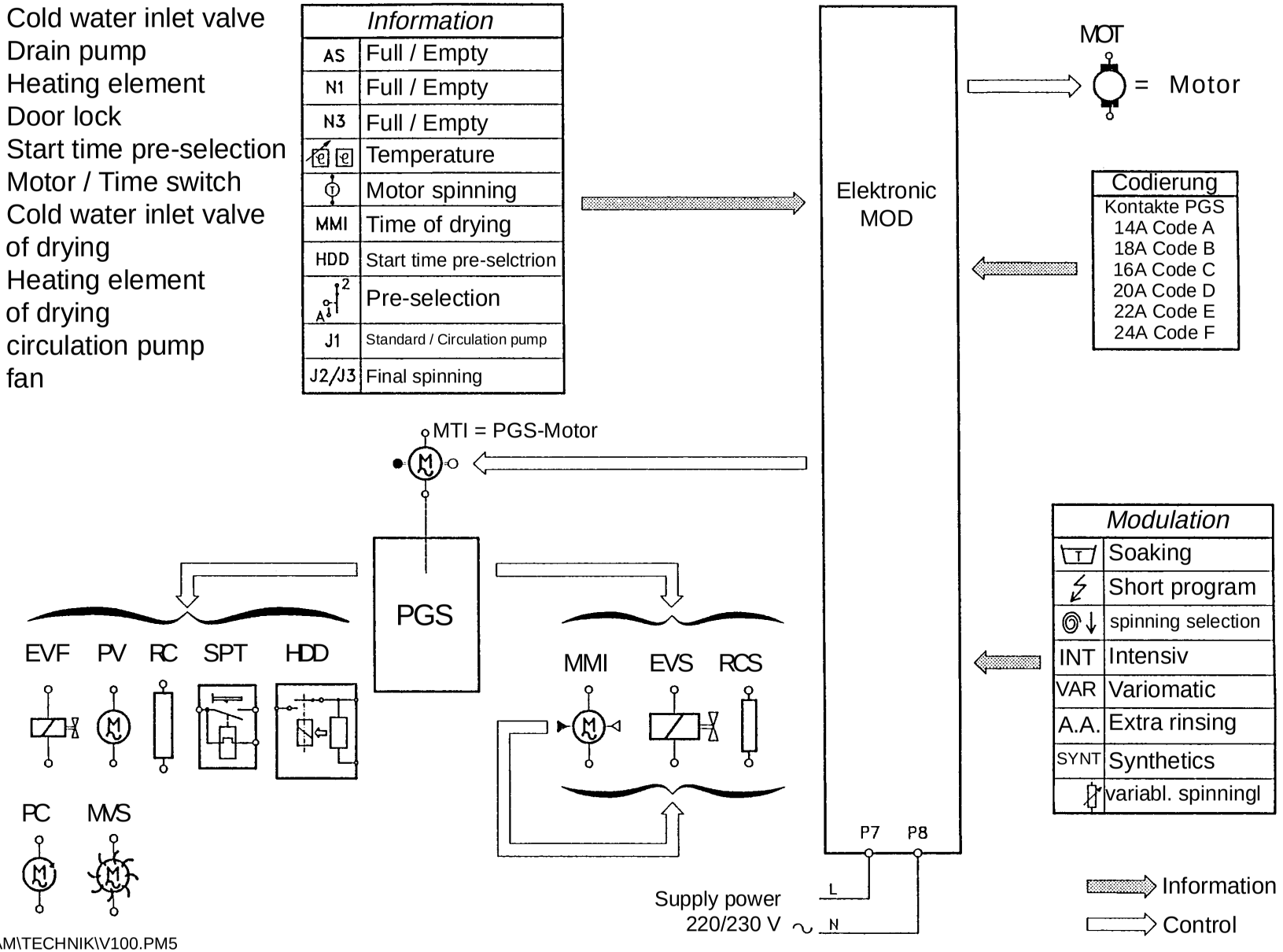
Hybridsteuerung

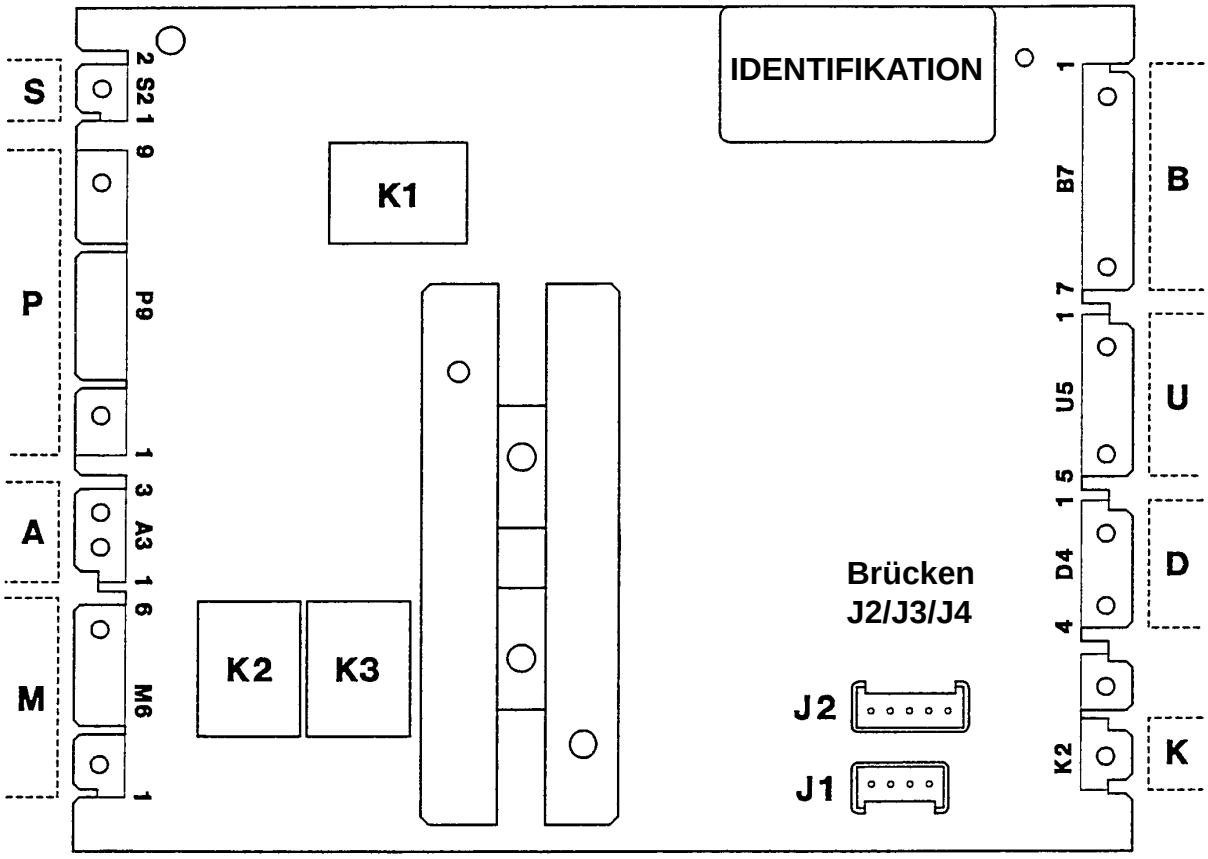
EVF = Cold water inlet valve
PV = Drain pump
RC = Heating element
SPT = Door lock
HDD= Start time pre-selection
MMI = Motor / Time switch
EVS = Cold water inlet valve of drying
RCS= Heating element of drying
PC = circulation pump
MVS= fan

Information	
AS	Full / Empty
N1	Full / Empty
N3	Full / Empty
	Temperature
	Motor spinning
MMI	Time of drying
HDD	Start time pre-selctrion
	Pre-selection
J1	Standard / Circulation pump
J2/J3	Final spinning



Modulation	
	Soaking
	Short program
	spinning selection
INT	Intensiv
VAR	Variomatic
A.A.	Extra rinsing
SYNT	Synthetics
	variabl. spinningl

Plug connection on the electronic



A Control temperature
B Codes
D push button
J1/J2 with / without circulation pump / final spinning
K extra rinsing / allergie-button
M power of motor
P Power of electronic / pre-selection, start time pre-selection / power of PGS-motor / control drying / pressure switch
S variable spinning
U push button

Code tabular PGS

	Code F B 2 24-24a	Code E B 3 22-22a	Code D B 4 20-20a	Code C B 7 16-16a	Code B B 6 18-18a	Code A B 5 14-14a
1	0	1	0	0	1	1
2	0	1	0	0	1	0
3	0	1	0	1	1	0
4	0	1	0	1	1	1
5	0	1	0	1	0	1
6	0	1	0	1	0	0
7	0	1	1	1	0	0
8	0	1	1	1	0	1
9	0	1	1	1	1	1
10	0	1	1	1	1	0
11	0	1	1	0	1	0
12	0	1	1	0	1	1
13	0	1	1	0	0	1
14	0	1	1	0	0	0
15	0	0	1	0	0	0
16	0	0	1	0	0	1
17	0	0	1	0	1	1
18	0	0	1	0	1	0
19	0	0	1	1	1	0
20	0	0	1	1	1	1
21	0	0	1	1	0	1
22	0	0	1	1	0	0
23	0	0	0	1	0	0
24	0	0	0	1	0	1
25	0	0	0	1	1	1
26	0	0	0	1	1	0
27	0	0	0	0	1	0
28	0	0	0	0	1	1
29	0	0	0	0	0	1
30	1	0	0	0	0	1
31	1	0	0	0	1	1
32	1	0	0	0	1	0
33	1	0	0	1	1	0
34	1	0	0	1	1	1
35	1	0	0	1	0	1
36	1	0	0	1	0	0
37	1	0	1	1	0	0
38	1	0	1	1	0	1
39	1	0	1	1	1	1
40	1	0	1	1	1	0
41	1	0	1	0	1	0
42	1	0	1	0	1	1
43	1	0	1	0	0	1
44	1	0	1	0	0	0
45	1	1	1	0	0	0
46	1	1	1	0	0	1
47	1	1	1	0	1	1
48	1	1	1	0	1	0
49	1	1	1	1	1	0
50	1	1	1	1	1	1
51	1	1	1	1	0	1
52	1	1	1	1	0	0
53	1	1	0	1	0	0
54	1	1	0	1	0	1
55	1	1	0	1	1	1
56	1	1	0	1	1	0
57	1	1	0	0	1	0
58	1	1	0	0	1	1

Preselection

Description:

On normal function the timer knob is taken along with the PGS and follows its rotation.

At the end of the program the knob and PGS are in a “STOP” position.

