

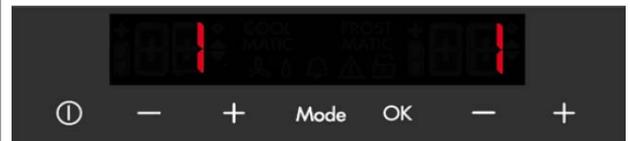


SERVICE MANUAL

Food preservation

COLD APPLIANCES WITH ELECTRONIC CONTROL SYSTEM

ERF2003



EN

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FOR INTERNAL AND PARTNERS USE ONLY

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Consumer Service - EMEA
Quality & Continuous Improvement - Technical Support

PURPOSE OF THIS MANUAL

The purpose of this Service Manual is to provide Service Engineers who are already familiar with repair procedures with information regarding the PCB.

The manual deals with the following topics:

- PCB general characteristics
- Disassembly

Document Revisions

Rev.	Date	Description	Author
00	04/2019	Document creation	Anna Grimlund

SAFETY

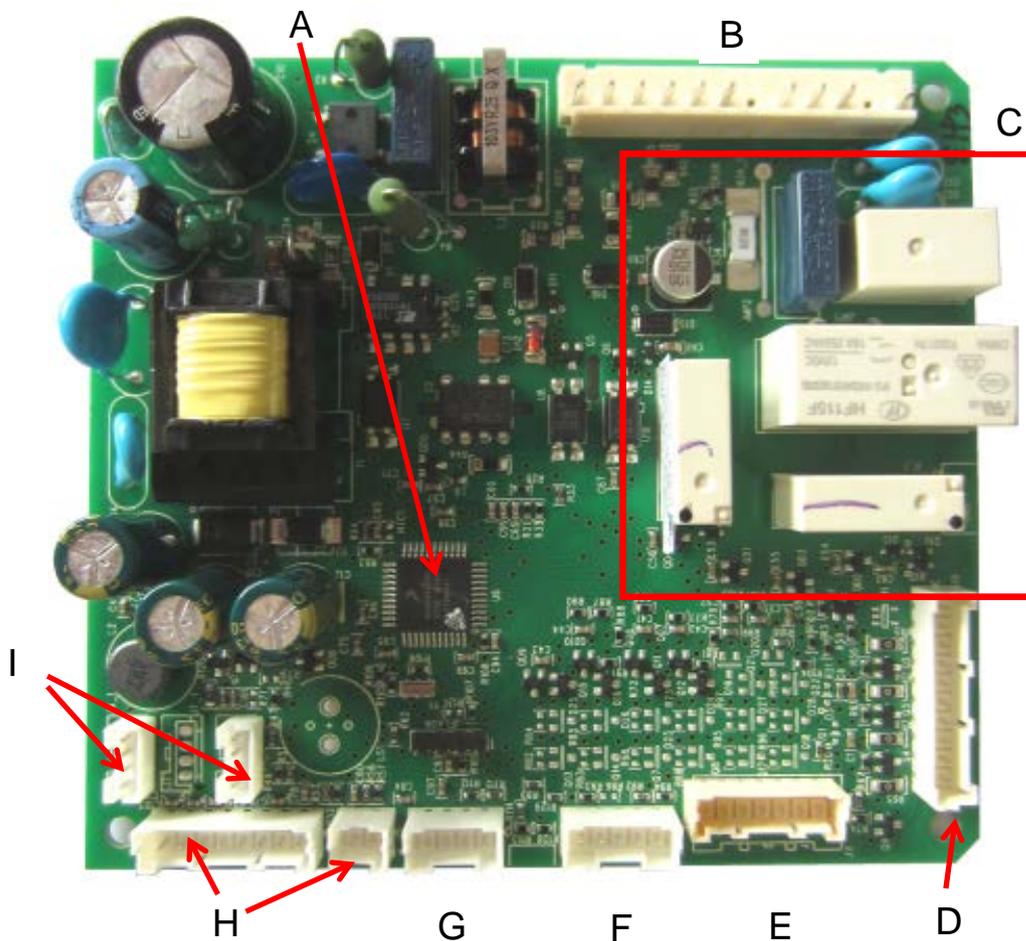


- All the work to be performed inside the appliance requires specific skills and knowledge and may only be carried out by qualified and authorised Service Engineers
- Before you access internal components, take the plug out of the socket to disconnect the power supply.
- Some of the components in the mechanical part could cause injuries, so wear suitable protection and proceed with caution.

