



# SERVICE MANUAL

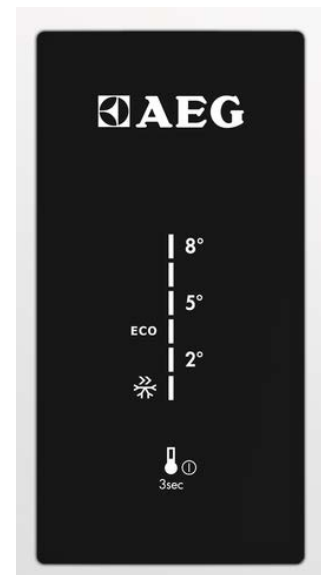
## Food preservation

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Consumer Service - EMEA  
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COLD APPLIANCES WITH ELECTRONIC  
CONTROL SYSTEM

ERF1600



EN

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## 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



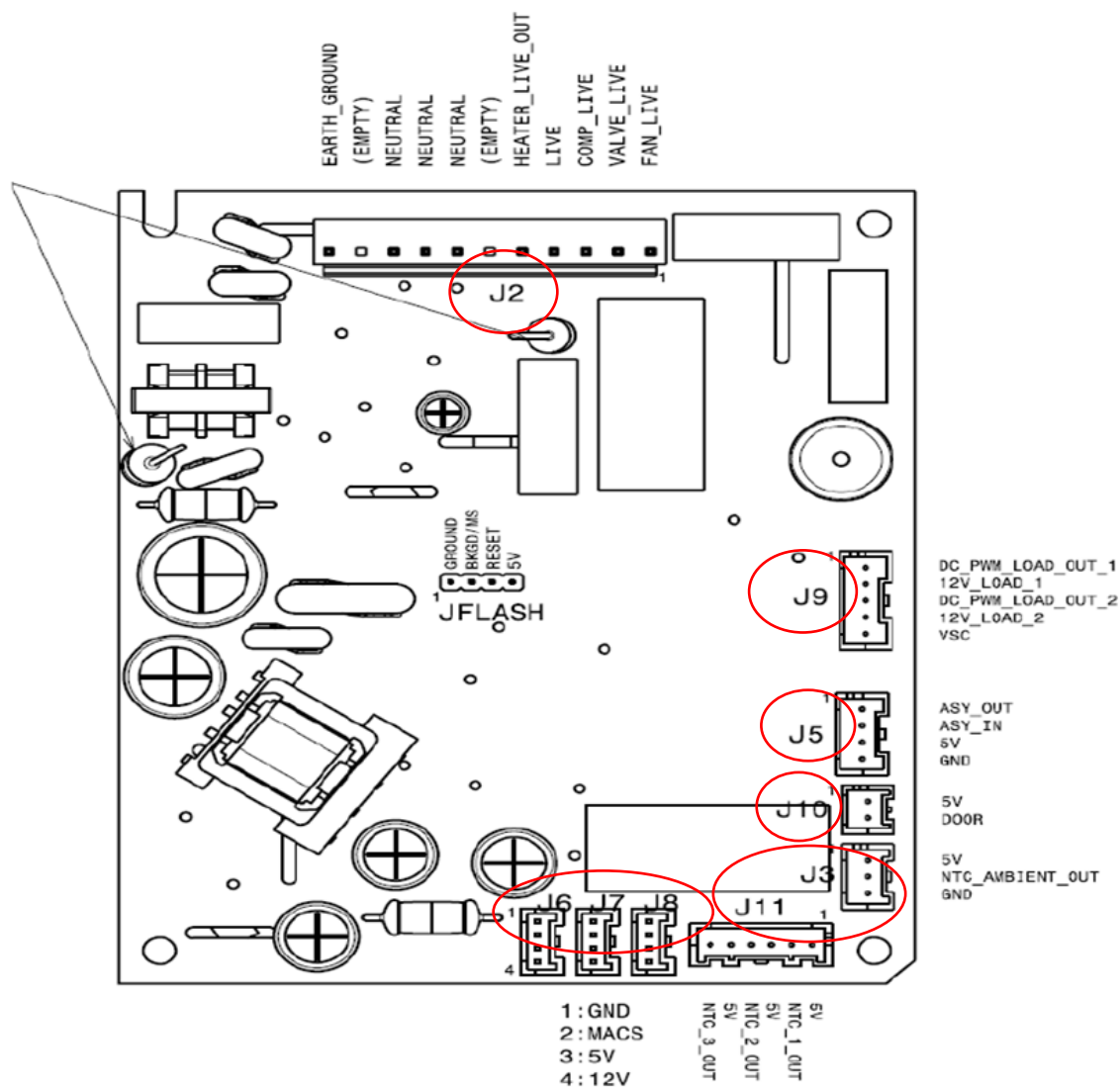
- All the work to be performed inside the appliance requires specific skills and knowledge and may only be carried out by qualified and authorised Service Engineers
- Before you access internal components, take the plug out of the socket to disconnect the power supply.
- Some of the components in the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

