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**Washing machines with  
EWM 1000 PLUS  
electronic control system  
and  
“Delta 3” display board**

**With sensor**

**Production ZP (Porcia-Italy)**



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# 1 PURPOSE OF THIS MANUAL

The purpose of this manual is to provide service engineers who are already familiar with the repair procedures for traditional washing machines with information regarding appliances fitted with the EWM 1000 plus electronic control system and produced in Porcia (Italy).

The EWM1000 plus electronic control system consists of a main electronic board and one control/display board, "Delta 3" version.

The following are described:

- General characteristics
- Control panel and washing programmes
- Technical characteristics
- Guide to the diagnostics

For detailed information concerning hydraulic circuit, structural characteristics of the appliances and accessibility, please refer to Service Manual for Series P6000/Nexus washing machines and washer-dryers (publication no. 599 35 23-17).

# 2 PRECAUTIONS



- Electrical appliances must be serviced only by qualified Service Engineers.
- Always remove the plug from the power socket before touching internal components.

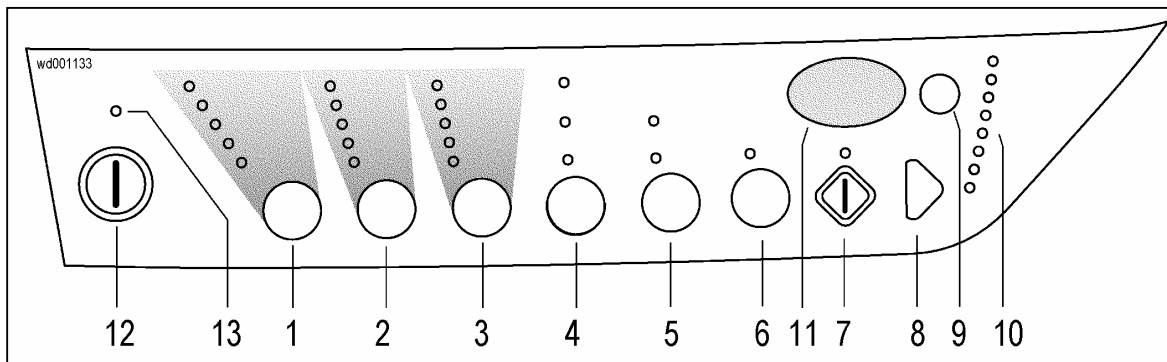
# 3 GENERAL CHARACTERISTICS

<b>Programme selection</b>	▪ Buttons (Input)
<b>Serial port</b>	▪ DAAS-EAP communications protocol up to 38400 baud
<b>Power supply</b>	▪ 220/240V ▪ 50/60 Hz (configurable)
<b>Type of washing</b>	▪ Traditional ▪ with "eco-ball" sphere
<b>Rinsing system</b>	▪ Traditional
<b>Motor</b>	▪ Commutator motor with tachimetric generator
<b>Spin speed</b>	▪ 850 ÷ 1600 rpm
<b>Anti-unbalancing system</b>	▪ FUCS
<b>Water fill</b>	▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
<b>Detergent drawer</b>	▪ 3 compartments: prewash/stains, wash, conditioners ▪ 4 compartments: prewash/stains, wash, conditioners, bleach
<b>Control of water level in the tub</b>	▪ two-level pressure switch: 1st level and anti-boiling safety level (the other levels refer to fixed-time fills) ▪ possibility of three-level pressure switch: 1st level, anti-boiling and anti-flooding safety levels
<b>Door safety device</b>	▪ Traditional (with PTC) ▪ Instantaneous
<b>Power of heating element</b>	▪ Up to 1950W
<b>Temperature control</b>	▪ NTC sensor
<b>Sensors</b>	▪ Aqua Control

## 4 CONTROL PANEL

The configuration of the control panel depends on the following:

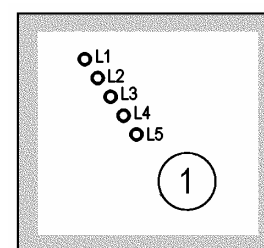
- Type of control/display board
- Design of the control panel ( max.9 buttons, LEDs)
- Different configuration of the buttons



1. "FABRICS" Button
2. "TEMPERATURE" Button
3. "SPIN" Button
4. "OPTIONS" Button
5. "OPTIONS" Button
6. "OPTIONS" Button
7. "START/PAUSE" Button
8. "SKIP/RESET" Button
9. "DELAYED START" Button
10. Programme phase/warning LEDs
11. Display
12. ON/OFF Button
13. Pilot lamp

### 4.1 "Fabrics" Button

- ↪ The programme is chosen on the basis of the type of washing by pushing this button in sequence. The corresponding LED lights.
- ↪ The machine proposes the standard programme for the type of fabric selected: the display shows a temperature and the maximum spin speed for the selected programme (and the normal soil level).
- ↪ These values can be modified using the relative buttons. The display indicates the duration of the selected programme, calculated on the basis of the maximum load for each type of fabric; the START/ PAUSE button pilot lamp begins to flash.
- ↪ The type of fabric can be modified during the washing phase: in this case the cycle will restart from the beginning, with the water level (if the water level is not sufficient the necessary level for the new cycle is reset) and the detergent quantity previously filled.



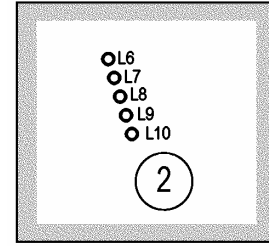
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The table below shows the options that the user can select for each model:

LED	Configuration type A	Configuration type B	Configuration type C
L1	Cotton	Cotton	Cotton
L2	Synthetics	Synthetics	Synthetics
L3	Delicates	Delicates	Delicates
L4	Wool	Hand wash	Wool
L5	Hand wash	Mini (30°/30min)	-----

## 4.2 “Temperature” Button

- ↪ Pushing this button in sequence the temperature is increased or decreased (if a temperature different from that set by the appliance is desired); the relative LED lights.
- ↪ The maximum temperature is 90°C for Cotton, 60°C for Synthetics, 40°C for Delicates, Wool and Hand wash.
- ↪ The button is active only after selecting the type of fabric.
- ↪ The temperature can be modified before the heating phase (by setting the appliance in PAUSE mode).



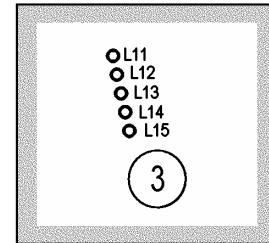
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The table below shows the options that the user can select for each model:

LED	Configuration type A	Configuration type B	Configuration type C
L6	90° C	90° C	90° C
L7	60° C	60° C	60° C
L8	40° C	50° C	50° C
L9	30° C	30° C	40° C
L10	Cold wash	Cold wash	30° C

## 4.3 “Spin” Button

- ↪ Pushing this button the speeds of all spin cycles are reduced.
- ↪ The button is active only after selecting the type of fabric; the spin speed can be modified up to the end of the rinse cycles.
- ↪ The last position can be used for NO SPIN, RINSE HOLD.
- ↪ The exclusion of the SPIN adds three rinses in the COTTON cycle and one rinse in the SYNTHETICS cycle.



wd001186

The table below shows the options that the user can select for each model:

Button	LED	Function 1	Function 2	Function 3	Function 4	Function 5	Function 6
3	L11	Max. Spin	Max. Spin	900 rpm	Max. Spin	Max. Spin	900 rpm
	L12	1200 rpm	900 rpm	700 rpm	1200 rpm	900 rpm	700 rpm
	L13	900 rpm	700 rpm	600 rpm	900 rpm	700 rpm	600 rpm
	L14	700 rpm	500 rpm	500 rpm	700 rpm	500 rpm	500 rpm
	L15	Rinse hold	Rinse hold	Rinse hold	No spin	No spin	No spin

## 4.4 Description of the options

The number and type of buttons vary according to the configuration of the model.

### Possible options according the selected programme

		OPZIONI															
		Rinse-hold	Night cycle	Pre-wash	Soak	Stains	Intensive	Daily	Short	Economy	Sensitive	Extra rinse	Bleach	Half-load	Easy iron	Reduced spin speed	No spin
Compatibility with PROGRAMMES	COTTON	90°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		60°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		50°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		40°C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
		30°C	X	X	X		X		X	X		X	X	X	X	X	X
	Cold	X	X	X		X		X	X		X	X	X	X	X	X	
	SYNTHETICS	60°C	X	X	X	X	X	X	X	X	X	X			X	X	X
		50°C	X	X	X	X	X	X	X	X	X	X			X	X	X
		40°C	X	X	X	X	X	X	X	X	X	X			X	X	X
		30°C	X	X	X	X		X	X	X		X	X			X	X
	MINI PROGRAMME	30°C	X	X												X	X
		40°C	X	X	X	X				X			X			X	X
	DELICATES	30°C	X	X	X	X				X			X			X	X
		Cold	X	X	X	X				X			X			X	X
	SILK	30°C	X	X								X				X	X
	WOOL - HAND WASH	40°C	X	X												X	X
		30°C	X	X												X	X
		Cold	X	X												X	X
	MIX	40°C	X	X	X	X				X			X			X	X
		30°C	X	X	X	X				X			X			X	X
		Cold	X	X	X	X				X			X			X	X
	SHOES	40°C		X	X	X				X			X			X	X
		30°C		X	X	X				X			X			X	X
		Cold		X	X	X				X			X			X	X
	JEANS	60°C	X	X	X							X				X	X
		50°C	X	X	X							X				X	X
		40°C	X	X	X							X				X	X
		30°C	X	X	X							X				X	X
		Cold	X	X	X							X				X	X
	SHORT 60 A	60°C	X	X								X				X	X
		50°C	X	X								X				X	X
		40°C	X	X								X				X	X
		30°C	X	X								X				X	X
Cold		X	X								X				X	X	
SOAK																	
RINSES		X	X								X	X	X		X	X	
CONDITIONER		X	X												X	X	
DRAIN																	
SPIN																X	
DELICATE SPIN																X	



## Compatibility with options

		OPTIONS															
		Rinse-hold	Night cycle	Pre-wash	Soak	Stains	Intensive	Daily	Short	Economy	Sensitive	Extra rinse	Bleach	Half-load	Easy iron	Reduced spin speed	No spin
Compatibility with the OPTIONS	RINSE HOLD		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	NIGHT CYCLE			X	X	X	X	X	X	X	X	X	X	X	X		
	PREWASH	X	X				X	X	X	X	X	X		X	X	X	X
	SOAK	X	X				X	X	X	X	X		X	X	X	X	
	STAINS	X	X				X	X	X	X	X		X	X	X	X	
	INTENSIVE	X	X	X	X	X					X	X	X	X	X	X	X
	DAILY	X	X	X	X	X					X	X	X	X	X	X	X
	SHORT	X	X	X	X	X					X	X	X	X	X	X	X
	ECONOMY	X	X	X	X	X					X	X	X	X	X	X	X
	SENSITIVE	X	X	X	X	X	X	X	X	X		X	X	X		X	X
	EXTRA RINSE	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
	BLEACH	X	X				X	X	X	X	X	X		X	X	X	X
	HALF-LOAD	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X
	EASY-IRON	X	X	X	X	X	X	X	X	X		X	X	X		X	X
	REDUCED SPIN SPEED	X		X	X	X	X	X	X	X	X	X	X	X	X		
NO SPIN	X		X	X	X	X	X	X	X	X	X	X	X	X			
Phases in which option can be selected	PRESELECTION	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	PREWASH	X	X			X	X	X	X	X	X	X	X	X	X	X	X
	WASH	X	X			X	X	X	X	X	X	X	X	X	X	X	X
	RINSES	X														X	X
	SPIN															X	X

The table below shows other limitations in the compatibility of the options according to the type of drawer type and number of solenoid valves.

	4C-3V	4C-2V	3C-2V
PREWASH / SOAK	▶	▶	▶
BLEACH	◆	▶	◇
STAINS	▶	▶	▶

4C= 4-compartment drawer

3C= 3-compartment drawer

3V= 3 solenoid valves

2V= 2 solenoid valves

◇ = Option not available

◆ = Option available

▶ = Only one of these options can be selected

## 4.5 Description of options

### 4.5.1 Night cycle

- ↳ Eliminates all spin phases and adds **three** rinses in COTTON cycles and **two** rinses in SYNTHETICS cycles.
- ↳ Stops the appliance with water in the tub before the final rinse.
- ↳ Switches off the buzzer (if configured)
- ↳ To drain the water, select a drain or spin cycle.

### 4.5.2 Rinse-hold

- ↳ Stops the appliance with water in the tub before the final spin cycle.
- ↳ Switches off the buzzer (if configured)
- ↳ To drain the water, select a drain or spin cycle.

### 4.5.3 Pre-wash

- ↳ Adds a pre-wash phase at the start of the cycle with water heating to 30°C (or cold, if selected).
- ↳ In COTTON and SYNTHETICS cycles, performs a short spin (impulse) before passing to the washing phase.
- ↳ This option cannot be selected for the WOOL and HAND-WASH cycles.

### 4.5.4 Soak

- ↳ Adds a pre-wash phase (30' duration with wool cycle movement) at the start of the cycle with water heating to 30°C (or cold, if selected).
- ↳ In COTTON and SYNTHETICS cycles, performs a short spin (impulse) before passing to the washing phase.
- ↳ Together with the delayed start option it is possible to select a soak time from 30 minutes up to 10 hours.
- ↳ This option cannot be selected for the WOOL and HAND-WASH cycles.

### 4.5.5 Stains

- ↳ Adds a 5-minute motor movement phase after heating to 40°C.
- ↳ Ducts water to the pre-wash/stains compartment in order to introduce the special stain-removal product.
- ↳ This option cannot be selected for DELICATES, WOOL and HAND-WASH cycles.
- ↳ The movements during the washing phase change from vigorous to normal.

### 4.5.6 Short (daily)

- ↳ Modifies the structure of the washes in the COTTON and SYNTHETICS programmes in order to obtain good washing performance with a short cycle (optimization for small loads).

### 4.5.7 Very short

- ↳ Modifies the structure of the COTTON, SYNTHETICS and DELICATES programmes in order to obtain very short washing times (optimization for small or lightly-soiled loads).
- ↳ Reduces the number of rinse cycles (one less).
- ↳ Increases the water level in the remaining two rinse cycles.

### 4.5.8 Intensive

- ↳ Modifies the washing phase by adding 10 minutes of normal movement in the cotton programme.

### 4.5.9 Economy / Energy label

- ↳ Modifies the structure of the COTTON 40°/50°/60°/90° - SYNTHETIC FABRICS 50°/60° programmes in order to reduce energy consumption.
- ↳ Reduces the washing temperature in 90°/60°/50° programmes, while for the 40° programme the temperature is increased by 4°.
- ↳ Increases the duration of the wash phase.

#### 4.5.10 Sensitive

- ↪ Adds one rinse in the COTTON – SYNTHETIC FABRICS cycles.
- ↪ During the cotton cycles the movements pass from vigorous to normal.
- ↪ Eliminates the intermediate spins except from the last two which are at reduced speed.

#### 4.5.11 Bleach

- ↪ Ducts water through the bleach compartment at the beginning of the first rinse in COTTON cycles.
- ↪ Pre-wash is possible only if there are three solenoids.
- ↪ In models with two solenoids, the bleach option is not compatible with the pre-wash option.

#### 4.5.12 “Half load” button

- ↪ Eliminates one rinse in the COTTONS programmes.

#### 4.5.13 Easy-Iron

- **In COTTON programmes:**
  - ↪ Adds three rinses.
  - ↪ Eliminates the intermediate spins.
  - ↪ Performs an impulse spin phase.
  - ↪ Adds an “untangling” phase after the spin cycle.
- **In SYNTHETICS cycles:**
  - ↪ Reduces the temperature in 50/60° cycles to 40°C.
  - ↪ Increases the washing time.
  - ↪ Prolongs the cooling phase at the end of the washing phase.
  - ↪ Adds one rinse without spin cycle.
  - ↪ Adds an “untangling” phase after the impulse spin cycle.

#### 4.5.14 Reduced spin speed

- ↪ Reduces the speed of **all** spins as shown in the table.

Maximum spin speed (rpm)	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
Reduction for COTTON (rpm)	450	450	450	450	500	550	600	650	700	750	800
Reduction for ALL OTHER CYCLES (rpm)	450	450	450	450	450	450	450	450	450	450	450

#### 4.5.15 No spin

- ↪ Eliminates **all** the spin phases.
- ↪ Three rinses are added in the COTTON cycle and one in the SYNTHETICS cycle.

#### 4.5.16 Modifying the spin speed

- ↪ Reduces the speed of **all** spin cycles.
- ↪ The last position can be used for NO SPIN, RINSE-HOLD.
- ↪ If the NO-SPIN option is selected, three rinses are added in the COTTON cycle, and one in the SYNTHETICS cycle.

#### 4.5.17 Time reduction (Quick)

- ↪ Modifies the structure of the COTTON - SYNTHETICS– DELICATES programmes to obtain very short washing times (optimization for small or lightly-soiled loads).
- ↪ Reduces the number of rinses (one rinse less).
- ↪ Increases the water level of the other two rinses.
- ↪ Corresponds to the SHORT- VERY SHORT cycles according to the configuration of the appliance.

#### 4.5.18 Temperature adjustment

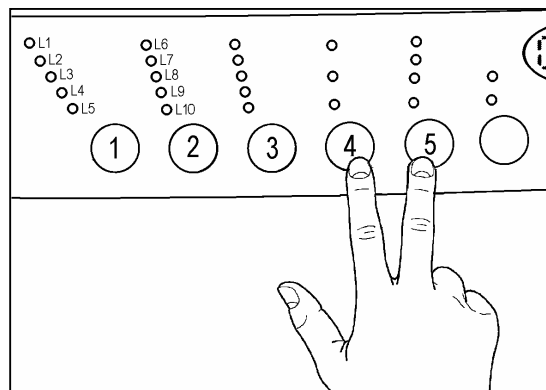
- ↳ Used to select the washing temperature compatibly with the limit temperature for the cycle.
- ↳ Can be used during the cycle selection phase: the temperature can be modified only if the heating phase has not started (in pause mode)

#### 4.5.19 Extra rinse

- ↳ Adds two rinses in the COTTON, SYNTHETICS and DELICATES cycles.
- Eliminates the intermediate spin cycles, with the exception of the final rinse, which is reduced to 450 rpm.

