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SERVICE MANUAL

FOOD PRESERVATION

COLD APPLIANCES WITH
ELECTRONIC CONTROL SYSTEM

ERF2004

OBSIDIAN UI

ECO | Extra Cool | 88 | -88 | Extra Freeze | Filter Reset

P10

ⓘ — + Mode OK — +

5° COOL MATIC

ⓘ | Mode | OK | — | +

ECO | Filter Reset | Extra Cool | 88 | -88 | Extra Freeze | Lock 3 SEC

	• All the work to be performed inside the appliance requires specific skills and knowledge and may only be carried out by qualified and authorised Service Engineers • Before you access internal components, take the plug out of the socket to disconnect the power supply. • Some of the components in the mechanical part could cause injuries, so wear suitable protection and proceed with caution.
PURPOSE	The purpose of this Service Manual is to provide Service Engineers who are already familiar with repair procedures with information regarding appliances fitted with NIU5 electronic control systems. The manual contains the following topics: • General characteristics • Control panel • Guide to diagnostics • Technical and functional characteristics • Access

| Revision	Date	Description	Author
00	10/2021	Document creation	Anna Grimlund

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ERF2004 PIN CONNECTIONS

ERF2004 can be connected to different types of user interfaces. Communications is via a standard protocol based on MACS with insulated user interface via four wires. ERF2004 have a maximum of four relays and one SSRs. Connected appliance have a separate NIU5 connectivity board.

- Operating voltage input: 100/240 Vac
- Frequency range: 50-60 Hz
- SMPS
- Buzzer (optional)
- DAAS
- Energy Meter
- DC fan PWM driver
- Variable speed compressor driver
- SidekickPC connection JST XA

Pin connection specification on the next page:

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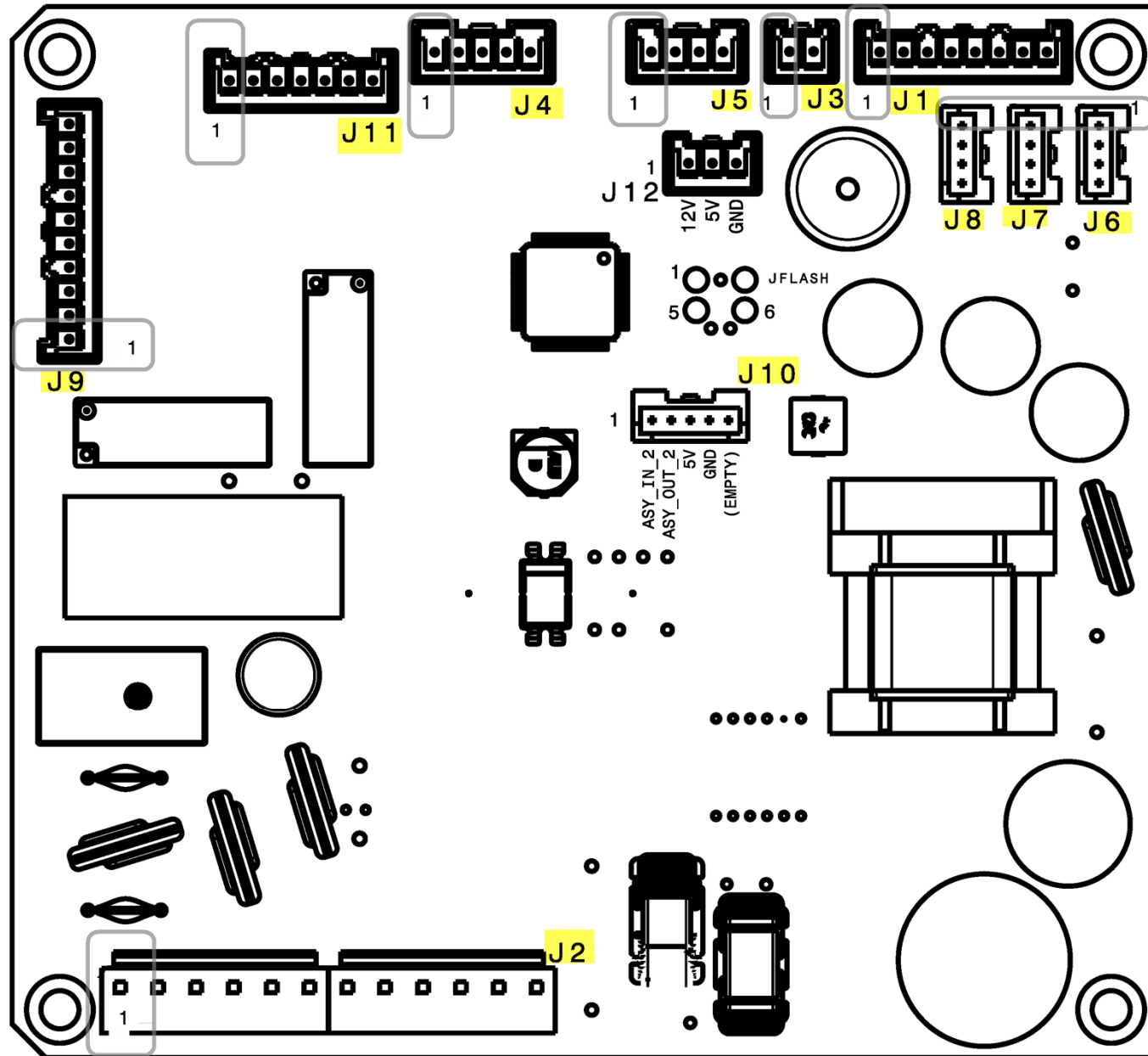
PIN CONNECTIONS

