

	WASHING MACHINES WITH TIMERS 124 9214 0.. / 124 9214 1..
<p>© ZANUSSI ELETTRODOMESTICI VIA GIARDINI CATTANEO, 3 I - 33170 PORDENONE (ITALY) Fax (0434) 394096</p> <p>Publication No. 599 33 46-57/5 980220 IT/SERVICE/EB</p>	<p>FUNCTIONS: VD50 - VD50J - VD51 VD52 - VD53 - VD53J</p>

INDEX

General characteristics	page	4/17
Operating principles	page	5/17
Safety features	page	7/17
Washing programmes	page	8/17
Key functions	page	12/17
Timer diagram	page	13/17
Basic circuit diagram	page	14/17
Troubleshooting	page	16/17
Timer connectors	page	17/17

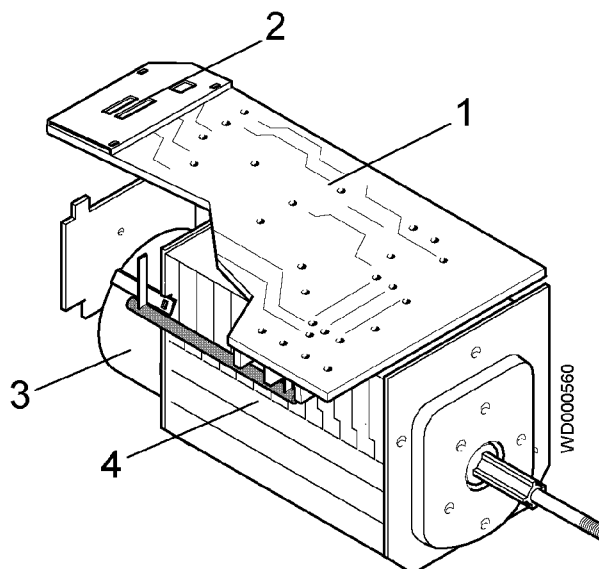
GENERAL CHARACTERISTICS

The VD50, VD50J, VD51, VD52, VD53 and VD53J timers manufactured by AKO 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, and performs the following functions:

- control of the washing programmes and the
- power supply to timer motor
- power supply and control of the drum moto

1. Electronic control board
2. Microprocessor
3. Timer motor
4. Electromechanical timer



ON/OFF button

- "push-pull" type on timer knob (timer code 124 9214 0..)
- separate switch (timer code 124 9214 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