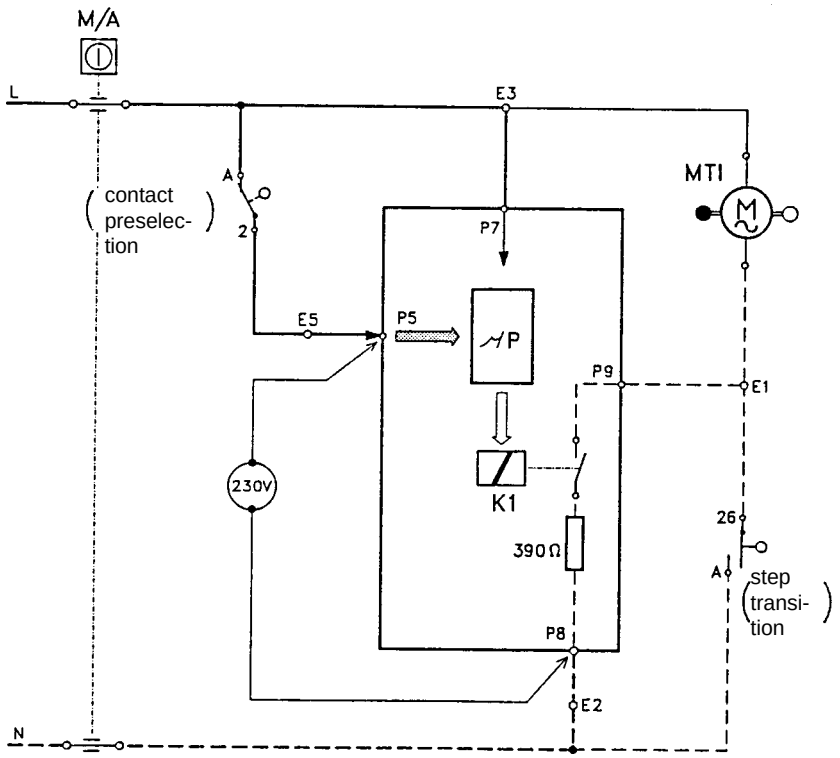
Selecting a program decouples knob and PGS from each other. The PGS remains in the “STOP” position.

At switching on the device the electronic system controls the timer motor and the program switch (PGS) goes in overdrive to the selected start position.

As soon as the PGS is in accordance with the adjusted knob position, the PGS engages and preselection is finished.

Function:

1. no preselection: “STOP” position

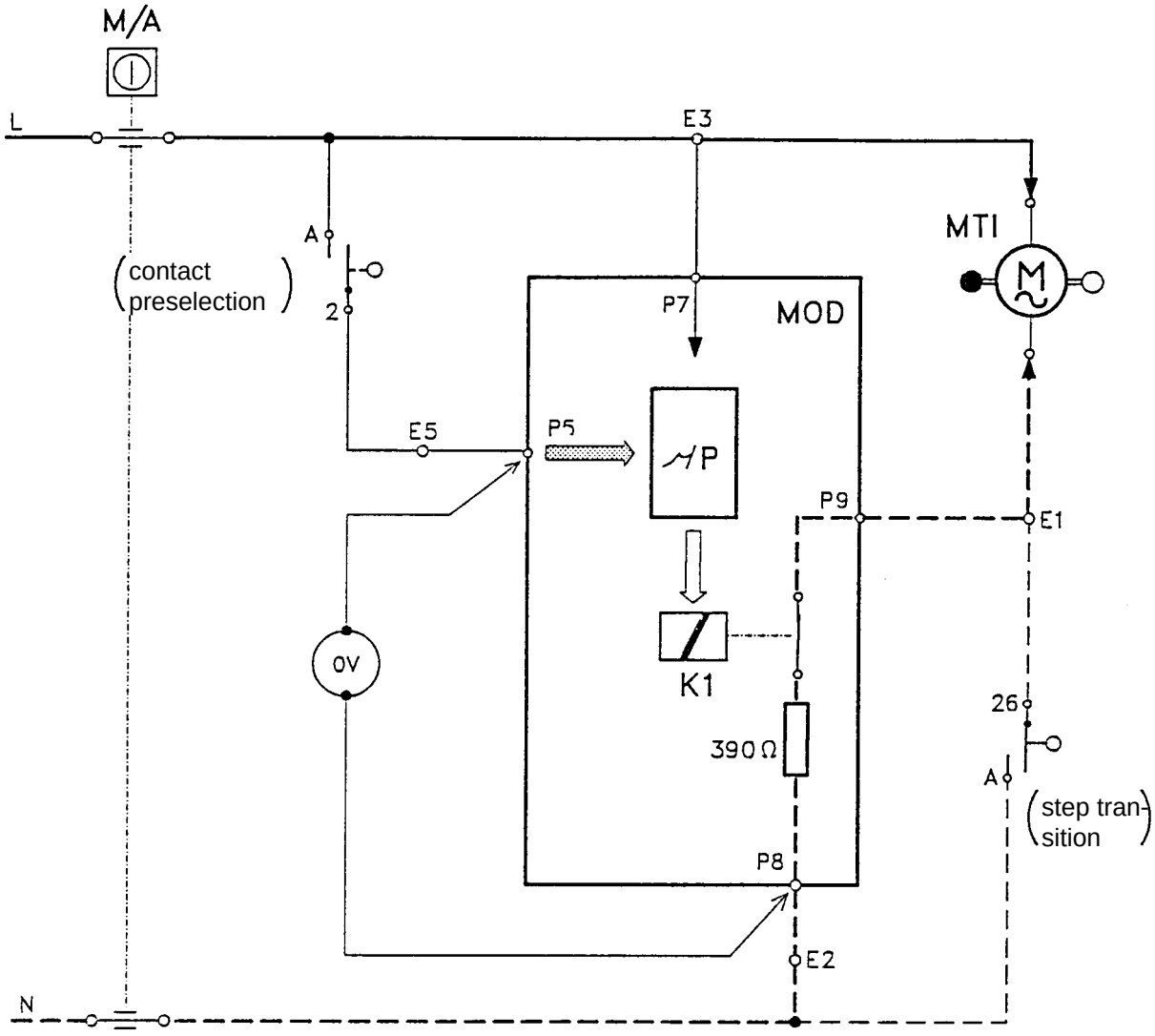


contact 2-A closed

⇒ input P5 of the electronic system is in state “1” (230 V between inputs P5/P8)
⇒ function preselection is inactive
⇒ MTI cannot be selected in this situation

Preselection

2. Display of a washing program: “PROGRAM ENTRY”



The entry of a washing program causes the opening of contact 2-A.

⇒ opening 2-A = input P5 changes to state “0” (0 V between P5/P8)

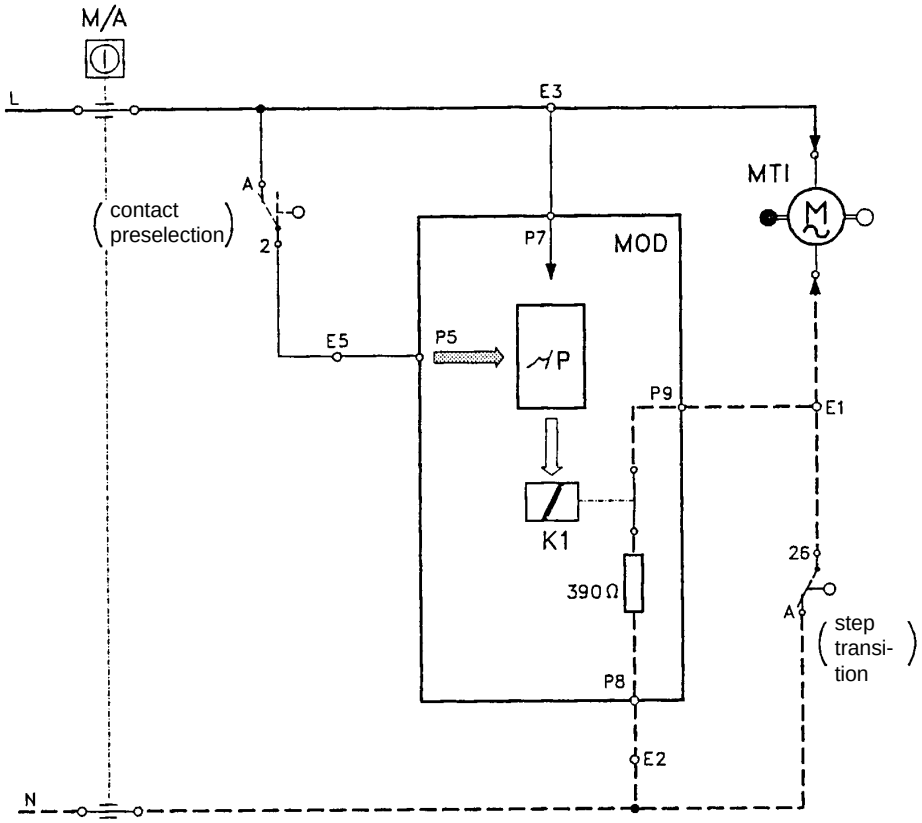
⇒ µP identifies the transition from “1” to “0” from input P5

⇒ µP selects relay K1.

⇒ Closing the contact of relay K1 selects MTI and sets the overdrive of the PGS going.

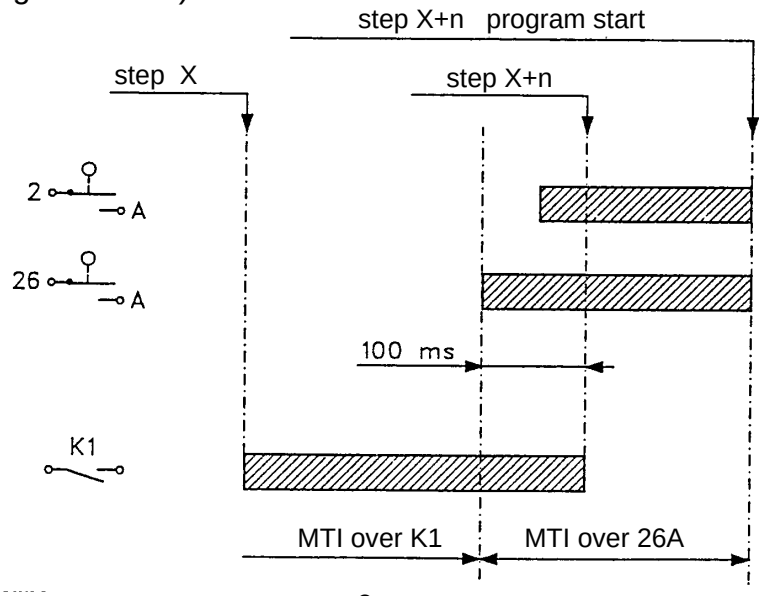
Preselection

3. The PGS reaches start position: “PROGRAM START”



Contact 2-A is closing.

⇒ P5 changes to state “1”
⇒ µP interrupts the selection of relay K1
⇒ interruption of the function preselection
⇒ MTI continues to be provided over the transition contact 26-A, so that the PGS will be positioned correctly to the start position of the program (compare diagram below)



Start Time Preselection

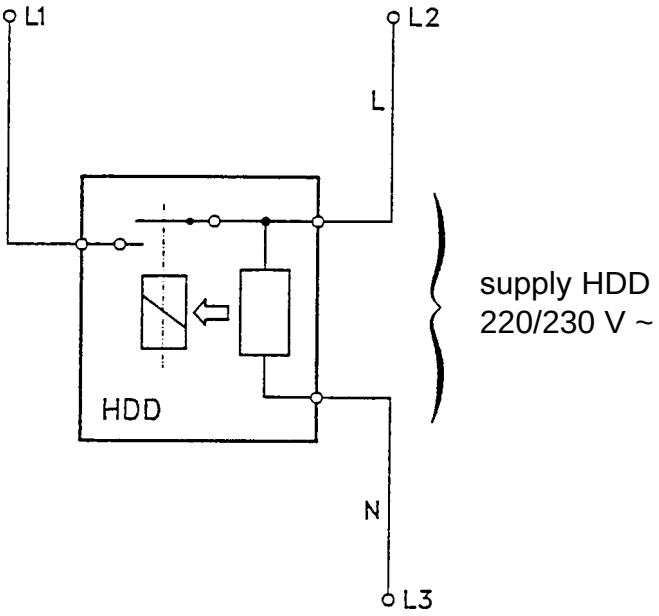
Start time preselection from 1 to 19 h is realized by the time link (HDD).

