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**ELECTRONIC WASHING
MACHINES**

"INPUT SYSTEM"

**ALARMS AND
DIAGNOSTIC CYCLES**

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INTRODUCTION

The purpose of this document is to provide a description of the operation of the alarms, diagnostics and tests for electronic appliances (washing machines and dishwashers) with INPUT styling (version **MWM 1.5**).

The document describes the control system for the machine's alarm and test diagnostics.

System architecture

One of the most important requirements of this system is that it must be transparent to the end user. In other words, the user should not have access to the diagnostics routines and, in case of malfunction or alarm condition, with the exception of a few cases, no code or warning is displayed.

The system utilizes the microprocessor's EEPROM to memorize the data relative to the various alarms in the following format:

- Alarm code
- Number of alarm interventions (since last system reset)

Also, the EEPROM memorizes the last alarm which occurred in the appliance, the phase and sub-phase during which it occurred, and the number of complete cycles performed by the machine (washing and drying, with the exclusion of short cycles such as rinses, drain, spin, pre-wash etc.).

The appliance's test system makes it possible to check the operation of the individual components, and offers a valuable tool in the identification and repair of faults.

Access to the system

Access to the system is possible only by selecting the appropriate mode using a special procedure.

On completion of the diagnostics cycle, simply switch the appliance off to exit the system.

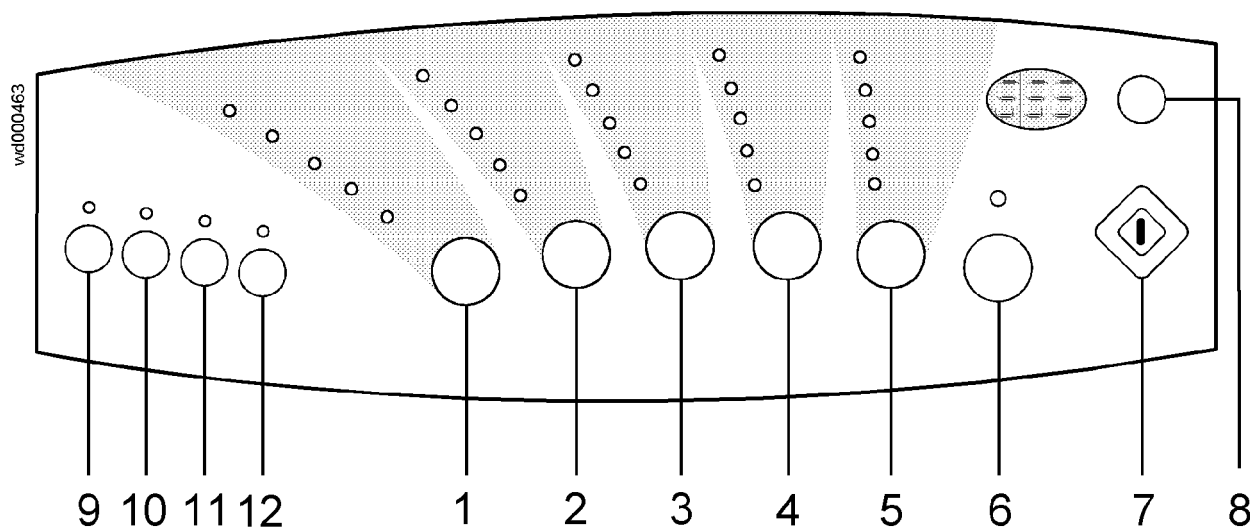
When the appliance is switched on again, it will return to normal operating mode.

Reading the alarm codes

In the case of a service call, the servicing technician can identify the alarms that have occurred during the life of the appliance by referring to the table of alarm codes. This information, used together with the user's explanations, make it possible to identify the component or part of the appliance that has malfunctioned.

To perform this operation, select "READ ALARMS" mode by following a special procedure.

ALARMS



READING THE ALARMS

In order to read the table of alarm codes, proceed as follows:

- Switch the appliance on by pressing **ON/OFF** and, at the same time, holding down buttons **1** and **4**.
- Press buttons **2** and **3** within two seconds.

