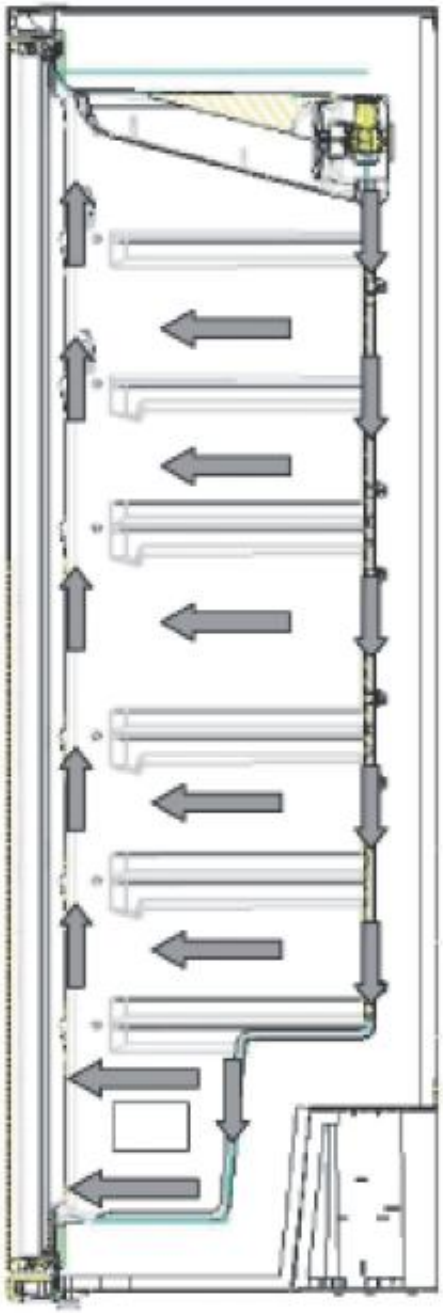
# INFORMATION ON THE NO-FROST TECHNOLOGY

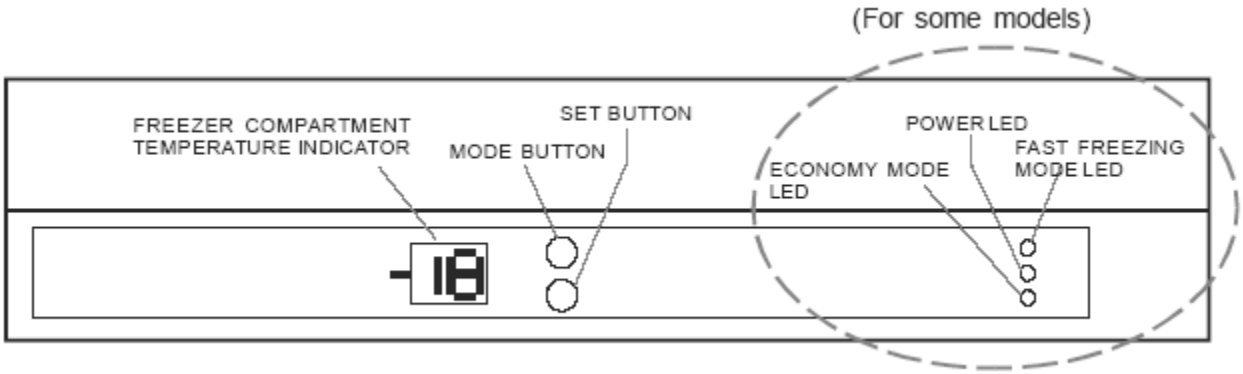
No frost fridges differ from other static fridges in their operating principle.

In normal fridges, the humidity entering the fridge in the door openings and humidity of the food cause freezing in the freezer department. To defrost the snow and ice in the freezer department, you should turn off the fridge, take the food that needs to be kept in a constant temperature off the fridge, and remove the ice gathered in the freezer department periodically.

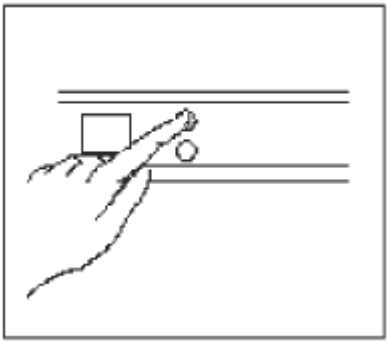
The situation is completely different in no-frost fridges. Dry and cold air is blowed to the fridge and freezer departments homogeneously from several points via a blower fan. Cold air dispersed homogeneously even between the shelcves cools all your food equally and uniformly, thus prevents humidity and freezing.

Therefore, your no-frost fridge allows you ease of use , besides its huge volume and appearance.