Important:

The start time preselection can only be activated if the PGS is in a “STOP” position (contact 12-B closed in step 37 or 58).

Time link HDD:

internal wiring



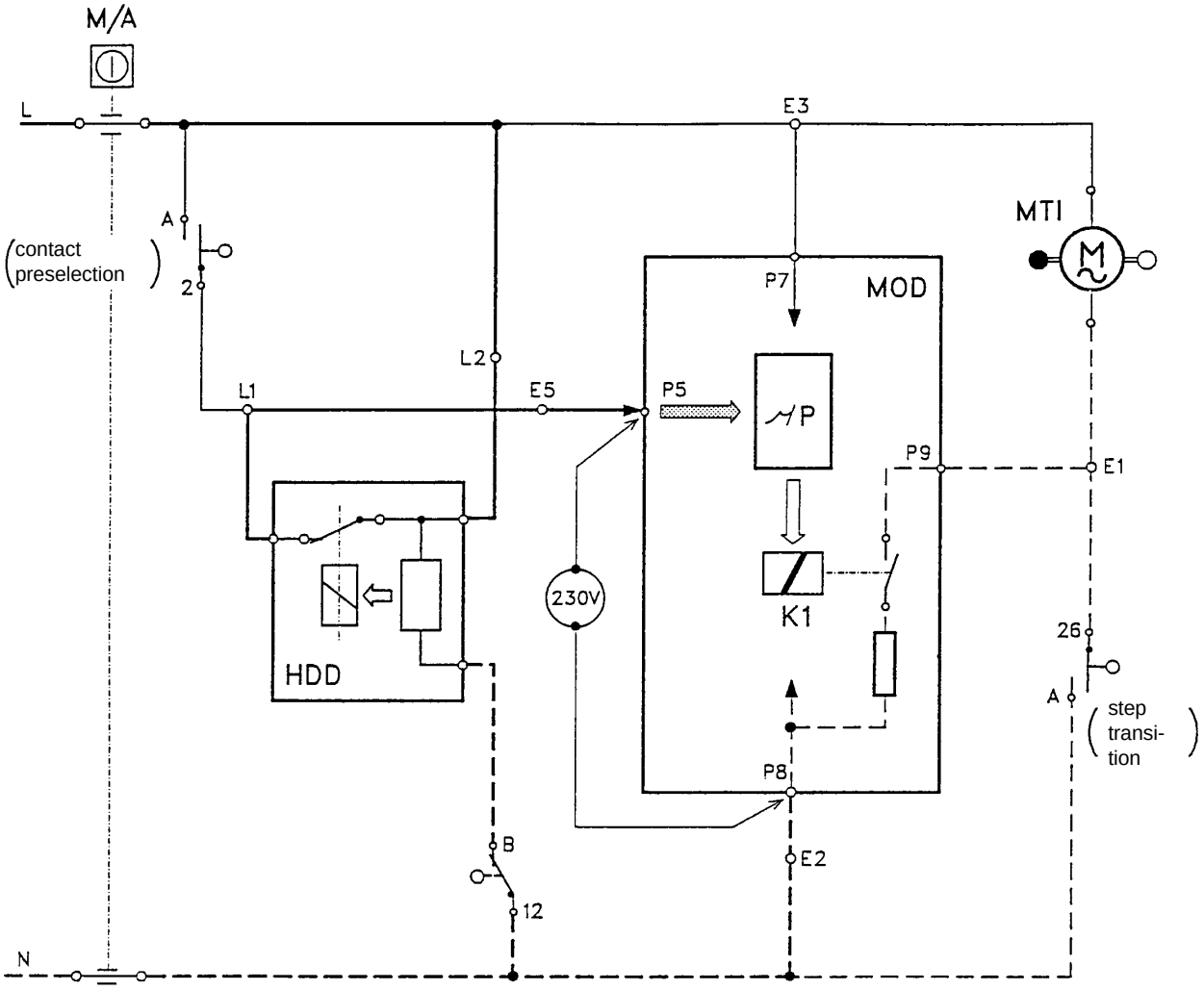
- start time preselection “OFF” = contact HDD open
- start time preselection “ON” = contact HDD closed

Adjustment of start time preselection:

1. If necessary, put PGS in stop position
   (knob position: start time preselection)
2. Adjust start time delay
3. Adjust requested program

Start Time Preselection

Funktionsprinzip:



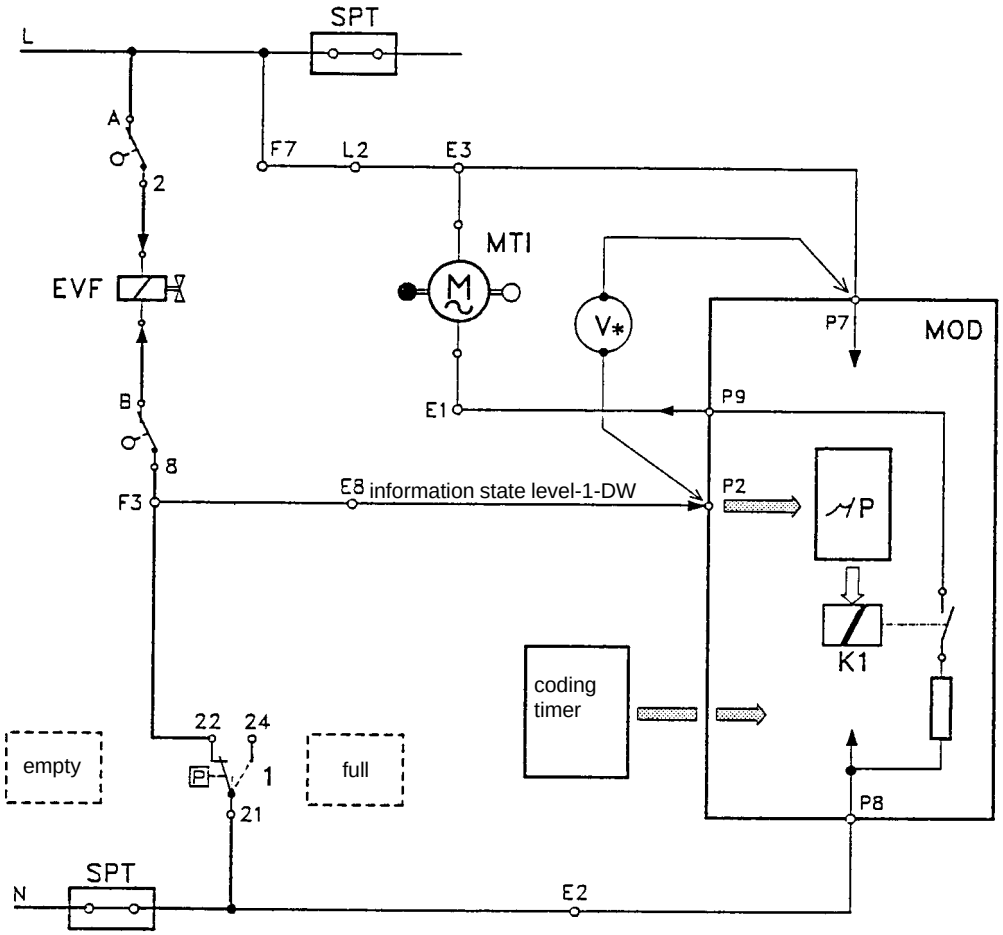
The selection of a start time delay entails the closing of the relay contact of the time link. This results in the transition from input P5 of the electronic system to state “1” (220/230V between P5 and P8).

The supply of MTI is interrupted.

As soon as the selected start time delay has proceeded, the relay contact of the time link opens. Input P5 changes to state “0”. Afterwards MTI is selected and the function preselection takes its normal course (compare section “preselection”).

Filling Process

1. Filling to level 1



* N1 in position “empty” ⇒ P2 in state “1” (220 V between P7 and P2)
N1 in position “full” ⇒ P2 in state “0” (0 V between P7 and P2)

The selection of EVF is effected by the disconnected level-1-pressure switch (compare diagram above).

The pressure switch is in an disconnected condition (contacts 22/21 closed):

- Input P2 of the electronic system in state “1”: µP interrupts the supply of MTI.

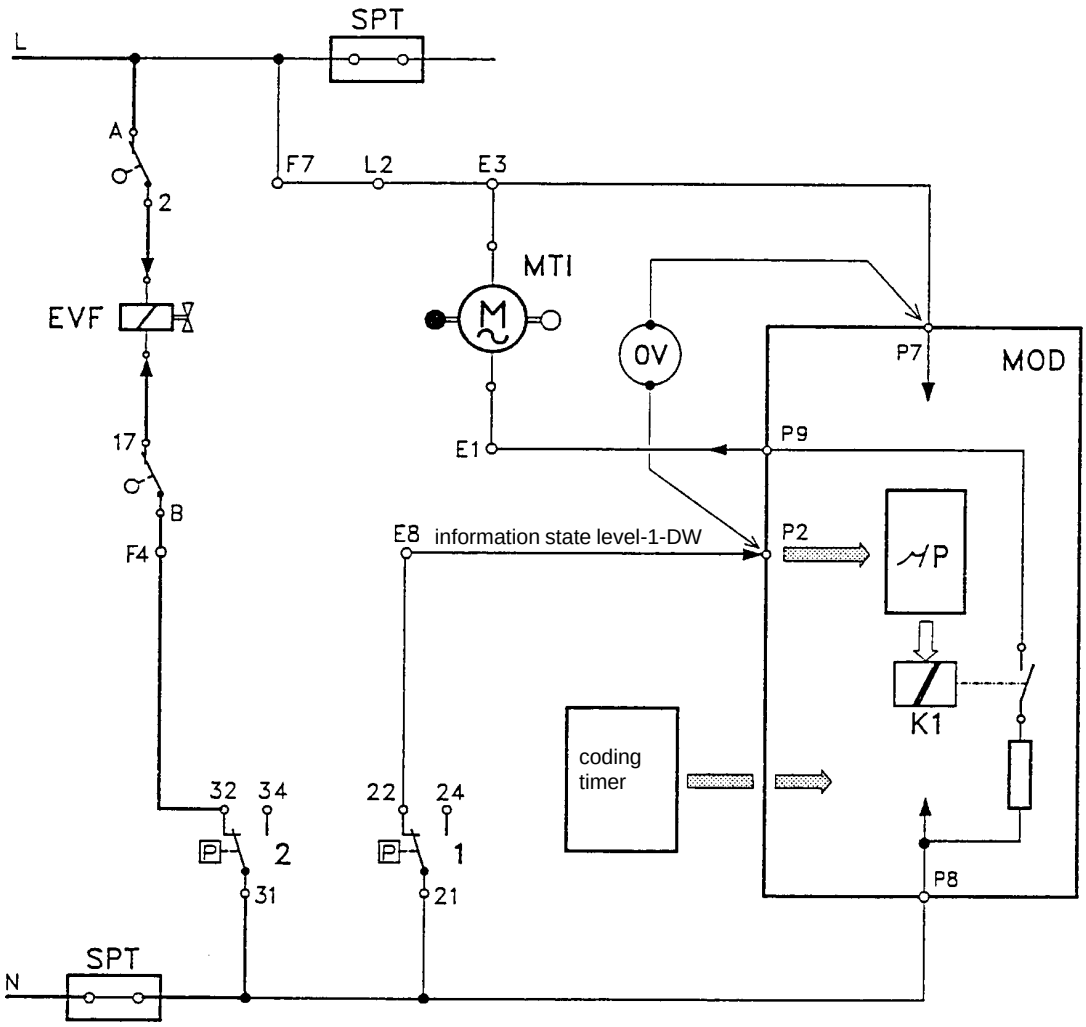
As soon as level 1 is obtained, the level-1-pressure switch (opening of contact 21/22) is connecting:

- Supply interrupt of EVF
- Input P2 of the electronic system changes to state “0”
- µP registers the reaching of state “0” and closes the contact of K1
- MTI is selected and the PGS leaves the level-1 filling step

Filling Process

2. Filling to level 2

Steps 2, 20, 22, 26 and 28



The selection of EVF is effected by switching the level-2-pressure switch (contact 32/ 21).

