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Washing machines

**with electronic
 control system**

EWM09312

**Technical and functional
 characteristics**

**THE
 INSPIRATION RANGE**

TC4 & TC5

INDEX

1	PURPOSE OF THIS MANUAL	5
2	WARNINGS	6
3	TC 4.....	7
3.1	General characteristics.....	7
3.2	Control panels.....	8
3.2.1	Styling.....	8
3.2.2	Display board.....	8
3.2.3	Control panel configuration.....	9
3.2.3.1	Programme selector (S1).....	9
3.2.3.2	Programme configuration.....	9
3.2.3.3	Sensor – LEDs and Display	10
3.2.3.4	Buzzer.....	14
3.3	Time manager.....	15
4	TC 5.....	16
4.1	General characteristics.....	16
4.2	Control panels.....	17
4.2.1	Styling.....	17
4.2.2	Display board.....	17
4.2.3	Control panel configuration.....	18
4.2.3.1	Programme selector (S1).....	18
4.2.3.2	Programme configuration.....	18
4.2.3.3	Sensor – LEDs and Display	18
4.2.3.4	Buzzer.....	20
5	COMPATIBILITY BETWEEN WASH PROGRAMMES AND OPTIONS.....	21
5.1	Description of options.....	22
6	DEMO MODE SETTING	24
6.1	Exiting DEMO mode.....	24
7	DIAGNOSTICS SYSTEM.....	25
7.1	Accessing diagnostics.....	25
7.2	Quitting the diagnostics system.....	25
7.3	Phases of the diagnostics test.....	26
8	ALARMS.....	28
8.1	Displaying the alarms to the user.....	28
8.1.1	Styling TC4	28
8.1.2	Styling TC5	28
8.2	Reading the alarms.....	29
8.2.1	Viewing the TC5 aesthetic alarm	30
8.2.2	Example of alarm display.....	30
8.2.3	Behaviour of the alarms during diagnostic testing	30
8.3	Rapid reading of alarms	31
8.4	Deleting the last alarm.....	31
9	ALARM SUMMARY TABLE	32
10	TECHNICAL CHARACTERISTICS.....	35
10.1	Electronic control	35
10.1.1	Programming/Updating the main circuit board	36
10.2	Washing unit.....	37
10.3	Welded tub assembly.....	38
10.4	Detergent dispenser	39
10.5	Detergent drawer	40
11	ELECTRICAL COMPONENTS.....	41
11.1	Noise filter.....	41
11.2	Display board.....	41
11.3	Drain pump	42
11.3.1	General characteristics.....	42
11.4	Heating element.....	43
11.4.1	General characteristics.....	43
11.5	Temperature probe	44
11.5.1	General characteristics.....	44
11.6	Voltmetric door safety device with PTC.....	45
11.6.1	General characteristics.....	45
11.7	Motor	46
11.7.1	General characteristics.....	46
11.7.2	Operating principle	46

11.7.2.1	Motor speed control	46
11.7.2.2	Direction of rotation of the motor	47
11.7.2.3	Tachometric generator	47
11.7.3	Power supply to motor	48
11.7.4	Anti-foam control system	48
11.8	Solenoid valves	49
11.8.1	General characteristics	49
11.9	Tub water level control analogue pressure switch	50
11.9.1	General characteristics	50
12	MAIN ELECTRICAL CIRCUIT DIAGRAM	51
12.1	Diagram	51
12.2	Key to diagram	52
13	ACCESSIBILITY	53
13.1	Worktop	53
13.2	From the worktop, it is possible to access:	53
13.2.1	Main board	53
13.2.2	Solenoid	54
13.2.3	Control panel	54
13.2.4	Display board assembly	56
13.2.5	Analogue pressure switch	57
13.2.6	Detergent dispenser	57
13.2.7	Top counterweight	59
13.3	Accessing the front part	60
13.3.1	Door safety device (with incorporated flange)	60
13.3.2	Door safety interlock (without incorporated flange)	61
13.3.3	Door	62
13.3.4	Drain filter	62
13.3.5	Fixed Blade	64
13.3.6	Opening blade	66
13.3.6.1	Replacing the blade by removing the counterweight	66
13.3.6.2	Replacing the blade without removing the counterweight	67
13.3.7	Door bellows seal	68
13.3.8	Front panel	69
13.4	From the front panel, you can access	69
13.4.1	Front counterweight	69
13.4.2	Welded tub assembly	70
13.4.3	Pressure chamber	70
13.4.4	Shock absorbers	71
13.4.5	Shock absorber pin	71
13.4.6	Tub suspension springs	71
13.5	Back panel	72
13.6	From the back panel, you can access	72
13.6.1	Belt	73
13.6.2	Plastic pulley	73
13.6.3	Motor	73
13.6.4	Drain pump	74
13.6.5	Heating element	74
13.6.6	Drain pipe	74

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 EWM09312 (TC4&TC5) electronic control systems.

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

The current electronic appliances manufactured (EWM09312 platform) use a heating element with thermal fuses (inside its branches) for safety, which interrupt in case of temperature overload caused by the water level dropping below the minimum level permitted.

The incorporated NTC probe contacts have a 2.5 mm pitch.

The manual deals with the following topics:

- General characteristics
- Control panel and compatibility between washing programmes and options
- Settings: Demo, Diagnostics
- Alarms
- Technical and functional characteristics
- Accessibility

Please note:

The selector on this platform is not fitted with an ON/OFF switch; to cut off the power supply to the appliance, the plug must be removed from the power socket.

Low consumption mode

In order to minimise electricity wastage when the cycle is not under way, appliances in this platform offer two ways of enabling a low consumption mode:

- Stand-By
- Stand-Off

Stand-By – triggered after five minutes, during programme selection (after the washing machine not receiving any commands from the sensors or the selector dial) and at the end of the wash cycle. All LEDs are turned off (the Display, too, where featured), with the exception of the yellow LED on the START/PAUSE sensor, which flashes at a very low frequency to signal that the appliance is powered, but is in a low power consumption mode. The appliance exits Stand-By mode when any of the sensors are pressed or the knob is turned. The control panel lights up and displays the status of the appliance (last programme selected or end of programme) before Stand-By mode was entered.

Stand-Off – The appliance is in “Stand - Off” (virtual off) status when the selector dial is set to “OFF” or “0” (zero). Indeed this position leads to the cancelling of any programme that might have been selected, the LEDs being turned off, along with the Display, where featured. While the main board and the components upstream of the door safety interlock remain powered.

The plug must be removed from the mains socket to cut the power to the appliance.

To ensure the appliance is always **safe to operate**, even when you turn the selector dial to the OFF position (to cancel a programme in progress), with a high water level and the motor in motion, this will only translate to the user interface (control panel) being turned off, while the main board remains powered to keep the door safety interlock locked until the safety conditions are achieved.

2 WARNINGS



- **Any work on electrical appliances must only be carried out by qualified personnel.**
- **Before servicing an appliance, check the efficiency of the electrical system in the home using appropriate instruments. For instance, please refer to the instructions provided/illustrated in the Electrolux Learning Gateway portal (<http://electrolux.edvantage.net>).**

When the work is finished check that the equipment's safety conditions have been reinstated, as though it were straight off the assembly line.
- **If the circuit board has to be handled/replaced, use kit ESD (Cod. 405 50 63-95/4) to avoid static electricity from damaging the circuit board, see S.B. No. 599 72 08-09 or consult the course "Electrostatic charges" at the address (<http://electrolux.edvantage.net>) on the Electrolux Learning Gateway portal.**
- **This platform is not fitted with an ON/OFF switch. Before you access internal components, take the plug out of the socket to cut the power supply.**
- **Make resistance measurements, rather than direct voltage and current measurements**
- **Warning the sensors located on the display board could be at a potential of 220 Volts.**
- **When replacing the heating element, replace it with one that has the same characteristics (2 thermal fuses) in order not to compromise the safety of the appliance. Do not remove/switch the NTC sensors between heating elements.**
- **Always empty the appliance of all the water before laying it on its side.**
- **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/electronic components and cause these to burn.**
- **When replacing components, please refer to the code shown in the list of spare parts relating to the appliance.**

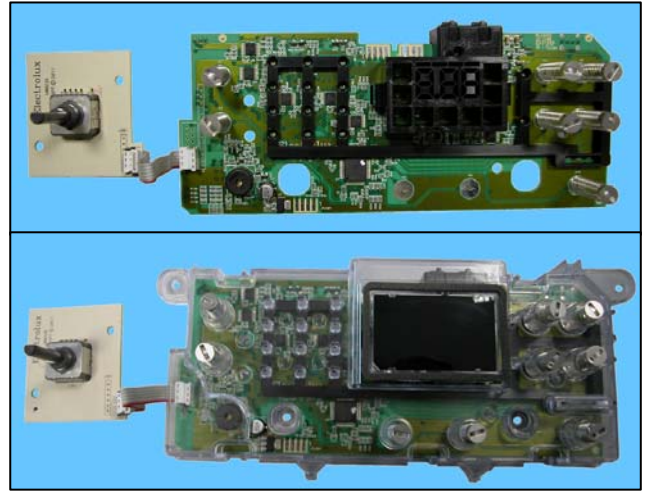


3 TC 4

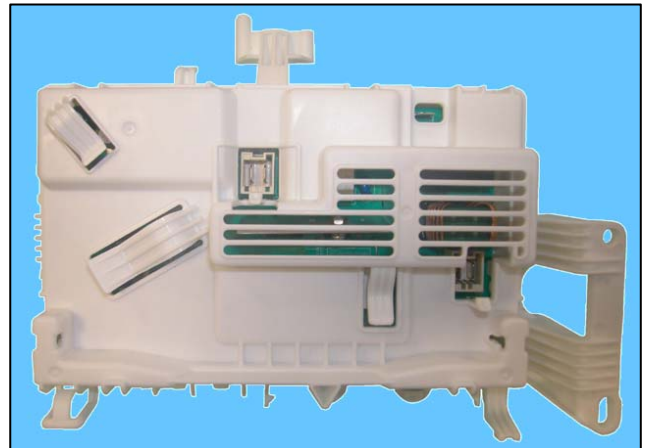
3.1 General characteristics

The EWM09312 electronic control system consists of two circuit boards.

- ↪ The control/display circuit board, inserted in a plastic box, secured to the control panel (the figure illustrates: the display circuit board with the side support plate onto which the selector is secured, connected to one another by a flat cable and the display circuit board assembly).



- ↪ Main board, positioned at the rear of the appliance. It powers the electrical components and receives commands from the display board.

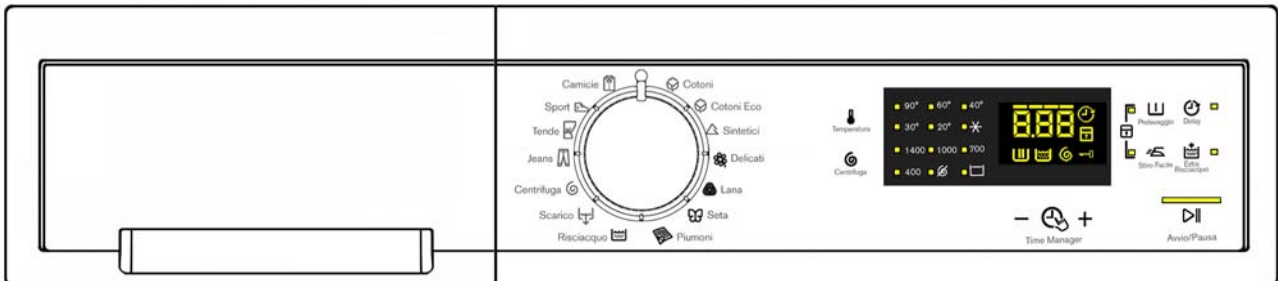


No. of touch-sensitive keys	<ul style="list-style-type: none"> ▪ Maximum 9 (8 options + start/pause)
No. LEDs	<ul style="list-style-type: none"> • Maximum 27 yellow + 1 red LED + Digit (made up of 22 LEDs)
Programme selector	<ul style="list-style-type: none"> ▪ 15 positions (incorporated in the circuit board)
Power supply voltage	<ul style="list-style-type: none"> ▪ 220/240 V ▪ 50/60 Hz (configurable)
Washing type	<ul style="list-style-type: none"> ▪ Traditional with "Eco-ball"
Rinsing system	<ul style="list-style-type: none"> ▪ Traditional with "Eco-ball"
Motor	<ul style="list-style-type: none"> ▪ Collector, with tachometric generator (Universal)
spin speed	<ul style="list-style-type: none"> ▪ 1,000 ÷ 1,600 rpm
Anti-unbalancing system	<ul style="list-style-type: none"> ▪ AGS
Cold water fill	<ul style="list-style-type: none"> ▪ 1 solenoid valve with 1 inlet – 2 outlets
Detergent dispenser	<ul style="list-style-type: none"> ▪ 2 compartments: wash, conditioners
Control of water level in the tub	<ul style="list-style-type: none"> ▪ Electronic/analogue pressure switch
Door safety interlock	<ul style="list-style-type: none"> ▪ Traditional (with PTC)
Heating element heat output	<ul style="list-style-type: none"> ▪ 1,750 W with thermal fuses incorporated
Temperature check	<ul style="list-style-type: none"> ▪ NTC probe incorporated in the heating element
Buzzer	<ul style="list-style-type: none"> ▪ Traditional incorporated in the PCB

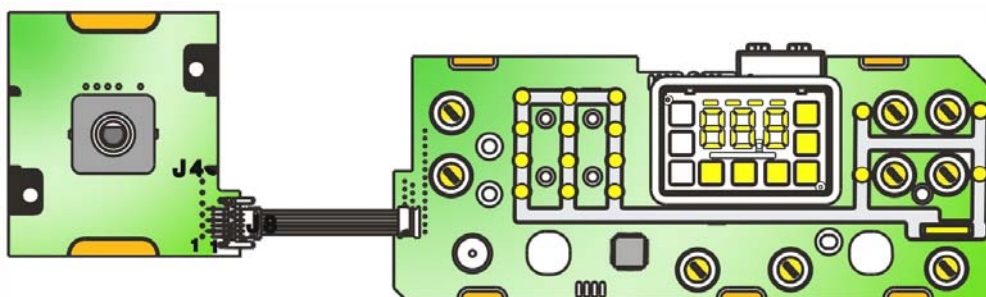
3.2 Control panels

3.2.1 Styling

- Max. 9 touch push buttons
- 15 position programme selector
- 27 yellow LEDs + 1 red LED
- Digits made up of 22 LEDs

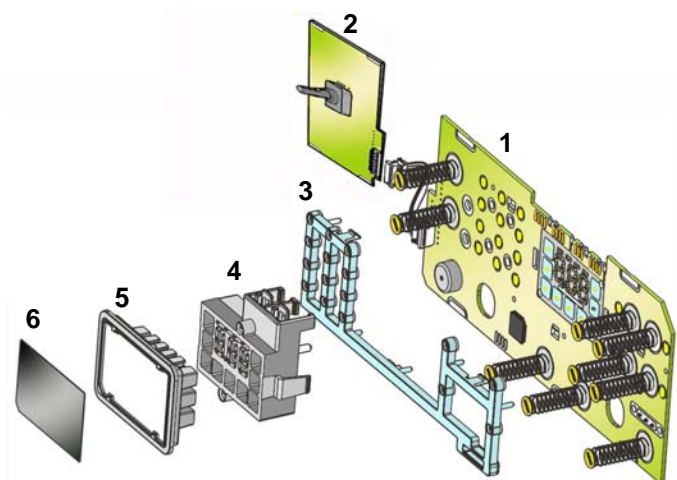


3.2.2 Display board

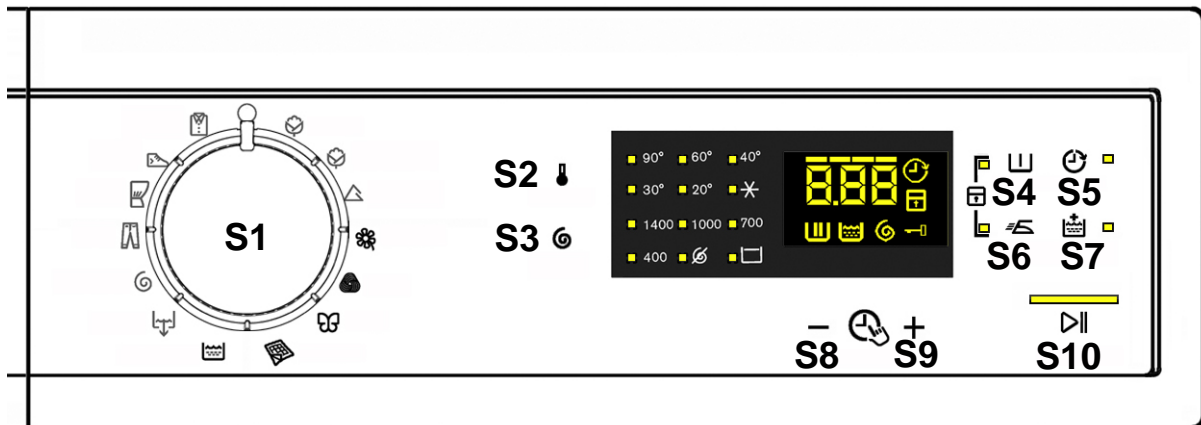


- Display board assembly, exploded view

1. Display board
2. Selector card with knob
3. Light divider
4. Digits light conveyor
5. Digits light diffuser
6. Silk-screen printed digital filter



3.2.3 Control panel configuration



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

3.2.3.1 Programme selector (S1)

The knob has 15 non configurable positions.

