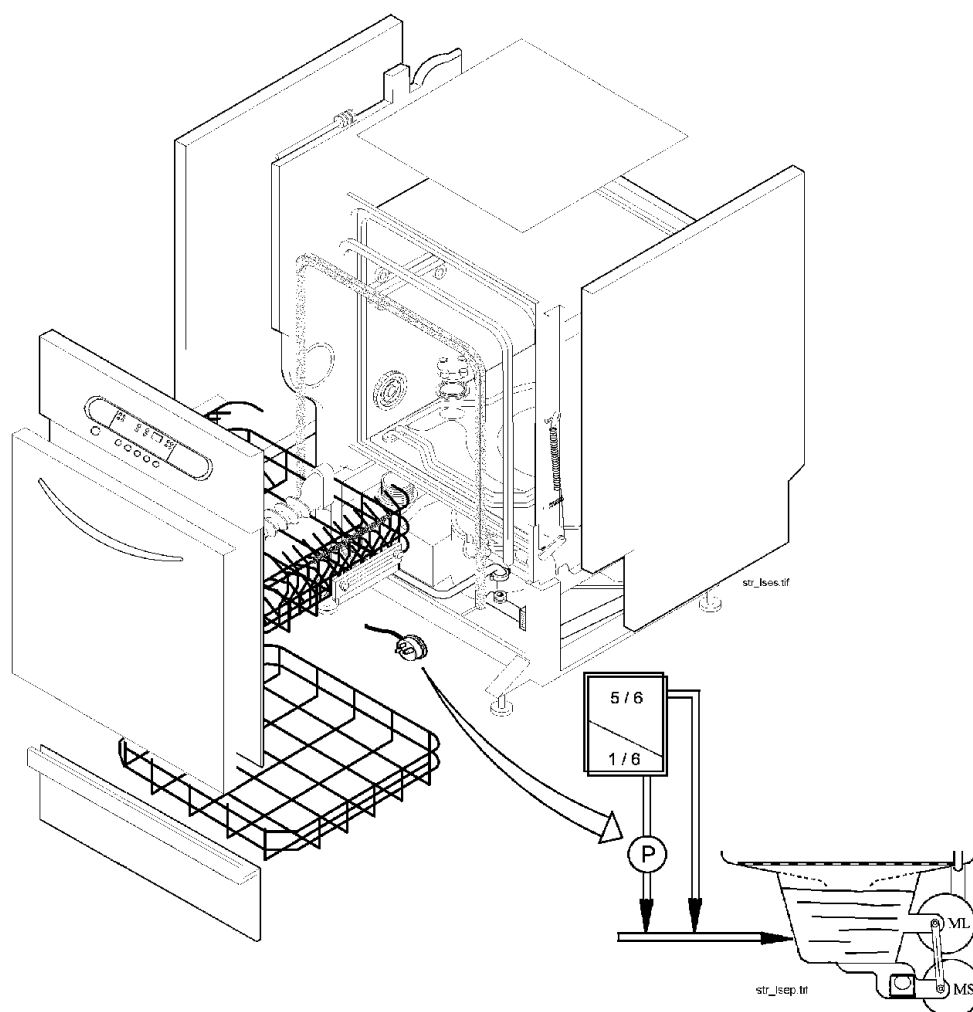




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**ELECTRONIC
DISHWASHER 1&5 / P**
(Pressure switch)

SOFT (Built-in) - 60 cm

(FUNCTIONALITIES)

INDEX

INTRODUCTION

1. GENERAL

- 1.1 General characteristics
- 1.2 Field of application
- 1.3 Structural characteristics

2. FUNCTIONAL CHARACTERISTICS

- 2.1 Control panel
- 2.2 Buzzer
- 2.3 Cycle execution time
- 2.4 Power failure
- 2.5 Programme selection
- 2.6 Programme selection with delayed start

3. REGENERATION

- 3.1 Definition
- 3.2 Selecting the level of regeneration

4. SPECIFICATIONS FOR ACTUATORS AND SENSORS

- 4.1 Components
- 4.2 Sensors
- 4.3 Operation of wash / drain motor
- 4.4 Washing with Full load / 1/2 load

5. HYDRAULIC CIRCUIT

- 5.1 Water fill functional system
- 5.2 Control of water fill
- 5.3 Control of stability of washing water
- 5.4 Control of drain function

6. SAFETY FEATURES - CONTROLS - ALARMS

- 6.1 Description of safety features / alarms
- 6.2 Description of the controls

7. ELECTRICAL FUNCTIONALITIES

- 7.1 Circuit diagram
- 7.2 Basic electrical diagram
- 7.3 Table of washing programmes

8. SERVICING

- 8.1 Component diagnostics
- 8.2 Function diagnostics
- 8.3 Test cycle
- 8.4 Options for improving washing performance

9. TROUBLE-SHOOTING

- 9.1 Checking the efficiency of the components
- 9.2 Electrical circuit diagram
- 9.3 Checking alarm conditions

1. GENERAL

1.1 GENERAL CHARACTERISTICS

Power supply :	-	220-240V / 50Hz (limits 187 - 254 V)
Total power absorption :	-	2300 W (with 2100 W heating element)
Water supply:	-	Min. / Max. pressure 5 - 80 N/cm ²
Load capacity:	-	Place settings: 12
Consumption (BIO AAB programme):		
	-	Water: 16 litres
	-	Energy: 1.2 Kwh
Duration of cycle:	-	Time 165 min.
Noise level:	-	(sound pressure) 47 db (A)

1.2 FIELD OF APPLICATION

Washing system	ALTERNATE IMPULSE
Water fill level	PRESSURE SWITCH CONTROL SOFTWARE (Level stability)
Water heating	HIDDEN HEATING ELEMENT
Temperature control	TEMPERATURE SENSOR (NTC)
Types of drying cycle	ACTIVE TURBO
Safety features/alarms	TOTAL PROTECTION (HYDRAULIC/SOFTWARE)

ELECTRONIC CONTROL MODULE

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

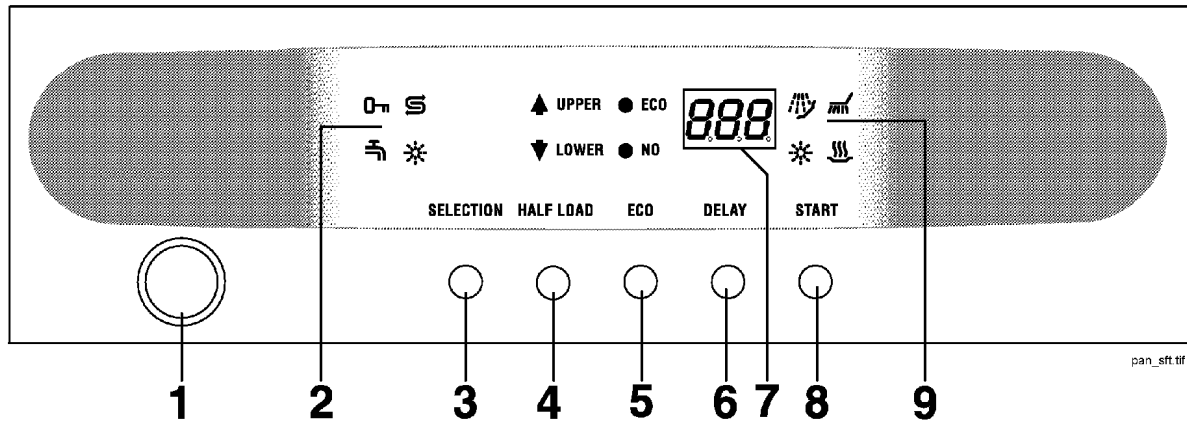
1.3 STRUCTURAL CHARACTERISTICS

Structure: MODULAR 60 cm

Range: SOFT

Controls: KEYS

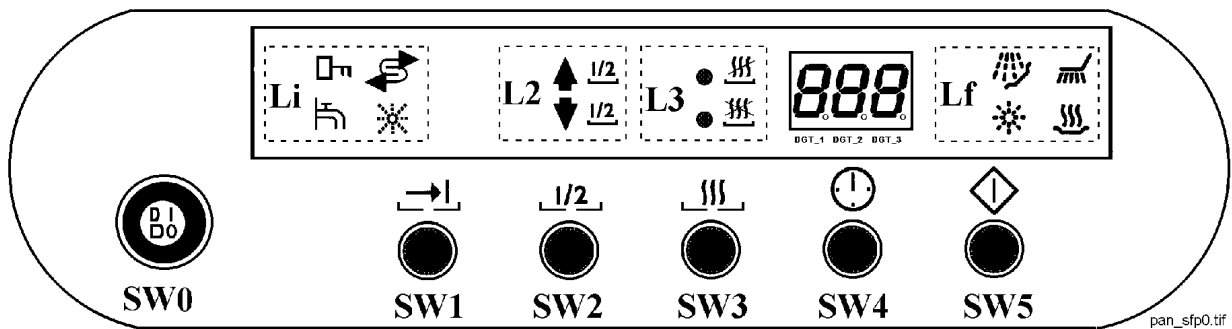
Styling: **SOFT**



1. ON/OFF key
2. INDICATOR / ALARM LEDS
3. PROGRAMME SELECTION key
3. 1/2 LOAD key
4. DRYING key
6. DELAYED START key
7. DISPLAY (3-DIGIT)
8. START/CANCEL PROGRAMME key
9. CYCLE PHASE INDICATOR LEDs

2. FUNCTIONAL CHARACTERISTICS

2.1 CONTROL PANEL



2.1.1 ON/OFF KEY (SW0)

Switches the appliance on and off.

- The DISPLAY lights when the appliance is powered. The SALT and RINSE-AID LEDs, too, may light (if these require topping up).

2.1.2 INDICATOR / ALARM LEDs (Li) (red)

INDICATOR LEDs:

- Light (fixed) only in the PROGRAMME SELECTION phase.
- These LEDs switch off when the washing cycle is in operation.

SALT

- Lights when the salt requires topping up.
- If the level of regeneration is set to [0] (no regeneration) this LED does not light.

RINSE-AID

- Lights when the rinse-aid requires topping up

ALARM LEDs:

- Light to indicate that an alarm condition has occurred.

DOOR

- Lights (fixed) if the door is open.

TAP

- Lights (flashing) to indicate a problem with the water supply (only in the CYCLE EXECUTION phase).

2.1.3 PROGRAMME KEY (SW1)

Used to select a washing programme

- The programme number increases sequentially from 1 to 10 each time this key is pressed.

2.1.4 1/2 LOAD (UPPER BASKET - LOWER BASKET) KEY (SW2)

Enables the user to optimize the cycle when a smaller quantity of dishes requires washing.

- The user can select a washing cycle using only one of the baskets (upper or lower).
- The following washing cycle parameters are modified:
 - a) The pre-wash phase (if featured by the programme) is not performed.
 - b) One cold rinse is eliminated.
 - c) The alternate washing sequence is altered, and concentrated on the basket selected.

2.1.5 1/2 LOAD LEDs (L2) (green)

These LEDs indicate that the 1/2 LOAD option has been selected. Standard setting: both LEDs switched off.

UPPER BASKET: The washing cycle is concentrated on the upper basket.

LOWER BASKET: The washing cycle is concentrated on the lower basket.

2.1.6 **DRYING SELECTOR KEY (SW3)**

Allows the user to reduce the temperature of the water in the hot rinse and to modify the drying phases.

- The drying selection is indicated by the corresponding LEDs: "**ECO**" and "**NO**".

2.1.7 **DRYING LEDs (L3)** (green)

Enables the user to optimize the cycle when a smaller quantity of dishes requires washing.

"ECO" option: Reduces the temperature of the hot rinse by about 12°C.

"NO" option: Replaces the hot rinse with a 10-minute cold rinse.

STANDARD SETTING: Active/Turbo - both LEDs switched off.

