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EN

**Washing machines
&
Washer dryers**

**with electronic control
system**

**EWM21xx
EWM25xx**

**Caratteristiche funzionali
e tecniche**

ENV06

Styling

Z 3

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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 washing machines fitted with the ENV06 electronic control system.

Previous platforms (electronic/mechanical) used a safety pressure switch which controlled the minimum water level in the tub, beneath which the supply to the heating element was interrupted.

The current electronic appliances manufactured (06 platform) use a heating element with thermal fuses (inside its branches) as safety, which interrupt if the water level drops below the minimum level permitted. The incorporated NTC probe contacts have a 2.5 mm pitch.

Do not remove/switch the NTC sensors between heating elements



The manual deals with the following topics:

- general characteristics
- control panel and washing programmes
- technical and functional characteristics
- access to the electronic control system

For detailed information concerning hydraulic circuits, structural characteristics of the appliances and accessibility, please refer to the presentation Service Manual:

- Publication no. 599 37 47-13 for HEC washing machines.

Identification table for functionality (EWM 21xx/25xx)

Styling	EWM 21xx		EWM 25xx	
	Washing type	Motor	Washing type	Motor
Z3	<ul style="list-style-type: none"> • Traditional with -BALL • Jet-Sistem 	Universal	<ul style="list-style-type: none"> • Traditional with -BALL • Jet-Sistem 	Three-phase asynchronous with Inverter
	<ul style="list-style-type: none"> • Traditional with ECO-BALL sphere • Jet-Sistem 	Universal	<ul style="list-style-type: none"> • Traditional with ECO-BALL sphere • Jet-Sistem 	Three-phase asynchronous with Inverter

2 WARNINGS

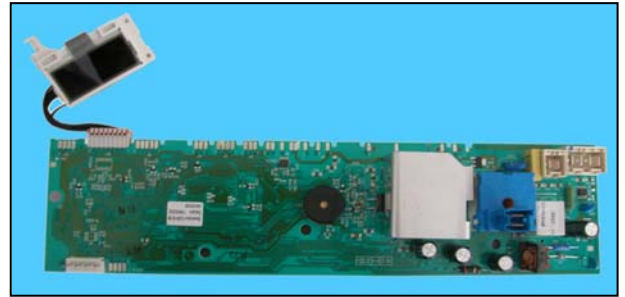


- Any work on electrical appliances must only be carried out by qualified technicians.
- Unplug the appliance before accessing internal components.
- Before placing the appliance on its side, always empty all the water using the purpose-provided system beside the drain filter.
- Never place the appliance on its right side (electronic control system side): some of the water in the detergent dispenser could leak onto the electrical components and cause these to burn.
- When replacing the heating element, replace it with one that has the same characteristics in order not to compromise the safety of the appliance
- Removing the NTC sensor from the heating element is strictly prohibited.


3 Z3

3.1 GENERAL CHARACTERISTICS


The ENV06 electronic control system consists of a single PCB, which incorporates the power, control and display (where the Display is connected) functions. The programme selector is incorporated in the board. The PCB is mounted on a casing fitted to the control panel.



3.1.1 General WM characteristics

Version Z3	
No. Buttons	<ul style="list-style-type: none"> ▪ maximum 7 (6 options + start/pause)
No. LEDs	<ul style="list-style-type: none"> ▪ maximum 14 + LCD
Programme selector	<ul style="list-style-type: none"> ▪ 15-21 positions with main switch (incorporated in the PCB)
Serial port	<ul style="list-style-type: none"> ▪ DAAS-EAP communication protocol up to 115,200 baud
Power supply voltage	<ul style="list-style-type: none"> ▪ 220/240V ▪ 50/60 Hz (configurable)
Washing type	<ul style="list-style-type: none"> ▪ Traditional with "Eco-ball" sphere ▪ Jet-system
Rinsing system	<ul style="list-style-type: none"> ▪ Traditional with "Eco-ball" sphere ▪ Jet-system
Motor	<ul style="list-style-type: none"> ▪ Collector, with tachometric generator ▪ Two-pole asynchronous (three-phase), with tachometric generator
Spin speed	<ul style="list-style-type: none"> ▪ 1,600 rpm
Anti-unbalancing system	<ul style="list-style-type: none"> ▪ FUCS and AGS
Water fill	<ul style="list-style-type: none"> ▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
Detergent dispenser	<ul style="list-style-type: none"> ▪ 3 compartments: prewash/stains, wash, fabric softeners ▪ 4 compartments: pre-wash, wash, conditioner, (bleach)
Control of water level in the tub	<ul style="list-style-type: none"> ▪ Electronic/analogue pressure switch
Door safety interlock	<ul style="list-style-type: none"> ▪ Traditional (with PTC) ▪ Instantaneous
Heating element heat output	<ul style="list-style-type: none"> ▪ 1950W with thermal fuses incorporated
Temperature control	<ul style="list-style-type: none"> ▪ NTC probe incorporated in the heating element
Buzzer	<ul style="list-style-type: none"> ▪ Traditional incorporated in the PCB
Sensors	<ul style="list-style-type: none"> ▪ Water fill gauge (flowmeter) ▪ Aqua control

3.1.2 General WD characteristics

Version Z3	
No. Buttons	<ul style="list-style-type: none"> ▪ maximum 7 (6 options + start/pause)
No. LEDs	<ul style="list-style-type: none"> ▪ maximum 14 + Display
Programme selector	<ul style="list-style-type: none"> ▪ 15-21 positions with main switch (incorporated in the PCB)
Serial port	<ul style="list-style-type: none"> ▪ DAAS-EAP communication protocol up to 115,200 baud
Power supply voltage	<ul style="list-style-type: none"> ▪ 220/240V ▪ 50/60 Hz (configurable)
Washing type	<ul style="list-style-type: none"> ▪ Traditional with "Eco-ball" sphere ▪ Jet-Sistem
Rinsing system	<ul style="list-style-type: none"> ▪ Traditional with "Eco-ball" sphere ▪ Jet-Sistem
Motor	<ul style="list-style-type: none"> ▪ Collector, with tachometric generator ▪ Two-pole asynchronous (three-phase), with tachometric generator.
Spin speed	<ul style="list-style-type: none"> ▪ 1,600 rpm
Anti-unbalancing system	<ul style="list-style-type: none"> ▪ FUCS and AGS
Water fill	<ul style="list-style-type: none"> ▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
Detergent dispenser	<ul style="list-style-type: none"> ▪ 3 compartments: prewash/stains, wash, fabric softeners ▪ 4 compartments: pre-wash, wash, conditioner, (bleach)
Control of water level in the tub	<ul style="list-style-type: none"> ▪ Electronic/analogue pressure switch
Door safety interlock	<ul style="list-style-type: none"> ▪ Traditional (with PTC) ▪ Instantaneous
Heating element heat output, washing	<ul style="list-style-type: none"> ▪ 1950W with thermal fuses incorporated
Heating element heat output, drying	<ul style="list-style-type: none"> ▪ 1840W (920+920)
Temperature control, washing	<ul style="list-style-type: none"> ▪ NTC probe incorporated in the heating element
Temperature control, drying	<ul style="list-style-type: none"> ▪ NTC probe ▪ Thermostats
Buzzer	<ul style="list-style-type: none"> ▪ Traditional incorporated in the PCB
Sensors	<ul style="list-style-type: none"> ▪ Water fill gauge (flowmeter) ▪ Aqua control

3.2 Control panel

3.2.1 Styling Z3

- max. 7 buttons
- 15 or -21-position programme selector
- 13 LEDs
- LCD

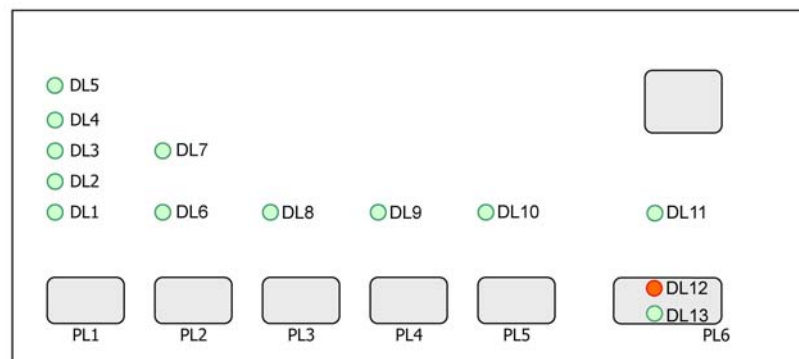
Version WM



Version WD

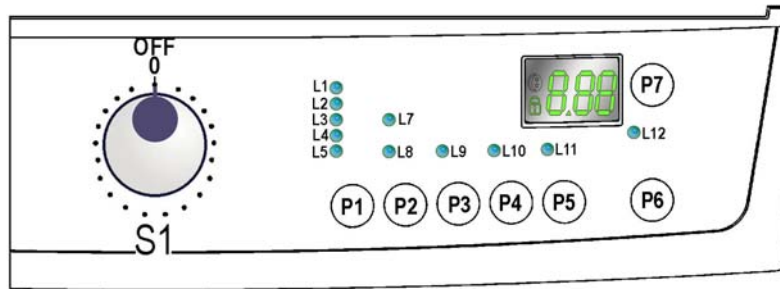


- Positioning of LEDs and buttons



3.2.2 Control panel configuration

The description below is valid both for the WM and WD versions, otherwise WM or WD is specified.



The washing programmes, the functions of the selector knob (where featured) and the various buttons vary according to the model, since these are determined by the configuration of the appliance.

3.2.3 Programme selector (S1)

The selector features 15-21 positions and incorporates the ON/OFF switch. The various positions of the selector may be configured to perform different washing programmes (e.g. water level, drum movement, no. of rinses and the washing temperature to be selected according to the type of garments). It can be turned both clockwise and anti-clockwise.

In the first position, the appliance is switched off and the current programme is cancelled.

For each programme, the compatible options and other parameters are defined.



3.2.4 Programme configuration

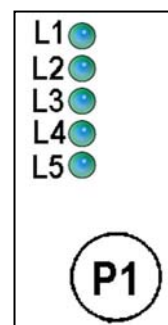
The table below lists the parameters that can be used to define the washing programmes.

Types of fabric	Cotton/linen, Synthetic fabrics, Delicates, Wool, Hand-wash, Shoes, Jeans, Duvet, Silk.
Special programmes	Soak, Miniprogramme, Easy-Iron, Conditioner, Rinses, Delicate rinses, Drain, Delicate spin, Spin, Drying.
Temperature	Normal, Maximum: the initial temperature is the maximum that can be selected for a specific washing programme.
Spin	Normal, Minimum, Maximum
Options (Normal/Possible)	Rinse Hold, Night cycle, Pre-wash, Stains, Bleach, Extra rinse, Easy-Iron, Economy (energy label), Intensive, Normal, Daily, Light, Quick, Super quick, Reduced spin speed, No spin, Half-load.
Programme phases	Pre-wash, Wash, Rinses, Spin, Delayed start, Drying.

3.2.5 Pushbuttons – LEDs and LCD

The functions of each button are defined by the configuration of the appliance.

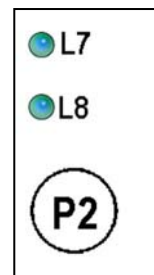
- **Button no. 1** :: this button is related to LEDs (L1÷L5). Pressing it sequentially the spin speed varies from maximum to no spin or rinse hold.



- **Button no. 2** : this button is configurable and is related to LEDs (L7 - L8).

In the WM version it can perform the function of:
normal, daily, light, quick, super quick, intensive, economy, pre-wash, easy-iron, bleach, stains, super rinse, night cycle, rinse hold, half-load, reduced spin speed, no spin.

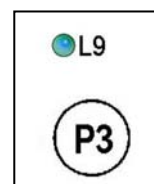
In the WD version it performs the function of automatic drying:
- Wardrobe
- Iron



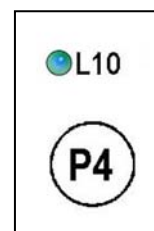
- **Button no. 3** : this button is configurable and is related to LED (L9).

In the WM version it can perform the function of:
normal, daily, light, quick, super quick, intensive, economy, pre-wash, easy-iron, bleach, stains, super rinse, night cycle, rinse hold, half-load, reduced spin speed, no spin.

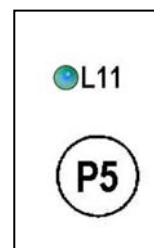
In the WD version it performs the sole function of:
- time-drying.



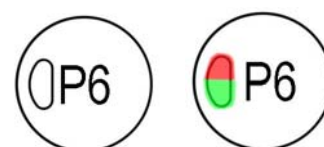
- **Button no. 4**: this button is configurable and is related to LED (L10); depending on the configuration of the appliance, it can perform the function of:
normal, daily, light, quick, super quick, intensive, economy, pre-wash, easy-iron, bleach, stains, super rinse, night cycle, rinse hold, half-load, reduced spin speed, no spin.



- **Button no. 5**: this button is configurable and is related to LED (L11); depending on the configuration of the appliance, it can perform the function of:
normal, daily, light, quick, super quick, intensive, economy, pre-wash, easy-iron, bleach, stains, super rinse, night cycle, rinse hold, half-load, reduced spin speed, no spin.
It can also perform the function of delayed start.



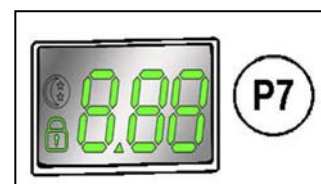
- **Button no. 6**: this button is configurable and has the function of START/PAUSE (inside there are two LEDs, one red that flashes in the event of an alarm and one green that flashes when the appliance is in pause mode or in combination with the red one to indicate the alarm code).



- **L12 Door closed**: It lights up when the safety device stops the door opening and switches off when it can be opened. It flashes when the device is about to unlock the door (with door interlock with PTC, which needs one or two minutes to open).



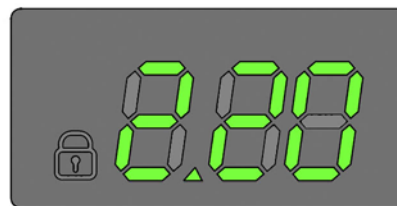
- **Button no. 7**: this button is configurable and has the DELAYED START function. During the programme selection phase, a delayed start can be selected, from 30' to 20 hours (↔ 30' ↔ 60' ↔ 90' ↔ 2h ↔ 3h... ↔ 20h ↔ 0h) and the time is shown on the Display. During the last hour the time decreases minute by minute.



- **LCD**

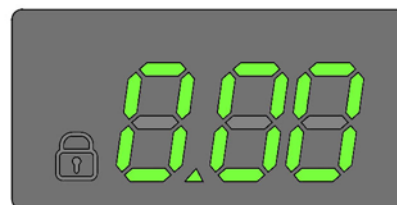
The information described below appears on the LCD.

- ↖ - **The duration of the washing programme**, which appears after it has been selected. This time corresponds to the time required for the maximum wash load for each type of programme. After the programme has started, the time decreases (and is updated) minute by minute.



