Service Manual
KE 590-1-2T
KEL 580-1-2T

Küppersbusch

THE HEART OF A GOOD KITCHEN

GB

Service Manual: H8-71-05

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Contents

1. Safety

Danger!

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

To prevent electric shocks, please observe the following tips:

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

Caution!

Make sure you observe the following instructions:

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

Sharp edges: Use protective gloves.

Components may be electrostatic!
Observe handling precautions!

2. Technical data

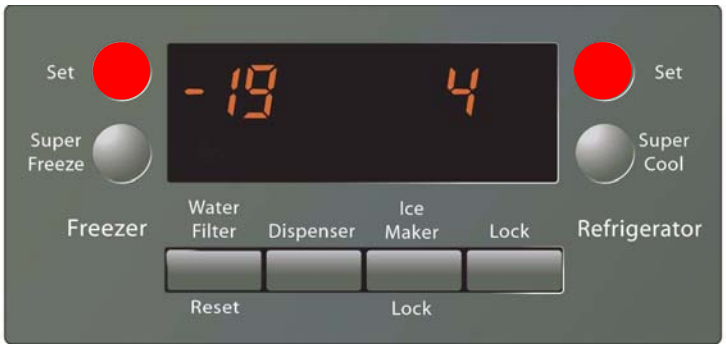
KE 590-1-2T

KEL 580-1-2T

Overall dimensions (HxWxD):	1790 x 903 x 733 mm
Net capacity:	537 l
Refrigerant:	R 600a
Refrigerant quantity:	76 g
Weight:	115 kg

3. Operation

3.1 Temperature setting



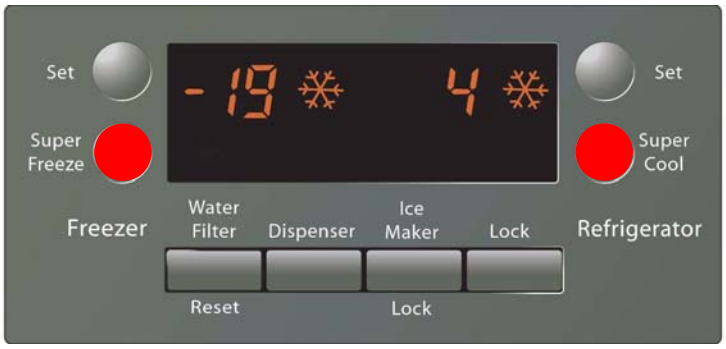
The temperature of the freezer compartment is set with the left-hand button for making settings.

Setting range = -16 °C – -22 °C
Factory setting = -19 °C

The temperature of the refrigerator compartment is set with the right-hand button for making settings.

Setting range = +2 °C – +8 °C
Factory setting = +4 °C

3.2 Super freeze / refrigeration



The coldest temperature setting is selected with the Super Freeze button.

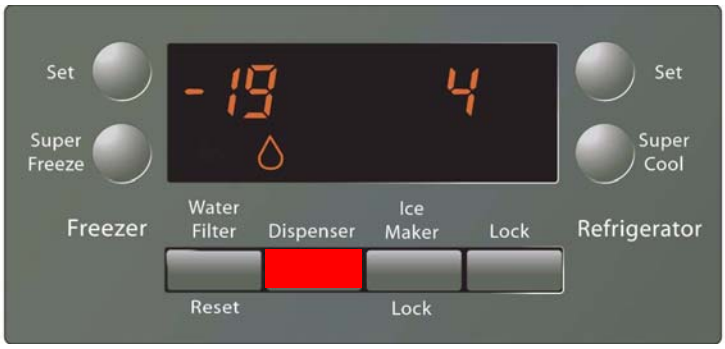
Coldest freezing temperature = -22 °C

The coldest temperature setting is selected with the Super Cool button.

Coldest refrigerator temperature = 2 °C

Pressing the button again will deactivate the Super Freeze/refrigeration function.