ACTIVE DRYING: Condenser drying system with internally-balanced air circulation.

TURBO DRYING: Condenser drying system with air circulation by convection.

STANDARD DRYING MODE: **Active/Turbo** - both LEDs unlit.

2.1.8 **DELAYED START KEY (SW4)**

Determines the delay time before the selected cycle begins.

- The 3 digits on the display [**h . .**] indicate the selected delay time (1 - 12 hours).
- The delay time (hours) increases sequentially from 1 to 12 each time this key is pressed.

2.1.9 **START / CANCEL KEY (SW5)**

This key has a dual function which depends on the status of the dishwasher:

- **START:** Function enabled during PROGRAMME SELECTION phase.
- **CANCEL:** Function enabled during PROGRAMME EXECUTION phase.

- START:**
- When the START/CANCEL key is pressed, the appliance passes from PROGRAMME SELECTION mode to PROGRAMME EXECUTION mode.
 - If the door is OPEN
 - The control system accepts the start signal, but the cycle does not start (the appliance remains in STANDBY mode).
 - The CYCLE PHASE LED for the current phase of the cycle flashes when the appliance is in STANDBY.
 - If the door is closed
 - The control system accepts the start signal and the cycle starts immediately.
 - The start of the cycle is confirmed by the buzzer and by the LED relative to the current cycle, which lights (fixed).

- CANCEL:**
- When the START/CANCEL key is pressed, the PROGRAMME EXECUTION phase ends and the appliance returns to PROGRAMME SELECTION mode.
 - If the key is held down for 3 seconds while the cycle is being performed, the current programme is cancelled.
 - If the pressed during the delayed-start countdown, only the countdown is reset.

At this point, the programme settings can be modified, the cycle can be restarted or the delayed-start setting can be modified.

2.1.10 **3-DIGIT DISPLAY** (green) [Dgt_1] [Dgt_2] [Dgt_3] displays letters/numbers to indicate:

- Programme number [. . .] (1 > 10)
- Time to elapse for the selected cycle [. . .]
- Delayed start time in hours [**h** + number] (0 > 12)
- The end of the washing cycle [- - -]
- The selected level of regeneration [**L** + number]
- Status of the diagnostics cycle [. . .]
- Alarm condition [**A L** + number]
- The temperature of the water during the execution of the cycle (by holding down **SW3**).

2.1.11 **CYCLE PHASE LEDs (Lf)** (green)

Light to indicate the current phase of the cycle:

PRE-WASH - WASH - RINSE - DRYING

These LEDs also light to indicate the following situations:

SELECTION - All the LEDs corresponding to the selected cycle light simultaneously.

EXECUTION - Only the LED corresponding to the current phase lights (fixed).

END OF CYCLE - All the LEDs remain unlit.

DOOR OPEN - In PROGRAMME EXECUTION phase, the LED corresponding to the current phase flashes.

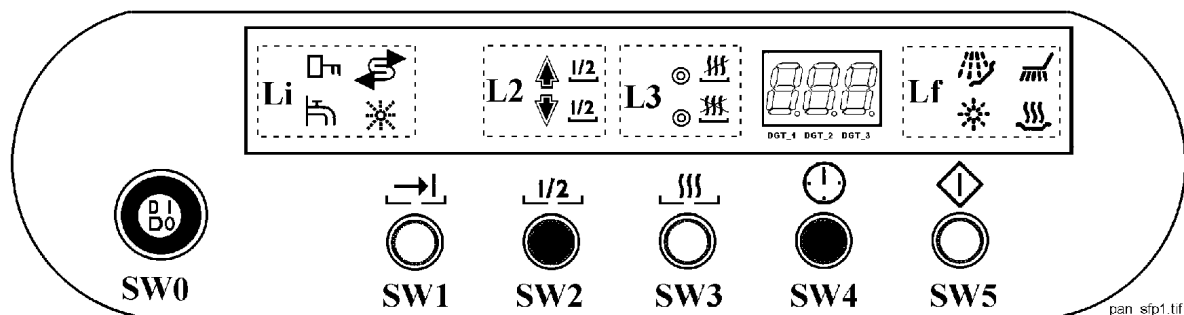
2.2 BUZZER

- The piezoelectric buzzer is fitted to the control board
- The buzzer sounds to confirm that a programme key has been pressed, at the start of the wash cycle, at the end of the cycle and, if necessary, to indicate an alarm condition.
- If preferred, the buzzer can be disactivated by pressing a combination of keys.

FUNCTION	TYPE/DURATION OF SIGNAL	DEFINITION
Key activation	short / 80 mS	Sequence_A
Start cycle	short / 500 mS	Sequence_B
End of cycle	intermittent / 2 sec (500mS On / 500mS Off)	Sequence_F
Alarm	intermittent / 15 sec (2 Sec On / 3 Sec Off)	Sequence_E

2.2.1 ACTIVATING / DISACTIVATING THE BUZZER

The buzzer can be disactivated by pressing a combination of two keys (**SW2 & SW4**).



- Disactivation and re-activation of the buzzer is possible only in the PROGRAMME SELECTION phase, i.e. before starting the washing cycle

DISACTIVATING THE BUZZER

PROCEDURE

- With the dishwasher switched ON (door OPEN or CLOSED)
- Press and hold down keys **SW2** and **SW4** simultaneously for at least **3** seconds. During this period (3 seconds) the buzzer will sound (sequence_B) to indicate that the function has been disactivated.

When the buzzer has been disactivated, the following signals are no longer heard:

- Key pressure - Start of cycle - End of cycle - Alarm condition

REACTIVATING THE BUZZER

Repeat the procedure described above; after 3 seconds, the buzzer will be re-activated.

Standard factory setting: Buzzer activated.

2.3 CYCLE EXECUTION TIME

The control board is programmed with an algorithm which calculates the duration of the washing cycle.

This algorithm takes the following parameters into consideration:

- Fixed times for the following phases:
 - Water fill (static and dynamic, fixed duration)
 - Drain
 - Wash / Cold rinses / Drying
 - Pauses during the cycles

The fixed times are predetermined directly for each cycle.

- Variable times for the following cycles:
 - Water fill to preset level
 - Water heating
- and for:
- Quantity of dishes loaded into the appliance

The variable times are additional, and are updated for each cycle according to the parameters measured during the cycle (mains water pressure, room temperature, mains voltage etc.); in other words, the duration of the cycles depends on the ambient conditions in which the appliance is operating.

Updating is carried out in real time, while the washing cycles are in operation, at the end of each phase.

While the cycle is being executed, each phase is monitored in order to ensure that the execution times and functions are correct; if this is not the case, the safety system intervenes.

2.4 POWER FAILURE

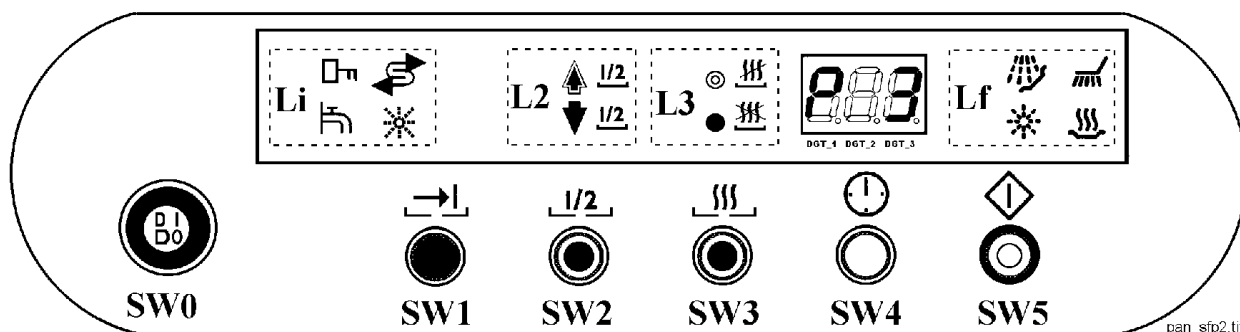
- A POWER FAILURE is detected if the mains power supply is interrupted for a very brief period (between 20 and 40mSec).
- The POWER FAILURE function consists of maintaining the cycle status information when a power failure occurs, so that, when power is restored, the appliance resumes the cycle from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

2.5 PROGRAMME SELECTION - EXECUTION - END OF CYCLE

Without DELAYED-START option



PROGRAMME SELECTION

WITH THE DOOR OPEN OR CLOSED:

1. Press **SW0** to switch the dishwasher ON.
 - The 3-digit display shows the last programme performed (e.g. [P . 3])
 - The SALT and RINSE AID LEDs (**Li**) may light.
2. Press the programme key (**SW1**) repeatedly to select the desired programme.
 - The cycle phase LEDs (**Lf**) for the programme light (fixed).
3. If desired, press **SW2** and/or **SW3** to select the corresponding option(s).
 - The corresponding LED(s) (**L2** and/or **L3**) light to confirm selection of the option.
 - The cycle phase LEDs (**Lf**) relative to the selected programme will change accordingly.

PROGRAMME EXECUTION (WITH THE DOOR CLOSED)

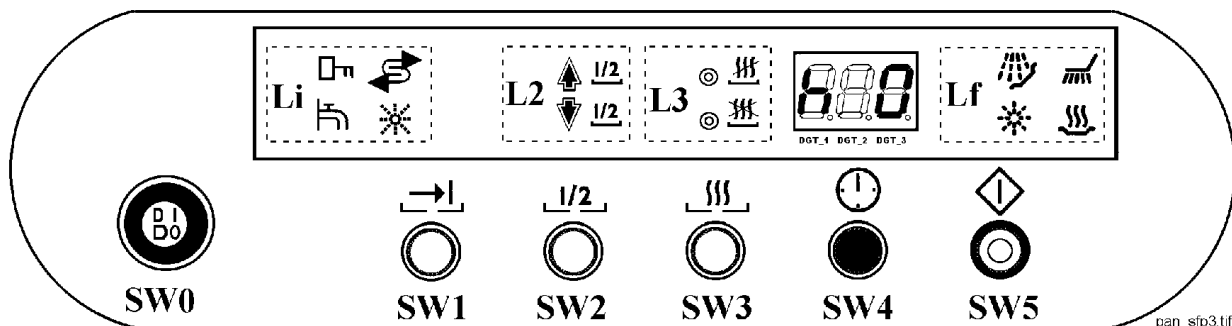
4. Press **SW5** to start the washing programme.
 - A short buzz (sequence_B) confirms that the programme has started.
 - The display [. . .] shows the duration of the cycle (in minutes) (e.g. [. 9 0]).
 - The LED (**Lf**) relative to the current phase remains lit; the remaining cycle phase LEDs remain unlit.
 - As the programme proceeds, the LED (**Lf**) for each completed phase switches off, and the LED for the subsequent phase, now in progress, lights.
 - The time shown on the display [. . .] begins to decrease at one-minute intervals.
 - The LEDs corresponding to the options (**L2** and **L3**) remain lit (fixed).
5. Press **SW1**: The display shows the current programme and all the cycle phase LEDs for all uncompleted phases light.
 - All the keys (with the exception of **SW5**, which can be used to cancel the current cycle) are disabled.
6. To display the temperature of the water, press and hold down **SW3** for 2 seconds.
7. If the door is opened, the cycle is interrupted.
 - The display [- - -] shows the current washing programme cycle.
 - The LED (**Lf**) relative to the current cycle flashes; the DOOR LED (**Li**) lights.
 - When the door is re-closed, the cycle resumes from the point at which it was interrupted.
 - To cancel the current washing programme, press **SW5** for 5 seconds; the appliance returns to PROGRAMME SELECTION mode and the display [. . .] shows the last programme performed.