ERF2003 GENERAL CHARACTERISTICS

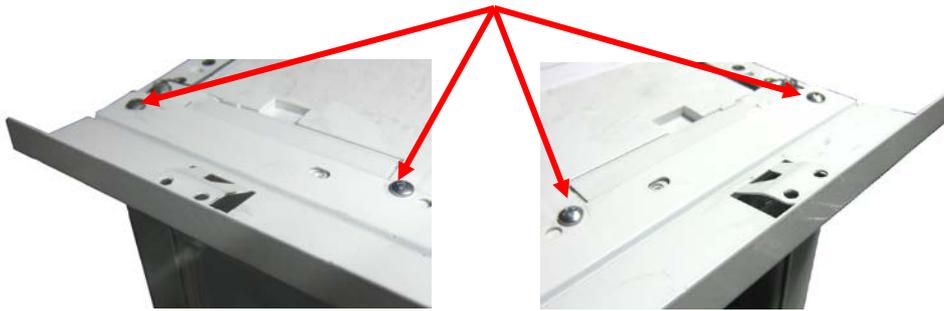
The main electronic ERF2003 can be connected to different types of user interfaces. The main electronic communicates through a serial interface when the insulation isn't needed via six wires and through a standard protocol based on MACS with insulated user interface via three wires.

Technical Specification	
Operating voltage input	100/240 Vac
Frequency range	50-60 Hz
A	Processor
B	AC: Magnetic valve, Compressor, Ventilator fridge, Defrost heater
C	Five relays
D	DC: Ventilator Freezer, Ventilator Zero degree, LED Board, Electronic driver
E	Stepper valve
F	Door
G	Sidekick
H	Five temperature sensors
I	UI



ERF2003 DISSASSEMBLY

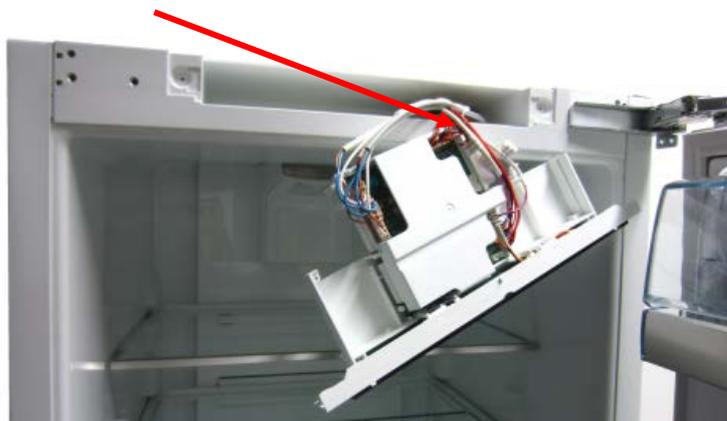
1. Unscrew the four screws and remove the panel



2. Unclip the cover on the left and right side



3. Remove two screws and pull out the electronic.



P10 USER INTERFACE

Overview

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.

7 touch keys for combi appliances:

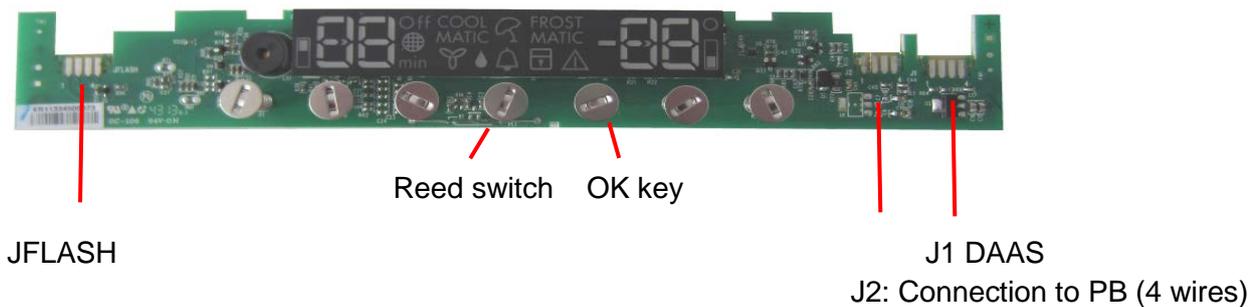


P10 on door 5 touch keys for fridge or freezer appliance:



ERF967 – P10 MACS UI

P10 on top



P10 DEMO MODE

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.