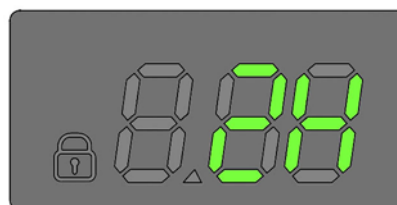
- ↖ - **Duration of the drying time**

- ↖ - **the end of the programme is** indicated by three flashing zeros (when the door can be opened);

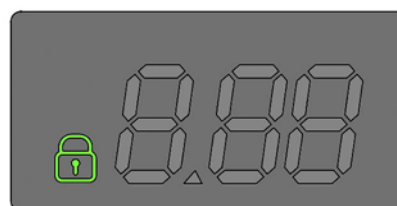


- ↖ - **stopping of the appliance with water in the tub**, after the programmes with the RINSE HOLD option, is displayed by three flashing zeros; the LED that indicates the door remains lit and the LED of the START/PAUSE button switches off;

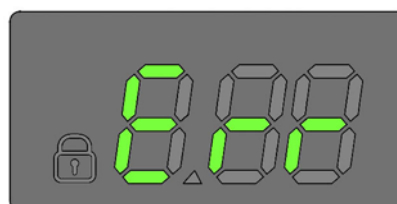
- ↖ - **delayed start**, selected on the related button; after the START/PAUSE button is pressed, the countdown starts and the delay time decreases hour by hour; during the last 2 hours, it decreases by 30 mins at a time;



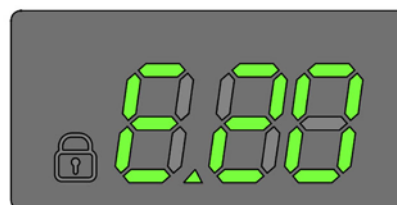
- ↖ - **the padlock**: when it is lit, it indicates that all the buttons are disabled to prevent children from modifying, starting or pausing the cycle; to disable this function, a key combination needs to be pressed;



- ↖ - **wrong choice of an option** is displayed by "Err", when a function not compatible with the chosen programme is selected. The wrong selection is also signalled by an acoustic alarm.



- ↖ **An alarm code** indicates an error in the appliance operation; simultaneously to the displaying of the code, the START/PAUSE button flashes.

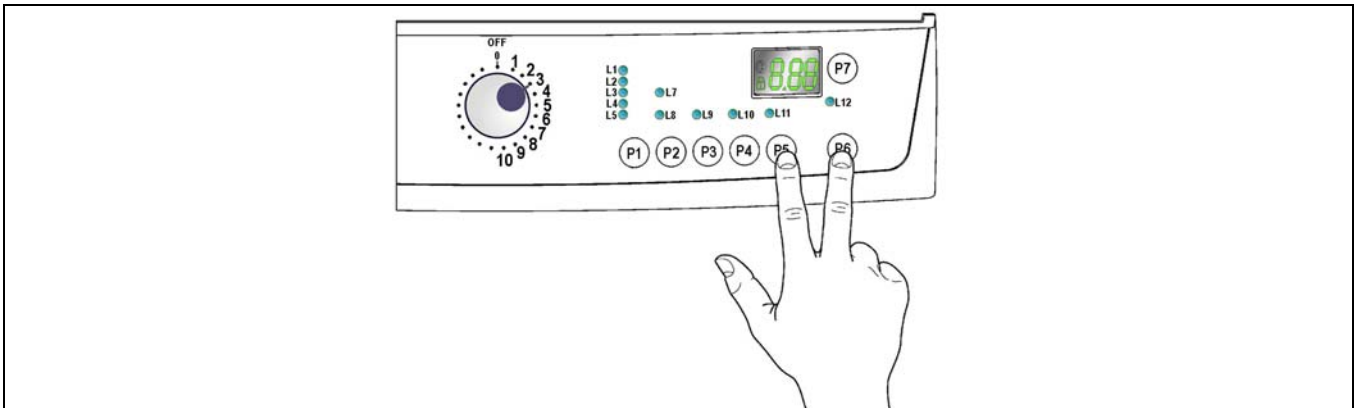


- **Buzzer**

The buzzer emits:

- one **"beep"** when the programmes or an option are selected, when the START/PAUSE button is pressed to start or pause the cycle;
- three **"beeps"** when an option not compatible with the selected programme is chosen, or when a button is pressed or a knob is turned during a cycle;
- a particular sequence of **"beeps"** for a two-minute duration when the cycle has terminated;
- a particular sequence of three **"beeps"** to signal an appliance malfunction.

4 DEMO MODE SETTING



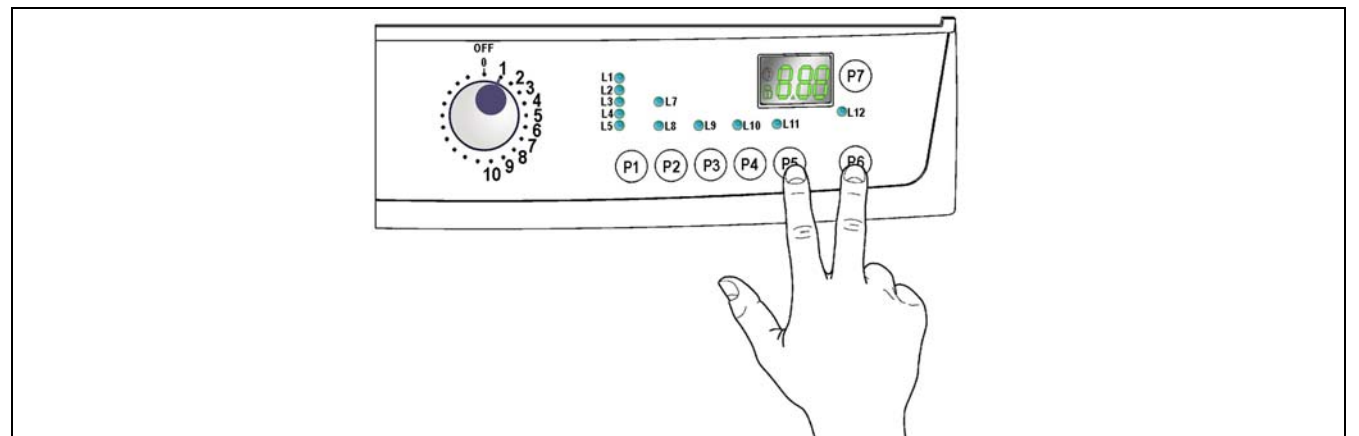
1. Switch off the appliance.
2. Press the **START/PAUSE** button and the nearest option button simultaneously (as shown in the figure).
3. Holding down both buttons, switch the appliance on by turning the programme selector dial by **three positions clockwise**.
4. Hold the buttons down until "dEM" flashes for a short time.

4.1 Exiting DEMO mode

To exit demo mode, switch the appliance off (programme selector in off/cancel position).

5 DIAGNOSTIC SYSTEM

5.1 Accessing diagnostics




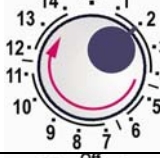

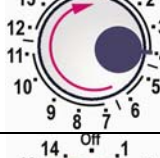
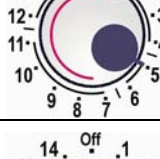



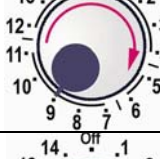

1. Switch off the appliance.
2. Press the **START/PAUSE** button and the nearest option button simultaneously (as shown in the figure).
3. Holding down both buttons, switch the appliance on by turning the programme selector dial by **one position clockwise**.
4. In the first position, the operation of the buttons and the related LEDs is checked; turn the programme selector dial clockwise to run the diagnostic cycle for the operation of the various components and to read any alarms.

5.2 Quitting the diagnostics system

→ To exit the diagnostic cycle, switch the appliance off, then back on and then off again.

5.3 Diagnostic test phases

Irrespective of the type of PCB and the configuration of the programme selector, after entering the diagnostic mode, turn the programme selector **clockwise** to perform the diagnostic cycle for the operation of the various components and to read any alarms (all alarms are enabled in the diagnostic cycle).

Selector position	Components activated	Working conditions	Function tested	LCD
1 	- All the LEDs and symbols light in sequence. - When a button is pressed, the corresponding group or LED or symbol lights up.	Always active	User interface functions	
2 	- Door safety interlock - Wash solenoid	Door closed Water level below anti-flooding level Maximum time 5 mins.	Water fill to wash compartment	Water level in the tub is displayed.
3 	- Door safety interlock - Pre-wash solenoid	Door closed Water level below anti-flooding level Maximum time 5 mins.	Water fill to pre-wash compartment (bleach)	Water level in the tub is displayed.
4 	- Door safety interlock - Pre-wash and wash solenoid valves	Door closed Water level below anti-flooding level. Maximum time 5 mins.	Water fill to conditioner compartment	Water level in the tub is displayed.
5 	- Door safety interlock - Hot water or bleach / stains solenoid (where featured)	Door closed Water level below anti-flooding level Maximum time 5 mins.	Water fill to bleach/stains Compartment	Water level in the tub is displayed.
6 	- Door safety interlock - Wash solenoid, if the water in the tub is not enough to cover the heating element. - Heating element - Circulation pump - Weight sensor	Door closed Water level above the heating element Maximum time 10 mins or up to 90°C. (*)	Heating Circulation	Wash water temperature
7 	- Door safety interlock - Wash solenoid, if the water in the tub is not enough to cover the heating element. - Motor (55 rpm clockwise, 55 rpm anti-clockwise, 250 rpm pulse)	Door closed Water level above the heating element	Check for leaks from the tub.	Drum speed (the real value divided by ten) is displayed.
8 	- Door safety interlock - Drain pump - Motor up to 650 rpm then at maximum spin speed (**)	Door closed Water level lower than anti-boiling level for spinning.	Drain and spin	Drum speed (the real value divided by ten) is displayed.
9 	- Door safety interlock - Drain pump - Power fan - Electronically controlled condensation valve. - - Drying heating element	Door closed Water level below anti-boiling level	Drying	Air temperature is displayed.
10 	- Reading/Deleting the last alarm	-----	----	

(*)In most cases, the established 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 diagnostic cycle and then back to the heating control phase (if the temperature is higher than 80 °C, heating does not take place).

(**)The check at the maximum speed occurs without control of the FUCS and no garments must be inside the appliance.

6 ALARMS

6.1 Displaying the alarms to the user

The alarms are displayed by the flashing red LED of the START/PAUSE button and simultaneously through the Display.

The alarms displayed to the user are listed below:

- ↵ E10 - Water fill difficulty (tap closed)
- ↵ E20 - Drain difficulty (filter dirty)
- ↵ E40 - Door open

They are represented through the flashing of the red LED inside the START/PAUSE button and can be solved directly by the user.



The alarms listed below:

- ↵ EF0 – Water leakage (Aqua Control System)
For its solution, the intervention of a Service engineer is required.

While for the alarm:

- ↵ EH0 – Voltage or frequency outside normal values
It is necessary to wait for power supply voltage and/or frequency to restore normal conditions.

The alarms are enabled during the execution of the washing programme. With the exception of alarms associated with the configuration and the power supply voltage/frequency, which are also displayed during the programme selection phase.

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

- the level of the water in the tub is below a certain level;
- the water temperature is lower than 55 °C;
- the motor has stopped.

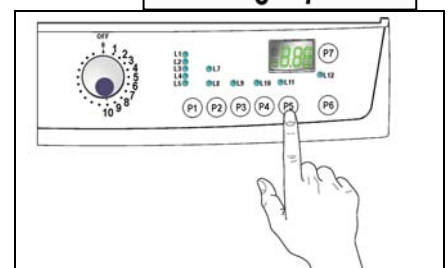
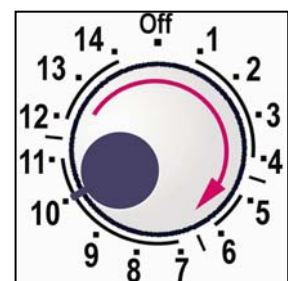
Certain alarm conditions require a drain phase to be performed before the door can be opened for safety reasons:

- cooling water fill if the temperature is higher than 65 °C
- drain until the analogue pressure switch is on empty, during a max. 3-minute interval.

6.2 Reading the alarms

The last three alarms stored in the FLASH memory of the PCB can be displayed:

- enter the diagnostic mode (para. 5.1)
- Irrespective of the type of PCB and configuration, turn the programme selector knob **clockwise** to the **tenth position** .
- The last alarm will be displayed.
- To display previous alarms, press the button to the left of the START/PAUSE button in sequence (as shown in the figure).
- To return to the last alarm, press the START/PAUSE button.

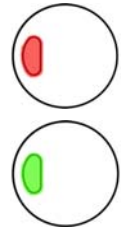


6.2.1 Displaying the alarm

The alarm is displayed by a repeated flashing sequence of the START / PAUSE button with red and green light (0.5 seconds on, 0.5 seconds off with a 2.5 second pause between sequences).

- START / PAUSE button indicator with red light indicates the first digit of the alarm code (family).
- START / PAUSE button indicator with green light indicates the second digit of the alarm code (number inside the family).

These two LEDs are featured in all models.



















Notes

- The first letter of the alarm code "E" (Error) is not displayed, since this letter is common to all alarm codes.
- Alarm code families are shown in hexadecimals; 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 all LEDs (user interface not configured).

6.2.2 Example of alarm display

Let us take alarm E43 (problem with the door safety TRIAC) as an example; the following will be displayed:

- the sequence of four flashes of the START/PAUSE button with the red light indicates the first number **E4 3**;
- the sequence of three flashes of the START/PAUSE button with the green light indicates the second number **E4 3**.

START / PAUSE button with red light			START / PAUSE button with green light		
ON/OFF	Time (Sec.)	Value	ON/OFF	Time (Sec.)	Value
	0.5	1		0.5	1
	0.5			0.5	
	0.5	2		0.5	2
	0.5			0.5	
	0.5	3		0.5	3
	0.5			0.5	
	0.5	4		2.5	Pause
	0.5				
	1.5	Pause			

6.2.3 Operation of alarms during the diagnostic cycle

All alarms are enabled during the components' diagnostic cycle.

