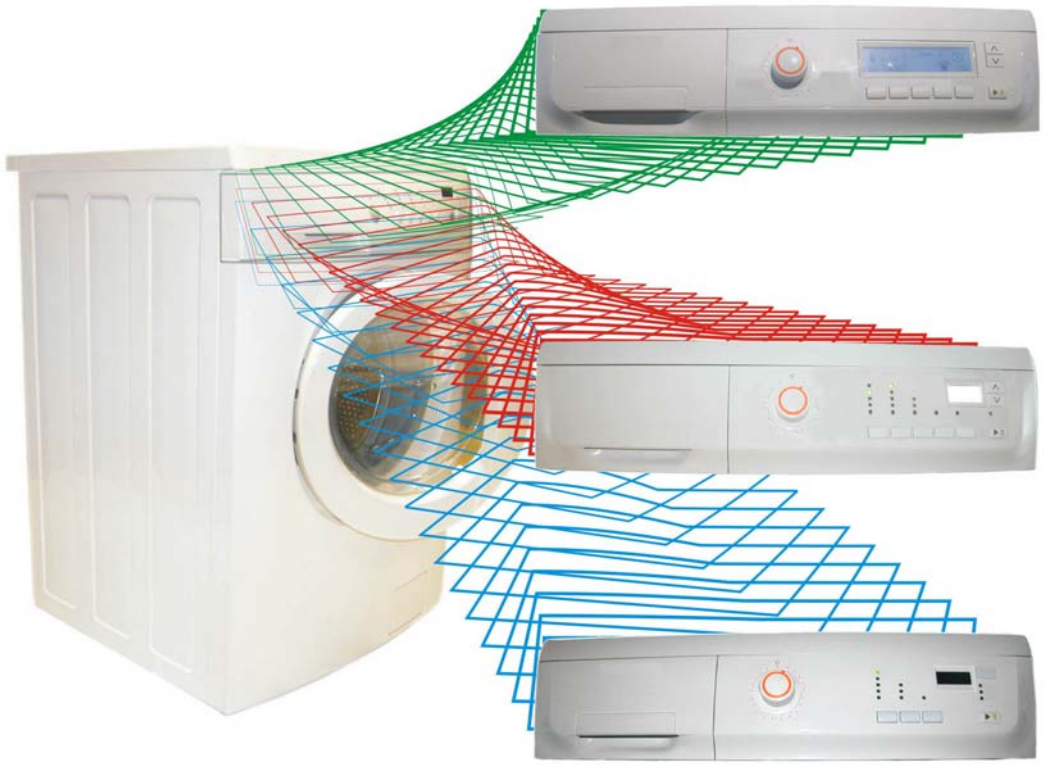
SERVICE MANUAL

WASHING



Spares Operations Italy
Corso Lino Zanussi, 30
I - 33080 PORCIA /PN

Fax +39 0434 394096

S.O.I.

Edition: 03-2010

Publication number
599 72 84-41

EN

Washing machines & Washer-dryers

with electronic control system
EWM21xx
EWM25xx

Functional and technical characteristics

ENV06

Styling

TC 4 / 3 / 2

Time manager 1-2

CONTENTS

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 (ENV06 platform) us 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 sensor contacts have step of 2.5 mm.

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*
- *Publication no. 599 70 40-15 for HEC RIM-ARCHED washer-dryers*

Identification table between styling (TC2/3/4) and functionality (EWM 21xx/25xx)

Styling	EWM 21xx		EWM 25xx	
	Washing type	Motor	Washing type	Motor
TC2	•Traditional with ECO-BALL •Jet-System	Universal	•Traditional with ECO-BALL •Jet-System	Three-phase asynchronous with Inverter
TC3	•Traditional with ECO-BALL •Jet-System	Universal	•Traditional with ECO-BALL •Jet-System	Three-phase asynchronous with Inverter
TC4	•Traditional with ECO-BALL •Jet-System	Universal	•Traditional with ECO-BALL •Jet-System	Three-phase asynchronous with Inverter

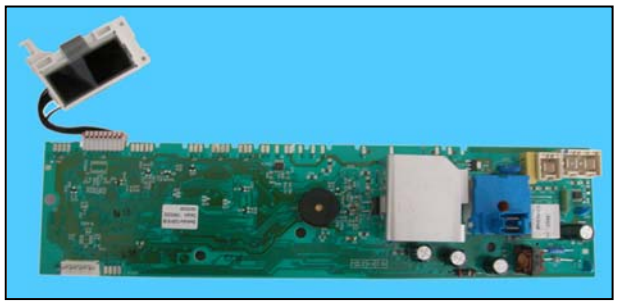
2 WARNINGS

- **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 with 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 TC4

3.1 GENERAL CHARACTERISTICS

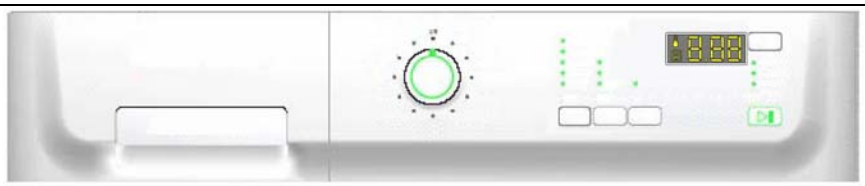
The ENV06 electronic control system consists of a single PCB, which incorporates the power, control and display (where the LCD display is connected) functions. The programme selector is incorporated in the board. The PCB is mounted on a casing fitted to the control panel.



3.1.1 General characteristics WM

Version **TC4**	
No. buttons	▪ maximum 5 (4 options + start/pause)
No. of LEDs	▪ maximum 14 + LCD display
Programme selector	▪ 15-21 positions with main switch (incorporated in the PCB)
Serial port	▪ DAAS-EAP communication protocol up to 115,200 baud
Power supply voltage	▪ 220/240V ▪ 50/60 Hz (configurable)
Washing type	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Rinsing system	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Motor	▪ Collector, with tachometric generator ▪ Two-pole asynchronous, with three-phase tachometric generator (with Inverter)
Spin speed	▪ 600 ÷ 1,600 rpm
Anti-unbalancing system	▪ FUCS (for universal motors) ▪ AGS (for asynchronous motors with Inverter)
Water fill	▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
Detergent dispenser	▪ 3 compartments: pre-wash/stains, wash, conditioner ▪ 4 compartments: pre-wash, wash, conditioner, (bleach)
Control of water level in the tub	▪ Electronic/analogue pressure switch
Door safety interlock	▪ Traditional (with PTC) ▪ Instantaneous
Heating element heat output	▪ 1950W with thermal fuses incorporated
Temperature control	▪ NTC sensor incorporated in the heating element
Buzzer	▪ Traditional incorporated in the PCB
Sensors	▪ Water fill gauge (flowmeter) ▪ Aqua control

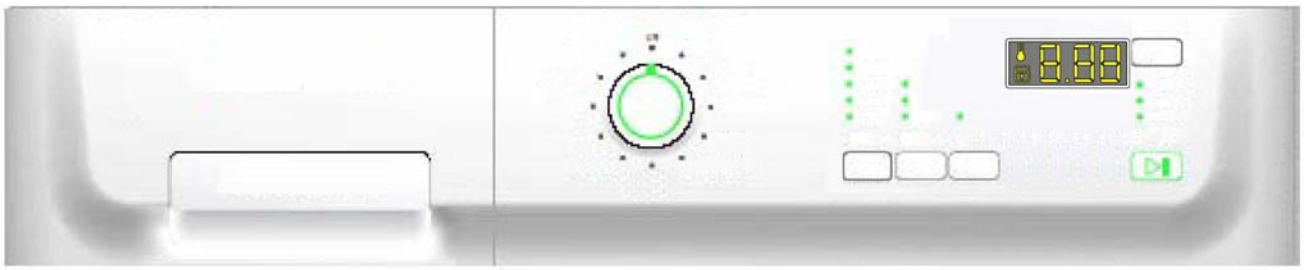
3.1.2 General characteristics WD

Version **TC4**	
No. buttons	▪ maximum 5 (4 options + 1 start/pause)
No. of LEDs	▪ maximum 14 + LCD display
Programme selector	▪ 15-21 positions with main switch (incorporated in the PCB)
Serial port	▪ DAAS-EAP communication protocol up to 115,200 baud
Power supply voltage	▪ 220/240V ▪ 50/60 Hz (configurable)
Washing type	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Rinsing system	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Motor	▪ Collector, with tachometric generator (Universal) ▪ Two-pole asynchronous, with three-phase tachometric generator (with Inverter)
Spin speed	▪ 600 ÷ 1,600 rpm
Anti-unbalancing system	▪ FUCS (for universal motors) ▪ AGS (for asynchronous motors with Inverter)
Water fill	▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
Detergent dispenser	▪ 3 compartments: pre-wash/stains, wash, conditioner ▪ 4 compartments: pre-wash, wash, conditioner, (bleach)
Control of water level in the tub	▪ Electronic/analogue pressure switch
Door safety interlock	▪ Traditional (with PTC) ▪ Instantaneous
Heating element heat output, washing	▪ 1950W with thermal fuses incorporated
Heating element heat output, drying	▪ 1840W (920+920)
Temperature control, washing	▪ NTC sensor incorporated in the heating element
Temperature control, drying	▪ NTC probe ▪ Thermostats
Buzzer	▪ Traditional incorporated in the PCB
Sensors	▪ Water fill gauge (flowmeter) ▪ Aqua control

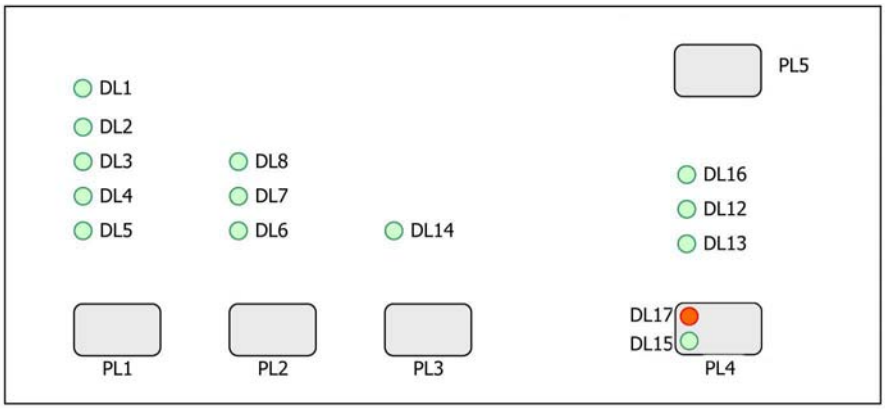
3.2 CONTROL PANEL

3.2.1 Styling TC4 WM/WD

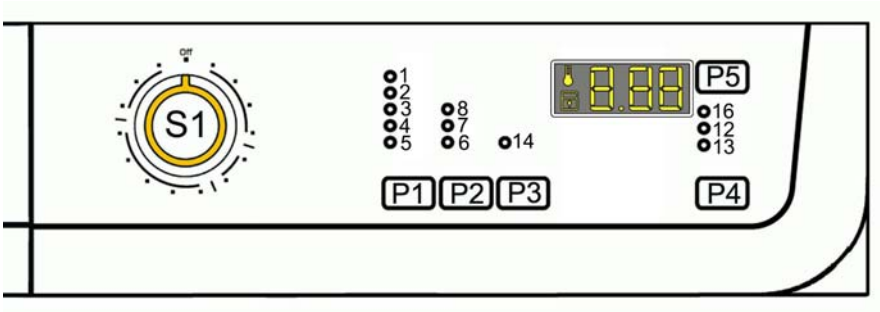
- max. 5 buttons
- 15 or 21-position programme selector
- 14 LEDs
- LCD display



- Positioning of LEDs and buttons



3.2.2 Configuration of WM/WD control panel



The washing programmes, the functions of the selector knob (where featured) and the various buttons vary according tot he 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.

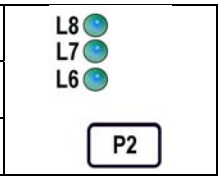
Types of fabric	Cotton/linen, Synthetic fabrics, Delicates, Wool, Hand-wash, Shoes, Jeans, Duvet, Silk.
Special programmes	Soak, Miniprogramme, Easy-Iron, Conditioner, Rinses, Delicate rinses, Drain, Delicate spin, Spin, Drying.
Temperature	Normal, Maximum: the initial temperature is the maximum that 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 Time MANAGER

The “Time manager” is designed to modify the programme settings according to the type of dirt; in order to reduce or prolong the wash time. It is shown by the Display.
The reduction levels are provided in the following table:

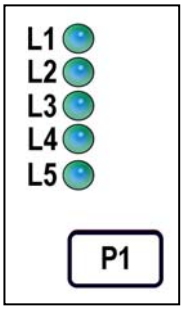
COTTON	SYNTHETICS	DELICATES
Programme (base)	Programme (base)	Programme (base)
Daily	Daily	Daily
Light	Light	Light
Super Quick	Super Quick	Super Quick

Press button P2 in sequence to choose one of the three levels. The corresponding LED will light up to confirm the selection.

L8	Daily	
L7	Light	
L6	Super Quick	

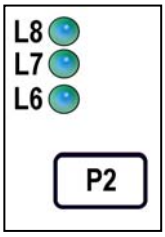
The different washing options such as: Pre-wash, Economy, etc. are set compulsorily as a programme.

3.2.6 Pushbuttons – LEDs and LCD display

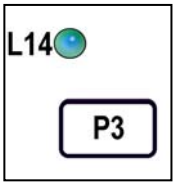


The functions of each button are defined by the configuration of the appliance.

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



- **Button no. 2**: this button is configurable and is related to LEDs (L6÷L8). (In some appliances it is connected to the “Time manager”)



- **Button no. 3**: this button is configurable and is related to LED (L14); it performs the super rinse function.

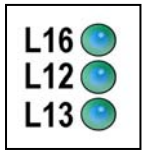
- **Button no. 4**: this button is configurable and has the function of START/PAUSE (inside there are two LEDs, one red that flashes in the event of an alarm and one green that flashes when the appliance is in pause mode or in combination with the red one to indicate the alarm code).

- **Button no. 5**: this button is configurable and has the function of DELAYED START. 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 LCD display. During the last hour, the time decreases minute by minute.

  In the washer-dryers, push this button to set the drying time displayed on the LCD display. Each time it is pressed, the time increases by five minutes (from a minimum of 10 minutes to a maximum of 130 minutes)

- **wash phase indicator LEDs**:

LEDs L13, L12, L16 are configurable and are used as indicators of the wash phases.

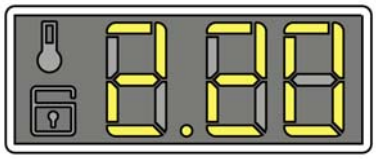


Possible indications	
Pre-wash	Lights during selection mode if the programme includes the pre-wash phase and during the performance of the pre-wash
Wash	Lights during selection mode if the programme includes the wash phase and during the performance of the wash
Pre-wash/Wash	Lights during selection mode if the programme includes the pre-wash or wash phase and during the performance of these phases
Rinses	Lights during selection mode if the programme includes rinse phases and during the performance of the rinses
Spin	Lights during selection mode if the programme includes the spin phase and during the performance of the spin
Rinses / Spin	Lights during selection mode if the programme includes rinses and spin and during the performance of these phases
Drain	Lights during selection mode if the programme includes the drain phase only and during the performance of the drain
Extra rinse	Lights when this option has been memorised (if included in the cycle)
Rinse hold	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.
Cycle in progress	Lights during the performance of the cycle
End of cycle	Lights when the programme has been completed and the door has been released
Door locked	Lights when the safety device stops the door opening and switches off when it is possible to open it. Flashes when the device is about to unlock the door (with door interlock with PTC, which needs one or two minutes to open)
Child lock	Lights when the child safety is on and all buttons are deactivated
Drying	Lights during selection mode if the programme includes the drying phase and during the performance of this phase.

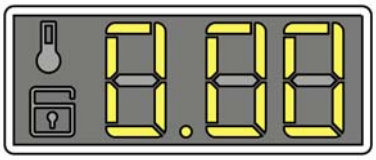
- **LCD**

The following information appears on the LCD display:

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

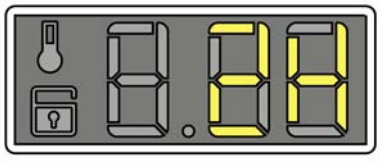


- **- the end of the programme** is indicated by **three flashing zeros** (when the door can be opened).

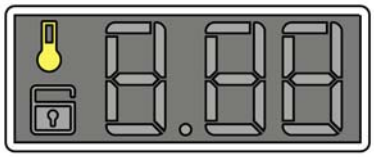


- **The stopping of the appliance with water in the tub**, after the programmes with the RINSE HOLD option, is displayed by **three flashing zeros,** the LED that indicates the door remains lit and the LED of the START/PAUSE button switches off.

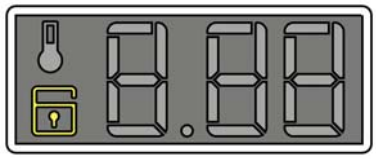
- **the delayed start**, selected on the related button. After the START/PAUSE button is pressed, the countdown starts and the delay time decreases hour by hour. In the last 2 hours, it decreases by 30 mins at a time.



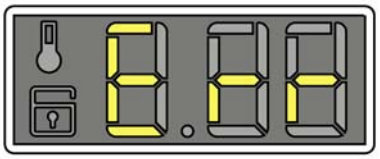
- **- The thermometer:** it is always on during the cycle and the icon is animated during the heating phase.



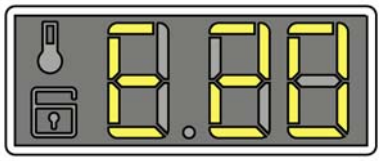
- **The padlock**: when it is lit, it indicates that all the buttons are disabled to prevent children from modifying, starting or pausing the cycle.
To enable/disable this function, a key combination needs to be pressed.



- **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.



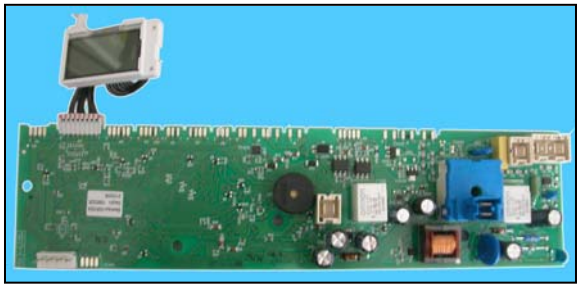
- **Buzzer** (configurable)

The buzzer emits:
→ A **"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 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.

To enable/disable the buzzer during the programme or option selection, see the key-combination described in the instruction manual.