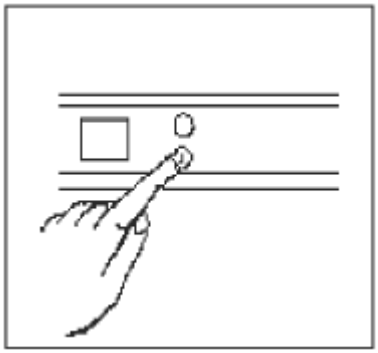

## MODE BUTTON



• Mode button allows switching between Freezer Department Indicator, Fast Freezing Mode Lamp, Economy Mode Lamp.
• When you press once, Freezer Department Indicator starts to flash.

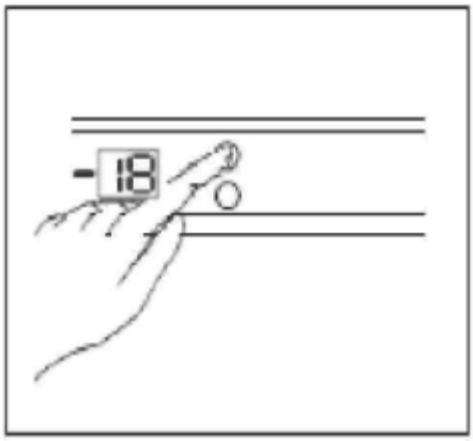
**Set value is ready to be changed.**
• When you press twice, Fast Freezing Mode Lamp starts to flash.
• When you press three times, Economy Mode Lamp starts to flash.

## SET BUTTON



Allows the temperature adjustment of the related department when Freezer Department Indicator is selected with the mode button.

## Freezer Department Tempretaure Adjustment and Activating FAST FREEZING Mode




• Initial temperature value for Freezer Department Indicator is -18$^0$C.
• Press mode button once.
• The set value for Freezer Department Indicator starts to flash when you press this button.
• The value for Freezer Department Indicator changes for a lower temperature each time you press this button when the indicator is flashing.
(-16$^0$C, -17$^0$C, -18$^0$C, -19$^0$C, -20$^0$C, -21$^0$C, -22$^0$C, -23$^0$C, -24$^0$C)
• When you wait for 5 seconds without pressing ant button after reaching the desired set value, the set value is activated and your fridge operates with that set value.
• When you press set button until the value for Freezer Department Indicator reaches -24$^0$C (maximum cold position), if you press the button again, SF letters will flash.
• If you continue to press the button when SF is flashing, the values will start again from -16$^0$C.

**Recommended Temperature Values for Freezer**

| When would it be adjusted? | Inner Temperature |
|---|---|
| When small amaont of food is stored | -16$^0$C, -17$^0$C |
| In normal usage | -18$^0$C, -19$^0$C, -20$^0$C, -21$^0$C |
| When lost of food is stored | -22$^0$C, -23$^0$C, -24$^0$C |

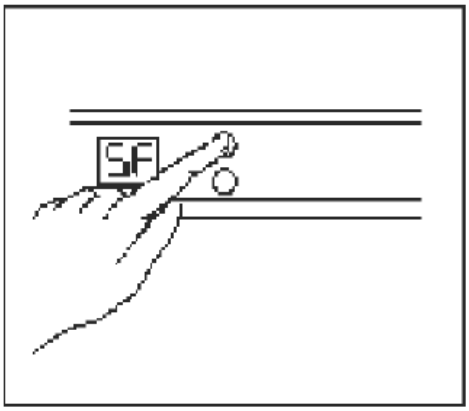
**Fast Freezering Mode**

•To freeze plenty of food
•To freeze ready foods
•To freeze foods rapidly
•To store the seasonal foods for a long time

**How to use;**

•Press the mode button until Fast Freezing mode.
•While Fast Freezing Mode Lamp is flashing if no button is clicked for 5 seconds then a beep sound will be heard and the mode will be enabled.
•While the Fast Freezing mode is active the letters “SF” will be seen at the Indicator of the Freezer.

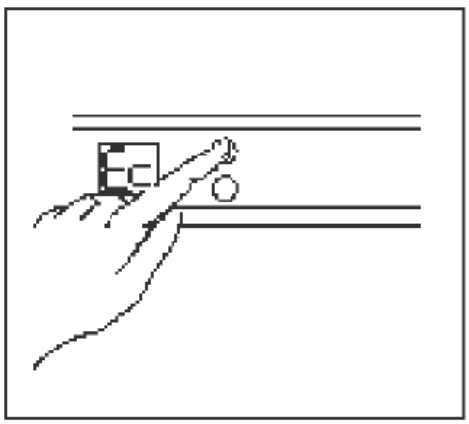
## While SF mode is selected:




**To cancel SF Mode and continue with previous set value:**
Please press Mode Button 2 times and wait for 5 secs.
SF mode will be cancelled and appliance will start to work according to previous set value.
**To cancel SF Mode and continue with new set value:**
Please press Mode Button 1 time and in 5 sec, push set button until you see set value you want and wait for 5 secs. SF mode will be cancelled and appliance will start to work according to new set value.
**To cancel SF Mode and activate Economy Mode:**
Please press Mode Button 3 times and wait for 5 secs.
SF mode will be cancelled and appliance will start to work according to Economy Mode.

