



Dishwasher series EDW 1500

Functionalities

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

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

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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 "EDW 1500" range of electronically-controlled dishwashers.

The EDW 1500 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 free-standing and partially 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.

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## 1.3 General features

<b>Mains voltage</b>	→	230V / 50Hz (limits 187-254 V)
<b>Total power absorption</b>	→	2300W
<b>Water connection</b>	→	Water supply min./max. pressure 5-80N/cm <sup>2</sup>
<b>Filling capacity</b>	→	12 place settings
<b>Dimensions:</b>		
- Width	→	59.6 cm
- Height	→	81.8 - 87.8 cm
- Depth	→	55.5 cm
<b>Control elements</b>	→	Horizontal / Vertical
- ON/OFF	→	Two-pole switch (separate from the electronic board)
- Programme selection / optional functions	→	Button-actuated (min. 3, max. 6)
<b>Display</b>	→	2.5 digits and LEDs
<b>Washing system</b>	→	Combined / pulse
<b>Water fill level</b>	→	Pressure switch control + software
<b>Water heating</b>	→	Tube-enclosed heating element (2100 W)
<b>Temperature control</b>	→	NTC Temperature sensor
<b>Drying system</b>	→	Active / Turbo
<b>Safety features / alarms</b>	→	Total protection (hydraulic + software)

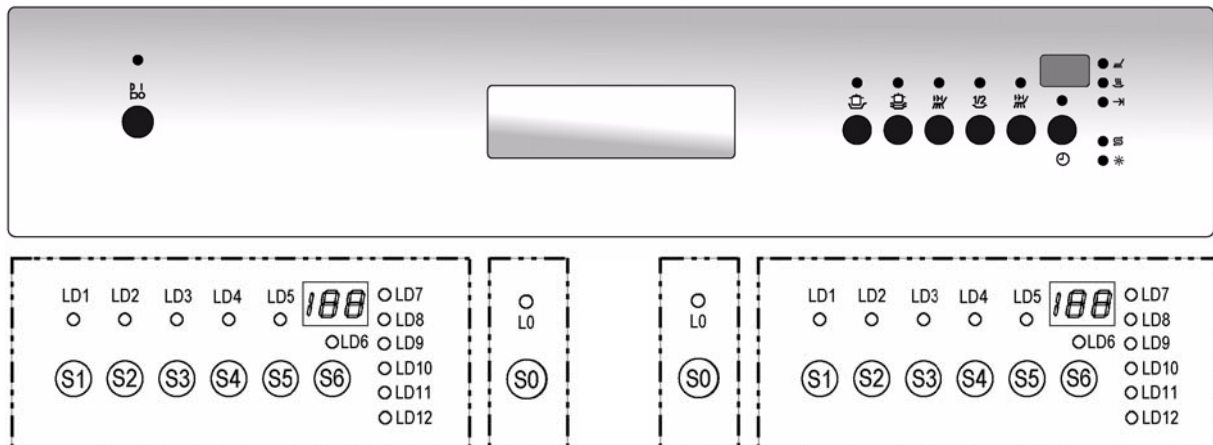
## 2. Control panel

### 2.1 Control panel

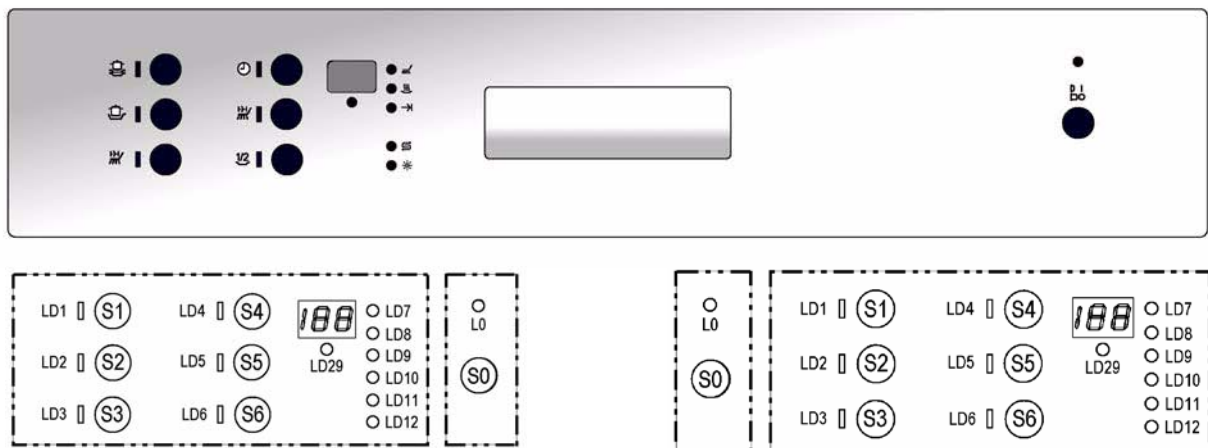
The configuration of the control panel depends on the following:

- Typology of the electronic board:
  - Horizontal controls
  - Vertical controls
- Number of programme selection buttons (from a minimum of 3 to a maximum of 6)
- Number of LEDs (max. 12)
- Position of the ON/OFF button (right or left)

#### Version with horizontal controls



#### Version with vertical controls



S0 ON/OFF button

S1+S6 Programme/option selection buttons

LD1+LD6 Programme/option indicator LEDs

LD7+LD12 Indicator LEDs phases / warnings (washing, drying, end of cycle, salt, rinse-aid)

### 2.1.1 ON/OFF button (S0)

The ON/OFF button is featured on all models in the range, and is used to switch the appliance on and off. Switching off does not cancel the programme being executed. The corresponding pilot lamp [L0] lights to indicate that the appliance is powered.

### 2.1.2 Programme/Option buttons (S1-S6)

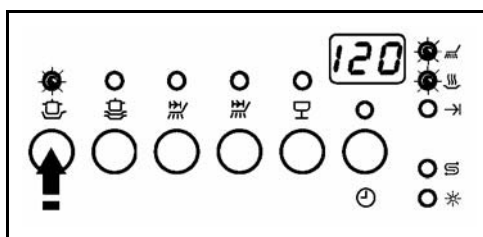
The functions of the various buttons depend exclusively on the software configuration of each appliance, which can feature from 3 to 6 buttons. Also the selection of the washing programmes changes according to the configuration of each appliance.

The buttons S1, S2, S3 are always featured because they perform special functions.

#### **Models with direct selection**

To each button corresponds a specific programme:

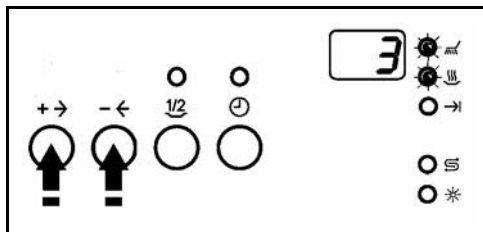
1. Close the door and switch the appliance on [S0].
2. Press a button to select a programme.
  - The corresponding LED lights.
  - The display shows the flashing time-to-end.
  - The indicator LEDs of the phase of the cycle light.
3. Within 3 seconds after the programme selection it is possible to set the eventual option or the delayed start (if available).
4. Automatically, 3 seconds after the last pressure of a button, the cycle starts. On the display the time-to-end lights steady and the LED of the current phase is on.



#### **Models with sequential selection**

In these versions two buttons are used to select the programmes:






1. Close the door and switch the appliance on [S0]. The display shows [ -- ].
2. Press button [+>] to select with an increasing order:
  - The LEDs relative to the programme buttons light (if featured).
  - The display shows the last selected flashing programme. Every time the button is pressed the following programme is selected (increasingly): -> 1 -> 2 -> 3.....
3. Press button [-<] to select with a decreasing order:
  - The LEDs relative to the programme buttons light (if featured).
  - The display shows the last selected flashing programme. Every time the button is pressed the previous programme is selected: -> 7 -> 6 -> 5 .....
4. Within 3 seconds after the programme selection it is possible to set the possible option or the delayed start (if available).
5. Automatically, 3 seconds after the last pressure of a button, the cycle starts. The digits and the LED indicating the current phase are on.





### 2.1.3 Indicator LEDs (LD7 - LD12)

The functionalities of the LEDs depend on the configuration software of each appliance.

	<b>Washing:</b> lights when the washing phase is performed and during the selection (if featured).
	<b>Drying:</b> lights when the drying phase is performed and during the selection (if featured).
	<b>End of cycle:</b> lights when the programmes ended.
	<b>Salt:</b> 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.
	<b>Rinse-aid:</b> indicates that the rinse-aid reservoir is empty.

### 2.1.4 Display

The display, which consists of 2.5 digits, can indicate:

- The indicative time-to-end of the programme in minutes. The countdown is carried out every minute and updated at the end of each programme phase.
- The end of cycle [0]
- The possible delayed start time in hours (max 19h); the time decreases every hour.
- The selected regeneration level (during the regulation).
- A possible alarm code in case of failure.
- The condition of the special functions (no rinse-aid and buzzer).
- The condition of the special functions (no rinse-aid and).

## 2.2 Options

### 2.2.1 "3 in 1 tablets"

This option can be selected by pressing the corresponding button, and remains in memory until the same button is pressed again. This option modifies the phases of the programme in order to optimize performance when "3 in 1" detergent tablets are used:

- variation of the duration of the programme and the temperatures required to dissolve the detergent tablets
- reduction of water exchange (partial drain phases)
- exclusion of introduction of rinse-aid
- exclusion of regeneration / resin washing

### 2.2.2 Extra rinse (rinse +)

This option may be selected temporarily by pressing the button (if featured), or in "Service" mode. If this option is set by the service engineer, it remains in memory until deactivated (see relative section). This option adds one cold rinse (with pulse washing) with a duration of about 5 minutes.

### 2.2.3 “1/2 load”

The 1/2 load option optimizes the washing cycle when only a small load is placed in the appliance.

#### 2.2.3.1 1/2 load button

When this button is pressed, certain parameters of the selected washing cycle are modified:

- Exclusion of Pre-wash (if featured)
- Reduction of the washing temperature.
- Reduction of the duration of the programme (up to 36 minutes)

#### 2.2.3.2 Automatic 1/2 load

When this button is not featured on the control panel, certain programmes may feature automatic detection of the half load. This system measures variations in the temperature during the initial heating phase. The temperature and the duration of the wash are both reduced.

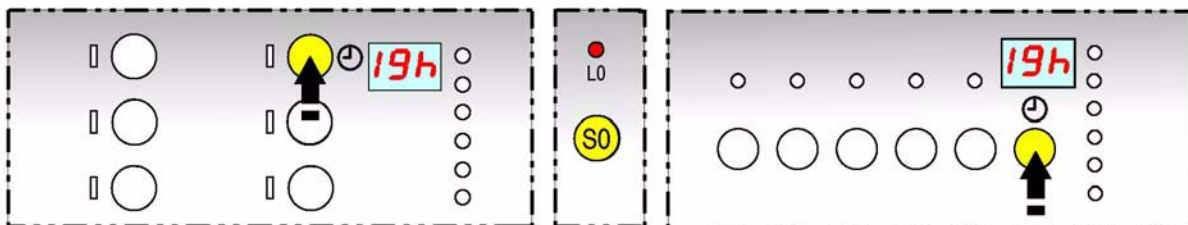
This option is not available in the following cycles: “Intensive”, “Short 30 minutes”, “Soak”, “Heating plates” and “Glassware”.

### 2.2.4 “Sanitize”

This is a special option used to sanitize the dishes/cutlery. However, it is NOT compatible with the “Glassware” programme.

- During the final rinse, the temperature is maintained at 68°C for 10 minutes.
- If used together with the **SOAK option**, the system performs a special sanitizing programme which lasts approximately 46 minutes (1 hot rinse followed by 10 minutes at a constant temperature of 68°C).

### 2.2.5 Delayed start



Proceed as follows to select the delayed-start time:

1. Press key S0 to switch on the appliance:
2. Press the button repeatedly to select the delayed-start time which appears flashing on the display. The time increases every hour up to 19h (1 ->2 ->3->....19).
3. Select the programme and the possible options. For some seconds the display shows the time-to-end of the cycle, then the delay time.
4. 3 seconds after the last selection, the delay time is activated. The display lights steady and the countdown starts: 19 ->18 ->17->....0 hours
5. During the countdown, till the programme starts, it is possible to modify the delay time or cancel it.
6. On expiry of the delay time the programme starts automatically.

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The delayed-start countdown can also be selected as follows:

1. Press key S0 to switch on the appliance.
2. Select the programme and the possible options.
3. Within 3 seconds, press sequentially the button to select the delay time.
4. 3 seconds after the selection the delay time and the countdown start with the same modalities previously described.

## 2.3 Washing programmes

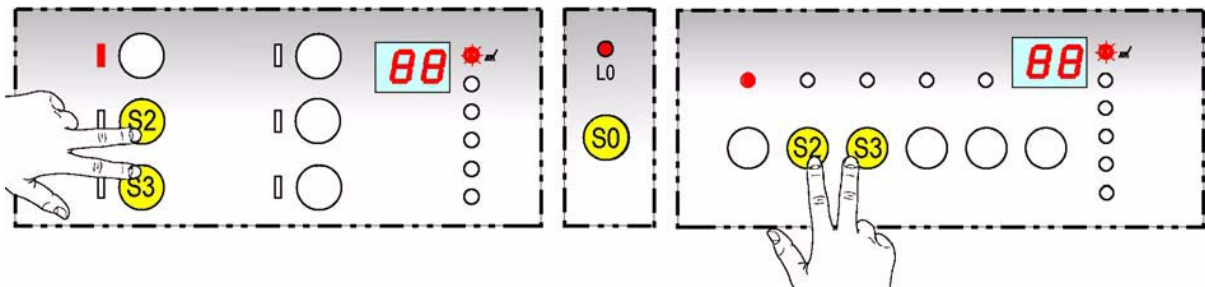
The number and type of washing programmes depends on the configuration of the appliance (max. 6).