4 TC3

4.1 GENERAL CHARACTERISTICS



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

4.1.1 General characteristics WM

Version **TC3** **(TIME MANAGER)**	
Version **TC3** **(PROPORTIONAL)**	
No. buttons	▪ maximum 8 (5 options + 1 start/pause + 2 for time driven)
No. of LEDs	▪ maximum 18 + LCD display
Programme selector	▪ 15-21 positions with main switch (incorporated in the PCB)
Serial port	▪ DAAS-EAP communication protocol up to 115,200 baud
Power supply voltage	▪ 220/240V ▪ 50/60 Hz (configurable)
Washing type	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Rinsing system	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Motor	▪ Collector, with tachometric generator (Universal) ▪ Two-pole asynchronous, with three-phase tachometric generator (with Inverter)
Spin speed	▪ 600 ÷ 1,600 rpm
Anti-unbalancing system	▪ FUCS (for universal motors) ▪ AGS (for asynchronous motors with Inverter)
Water fill	▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
Detergent dispenser	▪ 3 compartments: pre-wash/stains, wash, conditioner ▪ 4 compartments: pre-wash, wash, conditioner, (bleach)
Control of water level in the tub	▪ Electronic/analogue pressure switch
Door safety interlock	▪ Traditional (with PTC) ▪ Instantaneous
Heating element heat output	▪ 1950W with thermal fuses incorporated
Temperature control	▪ NTC sensor incorporated in the heating element
Buzzer	▪ Traditional incorporated in the PCB
Sensors	▪ Water fill gauge (flowmeter) ▪ Aqua control

4.1.2 General characteristics WD

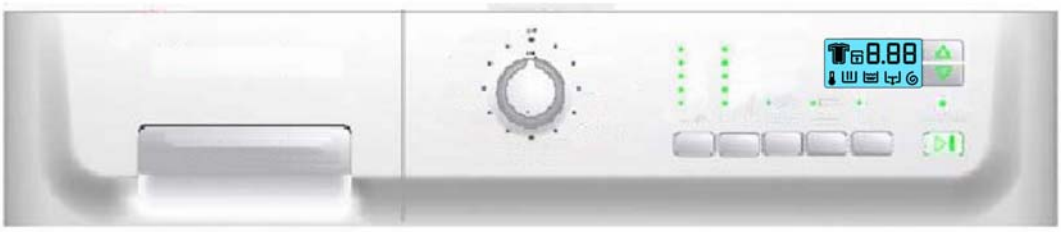
Version **TC3** **(TIME MANAGER)**	
Version **TC3** **(PROPORTIONAL)**	
No. buttons	▪ maximum 8 (5 options + 1 start/pause + 2 for time driven)
No. of LEDs	▪ maximum 18 + LCD display
Programme selector	▪ 15-21 positions with main switch (incorporated in the PCB)
Serial port	▪ DAAS-EAP communication protocol up to 115,200 baud
Power supply voltage	▪ 220/240V ▪ 50/60 Hz (configurable)
Washing type	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Rinsing system	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Motor	▪ Collector, with tachometric generator (Universal) ▪ Two-pole asynchronous, with three-phase tachometric generator (with Inverter)
Spin speed	▪ 600 ÷ 1,600 rpm
Anti-unbalancing system	▪ FUCS (for universal motors) ▪ AGS (for asynchronous motors with Inverter)
Water fill	▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
Detergent dispenser	▪ 3 compartments: pre-wash/stains, wash, conditioner ▪ 4 compartments: pre-wash, wash, conditioner, (bleach)
Control of water level in the tub	▪ Electronic/analogue pressure switch
Door safety interlock	▪ Traditional (with PTC) ▪ Instantaneous
Heating element heat output, washing	▪ 1950W with thermal fuses incorporated
Heating element heat output, drying	▪ 1840W (920+920)
Temperature control, washing	▪ NTC sensor incorporated in the heating element
Temperature control, drying	▪ NTC probe ▪ Thermostats
Buzzer	▪ Traditional incorporated in the PCB
Sensors	▪ Water fill gauge (flowmeter) ▪ Aqua control

4.2 CONTROL PANEL

4.2.1 Styling TC3 (TIME MANAGER)

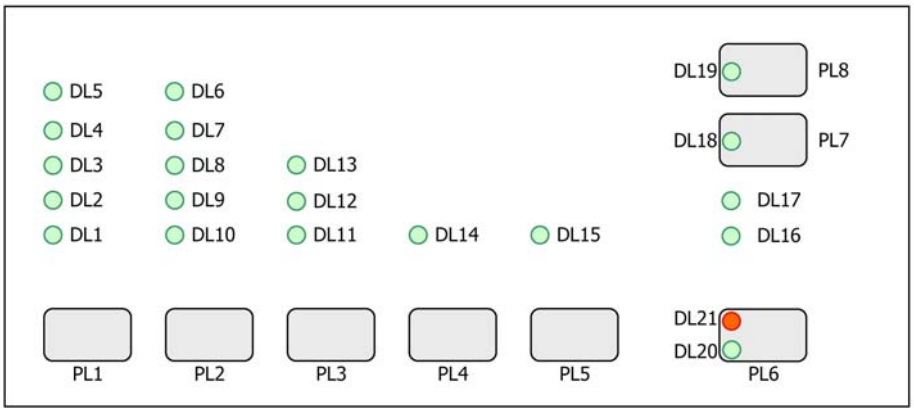
- max. 8 buttons
- 15 or 21-position programme selector
- 18 LEDs
- LCD display

Version **WM**

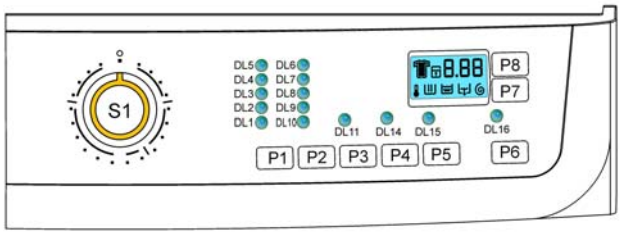
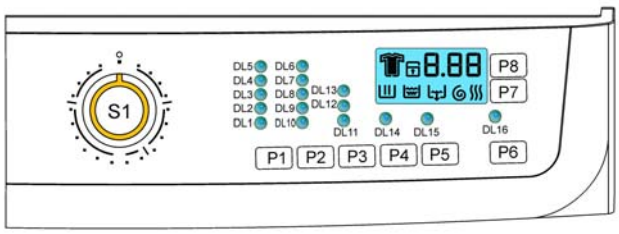


Version **WD**

- Positioning of LEDs and buttons



4.2.1.1 Control panel configuration

WM	WD
	

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

4.2.1.2 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.

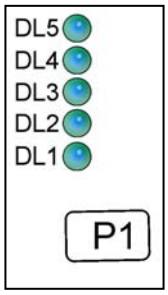
4.2.1.3 Programme configuration

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.

4.2.1.4 Pushbuttons and LEDs

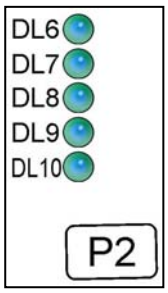
The functions of each button are defined by the configuration of the appliance.



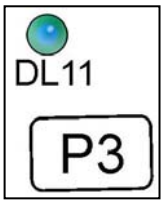
- **Button no. 1**: this button is configurable and is related to LEDs (DL16÷DL5).
  Depending on the configuration of the appliance, it can be connected both to the temperature regulation and the spin speed regulation. Press it in sequence to choose your desired regulation.
  Depending on the configuration of the appliance, different combinations can be obtained. The tables below contain some examples of combinations between temperature and spin

LEDs	Temperature	
DL5	90°	90°
DL4	60°	60°
DL3	40°	50°
DL2	30°	40°
DL1	0°	30°

LEDs	Spin	
DL5	1200	1400
DL4	900	900
DL3	700	700
DL2	Night cycle	Night cycle
DL1	Rinse hold	Rinse hold

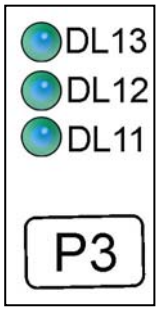


- **Button no. 2**: this button is configurable and is related to LEDs (DL6÷DL10).
  The description of its functions is the same as the one for pushbutton 1.



- **Button no. 3**: this button is configurable and is related to LED (DL11), in washing machines. 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.

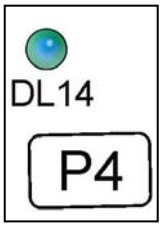


  In washer-dryers, it is related to LEDs (DL11÷DL13) and performs the function of automatic drying at three levels:

  - Extra
  - Wardrobe
  - Iron.

- **Button no. 4**: this button is configurable and is related to LED (DL14).
  In washing machines, 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.

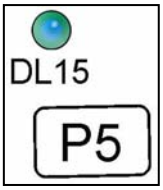


  In washer-dryers, it performs the function of:

  Time-drying

- **Button no. 5**: this button is configurable and is related to LED (DL15); 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).

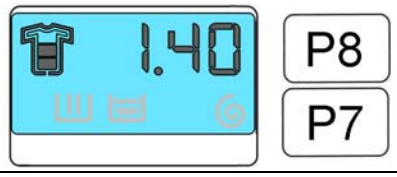
- **DL16 Door locked:** Lights when the safety device stops the door opening and switches off when it is possible to open it. It flashes when the device is about to unlock the door (with door interlock with PTC, which needs one or two minutes to open).

4.2.1.5 Time MANAGER

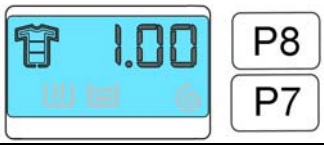
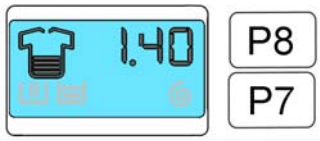
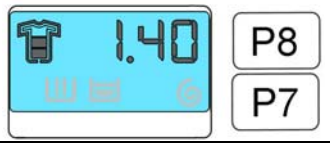
The “Time MANAGER” is used with the COTTON, SYNTHETICS and DELICATES programmes.
It is split into:

“Time MANAGER 1” and “Time MANAGER2”

The difference between the two versions can be seen in the number of sectors in the T-shirt (there are more for the “Time MANAGER2”).
Both versions have the main function of: modifying the washing time of the programme set.
This variation in the washing time can be obtained by pressing buttons P7 and P8, the sectors of the T-shirt vary in brightness and at the same time the three digits display the washing time.
Below is a graphic of the LCD display (for both versions) after the COTTON programme has been selected, as an example.

Time MANAGER 1	Time MANAGER2
	

The differences between the two versions of “Time MANAGER”

	Time MANAGER 1	Time MANAGER2
Super Refresh (*)	----------	
Refresh(*)	----------	
Super Quick (super rapid cycle) recommended for cottons and synthetics with light dirt level, and for half load		
Quick (rapid cycle) recommended for clothes used just once		
Light (light cycle) recommended for slightly dirty clothes or of daily use		
Daily (daily cycle) recommended for quite dirty clothes.		
Normal (normal cycle) recommended for quite dirty clothes worn many times		
Intensive (intensive cycle) recommended for very dirty clothes which need stain removal treatments, soaking or pre-wash		

(*) When this programme is selected, the T-shirt icon may flash several times and then stop.

The options for the “Time MANAGER” are summarised in the following tables:

Time Manager 1

COTTONS	SYNTHETICS	DELICATES
INTENSIVE	----------	----------
NORMAL (basic programme)	NORMAL (basic programme)	NORMAL (basic programme)
DAILY	DAILY	DAILY
LIGHT	LIGHT	LIGHT
QUICK	----------	----------
SUPER QUICK	SUPER QUICK	SUPER QUICK

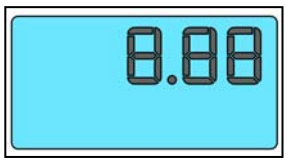
Time Manager 2

COTTONS	SYNTHETICS	DELICATES
INTENSIVE	INTENSIVE	INTENSIVE
NORMAL (basic programme)	NORMAL (basic programme)	NORMAL (basic programme)
DAILY	DAILY	DAILY
LIGHT	LIGHT	LIGHT
QUICK	QUICK	QUICK
SUPER QUICK	SUPER QUICK	SUPER QUICK
REFRESH	REFRESH	REFRESH
SUPER REFRESH	SUPER REFRESH	SUPER REFRESH

4.2.1.6 LCD display

The following information appears on the LCD display:

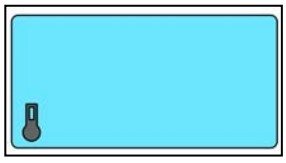
The three digits with seven segments represent:
- Duration of the washing and drying programme
- End of the programme
- Delayed start
- Wrong choice of an option
- Alarm code
- Duration of drying time



For explanations, please refer to the LCD display description on pages 11 and 12

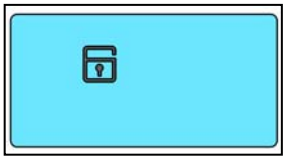
- Thermometer

See page 11
(represented as a symbol in washing machines, not represented in washer-dryers)



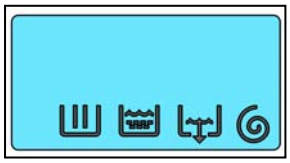
- Padlock

See page 12



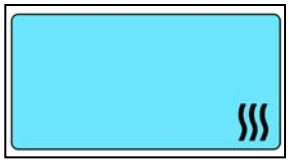
- Washing phases

(for both washing machines and washer-dryers)
Washing, rinses, drain and spin light up in the selection mode if the programme includes these phases and during the performance of the phase.



- Drying phase

Lights during selection mode if the programme includes the drying phase and during the performance of the phase.



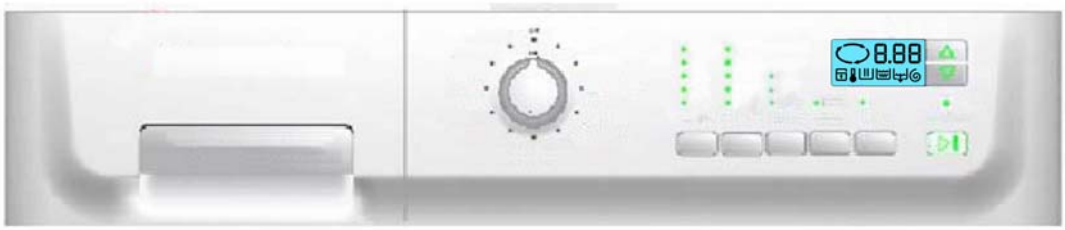
- Buzzer

See page 12

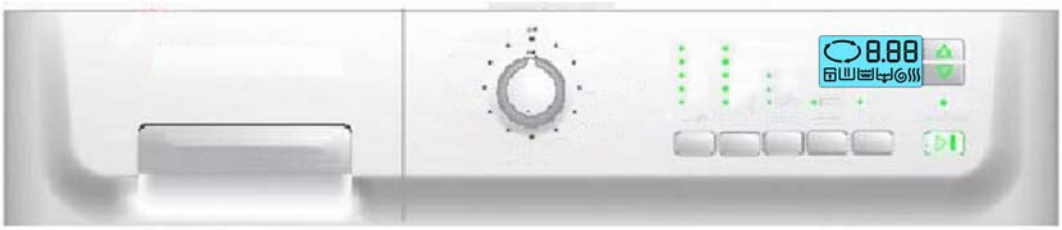
4.2.2 Styling TC3 (PROPORTIONAL)

- max. 8 buttons
- 15 or 21-position programme selector
- 18 LEDs
- LCD display

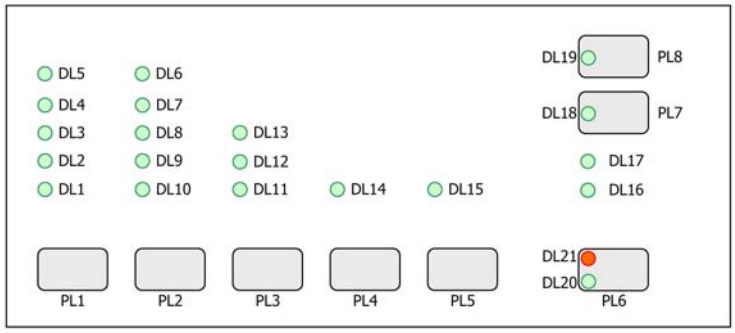
Version **WM**



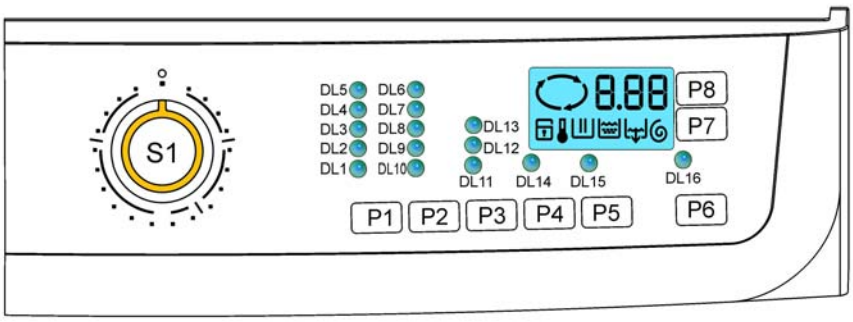
Version **WD**



- Positioning of LEDs and buttons



4.2.2.1 Control panel configuration



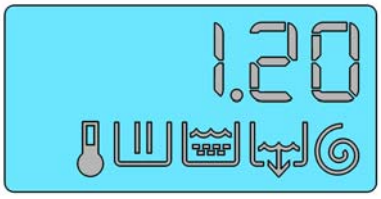
Differences between “TC3 TIME MANAGER” and “TC3 PROPORTIONAL”

- The P3 button controls three LEDs (DL11÷DL13)
- The buttons P7-P8 perform the function of “DELAYED START”
- In the LCD display, the T-shirt is not represented, but it is replaced by a circle formed by three arrows, which start to move when a programme with the "PROPORTIONAL" function has been chosen (for the number of programmes and their position, please refer to the user manual).

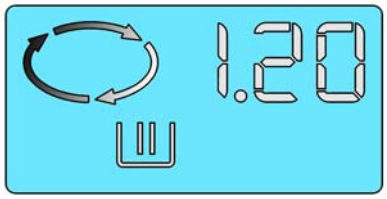
4.2.2.2 PROPORTIONAL

The characteristic trait of proportional programmes is that it calculates the time for the washing cycle, according to the weight of the clothes inside the drum, with the measurement of the water quantity absorbed by the clothes; that is to say, with a few clothes, the water absorption will be lower and consequently also the duration of the washing cycle, while with more clothes and thus a heavier load, the water absorption will be higher and the washing cycle accordingly longer.