**Note:** "Quick Freezing" mode will be cancelled automatically after 24 hours or when the freezer sensor temperature falls below -32°C.

## ECONOMY MODE




Freezer Compartment will be operated according to the economy conditions specified on the control circuit.

**When to use;**

• When you want your refrigerator to operate economically.

**How to use;**

• Press the mode button until Economy Mode Led lights up (3 times).
• While the Economy Mode Led is flashing if no button is clicked then a beep sound will be heard and the mode will be enabled.
• During this mode, the freezer compartment will be operated at the special temperature value set on the control circuit.
• While the Economy mode is active the letters "Ec" will be seen at the Indicators of the Freezer Compartment.

**While Economy mode is selected;**

**To cancel Economy Mode and continue with previous set value:**
Please press Mode Button 3 times and wait for 5 secs.
Economy mode will be cancelled and appliance will start to work according to previous set value.

**To cancel SF Mode and continue with new set value:**
Please press Mode Button 1 time and in 5 sec, push set button until you see set value you want and wait for 5 secs.
Economy mode will be cancelled and appliance will start to work according to new set value.

**To cancel Economy Mode and activate SF Mode:**
Please press Mode Button 3 times and wait for 5 secs.
Economy mode will be cancelled and appliance will start to work according to SF Mode.

### During initial operation of the refrigerator;

If the freezer and defrost sensors are warmer than –5ºC, then the automatic test starts.The below listed components will be tested respectively with 5 second intervals. For this reason, the refrigerator switches to normal operation mode after 20 secs.

5 secs. Defrost resistance
5 secs Drain Heater
5 secs. Evap. Fan Motor,
5 secs. Compressor is operated

After waiting for 5 min. it switches to normal operation mode.

### Indicator temperatures

Indicators are LED. Only numbers can be seen. There is no bar. Defaul set values are -18°C and +5°C

**Freezer Temperature** ( -16ºC, -17ºC, -18ºC, -19ºC, -20ºC, -21ºC, -22ºC, -23ºC, -24ºC)

### Compressor - Fan Workings:

**Step 1.** If F sensor temp< =Setting temp, go to step 4.
If F sensor temp> Setting temp, go to step 2.
**Step 2.** Set compressor ON then
**Step 3.** If F sensor temp>= Setting temp then return to step 2.
If F sensor temp< Setting temp then go to next step
**Step 4.** Set compressor OFF.

Compressor runs and stops according to set values.

| FREEZER SECTION for 321E | | | | | |
|---|---|---|---|---|---|
| ADJUSTED SET VALUES ON DISPLAY | COMPRESSOR ON VALUES | COMPRESSOR OFF VALUES | ADJUSTED SET VALUES ON DISPLAY | COMPRESSOR ON VALUES | COMPRESSOR OFF VALUES |
| **-16 º C** | -08 ° C | -18 ° C | **-21º C** | -13 º C | -23 º C |
| **-17 º C** | -09 ° C | -19 ° C | **-22 º C** | -14 º C | -24 º C |
| **-18 º C** | -10 º C | -20 º C | **-23 º C** | -15 º C | -25 º C |
| **-19 º C** | -11 º C | -21 º C | **-24 º C** | -16º C | -26º C |
| **-20 º C** | -12 º C | -22 º C | | | |

**Fan Motor:**
Fan motor runs in accordance with compressor
But some delays will be used:
Fan Start Delay: Delay after compressor working to fan motor working
Fan Stop Delay: Delay after compressor stopping to fan motor stopping

**321E**
Fan Start Delay 90 sec
Fan Stop Delay : Attached table

| FAN STOP DELAY (FAN STOPPING POINT) | | | |
|---|---|---|---|
| ADJUSTED SET VALUES ON DISPLAY | DEFROST SENSOR | ADJUSTED SET VALUES ON DISPLAY | DEFROST SENSOR |
| **-16 º C** | -16,5 º C | **-21º C** | -21,5º C |
| **-17 º C** | -17,5 º C | **-22 º C** | -22,5 º C |
| **-18 º C** | -18,5 º C | **-23 º C** | -23,5 º C |
| **-19 º C** | -19,5 º C | **-24 º C** | -24,5 º C |
| **-20 º C** | -20,5 º C | | |

## Defrost Program

Defrost is activated under the following conditions.

When the ambient temperature sensor drops below 10°C (cold), it enters defrost mode every 5 hours.
If the ambient temperature sensor is between 10°C and 20°C, it enters defrost mode every 8 hours.
If the ambient temperature sensor is higher than 20°C, it will enter defrost mode at the moment when 32 hours of compressor running is over or when 40 hours of compressor stop comes to an end, whichever occurs first.