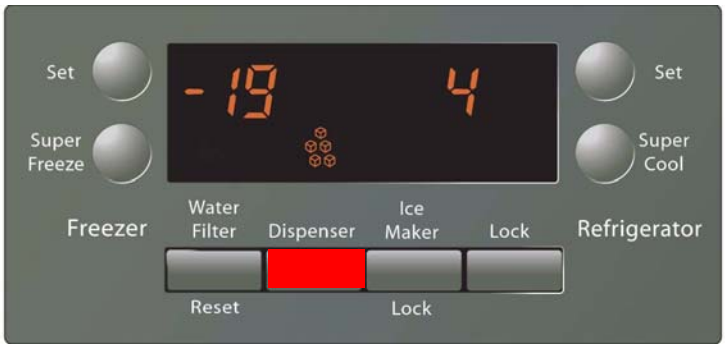
3.3 Dispenser button



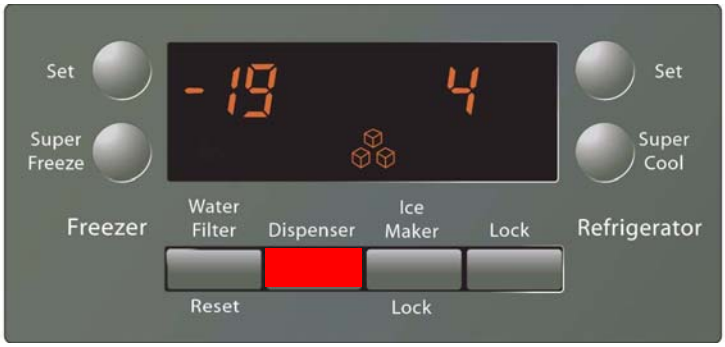
The dispenser button is used to select between three types of dispensing.

These three dispensing modes are: drinking water, crushed ice and ice cubes.

The drop symbol stands for drinking water.

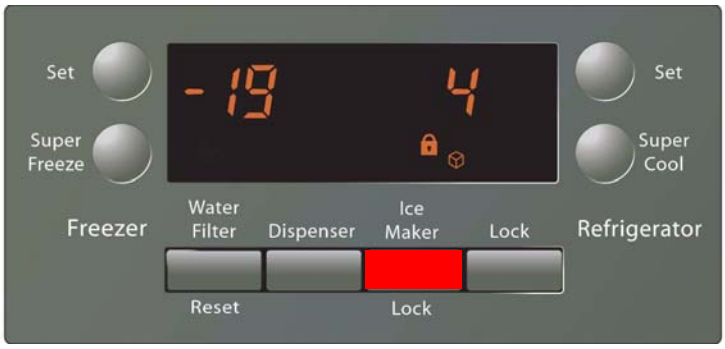


The “small ice cube” symbol stands for crushed ice.



The “large ice cube” symbol stands for ice cubes.

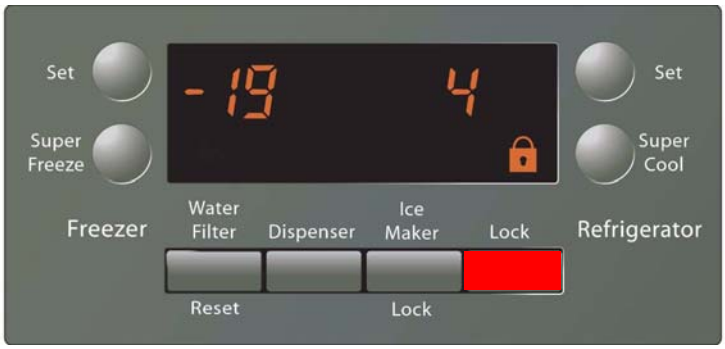
3.4 Ice Maker lock button



The dispenser button is disabled with the Ice Maker lock button. Ice cubes cannot be dispensed; it will only be possible to dispense water.