END OF CYCLE

8. At the end of the washing cycle the three central segments of the display are lit [- - -].
 - The buzzer sounds (sequence_F).
 - After 5 seconds, the display [. . .] shows the programme that has just ended, which is stored in memory.
 - All the LEDs switch off.
 - Press **SW0** to switch the dishwasher off.

2.6 PROGRAMME SELECTION

With DELAYED-START option



PROGRAMME SELECTION

WITH THE DOOR OPEN OR CLOSED

Press **SW0** to switch the dishwasher ON; the "POWER ON" LED lights.

- Carry out the programme selection procedure described in the previous paragraph (2.5, steps 1 to 3)
- a. Press **SW4** to select the desired delay time. The display shows [h . 0].
 - Press **SW4** repeatedly to select the desired delayed-start time.
 - The 3 digits on the display [. . .] indicate the delayed-start time in sequence (1 - 12 hours).

Dgt_1: [h] (abbreviation for hours)
 Dgt_2: [.] unlit, or number (hours - tens)
 Dgt_3: [.] number (hours - units).

- To cancel the delayed start option, continue pressing **SW4** until the display shows [h . 0].

PROGRAMME EXECUTION (WITH THE DOOR CLOSED)

- b. Press **SW5**. The delayed-start countdown starts automatically.
 - A short buzz (sequence B) confirms that the countdown has started
 - The display shows [h . .] followed by the delayed start time in hours.
 - The letter [h] flashes to indicate that the countdown has started.
 - As the countdown progresses, the number shown by Dgt_2 and Dgt_3 (time to elapse in hours) decrements at intervals of 1 hour.
 - The cycle phase LEDs (Lf) remain unlit for the entire duration of the countdown.
 - Press **SW1** to display the programme selected.
- c. The delayed-start countdown is not interrupted if the door is opened.
 - All the keys (with the exception of **SW5**, which can be used to cancel the current cycle) are disabled.
- d. At the end of the delayed-start countdown, the washing programme starts automatically.
 - The display [. . .], which previously showed the delayed start countdown, now indicates the time to elapse to the end of the cycle.
 - The cycle phase LED (Lf) corresponding to the phase being performed lights.
- Repeat the procedure described in the previous paragraph (2.5, steps 4 - 8).

3. SPECIAL REGENERATION CYCLE

3.1 DEFINITION

With the new water softening system, the level of regeneration can be selected electronically, with **10** special regeneration levels:

TABLE OF REGENERATION VALUES

DISPLAY	WASHING CYCLE		FILL PHASES	HARDNESS OF WATER	
LEVEL	AUTONOMY	REGEN.	N°	° F (TH)	° D (dH)
0.00	No regeneration		-	0 > 8	0 > 4
1.00	8 cycles	at 9° cycle	40	9 > 14	5 > 8
2.00	6 cycles	at 7° cycle	30	15 > 20	9 > 11
3.00	4 cycles	at 5° cycle	20	21 > 30	12 > 17
*4	3 cycles	at 4° cycle	15.00	31 > 40	18 > 22
5.00	2 cycles	at 3° cycle	10.00	41 > 50	23 > 28
6.00	1 cycle	at 2° cycle	5	51 > 60	29 > 33
7.00	0 cycles	every cycle	1	61 > 70	34 > 39
8.00	0 cycles	every cycle	1	71 > 80	40 > 45
9	0 cycles	every cycle	1.00	81 > 120	46 > 70

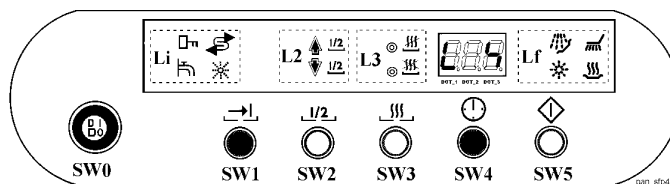
REGENERATION PROCEDURE

- Cycle counting for "special" regeneration is performed by the electronic control system and is based on the number of fill phases rather than on the actual number of cycles; this makes the process independent of the number and type of programmes performed.
- Calculation of the number of cycles is based on a programme with 5 fill phases.
- Modification of the level of regeneration automatically results in regeneration being carried out 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 level of regeneration selected.

- N.B.
- If level [**0**] is selected, regeneration does not take place and the Salt LED remains unlit.
 - The Time-out for the regeneration solenoid valve is set to 10 minutes.

3.2 SELECTING THE LEVEL OF REGENERATION

- With the dishwasher switched **ON**.
1. Press and hold down **SW1** and **SW4** simultaneously.
 - After about **5** seconds, the display shows [**L . 4**] (**L** flashing).
 2. To modify the level of regeneration, press **SW4** repeatedly within 5 seconds
 - The display [**L . .**] indicates the corresponding regeneration level in sequence each time the key is pressed.
 - All the remaining LEDs remain unlit.



Five seconds after pressing **SW4** for the last time, the selected regeneration level is stored in memory and the dishwasher returns to the previous condition (PROGRAMME SELECTION mode).

4. SPECIFICATIONS FOR ACTUATORS AND SENSORS

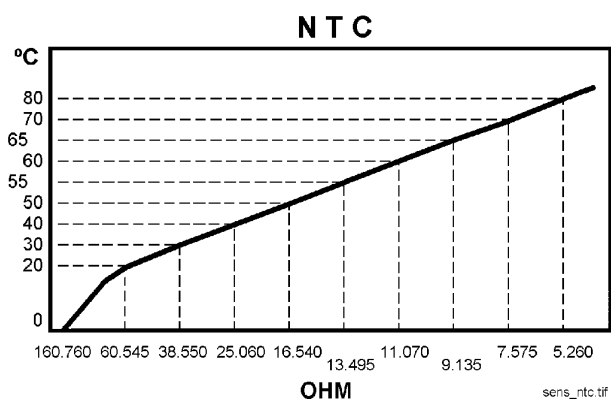
4.1 COMPONENTS

TYPE OF COMPONENT	POWER AVAILABLE	TYPE OF CONTROL
Wash pump	Max 250W	Triac & relay
Drain pump	Max 100W	Triac & relay
Washing heater	Max 2000W	Relay
Water fill solenoid	Max 10W	Triac
Reset solenoid	Max 10W	Triac
Regeneration solenoid	Max 10W	Triac
Detergent/Rinse-aid solenoid	Max 10W	Triac
Fan motor	Max 10W	Triac

4.2 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



4.3 OPERATION OF THE WASH / DRAIN MOTOR

4.3.1 CHARACTERISTICS OF THE MOTOR

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

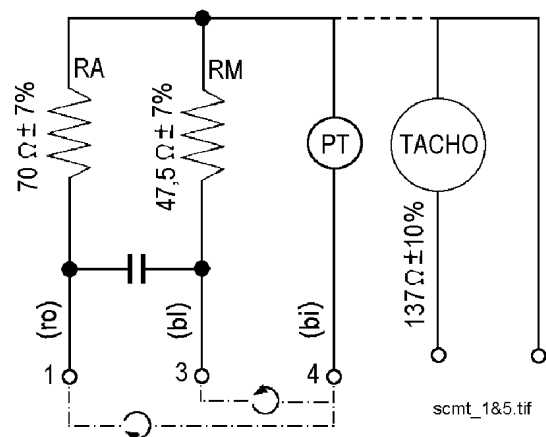
- The operation of the motor during the washing cycle is controlled by the electronic control system, which varies the speed of the motor in order to optimize the various washing cycles (fixed speed or variable speed).
- The signal sent by the tachimetric sensor to the electronic control system (microprocessor) 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
1800 rpm	1600 – 2800 rpm
2300 rpm	
2800 rpm	

TECHNICAL CHARACTERISTICS:

- Power supply: 220/230V, 50Hz
- Speed: 2800 rpm
- Power absorption: 168 W
- Capacitor: 4 μ F
- Direction of rotation: Bi-directional
- Rotation during washing: Anti-clockwise
- Delivery at constant speed in alternate operation:
 - lower spray arm 33 litres
 - upper spray arm 35 litres
- Rotation during drain: Clockwise
- Head 200 cm



4.3.2 WASH / DRAIN

The WASH and DRAIN functions are controlled by the electronic control board, which powers the primary motor winding (**RM**) and the auxiliary winding (**RA**) alternately by means of a switching relay fitted to the control board.

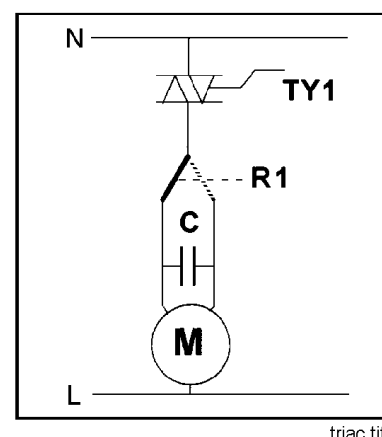
The motor's electrical circuit is controlled by:

- 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

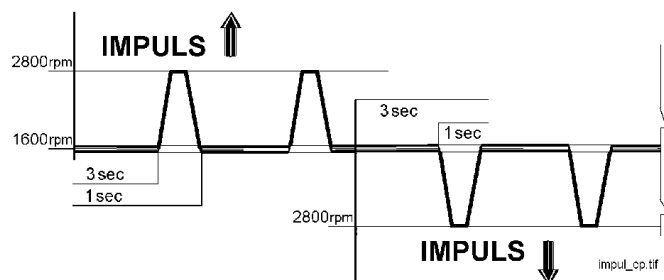


4.3.3 IMPULSE WASHING

The impulse washing function is governed by the electronic control system, which powers the wash motor at brief intervals at two alternating speeds.

The appliance is designed to perform two impulse washing sequences:

SPEED OF MOTOR		DURATION
Maintenance	1600rpm	3sec
IMPULSE	2800rpm	1sec



4.3.4 ALTERNATE WASHING CYCLE

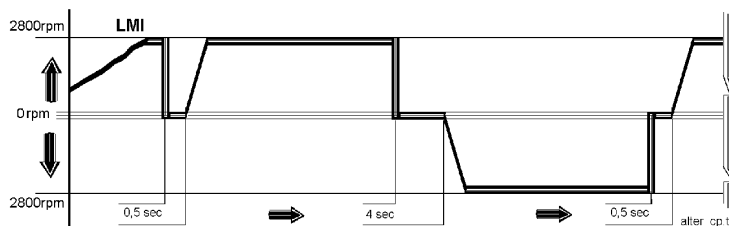
Alternate washing is a washing system in which the water supply to the spray arms - i.e. the fundamental washing function - is alternated between the upper spray arm and the lower spray arm; the two spray arms are never used simultaneously.

This type of washing function is obtained by activating the motor via an electronic control system which switches the motor off for brief intervals (pauses) of fixed duration in order to allow switching of the water flow from one spray arm to the other.

In effect, a flow deviator (ball valve) positioned on an inclined guide inside the pump alternately opens and closes the two circuits which supply water to the spray arms.

Alternate water supply to the two spray arms is based on two pauses of different duration.

