Dishwasher series EDW 1001

Functionalities

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THE HEART OF A GOOD KITCHEN

# Service Manual: H7-74-03E

**Product identification**
**Code for the production numbers used for the various models (PNC)**

|  |  |  |  | First 3 figures |
|---|---|---|---|---|
| Product line | **DISHWASHER** | | | 911 xxx xxx |
|  |  |  |  | 4th figure |
| Group | DIVA **45** cm | 9 place settings | 6 | 911 **6** x x xxx |
|  | DIVA **60** cm | 12 place settings | 9 | 911 **9** x x xxx |
|  |  |  |  | 5th figure |
| Structure | F.S. (45/60) | | **1** | 911X **1** x xxx |
|  | B.I. (45/60) | | **2** | 911X **2** x xxx |
|  | F.I. (45/60) | | **3** | 911X **3** x xxx |
|  | F.S./B.I.(B.U.) convertible (45/60) | | **4** | 911X **4** x xxx |
|  | F.S. "BIG 60" | | **6** | 911X **6** x xxx |
|  | B.I. "BIG 60" | | **7** | 911X **7** x xxx |
|  | F.I. "BIG 60" | | **8** | 911X **8** x xxx |
|  |  |  |  | 6th figure |
| Key typology & electro-mechanical function | 1 key | | **1** | 9119 X **1** xxx |
|  | 2 keys | | **2** | 9119 X **2** xxx |
|  | 3 keys | | **3** | 9119 X **3** xxx |
|  | 4 keys / + keys | | **4** | 9119 X **4** xxx |
| Electronic function | EDW 1001-1100/ 1003 | | **5** | 9119 X **5** xxx |
|  | EDW 1500 / 1503 | | **6** | 9119 X **6** xxx |
|  | EDW 2000 / 2003 | | **7** | 9119 X **7** xxx |
|  | EDW 2500 / 2503 | | **8** | 9119 X **8** xxx |
|  | EDW 500 / 503 | | **9** | 9119 X **9** xxx |
|  |  |  |  | Last 3 figures |
| Product identification (customer/market) | | | **XXX** | 911 9 X X **XXX** |
| Example | DIVA **electronic** | ⇨ F.S. | EDW1001-1100 | ⇨ 911 9 1 5 xxx |
|  |  | ⇨ B.I. | EDW1001-1100 | ⇨ 911 9 2 5 xxx |
|  |  | ⇨ F.I. | EDW1003 | ⇨ 911 9 3 5 xxx |
|  |  | ⇨ B.U. | EDW1001-1100 | ⇨ 911 9 4 5 xxx |
|  |  | ⇨ F.S. | EDW1500 | ⇨ 911 9 1 6 xxx |
|  |  | ⇨ B.I. | EDW1500 | ⇨ 911 9 2 6 xxx |
|  |  | ⇨ F.I. | EDW1503 | ⇨ 911 9 3 6 xxx |
|  |  | ⇨ B.U. | EDW1500 | ⇨ 911 9 4 6 xxx |
|  |  | ⇨ F.S. | EDW2000 | ⇨ 911 9 1 7 xxx |
|  |  | ⇨ B.I. | EDW2000 | ⇨ 911 9 2 7 xxx |
|  |  | ⇨ F.I. | EDW2003 | ⇨ 911 9 3 7 xxx |
|  |  | ⇨ F.S. | EDW2500 | ⇨ 911 9 1 8 xxx |
|  |  | ⇨ B.I. | EDW2500 | ⇨ 911 9 2 8 xxx |
|  |  | ⇨ F.I. | EDW2503 | ⇨ 911 9 3 8 xxx |
|  |  | ⇨ F.S. | EDW500 | ⇨ 911 9 1 9 xxx |
|  |  | ⇨ B.I. | EDW500 | ⇨ 911 9 2 9 xxx |
|  |  | ⇨ F.I. | EDW503 | ⇨ 911 9 3 9 xxx |
|  |  | ⇨ B.U. | EDW500 | ⇨ 911 9 4 9 xxx |

# Contents

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# 1. General

## 1.1 Purpose of this service manual

The purpose of this Service Manual is to provide Service Engineers, who already have the basic knowledge necessary to repair household dishwashers, with technical information regarding the specific functionalities featured in the new "DIVA EDW 1001" range of electronically-controlled dishwashers.

The EDW 1001 control system consists of a main circuit board and a control/display board. Both boards are housed in a single plastic container.

This system is used in fully-integrated versions with "DIVA" 60 cm structures.

This manual covers:

• General characteristics

• Control panel and programmes

• Technical characteristics

• Guide to diagnostics

For more detailed information regarding the hydraulic circuits and the structural characteristics of the appliances, refer to the Service Manual for presentation of the "DIVA" structure (H7-74-03 - Basic features).

## 1.2 Notes

⚠️

• Work on electrical appliances may only be carried out by suitably qualified staff!

• Always disconnect the mains plug before touching components inside the appliance.

## 1.3    General features

| | | |
|---|---|---|
| **Mains voltage** | ➔ | 230 V / 50 Hz (limits 187-254 V) |
| **Total power absorption** | ➔ | 2300 W |
| **Water connection** | ➔ | Water supply min./max. pressure 5-80 N/cm² |
| **Filling capacity** | ➔ | 12 place settings |
| **Dimensions:** | | |
| - Width | ➔ | 59.6 cm |
| - Height | ➔ | 81.8 - 87.8 cm |
| - Depth | ➔ | 55.5 cm |
| **Control elements** | ➔ | vertical / horizontal |
| - Display | ➔ | user interface and appliance |
| - Programme selection / optional functions | ➔ | with buttons |
| **Washing system** | ➔ | Combined / pulse |
| **Water fill level** | ➔ | Pressure switch control + software |
| **Water heating** | ➔ | Tube-enclosed heating element |
| **Temperature control** | ➔ | NTC Temperature sensor |
| **Drying system** | ➔ | Active / Turbo |
| **Safety features / alarms** | ➔ | Total protection - hydraulic + software |

# 2.    Control panel

## 2.1    Control panel

The configuration of the control panel depends on the typology of the electronic board:

- Horizontal controls
- Vertical controls

**Version with vertical controls**



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pan_01vd



pan_01vs.tif
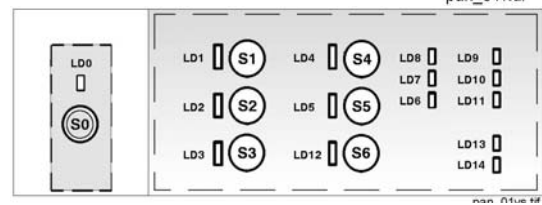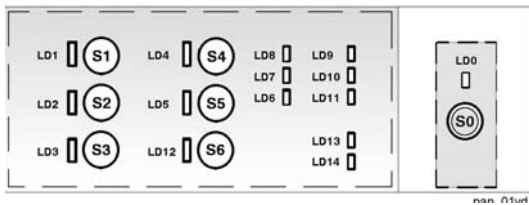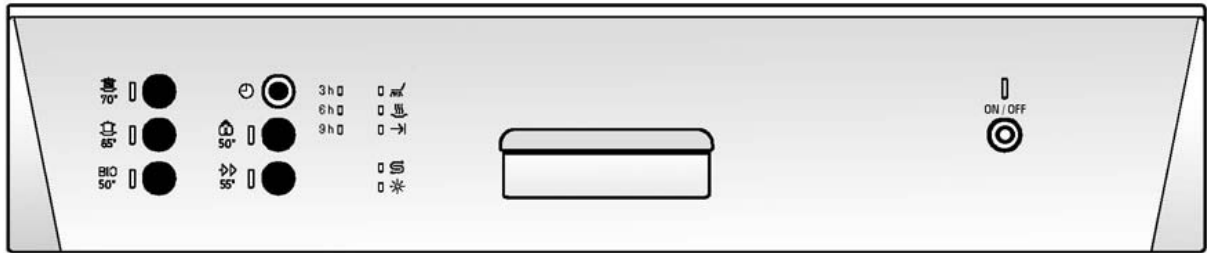
**Version with horizontal controls**



pan_01o.tif



pan_01od.tif



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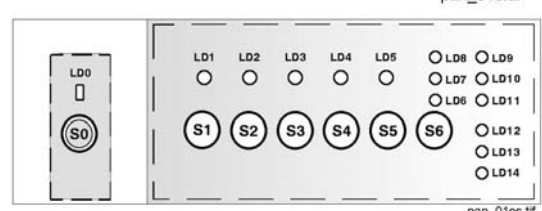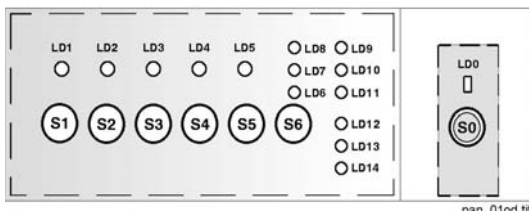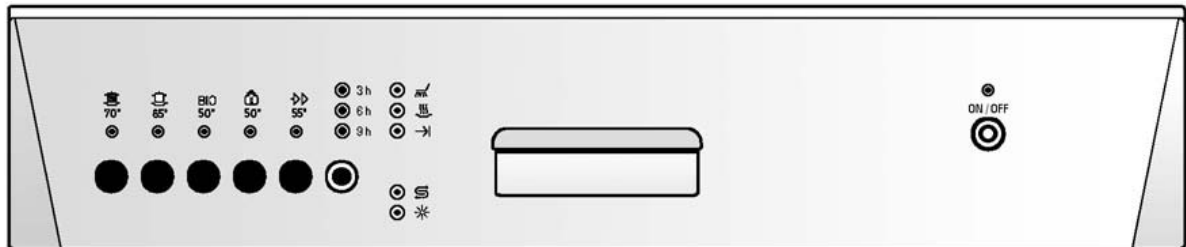
| S0 | ON/OFF button |
|---|---|
| S1-S5 | Programme selector buttons / optional function buttons |
| S6 | Delayed start selector button |
| LD1-LD5 | Programme indicator LEDs |
| LD6-LD8 | Delay time (hours) indicator LEDs |
| LD9-LD11 | Cycle phase indicator LEDs |
| LD12 | Delayed start indicator LED |
| LD13-LD14 | Salt / Rinse aid indicator LEDs |

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### 2.1.1    ON/OFF button (S0)

Switches the dishwasher ON and OFF. When the corresponding LED [LD0] lights, this means that the appliance is switched on.

### 2.1.2    Programme selector buttons (S1-S5)

Each button corresponds to a specific programme.

-   The various models feature from 3 (min.) to 5 (max.) programme buttons.
-   Buttons S1, S2, S3 are featured on all models; these are also used for certain servicing functions.
-   Button [S5] may be used as an option (½ load), in which case the maximum number of programme buttons is reduced from 5 to 4.

### 2.1.3    Programme indicator LEDs (LD1- LD5)

When the appliance is switched on, all the programme LEDs (except 3/1, if disactivated) are lit to indicate the programme selection phase. Press one of the buttons. The corresponding LED remains lit, and the other LEDs switch off. The LED remains lit for the entire duration of the washing programme.

### 2.1.4    Cycle phase LEDs

The indicator LEDs provide the user with the following information:

-   **LD9: washing**
-   **LD10: drying**
-   **LD 11: end of programme**: this LED is featured on all models.

The various LEDs light to indicate the corresponding phases of the washing cycle that will be carried out or are currently in operation, depending on the programme that has been selected and the status of the appliance.

Method of indicating the status of the appliance:

| | |
|---|---|
| Programme selection | LED [LD9] and, possibly, [LD10] flash simultaneously. |
| Execution of cycle | Only the LED corresponding to the current cycle lights. |
| | - In the washing phase, [LD9] is lit, [LD10] is off. |
| | - In the drying phase, [LD10] is lit, [LD9] is off. |
| End of cycle | LED [LD11] lights to indicate that the cycle has been completed; the remaining LEDs remain off. |

### 2.1.5    Indicator LEDs 13 and 14

-   **LD13: Salt**: indicates that the salt reservoir is empty. If the level of regeneration is set to "1" (no regeneration), this LED remains unlit at all times.
-   **LD14: Rinsing agent**: lights when it is necessary to add liquid rinse-aid.