Type	Programme	Pre-wash in °C	Wash in °C	No. of rinses	load	Sanitize	3 in 1	Rinse +	Elapsed time in min.
I1	Intensive 1	55	68	3	X	X	X	X	122
I2	Intensive (maximum speed)	55	68	3	X	X	X	X	120
I3	Intensive (short)	50	68	3	X	X	X	X	88
N1	Normal	cold	68	2	X	X	X	X	102
N2	Normal (maximum speed)	cold	68	3	X	X	X	X	100
N5	Normal (3 rinses)	cold	55	3	X	X	X	X	102
N3	Delicate	cold	55	2	X	X	X	X	98
E1	Energy label Axx	cold	50	2	X	X	X	X	162
E4	Energy label short	cold	55	2	X	X	X	X	134
E5	Energy label Auto performance (*)	cold	65 max.	2	X	X	X	X	141
Auto 1	Automatic 50-65 (*)	cold	50-68	2-3	Auto	X	X	X	92-115
Q4	Soaking	cold	—	(1)	—	X	—	—	12 (46)
Q5	Short 30 min	—	65 max.	2	—	X	X	X	31
Q6	Heat plates	—	—	2	—	X	—	—	30
Q7	Glassware	—	65 max.	2	—	—	X	X	73

(\*) models with turbidity meter only

## 2.4 Modifying a programme

### 2.4.1 Cancelling a programme (reset)



To cancel a programme that has already started, proceed as follows:

1. Open the door carefully and press buttons S2 - S3 together for approximately 2 seconds: the LED corresponding to the cycle being executed begins to flash.
2. After about two seconds, all the LEDs corresponding to the buttons (LD1 - LD6) light: the programme is now cancelled and the appliance returns to pre-selection mode.

### 2.4.2 Modifying a programme

Until a cycle has actually started, the settings selected can be modified at any time by pressing the appropriate buttons. If the door has been closed, proceed as follows to modify the programme:

1. Carefully open the door and press the button corresponding to the new programme for about 6 seconds: the LED for the current cycle begins to flash.
2. After about 6 seconds, the LED corresponding to the old programme switches off, and the LED for the new programme lights. Any options that have been selected are cancelled, and must therefore be entered again.
3. Close the door to start the new cycle.

### 2.4.3 Interruption of a programme (pause)

Proceed as follows to interrupt a programme that has already started:

1. Carefully open the door and press **S0** to switch the appliance off.
2. To re-start the appliance, press **S0** again and re-close the door. The programme starts (after a brief delay) from the point at which it was interrupted.

**Caution!** If the appliance is switched off or if the door is opened for more than 30 seconds during the drying phase, the cycle is considered to have been terminated after the regeneration phase; when the appliance is switched on again, it returns to programme selection mode.

## 2.5 Power failure

The power failure function maintains the information relative to the cycle status even in the even of a power outage; when the power supply is restored, the cycle resumes from the point at which it was interrupted.

If the power failure occurs during the drying phase, the cycle is considered to have been terminated after the regeneration phase.

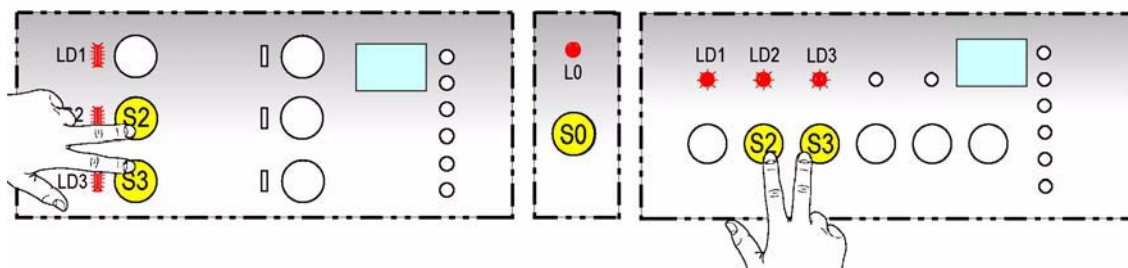
## 2.6 Buzzer (only certain models)

Normally this series of appliances does not feature the buzzer, but some models do.

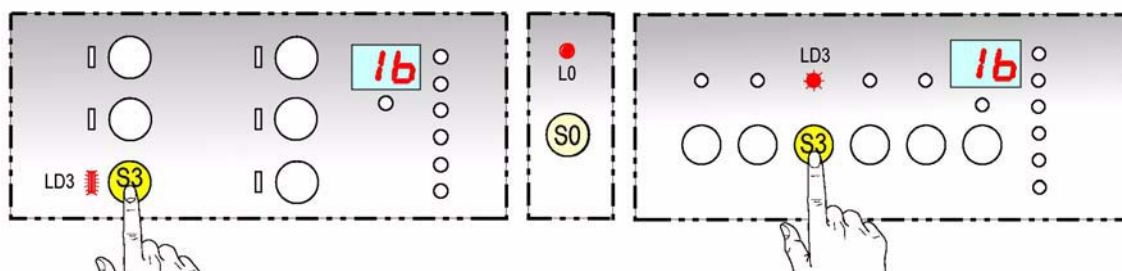
The buzzer sounds to indicate the **end of cycle** and in the event of an **alarm condition**. The buzzer sounds three times at the end of the cycle, but switches off immediately if the door is opened.

If the user prefers to switch off the buzzer, it is necessary to press a combination of buttons.

### 2.6.1 Activating/disactivating the buzzer



1. Cancel any cycles that have been selected.
2. Press key S0 to switch on the appliance.
3. Press buttons S2 and S3 simultaneously until LEDs LD1, LD2 and LD3 begin to flash.

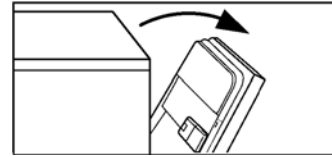


4. Press button S3: LEDs LD1 and LD2 switch off, while LD3 continues to flash.  
The condition of the buzzer is indicated by the display:  
**1b buzzer on**  
**0b buzzer off**
5. Press button S3 again to disactivate the buzzer.  
The end of cycle LED switches off to indicate that the buzzer has been disactivated.
6. To store this operation in memory: press button S0 and switch the appliance off or wait 60 seconds, the appliance is in selection mode.

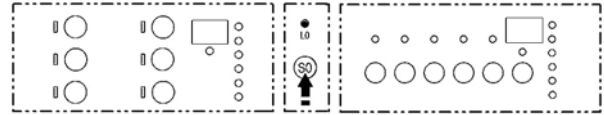
## 2.7 Sequence of operations

### Selecting the cycle

1. Open the door to access the control panel.



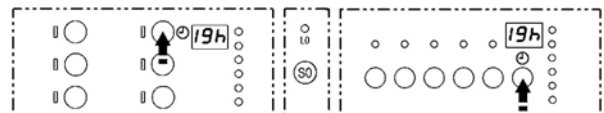
2. Press S0 to switch the appliance on. The LED L0 lights.



3. Press the button corresponding to the desired programme.  
The display shows the time-to-end or the programme number flashing. The phase LEDs light.

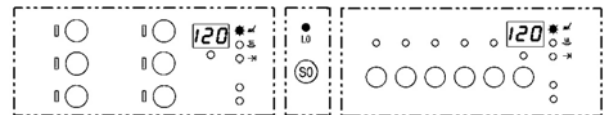


4. Within 3 seconds select the possible delayed start or the desired option (if featured).



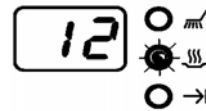
### Start

5. Automatically, 3 seconds after the last pressure of a button, the cycle starts. The digits and the current phase LED light steady.



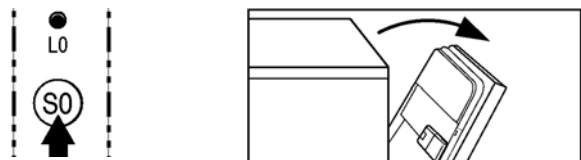
### Execution of the cycle

6. The time-to-end decreases every minute and is updated after every cycle phase.

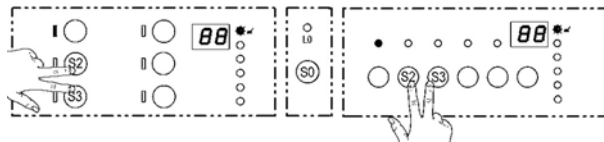


7. Proceed as follows to interrupt a programme that has already started:

1. Open the door and press S0 to switch off the appliance.
2. To re-start the appliance, press S0 again and re-close the door.

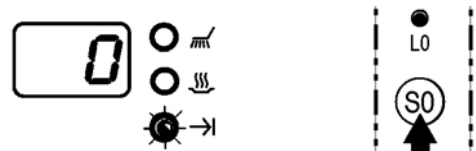


8. To cancel the current programme:  
Open the door and press buttons S2 and S3 at the same time, holding down for about 2 seconds.



### End of programme

9. At the end of the programme:  
The buzzer sounds at intervals.  
The END OF CYCLE LED lights.  
The display will indicate "0".



10. Press S0 to switch off the appliance.

### 3. Structural characteristics

#### 3.1 Structure

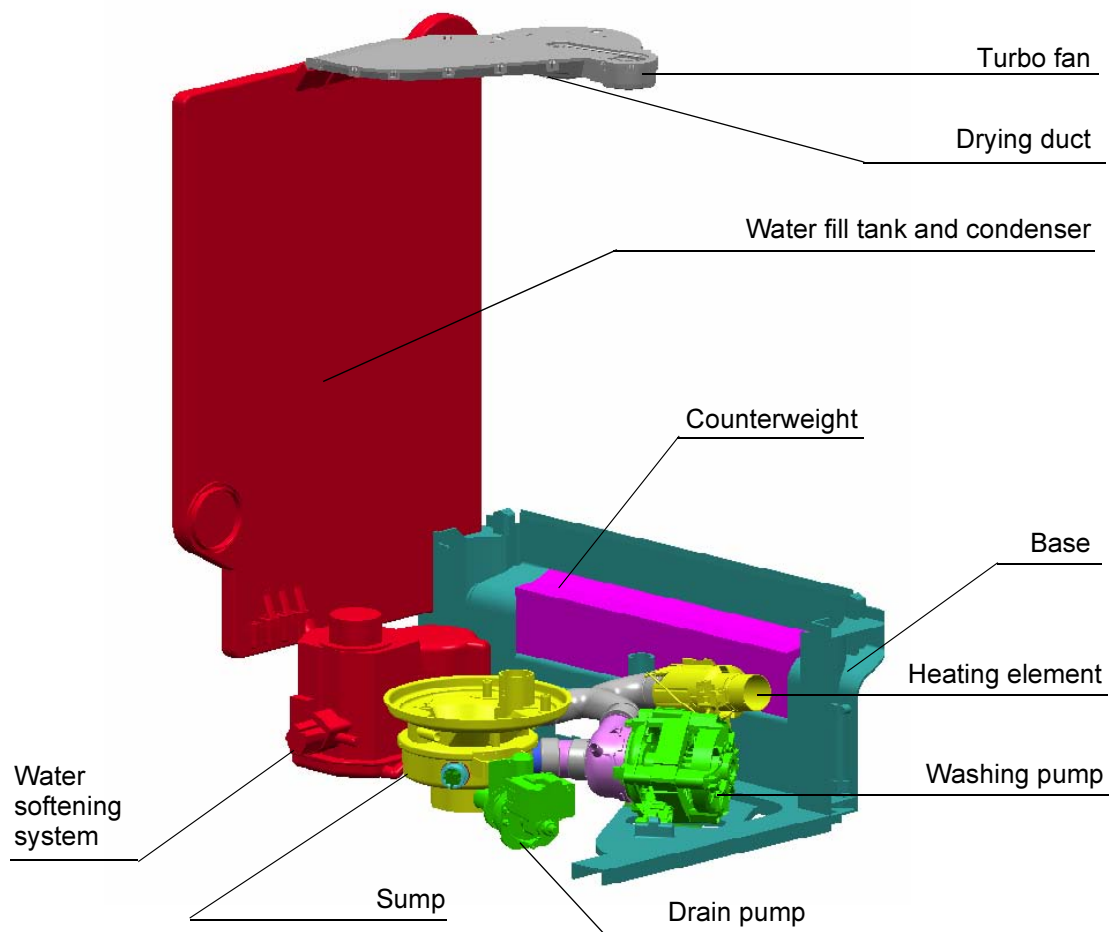
The appliance consists of four main assemblies:

- base
- door
- tub
- hydraulic system

These four assemblies are enclosed in a cabinet designed with the following removable parts:

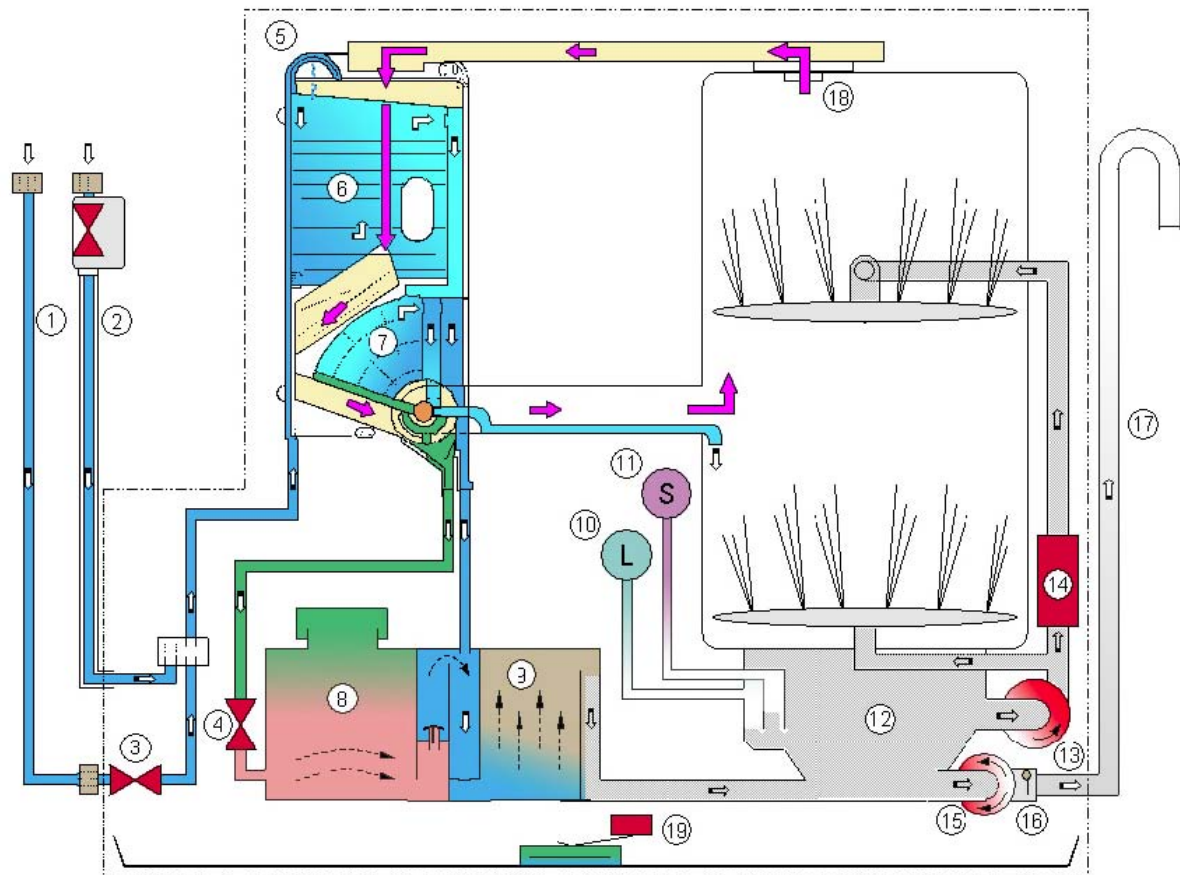
- a lower front panel (secured by two screws),
- two lateral panels (secured by six screws).

#### 3.2 Hydraulic and functional characteristics





### 3.3 Hydraulic circuit



#### 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	

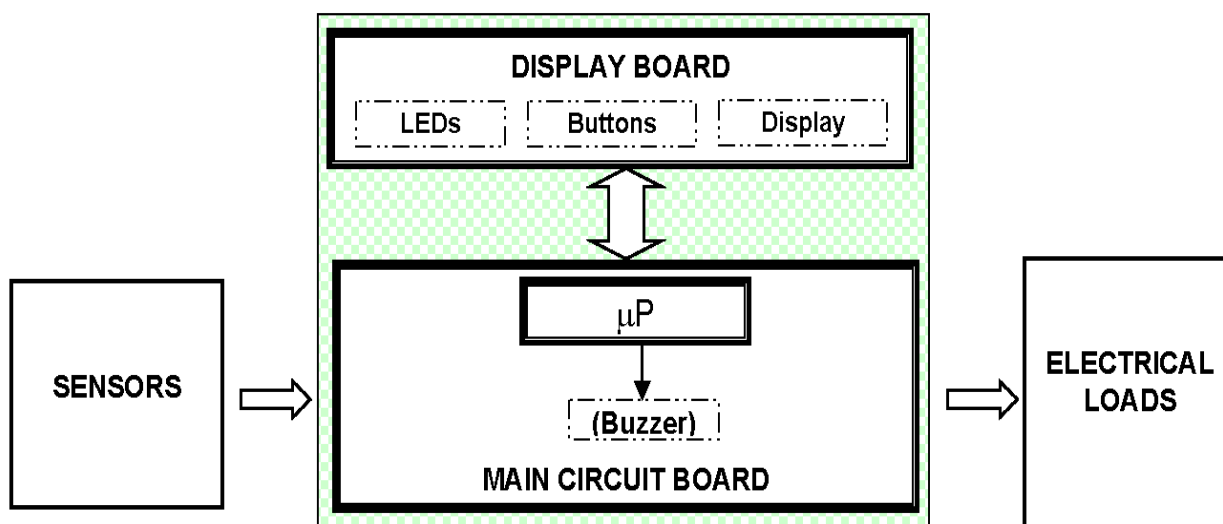
## 4. Electrical components and their functions

### 4.1 EDW 1500 Electronic control system



The EDW 1500 control system consists of a main circuit board and a control/display board. Both boards are housed in a single plastic container.

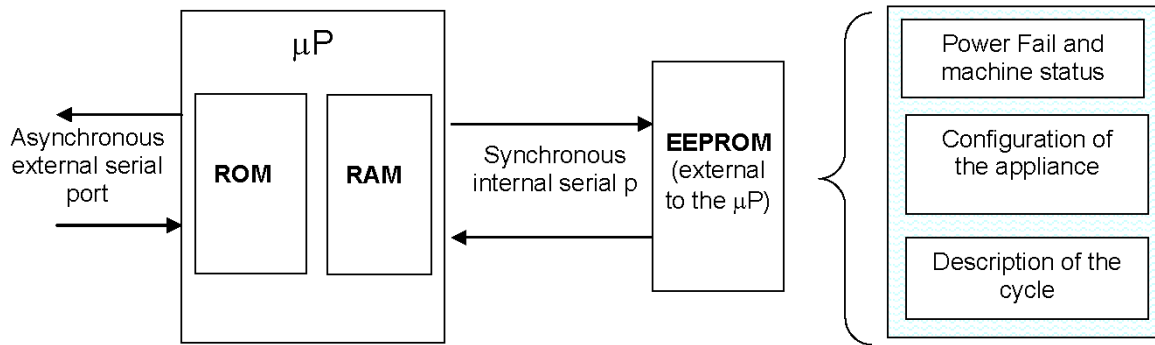
#### 4.1.1 Functions of the circuit board



The electronics

- receives signals relative to the cycle settings via the control/display board. The buttons and LEDs are also mounted on this board.
- powers all the electrical components (solenoid valves, washing pump, detergent/rinseaid dispenser, drain pump, heating element, fan motor).
- controls the temperature of the washing water via an NTC sensor, as well as the speed of rotation of the washing pump according to the signal received from the tachymetric generator.
- monitors the status of the pressure switch and the rinse-aid/salt sensors.

### 4.1.2 Memory in the control system



The main circuit board features an EEPROM memory (external to the microprocessor) which stores in memory data relative to the configuration, description of the cycle, cycle status in case of a power failure, and any alarm conditions. The configuration data (entered in the factory using a computer with a DAAS interface) determine the functionalities of the appliance (number and type of programmes, options, LEDs etc.).

## 4.2 Specifications for actuators and sensors

### 4.2.1 Components

Type of component	Power available	Type of electronic control
Wash pump motor	Max. 250W	Triac
Drain pump motor	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

### 4.2.2 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 (certain models only)	Analogue (max. 12 Volt)	Opto-electronic
Tachymetric sensor	Frequency	Tachymetric generator
Level sensor	Digital high voltage	Pressure switch
Door closure sensor	Digital high voltage	Switch
Anti-flooding sensor	Digital high voltage	Switch

### 4.2.3 NTC Temperature sensor

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

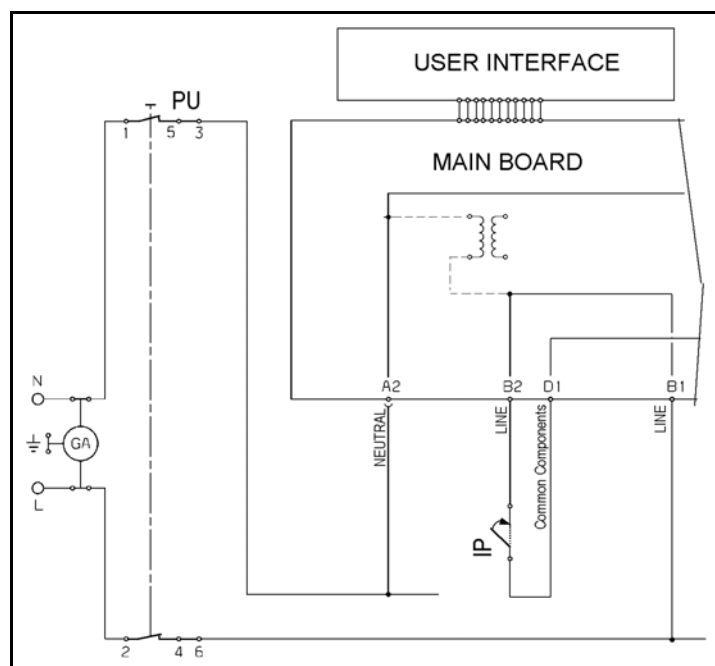
## 4.3 Power supply and programme selection

The main board is powered by the closure of contacts 1-5 and 2-4 of the ON/OFF button (PU). The connectors used in this case are A2 (neutral) and B1 (line).

The control/display board (user interface) is powered at 5V by the main board, making programme selection possible.

When the door is closed, the main board detects the closure of the contacts of the switch (IP) across connectors B2-D1, and starts the washing programme. The same switch powers the electrical components.

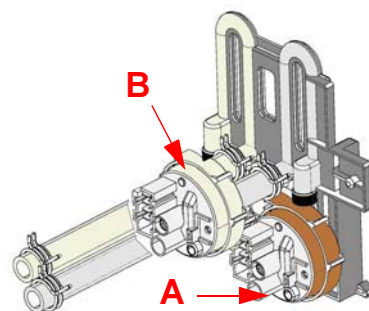
When the door is opened, the power loads are disconnected from the power supply and the cycle is paused.



## 4.4 Fill circuit

### 4.4.1 Level and anti-overflow pressure switch

- The level of water introduced into the appliance is determined by the level pressure switch (A).
- The anti-overflow pressure switch (B) ensures that the level of water does not exceed the safety threshold (causing overflow from the door).

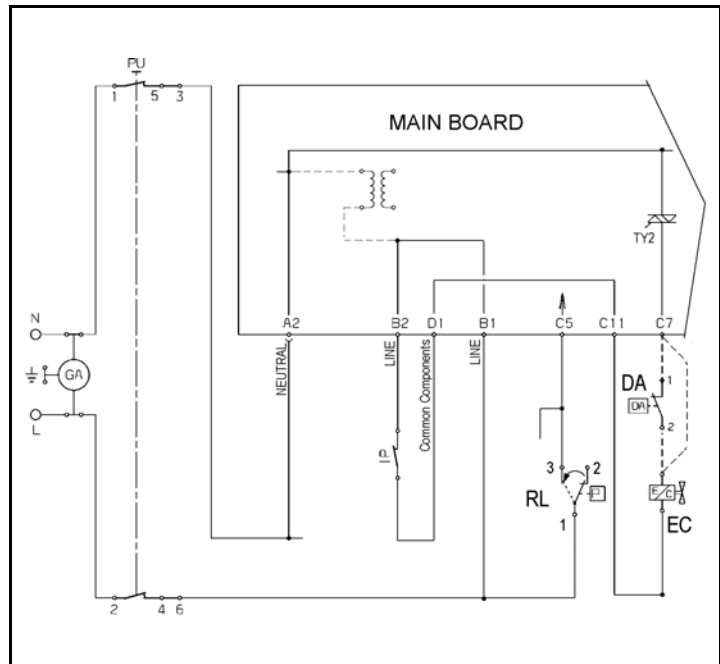


#### 4.4.2 Fill system

The water fill solenoid valve is powered by triac TY2 on the electronic board (connector C7), by the door switch (IP) and by the anti-flooding microswitch (DA).

The level of water in the sump is monitored by the pressure switch (RL). The electronic board constantly monitors the status of the pressure switch via a "sensing" line connected to connector C5:

- EMPTY if the contacts are closed on 1-2.
- FULL if the contacts are closed on 1-3.



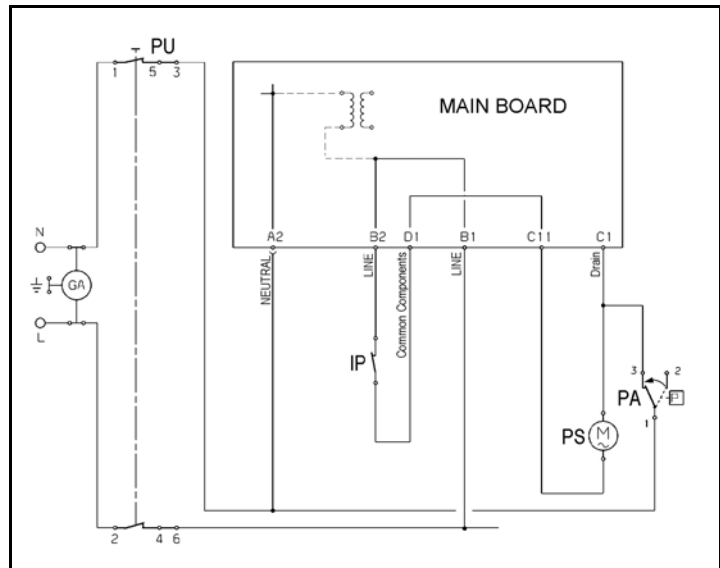
#### 4.4.3 Anti-flooding device

Intervention of the anti-flooding device causes the contacts of the microswitch (DA) to open, thus disconnecting the solenoid valve from the power supply.