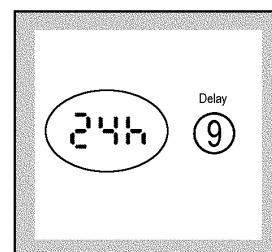
To select the extra rinse option, after selecting a COTTON or SYNTHETICS or DELICATES cycle, push simultaneously buttons **4** and **5** for at least 2 seconds, until the corresponding phase LED lights.

This option remains always active in the following cycles; to deactivate it, repeat the same procedure: press buttons PREWASH (no. 1) and no. 3 simultaneously for at least 2 seconds, until the extra rinse LED switches off.



#### 4.6 Delayed-start time

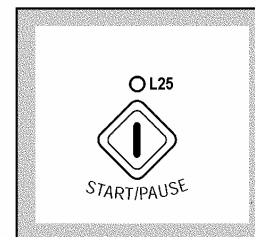
- **Models with digit:**
  - ↳ During the programme selection phase, it is possible to select a delayed start from 30 minutes up to 24 hours (30' 60' 90' 2h 3h... 24h 0h).
  - ↳ During the countdown, the time decreases every hour up to 2h, then by 30 minutes.
  - ↳ To start the cycle immediately, after the countdown has commenced: press the Start/Pause button, cancel the delay time by pressing the relative button and press Start/Pause again.
- **Models with LED**
  - ↳ Insert a pause before the start of the programme, the delay time is indicated by the corresponding LEDs.
  - ↳ To start the cycle immediately, after the countdown has commenced: press the Start/Pause button, cancel the delay time by pressing the relative button and press Start/Pause again.



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#### 4.7 Start/Pause

- **Start:** After selecting the programme and the desired options, press the START button to start the programme. If a delay time has been selected, the countdown will start and the display will indicate it. The LED stops flashing and remains lit for the whole duration of the programme.
- **Pause:** By pressing the button again, the current programme is interrupted and the display, or the relative LED, starts flashing. In pause mode it is possible to open the door on condition that the machine is not performing a heating phase, the water level is not high and the drum is not in movement.
- When the appliance is **paused**, the programmes can be modified as follows:
  - All the cycle OPTIONS can be modified before the beginning of the phase to be modified.
  - the SPIN can be modified before the start of the final spin cycle.
- **To re-start the programme**, press the START/PAUSE button again.



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## 4.8 “START/RESET” Button

This button performs two functions:

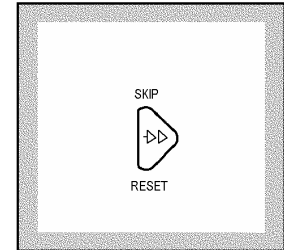
- **Cancels the programme:** Press the button until the cycle LEDs switch off. The display will show three flashing hyphens.
- **Selects special programmes:** In the programme **selection** and **execution** phases, this button can be used to cancel certain phases of the programme so that the appliance effectively performs a special cycle. In the programme execution phase, the appliance must be paused.

The cycle **normally** performed by the appliance consists of the following phases:

**Wash ⇒ Rinses ⇒ Spin**

- ↵ When the button is pressed **once**: **Rinses ⇒ Spin**
- ↵↵ When the button is pressed **twice**: **Spin**
- ↵↵↵ When the button is pressed **three times**: Only **drain**
- ↵↵↵↵ When the button is pressed **four times**: **Programme cancelled**

If the **PRE-WASH** option is selected, it can be cancelled by pressing this button, so that the appliance performs the wash only.



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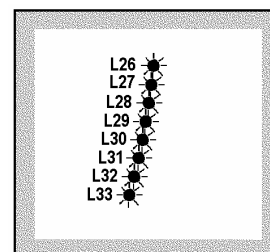
## 4.9 Display (some models)

The display shows the following information:

- ↪ **Three flashing hyphens**, when a programme is cancelled by pressing the SKIP/RESET button. The hyphens will also be displayed when the ON/OFF button is pressed to switch the appliance on, but only if the cycle selected previously has been cancelled.
- ↪ **The duration of the washing programme** is displayed when the programme has been selected. This time corresponds to the time necessary for the maximum wash load for each programme. When the programme is started, the time is decremented (updated) at intervals of one minute.
- ↪ **Rinse hold**: the appliance stops with water in the tub at the end of programmes for which the RINSE HOLD option has been selected; the display shows a **zero** (fixed).
- ↪ **End of cycle** indicated by a **zero** (flashing) and, at the same time, the door pilot lamp switches off. The zero re-appears when the appliance is switched on again, if the previous programme has not been cancelled.
- ↪ **Delayed start**, which is selected using the DELAYED START button. The countdown starts when the START/PAUSE button is pressed, and is decremented at intervals of one hour. During the last 2 hours the countdown decrements at intervals of 30 minutes.
- ↪ **An alarm code** indicates a machine malfunction.

## 4.10 Phase / warning LEDs

The LEDs indicate different information according to the type of configuration; the End-of-cycle Led is featured in all models.



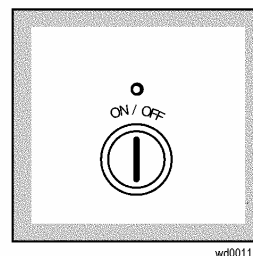
wd001141

Type of LED	Functions
<b>Pre-wash</b>	Lights during selection mode if the programme includes the pre-wash phase, and during the execution of the pre-wash.
<b>Wash</b>	Lights during selection mode if the programme includes the wash phase, and during the execution of the wash.
<b>Pre-wash/Wash</b>	Lights during selection mode if the programme includes the pre-wash or wash phases, and during the execution of these phases.
<b>Rinse</b>	Lights during selection mode if the programme includes rinse phases, and during the execution of the rinse.
<b>Spin</b>	Lights during selection mode if the programme includes the spin phase, and during the execution of the spin.
<b>Drain</b>	Lights during selection mode if the programme includes the drain phase, and during the execution of the drain
<b>Extra rinse</b>	Lights when this option has been memorized (if featured by the cycle) and during the execution of the rinse.
<b>Rinse hold</b>	Lights if the programme includes the rinse-hold option and at the end of the cycle, when the appliance stops with water in the tub.
<b>Current cycle</b>	Lights during execution of the cycle
<b>End of cycle</b>	Lights when the programme has been completed; also used to display alarm conditions
<b>Blocked filter</b>	Lights at the end of the cycle if the drain filter is blocked.
<b>Overdosing</b>	Lights at the end of the cycle if a detergent overdosing alarm occurs.
<b>ON/OFF</b>	Lights when the appliance is switched on
<b>Door</b>	<ul style="list-style-type: none"> <li>↪ Lights when the door is locked by the interlock.</li> <li>↪ Switches off when the door is released.</li> <li>↪ Flashes when the door is about to release (especially in models with safety device with PTC)</li> </ul>
<b>Time to end</b>	Lights when the display shows the time-to-end

## 4.11 ON/OFF Button

Press the ON/OFF button to switch the appliance ON. The display shows three flashing hyphens or a flashing zero. Press the same button to switch the appliance OFF.

The ON/OFF button is an individual pushbutton, and is not part of the display board.



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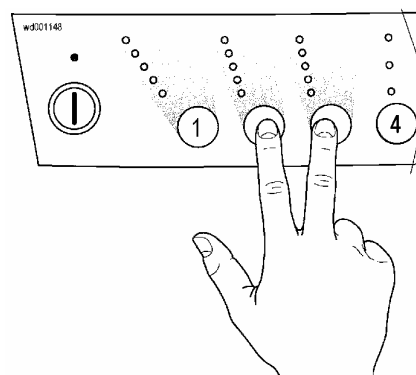
## 4.12 Exclusion of the buzzer at the end of the programme

By pressing the "TEMPERATURE" (2) and "SPIN" (3) buttons at the same time (or the temperature button with button 4) it is possible to deactivate the buzzer which sounds to indicate the end of the programme; by repeating this operation the buzzer will be activated again.

This function is always available and is memorized until it is modified.

↳ By holding down a combination of buttons for 2 seconds, it is possible to exclude the buzzer. This option depends on the configuration and therefore the buttons may vary according to the model.

↳ If the buzzer is deactivated there is no sound during selection or at the end of the cycle, but the alarm remains on.



## 4.13 Variation of the rinses according to the options

		Number of rinses for each option											
		Normal	Half load	Super rinse	Night cycle	Easy-ironing	Exclusion of spin	Super rinse and half load	Super rinse and night cycle	Night cycle and half load	Night cycle, super rinse and half load	Sensitive	
PROGRAMMES	COTTON	Normal	3	2	5	6	6	6	4	8	5	7	4
		Eco – Energy label	3	2	5	6	6	6	4	8	5	7	4
		Very short	2	2	4	5	5	5	4	7	5	7	3
	SYNTHETIC FABRICS	Normal	3	-	5	4	4	4	-	6	-	-	4
		Eco – Energy label	3	-	5	4	4	4	-	6	-	-	4
		Very short	2	-	4	3	3	3	-	6	-	-	3
	DELICATES	Normal	3	-	5	3	-	3	-	5	-	-	4
		Eco – Energy label	-	-	-	-	-	-	-	-	-	-	-
		Very short	2	-	4	2	-	2	-	4	-	-	3

## 5 WASHING PROGRAMMES

The washing programmes and the functions of each button vary for the different models since they are determined by the configuration of the appliance.

### 5.1 Possible programmes

The washing programmes can be configured: the basic programmes are listed in the table below.

Programme	Temperature (°C)	No. of rinses	Final spin (rpm)
Cotton	90	87	450/650/850/1000/1200/ 1300/1400/1600
	90E	67(***)	
	60	60	
	60E	50 (*)(**)(***)	
	50	50	
	50/40E	44 (*)(**)	
	40	40	
	30	30	
Synthetics	cold	20	Max. 900
	60	60	
	60/50E	42 (*)	
	50	50	
	40	40	
Delicates Duvet Silk	30	30	450/700
	cold	20	
	40	40	
Wool	40	40	Max. 900
	30	35	
	cold	20	
Hand wash	40	40	Max. 900
	30	35	
	cold	20	
Jeans	60	60	450/650/850/1000/1200/ 1300/1400/1600
	50	50	
	40	40	
	30	30	
	cold	20	
Shoes	40	40	Max. 1000
	30	30	
	cold	20	
Soak	30/20	----	----
Rinses	----	3	Max. 1600
Delicate rinses	----	3	Max. 700
Softener	----	1	Max. 1600
Drain	----	----	----
Spin	----	----	Max. 1600
Delicate spin	----	----	Max. 700
Mini	30	2	Max. 1000

(\*) "Energy label" programmes

(\*\*)

Programme	Group	Temperature (°C)
COTTON 60 E	G18	50
	G19	53
	G20	45
	G21	47

(\*\*\*) According to the configuration of the appliance, 2 or 3 rinses may be performed.



## 6 WASHING PROGRAMMES

### 6.1 Basic programmes for Cotton / Linen: cold – 30-40-60-90 (without options) for G17/18/19/20/22

Phase		N.	Function	Time/control	Movement	Heating°C	Notes	
Delay		-	Delayed start	Delay time	No movement			
Pre-wash		0	Drain	VAE + 2'+ 6" pause	No movement			
		1	Water fill	P1 + QPW1 (*)	D55 from full		Refill: P1(*)	
		2	Cold wash	5'				
		3	Water fill	QPW2 (*)				
		4	Heating	T	D55	30°	Cold = 20°C	
		5	Maintenance	10'				
		6	Drain + spin	VAE + 14" + 4,5'	C0		300/450/650 rpm	
Wash		7	Drain	20"	No movement			
		8	Cotton water fill	P1 + Qhl (*)	N55 from full			
		9	Cold wash	10'			Refill: P1+Qw(*)	
		10	Cotton heating	T	N55	20/30/40/60/ (87-84)		
		11	Maintenance	4'(87°/84°)/5'(20-30°-40°) /10'(60°)	E55			
		12	Cotton heating	T	E55	30/40/60/(87-84)		
		13	Maintenance	14'(87°-84°)/35'(20°-30°-40°) /20'(60°)	E55			
		14	Cooling water fill	Qc (*)	D55		Only for (87°/84°) se >67°C	
		15	Movement	2'				
		16	Drain	VAE + 14"	No movement			
Rinses	Cooling	17	Drain + spin	5'	C1		450/650/850 rpm	
		18	Drain	20"	No movement		No movement	
		19	Cotton water fill	P1	N 55 from full			
		20	Movement	5'			Refill: P1+Qn1(*)	
		21	Drain	VAE + 14"	No movement			
		22	Drain + spin	5'	C2		450/650/850/1000rpm	
	1st rinse	23	Drain	20"	No movement			
		24	Cotton water fill	P1+Qn2(*)	N 55 from full			
		25	Movement	5'			Refill: P1+Qne(*)	
		26	Drain	VAE + 14"	No movement			
		27	Drain + spin	5'	C2		450/650/850/1000rpm	
		28	Drain	20"	No movement			
	2nd rinse	29	Cotton water fill	P1	N 55 from full			
		30	Movement	30"				
		31	Time water fill	Qn3(*)				
		32	Movement	8'			Refill: P1(*)	
		33	Drain	VAE + 15"	No movement			
		34	Drain + spin	9'	COT_CF		450/650/850/1000/ Max.	
35		Untangling	1'	N55				

N.B. Data subject to modification  
(\*) see details on p. 33/34

6.2 Cotton / Linen Cycles: 90 Eco, 60 - 40/50 "energy label" (without options) for G17

Phase	N.	Function	Times/Controls	Movement	Heating °C	Note	
Pre-wash	Delay	-	Delayed start	Delay Time	No Movement		
		0	Drain	VAE + 2"+ 6" pause	No Movement		
		1	Water fill	P1 + QPW1 (*)	D55 from full	Refill: P1(*)	
		2	Cold wash	5'			
		3	Water fill	QPW2 (*)	D55	30°	
		4	Heating	T			
		5	Maintenance	10'			
		6	Drain + spin	VAE + 14" + 4,5'	C0	300/450/650 rpm	
	7	Drain	20"	No Movement			
Wash		8	Water fill (cotton)	P1 + Qe (*)	N55 from full	Refill: P1+Qwe(*)	
		9	Cold wash	2'			
		10	Water fill (cotton)	P1+Qec(*)	N55	Refill: P1+Qwe(*)	
		11	Cold wash	8'	N55		
		12	Heating (cotton)	T	N55(67°/64°-44°/40°) E55(53°/45°)	67°/64°-53°/45°-44°/40°	
		13	Maintenance	10' (67°/64°)-5' (53°/45°)-15' (44°/40°)	E55		
		13a	Maintenance 44	15'	E55	Only for 44°/40°C	
		14	Heating (cotton)	T	E55	(67°/64°) (44°/40°)	
		15	Maintenance	30'(67°/64°)-35'(44°/40°)	E55(44°/40°) N55(67°/64°)		
		15a	Maintenance	45'	E55	Only for 53°/45°C	
	Cooling		16	Water fill (cotton)	Qc (*)	D55	Only for (67°/64°) se >67°C
			17	Movement	2'		
			18	Drain	VAE + 14"	No Movement	
			19	Drain + spin	5'	C1	450/650/850 rpm
			20	Drain	20"	No Movement	
	Rinses	1st rinse	21	Water fill (cotton)	P1	N 55 from full	
22			Movement	5'		Refill: P1+Qne(*)	
23			Drain	VAE + 14"	No Movement		
24			Drain + spin	5'	C2	450/650/850/1000rpm	
2nd rinse		25	Drain	20"	No Movement		
		26	Water fill (cotton)	P1 (C1≥850 rpm) P1+Qn2 (C1<850 rpm)	N 55 from full		
		27	Movement	5'		Refill: P1+Qne(*)	
		28	Drain	VAE + 14"	No Movement		
Final rinse (Conditioner)		29	Drain + spin	5'	C2	450/650/850/1000rpm	
		30	Drain	20"	No Movement		
		31	Water fill (cotton)	P1	N 55 from full		
		32	Movement	30"			
33	Time water fill	Qn3e 90° 40°			Qn3e for 60° cycle		
34	Movement	8'			Refill: P1(*)		
35	Drain	VAE + 15"	No Movement				
36	Drain + spin	9'	COT CF		450/650/850/1000/ Max.		

N.B. Data subject to modification  
(\*) see details on p. 33/34

6.3 Cotton / Linen Cycles: 90 Eco, 60 - 40/50 "energy label" (without options) for G18

Phase	N.	Function	Times/Controls	Movement	Heating °C	Note	
Pre-wash	Delay	-	Delayed start	Delay Time	No movement		
		0	Drain	VAE + 2" + 6" pause	No movement		
		1	Water fill	P1 + QPW1 (*)			
		2	Cold wash	5'	D55 from full		Refill: P1(*)
		3	Water fill	QPW2 (*)			
		4	Heating	T	D55	30°	
		5	Maintenance	10'			
		6	Drain + spin	VAE + 14" + 4,5'	C0		300/450/650 rpm
Wash		7	Drain	20"	No movement		
		8	Water fill (cotton)	P1 + Qe (*)	N55 from full		Refill: P1+Qwe(*)
		9	Cold wash	2'			
		10	Water fill (cotton)	P1+Qec(*)	N55		
		11	Cold wash	8'	N55		Refill: P1+Qwe(*)
		12	Heating (cotton)	T	N55(67°/64°-44°/40°) E55(50°/47°)	67°/64°-50°/47°-44°/40°	
		13	Maintenance	10' (67°/64°-50°/47°)-40' (44°/40°)	E55		
		13a	Maintenance 44	15'	N55		Only for 44°/40°C
		14	Heating (cotton)	T	E55	(67°/64°)(50°/47°) (44°/40°)	
		15	Maintenance	30'(67°/64°)-15'(50°/47°)-20'(44°/40°)	E55(50°/47°)-(44°/40°) N55(67°/64°)		
		15a	Maintenance	5'	N55		Only for 50°/47°C
		15b	Maintenance	15'	E55		Only for 50°/47°C
		16	Water fill (cotton)	Qc (*)			
	Cooling	17	Movement	2'	D55		Only for (67°/64°) se >67°C
		18	Drain	VAE + 14"	No movement		
	19	Drain + spin	5'	C1			
	20	Drain	20"	No movement			
Rinse	1st rinse	21	Water fill (cotton)	P1(*)	N 55 from full		
		22	Movement	5'			Refill: P1+Qne(*)
		23	Drain	VAE + 14"	No movement		
		24	Drain + spin	5'	C2		450/650/850/1000rpm
		25	Drain	20"	No movement		
	2nd rinse	26	Water fill (cotton)	P1 (C1>850 rpm) P1+Qn2 (C1<850 rpm)	N 55 from full		
		27	Movement	5'			Refill: P1+Qne(*)
		28	Drain	VAE + 14"	No movement		
		29	Drain + spin	5'	C2		450/650/850/1000rpm
		30	Drain	20"	No movement		
	Final rinse (Conditioner)	31	Water fill (cotton)	P1(*)			
		32	Movement	30"			
33		Time water fill	Qn3e 90° 40°	N 55 from full		Qn3e for 60° cycle	
34		Movement	8'			Refill: P1	
35		Drain	VAE + 15"	No movement			
36		Drain + spin	9'	COT CF		450/650/850/1000/ Max.	