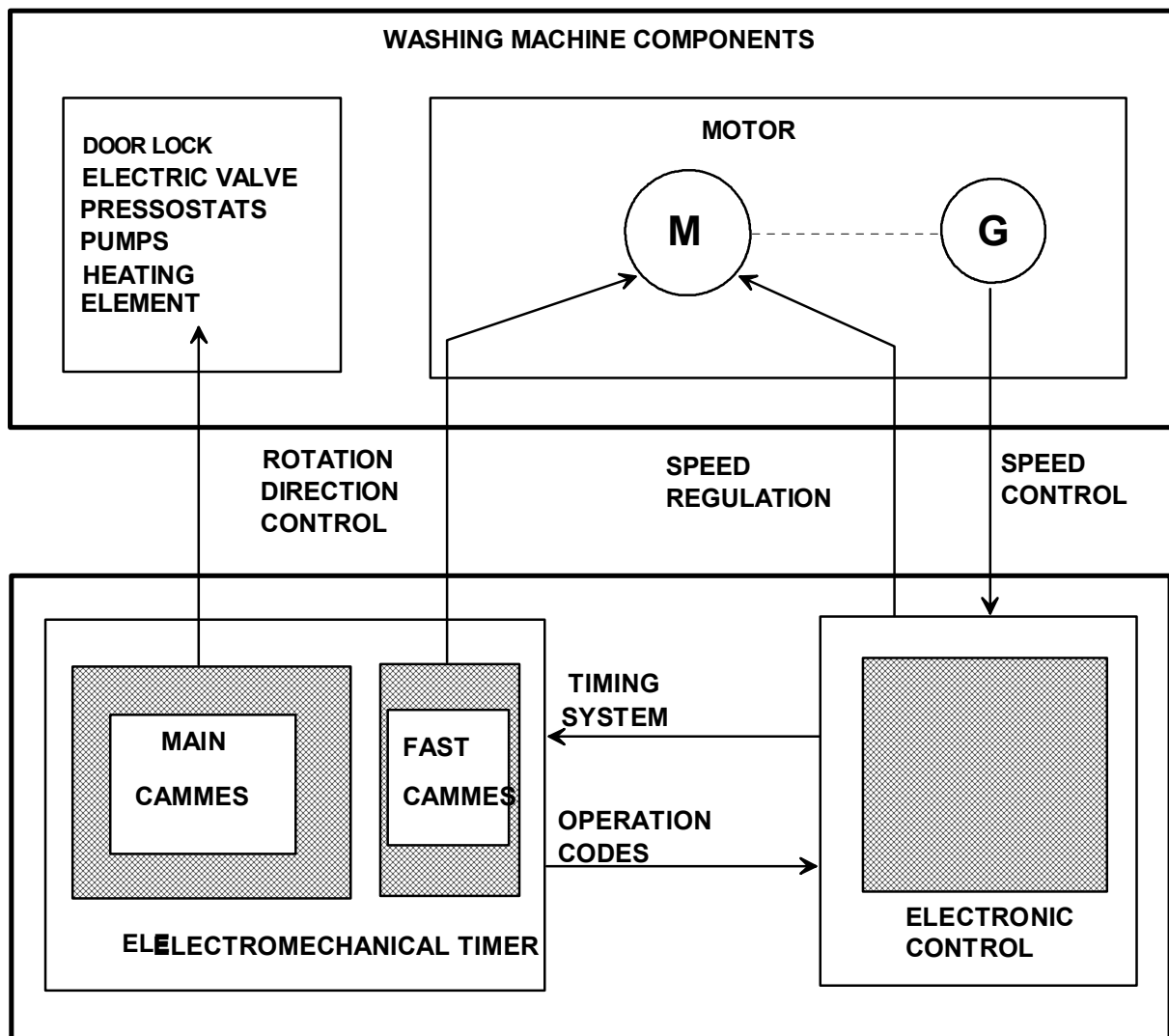
Temperature control

- 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 COT PROGRAMME
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 electronic control board powers the timer motor via a TRIAC. 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.

Via a second TRIAC, the electronic control board directly powers the drum motor, and controls its speed according to a signal received from the tachymetric generator.

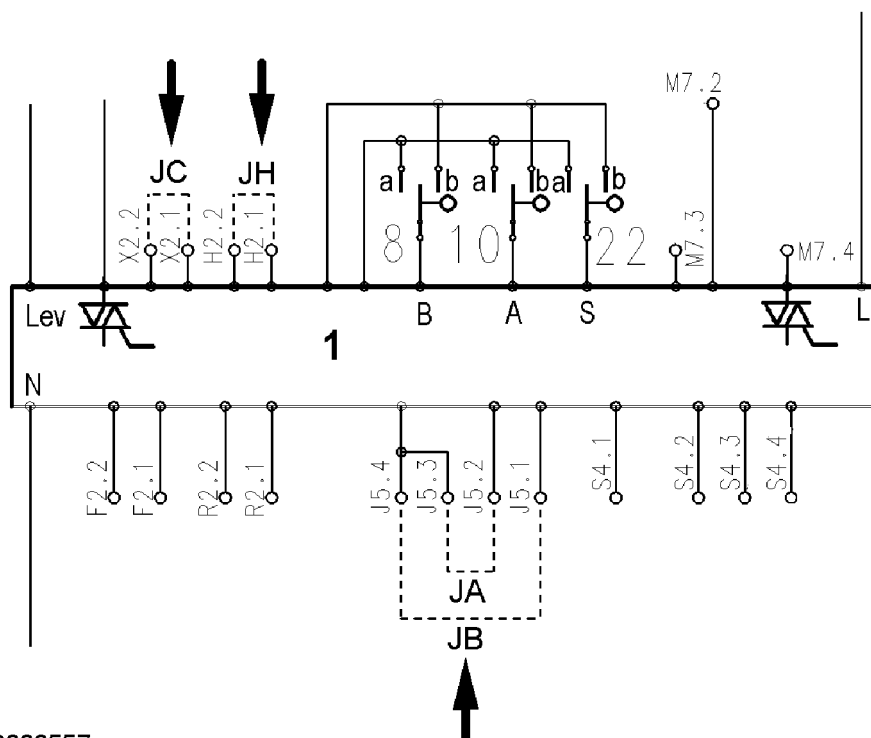
The direction of rotation and the operating sequence (pause - rotation) are controlled by the closure of four contacts on the fast camme of the timer.