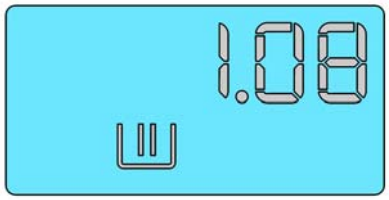
When a "PROPORTIONAL” programme is selected, the LCD displays the three digits which indicate the maximum time for the cycle and all the available options for the programme.



Once the desired/possible options for the selected programme have been selected, push the START button and the appliance starts to calculate the real time required to perform and the cycle, which is then displayed by the three animated arrows in pursuit; during this time, you will see the time decreasing.



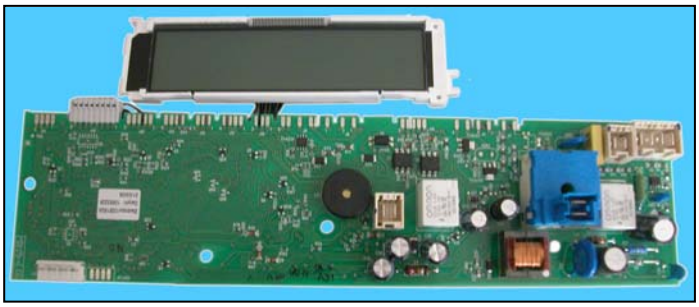
When the appliance has completed the calculation phase, the flashing of the digits stops and the animation of the arrows disappears, displaying the real time of the cycle.



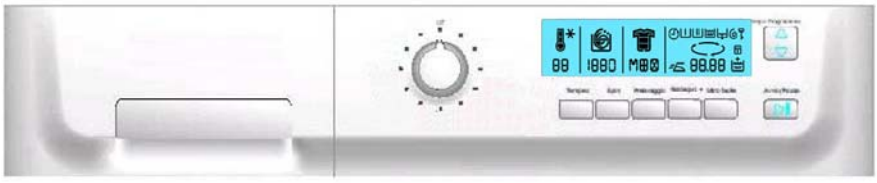
5 TC2

5.1 GENERAL CHARACTERISTICS

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



5.1.1 General characteristics WM

Version **TC2 (TIME MANAGER)**	
Version **TC2 (PROPORTIONAL)**	
No. buttons	▪ maximum 8 (5 options + 1 start/pause + 2 for time driven)
No. of LEDs	▪ maximum 2 + LCD display
Programme selector	▪ 15-21 positions with main switch (incorporated in the PCB)
Serial port	▪ DAAS-EAP communication protocol up to 115,200 baud
Power supply voltage	▪ 220/240V ▪ 50/60 Hz (configurable)
Washing type	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Rinsing system	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Motor	▪ Collector, with tachometric generator (Universal) ▪ Two-pole asynchronous, with three-phase tachometric generator (with Inverter)
Spin speed	▪ 600 ÷ 1,600 rpm
Anti-unbalancing system	▪ FUCS (for universal motors) ▪ AGS (for asynchronous motors with Inverter)
Water fill	▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
Detergent dispenser	▪ 3 compartments: pre-wash/stains, wash, conditioner ▪ 4 compartments: pre-wash, wash, conditioner, (bleach)
Control of water level in the tub	▪ Electronic/analogue pressure switch
Door safety interlock	▪ Traditional (with PTC) ▪ Instantaneous
Heating element heat output	▪ 1950W with thermal fuse incorporated
Temperature control	▪ NTC sensor incorporated in the heating element
Buzzer	▪ Traditional incorporated in the PCB
Sensors	▪ Water fill gauge (flowmeter) ▪ Aqua control

5.1.2 General characteristics WD

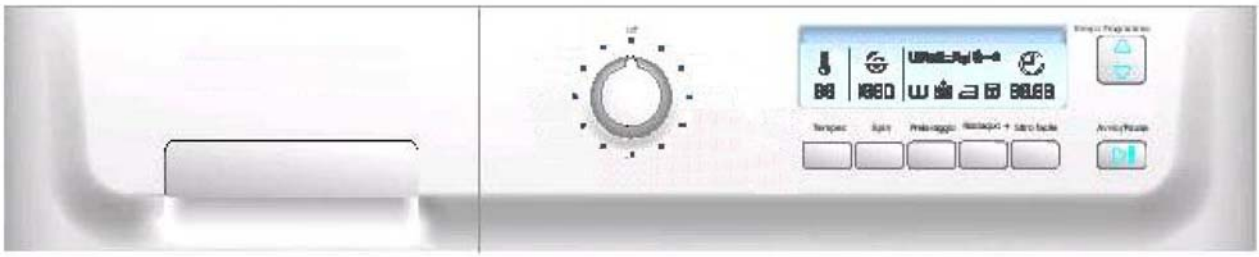
Version **TC2** **(TIME MANAGER)**	
No. buttons	▪ maximum 8 (5 options + 1 start/pause + 2 for time driven)
No. of LEDs	▪ maximum 18 + LCD display
Programme selector	▪ 15-21 positions with main switch (incorporated in the PCB)
Serial port	▪ DAAS-EAP communication protocol up to 115,200 baud
Power supply voltage	▪ 220/240V ▪ 50/60 Hz (configurable)
Washing type	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Rinsing system	▪ Traditional with "Eco-ball" sphere ▪ Jet-System
Motor	▪ Collector, with tachometric generator (Universal) ▪ Two-pole asynchronous, with three-phase tachometric generator (with Inverter)
Spin speed	▪ 600 ÷ 1,600 rpm
Anti-unbalancing system	▪ FUCS (for universal motors) ▪ AGS (for asynchronous motors with Inverter)
Water fill	▪ 1 solenoid valve with 1 inlet – 2 or 3 outlets
Detergent dispenser	▪ 3 compartments: pre-wash/stains, wash, conditioner ▪ 4 compartments: pre-wash, wash, conditioner, (bleach)
Control of water level in the tub	▪ Electronic/analogue pressure switch
Door safety interlock	▪ Traditional (with PTC) ▪ Instantaneous
Heating element heat output, washing	▪ 1950W with thermal fuses incorporated
Heating element heat output, drying	▪ 1840W (920+920)
Temperature control, washing	▪ NTC sensor incorporated in the heating element
Temperature control, drying	▪ NTC probe ▪ Thermostats
Buzzer	▪ Traditional incorporated in the PCB
Sensors	▪ Water fill gauge (flowmeter) ▪ Aqua control

5.2 CONTROL PANEL

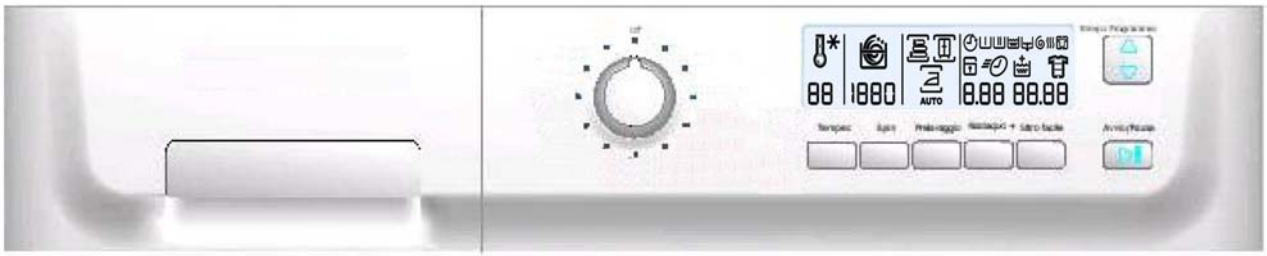
5.2.1 Styling TC2 (TIME MANAGER)

- max. 8 buttons
- 15 or 21-position programme selector
- 2 LEDs
- LCD display

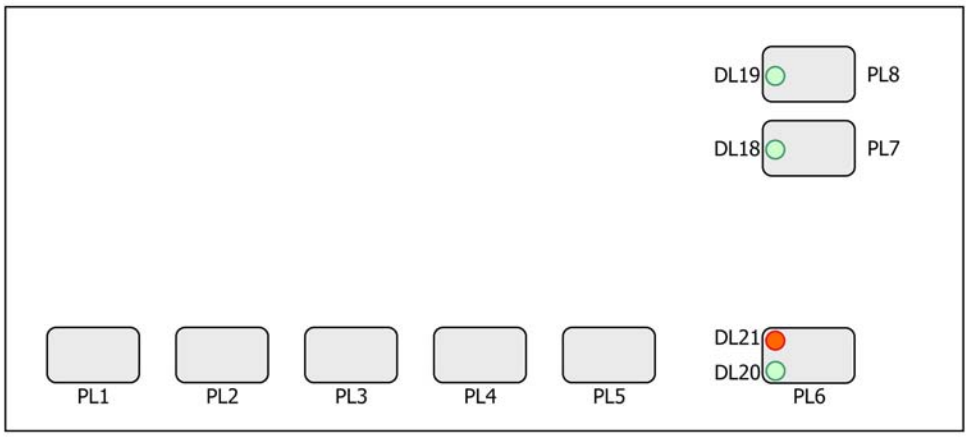
Version **WM**



Version **WD**

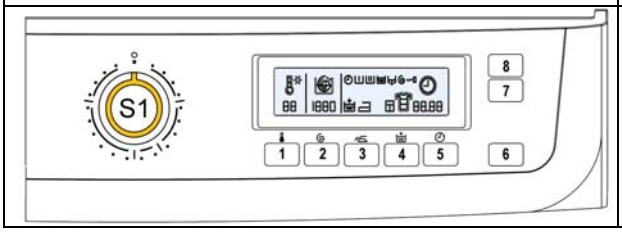
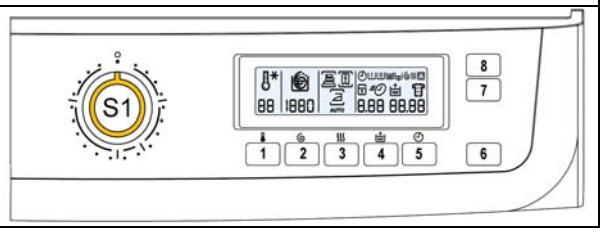


- Positioning of LEDs and buttons



5.2.1.1 Control panel configuration

The symbols displayed in the two WM and WD versions can have a symbolic representation and different positions.

WM	WD
	

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

5.2.1.2 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.

5.2.1.3 Programme configuration

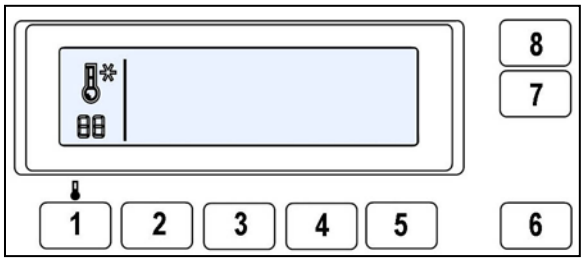
The table below lists the parameters that can be used to define the washing programmes.

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.

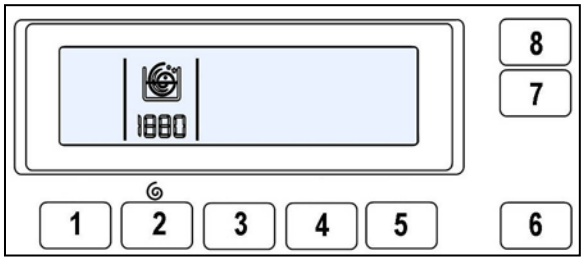
5.2.1.4 Pushbuttons and LCD display

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

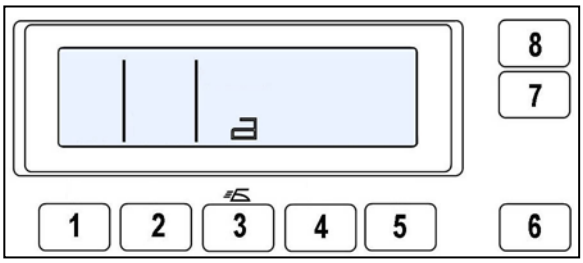
- **Button no. 1: TEMPERATURE**
  The default programme temperature is the basic one. Press the button to modify it from a maximum to a minimum depending on the programme. The thermometer symbol is modified concurrently.



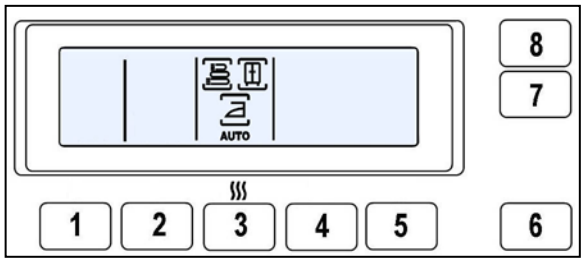
- **Button no. 2: SPIN**
  The spin speed suggested by the programme is the maximum speed. Press the button to vary the speed down to zero, or switch to NIGHT cycle and RINSE HOLD (with related symbols lit).



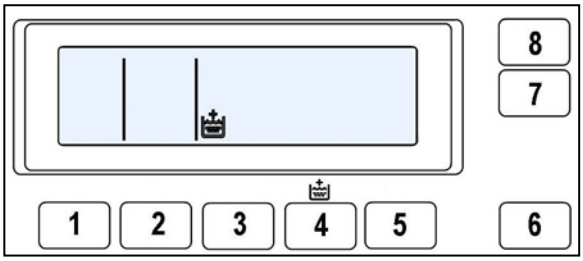
- **Button no. 3: OPTIONS (version WM)**
  Configurable button. The options available for this button are:
  –Pre-wash (it can also be configured as a programme)
  –Easy-iron (it can also be configured as a programme)
  –Intensive



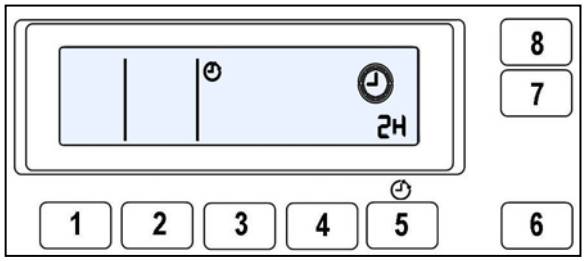
- **Button no. 3: OPTIONS (version WD)**
  Configurable button. The options available for this button are:
  –Extra dry
  –Wardrobe dry
  –Iron dry
  –Automatic drying



- **Button no. 4: OPTIONS**
  Configurable button. The options available for this button are:
  –Super rinse
  –Quick



- **Button no. 5: DELAYED START/SUPER RINSE**
  Configurable button. It can perform the function of:
  - Delayed start
  - Super rinse



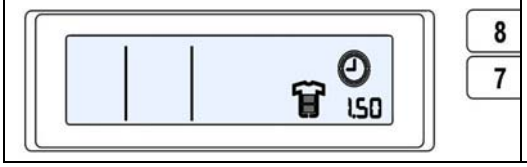
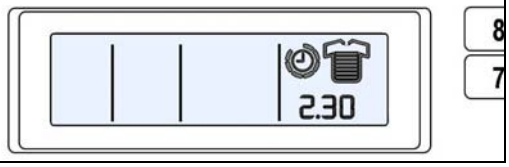
- **Button no. 6: START/PAUSE**
  This button is configurable and has the function of START/PAUSE (inside there are two LEDs, one red that flashes in the event of an alarm and one green that flashes when the appliance is in pause mode or in combination with the red one to indicate the alarm code).

5.2.1.5 Time MANAGER

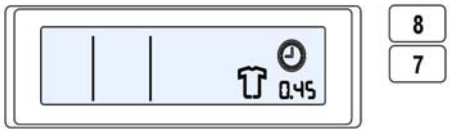
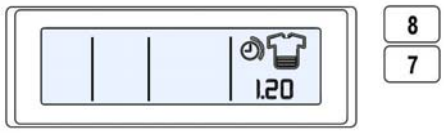
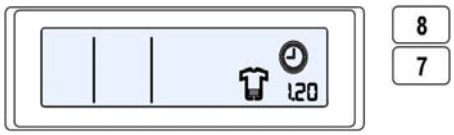
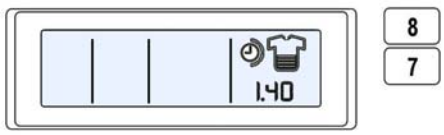
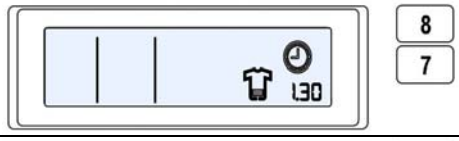
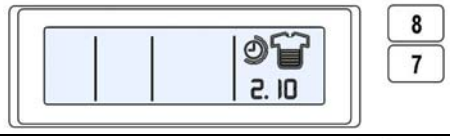
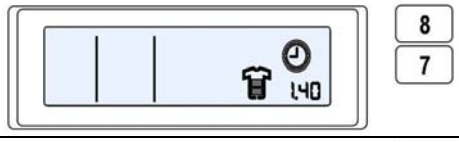
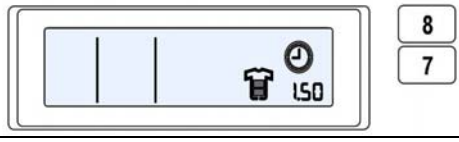
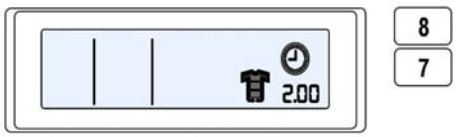
The “Time MANAGER” is used with the COTTON, SYNTHETICS and DELICATES programmes.
It is split into:

“Time MANAGER 1” and “Time MANAGER2”

The difference between the two versions can be seen in the number of sectors in the T-shirt (there are more for the “Time MANAGER2”).
Both versions have the main function of: modifying the washing time of the programme set.
This variation in the washing time can be obtained by pressing buttons P7 and P8, the sectors of the T-shirt vary in brightness and at the same time the three digits display the washing time variation.
Below is a graphic of the LCD display (for both versions) after the COTTON programme has been selected, as an example.

Time MANAGER 1	Time MANAGER2
	

The differences between the two versions of “Time MANAGER”

	Time MANAGER 1	Time MANAGER2
Super Refresh (*)	----------	
Refresh(*)	----------	
Super Quick (super rapid cycle) recommended for cottons and synthetics with light dirt level, and for half load		
Quick (rapid cycle) recommended for clothes used just once		
Light (light cycle) recommended for slightly dirty clothes or of daily use		
Daily (daily cycle) recommended for quite dirty clothes.		
Normal (normal cycle) recommended for quite dirty clothes worn many times		
Intensive (intensive cycle) recommended for very dirty clothes which need stain removal treatments, soaking or pre-wash		

(*) When this programme is selected, the T-shirt icon may flash several times and then stop.