However, in cases where the ambient temperature sensor is higher than 20°C, this period may fall to 24 hours according to the usage conditions (because of the reasons given below).

- ***** Amount of ice formed,
- ***** Number of times the door is opened and closed,
- ***** Duration the door remained opened,
- ***** Sudden usage change,
- ***** Sudden Cooler Compartment temperature increase,
- ***** Sudden Freeze Compartment temperature increase,

Checking of ambient temperature will be done every 10 min
Defrost conditions (durations) can be changed acc to new AT.

**Duration of remaining in defrost mode:**

Defrost, which is controlled by the defrost sensor, ends up when the defrost sensor temperature reaches 8°C under normal conditions. However, If resistances have some problem and Dsensor temperature doesn't reach to 8°C during 90 min; compressor will start to work.

When the defrost starts;

| | | COMP | FAN | EVAP RES | DRAIN RES | DURATION |
|---|---|---|---|---|---|---|
| **I** | Normal condition | **ON** | **ON** | **OFF** | **OFF** | Look at "Compressor - Fan Workings" (page-5) |
| **II** | Defrost 1.part | **OFF** | **OFF** | **ON** | **ON** | Until D Sensor reaches 8°C*** |
| **III** | Defrost 2.part | **OFF** | **OFF** | **OFF** | **ON** | During 7:30 |
| **IV** | Waiting 1.part | **ON** | **OFF** | **OFF** | **OFF** | During 2:30 |
| **I** | Normal condition | **ON** | **ON** | **OFF** | **OFF** | When "waiting 1.part" finishes |

**Low Voltage Program**

If the supply voltage is below < 170 V for 5 seconds or more, the low voltage program is activated and compressor, evap. fan motor, condenser fan motor, quick freezing and fast cooling functions are all stopped. If the appliance is in defrost mode, defrost function also stops.
It waits until the supply voltage reaches >180 V and when it climbs above 180 V, if the appliance is in defrost mode, it resumes from defrosting. If the appliance is not in defrost mode, it waits for 5 min. for compressor safety and resumes from the last set program.

**Power Cut off Program**

***** When the power is cut off, all set parameters and functions (except for the child lock function) remains in the memory.
* When the power is resupplied, compressor starts running after 5 minutes;
* It resumes operating from the last set program.

**Other Features**

After every compressor stopping, it starts after 5 min

## COMPONENTS USED

| | |
|---|---|
| Defrost Resistance | 220V / 185W |
| Drain Heater | 220V / 25W |
| Thermal fuse | 76 $^0$C |
| Evap. Fan motor | BG2012 (AC input but DC fan)<br>1W - 2500RPM (Noload) Propeller : 100mm |
| Motor damper | NO |
| Main board (Power board) | DANFOSS |
| Display board | Together with main board |
| Defrost sensor | EPCOS |
| Freezer compartment sensor | EPCOS |
| Cooler Lamp | NO LAMP |
| Freezer Lamp | NO LAMP |

## NTC Sensor

There are 3 sensors: Freezer Compartment, Defrost and Ambient.
The ones other than the ambient sensor have the same properties except for their varying cable lengths.

**Freezer and Defrost Sensors**

| [°C] | R_nom | R_min | R_max |
|---|---|---|---|
| -40 | 169157 | 159347 | 178968 |
| -35 | 121795 | 115386 | 128204 |
| -30 | 88766 | 84553 | 92979 |
| -25 | 65333 | 62555 | 68111 |
| -20 | 48614 | 46778 | 50450 |
| -15 | 36503 | 35291 | 37715 |
| -10 | 27681 | 26883 | 28478 |
| -5 | 21166 | 20646 | 21686 |
| 0 | 16330 | 16003 | 16657 |
| 5 | 12696 | 12386 | 13006 |
| 10 | 9951 | 9670 | 10232 |
| 15 | 7855 | 7604 | 8105 |
| 20 | 6246 | 6025 | 6467 |
| 25 | 5000 | 4806 | 5194 |
| 30 | 4029 | 3859 | 4198 |
| 35 | 3266 | 3118 | 3414 |
| 40 | 2665 | 2536 | 2794 |
| 45 | 2186 | 2073 | 2298 |
| 50 | 1803 | 1705 | 1901 |
| 55 | 1495 | 1410 | 1581 |