MOTOR PAUSE	WATER SUPPLY
0.5 sec	Upper spray arm
4.0 sec	Lower spray arm



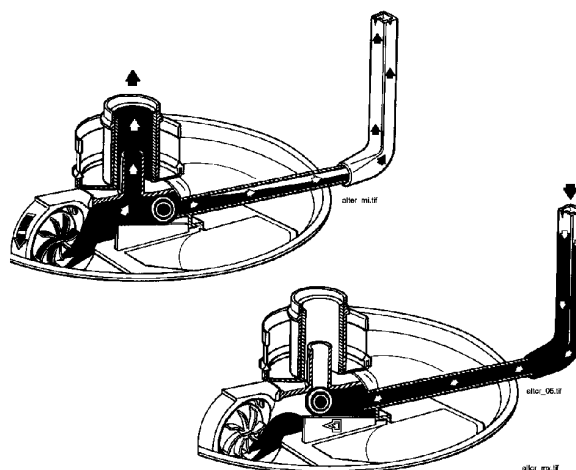
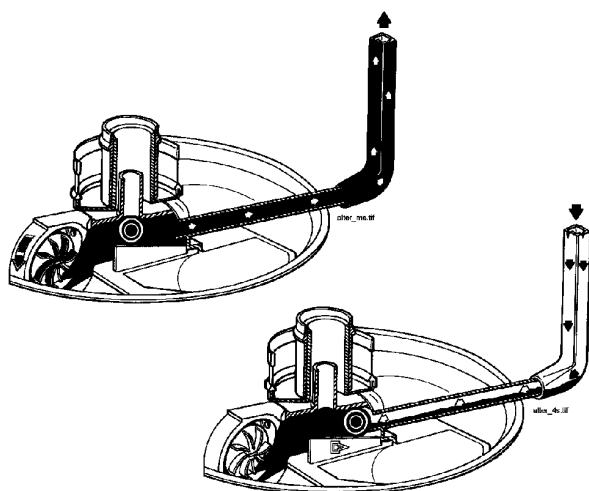
The position of the flow deviator valve determines which of the spray arms is used.

UPPER SPRAY ARM

PAUSE (4 sec.)

LOWER SPRAY ARM

PAUSE (0.5 sec.)



4.4 WASHING WITH FULL LOAD / 1/2 LOAD

Depending on the way in which the dishes are distributed and the quantity of dishes to be washed, the standard settings for the alternate washing phases can be modified by pressing the 1/2-LOAD key (**SW2**).

The times for the alternate washing phases are defined by the electronic control system.

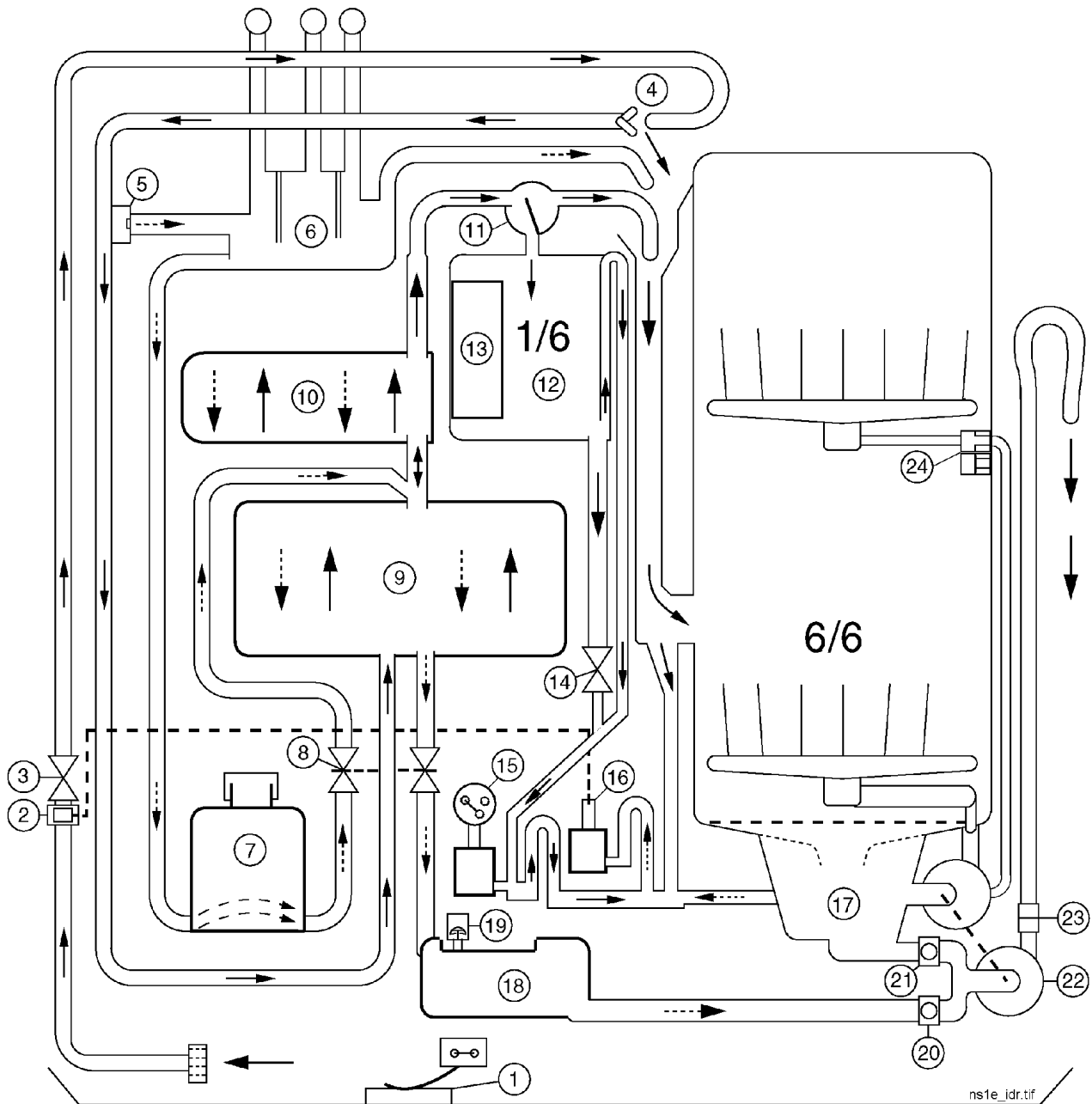
Duration of alternate washing phases
with FULL LOAD and 1/2 LOAD

TYPE OF LOAD	Alternate action $\uparrow\downarrow$		Alternate action $\uparrow\downarrow$		Alternate action $\uparrow\uparrow\downarrow$	
	Upper t sec	Lower t sec	Upper t sec	Lower t sec	Upper t sec	Lower t sec
Full load	30	20	40	25	40	10
1/2 Load	50	10	50	10	50	10
1/2 Load	10	50	10	50	10	50
Key	$\uparrow\downarrow$ = BALANCED alternate washing action $\uparrow\downarrow$ = Washing action CONCENTRATED on UPPER basket $\uparrow\uparrow\downarrow$ = Washing action EXTRA-CONCENTRATED on UPPER basket					
$\uparrow$	Washing action in UPPER basket (t variable between 30 / 45 sec. - see cycles table for variants)					

The selection of the 1/2 Load Key besides modifying the alternate washing cycle implies:

- The cancellation of the Pre-wash in cycles **2, 3, 4, 6, 9**.
- The cancellation of a cold Rinse in cycles **2, 3, 4, 5, 6, 9**.
- In every cycle it wrongly concentrates the washing action on the selected basket.

5. HYDRAULIC CIRCUIT



KEY

- | | |
|--|--|
| 1. Anti-flooding device | 13. Insert for reduction of volumetric chamber |
| 2. Anti-overflow device | 14. Reset solenoid |
| 3. Fill solenoid | 15. Pressure switch |
| 4. Air-Break | 16. Pressure chamber for anti-overflow device |
| 5. Water intake valve for regeneration chamber | 17. Sump |
| 6. Regeneration chamber | 18. Water tank for resin washing |
| 7. Salt container | 19. Breather valve for resin washing water |
| 8. Regeneration/Resin washing solenoid | 20. Separation valve for resin washing water |
| 9. Resin reservoir | 21. Valve in sump bottom |
| 10. Resin washing water tank | 22. Washing/Drain pump assembly |
| 11. Volumetric distributor | 23. Non-return valve |
| 12. Volumetric chamber | 24. Delivery valve to upper spray arm |

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:

- | | |
|------------------------------------|-----------------------------------|
| a) Static Fill (fixed duration) | (30 seconds) |
| b) Dynamic Fill (fixed duration) | (10 seconds) |
| c) Fill to pressure switch level | (until "FULL" signal is received) |
| d) Control of level stability | (dynamic balance) |
| e) Supplementary fill (percentage) | |

a) Static Fill

- With the motor switched off, the fill solenoid is opened and water is introduced into the appliance for **30 seconds** (fixed time). This is followed by:

b) Dynamic Fill (2300 rpm)

- The motor is switched on at 2300 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:

c) Fill to pressure switch level

- The motor switches off, and the water fill continues until the pressure switch signal returns to "FULL".
- The level is determined by the volumetric control chamber as 1/6 of the IWMS which, when filled, pressurizes the level chamber of the pressure switch. This is followed by:

d) 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.

Once 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.
- 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".
- 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 quantity of water in the sump is insufficient.
- When this condition is reached, the appliance is said to be dynamically balanced.

e) Supplementary fill

On completion of the water fill phase, and before proceeding to the subsequent phase, the system performs a fixed-duration supplementary water fill which depends on the speed of the motor for the subsequent washing phase (as specified in the cycles table).

The duration of this supplementary fill phase is as follows:

- Washing speed ≤ 2300 rpm = no percentage water replenishment
(quantity of water fill: 3.9 litres approx.)
- Washing speed > 2300 rpm = percentage replenishment equivalent to 12%, with calculation based on the aperture time of the solenoid, Sub-phase **a**) > Sub-phase **d**)
(quantity of water fill: 3.9 litres + 12% = 4.4 litres approx.)

5.2.1 FILL TIME

During the entire duration of the fill phase (i.e. from sub-phase "a" to sub-phase "d"), 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 **d**) after this 4-minute period, a Time-out is generated and the appliance goes into Alarm mode [**AL5**] (no water).

5.2.2 POWER FAILURE DURING WATER FILL PHASE

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

In this case, the 12% replenishment calculation is not carried out according to the aperture time of the solenoid (which would give an incorrect result), but rather on an average time (T_m) which is the floating average of all the fill times performed thus far.

The certainty that the fill results are correct is given by the fact that the opening of the solenoid depends only on the opening 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.
- If the pressure switch returns to "EMPTY", the fill solenoid is activated for a time (**T**) of:
 - **T3 sec** if the duration of the "EMPTY" signal is less than 0.5 sec.
 - **Tx sec** if the duration of the "EMPTY" signal is in excess of 0.5 sec.
(Tx = 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 **90 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

If the washing cycle is interrupted due to a power failure, the current value in the counter which monitors the solenoid opening time (limit **90 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 90 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 ([**AL 6**] - 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.

6. SAFETY FEATURES - CONTROLS - ALARMS

6.1 DESCRIPTION OF SAFETY FEATURES AND ALARMS

Whether the appliance is switched off or in operation, a series of safety features are activated in order to protect the components fitted to the appliance.

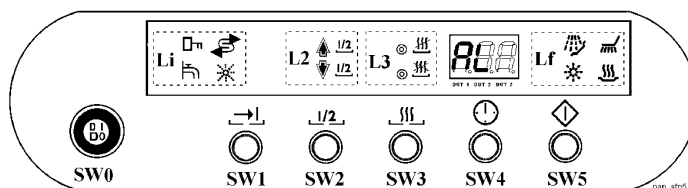
If one of the following safety features should intervene, a Time-Out immediately interrupts the washing cycle; the user is informed of this by an alarm code on the display panel and an acoustic signal (buzz) (sequence_E) indicating an alarm condition.