6.3 Rapid reading of alarms

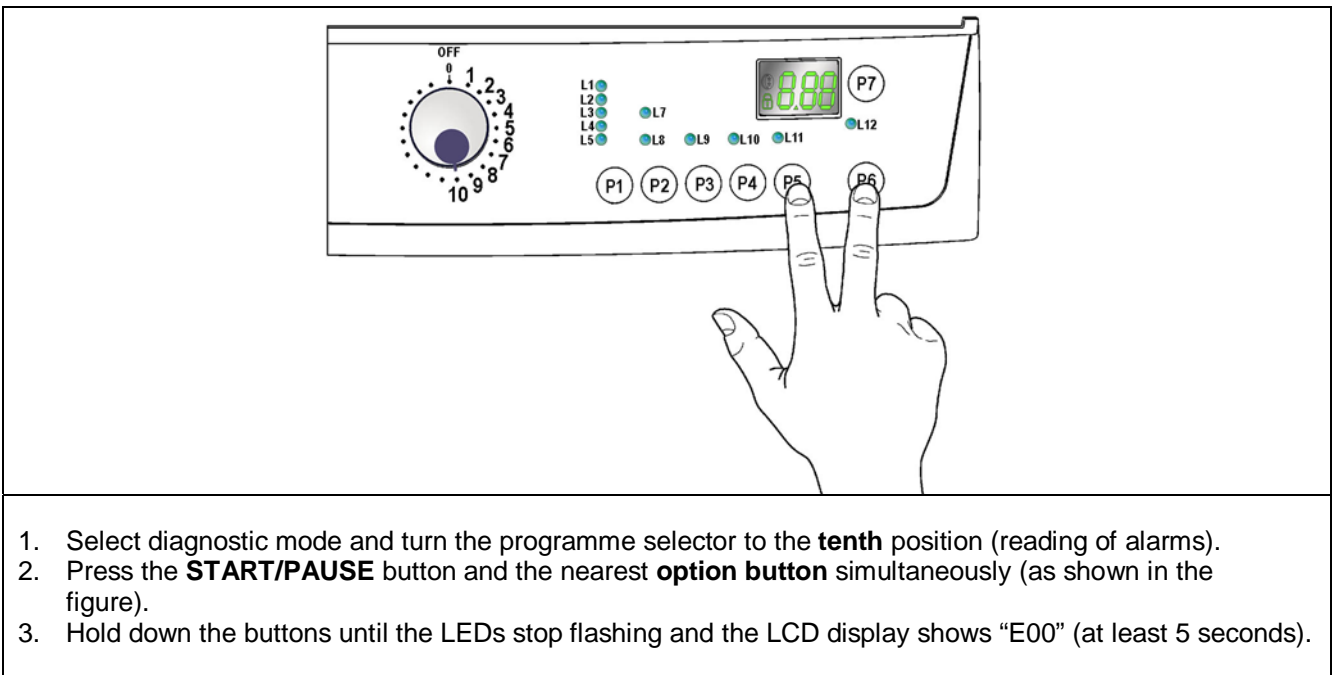
The last three alarms can be displayed even if the programme selector is not in the tenth position (diagnostics) or if the appliance is in normal operating mode (e.g. during the execution of the washing programme):

- press the **START/PAUSE** button and the nearest **option button** simultaneously (as if you were entering DIAGNOSTIC mode) for at least 2 seconds: the LEDs initially switch off, and then display the flashing sequence indicating the last alarm.
- The alarm continues to be displayed for the amount of time required, and then the display returns to its normal operation.
- The alarm reading system is as described in para. 6.2
- While the alarm is being displayed, the appliance continues to perform the cycle or, if in the programme selection phase, it maintains the previously selected options stored in the memory.

6.4 Deleting the last alarm

It is good practice to cancel the alarms stored:

- after reading the alarm codes, to check whether the alarm re-occurs during the diagnostic cycle,
- after repairing the appliance, to check whether it re-occurs during testing.



N.B. With this operation all the alarms stored are deleted.

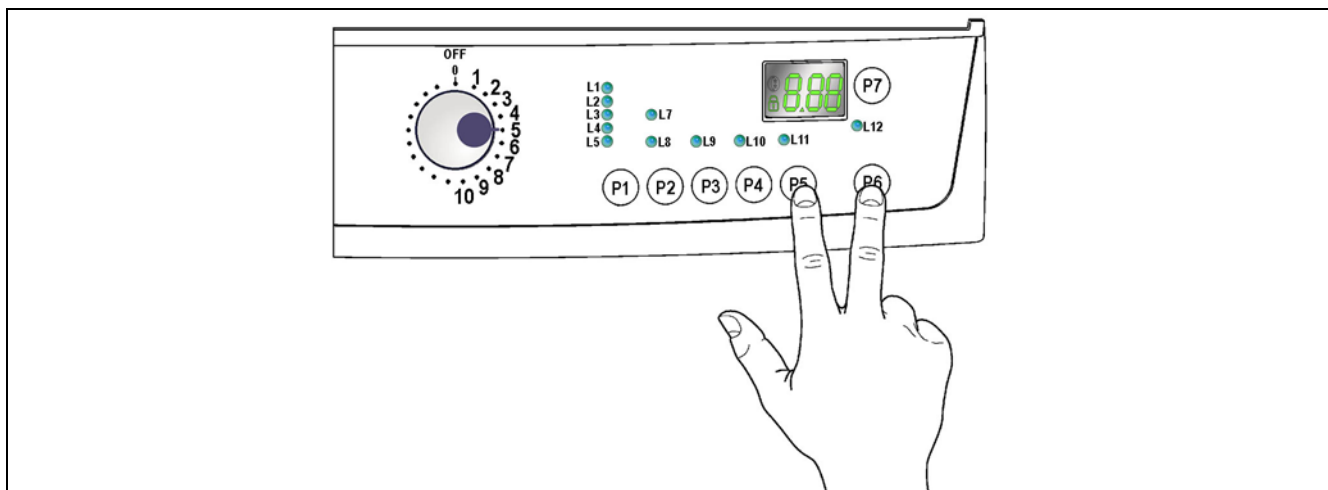
7 OPERATING TIME COUNTER

Using a specific procedure, the operator can display the total operating time for the appliance, which is counted from the moment it is first switched on.

The unit can count up to a maximum of **6,550** hours of operating time.

- Only the operating time of normal programmes (and not diagnostic cycles) is counted,
- the actual operating time for the cycle is counted (which does not include pauses, delayed start time, rinse hold time and soaking phases).
- The precision of the counter is 30 seconds per programme.
- Only whole hours of operation are counted (1 hr and 59 min = 1 hr).

7.1 Reading the operating time



1. Switch off the appliance.
2. Press the **START/PAUSE** button and the nearest **option button** simultaneously (as shown in the figure).
3. Holding down both buttons, switch the appliance on by turning the programme selector dial by **five positions clockwise**.
4. Hold down the buttons until the hours of operation appear on the display (at least 5 seconds).

7.2 Display of total operating time on the LCD

This time is displayed with a sequence of two digits at a time: the first two digits indicate thousands and hundreds, the second two digits indicate tens and units.

For example, if the operating time is **6,550** hours, the display will show the following sequence:

	Phase 1 →	Phase 2 →	Phase 3 →
Styling	For <u>two seconds</u> , nothing is displayed.	For <u>two seconds</u> , the following digits are displayed: ↺ thousands (6) ↺ hundreds (5)	For the next <u>two seconds</u> the following digits are displayed: ↺ tens (5) ↺ units (0)
Z3			

At the end of phase three (after the tens and units are displayed), the cycle is repeated. To return to normal mode, either: switch the appliance off or press a button or turn the selector knob.

8 WASHING PROGRAMMES AND OPTIONS

8.1 Possible programmes

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

Programme		Temperature (°C)	No. Rinses	Final spin (rpm)
Cotton	90	82	3	450/650/850/1000/1200/ 1300/1400/1600
	90E	67(*)	(**)	
	60	60	3	
	60E	55 (*)	(**)	
	50	50	3	
	50/40E	44(*)	(**)	
	40	40	3	
	30	30		
	cold	20		
Synthetic fabrics	60	60	3	Max. 900
	60/50E	42(*)	(**)	
	50	50	3	
	40	42		
	30	30		
cold	20			
Mini Programme	30	30	3	Max. 900
	cold	20		
Delicates	40	40	3	Max. 700
	30	30		
	cold	20		
Wool Hand Wash	40	38	3	Max. 1000
	30	33		
	cold	20		
Shoes	40	40	3	Max. 1000
	30	30		
	cold	20		
Jeans	60	60	5	Max. 1200
	50	50		
	40	40		
	30	30		
	cold	20		
Soak		30/20	----	----
Rinses		----	3	Max. 1600
Conditioner		----	1	Max. 1600
Drain		----	----	----
Spin		----	----	Max. 1600

The information is purely indicative.

(*) "energy label" programmes

(**) In some countries the rinses are 3, in others 2.

8.1.1 Compatibility between options

		OPTIONS																	
		Rinse hold	Night cycle	Pre-wash	Stains	Bleach	Extra rinse	Easy-iron	Economy	Intensive	Normal	Daily	Light	Quick	Super Quick	Sensitive	Reduced spin speed	No spin	Half-load
Compatibility with OPTIONS	Rinse hold	■		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
	Pre-wash	X	X	■	(*)	(*)	X	X	X	X	X	X	X	X	X	X	X	X	X
	Stains	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	X	X	
	Extra rinse	X	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	X
	Economy	X	X	X	X	X	X	X	■								X	X	X
	Intensive	X	X	X	X	X	X	X	X	■							X	X	X
	Normal	X	X	X	X	X	X	X	X		■						X	X	X
	Daily	X	X	X	X	X	X	X	X			■					X	X	X
	Light	X	X	X	X	X	X	X	X				■				X	X	
	Quick	X	X	X	X	X	X	X	X					■			X	X	
	Super Quick	X	X	X	X	X	X	X	X						■		X	X	
	Sensitive	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	■		X
	No spin			X	X	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	■	
Phases where selection / modification is possible	Selection	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	
	Pre-wash	X	X				X	X								X	X		
	Wash	X	X				X	X								X	X		
	Rinses	X																	
	Spin																		

(*) Pre-wash, Stains and Bleach are compatible with one another depending on the detergent dispenser used.

- The delayed start is compatible with all programmes, except for drain; the maximum time selectable is 20 hours.
- The selection of the spin cycle is available for all programmes, except for drain/soak. The minimum speed for the Spin / Delicate spin programmes is 400 rpm. For all others, it is 0 rpm.

8.2 Description of options

- **Rinse hold**
 - Stops the appliance with water in the tub before the final spin cycle.
 - To drain the water, reset the programme and then select a drain or spin cycle.
- **Night cycle**
 - Eliminates all spin phases and adds **three** rinses in COTTON cycles and **two** rinses in SYNTHETIC FABRICS cycles.
 - Stops the appliance with water in the tub before the final spin cycle.
 - Eliminates the buzzer (if configured).
 - To drain the water, reset the programme and then select a drain or spin cycle.
- **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 SYNTHETIC FABRICS cycles, performs a short spin before passing on to the washing phase.
 - This option cannot be selected for WOOL and HAND WASH cycles.
- **Soak**
 - Adds a pre-wash phase with heating to (or cold, if selected) plus 30 ' hold with HAND WASH movement.
 - Fills water, goes to the end of the cycle and for a maximum period of 9+9 hours of hold, it performs a HAND WASH movement.
- **Stains**
 - Adds a 5-minute motor movement phase after heating to 40 °C.
 - Water flow to the pre-wash/stains compartment to introduce the special stain-removal product.
 - This option cannot be selected for WOOL and HAND WASH cycles.
- **Bleach**
 - Loads water through the bleach compartment at the beginning of the first rinse in COTTON cycles.
- **Economy / Energy label**
 - Modifies the structure of the COTTON 40 90 - SYNTHETIC FABRICS 50/60 programmes to reduce energy consumption, guaranteeing washing performance levels.
 - Reduces the washing temperature.
 - Increases the duration of the wash phase.
- **Super rinse**
 - Adds **two** rinses to the COTTON cycle, one to the SYNTHETIC FABRICS - DELICATES cycles.
 - Eliminates the spins at the end of the washing and the first two intermediate spins. The other intermediate spins are limited to 450 rpm and the final spin is performed at maximum speed.
- **Half-load**
 - Eliminates one rinse in COTTON programmes.
- **Easy-iron**
 - In COTTON programmes:
 - adds **three** rinse cycles,
 - eliminates intermediate spin cycles,
 - performs a pulse spin phase before the final one,
 - adds an "untangling" phase after the spin cycle.
 - In SYNTHETIC FABRICS programmes:
 - it reduces the heating temperature in 50/60°C cycles to 40 °C,
 - increases washing time,
 - prolongs the cooling phase at the end of the washing phase,
 - adds **one** rinse cycle,
 - adds an "untangling" phase after the pulse spin cycle.

- **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	1550
Reduction for COTTON (rpm)	450	450	450	450	500	550	600	650	700	750
Reduction for ALL OTHER CYCLES (rpm)	450	450	450	450	450	450	450	450	450	450

- **No spin**

→ It eliminates all the spin phases.

→ It adds three rinses to the COTTON CYCLE and one to the SYNTHETIC FABRICS cycle.

- **Intensive**

→ Performs a specific intensive cycle.

- **Daily**

→ Modifies the structure of the COTTON - SYNTHETIC FABRICS - DELICATES cycles to obtain good washing performance in a short space of time.

- **Light**

→ Modifies the structure of the wash phase of the COTTON - SYNTHETIC FABRICS - DELICATES cycles in a short space of time.

- **Quick**

→ Modifies the structure of the COTTON - SYNTHETIC FABRICS - DELICATES cycles to obtain very short washing times (optimised for reduced and very dirty wash loads).

→ Reduces the number of rinses (one less rinse).

→ Increases the water level of the other two rinses.

- **Super quick**

→ Modifies the structure of the wash phase of the COTTON - SYNTHETIC FABRICS - DELICATES cycles by half a load.

- **Sensitive**

→ Adds one rinse to the COTTON - SYNTHETIC FABRICS cycles.

→ During the cotton cycles, the movements pass from energetic to normal.

→ Intermediate spin cycles are reduced.

- **Delayed start time**

→ Adds a pause before the start of the programme. The delay time is displayed on the corresponding LEDs starting from a 2-hour until a 20-hour delay (☞ 30'☞ 60'☞ 90'☞ 2h☞ 3h...☞ 20h☞ 0h).

To start the cycle immediately after the countdown to the delayed start has already begun: press the Start/Pause button, cancel the delay time by pressing the relevant button, then press Start/Pause again.

- **Electronic drying (WASHER-DRYERS – only certain models)**

→ You can choose from three different levels of electronic drying for COTTONS and one for SYNTHETIC FABRICS:

☞ Extra dry (only for cotton)

☞ Wardrobe dry (cotton and synthetic fabrics)

☞ Iron dry (only for cotton)

→ The drying time is calculated automatically with "Fuzzy" by the appliance.

→ The drying phase can be performed both as automatic drying (non-stop programme), if selected together with a washing cycle, or as a separate programme.

- **"Drying time" button**

→ Push this button to select from 10 to 130 minutes of drying for the COTTON and SYNTHETIC FABRICS cycles, 5 minutes at a time.

→ The selected drying phase either in automatic drying or as a separate programme.

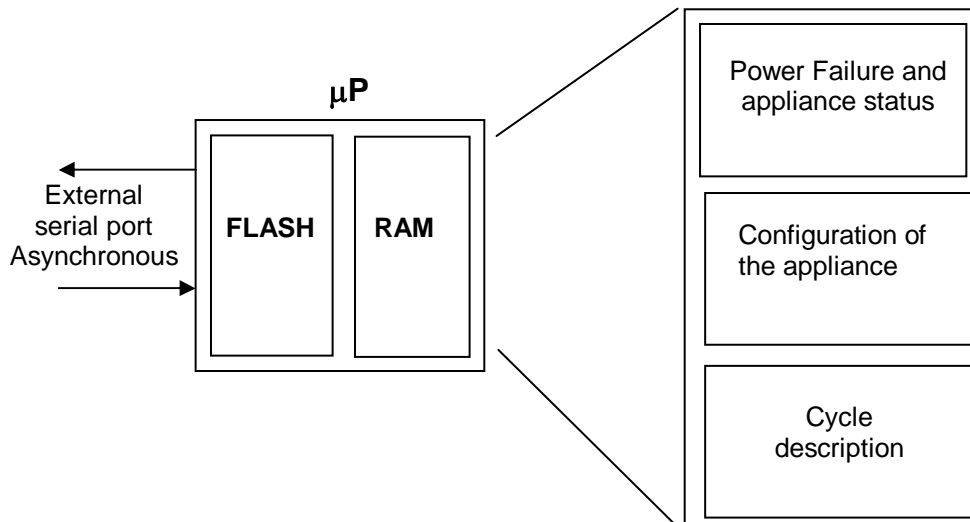
9 TECHNICAL CHARACTERISTICS

9.1 Electronic control system memory



9.1.1 General structure of the memory system

The system features a FLASH memory inside the microprocessor, which allows recording of configuration data, of the description of the cycle, of the status of the appliance in the event of a power failure and of alarms.