There is no ON/OFF switch.

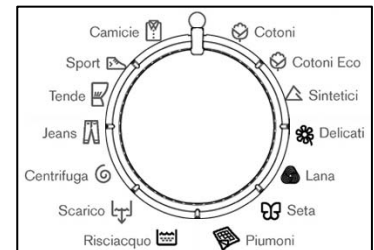
The 0 (zero) position is reserved for resetting the programme that is running and turn off all the LEDs on the display board.

The plug must be removed from the mains socket to cut the power to the appliance.

The various positions of the selector may be configured in order to perform the various washing programmes (e.g. water level, drum movement, No. of rinses and the washing temperature to be selected according to the type of laundry).

The selector can be turned both clockwise and anti-clockwise.

For each programme, the compatible options and other parameters are defined. The programme temperature is selected using the relevant sensor.



3.2.3.2 Programme configuration

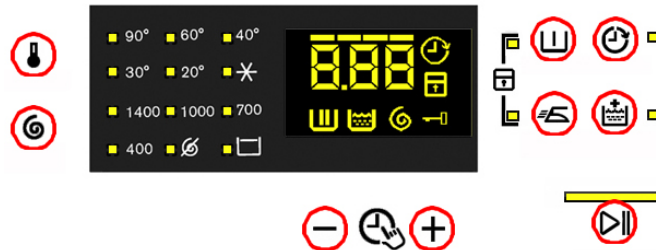
The table below lists the parameters that can be used to define the washing programmes.

Types of fabric	Cotton/linen, Synthetic fabrics, Delicates, Wool, Hand-wash, Shoes, Jeans, Duvet, Silk.
Special programmes	Cotton/linen + pre-wash, Soak, Miniprogramme, Easy-Iron, Conditioner, Rinse, Drain, Spin, Economy.
Temperature	Normal, Minimum, Maximum: the initial temperature is the one proposed for the washing programme.
Spin	Normal, Minimum, Maximum.
Options (Normal/Possible)	Rinse Hold, Pre-wash, Extra rinse, Easy-Iron, Economy (energy label), Normal, Super quick, Reduced spin speed, No spin.
Programme phases	Pre-wash, Wash, Rinses, Spin, Delayed start.

3.2.3.3 Sensor – LEDs and Display

The function of each touch sensor is defined via the configuration of the appliance (the data and images are for guidance only).

The touch sensors are positioned under the silk-screen printed symbols on the control panel (circled here in red).



A light touch on the centre of the symbol is enough to activate/deactivate the function linked to the sensor with the switching on/off of the relative LED confirming that the enabling/disabling has taken place.

Simultaneously to the enabling/disabling of the options, the cycle duration time is updated via the digits.

You need to keep your finger pressed down for a longer period of time with the Start/Pause sensor to confirm both the cycle's start and pause, in order to avoid unwanted starts or accidental pauses.

Everytime you touch a sensor, you need to lift your finger up by a centimeter and half a second needs to elapse before touching it again, otherwise the electronic system does not recognise that the sensor has been touched for a second time.

The sensors used for adjusting the: Temperature, Spin, delayed Start and Time Manager have a continued variation of values as long as your finger is in contact with the sensor.

🔧 **Sensor no. 2: TEMPERATURE** (configurable)

The temperature is always associated with the first sensor, in combination with the six LEDs located in the top left hand corner of the display.

The initial temperature displayed is that set for the chosen programme. By touching the sensor you can lower the temperature. Once this has been reached the selection starts again from the highest available one for the selected programme.

The selected temperature is shown by turning on the LEDs near the silk-screen printed value on the control panel.



The temperatures available (displayed in °C) are: **90°C, 60°C, 40°C, 30°C, 20°C cold cycle.**

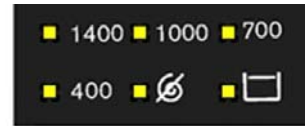
The cold cycle is indicated by the symbol .

The initial temperature set for each programme is configurable.


The temperature of 50°C is not envisaged.

↩ **Sensor no. 3: SPIN SPEED** (configurable)

The spin speed is always associated with the second sensor, in combination with the six LEDs located in the bottom left hand corner of the display.



The initial spin speed displayed is that set for the chosen programme.

Touching the sensor you can reduce the spin speed, indicated by the LED near the silk-screen printed value on the control panel coming on. Once the lowest speed has been reached you can, if you wish, select “No spin”, “Stop water in tub” lighting up the relative symbol , or “Night cycle” (if compatible with the selected programme).

The next selection will be the highest speed available for the selected programme.

The speeds that can be combined with the six LEDs are shown in the following table.

Max spin speed (rpm)	800	1,000	1,000	1,200	1,200÷1,400	1,200÷1,400	1,400-1,600	1,400-1,600	1,400-1,600	1,400-1,600
Intermediate	600	800	800	800	1,000	1,000	1,200	1,200	1,200	1,200
Intermediate	400	400	600	400	800	800	800	800	1,000	1,000
Intermediate	No speed	No speed	400	No speed	400	400	400	400	800	800
Intermediate	Rinse hold	Rinse hold	No speed	Rinse hold	Rinse hold	No speed	Rinse hold	No speed	Rinse hold	No speed
Last selection	Night Cycle	Night Cycle	Rinse hold	Night Cycle	Night Cycle	Rinse hold	Night Cycle	Rinse hold	Night Cycle	Rinse hold

↩ **Sensor no. 4-5-6-7** (configurable)

Each of the sensors located on the right hand side of the display can be combined with a LED and are used to choose one of the following four selected options:

- ↩ Delayed start
- ↩ Extra-rinse
- ↩ Easy Iron
- ↩ Pre-wash



Depending on the option/choices, the programme duration time is updated (via the three digits).

↩ **Sensor no. 8-9**

These two sensors are positioned under the display and act as:

- ↩ Time manager

Allowing the end user to lengthen or shorten the washing cycle duration, this adjustment should be done after setting the temperature value and the spin speed.

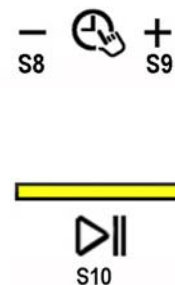


• **Sensor no. 10**

This sensor has the START/PAUSE function, used to start up a washing programme, after selecting the washing cycle and required options; it can also pause a cycle that has already started: to allow you to change selected option or open the door (if the temperature conditions or water level allow for this).

The cycle re-starts if you touch the sensor again.

The LED combined with this sensor flashes slowly: in the selection phase, during the pause and at the end of a cycle with water in the tub. It stays lit when a cycle is running and turns off when the cycle has ended and the door is unlocked.



While other sensors when touched immediately change from selected to de-selected, in the case of this sensor, more time is needed to avoid unwanted cycle start ups or pauses.

Display

The display is produced by a black film with transparent, silk-screen printed symbols, that are lit by yellow LEDs when activated.



The display shows the following information.

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



↖ - **End of the programme** is indicated by a **permanently lit zero** (when the door can be opened).




↖ - **Appliance stopped with water in the tub**, after programmes with the RINSE HOLD option. This is displayed by a **permanently lit zero**. The symbol indicating the door remains on and the LED of the START/PAUSE sensor is turned off. The washing machine continues to operate, rotating the drum once every 2 minutes.

↖ - **Delayed start:** selected using the relative sensor, every time the delayed time is pressed, it increases and is simultaneously shown on the display. Up to 90 minutes the increases are of 30 minutes (↖ 30 mins ↖ 60 mins ↖ 90 mins) From 2 - 20 hours the increases are of 1 hour (2hrs. ↖ 3hrs... ↖ 20hrs. ↖ 0hrs.). In order to reset the delay time, reach the maximum delay time (20 hours) and the next time the sensor is pressed the delay time is cancelled.



Once the delay time has been set, after 3" of no sensor being touched, the display will once again show the programme's duration time. Press the sensor once to view the set delay time. After starting the cycle the display shows the delay time count down.

The icon  and the LED near the silk-screen printed symbol stay on, for the entire selection and delay phase, to show that the function is active.

During the last hour, the time decreases minute by minute

To cancel the delayed start time, after the cycle has started, pause the washing machine using the related sensor and cancel the option.

↖ - **Padlock:** when lit, it indicates that all the sensors are disabled to prevent children from altering, starting or pausing the cycle. To disable this function, a sensor combination needs to be pressed, which can be printed on the control panel or described in the instruction manual.



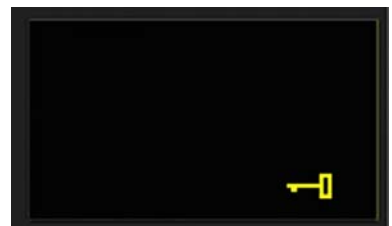
- ↖ - **Incorrect choice:**
displayed by the message “Err”, when a function that is not compatible with the chosen programme is selected. The display duration is two seconds.



- ↖ - **Alarm code:**
Alarm code indicates an error in the appliance operation; the START/PAUSE sensor flashes when the code is displayed.



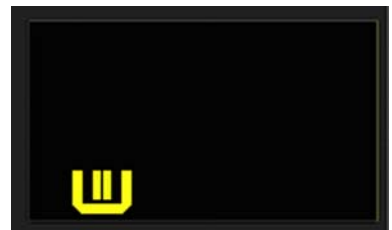
- ↖ - **Door closed:**
It lights up when the safety device prevents the door opening and switches off when it can be opened.
It flashes when the device is about to unlock the door (it should be noted with PTC delaying devices, which need one or two minutes to open).



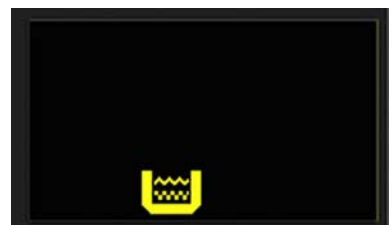
- ↖ - **Time manager:**
Represented by four segments positioned above the digits. (See par. 3.3 page 15)



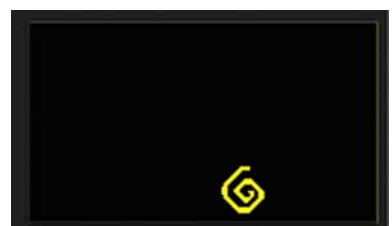
- ↖ - **Wash phase:**
It lights up during the washing phase.



- ↖ - **Rinse phase:**
It lights up during the rinse phase.



- ↖ - **Spin phase:**
It lights up during the drainage phase before and during the final spin.



3.2.3.4 Buzzer

This comprises a multi-tone buzzer and sounds in the following cases:

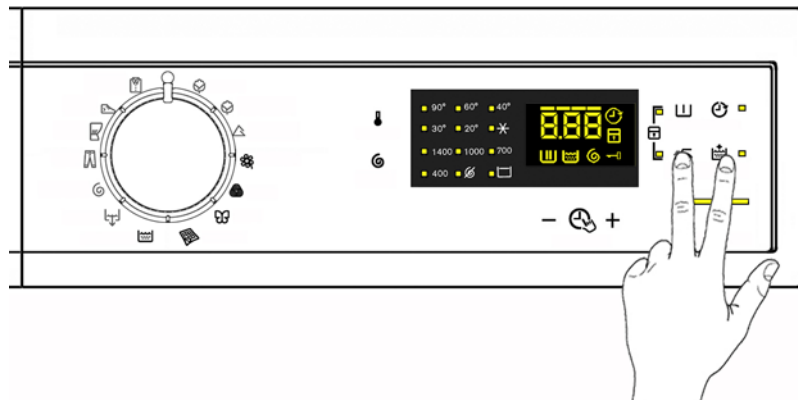
- When the appliance is turned on and off, it plays two different musical tunes.
- When a sensor is pressed it emits a short “**Click**”
- When the cycle ends this is indicated by a special sequence of “**three long beeps**” repeated at intervals of 15” for a total of 2 minutes. The sequence can only be stopped by opening the door in appliances where the instant door safety device with micro-switch is fitted.
- In the event of a malfunction in the machine this is indicated by a special sequence of “**three short beeps**” repeated 3 times at intervals of 15” for a total of 5 minutes.

All appliances are fitted with the buzzer, and leave the factory with the option enabled. To disable it use the combination of sensors.

The volume has a factory setting which cannot be adjusted by the user.

When the buzzer is disabled (using the combination of sensors) it only emits the short “**Click**” and the sequence of “**three short beeps**” when an alarm is triggered.

During the programme selection phase, the buzzer can be enabled/disabled with a sensor combination (which may be silk-screen printed on the control panel or described in the instruction manual), but the alarm signalling remains enabled.



To enable it, touch the sensors simultaneously for 3 seconds. A short beep will confirm that it has been enabled, whereas two short beeps will confirm that it has been disabled.

3.3 Time manager

The time manager is an option available in programmes for Cotton, Synthetics, Delicates and Jeans.

During the selection of the washing cycle, four segments above the digits light up which show that the programme manages the “Time Manager” option.

The final user can reduce the three level washing cycle duration, simultaneously with each selection: the display updates the washing cycle time and turns off a segment.

When a programme with “Time manager” is selected the four segments light up that correspond to the maximum duration time of the selected programme.

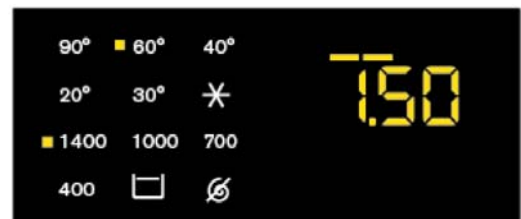
Touching the sensor with the “+” sign there is no variation. The four segments stay lit and the time shown by the digits does not vary.



Touching the sensor with the “-” sign once, one segment turns off and simultaneously the washing time shown by the digits decreases.



Touching the sensor with the “-” sign twice, two segments turn off and simultaneously the washing time shown by the digits decreases further.



Touching the sensor with the “-” sign three times, three segments turn off and simultaneously the washing time shown by the digits decreases further. Only one segment that indicates the minimum level of the “Time manager” is still lit.



Continuing to touch the sensor with the “-” sign no other segment turns off and the time does not decrease any further.

Once the minimum level has been reached to obtain a variation, you need to touch the sensor with the “+” sign. An increase in time shown by the digits will be obtained with the respective increase in the number of segments lit, until they are all lit and the maximum time shown will be that of the programme.

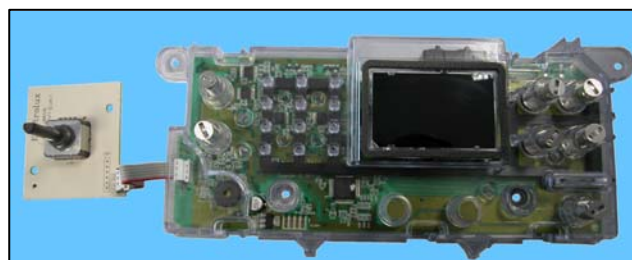
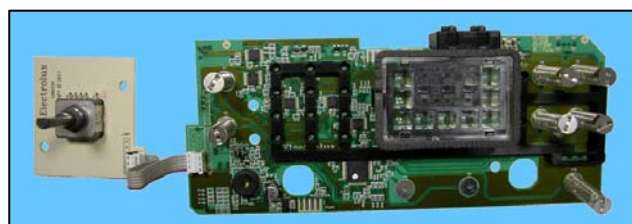
There is no “Time manager” in the “Cotton Eco” programme, however the segments are lit. By pressing the “Time manager” sensor once to reduce the time two segments are deselected.

4 TC 5

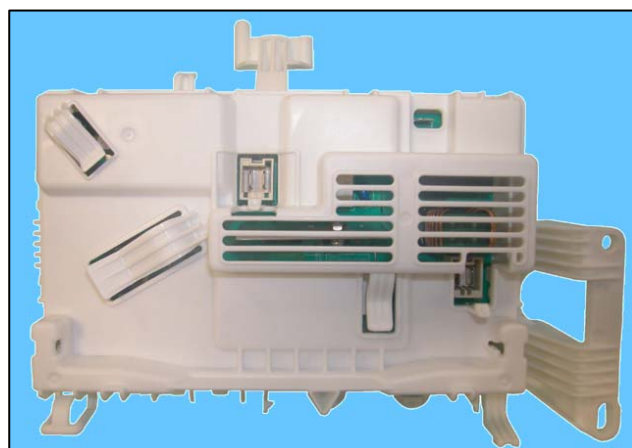
4.1 General characteristics

The EWM09312 electronic control system consists of two circuit boards.

↪ The control/display circuit board, inserted in a plastic box, secured to the control panel (the figure illustrates: the display circuit board with the side support plate onto which the selector is secured, connected to one another by a flat cable and the display circuit board assembly).