This is the full pin specification, actual pin connections depends on the configuration of the appliance.

Pin	Specification	Note
J1:1	NTC_4	
J1:2	+5V	
J1:3	NTC_3	Sensor FZ
J1:4	+5V	
J1:5	NTC_2	Sensor evaporator
J1:6	+5V	
J1:7	NTC_1	Sensor FR
J1:8	+5V	
J2:1	GROUND	Not always used
J2:2	-	
J2:3-J2:5	NEUTRAL	
J2:6	-	
J2:7	HEATER_LIVE (RL2)	Defrost or balancing heater
J2:8	LIVE	
J2:9	DAC_LIVE (RL3)	DAC fan (FanHigh)
J2:10	COMP_LIVE (RL1)	Compressor
J2:11	VALVE_LIVE (SSR)	Electrovalve
J2:12	LIGHT (RL4)	DAC light
J3:1	+5V	Ambient sensor
J3:2	NTC_5	Ambient sensor
J4:1	DC_IN_2	FZ Door Reed sensor DC input
J4:2	+5V	FZ Door Reed sensor DC input
J4:3	+5V	Other DC input
J4:4	DC_IN_1	Other DC input
J4:5	DC_IN_3	
J5:1	ASY_OUT	Sidekick PC
J5:2	ASY_IN	Sidekick PC
J5:3	+5V	Sidekick PC
J5:4	GROUND	Sidekick PC
J6:1	REF	Fan DC
J6:2	COMM	
J6:3	+5V	
J6:4	+12V	

Pin	Specification	Note
J7:1	REF	Main board and UI
J7:2	COMM	
J7:3	+5V	
J7:4	+12V	
J8:1	REF	Main board and UI
J8:2	COMM	
J8:3	+5V	
J8:4	+12V	
J9:1	DC_PWM_LOAD_OUT_1	e.g. led light
J9:2	+12Vdc	25KhZ (e.g. FZ or FF fan)
J9:3	DC_PWM_LOAD_OUT_2	25KhZ (e.g. FZ or FF fan)
J9:4	+12Vdc	e.g. led light
J9:5	DC_PWM_LOAD_OUT_3	25KhZ (e.g. FZ or FF fan)
J9:6	+12Vdc	25KhZ (e.g. FZ or FF fan)
J9:7	DC_PWM_LOAD_OUT_4	e.g. led light
J9:8	+12Vdc	e.g. led light
J9:9	VSC	VS. compressor frequency signal
J9:10	+12Vdc	VS. compressor frequency signal
J10:1	IN	NIU5 connectivity board
J10:2	OUT	NIU5 connectivity board
J10:3	+5V	NIU5 connectivity board
J10:4	REF	NIU5 connectivity board
J10:5	-	
J11_1:1	+12V	
J11_1:2	+12V	Stepper valve
J11_1:3	OUT1	Stepper valve
J11_1:4	OUT1R	Stepper valve
J11_1:5	OUT2	Stepper valve
J11_1:6	OUT2R	Stepper valve
J11_1:7	REF	