#### 4.4.4 Intervention of the anti-overflow device

If the anti-overflow pressure switch (PA) should intervene, the closure of the contact on FULL (1-3) powers the drain pump (PS). The pump remains in operation until the contact returns to EMPTY (1-2).

**Caution!** If the door is opened or the appliance is switched off, the drain pump is disactivated.



## 4.5 Control of water fill phase

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.

This system ensures that, if the pressure switch re-opens on EMPTY, further water is introduced until it returns to FULL.

The water fill phase consists of the following sub-phases:

### 4.5.1 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.

### 4.5.2 Dynamic fill

The dynamic fill is obtained by switching on the washing pump whose rotation causes the pressure switch to switch to EMPTY. Subsequently, the fill solenoid valve is energized and water is introduced until the switch returns to FULL.

The speed of rotation of the motor determines the quantity of water introduced, since the electronic control system switches on the washing pump at a variable speed which depends on the washing system that will be performed in the phases subsequent to the water fill:

- In the case of "ctrl" washing (at constant speed), the speed of rotation increases gradually to 2800 rpm.
- In the case of "pw" (pulse) washing, the speed of rotation increases gradually to 1900 rpm.

**Refer to the Table of Programmes for the definition of the washing system.**

### 4.5.3 Level stability control

The hydraulic circuit operates with maximum efficiency when the pressure switch signal remains stable on FULL. In practise, the quantity of water circulating in the sump allows the motor to run without speed fluctuations caused by cavitation.

When the pressure switch signals FULL, the fill solenoid valve switches off.

## 4.6 Water fill time

The aperture of the solenoid valve has a pre-set overall duration, which is subdivided into the various subphases of the fill:

### 4.6.1 Static fill time

T.S. = max. 90 seconds: This is the maximum time within which the pressure switch must switch to FULL. If the FULL signal is not received from the pressure switch within this time, the electronic control system interrupts the washing cycle and the appliance enters alarm condition [1 0].

### 4.6.2 Dynamic fill time

**T.D. = T.S. x 3:** This is the maximum time allowed for the entire fill phase within which the pressure switch signal must stabilize on FULL.

- If the pressure switch signal does not stabilize on FULL within this period (T.S. x 3), the electronic control system switches off the fill solenoid (and the heating element, if switched on), and then allows the washing cycle to proceed until it is completed. In this situation, the alarm condition [F 0] is not displayed to the user, but may be accessed by the Service Engineer using a specific procedure.
- If, during a 2800 rpm dynamic fill, the pressure switch never closes on FULL during the initial 60 seconds, the electronic control system interrupts the washing cycle and the appliance enters alarm condition [1 0].

### 4.6.3 Power failure during water fill phase

If the water fill phase is interrupted by opening the door or due to a power failure, the contents of the counters are stored in memory; when the door is re-closed or when the power supply is restored, the water fill resumes from the point at which it was interrupted; the new counter values are added to those previously memorized.

## 4.7 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 during the washing phase, the fill solenoid is energized for a maximum time equivalent to T.S. x 3 (maximum allowable total fill time).
- If this time is exceeded, the washing cycle is completed, but no further supplementary fills are performed. In this situation, the alarm condition [F 0] is not displayed to the user, but may be accessed by the Service Engineer using a specific procedure.





## 4.9 Heating

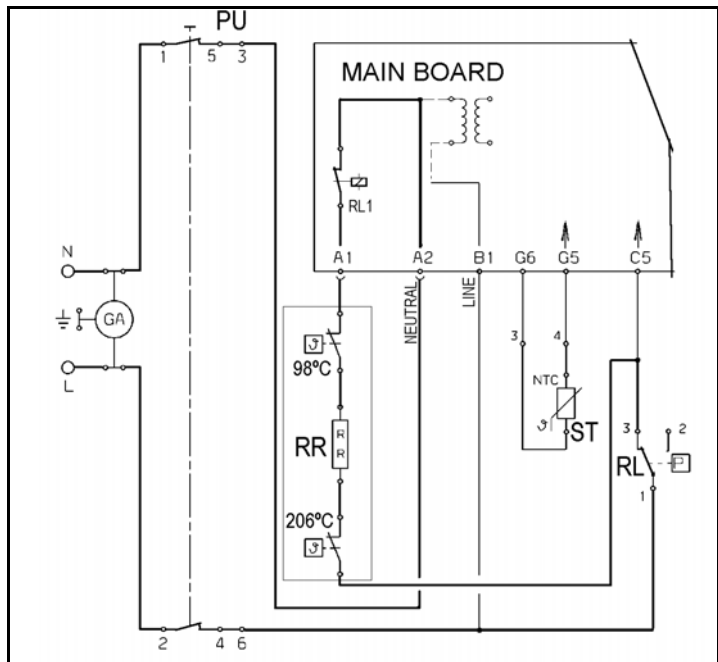
The heating element, which is enclosed inside a tube, is used to heat the washing water. The heating element is not activated during the drying phase. Inserted into the delivery side of the washing pump and coupled with the duct which directs water to the upper spray arm.

The heating element (RR) is powered by relay RL1 on the circuit board (connector A1), by the ON/OFF switch (PU) and by the level pressure switch (RL), which must be set to "FULL" (contact closed on 1-3).

Two safety thermostats are fitted to the heating element:

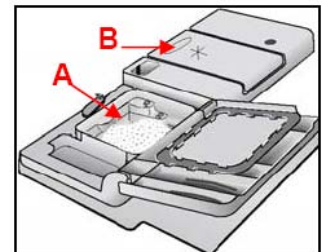
- an automatic-reset thermostat which intervenes at 98°C
- a thermostat with a thermal fuse (206°C).

The temperature of the water is controlled by the main circuit board via an NTC sensor (ST) which is connected to connectors G5-G6.



### 4.9.1 Integrated detergent dispenser

The detergent dispenser is a plastic container consisting of two separate sections. The first (A) contains the detergent; the second (B) contains the rinse-aid. The dispenser uses a single electrical coil connected to a mechanical system and which performs both functions. When the coil is energized, it actions the mechanism via a series of levers, thus introducing the contents in sequence (first detergent, then rinse-aid).

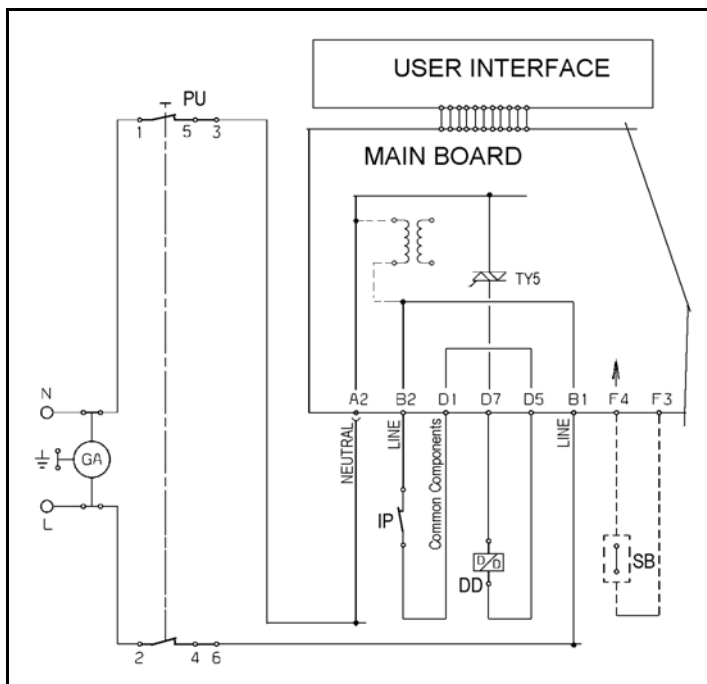


The coil of the detergent dispenser (DD) is powered by the circuit board via triac TY5 (connector D7) at certain points during the cycle, thus ensuring correct dosage.

The circuit is closed by the contacts of the ON/OFF switch (PU) and the door switch (IP).

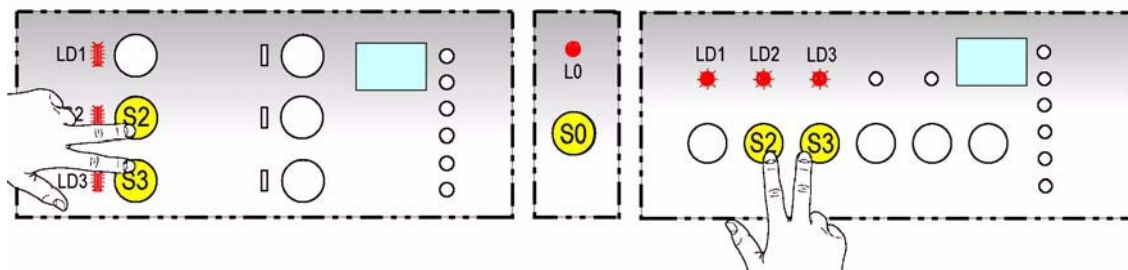
Some models feature a rinse-aid sensor whose reed contact (SB) is connected to connectors F3-F4 on the circuit board.

The absence of rinse-aid causes the contact to close, which lights the corresponding LED (on the display board).



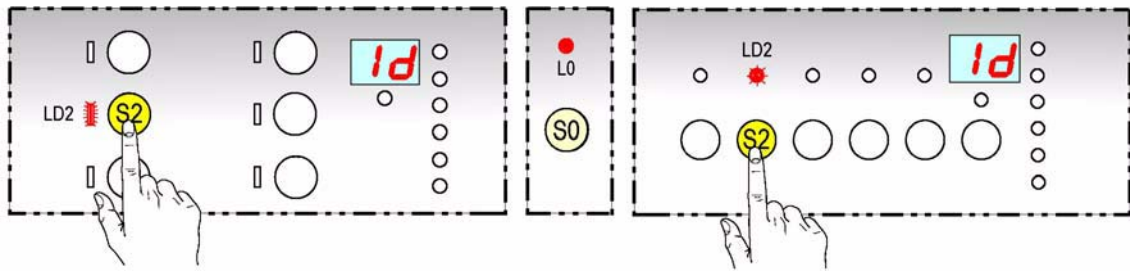
## 4.10 Disactivating the rinse-aid function

Introduction of rinse-aid may be deactivated by the user by pressing a combination of buttons. In this case, the rinse-aid LED (if featured) will also be deactivated.



1. Cancel any cycles that may have been selected.
2. Press key S0 to switch on the appliance.  
LEDs LD1+LD6 must be lit to indicate the programme selection phase.

- Press buttons S2 and S3 simultaneously until LEDs LD1, LD2 and LD3 begin to flash.



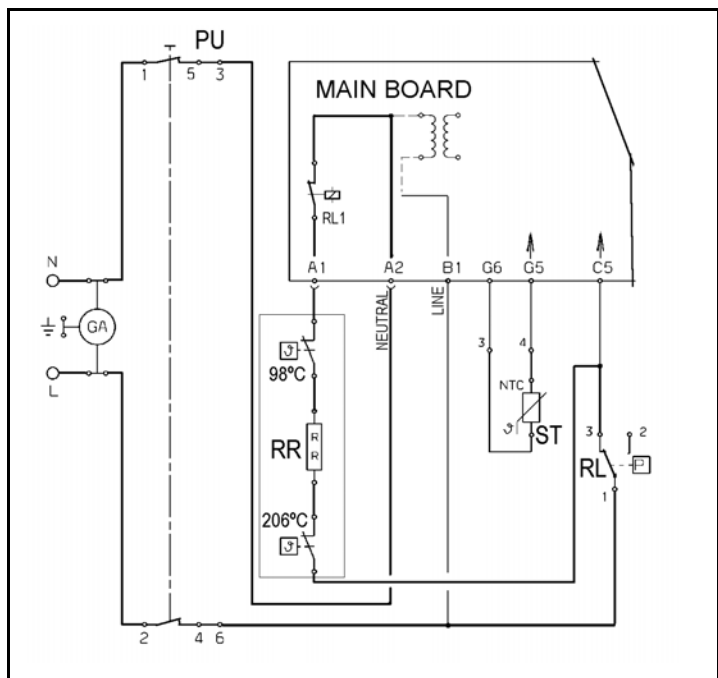
- Press button S2: LEDs LD1 and LD3 switch off, while LD2 continues to flash. The condition of the function is indicated by the display: **1d** rinse-aid function is operative, **0d** rinse-aid function is inoperative.
- Press button S2 again to deactivate/activate the rinse-aid function. The end of cycle LED switches off to indicate that the rinse-aid function has been deactivated.
- To store this setting in memory: press button S0 and switch the appliance off; alternatively, wait for 60 seconds (appliance in selection mode).

#### 4.10.1 Drain

The drain pump (PS) is powered by triac TY3 (connector C1) and via the contacts of the ON/OFF switch (PU) and the door switch (IP).

At the end of the drain phase, a control procedure is performed to check that the contact of the level 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. On completion of this second drain phase, the status of the pressure switch is again checked. If it is still closed on FULL, alarm [i20] is generated (failure to drain). The time-out for each of these two phases is 120 seconds. Note: The washing programmes always begin with a drain phase.



## 4.11 Regeneration system

In this series of dishwashers, regeneration of the softening system, whose duration is approximately **4 minutes**, takes place towards the end of the washing cycle, during the drying phase.

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).