Demo mode touch keys

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.

SALSA USER INTERFACE

Overview

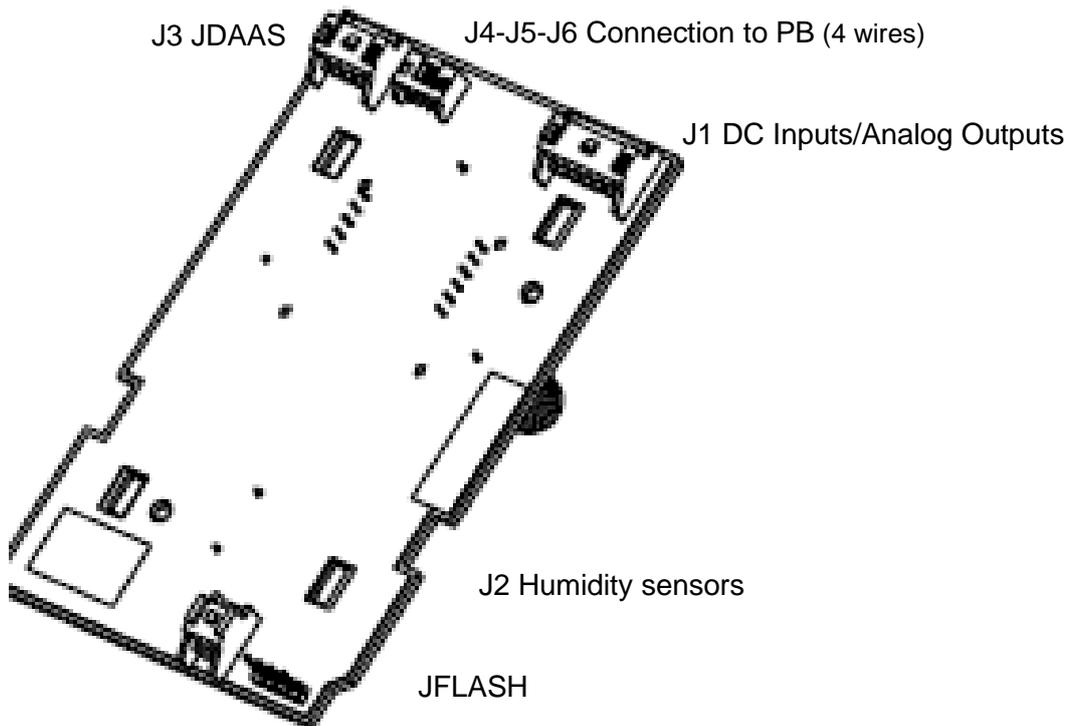
Interface on door with five touch keys, one LED digit display and buzzer alarm. Icons depends on the model.



1. On/Off & Selected compartment
2. Temp. settings
3. Modes LED
4. Modes button
5. Processor
6. Buzzer
7. Features
8. Connection electronics 5V DC



SALSA ERF905



SALSA DEMO MODE

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.

Demo mode touch keys



Boost key varies between models.

Command	Touch key	Press	Action	Indicator
Demo mode		Press key 9 times.	Enter demo mode.	Long beep and dE on the display.
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 graphics is displayed again.
Exit demo mode		Press and hold key for 10 seconds.	Exit demo mode	Long beep.