Method of indicating the status of the appliance:

| | |
|---|---|
| Programme selection | LEDs remain lit. |
| Execution of cycle | LEDs off. |
| End of cycle | LEDs remain lit. |

## 2.2    Options

### 2.2.1    Using button [S5] as an option (1/2 load)

This option selects a special washing cycle for small loads.

The following parameters of the selected washing cycle are modified:

- The pre-wash phase is eliminated (in those cycles in which it is normally performed).
- The cycle time is reduced by 10 - 30 minutes, and the hot water consumption is reduced by about 5 litres.

### 2.2.2    Delayed start button - [S6]

Determines the delay time before the commencement of the cycle selected. Press this button repeatedly until the desired delay time is displayed by the corresponding LED.

This **indicator LED 12** lights when the delayed-start option has been selected.

**DELAY TIME indicator LEDs - [LD6] … .. [LD8]**

When the DELAYED START option is selected, these three LEDs light in sequence each time the button is pressed [3h], [6h], [9h], or OFF.

- LEDs [3h], [6h], [9h] correspond to the number of hours before the cycle starts.

- The selected delay time is indicated by the corresponding LED [3h], [6h], [9h].

## 2.3    Programme selection

### 2.3.1    Selecting the cycle (with the door closed)

1.    Switch the dishwasher ON by pressing [S0].

- The "POWER ON" pilot lamp lights.
- The SALT and RINSE-AID LEDs [LD13] [LD14] may light.

2.    Press the button for the desired programme [S1 ... S4].
- The LED corresponding to the selected programme lights.
- The two cycle phase LEDs [LD9] [LD10] flash.
- Select the "½ load" option (if desired) by pressing [S5]. The corresponding LED lights.

3.    About 6 seconds after the last button is pressed, the washing programme commences.
- If the programme is selected with the door OPEN, the programme will start 6 seconds after the door is closed.

***Proceed as follows to select the delayed-start time:***
1.    Press button [S6]. The corresponding LED lights.
2.    Press button [S6] repeatedly; LEDs [3h] - [6h] - [9h] will light in sequence.
3.    To cancel the delay time, continue to press [S6] until the LEDs switch off.
4.    The delayed-start countdown begins about 6 seconds after the button is pressed for the last time. The "POWER ON" pilot lamp lights.

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### 2.3.2    Cycle execution

#### 2.3.2.1  Washing programme currently being performed

- The LED relative to the selected programme [L...] remains lit.

- LED [LD9] for the current phase remains lit.

- As the programme proceeds to the subsequent phase, LED [LD9] switches off; LED [LD10] lights until the end of the cycle, then switches off.

#### 2.3.2.2  Delayed-start countdown

As the DELAYED-START countdown proceeds, the time to elapse before the start of the cycle is indicated by LEDs [3h] - [6h] - [9h], changing at intervals of 3 hours starting from the highest value, until all the LEDs have switched off.

- The LED for the selected programme [LD...] lights, and the cycle phase LEDs [LD9] and [LD10] remain unlit.

- The DELAYED START countdown is not interrupted if the door is opened.

- All the buttons are disabled, with the exception of the Programme button [S...] relative to the selected programme, which can be used to cancel the cycle, and the DELAY button [S6], which can be used to modify or cancel the countdown.

- If the appliance is switched off by pressing button [S0], the power supply is disconnected. If the same switch is pressed again, the appliance resumes operation from the point at which it was interrupted.

- If the door is opened, the appliance remains switched on (though the power loads are disactivated); when the door is re-closed, the programme resumes from the point at which it was interrupted.

#### 2.3.2.3  Cancelling the cycle/delayed start

1.  To cancel the current programme, press the button corresponding to the selected programme [S..] indicated by the LED [LD..] for 1 second. The appliance returns to programme selection mode.

2.  To cancel the delayed-start countdown, press the DELAY button (S6) repeatedly until the countdown LEDs [3h] - [6h] - [9h] all switch off.

#### 2.3.2.4  End of programme

- The end of the programme is indicated by cycle phase LED [LD11], which remains lit.

- To cancel the programme that has just been completed, open the door or press [S0] to switch the appliance off.

# 3.      Structural characteristics

## 3.1      Specifications for actuators and sensors

### 3.1.1      Components

| Type of component | Power available | Type of electronic control |
|---|---|---|
| Wash pump | Max. 250W | Triac |
| Drain pump | Max. 100W | Triac |
| Heating element | Max. 2100W | Relay |
| Water fill solenoid valve | Max. 10W | Triac |
| Regeneration solenoid valve | Max. 10W | Triac |
| Detergent and rinse-aid solenoid valve | Max. 10W | Triac |
| Fan motor | Max. 10W | Triac |

### 3.1.2      Sensors

| Sensor | Type of electronic signal | Type of component |
|---|---|---|
| Salt sensor | Digital 5 Volt | Reed |
| Rinse-aid sensor | Digital 5 Volt | Reed |
| Temperature sensor | Analogue 5 Volt | NTC |
| Turbidity sensor | Analogue 5 Volt | Opto-electronic |
| Tachymetric sensor | Frequency | Tachymetric generator |
| Level sensor | Digital high voltage | Pressure switch |
| Anti-overflow sensor | Digital high voltage | Pressure switch |
| Door closure sensor | Digital high voltage | Switch |
| Anti-flooding sensor | Digital high voltage | Switch |

### 3.1.3      NTC Temperature sensor

| NTC Table of comparative values | |
|---|---|
| Temperature °C | Nominal value $\Omega$ |
| 10 | 9655 |
| 25 | 4850 |
| 60 | 1205 |
| 90 | 445 |

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# 4.    Operation of the wash / drain motor

## 4.1    Wash / drain function

The WASH and DRAIN functions are controlled by the electronic control board, which powers the windings of the two pumps alternately by means of a switching relay fitted to the control board.

The electrical control circuit for the two pumps is piloted as follows:

- **Relay R1**, which switches the power from one motor winding to the other.
  The switching procedure is as follows:

  Wash motor      =>    relay not powered
  Drain motor     =>    relay powered

- Triac (**TY1**) powers the winding of the washing pump and determines its speed of rotation.

- Triac (**TY2**) powers the winding of the drain pump at a constant speed of rotation.
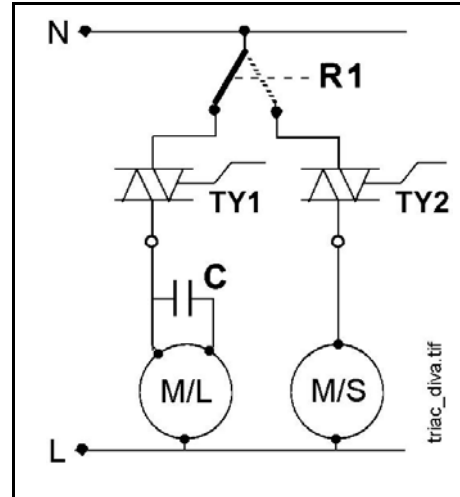


## 4.2    Washing pump

- The washing pump features a variable-speed single-phase asynchronous motor.
- The motor rotates in a single direction.
- A tachymetric sensor housed internally constantly monitors the speed of the motor.

### 4.2.1    Definition of the motor speed

The operation of the motor during the washing cycle is controlled by the electronic control system, which operates the motor at different speeds (fixed or variable). The signal sent by the tachymetric sensor to the electronic control system (microprocessor) detects the speed of the motor; the microprocessor performs a series of calculations and switches on the Triac which generates the appropriate speed.

The following motor speeds are used during the washing cycle:

| FIXED speed | VARIABLE speed |
|---|---|
| 1600 rpm | 1600 -> 2800 rpm |
| 2300 rpm | |
| 2800 rpm | |

### Technical characteristics

| | |
|---|---|
| Voltage | 230V - 50Hz |
| Speed | 2800 rpm |
| Power absorption | 168 W |
| Capacitor | 3µF |
| Direction of rotation | Counter-clockwise |
| Delivery height | 200 cm |



RM 1-2 = 48Ω
RA 1-(ro) = 117Ω

213Ω
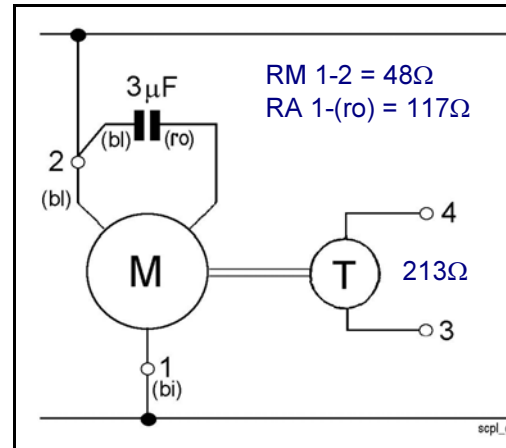
## 4.3    Drain pump

- Synchronous centrifugal single-phase motor
- Rotation in both directions

### Technical characteristics

| | |
|---|---|
| Voltage | 220/240V - 50Hz |
| Speed | 3000 rpm |
| Power absorption | 30 W |
| Delivery | 22 l/min |
| Delivery height | 90 cm |



RM = 170Ω
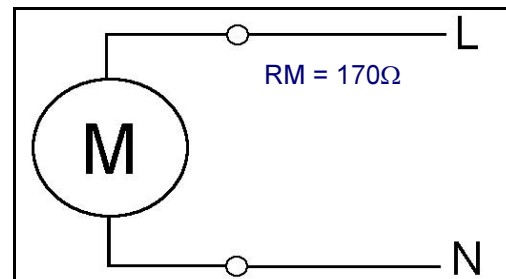
### 4.3.1    Drain function

The drain system is controlled by the electronic control unit by means of a system which powers the drain pump at maximum speed (3,000 rpm) with 15-second pauses at intervals.

This sequence is designed to ensure that the impeller is not subject to cavitation and thus drains all the water from the appliance.

**Drain cycle sequence**

| DRAIN PUMP | | | TIME (seconds) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Activated** | **3000rpm** | -> | **3** | ⇗ | **3** | ⇗ | **3** | ⇗ | **45** | ⇗ | **15** |
| Disactivated | Pause | -> | ⇘ | 2 | ⇘ | 2 | ⇘ | 2 | ⇘ | 15 | ⇘ | End |
| | | | <- **90** -> | | | | | | | | |

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## 4.4    Washing system

## 4.5    Washing system

The washing system is of the traditional type in which the mechanical washing action is provided by the rotation of the washing pump. The pump ducts the water into the hydraulic circuit, thus actioning both spray arms simultaneously.

In order to optimize the washing programmes, this appliance offers two different washing systems:

ctrl            The electronic control unit powers the washing motor at the maximum speed (2800 rpm), in other words at fixed speed.

pulse           Variable-speed (pulse) washing at 1600 > 2800 rpm. The variable-speed (pulse) washing system is controlled by the electronic control unit; the washing m otor is actioned sequentially at two different speeds (minimum and maximum) at brief intervals. Two timings are used for variable-speed (pulse) washing:

| Motor speed | | Time | |
|---|---|---|---|
| Maintenance | 1600 rpm | -> | 3 sec |
| Pulse PW1 | 2800 rpm | -> | 1 sec |

# 5.      Hydraulic circuit

From the solenoid valve (2/3), the water is ducted into the fill tank and across the air break (5) into the steam condenser (6) until the condenser is full.

When the condenser is full to overflowing, the water is ducted through a channel into the regeneration chamber (7). In this case, too, once the overflow level is reached, the water is divided into two parts ducted through two separate channels.

- Part of the water passes through one channel directly to the softener (9) (resin container), from which the softened water continues towards the sump.

- A smaller quantity of water is collected in one of the channels for use in the "Blending" function (this function is described on page 21), where it is ducted directly into the tub through the steam venting ring.

**Please note!**    The steam condenser (6), once full of water, remains filled. With each subsequent fill, the incoming water replaces the water previously present in the condenser.

