 SPECIFICATIONS

### 8.1 NTC sensor values