The Ice Maker lock button interrupts the ice-making process.

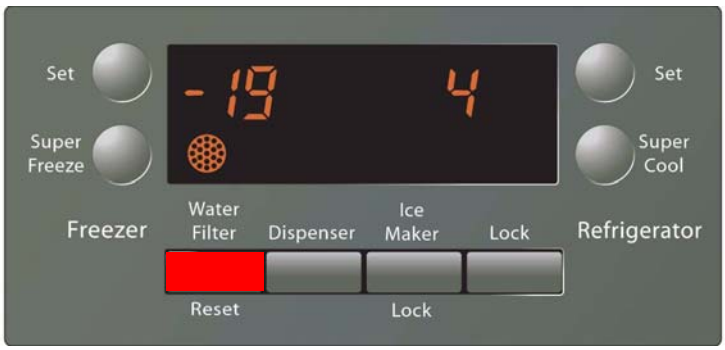
3.5 Refrigerator lock button



The lock button will disable all of the buttons on the display.

Press once to activate. Press the button for three seconds to disable the function.

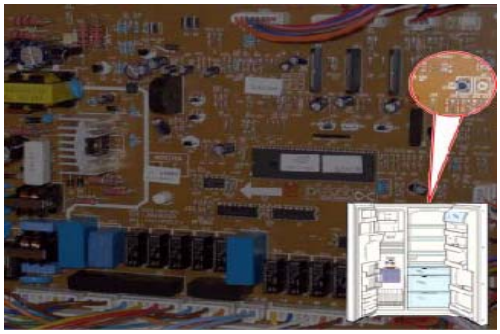
3.6 Water filter reset button



Replace water filter display: press the Water Filter reset button for three seconds in order to reset the display.

4. Construction components

4.1 Control module

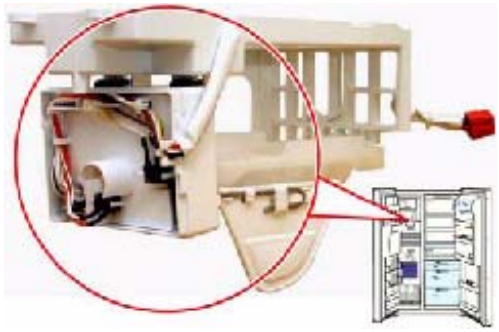


The control module is located on the appliance.

The "time shortening switch" shortens the expiry times, e.g. compressor start-up barrier, fan switch-on delay, etc.

- Press once briefly to shorten the time by 1 min.
- Continuous pressing will shorten the time by 1 min. every two seconds. The maximum shortening time is 30 min.

4.2 Ice Maker



The ice cube bowl is swung with a motor. This turns the plastic bowl and the ice cubes fall out. The horizontal switch interrupts the running of the motor and the ice cube bowl is returned to the original position.

The ice cubes are ejected after 130 min and when the ice sensor is colder than –12.5 °C.

The ice sensor is located under the ice cube bowl.

The volume of ice pushes the on/off lever upwards and the preparation of ice is stopped. When the volume of ice drops, the lever drops down and the ice-making process starts up again.

4.3 Drinking water tank

The tank for drinking water is located behind the drawers.

Warm tap water flows in again every time water is drawn off. Water is mixed and this causes the temperature to rise.

The water will taste flat if no water is drawn off for some time. In this case empty the water tank so that fresh water can run in again.

Capacity 1.5 l.

4.4 Vario Box (only KE 590-1-2T)

Cold air in the rear section flows into the air admission opening and reaches the air exit through the side wall. The volume of air is regulated by an NTC sensor located in the rear wall and by a flap in the air exit opening.

The flap is heated up:

Heating	5 W
Flap open	Heater off
Flap closed	Heater on
Vegetables	3 °C (target temperature)
Fish	-1 °C (target temperature)
Meat	-3 °C (target temperature)
Off	The Vario Box is not supplied with cold air
Select	Temperature selection

Test program

Entering:

- Press the select button for 2 seconds.
  The Vario Box temperature will be shown.
- Press the select button once.
  OP will be shown and the Vario Box flap will be opened.
- Press the select button twice.
  CL will be shown and the Vario Box flap will be closed.