Safety features	Interruption of cycle	Automatic cycle reset		ALARM codes	
NTC sensor short-circuited	YES	NO		AL1	
NTC sensor: open circuit	YES	NO		AL2	
Heating Time-out	YES	NO		AL3	
Anti-flooding	YES		YES		*AL4
Water fill Time-out	YES	NO		AL5	
Pressure switch on "EMPTY"	YES		YES		*AL5
Drain not completed / malfunction	YES	NO		AL6	
Motor jammed	YES	NO		AL7	
Motor Triac short-circuited	YES	NO		AL8	

6.1.1 ALARM CONDITIONS

In the event of an ALARM condition:

- The operation of the dishwasher is interrupted.
- The three DIGITS in the DISPLAY window indicate the corresponding ALARM CODE [**A L** -].
- All the LEDs switch off.
- All the keys (**SW1** - **SW5**) are disabled (including the CANCEL function).
- To reset the appliance from an ALARM condition, it is necessary to switch it off by pressing **SW0**.
- Example of Alarm: Heating Time-out: The DISPLAY shows [**A L 3**] (**A** and **L** flashing).
- When **SW0** is pressed again to switch the appliance on, two different conditions may occur, depending on the Alarm code displayed:



- AUTOMATIC CYCLE RESET = **YES** - Alarms [***AL4**] [***AL5**]
 - The washing cycle is cancelled. The appliance returns to PROGRAMME SELECTION mode.
 - The programme restarts from the beginning.
- AUTOMATIC CYCLE RESET = **NO** - Alarms [**AL1**] [**AL2**] [**AL3**] [**AL5**] [**AL6**] [**AL7**] [**AL8**]
 - The washing cycle is suspended, and will restart from the point at which it was interrupted.

If the fault persists when the cycle is resumed, the appliance returns to Alarm mode.

N.B. The electronic control system always memorizes the last Alarm condition generated, which can be shown on the DISPLAY using the Components Diagnostics Test (see paragraph 8.1.1.d).

6.2 DESCRIPTION OF THE CONTROLS

6.2.1 NTC TEMPERATURE SENSOR

- 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.

6.2.1.1 NTC TEMPERATURE SENSOR SHORT-CIRCUITED

- If the impedance is too low (equivalent to a temperature of $\geq 85^{\circ}\text{C}$), based on the conversion by the electronic control system of the impedance into temperature, the ALARM intervenes.

Possible causes:

ALARM [AL1]

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

6.2.1.2 NTC TEMPERATURE SENSOR OPEN:

- If the impedance is too high (temperature -5°C), based on the conversion by the electronic control system of the impedance into temperature, the ALARM intervenes.

Possible causes:

ALARM [AL2]

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

6.2.2 HEATING TIME-OUT

RAMP INSUFFICIENT

- 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:

ALARM [AL3]

- a. Heating element broken
- b. Safety thermostat open
- c. Wiring interrupted / disconnected
- d. NTC sensor faulty / incorrectly positioned / poor thermal contact
- e. Insufficient water circulation
- f. Excessive foam
- g. Central filter obstructed

6.2.3 ANTI-FLOODING CONTROL SYSTEM

- 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 6.2.4 "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:

ALARM [AL4]

- a. Water leakage from the various components
- b. Water leakage from the various couplings
- c. Floating sensor/microswitch jammed mechanically

6.2.4 WATER FILL TIME-OUT

- This is a TIME-OUT which is operative only during the water fill phases.
- The control system definitively disconnects the water fill solenoid.
- The count for the time ("T") starts at the moment of aperture of the fill solenoid, and ends when the pressure switch signal stabilizes on "FULL".
- The maximum time for aperture of the fill solenoid ("T") is **4 minutes** for the entire fill phase. When this time limit has elapsed, an alarm condition is generated.

Possible causes:

ALARM [AL5]

- a. Water tap closed
- b. Mains water pressure <0.3 bar
- c. Intervention of Anti-overflow device
- d. Fill solenoid or connections faulty
- e. IWMS - Pressure switch tube obstructed/kinked
- f. Pressure switch faulty
- g. Siphon created in the drain hose

6.2.4.1 PRESSURE SWITCH SIGNALS "EMPTY"

- 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, it must remain "FULL" until the subsequent drain phase.
- If the pressure switch signals "EMPTY", 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 phase is **90 seconds**; if this period is exceeded, an alarm condition is generated.

Possible causes:

ALARM [AL5]

- a. Dishes upside down
- b. Central filter obstructed
- c. Excessive foam
- d. Leakage from IWMS - Pressure switch tube
- e. Pressure switch faulty
- f. Siphon created in drain hose

6.2.5 DRAIN INCOMPLETE/INCORRECT

- 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".
- 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:

ALARM [AL6]

- a. Domestic drain circuit not suitable (obstructed / blocked)
- b. Drain pump jammed
- c. Pressure switch faulty
- d. Sump - pressure switch tube obstructed
- e. Drain filters obstructed
- f. Relay or Triac faulty

6.2.6 WASHING MOTOR JAMMED

- 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:

ALARM [AL7]

- a. Motor winding short-circuited
- b. Motor winding interrupted
- c. Motor jammed / foreign bodies
- d. Electrical connections broken / false contacts
- 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**.

6.2.7 WASHING MOTOR TRIAC SHORT-CIRCUITED

- 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:

ALARM [AL8]

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

6.2.8 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 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 are switched off.
- This procedure takes place only during washing phases, when the cycle is restarted after a power failure or after opening the door.

6.2.9 DOOR OPEN

- A high-voltage sensor connected downstream of 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.

6.2.10 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.

6.2.11 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.

6.2.12 CONTROL OF SALT LEVEL

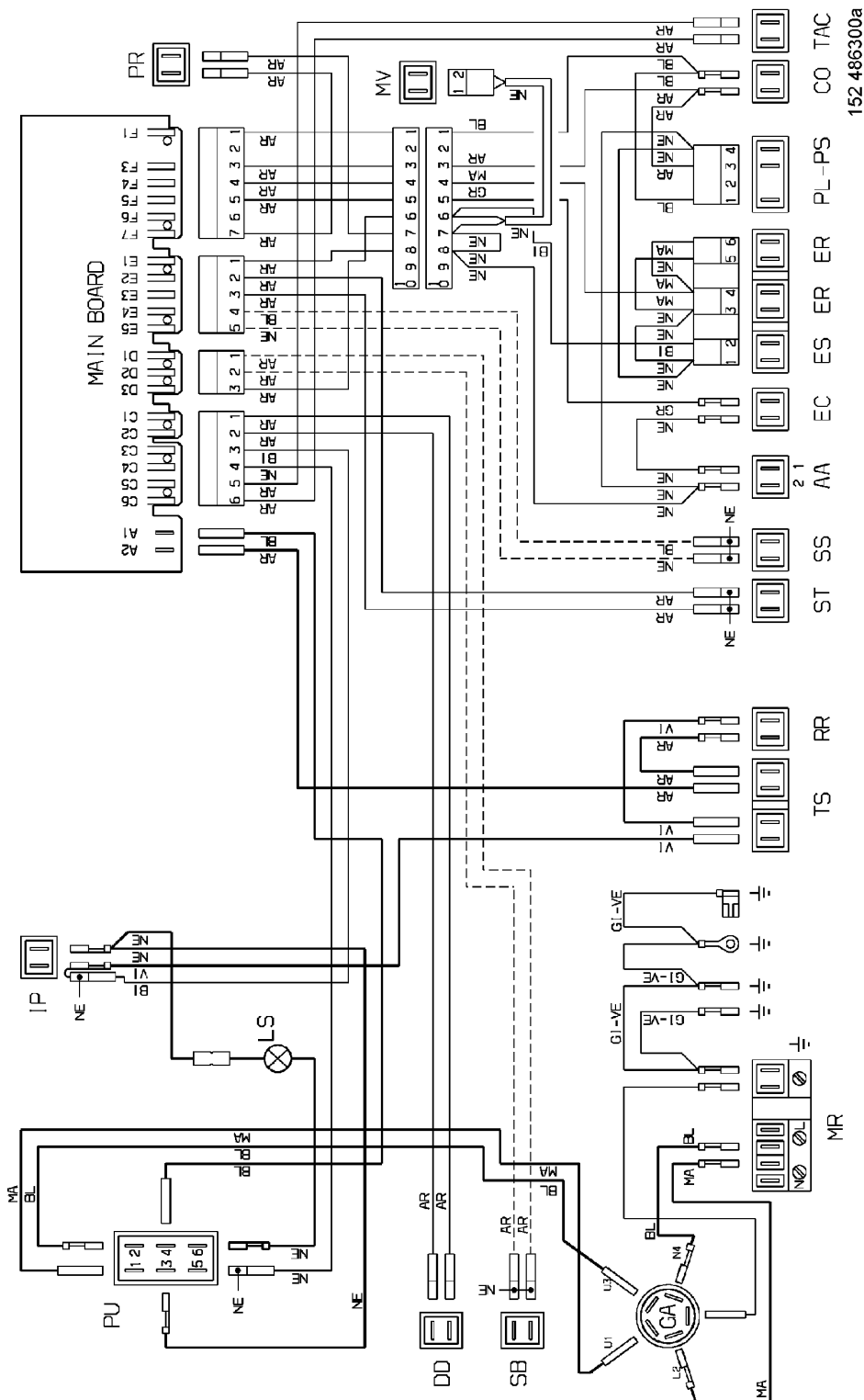
- This control system consists of a reed sensor which positioned on the exterior of the salt container and actioned by an internal float.

6.2.13 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.