**The steam condenser (6) is drained through the fill hose (1/2) by a vacuum effect, after disconnecting it from the intake tap and laying it on the floor.**

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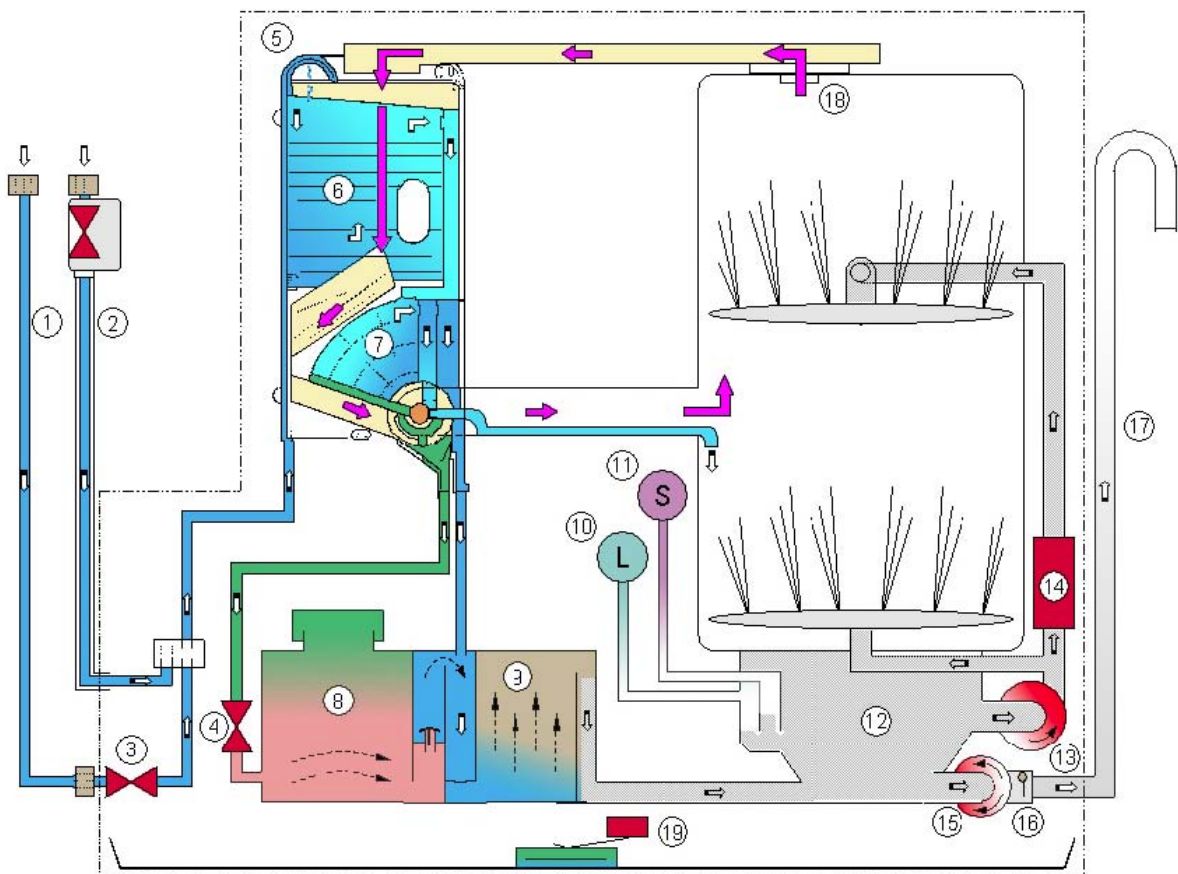
**Legend**

| | |
|---|---|
| 1 - Fill hose | 11 - Anti-overflow pressure switch |
| 2 - Fill hose with Aqua Stop | 12 - Sump assembly |
| 3 - Fill solenoid valve | 13 - Washing pump |
| 4 - Regeneration solenoid valve | 14 - Tube-enclosed heating element |
| 5 - Air-Break | 15 - Drain pump |
| 6 - Steam condenser | 16 - Non-return valve |
| 7 - Regeneration chamber | 17 - Drain hose |
| 8 - Salt reservoir | 18 - Drying duct / Fan |
| 9 - Resin reservoir | 19 - Anti-flooding device |
| 10 - Level pressure switch | |

## 5.1     Water fill system - functional description

For these dishwashers, fitted with motors with tachymetric sensors, the electronic control system is designed to control the water fill by identifying a combination of signals which are measured according to the speed of rotation of the motor and the status of the pressure switch.

The water fill system is constantly monitored by the level pressure switch, which acts as a pressure sensor.
The tachymetric sensor which signals the speed of the motor to the electronic control system is independent of the water fill level control function.

### 5.1.1     Definition of water level

The quantity of water required to perform the washing cycle is determined exclusively by the closure of the electrical contact of the pressure switch, which switches from EMPTY to FULL.

In order to maintain a condition of equilibrium, this system ensures that, if the pressure switch should re-open on EMPTY, fresh water is introduced until it returns to FULL.

It is therefore possible to ascertain with certainty that the status of the pressure switch - i.e. its position of EMPTY or FULL - ensures that the cycle is performed correctly.

**Washing cycle sequence**

| Cycle phase | | Pressure switch status | | Stability / Objective |
|---|---|---|---|---|
| Water fill | -> | Switches from EMPTY to FULL | -> | Water fill level |
| Washing | -> | Maintained on FULL | -> | Water present |
| Drain | -> | Switches from FULL to EMPTY | -> | No water present |

The fill phase is subdivided into the following sub-phases.

### 5.1.2     Static fill

With the motor switched off, the fill solenoid is activated and water is introduced into the appliance until the pressure switch returns to FULL.

### 5.1.3    Dynamic fill

The motor is switched on at 2300 rpm, and water is introduced for 10 seconds (fixed time).

This condition makes it possible to start filling the hydraulic circuit. This is followed by:

### 5.1.4    Pause

The motor is switched off and the fill solenoid is disactivated for 5 seconds in order to allow the water to return to the sump.

### 5.1.5    Dynamic fill and level definition

The motor switches on again at a speed of 2300 rpm, and water is introduced - if the pressure switch signal is EMPTY - until the pressure switch returns to FULL.
The level is defined by the pressure chamber (located inside the sump), which is connected to the pressure switch. This is followed by:

### 5.1.6    Level control and stability

When the pressure switch signal is FULL, the fill solenoid is switched off; the motor switches on at a constant speed of 2300 rpm.

- A control procedure takes place, during which the pressure switch signal must remain closed on FULL for 20 seconds without interruption.
- The hydraulic circuit operates in optimum conditions when the pressure switch signal remains stable on FULL. In this case, the quantity of water inside the sump is sufficient to ensure that the motor can operate without speed fluctuations caused by cavitation, which may occur when the water in the sump is insufficient.
- When the pressure switch signal has remained on FULL for 20 seconds without interruption, the fill phase is considered complete; the system advances to the subsequent phase.
- When this condition is reached, the appliance is said to be dynamically balanced.
- If the pressure switch signal should go to EMPTY during the 20 second control procedure, the fill solenoid is again activated, and water is introduced until the pressure switch signal returns to FULL. This control procedure is repeated until dynamic balance is achieved.

**Please note!**    In this case, the water level is monitored constantly by the two special safety systems (software and hydraulic) in order to ensure that an excessive water fill does not result in water to overflow from the appliance.

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### 5.1.7   Supplementary fill

On completion of the water fill phase, and before proceeding to the subsequent washing phase, the system performs a fixed-duration percentage water fill which depends on the speed of the motor for the subsequent washing phase (as specified in the cycles table).

The electronic control unit governs the supplementary water fill according to the type of washing system:

- (pulse) (pulse/variable-speed) or (ctrl) (fixed-speed washing).

| Definition of the supplementary water fill | |
|---|---|
| Type of washing | Conditions |
| **pulse** (1600 > 2800rpm)<br>Pulse washing | Supplementary water fill (12%) with calculation based on the aperture time of the solenoid valve, sub-phases 5.1.1 > 5.1.6<br>(quantity of water fill 3.9lt + 12% = 4.3lt approx.). |
| **ctrl** (2800rpm)<br>Fixed-speed washing | Supplementary water fill (24%) with calculation based on the aperture time of the solenoid valve, sub-phases 5.1.1 > 5.1.6<br>(quantity of water fill 3.9lt + 24% = 4.8lt approx.). |

## 5.2   Water fill time

During the entire duration of the fill phase (i.e. from sub-phase 5.1.1 to subphase 5.1.6), the solenoid valve may remain in the open position for a maximum overall time of 4 minutes.

-   Within this period, the system detects whether the pressure switch signal has stabilized on FULL.

-   If the pressure switch signal stabilizes on FULL (sub-phase 5.1.1) after this 4-minute period during which the solenoid is open, a time-out is generated and the appliance goes into alarm mode [AL5] (no water).

### 5.2.1   Power failure during water fill phase

If the water fill phase is interrupted by a power failure, the fill always resumes from sub-phase 5.1.1 when the power supply is restored; all the counters are reset to zero.

-   The certainty that the fill results are correct is given by the fact that the aperture of the solenoid depends only on the aperture of the pressure switch contact on EMPTY; in this way, water is introduced until the level is sufficient to close the pressure switch contact on FULL.

-   If the water fill phase is interrupted by opening the door, the values of all the counters are memorized; when the door is re-closed, the water fill phase resumes from the point at which it was interrupted.

## 5.3    Control of stability during the washing phase

When the fill phase is complete, the appliance passes to the washing phase.

In the washing phase - with cold or heated water - the status of the pressure switch is monitored constantly in order to ensure that the hydraulic system operates efficiently. Water replenishment may take place if necessary.

-    If the pressure switch returns to EMPTY, the fill solenoid is activated for a time (T) of:

-      T _3 sec if the duration of the EMPTY signal is less than 0.5 sec.

-      T _x sec if the duration of the EMPTY signal is in excess of 0.5 sec.

   (T_x sec = variable time required by the pressure switch to commutate from EMPTY to FULL).

During the washing phase, the fill solenoid may remain open (also at intervals) for a maximum total time of 60 seconds; if this period is exceeded, a time-out is generated and the machine passes to the alarm condition ([AL5] - no water present).

### 5.3.1    Interruption of the washing cycle during water replenishment

If the washing cycle is interrupted due to a power failure, the current value in the counter which monitors the solenoid aperture time (limit 60 sec.) is reset to zero. When the power supply is restored, the count is restarted from the beginning.

If the washing cycle is interrupted by opening the door, the current value in the counter which monitors the solenoid aperture time (limit 60 sec.) is memorized. When the door is re-closed, the count resumes from the point at which it was interrupted.

## 5.4    Control of drain cycle

When the washing cycle ends, the appliance passes to the drain phase.

-    In this phase, in order to ensure that the hydraulic circuit is empty before the start of the subsequent phase (water fill), a control procedure is carried out at the end of the drain phase to check that the contact of the pressure switch is open on EMPTY.

If this is the case, the appliance passes to the subsequent phase. If, due to a malfunction in the drain phase, the contact of the pressure switch is closed on FULL (signalling the presence of water in the hydraulic circuit), the drain phase is repeated.

-    If, after this second drain phase, the control system detects that the pressure switch contact is still closed on FULL, a time-out is generated and the system generates an alarm condition [AL6 - drain not completed].

### 5.4.1    Interruption of the drain cycle

If the drain cycle is interrupted due to a power failure, the phase cancelled and all the information relative to a possible incomplete drain cycle is lost. When the power supply is restored, the phase is repeated from the beginning.

If the drain cycle is interrupted by opening the door, the information relative to a possible incomplete drain cycle is memorized. When the door is re-closed, the drain phase resumes from the point at which it was interrupted.

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## 5.5    Anti-overflow safety system

In all dishwashers in the new range, the anti-overflow safety system is constantly monitored by the safety pressure switch (which acts as a pressure sensor) in order to prevent water from overflowing due to an excessively high level.

- The safety pressure switch is connected pneumatically via a small tube to the sump, which contains a second pressure chamber (air trap), located adjacent to that of the level pressure switch. In the safety circuit, too, the air pressure is proportional to the quantity of water present in the sump.

- Therefore, in case of a malfunction in the hydraulic circuit, and if the water level exceeds the predetermined safety threshold, the pressure switch intervenes by switching the electrical contact to FULL.

### 5.5.1    Intervention of the anti-overflow device

If the safety pressure switch commutates to FULL, this immediately activates the drain pump, which is connected electrically downstream of the circuit; the pump remains in operation until the safety pressure switch returns to EMPTY.
The washing cycle continues in any case until completion.