**Ambient Temp Sensor**

| Temperature | RT | Alfa | R | -R |
|---|---|---|---|---|
| -55 | 97,578 | 7,500 | 487.890 | -487.890 |
| -50 | 67,650 | 7,200 | 338.250 | -338.250 |
| -45 | 47,538 | 7,000 | 237.690 | -237.690 |
| -40 | 33,831 | 6,700 | 169.155 | -169.155 |
| -35 | 24,359 | 6,500 | 121.795 | -121.795 |
| -30 | 17,753 | 6,300 | 88.765 | -88.765 |
| -25 | 13,067 | 6,000 | 65.335 | -65.335 |
| -20 | 9,723 | 5,800 | 48.614 | -48.614 |
| -15 | 7,301 | 5,600 | 36.503 | -36.503 |
| -10 | 5,536 | 5,500 | 27.681 | -27.681 |
| -5 | 4,233 | 5,300 | 21.166 | -21.166 |
| 0 | 3,266 | 5,100 | 16.330 | -16.330 |
| 5 | 2,539 | 5,000 | 12.696 | -12.696 |
| 10 | 1,990 | 4,800 | 9.951 | -9.951 |
| 15 | 1,571 | 4,700 | 7.855 | -7.855 |
| 20 | 1,249 | 4,500 | 6.246 | -6.246 |
| 25 | 1,000 | 4,400 | 5.000 | -5.000 |
| 30 | 0,806 | 4,300 | 4.029 | -4.029 |
| 35 | 0,653 | 4,100 | 3.266 | -3.266 |
| 40 | 0,533 | 4,000 | 2.665 | -2.665 |
| 45 | 0,437 | 3,900 | 2.186 | -2.186 |
| 50 | 0,361 | 3,800 | 1.803 | -1.803 |
| 55 | 0,299 | 3,700 | 1.495 | -1.495 |
| 60 | 0,249 | 3,600 | 1.247 | -1.247 |

## USER AND SERVICE MODE ERROR MESSAGES

There are error messages that can be seen on the screen.
These error messages are shown in the table below.

| SENSOR | TEMPERATURE | USER MODE REACTION |
|---|---|---|
| (1) Freezer | >+50°C or <-50°C<br>(Sensor is short or open) | Sr will blinks in FREEZER segment LED |
| (2) Defrost | Short (< 800Ω) or <-50°C | Sr will blinks in FREEZER segment LED and<br>ECONOMY led blinks |
| (3) AT sensor | Short or < -30°C | Sr will blinks in FREEZER segment LED and<br>S.FREEZE led blinks |

## COMPONENT ERRORS

| DEFECT TYPE | USER MODE REACTION |
|---|---|
| Compressor Defect | Sr will blinks in FREEZER segment LED and<br>ECONOMY and S.FREEZE leds blinks together |
| Defrost Heater Defect | |

## LOW VOLTAGE ERROR

| ERROR | DETAILS | USER MODE |
|---|---|---|
| Low voltage | Supply voltage <170 | Freezer number segment shows LP |

## COOLING ERRORS

| ERROR | DETAILS | USER MODE |
|---|---|---|
| If freezer sensor is > -5°C | Freezer compartment is not cold enough. | LF is shown on LED segments |

**If temperature is warmer than alarm set value during 30 min;** LED will show LF and buzzer will make beep-beep. LF and buzzer will continue until user pushes SET or MODE button directly; buzzer will stop.
(After stopping of buzzer, SET and MODE button will work acc to their normal functions)
But LF;

a) will continue if temperature is still warmer than -5 C
b) will stop if temperature decreases and comes to normal temperature.
In this condition;

LED will show setting temperature again.
(Because user saw the LF and he/she was warned but he/she cancelled alarm.
So; he/she can check the qualities of foods)

**NOTE :** To prevent the wrong alarms, this alarm status is disabled on following conditions:

**1)** During the first 6 hours after the product was firstly connected.
**2)** During the defrost period
**3)** During the first two hours after a defrost cycle
**4)** During the first 2 hours that one of the doors was open.

### PRIORITY OF ERROR ON DISPLAY

| | REACTION |
|---|---|
| Compressor, Defrost H. or Drain H. Defect | SR |
| Sensor Defect (Short-Open) | SR |
| Cooling Errors | LF |

**Information Screen**










Entering Service Mode : Push Mode and Set Buttons together during 5 sec.

When user enter to Service Mode,
Informations will be seen acc to scheme on the left side.