7. ELECTRICAL FUNCTIONS

7.1 CIRCUIT DIAGRAM

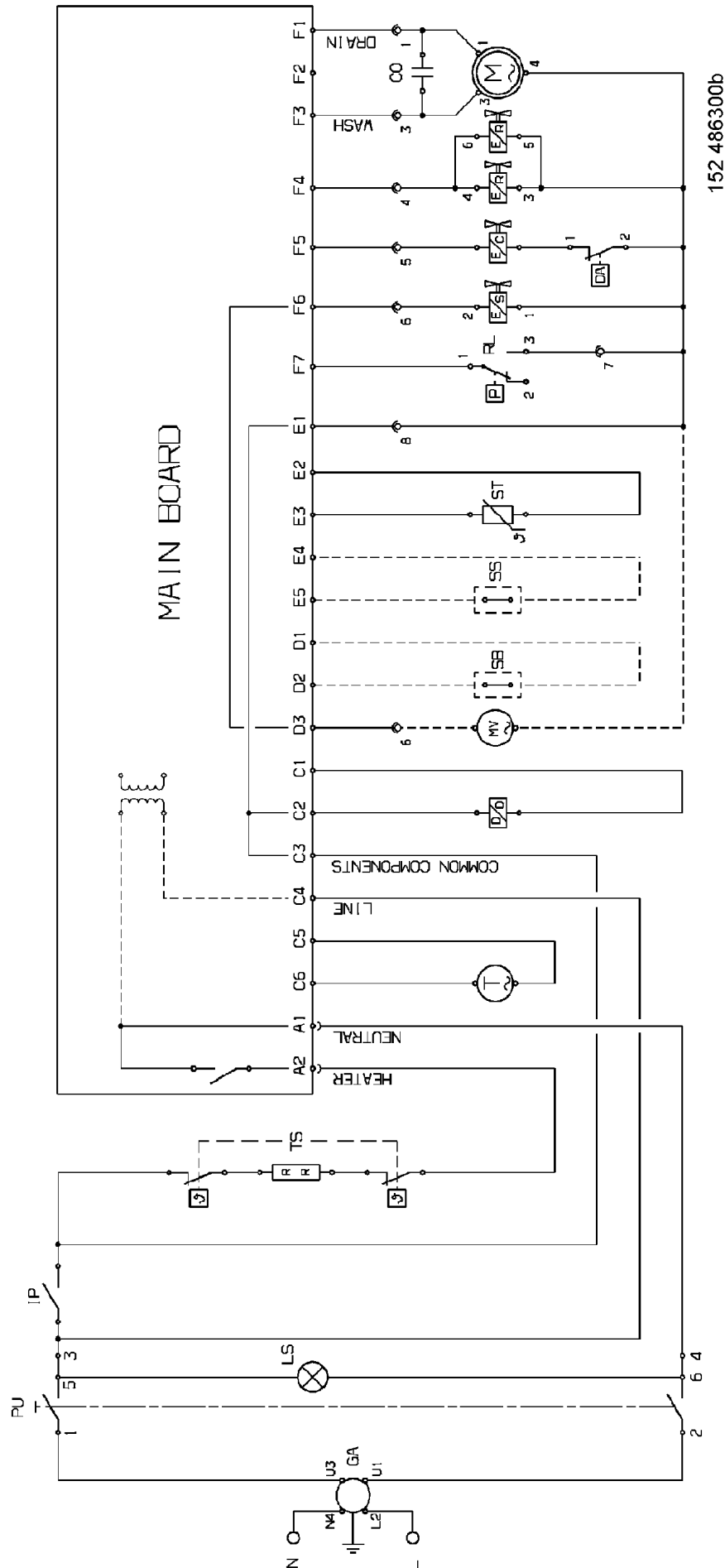


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LEGEND

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

7.2 BASIC ELECTRICAL DIAGRAM



LEGEND										
=	ORANGE	AA	=	ANTI-FLOODING DEVICE	LS	=	CONTROL LAMP	RP	=	TIME SWITCH
=	WHITE	CO	=	CAPACITOR	MR	=	JUNCTION BOX	RR	=	HEATING ELEMENT
=	BLUE	DA	=	ANTI-FLOODING DEVICE	MV	=	FAN MOTOR	SB	=	RINSE-AID SENSOR
=	LIGHT BLUE	DB	=	RINSE-AID DISPENSER	PL	=	WASH PUMP	SD	=	DETERGENT SENSOR
=	YELLOW-GREEN	DD	=	DETERGENT/RINSE-AID DISPENSER	PL/S	=	WASH/DRAIN PUMP	SS	=	SALT SENSOR
=	GREY	EC	=	WATER FILL ELECTRIC VALVE	PS	=	DRAIN PUMP	ST	=	TEMPERATURE SENSOR
=	BROWN	ER	=	REGENERATION ELECTRIC VALVE	PU	=	PUSHBUTTON BOARD	TA	=	THERMOSTAT H.T.
=	BLACK	ES	=	RESET ELECTRIC VALVE	RA	=	ANTIOVERFLOW PRESSURE	TAC/T	=	TACHOMETRIC GENERATOR
=	PINK	GA	=	INTERFERENCE SUPPRESSOR	RE	=	SWITCH	TB	=	THERMOSTAT L.T
=	VIOLET	IP	=	DOOR SWITCH	RL	=	PRESSURE SWITCH	TM	=	THERMOSTAT M.T.
								TS	=	SAFETY THERMOSTAT

7.3 TABLE OF WASHING PROGRAMMES

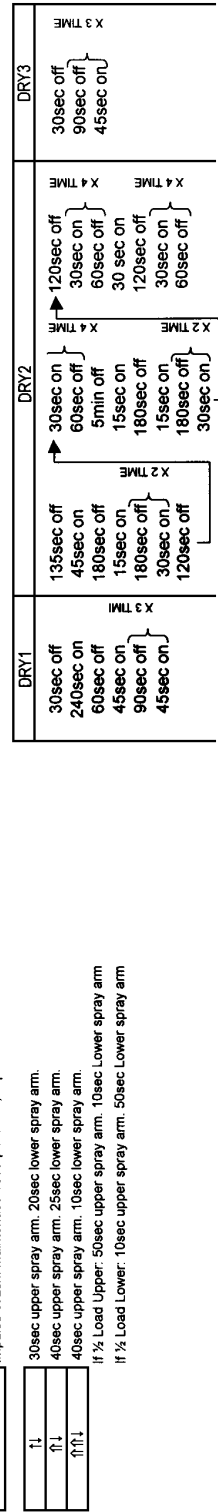
PROGRAMMES TABLE DW60cm AAB

	prog1 SOAK	Prog. 2 INTENSIV	Prog. 3 UNI. PLUS	Prog. 4 UNIVERSALE	Prog. 5 BIO	Prog. 6 BIO AAB	Prog. 7 ECO	Prog. 8 QUICK	Prog. 9 DELICATE	Prog. 10 WARM PLATES
water fill-drain	1min	If ½ load no phase	If ½ load no phase	If ½ load no phase	If ½ load no phase	If ½ load no phase			If ½ load no phase	
drain	dra	dra	dra	dra	dra	dra			dra	
water fill	load1	load2	load2	load2	load2	load1			load1	
wash+heat		52° t1	50° t1							
wash	6min t1	4min t1		6min t1	6min t1	8min t1			6min t1	
drain	dra	dra	dra	dra	dra	dra	dra	dra	dra	
water fill		load2	load2	load1	load1	load1	load1	load2	load1	
wash+heat+disp		55° t1	55° t1	52° t1	50° t1	54° t1	54° t1	55° t1	45° t1	
wash		4min t1	4min t1	3min t1	5min t1	2min t1	2min t1	2min t1	14min t1	
wash+heat						[4min 52° t1]x5				
wash+heat		70° t1	68° t1	65° t1	55° t1	10min t1				
wash		14min t1	6min t1	8min t1	9min t1	10min t1	10min t1			
drain		dra	dra	dra	dra	dra1	dra1	dra	dra	
water fill		load2	load2	load2	load2	load1	load1	load1	load1	
wash		5min t1		5min t1	5min t1	6min t1	5min t1	5min t1	5min t1	
wash+heat			4min 60° t1							
drain		dra	dra	dra	dra	dra	dra	dra	dra	
water fill		load2	load2	load2	load2	load1			If ½ load no phase	
wash		5min t1	load2	5min t1	load2	load1			load1	
wash+heat			If ½ load no phase	If ½ load no phase	If ½ load no phase					
drain		dra	dra	dra	dra	dra	dra	dra	dra	
water fill		load2	load2	load2	load2	load1				
wash		5min t1	load2	5min t1	load2	load1			load1	
wash+heat			4min 60° t1	5min t1	5min t1	6min t1			5min t1	
drain		dra	dra	dra	dra	6sec			dra	
water fill		If ½ load no phase								
wash		load2								
wash+heat		5min t1								
drain		dra	dra	dra	dra				dra	
water fill		load2	load2	load1	load1	load1	load1	load2	load1	load1
wash		30sec t	30sec t	30sec t	30sec t	30sec t	30sec t	30sec t	30sec t	30sec t
wash+reg		52° t1	52° t1	52° t1	52° t1	52° t1	52° t1	52° t1	52° t1	52° t1
drain						2 sec.				
wash+reg+Disp.		30sec.x2 t1	30sec.x2 t1	30sec.x2 t1	30sec.x2 t1	30sec.x2 t1	30sec.x2 t1	30sec.x2 t1	30sec.x2 t1	30sec.x2 t1
wash+reg		70° t1	70° t1	68° t1	68° t1	60° t1	60° t1	58° t1	58° t1	68° t1
wash				45sec. t	45sec. t		45sec. t		45sec. t	45sec. t
drain		dra	dra	dra	dra	dra	dra	dra	dra	dra
dry	I	DRY1	DRY3	DRY1	DRY1	DRY2	DRY1	I	DRY1	I
end	I	END	END	END	END	END	END	END	END	END

Control speed 2800rpm
Control speed 2300rpm
Control speed 1800rpm
Impulse Wash: maintenance 1600rpm 3sec.; impulse 1sec.

load1 = Volume filling (set speed 2300rpm) + 12% c.a.
load2 = Volume filling (set speed 2300rpm) + 12% c.a.
dra = drain (3°ON + 2°OFF) x 3time + 45°ON + 15°OFF + 15°ON
dra1 = drain 2sec + wash 15sec + dra

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152 48541/...EN



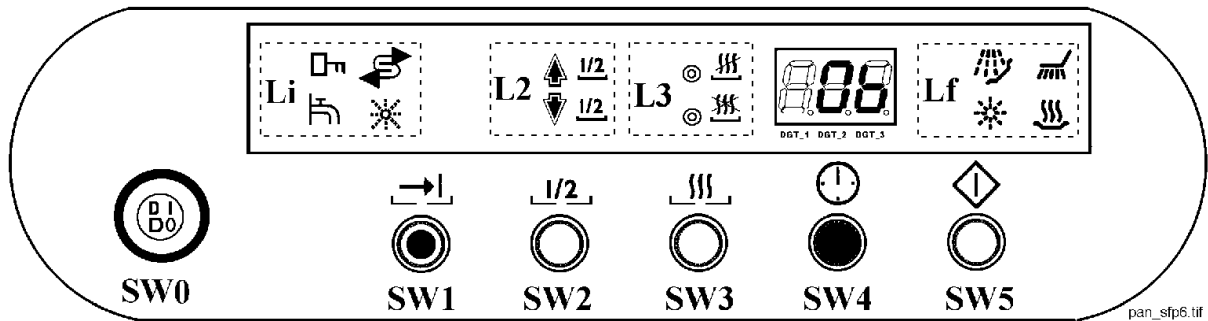
8. SERVICING: DIAGNOSTICS TESTS AND OPTIONS

8.1 DIAGNOSTICS ON COMPONENTS

The diagnostics procedure is divided into two parts:

- **Part 1** provides the service engineer with information regarding the status of the dishwasher.
- **Part 2** makes it possible to check the electrical components for correct operation.

Selecting the Component Diagnostics routine:



With the door CLOSED and the dishwasher switched OFF (PROGRAMME SELECTION mode):

1. Press and hold down **SW4**
2. Press **SW0** to switch the dishwasher on.
3. After about 5 seconds, the 3 Digits and all the LEDs light for 5 seconds and the buzzer sounds (sequence_B).
4. Press **SW1** repeatedly: the 3 Digits will show the following in sequence:

8.1.1 1st part

- a) The SOFTWARE VERSION is displayed as follows:
- DGT_1 [.] segment unlit
 - DGT_2 [-] one number [0 > 9] (Software version)
 - DGT_3 [-] one letter [A, b, C, d,...] (type)
- example: [. 0 b] = Software version of control board

Press **SW1** again.

- b) PERSONALIZATION OF DISHWASHER is displayed as follows:

DGT_1 [-] one letter [A, b, C, d, E, F] (type)
DGT_2 [.] segment unlit
DGT_3 [-] one number [0, 1, 2, 3] (supplementary options)
example: [A . 0] = no supplementary options (standard)

Press **SW1** again.

- c) NUMBER OF WASHING CYCLES

The display shows the number of washing cycles performed in two phases:

DGT_1 = [C] letter (cycles)
DGT_2 = [-] number (thousands)
DGT_3 = [-] number (hundreds)

Press **SW1** again.

DGT_1 = [.] segment unlit
DGT_2 = [-] number (tens)
DGT_3 = [-] number (units)

example: [C 1 5] + [- 1 3] = 1513 cicli

Press **SW1** again.

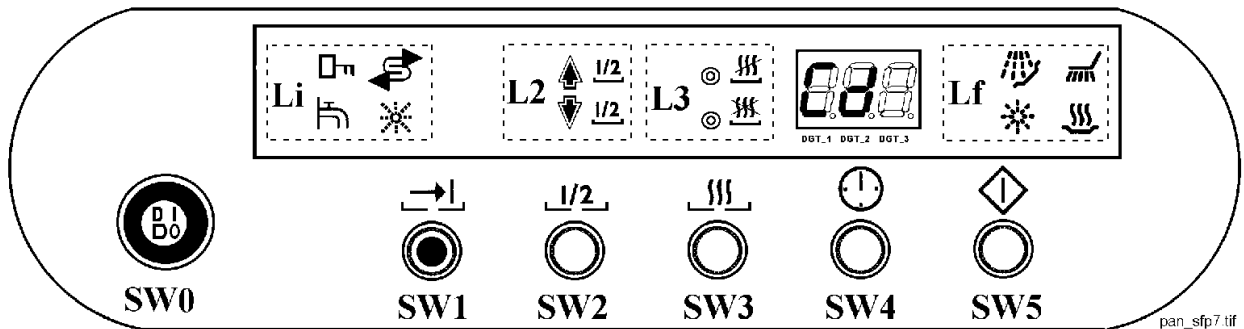
d) LAST ALARM CONDITION is displayed as follows:

DGT_1 & DGT_2 = [**A L**] (letters)

DGT_3 = [-] number [**1,2,3,4,5,6,7,8**] (reference n°)

example: [**A L 4**] = Anti-flooding alarm

Press **SW1** again to pass to the Component Diagnostics procedure.



