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DISHWASHERS
EDW 1000
(Mini_Tronic)

45 cm
Free-standing / Built-in

(FUNCTIONALITIES)

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1. GENERAL

1.1 GENERAL CHARACTERISTICS

| | |
|----------------------------------|--|
| Power supply | 220 - 240 V / 50 Hz (limits 187÷254 V) |
| Total power absorption | 2300 W (2100 W heating element) |
| Water supply | Min. / Max. Pressure: 5 ÷ 80 N/cm ² |
| Load capacity | 12 Place settings |
| Consumption (BIO AAB programme): | |
| ↳ Water | 14 litres |
| ↳ Energy | 0.8 kWh |
| ↳ Duration of cycle | 120 minutes |
| Noise level | 50 db (A) (sound pressure) |

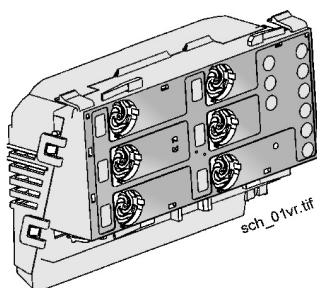
1.2 FIELD OF APPLICATION

| | |
|------------------------|---|
| Washing system | COMBINED IMPULSE |
| Water fill level | PRESSURE SWITCH CONTROL SOFTWARE (Level stability) |
| Water heating | HIDDEN HEATING ELEMENT |
| Temperature control | TEMPERATURE SENSOR (NTC) |
| Drying cycle | ACTIVE |
| Safety features/alarms | TOTAL PROTECTION (HYDRAULIC/SOFTWARE) |

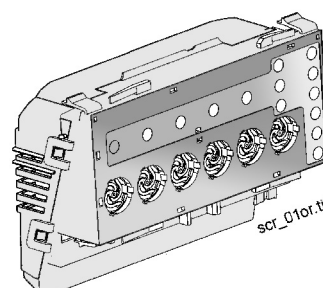
1.3 ELECTRONIC CONTROL MODULE

| | |
|-----------------------|--|
| Power board | MAIN CONTROL BOARD (built-in microprocessor) |
| Control/Display board | USER / MACHINE INTERFACE |

Module with vertical controls

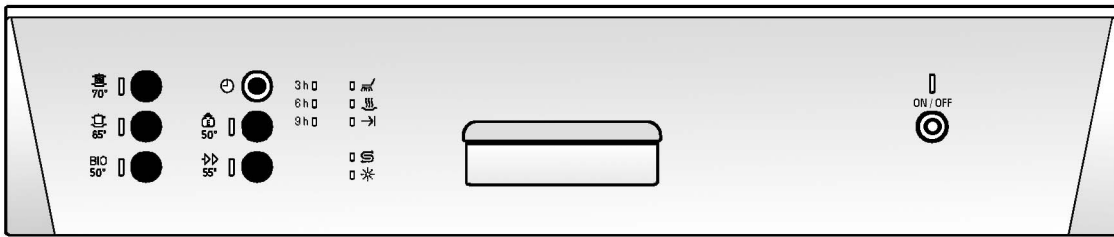


Module with horizontal controls



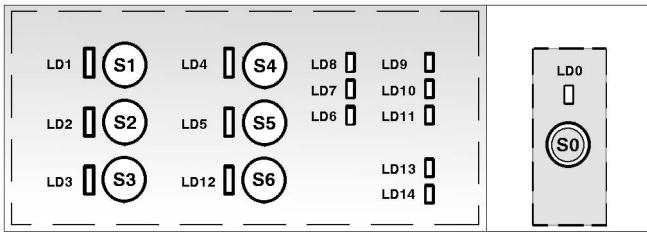
1.4 AESTHETIC CHARACTERISTICS

Control panel – VERTICAL version



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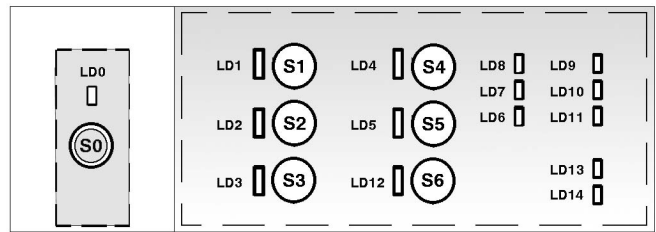
VARIANTS



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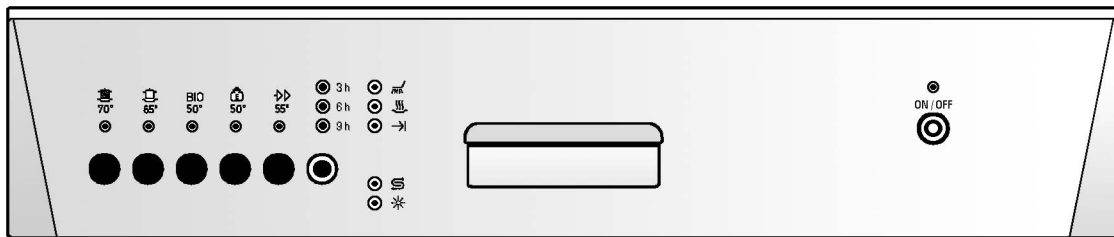
ON key on right

ON key on left



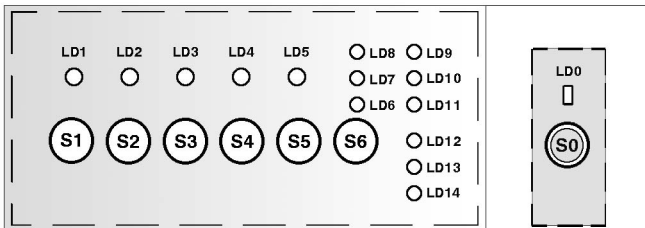
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Control panel – HORIZONTAL version



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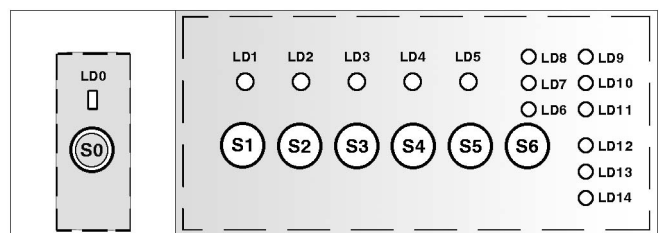
VARIANTS



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ON key on right

ON key on left

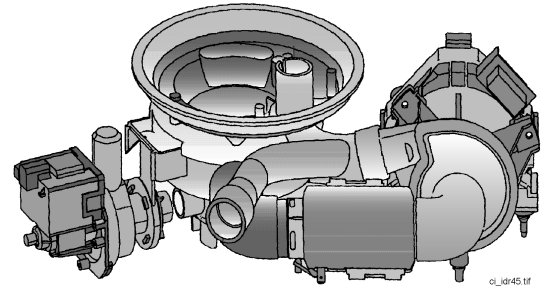
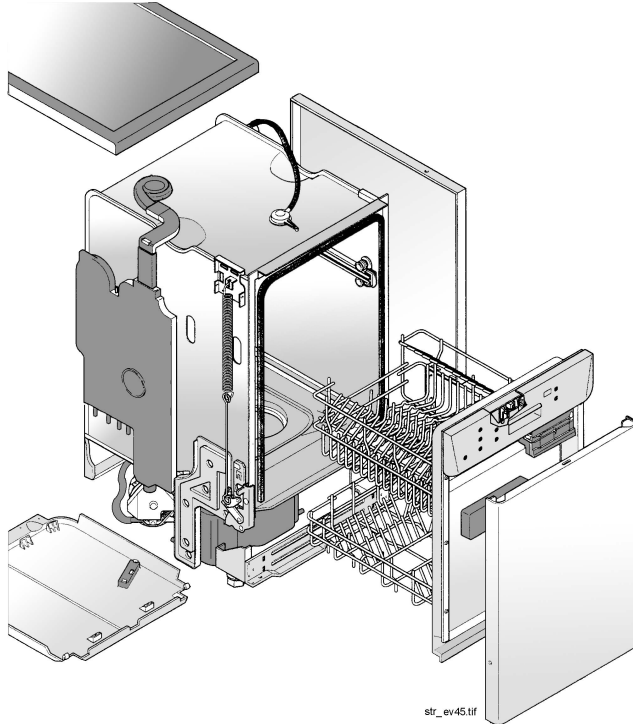


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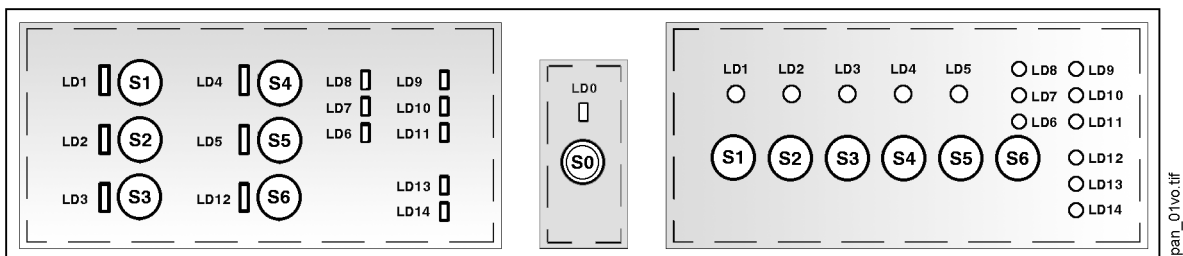
1.5 STRUCTURAL CHARACTERISTICS

Structure: MODULAR 45 cm
 Version: FREE-STANDING / BUILT-IN
 Controls: KEYS

Functionality: EVOLUTION



LAYOUT OF CONTROLS



[S0] - ON/OFF key

[S1] ... [S3] - PROGRAMME SELECTION keys

[S4] ... [S6] - PROGRAMME SELECTION and/or OPTION keys

[LD1] ... [LD3] - "PROGRAMME" INDICATOR LEDES

[LD4] [LD5] [LD12] - "PROGRAMME" and/or "OPTIONS" INDICATOR LEDES

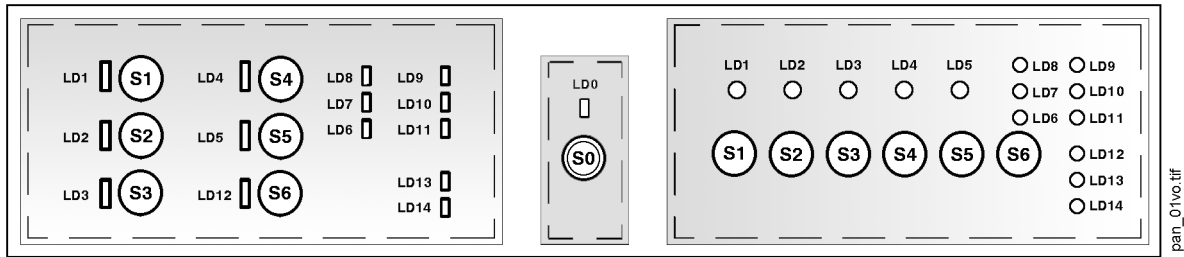
[LD6] ... [LD8] - "DELAYED START" INDICATOR LEDES

[LD9] ... [LD11] - "CYCLE PHASE" INDICATOR LEDES

[LD13] [LD14] - "SALT" / "RINSE AID" LEDES

2. FUNCTIONAL CHARACTERISTICS

2.1 CONTROL PANEL



ON/OFF KEY [S0]

Switches the dishwasher ON and OFF.

↪ When the LED [LD0] lights, this means that the appliance is switched on.

2.1.1 PROGRAMME AND OPTION KEYS [S1 S2 S3 S4 S5 S6]

Used to select a washing programme and the desired options (if featured).

↪ Each key corresponds to a specific programme or option (Delay, ½ Load).

↪ Each key features a LED which switches on and off when the key is pressed.

↪ Each type of dishwasher may feature from 3 keys (minimum) to 6 keys (maximum).

↪ Keys [S1 S2 S3] are featured on all models, since these are used for special functions by Service engineers.

2.1.2 CYCLE PHASE LEDs [LD9 LD10 LD11]

These LEDs light during the various phases of the washing cycle.

[LD9] - WASHING

[LD10] - DRYING

[LD11] - END OF CYCLE

The LEDs light as follows:

↪ Programme selection - the two LEDs [LD9 LD10] flash simultaneously.

↪ Programme execution - only one LED [LD9] or [LD10] relative to the current phase of the cycle remains lit.

↪ End of cycle - only one LED [LD11] remains lit; the remaining LEDs are unlit.

2.1.3 INDICATOR LEDs [LD13- LD14]

These LEDs light to indicate the corresponding functions.

[LD13] - SALT

[LD14] - RINSE-AID

These LEDs light during the various phases as follows:

↪ Programme selection - the LEDs light (fixed).

↪ Programme execution - the LEDs remain unlit.