The display will alternately show the total number of cycles performed by the appliance and **tot**. The number shown should be multiplied by ten (i.e. if the machine has performed 251 cycles, the display will show **25**).

Press any button to display the last alarm code, which alternates with the phase and sub-phase in which the alarm occurred (e.g. **E30** alternating with **2-3** means a fault in the electronic pressure switch during the heating sub-phase of the washing phase).

Press the same button again to display all the alarms that have occurred during the life of the appliance (the alarm code alternates with the number of interventions).

If no alarm conditions have occurred, the display shows **A00**.

To resume normal operation, the machine must be switched off and then on again.

RESETTING THE LIST OF ALARMS

When repairs have been effected, the table of alarms can be reset so that the appliance can be checked again at a later date if necessary.

To reset the alarm counters, proceed as follows:

- Switch the appliance on by pressing **ON/OFF** and, at the same time, holding down buttons **2** and **4**.
- Press buttons **1** and **3** within two seconds.

The alarm reset procedure starts, lasting approximately one second, during which the display shows **"EE"**.

To resume normal operation, the machine must be switched off and then on again.

ALARM CODES

Alarm code	Description	User code	Operation performed in case of alarm	Possible fault
E00	Problems with water fill during washing	E00	Cycle in PAUSE	Tap closed; solenoid valve, water distributor, wiring , main PCB, pressure switches
E01	Problems with water fill during drying	E00	Cycle in PAUSE	Tap closed; solenoid valve, wiring , main PCB, pressure switches
E10	Problems with water drain during washing	E10	Cycle in PAUSE	Drain hose kinked, filter blocked, drain pump, water distributor, wiring , main PCB, pressure switches
E11	Problems with water drain during drying	E10	Cycle in PAUSE	Drain hose kinked, filter blocked, drain pump, pressure switches
E20	Door open	E20	Cycle in PAUSE	Door delay, wiring , main PCB
E21	Fault in door delay power triac	E20	Cycle in PAUSE	Wiring , main PCB
E30	Fault in electronic pressure switch	---	Cycle interrupted	Electronic pressure switch, wiring , main PCB
E31	Fault in electronic pressure switch circuit	---	Cycle interrupted	Main PCB (fault in electronic pressure switch circuit)
E32	Calibration error in electronic pressure switch	E10	Cycle interrupted	Electronic pressure switch, drain pump, wiring , main PCB, filter blocked
E33	Incongruency between electronic pressure switches and safety switch 1	---	Cycle interrupted	Electronic pressure switch, safety pressure switch, wiring, main PCB
E34	Incongruency between electronic pressure switches and safety switch 2	---	Cycle interrupted	Electronic pressure switch, safety pressure switch, wiring, main PCB
E35	Intervention of anti-overflow pressure switch	---	Cycle interrupted	Solenoid valve, water distributor, wiring, main PCB, anti-overflow pressure switch
E36	Water leakage (maximum number of resets exceeded)	---	Cycle interrupted	Water leakage, drain hose too low, pressure switch, wiring, main PCB
E40	Motor power triac short-circuited	---	Cycle interrupted	Main PCB (triac short-circuited)
E41	No signal from tachimetric generator	---	Cycle interrupted	Tachimetric generator on motor, wiring, main PCB
E42	Fault in tachimetric generator circuit	---	Cycle interrupted	Main PCB (tachimetric generator sensing circuit)
E43	Intervention of motor overload protection	---	Cycle interrupted	Motor, wiring, main PCB
E50	Insufficient heating during wash phase	---	Phase skipped	NTC sensor setting incorrect, heating element, wiring, main PCB
E51	Overheating during wash phase	---	Cooling, drain, then cycle interrupted	Heating element (to earth), main PCB (relays)
E52	Insufficient heating during drying phase	---	Phase skipped	NTC sensor setting incorrect, safety thermostat, thermostats, drying heater, wiring, main PCB (relays)
E53	Overheating during drying phase	---	Phase skipped	Drying heater (to earth), main PCB (relays)
E55	Fault in power relay for heating element (K3)	---	Cycle interrupted	Safety pressure switch 2, wiring, main PCB