N.B. Data subject to modification  
(\*) see details on p. 33/34

6.4 Cotton / Linen Cycles: 90 Eco, 60 - 40/50 “energy label” (without options) for G19

Phase		N.	Function	Times/Controls	Movement	Heating °C	Note	
Delay		-	Delayed start	Delay Time	No movement			
Pre-wash		0	Drain	VAE + 2'+ 6" pause	No movement			
		1	Water fill	P1 + QPW1 (*)	D55 from full			
		2	Cold wash	5'			Refill: P1(*)	
		3	Water fill	QPW2 (*)	D55	30°		
		4	Heating	T				
		5	Maintenance	10'				
		6	Drain + spin	VAE + 14" + 4, 5'	C0		300/450/650 rpm	
	7	Drain	20"	No movement				
Wash		8	Water fill (cotton)	P1 + Qe (*)	N55 from full		Refill: P1+Qwe(*)	
		9	Cold wash	2'				
		10	Water fill (cotton)	P1+Qec	N55			
		11	Cold wash	8'	N55		Refill: P1+Qwe(*)	
		12	Heating (cotton)	T	N55(67°/64°-44°/40°) E55(53°/50°)	67°/64°-53°/50°-44°/40°		
		13	Maintenance	10' (67°/64°)5' (-53°/50°)-40' (44°/40°)	E55			
		13a	Maintenance 44	15'	N55		Only for 44°/40°C	
		14	Heating (cotton)	T	E55	(67°/64°)(53°/50°) (44°/40°)		
		15	Maintenance	30'(67°/64°)-25'(53°/50°)-20'(44°/40°)	E55(53°/50°)-(44°/40°) N55(67°/64°)			
		15a	Maintenance	20'	N55		Only for 53°/50°C	
	Cooling		16	Water fill (cotton)	Qc (*)	D55		
			17	Movement	2'			Only for (67°/64°) se >67°C
			18	Drain	VAE + 14"	No movement		
			19	Drain + spin	5'	C1		
			20	Drain	20"	No movement		
	Rinse	1st rinse	21	Water fill (cotton)	P1(*)	N 55 from full		
22			Movement	5'			Refill: P1+Qne(*)	
23			Drain	VAE + 14"	No movement			
24			Drain + spin	5'	C2		450/650/850/1000rpm	
25			Drain	20"	No movement			
2nd rinse		26	Water fill (cotton)	P1 (C1>850 rpm) P1+Qn2 (C1<850 rpm)	N 55 from full			
		27	Movement	5'			Refill: P1+Qne(*)	
		28	Drain	VAE + 14"	No movement			
		29	Drain + spin	5'	C2		450/650/850/1000rpm	
		30	Drain	20"	No movement			
Final rinse (Conditioner)	31	Water fill (cotton)	P1(*)	N 55 from full				
	32	Movement	30"					
	33	Time water fill	Qn3e_90°_40°			Qn3e for 60° cycle		
	34	Movement	8'			Refill: P1(*)		
	35	Drain	VAE + 15"		No movement			
	36	Drain + spin	9'		COT CF		450/650/850/1000/ Max.	

N.B. Data subject to modification  
(\*) see details on p. 33/34

6.5 Cotton / Linen Cycles: 90 Eco, 60 - 40/50 “energy label” (without options) for G20-5Kg-6KG

Phase	N.	Function	Times/Controls	Movement	Heating °C	Note	
Pre-wash	Delay	-	Delayed start	Delay Time	No movement		
		0	Drain	VAE + 2" + 6" pause	No movement		
		1	Water fill	P1 + QPW1 (*)			
		2	Cold wash	5'	D55 from full		Refill: P1(*)
		3	Water fill	QPW2 (*)			
		4	Heating	T	D55	30°	
		5	Maintenance	10'			
		6	Drain + spin	VAE + 14" + 4,5'	C0		300/450/650 rpm
Wash		7	Drain	20"	No movement		
		8	Water fill (cotton)	P1 + Qe (*)	N55 from full		
		9	Cold wash	2'			Refill: P1+Qwe(*)
		10	Water fill (cotton)	P1+Qec(*)	N55		
		11	Cold wash	8'	N55		Refill: P1+Qwe(*)
		12	Heating (cotton)	T	N55	67°/64°-55°/47°-44°/40°	
		13	Maintenance	10' (67°/64°)5' (-55°/47°)-20' (44°/40°)	E55		
		13a	Maintenance 44	10'	N55		Only for 44°/40°C
		14	Heating (cotton)	T	E55(67°/64°-55°/47°) N55(44°/40°)	67°/64°-55°/47°-44°/40°	
		15	Maintenance	30'(67°/64°)-25'(55°/47°)-10'(44°/40°) 20'(55°/47°)-per 6Kg	E55(55°/47°)-(44°/40°) N55(67°/64°)		
		15a	Maintenance	10'	N55		Only for 55°/47°C
		16b	Maintenance	20'	E55(55°/47°) N55(44°/40°)		Only for (55°/47°)(44°/40°)
		16c	Maintenance	10'	N55		Only for (55°/47°) 6Kg
		16	Water fill (cotton)	Qc (*)	D55		Only for (67°/64°) se >67°C
		17	Movement	2'			
		18	Drain	VAE + 14"	No movement		
	19	Drain + spin	5'	C1			
	20	Drain	20"	No movement			
Rinsees	1st rinse	21	Water fill (cotton)	P1(*)	N 55 from full		
		22	Movement	5'			Refill: P1+Qne(*)
		23	Drain	VAE + 14"	No movement		
		24	Drain + spin	5'	C2		450/650/850/1000rpm
		25	Drain	20"	No movement		
	2nd rinse	26	Water fill (cotton)	P1 (C1≥850 rpm) P1+Qn2 (C1<850 rpm)	N 55 from full		
		27	Movement	5'			Refill: P1+Qne(*)
		28	Drain	VAE + 14"	No movement		
		29	Drain + spin	5'	C2		450/650/850/1000rpm
		30	Drain	20"	No movement		
	Final rinse (Conditioner)	31	Water fill (cotton)	P1(*)			
		32	Movement	30"	N 55 from full		
33		Time water fill	Qn3e_90°_40°			Qn3e for 60° cycle	
34		Movement	8'			Refill: P1	
35		Drain	VAE + 15"	No movement			
36		Drain + spin	9'	COT CF		450/650/850/1000/ Max.	

N.B. Data subject to modification (\*) see details on p. 33/34

6.6 Cotton / Linen Cycles: 90 Eco, 60 - 40/50 "energy label" (without options) for G22-6KG-7Kg

Phase	N.	Function	Times/Controls	Movement	Riscal. °C	Note	
<b>Delay</b>		-	Delayed start	Delay Time			
Pre-wash	0	Drain	VAE + 2" + 6" pause	No movement			
	1	Water fill	P1 + QPW1 (*)	D55 from full		Refill: P1(*)	
	2	Cold wash	5'				
	3	Water fill	QPW2 (*)	D55	30°		
	4	Heating	T				
	5	Maintenance	10'				
	6	Drain + spin	VAE + 14" + 4,5'			C0	300/450/650 rpm
	7	Drain	20"	No movement			
Wash	8	Water fill (cotton)	P1 + Qe (*)	N55 from full		Refill: P1+Qwe(*)	
	9	Cold wash	2'				
	10	Water fill (cotton)	P1+Qec(*)	N55	67°/64°-55°/47°-44°/40°	Refill: P1+Qwe(*)	
	11	Cold wash	8'				
	12	Heating (cotton)	T	E55	67°/64°-55°/47°-44°/40°		
	13	Maintenance	10' (67°/64°)5' (-55°/47°)-20' (44°/40°)				
	13a	Maintenance 44	10'	N55		Only for 44°/40°C	
	14	Heating (cotton)	T	E55(67°/64°-55°/47°) N55(44°/40°) N55(55°/47°)per 7Kg	67°/64°-55°/47°-44°/40°		
	15	Maintenance	30'(67°/64°)-25'(55°/47°)-10'(44°/40°) 20'(55°/47°)-per 7Kg	E55(55°/47°)-(44°/40°) N55(67°/64°)			
	15a	Maintenance	10'	N55		Only for 55°/47°C	
	16b	Maintenance	25' per 6Kg 20' per 7Kg	E55(55°/47°) N55(44°/40°) per 6Kg N55 (55°/47°-44°/40°) per 7Kg		Only for (55°/47°)(44°/40°)	
	16c	Maintenance	15' only for 7Kg	N55 (55°/47°) only for 7Kg			
	Cooling	16	Water fill (cotton)	Qc (*)	D55		Only for (67°/64°) se >67°C
		17	Movement	2'			
		18	Drain	VAE + 14"	No movement		
		19	Drain + spin	5'	C1		
20	Drain	20"	No movement				
Rinses	1st rinse	21	Water fill (cotton)	P1(*)	N 55 from full	Refill: P1+Qne(*)	
		22	Movement	5'			
		23	Drain	VAE + 14"	No movement		
		24	Drain + spin	5'	C2	450/650/850/1000rpm	
		25	Drain	20"	No movement		
	2nd rinse	26	Water fill (cotton)	P1 (C1≥850 rpm) P1+Qn2 (C1<850 rpm)	N 55 from full		Refill: P1+Qne
		27	Movement	5'			
		28	Drain	VAE + 14"	No movement		
		29	Drain + spin	5'	C2	450/650/850/1000rpm	
		30	Drain	20"	No movement		
	Final rinse (Conditioner)	31	Water fill (cotton)	P1(*)	N 55 from full		Qn3e for 60° cycle
		32	Movement	30'			
33		Time water fill	Qn3e 90° 40°				
34		Movement	8'	Refill: P1			
35		Drain	VAE + 15"	No movement			
36		Drain + spin	9'	COT_CF	450/650/850/1000/ Max.		

N.B. Data subject to modification (\*) see details on p. 33/34

6.7 Basic programmes for synthetic fabrics: cold – 30° - 40° – 50° - 60° (without options)

Phase	N.	Function	Times/Controls	Movement	Heating °C	Note	
<b>Delay</b>		-	Delayed start	Delay Time		No movement	
<b>Pre-wash</b>	0	Drain	VAE + 2" + 6" pause	No movement			
	1	Water fill	P1 + QPW1 (*)	D 55 from full		Refill: P1(*)	
	2	Cold wash	5'				
	3	Water fill	QPW2 (*)				
	4	Heating	T	D 55	30°	Cold = 20°C	
	5	Maintenance	10'				
	6	Drain + spin	VAE + 15" + 4,5'	C0		300/450/650 rpm	
	7	Drain	20"	No movement			
<b>Wash</b>	8	Water fill sintetici	P1 + Qsy (*)	N 55 from full		Refill: P1+Qy1(*)	
	9	Cold wash	2'				
	10	Heating	T	N55 per T>40°	20/30/40/50/60	Economy = 42°/39°C	
	11	Maintenance	10'	E55 per T< / = 40°		Economy = E55	
	12	Heating	T		30/40/50/60	Economy = 42°/39°C	
	13	Maintenance	22'	E55		Economy = 25'	
	<b>Cooling</b>	14	Water fill (cotton)	Qc (*)	N55		
		15	Movement	2'			
		16	Drain	VAE	No movement		
		17	Drain	1'	D55		
<b>Rinse</b>	<b>1st rinse</b>	18	Water fill	P1+ Qyr1 (*)	E55 from full		
		19	Movement	3'			Refill: P1(*)
		20	Drain	VAE	No movement		
	<b>2nd rinse</b>	21	Drain	1'	D55		
		22	Water fill	P1+ Qyr2 (*)	E 55 from full		Refill: P1(*)
		23	Movement	3'			
		24	Drain	VAE	No movement		
		25	Drain	1'	D55		
		26	Drain + spin	4,5'	C0		300/450/650 rpm
	<b>Final rinse (Conditioner)</b>	27	Water fill	P1			
		28	Movement	30"			
		29	Time water fill	Qyr3(*)	E55 from full		
		30	Movement	5'			Refill: P1(*)
31		Drain	VAE + 14"	No movement			
32		Drain + spin	4,5'	SYN_CF		(max. 1000rpm)	
33		Untangling	1'	N55		Not for Economy	

N.B. Data subject to modification (\*) see details on p. 33/34

6.8 Basic programmes for delicates: cold – 30° - 40° (without options)

Phase	N.	Function	Times/Controls	Movement	Heating °C	Note	
Delay	-	Delayed start	Delay Time	No movement			
Pre-wash	0	Drain	VAE + 2"+ 6" pause	No movement			
	1	Water fill	P1 + QPW1 (*)				
	2	Cold wash	5'	D55 from full		Refill: P1(*)	
	3	Water fill	QPW2 (*)				
	4	Heating	T	D55	30	Freddo = 20°C	
	5	Maintenance	3'				
Wash	6	Drain	VAE + 15"	No movement			
	7	Water fill delicati	P1 + Qdw1 (*)	D55 from full			
	8	Cold wash	1'	D55		Refill: P1+Qdw2(*)	
	9	Heating	T		20/30/40		
	10	Maintenance	10'	D55	20/30/40		
	11	Heating	T		20/30/40		
	12	Maintenance	10'				
13	Drain	VAE	No movement				
14	Drain	1'	D55				
Rinses	1st rinse	15	Water fill	P1	No movement		
		16	Time water fill	Qrd1 (*)			
		17	Movement	5'	D55		Refill: P1(*)
		18	Drain	VAE	No movement		
	2nd rinse	19	Drain	1'	D55		
		20	Water fill	P1	No movement		
		21	Time water fill	Qrd1 (*)			
		22	Movement	5'	D55		Refill: P1(*)
	Final rinse (Conditioner)	23	Drain	VAE	No movement		
		24	Drain	1'	D55		
		25	Water fill	P1			
		26	Movement	30"	D55 from full		
		27	Time water fill	Qrd2 (*)			
28	Movement	3'			Refill: P1(*)		
29	Drain	VAE+14"	No movement				
30	Drain + spin	3,8'	DEL_CF		(450/700rpm)		
31	Untangling	1'	N55				

N.B. Data subject to modification (\*) see details on p. 33/34



## 6.9 Wool programme: cold - 30° - 40°

Phase	N.	Function	Times/Controls	Movement	Heating °C	Note	
<b>Delay</b>	-	Delayed start	Delay Time	No movement			
<b>Wash</b>	0	Drain	VAE + 2" + 6" pause	No movement			
	1	Water fill (wool)	P1 + Qwo (*)	Pwl_1 from full		Refill:P1+Qwo1(*)	
	2	Cold wash	1'				
	3	Heating	T			20/33/38	
	4	Maintenance	14'				
5	Drain	VAE+14"	No movement				
<b>Rinses</b>	<b>1st rinse</b>	6	Water fill	P1	No movement		
		7	Time water fill	Qwor1 (*)	Pwl_1		
		8	Movement	3'			Refill:P1(*)
		9	Drain	VAE+14"	No movement		
	<b>2nd rinse</b>	10	Water fill	P1	No movement		
		11	Time water fill	Qwor1 (*)	Pwl_1		
		12	Movement	3'			Refill:P1(*)
		13	Drain	VAE+14"	No movement		
	<b>Final rinse (Conditioner)</b>	14	Water fill	P1	No movement		
		15	Movement	30"	Pwl_1		
		16	Time water fill	Qwor2 (*)			
		17	Movement	5'			Refill:P1(*)
18		Drain	VAE+ 14"	No movement			
19		Drain + spin	3,5'	WOOL_CF		(max. 1000rpm)	

N.B. Data subject to modification (\*) see details on p. 33/34

### 6.10 Hand-wash programmes: cold - 30° - 40°

Phase	N.	Function	Times/Controls	Movement	Heating °C	Note	
<b>Delay</b>	-	Delayed start	Delay Time	No movement			
<b>Wash</b>	0	Drain	VAE + 2" + 6" pause	No movement			
	1	Water fill	P1 + Qwh (*)	No movement			
	2	Cold wash	1'	Pwl_4	20/33/38	Refill:P1+Qwh1(*)	
	3	Heating	T				
	4	Maintenance	14'				
5	Drain	VAE+14"	No movement				
<b>Rinses</b>	<b>1st rinse</b>	6	Water fill	P1	No movement		
		7	Time water fill	Qwor1 (*)	Pwl_4	Refill:P1(*)	
		8	Movement	3'			
	<b>2nd rinse</b>	9	Drain	VAE+14"	No movement		
		10	Water fill	P1	No movement		
		11	Time water fill	Qwor1 (*)	Pwl_4	Refill:P1(*)	
	12	Movement	3'				
	<b>Final rinse (Conditioner)</b>	13	Drain	VAE+14"	No movement		
		14	Water fill	P1	No movement		
		15	Movement	30"	Pwl_4		
		16	Time water fill	Qwor2 (*)			
		17	Movement	5'		Refill:P1(*)	
	18	Drain	VAE+14"	No movement			
19	Drain + spin	3,5'	WOOL_CF		(max. 1000rpm)		