Step transition:

- Level 1 reached:

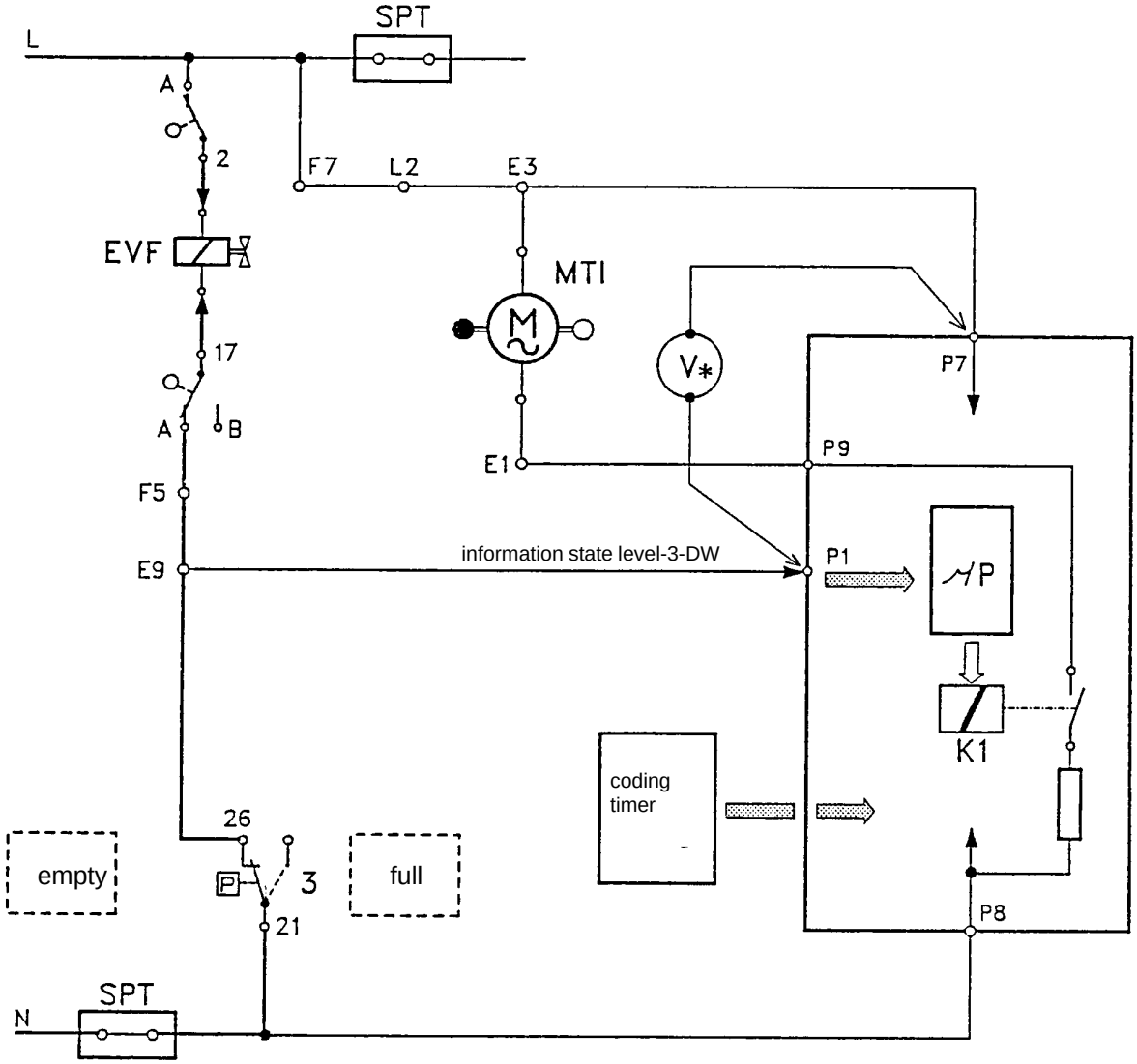
  ⇒ Input P2 changes to state “0” (0 V between clamps P7 and P2)

  ⇒ µP registers that input P2 changes from state “1” to state “0”.

  ⇒ µP waits 90 s before it closes contact K1 to enable the transition from level 1 to level 2.

Filling Process

3. Filling to level 3:



* N3 in position “empty” ⇒ P1 in state “1” (220 V between P7 and P1)
N3 in position “full” ⇒ P1 in state “0” (0 V between P7 and P1)

EVF is selected by the connected level-3 pressure switch (contact 21/26)

During the filling, input P1 of the electronic system is in state “1” (220 V between P7 and P1)

Level 3 reached:

- ⇒ Opening of pressure switch contact 26/21
- ⇒ Input P1 of the electronic system changes to state “0” (0 V between P7 and P1)
- ⇒ µP registers the reaching of state “0” and begins to count down time (2 min after the filling process to level 3)

Two-Step Rinsing

In the first step water runs through the pre-wash chamber, which contains a softener product. Then the detergent is absorbed by the water inlet over the main wash chamber.

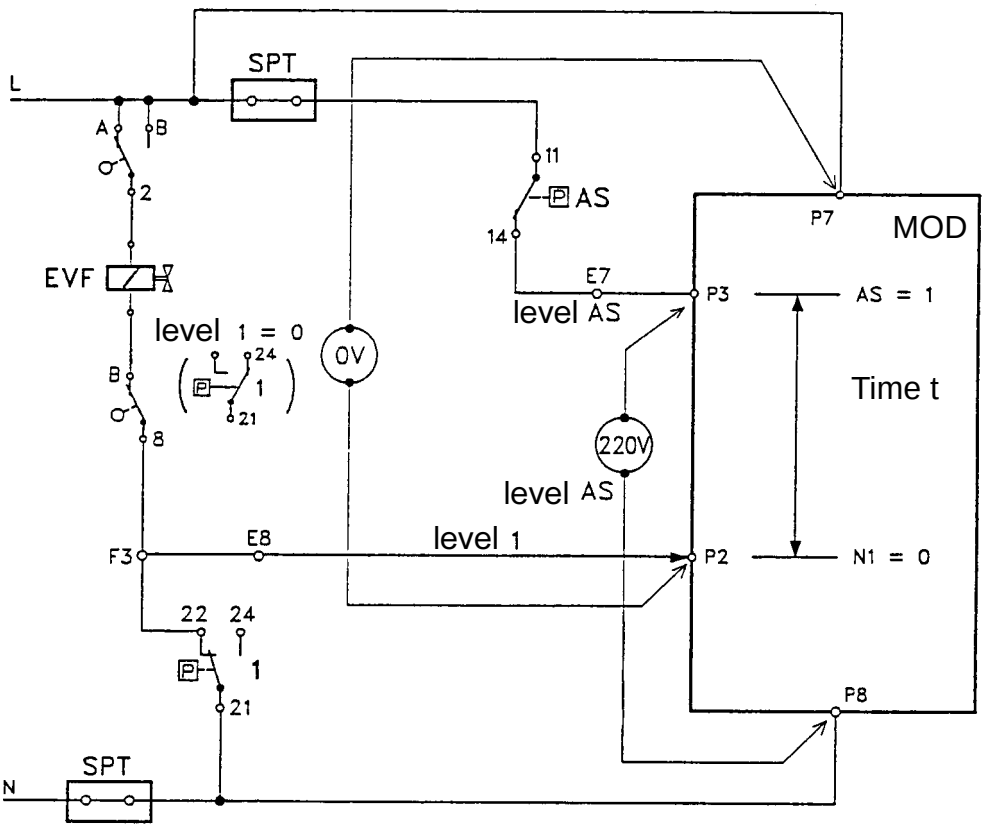
1. Filling in the field of boilproof and coloured washing:

To avoid problems with different water pressures and to guarantee minimum water consumption values, the filling is performed in the following way:

- Step no. 11:

Water inlet over the pre-wash chamber up to level 1.
During this water inlet the mP determines the time between reaching level AS (input P3 = “1”; 230 V between P8 and P3) and reaching level 1 (input P2 = “0”). We label that time with t.

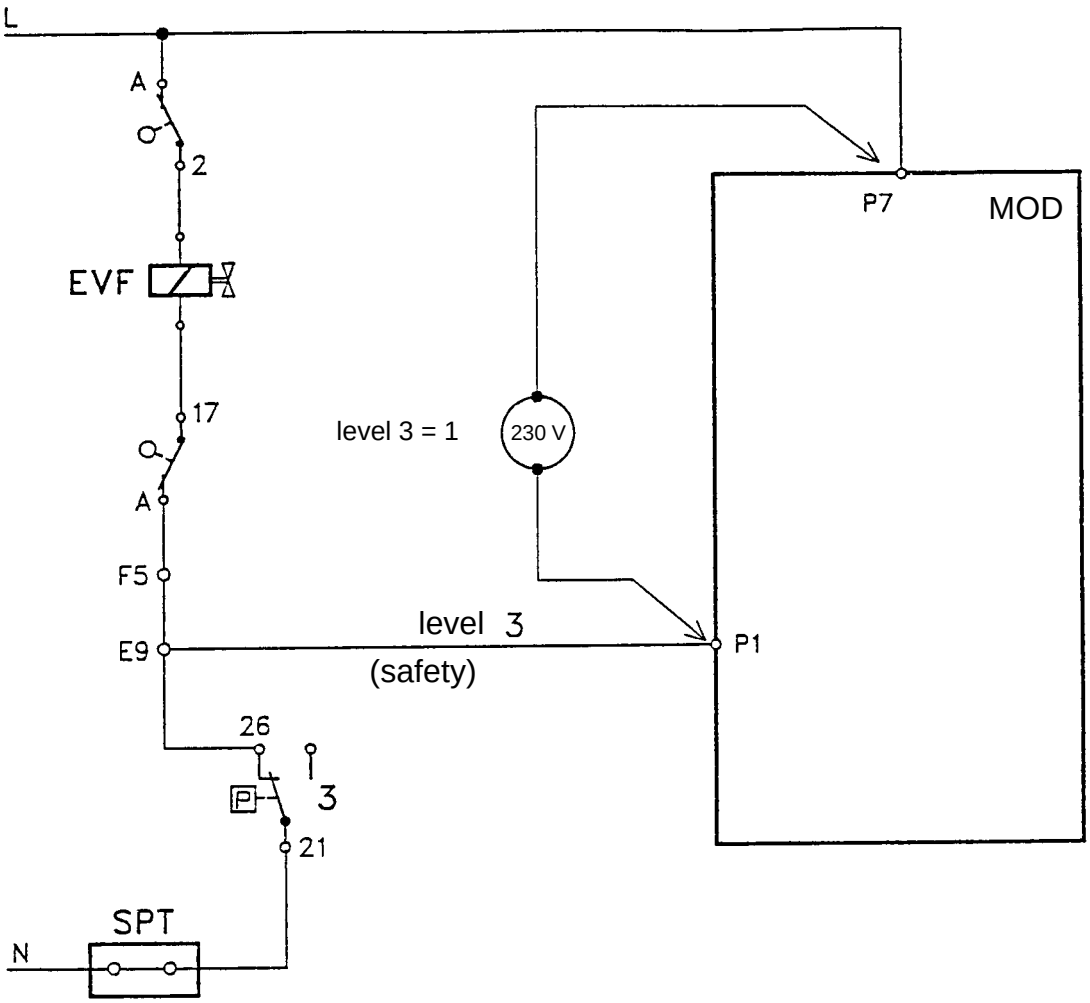
Level “1” reached:



Input P2 changes from state “1” to state “0” (0 V between P7 and P2)
⇒ Selection of MTI; continuation of the PGS up to step 13.

Two-Step Rinsing

- Step 13:



Temporal filling (time t') over the main wash chamber.
Time t' is calculated by mP in the following way:

⇒ automatic washing machine without jet system: $t' = t \cdot \frac{3}{8}$

⇒ automatic washing machine with jet system: $t' = t \cdot \frac{3}{4}$

In case of a power supply interrupt the temporal filling must not take less than 23" and more than 90", so that possible problems with an unsteady water pressure can be prevented.

In addition to that the maximum filling level is selected by level 3, input P1.

Two-Step Rinsing

2. Filling in the field of delicate

- Step no. 43:

  Water inlet over the pre-wash chamber up to level 1 + 30" s temporal filling and selection of MTI.

- Step no. 44:

  Delicate program: Reversing + circulation* for 1’.
(* for machine with jet system)

Wool program: overdrive

- Step no. 45:

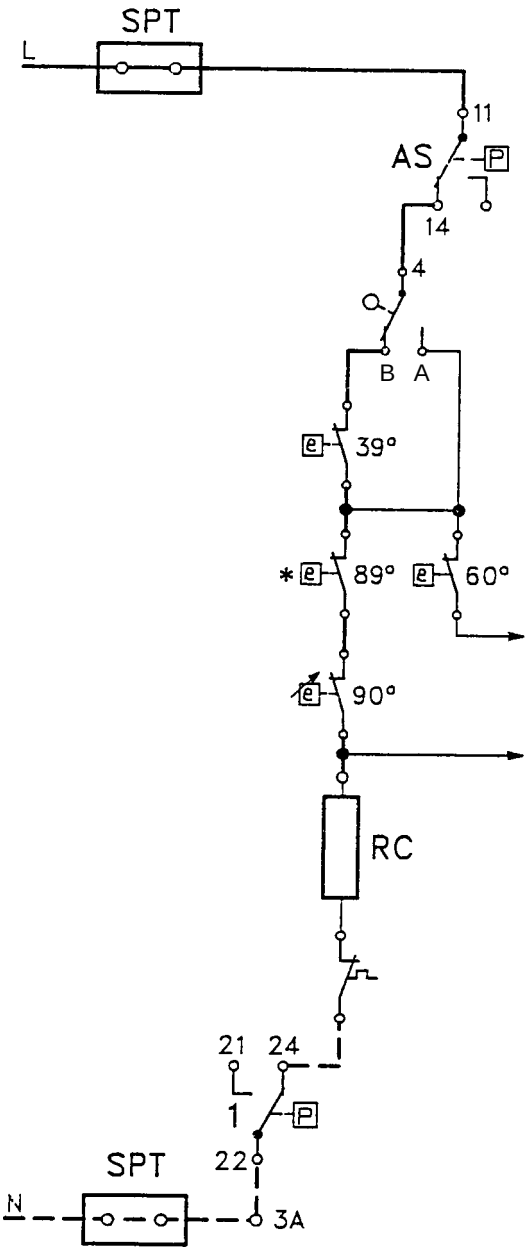
  Finishing up to level 3 and reversing within 2’.

Heating

1. Control of heating element (RC)

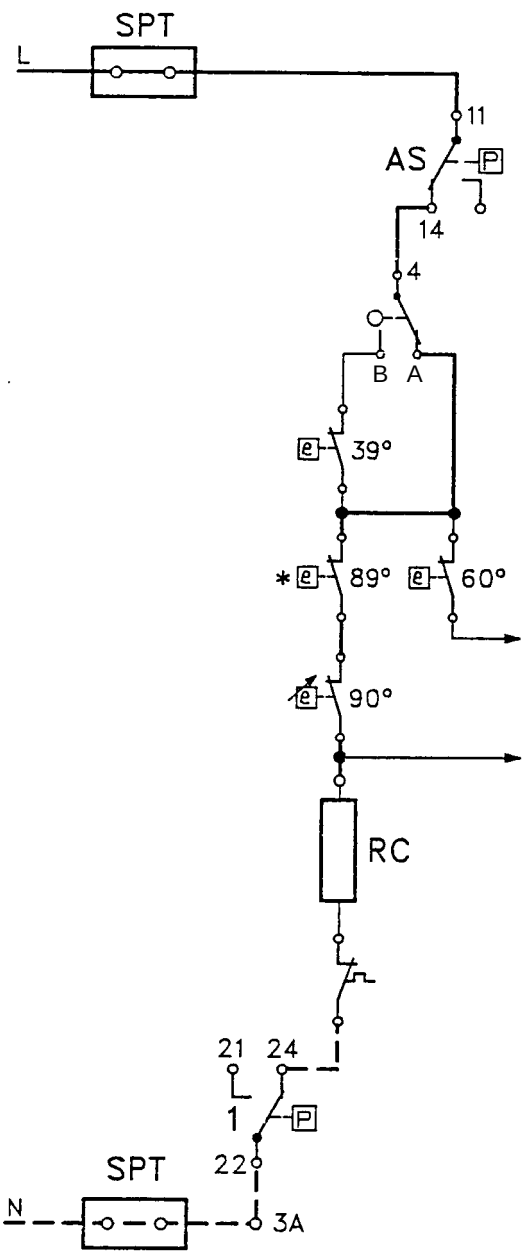
40° C

Steps 1, 2, 16, 38 u. 46



60°/90° C

Step 15

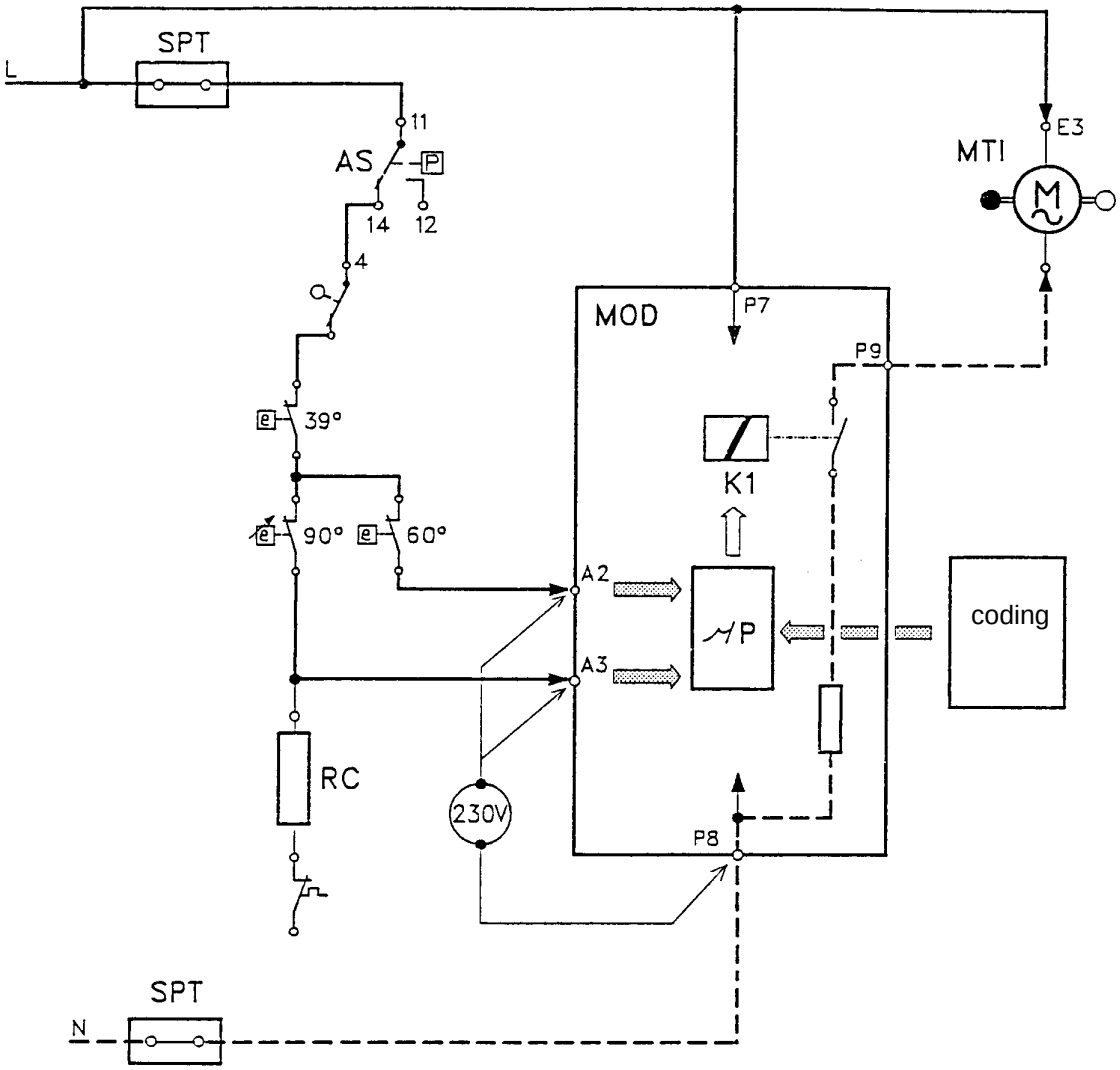


* Excess temperature fuse for machines with a jet system

Heating

2. Thermostop function

- 40° C (steps 1, 2, 38 and 46)



⇒ Input A2 in state “1” (220/230 V between clamps A2 and P8)
⇒ Input A3 in state “1” (220/230 V between clamps A3 and P8)

The change to state “1” of these two inputs activates the thermostop function.