All the other electromechanical components of the washing machine are powered by the contacts of the timer's main cammes.

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.



WD000557

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	1

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 spin cycle is not performed, and the ramp is repeated at 85 rpm.

If the load remains unbalanced, this procedure is repeated approximately 10 times. After this period, the timer passes to the next step, and the spin cycle is skipped.

MOTOR PROTECTION

Power TRIAC for motor short-circuited

If the TRIAC which powers the motor is short-circuited, the electronic control board moves the fast cammes to the position in which the motor is not powered. After 30 seconds, the motor is again powered; if the defect persists after three attempts, the power to the motor is disconnected and the timer remains in its current position.

Tachymetric generator short-circuited or disconnected

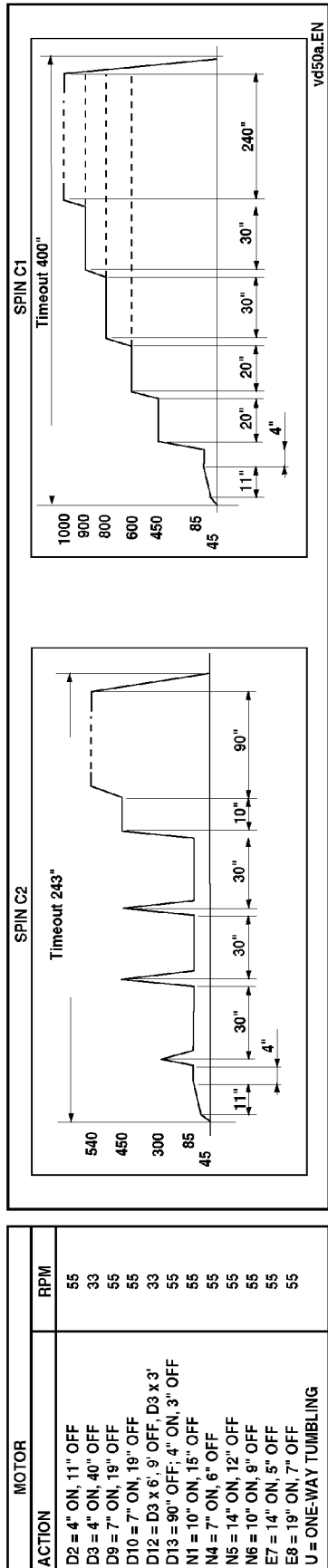
If a malfunction is detected in the tachymetric generator, the electronic control board disconnects the motor for 30 seconds, and then restores power. If the malfunction persists, this sequence is repeated every 30 seconds until the end of the cycle.