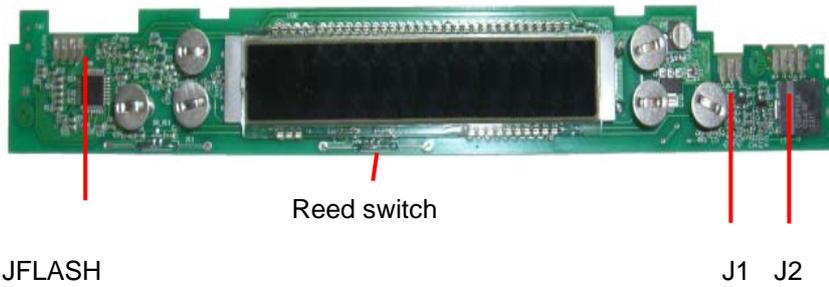
INSPIRATION USER INTERFACE

Overview

Interface on door with five touch keys, one LED digit display and buzzer alarm. Icons depends on the model.



INSPIRATION ERF957



J1: Connection to PB (3wires; only +12V)

J2: JDAAS J2 : JDAAS

INSPIRATION DEMO MODE

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.

Demo mode touch keys

Command	Touch key	Press	Action	Indicator
Demo mode	On/Off	Press key 9 times.	Enter demo mode.	 appliance starts with Eco mode.
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, DEMO graphics is displayed again.
Exit demo mode	Mode	Press and hold key for 10 seconds.	Exit demo mode	Long beep.

SERVICE MODE DIGITAL INTERFACE

Service mode can be started with a cold or warm appliance. The only exception is when testing the digital input heater switch that requires a cold appliance.

When service mode starts, all LEDs are on and all components are off. Service mode activates multiple components simultaneously. Sensors are self-diagnosing while components must be checked manually.

Turning a component on provides electricity to the component. This makes it possible to test that the power supply is getting through and if there is voltage absorption.

For example, if activating the refrigerator compressor does not work, use a tester to see whether the motor or the power board causes the problem.

Activate service mode on digital interface

1. Switch on the appliance
2. Unplug the appliance
3. Wait 10 seconds
4. Plug in the appliance
5. Wait 6 seconds.
6. Press touch key for 5 seconds
 - the key must be pressed within 6 to 16 seconds after power-on

Any key except the On/Off key can be used to activate service mode.

Command	Touch key	Press	Action	Indicator
Service mode	Any key	Hold for 5 seconds within 6 - 16 seconds of starting the appliance.	Enter service mode	All LEDs lit
Next	Same key as enter service mode	Short press	Moves service mode to next component	Index of component
Action	Any other key (not the key used for the next action)	Short press	Activate and deactivate components	Lit when command is applicable
Exit service mode	Same key as started service mode	Hold for 5 seconds.	Exit service mode	None

It is not possible to move service mode backwards, complete the sequence to go back to a required phase/component.

SERVICE MODE DIGITAL INTERFACE

Each phase is identified by an index displayed on the UI. When the index represents hardware (AC or DC output and digital input) the visual indicator shows the hardware state.

Task	Hardware state	Indicator (<i>flower, umbrella, snowflake, ECO</i>)
Output test	Turned off	Off
	Middle state	Blinking
	Switched on	Lit up
	Special state	Blinking of two visual indicators
Input test	Close	Off
	Open	Lit up

AC output test

Tests AC loads connected to the appliance, only physically mounted components are displayed. When service mode starts, all components are switched off.

Description	Index	Action key
Refrigerator compressor	0	Toggles load on/off.
Freezer compressor	1	Toggles load on/off.
Freezer evaporator heater	2	Toggles load on/off.
Refrigerator lamp	3	Toggles load on/off.
Freezer evaporator fan	4	Toggles load on/off.
Refrigerator fan	5	Toggles load on/off.
Evaporator electro valve	6	Toggles load on/off.
Zero-degree fan	7	Toggles load on/off.
Water faucet	8	Toggles load on/off.
Freezer lamp	9	Toggles load on/off.
Ice selector/solenoid cube	11	Toggles load on/off.
Condenser fan	12	Toggles load on/off.
Perfect drawer	41	Toggles load on/off.
Refrigerator balance heater	42	Toggles load on/off.
Frame heater	43	Toggles load on/off.
Condenser electro valve	46	Toggles load on/off.
Sparkling water valve	52	Toggles load on/off.
Still water valve	53	Toggles load on/off.
Ambient water valve	54	Toggles load on/off.
Ice maker water valve	56	Toggles load on/off.
Bypass electro valve	65	Toggles load on/off.
Refrigerator evaporator fan	69	Toggles load on/off.
Refrigerator evaporator heater	71	Toggles load on/off.
Ice maker heater	72	Toggles load on/off.
Freezer balance heater	73	Toggles load on/off.
Zero-degree balance heater	74	Toggles load on/off.
Mullion heater	75	Toggles load on/off.