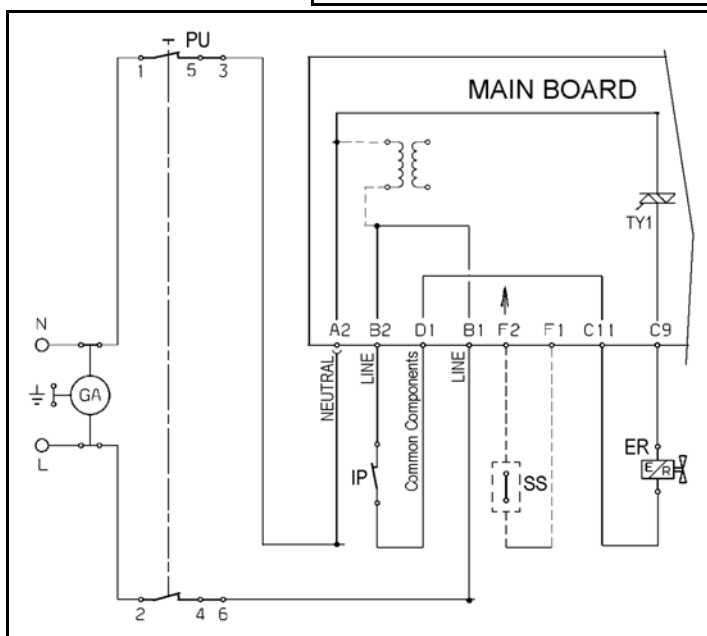
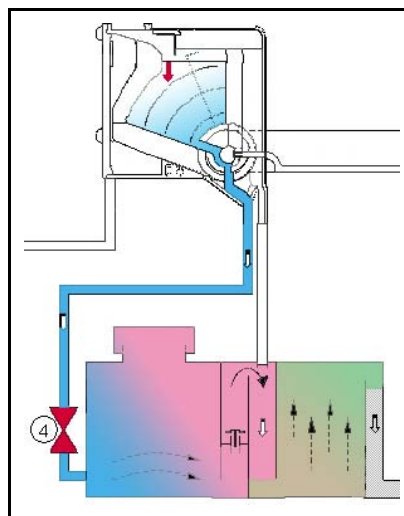
Regeneration of the softening system is governed by the electronic control system at "ad hoc" intervals, i.e. not for every washing cycle, but at intervals determined by the level of regeneration selected.

- If level [1] is selected, regeneration is never performed and the SALT LED (if featured) always remains unlit.
- If level [10] is selected, regeneration is performed twice during each cycle; first at the end of the washing phase, and then at the beginning of the drying phase.

The regeneration solenoid (ER) is powered by triac TY1 (connector C9 on the circuit board) and by the contacts of the ON/OFF switch (PU) and the door switch (IP).

Some models feature a salt sensor whose reed contact (SS) is connected to connectors F1-F2 on the circuit board.

The absence of salt causes the contact to close, which lights the corresponding LED (on the display board).



## 4.12 Resin washing

Washing of the resins contained in the softening system is performed at the beginning of each washing cycle. In practise, the solution of salty water (regeneration water) remains deposited in the resin container from the end of the last completed cycle until the subsequent cycle. If the regeneration level is set to [10], washing of the resins is performed once at the beginning of the washing cycle and then again immediately after the regeneration process performed at the end of the washing phase.

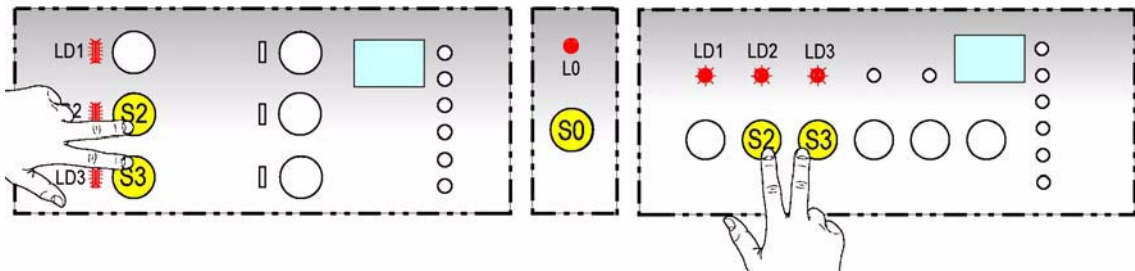
The regeneration sequence is as follows:

- a. Drain (30 seconds)
- b. Water fill to correct level
- c. Drain (10 seconds)
- d. Water fill (15 seconds)
- e. Complete drain

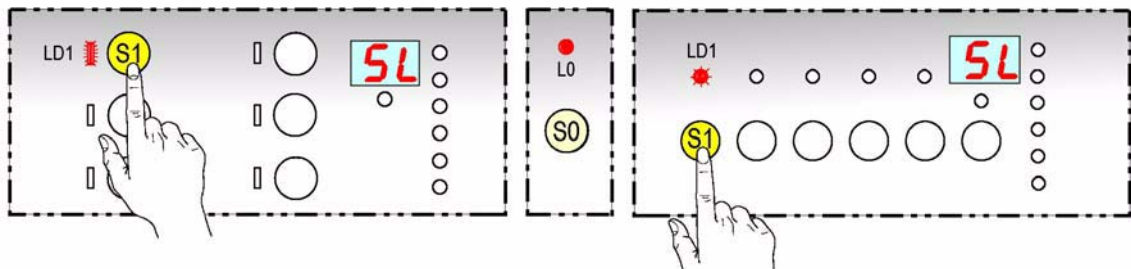
## 4.13 Regeneration levels

The counter for execution of the "Ad Hoc" regeneration process is governed by the electronic control system on the basis of the duration of the fill phases (i.e. the quantity of water introduced), and NOT on the number of cycles. Regeneration can be set to one of 10 levels. If regeneration is set to level [1], the procedure is not performed and the Salt LED remains unlit.

### 4.13.1 Setting the regeneration level



1. Cancel any cycles that may have been selected.
2. Press key S0 to switch on the appliance.
3. Press buttons S2 and S3 simultaneously until LEDs LD1, LD2 and LD3 begin to flash.



4. Press button S1: LEDs LD2 and LD3 switch off, while LD1 continues to flash.
5. Press button S1 sequentially to modify the level of regeneration. Each time the button is pressed, the regeneration level increases by 1 level. If S1 is pressed after the 10th level has been reached, the setting returns to level 1.
6. To store this setting in memory: press button S0 and switch the appliance off; alternatively, wait for 60 seconds (selection mode).

### 4.13.2 “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 level of regeneration is set to between 1 and 4, it is advisable to activate the BLENDING function to mix softened water with unsoftened water.

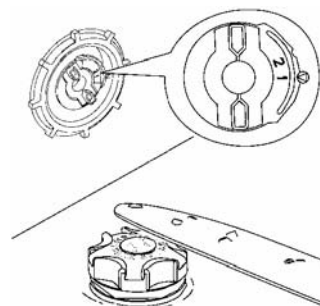
This function optimizes the consumption of salt thus preventing the possibility of corrosion of glass recipients due to excessively soft water.

When the BLENDING function is activated, the percentage of unsoftened water introduced into the dishwasher is 15%.

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

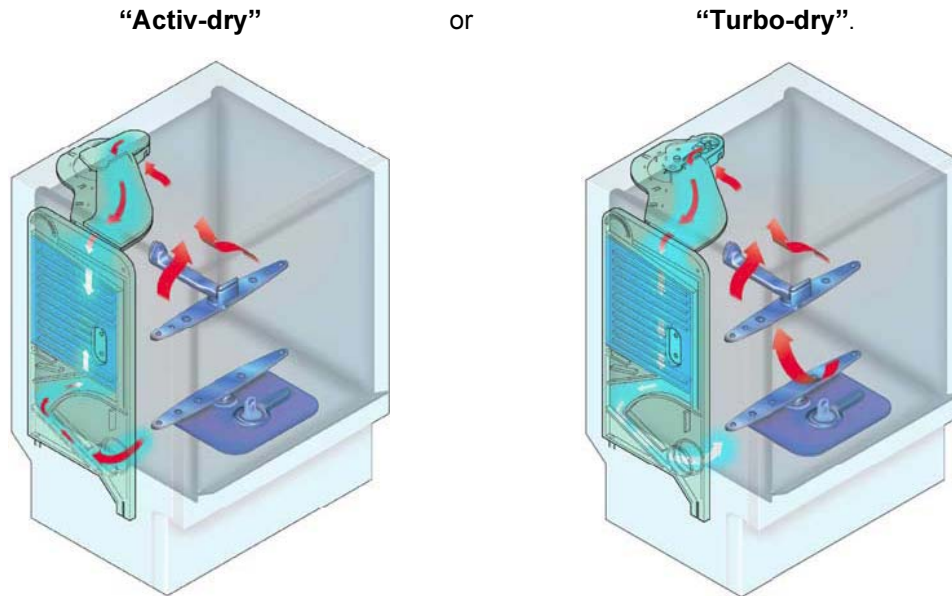


### 4.13.3 Table of regeneration values

Level	Display	Water introduced between regeneration cycles	Aperture of regeneration solenoid valve	Position of selector in the tub	Hardness of treated water level	
					°F (TH)	°D (dH)
		Litres	Seconds	Number		
1	1 L	---	0	1	0 > 8	0 > 4
2	2 L	130	240	1	9 > 14	5 > 8
3	3 L	94	240	1	15 > 20	9 > 11
4	4 L	70	240	1	21 > 30	12 > 17
* 5	5 L	53	240	2	31 > 40	18 > 22
6	6 L	37	240	2	41 > 50	23 > 28
7	7 L	20	240	2	51 > 60	29 > 33
8	8 L	15	240	2	61 > 70	34 > 39
9	9 L	10	240	2	71 > 80	40 > 45
10	10 L	3	2x240	2	81 > 90	46 > 50
* “5” = factory-set level			Position of selector in tub: “2”			

## 5. Drying

In these dishwashers, the dishes are dried by means of a steam condensation process. The drying system is based on the circulation of the hot air produced during the hot rinse, in which the steam circulates inside the condenser of the fill tank. The condenser is a condensation chamber filled with water (cold wall); contact between the hot air and the cold wall results in the condensation process. Depending on the type of appliance, one of two drying systems is used:

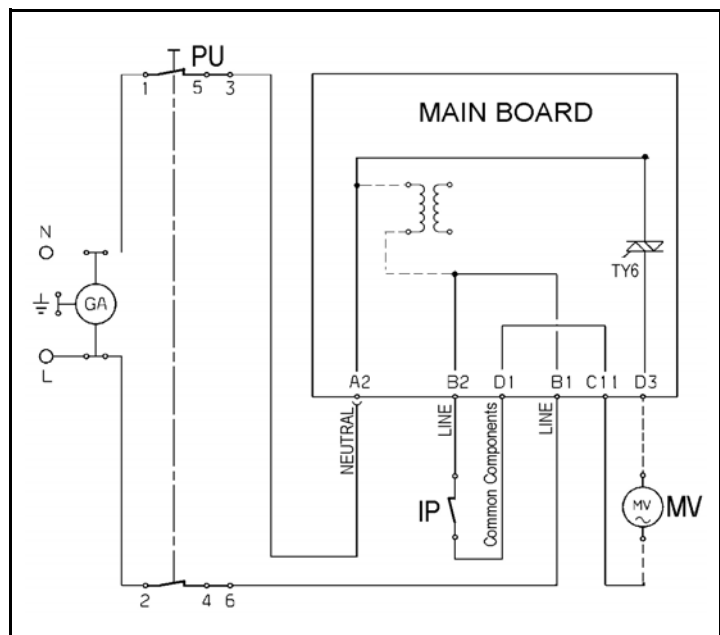


### “Turbo-dry” drying

Certain models feature a forced-air drying system. The steam is drawn in by the fan located inside the upper duct and routed towards the condenser in the fill tank, from which it returns to the tub through the steam venting ring.

The fan motor (MV) is powered by triac TY6 (connector D3 on the circuit board) and by the contacts of the ON/OFF switch (PU) and the door switch (IP). The drying time is variable and pre-defined for each washing cycle.

In some programmes, the fan remains in operation for about 20 minutes after the end of the cycle. If the door is opened, the fan switches off.

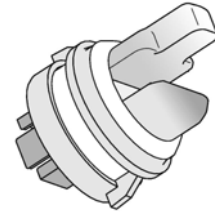




## 6. Automatic cycle

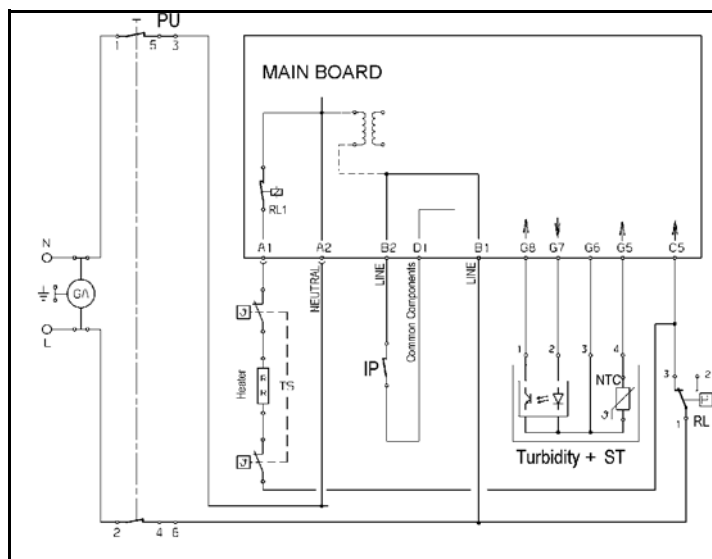
### 6.1 Turbidity sensor

Certain models which feature the turbidity sensor may also feature a special “automatic” programme which optimizes the cycle according to the size of the load and the degree of soiling. This sensor is positioned externally to the sump, in direct contact with the water. A single container houses the NTC sensor (for control of the washing temperature) and the infra-red opto-electronic sensor, which controls the turbidity of the water and therefore the degree of soiling that it contains.