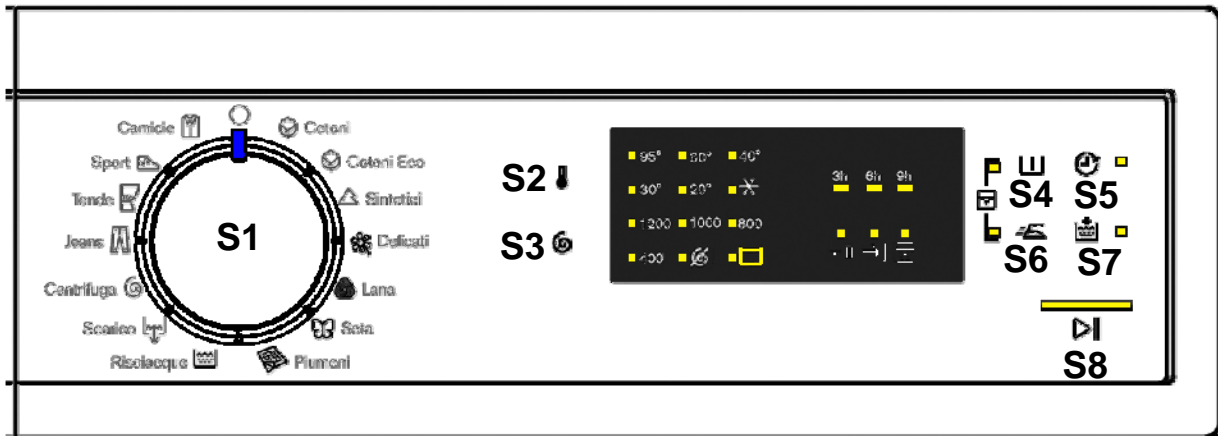


↪ Main board, positioned at the rear of the appliance. It powers the electrical components and receives commands from the display board.



No. of touch-sensitive keys	▪ Maximum 7 (6 options + 1 start/pause)
No. LEDs	▪ Maximum 23 yellows + 1 red
Programme selector	▪ 15 positions (incorporated in the circuit board)
Power supply voltage	▪ 220/240 V ▪ 50/60 Hz (configurable)
Washing type	▪ Traditional with "Eco-ball"
Rinsing system	▪ Traditional with "Eco-ball"
Motor	▪ Collector, with tachometric generator (Universal)
spin speed	▪ 800 ÷ 1,600 rpm
Anti-unbalancing system	▪ AGS
Cold water fill	▪ 1 solenoid valve with 1 inlet – 2 outlets
Detergent dispenser	▪ 2 compartments: wash, conditioners
Control of water level in the tub	▪ Electronic/analogue pressure switch
Door safety interlock	▪ Traditional (with PTC)
Heating element heat output	▪ 1,750 W with thermal fuses incorporated
Temperature check	▪ NTC probe incorporated in the heating element
Buzzer	▪ Traditional incorporated in the PCB

4.2.3 Control panel configuration



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

4.2.3.1 Programme selector (S1)

See sect. 3.2.3.1 page 9

4.2.3.2 Programme configuration

See sect. 3.2.3.2 page 9

4.2.3.3 Sensor – LEDs and Display

The function of each touch sensor is defined via the configuration of the appliance (the data and images are for guidance only).

The touch sensors are positioned under the silk-screen printed symbols on the control panel (circled here in red)



A light touch on the centre of the symbol is enough to activate/deactivate the function linked to the sensor with the switching on/off of the relative LED confirming that the enabling/disabling has taken place.

At the same time as the enabling/disabling, the cycle duration time is updated via the digits.

You need to keep your finger pressed down for a longer period of time with the Start/Pause sensor to confirm both the cycle's start and pause, in order to avoid unwanted starts or accidental pauses.

Each time you touch a sensor, you need to lift your finger up by a centimetre and wait for half a second before touching it again, otherwise the electronic system does not recognise that the sensor has been touched for a second time.

The sensors used for adjusting the Temperature, Spin and Delayed Start settings have a continued variation of values as long as your finger is in contact with the sensor.

↩ **Sensor no. 2:** TEMPERATURE (configurable)

See sect. 3.2.3.3 page 10

↩ **Sensor no. 3:** SPIN SPEED (configurable)

See sect. 3.2.3.3 page 11

↩ **Sensor no. 4-5-6-7** (configurable)

See sect. 3.2.3.3 page 11

↩ **Sensor no. 8**

The function of this sensor is to START/PAUSE.

Touching this sensor starts a washing cycle, or can pause a washing cycle already under way (there are two LEDs inside:

→ a **yellow** one which flashes when the appliance is in set-up, pause; it stays on when the cycle is under way and turns off when the cycle has ended;

→ a **red** one that flashes (150 ms off, 150 ms on) in the event of an alarm or incorrect selection, such as: an incompatible option, an incorrect temperature for the chosen programme or the rotation of the programme selector dial or the selection of an option while a washing cycle is under way.



Display

The display is made with a black film (with transparent symbols), positioned above the yellow LEDs that allow light to filter through when they are activated with the display of the selected option symbol.



The display shows the following information.

↩ - **The end of the programme**

The symbol lights up when the washing cycle ends and you can open the door.

↩ - **Delayed start**

During the selection phase with the relative sensor, you can choose three possible delayed starts:

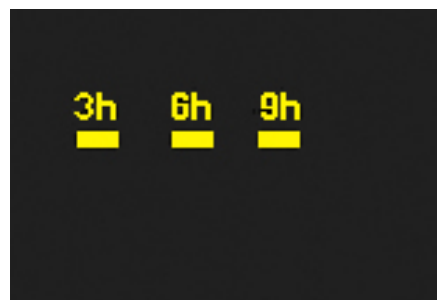
3hrs-6hrs-9hrs

After start up the LEDs only stay on for the time period dedicated to them:

LED **3hrs** stays on for the last 3hrs, before the washing cycle starts

LED **6hrs** stays on for the period between 6hrs and 3hrs

LED **9hrs** stays on for the period between 9hrs and 6hrs



↩ - **Padlock:**

See sect. 3.2.3.3 page 12



↩ - **Door closed**

See sect. 3.2.3.3 page 13



4.2.3.4 Buzzer

See sect. 3.2.3.4 page14

5 COMPATIBILITY BETWEEN WASH PROGRAMMES AND OPTIONS

		Rinse hold	Night cycle	Pre-wash/Soak (*)	Stains	Super rinse	Easy-iron	Economy	TM 8 (Intensive)	TM 6 (Daily)	TM 4 (Quick)	TM 2	Aquasol	Max steam	Medium steam	Minimum steam	
Compatibility with OPTIONS	Rinse hold			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/Soak (*)	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	
	Super rinse	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	
	Economy	X	X	X	X	X	X		X					X	X	X	
	TM 8 (Intensive)	X	X	X	X	X	X	X						X	X	X	X
	TM 6 (Daily)	X	X	X	X	X	X							X	X	X	X
	TM 4 (Quick)	X	X	X	X	X	X							X	X	X	X
	TM 2	X	X	X	X	X	X							X	X	X	X
	Aquasol	X	X	X	X	X	X	X	X	X	X	X					
	Max steam	X	X	X	X	X	X	X	X	X	X	X					
	Medium steam	X	X	X	X	X	X	X	X	X	X	X					
Minimum steam	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	
	Pre-wash	X	X			X	X						X	X	X	X	
	Wash	X	X			X	X						X	X	X	X	
	Rinses	X															
	Spin																

(*) Pre-wash and Soak exclude each other.

Pre-wash+Stains and Soak+Stains 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/Extra Silent.

5.1 Description of options

- **Rinse hold**

- During the cycle the intermediate rinses and spins are performed.
- Stops the appliance with water in the tub before the final spin cycle.
- To drain the water, simply touch the START/PAUSE sensor to run the drain and spin cycles.

- **Night cycle**

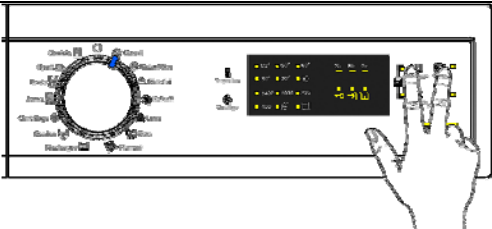
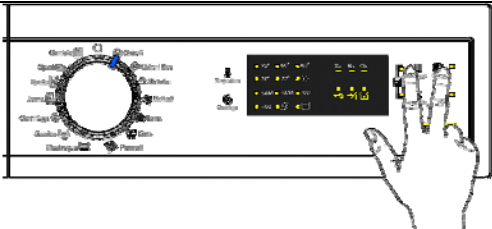
- Eliminates all spin phases and adds **three** rinses in COTTON cycles and **two** rinses in SYNTHETIC FABRICS cycles
- Stops the appliance with water in the tub before the final spin cycle.
- Eliminates the buzzer (if configured).
- To drain the water, reset the programme and then select a drain or 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 SYNTHETICS cycles, performs a short spin before passing on to the washing phase.
- This option cannot be selected for WOOL and HAND WASH cycles.

- **Super rinse**

- Adds **two** rinses to the COTTONS cycles, adds **one** rinse to the SYNTHETICS - DELICATES cycles
- Eliminates the spin at the end of washing.

COMBINATION OF SENSORS FOR THE EXTRA RINSE ACTIVATION /DEACTIVATION	
The appliances that include the SUPER RINSE option combined with a sensor, can even activate/deactivate later cycles with a combination of sensors.	
TC 4	TC 5
	
During the selection stage, to activate: simultaneously touch the two sensors for a few seconds, as shown in the figure until the relative LED comes on. To deactivate it, touch the same combination until the LED turns off.	

- **No spin**

- It eliminates all the spin phases.
- It adds three rinses to the COTTON CYCLE and one to the SYNTHETIC FABRICS cycle.

- **Easy-iron**

- In COTTON programmes:
 - adds **three** rinse cycles
 - eliminates intermediate spin cycles
 - performs a pulse spin phase before the final spin
 - adds an “untangling” phase after the spin cycle
- In SYNTHETIC FABRICS programmes:
 - it reduces the heating temperature in 50/60°C cycles to 40°C
 - increases the wash time
 - prolongs the cooling phase at the end of the wash phase
 - adds **one** rinse cycle
 - adds an “untangling” phase after the pulse spin cycle
- It limits spin speed to 1000 rpm if the appliance can reach a higher speed.

- **Economy/Energy label**
 - Modifies the structure of the COTTON 40÷90 - SYNTHETIC FABRICS 50/60 programmes to reduce energy consumption, guaranteeing washing performance levels.
 - Reduces the washing temperature.
 - Increases the duration of the wash phase.

- **Super quick**
 - Can only be started with the T5 aesthetic where there is no Time manager (corresponding with the second level of Time manager).
 - Modifies the structure of the wash phase of the COTTON - SYNTHETIC FABRICS - DELICATES cycles by half a load.

- **Delayed start**
 - Adds a pause before the start of the programme. The delay time is displayed on the corresponding LEDs or on the Display (see page 12 or page 19 to respectively view with Display or LEDs).
 - To start the cycle immediately after the countdown to the delayed start has already begun: press the Start/Pause sensor, cancel the delay time by touching the relevant sensor, then press the Start/Pause sensor again.

6 DEMO MODE SETTING



A special cycle allows demonstration of the operation of these appliances in shops, in a user interactive manner, without connecting them to the water mains:

- ◆ interactive mode consists of selecting one of the programmes, adding any options and, after touching the START/PAUSE sensor, the appliance will only perform some of the programme phases, skipping those that cannot be performed (water fill, drain, heating).

The cycle takes place as follows:

- ↖ the door lock is enabled as usual (door locked during operation, possibility of opening it at the end of the cycle or when paused).
- ↖ Motor: all low speed movements are enabled, the pulses and spin are disabled.
- ↖ the water fill solenoid valves and the drain pump are disabled.
- ↖ Display: displays all the phases of the programme very quickly.
- ↖ Alarms: for safety reasons, the E40 (door closed), E50 (motor) and E90 (communication between boards/configuration) families of alarms are enabled.

The operations listed below must be carried out within 7 seconds.

TC4	TC5
	
<ol style="list-style-type: none"> 1. Set the selector dial to position 0 (zero). 2. Rotate the programme selector three positions clockwise 3. Simultaneously press the START/PAUSE button and the nearest sensor option (as shown in the diagram). 4. Keep your finger above the sensors until the flashing text "DEM" appears on the screen. 	<ol style="list-style-type: none"> 1. Set the selector dial to position 0 (zero). 2. Rotate the programme selector three positions clockwise 3. Simultaneously press the START/PAUSE button and the nearest sensor option (as shown in the diagram). 4. Keep your finger above the sensors until the LEDs start flashing, with the exception of the Start/Pause LED.



6.1 Exiting DEMO mode

Unplug the appliance from the mains socket.

7 DIAGNOSTICS SYSTEM

7.1 Accessing diagnostics

The operations listed below must be carried out within 7 seconds.

TC4	TC5
	
<ol style="list-style-type: none">1. Set the selector dial to position 0 (zero).2. Rotate the programme selector one position clockwise.3. Simultaneously press the START/PAUSE button and the nearest sensor option (as shown in the diagram).4. Keep your fingers above the sensors until the LEDs and display symbols start flashing. <p>In the first position, the operation of the buttons and the related LEDs is checked; turning the programme selector dial clockwise runs the diagnostic cycle for the operation of the various components and reads any alarms.</p>	

7.2 Quitting the diagnostics system





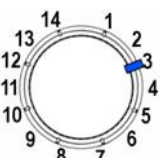

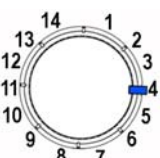

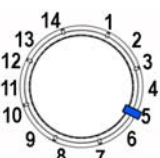



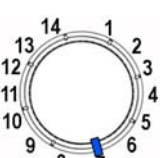

→ To exit the diagnostics system, turn the selector dial to position 0, turn the appliance back on and return the dial to position 0.

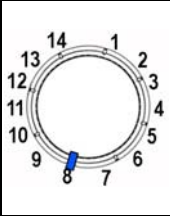

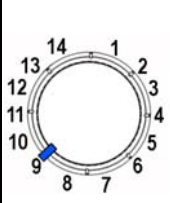

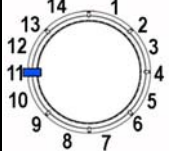

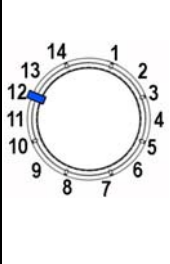
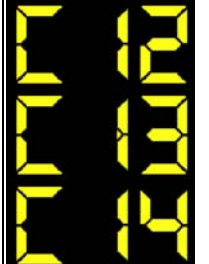
7.3 Phases of the diagnostics test

Irrespective of the type of electronic board and of the selector configuration, once the diagnostics system has been activated, turn the selector knob **clockwise** and you can run a check on the various components and the alarm reading.

Simultaneously, a selector control code is shown using the display screen for **two** seconds, before displaying what is described in the last column of the table below.

(all alarms are enabled in the diagnostic cycle).

Selector position	Components activated	Working conditions	Function tested	LCD display
1 	<ul style="list-style-type: none"> - They following come on in sequence: the LEDs, in groups the display symbols and the background light that light it up - Touch a sensor to turn on the group of display icons or the corresponding LED and the buzzer sounds at the same time 	Always active	User interface functioning	
2 	<ul style="list-style-type: none"> - Door safety interlock - Wash solenoid 	<ul style="list-style-type: none"> - Door closed - Water level below anti-flooding level - Maximum time 5 mins 	Water fill to wash compartment	 Water level in the tub (mm)
3 	<ul style="list-style-type: none"> - Door safety interlock - Pre-wash solenoid 	<ul style="list-style-type: none"> - Door closed - Water level below anti-flooding level - Maximum time 5 mins 	Water fill to pre-wash compartment	 Water level in the tub (mm)
4 	<ul style="list-style-type: none"> - Door safety interlock - Solenoid pre-wash and wash 	<ul style="list-style-type: none"> - Door closed - Water level below anti-flooding level - Maximum time 5 mins 	Water fill to conditioner compartment	 Water level in the tub (mm)
5 	<ul style="list-style-type: none"> - Door safety interlock - Third solenoid valve (where featured) 	<ul style="list-style-type: none"> - Door closed - Water level below anti-flooding level - Maximum time 5 mins 	Water fill to third solenoid valve compartment	 Water level in the tub is displayed (mm)
6 	<ul style="list-style-type: none"> - Door safety interlock - Fourth solenoid valve (hot water where featured) 	<ul style="list-style-type: none"> - Door closed - Water level below anti-flooding level - Maximum time 5 mins. 	Water fill to fourth solenoid valve compartment	 Water level in the tub is displayed (mm)
7 	<ul style="list-style-type: none"> - Door safety interlock - Wash solenoid, if the water in the tub is not enough to cover the heating element - Heating element - Weight sensor (if present, an extra litre of water is loaded) - Circulation pump 	<ul style="list-style-type: none"> - Door closed - Water level above the heating element. - Maximum time 10 mins up to 90°C (*) 	Reheating Circulation	 Temperature in °C measured using the NTC probe.

8		<ul style="list-style-type: none"> - Door safety interlock - Wash solenoid, if the water in the tub is not enough to cover the heating element - Motor (55 rpm clockwise, 55 rpm anti-clockwise, 250 rpm pulse) 	<p>Door closed Water level above the heating element</p>	<p>Check for leaks from the tub</p>	 Drum speed in rpm/10
9		<ul style="list-style-type: none"> - Door safety interlock - Drain pump - Motor up to 650 rpm then at maximum spin speed (**) 	<p>Door closed Water level lower than anti-boiling level for spinning</p>	<p>Drain, calibration of analogue pressure switch and spin</p>	 Drum speed in rpm/10
10	-----	-----	-----	-----	-----
11		<ul style="list-style-type: none"> - Reading/Deleting the last alarm 	----	----	
12 ÷ 14		<ul style="list-style-type: none"> - The LEDs, groups of symbols in the LCD screen and the backlight of the display are turned on in sequence - Touch a sensor to turn on the group of icons in the LCD screen or the corresponding LED and the buzzer sounds at the same time 	<p>Always active</p>	<p>User interface functioning</p>	

(*) 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 AGS (anti-unbalancing system) and no garments must be inside the appliance.