DC output test

When service mode starts, all components are switched off.

Description	Index	Action key
Refrigerator lamp	13	Toggles output on/off.
Zero degree lamp	14	Toggles output on/off.
Freezer evaporator fan	15	Toggles output on/off.
Refrigerator fan	16	Toggles output on/off.
Zero-degree fan	17	Toggles output on/off.
Condenser fan	18	Toggles output on/off.
Glacier	19	Toggles output on/off.
Freezer lamp	20	Toggles output on/off.
Air filter Fan	21	Toggles output on/off.
Refrigerator compressor	37	Toggles output on/off.
Freezer compressor	38	Toggles output on/off.
UI dispenser lamp	47	Toggles output on/off.
UI Anti-condensation Heater	48	Toggles output on/off.
UI dispenser valve	57	Toggles output on/off.
Nutrilight lamp	59	Toggles output on/off.
Ice maker fan	62	Toggles output on/off.
Frame/mullion heater	63	Toggles output on/off.
2nd UI Dispenser lamp	66	Toggles output on/off.
Pipe/fill tube heater	67	Toggles output on/off.
Refrigerator evaporator fan	70	Toggles output on/off.
Zero-degree damper heater	76	Toggles output on/off.

Auger motor test

Description	Index	Action key
Auger motor	10	Rotates auger motor clockwise, then anticlockwise.

Damper test

Description	Index	Action key
Zero-degree damper	22	Toggles damper open /close
Remote damper	44	Toggles damper open /close
Refrigerator damper	77	Toggles damper open /close

Digital input test

Indicator is for example *flower, umbrella, snowflake*.

- Digital input open: LED and indicator on.
- Digital input closed: LED and indicator off.

Action key is not used in this phase.

Description	Index	Action key
Refrigerator door	23	Sensor on - Indicator
Freezer door	24	Sensor on - Indicator
Zero-degree door	25	Sensor on - Indicator
Heater switch	26	Sensor on - Indicator. See NOTE below.
Ice maker	27	Sensor on - Indicator
Paddle switch	28	Sensor on - Indicator
Rapid drink cooler	40	Sensor on - Indicator
Dispenser ambient light	49	Sensor on - Indicator
Max tank level	51	Sensor on - Indicator
Ice bin switch	58	Sensor on - Indicator
Bail arm	78	Sensor on - Indicator

NOTE: Index 26. How to test the Heater switch is related to the associated power board:

- ERF2002, ERF2003, ERF1600: Activate index 2 (Freezer evaporator heater) before checking the Heater switch.
- ERF2001 and ERF502L: Check Heater switch without activating index 2

Flapper test

Description	Index	Action key
Ice flapper	36	Toggles flapper open /close

Ice Maker Twist Tray test

Description	Index	Action key
Ice maker twist tray	50	Detects if ice cubes are present. When service mode starts, the tray is moved to the home position.

Stepper Valve test

Description	Index	Action key
Stepper valve	61	<ol style="list-style-type: none"> 1. Move from initial open-open position to all closed position. 2. Move from the all closed position to the first position (open cooler) (indicator ON) 3. Move from the first position (open cooler) to the second position (open freezer) (indicator BLINKING)

Temperature/Humidity probe sensor test

Topical temperature and index is displayed if the probe sensor detects an acceptable value. The Action key is not used in this phase. Topical temperature is not shown on P10 6 wires.