E60	Fault in washing NTC sensor	---	Phase skipped	Washing NTC sensor, wiring, main PCB
E61	Fault in drying NTC sensor (condenser)	---	Phase skipped	Drying NTC sensor (condenser), wiring, main PCB
E62	Fault in drying NTC sensor (duct)	---	Phase skipped	Drying NTC sensor (duct), wiring, main PCB
E63	Fault in 1/2 power thermostat	---	Phase skipped	Drying NTC sensor (duct), 1/2 power thermostat, wiring, main PCB
E70	Power triac to distributor motor short-circuited	---	Cycle interrupted	Main PCB (triac short-circuited)
E71	Fault in power relay to distributor loads	---	Cycle interrupted	Main PCB (relay open)
E72	No distributor position signal	---	Cycle interrupted	Water distributor motor, wiring, main PCB
E73	Incorrect timing on distributor contacts	---	-	Water distributor, wiring, main PCB
E90	Fault in tank fill pump	---	Cycle interrupted	Hoses obstructed, tank fill pump, wiring
E91	Fault in tank drain pump	---	Cycle interrupted	Hoses obstructed, tank drain pump, wiring
E92	Fault in power triac to tank fill pump	---	Cycle interrupted	Tank fill pump, wiring, main PCB

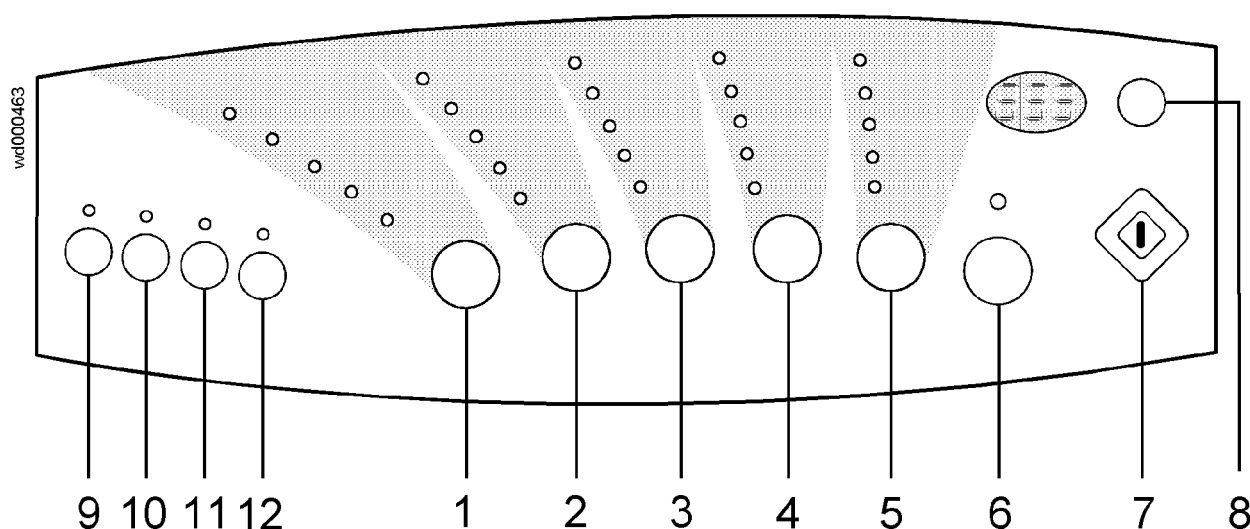
In order to exit the alarm condition:

- if the cycle is in PAUSE, press the START/PAUSE button (7); this allows the appliance to retry the operation under the control of the user.
- if the cycle is interrupted, press the ON/OFF button.