- If the malfunction is caused by a temporary fault (dishes upside-down, excessive foam etc.) which is rectified during the cycle, the user is unlikely to be aware that the fault has occurred.

- If the fault persists (e.g. leakage from the solenoid), water will remain in the tub at the end of the cycle, and the drain pump will switch on and off alternately, since it is controlled by the pressure switch (which cycles between FULL and EMPTY).
  In this case, the electronic control system is not affected; this means that none of the safety and alarm devices will generate a fault signal.

**Please note:**    **If the door is opened, or if the appliance is switched off, the drain pump switches off, but the fault is not eliminated. In this case, it is necessary to turn off the water tap.**

**Please note:**    The anti-overflow safety device is also operative when the appliance is not in operation. In this case, the appliance must be connected to the power supply, switched on (by pressing the ON switch), and the door must be closed.
If either of these conditions is not satisfied, the anti-overflow device is disactivated.

The connections for the anti-overflow system are shown in the diagram below.



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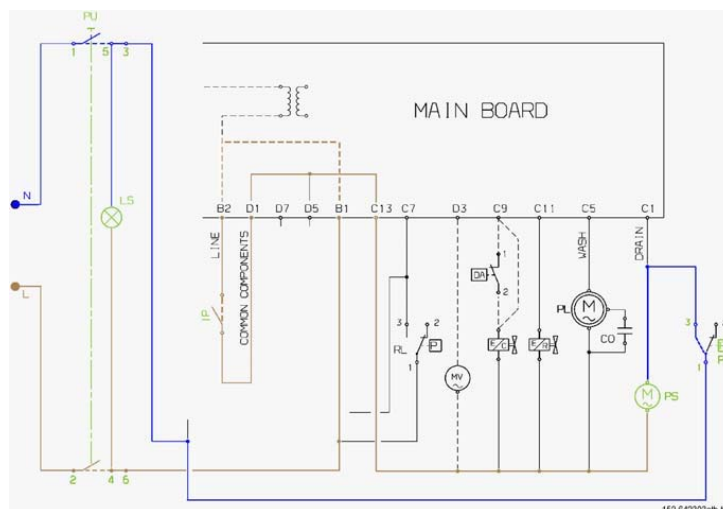
## 5.6 Regeneration system

In this series of dishwashers, regeneration of the softening system, whose duration is approximately **3 minutes**, takes place towards the end of the washing cycle, during the drying phase.

Regeneration of the softening system is governed by the electronic control system at "ad hoc" intervals, i.e. not for every washing cycle, but at intervals determined by the level of regeneration selected.

Each time the regeneration cycle is carried out (i.e. when the regeneration solenoid 4 is energized), the storage chamber is drained completely (for a total of about 230 cc of water).

The counter according to which "ad hoc" regeneration is carried out is governed by the electronic control system according to the number of fill phases and not the number of cycles. This makes the operation independent of the number and type of programmes executed.

Regulation consists of 5 levels (see "Table of regeneration values" on page 22) and is selected by pressing a combination of buttons on the control panel.

If regeneration level 1 is selected (no regeneration), regeneration is never performed and the "SALT" LED [LD13] remains unlit.
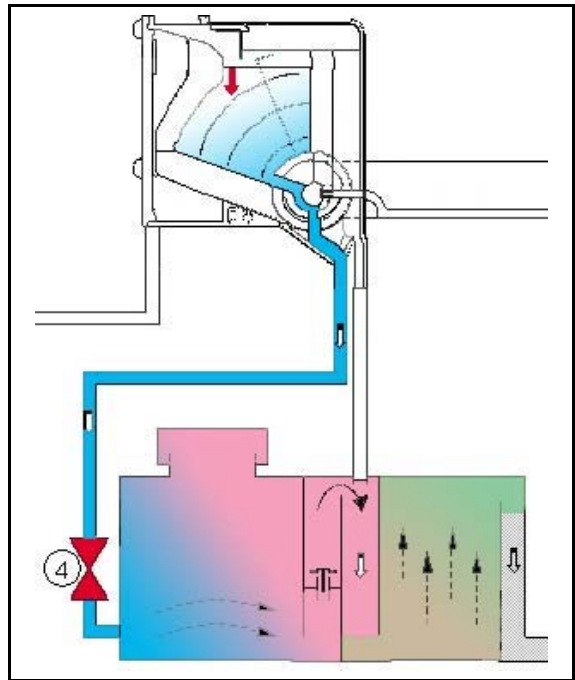
### 5.6.1 "Blending" function

This function is performed inside the fill tank during the water fill phase which, depending on the position of the selector, automatically blends the softened water with the unsoftened water present in the appliance.

In practice, the softened water is introduced into the appliance through the softening system, while the unsoftened water flows via an open by-pass duct directly through the steam venting ring.

If the mains water supply is very soft, this function optimizes the hardness of the washing water in order to prevent the possibility of corrosion of glassware.

The quantity of unsoftened water that is introduced into the appliance is 15% of the total quantity of water utilized.

If the level of regeneration is set to 1 or 2, it is advisable to activate the BLENDING function to mix softened water with unsoftened water.

This function optimizes the consumption of salt, thus preventing corrosion of glassware when the water is very soft.

Selector switch position

- Pos. 1 = BLENDING activated
- Pos. 2 = BLENDING disactivated (factory setting)

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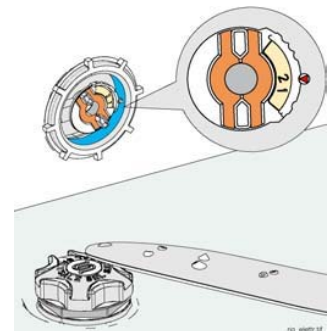
### 5.6.2    Selecting the regeneration level

1.    Press and hold down programme buttons [S1] and [S2] simultaneously.

2.    Press the "ON/OFF" button [S0].
      The corresponding LEDs [LD1] and [LD2] begin to flash.

3.    Press button [S1].

      -    The LED [LD2] switches off, while LED [LD1] stops flashing and remains lit for about 5 seconds. After 5 seconds, LED [LD1] begins to flash in a sequence that indicates the level of regeneration selected.

      -    The level of regeneration is indicated by the number of times that LED [LD1] flashes, at intervals of 5 seconds, for one minute. (For example: level 3: 3 flashes, followed by 5 seconds pause, repeated for one minute).

4.    To modify the level of regeneration, press button [S1] until the desired level is displayed by the LED.

      -    Each time button [S1] is pressed, the level of regeneration is incremented; as a result, the number of flashes of LED [LD1], too, is modified.

5.    To store the selected level in memory, press the "ON/OFF" button [S0] to switch the appliance off.
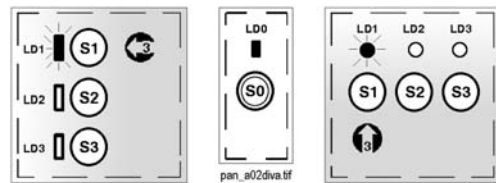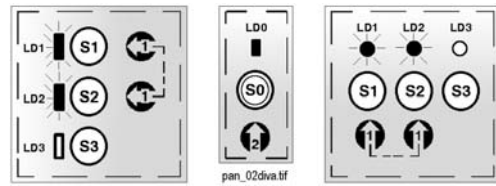
*Table of regeneration values*

| Level | Indication | Wash cycle | | Fill phase | Selector | Aperture of regeneration solenoid valve | Hardness of water | |
|---|---|---|---|---|---|---|---|---|
| | LD 1 | Autonomy | Regeneration | No. | Pos. | sec. | °F (TH) | °D (dH) |
| 1 | 1 flash | No regeneration | | 0 | 1 | 0 | 0 > 8 | 0 > 4 |
| 2 | 2 flashes | 4 cycles | 5th cycle | 16 | 1 | 225 | 9 > 30 | 5 > 8 |
| *3 | 3 flashes | 3 cycles | 4th cycle | 12 | 2 | 225 | 31 > 50 | 19 >29 |
| 4 | 4 flashes | 2 cycles | 5th cycle | 8 | 2 | 225 | 51 > 70 | 30> 40 |
| * 5 | 5 flashes | Regeneration every cycle | | 4 | 2 | 225 | 71 > 90 | 41 >50 |
| * "3" = factory-set level          Position of selector = "2" | | | | | | | | |

### 5.6.3    Resin washing

The resins contained in the softening system are washed at the beginning of every cycle.

This is a fill/drain cycle in which the fill solenoid and the drain pump are switched on simultaneously for about 1 minute.

# 6.     Drying circuit

In these dishwashers, the dishes are dried by means of a steam condensation process. Depending on the type of appliance, one of two drying systems is used:
- "ACTIVE - DRY" drying
- "TURBO - DRY" drying

## 6.1     "Activ Dry" drying system



The "Active Dry" system is characterized by an integrated closed circuit in which the hot air is circulated in a **bi-directional convection movement** onto a cold wall; no air is drawn in from the exterior.

This drying system is based on the natural circulation of the hot air produced during the hot rinse, where the steam (hot, humid air) circulates inside the condenser of the fill tank through two connector ducts, thus generating the process of condensation.
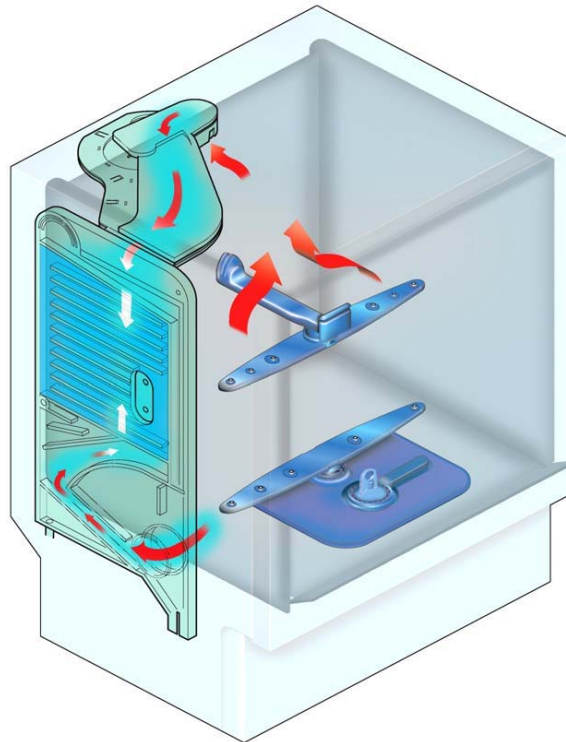
Part of the steam enters from the lower section through the steam venting ring and circulates slowly inside the chamber of the condenser.

The remaining part of the steam circulates in the same way, entering from the upper section of the tub through the external upper duct, which communicates with the chamber of the condenser.

The condenser is a condensation chamber filled with water (cold wall) against which the hot air is ducted. This contact between the hot air and the cold wall generates the process of condensation.

This forms a closed condensation circuit which does **not** expel steam to the exterior, from which the circuit is isolated.

The drying time is variable and pre-defined for each washing cycle.

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## 6.2　　"Turbo Dry" drying system
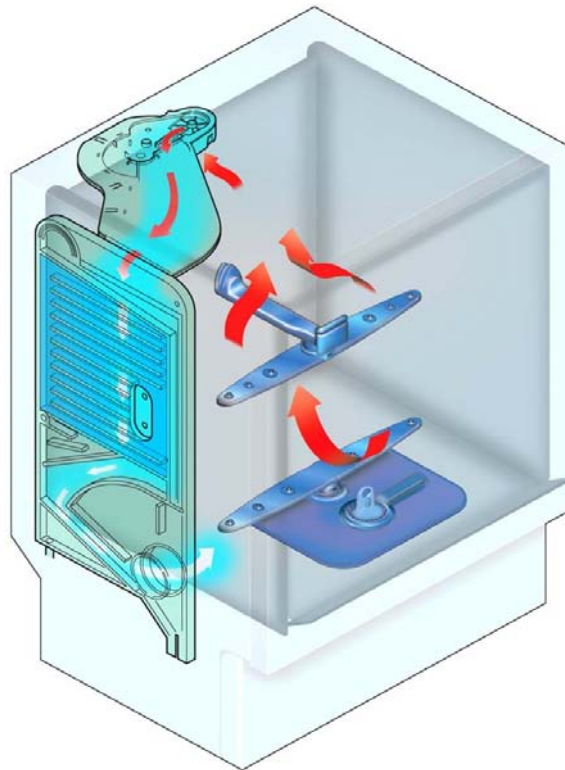


The "Turbo Dry" system is characterized by an integrated closed circuit in which the hot air is circulated in a **mono-directional convection movement** onto a cold wall; no air is drawn in from the exterior.