#### 6.1.1 Calculating the degree of soiling

Measurement of the level of turbidity is performed during the cold pre-wash. The photoemitting diode, which is powered by the circuit board (connector G7), transmits a beam of light to the photoreceiver. The circuit of the photoreceiver (connector G8 on the circuit board - G6 is the common contact) is traversed by a certain current whose intensity is proportional to the quantity of light received (i.e. inversely proportional to the level of turbidity). The microprocessor measures the signal present in the circuit, and can thus determine the most appropriate cycle according to the quantity of soiling present in the water.

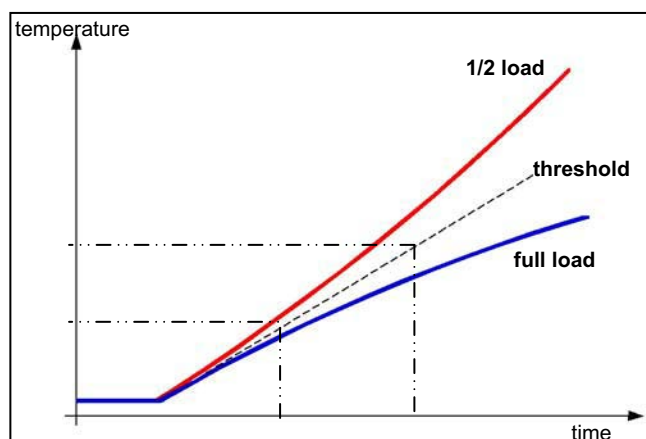


#### 6.1.2 Determination of the load

The quantity of dishes in the load (full load or 1/2 load) is determined during the initial heating phase during washing by controlling the rate at which the temperature of the water increases (NTC sensor, connector G5).

**Full load:** when the inclination of the curve is below a certain threshold which is memorized as standard.

**Half load:** when the inclination of the curve is above the standard threshold.





## 6.2 Automatic cycle

The table below shows the variations in the programme phases according to the type of soiling and the size of the load.

Type		Programme phases					
Load	Heavy soil	Pre-wash	Washing	First rinse	Second rinse	Hot rinse	Drying
Full	Yes	cold	68 °C	no	cold	68°C	24 min.
Full	No		55 °C		no		
Half	Yes		55 °C				
Full	No		50 °C				

## 7. Alarms

In the event that an abnormal situation should occur which might affect the correct operation of the appliance, the circuit board causes a safety system to intervene. In most cases, this interrupts the washing cycle. The last three alarm conditions are stored in memory.

Using a special procedure available only to Service Engineers, it is possible to read all the alarms stored in memory. However, only four current alarm conditions are displayed to the user.

The alarms are displayed by the display and with a series of "beeps" from the buzzer (only certain models).

### 7.1 Table of alarms

Alarm	Display	Displayed to the user	Description of the alarms	Machine status	Possible causes
<b>i10</b>	<b>1 10</b>	<b>YES</b>	<b>Water fill time-out</b> (The pressure switch does not close on FULL after 90 sec. static fill, or never closes on "FULL" during the initial 60 sec of the dynamic fill at 2800 rpm.)	The drain pump switches on, then the cycle stops.	Tap closed; water mains pressure too low; fill solenoid / wiring faulty; hydraulic circuit of pressure switch obstructed; level pressure switch / wiring faulty; circuit board faulty.
<b>i20</b>	<b>1 20</b>	<b>YES</b>	<b>Water drain time-out</b> (The pressure switch does not return to EMPTY after two drain phases lasting 120 seconds.) (**)	The drain pump switches on, then the cycle stops.	Drain circuit obstructed/blocked; drain pump interrupted or jammed (foreign bodies); level pressure switch blocked on FULL (1-3); hydraulic circuit of pressure switch obstructed; wiring faulty; circuit board faulty.
<b>i30</b>	<b>1 30</b>	<b>YES</b>	<b>Intervention of anti-flooding system</b> (The drain pump switches on.)	The cycle is interrupted and the drain pump switches on.	Water leakage from the tub - sump and various connections (pump, upper spray arm duct etc.). Floating sensor blocked mechanically. Microswitch faulty. Fill solenoid blocked mechanically. Circuit board faulty (solenoid triac short-circuited).
<b>i50</b>	<b>1 50</b>	<b>YES</b>	<b>Motor triac short-circuited</b> (The washing pump runs uncontrolled at maximum speed.)	Water fill to level (if necessary), disactivation of the other actuators, cycle interrupted. The washing motor runs at maximum speed and the alarm is displayed.	Circuit board faulty.

Alarm	Display	Displayed to the user	Description of the alarms	Machine status	Possible causes
<b>i60</b>	<b>1 60</b>	<b>NO</b>	<b>Heating Time-out</b> (The check takes place every 3 minutes: the temperature must increase by a certain amount at each step.)	The programme continues to the end without heating (the washing result will probably be unsatisfactory).	Heating element faulty; intervention of safety thermostats (open); wiring faulty; NTC sensor (poor thermal contact); insufficient water circulating in the tub; washing pump faulty (impeller stripped); circuit board faulty.
<b>i70</b>	<b>1 70</b>	<b>NO</b>	<b>NTC sensor (short-circuited or open)</b>	The programme continues to the end without heating (the washing result will probably be unsatisfactory).	NTC sensor faulty; wiring short-circuited / open; circuit board faulty.
<b>i80</b>	<b>1 80</b>	<b>NO</b>	<b>Communication error between the microprocessor and the EEPROM</b>	Machine inoperative: no selection possible. (*)	Circuit board faulty.
<b>i90</b>	<b>1 90</b>	<b>NO</b>	<b>Problems with software configuration</b>	The fault occurs when switching on: no selection possible. (*)	Circuit board faulty (configuration software incorrect).
<b>ib0</b>	<b>1 b0</b>	<b>NO</b>	<b>Problems with the turbidity meter</b> [if featured] (Calibration Time-out)	The programme continues as if a "heavy soiling" condition had been detected.	Turbidity sensor faulty; sensor wiring faulty; circuit board faulty.
<b>id0</b>	<b>1 d0</b>	<b>NO</b>	<b>Problems with the washing motor</b> No signal from the tachymetric generator (washing pump powered, but no signal from the generator)	The heating element is switched off. If the fault persists after the time-out, the washing pump operates at maximum speed and the alarm code is stored in memory (the cycle continues)	Motor winding interrupted / short-circuited; motor jammed (foreign bodies); wiring to washing motor faulty; motor capacitor faulty; Tachymetric generator interrupted / short-circuited; circuit board faulty.
<b>iF0</b>	<b>1 F0</b>	<b>NO</b>	<b>Water replenishment time-out</b> (3 times during the T.S. time-out)	The cycle continues until the next phase without supplementary fills and without heating. The error is cancelled on completion of a drain phase.	Dishes upside-down; central filter clogged; excessive foam; leaks from the sump-pressure switch coupling; pressure switch faulty / false contacts.
<b>i0</b>	<b>1 0</b>	<b>NO</b>	No alarm stored		

(\*) If it is not possible to access diagnostics mode, switch the appliance off and then on again to check that this is not caused by a temporary fault. Before replacing the circuit board, check that it is correctly powered by controlling the following:

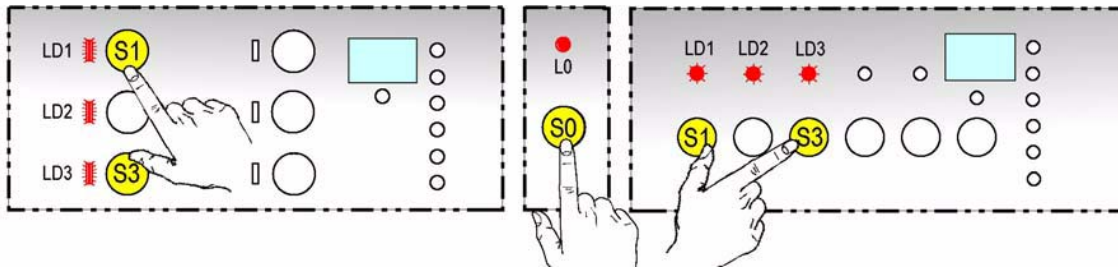
- Continuity of the power cable
- Correct operation of the suppressor
- Closure of the door switch contacts
- Continuity of the wiring between connectors A2/B1 on the circuit board and the suppressor.

## 8. Diagnostics mode / Options

A single procedure can be used by Service Engineers to access the diagnostics system. After accessing diagnostics mode, the Engineer can:

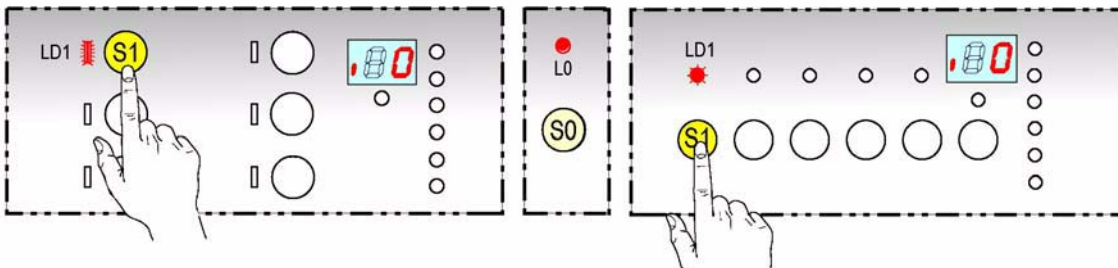
- read / cancel the alarms,
- check for correct operation of the various components of the appliance,
- start the diagnostics cycle and
- select the options available to Service Engineers.

### 8.1 Accessing diagnostics mode



1. Switch off the appliance.
2. Press buttons S1-S3 simultaneously and hold down.
3. Press key S0 to switch the appliance on, still holding down buttons S1 - S3 until LEDs LD1, LD2 and LD3 begin to flash.

### 8.2 Reading the alarms and activating the individual components



1. Access diagnostics mode (see 8.1).
2. Press button S1 to start the function.  
LEDs LD2 and LD3 switch off; LD1 continues to flash.  
The first alarm stored in memory is displayed [ ix0 ] (for the codification see the summary table of the alarms – page 34).
3. Press S1 to display the other two alarms and to activate the electrical components.  
The display shows, after the first three alarms, the number corresponding to the activated function.
4. All the positions can be repeated by pressing sequentially S1.

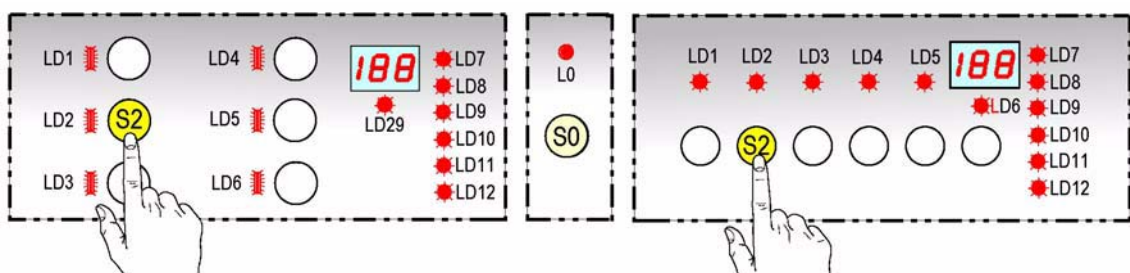
Activation S1	Display	Activated function
1	10	Reading of the last alarm occurred
2	10	Reading of the last alarm but one occurred
3	10	Reading of the last alarm but two occurred
4	4	Activation of the solenoid regeneration
5	5	Activation of drain pump
6	6	Water fill solenoid to level
7	7	Heating (only if water level is OK!)
8	8	Washing pump at 2800 rpm.
9	9	Detergent/rinse-aid dispenser
10	10	Drying fan (if turbo-dry)

**Caution!** The components are powered when the door is closed: open the door to select a different component, then re-close the door.  
If button S1 is not pressed for 60 seconds, the system automatically exits diagnostics mode).

### 8.3 Cancelling alarm codes from memory / Testing the LEDs

It is good practise to cancel the alarm codes

- after reading the alarm code or
- after effecting repairs to check whether it is repeated during the diagnostics test.

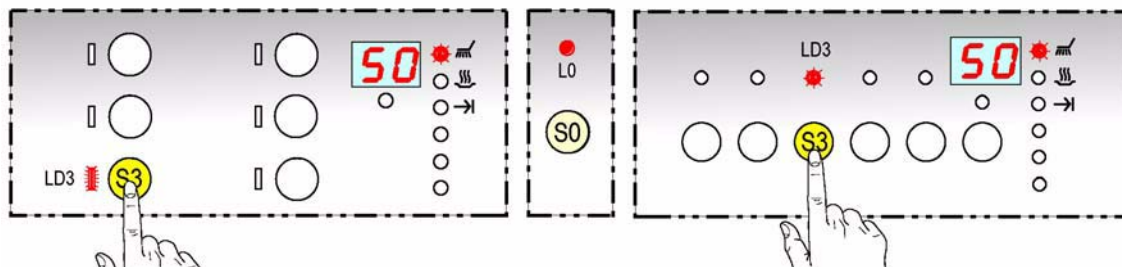


1. Access diagnostics mode. (See "Accessing diagnostics mode" on page 36.)
2. Press button S2 to cancel the alarms.
  - All the LEDs and the digits [188] flash for about 30 seconds.
  - The function terminates automatically and the machine enters pre-selection mode.

## 8.4 Functional testing cycle

This is an abbreviated washing programme which allows the Service Engineer to test all the functions that comprise a traditional washing cycle; in effect, the system simulates a normal cycle.