Description	Index	Action key
Refrigerator air sensor	29	In case of error - ER
Freezer air sensor	30	In case of error - ER
Refrigerator evaporator sensor	31	In case of error - ER
Zero-degree air sensor	32	In case of error - ER
PB ambient sensor	33	In case of error - ER
UI ambient sensor	34	In case of error - ER
Freezer evaporator sensor	39	In case of error - ER
Ice maker tray sensor	45	In case of error - ER
Zero-degree evaporator sensor	60	In case of error - ER
UI ambient humidity	64	In case of error - ER
Ice maker evaporator sensor	68	In case of error - ER

Temperature probe sensor error

If a probe sensor is broken it is visualized as follows:

- Air sensor probe broken:
 - LED UI: All temperature LEDs are blinking
 - Digit UI: A small square at the bottom of the display
- Evaporator probe sensor broken (if enabled):
 - LED UI: All temperature LEDs are blinking
 - Digit UI: A small square at the top of the display
- Zero degree air sensor probe broken:
 - Digit UI: Three parallel lines on the display

SERVICE MODE EXAMPLE

Test to check that loads and sensors work, go to each number in service mode according to the following list:

- Activate service mode
- No. 1: Activate freezer compressor
- No. 2: Activate heating element-ERF2002/ERF2003/ERF1600 only
- No. 6: Activate and deactivate several times
 - Test ok if solenoid valves clicks.
- No. 13: Activate and deactivate lamp several times
 - Test ok if lamp switches on/off.
- No. 15: Activate freezer evaporator fan
- No. 16: Activate refrigerator fan
- No. 23: Close refrigerator door
 - Door open indicator disappears (Indicator)
- No. 26: Heater switch safety cut-outs
 - Test ok if no indicator appears (Indicator).
- No. 29: Refrigerator air sensor
 - Test ok if number appears, not ok ER
- No. 30: Freezer air sensor.
 - Test ok if number appears, not ok ER
- No. 31: Freezer evaporator sensor.
 - Test ok if number appears, not ok ER
- No 34: UI ambient sensor.
 - Test ok if number appears, not ok ER
- DAC fan: Place a hand near the refrigerator DAC and feel the flow of air (any noises are immediate).
- Freezer fan: Place a hand near the open freezer door and feel the flow of air (any noises are immediate)
- Compressor: Subject to resetting overload cut-out, the compressor starts. Feel for vibrations.
- End

SOFTWARE AND PARAMETERS

Software and parameters are visualized at the end of service mode. Depends on the number of microprocessor , user interface and power board. All codes of software and parameters are shown on the display

Software
Software code (8 numeric characters)
PB software name (8 characters)
PB software production (8 characters)
UI software name (8 characters)
UI software production name (8 characters)

- The digits are shown letter by letter.
- The digits show each character in second steps and a short beep from the buzzer.
- Between two different codes a bar is shown on digits for one second.
- The **action**-key is not used in this phase

Life time display

The max value can show 9999 days. Each number is shown on the display (starts from most significant).

- Press „**next**“-key- you can hear a short beep from the buzzer and the display shows the next digit
- Press the „**next**“-key again to go to the next phase

Final phase

On the display a time counter is shown in seconds the number 0 to 99 (loop).

AZZURRA USER INTERFACE

The touch key is positioned at the bottom or to the right of the display.

Electrolux brand: White LEDs

AEG brand: Red LEDs

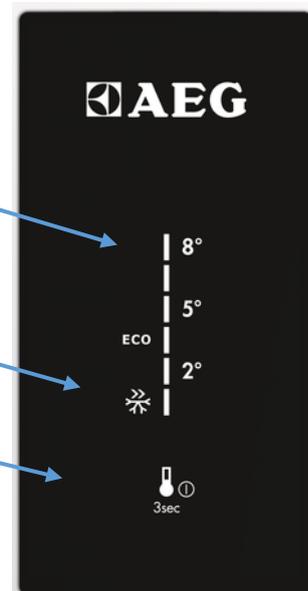
Private labels/key accounts: Red LEDs

When the UI is used in combi appliances it covers both the refrigerator and freezer, but the user can only toggle the fridge temperature. The boost applies to both fridge and freezer. The boost icon varies between brands.