The options for the “Time MANAGER” are summarised in the following tables:

Time Manager 1

COTTONS	SYNTHETICS	DELICATES
INTENSIVE	----------	----------
NORMAL (basic programme)	NORMAL (basic programme)	NORMAL (basic programme)
DAILY	DAILY	DAILY
LIGHT	LIGHT	LIGHT
QUICK	----------	----------
SUPER QUICK	SUPER QUICK	SUPER QUICK

Time Manager 2

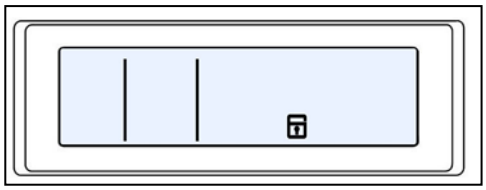
COTTONS	SYNTHETICS	DELICATES
INTENSIVE	INTENSIVE	INTENSIVE
NORMAL (basic programme)	NORMAL (basic programme)	NORMAL (basic programme)
DAILY	DAILY	DAILY
LIGHT	LIGHT	LIGHT
QUICK	QUICK	QUICK
SUPER QUICK	SUPER QUICK	SUPER QUICK
REFRESH	REFRESH	REFRESH
SUPER REFRESH	SUPER REFRESH	SUPER REFRESH

5.2.1.6 LCD display

The following information appears on the LCD display:

The three digits with seven segments represent:
- Duration of the washing and drying programme.
- End of the programme.
- Delayed start.
- Wrong choice of an option.
- Alarm code.
- Duration of drying time.

For explanations, please refer to the LCD display description
See pages 11 and 12



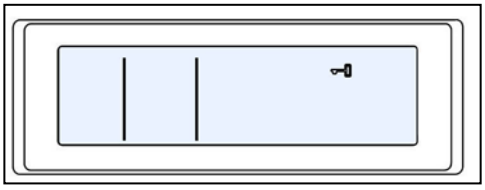
- Padlock

See page 12

- Washing phases

Pre-wash, wash, rinses, drain and spin light up in the selection mode if the programme includes these phases and during the performance of the phase.
Pre-wash lights up when it is configured as an option and selected with the relevant button.

- Door lock



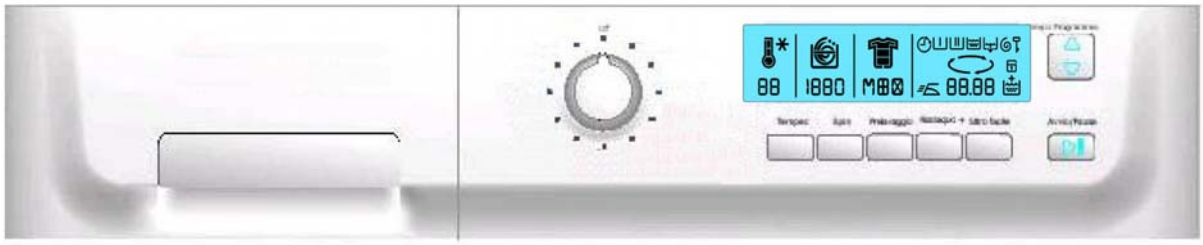
It lights up when the door is locked.
It switches off when the door is not locked.
It flashes when the door is about to be released (above all in models with door interlock with PTC)

- Buzzer

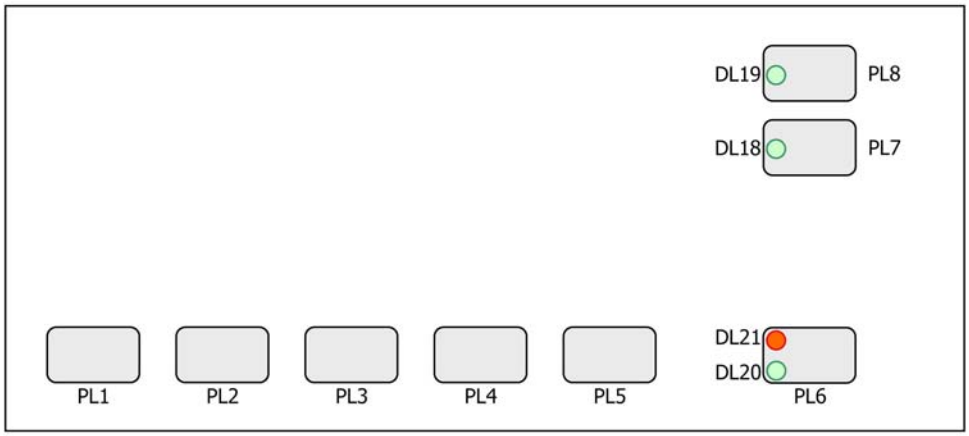
See page 12

5.2.2 Styling TC2 (PROPORTIONAL)

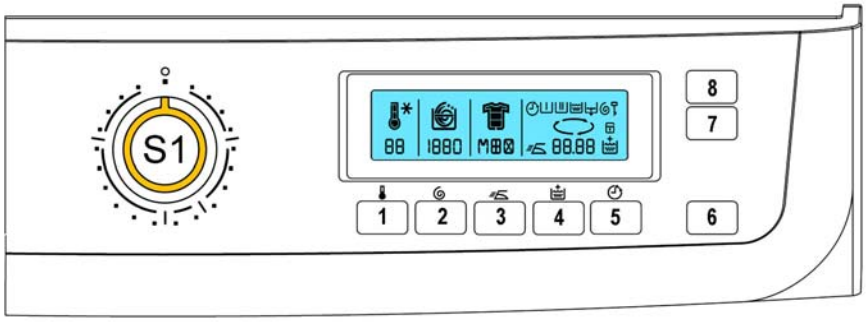
- max. 8 buttons
- 15 or -21-position programme selector
- 2 LEDs
- LCD display



- Positioning of LEDs and buttons



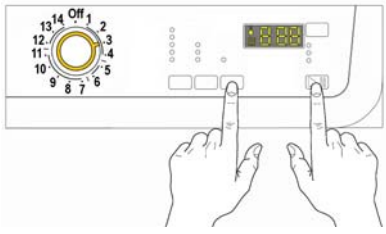
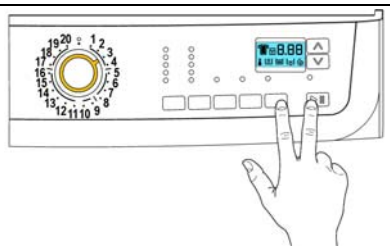
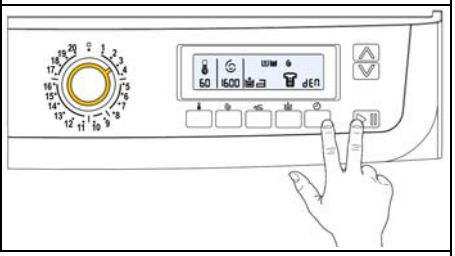
5.2.2.1 Control panel configuration



The description of the “PROPORTIONAL” operation is on page 22.

For the description of the operation of the pushbuttons and the symbols displayed on the LCD, please see pages 26÷29.

6 DEMO MODE SETTING

Version TC4	Version TC3 “Time Manager” “Proportional”	Version TC2 “Time Manager” “Proportional”
		

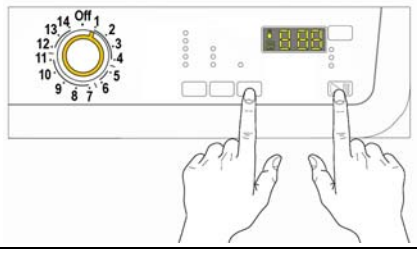
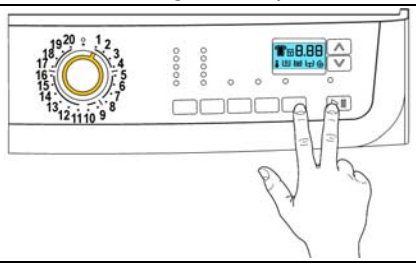
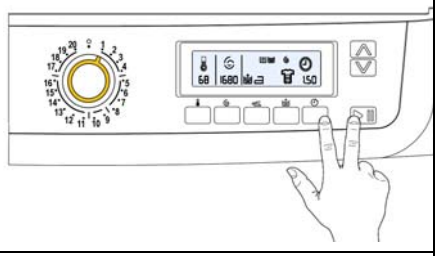
1. Switch off the appliance
2. Press the **START/PAUSE** button and the nearest **option button** simultaneously (as shown in the figure).
3. Holding down both buttons, switch the appliance on by turning the programme selector **by three positions clockwise**.
4. Hold the buttons down until **“**dEM**”**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

6.1 Exiting DEMO mode

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

7 DIAGNOSTIC SYSTEM

7.1 Accessing diagnostics

Version TC4	Version TC3 “Time Manager” “Proportional”	Version TC2 “Time Manager” “Proportional”
		

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 **by one position clockwise**.
4. Hold the buttons down until the LEDs and symbols begin to flash in sequence (at least 2 seconds).

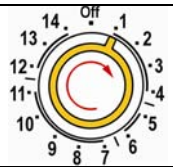
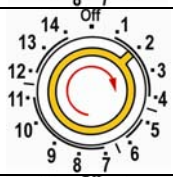
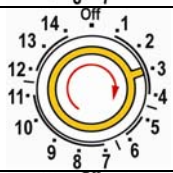
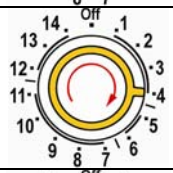
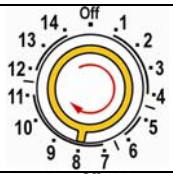
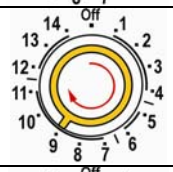
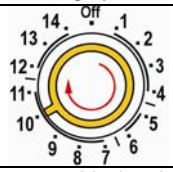
In the first position, the operation of the buttons and the related LEDs is checked; turn the programme selector knob **clockwise** to run the diagnostic cycle for the operation of the various components and to ready any alarms.

7.2 Quitting the diagnostics system

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

7.3 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 valve	Door locked Water level below anti-flooding level Maximum time 5 mins	Water fill to wash compartment	Displays the water level in the tub
3		- Door safety interlock - Pre-wash solenoid valve	Door locked Water level below anti-flooding level Maximum time 5 mins	Water fill to pre-wash compartment (bleach)	Displays the water level in the tub
4		- Door safety interlock - Pre-wash and wash solenoid valves	Door locked Water level below anti-flooding level Maximum time 5 mins	Water fill to conditioner compartment	Displays the water level in the tub
5		- Door safety interlock - Bleach/stains solenoid valves	Door locked Water level below anti-flooding level Maximum time 5 mins	Water fill to bleach/stains compartment	Displays the water level in the tub
6		- Door safety interlock - Wash solenoid valve if the water level in the tub does not cover the heating element - Heating element - Circulation pump	Door locked 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 valve if the water level in the tub does not cover the heating element - Motor (55 rpm clockwise, 55 rpm anti-clockwise, 250 rpm pulse)	Door locked Water level above the heating element	Check for leaks from the tub	Displays the drum speed (the real value divided by ten)
8		- Door safety 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, calibration of analogue pressure switch and spin	Displays the drum speed (the real value divided by ten)
9		- Door safety interlock - Drain pump - Power fan - Condensation solenoid valve - Drying heating element	Door locked Water level below anti-boiling level	Drying	Displays the air temperature
10		- Reading/Cancellation of the last alarm	-----	----	

(*) 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 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.

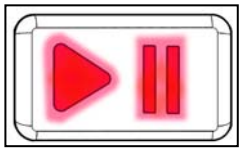
8 ALARMS

8.1 Displaying the alarms to the user

The alarms are displayed by the flashing red LED of the START/PAUSE button and simultaneously through the LCD 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 the normal values*

It is necessary to reset the normal conditions of the voltage and/or of the frequency of the electricity line.

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 that a drain phase be performed before the door can be opened for safety reasons:

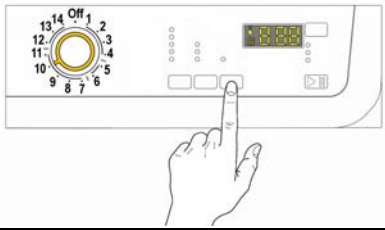
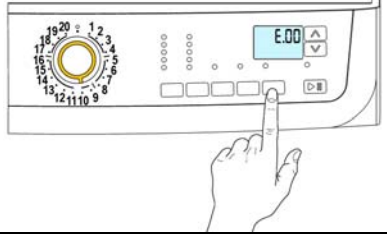
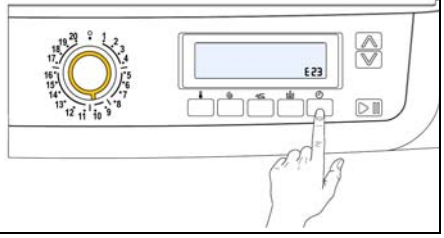
- Cooling water fill if the temperature is higher than 65°C.
- Drain until the analogue pressure switch is on empty, during a max. 3-minute time.

8.2 Reading the alarms

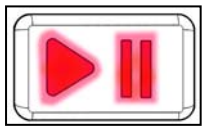
The last three alarms stored in the FLASH memory of the PCB can be displayed:

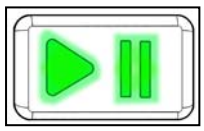
- Enter the diagnostic mode (para. 7.1)
- Irrespective of the type of PCB and configuration, turn the programme selector knob **clockwise** to the **tenth position**

- the last alarm is displayed.
- to display the 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.

Version TC4	Version TC3 “Time Manager” “Proportional”	Version TC2 “Time Manager” “Proportional”
		

8.2.1 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 the 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.
- The alarm code families are shown in hexadecimal; in other words:

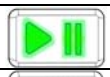
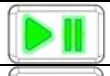
→ **A** is represented by **10** flashes
→ **B** is represented by **11** flashes
→ ...
→ **F** is represented by **15** flashes

- Configuration errors are shown by the flashing of all LEDs (user interface not configured).

8.2.2 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 E**4**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**			
	0.5			2.5	Pause
	1.5	Pause			

8.2.3 Operation of alarms during the diagnostic cycle

All alarms are enabled during the components diagnostic cycle.

8.3 Rapid reading of alarms

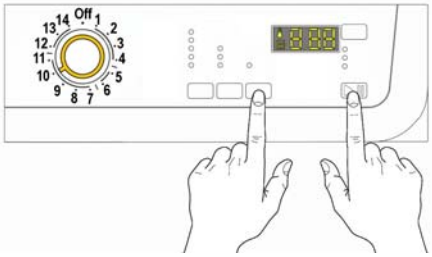
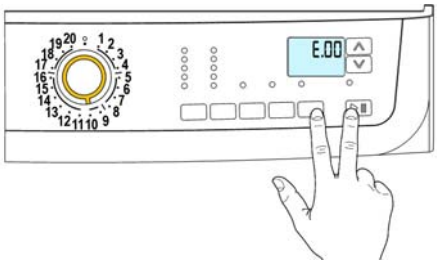
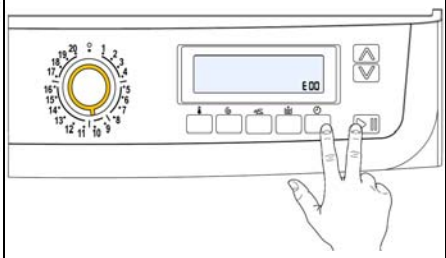
The last three alarms can be displayed even if the programme selector is not in the tenth position (diagnostics) or if the appliance is in normal operating mode (e.g. during the execution of the washing programme):

→ 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.
→ To display the previous alarms, press the button to the left of the START/PAUSE button in sequence.
→ To return to the last alarm, press the START/PAUSE button.
→ 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. 8.2
→ 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 in memory.

8.4 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.

Version TC4	Version TC3 “Time Manager” “Proportional”	Version TC2 “Time Manager” “Proportional”
		
1. Select diagnostic mode and turn the programme selector to the **tenth** position (reading of alarms) 2. Press the **START/PAUSE** button and the nearest **option button** simultaneously (as shown in the figure). 3. Hold down the buttons until the LEDs stop flashing and the LCD display shows **“**E00**”** (at least 5 seconds).		

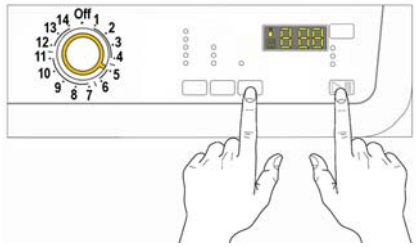
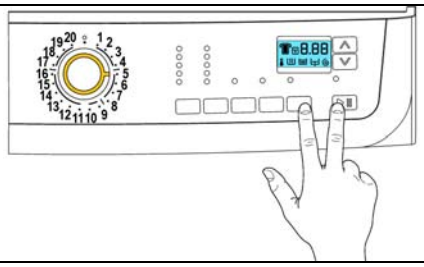
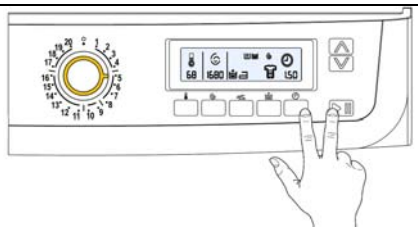
N.B. With this operation all the alarms stored are deleted.

9 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)

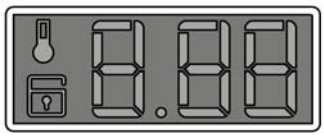
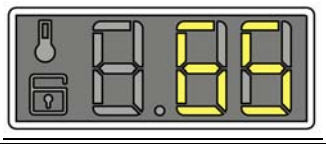
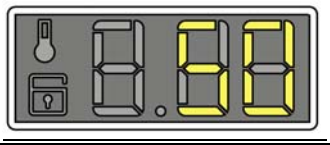
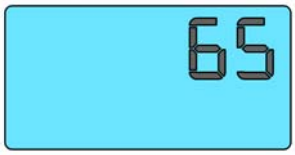
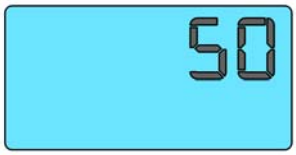
9.1 Reading of operating time

Version TC4	Version TC3 “Time Manager” “Proportional”	Version TC2 “Time Manager” “Proportional”
		

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 **by five positions clockwise**.
4. Hold down the buttons until the hours of operation appear on the display or LCD display (at least 5 seconds).

9.2 Display of total operating time

This time is displayed with a sequence of two digits at a time: the first two digits indicate the thousands and hundreds, the second two digits indicate the 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 two seconds, nothing is displayed	For two seconds, the following digits are displayed: ↳ thousands (**6**) ↳ hundreds (**5**)	For the next two seconds the following digits are displayed: ↳ tens (**5**) ↳ units (**0**)
TC4			
TC3			
TC2			

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.