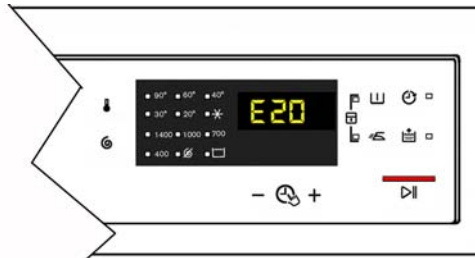
8 ALARMS

8.1 Displaying the alarms to the user

8.1.1 Styling TC4

When a problem arises with the appliance generating a “WARNING” or “ALARM” this is shown in three digits (where the remaining time for the cycle to finish is shown) and simultaneously by the yellow sensor LED flashing STOP/PAUSE and the alarm (even if the user has deactivated it) gives off three short beeps every twenty seconds for five minutes.

Once the problem has been resolved, the alarm stops ringing and the code shown disappears.



The alarms displayed to the user are listed below and can be eliminated by the user:

- ☞ E10 - Water fill difficulty (tap closed)
- ☞ E20 - Drain difficulty (filter dirty)
- ☞ E40 - Door open
- ☞ EF0 - If created by an overdose of detergent (if configured)

8.1.2 Styling TC5

The alarms are displayed by the flashing red LED of the START/PAUSE sensor and by one of the three LEDs in the lower right hand corner of the display.

As soon as a problem arises these LEDs start flashing (half a second on and half a second off), until the problem is resolved.

The table below illustrates the combinations of LED lightings.

E10		E20		E40	
Water fill difficulty (tap closed)		Drain difficulty (filter fouled)		Door open	

While the alarms listed below:

- ☞ EF0 - If generated by water leaks inside the appliance (Aqua Control System)

The intervention of a service engineer is required

For the alarm on the other hand:

- ☞ EH0 - Voltage or frequency outside normal values

It is necessary to wait for power supply voltage and/or frequency to restore normal conditions.

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

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

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

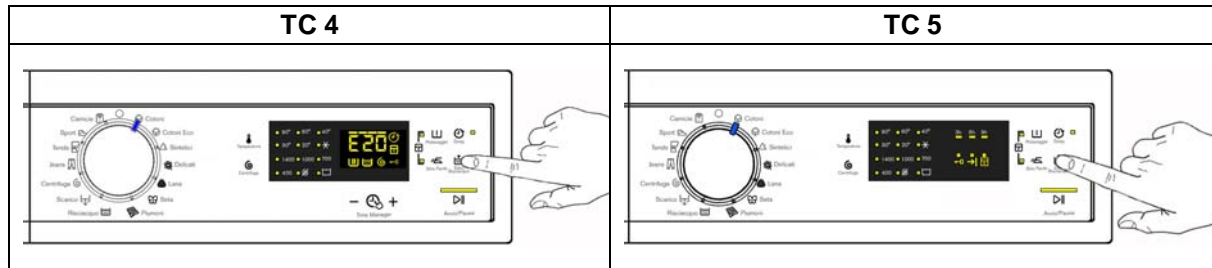
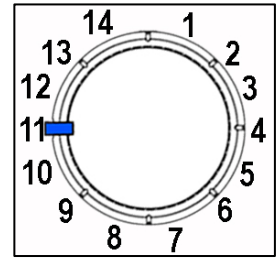
Certain alarm conditions require a drain phase to be performed before the door can be opened for safety reasons:

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

8.2 Reading the alarms

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

- Enter diagnostic mode (par. 7.1 page 25).
- Irrespective of the type of circuit board and configuration, turn the programme selector knob **clockwise** to the **eleventh position** and the last alarm is displayed.
- In order to view previous alarms, sequentially touch the sensor (as shown in the diagram below).
- To return to the last alarm, touch the START/PAUSE sensor.



8.2.1 Viewing the TC5 aesthetic alarm

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

- START/PAUSE sensor indicator with red light → indicates the first digit of the alarm code (family)
- START/PAUSE sensor indicator with yellow light → indicates the second digit of the alarm code (number inside the family)

These two LEDs are present in all models.



















Notes:

- The first letter of the alarm code “E” (Error) is not displayed, since this letter is common to all alarm codes.
- Alarm code families are expressed in hexadecimals; and therefore the letters:
 - **A** is represented by **10** flashes
 - **B** is represented by **11** flashes
 - ...
 - **F** is represented by **15** flashes
- Configuration errors are displayed by all LEDs flashing (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:

- a sequence of four flashes of the START/PAUSE sensor red light indicates the first number **E43**;
- the sequence of three flashes of the START/PAUSE sensor with the yellow light indicates the second number **E43**.

START/PAUSE sensor with red light			START/PAUSE sensor with green light		
On/off	Time (Sec.)	Value	On/off	Time (Sec.)	Value
	0.5	1		0.5	1
	0.5			0.5	
	0.5	2		0.5	2
	0.5			0.5	
	0.5	3		0.5	3
	0.5			0.5	
	0.5	4		2.5	Pause
	0.5				
	1.5	Pause			

8.2.3 Behaviour of the alarms during diagnostic testing

All alarms are enabled during diagnostic testing of the components.

8.3 Rapid reading of alarms

It is possible to display the last alarm even if the selector is not in the eleventh diagnostics position or if the appliance is in normal operating mode (for example when performing a wash programme):

→ 10 seconds after turning on the appliance, simultaneously touch the **START/PAUSE** sensor and the nearest **sensor option** (as if accessing DIAGNOSTICS) for at least 2 seconds:

In the TC4 aesthetics, the display shows the last alarm.

In the TC5 aesthetics, the LEDs initially switch off, and then display the flashing sequence indicating the last alarm.

→ The alarm continues to be displayed for the required time and then returns to its normal function or until a sensor is touched.


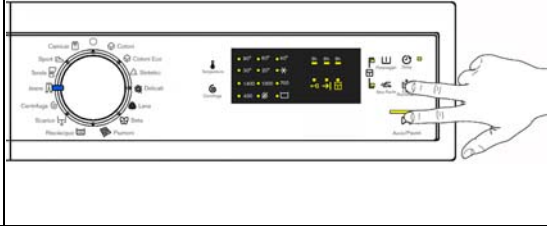
→ The alarm reading system is as described in para. 8.2.

→ While the alarm is being displayed, the appliance continues to perform the cycle or, if in the programme selection phase, it stores the previously selected options.

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

TC 4	TC 5
	
<ol style="list-style-type: none">1. Enter the diagnostic mode.2. Turn the programme selector clockwise to position eleven (alarm reading).3. Simultaneously press the START/PAUSE sensor and the nearest sensor option (as shown in the diagram).4. Keep your finger above the sensors until: In the TC4 aesthetics: "E00" appears on the LCD screen (at least 5 seconds). In the TC5 aesthetics: the LEDs stop flashing (at least 5 seconds).	

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

9 ALARM SUMMARY TABLE

Alarm	Description	Possible fault	Machine status/action	Reset
E00		-----		
E11	Water fill difficulty during washing	Tap closed or water pressure too low; Drain pipe improperly positioned; Water fill solenoid valve faulty; Leaks from water circuit on pressure switch; Pressure switch faulty; Wiring faulty; Main PCB faulty.	Cycle is paused with door locked.	START/RESET
E13	Water leaks	Drain pipe improperly positioned; Water pressure too low; Water fill solenoid valve faulty; Water circuit on pressure switch is leaking/clogged; Pressure switch faulty.	Cycle is paused with door locked.	START/RESET
E21	Drain difficulty during washing	Drain pipe kinked/clogged/improperly positioned; Drain filter clogged/dirty; Wiring faulty; Pressure switch faulty; Drain pump rotor blocked; Drain pump faulty; Main PCB faulty.	Cycle is paused (after 2 attempts).	START ON/OFF 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	Drain pump triac "sensing" circuit faulty	Main circuit board faulty.	Safety drain cycle - Cycle stops with door unlocked.	RESET
E31	Malfunction in electronic pressure switch circuit	Wiring; Electronic pressure switch; Main PCB.	Cycle stops with door locked.	RESET
E32	Calibration error of the electronic pressure switch	Drain pipe kinked/clogged/improperly positioned; Solenoid valve faulty; Drain filter clogged/dirty; Drain pump faulty; Leaks from pressure switch hydraulic circuit; Pressure switch faulty; Wiring; main PCB.	Cycle is 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 switch clogged.	Heating phase is skipped.	RESET
E41	Door open	Check whether the door is closed properly; Wiring faulty; Door safety interlock faulty; Main circuit board faulty.	Cycle is 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 is 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.	RESET
E44	Faulty sensing by door delay system	Main circuit board faulty.	(Safety drain cycle) Cycle blocked.	RESET
E45	Faulty sensing by door delay system triac	Main circuit board faulty.	(Safety drain cycle) Cycle blocked.	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).	ON/OFF

Alarm	Description	Possible fault	Machine status/action	Reset
E52	No signal from motor tachometric generator	Wiring faulty; Motor faulty; Main circuit board faulty.	Cycle stops with door locked (after 5 attempts).	ON/OFF
E53	“Sensing” faulty triac motor	Main circuit board faulty.	Cycle blocked.	RESET
E54	Motor relay contacts sticking	Current leakage from motor or from wiring; Main PCB faulty.	Cycle blocked (after 5 attempts).	RESET
E61	Insufficient heating during washing	Wiring faulty; NTC probe for wash cycle faulty; Heating element faulty; Main PCB faulty.	The heating phase is skipped.	START/RESET
E62	Overheating during washing (temperature higher than 88°C for more than 5 min.)	Wiring faulty; NTC probe for wash cycle faulty; Heating element faulty; Main PCB faulty.	Safety drain cycle. Cycle stops with door open.	RESET
E66	Heating element power relay faulty (inconsistency between sensing and K2 relay status)	Main PCB faulty.	Safety water fill. Cycle stops with door closed.	ON/OFF RESET
E68	Current leak to the ground	Current leakage between heating element and ground.	The heating phase is skipped.	START/RESET
E69	Heating element interrupted	Wiring faulty; Heating element for washing interrupted (thermal fuse open); Main PCB faulty.	-----	START ON/OFF RESET
E6A	Heating relay sensing faulty	Main circuit board faulty.	Cycle stops with door locked.	RESET
E6H	Heating element power relay faulty (inconsistency between sensing and K1 relay status)	Wiring faulty; Earth-leakage between heating element and earth; Main PCB faulty.	Safety water fill. Cycle stops with door closed.	ON/OFF RESET
E71	NTC probe for wash cycle faulty (short-circuited or open)	Wiring faulty; NTC probe for wash cycle faulty; Main circuit board faulty.	The heating phase is skipped.	START/RESET
E74	NTC probe for wash cycle improperly positioned	Wiring faulty; NTC probe for wash cycle improperly positioned; NTC probe faulty; Main PCB faulty.	The heating phase is skipped.	RESET
E83	Error in reading selector	Main PCB faulty (Incorrect configuration data).	Cycle cancelled.	START/RESET
E86	Selector configuration error	Display board.	-----	START ON/OFF RESET
E87	Display board microprocessor faulty	If this continues, replace the display board.	No action to be taken.	START ON/OFF RESET
E91	Communication error between main PCB and display	Wiring faulty; Control/display PCB faulty; Main circuit board faulty.	-----	RESET
E92	Communication inconsistency between main PCB and display (incompatible versions)	Incorrect control/display PCB; Incorrect PCB (does not correspond to the model).	Cycle blocked.	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
E97	Inconsistency between programme selector and cycle configuration	Main PCB faulty (incorrect configuration data).	Cycle blocked.	RESET

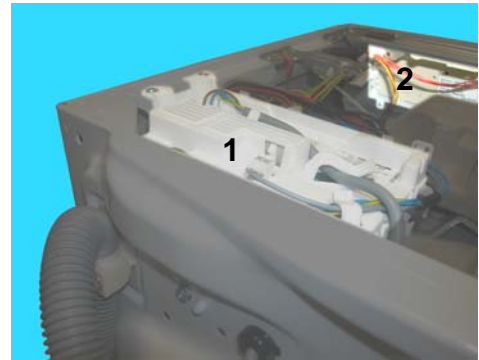
Alarm	Description	Possible fault	Machine status/action	Reset
E9C	Display board configuration error	Display board faulty.	-----	START ON/OFF RESET
E9E	Display board sensor/touch key faulty	Display board faulty.	-----	ON/OFF
EC1	Electronically controlled valve blocked with operating flowmeter	Faulty cabling; Faulty/blocked solenoid, PCB faulty.	Cycle stops with door locked. Drain pump continues to operate (5 min. on, then 5 min. off. etc.).	RESET
EC4	AGS current sensor faulty	Main board faulty.	Spin speed reduced to safety speed of 150 rpm	RESET
EF1	Drain filter clogged (drain phase too long)	Drain filter clogged/dirty; Drain hose blocked/kinked/too high.	Warning displayed at the end of cycle.	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; Drain pump winding interruption/overheating.	Appliance drains.	ON/OFF RESET
EF4	Water fill pressure too low, no signal from flowmeter and electronically controlled valve is open	Tap closed, water fill pressure too low.	-----	RESET
EF5	Unbalanced load	Final spin phases skipped.	-----	START/RESET
EF6	Reset	If it continues, replace the main board.	No action to be taken.	-----
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

10 TECHNICAL CHARACTERISTICS

10.1 Electronic control

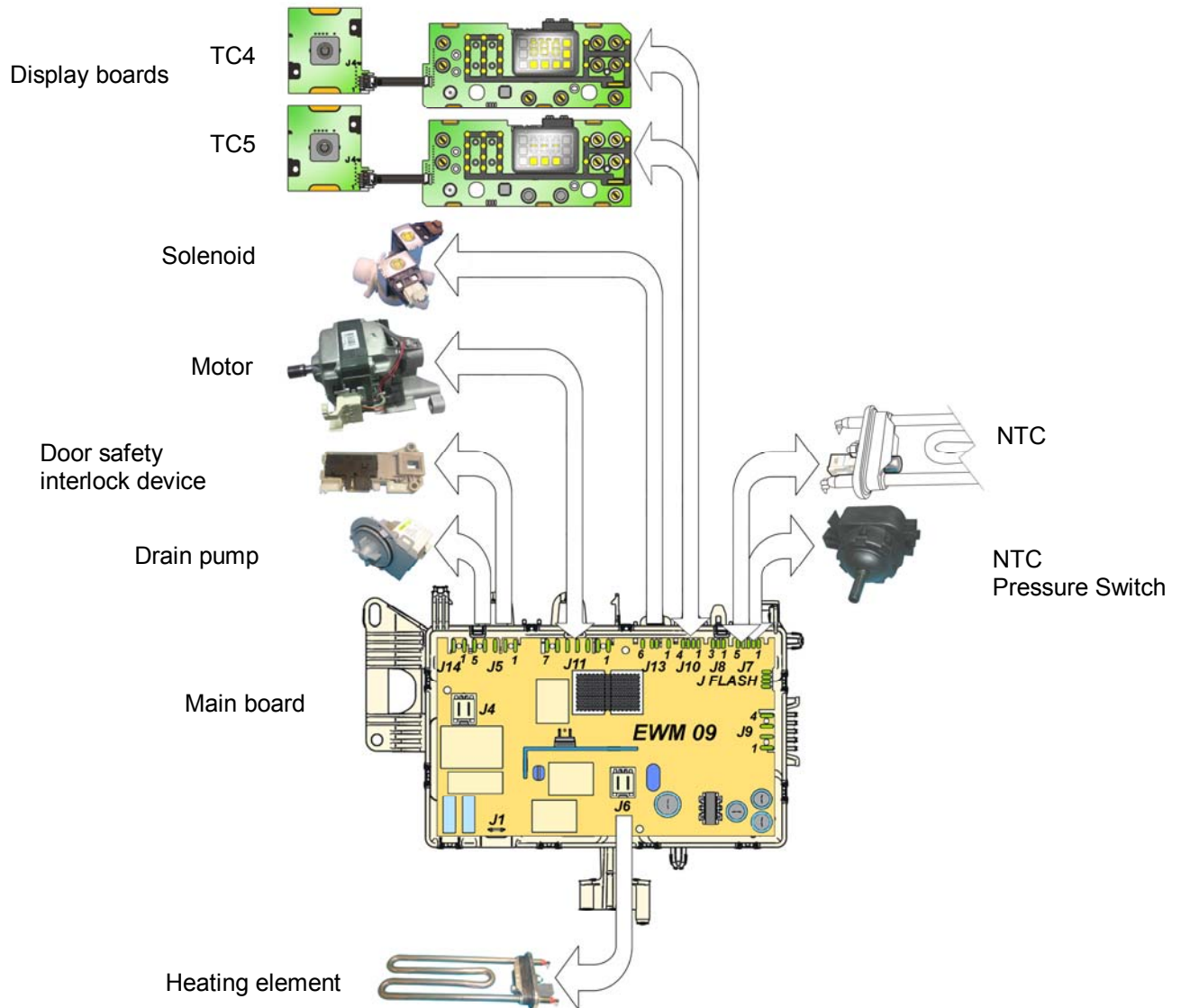
The electronic control is made up of:

1. Main circuit board
2. Control/display circuit board



The control/display circuit board acquires the commands for cycle set-up. This board includes: Buttons, LEDs, Display (where featured), programme selector and temperature control (where featured). The commands acquired by the display board are sent to the main circuit board, which powers all the electrical components (solenoid valve, wash motor, drain pump, heating element and door safety device).