9.1.2 FLASH

This area of the memory contains the "firmware" code comprising the appliance functions:

- ⇒ control of electric loads (motor, pump, electronically controlled valves, etc.);
- ⇒ control of the sensors (pressure switches, motor speed, door status, etc.);
- ⇒ management of the user interface;
- ⇒ management of the serial port;
- ⇒ management of power failures and alarms;
- ⇒ running the washing programme;
- ⇒ power failure, i.e. the information necessary to restart the appliance in the event of a power failure:
 - selected cycle and options;
 - current phase and sub-phase;
- ⇒ appliance status, used to perform special cycles, such as:
 - electrical test (used on the assembly line);
 - continuous cycles (used in the factory workshop).
- ⇒ the data contained in this portion of the memory defines the characteristics of the model and is interpreted by the function software. The variables are as follows:
 - type of appliance (front-loader, top-loader, compact);
 - type of door interlock (PTC or instantaneous);
 - anti-flooding safety device;
 - transmission ratio between drum pulley and motor pulley;
 - structure of the washing group;
 - power supply frequency (50 or 60 Hz);
 - type of PCB (horizontal or vertical buttons);
 - detergent dispenser (3 or 4 compartments);
 - final spin speed (600 1400 rpm).
- ⇒ Identification of the appliance:
 - Prod. No.
 - ELC
 - Serial Number
- ⇒ Configuration of the user interface:
 - Programmes on main selector
 - Function of secondary selector (where featured)
 - Number and functions of buttons
 - LED functions
 - Buzzer operation

- ⇒ Washing cycle tables: each washing cycle consists of a series of phases (steps); the steps are the basic instructions which comprise the description of the cycle, which is common to all appliances having the same characteristics.
 - Water fill
 - Motor movement
 - Reset
 - Heating
 - Drain
 - Spin
 - " IF " conditions (options, temperatures, etc.)
- ⇒ Configuration of the washing cycle: for each family of appliances, certain parameters associated with the washing cycle are defined:
 - working limits (voltage/frequency);
 - transmission ratios;
 - parameters for control of the signal from the tachometric generator;
 - parameters for half-range operation of the motor;
 - structure of the washing group;
 - control parameters for the FUCS anti-unbalancing system;
 - water fill algorithm;
 - alarm control system;
 - drying cycle control parameters;
 - sensor parameters (flowmeter, etc ...).

9.1.3 RAM

This memory contains the variables, that is to say all the dynamic information used during running of the programme:

- ⇒ motor speed
- ⇒ water temperature
- ⇒ alarms
- ⇒ cycle selected
- ⇒ machine status.

The memory is cancelled every time the power supply is disconnected (power failure or appliance switched off).

The memory is cancelled every time the power supply is disconnected (power failure or appliance switched off).

The same system can be used to send commands to the electronic control unit such as:

- ⇒ select remote control mode;
- ⇒ activate the various loads in remote mode;
- ⇒ select diagnostic mode;
- ⇒ select a cycle and options, and start the cycle.

9.2 Door safety interlock

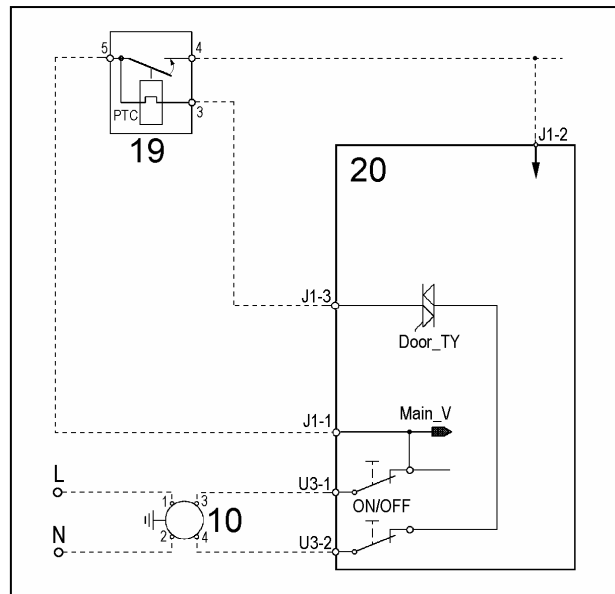
There are two types of door interlock:

- volumetric with PTC
- instantaneous

9.2.1 Volumetric interlock with PTC

- 10 Anti-disturbance filter
- 19 Door safety interlock
- 20 PCB

ON/OFF = Main switch (incorporated in the programme selector)



9.2.1.1 Operating principle

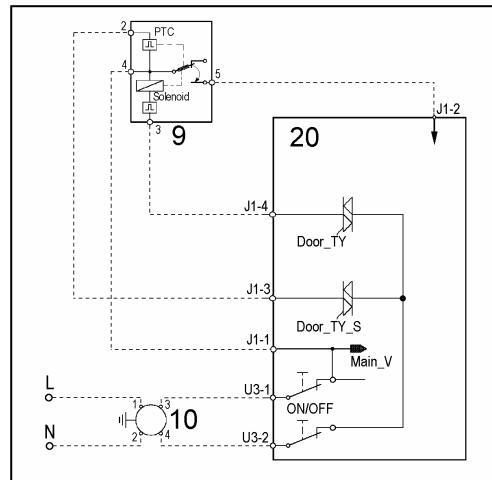
- ↪ When the washing programme is started by pressing the start/pause button, the bi-metal PTC (contacts 3-5) is powered by the triac (Door_TY) on the PCB: after 2-4 seconds, this closes the switch (5-4) which powers the electrical components of the appliance (only if the door is closed).
- ↪ The door interlock prevents the door from being opened 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 a further 1 to 3 minutes (PTC cooling time).

9.2.2 Instantaneous door interlock

- With this safety device, the door can be opened immediately after the end of the cycle.

9 Door safety interlock
 19 Anti-disturbance filter
 20 PCB

ON/OFF = Main switch (incorporated in the programme selector)



9.2.2.1 Operating principle

- When the ON/OFF switch closes and the appliance is switched on (at the programme selector knob), power is supplied to the bi-metal PTC (contact 4-2), but the door remains unlocked.
- When the programme starts (Start/Pause button), the PCB sends a 20 msec pulse to contact 4-3 of the electronically controlled valves (at least 6 seconds must have passed since the appliance was switched on); this locks the door and simultaneously closes the main switch (contacts 4-5), thus supplying power to all the appliance components.
- When the programme ends, the PCB sends two additional 20 msec pulses (200 msec apart):
 - the first pulse does not unlock the door;
 - the second pulse (which is sent only if the appliance is operating properly) unlocks the door lock device and simultaneously opens the contacts on the main switch.

9.2.2.2 Door open conditions

Before pulses are sent to open the door, the PCB checks for the following conditions

- the drum must be stationary (no signal from the tachometric generator);
- the water level must not be higher than the lower edge of the door;
- the temperature of the water must not be higher than 40° C.

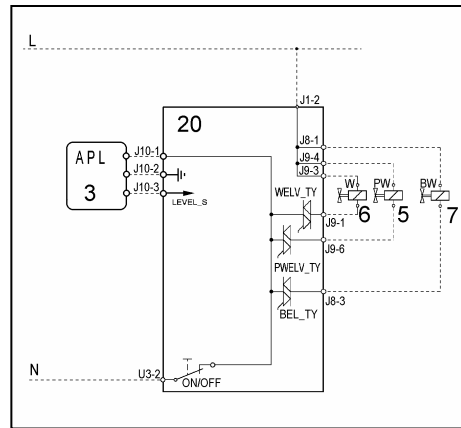
9.2.2.3 Automatic release device

If a power failure occurs, if the appliance is switched off, or if the electronically controlled valve malfunctions, the bi-metal PTC will cool down and unlock the door in approximately 1 - 4 minutes.

9.3 Water fill system

The solenoid valves are powered by the PCB by means of the triac and the water level in the tub is controlled by the analogue pressure switch.

- 3 Analogue pressure switch
- 5 Pre-wash solenoid
- 6 Wash solenoid
- 7 Electronically controlled bleach valve
- 20 PCB



9.3.1 Flowmeter

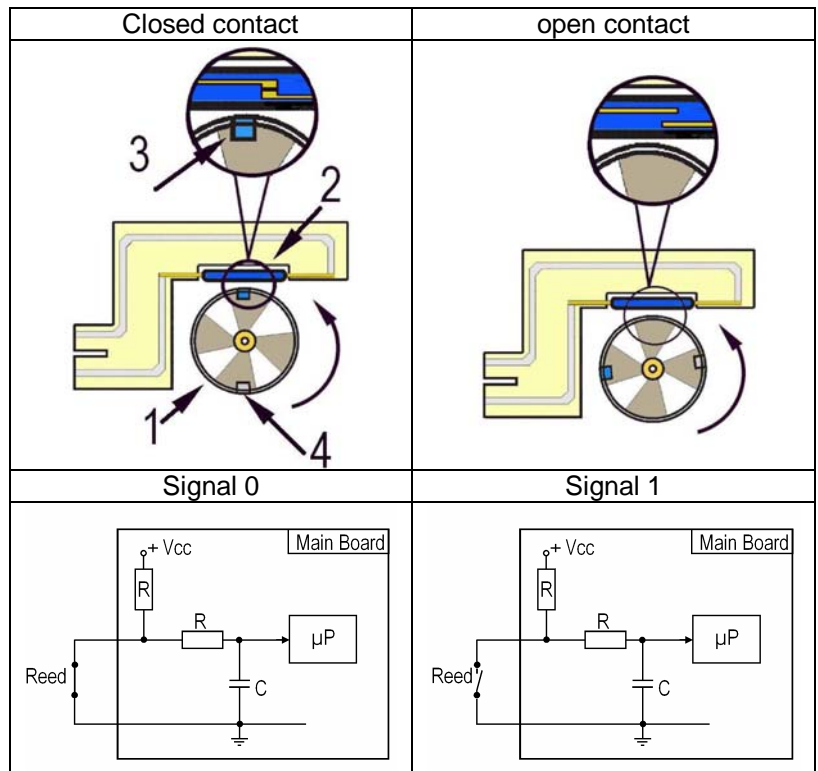
Some models of solenoid valves have a built-in flow sensor, which measures the quantity of water in litres that is loaded into the appliance. In the event of a sensor failure, the water level is controlled by the analogue pressure switch.

Electronically controlled valve, exploded view.	PCB	Turbine
1-PCB 2-Turbine 3-Deflector 4-Diffuser 5-Double filter	6-Reed contact	7-Magnet

9.3.2 Operating principle of the flowmeter

The main components of the flowmeter are:

- 1 – Turbine (with magnet and counterweight mounted on the outside)
- 2 – Reed contact (normally open)
- 3 – Magnet
- 4 – Counterweight



Water entering the solenoid valve rotates the turbine (1) and magnet (3), which passes in front of the Reed contact (2), thus closing it. As this contact opens and closes, it generates pulses at a frequency that depends on the water flow rate).

The turbine completes 230 revolutions for each litre of water. The operating range of the flow sensor is 0.2÷10 bar.

Using the signal it receives, the micro-processor can calculate the number of litres of water passing through the solenoid valve.

Mechanical jamming of the solenoid valve

The solenoid valve may jam open without being actuated (which will cause flooding if the pressure switch controlling the water level does not trip). If this occurs, the electronic control system (which continuously monitors the flow sensor) will lock the door, start the drain pump and display an ALARM simultaneously.

Low water pressure

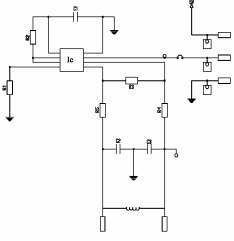
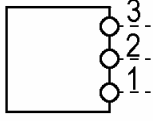

If the flow sensor does not generate a signal during the water fill phases, even though power is being supplied to the solenoid valve, the cause of this condition may be a closed water tap or clogged filter on the solenoid valve (with ensuing low water pressure). If this occurs, only a WARNING will be displayed and the cycle will continue for five minutes, after which time an ALARM will be signalled.

The electronically controlled condensation valve operates during the drying phase on washer-dryers. The alarm is disabled because the amount of water is very small.

9.4 A nalogue pressure switch of water level control in the tub

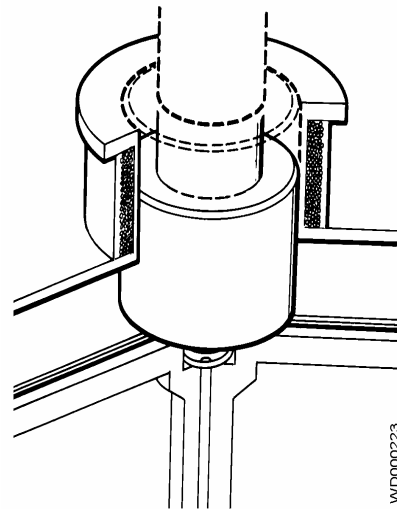
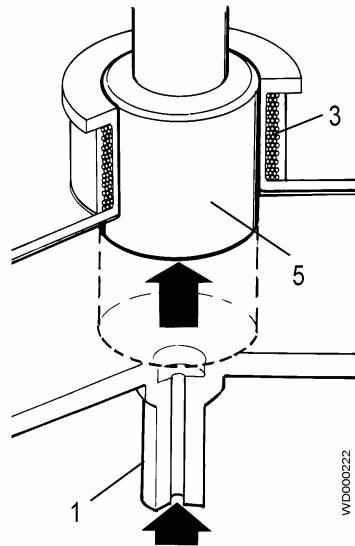
General characteristics

The electronic pressure switch is an analogue device that controls the water level in the tub, used in the models with electronic control system and it is directly connected to the main PCB.

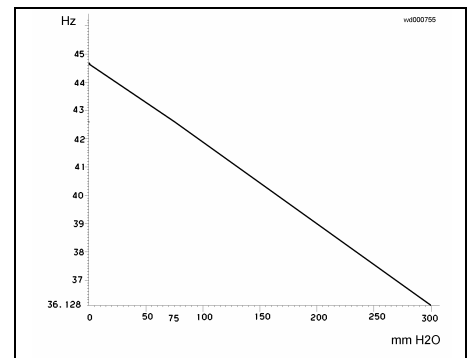
ELECTRONIC PRESSURE SWITCH		
Electronic circuit	Electrical symbol	
		

The pressure switch is connected via a pipe to the pressure chamber. When water is introduced into the tub, this creates a pressure inside the hydraulic circuit that causes the membrane to change position. This in turn modifies the position of the core inside the coil, thus changing the inductance and the frequency of the oscillating circuit. The PCB recognises how much water has been introduced into the tub according to the frequency.