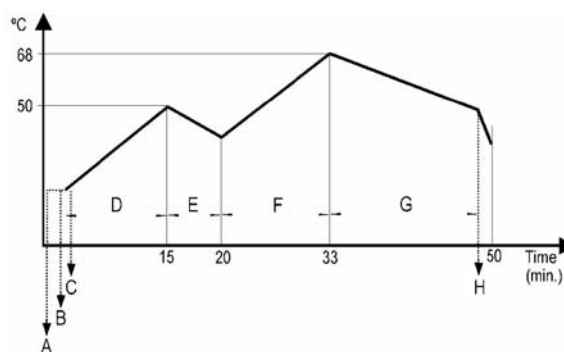
### 8.4.1 Selecting the cycle



1. Access diagnostics mode. (See "Accessing diagnostics mode" on page 36.)
2. Press button S3 to start the cycle.
  - The LEDs LD1, LD2 switch off while LD3 continues to flash while the LED of the current phase is steady.
  - The display shows the time-to-end.
  - The programme the programme behaves as in a normal cycle; the PAUSE and CANCEL options are accessible.

### 8.4.2 Programme phases

	Phase	Type of washing
A	Calibration of the turbidity sensor (without water)	---
B	Water fill to level (static + dynamic)	---
C	Detergent/rinse-aid dispenser	ctrl
R	Heating to 50°C	ctrl
E	Washing (5 minutes)	ctrl
F	Heating to 68°C	ctrl
G	Washing (14 minutes)	ctrl
H	Drain	---



**Note:**

- The overall duration of the test cycle is about 50 minutes.
- At the beginning of the subsequent programme (i.e. after the test cycle), the resins are washed.

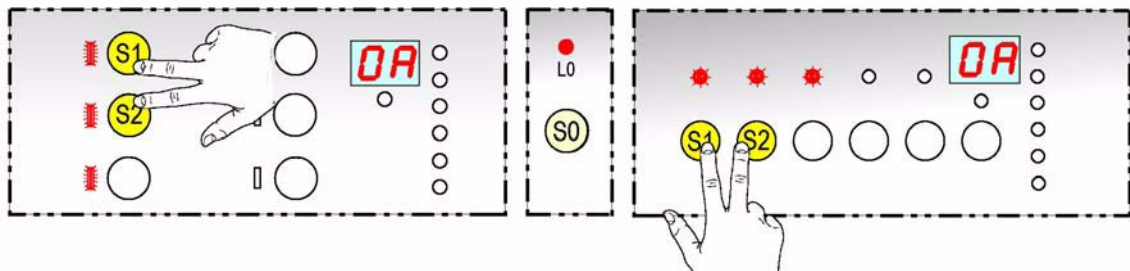
## 8.5 Options available to Service Engineers

In particular circumstances, i.e. if the user reports unsatisfactory washing results, a special procedure, available only to Service Engineers, can be used to select two supplementary options designed to improve performance:

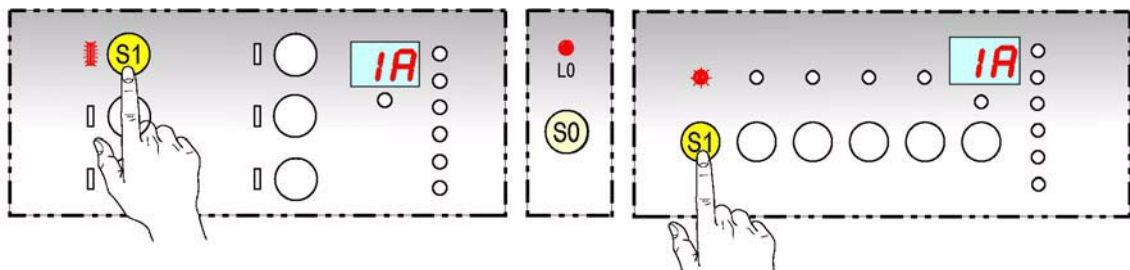
- Extra cold rinse.
- Disabling of pulse washing (PW), replaced by continuous washing (Ctrl).

### 8.5.1 Selecting the extra cold rinse option

Using the procedure described below, it is possible to add a supplementary cold rinse in all the washing programmes. This improves the quality of the rinse in case of necessity.



1. Access diagnostics mode. (See "Accessing diagnostics mode" on page 36.)
2. Press buttons S1-S2 simultaneously. The display indicates the status of the function:
  - [0A] extra rinse not selected,
  - [1A] extra rinse active.



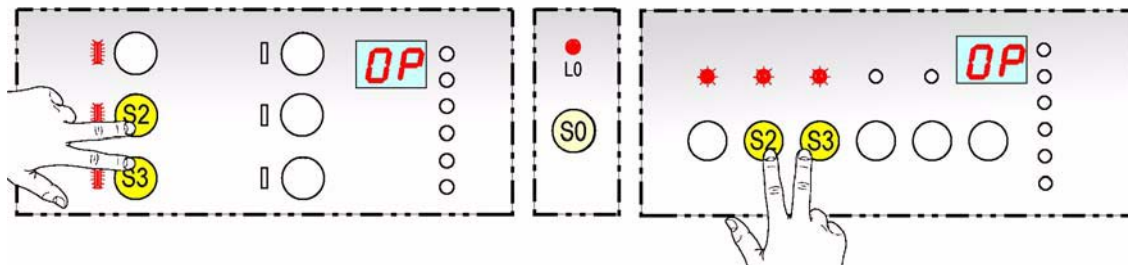
3. Press button S1 to activate and deactivate this function.
  - [0A] extra rinse not selected,
  - [1A] extra rinse active.
4. To store this operation in memory: press button S0 and switch the appliance off; alternatively, wait for 60 seconds (appliance in selection mode).



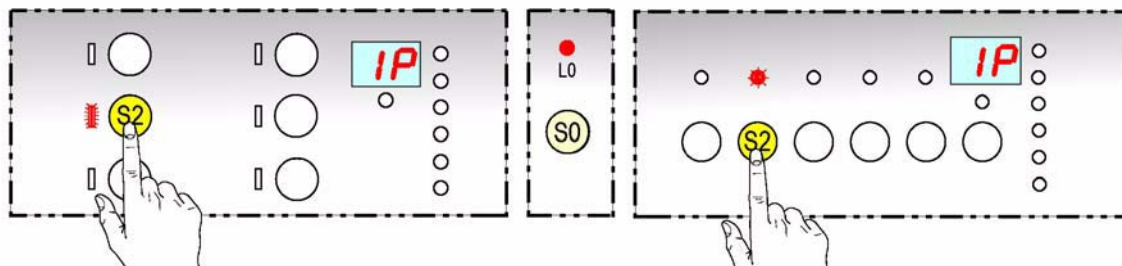
### 8.5.2 Disabling pulse washing

Certain programmes use the pulse washing system (PW). Using the procedure described below, the Service Engineer can modify this system so that "Ctrl" (continuous) washing is used in all those programme which normally use the PW system. This intensifies the washing action even in delicate programmes.

#### Disactivation/activation mode

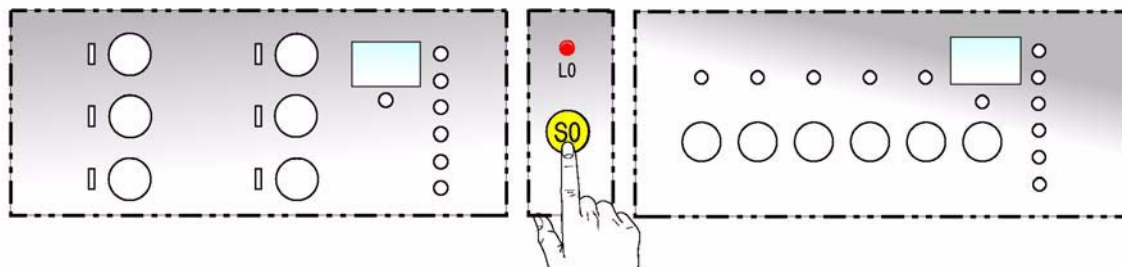


1. Access diagnostics mode. (See "Accessing diagnostics mode" on page 36)
2. Press buttons S2-S3 simultaneously. The display indicates the status of the function:
  - [0P] continuous washing "Ctrl" active;
  - [1P] pulse washing "PW" active.



3. Press button S2 to activate and deactivate this function. The condition of the washing system is indicated by the display:
  - [0P] continuous washing "Ctrl" active;
  - [1P] pulse washing "PW" active.
4. To store the operation in memory: press button S0 and switch the appliance off; alternatively, wait for 60 seconds (appliance in selection mode).

### 8.6 Exiting diagnostics mode

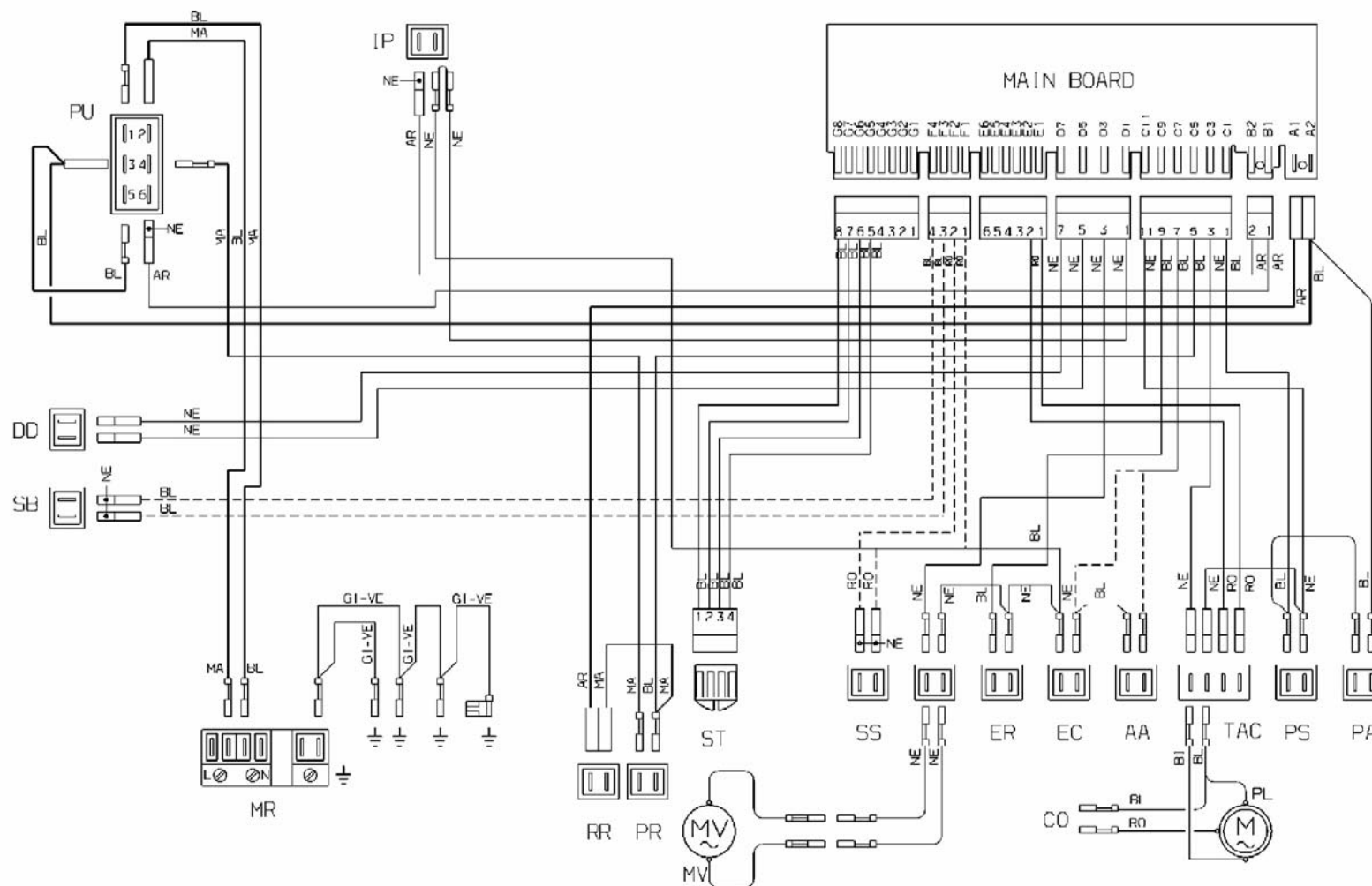


1. To exit the diagnostics cycle, press key S0 and switch the appliance off, or
2. wait 60 seconds: the appliance returns to programme selection mode.