WASHING PROGRAMMES

MODELS WITH ADJUSTABLE THERMOSTAT				
	PROGRAMMES		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	-	-	-

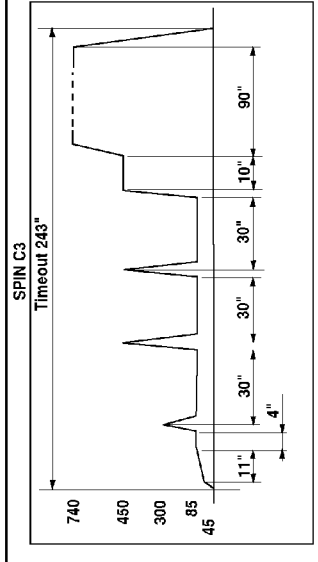
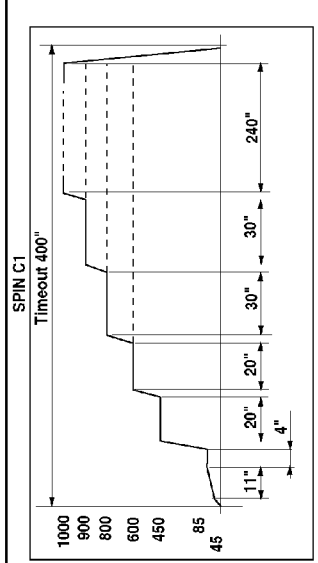
MODELS WITH FIXED-TEMPERATURE THERMOSTAT				
	PROGRAMMES		RINSES	
		WASHING TEMPERATURE	VD50 - VD51 - VD50J	VD52 - VD53 - VD53J
n°	COTTON - LINEN			
1	Whites / Coloureds with pre-wash	60	4	3
	Whites with pre-wash *	95	4	3
2	Whites / Coloureds	60	4	3
	Whites *	95		
3	Coloureds	60	4	3
4	Delicate coloureds	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	-	-	-

WASHING PROGRAMMES - TIMER FUNCTIONS VD50 - VD51 - VD51J

[illegible]

WASHING PROGRAMMES - TIMER FUNCTIONS VD52 - VD53 - VD53J

VD 52 - VD53										DELICATES - WOOL									
WASH PHASES										SYNTHETICS									
COTTONS										COTTONS									
WASH PHASES										COTTONS									
STEP										STEP									
PROGRAMMES STARTING POINTS										PROGRAMMES STARTING POINTS									
DETERGENT DRAWER										DETERGENT DRAWER									
HEATING										HEATING									
CODE										CODE									
MOTOR: ACTION										MOTOR: ACTION									
- SPIN										- SPIN									
WATER INTAKE 2 nd LEV.										WATER INTAKE 2 nd LEV.									
WATER INTAKE 1 st LEV.										WATER INTAKE 1 st LEV.									
EMPTY CONDITION										EMPTY CONDITION									
FILL UP TIME 1 st LEV.										FILL UP TIME 1 st LEV.									
TIME (MINUTES)										TIME (MINUTES)									
STEPS										STEPS									
OPTIONS:										OPTIONS:									
COTTONS 60' (ACTION):										COTTONS 60' (ACTION):									
(MINUTES):										(MINUTES):									
COTTONS 40' (ACTION):										COTTONS 40' (ACTION):									
(MINUTES):										(MINUTES):									
COTTONS: RINSE HOLD										COTTONS: RINSE HOLD									
(FAST) SYNTHETICS 40' (ACTION):										(FAST) SYNTHETICS 40' (ACTION):									
(MINUTES):										(MINUTES):									
WOOL (ACTION):										WOOL (ACTION):									
(MINUTES):										(MINUTES):									
P. BUTTON FUNCTION:										P. BUTTON FUNCTION:									
RINSE HOLD										RINSE HOLD									
DELICATE SPIN:										DELICATE SPIN:									
EXTRA RINSE(MINUTES):										EXTRA RINSE(MINUTES):									
HALF-LOAD (MINUTES):										HALF-LOAD (MINUTES):									
MOTOR										MOTOR									
ACTION										ACTION									
RPM										RPM									
D2 = 4" ON, 11" OFF										D2 = 4" ON, 11" OFF									
D3 = 4" ON, 40" OFF										D3 = 4" ON, 40" OFF									
D9 = 7" ON, 19" OFF										D9 = 7" ON, 19" OFF									
D10 = 7" ON, 19" OFF										D10 = 7" ON, 19" OFF									
D12 = D3 x 6; 9" OFF, D3 x 3'										D12 = D3 x 6; 9" OFF, D3 x 3'									
D13 = 90" OFF; 4" ON, 3" OFF										D13 = 90" OFF; 4" ON, 3" OFF									
N1 = 10" ON, 15" OFF										N1 = 10" ON, 15" OFF									
N4 = 7" ON, 6" OFF										N4 = 7" ON, 6" OFF									
N5 = 14" ON, 12" OFF										N5 = 14" ON, 12" OFF									
N6 = 10" ON, 9" OFF										N6 = 10" ON, 9" OFF									
E7 = 14" ON, 5" OFF										E7 = 14" ON, 5" OFF									
E8 = 19" ON, 7" OFF										E8 = 19" ON, 7" OFF									
U = ONE-WAY TUMBLING										U = ONE-WAY TUMBLING									