The following table shows the phases and subphases displayed alternately to the alarm code; they give more information on the alarm situation:

Phase		Subphase	
Number	Description	Number	Description
0	Cycle selection or delayed start	---	---
1	Prewash/Soak	1	Filling
2	Wash	2	Maintenance
3	1st Rinse	3	Heating
4	2nd Rinse	4	Drain
5	3rd Rinse	5	Spin
6	4th Rinse	6	Drying
7	Softener	7	PCB test
8	Spin	---	---
9	Drying	---	---
A	Cooling	---	---
B	No-iron	---	---
C	PCB test	---	---
D	Cycle end	---	---

DIAGNOSTICS CYCLE



The diagnostics cycle can be used to test the individual components. Depending on the type of component, the system performs a series of automatic tests; manual tests, too, can be performed.

In order to perform this operation, it is necessary to select "MACHINE TEST" mode by following a special procedure.

Type of test	Access to test			Options	
	Press ON/OFF together with:	Within 2 seconds, simultaneously press:	Code displayed for 3 seconds	To skip phase, press:	To display variables, press:
Control/display board	1 - 3	7 - 4	t01	-	-
Water distributor	7 - 4	2 - 3	t02	1	-
Diagnostics cycle (washing)	1 - 3	2 - 4	t03	1	2
Diagnostics cycle (drying)	2 - 4	7 - 3	t04	1	2

Checking the electromechanical components

Checking the electromechanical components is a more complex procedure, and certain conditions are necessary in some cases in order to make checks (e.g. the washing heater cannot be operated without water in the tub). For this reason, a series of operating cycles (washing and drying) has been created which makes it possible to check the individual components in a special sequence. Also, during the course of the individual phases, it is possible to examine a number of the appliance's variable parameters (which are controlled by the microprocessor) in order to check that their values are correct or that the relative component operates correctly.

Finally, for the water distributor, a special self-diagnostics cycle has been created to check for correct operation, since it is difficult to do this by visual examination and/or using traditional instruments (testers etc.).

CONTROL/DISPLAY BOARD: DIAGNOSTICS

Using this cycle, it is possible to check all the components which make up the appliance's user interface. The appliance does not perform an actual operating cycle, but the individual buttons and their LEDs can be checked.

To access the diagnostics cycle, proceed as follows:

- Switch the appliance on by pressing **ON/OFF** and, at the same time, holding down buttons **1** and **3**.
- Press buttons **7** and **4** within two seconds.

"**t01**" is displayed for 3 seconds to confirm access to the diagnostics cycle.

When each button is pressed, the corresponding LED lights and a number appears on the display.

If it is not possible to access this diagnostics cycle, there may be a fault in one of the following:

- wiring between the two boards
- main PCB
- control/display board

WATER DISTRIBUTOR: DIAGNOSTICS

This self-diagnostics cycle checks the component by verifying the following parameters:

- Operation of the motor
- Contact timing

If the component is faulty, the corresponding alarm code is displayed.

To access this diagnostics cycle, proceed as follows:

- Switch the appliance on by pressing **ON/OFF** and, at the same time, holding down buttons **7** and **4**.
- Press buttons **2** and **3** within two seconds.

"**t02**" is displayed for 3 seconds to confirm access to the diagnostics cycle.

At this point, by pressing button **1** it is possible to advance the distributor from position 0 to position 16, and to use a tester to check for correct closure of the contacts as shown in the table below.

Position	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
T7.5 - T7.3																	
T7.7 - T7.3																	
T7.6 - T7.3																	
T7.4 - T7.3																	

WASHING: DIAGNOSTICS CYCLE

The purpose of this cycle is to perform a semi-automatic check of all the components which are used during the course of a washing cycle.

To access this diagnostics cycle, proceed as follows:

- Switch the appliance on by pressing **ON/OFF** and, at the same time, holding down buttons **1** and **3**.
- Press buttons **2** and **4** within two seconds.

“t03” is displayed for 3 seconds to confirm access to the diagnostics cycle.

The cycle consists of a number of phases, each of which can be used to test one or more components. In certain phases, it is possible to exit before the end of the phase by pressing button **1**.

