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|--|---|---|--|
| | | WASHING MACHINES WITH TIMERS 12428840.. / 12428841.. FUNCTIONS: VD50 - VD50J - VD51 VD52 - VD53 - VD53J ELBI | |
| ©ELECTROLUX ZANUSSI S.p.A. Corso Lino Zanussi, 30 I - 33180 PORCIA (ITALY) Tel +39 0434 394850 Fax +39 0434 394096 | Publication No. 599 33 62-25/9 980820 EN/SERVICE/EB | | |

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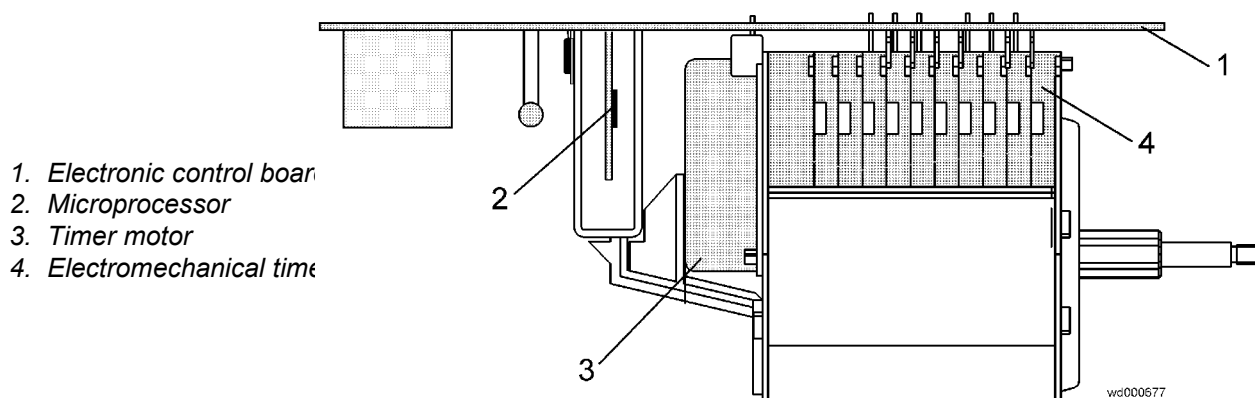
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GENERAL FEATURES

The VD50, VD50J, VD51, VD52, VD53 and VD53J timers manufactured by ELBI are used in certain washing machine models with spin speeds from 600 rpm to 1000 rpm.

These timers consist of two main components: an electromechanical timer and an electronic control board.

The electronic control board is connected directly by soldering to the timer connectors.



ON/OFF button

- "push-pull" type on timer knob (timer code - 12428840..)
- separate switch (timer code - 1242884 1..)

Tub

- stainless steel or carboran

Water fill

- cold water

Type of motor

- commutator

Water level control

- two-level pressure switch (models with adjustable thermostat)
- single-level pressure switch (models with fixed-temperature thermostats)