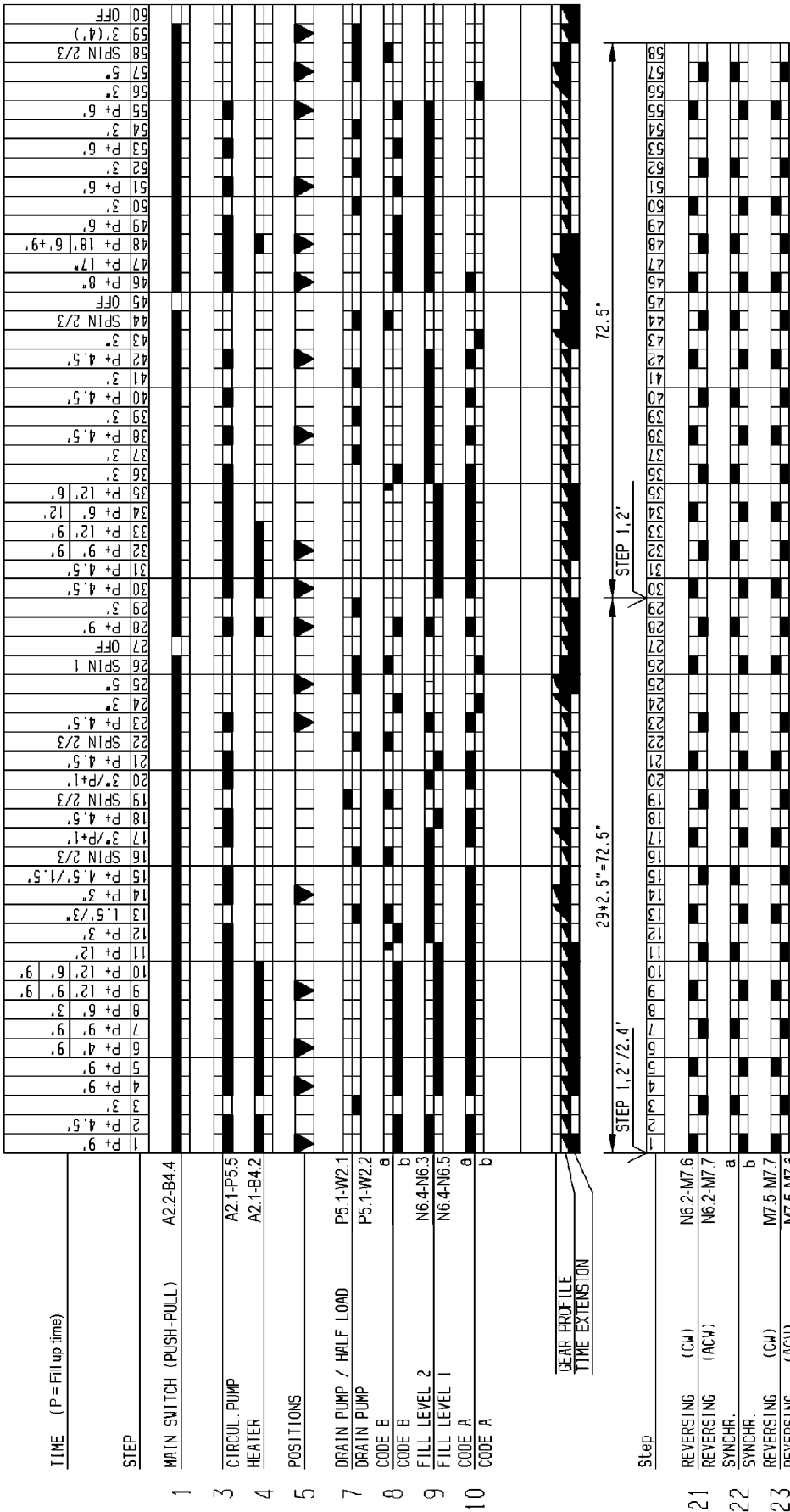
KEY FUNCTIONS

BASIC CIRCUIT DIAGRAM

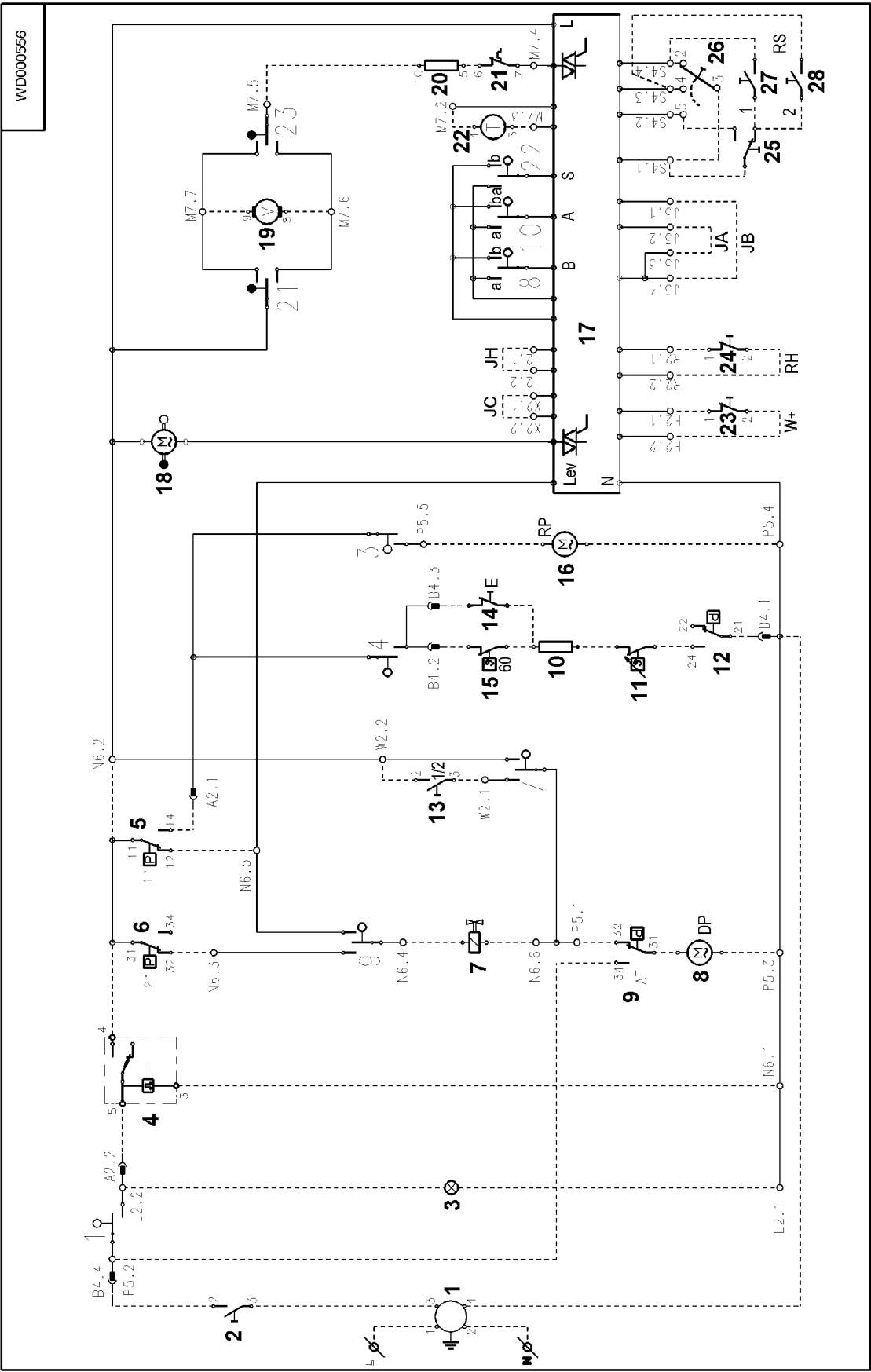
START/STOP	switches the appliance ON and OFF (timer 124.92141... only)
1/2 LOAD	with timers VD50/VD51, reduces the number of rinses from 4 to 3 in COTTON cycles; with timers VD52/VD53, reduces the number of rinses from 3 to 2 in COTTON cycles.
SUPER RINSE	increases the water fill in the second and third 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.
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
	1.000	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