N.B. Data subject to modification (\*) see details on p. 33/34

### 6.11 JEANS Wash programmes: 40° - 60°

Phase	N.	Function	Times/Controls	Movement	Heating °C	Note
Delay	-	Delayed start	Delay Time	No movement		
Pre-wash	0	Drain	VAE + 2"+ 6" pause	No movement		
	1	Water fill	P1 + Qpw (*)	No movement		
	2	Cold wash	5'			Refill:P1(*)
	3	Water fill	Qpw2(*)			
	4	Heating	T	D55	30°	
	5	Maintenance	10'			
	6	Drain+ spin		C0		
Wash	7	Drain	20"			
	8	Water fill	P1+Qh1(*)	N55		Refill P1+Qw(*)
	9	Cold wash	10'			
	10	Heating	T	E55	60°/40°	
	11	Maintenance	10' (60°) 5' (40°)			
	12	Riscaldamento	T	E55	60°/40°	
	13	Maintenance	20' (60°) 35' (40°)			
	14	Drain	VAE +14"	No movement		
	15	Drain+ spin	5'	C2		
	16	Drain	20"	No movement		

### 6.12 SHOES Wash programmes: 40° - 60°

Phase	N.	Function	Times/Controls	Movement	Heating °C	Note	
Delay	-	Delayed start	Delay Time	No movement			
Wash	0	Drain	VAE + 8"+ 6" pause	No movement			
	1	Water fill	P1	No movement		PRE_WASH compartment	
	2	Water fill	Qdw1(*)			WASH compartment	
	3	Water fill	Qdw2(*)	D55			
	4	Cold wash	5'				
	5	Heating	T	D55	Programme T°		
	6	Maintenance	5'		Programme T°		
	7	Maintenance	15'				
Rinses	8	Drain	VAE +20"	N55			
	1st/2nd rinse	9	Water fill	P1+Qrd1(*)			PRE_WASH comp.
		10	Maintenance	5'	D55		Refill P1
		11	Drain	VAE +14"	No movement		
	3rd Rinse	12	Water fill	P1	No movement		CONDITIONER comp.
		13	Maintenance	30"			
		14	Water fill	Qrd2(*)	D55		CONDITIONER comp.
		15	Maintenance	3'			Refill P1(*)
		16	Drain	VAE +14"			
		17	Spin	3'5"	WOOL_CF		

N.B. Data subject to modification (\*) see details on p. 33/34

### 6.13 DUVET Wash programmes

Phase	N.	Function	Times/Controls	Movement	Heating °C	Note	
<b>Delay</b>	-	Delayed start	Delay Time	No movement			
<b>Wash</b>	0	Drain	VAE + 8"	No movement			
	1	Water fill	P1+140"	No movement		WASH compartment	
	2	Cold wash	5'	D55	Programme T° Programme T°	Refill P1(*)	
	3	Heating	T				
	4	Maintenance	5'	D55			
	5	Maintenance	5'				
	6	Drain	VAE +14"				
7	Spin			IMP_BLANKET_II_650			
<b>Rinses</b>	<b>1st rinse</b>	8	Idle	6"	No movement		
		9	Water fill	P1+130"			PRE_WASH compartment
		10	Maintenance	5'		D55	Refill P1(*)
		11	Drain	VAE +14"		No movement	
	12	Spin			IMP_BLANKET_II_650		
	<b>2nd rinse</b>	13	Idle	6"	No movement		
		14	Water fill	P1+130"			PRE_WASH compartment
		15	Maintenance	5'		D55	
		16	Drain	VAE +14"		No movement	
	17	Spin			IMP_BLANKET_II_650		
	<b>3rd rinse</b>	18	Idle	6"	No movement		CONDITIONER compartment
		19	Water fill	P1			
		20	Maintenance	30"	D55		CONDITIONER compartment
		21	Water fill	125"			Refill P1(*)
		22	Maintenance	8'			
		23	Drain	VAE +14"			
	24	Spin			IMP_BLANKET_II_650		

N.B. Data subject to modification (\*) see details on p. 33/34

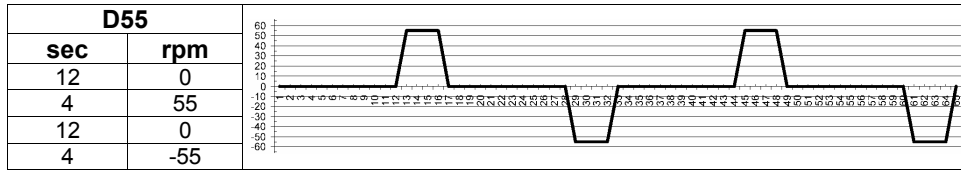
## 6.14 SILK Wash programmes

Phase		N.	Function	Times/Controls	Movement	Heating °C	Note	
Delay		-	Delayed start		Delay Time		No movement	
Wash		0	Drain	VAE + 8"	No movement			
		1	Water fill	P1+Qdw1(*)	D55		WASH compartment	
		2	Cold wash	1'		Refill Qdw2(*)		
		3	Heating	T		Programme T°		
		4	Maintenance	5'		Programme T°		
5	Drain	VAE +14"						
Rinses	1st/2nd rinse	6	Water fill	P1+Qrd1(*)	D55		PRE_WASH compartment	
		7	Maintenance	5'		Refill P1(*)		
		8	Drain	VAE +14"	No movement			
	3rd rinse	9	Water fill	P1	No movement		CONDITIONER compartment	
		10	Maintenance	30"	D55			
		11	Water fill	Qrd2(*)		CONDITIONER compartment		
		12	Maintenance	3'		Refill P1(*)		
		13	Drain	VAE +14"				
		14	Spin	3,8'		DEL_CF		

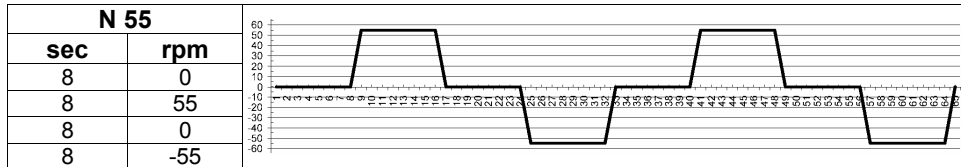
N.B. Data subject to modification (\*) see details on p. 33/34

## 6.15 Drum movements - low speeds and spin

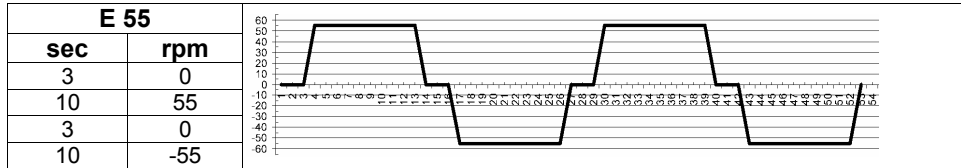
### 6.15.1 Delicate movement D55



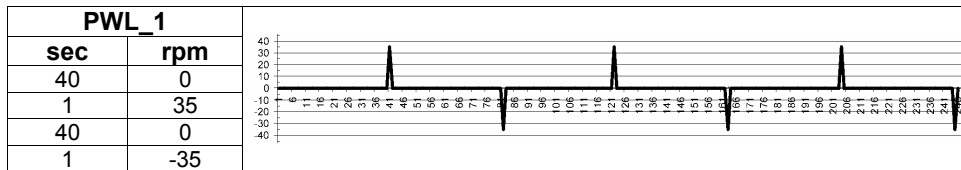
### 6.15.2 Normal movement N55



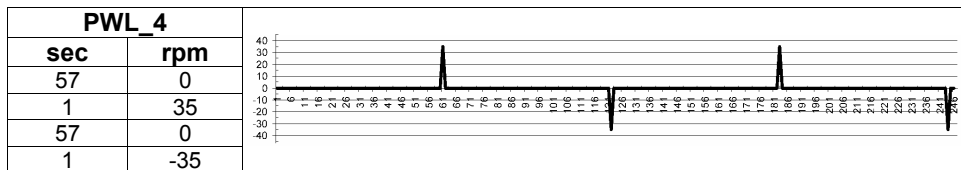
### 6.15.3 Vigorous movement E55



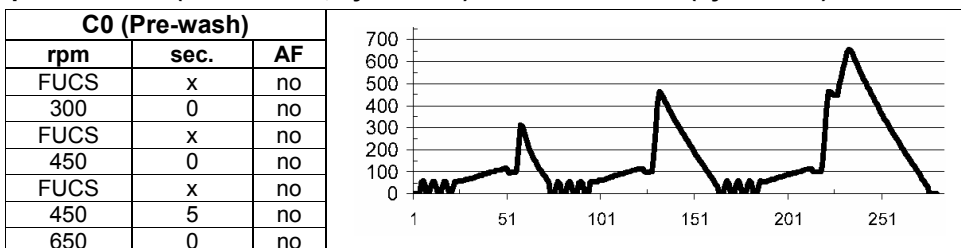
### 6.15.4 Delicate movement PWL\_1 (wool)



### 6.15.5 Delicate movement PWL\_4 (hand wash)

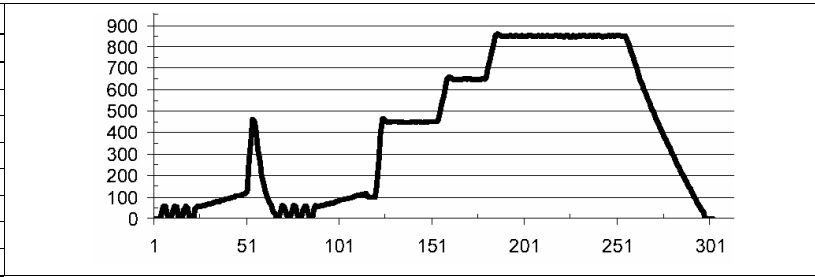


### 6.15.6 Spin Pre-wash (cotton/linen, synthetics) - C0 intermediate (synthetics)



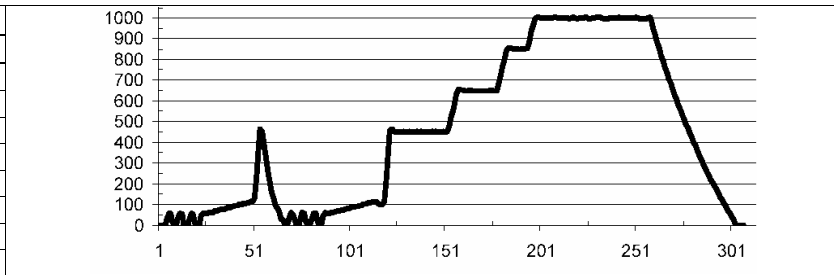
**6.15.7 Wash spin (cotton/linen) C1**

C1 (Wash)		
rpm	sec	AF
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	30	AF
650	15	AF
850	10	AF
850	60	no



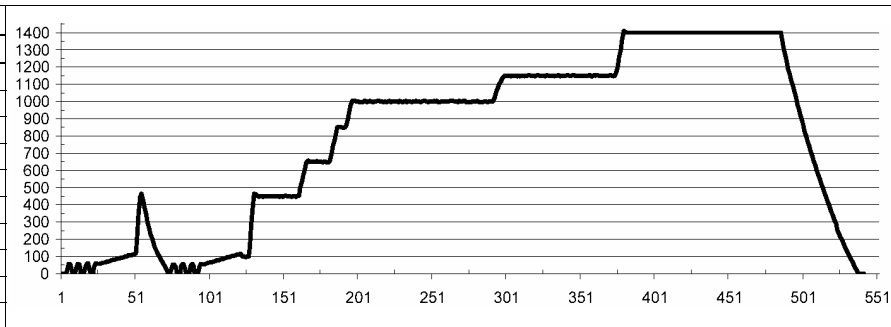
**6.15.8 Intermediate spin (cotton/linen) C2**

C2 (intermediate)		
rpm	sec	AF
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	30	AF
650	20	AF
850	10	AF
1000	60	no



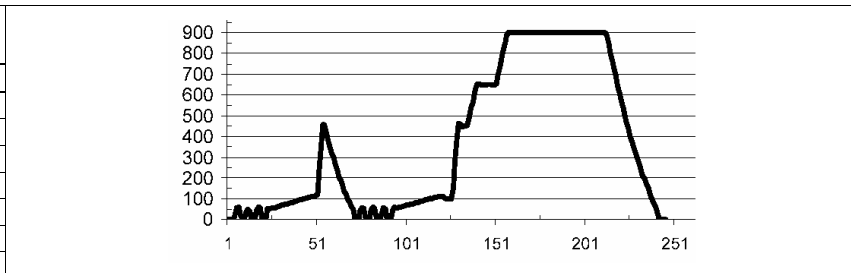
**6.15.9 Final spin (cotton/linen) COT\_CF**

COT_CF (final cotton)		
rpm	sec	AF
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	30	AF
650	15	AF
850	5	AF
1000	95	no
1150	75	no
1400	110	no



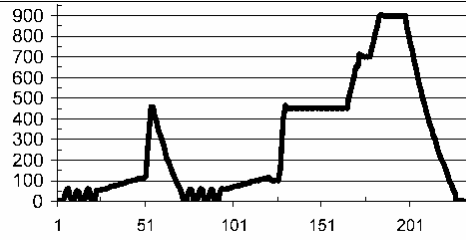
**6.15.10 Intermediate and final spin (synthetics) SYN\_CF**

SYN_CF (intermediate/final)		
rpm	sec	AF
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	5	no
650	10	no
900	55	no



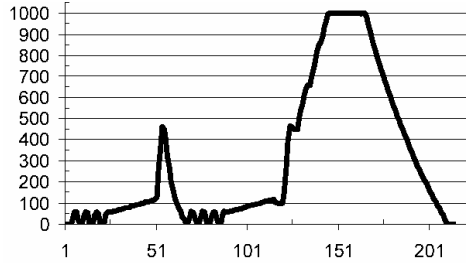
### 6.15.11 Final spin (delicate fabrics) DEL\_CF

CF (final delicates)		
rpm	sec	AF
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	35	AF
700	5	AF
900	20	AF



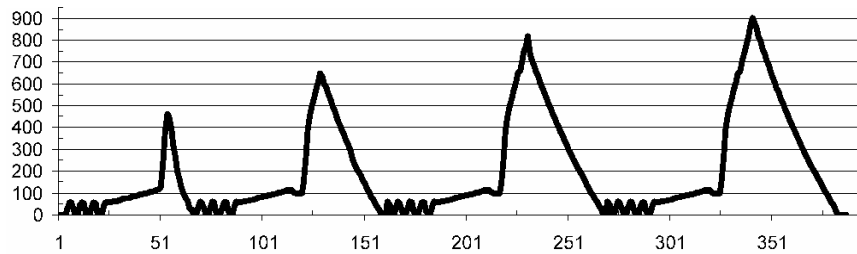
### 6.15.12 Final spin (wool and hand wash) WOOL\_CF

CF (final wool)		
rpm	sec	AF
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	5	AF
650	1	AF
850	1	AF
1000	20	no



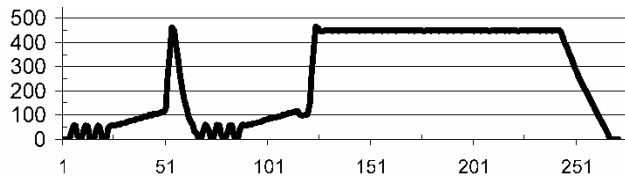
### 6.15.13 Impulse spin for easy-iron programmes EASY\_IRON\_IMP

EASY_IRON_IMP		
rpm	sec	AF
FUCS	x	no
450	0	no
FUCS	x	no
650	0	AF
FUCS	x	no
800	0	AF
FUCS	x	no
900	0	AF



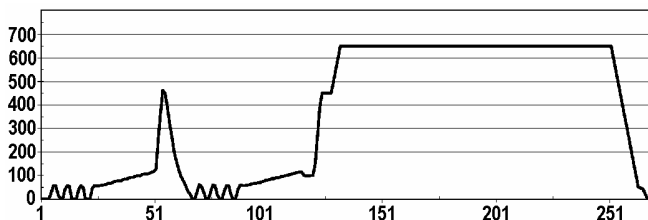
### 6.15.14 Intermediate spin for super-rinse options (cotton/linen) CSR

CSR		
rpm	sec	AF
FUCS	x	no
FUCS imp	x	no
FUCS	x	no
450	120	AF



### 6.15.15 Spin IMP\_BLANKET\_III\_650

IMP_BLANKET_III_650		
rpm	sec	
0	0	
FUCS	x	
FUCS imp	x	
FUCS	x	
450	5	
650	140	





Notes:

**AF** indicates if antifoam function is active

**FUCS** antiunbalance function before spin phase

**x** variable duration

- In the diagrams the speed is indicated as rotations per minute and the time in seconds

## 6.16 Control of water level in tub

The water fill is carried out in two phases:

- **level fill:** is controlled by the closure of 1<sup>st</sup> level pressure switch in the FULL position
- **time fill:** the duration is calculated by the electronic board to fill the correct quantity.

The different levels are determined by the model configuration and depend on the type of tub used.

Notes:

**P1** time needed to 1<sup>st</sup> level water fill

**(\*)** time water fills are variable and are calculated by the electronic board on the basis of the delivery rate (see specific table)

**T** time needed to heat the water to the set temperature

**”** seconds

**‘** minutes

**VAE** time needed to drain the water until the anti-boiling (safety heater) pressure switch goes to "EMPTY"

**Movement:** this column shows the drum movements at low speed and during spin. (See paragraph "drum movements")

The times of drain phases with spin cycle are indicative and do not take into consideration the intervention of the antiunbalancing and antifoam devices.