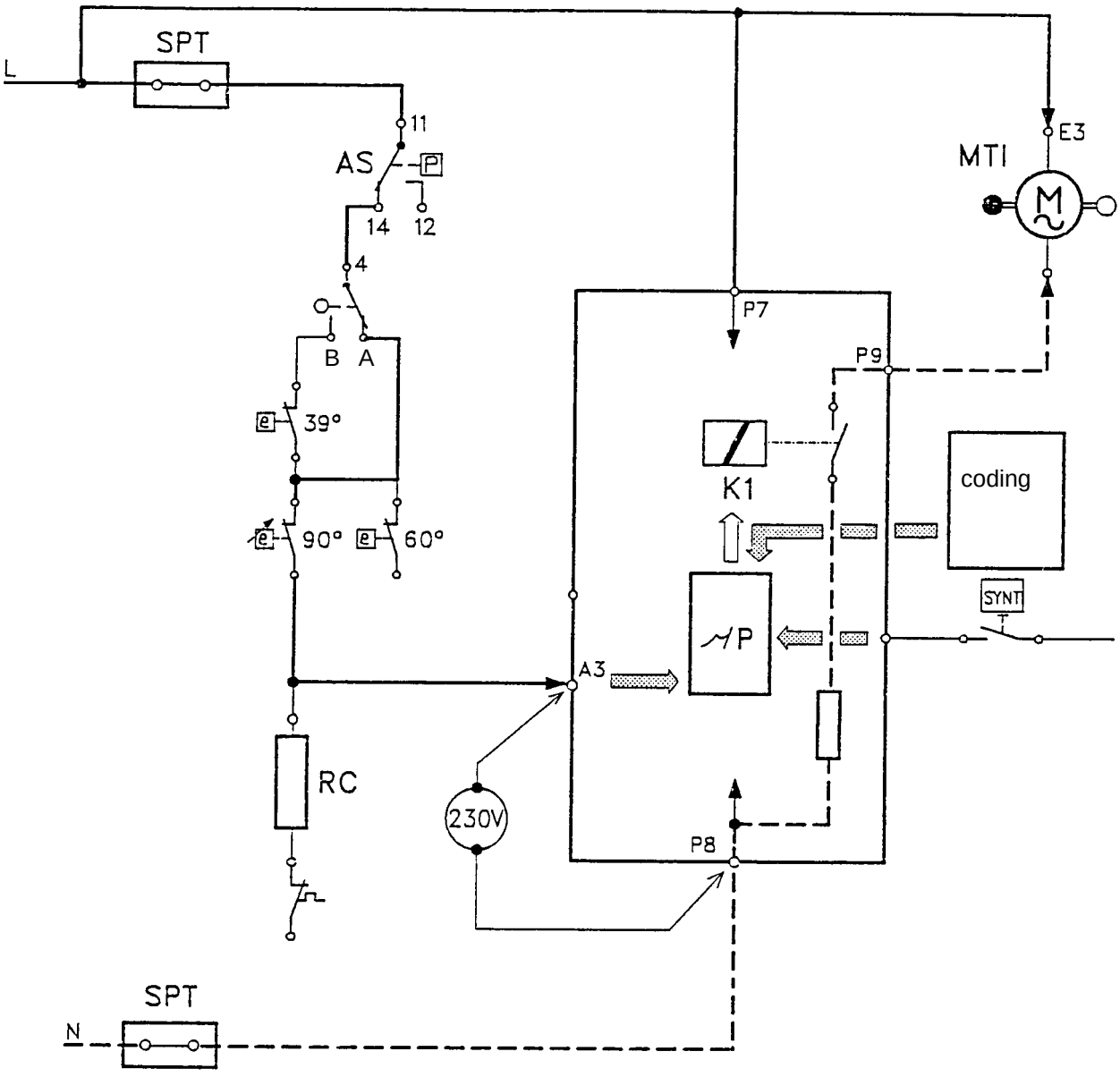
⇒ µP interrupts the selection of MTI (contact of relay K1 open)

As soon as a temperature of 39° or a lower temperature being adjusted by the variable thermostat is achieved, one of both contacts changes to state “0”.

µP nullifies the thermostop function selecting MTI by relay K1.

Heating

- 90° C (step 15)



The **nonpressed** button for synthetics activates the thermostop function only by:

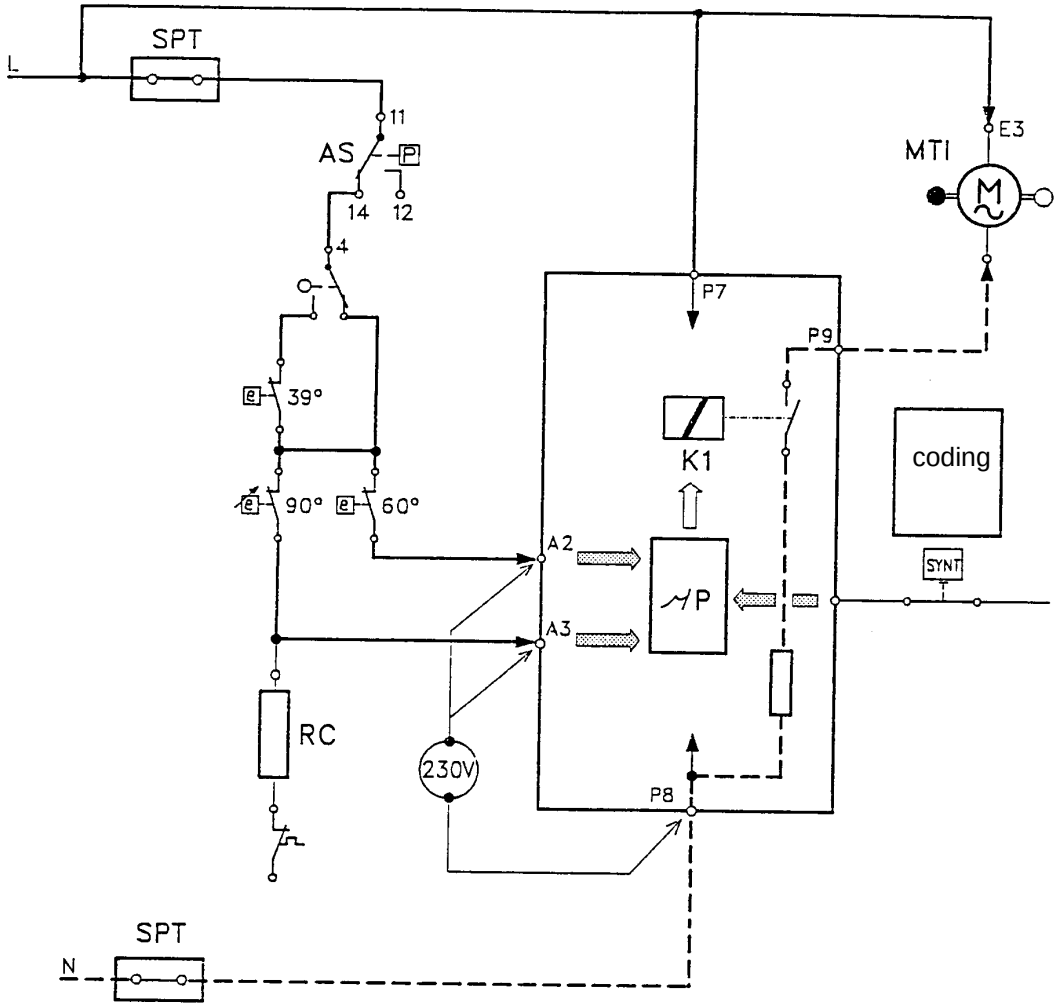
⇒ A3 in state “1” (220/230 V between A3 and P8).

MTI is not selected.

When reaching a temperature of 90°, input A3 changes to state “0”; the thermostop function is nullified and MTI selected by relay K1.

Heating

- 60° C (step 15)



Button “SYNTHETICS” **pressed**.

The thermostop function is activated as with heating 40° C.

⇒ A2 = 1
⇒ A3 = 1

- Safety

To prevent too high temperatures, the electronic system limits the heating time:

⇒ step 1	⇒	maximum time 30'
⇒ step 2	⇒	maximum time 20'
⇒ step 15	⇒	maximum time 60'
⇒ step 16	⇒	maximum time 20'
⇒ step 38	⇒	maximum time 30'
⇒ step 46	⇒	maximum time 30'

Function AS Pressure Switch

Spinning may cause the development of foam by detergent residues.

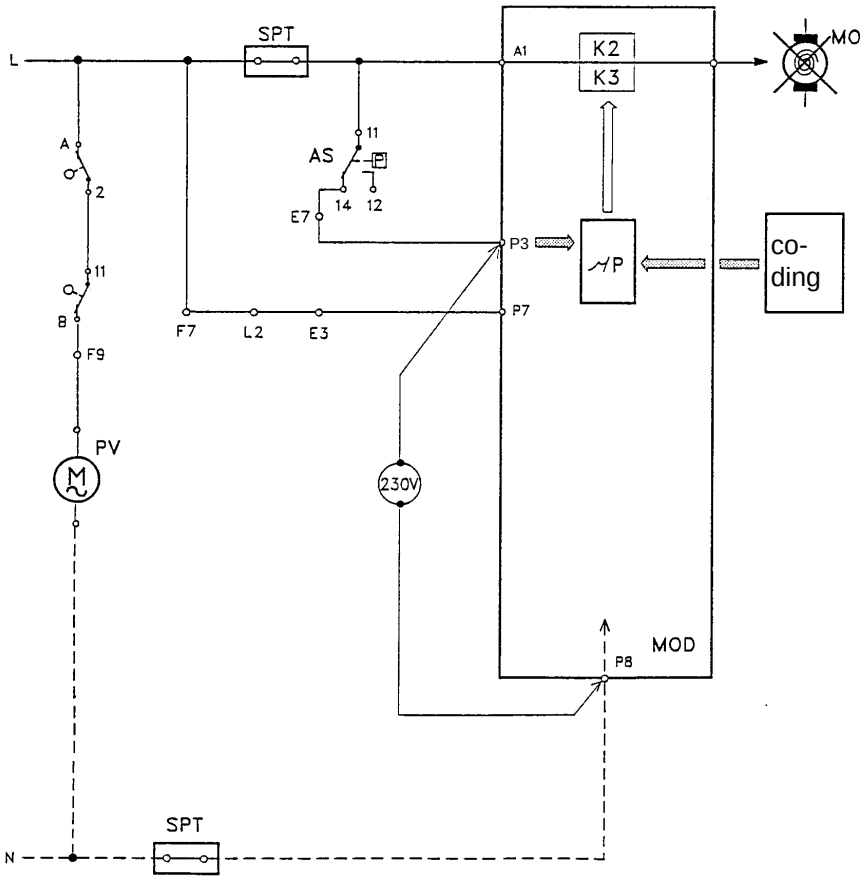
This production of foam effects the connection of the AS pressure switch.

⇒ Closing of the pressure switch contact 11/14,
⇒ input P3 changes to state “1” (230 V between clamps P8 and P3)

The change of contact P3 into state “1” interrupts the current spinning function, but the drain pump remains to be selected to remove the foam. As soon as the foam is obliterated, the AS pressure switch goes back to its empty position.