10 WASHING PROGRAMMES AND OPTIONS

10.1 Possible programmes

The 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/ 1300/1400/1600/1800
	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. 1600/1800
Conditioner		----	1	Max. 1600/1800
Drain		----	----	----
Spin		----	----	Max. 1600/1800

The information is purely indicative

(*) "energy label" programmes

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

10.2 Options (for EWM 21xx appliances with universal motor)

The following table contains the possible washing programme options, their compatibility with one another and with the cycle and when they can be selected or modified.

The options can be selected in various ways:

- using the programme selector: in this case, the options are configured as special programmes.
- using the relevant buttons.

Compatibility with PROGRAMMES		Spin speed Max.	Spin speed Min.	Temp.	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	Phases: Pre-wash	Wash	Rinses	Spin	Delay	Drying
	Cotton	1600	0	90°C	X	X	X	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	X	X	X						X
				50°C	X	X	X	X	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	X	X	X		X	X	X	X	X
				30°C	X	X	X		X	X	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	X	X	X	X						X
	Synthetic fabrics	900	0	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	X	X	X	X
				30°C	X	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							X
	Delicates	700	0	40°C	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	X	X	X
				cold	X	X	X			X				X	X	X		X		X	X							X
	Wool / Hand Wash	1000	0	40°C	X	X								X						X	X							X
				30°C	X	X								X						X	X			X	X	X	X	X
				cold	X	X								X						X	X							X
	Easy iron	900	0	60°C	X		X			X	X			X						X	X							X
				50°C	X		X			X	X			X						X	X							X
				40°C	X		X			X	X			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
	Duvet	700	400	40°C										X						X				X	X	X	X	
				30°C										X						X								
	Jeans	1200	0	60°C	X	X	X			X	X			X						X	X							X
				50°C	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
				cold	X	X	X			X	X			X						X	X							X
	Shoes	1000	0	40°C	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
	Lingerie	900	0	40°C	X	X								X						X	X							X
				30°C	X	X								X						X	X			X	X	X	X	X
				cold	X	X								X						X	X							X
	Silk	700	0	30°C	X	X												X		X	X			X	X	X	X	X
				cold	X	X												X		X	X							X
	Baby	700	0	40°C	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
	Mini, Flash, Sport, Light	700	0	30°C														X		X	X			X	X	X	X	
	Sanitised	1600	0	90°C	X	X	X	X	X	X			X							X	X			X	X	X	X	X

continues overleaf

		Spin speed		Temp.	OPTIONS																		Phases					
		Max.	Min.		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	Pre-wash	Wash	Rinses	Spin	Delay	Drying
Compatibility with PROGRAMMES	**Sport**	900	0	40°C	X	X	X			X				X						X	X							
				30°C	X	X	X			X				X						X	X			X	X	X	X	
				cold	X	X	X			X				X						X	X							
	Shirts	900	0	30°C														X		X	X			X	X	X	X	
	Mixed	1600	0	40°C	X	X	X	X	X	X		X							X	X	X	X		X	X	X	X	
	Hygiene	1800	0	90°C	X	X		X		X	X			X						X	X	X						
				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						
				40°C	X	X		X		X	X			X						X	X	X						
	Grass	1600	0	60°C	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							
	Curtains	700	0	40°C	X	X	X			X				X						X	X							
				30°C	X	X	X			X				X						X	X			X	X	X	X	
				cold	X	X	X			X				X						X	X							
	Automatic	1600	0	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			X	X	X	X	
				30°C	X	X	X		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	X	X	X								
	Soak	0	0	30°C			X							X									X				X	
	Rinses	1600	0		X	X			X	X	X									X	X					X	X	
	Delicate rinses	700	0		X	X				X										X	X					X	X	
	Conditioner	1600	0		X	X					X									X	X					X	X	
	Delicate conditioner	1600	0		X	X					X									X	X					X	X	
	Drain	0	0																								X	
	Spin	1600	400																	X							X	X
	Delicate spin	700	400																	X							X	X

(*) Economy

- Cotton: 90°C = Eco 67°C; 60°C = Energy Label; 50°= Eco 48°C;40°C = Eco 44°C AA
- Synthetic fabrics: 60-60°C = Eco 40°C

X Option included by default with the programme which cannot be deleted

X Option included by default with the programme which can be deleted

Only for Jetsystem + Flowmeter

10.3 Options (for EWM 25xx appliances with asynchronous motor and inverter)

The following table contains the possible washing programme options, their compatibility with one another and with the cycle and when they can be selected or modified.

The options can be selected in various ways:

- using the programme selector: in this case, the options are configured as special programmes.
- using the relevant buttons

		Spin speed		Temp.	OPTIONS																	Phases					
		Max.	Min.		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	Pre-wash	Wash	Rinses	Spin	Delay	Drying
Compatibility with PROGRAMMES	**Cotton**	1800	0	90°C	X	X	X	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	X	X	X						
				50°C	X	X	X	X	X	X	X	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	X	X	X						
				30°C	X	X	X		X	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	X	X	X	X						
	Synthetic fabrics	900	0	60°C	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							
				40°C	X	X	X	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							
	Delicates	700	0	40°C	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	X	X	
				cold	X	X	X			X				X	X	X		X		X	X							
	Wool / Hand Wash	1000	0	40°C	X	X								X						X	X							
				30°C	X	X								X						X	X			X	X	X	X	
				cold	X	X								X						X	X							
	Easy iron	900	0	60°C	X		X			X	X			X						X	X							
				50°C	X		X			X	X			X						X	X							
				40°C	X		X			X	X			X						X	X			X	X	X	X	
				30°C	X		X			X	X			X						X	X							
				cold	X		X			X	X			X						X	X							
	Duvet	700	400	40°C										X						X								
				30°C										X						X				X	X	X	X	
	Jeans	1200	0	60°C	X	X	X			X	X			X						X	X							
				50°C	X	X	X			X	X			X						X	X							
				40°C	X	X	X			X	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	1000	0	40°C	X	X	X			X				X						X	X							
				30°C	X	X	X			X				X						X	X			X	X	X	X	
				cold	X	X	X			X				X						X	X							
	Lingerie	900	0	40°C	X	X								X						X	X							
				30°C	X	X								X						X	X			X	X	X	X	
				cold	X	X								X						X	X							
	Silk	700	0	30°C	X	X												X		X	X			X	X	X	X	
				cold	X	X												X		X	X							
	Baby	700	0	40°C	X	X	X			X				X						X	X							
				30°C	X	X	X			X				X						X	X			X	X	X	X	
				cold	X	X	X			X				X						X	X							
	Mini, Flash, Sport, Light	700	0	30°C														X		X	X			X	X	X	X	
	Sanitised	1800	0	90°C	X	X	X	X	X	X			X							X	X			X	X	X	X	

continues overleaf

		Spin speed		Temp.	OPTIONS																		Phases					
		Max.	Min.		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	Pre-wash	Wash	Rinses	Spin	Delay	Drying
					X	X	X			X				X						X	X							
				30°C	X	X	X			X				X						X	X			X	X	X	X	
				cold	X	X	X			X				X						X	X							
	Shirts	900	0	30°C														X		X	X			X	X	X	X	
	Mixed	1800	0	40°C	X	X	X	X	X	X		X							X	X	X	X		X	X	X	X	
	Hygiene	1800	0	90°C	X	X		X		X	X			X						X	X	X						
				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						
				40°C	X	X		X		X	X			X						X	X	X						
	Grass	1800	0	60°C	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							
	Curtains	700	0	40°C	X	X	X			X				X						X	X							
				30°C	X	X	X			X				X						X	X			X	X	X	X	
				cold	X	X	X			X				X						X	X							
	Automatic	1800	0	60°C	X	X	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	X	X						
				40°C	X	X	X	X	X	X	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	X	X	X	X	X						
				cold	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X						
	Express	1200	0	60°C	X					X								X		X	X			X	X	X	X	
	Sensitive plus	1800	0	60°C	X	X	X	X	X	X				X		X				X	X			X	X	X	X	
	Rapid	900	0	30°C	X									X						X	X			X	X	X	X	
	Cotton Proportional	1800	0	90°C	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							
				50°C	X	X	X	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							
				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 Proportional	900		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			X	X	X	X	
				30°C	X	X	X			X	X		X	X				X	X	X	X							
				cold	X	X	X			X	X		X	X				X	X	X	X							
	A++	1800	0	50°C	X	X	X	X	X	X	X	X							X	X	X	X		X	X	X	X	
	Soak	0	0	30°C			X							X									X				X	
	Rinses	1800	0		X	X			X	X	X									X	X				X	X	X	
	Delicate rinses	700	0		X	X				X										X	X				X	X	X	
	Conditioner	1800	0		X	X					X									X	X				X	X	X	
	Delicate conditioner	1800	0		X	X					X									X	X				X	X	X	
	Drain	0	0																							X		
	Spin	1800	400																	X						X	X	
	Delicate spin	700	400																	X						X	X	

(*) Economy

- Cotton: 90°C = Eco 67°C; 60°C = Energy Label; 50°= Eco 48°C;40°C = Eco 44°C AA
- Synthetic fabrics: 60-60°C = Eco 40°C

X — Option included by default with the programme which cannot be deleted

X — Option included by default with the programme which can be deleted

Only for Jetsystem + Flowmeter

10.3.1 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	x
	Intensive	x	x	x	x	x	x	x	x	■						x	x	x	x
	Normal	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
	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	x
	Pre-wash	x	x				x	x									x	x	
	Wash	x	x				x	x									x	x	
	Rinses	x																	
	Spin																		
Drying				x	x	x	x	x	x	x	x	x	x	x	x	x	x		x

(*) 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 400rpm. For all others, it is 0 rpm

10.4 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 30°C (or cold, if selected) plus 30′ hold with wool movement.
→ Fills water, goes to the end of the cycle and for a maximum time of 9+9 hours of hold, it performs a wool movement.

- **Stains**

→ Adds a 5-minute motor movement phase after heating to 40°C
→ Ducts water to the pre-wash/stains compartment to introduce the special stain-removal product
→ This option cannot be selected for DELICATES, WOOL and HAND WASH cycles.

- **Bleach**

→ Ducts 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÷60 - SYNTHETIC FABRICS 50/60 programmes to reduce energy consumption, guaranteeing the washing performance levels.
→ Reduces the washing temperature.
→ Increases the duration of the wash phase.

- **Super rinse**

→ Adds **two** rinses in the COTTON - SYNTHETIC FABRICS - DELICATES cycles
→ Eliminates the intermediate spins except for the last one, which is limited to 450 rpm.

- **Half-load**

→ Eliminates one rinse in COTTON programmes.

- **Easy-iron**

→ In COTTON programmes:
  - adds **three** rinse cycles
  - eliminates the intermediate spin cycles
  - performs a pulse spin phase
  - adds an "untangling" phase after the spin cycle

→ In SYNTHETIC FABRICS programmes:
  - reduces the heating 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 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**

→ 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 a 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 in the COTTON - SYNTHETIC FABRICS cycles

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

→ The 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 dying (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.

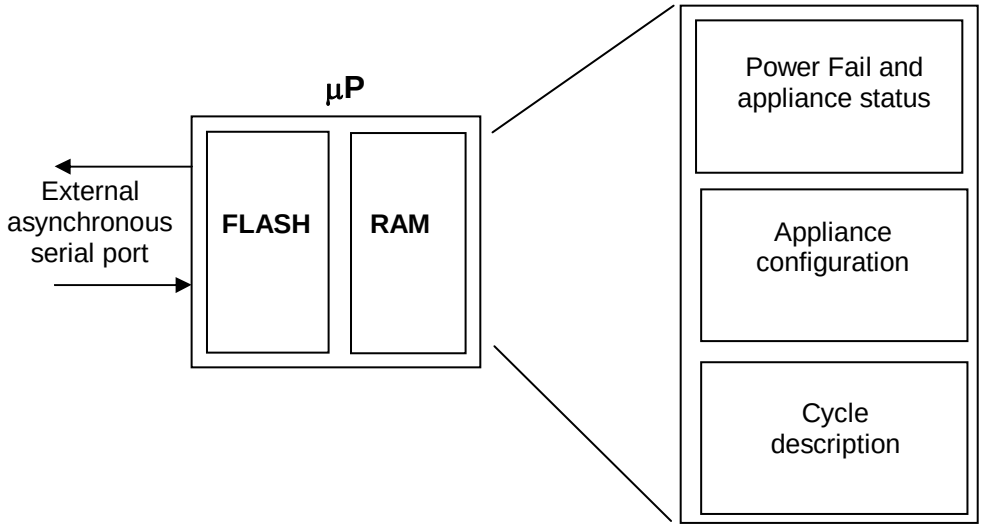
→ The selected drying phase either in automatic drying or as a separate programme.

11 TECHNICAL CHARACTERISTICS

11.1 Electronic control system memory

11.1.1 General structure of the memory system

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



11.1.2 FLASH

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

- ⇨ Control of electric loads (motor, pump, solenoid 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;
- ⇨ Execution of 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)
- ⇨ Appliance configuration: 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÷1,400 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
  - Conditions "IF" .... (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
  - Sensor parameters (flowmeter, etc…)

11.1.3 RAM

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

- ⇨ Motor speed
- ⇨ Temperature of the water
- ⇨ Alarms
- ⇨ Cycle selected
- ⇨ Machine status

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

The contents of the memory can be read using a computer connected via a DAAS interface.

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

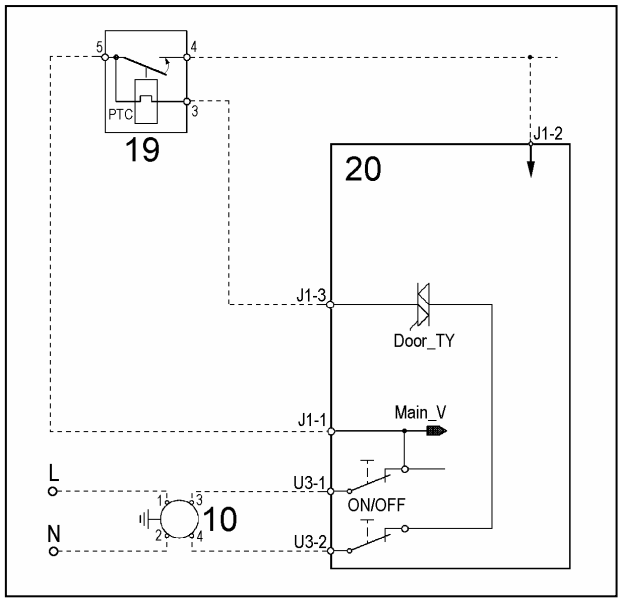
- ⇨ Select remote control mode
- ⇨ Activate the various loads in remote mode
- ⇨ Select diagnostic mode
- ⇨ Select a cycle and options, and start the cycle

11.2 Door safety interlock

There are two types of door interlock:

- volumetric with PTC
- instantaneous

11.2.1 Volumetric interlock with PTC



10 Anti-disturbance filter
19 Door safety interlock
20 PCB

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

11.2.1.1 Operating principle

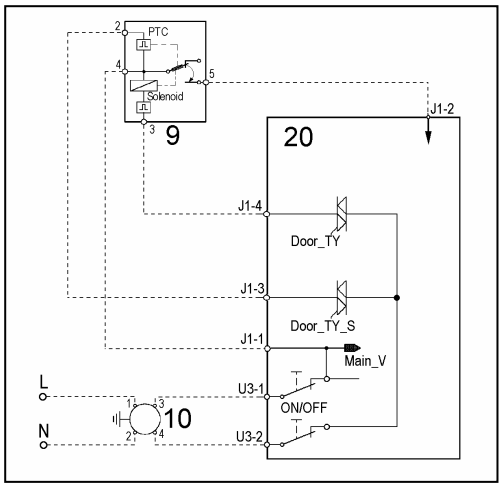
- When the washing programme is started by pressing the start/pause button, the bi-metal PTC (contacts 3-5) is powered by the triac (Door_TY) on the PCB: after 2-4 seconds, this closes the switch (5-4) which powers the electrical components of the appliance(only if the door is closed).
- The door interlock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

11.2.2 Instantaneous door interlock

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

9 Door safety interlock
20 Anti-disturbance filter
20 PCB

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



11.2.2.1 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 solenoid (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.

11.2.2.2 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.

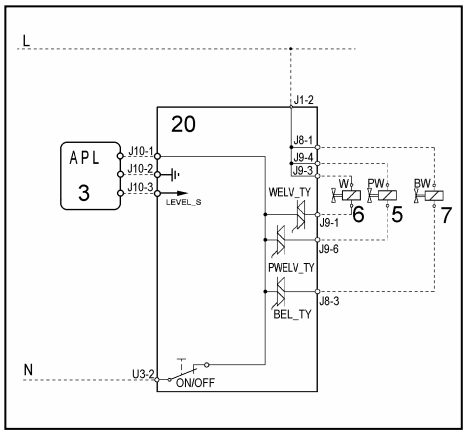
11.2.2.3 Automatic release device

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

11.3 Water fill system

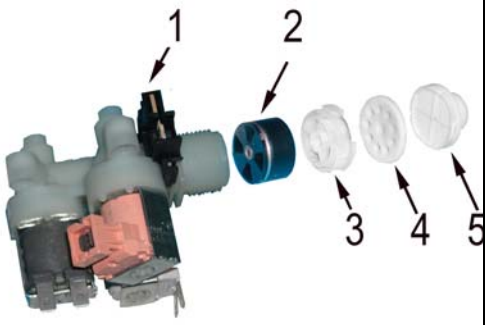
The solenoid valves are powered by the PCB by means of the triac and the water level in the tub is controlled by the analogue pressure switch.

3 Analogue pressure switch
5 Pre-wash solenoid valve
6 Wash solenoid valve
7 Bleach solenoid valve
20 PCB



11.3.1 Flowmeter

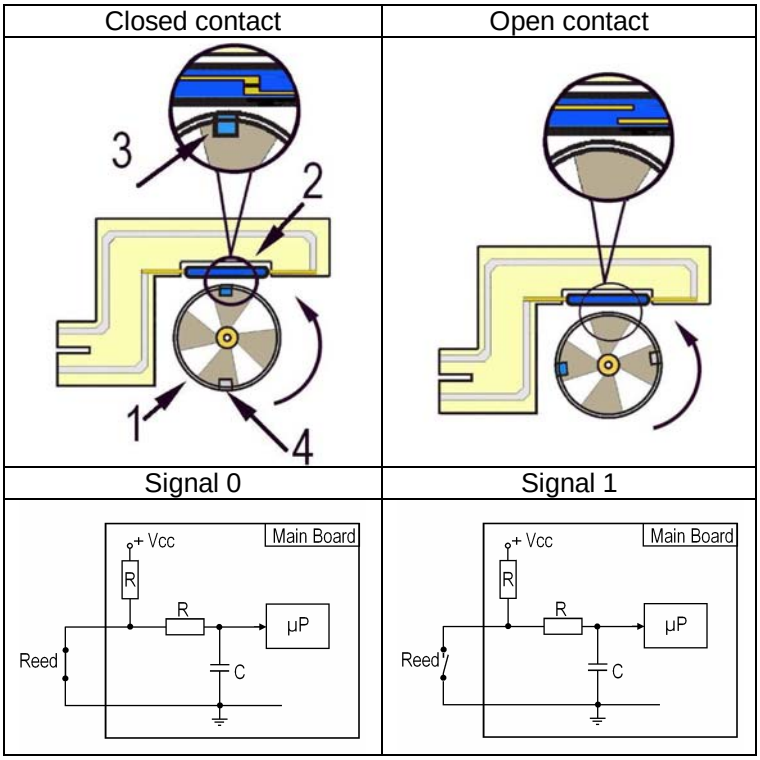
Some models of solenoid valves have a built-in flow sensor, which measures the quantity of water in litres that is loaded into the appliance.
In the event of a sensor failure, the water level is controlled by the analogue pressure switch.