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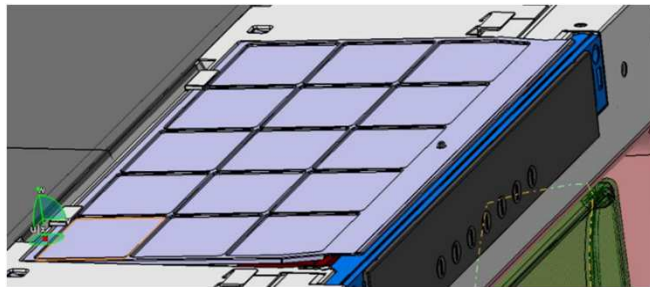
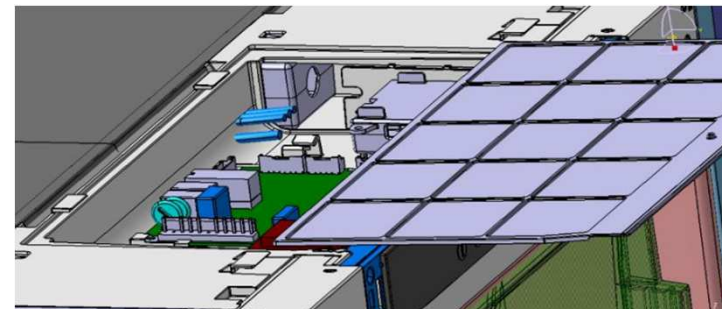Pull the appliance out 10 cm, be careful not to pull too far.

Unscrew the top panel
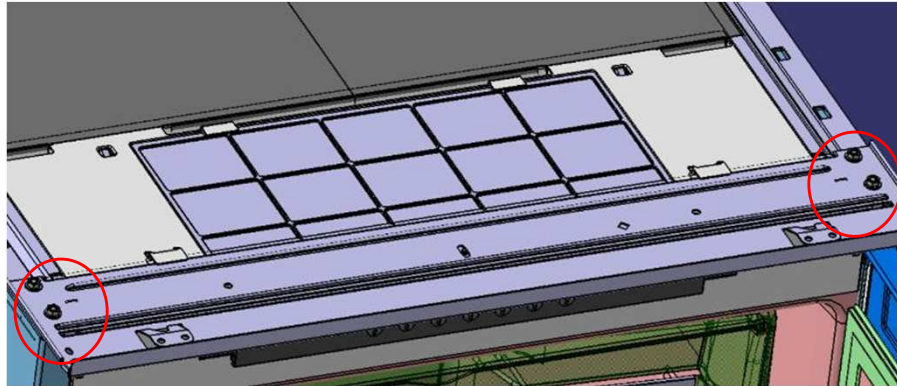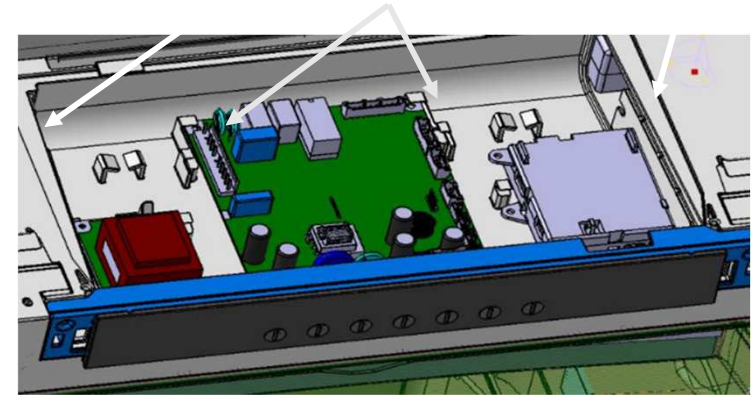