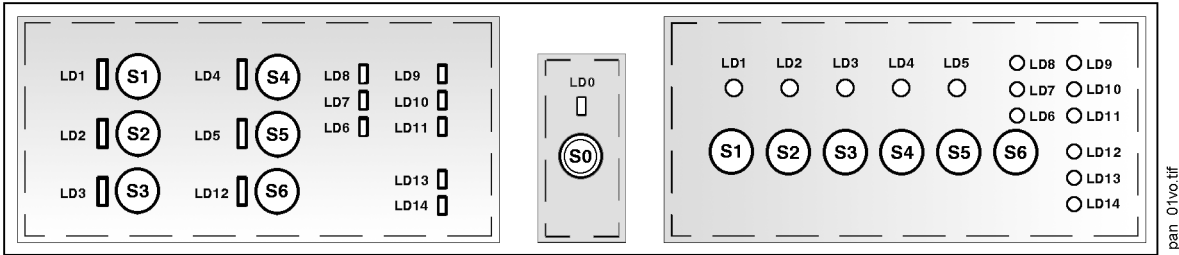
These LEDs indicate the following:

↪ [LD13] - the salt required for regeneration requires topping up.

If the regeneration level is set to [0] (no regeneration), this LED remains unlit at all times.

↪ [LD14] - the rinse-aid liquid requires topping up.

2.2 SUPPLEMENTARY OPTIONS (factory-set)



2.2.1 POSSIBLE OPTIONS: «DELAY» & «1/2 LOAD» (if featured)

- ↳ Only one option can be selected at a time («DELAY» or «1/2 LOAD»), never both.
- ↳ If featured, the option may be associated with keys [S4] or [S5] or [S6].

2.2.1.1 «DELAYED START» SELECTOR KEY Leds [LD6 LD7 LD8]

Determines the delay time before the selected cycle is started.

- ↳ Press this key repeatedly until the desired delay time is displayed; the corresponding LEDs will switch on and off.
- ↳ LEDs [LD6 LD7 LD8] correspond to [3h.. 6h.. 9h..]
- ↳ The LED which remains lit [LD6 LD7 LD8] indicates the selected delay time.
- ↳ When the selected delay time is confirmed, the LEDs (e.g.[LD8 LD7 LD6]) switch off one at a time until all three are off.

2.2.1.2 «1/2 LOAD» SELECTOR KEY LEDs [LD4] or [LD5] or [LD12]

The 1/2 LOAD key is used to optimize the washing cycle when small quantities of dishes are to be washed..

The washing cycle is modified when the following parameters are selected:

- ↳ Exclusion of the PRE-WASH cycle (in cycles that normally include the PRE-WASH).
- ↳ Reduction of the cycle time (18 > 28 min).
- ↳ Reduction of water consumption for the cycle (~ 4lt).

In this case, LEDs [LD6 LD7 LD8] are not present on the control panel.

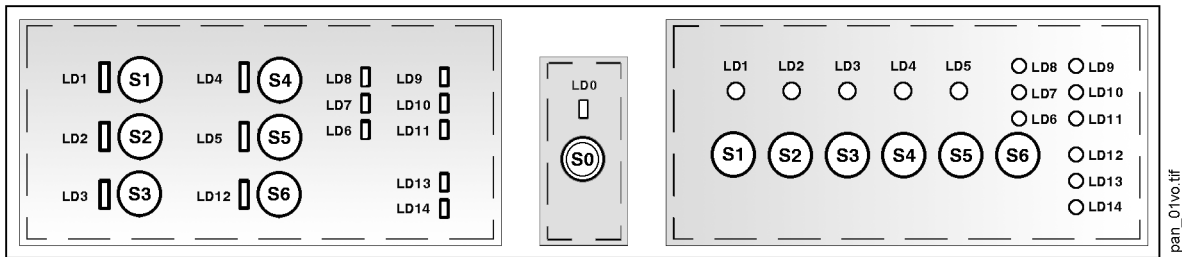
2.3 POWER FAILURE

- A POWER FAILURE is detected if the mains power supply is interrupted for a very brief period (between 20 and 40mSec).
- The POWER FAILURE function consists of maintaining the cycle status information when a power failure occurs, so that, when power is restored, the appliance resumes the cycle from the point at which it was interrupted.

The POWER FAILURE function is as follows:

- ↳ When a power failure is detected, all loads switch off simultaneously, and the energy stored in the capacitor is used to memorize the machine status data in the EEPROM; when the power supply is restored, this data is used to resume the cycle from the point at which it was interrupted.

2.4 SELECTION OF PROGRAMMES



2.4.1 SELECTING THE CYCLE (with the door closed)

- ☀ Switch the dishwasher ON by pressing [S0]; the “POWER ON” pilot lamp lights [LD0].
- ↻ The SALT and RINSE-AID LEDs [LD13 LD14] may light.
- ☀ Press the key for the desired programme [S1 S2 S3].
- ↻ The LED corresponding to the selected programme lights [LD1 LD2 LD3].
- ↻ The two cycle phase LEDs [LD9 LD10] flash.
- ☀ Select the desired option (if featured).
- ↻ LED [LD..] lights to confirm the option selected.
- ☀ About 6 seconds after the last key is pressed, the washing programme commences.
- ↻ If the programme is selected with the door OPEN, the programme will start 6 seconds after the door is closed.

2.4.2 CYCLE EXECUTION

- ☀ Washing programme currently being performed.
- ↻ The LED relative to the selected programme [LD..] remains lit.
- ↻ The Options LED, too [LD..] may remain lit.
- ↻ LED [LD9] for the current phase remains lit; the other LEDs [LD10 LD11] remain off.
- ↻ As the programme proceeds and at the end of the phase, LED [LD9] switches off; Led [LD10], corresponding to the subsequent phase of the cycle, lights.
- ☀ All the keys (with the exception of the key for the selected programme, which can be used to cancel the current cycle) are disabled, i.e. no parameter can be modified.

2.4.2.1 CYCLE PAUSE – The programme is suspended (though all the parameters remain stored in memory).

- ☀ If key [S0] is pressed, the power supply is disconnected and the machine is switched off.
- ↻ If key [S0] is pressed again, the machine is switched on again and the cycle resumes from the point at which it was interrupted.
- ☀ If the door is opened, the appliance remains connected to the power supply (though the power loads are deactivated).
- ↻ The LED for the current phase of the cycle [LD9] or [LD10] flashes.
- ↻ The LED corresponding to the selected programme [LD..] (as well as the LED for any options that have been selected) remain lit.
- ↻ When the door is closed, the cycle resumes from the point at which it was interrupted.

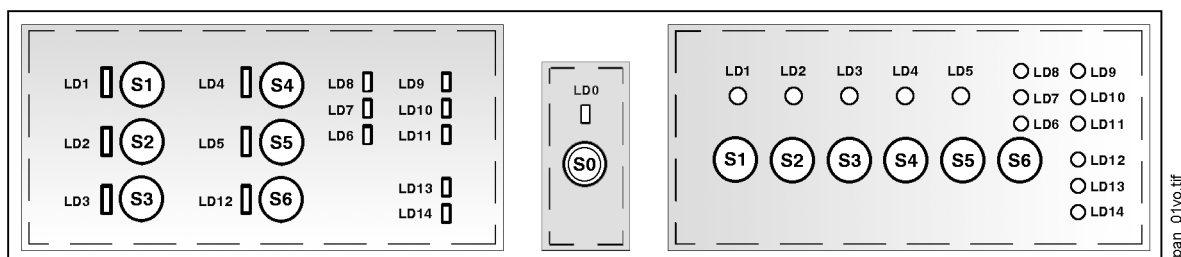
2.4.2.2 CANCELLING THE CYCLE

- ☀ To cancel the current programme, press the key relative to the programme selected [S..] for 3 seconds; this key corresponds to LED [LD..]; the appliance returns to programme selection mode.

2.4.3 END OF CYCLE

- ☀ The cycle phase LED [LD11] lights to indicate that the cycle has ended.
- ↻ To cancel the programme that has just ended, open the door or switch off the dishwasher by pressing [S0].

2.5 SELECTING A PROGRAMME WITH THE DELAYED START OPTION



2.5.1 PROGRAMME SELECTION (with the door closed)

- ☀ Press [**S0**] to switch the dishwasher on; the “POWER ON” LED [**LD0**] lights.
- ☀ Perform the procedure for selection of the programme / options as described in paragraph (2.4.1).
- ☀ Press one of the keys [**S4**] or [**S5**] or [**S6**] (i.e. the key corresponding to the delayed start function) to select the desired delay time.
- ↪ Press [**S...**] repeatedly; LEDs [**LD6 LD7 LD8**], which correspond to the possible delay times (in hours) will light in sequence.
- ↪ To cancel the delay time, press [**S...**] repeatedly until the LEDs switch off.
- ☀ 6 seconds after [**S...**] is pressed for the last time, the delayed start countdown will begin.
- ↪ If the delayed start time is selected with the door open, the countdown will begin 6 seconds after the door is closed.

2.5.2 PROGRAMME EXECUTION

- ☀ The delayed start countdown has started.
- ↪ The countdown time decreases from the maximum (9 hours) to (0 hours).
- ↪ As the countdown proceeds, the time to elapse is shown by LEDs [**LD8 LD7 LD6**] and is updated at intervals of 3 hours.
example: If a 9-hour delay is selected, LED [**L8**] will be lit; after 3 hours, this LED switches off and LED [**L7**] lights; after another 3 hours, LED [**L7**] switches off and LED [**L6**] lights; three hours later, all the LEDs are switched off.
- ↪ LED [**LD..**] for the selected programme (and [**LD..**] if any options have been selected) remain lit for the entire duration of the countdown.
- ↪ The cycle phase LEDs [**LD9 LD10 LD11**] remain unlit.
- ↪ All the keys are disabled (i.e. none of the parameters can be modified) with the exception of the key for the selected programme, which can be used to cancel the programme, and the DELAY key, which can be used to modify or cancel the delayed-start function.
- ☀ The countdown is not interrupted if the door is opened.
- ☀ At the end of the countdown (i.e. when LEDs [**LD6 LD7 LD8**] all switch off), the washing programme starts automatically.
- ↪ The cycle phase LED [**LD9**] relative to the programme being performed lights.
- ☀ From this point, repeat the steps described in the previous paragraphs (from 2.4.2 on).

2.5.2.1 CANCELLING THE DELAYED START OPTION

- ☀ To cancel the delayed start option, press the DELAY key [**S...**] repeatedly until the LEDs [**LD8 LD7 LD6**] switch off; after 6 seconds, the programme will start automatically.

3. SPECIFICATIONS FOR ACTUATORS AND SENSORS

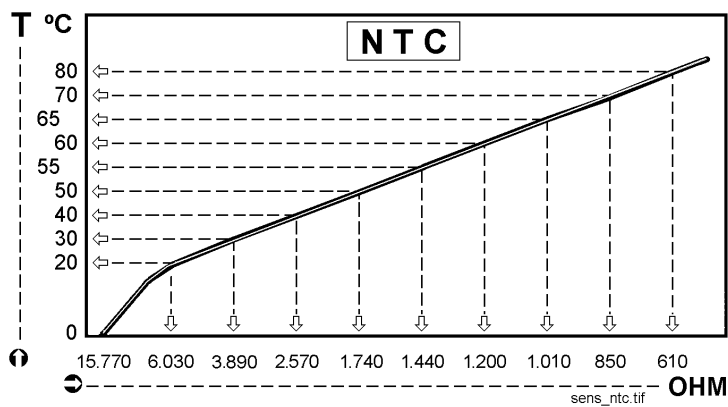
3.1 COMPONENTS

| TYPE OF COMPONENT | POWER AVAILABLE | TYPE OF CONTROL |
|------------------------------|-----------------|-----------------|
| Wash pump | Max 250W | Triac & relay |
| Drain pump | Max 100W | Triac & relay |
| Washing heater | Max 2100W | Relay |
| Water fill solenoid | Max 10W | Triac |
| Regeneration solenoid | Max 10W | Triac |
| Detergent/Rinse-aid solenoid | Max 10W | Triac |
| Fan motor | Max 10W | Triac |

3.2 SENSORS

| TYPE OF SENSOR | TYPE OF READING | TYPE OF COMPONENT |
|----------------------|-----------------------|-----------------------|
| Salt sensor | Digital 5 V | Reed |
| Rinse-aid sensor | Digital 5 V | Reed |
| Temperature sensor | Analogue 5 V | * NTC |
| Tachimetric sensor | Frequency | Tachimetric generator |
| Level sensor | Digital, high voltage | Pressure switch |
| “Door closed” sensor | Digital, high voltage | switch |
| Anti-flooding sensor | Digital, high voltage | switch |

* COMPARATIVE VALUES



4 OPERATION OF THE WASH / DRAIN MOTOR

4.1 WASH MOTOR

CHARACTERISTICS

This dishwasher is fitted with a single-phase variable-speed asynchronous motor.

↳ A tachimetric sensor, fitted to the interior of the motor, constantly monitors the speed of the motor, which is transmitted to the electronic control system.

MEASURING THE SPEED OF THE MOTOR

The operation of the motor during the washing cycle is controlled by the electronic control system, which operates the motor at different speeds (fixed or variable).