BASIC CIRCUIT DIAGRAM



WD000556

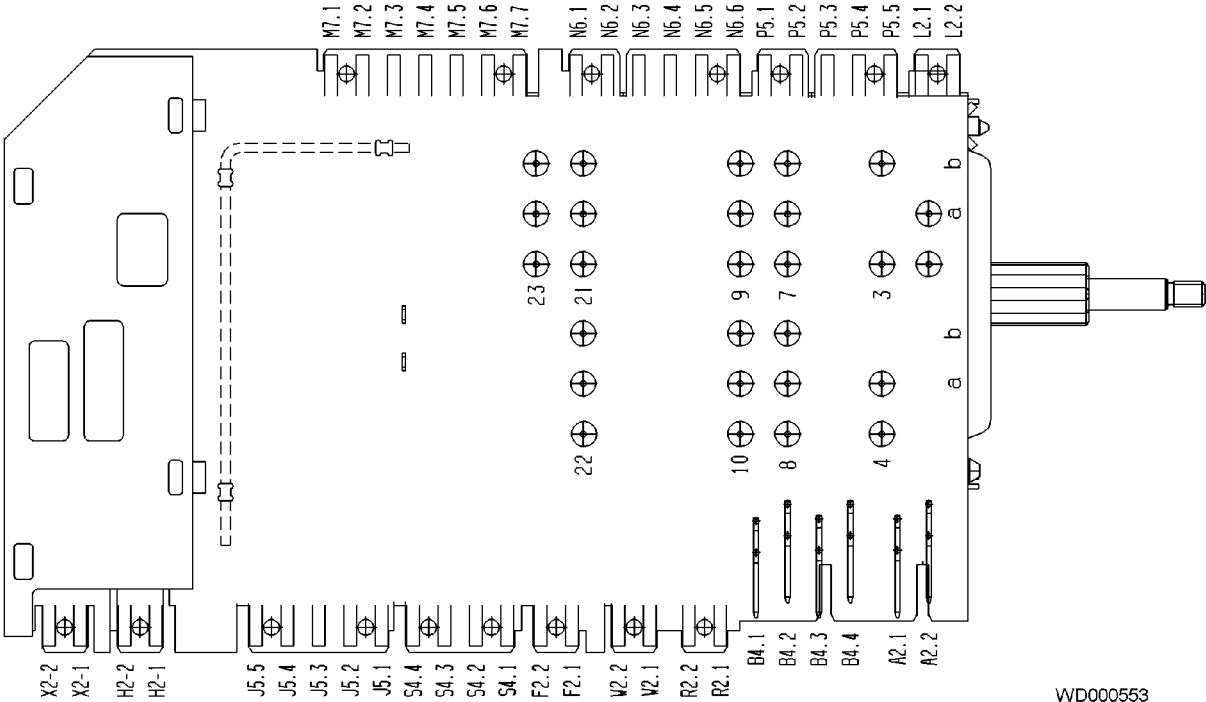
KEY TO CIRCUIT DIAGRAM

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. Tachymetric 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
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 STARTS FOR A MOMENT, THEN STOPS FOR 30 SECONDS (sequence repeated up to 3 times, then timer stops)	timer
MOTOR STARTS FOR A MOMENT, THEN STOPS FOR 30 SECONDS (cycle continues)	motor (tachymetric generator), wiring between tachymetric 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
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



WD000553