This drying system is based on the forced circulation of the hot air produced during the hot rinse, where the steam (hot, humid air) is drawn in by the fan located inside the upper duct and then ducted towards the condenser in the fill tank, from where it returns to the tub via the steam venting ring.

The condenser is a condensation chamber filled with water (cold wall) against which the hot air is ducted. This contact between the hot air and the cold wall generates the process of condensation.

This forms a closed condensation circuit which does not expel steam to the exterior, from which the circuit is isolated.

The fan is not switched on continuously, but pauses at intervals.

The drying time is variable and pre-defined for each washing cycle.

# 7.    Safety/control systems and alarms

The dishwashers in this new range feature a series of safety systems which protect the appliance in the event of malfunctions, whether it is switched on or off.

In the event of a situation that might compromise the correct operation of the appliance, the electronic control system causes a specific safety system to intervene. In most cases, this immediately generates a time-out which interrupts the washing cycle.
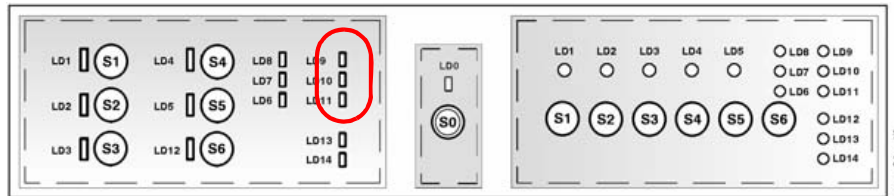


A visual signal on the display (one or more LEDs flashing) indicates the existence of the alarm condition.

## 7.1    Alarm conditions [AL4], [AL5], [AL6], [AL7], [AL8]

In the case of an alarm condition the dishwasher is switched inoperative and the washing cycle is interrupted.

The alarm condition is indicated on the control panel by the flashing of one or more of the cycle phase LEDs [L9], [L10] or [L11]. Example: LED [L9] flashing = Water Fill time-out [AL5].

-   The LED for the current programme flashes (rapidly); the remaining LEDs remain unlit.
-   All the buttons, including the CANCEL button, are disabled.
-   To reset the ALARM condition, press [S0] to switch the appliance off.

When the appliance is switched on again (by pressing [S0]), the programme resumes from the point at which it was interrupted. If the malfunction persists, the dishwasher returns to the ALARM condition.

## 7.2    Alarm conditions [AL1]/[AL2], [AL3]

In the case of an alarm condition the dishwasher is in operation and the washing cycle is completed.

No alarm condition is shown on the display.

The cycle is completed normally, but the heating phases are skipped.

-   The user may complain of poor washing results or a shorter than normal cycle.
-   In this case, the ALARM condition is stored in memory by the electronic control system, and may be displayed by Service Engineers.

**Please note:**  In all cases, the electronic control system stores the **last 3 ALARMS** in memory; these may be checked using the specific procedure described below (paragraph 8.1).

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## 7.3    Table of safety systems / alarms

| Safety systems | | Alarms | Washing programme | LEDs lit | |
|---|---|---|---|---|---|
| Alarm | Description of the alarms | LEDs flashing | Interruption | Displayed to the user | In memory |
| **AL5** | **Water fill time-out** | **LD9** | **YES** | **YES** | **YES** |
| **AL6** | **Water drain time out** | **LD10** | **YES** | **YES** | **YES** |
| **AL4** | **Intervention of anti-flooding device** | **LD9 + LD10** | **YES** | **YES** | **YES** |
| **AL3** | **Heating time-out** | **LD11** | **NO** | **NO** | **YES** |
| **AL1/AL2** | **NTC sensor (short-circuited or open)** | **LD9 + LD11** | **NO** | | |
| **AL7** | **Motor inoperative** | **LD10 + LD11** | **YES** | **YES** | **YES** |
| **AL8** | **Motor triac (short-circuited)** | **LD9 + LD10 + LD11** | **YES** | **YES** | **YES** |

## 7.4    Description of the alarms

### 7.4.1    Water fill time-out - Alarm [A L 5]  - LED [Ld9]

This is a time-out which is operative only during the water fill phases.

- The control system definitively disconnects the water fill solenoid.
- The count for the time ("T") starts at the moment of aperture of the fill solenoid, and ends when the pressure switch signal stabilizes on FULL.
- The maximum time for aperture of the fill solenoid ("T") is 4 minutes for the entire fill phase. If this time limit is exceeded, an alarm condition is generated.

### Possible causes

a.  Water tap closed

b.  Mains water pressure < 0.3 bar

c.  Fill solenoid valve or connections faulty

d.  Sump - Pressure switch tube obstructed

e.  Pressure switch faulty / false contacts


### PRESSURE SWITCH SIGNALS "EMPTY" (1-2)

This control procedure is in operation only during the washing phases, i.e. after the water fill phase has been completed.

-  Once the pressure switch has closed in the FULL position (1-3), it must remain FULL until the subsequent drain phase.

-  If the pressure switch signals EMPTY (1-2), the fill solenoid is activated for a period equivalent to the period of aperture of the pressure switch.

-  The maximum duration for which the pressure switch signals EMPTY (T) during the entire phase is 60 seconds; if this period is exceeded, an alarm condition is generated.

### Possible causes

a.  Dishes upside down

b.  Central filter obstructed

c.  Excessive foam

d.  Leakage from Sump - Pressure switch tube

e.  Pressure switch faulty / false contacts


## 7.4.2    Water drain time-out - Alarm [A L 6]  - LED [Ld10]

This control procedure is operative in all the drain phases and checks the status of the pressure switch in order to ensure that the cycle is performed correctly.

-  In all the final drain phases, and before passing to the subsequent phase, the pressure switch contact must be open on EMPTY (1-2).

-  If the contact is closed on FULL, the drain phase is repeated.

-  At the end of the second drain phase, if the pressure switch contact remains closed on FULL, an alarm condition is generated.

### Possible causes

a.  Domestic drain circuit not suitable (obstructed / blocked)

b.  Drain pump disconnected/obstructed by foreign objects

c.  Pressure switch on FULL (1-3)

d.  Sump - pressure switch tube obstructed

e.  Electrical connections interrupted / false contacts

f.  Control board (relay faulty)

### 7.4.3    Intervention of anti-flooding system - Alarm [A L 4]  - LEDs [LD9] + [LD10]

This control system is operative during the washing phases only, and not in the water fill phases, which in this case are associated with the safety device.

- If water is present in the bottom, a floating mechanical sensor positioned on the bottom of the appliance trips a microswitch which is connected in series to the fill solenoid valve, thus disconnecting the solenoid valve.

- Intervention of the sensor is detected by the electronic control board, which actions the drain pump for 1 minute, after which an alarm condition is generated.

*Possible causes*

a.    Water leakage from tub / sump

b.    Water leakage from the various couplings (washing pump, duct to upper spray arm etc.)

c.    Floating sensor jammed mechanically / microswitch faulty


### 7.4.4    Heating time-out - Alarm [A L 3]  - LED [LD11]

The maximum heating time for the water is 45 minutes; if the correct temperature is not reached within this time, an alarm condition is generated.

*Possible causes*

a.    Heating element broken

b.    Intervention of safety thermostat (open)

c.    Wiring interrupted / false contacts

d.    NTC sensor faulty (poor thermal contact)

e.    Insufficient water circulation in tub

f.    Washing pump faulty (impeller stripped)


### 7.4.5    NTC temperature sensor - Alarm [A L 1-2]  - LEDs [LD9] + [LD11]

This alarm is operative during the entire washing cycle, i.e. from after the initial water fill phase until the end of the final wash phase.

- The impedance of the NTC sensor is monitored constantly.

- If the impedance is not within the correct range, based on the conversion by the electronic control system of the impedance into temperature, the ALARM intervenes.

#### 7.4.5.1  NTC temperature sensor short-circuited

The impedance is too low (T = / > 85°C )

*Possible causes*

a.    Sensor faulty / short-circuited

b.    Wiring short-circuited

c.    Temperature too high (> 85°C)

### 7.4.5.2  NTC temperature sensor circuit open

The impedance is too high (T = / < 5°C )

### Possible causes

a.   Sensor faulty / circuit open

b.   Wiring interrupted / false contacts

c.   Temperature too low (< 5°C)

## 7.4.6   Washing motor inoperative - Alarm [A L 7]  - LEDs [LD10] + [LD11]

This control system is operative during the entire washing cycle.

Jamming of the motor is detected by the tachymetric sensor; this also makes it possible to check for a faulty tachymetric sensor using the following procedure.

-   When the motor is switched on, it must reach a speed of 2000 rpm within 5 seconds; if this does not occur, an alarm condition is generated.

### Possible causes

a.   Motor winding interrupted / short-circuited

b.   Motor jammed (foreign bodies)

c.   Electrical connections broken / false contacts

d.   Capacitor interrupted / short-circuited

e.   Tachymetric sensor interrupted / short-circuited

f.   Control board (Triac interrupted)

To check that the tachymetric sensor functions correctly:

-   Check that the voltage across the terminals of the sensor is higher than 7V AC.

## 7.4.7   Washing motor always running
## Alarm [A L 8] - LESs [LD9] + [LD10] + [LD11] (triac short-circuited)

This control system is operative during the entire washing cycle.

The electronic control system identifies that the motor is correctly powered and detects the reason for a malfunction. If the microprocessor identifies a signal from the tachymetric sensor indicating that the motor is in operation when it should be switched off, an alarm condition is generated.

### Possible causes

a.   Triac on control board short-circuited => Replace the control board.

# 7.5   Additional protective systems and safety devices

## 7.5.1   Anti-pressure surge

Pressure surge sometimes occurs during the hot wash phases when operation of the motor is resumed after the cycle has been interrupted.

-   This phenomenon may result in noise (rattling of the dishes) and minor leakage of water from the door seal.

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- The electronic control system performs a procedure which prevents this phenomenon by controlling the operation of the motor.

- The control procedure consists of a phase (duration 20 seconds) during which the motor rotates at a constant speed of 1600 rpm; during this period, the remaining loads (heating element) are switched off.

- This procedure takes place only during washing phases (motor switched on), when the cycle is restarted after a power failure or after opening the door.

### 7.5.2    Door open

A high-voltage sensor connected to the door microswitch performs this function.

- When the door is opened, all electrical loads are disconnected (motor, heating element, etc.) and the electronic control board identifies the "door open" condition; the phase being performed is interrupted and stored in memory.

- When the door is re-closed, all the electrical loads are reconnected; operation of the dishwasher resumes from the beginning of the phase which was interrupted.

### 7.5.3    Programme being executed

When the cycle has started, the electronic control system recognizes the "Programme in execution" condition, and disables all the control buttons (with the exception of the CANCEL button) in order to prevent inadvertent modification of the settings.

### 7.5.4    Power failure

A power failure is detected when the duration of the outage is a very short period (between 20 ms and 40 ms).

The power failure function stores information regarding the status of the cycle in memory even in the event of an unexpected power failure so that, when power is restored, the cycle resumes from the point at which it was interrupted.

The power failure function operates as follows:

- When a power failure is detected, all the loads are disconnected simultaneously and the energy stored in the capacitor on the control board makes it possible to store the data in the EEPROM. When the power supply is restored, the cycle resumes from the point at which it was interrupted.

### 7.5.5    Salt level

This control system consists of a reed sensor which is positioned externally to the salt container and actioned by an internal float.

### 7.5.6    Rinse-aid level

This control system consists of a reed sensor which is positioned externally to the integrated detergent dispenser and actioned by an internal float.