Exit: automatically after 20 s

5. Functions

5.1 Refrigeration system

The appliance is fitted with a single-circuit, no-frost technology refrigeration system with recirculating air. The evaporator is located in the freezer compartment.

The refrigerator compartment fan supplies the refrigerator compartment with cold air from the freezer compartment. The refrigerator compartment fan will operate when the refrigerator sensor indicates that cooling is required.

The air is returned to the evaporator by means of an air duct located behind the drawers.

5.2 Defrosting

The defrost phase will be started when:

- The compressor operating time is > than 2 h and the appliance operating time is > 60 h;
- The compressor operating time is > than 24 h;
- The compressor operating time is > than 6 h and the relative operating time is > 85 %;
- An error is shown in the display;
- The entire time that the door is open is > 2 min.

Defrosting procedure

Waiting time:

The waiting time is activated when the evaporator sensor is ≤ -27 °C.

- The waiting time is 50 min.
- The freezer compartment fan is on all the time.
- The refrigerator compartment fan operates in the standard operation mode.
- The evaporator heater is off.

Defrosting procedure:

- The maximum defrosting time is 80 min.
- The defrosting procedure will have been completed when the evaporator sensor reaches 13 °C.
- The two fans will be off.
- The defroster heating element will be on.

Break:

After defrosting the two fans and the defroster heating element will remain switched off for 7 minutes. The two fans will run with a 5 min switch-on delay.

5.3 Door alarm

The door alarm is activated when the refrigerator or freezer compartment is left open for longer than one minute. Another alarm will sound every minute.

The door alarm is deactivated:

- automatically after 5 min.
- when the door or the doors is/are closed again.

5.4 Demonstration program

Entering:

- Press the right-hand refrigerator lock button.
- Press the refrigerator set button and keep it pressed.
- Press the dispenser button five times.

Exit:

- Press the refrigerator set button and keep it pressed.
- Press the dispenser button five times;
- or disconnect the power supply.

Demonstration program:

- The temperatures are all shown consecutively.
- The display symbols are shown consecutively.
- The display buttons are enabled.
- The fan and the interior lighting are in operation.
- None of the other components are activated.

5.5 Test program

Entering:

- Press the right-hand refrigerator lock button.
- Press the freezer set button and keep it pressed.
- Press the super-freeze button five times.

The freezer set button is used to activate the individual test steps and the error displays.

Test step	Function
1	Appliance operation duration
2	Freezer compartment sensor temperature (in ° Fahrenheit)
3	Defrost sensor temperature (in ° Fahrenheit)
4	Refrigerator compartment sensor temperature (in ° Fahrenheit)
5	Room temperature sensor reading (in ° Fahrenheit)
6	Remaining time until ice is made again
7	Remaining time until the water filter is changed again

Exit:

- Press the lock button for 4 seconds.

If no button is pressed for 4 minutes the appliance will automatically return to standard operation.

5.6 Converting Fahrenheit / Celsius:

The formula for converting Fahrenheit to ° Celsius is: $°C = \frac{°F - 32}{1,8}$

°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

6. Repairs

6.1 Intervention in the cooling circuit

Please note: The dehumidifier is to be replaced before evacuation and filling during any intervention in the cooling circuit.

6.2 Leaks in terms of suction

Please note: It is essential to replace the compressor and the dehumidifier for repair work as a result of suction leaks.

6.3 Dismantling the air duct in the freezer compartment

- Remove the cover flap.
- Take out the screw.
- Disengage the cover on the positions marked with an arrow.