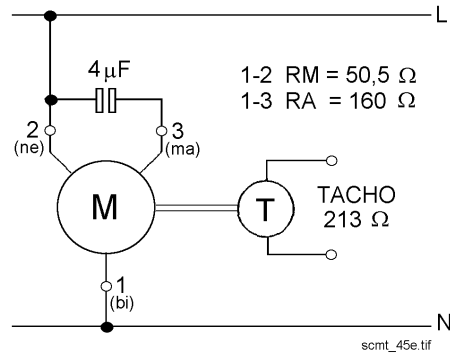
↳ The signal sent by the tachimetric sensor to the electronic control system (microprocessor) detects the speed of the motor; the microprocessor performs a series of calculations and switches on the Triac which generates the appropriate speed.

↳ The following motor speeds are used during the washing cycle:

| Fixed speed | Variable speed |
|-------------|----------------|
| 1600rpm | 1600 2800rpm |
| 2300rpm | |
| 2800rpm | |

TECHNICAL CHARACTERISTICS:

- Power supply: 220/230V, 50Hz
- Speed: 2800 rpm
- Power absorption: 168 W
- Capacitor: 4μF
- Direction of rotation: Anti-clockwise
- Head 200 cm



4.2 WASH / DRAIN FUNCTION

The WASH and DRAIN functions are controlled by the electronic control board, which powers the two motors alternately by means of a switching relay fitted to the control board.

The motor's electrical circuit is controlled by:

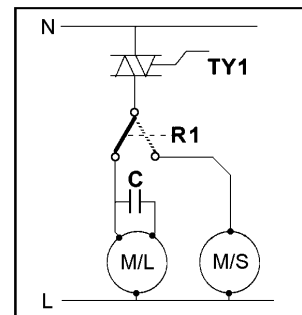
↳ The triac (**TY1**), which powers the two windings and determines the speed of rotation of the motor.

↳ Relay **R1**, which switches the power from one motor winding to the other.

The switching procedure is as follows:

↳ WASH motor: relay not powered

↳ DRAIN motor relay powered



4.3 WASHING SYSTEM

This appliance features the conventional washing system, in which the mechanical action is obtained by the rotation of the single motor. This drives the water into the hydraulic circuit and actions the two spray arms simultaneously.

DEFINITION OF THE WASHING SYSTEM

In order to optimize the washing programmes, this appliance offers two different washing systems; these are governed by the electronic control system, which powers the motor at two different speeds.

- ↳ **(ctrl)** Fixed-speed washing at 2800rpm
- ↳ **(puls)** Variable-speed (pulse) washing at 1600 > 2800rpm

The motor speeds for **(ctrl)** & **(puls)** are shown in the cycles table in the relative Service Notes.

4.3.1 (ctrl) FIXED-SPEED WASHING

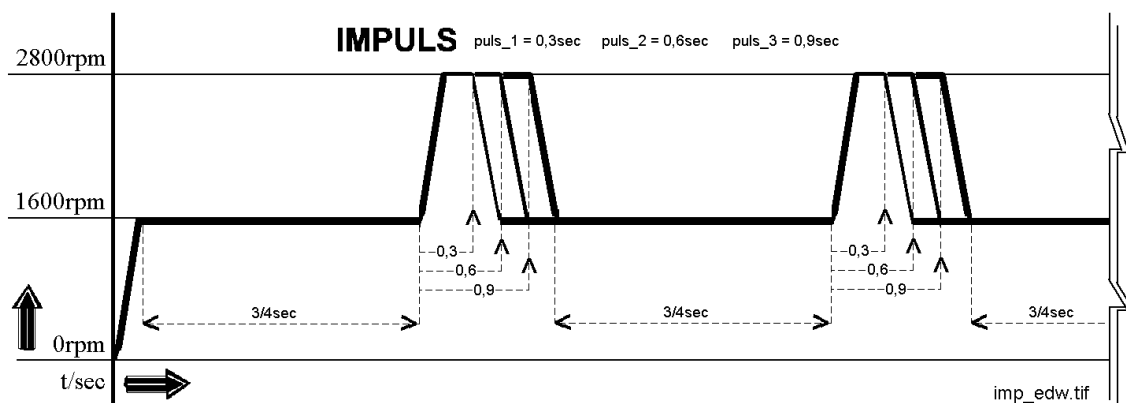
The electronic control unit powers the washing motor at the maximum speed (2800 rpm), in other words at fixed speed.

4.3.2 (puls) VARIABLE-SPEED (IMPULSE) WASHING

The variable-speed (impulse) washing system is controlled by the electronic control unit; the washing motor is actioned sequentially at two different speeds at brief intervals.

↳ Two timings are used for variable-speed (impulse) washing:

| MOTOR SPEED | | VARIABLE PERIOD |
|-------------|---------|--------------------|
| Maintenance | 1600rpm | 3/4sec |
| Impulse | 2800rpm | 0,3 ÷ 0,6 ÷ 0,9sec |

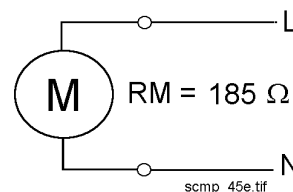


4.4 DRAIN MOTOR

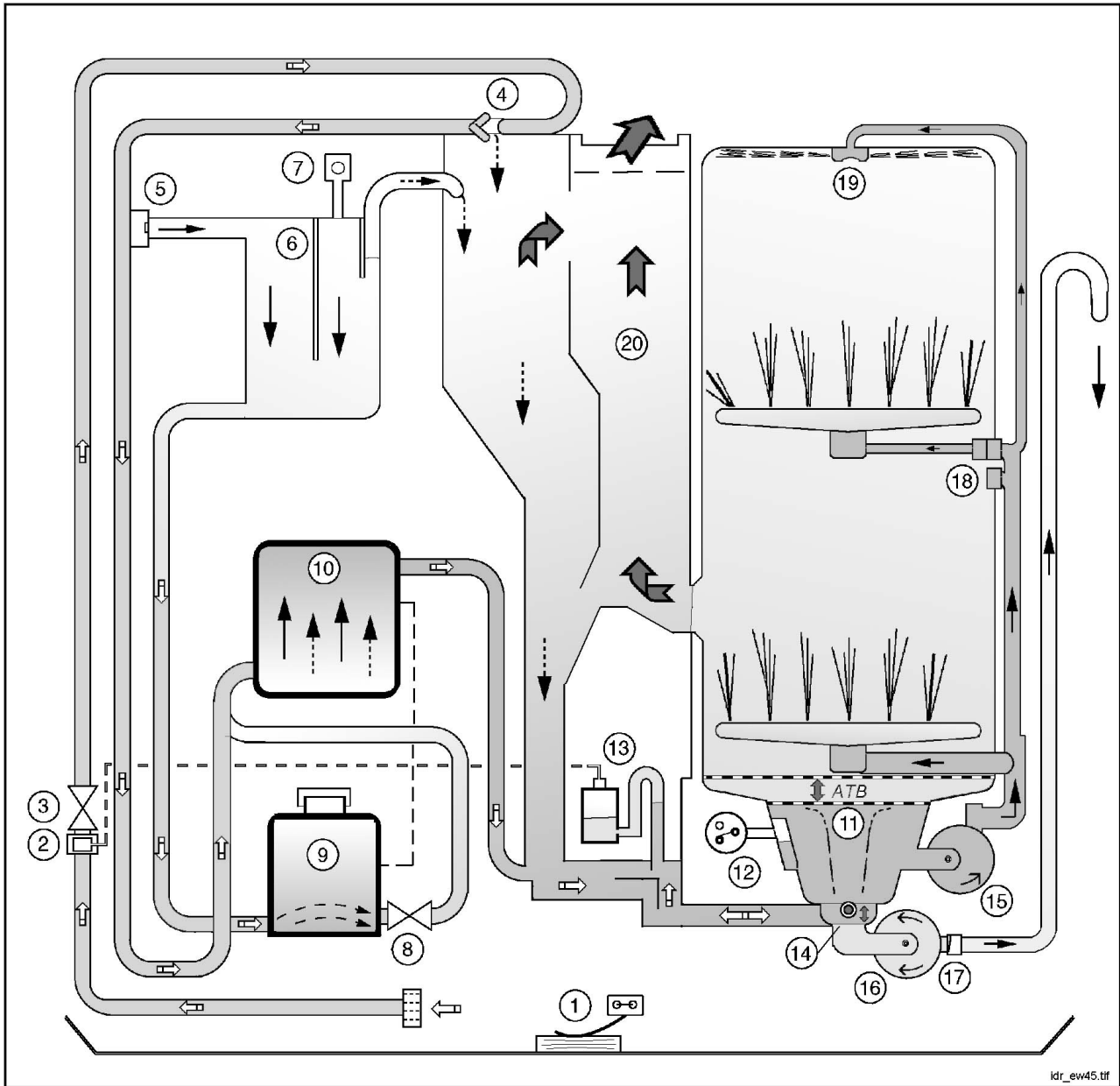
The type of motor used is spin single-phase synchronous.

TECHINICAL CHARACTERISTICS:

- Power supply: 220/230V, 50Hz
- Speed: 2800 rpm
- Power absorption: 168 W
- Capacitor: 4µF
- Direction of rotation: Anti-clockwise
- Head: 200 cm



4.5 5. HYDRAULIC CIRCUIT



KEY

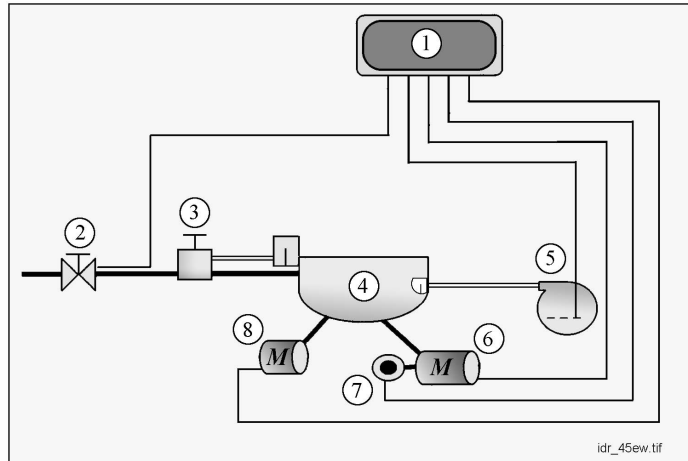
- | | |
|--|---|
| 1. Anti-flooding device | 11. Sump |
| 2. Anti-overflow device | 12. Pressure switch |
| 3. Fill solenoid | 13. Connector siphon for anti-overflow device |
| 4. Air-Break | 14. Cutting valve sump |
| 5. Intake valve for regeneration chamber | 15. Wash motor |
| 6. Regeneration chamber | 16. Drain motor |
| 7. Vent valve 2 nd regeneration chamber | 17. Non-return valve |
| 8. Regeneration solenoid | 18. Delivery valve to upper spray arm |
| 9. Salt container | 19. Upper sprayer |
| 10. Resin reservoir | 20. Vent chamber |

5.1 WATER FILL - FUNCTIONAL SYSTEM

For dishwashers fitted with motors with tachimetric sensors (1.5 New Generation models), the electronic control system is designed to control the water fill by identifying the signals received from the pressure switch (which thus acts as a pressure sensor).

The tachimetric sensor which signals the speed of the motor to the electronic control system is independent of the water fill level control function.

5.1.1 BLOCK DIAGRAM OF HYDRAULIC CIRCUIT



KEY:

- | | |
|-------------------------|-----------------------|
| 1) Control board | 5) Pressure switch |
| 2) Fill solenoid | 6) Sump |
| 3) Anti-overflow device | 7) Wash/Drain motor |
| 4) Sump | 8) Tachimetric sensor |

5.1.2 DEFINITION OF THE WATER LEVEL

The pressure switch is connected pneumatically to the IWMS. Inside the IWMS, an air trap (pressure chamber) communicating via a tube serves to determine the level of the water.

↳ Inside the water level circuit, the air pressure is proportional to the quantity of water present in the sump; when the pressure exceeds the predetermined threshold, the pressure switch - which is also a pressure sensor - switches the electrical contact to "FULL".

↳ In order to maintain this condition, in dynamic operation (washing), the stability of the water level is guaranteed so that the pressure switch remains on "FULL".

↳ In this way, it is possible to determine with certainty that the status of the pressure switch determines the sequence of the washing cycle according to its position ("FULL" or "EMPTY", which indicate the presence or absence of water in the appliance); during the various phases, switching of the pressure switch is as follows:

| WASHING CYCLE SEQUENCE | | |
|------------------------|------------------------|---------------------------------------|
| SPECIFIC PHASES | PRESSURE SWITCH STATUS | STABILITY OBJECTIVE |
| During the fill phase | "empty" > "full" | The water level that has been reached |
| During the wash phase | "full" (maintenance) | The presence of water |
| During the drain phase | "full" > "empty" | The absence of water |

5.2 WATER FILL CONTROL

The quantity of water necessary to perform the washing cycle is determined exclusively by the closure of the contact on the pressure switch, which switches from "EMPTY" to "FULL".