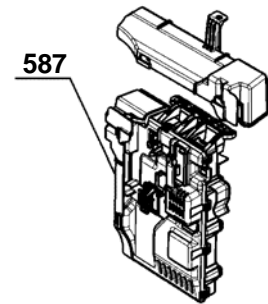
- It controls the temperature of the washing water via the NTC probe inserted in the heating element.
- It controls the motor rotation speed using the signal from the tachometric generator.
- It controls the level of water via the analogue pressure switch.



10.1.1 Programming/Updating the main circuit board

In the Service Notes the main circuit board (587) is identified with two spare parts codes:

- ↖ Code 973 914... identifies the pre-programmed board.
- ↖ Code 132... identifies the unprogrammed board.



The circuit board can be programmed/updated using the **Sidekick** application.
For further information, please refer to the instructions provided/illustrated in the course entitled << **Guide to Sidekick** >> at the address (<http://electrolux.edvantage.net>) on the Electrolux Learning Gateway portal.

10.2 Washing unit

WASHING UNIT		
Type	Load capacity (cottons)	Drum volume
	Max.	
P30	6/7 Kg	49 litres

The washing unit is suspended by two coil springs attached to two brackets secured to the cabinet.



Oscillations are dampened by two shock absorbers fixed to the lower crossbars.



The unit is balanced by two cement counterweights: one at the front and one at the top screwed onto the welded tub.



10.3 Welded tub assembly

The welded tub consists of:

- ↙ a rear casing assembly
 - ↙ a front casing
- welded together.

The tub assembly incorporates: the drain circuit with the drain pump screw (a) and the pressure chamber (b).

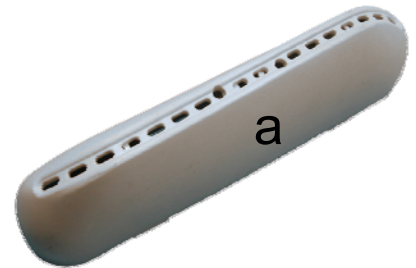


The tub interior contains the drum assembly consisting of a STAINLESS steel casing to which the two flanges are seamed.

The drum contains three blades:

two blades are clicked and locked in place with tabs onto the drum (Fig. a).

(for further information see sect. 13.3.5 page 64)



one opening blade secured to the drum with screws (fig. b).

The coloured part can be opened to grant access/to allow the drain filter to be checked.

(for further information see sect. 13.3.6 page 66).



10.4 Detergent dispenser

New detergent drawer assembly, with a dispenser assembly incorporated at the front, which is inserted into the detergent inlet pocket of the porthole bellows seal.



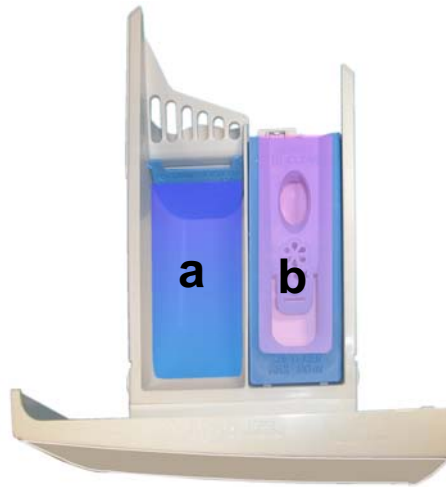
Operating principle of the conveyor.

<p style="text-align: center;">Water fill directly to tub (pre-wash solenoid)</p> <ul style="list-style-type: none">• There is no pre-wash compartment. If necessary, the detergent must be introduced directly into the drum.	
<p style="text-align: center;">Water fill to wash compartment (wash solenoid)</p> <ul style="list-style-type: none">• In all models: compartment "a" is used to hold the detergent loaded at the start of washing.• In the event of stains, mix stain removers with the washing detergent (for powder detergent).	
<p style="text-align: center;">Water fill to conditioner compartment (pre-wash and wash solenoid valves)</p> <ul style="list-style-type: none">• In all models: compartment "b" is used to contain the conditioner, which is removed with the water at the last rinse.	

10.5 Detergent drawer

The detergent dispenser is designed for use with: powder detergent or liquid detergent.

A flap has been fitted inside compartment “a” where the detergent is introduced, which can be flipped up or down.



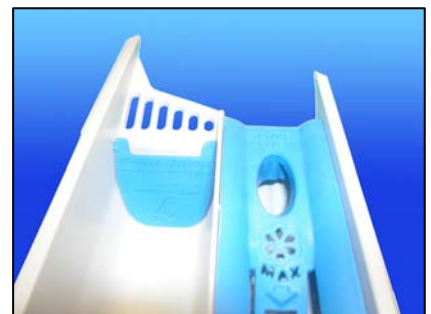
Flip it up to use powder detergent.

Position of the flap when the appliance leaves the factory (see figure).



To modify the position of the flap, pull the detergent dispenser out (see page 54).

Flip the flap down to use liquid detergent.



For further details, read the instruction manual.

11 ELECTRICAL COMPONENTS



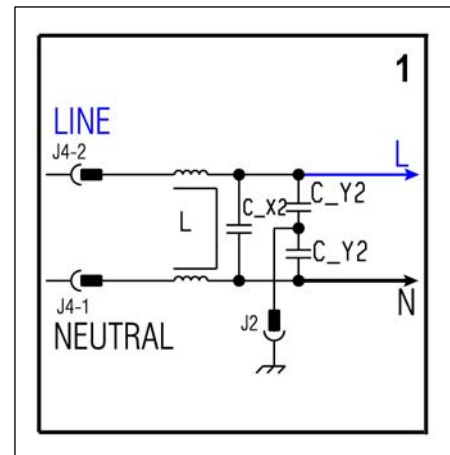
- **When replacing any of the components, please refer to the code shown in the list of spare parts relating to the appliance.**

11.1 Noise filter

General characteristics

This is a device that is connected to the electricity power line input of the appliance and prevents the emission of radio frequency noise. It is incorporated into the main board.

1. Main circuit board



11.2 Display board

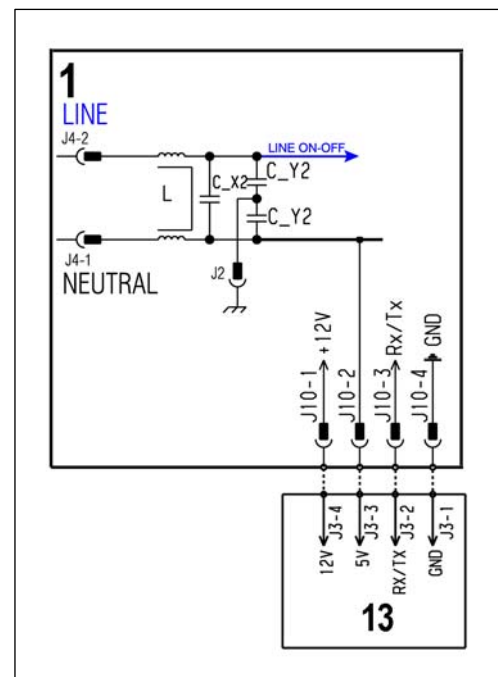
The main circuit board (1) supplies the power supply voltage to the control and display board (13).

The selector dial is used to select programmes.

Selection of the options or start/pause is achieved using the buttons on the board (13).

The buzzer - where featured - is powered by the display board.

1. Main circuit board
13. Display board



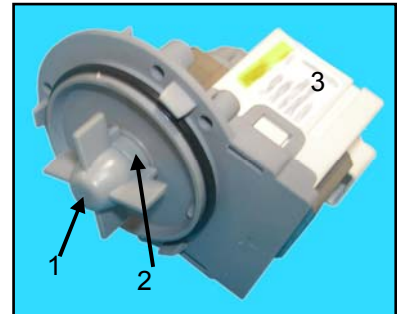
11.3 Drain pump



- When replacing the pump, please refer to the code shown in the list of spare parts relating to the appliance.

11.3.1 General characteristics

1. Wheel
2. Rotor
3. Stator



The pump, which drains the water at the end of the various washing cycle phases, is centrifugal and is actuated by a synchronous motor.

The rotor consists of a permanent magnet and the direction of rotation can be either clockwise or anticlockwise. The rotor can turn by approximately a quarter of a revolution without turning the wheel. Consequently, if a foreign body is stuck in the wheel, the rotor can perform small movements clockwise and anticlockwise until the foreign body is released.

The flow rate of these pumps is approximately 22-25 l/min, and the maximum head is 90 cm.

Important!

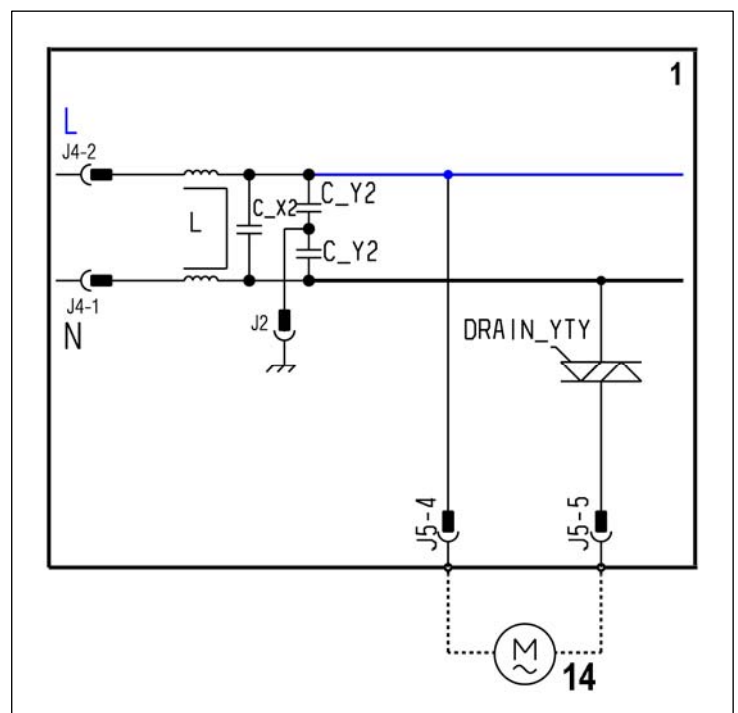
Synchronous pumps, when powered on empty (disconnected from the water circuit), may not start in some cases because their very construction makes them need an antagonist torque on the wheel to allow the rotor to move in one of the two directions.

The pumps should therefore only be tested once fitted to the appliance, after a little water has been filled.

The drain pump is powered by the main circuit board through a triac, as follows:

- ↪ For a maximum pre-determined period (and an alarm might be displayed).
- ↪ Until the electronic pressure switch closes on empty, after which the pump is activated for a brief period or moves on to the next phase.

1. PCB
17. Drain pump



11.4 Heating element



- When replacing the heating element, please refer to the code shown in the list of spare parts relating to the appliance.
- It is strictly forbidden to tamper with the heating element in any way!!! (e.g. replace the NTC probe, etc...)

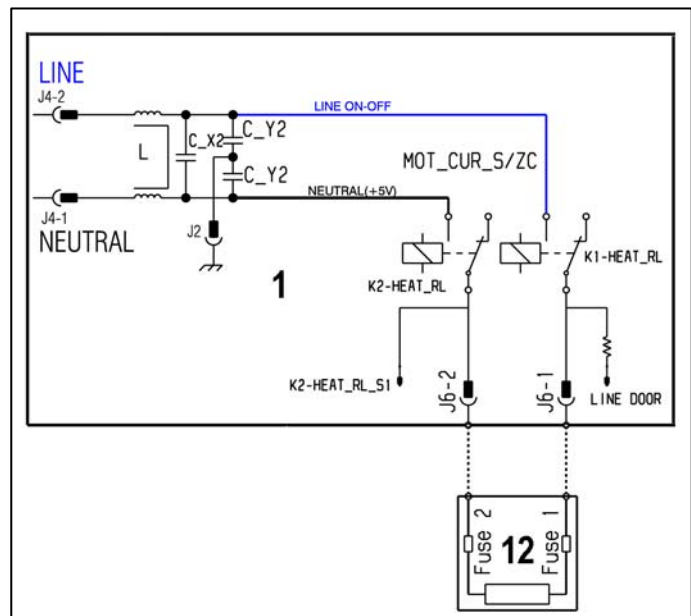
11.4.1 General characteristics



The heating element of the washing water is armoured, i.e. it is inserted in sealed tubular stainless steel casing.

It is powered by two relays (K1, K2) located on the circuit board. It is fitted with two thermal fuses which trip if the temperature of the heating element exceeds the values for which they were calibrated.

1. Main circuit board
11. Heating element



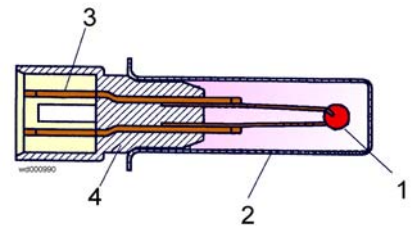
11.5 Temperature probe



- When replacing the heating element, please refer to the code shown in the list of spare parts relating to the appliance.
- It is strictly forbidden to tamper with the heating element in any way!!! (e.g. replace the NTC probe, etc...)

11.5.1 General characteristics

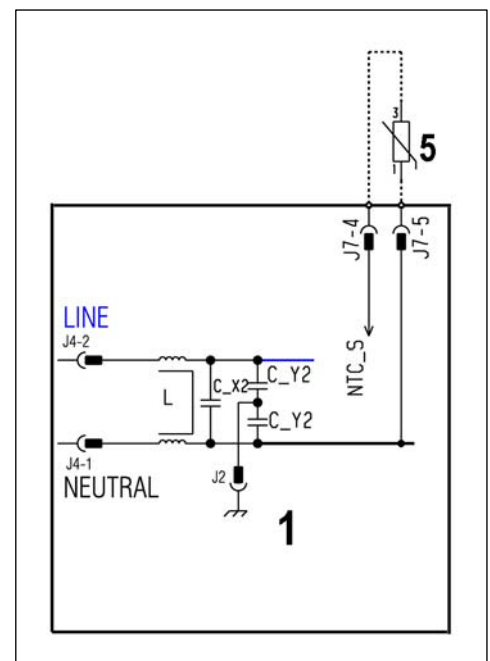
1. NTC heating element
2. Metal capsule
3. Terminals
4. Plastic casing



An NTC type probe is used to control the wash temperature: it is built in such a way that its internal resistance decreases as the temperature rises. This drop in resistance is detected by the electronic control which, when the desired temperature is reached, disconnects the heating element.

The temperature of the water is controlled by the circuit board by means of an NTC temperature probe incorporated in the heating element.

1. Main circuit board
4. NTC probe

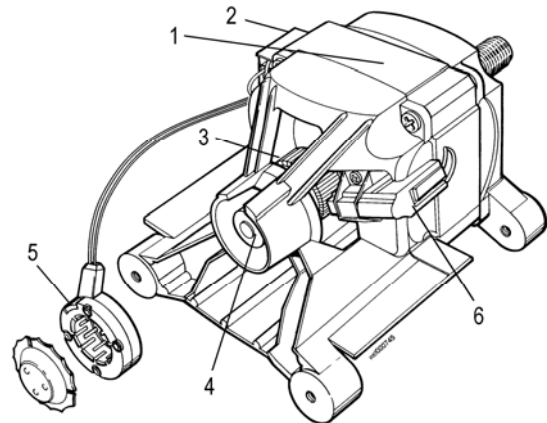


11.7 Motor

11.7.1 General characteristics

Collector motors are fitted on appliances with a spin speed of between 600 and 1,400 rpm.

1. Stator
2. Terminal board
3. Collector
4. Tachometric generator magnet
5. Tachometric generator coil
6. Brush



11.7.2 Operating principle

The stator winding is connected in series to the rotor winding (serial excitation).

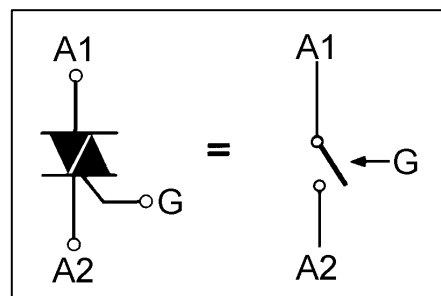
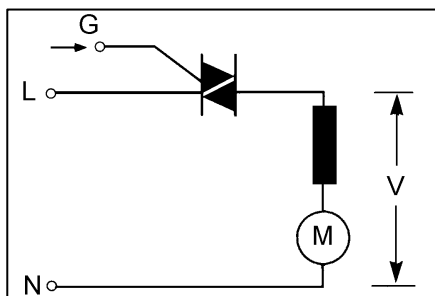
Every section of the rotor winding is connected to a pair of collector blades (also referred to as a switching device). The electrical contact between the collector and the fixed circuit is made by two static brushes on the collector blades.