AZZURRA ON DOOR

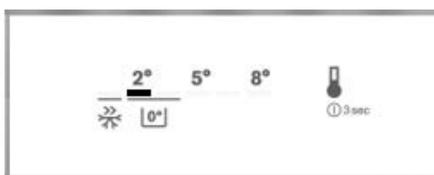
Each step in service mode is identified by LED combinations starting from the top

1. Temperature scale
2. Boost- fridge & freezer
3. Temperature adjustment
ON/OFF (long press)
Service mode



AZZURRA HORIZONTAL ON TOP AND ON DOOR

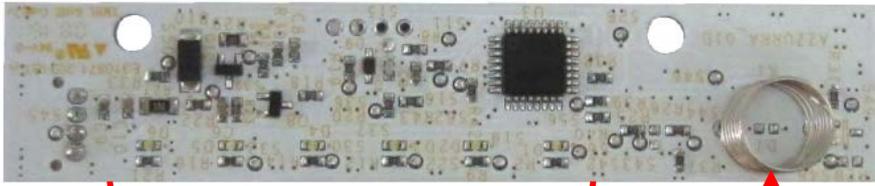
Each step in service mode is identified by LEDs starting from the 2nd LED on the left. The 1st LED (on the left) acts as hardware item state indicator.



AZZURRA ERF908

Front

Processor



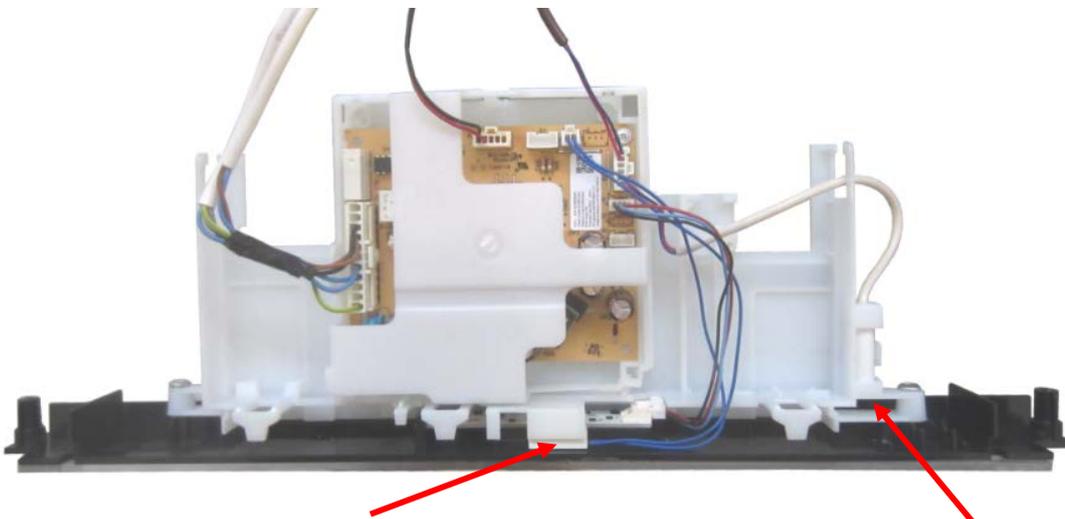
Six LED's for temperature and boost

Touch key
- On / Off
- Temperature adjustment

Back



Connection electronic
5V DC



Reed-Switch, Open = Door open
Close = Door closed

Ambient- temperature sensor

AZZURRA DEMO MODE

Demo mode is not available for Azzurra UI.

SERVICE MODE LED COMBINATIONS

Service mode can be started with a cold or warm appliances. The only exception is when testing the digital input heater switch that requires a cold appliance.

When service mode starts, all light indications are on and all components are off. Service mode activates multiple components simultaneously. Sensors are self-diagnosing while components must be checked manually.

Turning a component on provides electricity to the component. This makes it possible to test that the power supply is getting through and if there is voltage absorption.

For example, if activating the refrigerator compressor does not work, use a tester to see whether the motor or the power board causes the problem.

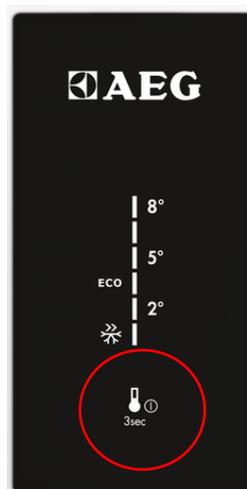
Activate service mode on interfaces with LED combinations

1. Switch on the appliance
2. Unplug the appliance
3. Wait 10 seconds
4. Plug in the appliance
5. Wait 6 seconds.
6. Press key for 5 seconds - the key must be pressed within 6 to 16 seconds after power-on

The same key is used for all commands. The key varies between user interfaces, see images below.