In order to assure that the hydraulic circuit is correctly balanced, this system ensures that, if the pressure switch re-opens on "EMPTY", the water is replenished until the pressure switch returns to "FULL".

The fill phase is subdivided into the following sub-phases:

| WATER FILL SUB-PHASE | MOTOR STATUS | CONDITIONS |
|------------------------------------|--------------|---------------------------------|
| Static Fill (pressure switch lev.) | Stopped | until "FULL" signal is received |
| Dynamic Fill (fixed duration) | 1600 rpm | Time-out (10 seconds) |
| Pause | Stopped | Time-out (5 seconds) |
| Dynamic Fill (fixed duration) | 1600 rpm | Time-out (5 seconds) |
| Control of level stability | 2300 rpm | (dynamic balance maintaining) |

5.2.1 Static Fill

With the motor switched off, the fill solenoid is activated and water is introduced into the appliance until "FULL" signal is received. This is followed by:

5.2.2 Dynamic Fill

The motor is switched on at 1600 rpm, and water is introduced for 10 seconds (fixed time).

↳ This condition makes it possible to start filling the hydraulic circuit. This is followed by:

5.2.3 Pause

The motor and the fill solenoid switch off for 5 seconds (fixed time) to allow the water to fill up the sump again.

5.2.4 Dynamic Fill to level control

The motor is switched on at 1600rpm for 5 seconds (fixed time) and water fill continues only if the pressure switch is on "EMPTY", until it turns to "FULL".

↳ The level is determined by the pressure chamber (inside the sump) to which the pressure switch is linked. This is followed by:

5.2.4 Control of level stability

When the pressure switch signal is "FULL", the fill solenoid is switched off; the motor switches on at a constant speed of 2300 rpm.

↳ A control procedure takes place, in which the pressure switch signal must remain closed on "FULL" for 20 seconds without interruption.

↳ The hydraulic circuit operates in optimum conditions when the pressure switch signal remains stable on "FULL". In this case, the quantity of water inside the sump is sufficient to ensure that the motor can operate without speed fluctuations caused by cavitation, which may occur when the water in the sump is insufficient.

↳ When the pressure switch signal has remained on "FULL" for 20 seconds without interruption, the fill phase is considered complete; the system advances to the subsequent phase.

↳ When this condition is reached, the appliance is said to be dynamically balanced.

↳ If the pressure switch signal should go to "EMPTY" during the 20 second control procedure, the motor is switched off; the fill solenoid is again activated, and water is introduced until the pressure switch signal returns to "FULL".

This control procedure is repeated until dynamic balance is achieved.

N.B. In this case, the water level is monitored constantly by the two special safety systems (software and hydraulic) in order to ensure that an excessive water fill does not result in water leakage from the appliance.

5.2.6 WATER FILL TIME

During the entire duration of the fill phase (i.e. from sub-phase 5.2.1 to sub-phase 5.2.4), the solenoid valve may remain in the open position for a maximum overall time of 4 minutes.

- ↳ Within this period, the system detects whether the pressure switch signal has stabilized on "FULL".
- ↳ If the pressure switch signal stabilizes on "FULL" (sub-phase 5.2.4) after this 4-minute period during which the solenoid is open, a Time-out is generated and the appliance goes into Alarm mode [AL5] (no water).

5.2.7 POWER FAILURE DURING WATER FILL PHASE

If the water fill phase is interrupted by a power failure, the fill always resumes from sub-phase 5.2.1 when the power supply is restored; all the counters are reset to zero.

- ↳ The certainty that the fill results are correct is given by the fact that the aperture of the solenoid depends only on the aperture of the pressure switch contact on "EMPTY"; in this way, water is introduced until the level is sufficient to close the pressure switch contact on "FULL".
- ↳ If the water fill phase is interrupted by opening the door, the values of all the counters are memorized; when the door is re-closed, the water fill phase resumes from the point at which it was interrupted.

5.3 CONTROL OF STABILITY OF WASHING WATER

When the fill phase is complete, the appliance passes to the washing phase.

- ↳ In the washing phase - with cold or heated water - the status of the pressure switch is monitored constantly in order to ensure that the hydraulic system operates efficiently.
- ↳ Water replenishment may take place if necessary.
- ↳ If the pressure switch returns to "EMPTY", the fill solenoid is activated for a time (**T**) of:
 - **T 3 sec** if the duration of the "EMPTY" signal is less than 0.5 sec.
 - **T x sec** if the duration of the "EMPTY" signal is in excess of 0.5 sec.(**T_{xsec}** = time required by the pressure switch to commutate from "EMPTY" to "FULL").

During the washing phase, the fill solenoid may remain open (also at intervals) for a maximum total time of 60 seconds; if this period is exceeded, a Time-out is generated and the machine passes to the Alarm condition ([AL5] - no water present).

5.3.1 INTERRUPTION OF THE WASHING CYCLE DURING WATER REPLENISHMENT

If the washing cycle is interrupted due to a power failure, the current value in the counter which monitors the solenoid aperture time (limit 60 sec.) is reset to zero. When the power supply is restored, the count is restarted from the beginning.

- ↳ If the washing cycle is interrupted by opening the door, the current value in the counter which monitors the solenoid aperture time (limit 60 sec.) is memorized. When the door is re-closed, the count resumes from the point at which it was interrupted.

5.4 CONTROL OF DRAIN CYCLE

When the washing cycle ends, the appliances passes to the drain phase.

↳ In this phase, in order to ensure that the hydraulic circuit is empty before the start of the subsequent phase (water fill), a control procedure is carried out at the end of the drain phase to check that the contact of the pressure switch is open on "EMPTY".

If this is the case, the appliance passes to the subsequent phase.

↳ If, due to a malfunction in the drain phase, the contact of the pressure switch is closed on "FULL" (signalling the presence of water in the hydraulic circuit), the drain phase is repeated.

↳ If, after this second drain phase, the control system detects that the pressure switch contact is still closed on "FULL", a Time-out is generated and the machine passes to the Alarm condition [AL6 - drain not completed).

5.4.1 INTERRUPTION OF THE DRAIN CYCLE

If the drain cycle is interrupted due to a power failure, the phase is reset to zero and all the information relative to a possible incomplete drain cycle is lost. When the power supply is restored, the phase is repeated from the beginning

↳ If the drain cycle is interrupted by opening the door, the information relative to a possible incomplete drain cycle is memorized. When the door is re-closed, the drain phase resumes from the point at which it was interrupted.

5.5 SPECIAL REGENERATION CYCLE

With the new water softening system, the “special regeneration” process is controlled electronically, and is subdivided into 5 levels as follows:

REGENERATION VALUES

| LEVEL | INDICATION | WASHING CYCLE | | FILL PHASES | WATER HARDNESS | |
|-----------------------------------|------------------|-----------------------------|------------------|-------------|----------------|----------|
| | | AUTONOMY | REGENERATION | | ° F (TH) | ° D (dH) |
| WH1 | 1 flash | No regeneration | | - | 0 > 8 | 0 > 4 |
| WH2 | 2 flashes | 5 cycles | in the 6th cycle | 24 | 9 > 30 | 5 > 18 |
| * WH3 | 3 flashes | 3 cycles | in the 4th cycle | 16 | 31 > 50 | 19 > 29 |
| WH4 | 4 flashes | 2 cycles | in the 3rd cycle | 12 | 51 > 70 | 30 > 40 |
| WH5 | 5 flashes | Regeneration in every cycle | | 4 | 71 > 90 | 41 > 50 |
| <i>* Level set in the factory</i> | | | | | | |

5.5.1 DEFINITION OF THE SYSTEM

Cycle counting for the “special” regeneration process is performed by the electronic control system, and is based on the number of fill phases rather than on the number of cycles; this makes the process independent of the number and type of programmes performed.

- ↪ Each time regeneration is performed, the chamber is emptied completely (about 240 cc of water).
- ↪ Cycle calculation is based on a programme with 4 fill phases.
- ↪ Modification of the regeneration level automatically results in regeneration being performed in the subsequent cycle, irrespective of the number of fill phases performed previously.
- ↪ With the new board, regeneration is always performed in the first cycle, irrespective of the regeneration level selected.
- ↪ If level **[WH1]** is selected, the regeneration process is not performed, and LED **[LD13]** remains unlit.

5.5.2 SELECTING THE REGENERATION LEVEL

With the dishwasher switched OFF (programme selection mode)

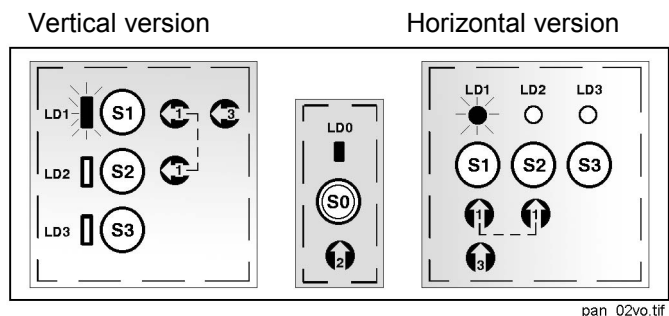
1 Press and hold down keys **[S1]** & **[S2]** simultaneously

2. Press the START key **[S0]**

- ↪ LED **[LD1]** lights (fixed) for 5seconds, and then begins to flash to indicate the level of regeneration selected.
- ↪ example: WH3 = (**3 flashes – 5 seconds pause**) x 60 seconds (repeated).

3. To modify the level, press **[S1]** repeatedly.

- ↪ Each time **[S1]** is pressed, the regeneration level is modified; as a result, the flashing of LED **[LD1]** changes.
- ↪ The last level selected is stored in memory automatically after 60 seconds, after which the dishwasher returns to programme selection mode.
- ↪ LED **[LD1]** remains lit (fixed), while the cycle phase LEDs **[LD9]** & **[LD10]** flash.
- ↪ To exit the regeneration level selection process, press the START key **[S0]**.



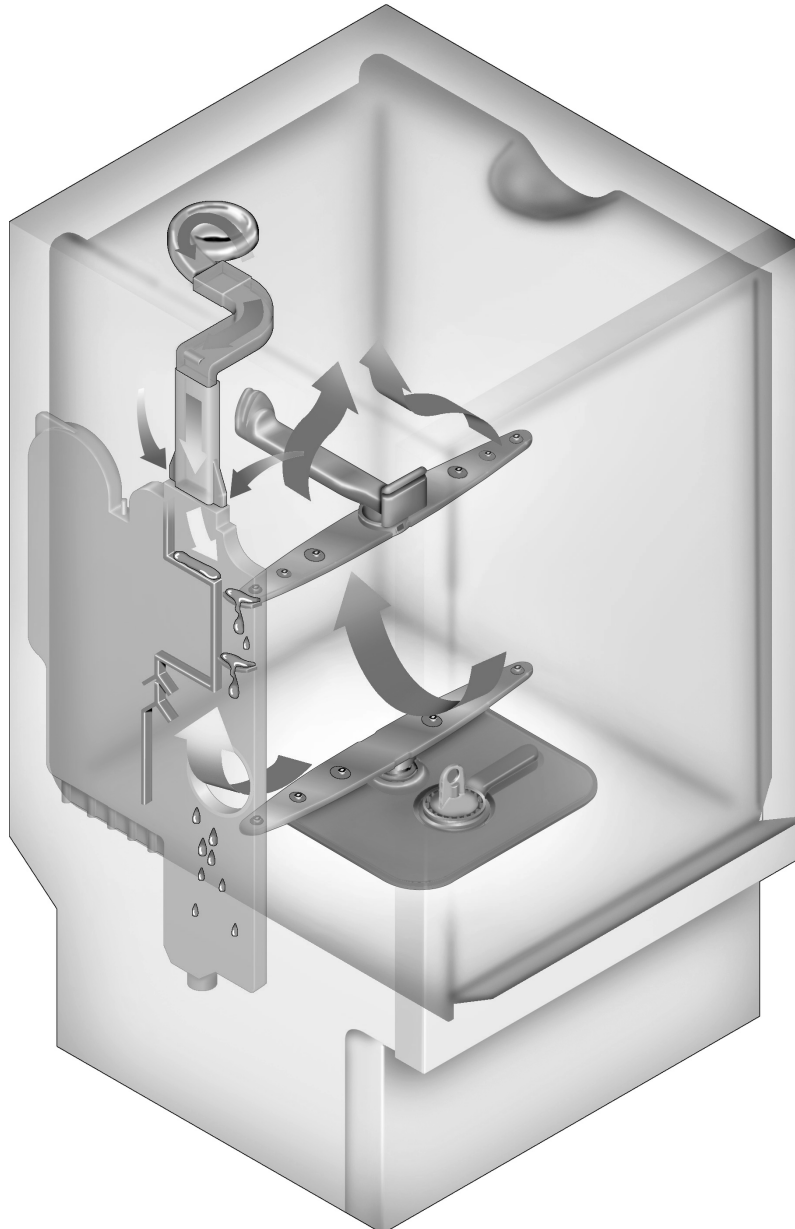
6 «ACTIVE» DRYING SYSTEM

The “Active Plus” drying system features a close integrated circuit with bidirectional convective movement ; air is drawn in from the exterior thus allowing the circulation of the inner warm air.