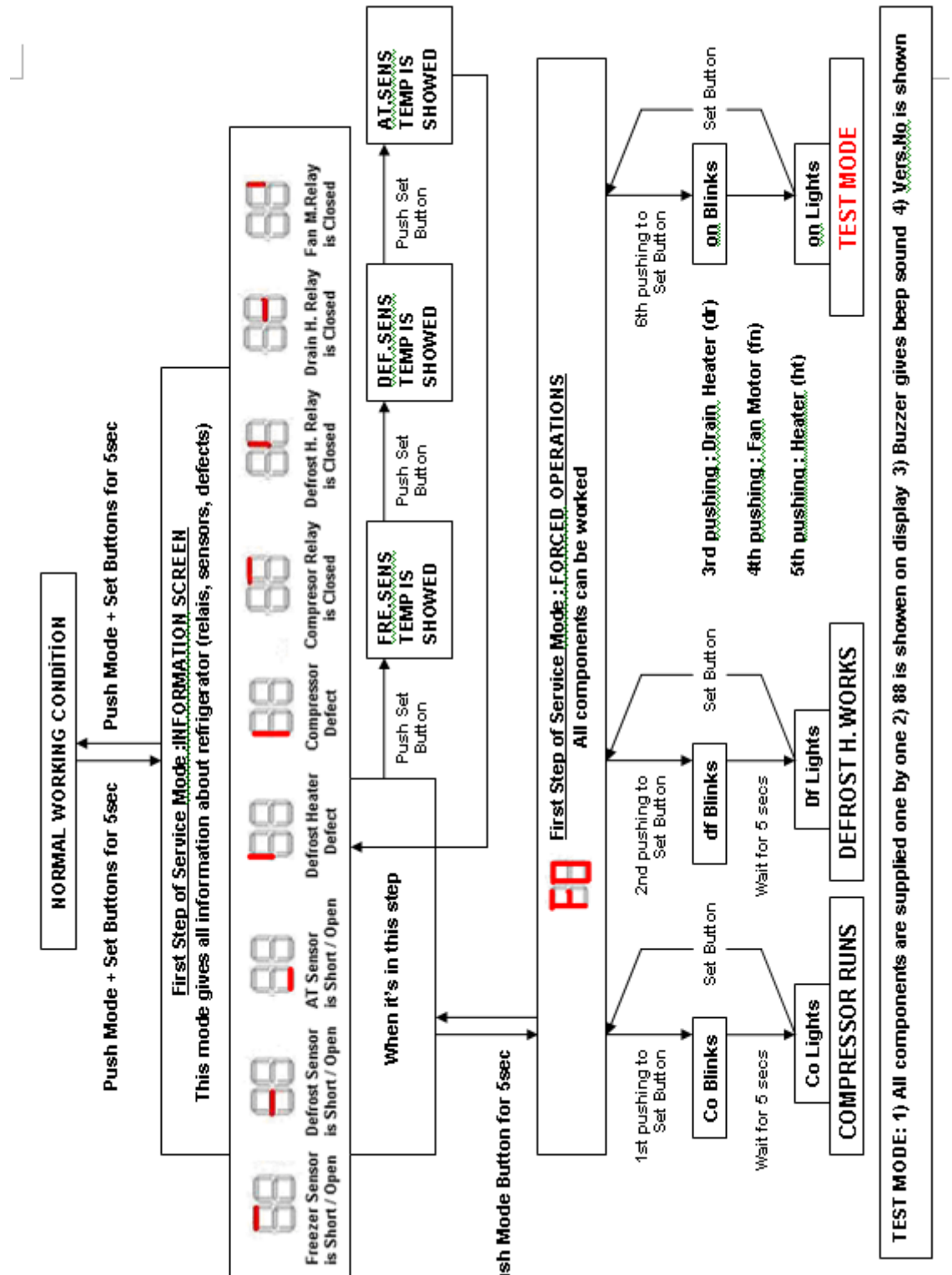
While this screen is being seen;
1.push to Set Button: Freezer Sensor Temperature
2.push to Set Button: Defrost Sensor Temperature
3.Push to Set Button: Ambient Sensor Temperature
4.Push to Set Button: Again Information Screen

While this screen is being seen;
Pushing Mode Button during 5 sec, FO will be seen.
FO means Forced Operation. After this point;

1.push to Set Button: CO will blink, if you wait for 5 sec. Blinking will stop, CO will light
Compressor will be supplied until user pushes set button one more time.
If user pushed set button, compressor supplying will be stopped.
FO will be seen again.
2.push to Set Button: Defrost Heater Forced Working. Other pushing are same.
3.push to Set Button: Drain Heater Forced Working. Other pushing are same.
4.push to Set Button: Fan Motor Forced Working. Other Pushing are same.
5.push to Set Button: Defrost+Drain Heater Forced Working. Other Pushing are same.

When FO is being sseen, if user pushed Mode Button for 5 sec.
Forced Operation Mode will be finished. Information screen will be seen.

When information screen is being seen, if user pushes Mode and Set Button for 5 sec,
Service Mode will be finished. Last Mode ot Set Value will be seen.


NORMAL WORKING CONDITION
Push Mode + Set Buttons for 5sec
Push Mode + Set Buttons for 5sec
First Step of Service Mode :INFORMATION SCREEN
This mode gives all information about refrigerator (relais, sensors, defects)
Freezer Sensor is Short / Open
Defrost Sensor is Short / Open
AT Sensor is Short / Open
Defrost Heater Defect
Compressor Defect
Compresor Relay is Closed
Defrost H. Relay is Closed
Drain H. Relay is Closed
Fan M.Relay is Closed
When it's in this step
Push Set Button
FRE.SENS TEMP IS SHOWED
Push Set Button
DEF.SENS TEMP IS SHOWED
Push Set Button
AT.SENS TEMP IS SHOWED
Push Mode Button for 5sec
First Step of Service Mode : FORCED OPERATIONS
All components can be worked
1st pushing to Set Button
Co Blinks
Set Button
Co Lights
COMPRESSOR RUNS
Wait for 5 secs
2nd pushing to Set Button
df Blinks
Set Button
Df Lights
DEFROST H. WORKS
Wait for 5 secs
3rd pushing : Drain Heater (dr)
4th pushing : Fan Motor (fn)
5th pushing : Heater (ht)
6th pushing to Set Button
on Blinks
Set Button
on Lights
TEST MODE
TEST MODE: 1) All components are supplied one by one 2) 88 is shown on display 3) Buzzer gives beep sound 4) Vers.No is shown