⇒ input P3 changes to state “0”
⇒ spinning process starts again at that point where it was interrupted
⇒ if there is still some foam existing, the AS function is set off another time.

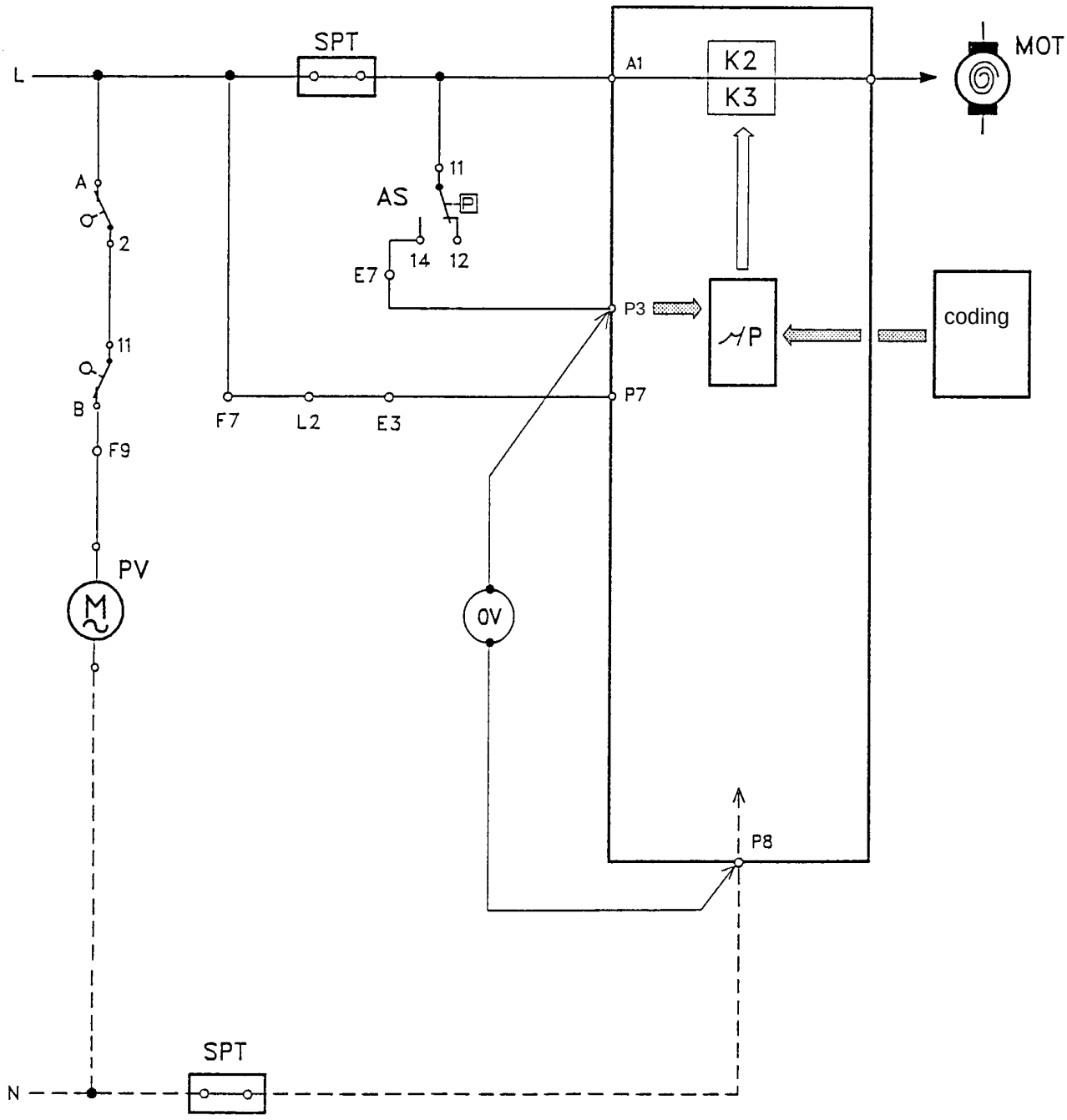
AS-function AS:



Function AS Pressure Switch

To guarantee a highest possible rinsing result with a minimum of water consumption the below described AS function is activated during all spinning steps with “COT-TON”, except the final spinning process.

AS function not set off:



After input P3 in state “0” (0 V between clamps P8 and P3)

⇒ the spinning function runs normally

1. Drum speed:

Drum Revolution			Pause	
speed r.p.m.	working speed			
40 / 55	slow	4"	12"	4"
55	normal	8"	8"	8"
55	dynamic	12"	4"	12"
55	intensive	57"	3"	57"

2. Spinning:

Spinning starts only if the tub is empty:

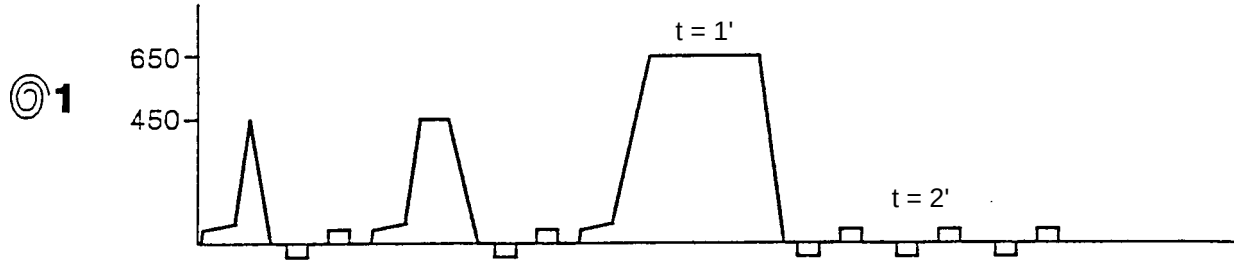
Input P.3 = 0 (AS pressostat off)

If this information does not exist (pump clogged or blocked), the module will supply the timer with power within 3’ in order to pass the spinning cycle.

Spinning Profiles

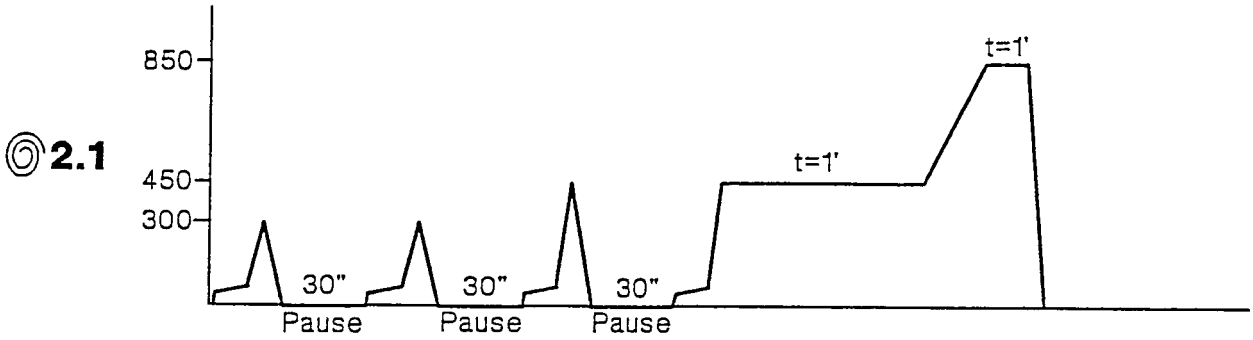
a) **Spinning 1**

- Intermediate spinning between first and main wash with boilproof/coloured washing
- Variomatic function in program “COTTON”



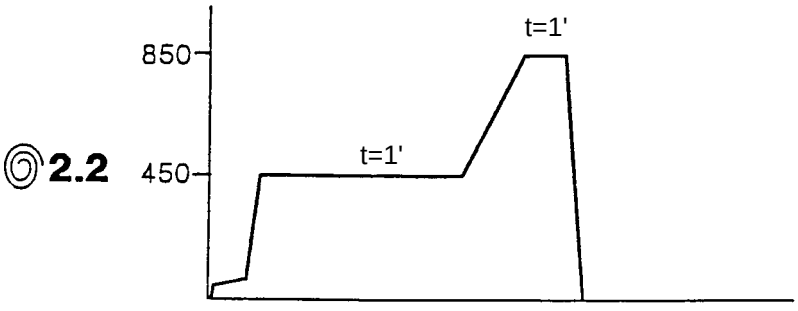
b) Spinning 2.1

- Intermediate spinning at the end of the washing process and first spinning with boilproof/coloured washing
- final spinning with delicate



c) **Spinning 2.2**

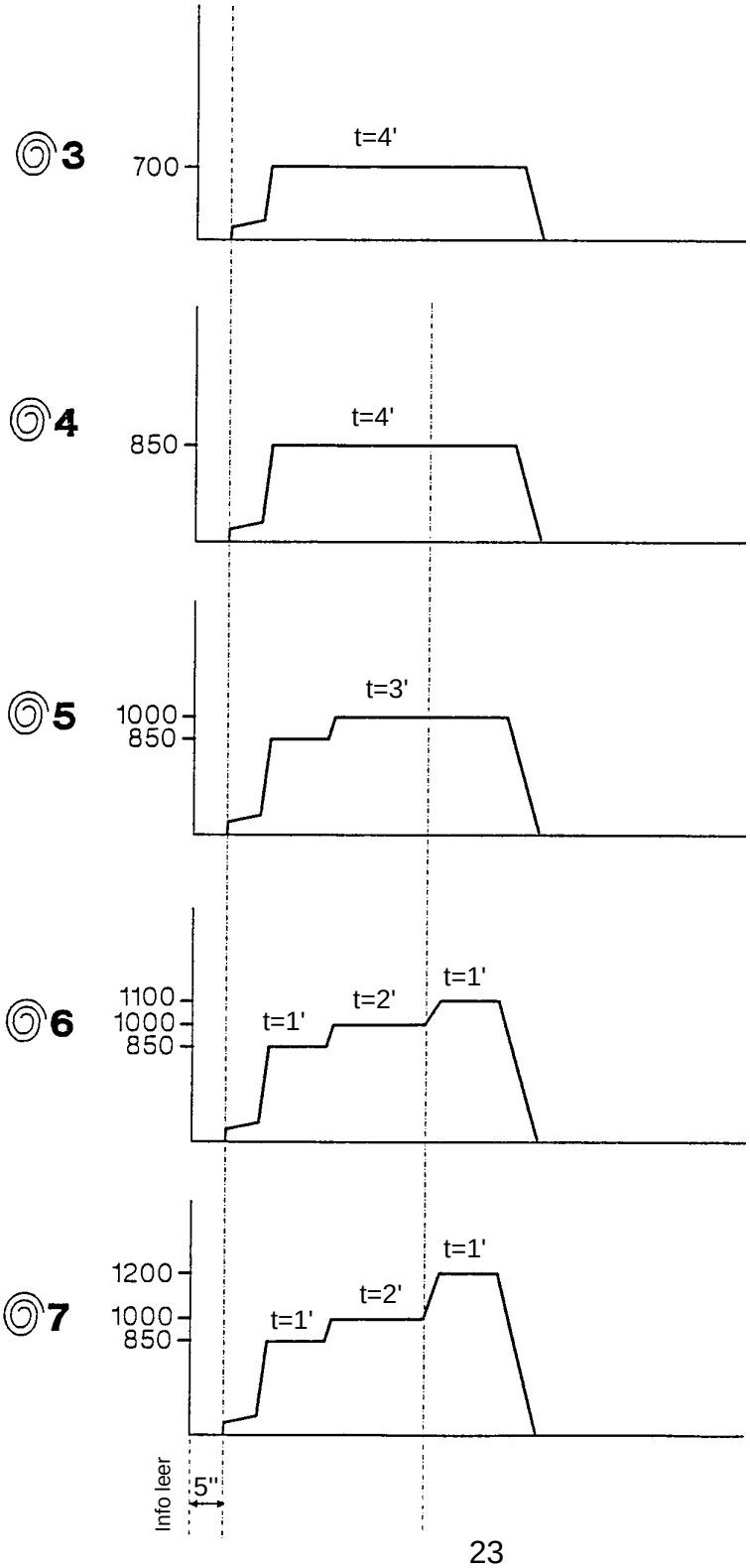
- Second, third, fourth and fifth intermediate spinning with boilproof/coloured washing
- Final spinning for synthetics with boilproof/coloured washing (push button synthetics pressed)