Raise the front of the cover
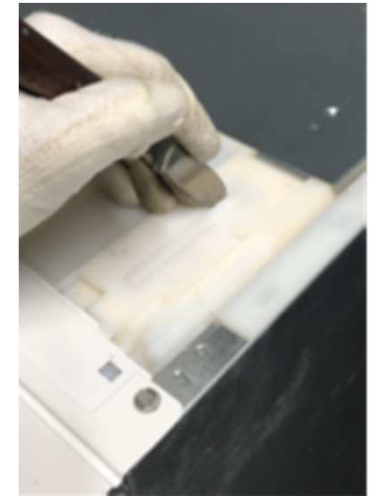

and pull out

230V power inlet   2x screws/2x pins   12V exit

The ambient sensor is replaceable. The position of other sensors depends on the type of appliance and are indicated in the spare part list.
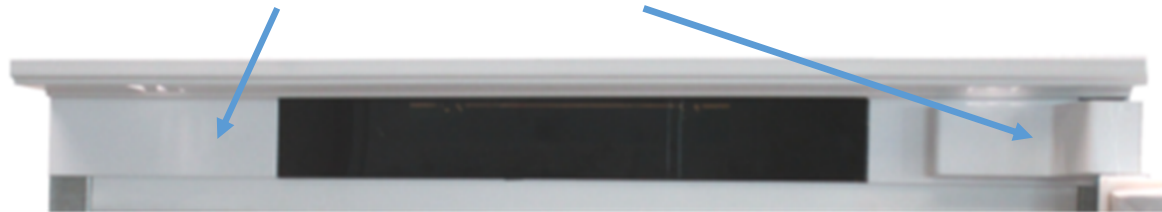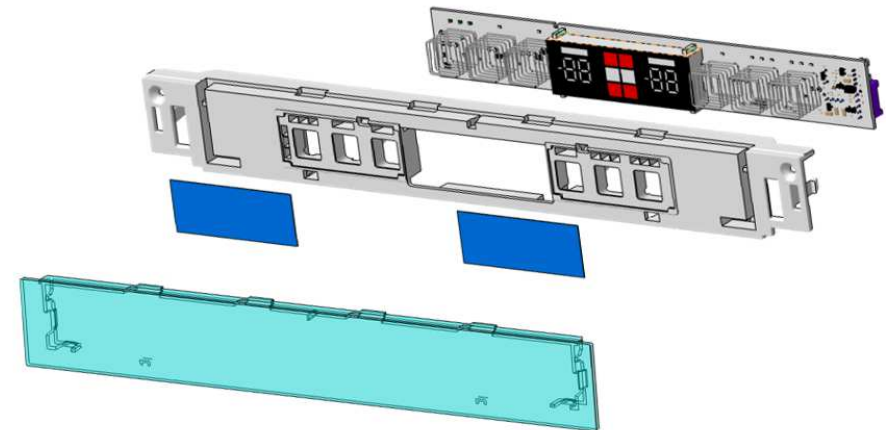

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Pull the appliance out 10 cm, be careful not to pull too far.

Loosen the top bar with four screws

Remove the two covers

Unlatch the UI using a flat screwdriver on both sides

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Interface with five touch keys for single appliances, freezer or fridge. In combi appliances the interface has 7 touch keys. Icons depends on the model.

P10 on top

Reed switch   OK key

JFLASH

J1 DAAS
J2: Connection to PB (4 wires)

Demo mode can only be activated when the air temperature is warmer than 10°C in the compartment or the temperature probes are disconnected. Demo Mode remains active if there is a power failure or the appliance is switched off.