Spin speeds

- 600 rpm - 1000 rpm

Heating element

- 1950 W

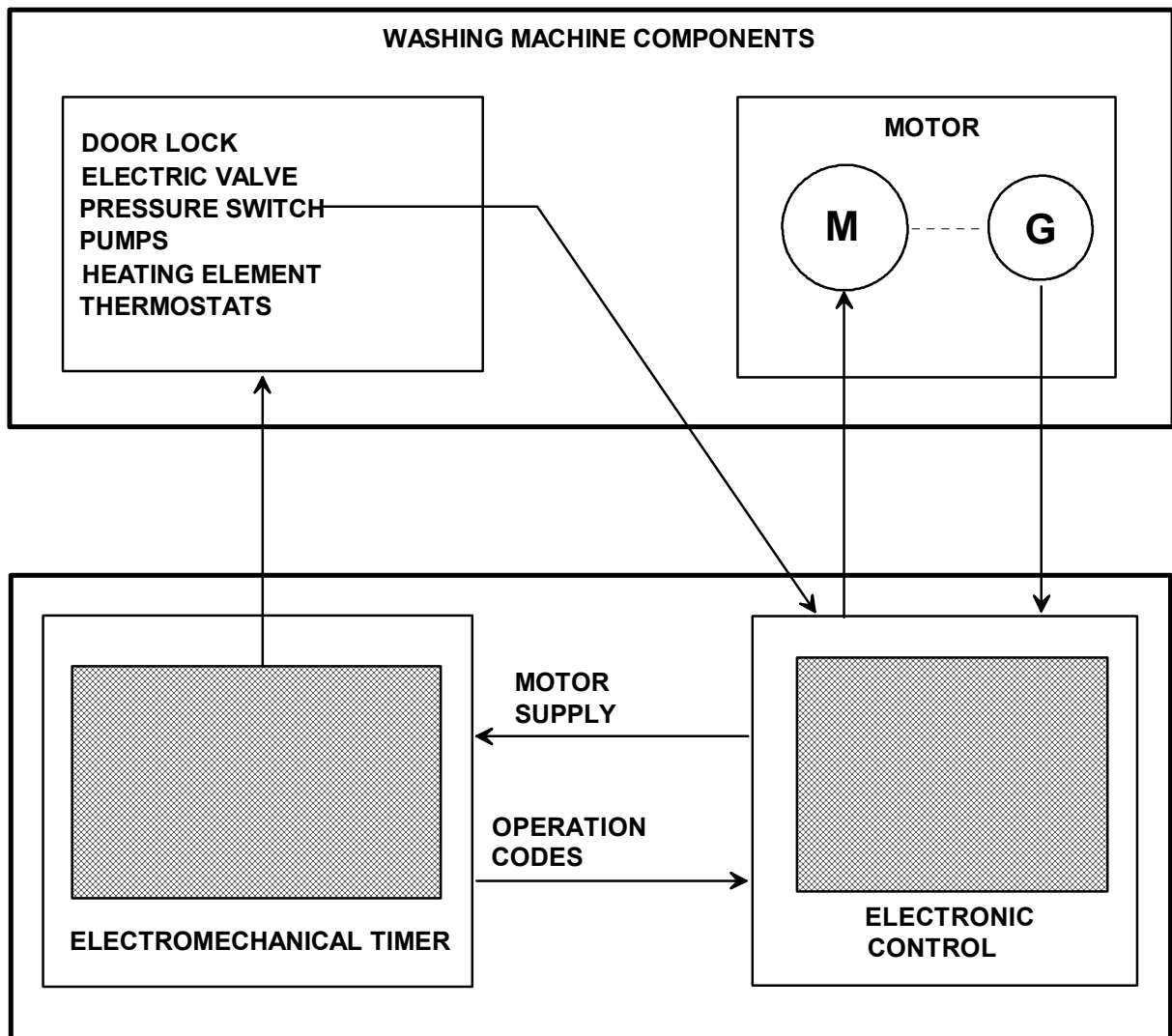
Temperature control

- by adjustable thermostat (0 - 90°C)
- fixed-temperature thermostats

The characteristics of the various types of timer are shown in the table below.

| TIMER | POSITION OF PRESSURE SWITCH PRESSURE CHAMBER | TYPE OF WASH | N° RINSES IN COTTON PROGRAMMES |
|-------|--|--------------|-----------------------------------|
| VD50 | on filter body | traditional | 4 |
| VD50J | near tub | jetsystem | 4 |
| VD51 | near tub | traditional | 4 |
| VD52 | on filter body | traditional | 3 |
| VD53 | near tub | traditional | 3 |
| VD53J | near tub | jetsystem | 3 |

OPERATING PRINCIPLES



The timer by closing a series of contacts, transmits to the electronic control board the codes which identify the operations to be performed at each timer step.

The electronic control board performs the following functions:

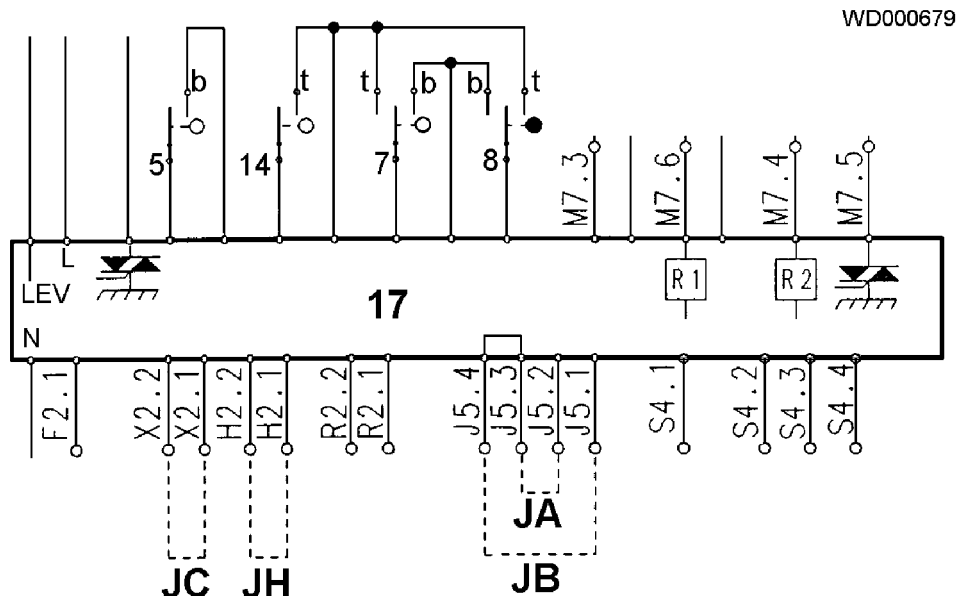
- controls the washing programmes and their relative options
- via a triac it powers the timer motor, thus advancing the timer (the voltage is supplied in the form of pulses)
- via a second triac it powers the drum motor and controls its spin speed according to a signal received by the tachometric generator. The direction of rotation is controlled by the closure of the contacts of two relays.
- controls the closure of the pressure switch contacts during the fill and drain phase.

All other electromechanical components of the washing machine are powered by the timer contacts.

The duration of the heating phases is fixed; the thermostat (if fitted) serves only to reduce the temperature for the selected programme.

CONFIGURATION OF TIMER FUNCTIONS

The various types of timer, and thus its functions, are configured according to the wiring connectors.



1 Electronic control board

JC Connector which determines the timer functions:
VD50 - VD50J - VD51 if there is no jumper between X2.1 and X2.2
VD52 - VD53 - VD53J if a jumper is fitted between X2.1 and X2.2

JH This connector is used in conjunction with the "rinse hold" button.
 If there is no jumper between H2.1 and H2.2, the "rinse hold" option can be selected (by pressing the button) in cycles for SYNTHETICS, DELICATES and WOOL.
 If a jumper is inserted between H2.1 and H2.2, this function is enabled at the end of the rinses in COTTON cycles, too.

JA - JB Depending on the type of model, these connectors determine the transmission ratio between the motor pulley and the drum pulley, and thus the speed of the final spin cycle:

| JB | JA | Ratio | Max. speed |
|----|----|--------|------------|
| 0 | 0 | 1 / 18 | 600 |
| 0 | 1 | 1 / 18 | 800 |
| 1 | 0 | 1 / 14 | 900 |
| 1 | 1 | 1 / 14 | 1000 |

SAFETY FEATURES

ANTI-UNBALANCING DURING SPINNING

Control of the balance of the load is performed while the drum rotates at a speed of 85 rpm, i.e. before the spin cycle. If the load is particularly unbalanced, the drum rotates three times at a speed of 55 rpm; at the end the load condition is checked again.

If the load remains unbalanced, this procedure is repeated once again; the series of attempts to balance the load is limited to the max. time of every spin phase (382 or 480 sec.). After this period, the timer passes to the next step, and the spin cycle is skipped.

DRUM MOTOR PROTECTION SYSTEM

In case of the following faults:

- tachometric generator open
- tachometric generator short-circuited
- triac which powers the motor open
- triac which powers the motor short-circuited
- rotor blocked
- motor overload cut-out open or motor windings broken

the electronic PCB makes three attempts to supply power to the motor; if the malfunction is still present three further attempts are performed after a pause of 20 minutes; no power is supplied to the motor (relay contacts open).

During these attempts the drum reaches a rotation speed of about 260 rpm.

DRAIN PROTECTION SYSTEM

If during the drain phase the contacts of the pressure switch do not close in the "empty" position after three minutes (drain pump faulty), the timer advances to the next position.