6.1 DEFINITION OF THE SYSTEM

The drying system is based on the natural circulation of the hot air produced during the hot rinse cycle, in which the steam (humid hot air) circulates slowly through two ducts, this activating the process of condensation.

- ↪ Some of the steam enters from the lower section through the steam venting ring; this steam circulates inside the chamber where it condenses.
- ↪ The remaining part of the steam is expelled from the upper section of the tub via the external upper duct linked with the lateral duct, in communication with the condensation chamber; in this junction point (which isn't waterproof) the cold air from the exterior convenes in the system, thus allowing the circulation of the inner warm air.
- ↪ The condensation water sediments at the bottom of the chamber communicating with the hydraulic system.
- ↪ The duration of the drying cycle is approximately *10 minutes*.



7. SAFETY FEATURES - CONTROLS - ALARMS

Dishwashers with electronic control systems include a number of safety features which protect the components whether the appliance is switched off or in operation

7.1 DEFINITION

In the event of a fault that might affect the operation of the appliance, the electronic control system activates a specific safety device; in most cases, this immediately activates a Time-out which interrupts the washing cycle.

The alarm situation is displayed on the control panel (one or more LEDs flash).

SAFETY FEATURES / ALARMS

| SAFETY FEATURE | | ALARMS | LEDs LIT | | WASHING CYCLE |
|----------------|--------------------------------------|---------------------|-----------------|-----------|---------------|
| Reference code | Definition | LEDs FLASHING | Visible to user | In memory | Interruption |
| [AL5] | Time_out Water fill | [LD9] | YES | YES | YES |
| [AL6] | Time_out Drain | [LD10] | YES | YES | YES |
| [AL4] | Intervention of anti-flooding device | [LD9 + LD10] | YES | YES | YES |
| [AL3] | Time_out Heating | [LD11] | NO | YES | NO |
| [AL1-2] | NTC sensor (open or short-circuited) | [LD9 + LD11] | NO | YES | NO |
| [AL7] | Motore Stopped | [LD10 + LD11] | YES | YES | YES |
| [AL8] | Motor triac (Short-circuited) | [LD9 + LD10 + LD11] | YES | YES | YES |

7.1.1 ALARM CONDITION

If one of the following ALARM codes is displayed: - [AL4], [AL5], [AL6], [AL7], [AL8]

The appliance is OFF – The washing cycle is interrupted.

- ↻ One or more LEDs on the control panel flash to indicate the alarm condition.
- ↻ example:- LED [LD9] flashing = intervention of Water Fill Time_out [AL5].
- ↻ All LEDs (with the exception of the Programme LED for the current cycle) switch off.
- ↻ All the keys – including CANCEL – are disabled.
- ↻ To reset the alarm condition, press [SO] to switch the dishwasher off

When [SO] is pressed to switch the appliance on again, the programme resumes from the point at which it was interrupted; if the fault persists, the dishwasher returns to the alarm condition.

7.1.2 ALARM CONDITION

If one of the following ALARM codes is displayed: - [AL1/2], [AL3]

The dishwasher remains in operation – The Washing cycle has ended

- ↻ No alarm condition is displayed on the control panel.
- ↻ The cycle is completed normally, but the heating phases are bypassed The user may report poor washing results and a short washing time.
- ↻ In these cases, the alarm condition is stored in memory, and may be displayed only by Service Engineers.

N.B.: In all cases, the electronic control system stored the last 3 alarm conditions in memory; these may be checked using a special procedure (see paragraph 7.2 below).

7.2 DISPLAYING ALARM CONDITIONS STORED IN MEMORY

This procedure can be performed by service engineers only in order to check for any alarm conditions stored in the memory of the electronic control system.

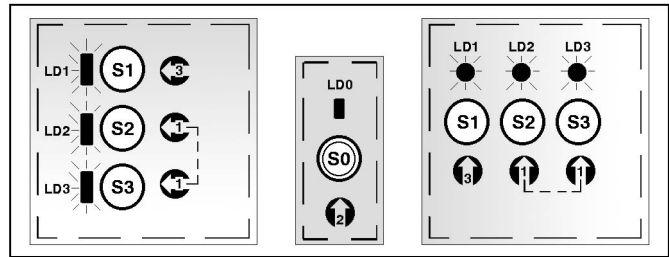
The procedure is accessed by pressing a combination of keys, and enables the service engineer to identify the fault (whether currently existing or occurring previously).

- ↪ The Alarm condition stored in memory is indicated by LEDs [LD9], [LD10], [LD11] (flashing) according to a binary coding system described in the Alarm Table (paragraph 7.1 above).
- ↪ Press [S1] repeatedly to display the alarms in sequence.
- ↪ The last 3 alarm conditions stored in memory can be displayed.

7.2.1 CHECKING THE ALARM CONDITIONS STORED IN MEMORY

Door closed – Dishwasher switched OFF:

1. Press and hold down keys [S2] & [S3] simultaneously.
2. Press the ON key [S0].
 - ↪ LEDs [LD1], [LD2], [LD3] immediately begin to flash to indicate that the function has been selected.



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3. Press [S1] to start the procedure.
 - ↪ LED [LD1] flashes during the test procedure.
 - ↪ The last alarm condition stored in memory is indicated by LEDs [LD9], [LD10], [LD11].
 - ☀ Press key [S1] repeatedly; the 2nd and then the 1st alarm condition will be displayed in sequence.
 - ☀ To exit the procedure, press [S0] to switch off the appliance.

7.3 CANCELLING THE ALARM CONDITIONS STORED IN MEMORY

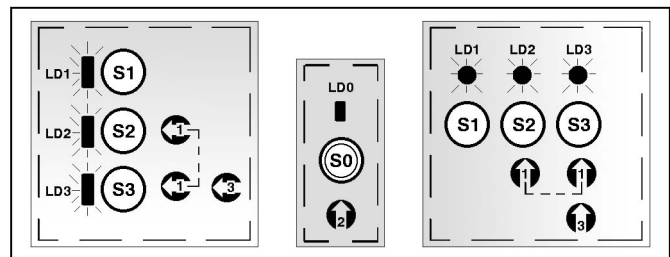
This procedure enables service engineers to cancel the alarms stored in memory in order to avoid possible doubts or confusion in the event of a subsequent service call.

- ↪ It is advisable to perform this procedure after checking the alarm conditions stored in memory.

7.3.1 CANCELLATION PROCEDURE

Door closed – Dishwasher switched OFF

1. Press and hold down keys [S2] & [S3] simultaneously
2. Press the ON key [S0]
 - ↪ LEDs [LD1], [LD2], [LD3] flash to indicate that the procedure has been selected.



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3. Press [S3] to start the procedure.
 - ↪ The alarms stored in memory are immediately cancelled.
 - ↪ All the LEDs on the control panel [LD1 LD14] switch on simultaneously for one second.
 - ↪ The LEDs light again twice at intervals of 2 seconds.
 - ↪ On completion, the system exits the procedure automatically.
 - ☀ Press [S0] to switch the dishwasher off.

7.4 DESCRIPTION OF SAFETY FEATURES AND ALARMS

7.4.1 WATER FILL TIME-OUT

ALARM [A L 5]

Led [LD9]

This Time-out is activated only during the water fill phases.

- ↳ The control system definitively switches off the fill solenoid valve.
- ↳ Counting of time "T" starts when the solenoid valve opens and ends when the signal from the pressure switch stabilizes on "full".
- ↳ The maximum time for aperture of the fill solenoid ("T") is 4 minutes for the entire fill phase; if this time is exceeded, an alarm condition is generated.

Possible causes:

- a. Water tap closed
- b. Mains water pressure <0.3 bar
- c. Intervention of Anti-overflow device
- d. Fill solenoid or connections faulty
- e. Sump - Pressure switch tube obstructed
- f. Pressure switch faulty / loose connections

7.4.1.1 PRESSURE SWITCH SIGNALS "EMPTY" (1-2)

This control procedure is in operation only during the washing phases, i.e. after the water fill phase has been completed.

- ↳ Once the pressure switch has closed in the "FULL" position (1-3), it must remain "FULL" until the subsequent drain phase.
- ↳ If the pressure switch signal returns to "EMPTY" (1-2), the fill solenoid is activated for a period equivalent to the period of aperture of the pressure switch.
- ↳ The maximum duration for which the pressure switch signals "EMPTY" (T) during the entire phase is 60 seconds; if this period is exceeded, an alarm condition is generated.

Possible causes:

- a. Dishes upside down
- b. Central filter obstructed
- c. Excessive foam
- d. Leakage from Sump - Pressure switch tube
- e. Pressure switch faulty / loose connections

7.4.2 WATER DRAIN TIME-OUT

ALARM [A L 6]

Led [LD10]

This control procedure is operative in all the drain phases and checks the status of the pressure switch in order to ensure that the cycle is performed correctly.

- ↳ In all the final drain phases, and before passing to the subsequent phase, the pressure switch contact must be open on "EMPTY" (1-2).
- ↳ If the contact is closed on "FULL", the drain phase is repeated.
- ↳ At the end of the second drain phase, if the pressure switch contact remains closed on "FULL", an alarm condition is generated.

Possible causes:

- a. Domestic drain circuit not suitable (obstructed / blocked)
- b. Drain pump faulty (foreign bodies)
- c. Pressure switch on "FULL" (1-3)
- d. Sump - pressure switch tube obstructed
- f. Electrical connections loose/false
- g. Control board (relay interrupted)

7.4.3 ANTI-FLOODING CONTROL SYSTEM

ALARM [A L 4]

Leds [LD9] + [LD10]

This control system is operative during the washing phases only, and not in the water fill phases, in which case it is connected to the safety device (see paragraph 7.4.1 "Water Fill Time-out").

- ↳ A float-actuated mechanical sensor positioned on the bottom of the appliance trips a microswitch which is connected in series to the fill solenoid, thus disconnecting the solenoid.
- ↳ Intervention of the sensor is detected by the electronic control board, which actions the drain pump for 1 minute, after which an alarm condition is generated.

Possible causes:

- a. Water leakage from the tub/sump seal
- b. Water leakage from the various couplings (washing pump, duct to the upper spray arm, etc.)
- c. Floating sensor jammed mechanically/microswitch faulty

7.4.4 HEATING TIME-OUT

ALARM [A L 3]

Led [LD11]

The maximum heating time for the water is 45 minutes; if the correct temperature is not reached within this time, an alarm condition is generated.

Possible causes:

- a. Heating element broken
- b. Safety thermostat intervention (open)
- c. Wiring interrupted / loose
- d. NTC sensor faulty (poor thermal contact)
- e. Insufficient water circulation in the tub
- f. Washing pump faulty (washing impeller damaged)

7.4.5 NTC TEMPERATURE SENSOR

ALARM [A L 1-2]

Leds [LD9] + [LD11]

This alarm is operative after the initial water fill phase of the cycle until the end of the final wash phase.

- ↳ The impedance of the NTC sensor is monitored constantly.
- ↳ If the impedance should not be within the correct limits as determined by the impedance/temperature conversion performed by the electronic control system, the alarm condition is generated.

7.4.5.1 NTC SENSOR SHORT-CIRCUITED

If the impedance is too low ($T = / > 85^{\circ}\text{C}$).

Possible causes:

- a. Sensor faulty / short-circuited
- b. Wiring short-circuited
- c. Temperature too high ($> 85^{\circ}\text{C}$)

7.4.5.2 NTC SENSOR OPEN

If the impedance is too high ($T = / < - 5^{\circ}\text{C}$).

Possible causes:

- a. Sensor faulty / circuit open
- b. Wiring interrupted / loose
- c. Temperature too low ($< -5^{\circ}\text{C}$)

7.4.6 MOTOR INOPERATIVE

ALARM [A L 7]

Leds [LD10] + [LD11]

This control system is operative during the entire washing cycle.

- ↳ Jamming of the motor is detected by the tachimetric sensor; this also makes it possible to check for a faulty tachimetric sensor using the following procedure.
- ↳ When the motor is switched on, it must reach a speed of 2000 rpm within 5 seconds; if this does not occur, an alarm condition is generated.

Possible causes:

- a. Motor winding interrupted / short-circuited
- b. Motor jammed (foreign bodies / pump unit)
- c. Electrical connections broken / loose
- d. Capacitor interrupted/short-circuited
- e. Tachimetric sensor broken / short-circuited

To check that the tachimetric sensor functions correctly:

- ↳ Check that the voltage across the terminals of the sensor is higher than 7V AC.

7.4.7 WASH MOTOR TRIAC SHORT-CIRCUITED ALARM [A L 8]

Leds [LD9] + [LD10] + [LD11]

This control system is operative during the entire washing cycle.

- ↳ The electronic control system identifies that the motor is correctly powered and detects the reason for a malfunction.
- ↳ If the microprocessor identifies a signal from the tachimetric sensor indicating that the motor is in operation when it should be switched off, an alarm condition is generated.