Command	Touch key	Press	Action	Indicator
Demo mode	OK	Press key 9 times.	Enter demo mode.	Long beep and:
Settings	Any button	Short press	Settings works as normal during demo mode.	Indicator depends on user interaction. If there is no user interaction for 20 minutes during demo mode, dE Mo graphics is displayed again.
Exit demo mode	OK	Press and hold key for 10 seconds.	Exit demo mode	Long beep.

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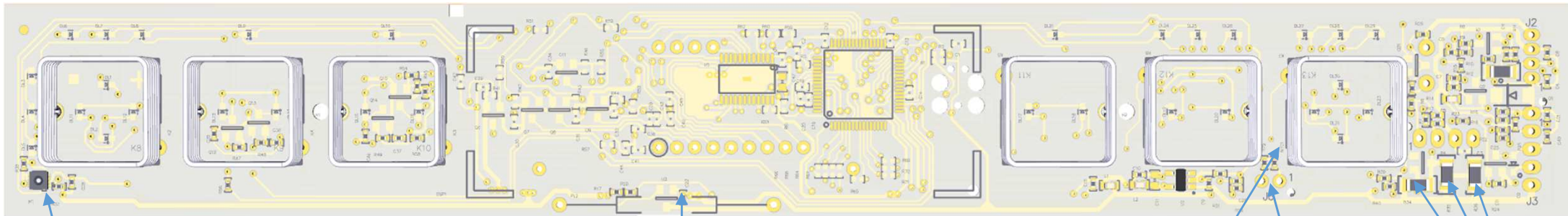
OBSIDIAN UI

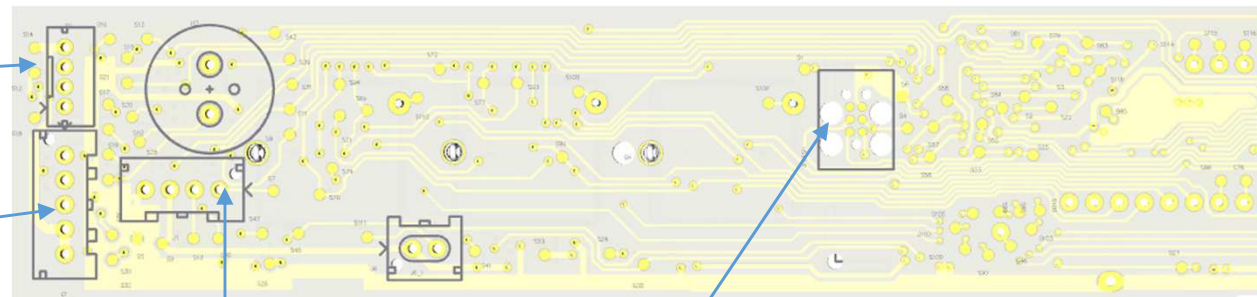Ambient sensor

Door sensor

NTC sensor

Temp probe connector J6 (alternative to NTC sensor)

Heater

Buzzer

J2-MACS DC power supply: +12V +5V Signal GND

J3

J1-DAAS Connection to PC

JFLASH programming port

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OBSIDIAN UI

- ECO meter: Feedback on the energy consumption compared to the ECO setting (3 bars is ECO-friendly).
- ECO: Icon on - default ECO settings. Hold for 3 seconds to access other settings. Timeout after 60 seconds.
  - Tap fridge temp to navigate and freezer temp to change the value (or Extra Freeze/Extra cool).
- Filter Reset: Resets the filters alerts and restarts the filter count-down.
- Extra Cool: Activates a cold boost.
- Fridge temperature: Displays the set temperature, touch to change. Displays feedback from settings.
- Air Filter: Alerts when a filter change is needed.
- Anti-Oxidant Filter: Alerts when a filter change is needed.
- UI lock: Indicates that the UI is locked. Function is only present on freestanding appliances.
- Alert: Alerts the user for any error on the appliance.
- Door open: "H°" on the display and sound alert.
  - The alert stops after 60 minutes but the icon stays on until the alarm is acknowledged.
  - The alerts sounds again if the temperature is still too high.
- Freezer temperature: Displays the set temperature, touch to change. Displays feedback from settings.
- To reset to factory default (Wi-Fi settings are not affected):
  - Hold ECO for 3 seconds
  - Tap Fridge Temperature
  - Tap Freezer Temperature 3 times
- Extra Freeze: Activates a cold boost.
- Wi-Fi:
  - Onboarded appliance: Hold for 3 seconds to turn Wi-Fi on/off.
  - Or hold for 3 seconds to start onboarding, see the slide Wi-Fi settings for more information.
- DAC: Air is circulated constantly in the cavity.