The motor rotation speed is in proportion to the supply voltage, supplied by an electronic control.

This type of motor is also referred to as “universal” because it can be powered by either alternating or direct current.

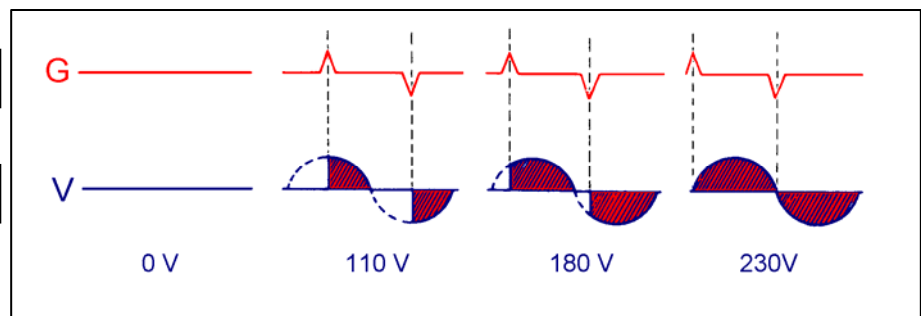
11.7.2.1 Motor speed control

- This is achieved by an electronic control varying the voltage (V) applied to the motor.
- The method adopted is the “phase partialization” command of the TRIAC. The TRIAC is an electronic bidirectional switch. Closing of the circuit between A1-A2 (anodes) occurs when there are appropriate starting pulses on gate (G).



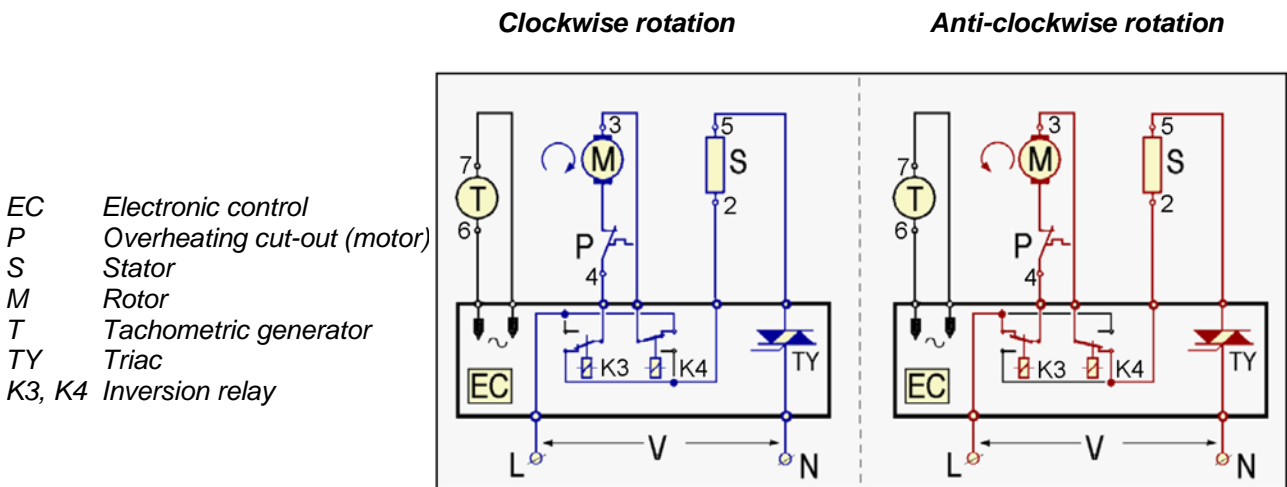
Starting pulses

Voltage on the motor



11.7.2.2 Direction of rotation of the motor

The direction of rotation of the motor depends on how the windings of the stator and rotor are connected to one another. This connection is made by the circuit board relay contacts.

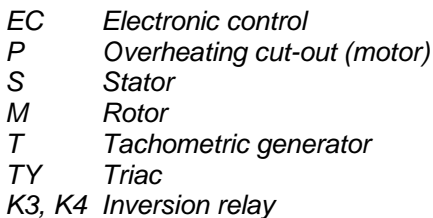


11.7.2.3 Tachometric generator

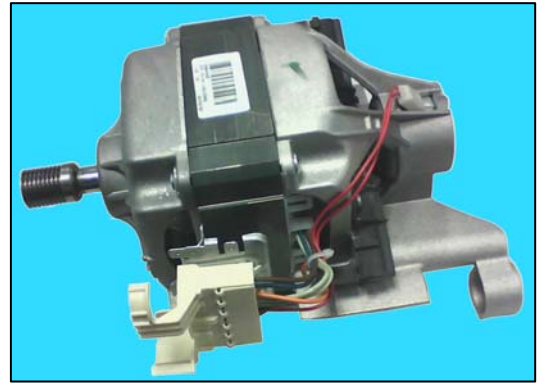
The speed of the collector motor, like all motors with serial excitation, depends on the load; so the speed decreases as the load increases. This makes it necessary for the power supply voltage to the motor, and therefore its speed, to be constantly controlled by an electronic speed control.

A tachometric generator, consisting of a magnet secured to the shaft and a coil, generates a voltage depending on the speed of the rotor, which is sent to the electronic control.

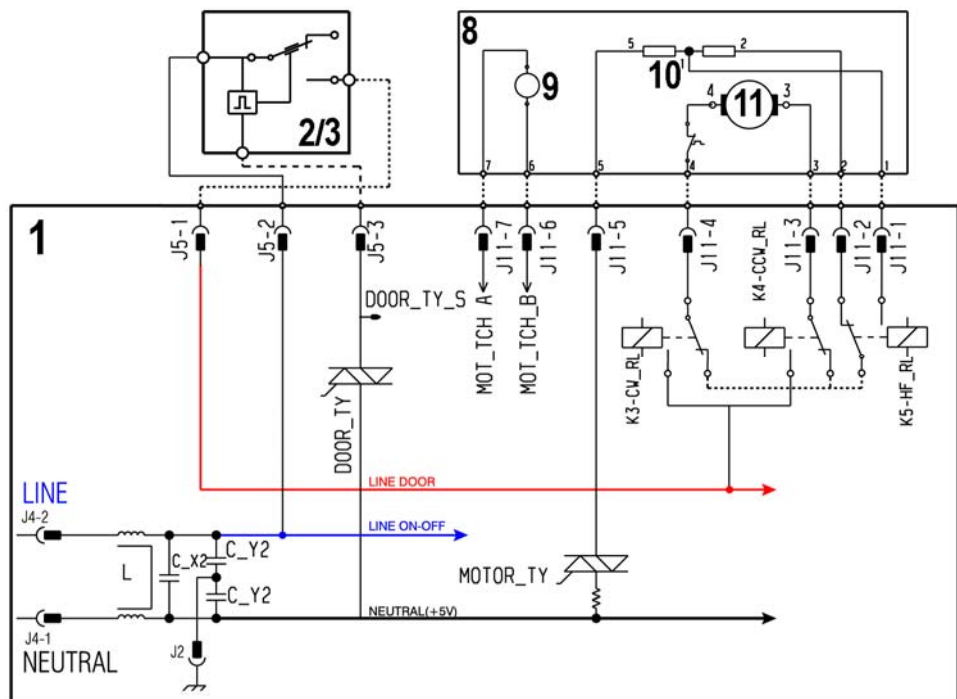
All the electronic controls have a protection system, which is more or less sophisticated, to avoid the operation of the motor in the event of a failure in the tachometric generator.



11.7.3 Power supply to motor



The PCB powers the motor via a triac; changes in the direction of rotation are achieved by switching the contacts on the two relays (K3-K4), which change the connection between the rotor and the stator. In certain models, a third relay (K5) is used to power the stator (full or half field) according to the spin speed. The motor speed is controlled by the signal from the tachometric generator. During the spin phases, the micro-processor performs the anti-foam and the anti-balancing check procedure.



1. Main circuit board
2. Door safety interlock (without flange)
3. Door safety interlock (with flange)
8. Universal motor
9. Tachometric generator
10. Stator
11. Rotor

11.7.4 Anti-foam control system

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

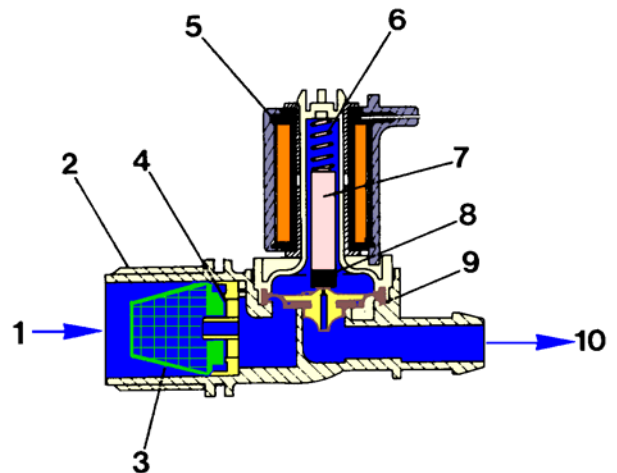
- **Spin with little foam:** if the pressure switch senses a “full” level, the spin phase is interrupted, the drain pump continues to operate and, when the pressure switch senses “empty”, the spin phase is resumed.
- **Spin with excess foam in the tub (critical situation):** this is recognised if the pressure switch senses full level on 5 occasions (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.

11.8 Solenoid valves

11.8.1 General characteristics

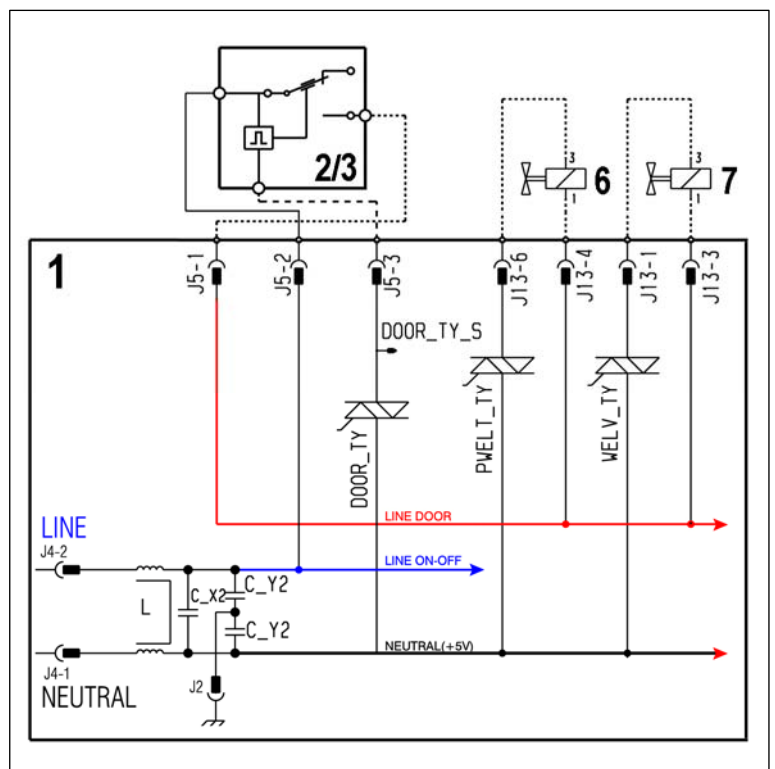
This component introduces water into the detergent dispenser and is controlled electrically by the main circuit board via Triac. The level of water in the tub is controlled by the analogue pressure switch.

1. Water inlet
2. Solenoid valve body
3. Filter or needle trap
4. Flow reducer
5. Coil
6. Spring
7. Moving core
8. Rubber
9. Membrane
10. Water outlet



When idle, the core, pushed by a spring, keeps the central hole of the membrane closed and so the latter hermetically seals access to the water inlet duct.

When the coil is powered, the core is attracted, releasing the central hole of the membrane. Consequently the valve opens.



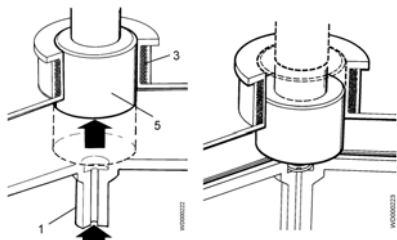
1. Main circuit board
2. Door safety interlock (without flange)
3. Door safety interlock (with flange)
7. Pre-wash solenoid
8. Wash solenoid

11.9 Tub water level control analogue pressure switch

11.9.1 General characteristics

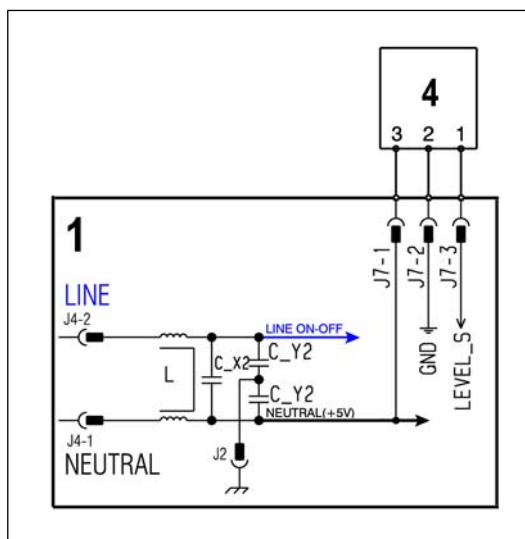
The electronic pressure switch is an analogue device that controls the water level in the tub, used in models with the electronic control system, and is connected directly to the main PCB.

1. Pipe
3. Oscillating coil
5. Core

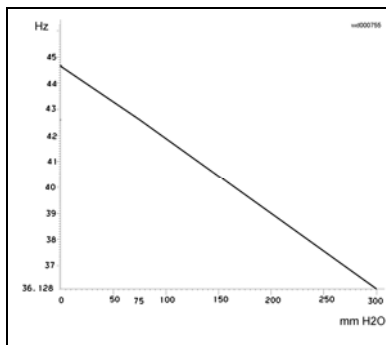


The pressure switch is connected via a pipe to the pressure chamber. When water is introduced into the tub, this creates a pressure inside the hydraulic circuit that causes the membrane to change position. This in turn modifies the position of the core inside the coil, thus changing the inductance and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

1. Main circuit board
3. Analogue pressure switch

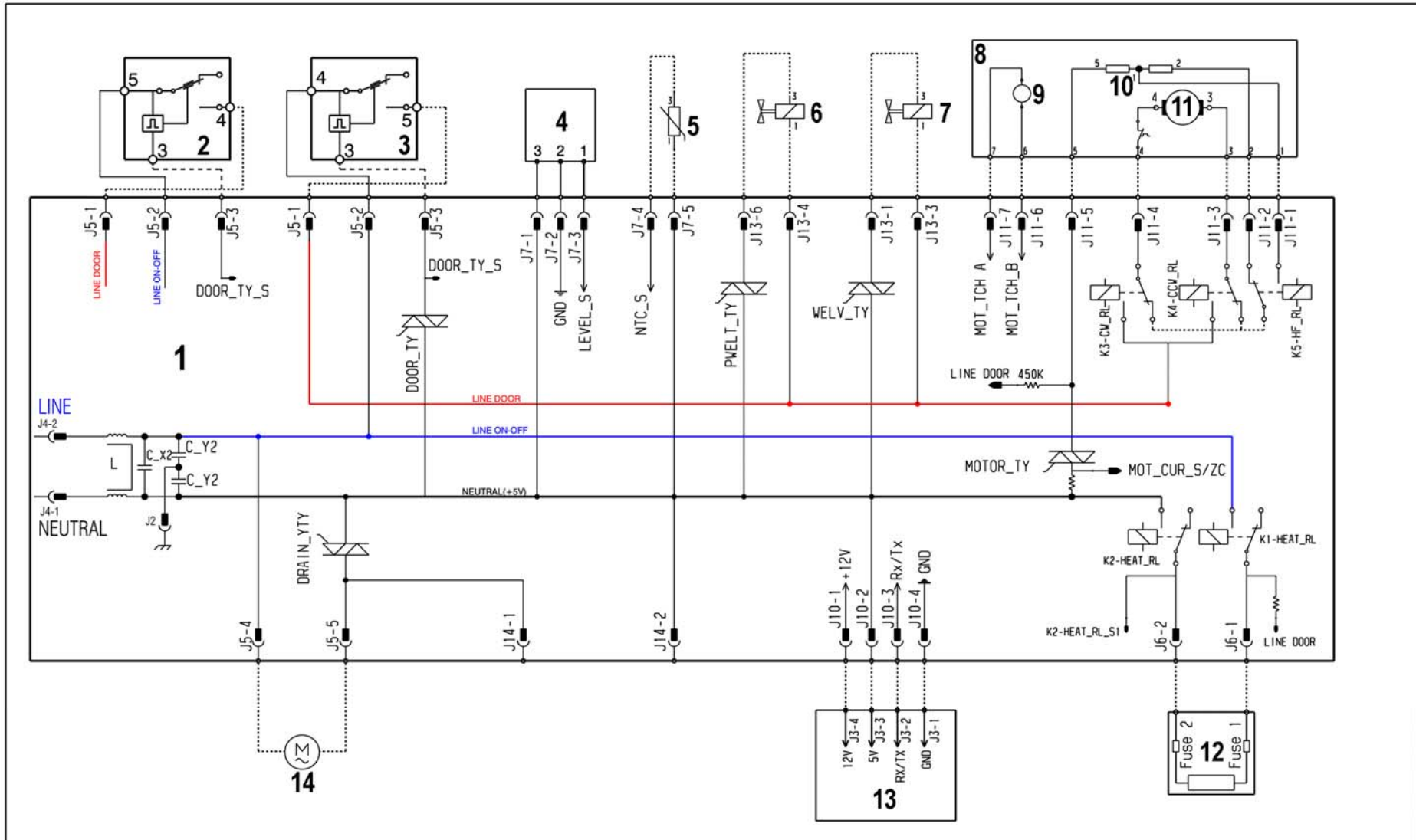


Operating frequency variation according to the quantity of water in the tub



12 MAIN ELECTRICAL CIRCUIT DIAGRAM

12.1 Diagram



12.2 Key to diagram

Appliance electrical components	PCB components	
<ol style="list-style-type: none"> 1. Main circuit board 2. Door safety interlock (without flange) 3. Door safety interlock (with flange) 4. Electronic pressure switch 5. NTC 6. Pre-wash solenoid 7. Wash solenoid 8. Universal motor 9. Tachometric (motor) 10. Stator (motor) 11. Rotor (motor) 12. Heating element 13. Display board 14. Drain pump 	DRAIN_YTY DOOR_TY PWELT_TY WELV_TY MOTOR_TY K1 K2 K3 K4 K5	Drain pump Triac Door interlock Triac Pre-wash solenoid Triac Wash solenoid Triac Motor Triac Heating element relay Heating element relay Motor relay: clockwise rotation Motor relay: anti-clockwise rotation Motor relay: half-field power supply

13 ACCESSIBILITY

13.1 Worktop

Remove the two screws securing it to the back panel.