## ERF1600 GENERAL CHARACTERISTICS

The main electronics ERF1600 can be connected to different types of user interfaces. The main electronics communicates through a standard protocol based on MACS with insulated user interface via four wires.

| Technical specification |             |
|-------------------------|-------------|
| Operating voltage input | 100/240 Vac |
| Frequency range         | 50-60 Hz    |

|          |   |
|----------|---|
| J2       | AC Loads: Magnetic valve, Compressor, Ventilator fridge, Defrost heater |
| J3/J11   | Temperature sensors   |
| J9       | DC: Ventilator freezer, LED Board, Electronic driver                    |
| J10      | Digital Input/output - door   |
| J5       | Sidekick  |
| JFLASH   |   |
| J6/J7/J8 | Connection to UI  |



# SALSA USER INTERFACE

## Overview

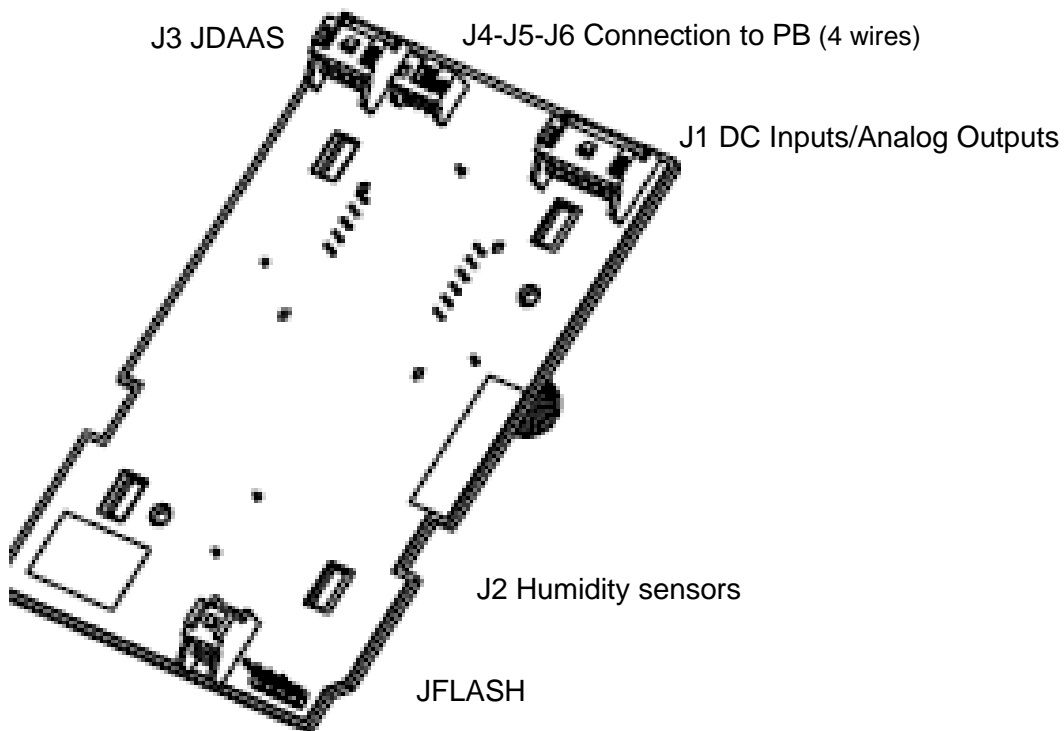
Interface on door with five touch keys, one LED digit display and buzzer alarm. Icons depends on the model.