## Changing The Door Direction to Right Hand

**1-** Remove the top hinge cover on the right. (Fig-1)

**Figure-1**

**2-** Unscrew the screw fixing the top hinge and remove it. (Fig-2)

**Figure-2**

**3-** Unscrew the bottom hinge fixing screws and remove it. (Fig-6)

**Figure-3**

**4-** Unscrew the stationary foot of bottom hinge and screw to **Hole-1**. Unscrew the hinge pin and screw to **Hole-2**.(Fig-4)

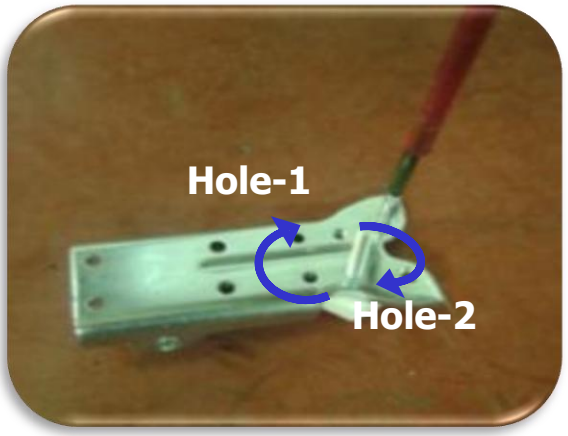



**Figure-4**

**5-**Unscrew the stationary foot and front wheel (Fig-5.1) and screw to the right side. (Fig-5.2)

**Figure-5.1**

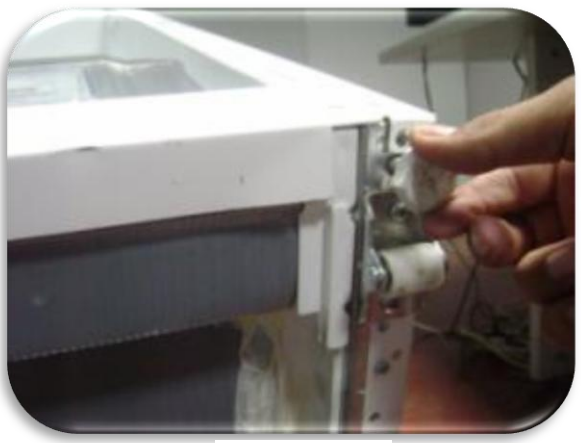


**Figure-5.2**

**6-** Remove the bushing and then insert it to the left side. (Fig-6.1 / Fig-6.2)

**Figure-6.1**

**Figure-6.2**

**7-** Remove the bottom bushing and bottom stopper and then insert them to the left side. (Fig-7)

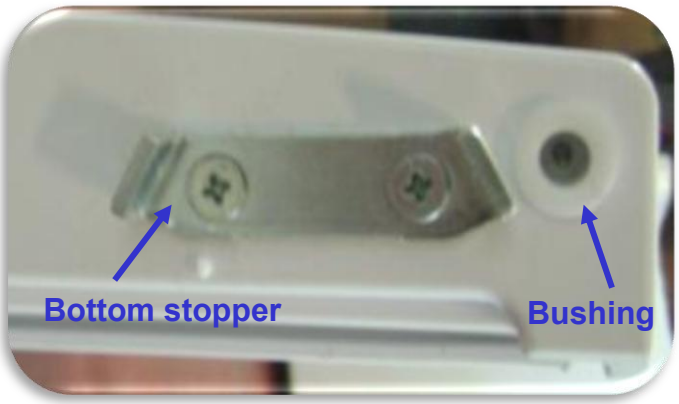



**Figure-7**

**Figure-8**

**8.** Remove the hinge panel cover (Fig-8) and remove it on the right side turn by180º.

**9-** Assemble the door. (Fig-9.1 / Fig-9.2)

**Figure-9.1**

**Figure-9.2**

**10-** Unscrew the pin of the top hinge, turn the top hinge by 180° then screw it to the left side hinge holes and screw the pin of the top hinge (Fig-10.1 / Fig-10.2)