# 8.    Options and diagnostics

## 8.1    Display/cancellation of alarm conditions stored in memory

This procedure can be used solely by Service Engineers when confronted with functional faults, and allows them check and/or cancel any ALARM conditions memorized by the electronic control system.

Access is by pressing a combination of buttons for rapid identification of the fault (existing currently or occurring in the past).

- The ALARM code stored in memory is displayed by the flashing of the CYCLE PHASE LEDs [LD9], [LD10] and [LD11]. The button to these flashing sequences (in binary code) is shown in the table of alarms.

- Press button [S1] to display the last 3 memorized alarms in sequence.

- These ALARMS can be cancelled by pressing button [S3].

### 8.1.1    Displaying the alarms stored in memory

With the door closed and the dishwasher **switched off**.

1.  Press and hold down programme buttons [S2] and [S3] simultaneously.

2.  Press the "ON/OFF" button [S0].
    LEDs [LD1], [LD2] and [LD3] flash to indicate that the function has been selected.
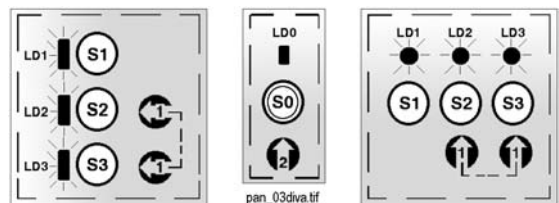


3.  Press programme button [S1] to start the function.

    - LED [LD1] flashes, while LEDs [LD2] and [LD3] switch off.

    - The last alarm (if any) stored in memory is displayed by the flashing of CYCLE PHASE LEDs [LD9], [LD10] and [LD11].
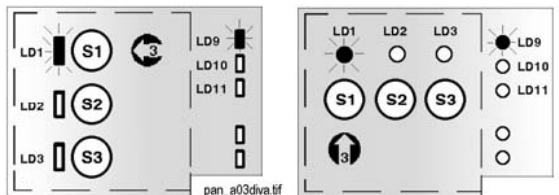
4.  Press button [S1] repeatedly to display (in sequence) the 2nd and 1st alarm conditions (if any) stored in memory.

5.  To exit this function, press the "ON/OFF" button [S0] to switch off the appliance.

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### 8.1.2    Cancelling alarm conditions stored in memory

This option enables Service Engineers to cancel alarm conditions stored in the appliance's memory thus preventing any doubt or uncertainty in the event of a subsequent service call.

After checking the status of the alarms, it is good practise to perform the following procedure.

1.  Press and hold down programme buttons [S2] and [S3] simultaneously.

2.  Press the "ON/OFF" button [S0].
    LEDs [LD1], [LD2] and [LD3] flash to indicate that the function has been selected.


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3.  Press programme button [S1] to start the function.

    -   LED [LD1] flashes, while LEDs [LD2] and [LD3] switch off.

    -   The last alarm (if any) stored in memory is displayed by the flashing of CYCLE PHASE LEDs [LD9], [LD10] and [LD11].

4.  Press button [S3] to cancel the alarm conditions stored in memory.

    -   All the LEDs on the control panel flash 3 times for 1 second, at intervals of 2 seconds, to confirm cancellation.

5.  Press the "ON/OFF" button [S0] to switch the appliance off.


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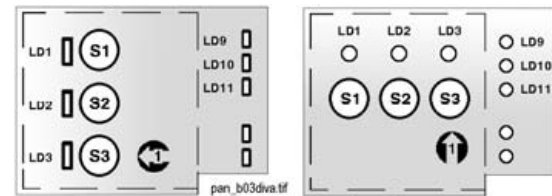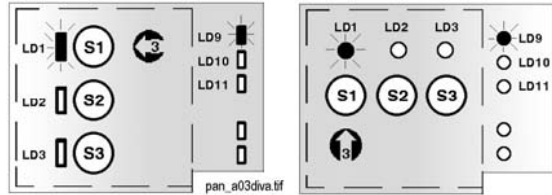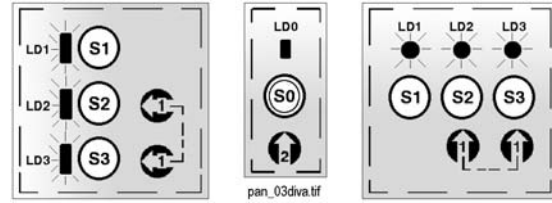
## 8.2    Disactivation/re-activation of the rinse-aid LED

With the dishwasher OFF (programme selection mode).

1.  Press and hold down buttons [S1] and [S2] simultaneously for about 5 seconds.

2.  Press the "ON/OFF" button [S0]. LEDs [LD1] and [LD2] flash.


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3.  Press button [S2].

    -   LED [LD2] continues to flash, while LED [LD1] switches off.

    -   The rinse-aid LED [LD14] lights.

4.  Press button [S2] again: the rinse-aid LED switches off.


pan_a04diva.tif
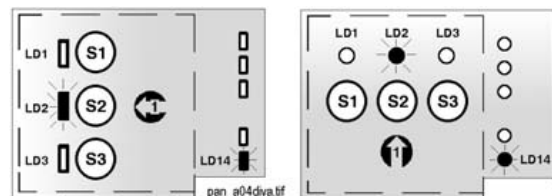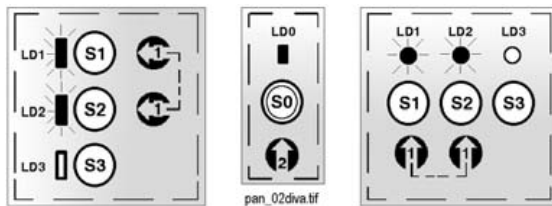
In order to memorize this operation, press the ON/OFF button [S0] to switch the appliance off.

To re-activate the rinse-aid LED [LD14], repeat this procedure.

## 8.3    Component diagnostics test

This test can be used by Service Engineers only to perform a rapid test of the efficiency of the main electrical components.

Access to this procedure is by pressing a combination of buttons. The test routine rapidly performs a check of the operation of the components to be examined.

The test consists of 7 fixed-sequence phases:

- The component activated is displayed by the three cycle phase LEDs, which light in a coded sequence.
- By pressing button [S2] repeatedly, the Service Engineer can activate all the components in sequence according to the logic described below.
- Each component is activated for a pre-set period (time-out), after which it is automatically disactivated.
- After each component has been activated, the appliance enters PAUSE mode. The next component is tested only when button [S2] is pressed.
- The activation time for each component can be reduced by pressing button [S2] before the pre-set activation time (time-out) has elapsed.

### 8.3.1    Access to the diagnostics test

With the door closed and the dishwasher **switched off**.

1.   Press and hold down programme buttons [S2] and [S3] simultaneously.

2.   Press the ON/OFF button.
     - LEDs [LD1], [LD2] and [LD3] flash to indicate that the function has been selected.

3.   Press button [S2] to start the function.
     - LED [LD2] continues to flash, while LEDs [LD1] and [LD3] switch off.
     - LED [LD9] lights when the water fill solenoid valve is in operation.

4.   Press button [S2] again: CYCLE PHASE LEDs [LD9], [LD10] and [LD11] light in sequence to indicate the functions listed in the table below.



pan_03diva.tif



pan_a05diva.tif

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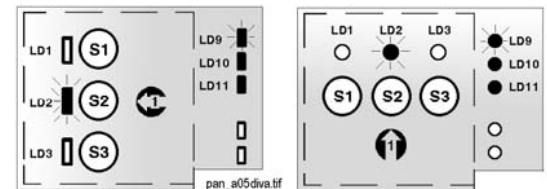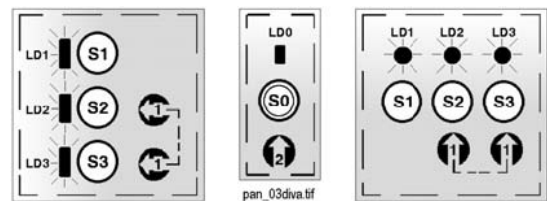
| LEDs on | Components tested | TIME-OUT | Advance buttons |
|---|---|---|---|
| [LD9] | Water fill solenoid valve | 60 sec | [S2] |
| [LD10] | Integrated dispenser (detergent / rinse aid) | 60 sec | [S2] |
| [LD9]+[LD10] | Washing pump | 60 sec | [S2] |
| [LD11] | Heating element | 20 sec | [S2] |
| [LD9]+[LD11] | Pause / Fan motor (if fitted) | 60 sec | [S2] |
| [LD10]+[LD11] | Regeneration solenoid valve | 60 sec | [S2] |
| [LD9]+[LD10]+[LD11] | Drain pump | 60 sec | [S2] |
| [LD2] flashing | END OF TEST | PAUSE | |
| | | ↓   → | [S2] |
| | | EXIT | [S0] |

At the end of the test, LED [LD2] continues to flash, while the remaining LEDs remain unlit.

- The appliance remains in PAUSE mode.
- To repeat the diagnostics cycle, press button [S2] again.

To exit the test procedure, press "ON/OFF" [S0] to switch the appliance off.

## 8.4    Functional test cycle

The functional test cycle is a washing programme for use by Service Engineers only, and can be used to test all the functions included in a traditional washing cycle. In effect, a normal cycle is simulated.

Access is by pressing a combination of buttons for rapid verification that the appliance functions correctly.

The test cycle is designed to perform the following phases:

| Washing programme | Programme phases | Definition of phase | Washing system |
|---|---|---|---|
| **Pre-wash** | Drain | 30sec | / |
| | Water fill | P (level) | "Ctrl" – 2800rpm |
| | Washing | 3 min. | |
| | Drain | 90sec | / |
| **Washing** | Water fill | P (level) | "Ctrl" – 2800rpm |
| | Wash + Heater+ Disp. | 50 °C | |
| | Washing | 4 min. | |
| | Washing + Heater | 68 °C | |
| | Washing | 6 min. | |
| | Drain | 90 sec. | / |
| **Cold rinse** | Water fill | P (level) | "Pulse" – 1600 - 2800rpm |
| | Washing | 3 min. | |
| | Drain | 90 sec. | / |
| **Hot rinse** | Water fill | P (level) | "Pulse" – 1600 - 2800rpm |
| | Washing + Heater + Disp. | 50 °C | |
| | Washing | 16 min. | |
| | Drain | 90 sec. | / |

The total duration of the test cycle is approximately 60 minutes.

The test cycle is not included in the counter for "ad hoc" regeneration.

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### 8.4.1    Access to the test cycle

With the door closed and the dishwasher **switched off**.

1.  Press and hold down programme buttons [S1] and [S3] simultaneously.

2.  Press the "ON/OFF" button [S0]. LED [LD3] flashes to indicate that the test function has been selected.

    -   The LED continues to flash for the entire duration of the cycle and until the test function is exited.

    -   Cycle phase LEDs [LD9] and [LD10] light.

3.  After about 6 seconds, the cycle starts automatically.

    -   LED [LD9] remains lit, while LED [LD10] switches off.

    -   The current phase of the cycle is displayed as the cycle progresses by LEDs [LD9], [LD10] and [LD11] which light in sequence and then switch off.
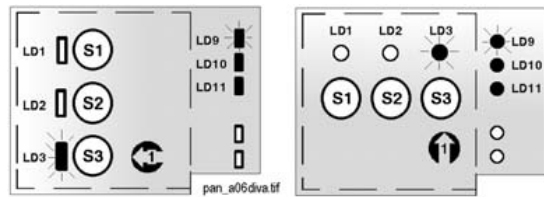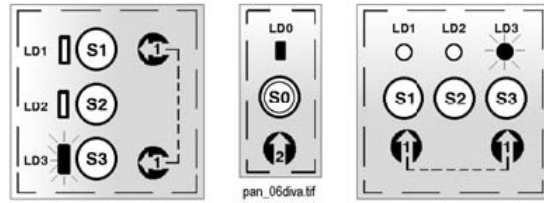
If the door is opened, the cycle is interrupted; when the door is re-closed, the cycle resumes (after 6 seconds) from the point at which it was interrupted. The same applies in the event of a power failure.

To cancel the cycle, press programme button [S3].

At the end of the cycle, LED [LD11] lights, while LED [LD3] continues to flash.

To exit the test procedure, press "ON/OFF" [S0] to switch the appliance off.