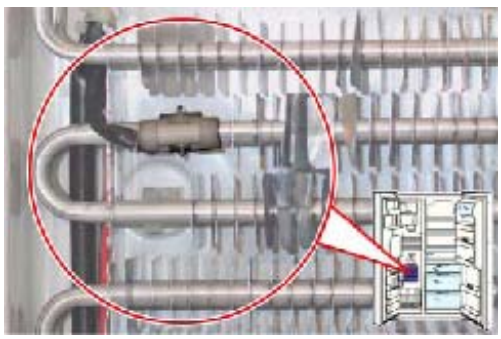
6.4 Sensor position

6.4.1 Freezer and refrigerator compartment sensors

Both sensors can be replaced.

The sensor boxes must be eased off with a flat screw driver. The fan cover in the refrigerator compartment must be removed when the refrigerator compartment sensor is replaced.

6.4.2 Evaporator sensor



The air duct in the freezer compartment must be removed in order to replace the evaporator sensor.

6.4.3 Ice Maker sensor

The Ice Maker sensor is located under the ice bowl. The sensor can be replaced.

6.4.4 Ambient temperature sensor

The ambient temperature sensor is located on the control electronic unit. The sensor cannot be replaced.

6.5 NTC sensor readings

6.5.1 Refrigerator compartment, ambient air, defrost sensor

°C	kΩ	°C	kΩ	°C	kΩ	°C	kΩ
-30	129.3	-15	60.1	0	30	15	15.9
-29	122.5	-14	57.2	1	28.7	16	15.3
-28	116.2	-13	54.6	2	27.5	17	14.7
-27	110.2	-12	52	3	26.3	18	14.1
-26	101.6	-11	49.6	4	25.2	19	13.6
-25	99.3	-10	47.3	5	24.1	20	13
-24	94.3	-9	45.1	6	23.1	21	12.5
-23	89.6	-8	43.1	7	22.2	22	12.1
-22	85.1	-7	41.1	8	21.2	23	11.6
-21	80.9	-6	39.3	9	20.4	24	11.2
-20	76.9	-5	37.5	10	19.5	25	10.7
-19	78.2	-4	35.8	11	18.7	26	10.3
-18	69.6	-3	34.3	12	18	27	10
-17	66.3	-2	32.7	13	17.3	28	9.6
-16	63.1	-1	31.3	14	16.4	30	8.9

6.5.2 Freezer sensor

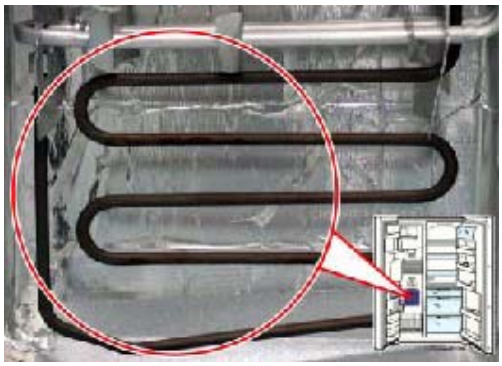
°C	kΩ	°C	kΩ	°C	kΩ	°C	kΩ
-30	39.66	-15	17	0	7.88	15	3.92
-29	37.38	-14	16.11	1	7.51	16	3.75
-28	35.24	-13	15.27	2	7.15	17	3.59
-27	33.24	-12	14.49	3	6.82	18	3.43
-26	30.93	-11	13.75	4	6.5	19	3.29
-25	29.62	-10	13.05	5	6.2	20	3.15
-24	27.97	-9	12.39	6	5.9	21	3.02
-23	26.43	-8	11.77	7	5.6	22	2.84
-22	24.97	-7	11.18	8	5.39	23	2.77
-21	23.61	-6	10.62	9	5.14	24	2.66
-20	22.33	-5	10.11	10	4.91	25	2.55
-19	21.13	-4	9.60	11	4.69	26	2.44
-18	20	-3	9.14	12	4.48	27	2.34
-17	18.94	-2	8.7	13	4.29	28	2.25
-16	17.94	-1	8.28	14	4.1	30	2.07