WASHING PROGRAMMES

| MODELS WITH ADJUSTABLE THERMOSTAT | | | | |
|-----------------------------------|------------------------------------|------------------------|------------------------|------------------------|
| | | | RINSES | |
| | | WASHING TEMPERATURE | VD50 - VD51 - VD50J | VD52 - VD53 - VD53J |
| n° | COTTON - LINEN | | | |
| 1 | Whites / Coloureds with pre-wash | 30-95 | 4 | 3 |
| 2 | Whites / Coloureds | 30-95 | 4 | 3 |
| 3 | Delicate coloureds / Light soiling | 30-60 | 4 | 3 |
| 4 | Short cycle | 40 | 4 | 3 |
| 5 | Rinses | - | 4 | 4 |
| 6 | Conditioner | - | 1 | 1 |
| 7 | Spin | - | - | |
| | SYNTHETICS | | | |
| 8 | Whites / Coloureds with pre-wash | 30-60 | 3 | 3 |
| 9 | Whites / Coloureds | 30-60 | 3 | 3 |
| 10 | Delicate coloureds / Short cycle | 30-40 | 3 | 3 |
| 11 | Rinses | - | 3 | 3 |
| 12 | Conditioner | - | 1 | 1 |
| | DELICATES - WOOL | | | |
| 13 | Delicates | 30-40 | 3 | 3 |
| 14 | Wool | 40 | 3 | 3 |
| 15 | Rinses | - | 3 | 3 |
| 16 | Conditioner | - | 1 | 1 |
| 17 | Short spin | - | - | - |
| 18 | Drain | - | - | - |

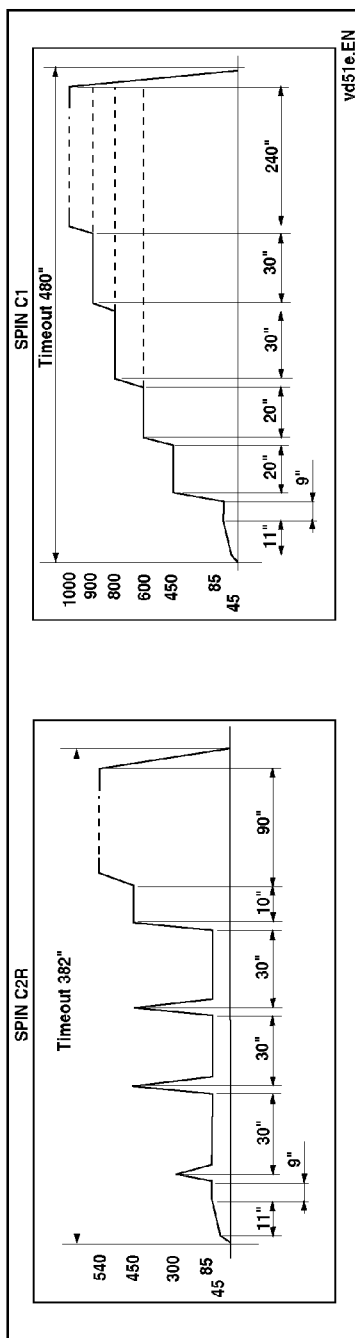
| MODELS WITH FIXED-TEMPERATURE THERMOSTAT | | | | |
|--|----------------------------------|------------------------|------------------------|------------------------|
| | | | RINSES | |
| | | WASHING TEMPERATURE | VD50 - VD51 - VD50J | VD52 - VD53 - VD53J |
| n° | COTTON - LINEN | | | |
| 1 | Whites / Coloureds with pre-wash | 60 | 4 | 3 |
| | Whites with pre-wash * | 95 | 4 | 3 |
| 2 | Whites / Coloureds | 60 | 4 | 3 |
| | Whites * | 95 | | |
| 3 | Coloureds | 60 | 4 | 3 |
| 4 | Delicate coloureds | 40 | 4 | 3 |
| 5 | Rinses | - | 4 | 4 |
| 6 | Conditioner | - | 1 | 1 |
| 7 | Spin | - | - | |
| | SYNTHETICS | | | |
| 8 | Whites with pre-wash | 60 | 3 | 3 |
| 9 | Whites | 60 | 3 | 3 |
| 10 | Coloureds | 40 | 3 | 3 |
| 11 | Rinses | - | 3 | 3 |
| 12 | Conditioner | - | 1 | 1 |
| | DELICATES - WOOL | | | |
| 13 | Delicates | 40 | 3 | 3 |
| 14 | Wool | 40 | 3 | 3 |
| 15 | Rinses | - | 3 | 3 |
| 16 | Conditioner | - | 1 | 1 |
| 17 | Short spin | - | - | - |
| 18 | Drain | - | - | - |