## 6.16.1 Time water fill

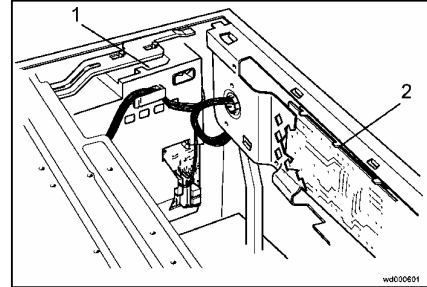
Type	Description of time fill	G18 litres	G19 litres	G20 litres	G21/2 litres
<b>Levels for COTTON/LINEN</b>					
<b>Qpw1</b>	First prewash water fill <i>(all cycles)</i>	5	5.0	3.5	3.5
<b>Qpw2</b>	Prewash water fill after cold wash <i>(all cycles)</i>	3.5	3.5	3.5	3.5
<b>Qhl</b>	Normal water fill/half load	0	5.0	3.5	3.5
<b>Qhl2</b>	Half load water fill for "VERY SHORT" cycle	5.5	5.5	4.5	4.5
<b>Qe</b>	Water fill for "energy label" cycle	0	2.5	4.5	3.5
<b>Qec</b>	Water fill for maintenance cold wash "energy label" cycle	0	0	0	0
<b>Qwe</b>	Refill for "energy label" cycle if prewash has not been selected	0	0	0	0
<b>Qw</b>	Wash refill if the cycle is not "energy label"	2.0	1.0	1.5	1.5
<b>Qc</b>	Cooling water fill	4.0	4.0	3.0	3.0
<b>Qs</b>	"Stains" compartment water fill	1.5	1.0	1.5	1.5
<b>Qk</b>	Water fill for "quick cycle" rinses	11.0	12.0	12.5	12.5
<b>Qn1</b>	Normal water fill for 1 <sup>st</sup> rinse	7.0	8.0	7.5	8.5
<b>Qn2</b>	Normal water fill for other rinses	7.0	9.0	9.0	9.5
<b>Qn3</b>	Normal water fill for last rinse	7.0	10.0	10.0	12.5
<b>Qn3e</b>	Water fill for economy last rinse	7.0	10.0	10.0	12.5
<b>Qne</b>	Normal water fill for rinse of "energy label" cycle	0	7.0	4.0	4.0
<b>Qne_60</b>	Water fill for rinse of "energy label" cycle	0	7.0	4.0	4.0
<b>Qsr1</b>	Water fill for super-rinse and night cycle if no spin has occurred	7.0	8.0	5.5	5.5
<b>Qsr2</b>	Water fill for super-rinse and night cycle if spin has occurred	8.0	6.0	6.0	6.0
<b>Levels for SYNTHETICS</b>					
<b>Qsy</b>	Wash water fill	3.0	0	1.0	1.0
<b>Qsy1</b>	Wash water fill for VERY SHORT cycle	2.5	2.5	3.5	4.0
<b>Qy1</b>	Wash water fill if prewash has not been selected	3.0	3.0	2.0	2.0
<b>Qyr1</b>	Normal water fill for 1 <sup>st</sup> rinse	6.0	8.0	8.0	8.5
<b>Qyr2</b>	Normal water fill for other rinses	6.0	8.0	8.0	8.5
<b>Qyr3</b>	Normal water fill for last rinse	6.0	8.0	9.5	10.0
<b>Levels for DELICATES</b>					
<b>Qdw1</b>	Wash water fill	9.5	9.0	8.5	9.0
<b>Qdw2</b>	Wash refill	0	0	0	0
<b>Qrd1</b>	Normal water fill for 1 <sup>st</sup> rinse and other rinses	9.0	9.5	10.0	11.0
<b>Qrd2</b>	Normal water fill for last rinse	10.5	11.5	11.0	11.5
<b>Levels for WOOL</b>					
<b>Qwo</b>	Wash water fill	9.0	8.5	10.0	10.5
<b>Qwo1</b>	Wash refill	0	0	0	0
<b>Qwor1</b>	Normal water fill for 1 <sup>st</sup> rinse and other rinses	7.5	9.5	8.0	8.5
<b>Qwor2</b>	Normal water fill for last rinse	8.0	10.0	8.0	8.5
<b>Levels for HAND WASH</b>					
<b>Qwh</b>	Wash water fill	8.5	8.5	10.0	10.5
<b>Qwh1</b>	Wash refill	0	10.0	0	0

(The data in the table are indicative)

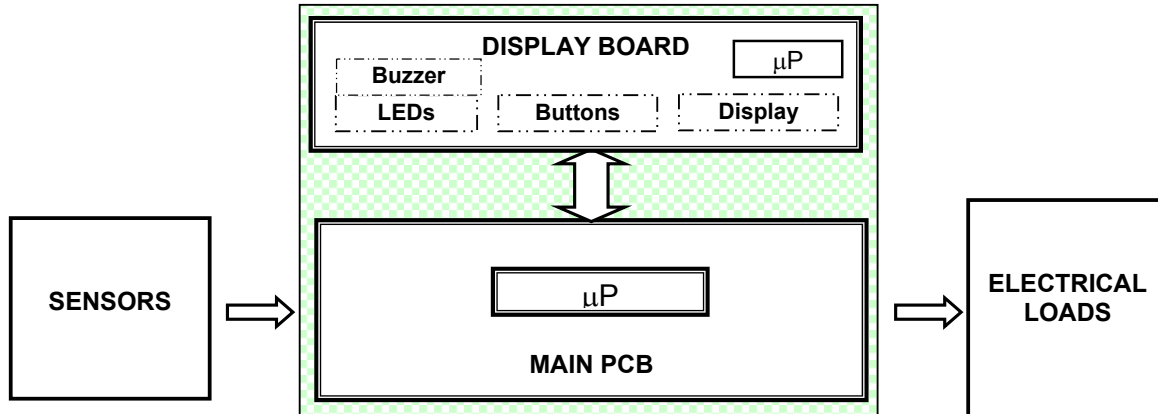
## 7 TECHNICAL CHARACTERISTICS

### 7.1 EWM1000 Plus Electronic control

The EWM1000 Plus electronic control consists of a main PCB (1) and a control/display board (2).

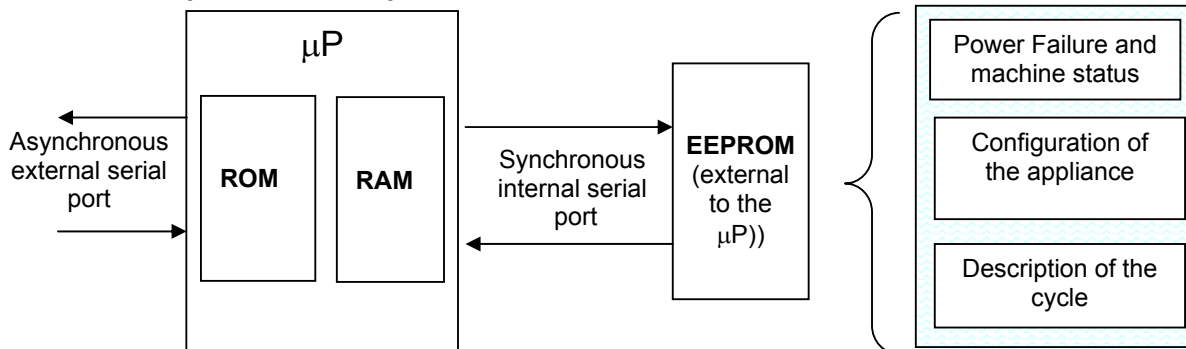


#### 7.1.1 Functions of the circuit board



- ⇒ The circuit board receives signals relative to the cycle settings via the control/display board. The buttons, the LEDs and the display are also mounted on this board.
- ⇒ The board also powers all the electrical components (solenoid valves, washing motor, drain pump, heating element, door interlock).
- ⇒ The board controls the temperature of the washing water via an NTC sensor, as well as the speed of rotation of the motor according to the signal received from the tachymetric generator.
- ⇒ It checks the water level in the tub via the level pressure switch and the safety pressure switch.

#### 7.1.2 Memory in the control system



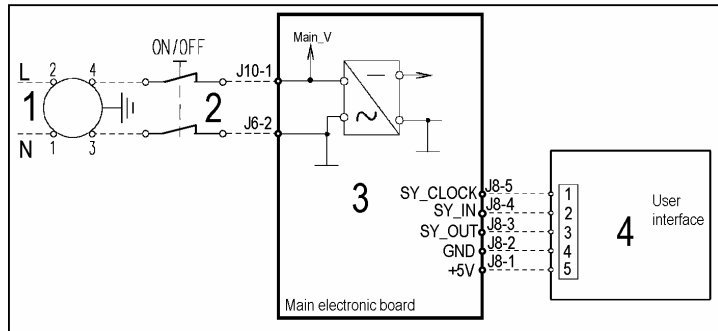
The main circuit board features an EEPROM memory (external to the microprocessor) which stores in memory data relative to the configuration, description of the cycle, cycle status in case of a power failure, and any alarm conditions.

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.).

## 7.2 Power supply and programme selection

The main board (3) is powered by the interference suppressor (1) and by the closure of the contacts of the main switch (2). The connectors used are J6-2 (neutral) and J10-1 (line).

The control/display board (4) is powered at 5V by the main board: the buttons can therefore be used for selection of the programmes and the options.



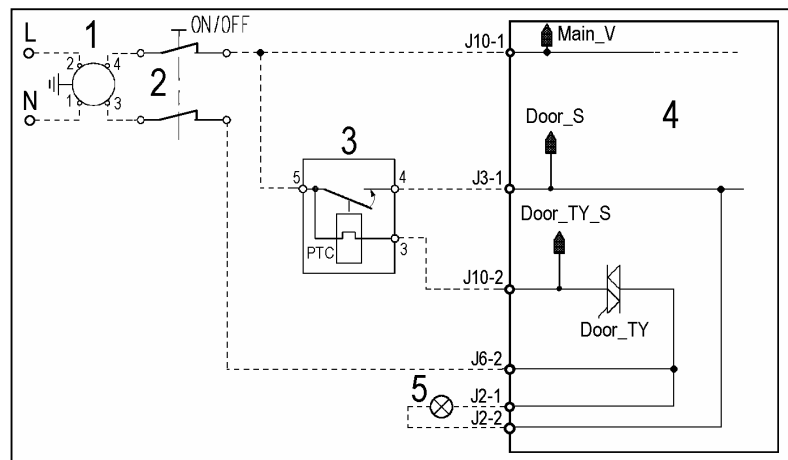
## 7.3 Door interlock

There are two types of door interlock:

- voltmetric with PTC: it is always necessary to wait from 1 to 3 minutes before opening the door.
- instantaneous: the door can be opened as soon as the cycle ends.

### 7.3.1 Voltmetric interlock with PTC

1. Suppressor
2. Main switch (button or programme selector)
3. Door interlock
4. Main PCB
5. Door closed pilot lamp



#### • Operating principle

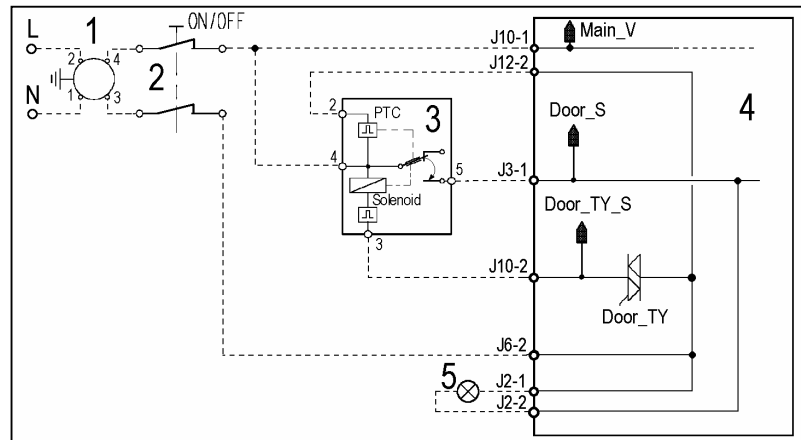
- When the washing programme is started by pressing the START/PAUSE button, the bi-metal PTC (contacts 3-5) is powered by the triac on the PCB (connector J6-2): after 2 – 4 seconds, this closes the switch (5-4) which powers the electrical components of the appliance (only if the door is closed).
- The door interlock prevents aperture of the door while the appliance is in operation.
- At the end of the washing programme, the PCB disconnects the interlock from the power supply, but the door remains locked for 1 to 2 minutes (PTC cooling time).

#### "Door locked" pilot lamp

- Certain models feature a pilot lamp which lights to indicate that the door is locked. This pilot lamp switches off when the door can be opened

### 7.3.2 Instantaneous door interlock

1. Suppressor
2. Main switch (button or programme selector)
3. Door interlock
4. Main PCB
5. Door locked pilot lamp



- **Operating principle**

- ↳ When the appliance is switched on, the ON/OFF switch closes and the bi-metal PTC (contact 4-2) is powered; the door, however, is not locked.
- ↳ When the programme starts (START/PAUSE button), the PCB transmits a 20 msec voltage signal to contacts 4-3 of the solenoid valve (connector J10-2 of the board) (at least 6 seconds must elapse after switching on); this signal locks the door and, at the same time, closes the main switch (contacts 4-5) which powers all the components in the appliance.
- At the end of the programme, the PCB transmits two 20 msec signals (at an interval of 200 msec).
  - the first signal does not release the door.
  - the second signal (which is transmitted only if the system functions correctly) releases the door interlock and at the same time the contacts of the main switch are opened.

- **Conditions necessary for door release**

- ↳ Before transmitting the door release signals, the main PCB checks for the following conditions:
  - the drum must be stationary (no signal from the tachymetric generator)
  - the water level must not be higher than the lower edge of the door
  - the temperature of the water must not exceed 50°C.

- **Automatic release device**

- ↳ In the event of a power failure, if the appliance is switched off, or if the solenoid should malfunction, the bi-metal PTC cools over a period of 1 to 4 minutes, and then releases the door.

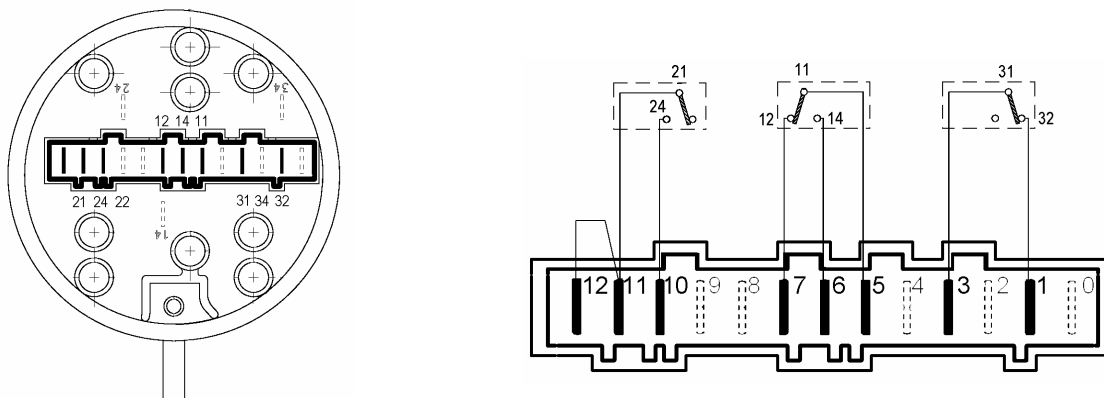
- **“Door locked” pilot lamp**

- ↳ Certain models feature a pilot lamp which lights to indicate that the door is locked. This pilot lamp switches off when the door can be opened.

## 7.4 Pressure switch

Control of the water level is performed by a two or three-level pressure switch which functions as follows:

- contact 11-14: anti-boiling safety level
- contact 21-24: first level
- contact 31-32: anti-overflow safety level (*not all models*)

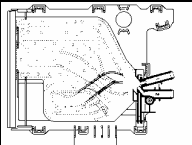
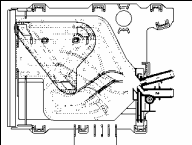
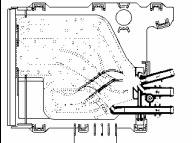


### 7.4.1 Pressure switch settings

	Full (mm)	Refill (mm)	Full (mm)	Refill (mm)
<b>Anti-boiling level</b>	60± 3	35± 3	55± 3	35± 3
<b>1st level</b>	95± 3	65± 3	80± 3	55± 3
<b>Anti-overflow level</b>	390± 15	240±50	390± 15	240±50

## 7.5 Detergent dispenser

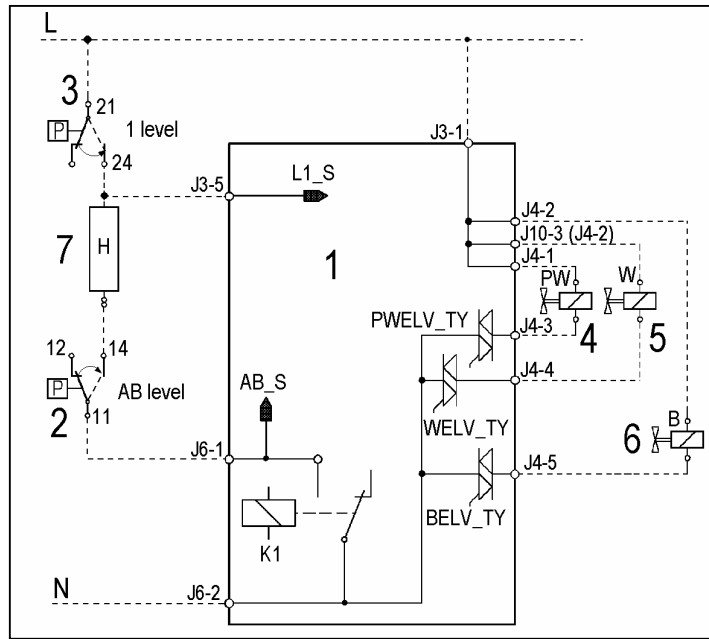
The EWM 1000 plus electronic system can control different types of dispensers:

Type	Detergent dispenser		No. of solenoid valves
<b>3 compartments</b>		Pre-wash/Stains – Wash – Conditioner ( <i>pre-wash and stain alternatively</i> )	2
<b>4 compartments</b>		Pre-wash/Stains – Wash – Bleach - Conditioner ( <i>the pre-wash/stain and conditioner compartment are linked together with a "intersection"</i> )	2
		Pre-wash/Stains – Wash – Bleach - Conditioner ( <i>pre-wash and stain alternatively</i> )	3

## 7.6 Water fill system

The solenoid valves are powered by the PCB via two or three triacs. The status of the pressure switch (empty/full) is detected by two “sensing” lines”.