# 9. Electrical functions

## 9.1 Circuit diagram



152 642303a
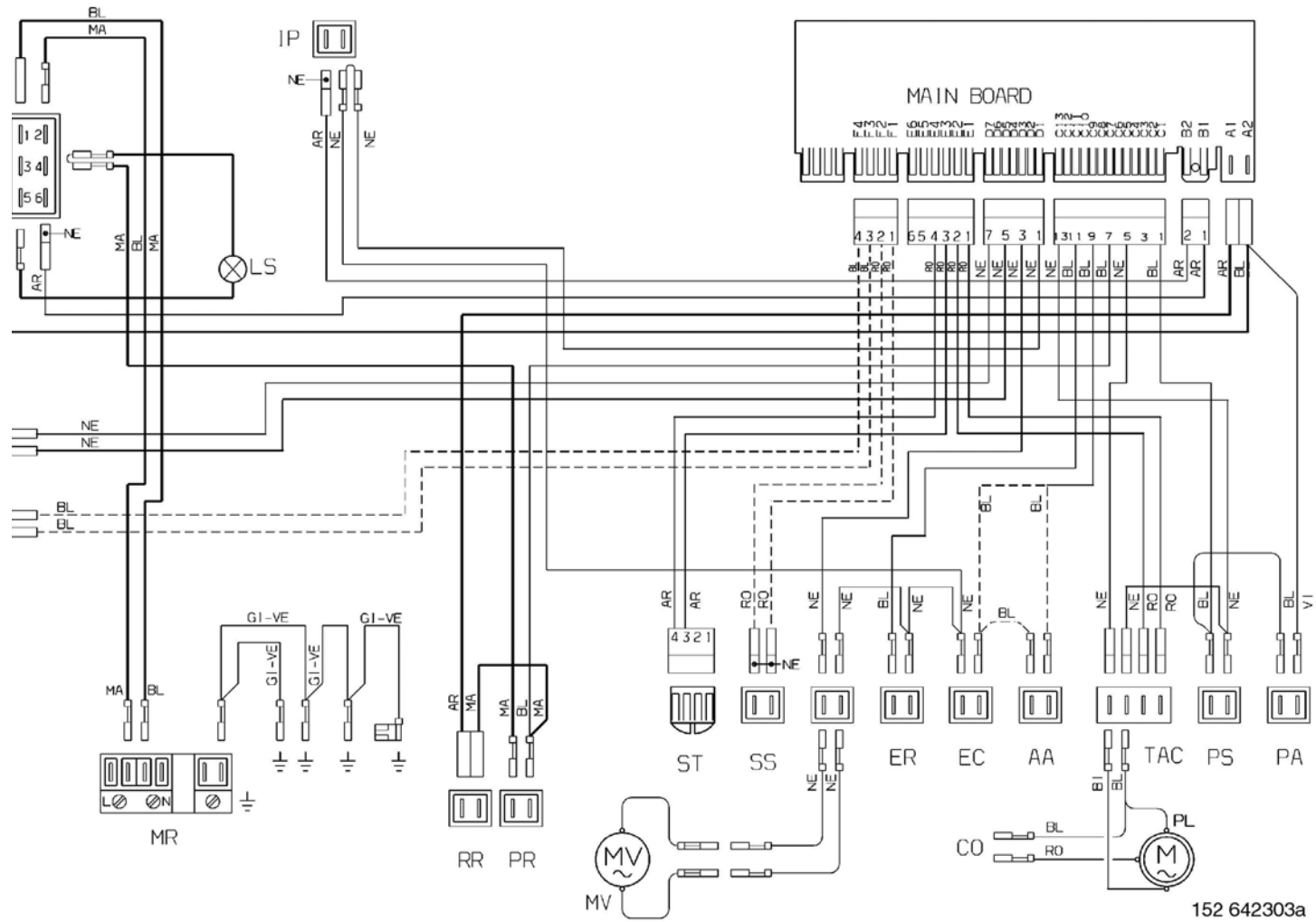
## 9.2 Basic circuit diagram
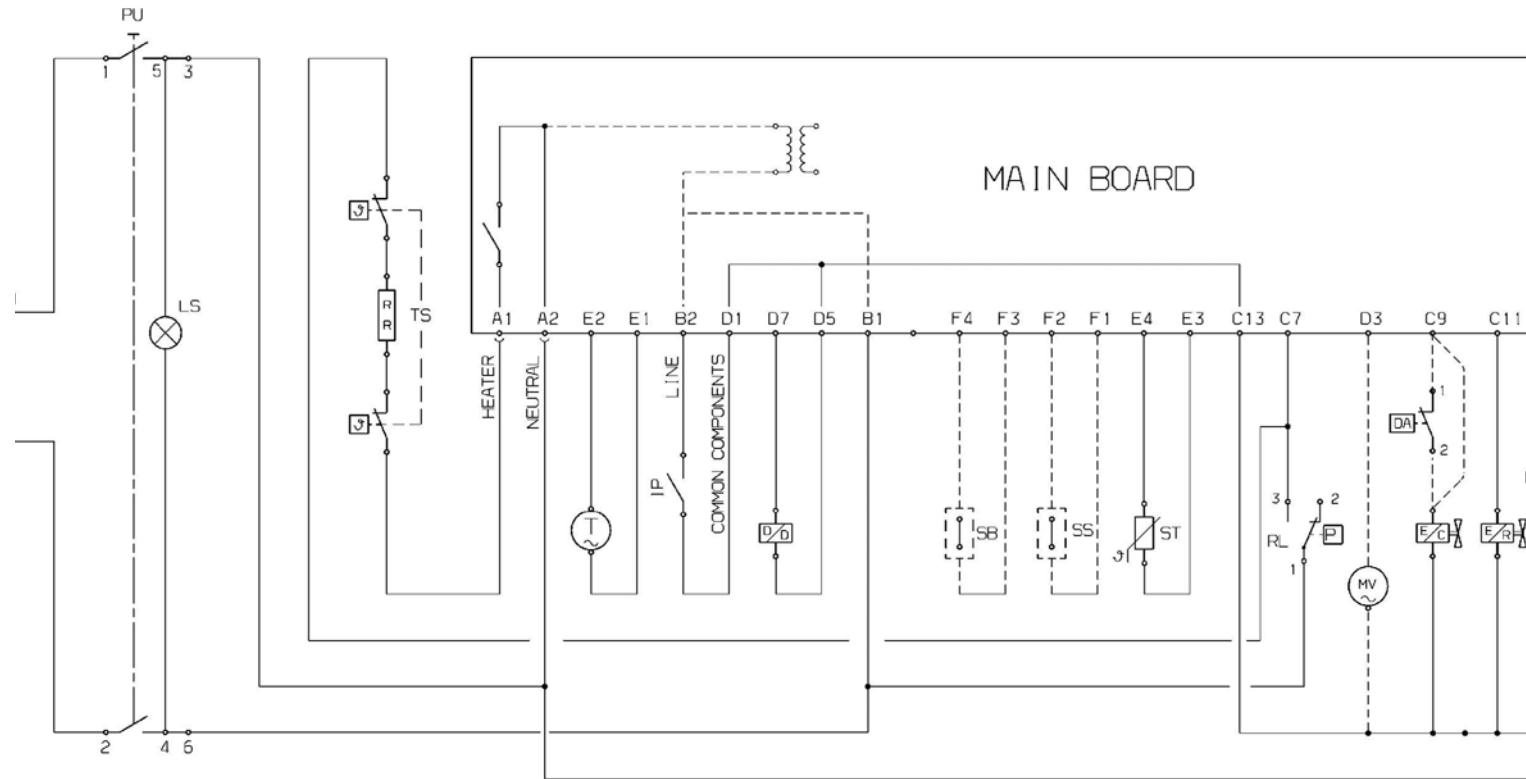
## 9.2.1    Key to the circuit diagram

| | | |
|---|---|---|
| AR | = | orange |
| BI | = | white |
| BL | = | blue |
| CE | = | light blue |
| GI-VE | = | yellow/green |
| MA | = | brown |
| NE | = | black |
| RO | = | pink |
| VI | = | violet |
| AA/DA | = | anti-flooding device |
| CO | = | condenser |
| DD | = | detergent/rinse-aid dispenser |
| EC | = | water fill solenoid valve |
| ER | = | regeneration solenoid valve |
| GA | = | suppressor assembly |
| IP | = | door switch |
| MR | = | terminal block |
| MV | = | fan motor |
| PL | = | washing pump |
| PS | = | drain pump |
| PU | = | pushbuttons |
| PR/RL | = | level pressure switch |
| PA | = | anti-overflow pressure switch |
| RR | = | heating element |
| SB | = | rinse-aid sensor |
| SS | = | salt sensor |
| ST | = | temperature sensor |
| TAC/T | = | tachymetric generator |
| TS | = | safety thermostat |

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## 9.3 Table of programmes

The table below lists the characteristics of the main programmes that can be selected on the various models. According to marketing requirements, each model features a number of programmes (from 3 to a maximum of 5) corresponding to the codes (A, L, B etc.).
For further details relative to the programmes available on individual models, refer to the specific documentation (Service Notes).

| Phases => | | Pre-wash | | | | Washing | | | | | | 1st rinse | | 2nd rinse | | Hot rinse | | | Drying | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Programme codes | Programmes | Resin washing (option) | Temperature (°C) | Prolonged washing | Type of washing | Resin washing (option) | Temperature | Prolonged washing | Temperature | Prolonged washing | Type of washing | Washing | Type of washing | Washing | Type of washing | Temperature | Prolonged washing | Type of washing | Regeneration (option) | Drying time (min.) | Cycle time (minutes) |
| A | Intensive 70° | 1' | 55°C | +T+10' | ctrl | --- | 55°C | +T+7' | 70°C | +T+14' | ctrl | 4' | ctrl | 4' | ctrl | 68°C | +T+0' | ctrl | 3' | 24' | 126' |
| L | Intensive 89 min. | 1' | 55°C | +T+10' | ctrl | --- | 50°C | +T+8' | 68°C | +T+0' | ctrl | 4' | ctrl | 4' | PW1 | 68°C | +T+0' | ctrl | 3' | 7' | 90' |
| B | Normal 65° | 1' | --- | 6' | ctrl | --- | 50°C | +T+4' | 68°C | +T+8' | ctrl | 5' | ctrl | --- | PW1 | 68°C | +T+0' | ctrl | 3' | 24' | 93' |
| O | Normal 65° Italy | 1' | --- | 6' | ctrl | --- | 50°C | +T+4' | 68°C | +T+8' | ctrl | 5' | ctrl | 5' | PW1 | 68°C | +T+0' | ctrl | 3' | 24' | 99' |
| C1 | Bio (ABC) | 1' | --- | 8' | Pulse | --- | 55°C | +T+12' | --- | --- | Pulse | 5' | Pulse | --- | Pulse | 60°C = 16min | | Pulse | 3' | 54' | 127' |
| C3 | Bio (BAB) | 1' | --- | 8' | Pulse | --- | 50°C = 15min | | 50°C | +T+42' | Pulse | 5' | Pulse | --- | Pulse | 70°C | +T+1' | Pulse | 3' | 24' | 126' |
| C5 | Bio (AAA) | 1' | --- | 8' | Pulse | --- | 50°C = 15min | | 50°C | +T+42' | Pulse | 5' | Pulse | --- | Pulse | 60°C = 16min | | Pulse | 3' | 54' | 154' |
| G | Delicate 55° | 1' | --- | 8' | Pulse | --- | 55°C | +T+12 | --- | --- | Pulse | 5' | Pulse | --- | Pulse | 70°C | +T+1' | Pulse | 3' | 24' | 97' |
| M | Short 30 min. | 1' | --- | --- | --- | --- | 65°C | +T+0' | --- | --- | Pulse | --- | Pulse | --- | --- | 60°C | +T+0' | Pulse | 3' | --- | 31' |
| F | Soak | 1' | --- | 8' | Pulse | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 11' |

| TYPE OF WASHING | ctrl = constant speed (2800 rpm) |
|---|---|
| | Pulse = 3min at 1600 rpm + 1min at 2800 rpm |
| **OPTION [½] (half-load)** | - Pre-wash excluded if desired<br>- Wash time reduced by 11 - 30min approx.<br>- Reduction in water consumption 5l approx. |

| RESIN WASHING | | |
|---|---|---|
| Functions | | Times |
| Drain | | 10 sec |
| Fill & Drain | | 15 sec |
| Drain | | 10 sec |
| Fill & Drain | | 15 sec |
| Drain | | 10 sec |

| REGENERATION | | | | |
|---|---|---|---|---|
| Level | ° dH German | ° TH French | Autonomy | Regeneration |
| L 1 | 0 ÷ 4 | 0 ÷ 8 | Total | No |
| L 2 | 5 - 18 | 9 - 30 | 5 cycles | 6th cycle |
| L 3 | 19 - 29 | 31 - 50 | 3 cycles | 4th cycle |
| L 4 | 30 - 40 | 51 - 70 | 2 cycles | 3rd cycle |
| L 5 | 41 - 50 | 71 - 90 | 0 cycles | all cycles |

## 9.4    Checking the efficiency of the components

In order to facilitate control of the component to be tested, a control procedure has been created indicating the points to which the tester probes should be connected and the correct value for each component.