1 pipe
3 oscillating coil
5 core

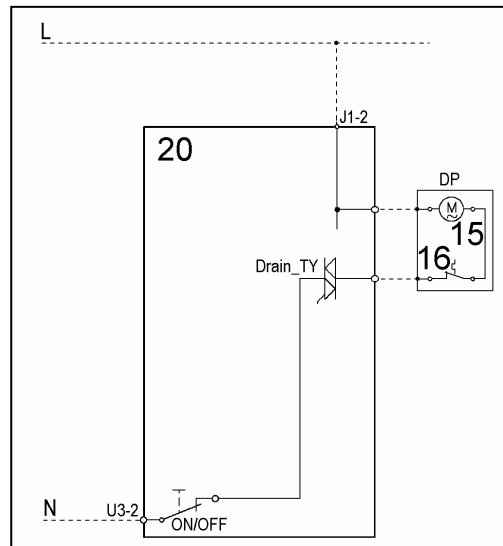


Operating frequency variation according to the quantity of water in the tub



9.5 Drain pump

- 15 Drain pump
- 16 Overload cut-out
- 20 PCB



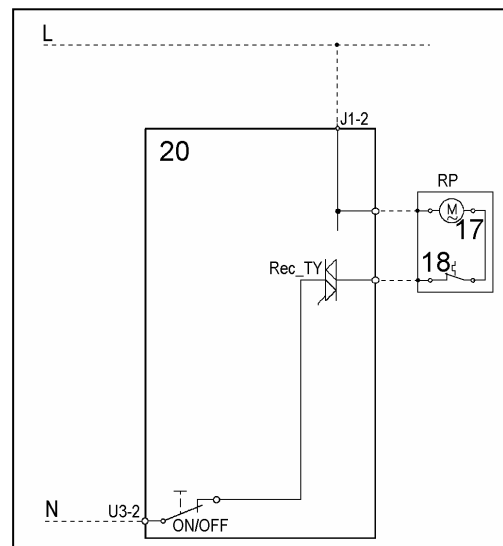
The PCB powers the drain pump via a TRIAC as follows:

- until the electronic pressure switch closes on empty, after which the pump is actuated for a brief period or passes to the subsequent phase
- for a pre-determined period (and possibly an alarm is displayed).

9.6 Circulation pump (where featured)

On jetsystem models, the main PCB powers the circulation pump directly through a triac.

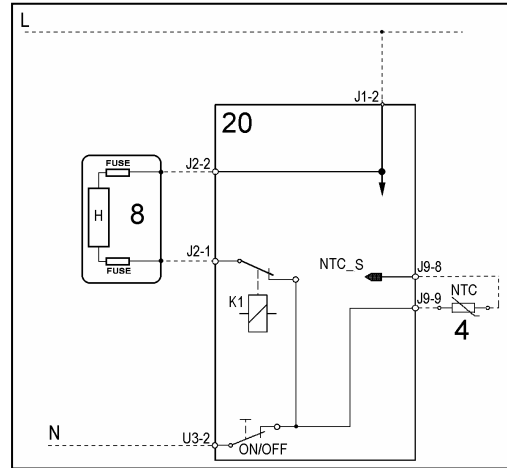
- 17 Drain pump
- 18 Overload cut-out
- 20 PCB



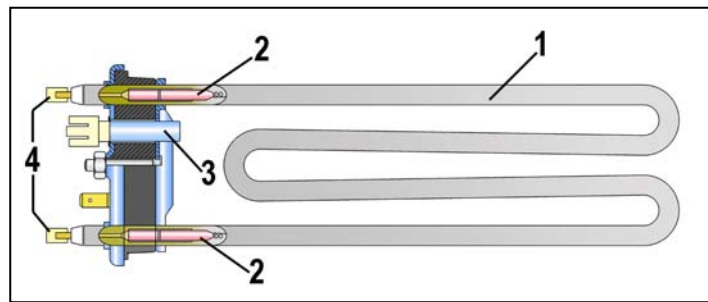
9.7 Heating



- 4 Heating
- 8 Heating element (with thermal fuses)
- 20 PCB
- K1 Relay



- 1. Tubular casing
- 2. Thermal fuses
- 3. NTC probe
- 4. Connectors



The heating element is powered by a relay (K1) of the PCB and it is fitted with two thermal fuses, which interrupt if the temperature degree exceeds the values to which they are calibrated.

WARNING



When replacing the heating element, do so with one that has the same characteristics so as not to compromise the safety of the appliance.

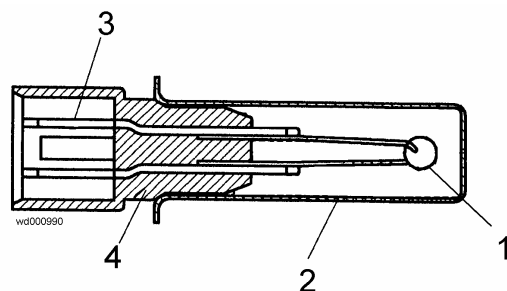
Do not remove/switch the NTC sensors between heating elements.



9.8 Temperature sensor

Temperature is controlled by the PCB by means of an NTC temperature sensor incorporated into the heating element.

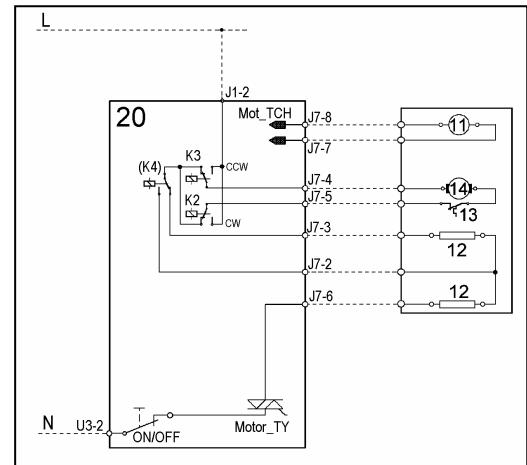
- 1. NTC heating element
- 2. Metallic capsule
- 3. Terminals
- 4. Plastic casing



CONNECTOR (°C)	RESISTANCE (Ω)		
	Rated value	Maximum value	Minimum value
20	6050	6335	5765
60	1250	1278	1222
80	640	620	660

9.9 Universal motor

- 11 Tachometric generator
- 12 Stator
- 13 Protector
- 14 Rotor
- 20 PCB



9.9.1 Power supply to motor

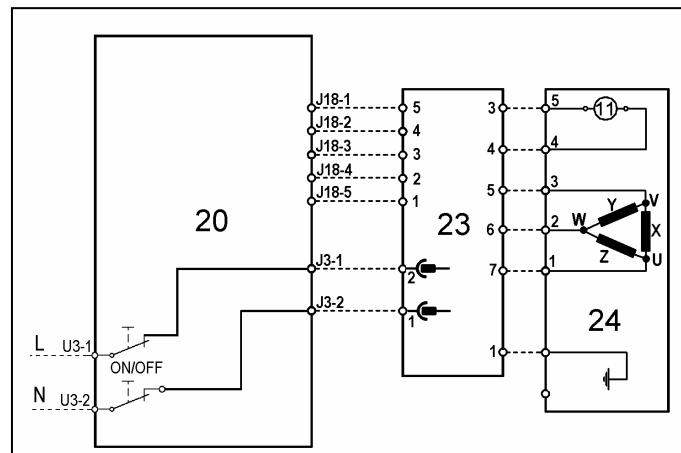
The PCB powers the motor via a TRIAC switch; the direction of rotation is reversed by switching the contacts on the two relays (K2-K3), which modify the connection between the rotor and the stator.

In certain models, 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 tachometric generator. During the spin phases, the micro-processor performs the anti-foam and the anti-unbalancing control procedure.

9.10 Three-phase asynchronous motor (EWM 25xx)

- 11. Tachometric generator
- 20. Main circuit board
- 23. Inverter
- 24. Motor

X-Y-X = Motor windings



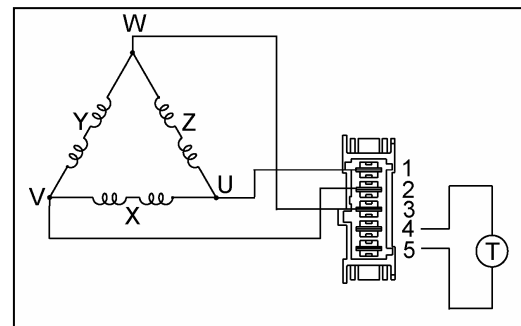
9.10.1 Power supply to motor

Three-phase power is fed by the inverter (4), which sends through the connectors 5-6-7 the three phases to connectors 1-2-3 on the motor (nodes U-W-V), where the windings (Y-X-Z-) are connected.

The phase shift between the phases is 120° and peak amplitude is 310V.

It is possible to get an idea of the efficiency of the motor by measuring the resistance of the coils:

- winding y ohm $5.4 \sim \pm 7\%$ (contacts 2-3)
- winding x ohm $5.4 \sim \pm 7\%$ (contacts 1-2)
- winding z ohm $5.4 \sim \pm 7\%$ (contacts 1-3)
- winding T (tachometric) ohm $121 \pm 7\%$ (contacts 4-5).

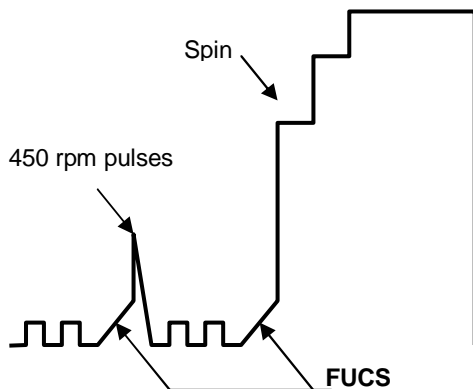


- **Any work on electrical appliances must only be carried out by qualified technicians.**
- **Unplug the appliance before accessing internal components.**
- **When replacing the "INVERTER" board, do not open the plastic casing, because some parts are subject to high voltage values and some condensers remain loaded for a long time at dangerous voltage levels even after being unplugged.**
- **Accidental physical contact may cause electric shocks.**

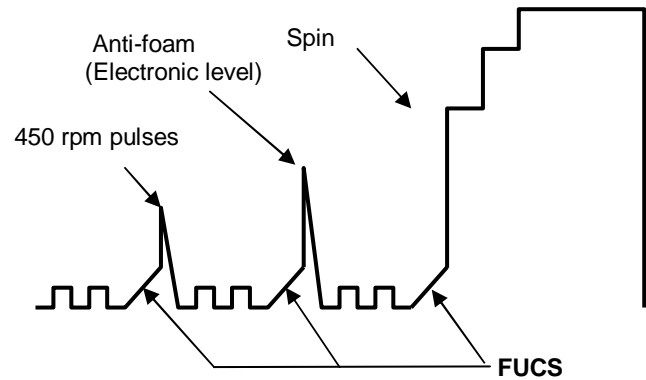
9.11 Anti-foam control system

The anti-foam control procedure is performed via the electronic pressure switch.

Spin phase without foam



Spin phase with little foam



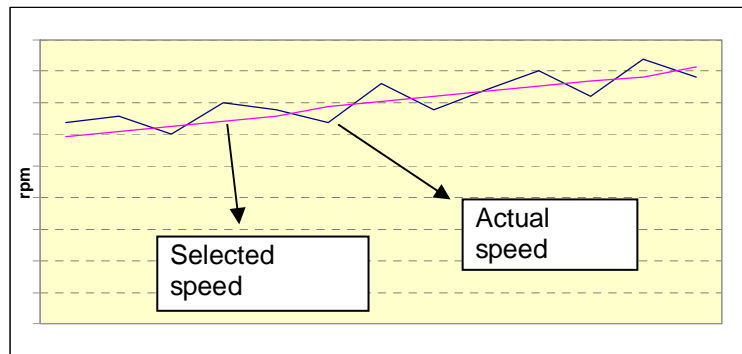
- **Spin with little foam:** if the contact of the electronic pressure switch closes on "full", the spin phase is interrupted; the drain pump continues to operate and, when the contact returns to "empty", the spin phase is resumed.
- **Spin with excessive foam in the tub (critical situation):** the control system detects whether the electronic pressure switch switches 5 times to full (five spin interruptions). If this occurs, the spin phase is skipped, and a one-minute drain cycle is performed with the motor stationary and, in the case of a washing phase, a supplementary rinse is added.

9.12 “ FUCS ”

(Fast Unbalance Control System)

The control procedure for unbalanced loads is performed dynamically, before each spin cycle, as described below.

- ↺ 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 pre-determined limits; if the value is less than the minimum limit, the speed of the drum is increased by a certain value depending on the transmission ratio 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 laundry 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 characterised by:

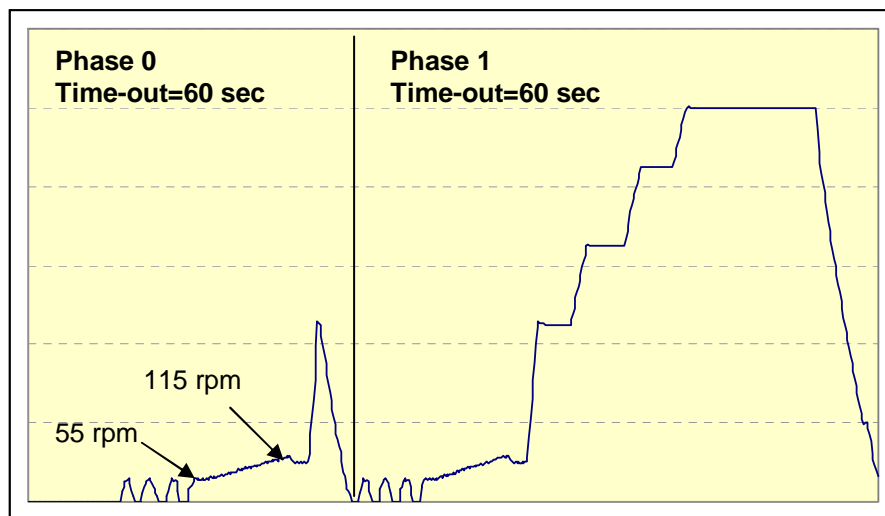
- ↺ an unbalancing index (0-1-2-3)
- ↺ an unbalancing threshold value (e.g. 850, 350, 650, 1100 rpm)
- ↺ a time out (max. time)

- **Ending of the FUCS balancing phase**

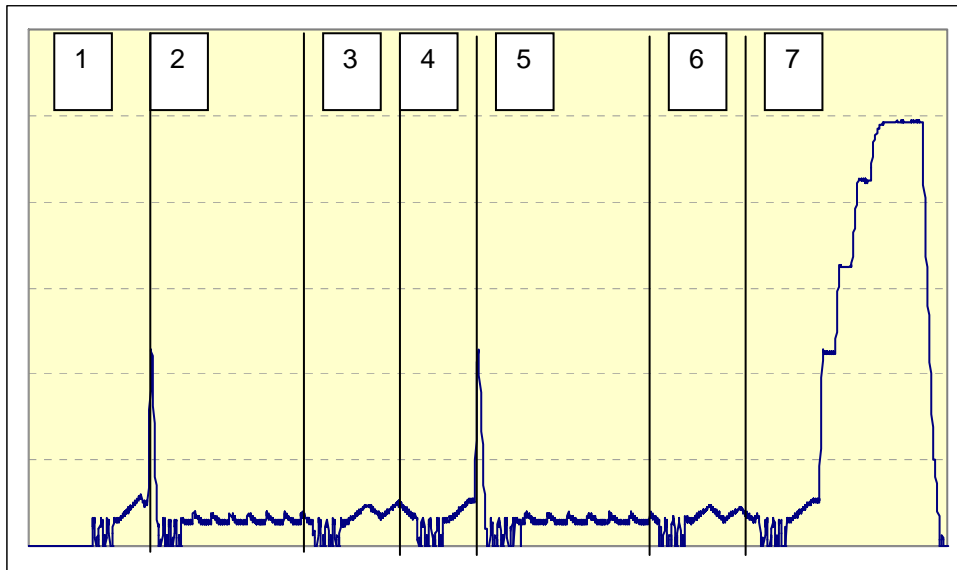
The phase ends when:

- ↺ the drum rotation speed is 115 rpm (or 85 rpm 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 spin is performed depending on the unbalancing.
- ↺ In the worst case scenario, in which all phases are not sufficient to reach a minimum balancing value, the spin is not performed.