Command	Press	Action	Indicator
Service mode	Hold key for 5 seconds within 6 - 16 seconds of starting the appliance.	Enter service mode	All lights on
Next	Long press	Moves service mode to next component	Lights switched off
Action	Short press	Activate and deactivate components	Lit when command is applicable
Exit service mode	Hold for 5 seconds.	Exit service mode	None

The key varies between appliances: **Azzurra:**



ZEF:



SERVICE MODE LED COMBINATIONS

Service mode feedback consists of light combinations.

Table note: FR: Refrigerator, FZ: Freezer, EV: Evaporator

AC output test

Tests AC loads connected to the appliance, only physically mounted components are displayed. When service mode starts, all components are switched off.

AC Load	1	2	3	4	5
FR compressor					on
FZ compressor					blinking
Heater				on	
FR lamp				on	on
AC EV fan				on	blinking
AC FR fan				blinking	
EV electro valve				blinking	on
AC Zero degree fan				blinking	blinking
Water faucet			on		
FZ lamp			on		on
Auger motor			on		blinking
Ice selector			on	on	
AC condenser fan			on	on	on
Perfect drawer			on	on	blinking
Balance heater			on	blinking	
Frame heater			on	blinking	on
FR VCC compressor		on	on	blinking	blinking
FZ VCC compressor		on	blinking		
Condenser electro valve			on	blinking	blinking

Digital output test

All digital outputs connected to electronics are automatically switched off at the start of the test.

Digital output	1	2	3	4	5
FR lamp		on	blinking		on
Zero degree lamp		on	blinking		blinking
DC EV fan		on	blinking	on	
DC FR fan		on	blinking	on	on
DC Zero-degree fan		on	blinking	on	blinking
DC Condenser fan		on	blinking	blinking	
FZ lamp		on	blinking	blinking	blinking
DC Air filter fan		on			

Damper test

DC Heater	1	2	3	4	5
Local damper		on			on
Remove damper		on			blinking

Heater test

DC Heater	1	2	3	4	5
UI anti condensation heater		on		on	
DC frame heater		on		on	on

Digital input test

- Digital input open: light on.
- Digital input closed: light off.

Action key is not used in this phase.

Digital input	1	2	3	4	5
FR door	on	on		on	
FZ door	on	on		on	on
Zero degree door	on	on		on	blinking
Heater switch	on	on		blinking	
Ice maker	on	on		blinking	on
Paddle	on	on		blinking	blinking
Rapid drink cooler	on	on	on		

Temperature probe test

Unlike the loads and digital outputs, the sensors are not activated electronically by pressing a key and their activation is signalled by a yellow light which lights up to the right.

If the circuit breaker is open the light is lit.

Digital input	1	2	3	4	5
FR air	blinking	on	on		blinking
FZ air	blinking	on	on	on	
FR EV	blinking	on	on	on	on
Zero degree air	blinking	on	on	on	blinking
PB ambient	blinking	on	on	blinking	
UI ambient	blinking	on	on	blinking	on
FZ EV	blinking	on	blinking		
UI ambient humidity	blinking	on	blinking		on

ALARMS

Temperature alarm

The alarm is activated if the temperature moves outside a set threshold:

- The maximum temperature reached is displayed.

The alarm stops when the temperature returns within the threshold.

Cancel audible alarm

Deactivate the alarm by pressing any key.

- The alarm is muted for 2 minutes in freezers and 10 minutes in refrigerators.

The display can be used as normal after the alarm is cancelled even if the alarm icon stays on until the temperature reaches an acceptable level.

Door alarm

The door alarm is activated if the door is left open for a certain period of time. The temperature key and set temperature LED starts to flash LED on for 500ms then LED off for 500ms. The door alarm stops when the door is closed.

- Fridge door: 5 minutes
- Freezer door: 80 seconds