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8.1.1 2nd part

a) COMPONENT DIAGNOSTICS: The display shows:

DGT_1 & DGT_2 = [**C d**] two letters

DGT_3 = [-] number [**0,1,2,3,4,5,6**] (reference n°)

Press **SW1** repeatedly

- It is now possible to check the operation of each electrical component in sequence. The relative codes are shown on the display.

DISPLAY	COMPONENTI	TIME-OUT
[C d 0]	Water fill solenoid valve	60 sec
[C d 1]	Integrated detergent / rinse-aid dispenser	60 sec
[C d 2]	Washing motor (lower spray arm)	60 sec
[C d 3]	Heating element	20 sec
[C d 4]	Fan motor	60 sec
[C d 5]	Regeneration/resin washing solenoid valve	60 sec
[C d 6]	Drain motor	60 sec

- The door must be closed.
- Once the test procedure has been started:
 - The component will be tested for a maximum time (Time-out), as shown in the table.
 - To proceed to the subsequent component, press **SW1** until the test procedure is completed.

On completion of the test procedure, the last component tested is displayed [**C d 6**].

Press **SW1** again.

- The 3 digits on the control panel indicate [**888**], and all the LEDs light for **5** seconds; the buzzer sounds (sequence_B) for 5 seconds.
- After **5** seconds, the appliance returns to the beginning of the test, and the display shows the software version (e.g. [**. 0 b**])
- To repeat the test, press **SW1**. The display will show [**A . 0**] (see para. 8.1.1 - section b)

Press **SW0** to exit the test routine.

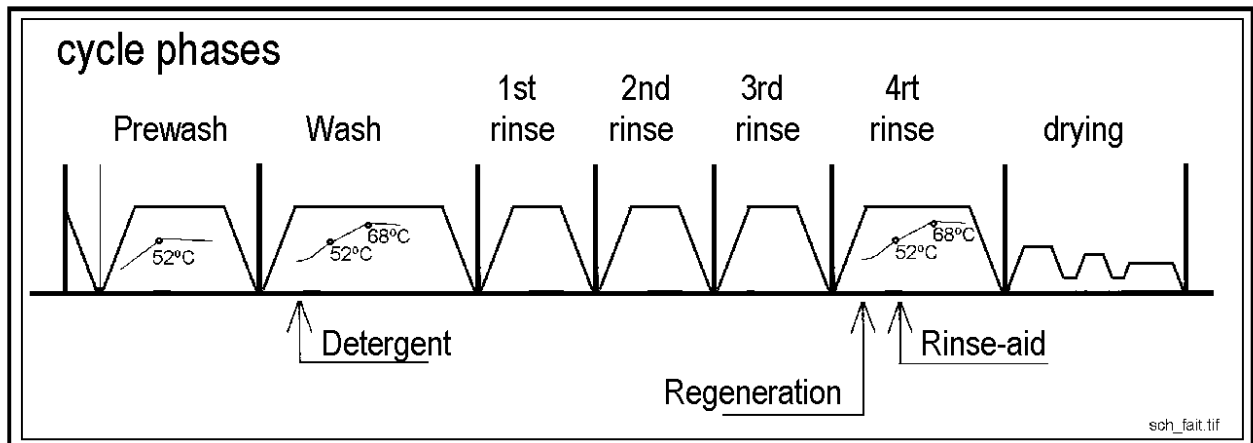
8.2 FUNCTION DIAGNOSTICS CYCLE

The purpose of the Function Diagnostics cycle is to provide the service engineer with a rapid test for the washing programme sub-phases by passing through each phase of the cycle sequentially.

In this way it is possible to check the functions which are carried out during the washing cycle by performing the sub-phases manually in sequence. This routine can be adapted to perform only those functions which are of interest, excluding the remaining functions.

Each cycle phase consists of a series of sub-phases.

Determination of cycle phases in a washing programme



GENERAL INFORMATION

A specific identification code has been assigned to each sub-phase.

These codes will not be shown on appliances not fitted with a display panel.

SPECIFIC INFORMATION FOR DISHWASHERS WITH DISPLAY

The 3 digits indicate the code attributed to the sub-phase being performed during the Diagnostics procedure as follows:

Codes for cycle sub-phase			COMPOSITION of (e.g. 3rd rinse and drying)
LEDS	DISPLAY	Cycle sub-phase	
/	[F d 0]	Water fill	
/	[F d 1]	Water drain	
/	[F d 2]	Washing	
/	[F d 2]	Washing & Heating	
/	[F d 3]	Fan	
/	[F d 4]	Pause	

INDICATIONS

Once the Diagnostics cycle has started, the sub-phase can be changed according to the sequence of the washing cycle selected, simply by pressing a key (refer to para. 8.2.1).

The DISPLAY shows the current sub-phase via the 3 digits:

DGT_1 & DGT_2 [F d] Two letters (abbreviation for Function Diagnostics)
DGT_3 [.] Number of Sub-phase currently being performed [0, 1, 2, 3 or 4]

example: [F d 1] Water drain

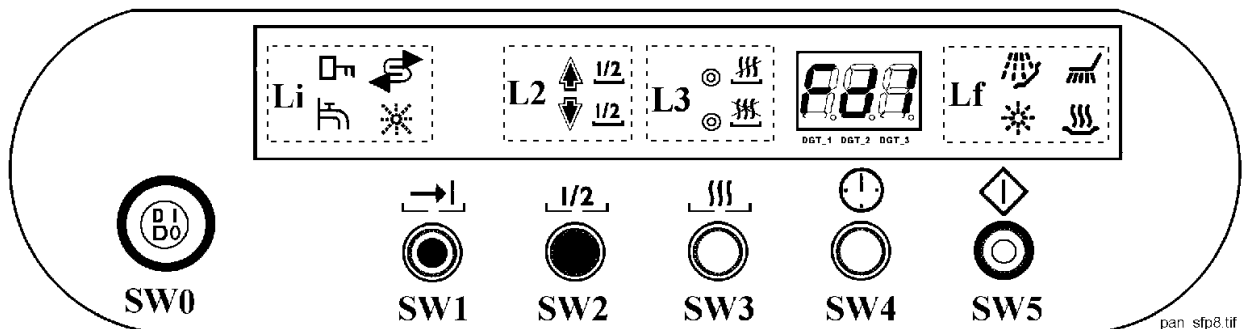
8.2.1 SELECTING THE CYCLE

Any programme can be selected for the diagnostics cycle.

Select a programme which includes the PRE-WASH + WASH + RINSE + DRYING phases; these utilize all the sub-phases to be checked.

In order to test the regeneration function, it is necessary, before entering the diagnostic cycle, to ensure that regeneration is set to a level in which regeneration is performed during every cycle (e.g. L7).

Selecting the function diagnostics cycle



With the door CLOSED and the dishwasher switched OFF (PROGRAMME SELECTION mode):

1. Press and hold down **SW2**.
2. Press **SW0** to switch the appliance on.
3. Hold down **SW2** for about **5** seconds, after which the buzzer will sound (sequence_B).
 - The 3 digits on the display will alternately indicate the last programme performed and two letters (abbreviation for Function Diagnostics) - e.g. [**P . 3**] [**F d .**].
4. Press **SW1** to select the desired cycle.
5. Press **SW5** to start the cycle.
 - The 3 digits on the display will indicate [**F d 1**] in which (1) indicates the number of the sub-phase (drain).
6. Press **SW2** to pass to the next sub-phase.
 - If **SW2** is not pressed, the cycle proceeds normally.
 - Passage from one sub-phase to the next is shown on the display, which indicates the number of the sub-phase being performed (example: [**F d 0**] (water fill)
 - If the door is opened, the diagnostics cycle is interrupted but not cancelled.
 - If the dishwasher is switched off by pressing **Sw0**, or in case of a power failure, the diagnostics routine is interrupted; when the dishwasher is switched on again, the cycle resumes normally from the point at which it was interrupted.
 - To cancel the diagnostics cycle currently being performed, press **SW5** and hold down for **3** seconds.
 - At the end of the cycle, the display shows [- - -].
 - Press **SW0** to switch the appliance off.

N.B. The safety devices are operative during the diagnostics cycle; in case of a malfunctioning, the relative ALARM code is shown in the DISPLAY.

TEST CYCLE

The test cycle is a specific washing programme which makes it possible to test all the functions performed by the dishwasher.

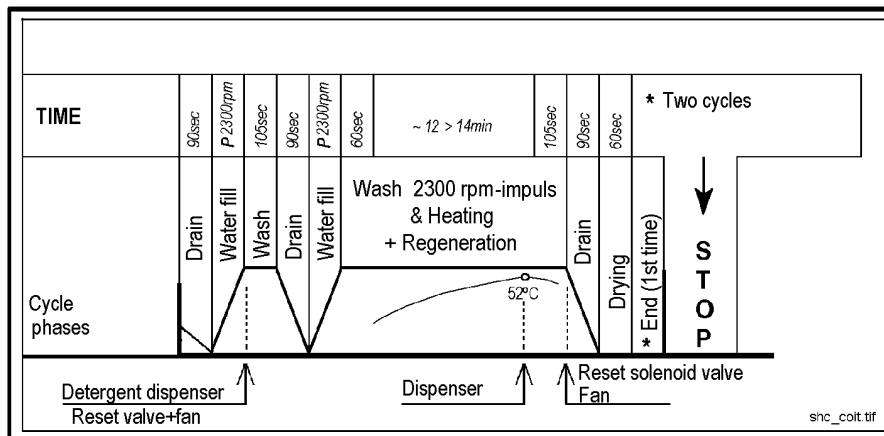
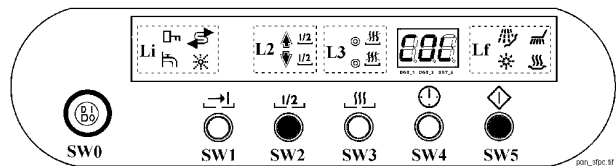
The test cycle is programmed as follows:

- All the phases (cold pre-wash, hot wash, cold rinse, hot rinse, drying) are performed.
- Water fill level to target 2000 rpm.
- The washing times in each phase are reduced.
- The temperature of the water in the hot phases is stabilized (target: 52°C).
- The regeneration function is brought forward during the hot phases (irrespective of the selected level of regeneration).
- Total duration of the cycle is about **48** minutes.
- The test cycle is not included in the count for "special" regeneration.

Selecting the test cycle:

With the door CLOSED and the dishwasher switched OFF (PROGRAMME SELECTION mode):

- Press and hold down **SW2 & SW5** simultaneously.
- Press **SW0** to switch the appliance on.
- Hold down **SW2 & SW5** for about **5** seconds, after which the buzzer will sound (sequence_B).
 - The 3 digits indicate [**C O L**] & [**P 1 1**] alternately to show the status of the test cycle.
- Press **SW5** to start the cycle.
 - The 3 digits indicate [**C O L**] (= TEST) for the entire duration of the cycle.



- If the door is opened, the diagnostics cycle is interrupted but not cancelled.
- If the dishwasher is switched off by pressing **Sw0**, or in case of a power failure, the diagnostics routine is interrupted, but not cancelled; when the dishwasher is switched on again, the cycle resumes normally from the point at which it was interrupted.
- To cancel the diagnostics cycle currently being performed, press **SW5** and hold down for **3** seconds.
- At the end of the cycle, the appliance exits the test procedure automatically. The display shows the last programme performed (before the test cycle), e.g. [**P . 3**].
- Press **SW0** to switch the appliance off.