Note: Not all features are available on all appliances.
Settings on combi appliances are displayed on both fridge and freezer temp, in cabinets, settings are alternated.

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DEMO MODE OBSIDIAN

Command	Touch key	Press	Action	Indicator
Demo mode	For Combi or fridge: ECO + ExtraCool For Freezers: ECO + ExtraFreezer	Hold 5 seconds.	Enter demo mode.	Combi appliances: "dE" and "On. Cabinets: Alternates between "dE" and "On" every 1,5 seconds The Demo screen is displayed every one minute after the last touch of any key.
Settings	Any button	Short press	Settings works as normal during demo mode.	Indicator depends on user interaction. If there is no user interaction for 1 minute during demo mode, dE Mo is displayed again.
Exit demo mode	For Combi or fridge: ECO + ExtraCool For Freezers: ECO + ExtraFreezer	Hold 5 seconds.	Exit demo mode	Long beep.

Demo mode can only be activated when the air temperature is warmer than 10°C in the compartment or the temperature sensors are disconnected.
Demo Mode remains active if there is a power failure or the appliance is switched off.

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SERVICE MODE P10 / OBSIDIAN

Controls P10 / Obsidian UI

Command	UI key	Press	Action	Indicator
Activate service mode	**Mode + OK** / ExtraCool + FridgeTemp	Hold for 5 seconds	Activate service mode	All LEDs lit
Next	**OK** / Extra Cool	Short press	Moves service mode to next component	Index number
Action	**+** / Any other key	Short press	Activate and deactivate components	Lit when command is applicable
Exit service mode	Same key used for activating service mode.	Hold for 5 seconds	Exit service mode [1]	All LEDs off

Hardware state indicators

Task	Item in test state	Indicator	Icon
Output test	Turned off	Off	⚠
	Middle state [2]	Blinking	⚠
	Switched on	Lit up	⚠
	Special state (stepper valve open-open)	Blinking of 2 visual indicators	⚠ 🚪
Input test	Close	Off	⚠
	Open	Lit up	⚠

[1] Service mode also turns off when the appliance is turned off.
[2] Variable speed fan, auger motor counter clockwise rotation, water pump reverse direction and one of the positions of the stepper valve according to the specific layout of the evaporator pipes ("open cooler" or "open freezer")

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Test area	Description	Index
AC	Refrigerator compressor	0
AC	Freezer compressor	1
AC	Freezer evaporator heater	2
AC	Refrigerator lamp	3
AC	Freezer evaporator fan	4
AC	Refrigerator fan	5
AC	Evaporator electro valve	6
AC	Zero-degree fan	7
AC	Water faucet	8
AC	Freezer lamp	9
AC	Auger motor	10 [1]
AC	Ice selector/solenoid cube	11
AC	Condenser fan	12
DC	Refrigerator lamp	13
DC	Zero degree lamp	14
DC	Freezer evaporator fan	15
DC	Refrigerator fan	16
DC	Zero-degree fan	17
DC	Condensor fan	18
DC	Glacier	19
DC	Freezer lamp	20
DC	Air filter Fan	21
DC	Refrigerator damper	22