Spinning Profiles

d) Spinning 3, 4, 5, 6 und 7

- Final spinning "COTTON" correspondingg to the product defintion of the machine
- Spinning "3" is only used if the machine is equipped with a push button "SPIN SPEED DESELECTION"

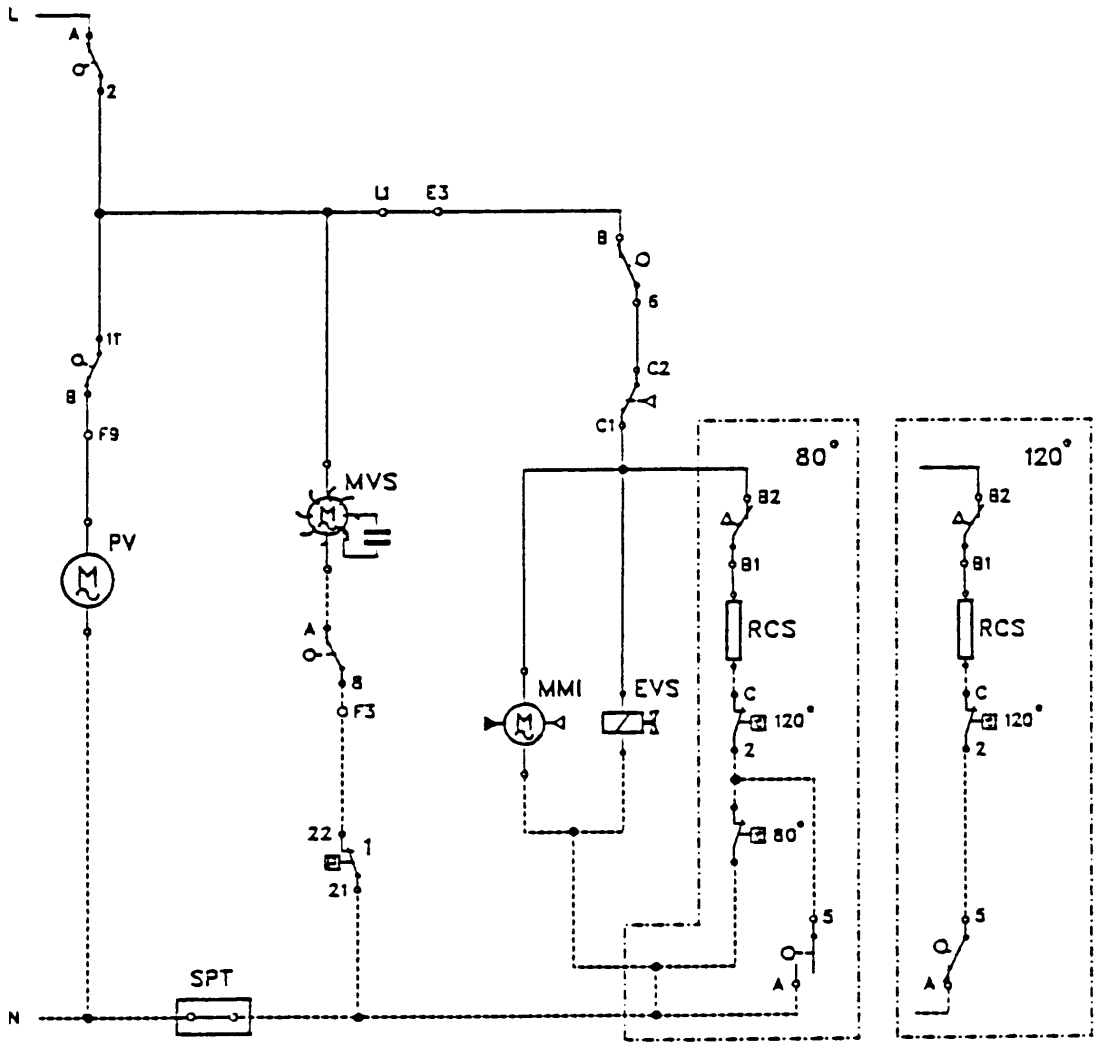


Dryer Function

1. Change of PGS in drying step 35:

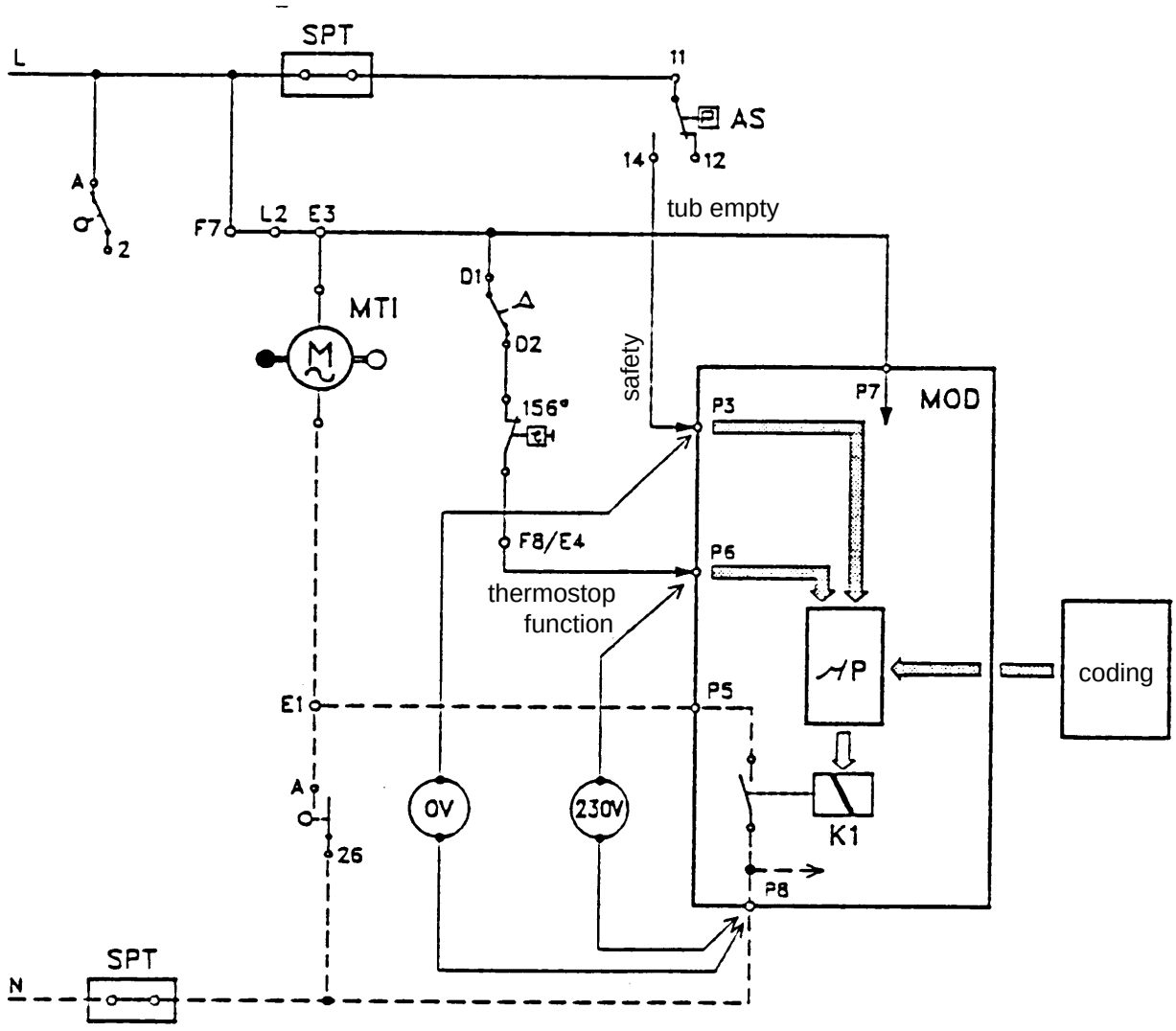
- Selection of dryer function:

  ⇒ temperature control 120°C closed over contact 5-A
  ⇒ temperature control 80°C open over contact 5-A



Dryer Function

- Thermostop function activated:



⇒ Input P6 of the electronic system in state “1” (230 V between P6 and P8)
⇒ µP interrupts supply of MTI

Dryer Function

2. Drain to “0” of dryer time switch

- Opening of contact D1 - D2

- Input P6 changes to state “0”. mP causes the closing of K1 and selects MTI, so that the PGS leaves the drying step.

3. Safeties

a) Malfunction during drain

During the drying step the AS pressure switch changes into its position “FULL”, i.e. closing of contact 11-14, as soon as an anomaly in the drain cycle occurs.

Closing 11/14 =

⇒ input P3 = 1 (230 V between P3 and P8)
⇒ microprocessor excites the coil of K1
⇒ selection of MTI to leave the drying step.

b) Excess Temperature

Opening of the 156°C bimetal thermostat that can be reversed manually:

⇒ holding of thermostop function during the transition from input P6 to state “0”

⇒ selection of MTI by K1 and leaving the drying step

c) Drying time

To prevent any fault that may be caused by a malfunction of the drying time switch, the electronic system confines the drying time to 120’ at maximum.

Unbalance Control System

The unbalance is determined by analyzing the tachometer signal during the spinning run-up step.

⇒ between 55 and 90 /mi

Depending on the unbalance the electronic system controls following processes:

1) Unbalance < 0,5 kg :
⇒ normal spinning

2) 0,5 kg < unbalance < 0,75 kg :
⇒ final spinning is confined to 1000 /min

3) 0,75 kg < unbalance < 1,2 kg :

⇒ The electronic system tries to remove the unbalance up to 3 times. In dependence on the remaining unbalance the final speed is limited to 2 and 3 correspondingly.

⇒ If the unbalance is still between 0,75 kg and 1,2 kg, the final speed is limited to 850 /min.

4) Unbalance > 1,2 kg

⇒ the electronic system tries to remove the unbalance up to 3 times. In dependence on the remaining unbalance the final speed is limited to 1, 2, and 3 correspondingly.

If the unbalance is still above 1,2 kg, the final speed is limited to 650 /min.

Note:

During the removal of the unbalance, the MTI is not selected.