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 <b>dE</b> on the display.   |
| Settings       | <b>Any button</b> | Short press                        | Settings works as normal during demo mode. | Indicator depends on user interaction.<br>If there is no user interaction for 20 minutes during demo mode, <b>dE</b> graphics is displayed again. |
| Exit demo 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 <b>NOTE</b> 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"> <li>1. Move from initial open-open position to all closed position.</li> <li>2. Move from the all closed position to the first position (open cooler) (indicator ON)</li> <li>3. Move from the first position (open cooler) to the second position (open freezer) (indicator BLINKING)</li> </ol> |

## 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**

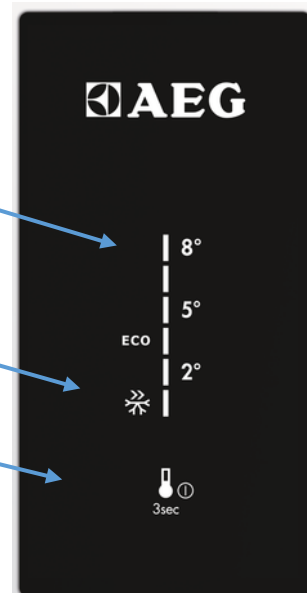
**Private labels/key accounts: Red LEDs**

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

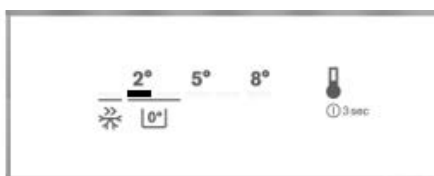
Each step in service mode is identified by LED combinations starting from the top

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



## AZZURRA HORIZONTAL ON TOP AND ON DOOR

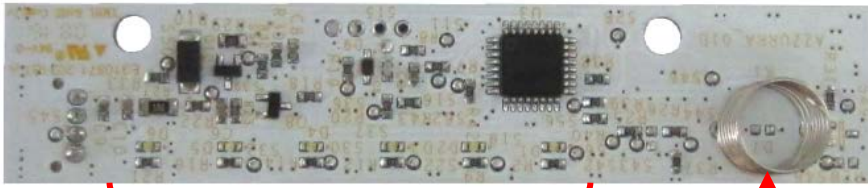
Each step in service mode is identified by LEDs starting from the 2nd LED on the left. The 1st LED (on the left) acts as hardware item state indicator.



# AZZURRA ERF908

Front

Processor



Six LED's for temperature and boost

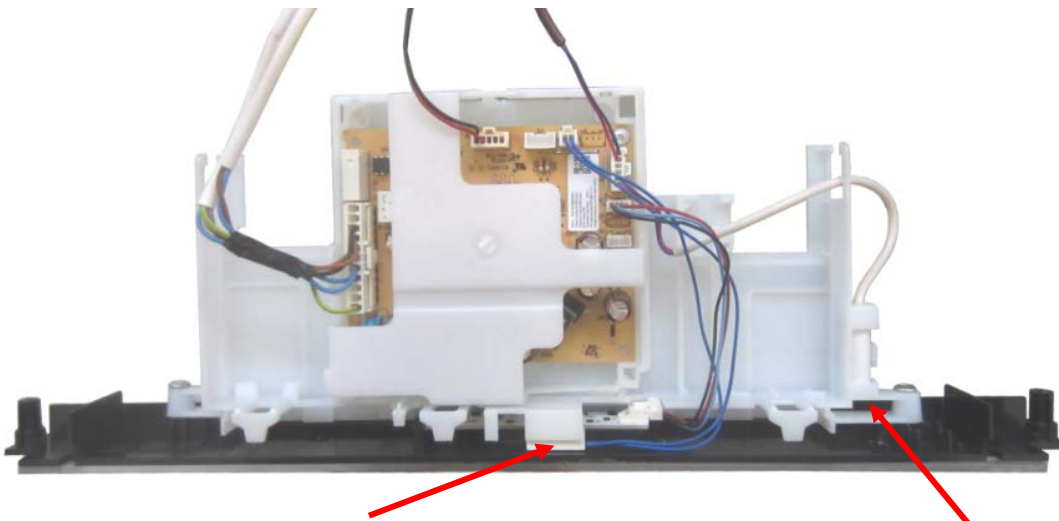
Touch key

- 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.

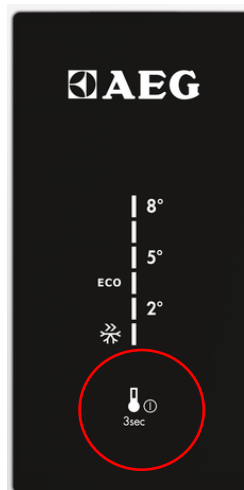
### Activate service mode on interfaces with LED combinations

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