1. PCB
  2. Anti-boiling level
  3. 1st level
  4. Pre-wash solenoid
  5. Wash solenoid
  6. Bleach solenoid (certain models only)
  7. Heating element
- AB\_S Anti-boiling level sensor  
L1\_S 1st level sensor



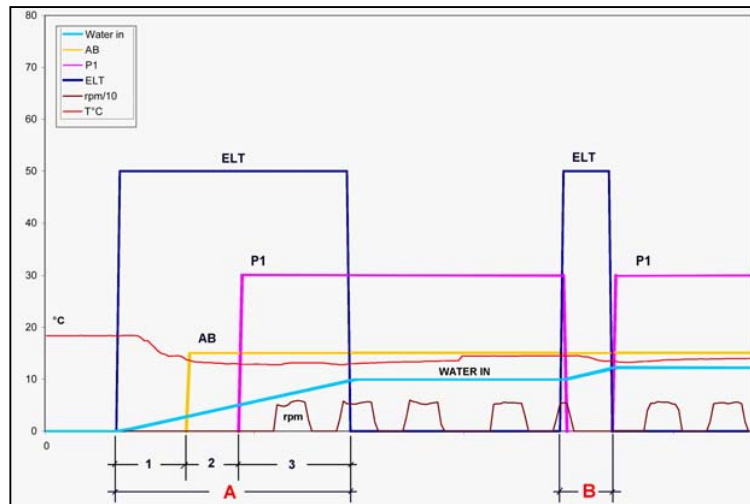
### 7.6.1 Calculation of flow rate

Calculation of the flow rate – necessary to determine the time for the supplementary fill – is performed by measuring the time that elapses between the closure of the anti-boiling contact on FULL and the closure of the 1st level contact.

$\text{Flow rate} = \frac{\text{Volume}}{\text{Time (T1-T2)}}$	<p><b>Volume</b> = Volume of the tub between the two levels (anti-boiling and 1st level)  <b>T1 –T2</b> = The time that elapses between the closure of the anti-boiling and 1st level contacts on FULL</p>
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#### • Water fill diagram

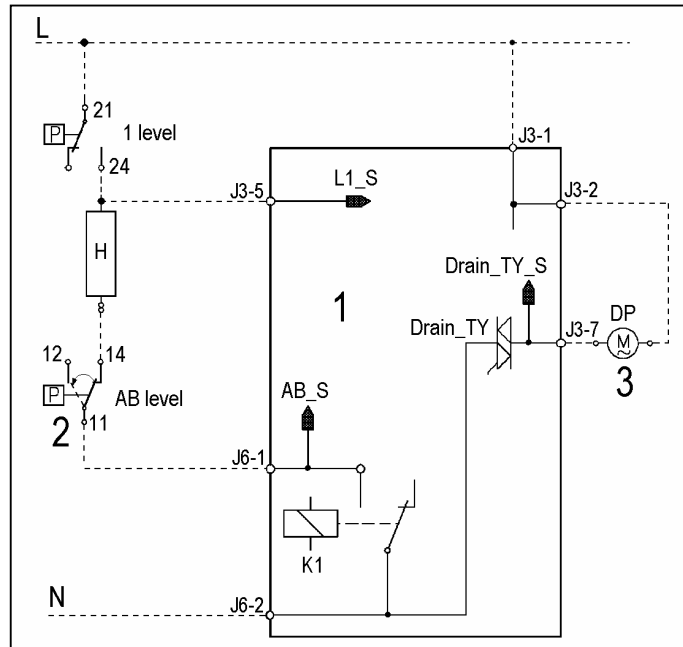
ELT = solenoid valve  
P1 = 1st level  
AB = anti-boiling level  
rpm = drum rotation speed  
Water in = water fill



- Phase A:** The phase during which the initial fill takes place:
1. Water fill until the anti-boiling pressure switch closes on FULL.
  2. Water fill until the 1st level pressure switch closes on FULL: the delivery of the solenoid is calculated during this phase.
  3. Water fill for time **Q**, which varies according to delivery and cycle phase.
- Phase B:** If the 1st level pressure switch returns to EMPTY, a supplementary fill is performed until the pressure switch returns to close on FULL. This phase may be followed by a further timer-controlled fill.

## 7.7 Drain pump

1. PCB
  2. Anti-boiling pressure switch
  8. Drain pump
- AB\_S Anti-boiling level sensor



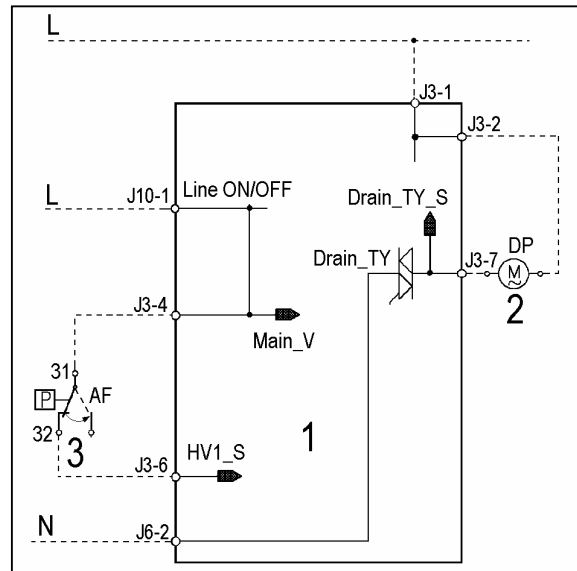
The PCB powers the drain pump via a triac as follows:

- ↳ for a pre-determined period.
- ↳ until the anti-boiling pressure switch closes on EMPTY, after which the pump is actioned for a brief period or passes to the subsequent phase

## 7.8 Anti-flooding device

1. PCB
2. Drain pump
3. Anti-overflow pressure switch

HV1\_S Anti-overflow level sensor



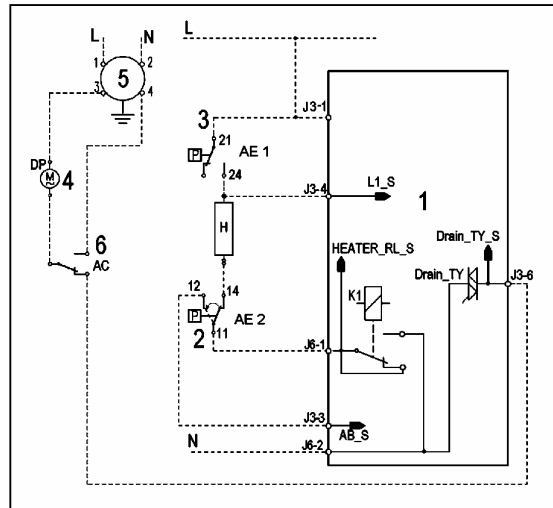
The third pressure switch level (if featured) is used as an anti-overflow safety device: if the pressure switch contact should open in the FULL position, the PCB actions the drain pump until the pressure switch returns to the EMPTY position.



## 7.9 Aqua Control (certain models only)

The Aqua Control system is a sensor located in contact with the base frame. The sensor detects water leaks inside the machine (not only during normal operation, but also when the unit is off and plugged in) and starts the drain pump if a leak occurs.

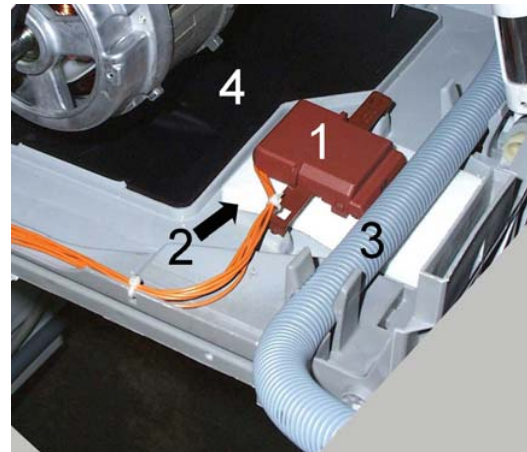
1. Main board
2. First-level pressure switch 1° LIV
3. Anti-boiling pressure switch AE
4. Drain pump
5. Suppressor
6. Aqua Control



Besides supporting the various components on the appliance (drain pump, recirculation pump, shock absorbers, etc.), the base frame is designed to be a container that collects any water leaks that may occur (from the drum, from a tube or pipe, etc.). These leaks are directed into an area where a float is installed. When this float is raised by water, it actuates a microswitch that starts the drain pump. When the switch is tripped, an ALARM is also generated (if the machine is switched on).

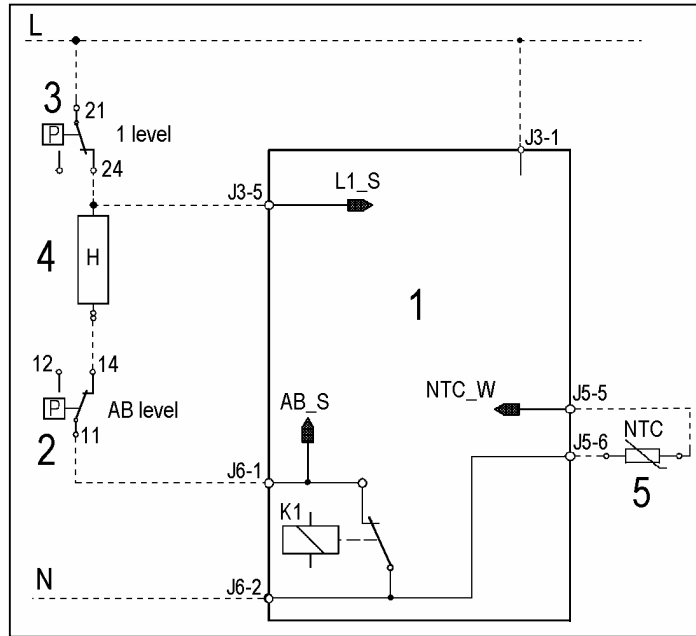
**Important:** When replacing the drain pump or tube, position the tube so that it does not interfere with the float.

1. microswitch actuated by float
2. float
3. drain tube
4. cover



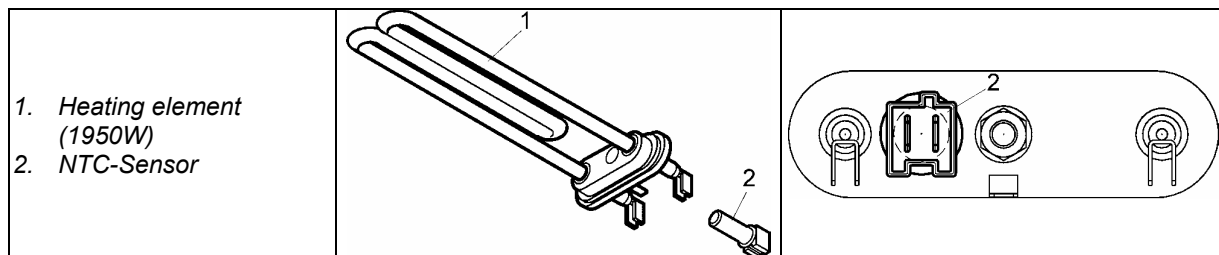
## 7.10 Heating

1. PCB
  2. Anti-boiling pressure switch
  3. 1st level pressure switch
  6. Heating element
  7. NTC temperature sensor
- K1 Relay  
 AB\_S Anti-boiling level sensor  
 L1\_S 1st level sensor



The heating element is powered by a relay on the main PCB via the contacts of the pressure switch when closed on FULL.

### 7.10.1 Heating element



### 7.10.2 Temperature sensor

The temperature is controlled by the main PCB by means of an NTC temperature sensor

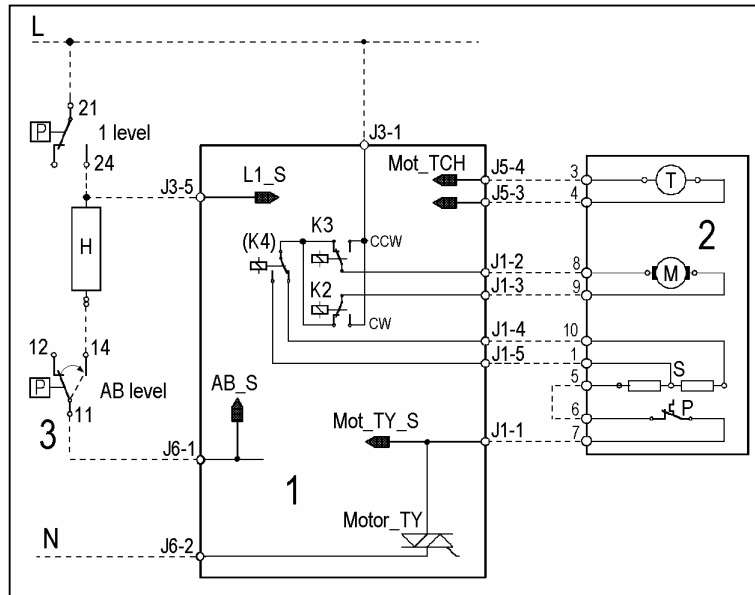
TEMPERATURE (°C)	RESISTANCE (Ω)		
	Nominal value	Nominal value	Nominal value
20	6050	6335	5765
60	1250	1278	1222
80	640	620	660

## 7.11 Motor

1. PCB
2. Motor
3. Anti-boiling/anti-foam pressure switch

M = rotor  
P = motor safety cut-out  
S = stator  
T = tachimetric generator

AB\_S Anti-boiling/anti-foam level sensor



## 7.12 Power supply to motor

The main PCB powers the motor via a triac. The direction of rotation is reversed by switching of the contacts on the two relays (K2-K3), which modify the connection between the rotor and the stator.

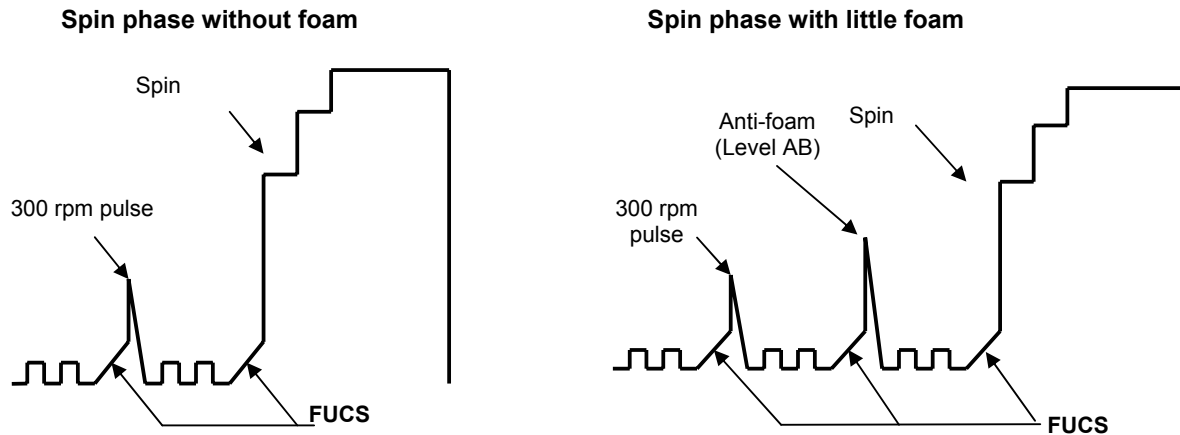
In certain models (1200-1600rpm), a third relay (K4) is used to power the stator (full or half field) according to the spin speed

The speed of rotation of the motor is determined by the signal received from the tachimetric generator.

During the spin phases, the microprocessor, depending on the software configuration, may perform the anti-foam control procedure (if featured) and the anti-unbalancing control procedure

## 7.13 Anti-foam control system

The anti-foam control procedure (if featured) is performed via the anti-boiling pressure switch (AB).

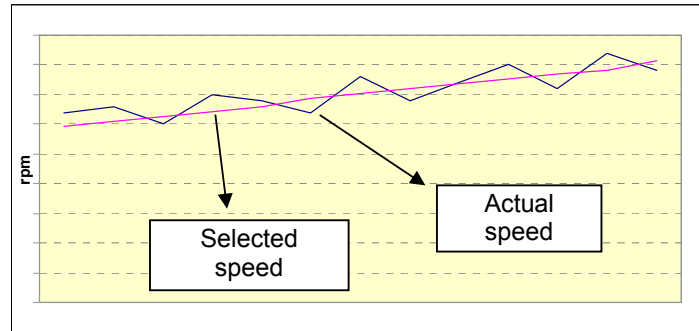


- **Spin with little foam:** if the contact of pressure switch AB closes on FULL, the spin phase is interrupted; the drain pump continues to operate and, when the contact returns to EMPTY, the spin phase is resumed.
- **Spin with excessive foam in the tub (critical situation):** The control system detects whether the pressure switch commutates 5 times to FULL. In this case, the spin phase is skipped, and a one-minute drain cycle is performed with the motor switched off; in the case of a washing phase, a supplementary rinse is added.

## 7.14 “FUCS” (Fast Unbalance Control System) ( Fast Unbalance Control System)

The control procedure for unbalanced loads is performed dynamically, before each spin cycle, as follows:

- ↪ The phase begins at a speed of 55 rpm; the speed can never fall below this threshold, otherwise the check is repeated.
- ↪ At intervals of 300 ms, the balance is calculated and compared with predetermined limits. If the value is less than the lower limit, the speed of the drum is increased by a certain value depending on the transmission relation between motor pulley/drum; if the unbalancing is higher, it is decreased by the same value. The reduction in the speed of the drum distributes the washing correctly; this procedure is repeated until the wash load is completely balanced.
- ↪ Correct balancing of the wash load is achieved at a speed of 115 rpm, after which the spin cycle begins.