Possible causes:

- a. TRIAC on control board short-circuited
 - ↳ Replace the control board.

7.5 SUPPLEMENTARY SAFETY FEATURES

7.5.1 ANTI-PRESSURE SURGE

Pressure surge sometimes occurs during the hot wash phases when operation of the motor is resumed after the cycle has been interrupted.

- ↪ This phenomenon may result in excessive noise, rattling of the dishes and slight leakage of water from the door seal.
- ↪ The electronic control system performs a procedure which prevents this phenomenon by controlling the operation of the motor.
- ↪ The control procedure consists of a phase (duration 20 seconds) during which the motor rotates at a constant speed of 1600 rpm; during this period, the remaining loads (i.e. the heating elements) are switched off.
- ↪ This procedure takes place only during washing phases (motor in operation), when the cycle is restarted after a power failure or after opening the door.

7.5.2 DOOR OPEN

A high-voltage sensor connected to the door microswitch performs this function.

- ↪ When the door is opened, all electrical loads are disconnected (motor, heating element, etc.) and the electronic control board identifies the "door open" condition; the phase being performed is interrupted and stored in memory.
- ↪ When the door is re-closed, all the electrical loads are reconnected; operation of the dishwasher resumes from the beginning of the phase which was interrupted.

7.5.3 POWER FAILURE

- ↪ The electronic control system recognizes a power failure condition, and memorizes all the settings and the current phase in the EEPROM for an unlimited period.
- ↪ When the power supply is restored, operation of the dishwasher resumes from the beginning of the phase which was interrupted.

7.5.4 CURRENT PROGRAMME

When the cycle has started, the electronic control system recognizes the "Programme in execution" condition, and disables all the control keys (with the exception of the CANCEL key) in order to prevent inadvertent modification of the settings.

7.5.5 CONTROL OF SALT LEVEL

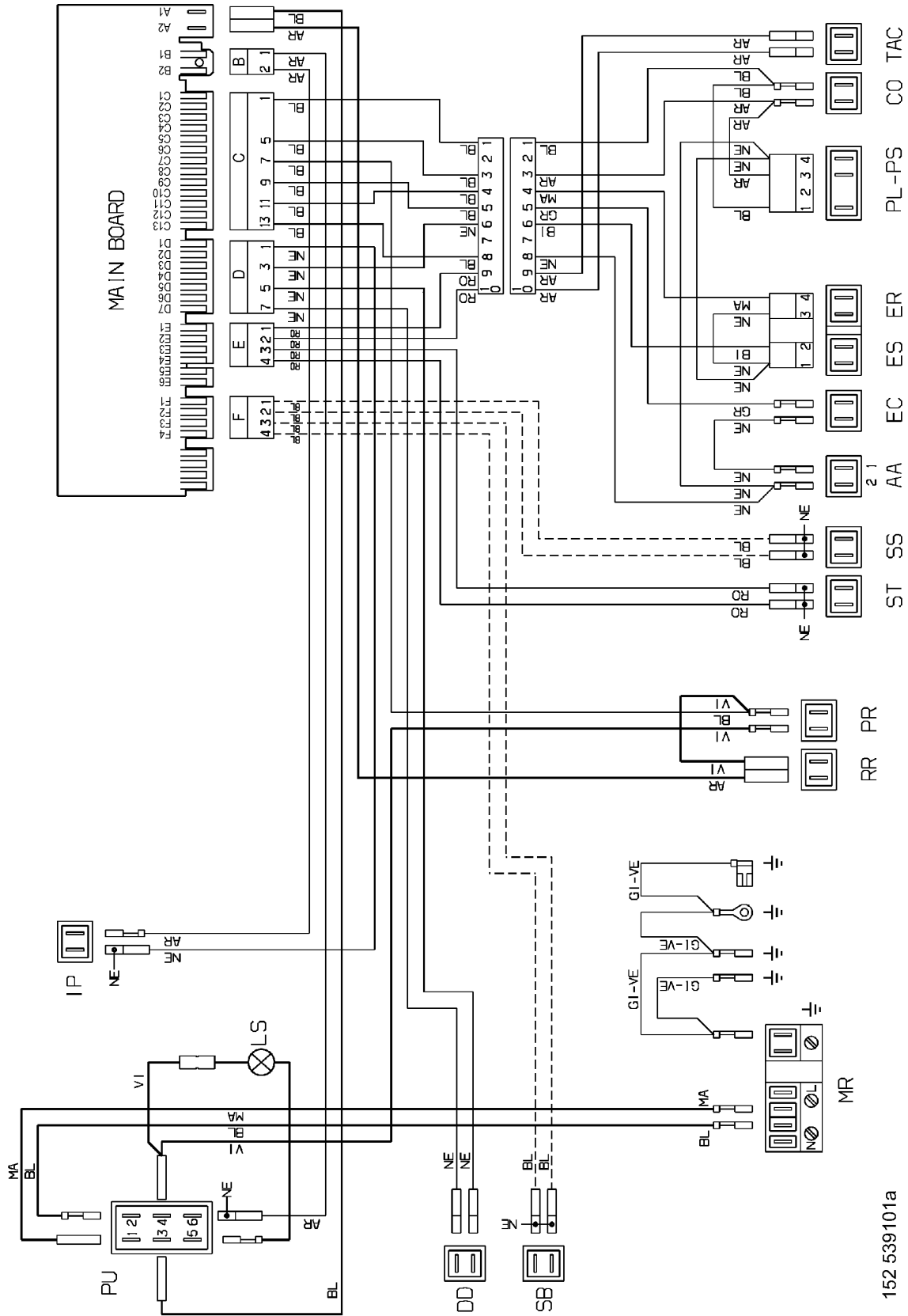
This control system consists of a reed sensor which positioned on the exterior of the salt container and actioned by an internal float.

7.5.6 CONTROL OF RINSE-AID LEVEL

This control system consists of a reed sensor which positioned on the exterior of the integrated detergent dispenser and actioned by an internal float.

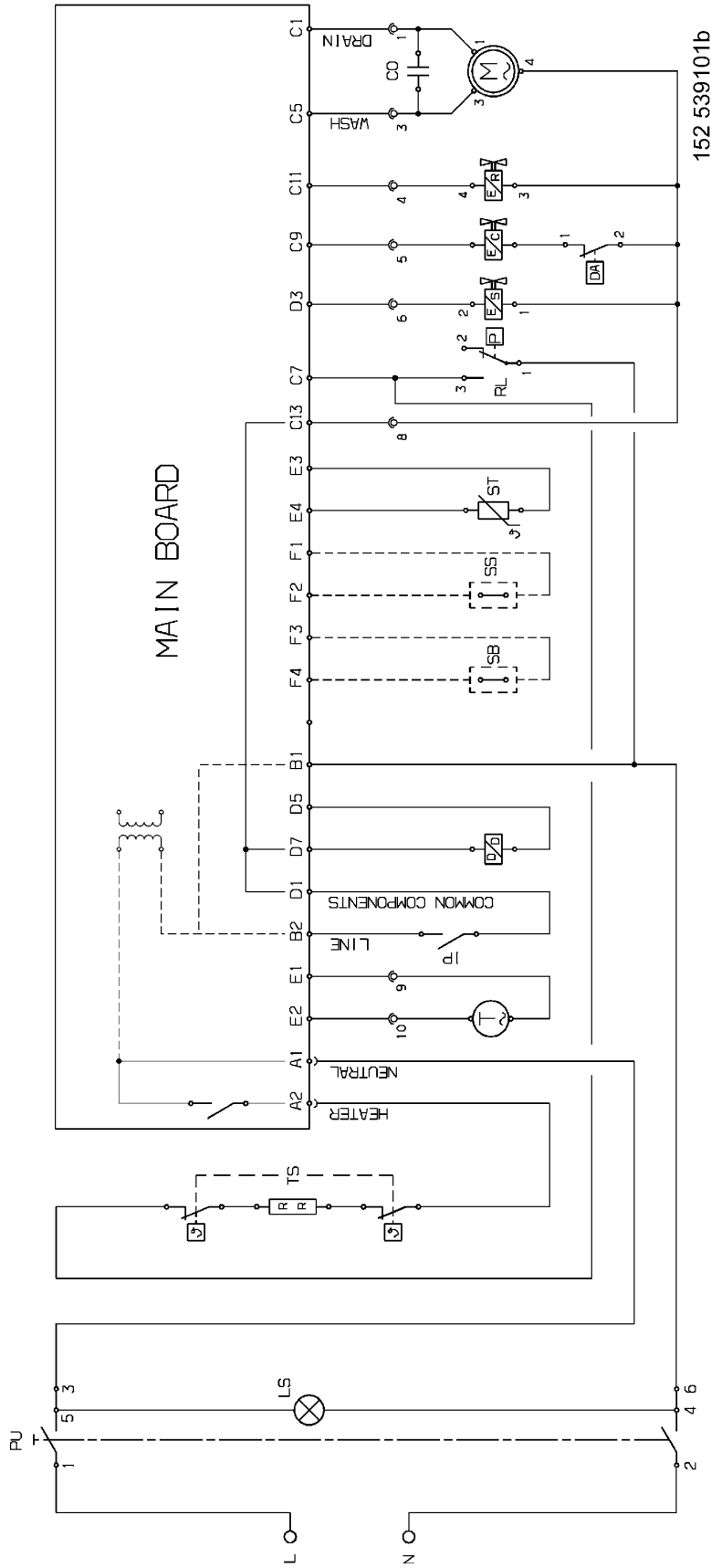
8. ELECTRICAL FUNCTIONS

8.1 CIRCUIT DIAGRAM



152 539101a

8.2 BASIC ELECTRICAL DIAGRAM



| LEGEND | | |
|---------------|---|-------------------------------|
| AR / ar | = | ORANGE |
| BI / bi | = | WHITE |
| BL / bl | = | BLUE |
| CE / ce | = | LIGHT BLUE |
| GI-VE / gi-ve | = | YELLOW-GREEN |
| GR / gr | = | GREY |
| MA / ma | = | BROWN |
| NE / ne | = | BLACK |
| RO / ro | = | PINK |
| VI / vi | = | VIOLET |
| AA | = | ANTI-FLOODING DEVICE |
| CO | = | CAPACITOR |
| DA | = | ANTI-FLOODING DEVICE |
| DB | = | RINSE-AID DISPENSER |
| DD | = | DETERGENT/RINSE-AID DISPENSER |
| EC | = | WATER FILL ELECTRIC VALVE |
| ER | = | REGENERATION ELECTRIC VALVE |
| ES | = | RESET ELECTRIC VALVE |
| GA | = | INTERFERENCE SUPPRESSOR |
| IP | = | DOOR SWITCH |
| LS | = | CONTROL LAMP |
| MR | = | JUNCTION BOX |
| MV | = | FAN MOTOR |
| PL | = | WASH PUMP |
| PL/S | = | WASH/DRAIN PUMP |
| PS | = | DRAIN PUMP |
| PU | = | PUSHBUTTON BOARD |
| RA | = | ANTI-OVERFLOW PRESSURE SWITCH |
| RE | = | TIMER RELAY |
| RL | = | PRESSURE SWITCH |
| RP | = | TIME SWITCH |
| RR | = | HEATING ELEMENT |
| SB | = | RINSE-AID SENSOR |
| SD | = | DETERGENT SENSOR |
| SS | = | SALT SENSOR |
| ST | = | TEMPERATURE SENSOR |
| TA | = | THERMOSTAT H.T. |
| TAC/T | = | TACHOMETRIC GENERATOR |
| TB | = | THERMOSTAT L.T. |
| TM | = | THERMOSTAT M.T. |
| TS | = | SAFETY THERMOSTAT |

8.3 TABLE OF WASHING PROGRAMMES

The table lists all the programmes stored in memory. The codes (A, B etc.) identify the programmes assigned (max. 5) to the individual appliances.