* Programmes performed by pressing the "cotton 90°C" button

WASHING PROGRAMMES - TIMER FUNCTIONS VD50 - VD51 - VD51J

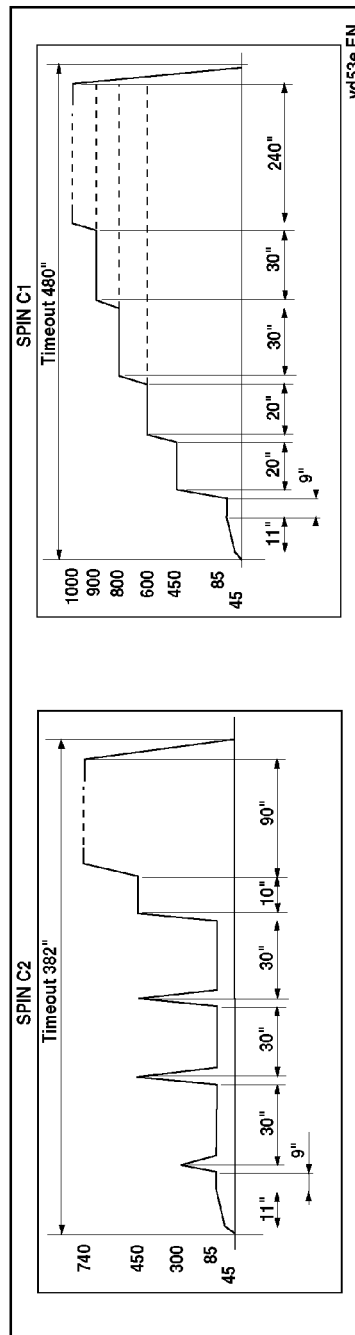
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| MOTOR | |
|---------------------|-----|
| ACTION | RPM |
| D = 4" ON, 12" OFF | 55 |
| D1 = 3" ON, 57" OFF | 33 |
| N = 8" ON, 8" OFF | 55 |
| E = 12" ON, 4" OFF | 55 |



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| MOTOR | | RPM |
|---------------------|--|-----|
| ACTION | | |
| D = 4" ON, 12" OFF | | 55 |
| D1 = 3" ON, 57" OFF | | 33 |
| N = 8" ON, 8" OFF | | 55 |
| E = 12" ON, 4" OFF | | 55 |



KEY FUNCTIONS

| | |
|---|---|
| START/STOP | switches the appliance ON and OFF (timer 124.28841... only) |
| 1/2 LOAD | with timers VD50/VD51, reduces the number of rinses from 4 to 3 in COTTON cycles; with timers VD52/VD53, reduces the number of rinses from 3 to 2 in COTTON cycles. |
| SUPER RINSE | increases the water fill in the second and third rinses in COTTON cycles (first and second rinses for timers VD51/VD52). |
| ECONOMY | reduces the washing temperature to 60°C in the 95°C COTTON programmes (the duration of the programme remains unaltered). |
| COTTON 90° | in models with fixed-temperature thermostats, performs the heating phase in COTTON cycles (n° 1 and 2) at 90°C instead of 60°C. |
| SELECT TEMPERATURE 30° - 40° - 60° - 90° | in models with fixed-temperature thermostats, these keys are used to select the washing temperature. |
| COLD WASH | in models with fixed-temperature thermostats, disconnects the power supply to the heating elements. |
| RINSE HOLD | stops the appliance leaving water in the tub at the end of the final rinse (in cycles for SYNTHETICS, DELICATES and WOOL). If a jumper is fitted between timer contacts H2.1 and H2.2, this option can also be selected in cycles for COTTON. By pressing this button again, the programme is completed with the drain and spin phase. |
| DELICATE SPIN | the function of this key is opposite to that of the "RINSE HOLD" key. |
| NO SPIN | excludes all the spin phases |
| REDUCED SPIN | reduces the spin speeds as shown in the table below. The two different types of reduced spin depend on the way in which the electronic control board is connected. |
| SPIN SPEED SELECTOR | reduces the speed in the final spin as shown in the table below. |