The Unbalancing Control function takes place in different phases: each phase is characterized by:

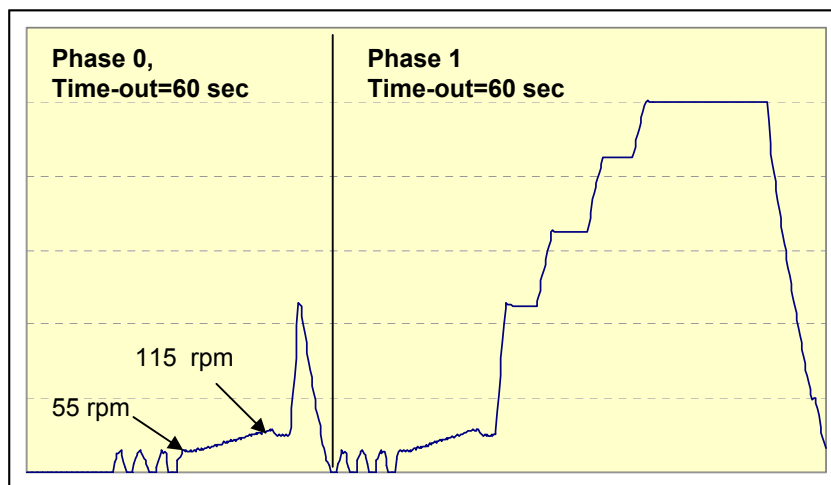
- ↪ an unbalancing index (0-1-2-3)
- ↪ an unbalancing threshold value (ex: 350, 650, 850, 1200g)
- ↪ a time out (max. time)

- **Ending of the FUCS balancing phase**

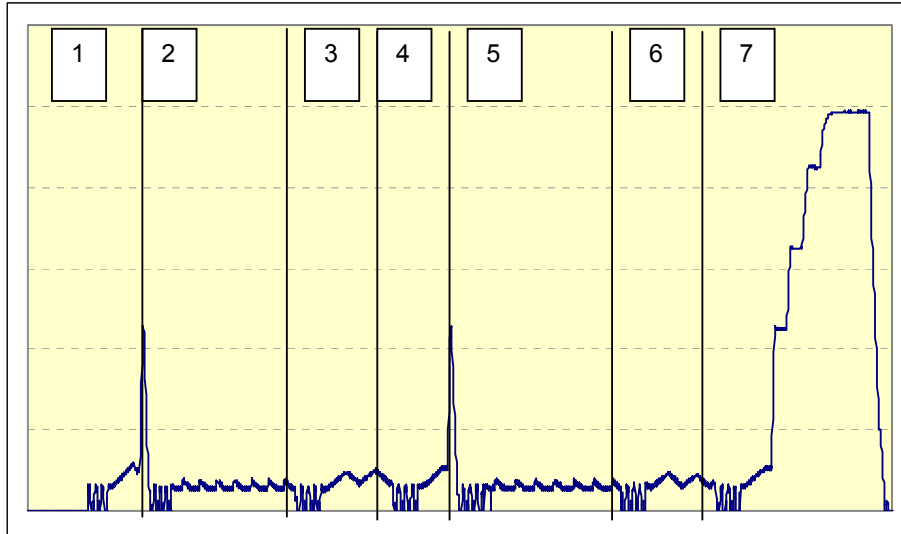
The phase is ended when:

- ↪ The drum rotation speed is 115 rpm (or 85rpm in some cases of unbalancing index). In this case the spin is performed.
- ↪ In some cases the optimal balancing value is not reached: a reduced-speed spin is performed depending on the unbalancing.
- ↪ In the worst case, in which all phases are not sufficient to reach a minimum balancing value, the spin is not performed.

- **Example of perfect balancing**



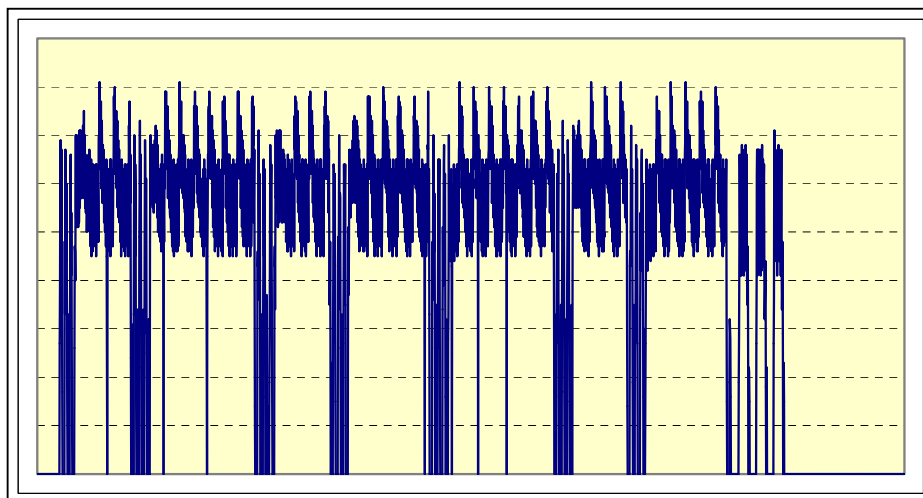
- **Balancing in the longest available interval**



Phase	Unbalancing index	Time-out (sec)
1	0	60
2	1	120
3	2	60
4	3	90
5	1	120
6	2	90
7	3	90

- **Unbalancing after all phases**

In this case the spin (or impulse) is not performed.



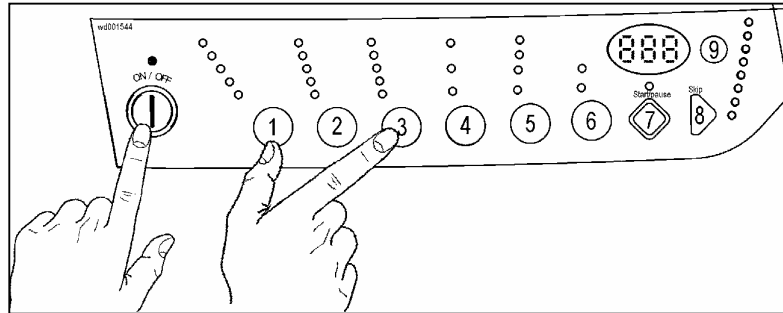
## 8 DEMO Mode

A special cycle has been created for demonstration of the operation of these appliances in retail outlets without connecting the appliance to the water supply. In this way, the salesman can select any programme; after starting the cycle by pressing START, the appliance will perform certain phases only, and will skip those which cannot be performed (water fill, drain, heating).

The cycle takes place as follows:

- ↪ the door locking device is actioned in the normal way (i.e. the door remains locked while the appliance is in operation, and can be opened at the end of the cycle or in pause mode)
- ↪ motor: all low-speed movements are enabled, while the pulse signals and the spin cycle are excluded
- ↪ the water fill solenoids and the drain pump are disabled
- ↪ display: since the phases of the cycle take place in rapid succession (1 second of the demo cycle is equivalent to 1 minute of the actual cycle), the time-to-elapsed decreases by 1 unit per second. Remember that the time-to-elapsed does not always correspond to the actual cycle time
- ↪ alarms: for reasons of safety, the following groups of alarms remain enabled: E40 (door closed), E50 and E90 (communication between the boards/configuration).

### 8.1 Setting Demo mode



1. Cancel the current programme and switch the appliance off.
2. Press the FABRICS (1) and SPIN (3) buttons simultaneously and then, holding the buttons down, switch the appliance on using the ON/OFF button.
3. Hold the buttons down for at least 2 seconds within 5 seconds.

### 8.2 Exiting demo mode

- ↪ To exit demo mode, switch the appliance off.

## 9 DIAGNOSTICS SYSTEM

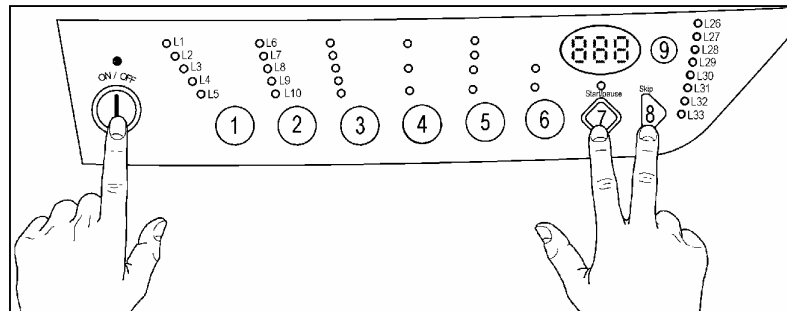
### 9.1 Access to diagnostics system

Using a single procedure, it is possible to access to the diagnostics system. After accessing this function, the following operations can be performed:

- control of the operation of each of the components in the appliance
- read / cancel the alarms

The diagnostics cycles are available only if the communication between the main PCB and the display board is correct; also, there must not be configuration errors of the appliance.

**To access:**

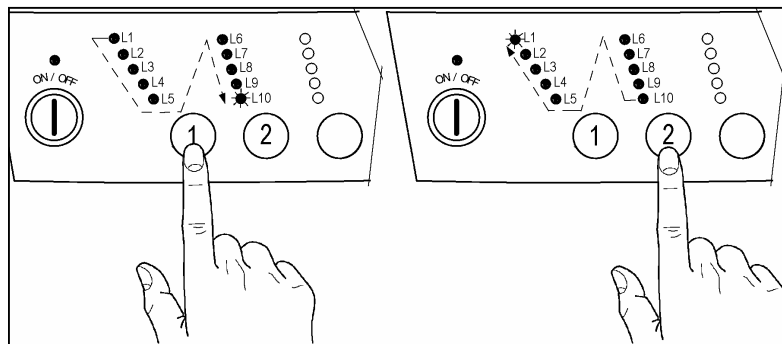


1. Reset the set programme with the SKIP/RESET (8) button and then switch the appliance off.
2. Press the START/PAUSE (7) and SKIP/RESET (8) buttons simultaneously and then, holding the buttons down, switch the appliance on using the ON/OFF button.
3. Hold the buttons down until the buzzer sounds and the LEDs start flashing (about 4 seconds).

### 9.2 Phases of the diagnostics test

After activating the diagnostics system the operating diagnostics of the various components and the reading of the alarms can be carried out.

In the diagnostics cycle all alarms are activated. If an alarm condition occurs during the cycle, the machine stops and the LEDs (and the display) flash indicating the relative code.



- ↪ Pressing the "FABRICS" (1) button the first phase of the test starts (LED L1 on).
- ↪ Pressing it again, the number of the control phase increases until the starting point is reached again; the LED corresponding to the diagnostics phase lights (L1 → L2.. → L10 → ... → L1).
- ↪ Pressing the "TEMPERATURE" (2) button again the number of the control phase decreases until the starting point is reached again (L10 → L9.. → L1).

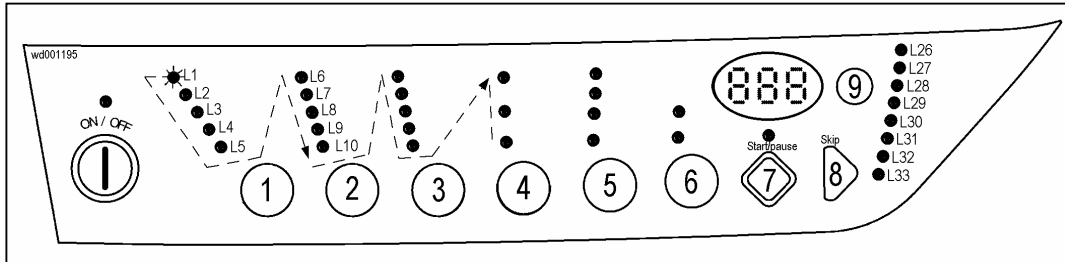
Diagnostics phases				
LED	Components actioned	Operating conditions	Function checked	Displayed parameters (1)
	All the LEDs light in sequence. When a button is pressed, the corresponding LED lights (and the buzzer, if featured, sounds)	Always activated	Operation of the user interface	Button codification
	Door interlock Washing solenoid	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through washing compartment	OFF
	Door interlock Pre-wash solenoid	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through pre-wash (bleach) compartment	OFF
	Door interlock Pre-wash and wash solenoids	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through conditioner compartment	OFF
	Door interlock. Bleach/stains solenoid.	Door locked Water level below anti-flooding level Maximum time 5 minutes	Water ducted through bleach/stains compartment	OFF
	Door interlock Washing solenoid if the level of water in the tub is below 1st level Heating element.	Door locked. Water at 1st level. Maximum time 10 min. or up to 90°C. (*)	Heating	OFF
	Door interlock. (Washing solenoid if the level of water in the tub is below 1st level). Motor (55 rpm clockwise, 55 rpm counter-clockwise, 250 rpm impulse)	Door locked Water level at 1st level.	Check for leaks from the tub	OFF
	Door interlock Drain pump Motor up to 650 rpm then at maximum spin speed	Door locked Water level lower than anti-boiling level for spinning	Drain and spin; control of congruence in closure of level pressure switches	OFF
9	---	---	---	---
	Reading/cancelling last alarm	---	---	OFF

(\*) In most cases, this time is sufficient to check the heating. However, the time can be increased by repeating the phase without draining the water: pass for a moment to a different phase of the diagnostics cycle and then back to the heating control phase (if the temperature is higher than 80°C, heating does not take place).

(1) Models with Display.



### 9.2.1 Display board diagnostics

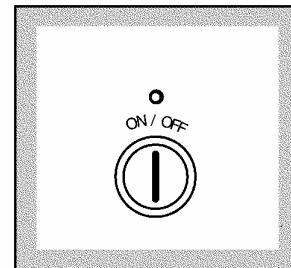


After entering the diagnostics system, the display board is checked: all LEDs and the display light in sequence (if featured).

- ↪ Pressing the buttons the corresponding LEDs light; the display shows the relative code to the codification of the button and the buzzer sounds.
- ↪ When the "FABRICS" (1) or "TEMPERATURE" (2) button is pressed, the relative LEDs light for a second and the button code is displayed; at the end of the beep of the buzzer the diagnostics programme passes one phase forward or back.

### 9.3 Exiting the diagnostics system

- ↪ To exit the diagnostics system switch the appliance off, then on and then switch off again.



wd001192

# 10 ALARMS

## 10.1 User alarm display

Control of the alarm system can be configured; according to the model, therefore, some or all of the alarms may be displayed to the user.

Normally all the alarms are displayed to the user except for:

- E61 (insufficient heating during the washing phase),

**The alarms are active during the execution of the washing programme; except for the alarms relative to the configuration and power/frequency supply which are also displayed in the selection phase.**

The door can normally be opened (except where specified) when an alarm condition has occurred on condition that:

- The level of the water in the tub is below 1st level
- The temperature of the water is lower than 55°C

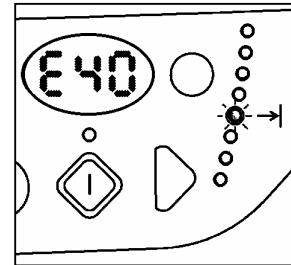
Certain alarm conditions require that a drain phase be performed before the door can be opened:

- Cooling water fill if the temperature is in excess of 65°C
- Drain until closure of both pressure switch contacts (1st level and anti-boiling safety system) on EMPTY within a maximum of 3 minutes.

### 10.1.1 Alarms displayed during normal operation

The type of alarm condition is displayed to the user by the repeated flashing of the END OF CYCLE LED (0.4 seconds lit, 0.4 seconds off, with an interval of 2.5 seconds between sequences).

This LED is featured on ALL MODELS, though configured in different positions.



If, for example, the user should forget to close the door, the control system will detect alarm E41 about 15 seconds from the start of the cycle; the cycle remains in PAUSE mode and the display, if featured, would display E40.

Simultaneously the end-of-cycle LED flashes repeating the sequence indicated in the table.

The four flashi indicate the first of the two digits of the alarm E41 (the alarms relative to a same function are grouped by families).

In this case, once the door has been closed, it is sufficient to press the start button to start the programme.

end of cycle LED →		
On/Off	Time (Sec.)	Value
☀	0.4	1
○	0.4	
☀	0.4	2
○	0.4	
☀	0.4	3
○	0.4	
☀	0.4	<b>4</b>
○	0.4	
○	2.5	Pause between sequences

## 10.2 Reading the alarm codes

In order to read the last alarm code memorized in the EEPROM on the PCB:

- Enter diagnostics mode
- Press the Fabrics (1) or Temperature (2) button until LED L10 lights

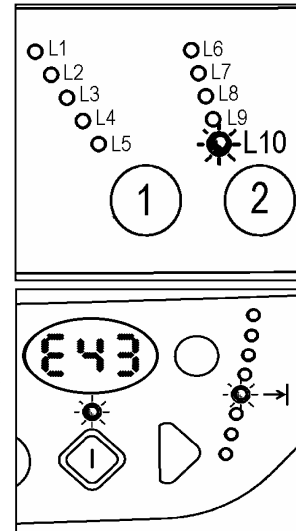
### 10.2.1 Displaying the alarm

The alarm is displayed by a repeated flashing sequence of the two LEDs (0.4 seconds lit, 0.4 seconds off, with an interval of 2.5 seconds between sequences).

The buzzer (if featured) will sound "beeps" in synchronization with the flashing of the LEDs.

- **END OF CYCLE LED** → indicates the first digit of the alarm code (family)
- **START/PAUSE** → indicates the second digit of the alarm code (number within the family)

These two LEDs are featured on all models (though they are **configured differently**), and flash simultaneously.



Notes:

- The first letter of the alarm code "E" (Error) is not displayed, since this letter is common to all alarm codes.
- The alarm code "families" are shown in hexadecimal; in other words:
  - A is represented by 10 flashes
  - B is represented by 11 flashes
  - ...
  - F is represented by 15 flashes
- Configuration errors are shown by the flashing of a series of LEDs (user interface not configured).

### 10.2.2 Examples of alarm displays

Example: Alarm E43 will display the following:

- On the display, if featured, **E43**
- The sequence of **four** flashes of the **End-of-cycle LED** indicates the first number **E43**;
- The sequence of **three** flashes of the **Start/Pause LED** indicates the second number **E43**;

END-OF-CYCLE LED →			START/PAUSE LED ◊		
On/Off	Time (Sec.)	Value	On/Off	Time (Sec.)	Value
☀	0.4	1	☀	0.4	1
○	0.4		○	0.4	
☀	0.4	2	☀	0.4	2
○	0.4		○	0.4	
☀	0.4	3	☀	0.4	3
○	0.4		○	0.4	
☀	0.4	4	○	3,3	Pause
○	0.4				
○	2.5	Pause			

### 10.2.3 Operation of alarms during diagnostics

All alarms are enabled during the components diagnostics phase. Moving the selector to pass from one control phase to the other, the appliance exits the alarm condition and performs the selected phase (if the alarm does not occur again).

## 10.3 Notes about some alarms

### Configuration alarms

- ↪ **E91:** the error is indicated by the flashing of all the LEDs, E90 is displayed on the display, if featured.
- ↪ **E92:** the error is indicated by the flashing of the LEDs placed over the buttons, E90 is displayed on the display, if featured.
- ↪ **E93:** the error is indicated by the flashing of the phase/warning LEDs, E90 is displayed on the display, if featured.