- **Example of perfect balancing**



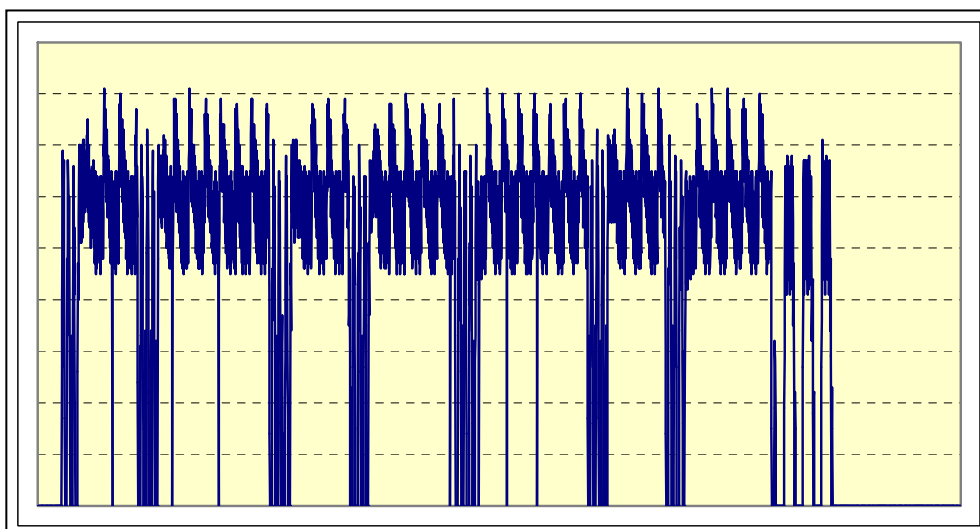
- **Balancing in the longest available time interval**



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

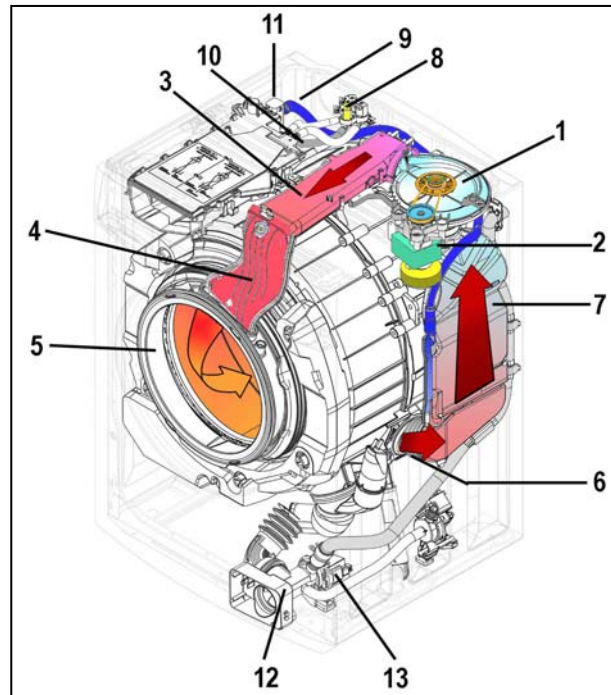
- **Unbalancing after all phases**

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



10 DRYING CIRCUIT

1. Fan
2. Fan motor
3. Heating element casing
4. Conduit
5. Bellow seal
6. Tub-condenser sleeve
7. Drying condenser
8. Electronically controlled water fill valve
9. Condensation intake tube and steam vent tube
10. Solenoid valve-air break tube
11. Coupling (Air-break)
12. Filter body
13. Drain pump



Automatic drying cycles: the drying time is controlled by the microprocessor so that the desired degree of drying is achieved.

The drying cycle can be performed at the end of the washing cycle, or as a separate programme. Three types of drying can be selected:

- extra dry
- wardrobe dry
- iron dry

Time-controlled cycle: the drying time is selected by the user (max. 130 minutes for cotton and synthetic fabrics).

Cooling: a cooling cycle is performed at the end of every drying cycle.

Anti-crease: a 10-minute anti-crease phase is performed after the cooling phase.

The drying heating elements are powered directly by the main PCB via two relays.

In the cycles for synthetic fabrics, the drying is performed with only one heating element (half power); in the cotton - linen cycles both heating elements are powered (full power).

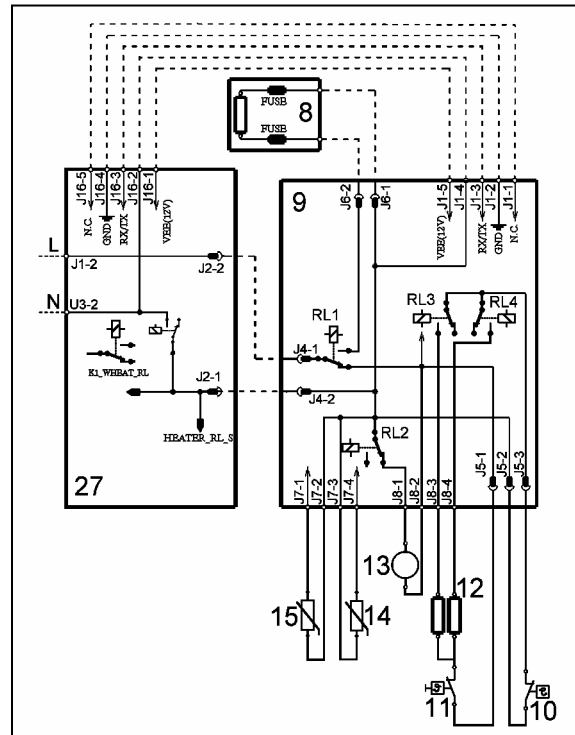
The fan motor is powered via a relay; the condensation **solenoid valve** is powered by a triac.

The wash of the condenser occurs at the beginning of the last rinse.

10.1 Temperature control

The drying temperature is controlled by an NTC sensor positioned on the duct; the heating element casing features two safety thermostats (one of which is a manual-reset type).

- 8. Washing heating element
- 9. PCB - WD
- 10. Safety thermostat (auto-reset)
- 11. Safety thermostat (manual reset)
- 12. Drying heating element
- 13. Fan motor
- 14. Drying control NTC sensor
- 15. Humidity control NTC sensor
- 27. Main circuit board

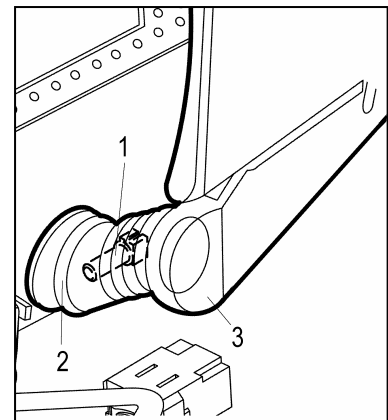


<ol style="list-style-type: none"> 1. Drying temperature control NTC sensor 2. Auto-reset safety thermostat 3. Manual reset safety thermostat (150°C) 4. Drying heating element 			
NTC sensor: heating element at 25 °C		5000Ω	
Manual reset safety thermostat		Normally closed, opens at 150 ±5°C.	
Auto-reset safety thermostat		Normally closed, opens at 110 ±3°C. Closes at 94°±5°.	
Heating unit	Power	920+920 W	
	Power supply voltage	230V	240
	Heating element	56,5Ω+56,5Ω	61,5Ω+61,5Ω
Fan capacity		approx. 80 m ³ /hour	

- Calculating the drying time:

in the automatic cycles the NTC sensor mounted on the drying duct is used to calculate the drying time.

1. NTC temperature probe
2. Tub-condenser tube
3. Drying condenser



10.2 Alarm Summary Table

Alarm	Description	Possible fault	Machine status/action	Reset
E00	No alarm	-----	-----	-----
E11	Water fill difficulty during washing	Tap closed or water pressure too low; Drain pipe improperly positioned; Water fill solenoid valve faulty; Leaks from water circuit on pressure switch; Pressure switch faulty; Wiring faulty; Main PCB faulty.	Cycle is paused with door locked.	START/RESET
E12	Water fill difficulty during drying	Tap closed or water pressure too low; Drain pipe improperly positioned; Water fill solenoid valve faulty; Leaks from water circuit on pressure switch; Pressure switch faulty; Wiring faulty; Main PCB faulty.	Cycle is paused with door locked.	START/RESET
E13	Water leaks	Drain pipe improperly positioned; Water pressure too low; Water fill solenoid valve faulty; Water circuit on pressure switch is leaking/clogged; Pressure switch faulty.	Cycle is paused with door locked.	START/RESET
E21	Drain difficulty during washing	Drain tube kinked/clogged/improperly positioned; Drain filter clogged/dirty; Wiring faulty; Drain pump faulty; Pressure switch faulty; Main PCB faulty;	Cycle paused (after 2 attempts).	START/RESET
E22	Drain difficulty during drying	Drain tube kinked/clogged/improperly positioned; Drain filter clogged/dirty; Wiring faulty; Drain pump faulty; Pressure switch faulty; Main PCB faulty;	Cycle paused	START/RESET
E23	Faulty triac for drain pump	Wiring faulty; Drain pump faulty; Main PCB faulty.	Safety drain cycle - Cycle stops with door open.	RESET
E24	Malfunction in sensing circuit on triac for drain pump (wrong input voltage to microprocessor)	Main circuit board faulty.	Safety drain cycle - Cycle stops with door unlocked.	RESET
E31	Circuito pressostato elettronico guasto (frequenza del segnale del pressostato fuori dai limiti)	Wiring; Electronic pressure switch; Main PCB;	Cycle stops with door locked.	RESET
E32	Calibration error of the electronic pressure switch (The electronic pressure switch generates a signal with unstable frequency during the drain phase.)	Drain tube kinked/clogged/improperly positioned; Drain filter clogged/dirty; Drain pump faulty; Leaks from water circuit on pressure switch; pressure switch; Wiring; main PCB;	Cycle paused	START/RESET
E35	Overflow	Water fill solenoid valve faulty; Leaks from water circuit on pressure switch; Wiring faulty; Pressure switch faulty; Main PCB faulty.	Cycle interrupted. Safety drain cycle. Drain pump continues to operate (5 min. on, then 5 min. off. etc.).	RESET
E38	Internal pressure chamber is clogged (water level does not change for at least 30 sec. of drum rotation)	Motor belt broken; Water circuit on pressure switches clogged	Heating phase is skipped	ON/OFF RESET
E3A	Faulty sensing by heating element relay (input voltage to microprocessor always 5V)	Main circuit board faulty.	Cycle stops with door locked.	RESET

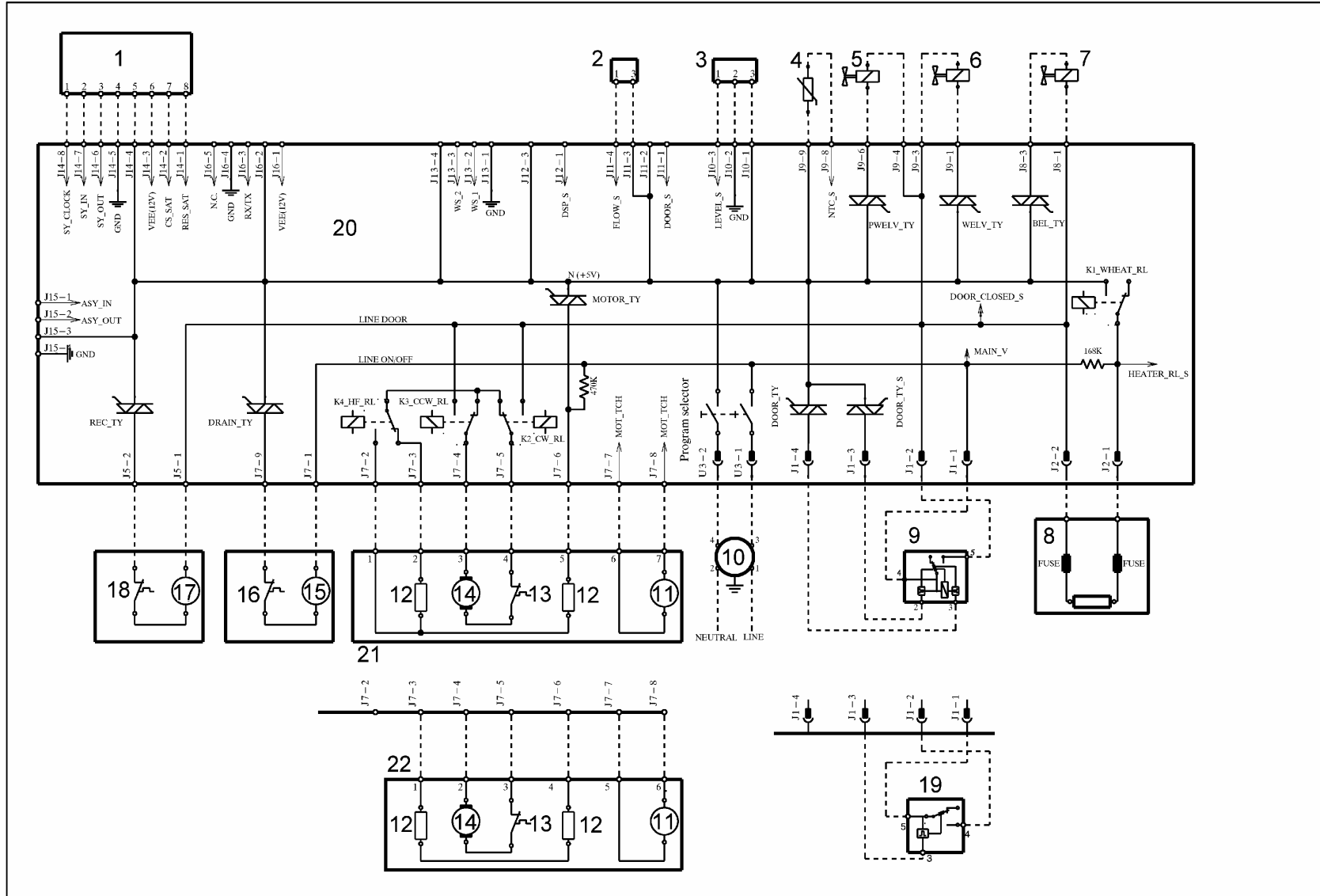
Alarm	Description	Possible fault	Machine status/action	Reset
E41	Door open (after 15 sec.)	Check whether the door is closed properly; Wiring faulty; Door safety interlock faulty; Main circuit board faulty.	Cycle paused	START/RESET
E42	Problems with door lock	Wiring faulty; Door safety interlock faulty; Electrical current leak between heating element and ground; Main PCB faulty.	Cycle paused	START/RESET
E43	Faulty triac supplying power to door delay system	Wiring faulty; Door safety interlock faulty; Main circuit board faulty.	(Safety drain cycle) Cycle blocked.	ON/OFF RESET
E44	Faulty sensing by door delay system	Main circuit board faulty.	(Safety drain cycle) Cycle blocked.	ON/OFF RESET
E45	Faulty sensing by triac on door delay system (wrong input voltage to microprocessor)	Main circuit board faulty.	(Safety drain cycle) Cycle blocked.	ON/OFF RESET
E51	Motor power triac short-circuited	Current leakage from motor or from wiring; Main PCB faulty.	Cycle stops with door open (after 5 attempts).	RESET
E52	No signal from motor tachometric generator	Wiring faulty; Motor faulty; Main circuit board faulty.	Cycle stops with door locked (after 5 attempts).	RESET
E53	Motor triac sensing circuit faulty (wrong input voltage to microprocessor)	Main circuit board faulty.	Cycle blocked.	RESET
E54	Motor relay contacts sticking (high voltage level when the relay switches to OFF)	Current leakage from motor or from wiring; Main PCB faulty.	Cycle blocked (after 5 attempts).	RESET
E57	Inverter is drawing too much current (>15A)	Wiring faulty on inverter for motor; Inverter PCB faulty; Motor faulty.	Cycle stops with door locked (after 5 attempts).	RESET
E58	Inverter is drawing too much current (>4.5A)	Motor malfunction (overload); Wiring faulty on inverter faulty; Motor faulty; Inverter PCB faulty	Cycle stops with door locked (after 5 attempts).	RESET
E59	No signal from tachometric generator for 3 seconds	Wiring faulty on inverter for motor; Inverter PCB faulty; Motor faulty	Cycle stops with door locked (after 5 attempts).	RESET
E5A	Overheating on heat dissipator for Inverter	Overheating caused by continuous operation or ambient conditions (let appliance cool down); Inverter PCB faulty. NTC open (on the Inverter PCB)	Cycle stops with door locked (after 5 attempts).	RESET
E5H	Input voltage is lower than 175V	Wiring faulty; Inverter PCB faulty	Cycle stops with door locked (after 5 attempts).	RESET
E5C	Input voltage is too high	Input voltage is too high (measure the grid voltage); Inverter PCB faulty	Cycle stops with door locked (after 5 attempts).	RESET
E5d	Data transfer error between Inverter and main PCB	Line interference; Wiring faulty; Faulty main PCB or Inverter PCB.	-----	RESET
E5E	Communication error between Inverter and main PCB	Faulty wiring between main PCB and inverter PCB; Inverter PCB faulty; Main PCB faulty	Cycle blocked (after 5 attempts).	ON/OFF
E5F	Inverter PCB fails to start the motor	Wiring faulty; Inverter PCB faulty; Main PCB faulty	Cycle stops with door open (after 5 attempts).	RESET
E61	Insufficient heating during washing	Wiring faulty; NTC probe for wash cycle faulty; Heating element faulty; Main PCB faulty.	The heating phase is skipped.	START/RESET