- First remove the door.

- Detach the modular connector from the control board and connect the probes of the tester to the appropriate points on the connector. Compare the ohmic reading with the theoretical value.
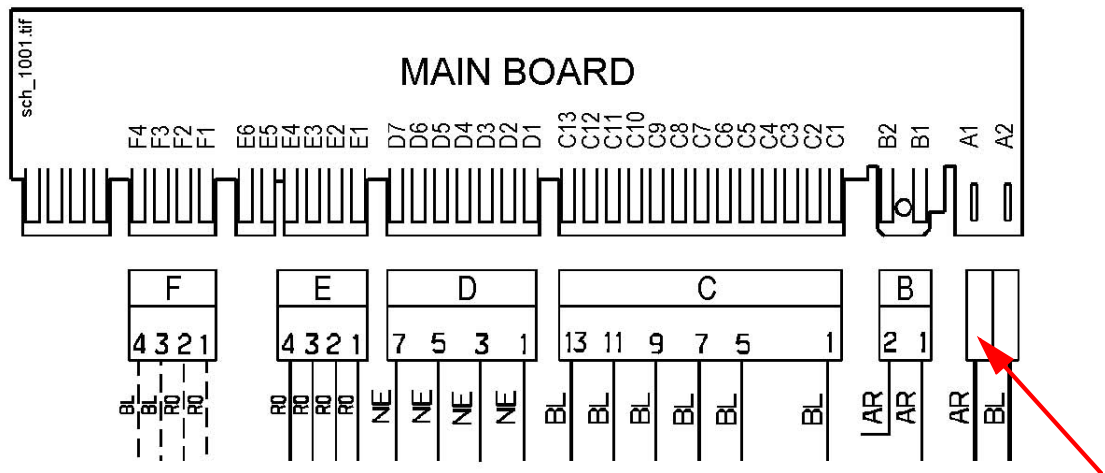


**Caution!**  **Care should be taken relative to the position of connector "A1 - A2": if this connector is replaced in the incorrect position (back-to-front), the appliance will *not function*. The board will not accept any commands since the power supply will be disconnected.**

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## 9.5 Measurement points on the board wiring connector and the correct theoretical values.

| List of components | Probe contacts | Correct values | | Notes |
|---|---|---|---|---|
| * Power cable & <br> (PU ) – ON/OFF switch | L - B1 <br> N - A2 | => <br> => | 0 Ω <br> 0 Ω | with ON/OFF button pressed |
| (RR) – heating element + <br> (TS) – safety thermostat | A1 - C57 | => | 25 Ω ± 8% | connected in series (2100W) |
| (PR) – level pressure switch | B1 - C7 | => | INFINITE <br> 0 Ω | on EMPTY (1-2) <br> on FULL (1-3) |
| (PA) – level pressure switch | C1 - A2 | => | INFINITE <br> 0 Ω | on EMPTY (1-2) <br> on FULLL (1-3) |
| (IP) – door micro switch | B2 - D1 | => | 0 Ω | Door closed |
| (DD/DB) – integrated dispenser | D5 <-> D7 | => | 1.500 Ω ± 8% | OK |
| (SB) – rinse-aid sensor | F3 - F4 | => | INFINITE <br> 0 Ω | with rinse-aid <br> without rinse-aid |
| (SS) – salt sensor | F1 - F2 | => | INFINITE <br> 0 Ω | with salt <br> without salt |
| (ST) – temperature sensor | E3 - E4 | => | 4850 Ω ± 5% <br> 1205 Ω ± 5% | (at 25ºC) <br> (at 60ºC) |
| (GT) – tachymetric sensor | E1 - E2 | => | 210 Ω ± 8% | OK |
| (MV) – fan motor | D1 - D3 | => | 7750 Ω ± 8% | OK |
| (ER) – regeneration solenoid valve | D1 - C11 | => | 3800 Ω ± 8% | OK |
| (EC) – fill solenoid valve + <br> (AA) – anti-flooding device | D1 - C9 | => | 3.800 Ω ± 8% | connected in series |
| (PI) – wash motor | C13 .. C5 <br> to the two motor wires (blue) / (red) | => | 50 Ω ± 8% <br> 130 Ω ± 8% | start-up winding <br> auxiliary winding |
| (Ps) – drain motor | C13 - C1 | => | 180 Ω ± 8% | OK |

**Note: * = Measurement points L and N refer to the pins of the plug fitted to the power cable.**

## 9.6    Table of alarm codes

In order to facilitate identification of an alarm condition indicated on the control panel and which causes one of the safety features to intervene, the possible causes for each alarm condition are listed in the table below together with suggested solutions.
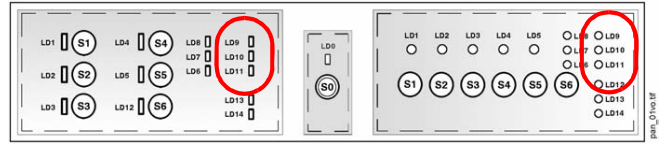
**Please note:** The control board is unlikely to be the cause of an alarm condition, and should therefore be checked last.

| Definition of alarms | | Intervention | Possible causes |
|---|---|---|---|
| [AL5] | [L9] | **Water fill time-out** Correct level not reached. Pressure switch does not switch to "FULL" (1-3) within the maximum time after activation of the solenoid valve. | a) Tap closed b) Water mains pressure < 0.3 bar c) Fill solenoid / connections interrupted d) Pressure switch faulty / false contacts e) Tube between sump and pressure switch obstructed or leaking |
| | | **Pressure switch on "EMPTY" (1-2)** Pressure switch does not return to "FULL" (1-3) within the maximum limit | a) Central filter clogged b) Excessive foam c) Dishes upside down d) Siphon created in drain hose |
| [AL6] | [L10] | **Water drain time-out (**)** | a) Domestic drain circuit unsuitable/obstructed b) Drain hose kinked c) Drain pump / connections interrupted d) Pressure switch faulty (jammed on 1-3) e) Control board |
| [AL4] | [L9] + [L10] | **Intervention of anti-flooding device** | a) Water leakage from various couplings b) Floating sensor jammed c) Float microswitch faulty |
| *[AL3] | [L11] | **Water heating time-out** Water does not reach correct temperature within 45 minutes after the heating element switches on. | a) Heating element interrupted b) Safety thermostat open c) Wiring interrupted / false contacts d) NTC sensor faulty / Poor thermal contact e) Insufficient water circulation to upper spray arm f) Washing pump (impeller stripped) |
| *[AL1] | [L9] + [L11] | **NTC sensor short-circuited** Range < 400$\Omega$ | a) Temperature sensor faulty (short-circuit) b) Wiring short-circuited c) Temperature too high (> 90°C) |
| *[AL2] | | **NTC sensor open** Range > 30.000$\Omega$. | a) Temperature sensor faulty (open) b) Wiring interrupted/disconnected c) Temperature too low (< -10°C) |
| [AL7] | [L10] + [L11] | **Washing motor inoperative** | a) Motor winding interrupted/short-circuited b) False/interrupted contacts c) Motor jammed by foreign bodies d) Capacitor interrupted / short-circuited e) Tachymetric sensor interrupted / short-circuited |

In **ALARM conditions [AL4], [AL5], [AL6], [AL7], [AL8]** => Operation of the dishwasher is interrupted and the corresponding LEDS flash. To cancel the ALARM ?? Press [S0] to switch off the appliance.
When the dishwasher is switched on again: The cycle resumes from the point at which it was interrupted. *)
**In ALARM conditions - [AL1]/[AL2], [AL3]**. The cycle is completed without any error displayed to the user. The problem is simply stored in memory for examination by a Service Engineer. See "Safety/control systems and alarms" on page 25

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## 9.7 Quick guide to the special functions

The table below summarizes the ways in which the diagnostic functions operate. These functions are available to Service Engineers only.
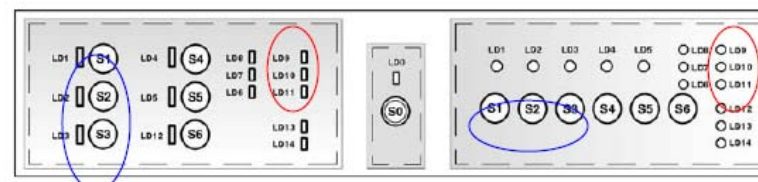


| Function | Activation of the function | | | Selection of response / Starting the function | | | Brief description / Comments |
|---|---|---|---|---|---|---|---|
| | Buttons | Led(s) | | Button | Led(s) | | |
| **Select regeneration** | S1 + S2 ⇓ S0 (On/Off) | LD1 + LD2 flashing | => | S1 | LD1 flashing with level mode selected | => | (Description on page 22)<br>Degrees … … >8°F /4°D … >30°F /18°D … >50°F /29°D … >70°F /40°D …>90°F /50°D<br>Level … … ... L1 … … … .. L2 … … … ... L3 … … ... L4 … … … … L5<br>N°. of flashes … 1 … … … … 2 … … … … 3 … … ... 4 … … … ... 5<br>Example: level WH3, operative sequence: [3 flashes, 5 sec pause] repeated for 1 minute |
| **Disactivation of the rinse-aid LED** | S1 + S2 ⇓ S0 (On/Off) | LD1 + LD2 flashing | => | S2 | LD2 flashing LD14 off | => | (description on page 32)<br>Press [S2] to switch LED [LD14] on; press again to switch it off. |
| **Display alarms stored in memory** | [S2 + S3] ⇓ S0 (On/Off) | LD1 + LD2 + LD3 flashing | => | S1 | LD1 flashing LD..9/10/11 may be flashing | => | (description on page 31)<br>[AL5] [AL6] [[AL4] [AL3] [ AL1/2] [AL7] [AL8]<br>LD9 LD10 LD9+LD10 LD11 LD9+LD11 LD10+LD11 LD9+LD10+LD11<br>The last 3 alarms stored in memory can be displayed by pressing S1 |
| **Cancel alarms stored in memory** | [S2 + S3] ⇓ S0 (On/Off) | LD1 + LD2 + LD3 flashing | => | S3 | LD1 ...LD14 activation of LEDs | => | (description on page 32)<br>All the LEDs light briefly (1 sec on, 2 sec off) three times |
| **Components diagnostics test** | [S2 + S3] ⇓ S0 (On/Off) | LD1 + LD2 + LD3 flashing | => | S2 | LD2 flashing LD9 ...10/11 lit in sequence | => | (description on page 33)<br>EV DD PL RR Pause/MV ER PS End<br>20sec 60sec 60sec 20sec 60sec 60sec 60sec<br>LD9 LD10 LD9+LD10 LD11 LD9+LD11 LD10+LD11 LD9+LD10+LD11 |
| **Test cycle** | [S1 + S3] ⇓ S0 (On/Off) | LD1 + LD2 + LD3 flashing | .. => | S3 | LD3 flashing | .. => | (description on page 35)<br>Cycle phase LEDs LD9, LD10 light and switch off in sequence; at the end of the cycle, LED LD11 remains lit.<br>The overall duration of the cycle is about 60 minutes. |
| Stop function | All the functions listed above may be cancelled while they are being performed by pressing [S0] ON/OFF to switch the appliance off. | | | | | | |