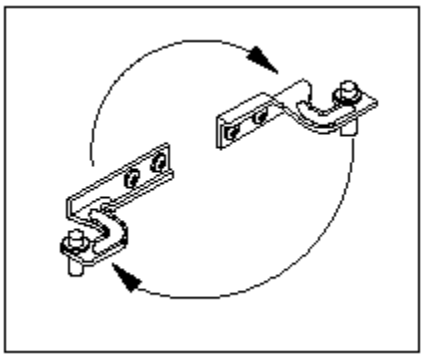


**Figure-10.1**

**Figure-10.2**

**11-** Insert the top hinge cover (which is put in the user manual bag) to the left side. (Fig-11)

**Figure-11**

## Replacement of Head Panel Group and Main PCB

**1-** Remove the head panel caps. (Fig-1)

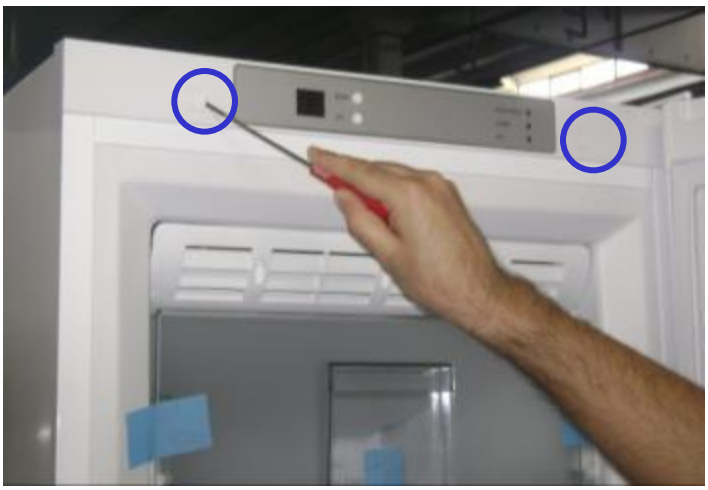


**Figure-1**

**2-** Unscrew the screws fixing the head panel. (Fig-2)

**Figure-2**

**3-** Remove the head panel. (Fig-3.1 and Fig-3.2) *Make sure that the door is open $90^0$*

**Figure-3.1**

**Figure-3.2**

**4-** Unscrew the screws fixing the main board box (Fig-4.1) and remove it. (Fig-4.2)

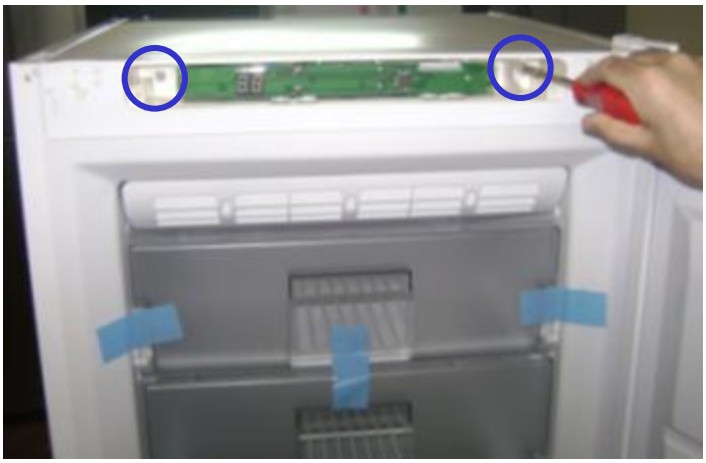


**Figure-4.1**

**Figure-4.2**

**5-** Disconnect all socket connections. (Fig-5)

**6-** Unscrew the screws fixing the main PCB and remove it. (Fig-6)

**Figure-5**

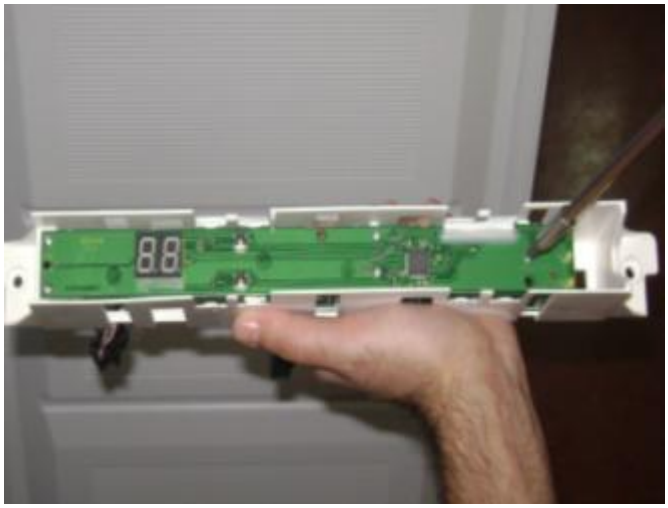


**Figure-6**

After changing the main PCB insert the new one into the main PCB box and make the connections then mount them to the head panel. Mount the head panel to the panel housing.