Push it towards the rear.



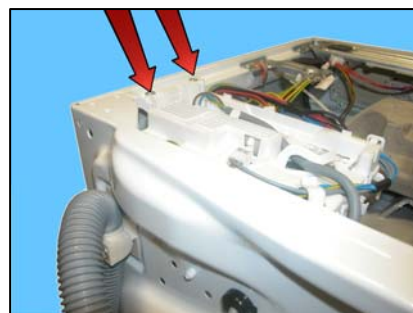
13.2 From the worktop, it is possible to access:

1. Power board (main)
2. Solenoid
3. Control panel
4. Assembly of display board/light diffuser
5. Analogue pressure switch
6. Detergent dispenser
7. Counterweight

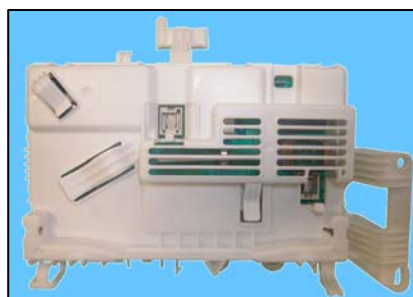


13.2.1 Main board

Remove the worktop (see relevant paragraph).
Disconnect the connectors.
Remove the screws that secure it to the side of the cabinet.



Remove the main board.

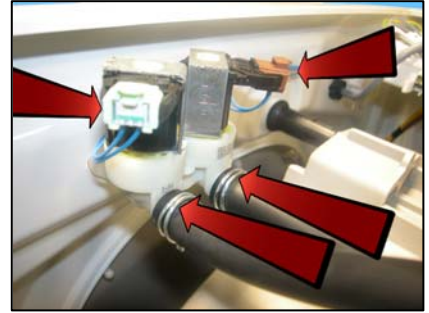


13.2.2 Solenoid

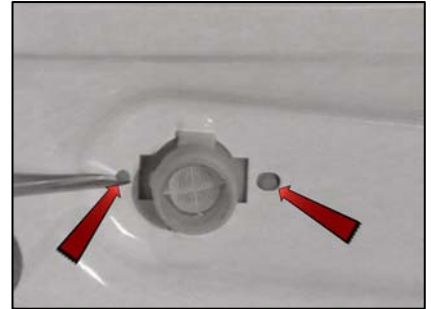
Remove the worktop (see relevant paragraph).

Disconnect the connectors.

Pull out the pipes which connect the solenoid valve to the detergent dispenser.



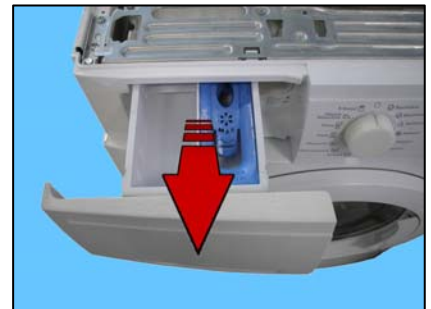
Unscrew the water fill pipe from the solenoid valve.
Push the two retainers indicated by the arrows towards the inside of the appliance.
At the same time, turn the solenoid valve to remove it.



13.2.3 Control panel

Remove the worktop (see relevant paragraph).

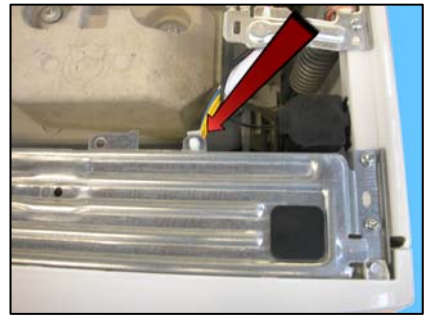
Pull the detergent drawer out and at the same time press the right-hand side indicated by the arrow.



Remove the screw securing the control panel to the conveyor.



If necessary pull the clamp out.



Remove the four screws which secure the crosspiece to the cabinet.
Remove the two screws securing the crossbar to the detergent tray.



Release the anchor tab securing the detergent drawer to the crosspiece.



Raise both sides of the control panel so as to pull out the hooks securing it to the front panel.



Remove the control panel and position it as shown in the figure, making sure to introduce protection to prevent scratching.



13.2.4 Display board assembly

Remove the worktop (see relevant paragraph).
Remove the control panel (see relevant paragraph).

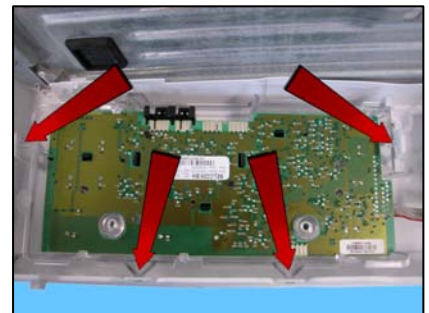
Rotate the control panel on itself.
Remove the connector connecting the display board.



Slacken the screws and the hooks that hold the switch to the control panel.
Slide off the connector



Release the tabs fixing the display board assembly to the control panel.



Remove the display board assembly.



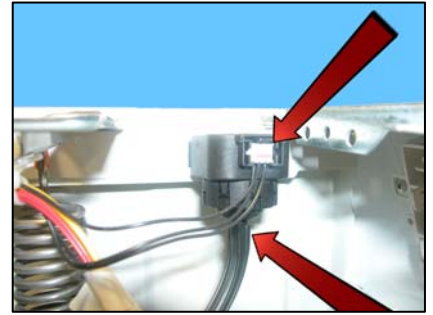
If the hooks are broken you can use screws to attach the display board to the control panel.

13.2.5 Analogue pressure switch

Remove the worktop (see relevant paragraph).

Remove the connector.

Pull off the pipe connecting it to the pressure chamber.



Tighten the two tabs which secure it to the cabinet and remove it.

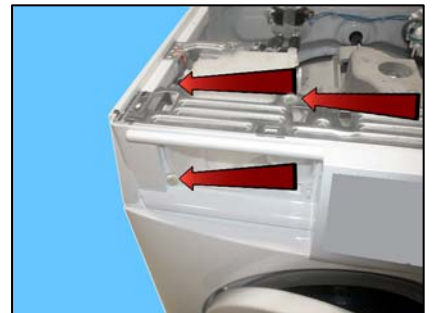


13.2.6 Detergent dispenser

Remove the worktop (see relevant paragraph).

Extract the detergent dispenser.

Remove the screws that secure the detergent dispenser to the control crossbar and to the control panel.



Pull off the pipes.



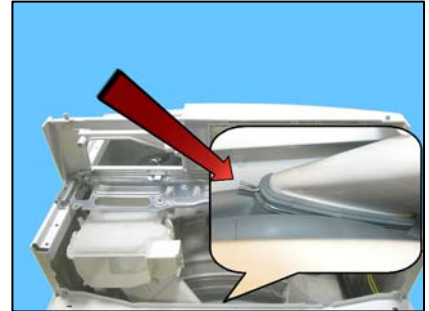
Release the anchor tab which secures the detergent dispenser to the control crosspiece.



Remove the control panel (see relevant paragraph).
Rotate it, arrange it as shown in the figure, making sure you introduce a protection to prevent scratching it.



Remove the detergent inlet pocket from the detergent dispenser assembly.



Remove the detergent dispenser.



For reassembly.

After completing all the steps in the reverse order.

During insertion of the detergent dispenser into the pocket of the bellows seal:

Remove the plastic ring securing the bellow seal to the cabinet.



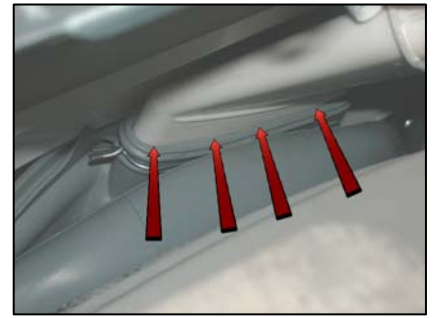
Reposition the closed clamp in the door bellow seal pocket and lubricate the inside.



Also lubricate the outside of the detergent dispenser assembly, which should be inserted into the pocket.



First task to perform:
introduce the dispenser only slightly into the bellow seal pocket, from the inside of the appliance.



Second task:
introduce the dispenser only slightly into the bellow seal pocket, from the outside of the appliance.



Lastly, introduce the detergent dispenser assembly completely into the bellow seal pocket.



Check that the dispenser is perfectly in place to avoid any water leaks.



13.2.7 Top counterweight

Remove the worktop (see relevant paragraph).
Remove the two screws that secure it to the welded tub.

When reassembling:
If the tub assembly is new, tighten the screws at a torque of 20 Nm.
If the casing is not new, tighten the screws at a torque of 10 Nm.



13.3 Accessing the front part

1. Door safety interlock (with/without incorporated flange)
2. Door
3. Drain filter
4. Fixed blade
5. Opening blade
6. Bellow seal
7. Front panel

13.3.1 Door safety device (with incorporated flange)

Remove the plastic ring fixing the bellows seal to the cabinet.
Release the bellows seal from the cabinet and turn it inside out towards the inside of the drum.



Unfasten the two screws securing the door safety interlock to the front panel.



Take the device and move it to the left.



Turn it towards the inside (right-hand side of the flange).



Pull it out towards the right and remove it.



Pull out the wiring protection from the door safety device.
Disconnect the connector.



To reassemble the door safety device, repeat the same operations in reverse.

Before tightening the screws to secure the door safety device to the front panel, make sure the flange is positioned properly on the outside as indicated by the arrows.



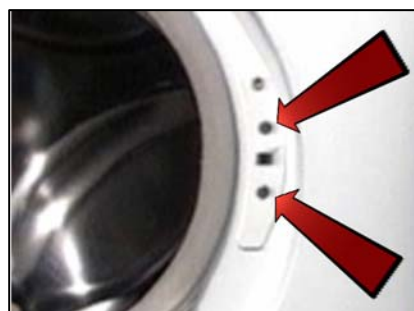
Tighten the screws at a torque of 2.5 Nm.

13.3.2 Door safety interlock (without incorporated flange)

Remove the plastic ring securing the bellows seal to the cabinet.
Release the bellows seal from the cabinet and turn it inside out towards the inside of the drum.



Unfasten the screws securing the door safety interlock to the front panel.



Pull out the door safety interlock.
Release the protection from the device.
Disconnect the wiring connectors.



13.3.3 Door

To replace the hinge, loosen the screws securing it to the cabinet.

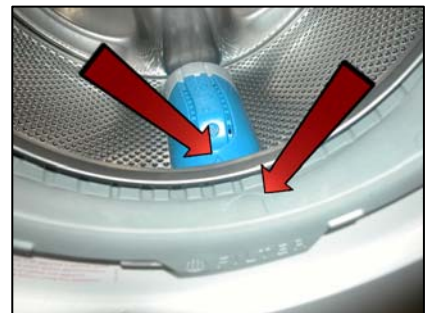


Unfasten the screws joining the two front and rear door frames shown in the figure.



13.3.4 Drain filter

To access the drain filter, place the opening blade against the arrow printed on the bellow seal.



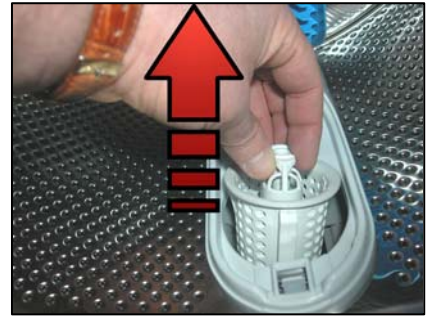
Insert a finger into the moving part of the blade, as shown in the figure and press the button indicated by the arrow, lifting it up.



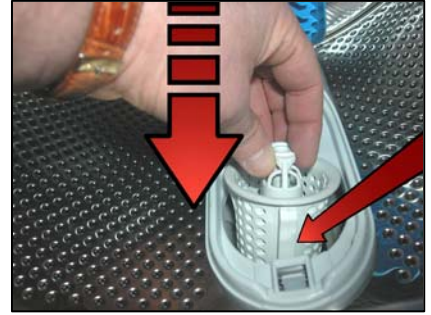
The drain filter is inside.



To remove it, lift it out.



When repositioning the filter in its seat, follow the tabs which guide it into place.



If the filter is not positioned correctly, the insertion indicator remains in its seat.



If the filter is positioned correctly, the insertion indicator appears at the centre of the filter.



13.3.5 Fixed Blade

This blade is secured to the drum with slides and secured with blades carved into the drum.

To remove it from the drum:

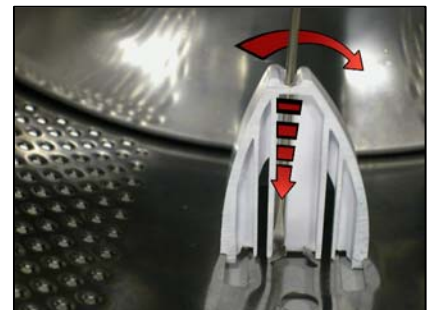
Insert a screwdriver into the fourth slot (start counting from the rear of the blade).

Insert the screwdriver with the handle tilted towards the left. Push the right-hand tab downwards.

Insert the screwdriver, with the handle tilted towards the right. Push the left-hand tab downwards.

When the two tabs are down. Move the blade towards the front of the drum.

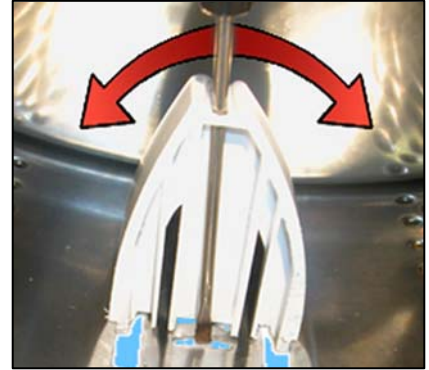
Before securing the new blade. Insert a flathead screwdriver beneath the tabs and raise them a little.



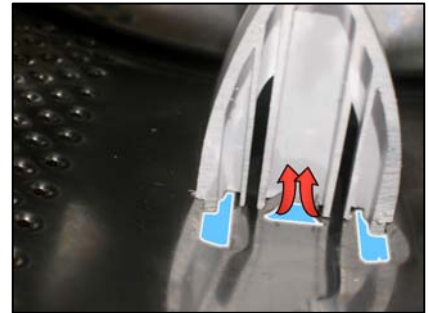
Position the new blade inside the drum guides.
Push it towards the back.



Insert the screwdriver (in the fourth slot) at a right angle to the blade,
so as to position it at the centre of the two tabs.
Move to the left and right.



So that the tabs are moved upwards (as indicated by the arrows in the figure)
and they are inserted inside the blade, securing it to the drum (as shown in
the figure).



13.3.6 Opening blade

Secured to the drum by four screws (Torx head).



13.3.6.1 Replacing the blade by removing the counterweight

Remove the upper counterweight, see para. 13.2.7 page 59.

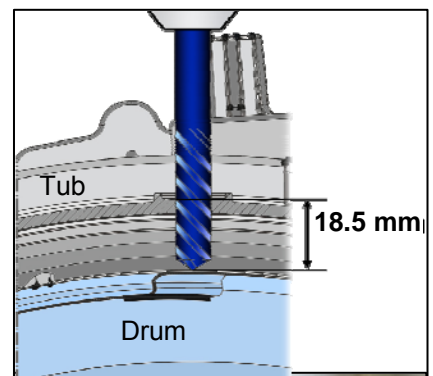
Once the counterweight has been removed, there are two circular references printed onto the tub (indicated by the arrows), corresponding to the position of the screws securing the mobile blade to the drum.



Using a \varnothing 11 mm drill bit, drill the tub in the centre of the references.

WARNING

To avoid damaging/drilling the drum, the drill bit must under no circumstances exceed a depth of 18.5 mm.



Hole at the centre of a reference point.