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

11.3.2 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

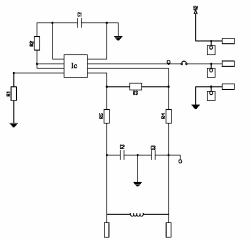
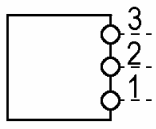
If the flow sensor does not generate a signal during the water fill phases, even though power is being supplied to the solenoid valve, the cause of this condition may be a closed water tap or clogged filter on the solenoid valve (with ensuing low water pressure). If this occurs, only a WARNING will be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

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

11.4 Analogue pressure switch of water level control in the tub

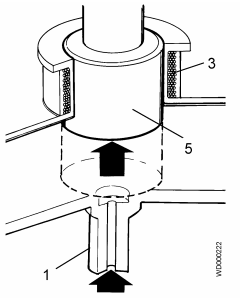
General characteristics

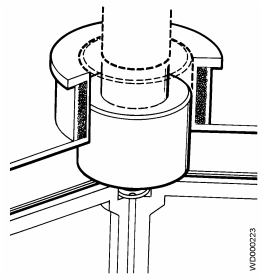
The electronic pressure switch is an analogue device that controls the water level in the tub, used in the models with electronic control system and it is directly connected to the main PCB.

ELECTRONIC PRESSURE SWITCH		
Electronic circuit	Electrical symbol	
		

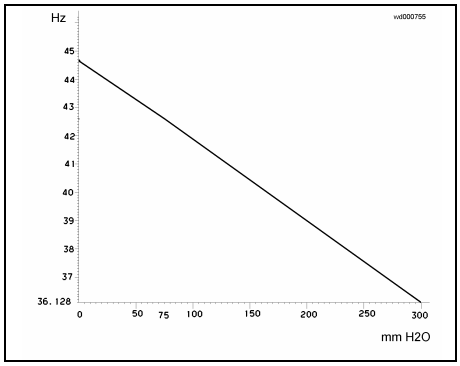
The pressure switch is connected via a tube to the pressure chamber.
When water is introduced into the tub, this creates a pressure inside the hydraulic circuit that causes the membrane to change position. This in turn modifies the position of the core inside the coil, thus changing the inductance and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

1 tube
3 oscillating coil
5 core



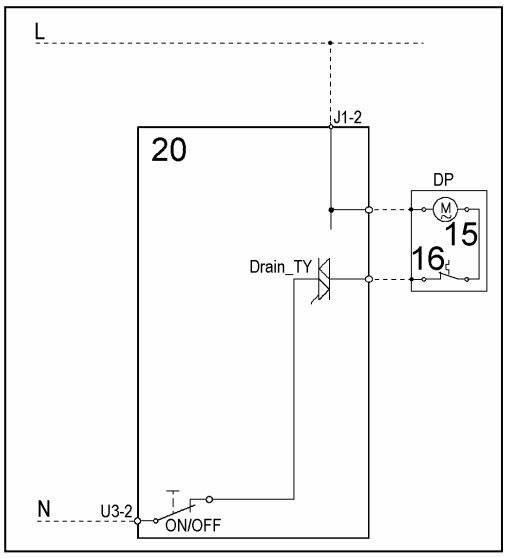


Operating frequency variation according to the quantity of water in the tub



11.5 Drain pump

15 Drain pump
16 Overload cut-out
20 PCB



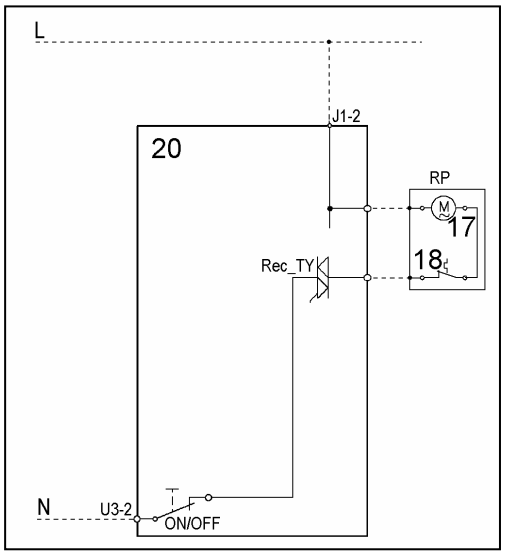
The PCB powers the drain pump via a triac as follows:

- 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)

11.6 Circulation pump (where featured)

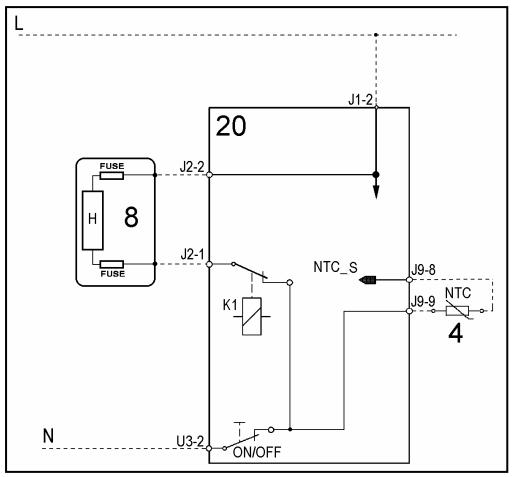
On jetsystem models, the main PCB powers the circulation pump directly through a triac

17 Drain pump
18 Overload cut-out
20 PCB

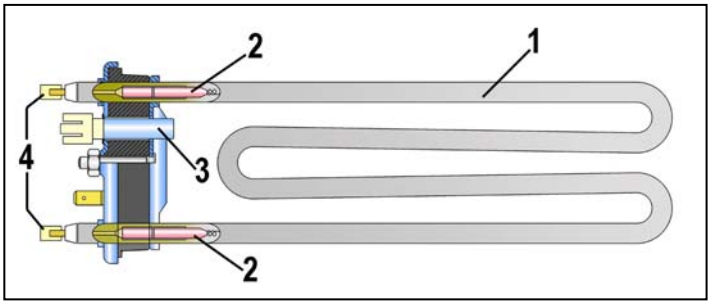


11.7 Heating

4 NTC temperature sensor
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

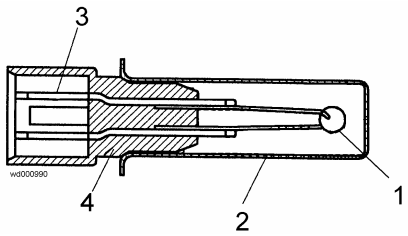
When replacing the heating element, do so with one with the same characteristics so as not to compromise the safety of the appliance.

Do not remove/switch the NTC sensors between heating elements

11.8 Temperature sensor

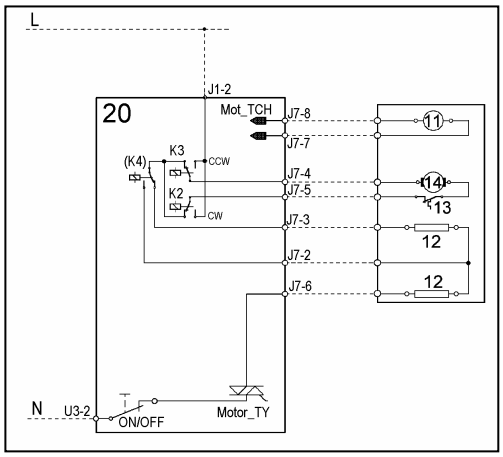
The temperature is controlled by the PCB by means of an NTC temperature sensor incorporated in the heating element.

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



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

11.9 Universal motor (EWM 21xx)



11 Tachometric generator
12 Stator
13 Thermal cut-out
14 Rotor
20 PCB

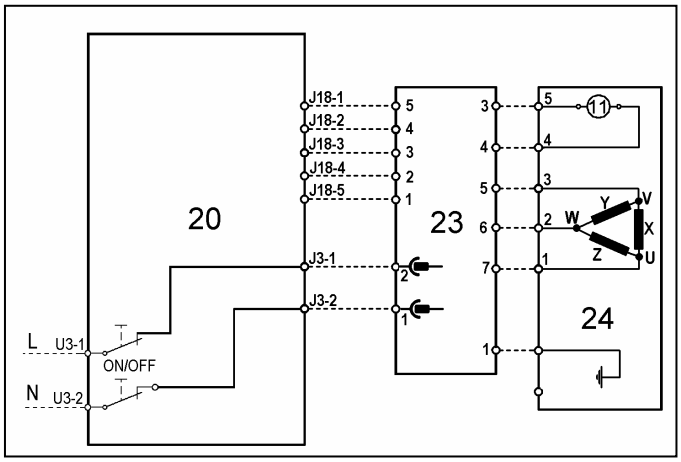
11.9.1 Power supply to motor

The PCB powers the motor via a triac; 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.

11.10 Three-phase asynchronous motor (EWM 25xx)

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

X-Y-X = Motor windings



11.10.1 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.

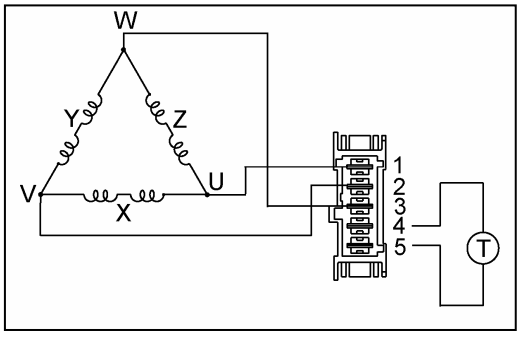
It is possible to get an idea of the efficiency of the motor by measuring the resistance of the coils:

Winding y ohm 5,4 ~ ±7% (contacts 2-3)

Winding x ohm 5.4 ~ ±7% (contacts 1-2)

Winding z ohm 5.4 ~ ±7% (contacts 1-3)

Winding T (tachometric) ohm 121 ~ ±7% (contacts 4-5))

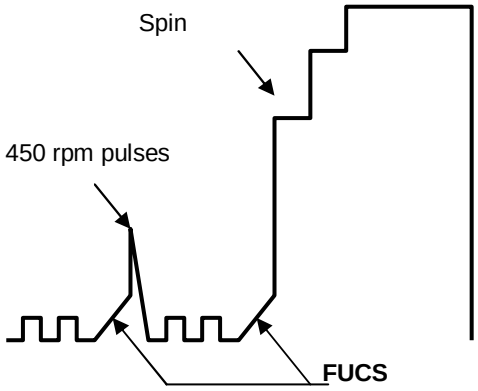


- **Any work on electrical appliances must only be carried out by qualified technicians.**
- **Unplug the appliance before accessing internal components.**
- **When replacing the "INVERTER" board, do not open the plastic casing, because some parts are subject to high voltage values and some condensers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

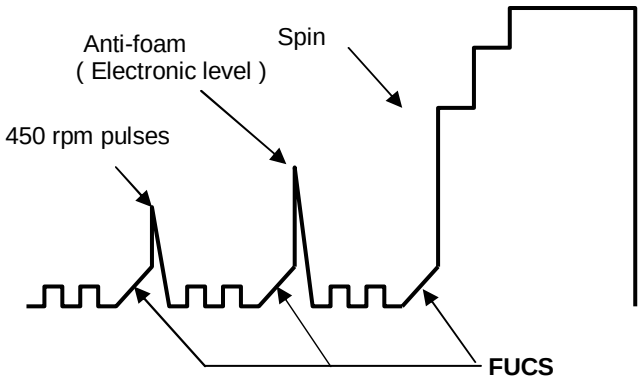
11.11 Anti-foam control system

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

Spin phase without foam



Spin phase with little foam



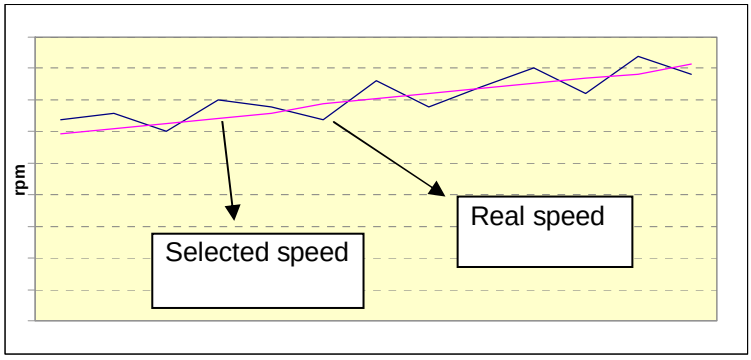
- **Spin with little foam:** if the contact of the electronic pressure switch closes on "full", the spin phase is interrupted; the drain pump continues to operate and, when the contact returns to "empty", the spin phase is resumed.
- **Spin with excessive foam in the tub (critical situation):** the control 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.

11.12 "FUCS"

(**F**ast **U**nbalance **C**ontrol **S**ystem)

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 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:

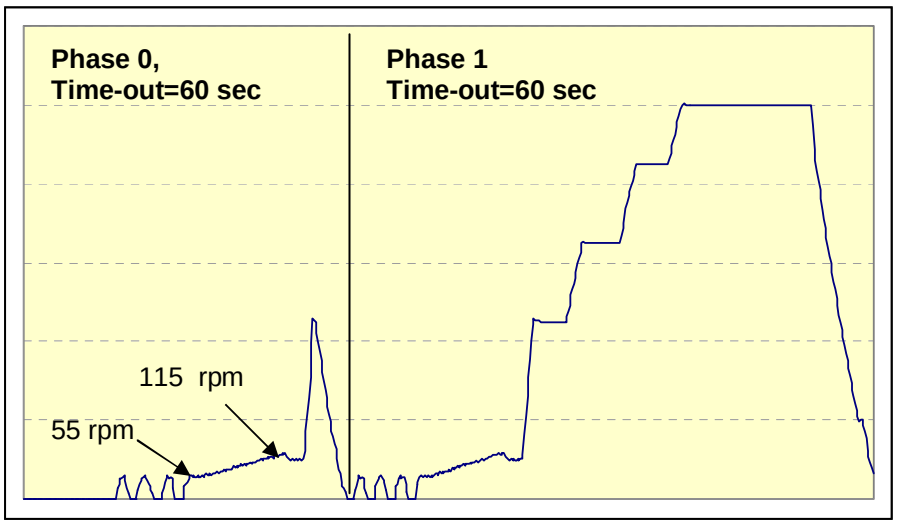
- *an unbalancing index (0-1-2-3)*
- *an unbalancing threshold value (e.g.: 850, 350, 650, 1100 rpm)*
- *a time out (max. time)*

- **Ending of the FUCS balancing phase**

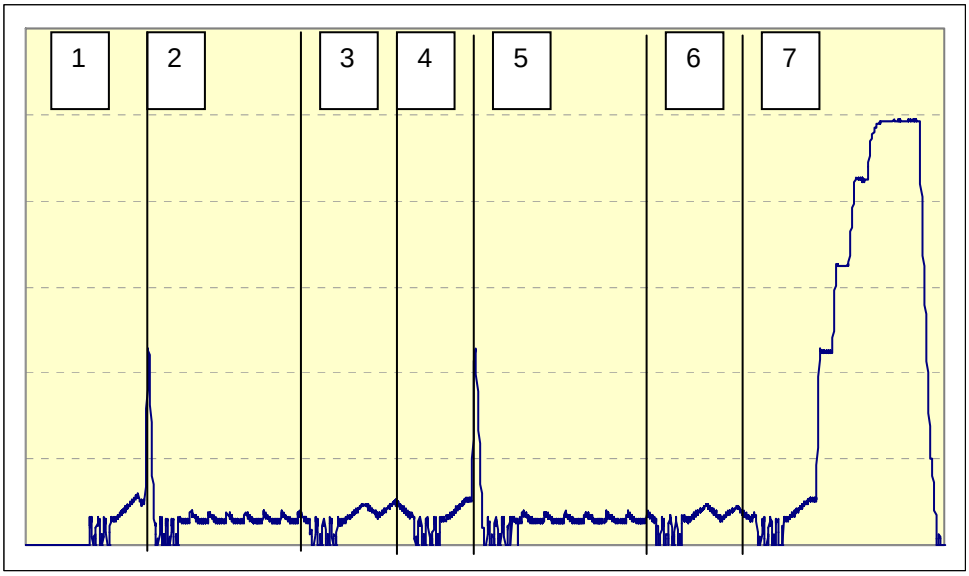
The phase is ended when:

- 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 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**



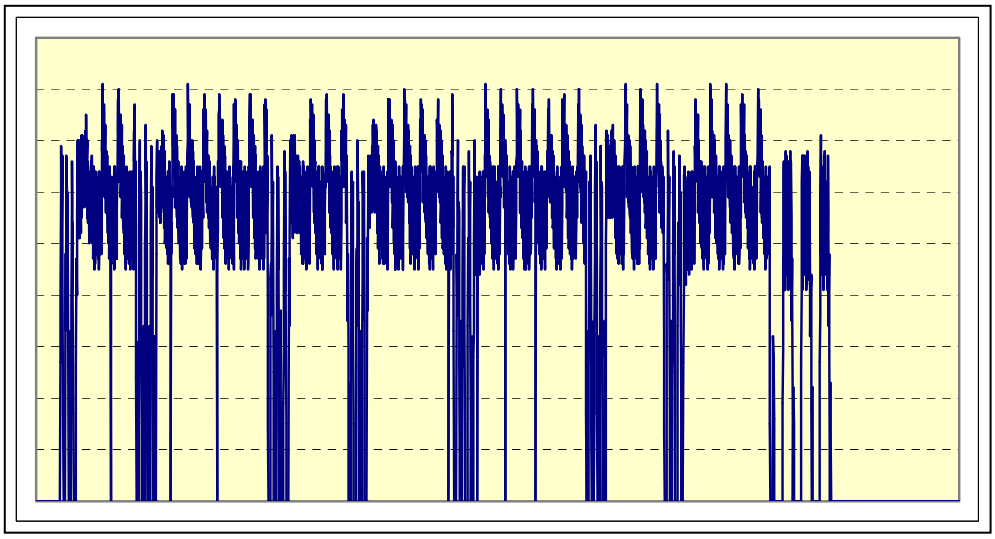
- **Balancing in the longest available time interval**