6.5.3 Ice Maker sensor

°C	kΩ	°C	kΩ	°C	kΩ	°C	kΩ
-25	49.7	-18	34.85	-11	24.83	-4	17.94
-24	47.2	-17	33.17	-10	23.68	-3	17.15
-23	44.84	-16	31.58	-9	22.59	-2	16.4
-22	42.61	-15	30.08	-8	21.61	-1	15.68
-21	40.5	-14	28.66	-7	20.59	0	15
-20	38.51	-13	27.46	-6	19.66		
-19	36.63	-12	26.03	-5	18.78		

6.6 Replacing the heating element

6.6.1 Evaporator heater

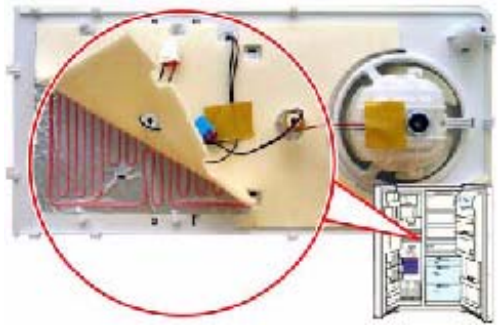


The air duct in the freezer compartment must be removed in order to replace the evaporator heater. The heater itself can be replaced separately.

Output = 192 watts

Resistance = 252 Ω

6.6.2 Air duct heater



The heater on the air duct in the freezer compartment prevents thawing. The heater operates simultaneously with the compressor.

The heater cannot be replaced separately; the entire rear panel will need to be replaced.

Output = 7 watts

Resistance = 6.8 kΩ

6.6.3 Water intake heater

The water intake pipe on the Ice Maker is covered by a heater.

The heater operates simultaneously with the compressor.

Exceptions:

- The heater will always operate if the ambient air temperature sensor shows ≤ 13 °C.
- If the temperature on the Ice Maker sensor does not rise within 5 minutes, the heater will operate for 1 hour.

The heater can be replaced separately.

Output = 5 watts

Resistance = 9.6 kΩ

6.6.4 Dispenser bottom heater

The heater on the bottom of the dispenser evaporates water in the collecting bowl. The heater operates simultaneously with the compressor.

Output = 5 watts

Resistance = 9.6 kΩ

6.7 Replacing the temperature fuse

The temperature fuse is located on the evaporator.

The temperature fuse itself can be replaced separately.

The temperature fuse is a safety fuse and must be replaced when it has tripped.

Cut-off temperature = 77 °C

6.8 Ice dispenser

Ease off the front panel of the ice dispenser with a flat screw driver.

The figure opposeite shows the KEL 580-1-2T ice dispenser. For information on how to access the ice dispenser of the KE 590-1-2T see Section 6.11.

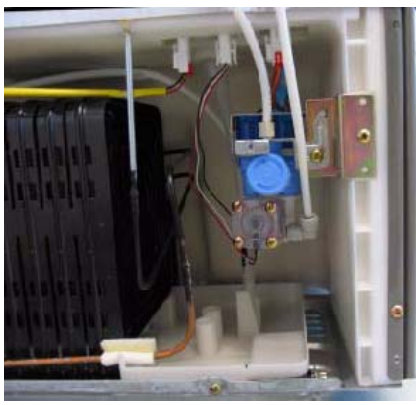
The dispenser switch, the lifting magnet for the dispenser flap and the lighting will be freely accessible from the front when the front panel is removed.

6.9 Adjusting the quantity of water taken in

The quantity of water is regulated with a flow sensor. The flow sensor is located on the water intake valve and cannot be replaced.

The quantity of water taken in can be adjusted as follows:

- Press the lock button.
- Press the freezer set button and keep it pressed.
- Press the super-freezer set button five times.
- Press the freezer set button 5 times until P100 appears in the display.