Alarm	Description	Possible fault	Machine status/action	Reset
E62	Overheating during washing (temperature higher than 88°C for more than 5 min.)	Wiring faulty; NTC probe for wash cycle faulty; Heating element faulty; Main PCB faulty.	Safety drain cycle Cycle stops with door open.	RESET
E66	Heating element power relay faulty (inconsistency between sensing and relay status)	Main PCB faulty.	Safety drain cycle Cycle stops with door open.	RESET
E68	Earth-leakage (value of grid voltage different from main value)	Earth-leakage between heating element and earth	Cycle blocked with door open.	RESET
E69	Heating element interrupted	Wiring faulty; Heating element for washing interrupted (thermal fuse open).	-----	START/RESET
E71	NTC probe for wash cycle faulty (short-circuited or open)	Wiring faulty; NTC probe for wash cycle faulty; Main circuit board faulty.	The heating phase is skipped.	START/RESET
E72	Fault in NTC sensor on drying condenser (voltage out of range, short-circuit or open circuit)	Wiring faulty; Drying NTC sensor (condenser) improperly positioned or faulty; Main WD PCB faulty.	The heating phase is skipped.	START/RESET
E73	Fault in NTC sensor on drying duct (voltage out of range, short-circuit or open circuit)	Wiring faulty; Drying NTC sensor (duct) improperly positioned or faulty; Main WD PCB faulty.	The heating phase is skipped.	START/RESET
E74	NTC probe for wash cycle improperly positioned	Wiring faulty; NTC probe for wash cycle improperly positioned; NTC probe faulty; Main PCB faulty.	The heating phase is skipped.	START/RESET
E82	Error in selector reset position	Main PCB faulty (Incorrect configuration data).	-----	RESET
E83	Error in reading selector	Main PCB faulty (Incorrect configuration data).	Cycle cancelled.	START/RESET
E91	Communication error between main PCB and display	Wiring faulty; Control/display PCB faulty; Main circuit board faulty.	-----	RESET
E92	Communication inconsistency between main PCB and display (incompatible versions)	Incorrect control/display PCB; Incorrect PCB (does not correspond to the model).	Cycle blocked.	OFF/ON
E93	Appliance configuration error	Main PCB faulty (Incorrect configuration data).	Cycle blocked.	OFF/ON
E94	Incorrect configuration of washing cycle	Main PCB faulty (incorrect configuration data).	Cycle blocked.	OFF/ON
E95	Communication error between microprocessor and EEPROM	Main circuit board faulty.	Cycle blocked.	RESET
E97	Inconsistency between programme selector and cycle configuration	Main PCB faulty (incorrect configuration data).	Cycle blocked.	RESET
E98	Communication error between main PCB – Inverter	Incompatibility between main PCB and Inverter	Cycle blocked.	OFF/ON
E9b/E9H	Communication error between microprocessor and FLASH memory	Display board	-----	OFF/ON RESET
E9C	Appliance configuration error	Display board	-----	OFF/ON RESET
E9d	Clock faulty	Display board	-----	OFF/ON RESET

Alarm	Description	Possible fault	Machine status/action	Reset
E9F	Communication error between main PCB and Inverter board	Faulty wiring between main PCB and Inverter; Inverter PCB faulty; Main PCB faulty.	Cycle blocked.	OFF/ON
EC1	Electronically controlled valve blocked with operating flowmeter	Wiring faulty; Solenoid valve faulty/blocked, Main PCB faulty,	Cycle stops with door locked. Drain pump continues to operate (5 min. on, then 5 min. off. etc.)	RESET
EC3	Problems with weight sensor (no signal or outside the limits).	Wiring faulty; Weight sensor faulty; Main PCB faulty;	-----	START/RESET
Ed1	Data transfer error between WD PCB and main PCB	Wiring faulty between main PCB and WD PCB; WD PCB faulty; Main PCB faulty	Cycle blocked.	OFF/ON
Ed2	Drying heating element relay 1 faulty	Wiring between WD PCB and thermostats faulty; Thermostats faulty; WD PCB faulty; Main PCB faulty	Cycle blocked with door open.	RESET
Ed3	Drying heating element relay 2 faulty	Wiring between WD PCB and thermostats faulty; Thermostats faulty; WD PCB faulty; Main PCB faulty	Cycle blocked with door open.	RESET
Ed4	Relay that switches the power between the washing and drying heating element (in the WD PCB)	Wiring faulty; Electrical current leak between heating element and ground; WD board faulty; Main PCB faulty	Cycle stops with door open.	RESET
Ed6	No communication between main PCB and display board (INPUT)	Wiring faulty between main PCB and programme display board; Display board faulty; Main PCB faulty.	-----	OFF/ON
Ed7	No communication between main PCB and remote display board	Wiring faulty between main PCB and remote control board; Remote control board faulty; Main PCB faulty.	-----	-----
EF1	Drain filter clogged (drain phase too long)	Drain hose blocked/kinked/too high. Drain filter clogged/dirty.	Warning displayed at the end of cycle (specific LED)	START/RESET
EF2	Overdosing of detergent (too much foam during drain phases)	Excessive detergent dosing; Drain hose kinked/blocked; Drain filter clogged/dirty.	Warning displayed after 5 attempts or by the specific LED.	RESET
EF3	Aqua control system intervention	Water leaks onto base frame; Aqua control system faulty.	Appliance drains	ON/OFF RESET
EF4	Water fill pressure too low, no signal from flowmeter and electronically controlled valve is open	Tap closed, water fill pressure too low	-----	RESET
EF5	Unbalanced load	Final spin phases skipped.	-----	RESET
EF6	Reset	-----	No action to be performed, if continues, replace the main PCB	-----
EH1	Power supply frequency of appliance outside the limits	Problem with the power supply network (incorrect/disturbed); Main PCB faulty.	Wait for nominal frequency conditions.	OFF/ON
EH2	Supply voltage too high	Problem with the power supply network (incorrect/disturbed); Main PCB faulty.	Wait for nominal voltage conditions.	OFF/ON
EH3	Supply voltage too low	Problem with the power supply network (incorrect/disturbed); Main PCB faulty.	Wait for nominal voltage conditions.	OFF/ON
EHE	Inconsistency between safety relay (in the main PCB) and safety “ sensing ” circuit	Faulty cabling; Main circuit board faulty	Safety drain cycle Cycle stops with door open.	RESET
EHF	Safety sensing circuit faulty (wrong input voltage to microprocessor)	Main circuit board faulty	Safety drain cycle Cycle stops with door open.	RESET

11 DIAGRAMS

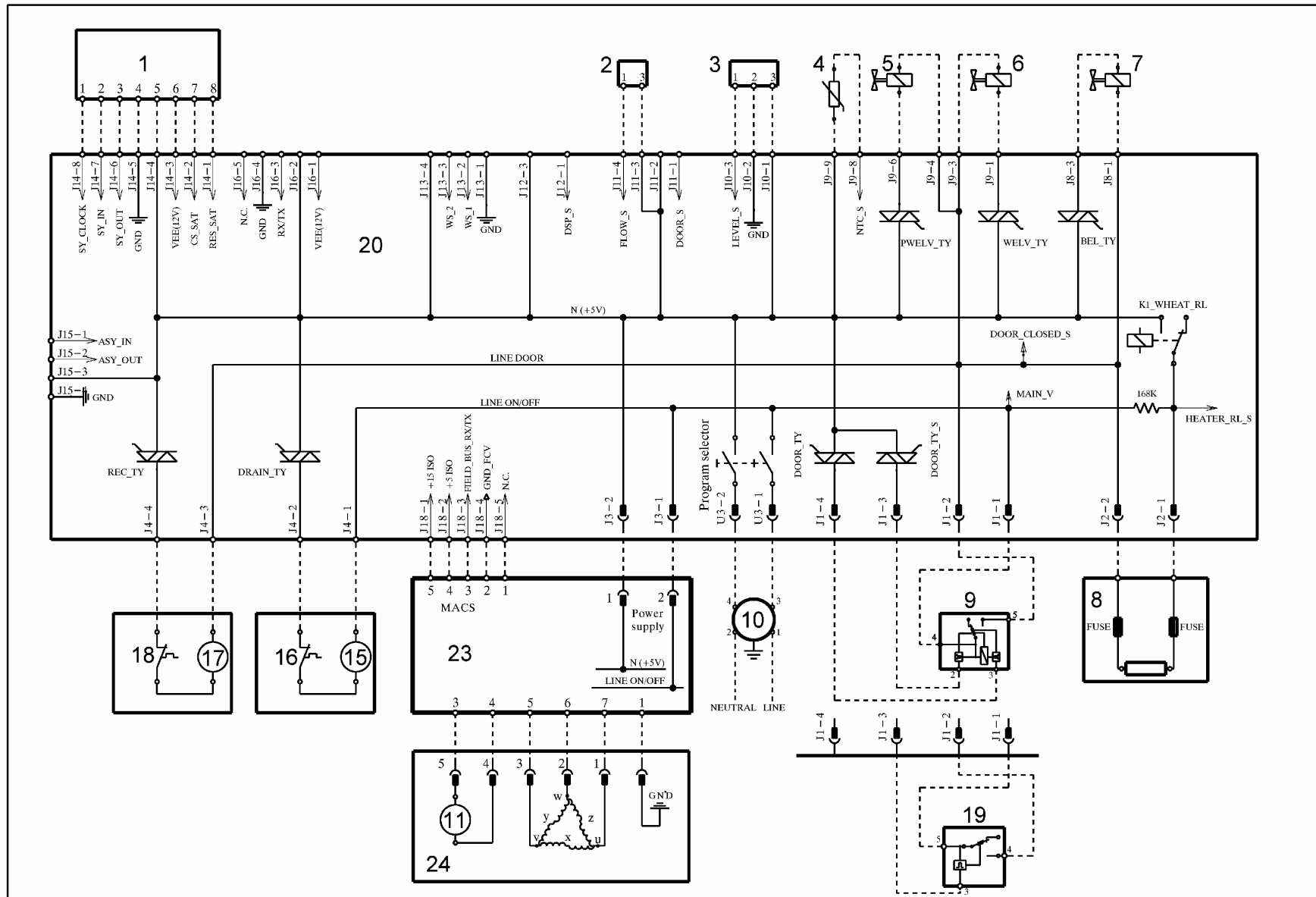
11.1 WM diagram with UNIVERSAL MOTOR EWM 21xx



- Key to WM diag ram with UNIVERSAL MOTOR EWM 21xx

Appliance electrical components	PCB components	
1. Display board	DOOR_TY	Door interlock Triac
2. Flowmeter	DRAIN_TY	Drain pump Triac
3. Analogue pressure switch	REC-TY	Circulation pump TRIAC switch
4. NTC temperature probe	K1	Heating element relay
5. Pre-wash solenoid	K2	Motor relay: clockwise rotation
6. Wash solenoid	K3	Motor relay: anti-clockwise rotation
7. Electronically controlled bleach valve	K4	Motor relay: half-range power supply (some
8. Heating element (with thermal fuses)	models)	
9. Door safety interlock (instantaneous)	MOTOR_TY	Motor Triac
10. Anti-disturbance filter	ON/OFF	Main switch (programme selector)
11. Tachometric generator (motor)	PWELV_TY	Pre-wash solenoid Triac
12. Stator (motor)	WELV_TY	Wash solenoid Triac
13. Thermal cut-out (motor)	BEL_TY	Electronically controlled TRIAC bleach valve
14. Rotor (motor)		
15. Drain pump		
16. Thermal cut-out (drain pump)		
17. Circulation pump		
18. Thermal cut-out (circulation pump)		
19. Door safety interlock (with PTC)		
20. PCB		
21. Motor with half-range		
22. Motor without range		