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

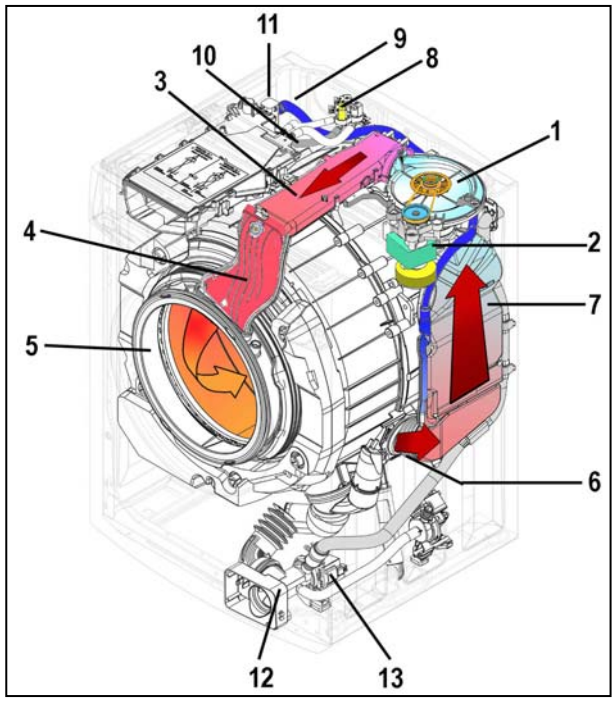
- **Unbalancing after all phases**

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



12 DRYING CIRCUIT

1. *Fan*
2. *Fan motor*
3. *Heating element casing*
4. *Conduit*
5. *Bellow seal*
6. *Tub-condenser sleeve*
7. *Drying condenser*
8. *Solenoid 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 micro-processor 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: *after the cooling phase, a 10-minute anti-crease phase is performed*

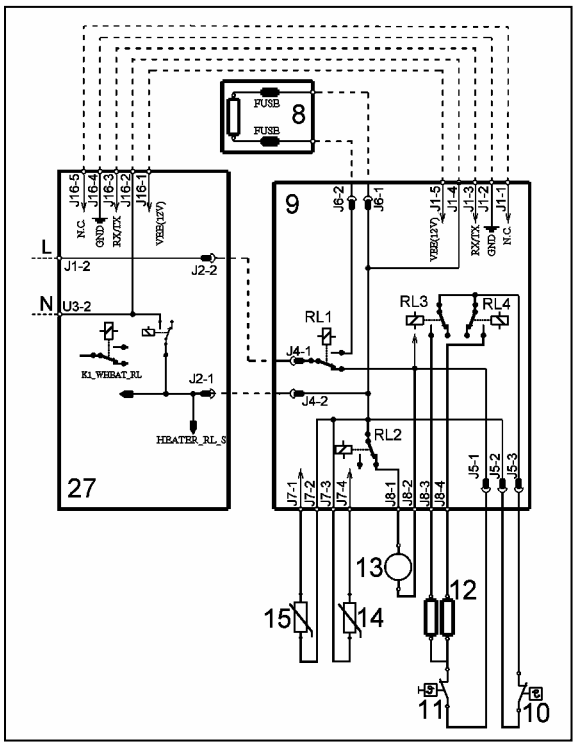
The drying heating elements *are powered directly by the main PCB via two relays*.
In the cycles for synthetic fabrics, the drying is performed with only one heating element (half power); in the cotton - linen cycles both heating elements are powered (full power).

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

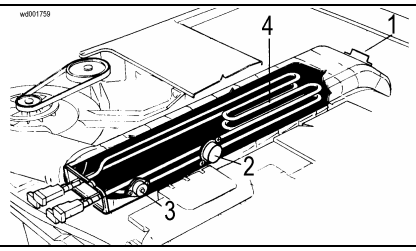
The wash of the condenser occurs at the beginning of the last rinse.

12.1 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).

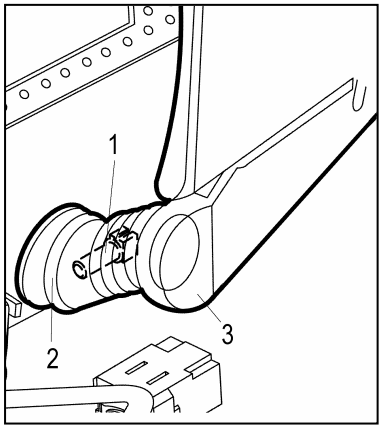


8. Washing heating element
9. PCB - WD
10. Safety thermostat (auto-reset)
11. Safety thermostat (manual reset)
12. Drying heating element
13. Fan motor.
14. Drying control NTC sensor
15. Humidity control NTC sensor
27. Main circuit board

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
	Resistance	56.5Ω+56.5Ω	61.5Ω+61.5Ω
Fan capacity		approx. 80 m^3 per 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 sensor
2. Tub-condenser tube
3. Drying condenser

12.2 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 tube 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 tube 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 tube 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 micro-processor)**	Main circuit board faulty.	Safety drain cycle - Cycle stops with door unlocked	RESET
E31	**Malfunction in electronic pressure switch circuit (frequency of signal from pressure switch outside limits)**	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.)**	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 micro-processor)**	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 micro-processor)**	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 sensor for wash cycle faulty; Heating element faulty; Main PCB faulty.	Heating phase is skipped	START/RESET

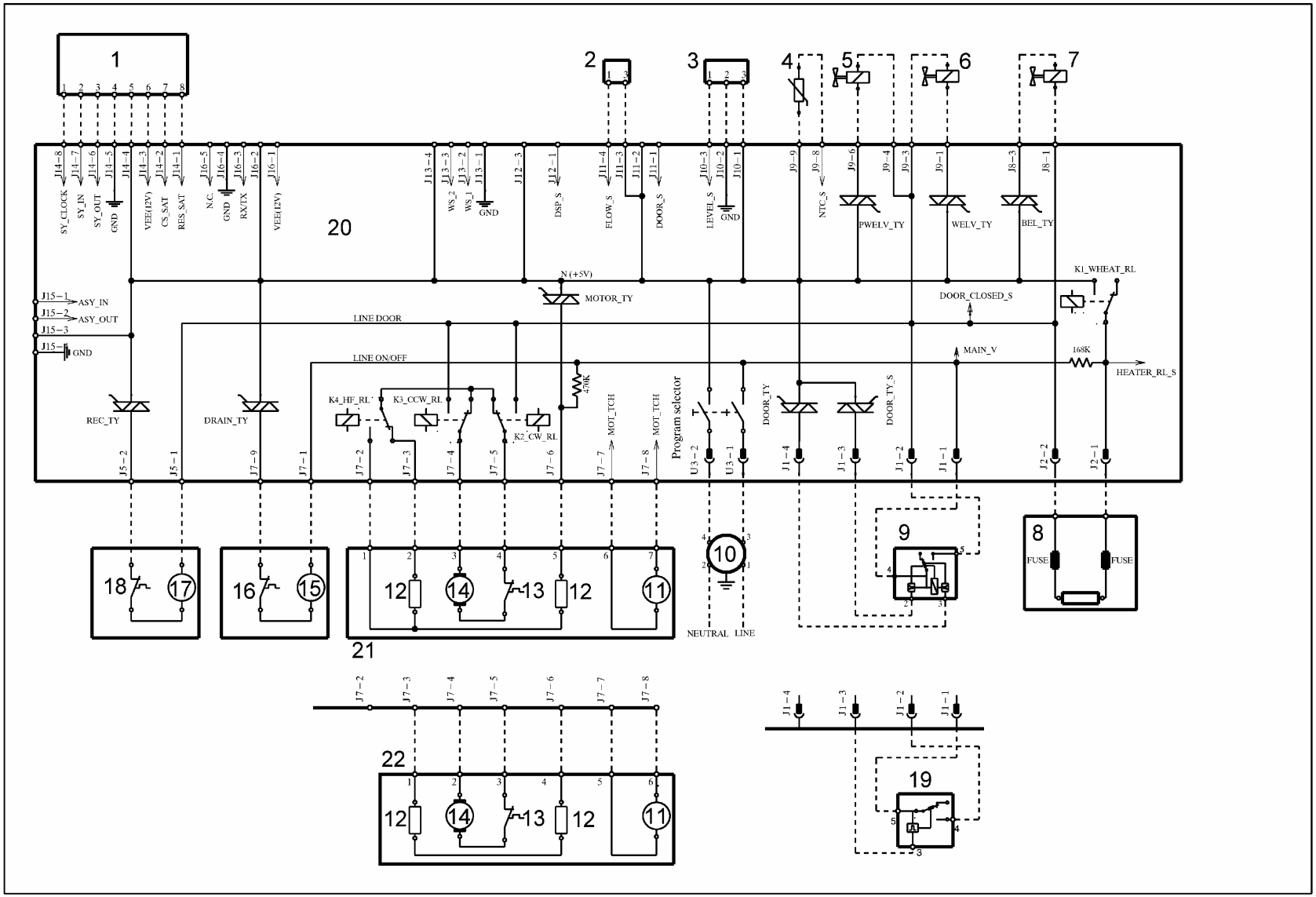
Alarm	Description	Possible fault	Machine status/action	Reset
E62	**Overheating during washing (temperature higher than 88°C for more than 5 min.)**	Wiring faulty; NTC sensor for wash cycle faulty; Heating element faulty; Main PCB faulty.	Safety drain cycle Cycle stops with door open	RESET
E66	**Heating element power relay faulty (incongruence 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 stops with door open	RESET
E69	**Heating element interrupted**	Wiring faulty; Heating element for washing interrupted (thermal fuse open)	----------	START/RESET
E71	**NTC sensor for wash cycle faulty (short-circuited or open)**	Wiring faulty; NTC sensor for wash cycle faulty; Main circuit board faulty.	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 sensor for wash cycle improperly positioned**	Wiring faulty; NTC sensor for wash cycle improperly positioned; NTC Sensor faulty; Main PCB faulty.	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 incongruence between main PCB and display (incompatible versions)**	Incorrect control/display PCB; Incorrect PCB (do not correspond to the model).	Cycle blocked	ON/OFF
E93	**Appliance configuration error**	Main PCB faulty (Incorrect configuration data);	Cycle blocked	ON/OFF
E94	**Incorrect configuration of washing cycle**	Main PCB faulty (Incorrect configuration data);	Cycle blocked	ON/OFF
E95	**Communication error between micro-processor and EEPROM**	Main circuit board faulty.	Cycle blocked	RESET
E97	**Incongruence 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	ON/OFF
E9b/E9H	**Communication error between micro-processor and FLASH memory**	Display board	----------	ON/OFF RESET
E9C	**Appliance configuration error**	Display board	----------	ON/OFF RESET

Alarm	Description	Possible fault	Machine status/action	Reset
E9d	**Clock faulty**	Display board	----------	ON/OFF 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	ON/OFF
EC1	**Solenoid 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	ON/OFF
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 which 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.	----------	ON/OFF
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 solenoid 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	**Supply frequency of appliance outside the limits**	Problem with the power supply network (incorrect/disturbed); Main PCB faulty.	Wait for nominal frequency conditions	ON/OFF
EH2	**Supply voltage too high**	Problem with the power supply network (incorrect/disturbed); Main PCB faulty.	Wait for nominal voltage conditions	ON/OFF
EH3	**Supply voltage too low**	Problem with the power supply network (incorrect/disturbed); Main PCB faulty.	Wait for nominal voltage conditions	ON/OFF

Alarm	Description	Possible fault	Machine status/action	Reset
EHE	**Incongruence between safety relay (in the main PCB) and safety sensing circuit**	Wiring faulty; Main PCB faulty	Safety drain cycle Cycle stops with door open	RESET
EHF	**Safety sensing circuit faulty (wrong input voltage to micro-processor)**	Main circuit board faulty	Safety drain cycle Cycle stops with door open	RESET

13 DIAGRAMS

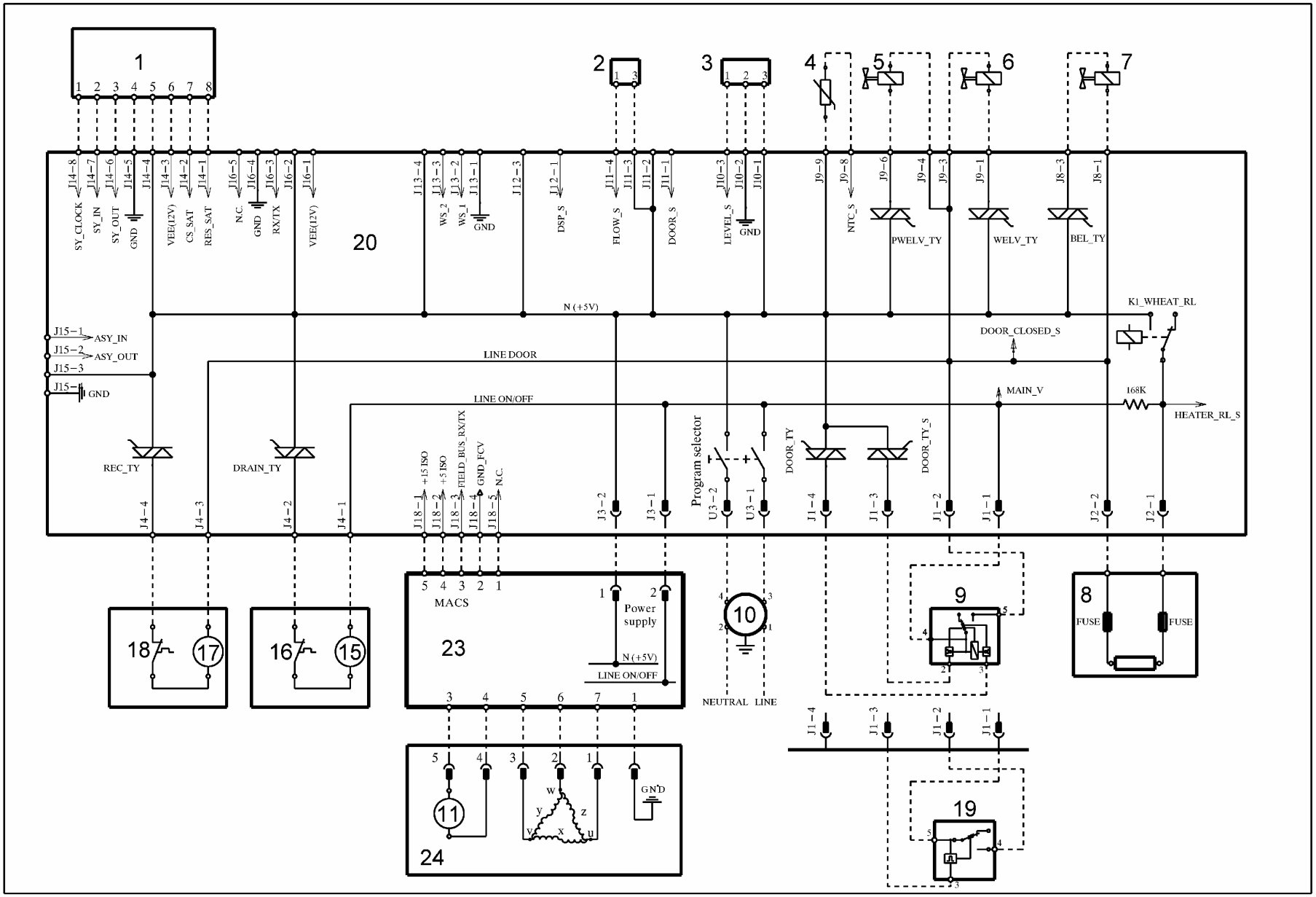
13.1 WM diagram with UNIVERSAL MOTOR EWM 21xx



- Key to WM diagram 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
4. NTC temperature sensor	K1	Heating element relay
5. Pre-wash solenoid valve	K2	Motor relay: clockwise rotation
6. Wash solenoid valve	K3	Motor relay: anti-clockwise rotation
7. Bleach solenoid 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. Overheating cut-out (motor)	BEL_TY	Bleach solenoid Triac
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		

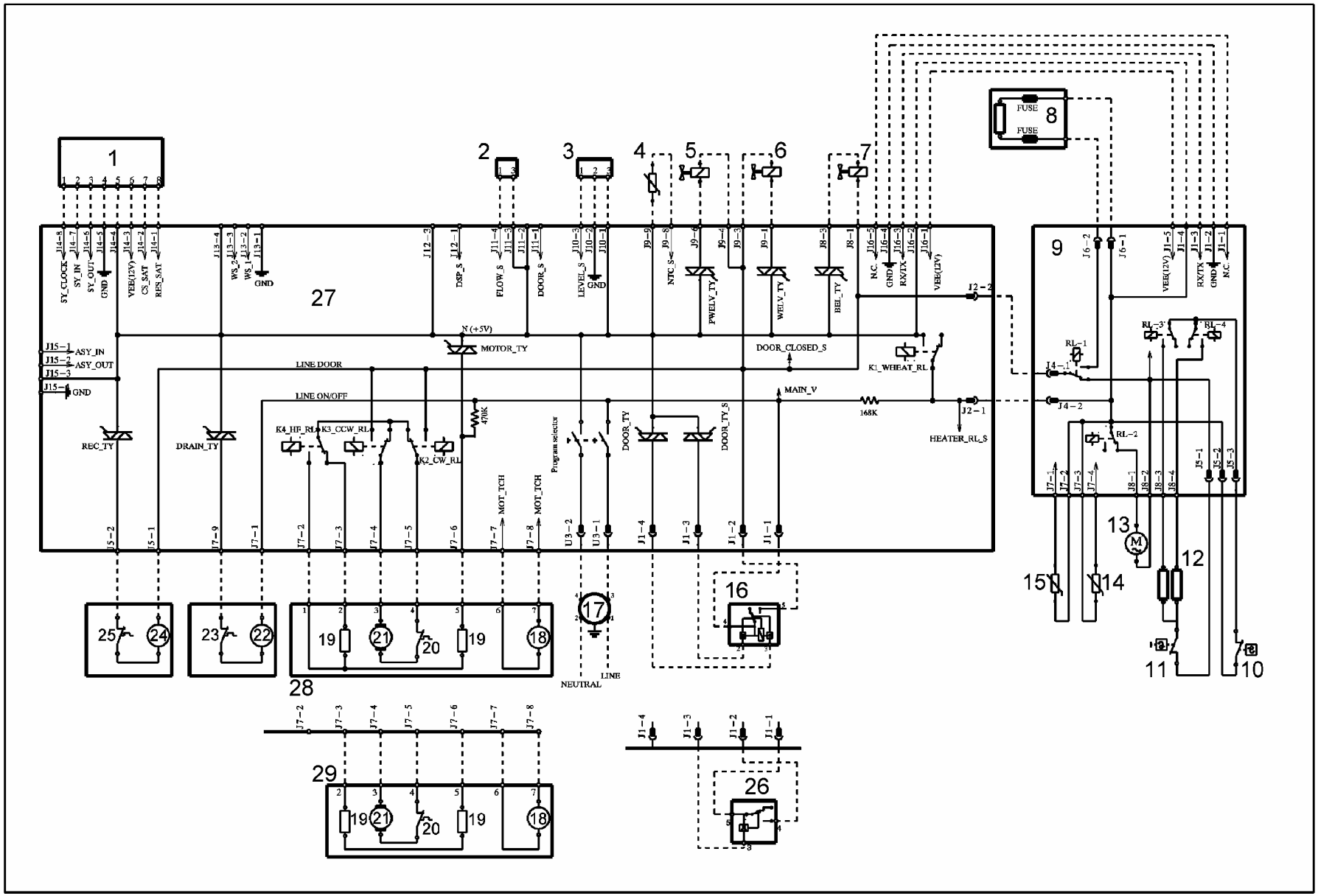
13.2 WM diagram with THREE-PHASE ASYNCHRONOUS MOTOR EWM 25xx