Factory setting: P100 = 86 ml

- Pressing the super cool button will increase the quantity of water.
  P101 = 87ml, P102 = 88ml usw.
- Pressing the refrigerator set button will reduce the quantity of water.
  P99 = 85ml, P98 = 84ml etc.

Exit:

- Press the lock button for 4 seconds.

If no button is pressed for 4 minutes the appliance will automatically return to standard operation.

6.10 Removing the door handle

Caution: The stainless steel front panels can easily be scratched.

Use a crosshead screwdriver to screw out the headless screw on the bottom of the handle. Putt the bottom part of the handle towards the front.

Place the bottom part of the handle next to the fastening-bolt and pull it downwards.

6.11 Removing the stainless steel door covering (KE 590-1-2T)

The door covering of the KEL 580-1-2T cannot be replaced.

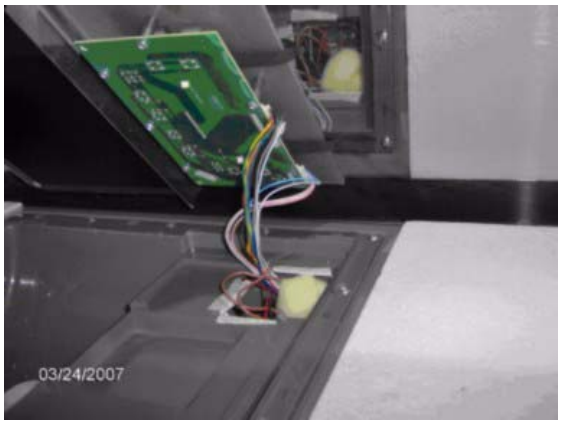
Replacing the stainless steel door covering is shown here with the freezer compartment door as an example; the work steps are similar for replacing the refrigerator door.

- Loosen the handles (see Section 6.10).

- Remove the top and bottom screws.

- Pull the door covering carefully towards the front.

- The plug connections of the user board can now be disconnected.



Assembly is carried out in reverse order.

6.12 Compressor has no function

Claim	Cause	Measure
The compressor does not work.	The compressor is not receiving any current.	Check the wiring. Electronic unit may be defective.
	The compressor is live but has no function.	Check the compressor. Check the start-up PTC. Check the motor protection. Any defect component will need to be replaced.

6.13 Fan is not activated

Claim	Cause	Measure
The fan does not work.	The fan is not receiving any current.	Check the wiring. Electronic unit may be defective.
	The fan is live but has no function.	Check the transmission of the fan coil and replace if necessary.
	Fan gets stuck.	Rectify the cause of the jamming.
	Door contact has no function.	Replace the door contact.

7. Trouble shooting

7.1 Error message

Error	Components	Trouble shooting	Repair
F1	Freezer compartment sensor	Reading on the control module	Replace the freezer compartment sensor
r1	Refrigerator compartment sensor	Reading on the control module	Replace the refrigerator compartment sensor
rt	Ambient temperature sensor	Reading on the control module	Cannot be replaced; replace the entire control electronic unit
d1	Defrost sensor	Reading on the control module	Replace the defrost sensor
dR	Refrigerator compartment door switch	Open and close the refrigerator compartment door	Replace the door switch
dF	Freezer compartment door switch	Open and close freezer compartment door	Replace the door switch
E1	Ice sensor	Reading on the ice maker	Replace the ice sensor
EF	Flow sensor	Reading on the intake solenoid valve?	Cannot be replaced; replace the entire solenoid valve
Et	Horizontal switch	Reading on the ice maker	Replace the switch
Eu	On/Off switch	Reading on the ice maker	Replace the switch
ES	Dispenser switch	Reading on the ice / water dispenser	Replace the switch
Ea	Ice maker motor	Reading on the ice maker	Replace the motor
Eg	Inflow valve	Reading on the inflow valve	Replace the inflow valve

The error message will only appear when an error has actually occurred.

8. Circuit diagram