During the course of the diagnostics cycle, all the alarms are active and displayed.

Press button **2** to display the following variables in sequence:

- Water level (mm)
- Status of safety pressure switch 1 (ON/OFF)
- Temperature of wash NTC (°C)
- Speed of rotation of washing motor (rpm, x10)
- Position of water distributor

Phase	Test	Loads actioned	End of phase condition	Phase skippable
1	Calibration of electronic pressure switch	Drain pump, distributor	After calibration, the tub is drained	NO
2	Water fill to prewash compartment	Solenoid valve, distributor	When level 1 is reached	NO
3	Water fill to wash compartment	Solenoid valve, distributor	Timeout (8 seconds)	YES
4	Water fill to bleach compartment	Solenoid valve, distributor	Timeout (8 seconds)	YES
5	Water fill to conditioner compartment	Solenoid valve, distributor	Timeout (8 seconds)	YES
6	Recirculation	Distributor, recirculation pump	Timeout (10 minutes)	YES
7	Heating	Heating element, recirculation pump	Timeout (10 minutes)	YES
8	Motor rotation	15 sec clockwise, 4 sec pause, 15 sec counter-clockwise	Timeout (10 minutes)	YES
9 *	Tank filling	Tank fill pump	Timeout (10 minutes)	YES
10 *	Tank drain	Tank drain pump	Timeout (10 minutes)	YES
11	Drain	Drain pump, distributor	When “empty” level is reached	NO
12	Spinning	Motor: final spin	End of spin	YES

* certain models only

DRYING: DIAGNOSTICS CYCLE

The purpose of this cycle is to perform a semi-automatic check of all the components which are used during the course of a drying cycle.

To access this diagnostics cycle, proceed as follows:

- Switch the appliance on by pressing **ON/OFF** and, at the same time, holding down buttons **2** and **4**.
- Press buttons **7** and **3** within two seconds.

"**t04**" is displayed for 3 seconds to confirm access to the diagnostics cycle.

The cycle consists of a number of phases, each of which makes it possible to test one or more components. In certain phases, it is possible to exit before the end of the phase by pressing button **1**.