| Plant | Programmes | | | | | Pre-wash | | | | | Main wash | | | | | First rinse | | Second rinse | | Hot rinse | | Drying | | Time to end (min) | | |
|-------------------|-----------------------|-------------|------------------------|--------------|--------|---------------------|-------------|------------------------|-------------|------------------------|--------------|--------|------|--------------|--------|-------------|--------------|--------------|-------------|------------------------|--------------|--------|-----------------------|-------------------|-------------|-----|
| | Resin wash (option) | Temperature | Time after temperature | Washing type | Drain | Resin wash (option) | Temperature | Time after temperature | Temperature | Time after temperature | Washing type | Drain | Time | Washing type | Drain | Time | Washing type | Drain | Temperature | Time after temperature | Washing type | Drain | Regeneration (option) | | Drying time | |
| A | Intensive 70° | 1' | 55°C | ΔT + 5' | puls_1 | N | --- | 50°C | ΔT + 5' | 70°C | ΔT + 10' | puls_1 | N | 5' | puls_2 | N | 5' | puls_2 | N | 68°C | ΔT + 2' | puls_1 | N | 2' | 12' | 94 |
| N | Intensive 70° - Italy | 1' | 55°C | ΔT + 5' | ctrl | N | --- | 50°C | ΔT + 4' | 70°C | ΔT + 12' | ctrl | N | 5' | ctrl | N | 5' | ctrl | N | 68°C | --- | ctrl | N | 2' | 12' | 106 |
| B | Normal 65° | 1' | 40°C | ΔT + 5' | puls_1 | N | --- | 50°C | ΔT + 4' | 65°C | ΔT + 8' | puls_1 | N | 5' | puls_2 | N | --- | --- | N | 68°C | ΔT + 2' | puls_1 | N | 2' | 12' | 91 |
| O | Normal 65° - Italy | 1' | 55°C | ΔT + 5' | ctrl | N | --- | 50°C | ΔT + 4' | 68°C | ΔT + 6' | ctrl | N | 5' | ctrl | N | 5' | ctrl | N | 68°C | --- | ctrl | N | 2' | 12' | 100 |
| C1 | Bio 50° (ABC) | 1' | --- | 8' | puls_1 | N | --- | 48°C | ΔT + 2' | 48°C | ΔT + 20' | puls_1 | N | 5' | puls_2 | D | --- | --- | N | 56°C | ΔT + 2' | puls_2 | N | 2' | 50' | 122 |
| C3 | Bio 50° (BAC) | 1' | --- | 8' | puls_1 | N | --- | 54°C | ΔT + 2' | 54°C | ΔT + 20' | puls_1 | N | 5' | puls_2 | D | --- | --- | N | 61°C | ΔT + 2' | puls_2 | N | 2' | 50' | 128 |
| G | Delicate 40°/45° | 1' | --- | 8' | puls_1 | N | --- | 45°C | ΔT + 16' | --- | --- | puls_1 | N | 5' | puls_2 | D | 5' | puls_2 | N | 55°C | ΔT + 1' | puls_2 | N | 2' | 12' | 85 |
| E | Eco 50° | 1' | --- | 8' | puls_1 | N | --- | 55°C | ΔT + 12' | --- | --- | puls_2 | N | 5' | puls_2 | D | --- | --- | N | 65°C | ΔT + 1' | puls_3 | N | 2' | 12' | 71 |
| D | Quick 40°/50° | --- | --- | --- | --- | --- | --- | 40°/50°C | ΔT + 2' | --- | --- | puls_2 | N | 5' | puls_2 | N | --- | --- | N | 55°C | ΔT + 1' | puls_2 | N | 2' | --- | 41 |
| P | Quick 50° - Italy | --- | --- | --- | --- | --- | --- | 55°C | ΔT + 2' | --- | --- | ctrl | N | 5' | ctrl | N | --- | --- | N | 55°C | ΔT + 2' | ctrl | N | 2' | --- | 49 |
| M | ELR (Daily) | --- | --- | --- | --- | --- | --- | 65°C | ΔT + 2' | --- | --- | ctrl | N | --- | --- | --- | --- | --- | N | 65°C | --- | ctrl | N | 2' | --- | 36 |
| F | Soak | 1' | --- | 6' | puls_1 | N | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 9 |
| Service programme | | 1' | --- | --- | --- | N | --- | 50°C | --- | --- | --- | puls_2 | N | --- | --- | --- | --- | --- | --- | --- | --- | --- | 2' | 4' | 20 | |

LEGEND

| | |
|------------------|--|
| Washing: | ctrl = motor speed 2800 rpm |
| | puls_1 = 3"±, 4" 1600rpm + 0.9" 2800rpm |
| | puls_2 = 3"±, 4" 1600rpm + 0.6" 2800rpm |
| | puls_3 = 3"±, 4" 1600rpm + 0.3" 2800rpm |
| Tipo di Scarico: | N = Normal (60"On) D = Dilution (11"On) |

| | |
|--------------------------|---|
| Option 1 ½ 1 (half load) | -No pre-wash -Washing time reduction 18 + 28min -Water consumption reduction ~ 5l |
|--------------------------|---|

| Resin wash | |
|--------------|--------|
| Drain | 10 sec |
| Drain & Fill | 15 sec |
| Drain | 10 sec |
| Drain & Fill | 15 sec |
| Drain | 10 sec |

| Level | °dH German | °TH French | Autonomy | Regeneration |
|-------|------------|------------|----------|--------------|
| WH 1 | 0 + 4 | 0 + 8 | Total | No |
| WH 2 | 5 + 18 | 9 + 30 | 5 cycles | at 6° cycle |
| WH 3 | 19 + 29 | 31 + 50 | 3 cycles | at 4° cycle |
| WH 4 | 30 + 40 | 51 + 70 | 2 cycles | at 3° cycle |
| WH 5 | 41 + 50 | 71 + 90 | 0 cycles | ogni cycle |

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9. SERVICING

9.1 COMPONENT DIAGNOSTICS

This test is used by service engineers only to check the efficiency of the main electrical components.

To access the test procedure, it is necessary to press a combination of keys. Correct operation of the components to be tested can be checked rapidly.

The component diagnostics procedure consists of 7 sequential phases:

- ↪ The component selected is displayed by a code shown by LEDs [LD9], [LD10], [LD11]
- ↪ Press [S2] repeatedly to select all the components (in the sequence described below).
- ↪ Each component is activated for a predetermined period (Time-out), after which it is deactivated automatically.
- ↪ When the period of activation has elapsed, the appliance goes into Pause mode until the subsequent component is selected by pressing [S2].
- ↪ The period of activation can be reduced (i.e. passing to the subsequent component) by pressing [S2] before the end of the predetermined test period (Time-out).

9.1.1 ACCESSING THE DIAGNOSTICS PROCEDURE

Door closed – Dishwasher switched OFF

1. Press and hold down keys [S2] & [S3] simultaneously

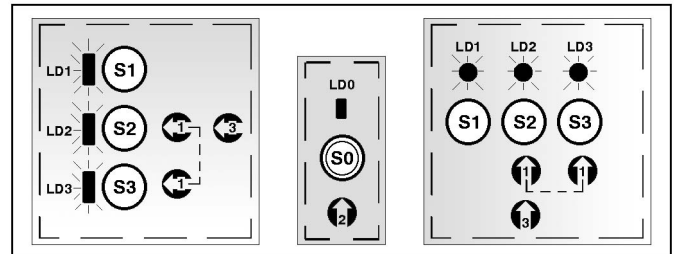
2. Press [S0] to switch the dishwasher on.

- ↪ LEDs [LD1], [LD2], [LD3] flash to indicate that the function has been selected.

3. Press [S2] to start the function.

- ↪ LED [LD9] lights immediately and the water fill solenoid is switched on.

- ↪ LEDs [LD9], [LD10], [LD11] light in sequence to indicate the following functions:



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| LEDs Lit (fixed) | COMPONENTS TESTED | TIME-OUT 🕒 | ADVANCE KEY |
|---------------------|--|---------------|-------------|
| [LD9] | Water fill solenoid | 20 sec | [S2] ↪ |
| [LD10] | Integrated dispenser (detergent/rinse-aid) | 60 sec | [S2] ↪ |
| [LD9]+[LD10] | Washing motor | 60 sec | [S2] ↪ |
| [LD11] | Heating element | 20 sec | [S2] ↪ |
| [LD9]+[LD11] | Pause / Fan motor (if present) | 60 sec | [S2] ↪ |
| [LD10]+[LD11] | Regeneration solenoid | 60 sec | [S2] ↪ |
| [LD9]+[LD10]+[LD11] | Drain motor | 60 sec | [S2] ↪ |
| OFF | END OF TEST | PAUSE | |
| | | EXIT | [S0] ↪ |

- ☀ At the end of the test, LEDs [LD1], [LD2], [LD3] switch off; the appliance remains in PAUSE.

- ↪ To exit the test procedure, open the door or switch the appliance off by pressing [S0].

9.2 FUNCTIONAL TESTING CYCLE

The functional testing cycle is an abbreviated washing programme for use by service engineers only. The testing cycle enables the engineer to check all the functions which make up a traditional washing cycle (in effect, the test simulates a normal cycle).

To access the test procedure, it is necessary to press a combination of keys. Correct operation of the appliance can be checked rapidly.

The procedure is designed to perform the following phases in the sequence shown below:

Resin washing – Hot wash – Regeneration – Drying

These phases consist of the following sub-phases:

- ↳ Water fill to stabilized pressure switch level + supplementary fill.
- ↳ Motor activation (objective: puls_2 washing).
- ↳ Reduction of washing time.
- ↳ Stabilization of water temperature in hot phase (objective 50°C).
- ↳ Normal drain.
- ↳ Performance of regeneration (irrespective of the regeneration level selected).
- ✱ Overall duration of cycle: 16 - 18 minutes approx.
- ✱ The test cycle is not taken into consideration in the count for “SPECIAL” regeneration.

9.2.1 STARTING THE TEST CYCLE

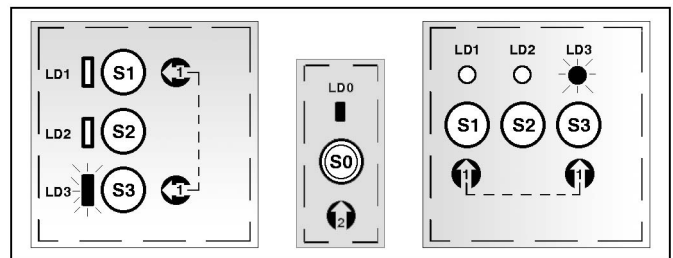
Door closed – dishwasher switched OFF

1. Press and hold down keys [S1] & [S3] simultaneously

2. Press [S0] to switch the dishwasher on

- ↳ LED [LD3] flashes to indicate that the function has been selected.
- ↳ The LED continues to flash until the function is exited.
- ↳ Cycle phase LEDs [LD9], [LD10] light.

- ✱ After 3 seconds, the function starts automatically.
- ↳ LED [LD9] remains lit, while LED [LD10] switches off.
- ↳ The phases of the cycle are indicated in sequence by LEDs [LD9], [LD10], [LD11], which switch on and off as the test proceeds.
- ✱ If the door is opened, the cycle is interrupted; when the door is re-closed, the cycle resumes (after 3 seconds) from the point at which it was interrupted. The same applies in the event of a power failure.
- ✱ To cancel the cycle, press programme key [S3].
- ✱ At the end of the cycle, LED [LD11] lights, while LED [LD3] continues to flash.
- ↳ To exit the test procedure, open the door or switch the appliance off by pressing [S0].



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9.3 CHECKING THE EFFICIENCY OF THE COMPONENTS

In order to facilitate testing of the components, a TEST PROCEDURE has been created showing the contacts to which the probes of the tester should be connected and the theoretical reading for each component.

9.3.1 PROCEDURE (after removing the door)

- ↳ Remove the modular connector from the control board, connect the probes of the tester to the points indicated in the table, and compare the actual reading with the theoretical value (in Ohms).
- ↳ Take special care when fitting the connector to position "A1 - A2".
If this connector is fitted incorrectly (i.e. reversed), the board will not be powered and the appliance will therefore not function (because it will not accept any commands).