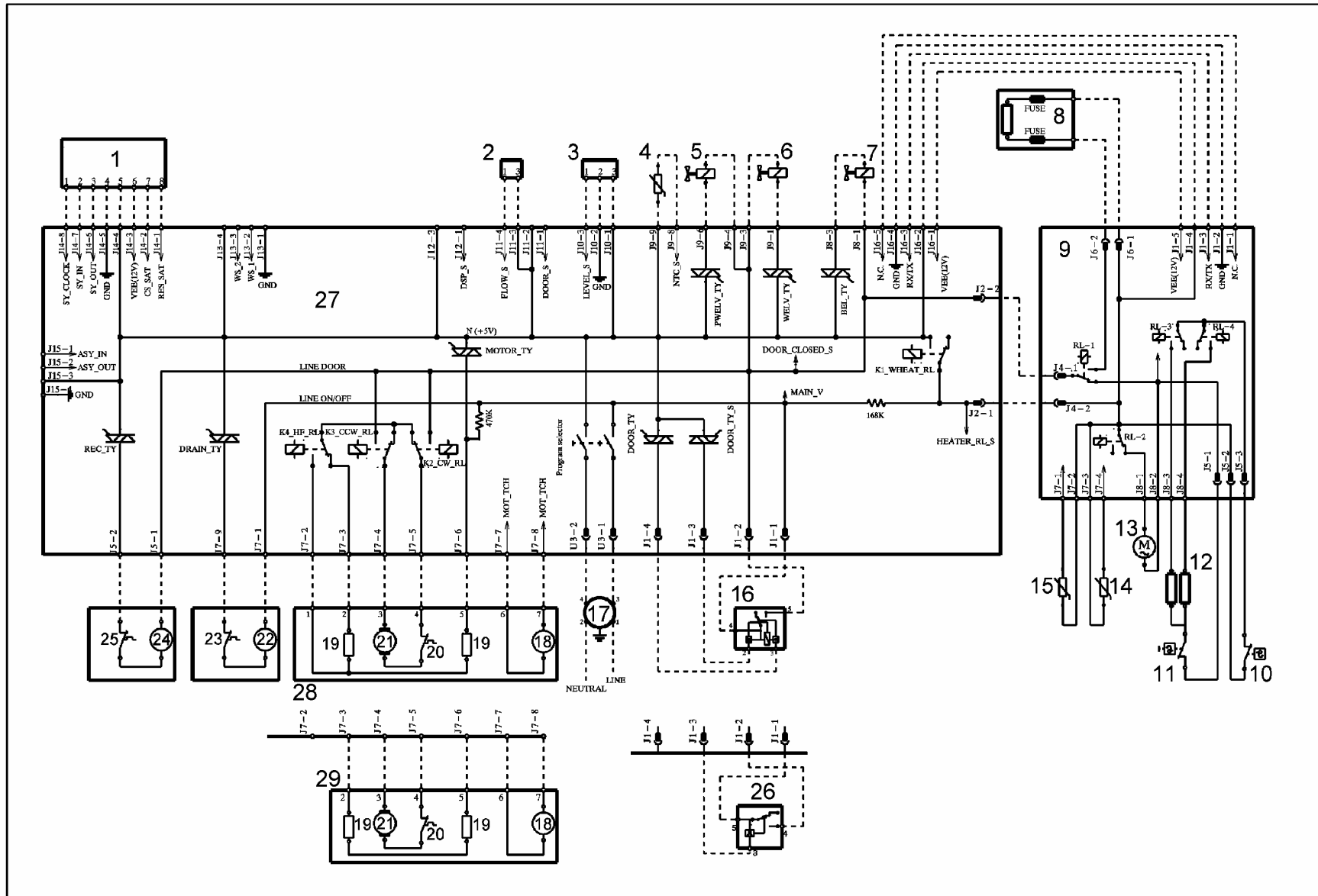
11.2 WM diagram with THREE-PHASE ASYNCHRONOUS MOTOR EWM 25xx



- Key to WM diagram with THREE-PHASE ASYNCHRONOUS MOTOR EWM 25xx

Appliance electrical components	PCB components	
1. Display board 2. Flowmeter 3. Analogue pressure switch 4. NTC temperature probe 5. Pre-wash solenoid 6. Wash solenoid 7. Bleach solenoid valve 8. Heating element (with thermal fuses) 9. Door safety interlock (instantaneous) 10. Anti-disturbance filter 15. Drain pump 16. Thermal cut-out (drain pump) 17. Circulation pump 18. Thermal cut-out (circulation pump) 19. Door safety interlock (with PTC) 20. PCB 23. Inverter 24. Triple-phase motor	DOOR_TY DRAIN_TY REC-TY K1 ON/OFF PWELV_TY WELV_TY BEL_TY	Door interlock Triac Drain pump Triac Circulation pump TRIAC switch Heating element relay Main switch (programme selector) Pre-wash solenoid Triac Wash solenoid Triac Electronically controlled TRIAC bleach valve

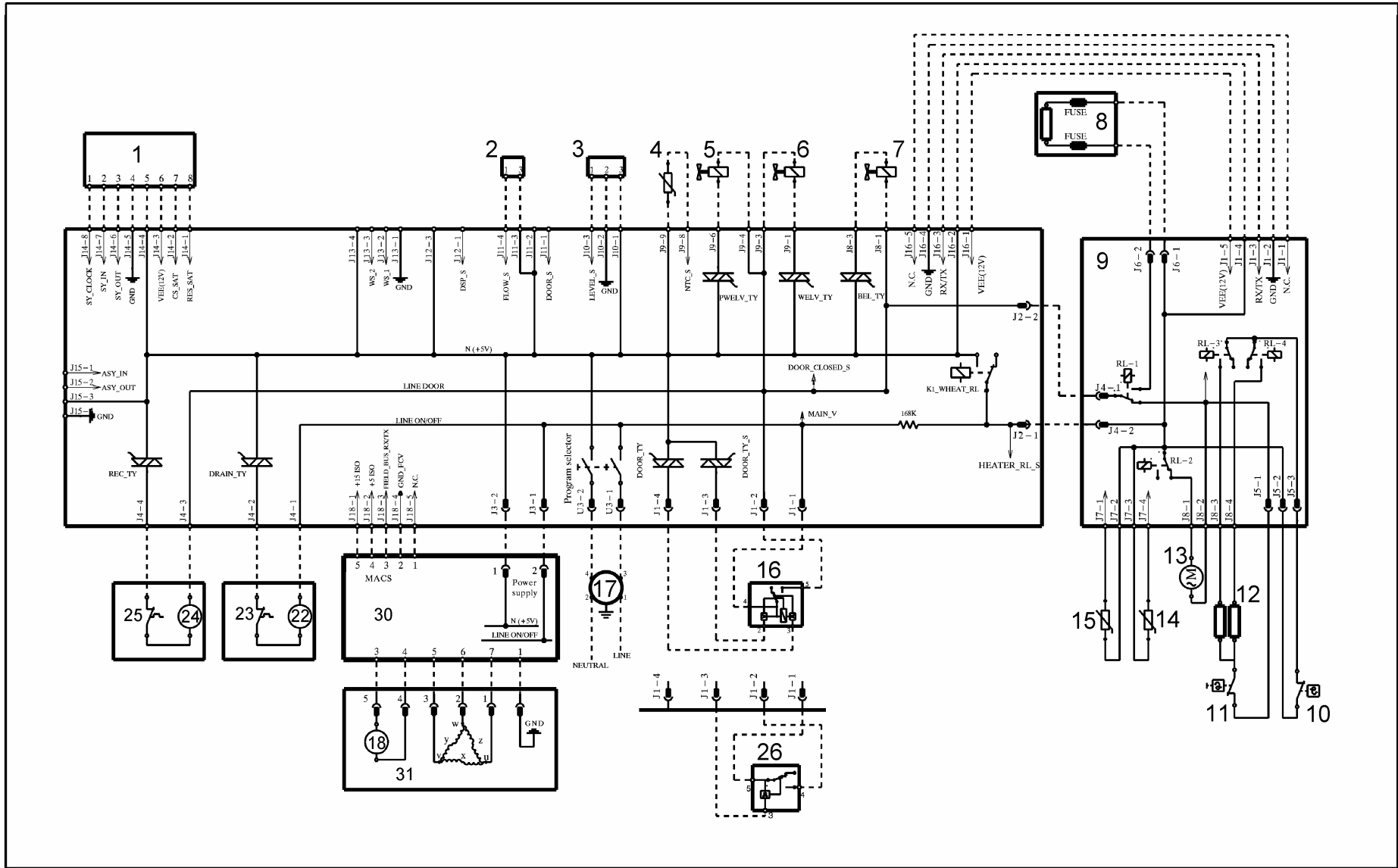
11.3 WD diagram with UNIVERSAL MOTOR EWM 21xx



- Key to WD diagram with UNIVERSAL MOTOR EWM 21xx

Appliance electrical components	PCB components	
<ol style="list-style-type: none"> 1. Display board or LCD 2. Flowmeter 3. Analogue pressure switch 4. NTC temperature sensor (washing) 5. Pre-wash solenoid 6. Wash solenoid 7. Condensation solenoid valve 8. Washing heating element (with thermal fuses) 9. WD PCB 10. Safety thermostat (auto-reset) 11. Safety thermostat (manual reset) 12. Drying heating element 13. Fan motor 14. Drying NTC temperature sensor 15. Humidity NTC temperature sensor 16. Door safety interlock (instantaneous) 17. Anti-disturbance filter 18. Tachometric generator (motor) 19. Stator (motor) 20. Thermal cut-out (motor) 21. Rotor (motor) 22. Drain pump 23. Thermal cut-out (drain pump) 24. Circulation pump 25. Thermal cut-out (circulation pump) 26. Door safety interlock (with PTC) 27. Main circuit board 28. Motor with half-range 29. Motor without half-range 	<p>DOOR_TY DRAIN_TY REC-TY K1 K2 K3 K4</p> <p>MOTOR_TY PROGRAMME SELECTOR PWELV_TY WELV_TY BEL_TY RL1</p> <p>RL2 RL3 RL4</p>	<p>Door interlock Triac Drain pump Triac Circulation pump TRIAC switch Relay Motor relay: clockwise rotation Motor relay: anti-clockwise rotation Motor relay: half-range power supply (some models) Motor Triac Main switch (programme selector) Pre-wash solenoid Triac Wash solenoid Triac Electronically controlled TRIAC bleach valve Washing or drying heating element power supply Fan motor power supply relay One-branch relay of drying heating element One-branch relay of drying heating element</p>

11.4 WD diagram with THREE-PHASE ASYNCHRONOUS MOTOR EWM 25xx



- Key to WD diagram with THREE-PHASE ASYNCHRONOUS MOTOR EWM 25xx

Appliance electrical components	PCB components
1. Display board or LCD	DOOR_TY Door interlock Triac
2. Flowmeter	DRAIN_TY Drain pump Triac
3. Analogue pressure switch	REC-TY Circulation pump TRIAC switch
4. NTC temperature sensor (washing)	K1 Relay
5. Pre-wash solenoid	K2 Motor relay: clockwise rotation
6. Wash solenoid	K3 Motor relay: anti-clockwise rotation
7. Condensation solenoid valve	K4 Motor relay: half-range power supply (some
8. Washing heating element (with thermal fuses)	models)
9. WD PCB	MOTOR_TY Motor Triac
10. Safety thermostat (auto-reset)	PROGRAMME SELECTOR Main switch (programme selector)
11. Safety thermostat (manual reset)	PWELV_TY Pre-wash solenoid Triac
12. Drying heating element	WELV_TY Wash solenoid Triac
13. Fan motor	BEL_TY Electronically controlled TRIAC bleach valve
14. Drying NTC temperature sensor	RL1 Washing or drying heating element power
15. Humidity NTC temperature sensor	supply relay
16. Door safety interlock (instantaneous)	RL2 Fan motor power supply relay
17. Anti-disturbance filter	RL3 One-branch relay of drying heating element
18. Tachometric generator (motor)	RL4 One-branch relay of drying heating element
19. Drain pump	
20. Thermal cut-out (drain pump)	
21. Circulation pump	
22. Thermal cut-out (circulation pump)	
23. Door safety interlock (with PTC)	
24. Main circuit board	
25. Inverter	
26. Single-phase motor	

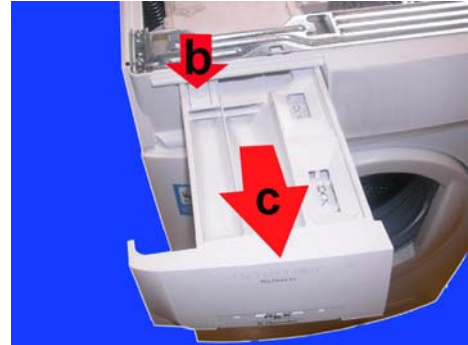
12 ACCESS TO THE ELECTRONIC CONTROL SYSTEM

12.1 Worktop

- a. Remove the two rear screws securing it to the cabinet and push the top panel backwards to remove it.

12.2 Control panel

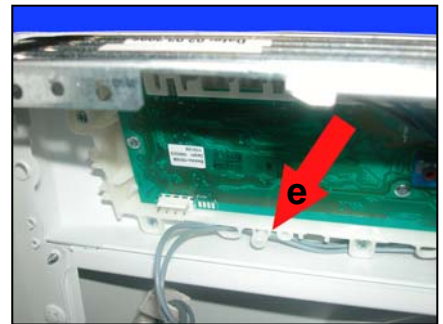
- b. Press the drawer lock
- c. Extract it



- d. Remove the screw which secures the control panel to the dispenser



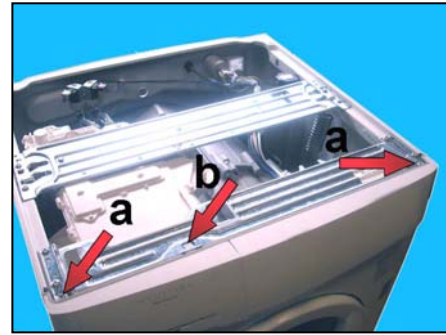
- e. cut the clamp which secures the wiring to the PCB casing (use a new clamp when re-assembling it).



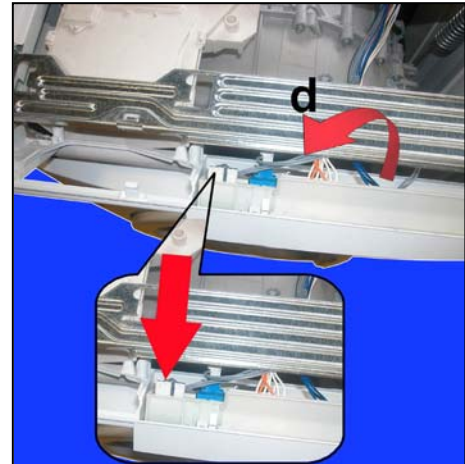
- f. Release the wiring from the clamp.
- g. Release the clamp from the crosspiece,
- h. Loosen the screws which secure the crosspiece to the cabinet.



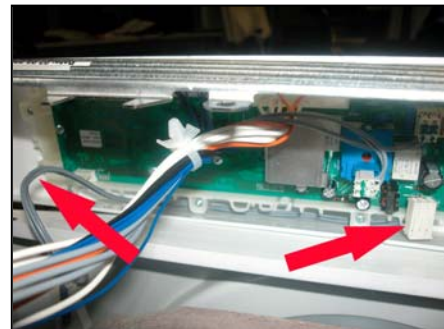
- a. Loosen the screws which secure the control panel to the crosspiece.
- b. Release the hook.
- c. Lift the control panel up and extract it.



- d. Rotate the control panel.
- e. Detach the connector indicated by the arrow.



- f. Arrange the wiring as shown in the figure.



- g. Extract the control panel.



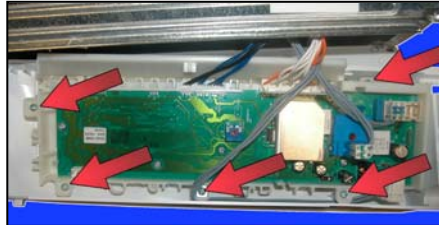
- h. Rotate the control panel.



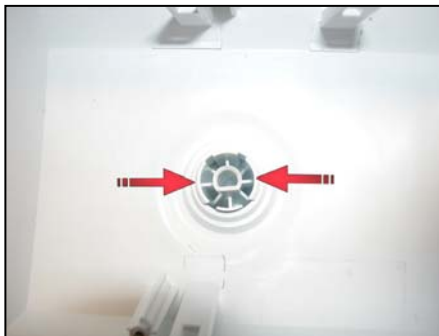
a. Position it as shown in the figure.



b. Remove the screws and release the hooks which secure the PCB casing to the control panel.



c. Before mounting the new PCB, extract the knob by pressing the hooks indicated by the arrows as shown in the figure.



While re-assembling, repeat the same operations in the reverse order and take care to position the knob correctly.



While remounting the worktop, please take care not to position it as shown in fig. A but rather as shown in fig. B.