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

Appliance electrical components	PCB components	
1. Display board	DOOR_TY	Door interlock Triac
2. Flowmeter	DRAIN_TY	Drain pump Triac
3. Analogue pressure switch	REC-TY	Circulation pump Triac
4. NTC temperature sensor	K1	Heating element relay
5. Pre-wash solenoid valve	ON/OFF	Main switch (programme selector)
6. Wash solenoid valve	PWELV_TY	Pre-wash solenoid Triac
7. Bleach solenoid valve	WELV_TY	Wash solenoid Triac
8. Heating element (with thermal fuses)	BEL_TY	Bleach solenoid Triac
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. Three-phase motor		

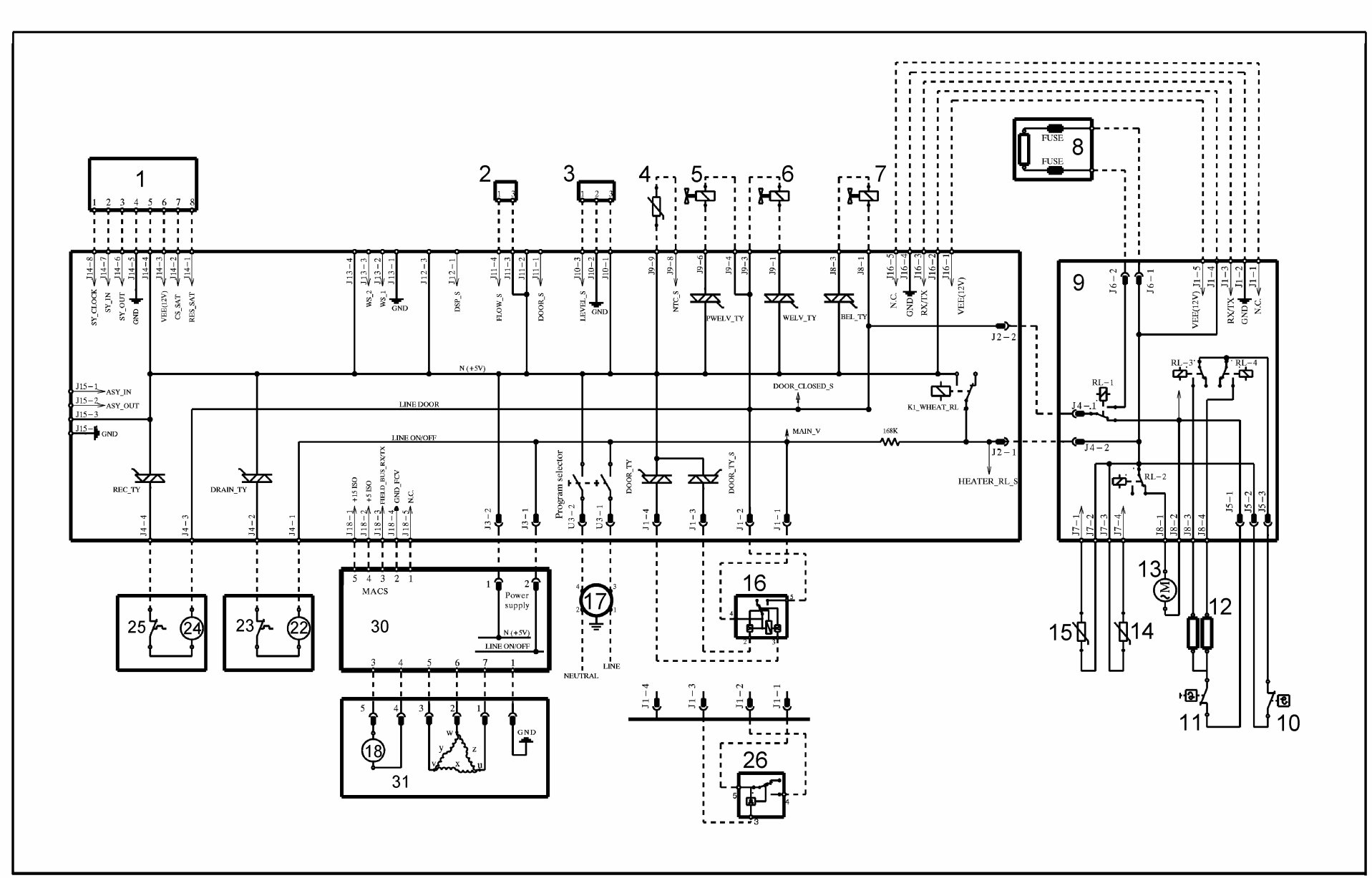
13.3 WD diagram with UNIVERSAL MOTOR EWM 21xx



- Key to WD diagram with UNIVERSAL MOTOR EWM 21xx

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
4. NTC temperature sensor (washing)	K1	Relay
5. Pre-wash solenoid valve	K2	Motor relay: clockwise rotation
6. Wash solenoid valve	K3	Motor relay: anti-clockwise rotation
7. Condensation solenoid valve	K4	Motor relay: half-range power supply (some models)
8. Washing heating element (with thermal fuses)		
9. WD PCB	MOTOR_TY	motor Triac
10. Safety thermostat (auto-reset)	PROGRAM 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	Bleach solenoid Triac
14. drying NTC temperature sensor	RL1	Washing or drying heating element power supply
15. humidity NTC temperature sensor		element
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. Stator (motor)		
20. Overheating 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		

13.4 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
4. NTC temperature sensor (washing)	K1	Relay
5. Pre-wash solenoid valve	K2	Motor relay: clockwise rotation
6. Wash solenoid valve	K3	Motor relay: anti-clockwise rotation
7. Condensation solenoid valve	K4	Motor relay: half-range power supply (some models)
8. Washing heating element (with thermal fuses)	MOTOR_TY	motor Triac
9. WD PCB	PROGRAM SELECTOR	Main switch (programme selector)
10. Safety thermostat (auto-reset)	PWELV_TY	Pre-wash solenoid Triac
11. Safety thermostat (manual reset)	WELV_TY	Wash solenoid Triac
12. Drying heating element	BEL_TY	Bleach solenoid Triac
13. Fan motor	RL1	Washing or drying heating element power supply relay
14. drying NTC temperature sensor	RL2	Fan motor power supply relay
15. humidity NTC temperature sensor	RL3	One-branch relay of drying heating element
16. Door safety interlock (instantaneous)	RL4	One-branch relay of drying heating element
17. Anti-disturbance filter		
18. Tachometric generator (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		
30. Inverter		
31. Single-phase motor		

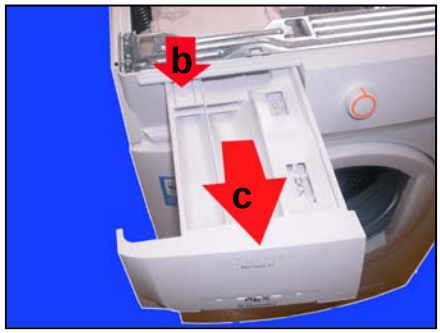
14 ACCESS TO THE WM ELECTRONIC CONTROL SYSTEM (HC cabinet)

14.1 Worktop

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

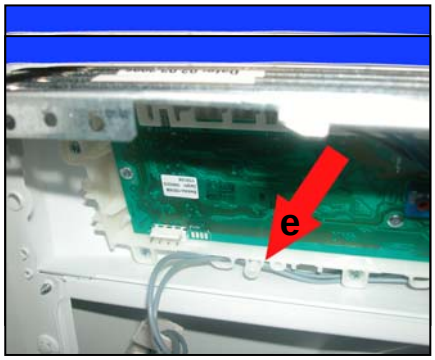
14.2 Control panel

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



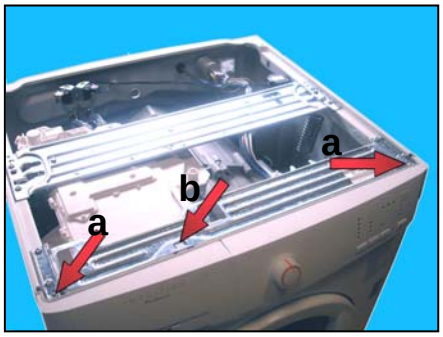
d. Remove the screw which secures the control panel to the dispenser.

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

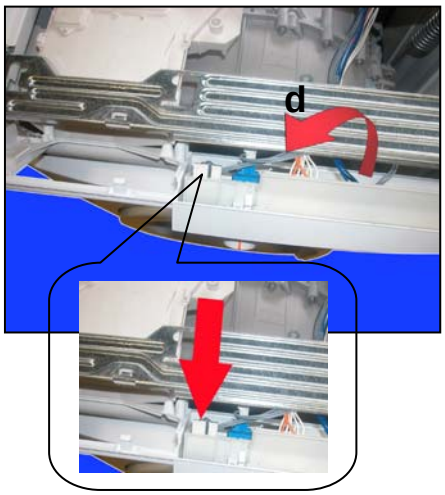


f. Release the wiring from the clamp.
g. Release the clamp from the crosspiece.
h. loosen the screws which secure the crosspiece to the cabinet.

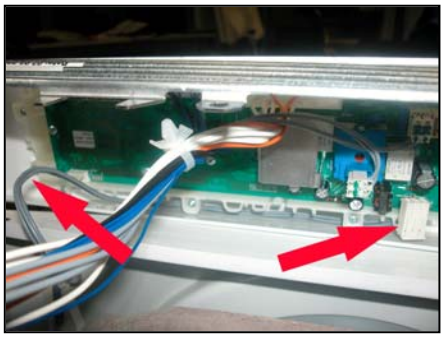
a. Loosen the screws which secure the control panel to the crosspiece.
b. Release the hook.
c. Lift the control panel up and extract it.



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



f. Arrange the wiring as shown in the figure.

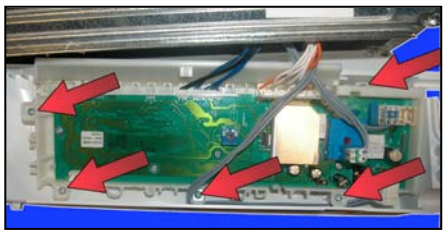


g. Extract the control panel.

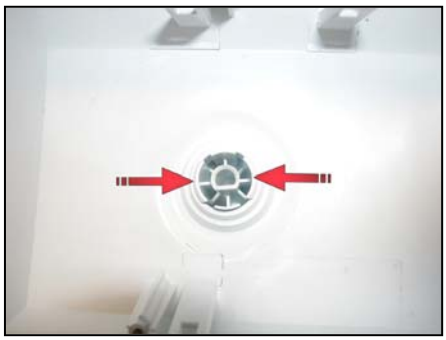
h. Rotate the control panel.

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.



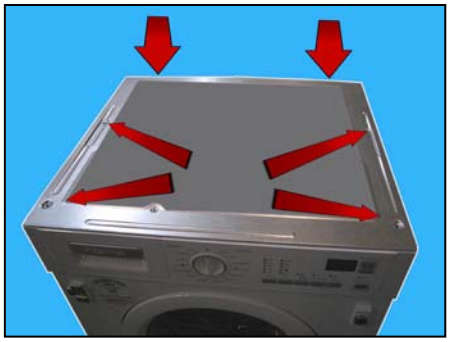
While re-assembling, repeat the same operations in the reverse order and take care to position the knob correctly.

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

15 ACCESS TO THE WM/WD ELECTRONIC CONTROL SYSTEM (NEXUS cabinet)

15.1 Worktop

a. To remove the sheet panel, unscrew the four screws situated above the top and the two rear screws.

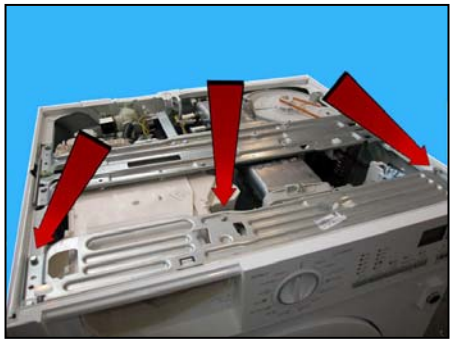


15.2 Control panel

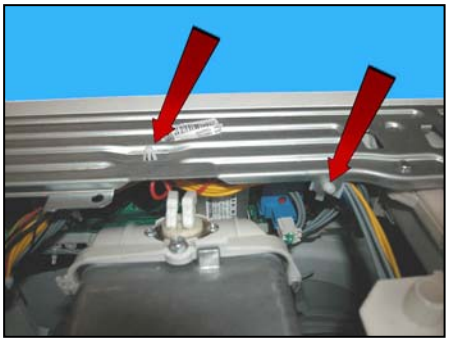
b. Extract the detergent dispenser.

c. Loosen the two screws which secure the control panel to the dispenser.

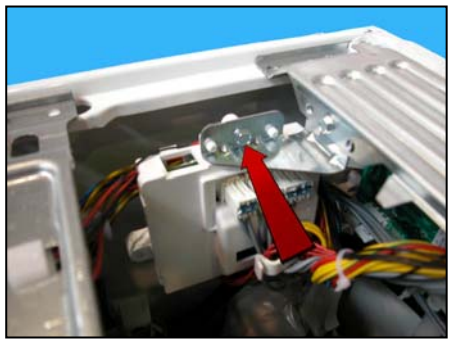
d. Loosen the three screws which secure the crosspiece to the cabinet and to the conveyor.



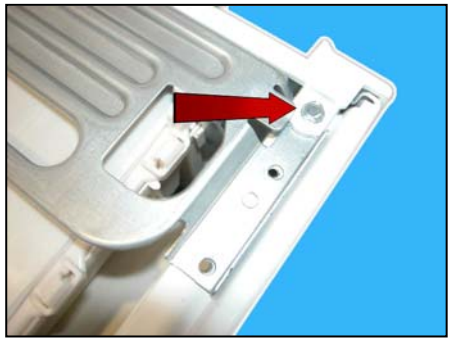
e. Release the wiring supports from the crosspiece.



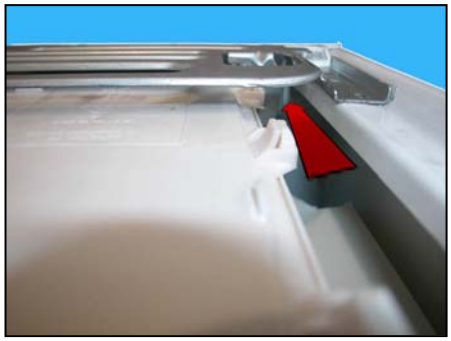
f. Loosen the screw which secures the PCB (which controls the WD section) to the bracket, extract it and position it so that it can facilitate the removal of the control panel.



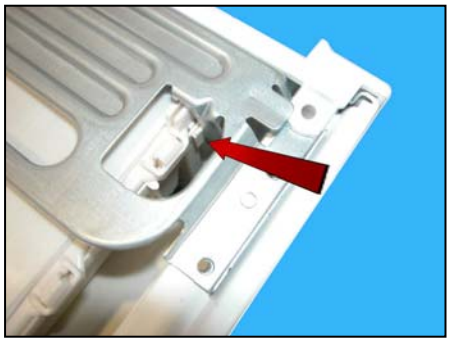
g. Loosen the two screws which secure the control panel to the crosspiece.



h. Release the hooks which secure the control panel to the cabinet, one on the right and the other on the left.

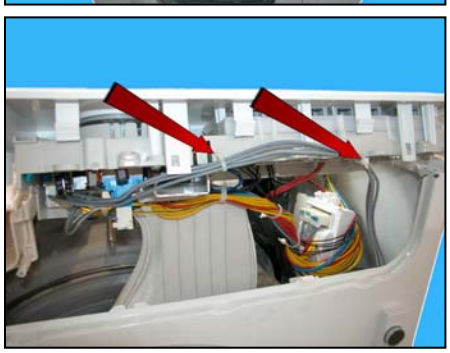


i. Release the hook which secures the crosspiece to the conveyor.

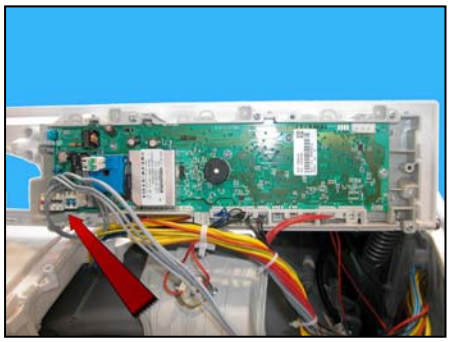


j. Extract the crosspiece from the control panel, lift up and rotate the control panel.

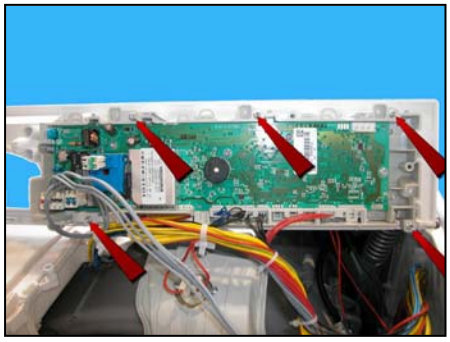
k. Cut the two clamps which secure the wiring of the microdoor.



l. Should problems arise with the wiring of the microdoor, detach the connector from the board.



m. To extract the board, remove the screws, release the hooks which secure it to the control panel.



Warning: the screws which secure the board in place could be cross head or Torx screws (T20).

While reassembling, repeat the same operations in the reverse order, replacing the old clamps with new ones.