Test area	Description	Index
Digital input	Refrigerator door	23
Digital input	Freezer door	24
Digital input	Zero-degree door	25
Digital input	Heater switch	26
Digital input	Ice maker	27
Digital input	Paddle switch	28
Sensors	Refrigerator air temperature	29
Sensors	Freezer air temperature	30
Sensors	Refrigerator evaporator temperature	31
Sensors	Zero-degree air temperature	32
Sensors	PB ambient temperature	33
Sensors	UI ambient temperature	34
DC	Ice flapper	36
DC	Refrigerator VCC compressor	37
DC	Freezer VCC compressor	38
Sensors	Freezer evaporator temperature	39
Digital input	Rapid drink cooler	40
AC	Perfect drawer	41
AC	Refrigerator balance heater	42
AC	Frame heater	43
DC	Remote damper	44
Sensors	Ice maker 1 tray temperature	45
AC	Condenser electro valve	46

- AC and DC: All loads are off when service mode starts.
  "Action" command toggles load off/on or close/open.
- Sensors: Temp. and index are displayed if the sensor detects an acceptable value.
- Fan: Variable speed fans has three states: State 0=off (displayed OF)
  → state 2=on at middle speed (displayed Mi)
  → state 1=on at max speed (displayed ON).

- [1] Auger motor: An "action" command rotates it clockwise, another rotates it anticlockwise. A one direction motor stops.

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SERVICE MODE TESTS

Test area	Description	Index
DC	Ice Chute / Dispenser Pocket Heater	47
DC	UI Anti-condensation Heater	48
Digital input	Dispenser ambient light	49
DC	Ice maker 1 twist tray	50 [2]
Digital input	Max tank level	51
AC	Sparkling water valve	52
AC	Still water valve	53
AC	Ambient water valve	54
AC	Ice maker 1 water valve	56
DC	Ui dispenser valve	57
Digital input	Ice bin switch	58
DC	Nutri-light lamp	59
Sensors	Zero-degree evaporator temperature	60
DC	Stepper valve	61 [3]
DC	Ice maker fan	62
DC	Frame/mullion heater	63
Sensors	UI ambient humidity	64
AC	Bypass electro valve	65
DC	UI Dispenser lamp	66
DC	Pipe/fill tube 1 heater	67
Sensors	Ice maker evaporator temperature	68
AC	Refrigerator evaporator fan	69
DC	Refrigerator evaporator fan	70

Test area	Description	Index
AC	Refrigerator evaporator heater	71
AC	Ice maker evaporator heater	72
AC	Freezer balance heater	73
AC	Zero-degree balance heater	74
AC	Mullion heater	75
DC	Zero-degree damper heater	76
DC	Zero-degree damper	77
DC	Ice tray 1 bail arm	78 [2]
AC	Pipe/Fill tube 1 heater	79
DC	Water pump	80 [4]
DC	Ice Maker Water Valve	81
AC	Ice maker 2 water valve	82
AC	Energize ice maker	83
DC	Ice cube solenoid	84
DC	End caps lamp	85
DC	Ice tray 2 bail arm	86 [2]
Sensors	Ice maker 2 tray temperature	87
DC	Ice maker 2 twist tray	88 [2]
Digital input	Heater switch (with Energy meter)	89 [5]
AC	Pipe/Fill tube 2 heater	91
DC	Pipe/Fill Tube 2 Heater	94
DC	…twist tray	96 [2]
DC	…bail arm	97 [2]

- AC and DC: All loads are off when service mode starts. "Action" command toggles load off/on or close/open.
- Sensors: Temp. and index are displayed if the sensor detects an acceptable value.
- Variable speed fans has three states: State 0=off (displayed OF)
  → state 2=on at middle speed (displayed Mi)
  → state 1=on at max speed (displayed ON).

- [2] Ice maker: "Action" command empties the ice cubes.
- [3] Stepper valve: "Action" toggles from open-open position to all closed position
- [4] Water pump: "Action" command moves the water pump forward, another moves it backwards. A one direction motor stops.
- [5] Heater with energy-meter: Turns the Heater (2) on, after few seconds,
- it provides the logical value. This test is exclusive of Heater switch (26)

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