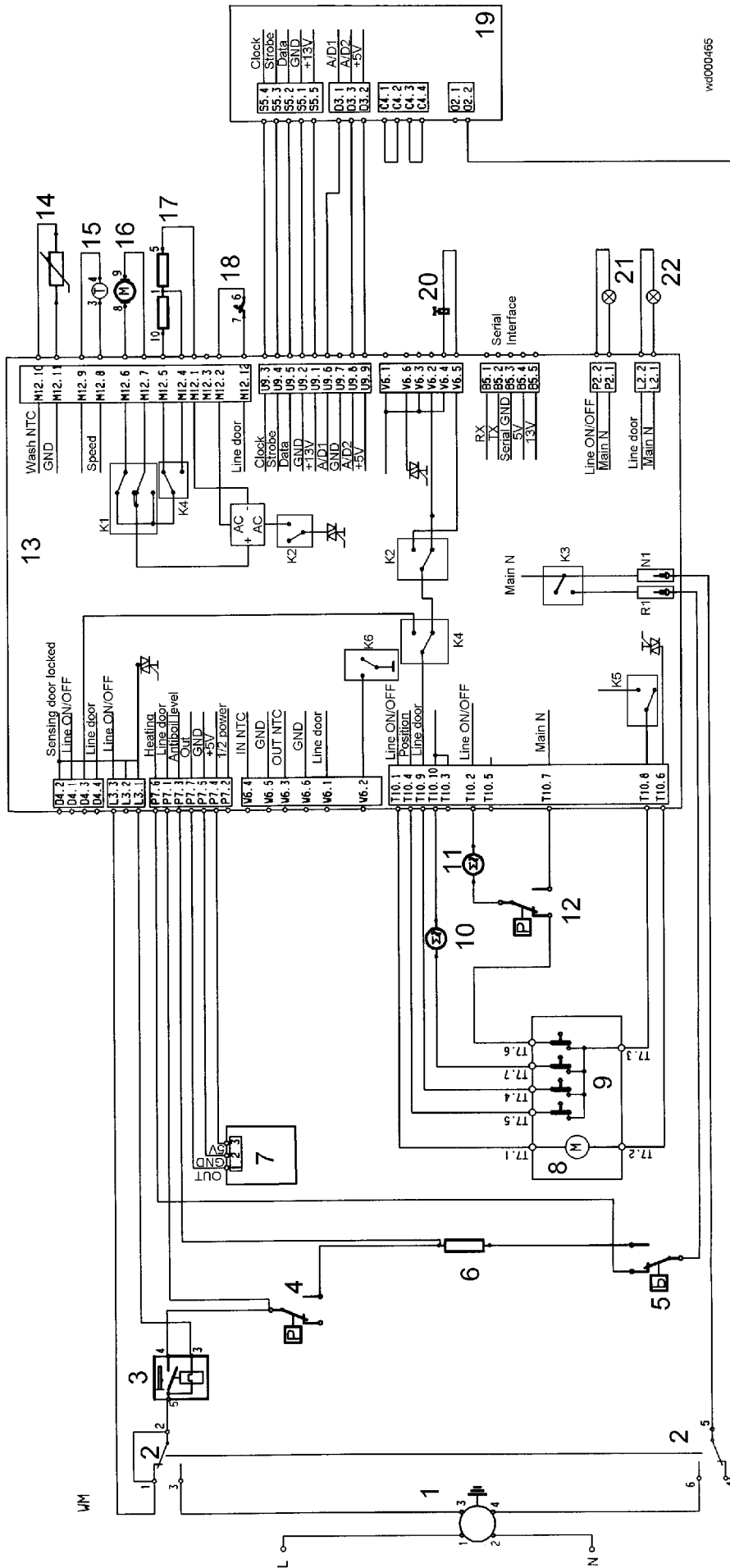
During the course of the diagnostics cycle, all the alarms are active and displayed.

A different button can be used to display the following variables in sequence:

- Water level (mm)
- Status of safety pressure switch 1 (ON/OFF)
- Status of 1/2 power thermostat (ON/OFF)
- Speed of rotation of motor (rpm, x10)
- Position of water distributor
- Temperature of NTC on drying duct (°C)
- Temperature of NTC on drying condenser (°C)

Phase	Test	Loads actioned	End of phase condition	Phase skippable
1	Calibration of electronic pressure switch	Drain pump, distributor	After calibration, the tub is drained	NO
2	Venting, condensation	Venting fan, condensation solenoid valve	Timeout (10 minutes)	YES
3	Drain	Drain pump, distributor	"Empty" level is reached (HS)	NO
4	1/2 power drying	One branch of drying heater	1/2 power thermostat closes	NO
5	Full-power drying	Both branches of drying heater, venting fan, condensation solenoid valve	Timeout (10 minutes)	YES