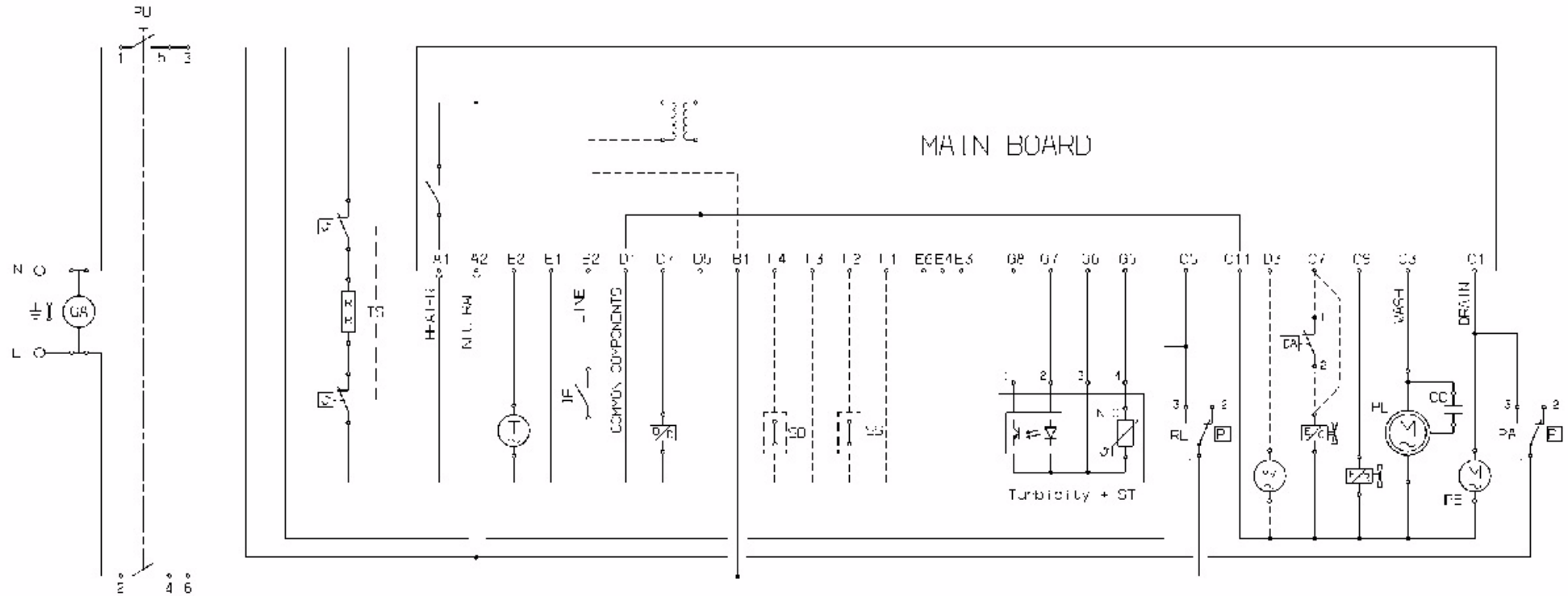


## 9. Electrical functions

### 9.1 Circuit diagram



## 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
Beamer	= beamer
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
Turbidity	= turbidity sensor
ST	= temperature sensor
TAC/T	= tachymetric generator
TS	= safety thermostat
Main Board	= main board
User Interface	= display board

### 9.3 Table of programmes

The table below lists the phases of the programmes for this type of appliance. As these can be configured differently, refer to the relative documentation for the specific cycles available for each model.

Programmes		Pre-wash			Washing					1st cold rinse			2nd cold rinse			Extra rinse		Hot rinse			Drying	
Type	Programme	Heating (°C)	Washing time after heating (min.)	Type of washing	1st heating (°C)	Washing time after heating (min.)	2nd heating (°C)	Washing time after heating (min.)	Type of washing	Washing time (min.)	Washing time (min.)	Type of washing	Washing time (min.)	Washing time (min.)	Type of washing	Washing time (min.)	Type of washing	Heating (°C)	Washing time after heating (min.)	Type of washing	Drying time (min.)	Cycle time (min.)
I1	Intensive 1	55°C	10'	ctrl	55°C	5'	68°C	14'	ctrl	3' (<65°C)	3'	PW1	3'	3'	PW1	5'	PW1	68°C	1'	PW1	24'	122'
I2	Intensive (ctrl)	55°C	10'	ctrl	55°C	5'	68°C	14'	ctrl	3' (<65°C)	3'	ctrl	3'	3'	ctrl	5'	PW1	68°C	---	ctrl	24'	120'
I3	Intensive (short)	50°C	2,5'	ctrl	50°C	10'	68°C	---	ctrl	5' (<68°C)	5'	ctrl	5'	5'	ctrl	5'	PW1	68°C	---	ctrl	6'	88'
N1	Normal (PW)	---	6'	ctrl	50°C	4'	68°C	8'	ctrl	---	4'	PW1	---	---	---	5'	PW1	68°C	1'	PW1	24'	102'
N2	Normal (ctrl)	---	6'	ctrl	50°C	4'	68°C	8'	ctrl	---	4'	ctrl	---	---	---	5'	PW1	68°C	---	ctrl	24'	100'
N5	Normal 3 rinses	---	6'	ctrl	50°C	4'	68°C	8'	ctrl	3' (<65°C)	3'	ctrl	3'	3'	ctrl	5'	PW1	68°C	---	ctrl	24'	102'
N3	Delicate	---	6'	PW1	50°C	2'	55°C	12'	PW1	---	4'	PW1	---	---	---	5'	PW1	68°C	1'	PW1	24'	98'
E1	Energy label Axx	---	10'	PW1	15,5' <62°C	42'	---	---	PW1	5' (<60°C)	---	PW1	---	---	---	4'	PW1	16' <68°C	2'	PW1	54'	162'
E4	Energy label (short)	---	6'	PW1	50°C	2'	55°C	12'	PW1	---	4'	PW1	---	---	---	5'	PW1	16' <68°C	2'	PW1	54'	134'
E5	Energy label (auto)	---	8'	PW1	14-16,5' <65°C	37'	---	---	PW1	5' (<60°C)	---	PW1	---	---	---	2'	3x5" (2800)	15-17' <68°C	2'	PW1	44'	141'
Aut o 1	Automatic 50-65	---	8'	ctrl	50°C	4'	68°C	8'	ctrl	---	4'	PW1	---	---	---	5'	PW1	68°C	1'	PW1	24'	92-115'
Q4	Soaking	---	8'	PW1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	12'
Q5	Short 30 min.	---	---	---	14,5' <65°C	---	---	---	ctrl	---	---	---	---	---	---	5'	PW1	9' <67°C	---	ctrl	---	31'
Q6	Heating plates	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	68°C	2'	PW1	---	30'
Q7	Glassware	---	---	---	45°C	9'	---	---	PW1	5' (<60°C)	---	PW1	---	---	---	3'	PW1	60°C	---	PW1	24'	73'

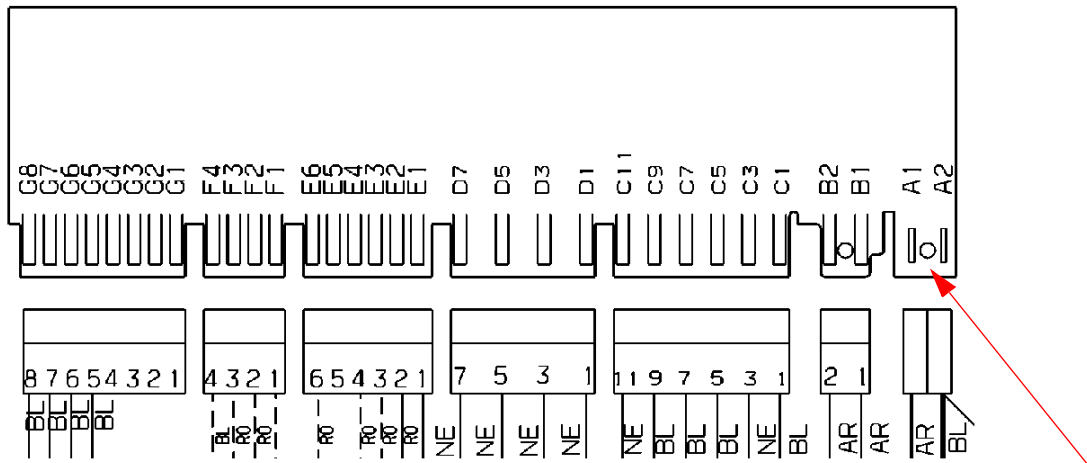
Note: The overall times for the programmes (duration) are approximate, and do not take into consideration the extra rinse, which may be selected as an option. The various phases do not include the times for regeneration/washing of the resins which, being performed "Ad Hoc", are not carried out at every cycle.

ctrl = Continuous washing at 2800 rpm. PW = Pulse washing at 1600 > 2800 rpm.

## 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.

- Remove the door and detach all the connectors from the main board.
- 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.

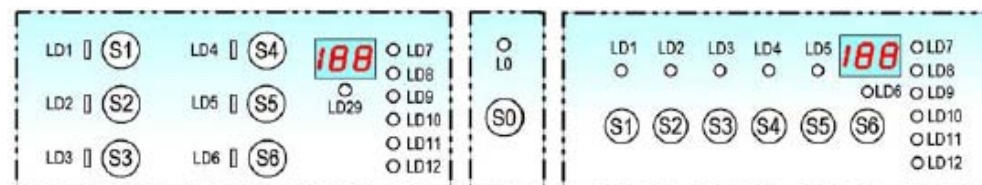
## 9.5 Measurement points on the board wiring connector and the correct theoretical values.

Components	Probe contacts	Correct values		Notes
* Power cable & (PU) – ON/OFF switch	L <-> B1 N <-> A2	—>	0 $\Omega$ 0 $\Omega$	with ON/OFF key pressed
(RR) – heating element + (TS) – safety thermostat	A1 <-> C5	—>	25 $\Omega \pm 8\%$	connected in series (2100W)
(PR) – level pressure switch	B1 <-> C5	—>	INFINITE 0 $\Omega$	on “EMPTY” (1-2) on “FULL” (1-3)
(PA) – anti-flooding pressure switch	C1 <-> A2	—>	INFINITE 0 $\Omega$	on “EMPTY” (1-2) on “FULL” (1-3)
(IP) – door microswitch	B2 <-> D1	—>	0 $\Omega$	door closed
(DD/DB) – integrated dispenser	D5 <-> D7	—>	1.500 $\Omega \pm 8\%$	OK
(SB) – rinse-aid sensor	F3 <-> F4	—>	INFINITE 0 $\Omega$	with rinse-aid without rinse-aid
(SS) – salt sensor	F1 <-> F2	—>	INFINITE 0 $\Omega$	with salt without salt
(ST) – temperature sensor	G5 <-> G6	—>	4850 $\Omega \pm 5\%$ 1205 $\Omega \pm 5\%$	(at 25°C) (at 60°C)
(GT) – tachymetric sensor	E1 <-> E2	—>	210 $\Omega \pm 8\%$	OK
(MV) – fan motor	C11 <-> D3	—>	7750 $\Omega \pm 8\%$	OK
(ER) – regeneration solenoid	C11 <-> C9	—>	6 K $\Omega \pm 8\%$	OK
(EC) – fill solenoid + (AA) – anti-flooding device	C11 <-> C7	—>	3.800 $\Omega \pm 8\%$	connected in series
(PL) – wash motor	C11 .. C3	—>	50 $\Omega \pm 8\%$	start-up winding
	to the two motor wires (blue) / (red)		180 $\Omega \pm 8\%$	auxiliary winding
(PS) - drain motor	C11 <-> C1	—>	180 $\Omega \pm 8\%$	OK

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

## 10. Quick guide to the special functions

The table below briefly describes how each of the special functions available to the user and to the Service Engineer can be used.



	Function	Activation of the function		Starting the function		Brief description / Comments	
U s e r		Keys	Led(s)		Keys	Display	
	Select regeneration	S0 (On/Off) ↓ [S2 + S3]	LD1 + LD2+ LD3 flashing	→	S1	1L ... 10L	→  (Description on page 29). Press S1: Liv....[1L].....[2L].....[3L].....[ 4L].....[ 5L].....[ 6L ].....[ 7L ].....[ 8L].....[9L].....[10L] °F... >8 ..... >14 .....>20 ..... >30 ..... >40 ..... >50 ..... >60 ..... >70 ..... >80 ..... >90 °D... >4 ..... >8 ..... >11 ..... >17 ..... >22 ..... >28 ..... >33 ..... >39 ..... >45..... >50
	Disactivate rinse-aid function	S0 (On/Off) ↓ [S2 + S3]	LD1 + LD2+ LD3 flashing	→	S2	0d /1d	→  (Description on page 26). Press S2 and press again: 1d = rinse-aid activated, 0d = not activated.
	Disactivate buzzer	S0 (On/Off) ↓ [S2 + S3]	LD1 + LD2+ LD3 flashing	→	S3	0b / 1b	→  (Description on page 14). Press S2 and press again: 1b = buzzer activated, 0b = not activated.
S e r v i c e e n g i n e e r s	Display of alarms and components diagnostics	[S1 + S3] ↓ S0 (On/Off)	LD1 + LD2 + LD3 flashing	→	S1	i0 / 4...10	→  (Description on page 36). Press button S1: [i.0] [i.0] [i.0] [4] [ 5] [ 6] [ 7 ] [ 8] [ 9 ] [10] AL 1.. AL2.. AL 3.. ER .. PS .. EV .. RR .. PL .. DD .. MV
	Cancel alarms stored in memory	[S1 + S3] ↓ S0 (On/Off)	LD1 + LD2 + LD3 flashing	→	S2	[188]	→  (Description on page 37). All the LEDs and digits flash for 30 sec.
	Test cycle	[S1 + S3] ↓ S0 (On/Off)	LD1 + LD2 + LD3 flashing	→	S3	[50] time-to- end	→  (Description on page 38). The cycle starts automatically.
	Extra rinse	[S1 + S3] ↓ S0 (On/Off)	LD1 + LD2 + LD3 flashing	→	[S1 + S2] .. S1	0A / 1A	→  (Description on page 39). Press S1 and press again: 1A = rinse activated, 0A = not activated.
	Disable buttons	[S1 + S3] ↓ S0 (On/Off)	LD1 + LD2 + LD3 flashing	→	[S2 + S3] .. S2	0A / 1P	→  (Description on page 40). Press S2 and press again: 1P = pulse wash PW activated; 0P = continuous wash
	Exit / Memorize	In order to memorize the functions or exit diagnostics mode, press key S0 to switch the appliance off. In most cases, memorization / exit take place automatically after 60 seconds (in which case the appliance returns to pre-selection mode).					

(\*) To activate the functions available to the user, no cycles must be selected (i.e. the appliance must be in pre-selection mode).