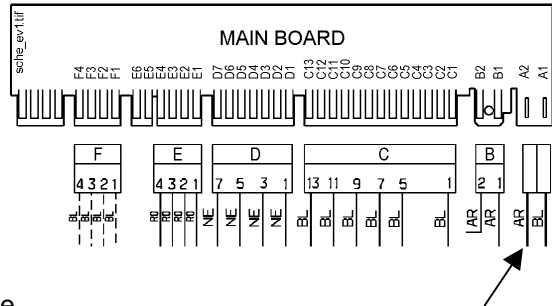
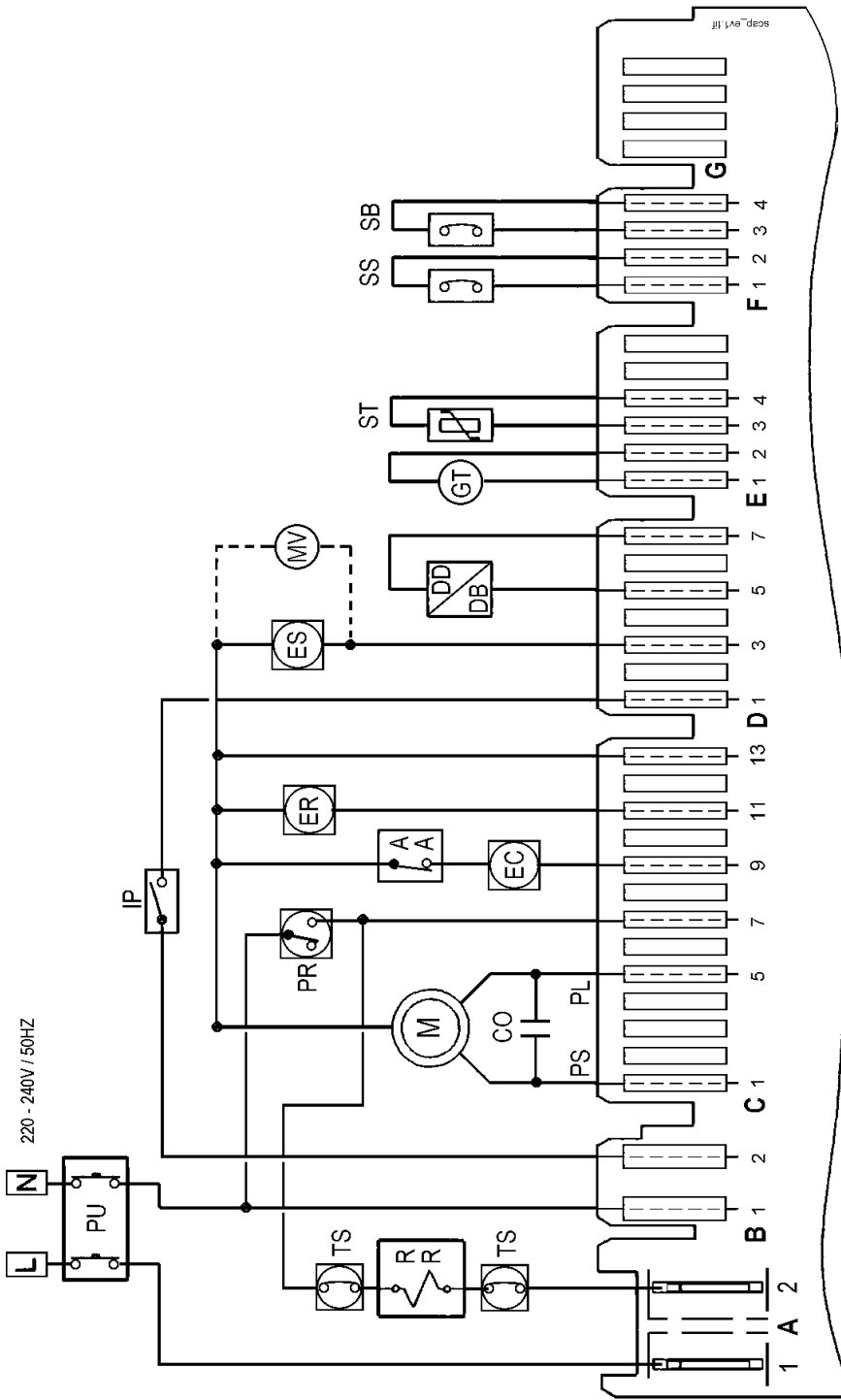


Table of contact points on the connector of the board and theoretical ohmic values

| COMPONENTS | CONTACTS | | CORRECT VALUE | NOTES |
|--|--|---|---------------|-----------------------------|
| * POWER CABLE & (PU) – ON/OFF SWITCH | L A1 | ⇒ | 0 Ω | With ON/OFF key pressed |
| | N B1 | | 0 Ω | |
| (RR) – HEATING ELEMENT + (TS) – SAFETY THERMOSTAT | A2 C7 | ⇒ | 25 Ω ± 8% | Connected in series (2100W) |
| (PR) – PRESSURE SWITCH | B1 C7 | ⇒ | INFINITE | Empty position (1-2) |
| | | | 0 Ω | Full position (1-3) |
| (IP) – DOOR MICROSWITCH | B2 D1 | ⇒ | 0 Ω | Door closed |
| (DD/DB) – INTEGRATED DISPENSER | D5 D7 | ⇒ | 1.500 Ω ± 8% | OK |
| (SB) – RINSE-AID DISPENSER | F3 F4 | ⇒ | INFINITE | With rinse-aid |
| | | | 0 Ω | Without rinse-aid |
| (SS) – SALT SENSOR | F1 F2 | ⇒ | INFINITE | With salt |
| | | | 0 Ω | Without salt |
| (ST) – TEMPERATURE SENSOR | E3 E4 | ⇒ | 6.030 Ω ± 8% | (at 20°C) |
| | | | 1.010 Ω ± 8% | (at 65°C) |
| (GT) – TACHYMERIC SENSOR | E1 E2 | ⇒ | 210 Ω ± 8% | OK |
| (MV) – FAN MOTOR | C13 D3 | ⇒ | 725 Ω ± 8% | OK |
| (ER) – REGENERATION SOLENOID VALVE | C13 C11 | ⇒ | 2.500 Ω ± 8% | OK |
| (EC) – FILL SOLENOID VALVE + (AA) – ANTI-FLOODING DEVICE | C13 C9 | ⇒ | 4.100 Ω ± 8% | Connected in series |
| (PL) – WASHING MOTOR | C13 C5 to the 2 Motor cables (white / brown) | ⇒ | 50 Ω ± 8% | Run winding |
| | | | 160 Ω ± 8% | Auxiliary winding |
| (PS) – DRAIN MOTOR | C13 C1 | ⇒ | 185 Ω ± 8% | OK |

Note: - * = The contacts used for measurement L N are the pins of the plug on the power cable.

9.3.2 COMPONENT CONNECTION DIAGRAM



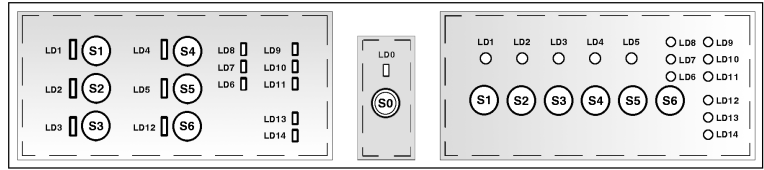
| LEGEND | |
|------------------------------------|----------------------------|
| AA = ANTI-FLOODING DEVICE | GT = TACHOMETRIC GENERATOR |
| CO = CAPACITOR | IP = DOOR SWITCH |
| DD = DETERGENT/RINSE-AID DISPENSER | M = PUMP MOTOR |
| ER = WATER FILL ELECTRIC VALVE | MV = FAN MOTOR |
| ES = REGENERATION ELECTRIC VALVE | PL/S = WASH/DRAIN PUMP |
| ES = RESET ELECTRIC VALVE | PR = PRESSURE SWITCH |
| | PU = PUSHBUTTON BOARD |
| | RR = HEATING ELEMENT |
| | SB = RINSE-AID SENSOR |
| | SS = SALT SENSOR |
| | ST = TEMPERATURE SENSOR |
| | TS = SAFETY THERMOSTAT |

9.4 TABLE OF ALARM CODES

In order to facilitate identification of an ALARM CONDITION indicated on the control panel and which causes one of the safety features to intervene, the possible causes for each alarm condition are listed in the table below together with suggested solutions.

Note:

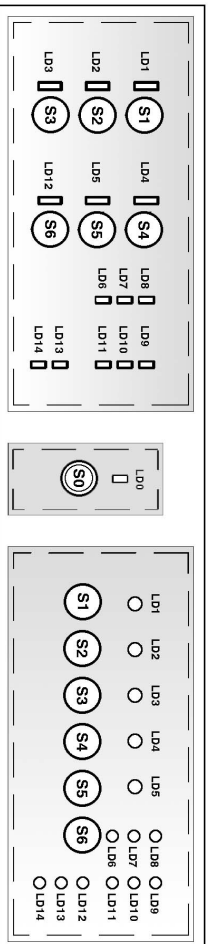
- The control board is unlikely to be the cause of an alarm condition, and should therefore be checked last.



| ALARMS | | SAFETY DEVICE | POSSIBLE CAUSES |
|--|-------------------------|--|---|
| Codice | Leds | | |
| [AL 5] | [LD9] | <p>WATER FILL TIME-OUT <i>The correct level is not reached. The pressure switch does not switch to FULL (1-3) within 4 minutes after activation of the solenoid valve</i></p> <hr/> <p>PRESSURE SWITCH ON "EMPTY" (1-2) <i>When the level has been reached, the pressure switch does not return to 1-3 within the maximum time of 60 seconds</i></p> | <p>a) The tap on the fill hose is closed. b) Mains water pressure <3 bar. c) The anti-flooding device has intervened. d) Fill solenoid/connections disconnected. e) Pressure switch faulty/Loose connections. f) Obstructions / Leakage from the tube connecting the sump to the pressure switch. g) Central filter clogged. h) Excessive foam. i) Dishes upside-down. j) Siphon effect in drain hose.</p> |
| [AL 6] | [LD10] | DRAIN TIME-OUT | <p>a) Domestic drain unsuitable (blocked) b) Drain pump/ Connections interrupted c) Pressure switch faulty (blocked on 1-3) d) Obstruction in connection between sump and pressure switch e) Control board (relay interrupted)</p> |
| [AL 4] | [LD9] + [LD10] | INTERVENTION OF ANTI-FLOODING DEVICE | <p>a) Leakage from the various connections b) Floating sensor blocked mechanically c) Float microswitch faulty</p> |
| *) [AL 3] | [LD11] | <p>WATER HEATING TIME-OUT <i>The correct temperature is not reached within 45 minutes after the heating element switches on</i></p> | <p>a) Heating element interrupted b) Safety thermostat open c) Electrical connections interrupted / loose d) NTC sensor faulty / Poor thermal contact e) Insufficient water circulation in tub f) Washing pump (damaged impeller)</p> |
| *) [AL 1/2] | [LD9] + [LD11] | <p>NTC SENSOR SHORT-CIRCUITED <i>Range < 450 Ω</i></p> | <p>a) Temperature sensor faulty (short-circuited) b) Electrical connections short-circuited c) Temperature too high (>90°C)</p> |
| | | <p>NTC SENSOR OPEN <i>Range > 26.700 Ω</i></p> | <p>a) Temperature sensor faulty (open) b) Electrical connections interrupted/disconnected c) Temperature too low (< -10°C)</p> |
| [AL 7] | [LD10] + [LD11] | MOTOR INOPERATIVE | <p>a) Motor winding interrupted/short-circuited b) Electrical connections loose / interrupted c) Motor jammed (foreign bodies) d) Capacitor interrupted/short-circuited e) Tachymetric sensor interrupted/short-circuited</p> |
| [AL 8] | [LD9] + [LD10] + [LD11] | MOTOR TRIAC SHORT-CIRCUITED | <p>a) Control board (Triac short-circuited)</p> |
| <p>In alarm conditions - [AL4], [AL5], [AL6], [AL7], [AL8] Dishwasher stopped – the corresponding LEDs flash To cancel the alarm condition Press (S0) to switch the dishwasher off. When the dishwasher is switched on again The cycle resumes from the point at which it was interrupted.</p> | | | |
| <p>*) In alarm conditions - [AL1/2], [AL3] The cycle is completed, and no alarm is displayed to the user; the condition is simply stored in memory for inspection by service engineers.</p> | | | |

9.5 SUMMARY OF FUNCTIONS

This table contains a brief summary of the procedures for all the functions available to the service engineer



| Function | Activation of function | LED (s) | Selection of response / Commencement of function | Key | LED(s) | Brief description / Comments |
|---------------------------------|---|--|--|-----|---|---|
| Selection of regeneration | [S1 + S2] S0 (On/Off) | → LD1 Lit for 5 seconds the code stored in memory flashes | S1 | → | LD1 Lit for 5 seconds the code stored in memory flashes | (description on page 19 / section 5.5 "Selecting the regeneration level") Temp >8°F / 4°D ... >30°F / 18°D ... >50°F / 29°D ... >70°F / 40°D ... >90°F / 50°D Level WH1 WH2 WH3 WH4 WH5 N° flashes 1 2 3 4 5 ex. level WH3, sequence - (flashes, 5sec pause) ...repeated for 1min |
| Display alarms stored in memory | [S2 + S3] S0 (On/Off) | → LD1 + LD2 + LD3 flashing | S1 | → | LD1 flashing | (description on page 22 / section 7.2 "Displaying the alarm codes") [AL5] [AL6] [AL4] [AL3] [AL1/2] [AL7] [AL8] LD9 LD10 [LD9+LD10] LD11 [LD9+LD11] [LD10+LD11] [LD9+LD10+LD11] The last 3 alarm codes stored in memory are displayed by pressing S1 repeatedly |
| Cancel alarms stored in memory | [S2 + S3] S0 (On/Off) | → LD1 + LD2 + LD3 flashing | S3 | → | LD1 ... → LD14 All LEDs lit | (description on page 22 / section 7.3 "Cancelling alarms") The LEDs light briefly for 1 second, then 2 seconds pause. Repeated twice. |
| Component diagnostics | [S2 + S3] S0 (On/Off) | → LD1 + LD2 + LD3 flashing | S2 | → | LD9 lit | (description on page 30 / section 9.1 "Component tests") EV DD PL RR ES ER PS PS Fine 20/sec 60/sec 20/sec 60/sec 60/sec LD9 LD10 [LD9+LD10] LD11 [LD9+LD11] [LD10+LD11] [LD9+LD10+LD11] |
| Test cycle | [S1 + S3] S0 (On/Off) | → LD3 flashing | Automatic start after 3 seconds | → | LD3 flashing | (description on page 31 / section 9.2 "Test cycle") Overall duration of cycle: 16 – 18 minutes |
| Stop function | All the functions listed above can be cancelled during execution. To do so, press S0 On/Off to switch the dishwasher off. | | | | | |