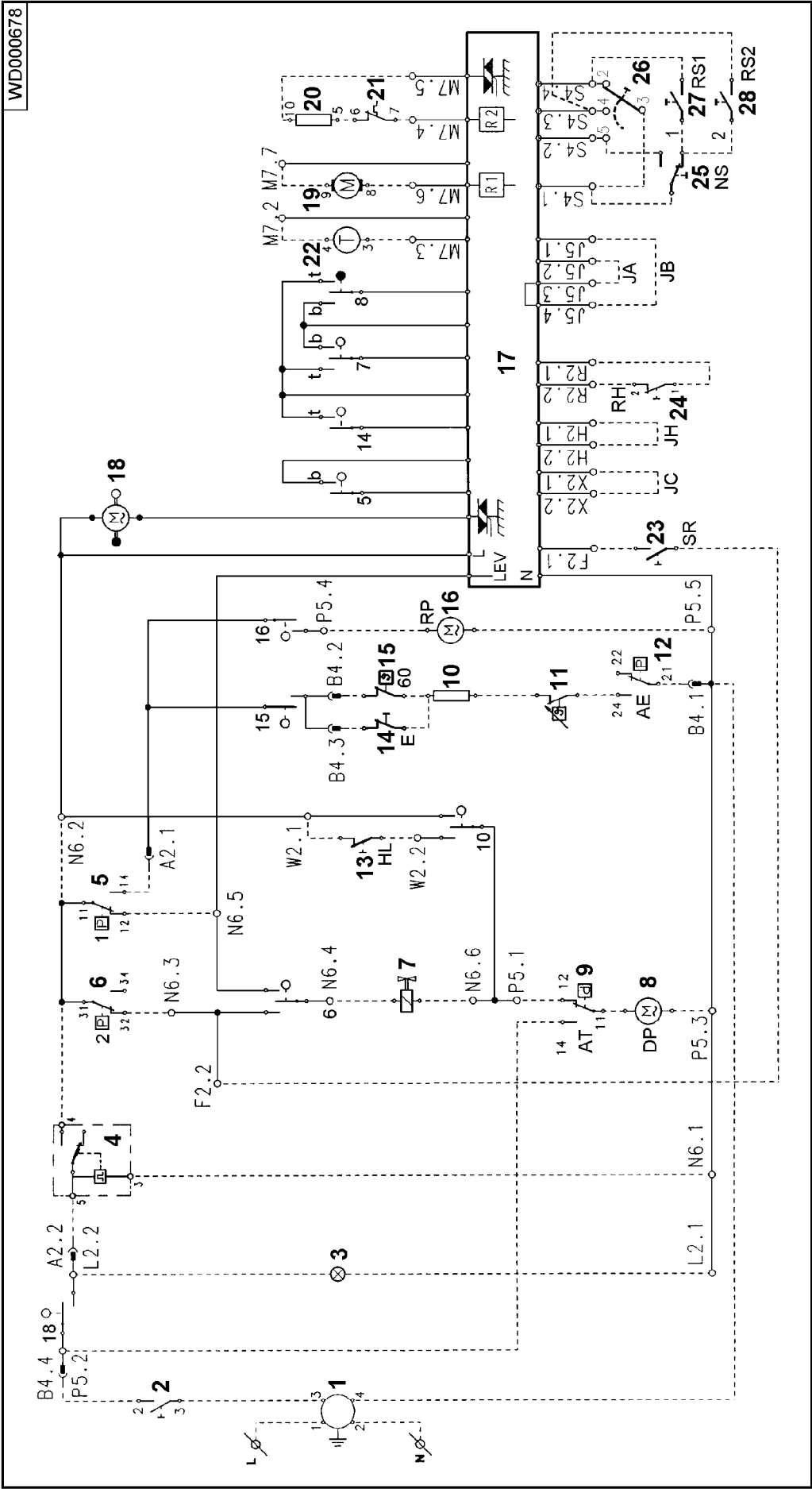
| POSITION OF SELECTOR | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|-------------------------|-------------|-----|-----|-----|------------|-----|------------|---|
| REDUCTION KEY | | | | | Type 2 | | Type 1 | |
| SPIN C1 (rpm) | 600 | 500 | 460 | 420 | 380 | 340 | 300 | 0 |
| | 800 | 700 | 600 | 500 | 400 | 350 | 300 | 0 |
| | 900 | 800 | 700 | 600 | 500 | 400 | 300 | 0 |
| | 1000 | 900 | 800 | 700 | 600 | 500 | 300 | 0 |
| SPIN C2 (rpm) | 540 | 500 | 460 | 420 | 380 | 340 | 300 | 0 |
| SPIN C3 (rpm) | 740 | 500 | 460 | 420 | 380 | 340 | 300 | 0 |