N.B. The safety devices are operative during the diagnostics cycle; in case of a malfunction, the relative ALARM code is shown in the DISPLAY.

8.4 OPTIONS FOR IMPROVING WASHING PERFORMANCE

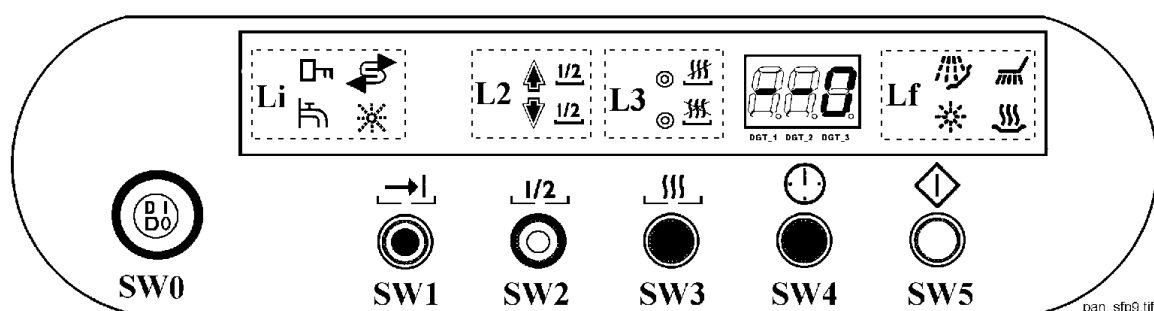
In cases in which the user is dissatisfied with the washing results, a procedure has been developed (exclusively for Service Engineers) that makes it possible to utilize a series of supplementary options which improve washing performance.

These options are memorized in the electronic control system, and consist of three functions, each identified by a specific code which allows them to be used when necessary.

The following codes are displayed on the control panel

SUPPLEMENTARY OPTIONS	[- - 0]	[- - 1]	[- - 2]	[- - 3]	DISPLAY
- Supplementary percentage water fill in all water fill phases (+12%).	--	YES	--	YES	
- IMPULSE washing (if featured) replaced by washing at a constant motor speed of 2800 rpm					
- Supplementary cold rinse (+ 1)	--	--	YES	YES	

To access the parameter setting function, proceed as follows:



With the door CLOSED and the dishwasher switched OFF (PROGRAMME SELECTION mode):

1. Press and hold down programme keys **SW3** & **SW4** simultaneously
 2. Press **SW0** to switch the dishwasher on.
 3. Hold down **SW3** & **SW4** for about **5** seconds, during which the buzzer will sound (sequence_B).
 - The 3 digits on the display will show:
 - Dgt_1 & Dgt_2 = [- -] two segments lit.
 - Dgt_3 = [0] one number [0, 1, 2, 3] identifying the supplementary option
- example: [- - 0] = no options (standard setting)
- To pass from one option to the next (in sequence), press **SW1** repeatedly.
 - To confirm selection of the options, press **SW2**.
 - Press **SW0** to exit the diagnostics procedure.

9.0 TROUBLESHOOTING

9.1 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.

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.

N.B. If preferred, certain components which are accessible can be tested directly on the component.

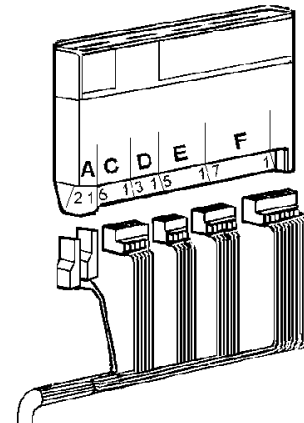
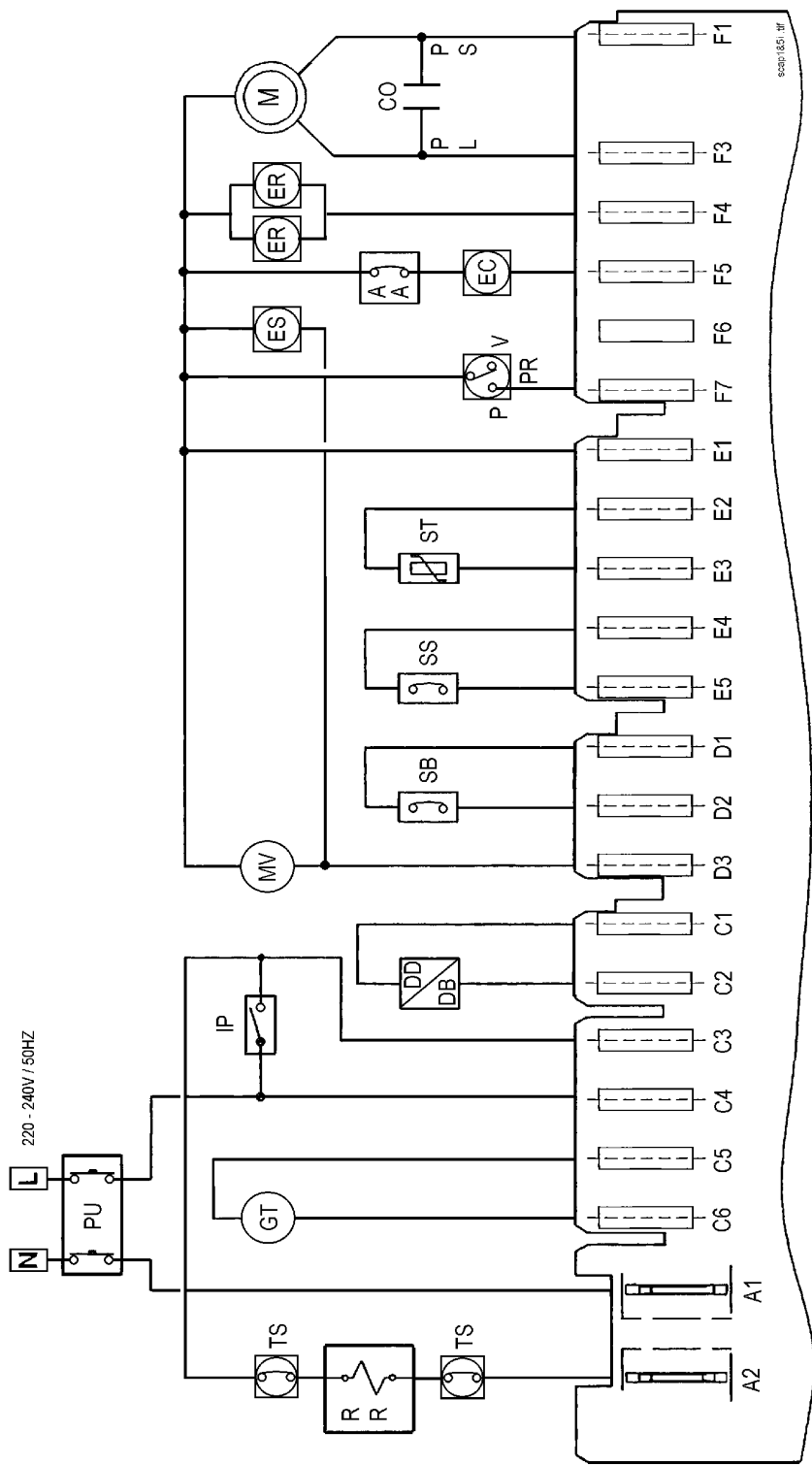


Table of contact points on the connector of the board and theoretical ohmic values

COMPONENTS	CONTACTS	CORRECT VALUE
POWER CABLE ON/OFF SWITCH	* L - C4 * N - A1	0 Ω - Key pressed 0 Ω - Key pressed
INTEGRATED DISPENSER	C1 - C2	1300 $\Omega \pm 8\%$
HEATING ELEMENT SAFETY THERMOSTAT	C3 - A2	25 $\Omega \pm 8\%$ - 2300 W
DOOR MICROSWITCH	C3 - C4	0 Ω - Door closed
TACHIMETRIC SENSOR	C5 - C6	135 $\Omega \pm 8\%$
RINSE-AID SENSOR	D1 - D2	INFINITE - With rinse-aid 0 Ω - Without rinse-aid
SALT SENSOR	E4 - E5	INFINITO - With salt 0 Ω - Without salt
TEMPERATURE SENSOR	E2 - E3	60.500 $\Omega \pm 8\%$ - at 20 °C 9.100 $\Omega \pm 8\%$ - at 65 °C
FAN MOTOR & RESET SOLENOID	E1 - D3	725 $\Omega \pm 8\%$ (if Reset solenoid interrupted) 610 $\Omega \pm 8\%$ 4.800 $\Omega \pm 8\%$ (if fan motor interrupted)
DRAIN MOTOR	E1 - F1	70 $\Omega \pm 8\%$
WASHING MOTOR	E1 - F3	50 $\Omega \pm 8\%$
REGENERATION AND RESIN WASHING SOLENOIDS	E1 - F4	2.500 $\Omega \pm 8\%$
FILL SOLENOID VALVE AND ANTI-FLOODING DEVICE	E1 - F5	3.800 $\Omega \pm 8\%$
PRESSURE SWITCH	E1 - F7	INFINITE - EMPTY (1-2) 0 Ω - FULL (1-3)
N.B.: - * L - N = Pins on power cable plug		

9.2 CIRCUIT DIAGRAM



LEGEND

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

9.3 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.

CONDITION	INTERVENTION	CAUSES
DISPLAY [A L 1]	NTC SENSOR SHORT-CIRCUITED Range < 5100 Ω	a) Temperature sensor faulty (short-circuit) b) Wiring short-circuited c) Temperature too high (>85°C)
DISPLAY [A L 2]	NTC SENSOR OPEN Range > 209.200 Ω	a) Temperature sensor faulty (open) b) Wiring interrupted/disconnected c) Temperature too low (< -5°C)
DISPLAY [A L 3]	WATER HEATING TIME-OUT Water does not reach correct temperature within 45 minutes	a) Heating element interrupted b) Safety thermostat open c) Wiring interrupted / disconnected d) NTC sensor incorrectly positioned / Poor thermal contact e) Insufficient water circulation
DISPLAY [A L 4]	*) ANTI-FLOODING DEVICE	a) Water leakage from various couplings b) Floating sensor / microswitch jammed
DISPLAY [A L 5]	WATER FILL TIME-OUT "Pressure switch 1-3" level not reached within 4 min. after activation of the solenoid ----- *) PRESSURE SWITCH ON "EMPTY" (1-2) After reaching level, water introduced for 90 seconds	a) Tap closed b) Water mains pressure <0.3 bar c) Intervention of ANTI-OVERFLOW device d) Fill solenoid / connections interrupted e) Pressure switch faulty / leakage f) Central filter clogged g) Siphon created in drain hose h) Dishes upside down j) Excessive foam
DISPLAY [A L 6]	APPLIANCE DOES NOT DRAIN	a) Domestic drain outlet unsuitable (obstructed) b) Drain pump disconnected / jammed c) Pressure switch faulty (jammed on 1-3) d) IWMS - Pressure switch tube obstructed e) Drain filters clogged f) Control board (Relay/Triac faulty)
DISPLAY [A L 7]	WASHING MOTOR JAMMED	a) Motor winding short-circuited b) Motor winding interrupted c) Motor jammed by foreign bodies d) Electrical connections uncertain/detached e) Tachimetric sensor interrupted / short-circuited
DISPLAY [A L 8]	WASHING MOTOR TRIAC SHORT-CIRCUITED	a) Control board (Triac short-circuited)
NOTE When in an alarm condition, the dishwasher remains inoperative, and does not perform any function. To reset the alarm condition, press Sw0 to switch off the appliance. When the appliance is switched on again: - After alarm conditions marked with an asterisk (*), the cycle is cancelled, and will restart from the beginning. - After other alarm conditions, the cycle is suspended, and will resume from the point of interruption.		