WASHING-MACHINES: ELEMENTARY DIAGRAM

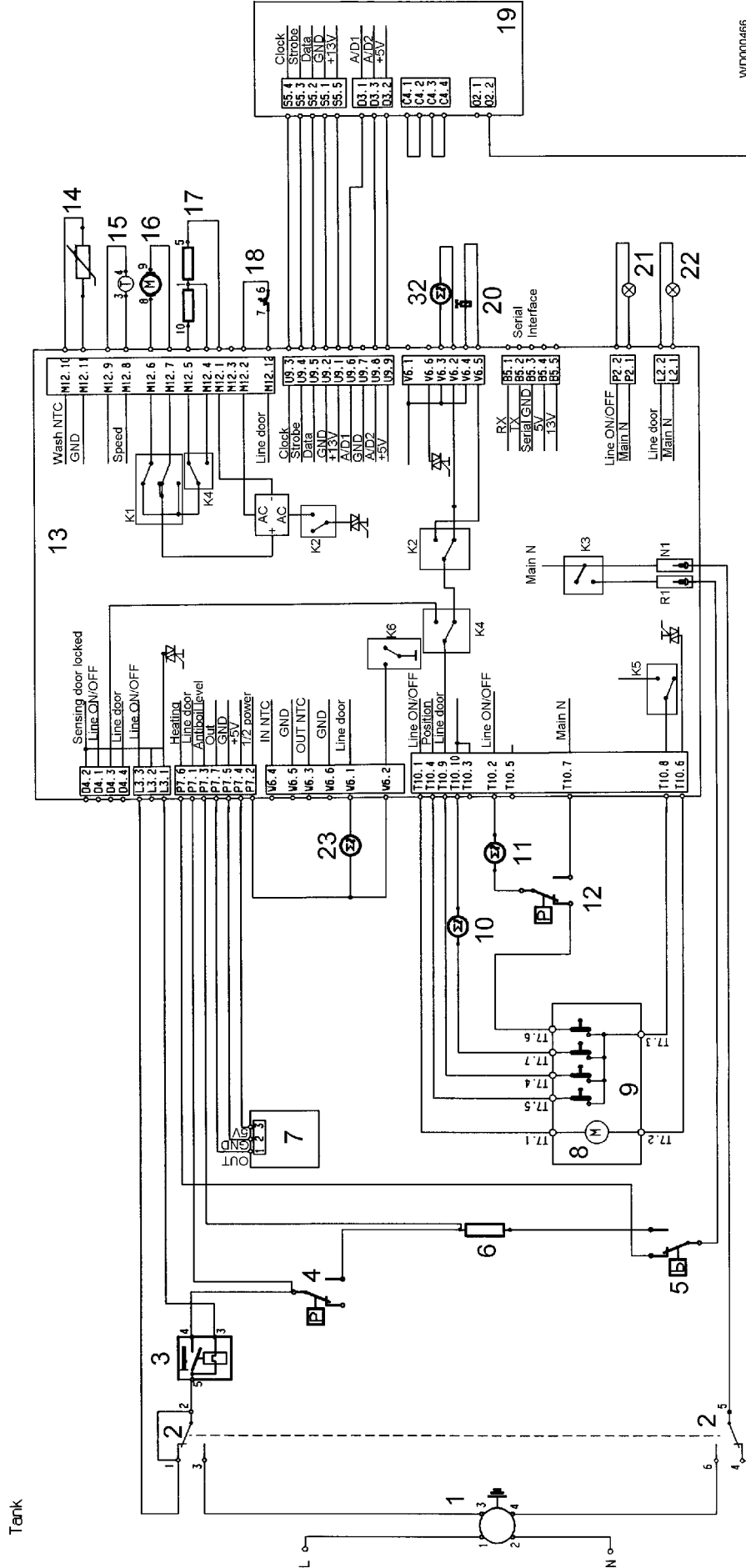


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WASHER-DRYERS: ELEMENTARY DIAGRAM



WASHING-MACHINES WITH WATER TANK: ELEMENTARY DIAGRAM



WD000466

KEY

- 1-Anti-interference filter
- 2-ON/OFF button
- 3-Door safety interlock
- 4-Safety pressure switch 1
- 5-Safety pressure switch 2
- 6-Heating element (washing)
- 7-Electronic pressure switch
- 8-Water distributor motor
- 9-Water distributor
- 10-Recirculation pump
- 11-Drain pump
- 12-Antioverflow pressure switch
- 13-Main electronic board
- 14-Temperature probe (washing)
- 15-Tachimetric generator
- 16-Rotor
- 17-Stator
- 18-Motor overload cut-out
- 19-User interface board
- 20-Cold water inlet valve
- 21-Pilot lamp
- 22-Door indicator lamp
- 23-Tank inlet pump
- 24-Temperature probe (duct)
- 25-Temperature probe (condenser)
- 26-Fan motor
- 27-Heating elements (drying)
- 28-Overheat protection thermostat
- 28-Thermostat (vigorous drying)
- 30-Manual adjustable safety thermostat
- 31-Condensation valve
- 32-Tank drain pump