TIMER DIAGRAM

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124.288400.EN

BASIC CIRCUIT DIAGRAM



KEY TO CIRCUIT DIAGRAM

1. Anti-disturbance capacitor
2. START/STOP key
3. Pilot lamp
4. Door interlock
5. Pressure switch (1st level)
6. Pressure switch (2nd level)
7. Cold water solenoid
8. Drain pump
9. Pressure switch (anti-overflow)
10. Washing heater
11. Adjustable thermostat
12. Pressure switch (anti-boiling device)
13. 1/2 LOAD key
14. ECONOMY key
15. 60°C thermostat
16. Circulation pump
17. Electronic control board
18. Timer motor
19. Rotor
20. Stator
21. Safety cut-out for motor
22. Tachometric generator
23. SUPER-RINSE key
24. NO DRAIN key

TROUBLESHOOTING

| TYPE OF FAULT | POSSIBLE CAUSES |
|---|--|
| WM DOES NOT START | PILOT LAMP OFF: power cable, suppressor, (main switch), wiring between suppressor and timer (B4.4 - B4.1), timer (B4.4 - A2.2) |
| | PILOT LAMP ON: door interlock, wiring between door interlock and timer (A2.2 - N6.2 - N6.1), timer |
| DOES NOT FILL | tap closed, mains pressure insufficient, solenoid valve, wiring between solenoid and timer (N6.4 - N6.6), 1st level pressure switch, pressure switch hydraulic circuit, wiring between pressure switch and timer (N6.5), drain pump winding broken, wiring between drain pump and timer (P5.1 - P5.3), timer (N6.5 - N6.4) |
| DOES NOT FILL TO 2nd LEVEL | 2nd level pressure switch, wiring between pressure switch and timer (N6.3), timer (N6.3 - N6.4) |
| FILLS CONTINUOUSLY | solenoid valve jammed; pressure switch, pressure switch hydraulic circuit |
| | solenoid valve jammed; pressure switch, pressure switch hydraulic circuit |
| FILLS CONTINUOUSLY (without reaching level) | drain hose too low, leakage from hydraulic circuit |
| WATER LEVEL INCORRECT | pressure switch, pressure switch hydraulic circuit |
| DOES NOT HEAT | heating element, anti-boiling pressure switch, thermostats, wiring between heating element - thermostats - pressure switches - timer (A2.1 - B4.2 - B4.3 - B4.1), timer (A2.1 - B4.2 - B4.3) |
| INCORRECT TEMPERATURE | thermostats, timer |
| CIRCULATION PUMP INOPERATIVE (Jetsystem) | circulation pump, wiring between circulation pump and timer (P5.4 - P5.5), timer (A2.1 - P5.4) |
| MOTOR INOPERATIVE | motor (stator, rotor, circuit-breaker, brushes), wiring between motor and timer (M7.4 - M7.5 - M7.6), timer |
| MOTOR ROTATES THREE TIMES AT 260 rpm, THEN STOPS FOR 20 MINUTES, ROTATES THREE TIMES AGAIN AND FINALLY STOPS (cycle continues) | motor (tachometric generator), wiring between tachometric generator and timer (M7.2 - M7.3), timer |
| MOTOR ROTATES IN ONE DIRECTION ONLY | timer |
| ONLY SPINNING INOPERATIVE | timer, wiring (S4.1 - S4.4, S4.1 - S4.3), spin speed selector, reduced spin key, no spin key |
| MOTOR DOES NOT OPERATE AT CORRECT SPEED | timer wiring 4J5.1 - J5.4, J5.2 - J5.3) (see specific circuit diagram for each model); wiring (S4.1 - S4.4, S4.1 - S4.3), spin speed selector, reduced spin key, timer |
| MOTOR DOES NOT ROTATE EVENLY | motor; timer |
| DOES NOT DRAIN | drain pump, wiring between drain pump and timer (P5.1 - P5.3), timer (N6.2 - P5.1) |
| TIMER DOES NOT ADVANCE | timer |
| CYCLE INCORRECT | timer |
| CYCLE OPTIONS INCORRECT | check the various option keys and their wiring; timer |

TIMER CONNECTORS