Turn the drum and position the screws in the hole.



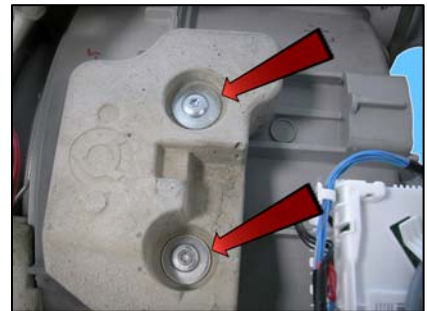
Use a magnetic screwdriver to loosen the screws (Torx head), making sure you don't drop them inside the tub.



Once the mobile blade replacement is complete, cover the holes with plugs and seal with silicone. (Code 5028 80 48-00/7).



Reposition the counterweight.
Tighten the screws at a torque of 10 Nm.



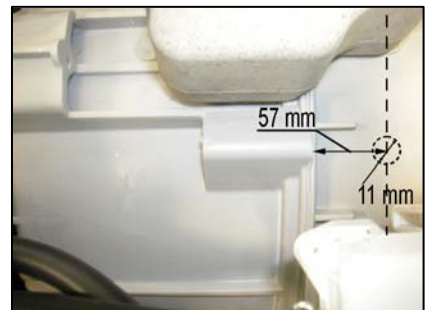
13.3.6.2 Replacing the blade without removing the counterweight.

With the counterweight screwed on, only one reference is visible, as indicated by the arrow.



The other reference can be obtained: by tracing a parallel line 57 mm from the front casing (tub welding). You can drill the \varnothing 11 mm hole on this line.

See page 66 for the tub drilling procedure.



The procedure to cover the holes is the same as that described in the previous paragraph.

13.3.7 Door bellows seal

Remove the worktop (see relevant paragraph).

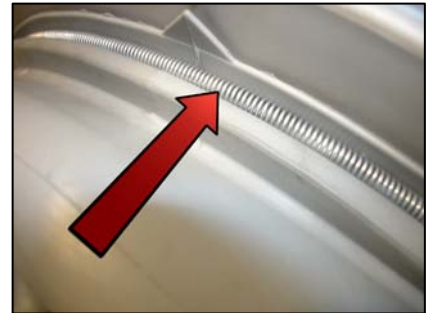
Remove the plastic ring to release the door bellows seal from the front panel.



Once the door bellows seal has been removed from its seat in the cabinet. Remove the pocket from the detergent dispenser assembly.



Remove the ring securing the seal to the tub.



Pull the door bellows seal out to remove it.

When reassembling the door bellows seal, lubricate it with soap. Align the seal and tub reference marks.



Reassemble the ring between the door bellow seal and the tub.

Thread the clamp onto the detergent inlet pocket.

Using soap, lubricate: the pocket and the detergent dispenser assembly and introduce it into the pocket (see sect. 13.2.6 page 58).

Reassemble the plastic ring between the door bellows seal and the cabinet.

13.3.8 Front panel

Remove the worktop (see relevant paragraph).
Remove the control panel (see relevant paragraph).
Remove the plastic ring and remove the door bellows seal from the front panel.

Unfasten the two screws fixing the front panel to the sides (indicated by the arrows).



Tilt the washing machine

Unfasten the three screws fixing the front panel to the base (indicated by the arrows).



Remove the front panel



13.4 From the front panel, you can access

1. Front counterweight
2. Welded tub assembly
3. Pressure chamber

13.4.1 Front counterweight

Remove the worktop (see relevant paragraph).
Remove the control panel (see relevant paragraph).
Remove the front panel (see relevant paragraph).

Unfasten the five screws fixing it to the welded casing assembly.



13.4.2 Welded tub assembly

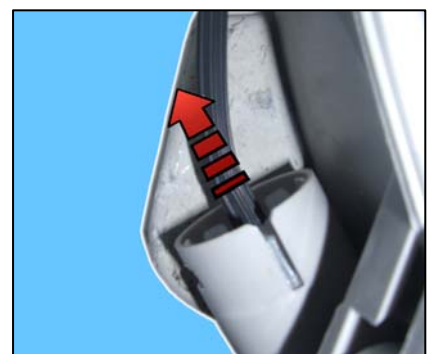
Remove the worktop (see relevant paragraph).
Remove the control panel (see relevant paragraph).
Remove the front panel (see relevant paragraph).
Remove the detergent drawer.
To remove the washing unit assembly, disconnect:
all the wiring connectors connecting the heating element, the NTC probe,
the motor and the drain pump.
The analogue pressure switch pipe, the drain pipe.



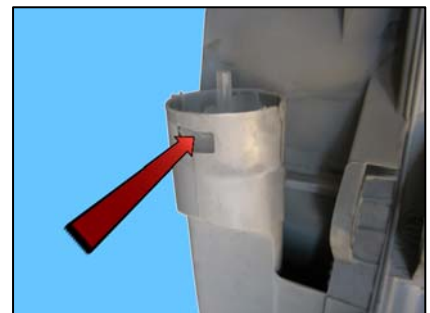
13.4.3 Pressure chamber

Remove the worktop (see relevant paragraph).
Remove the control panel (see relevant paragraph).
Remove the front panel (see relevant paragraph).
Remove the washing unit assembly (see relevant paragraph).

Pull out the pipe connecting the analogue pressure switch from the plug closing the pressure chamber.



Release the retainers that secure the plug to the pressure chamber.



Remove the plug.



To reassemble:

Use a new plug to close the pressure chamber.

Before introducing the plug into its seat, lubricate the plug seal or the edge of the pressure chamber interior.

Once repaired, check that no water leaks from the plug.

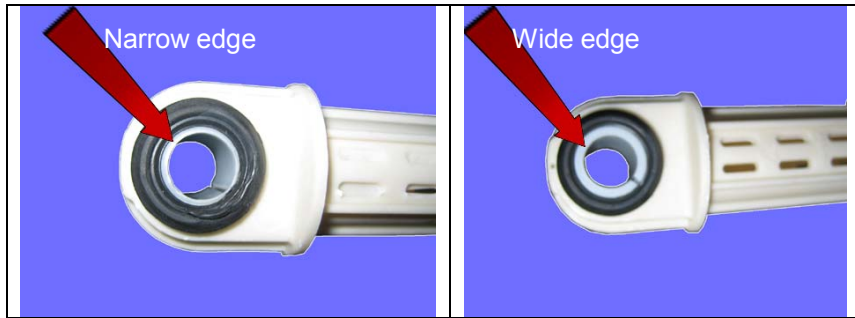
13.4.4 Shock absorbers

To remove the pins from their seats, press the locking tooth and at the same time remove it with pliers. Repeat the same task for both pins. Remove the shock absorber from its seat.

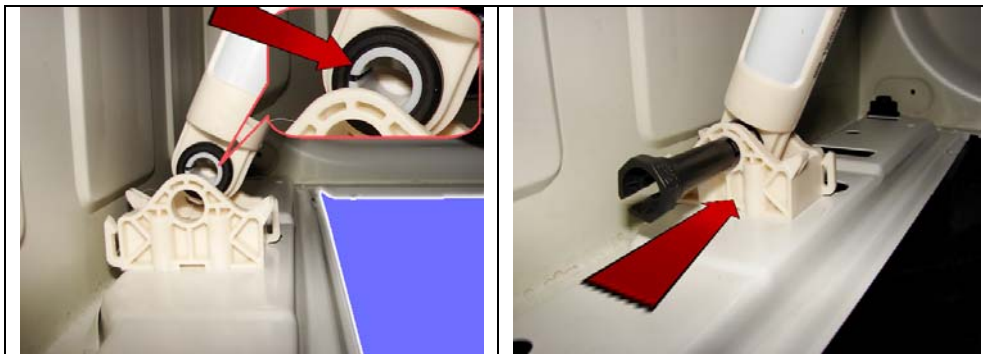


13.4.5 Shock absorber pin

Each end of the shock absorber has a bushing, which has a wider edge to avoid it becoming dislodged when the pin is inserted (see the two figures below).



When positioning the shock absorber inside the fastening (located in the base of the cabinet or in the tub), take care when positioning the bushing, so as to insert the pin from the part of the bushing with the widest edge. The spare bushing is supplied under Code 344 91 25-30/5.



If inserting the pin proves difficult, grease it a little (Code 5026 24 16-00/6).

13.4.6 Tub suspension springs

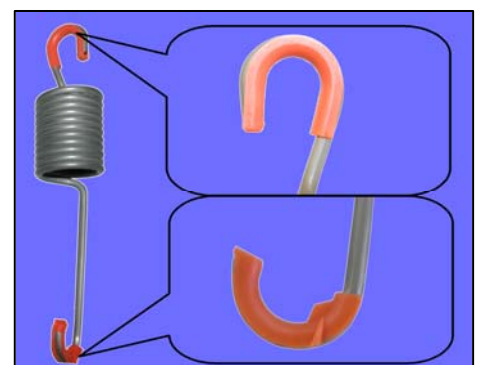
When reattaching the springs (after repair work which required their removal), make sure that the bushings shown in the figure are featured on both ends.

Pay attention to the differences between the bushings (see enlarged details).

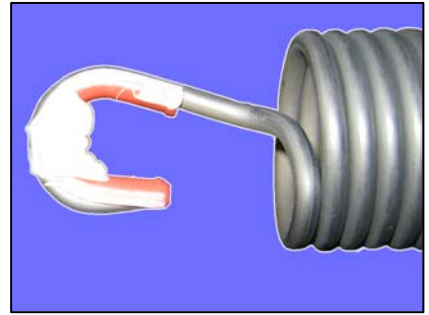
Spare bushings are available, under the following codes:

Upper bushing Code 405506251/9

Lower bushing Code 405506252/7



Apply some grease on either end of the spring. Use grease Cod. 5026 24 16-00/6.



Arrange the spring as shown in the figure with the short end attached to the bracket and the long end to the tub (reverse assembly is strictly forbidden).



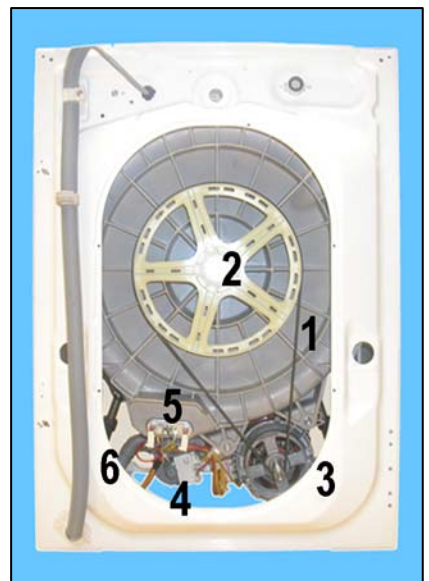
13.5 Back panel

Unfasten the screws securing it to the rear of the appliance.



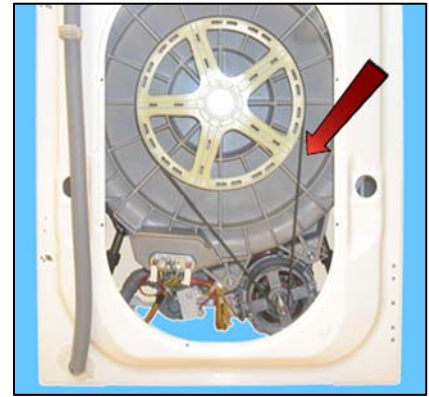
13.6 From the back panel, you can access

1. Belt
2. Pulley
3. Motor
4. Drain pump
5. Heating element
6. Drain pipe



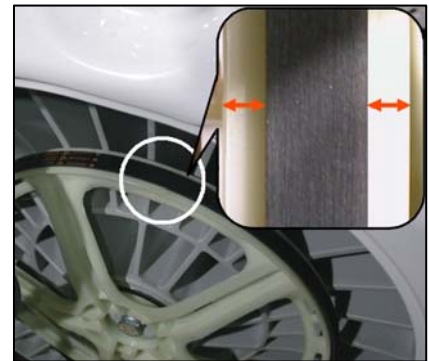
13.6.1 Belt

Remove the back panel (see relevant chapter).
Hold the belt, and by turning the pulley, remove it.



When reassembling:
position the belt in the centre of the pulley as shown in the figure.

Turning the pulley, check that the belt positions itself and remains in the central part of the pulley.



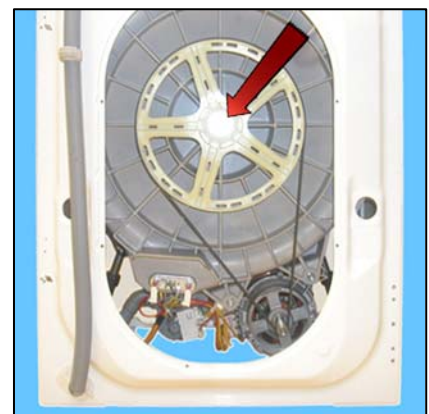
If necessary, adjust the position of the belt on the drive pulley, so that it is correctly positioned



13.6.2 Plastic pulley

Remove the back panel (see relevant chapter).
Remove the belt (see relevant chapter).
Insert a retainer to secure the pulley in place.
Remove the screw fixing the pulley to the drum shaft.

Tighten the screw at a torque of 60 Nm.

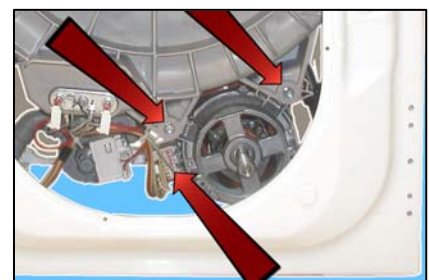


13.6.3 Motor

Remove the back panel (see relevant chapter).

Disconnect the wiring connector.
Unfasten the screws securing it to the welded tub assembly.

Tighten the screws at a torque of 5 Nm.



13.6.4 Drain pump

Remove the back panel (see relevant chapter).

Disconnect the wiring connectors.
Unfasten the three screws fixing it to the screw.

The screw is fitted with six slots to secure the pump in place. If three slots are damaged, the other three can be used.

13.6.5 Heating element

Remove the back panel (see relevant chapter).

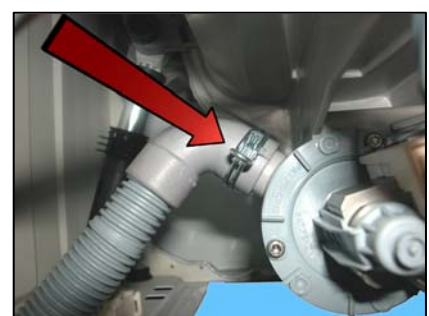
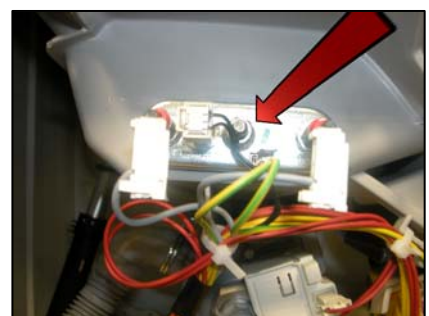
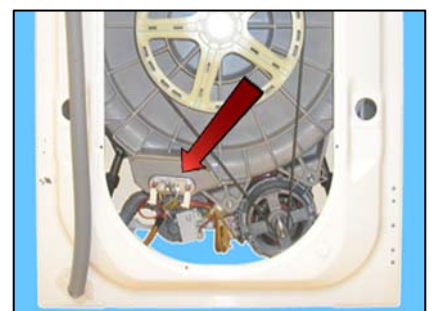
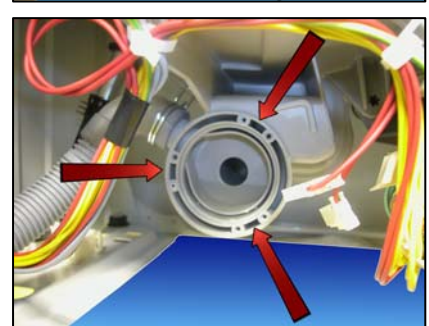
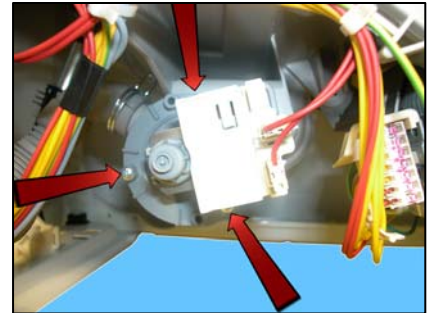
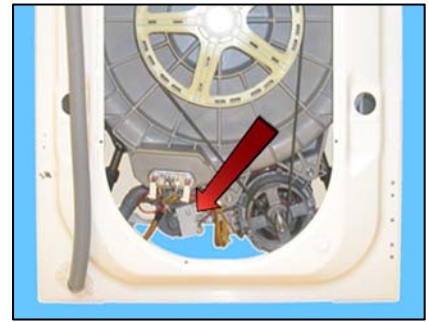
Disconnect the wiring connectors (heating element and probe).
Remove the heating element flange fastening screw.

13.6.6 Drain pipe

Remove the back panel (see relevant chapter).

Use a pair of pliers to tighten the tabs of the clamp and remove it from the screw.

Some of these operations may also be performed from the base of the appliance.



Revision	Date	Description	Author	Approved by:
00	04/2012	Document creation	DMM	XX – 0X/201X