- **Alarms EB1-EB2-EB3:** in case of problems with the power supply, the machine remains in alarm condition until the frequency or the power supply voltage returns to the correct values or the appliance is switched off. The “B” alarm family is displayed and it is not possible to enter the diagnostics or to use “fast alarm display” mode: the complete alarm can be read only when the abnormal situation has terminated.

- **Alarms E51- E52:** during the diagnostics test all alarms are displayed: normally, moving the selector to pass from one control phase to the next, the appliance exits the alarm condition and performs the selected phase. This does not occur for the E51 alarm (motor power triac short-circuited) and the E52 alarm (no signal from the motor tachimetric generator): the only possibility to exit from the alarm condition is to switch the appliance off.

## 10.4 Rapid reading of alarm codes

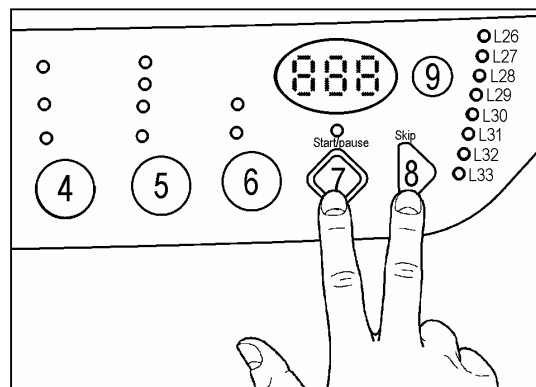
The last alarm code can be displayed even if the programme selector is not in the tenth position (diagnostics) or if the appliance is in normal operating mode (e.g. during the execution of the washing programme):

- ↪ Press **START/PAUSE** and **SKIP/RESET** buttons simultaneously for at least 2 seconds: the LEDs switch off and then display the sequence of flashes indicating the alarm.
- ↪ The alarm sequence is displayed for the time in which the buttons are hold down
- ↪ The reading system is the same as that indicated in paragraph. 9.2.1
- ↪ During the time the alarm is displayed, the appliance continues to perform the cycle or, if it is in the selection phase, it keeps the options previously chosen in memory.

## 10.5 Cancelling the last alarm

It is good practice to cancel the last alarm, after reading the alarm code to check whether the alarm re-occurs during the diagnostics control after the repairs t the appliance.

1. Select diagnostics mode and turn the programme selector to the **tenth** position (reading of alarm)
2. Press and hold down **START/PAUSE** and **START/RESET**.



## 10.6 Table of alarm codes

Alarm	Description	Possible fault	Action/machine status	Reset
E11	Difficulties in water fill for washing	Tap closed or mains pressure insufficient; drain hose incorrectly positioned; water fill solenoid faulty; leaks from the hydraulic circuit of the pressure switch; pressure switch faulty; wiring faulty; PCB faulty.	Cycle paused with door closed	Start
E13	Water leakage	Drain hose incorrectly positioned; mains pressure insufficient; water fill solenoid faulty; leakage/blockage of pressure switch hydraulic circuit; pressure switch faulty.	Cycle paused with door closed	Start
E21	Difficulties in draining	Drain hose kinked/blocked/incorrectly positioned; drain filter blocked/dirty; drain pump faulty; wiring faulty; PCB faulty; current leakage from heating element to ground.	Cycle paused	Start
E23	Drain pump triac faulty	Drain pump faulty; wiring faulty; PCB faulty.	Safety drain cycle – Cycle stopped with door open	OFF/reset
E24	Fault in “sensing” circuit of drain pump triac	PCB faulty.	Safety drain cycle – Cycle stopped with door released	OFF/reset
E33	Incongruence between closure of anti-boiling and 1st level pressure switch contacts	Pressure switch faulty; current leakage from heating element to ground; heating element; wiring faulty; PCB faulty.	Safety drain cycle – Cycle stopped with door open	OFF/reset
E35	Water overflow (flooding)	Water fill solenoid faulty; leakage from pressure switch hydraulic circuit; pressure switch faulty; wiring faulty; PCB faulty.	Cycle blocked. Safety drain cycle. Drain pump always in operation (5 minutes on, 5 minutes off etc.)	OFF/reset
E36	Fault in “sensing” circuit of anti-boiling pressure switch	PCB faulty.	Cycle blocked, door locked.	OFF/reset
E37	1st level sensing circuit faulty	PCB faulty.	Cycle blocked, door locked.	OFF/reset
E39	“HV” sensor of anti-overflow level faulty	PCB faulty.	Cycle blocked, door locked.	OFF/reset
E41	Door open	Door interlock faulty; wiring faulty; PCB faulty.	Cycle paused	Start
E42	Problems of door closure	Door interlock faulty; wiring faulty; PCB faulty.	Cycle paused	Start
E43	Interlock power supply triac faulty	Door interlock faulty; wiring faulty; PCB faulty.	(Safety drain cycle) Cycle blocked	OFF/reset
E44	Door interlock sensor faulty	PCB faulty.	(Safety drain cycle) Cycle blocked	OFF/reset
E45	Door interlock sensing circuit triac faulty	PCB faulty	(Safety drain cycle) Cycle blocked	OFF/reset
E51	Motor power supply triac short-circuited	PCB faulty; current leakage from motor or from wiring.	Cycle blocked, door locked (after 5 attempts)	OFF/reset
E52	No signal from motor Tachimetric generator	Motor faulty; wiring faulty; PCB faulty	Cycle blocked, door locked (after 5 attempts)	OFF/reset
E53	Motor triac sensing circuit faulty	PCB faulty.	Cycle blocked, door locked	OFF/reset

<b>E54</b>	<b>Motor relay contacts sticking</b>	PCB faulty; current leakage from motor or from wiring	Cycle blocked, door locked (after 5 attempts)	OFF/reset
<b>E61</b>	<b>Insufficient heating during washing</b>	NTC sensor faulty; heating element faulty; wiring faulty; PCB faulty.	The heating phase is skipped	---
<b>E62</b>	<b>Overheating during washing</b>	NTC sensor faulty; heating element faulty; wiring faulty; PCB faulty.	Safety drain cycle – Cycle stopped with door open	OFF/reset
<b>E66</b>	<b>Heating element power relay faulty</b>	PCB faulty; current leakage from heating element to ground.	Safety drain cycle – Cycle stopped with door open	OFF/reset
<b>E71</b>	<b>Washing NTC sensor faulty</b>	NTC sensor faulty; wiring faulty; PCB faulty.	The heating phase is skipped	Start
<b>E74</b>	<b>Washing NTC-sensor badly positioned</b>	NTC sensor badly positioned; NTC sensor faulty; wiring faulty; PCB faulty.	The heating phase is skipped	Start
<b>E91</b>	<b>Communication error between main PCB- display board</b>	Wiring faulty; control/display board faulty Main PCB faulty.	Cycle interrupted	---
<b>E92</b>	<b>Communication incongruence between main PCB- display board (versions not compatible)</b>	Wrong control/display board; Wrong PCB (do not correspond to the model).	Cycle interrupted	---
<b>E93</b>	<b>Incorrect configuration of appliance</b>	Incorrect configuration data; PCB faulty.	Cycle interrupted	OFF/reset
<b>E94</b>	<b>Incorrect configuration of washing cycle</b>	Incorrect configuration data; PCB faulty.	Cycle interrupted	OFF/reset
<b>E95</b>	<b>Communication error between microprocessor and EEPROM</b>	PCB faulty.	Cycle interrupted	OFF/reset
<b>E97</b>	<b>Incongruence between button and cycle configuration</b>	Wrong configuration data.	Cycle interrupted	OFF/reset
<b>EB1</b>	<b>Frequency of appliance incorrect</b>	Power supply problems (incorrect / disturbance); PCB faulty.	Cycle interrupted	---
<b>EB2</b>	<b>Voltage too high</b>	Power supply problems (incorrect / disturbance); PCB faulty.	Cycle interrupted	---
<b>EB3</b>	<b>Voltage too low</b>	Power supply problems (incorrect / disturbance); PCB faulty.	Cycle interrupted	---
<b>EF1</b>	<b>Drain filter blocked (drain phase too long)</b>	Drain tube blocked/kinked/too high; Drain filter dirty/blocked.	Warning displayed at the end of cycle (specific LED)	Start
<b>EF2</b>	<b>Overdosing of detergent (too much foam during drain phases)</b>	Excessive detergent dosing; drain tube kinked/blocked; Drain filter dirty/blocked.	(specific LED)	---
<b>EF3</b>	<b>Intervention of aqua control</b>	Water leakage into base; aqua control device faulty	Water drain; cycle blocked	---
<b>E00</b>	<b>No alarm</b>	---	---	---

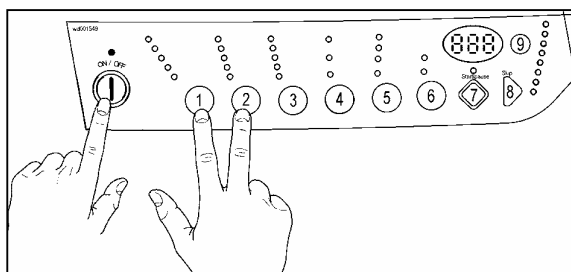
## 11 Operating time counter

It is possible to display, with a specific procedure, the operating time of the appliance, which is counted from the first switching on.

This option is available only in models with display. The maximum memorization capacity is **6550** operating hours.

- Only the operating time of normal programmes is displayed (not diagnostics cycles)
- The actual time of the cycle performed is counted (not the pauses, the delayed start time, rinse hold and the soak phases)
- The memorization is precise to within 30 seconds for each programme
- Only whole hours are displayed (1h and 59min = 1h)

### 11.1.1 Reading the operating time

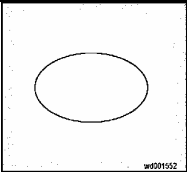
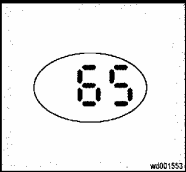
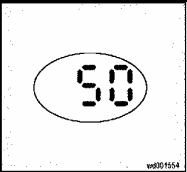


1. Reset the current programme and switch the appliance off.
2. Press the FABRICS (1) TEMPERATURE (2) buttons simultaneously and then, holding the buttons down, switch the appliance on using the ON/OFF button.
3. Hold the buttons down for at least 2 seconds.

### 11.1.2 Displaying the operating time

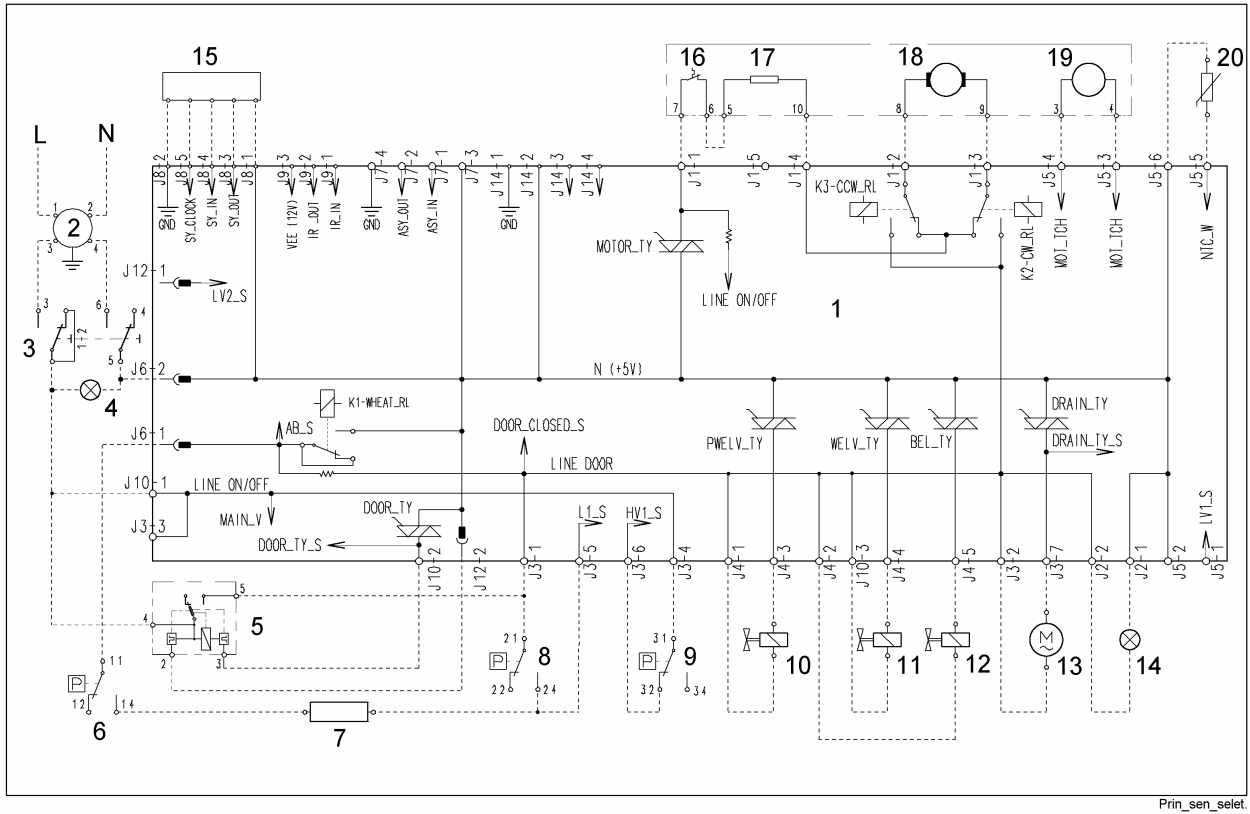
The operating time is displayed two digits at a time: the first pair of digits shows the thousands and hundreds; the second pair shows tens and units.

For example, a total operating time of **6,550** hours will be displayed as follows:

1 →	2 →	3 →
Blank display for <u>two seconds</u>	The first pair of digits is displayed for <u>two seconds</u> : - thousands (6) - hundreds (5)	The second pair of digits is displayed for <u>two seconds</u> : - tens (5) - units (0)
		

## 12 BASIC CIRCUIT DIAGRAM

### 12.1 Without Aquacontrol





## 12.2 Key to circuit diagram

Components in the appliance	Components of the PCB		
<ol style="list-style-type: none"> <li>1. Electronic board</li> <li>2. Suppressor</li> <li>3. ON/OFF switch</li> <li>4. ON/OFF pilot lamp</li> <li>5. Door interlock</li> <li>6. Anti-boiling pressure switch</li> <li>7. Heating element</li> <li>8. 1st level pressure switch</li> <li>9. Anti-overflow pressure switch (<i>not all models</i>)</li> <li>10. Pre-wash solenoid valve</li> <li>11. Wash solenoid valve</li> <li>12. Bleach solenoid valve (<i>not all models</i>)</li> <li>13. Drain pump</li> <li>14. Door closed lamp (<i>not all models</i>)</li> <li>15. Control/display board</li> <li>16. Thermal cut-out (motor)</li> <li>17. Stator (motor)</li> <li>18. Rotor (motor)</li> <li>19. Tachimetric generator (motor)</li> <li>20. NTC temperature sensor</li> </ol>	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;">           BELV_TY            DOOR_TY            DRAIN_TY            K1            K2            K3            K4              MOTOR_TY            PWELW_TY            Serial interface            WELV_TY         </td> <td style="width: 50%; vertical-align: top;">           Bleach solenoid Triac            Door interlock Triac            Drain pump Triac            Heating element relay            Motor relay: clockwise rotation            Motor relay: anti-clockwise rotation            Motor relay: half field power supply (<i>models with spin speed &gt;1200 rpm</i>)            Motor Triac            Pre-wash solenoid Triac            Asynchronous serial interface            Wash solenoid Triac         </td> </tr> </table>	BELV_TY DOOR_TY DRAIN_TY K1 K2 K3 K4  MOTOR_TY PWELW_TY Serial interface WELV_TY	Bleach solenoid Triac Door interlock Triac Drain pump Triac Heating element relay Motor relay: clockwise rotation Motor relay: anti-clockwise rotation Motor relay: half field power supply ( <i>models with spin speed &gt;1200 rpm</i> ) Motor Triac Pre-wash solenoid Triac Asynchronous serial interface Wash solenoid Triac
BELV_TY DOOR_TY DRAIN_TY K1 K2 K3 K4  MOTOR_TY PWELW_TY Serial interface WELV_TY	Bleach solenoid Triac Door interlock Triac Drain pump Triac Heating element relay Motor relay: clockwise rotation Motor relay: anti-clockwise rotation Motor relay: half field power supply ( <i>models with spin speed &gt;1200 rpm</i> ) Motor Triac Pre-wash solenoid Triac Asynchronous serial interface Wash solenoid Triac		



### 12.3.1 Key to circuit diagram

Components in the appliance	Components of the PCB	
<ol style="list-style-type: none"> <li>1. Electronic board</li> <li>2. Suppressor</li> <li>3. Drain pump</li> <li>4. Aqua control</li> <li>5. Anti-boiling pressure switch</li> <li>6. Door interlock</li> <li>7. Heating element</li> <li>8. 1st level pressure switch</li> <li>9. Anti-overflow pressure switch (<i>not all models</i>)</li> <li>10. Pre-wash solenoid valve</li> <li>11. Wash solenoid valve</li> <li>12. Bleach solenoid valve (<i>not all models</i>)</li> <li>13. Door closed lamp (<i>not all models</i>)</li> <li>14. Control/display board</li> <li>15. Thermal cut-out (motor)</li> <li>16. Stator (motor)</li> <li>17. Rotor (motor)</li> <li>18. Tachimetric generator (motor)</li> <li>19. NTC temperature sensor</li> </ol>	BELV_TY DOOR_TY DRAIN_TY K1 K2 K3 K4  MOTOR_TY PWELW_TY Serial interface WELV_TY	Bleach solenoid Triac Door interlock Triac Drain pump Triac Heating element relay Motor relay: clockwise rotation Motor relay: anti-clockwise rotation Motor relay: half field power supply ( <i>models with spin speed &gt;1200 rpm</i> ) Motor Triac Pre-wash solenoid Triac Asynchronous serial interface Wash solenoid Triac