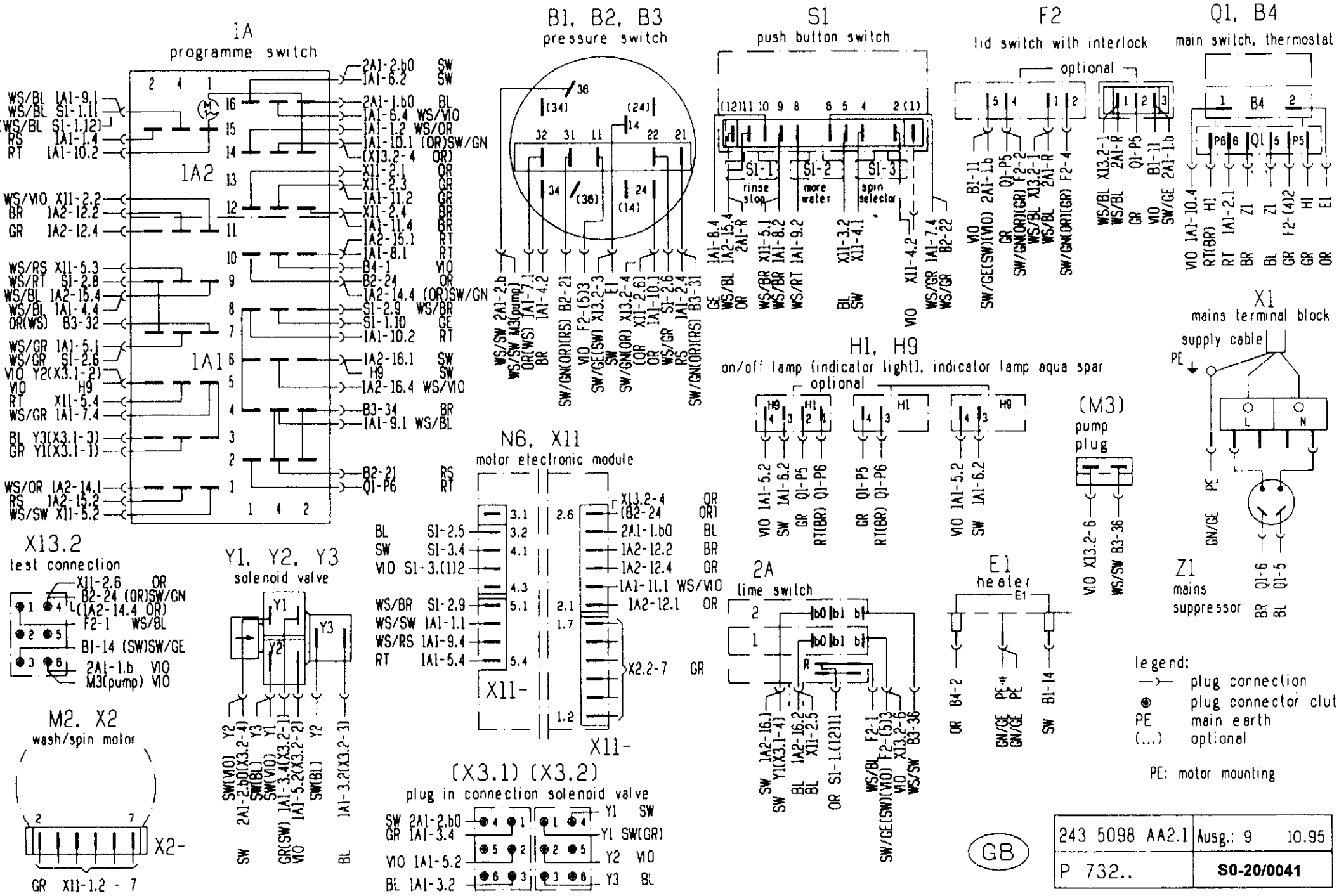
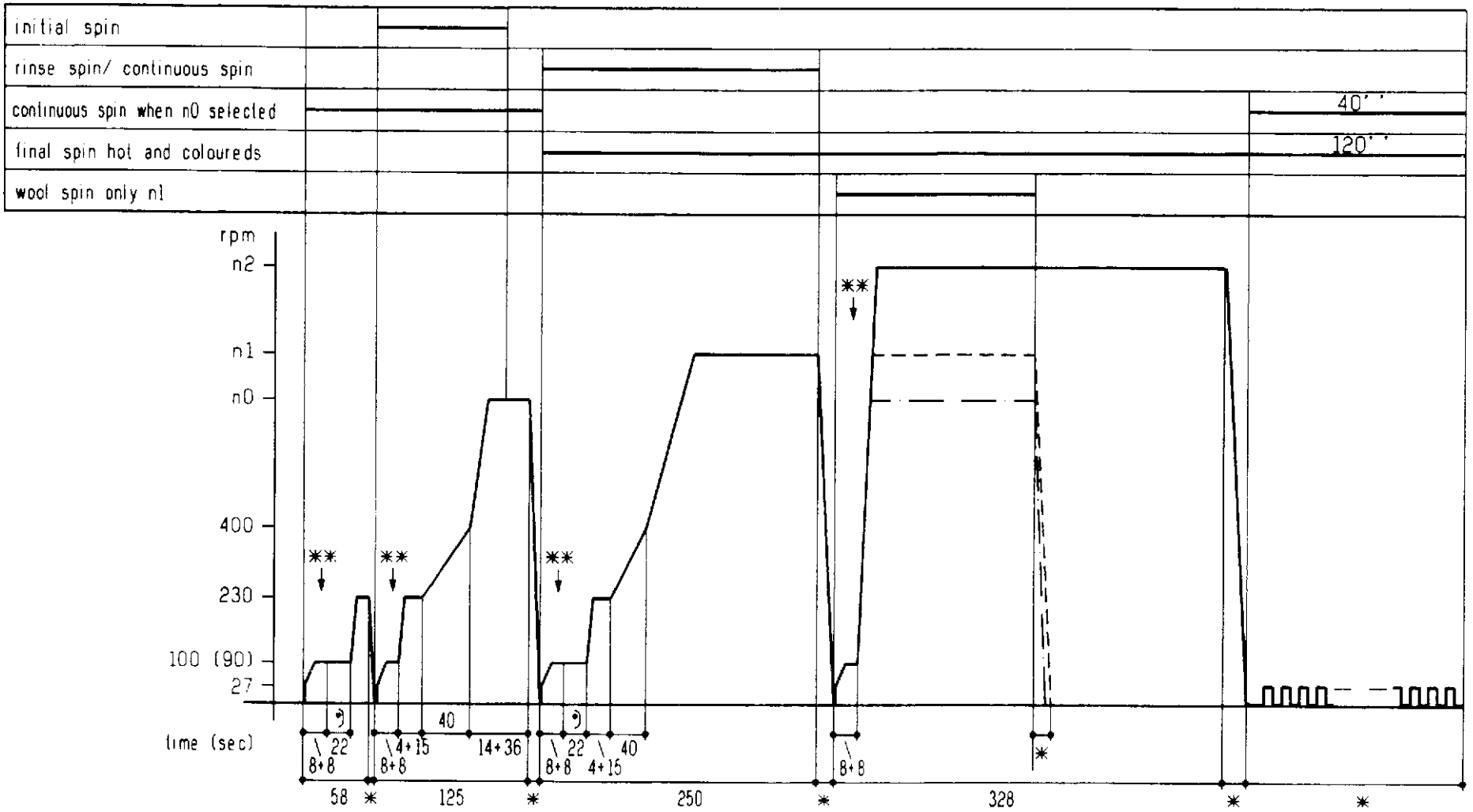

1A
programme switch
1A2
1A1
B1, B2, B3
pressure switch
S1
push button switch
rinse stop
more water
spin selector
F2
lid switch with interlock
optional
Q1, B4
main switch, thermostat
X1
mains terminal block
supply cable
H1, H9
on/off lamp (indicator light), indicator lamp aqua spar
optional
(M3)
pump plug
N6, X11
motor electronic module
X13.2
test connection
Y1, Y2, Y3
solenoid valve
2A
time switch
E1
heater
Z1
mains suppressor
M2, X2
wash/spin motor
(X3.1) (X3.2)
plug in connection solenoid valve
legend:
plug connection
plug connector clut
PE main earth
(...) optional
PE: motor mounting
GB
243 5098 AA2.1
Ausg.: 9 10.95
P 732..
S0-20/0041



type of wash		whites / coloureds			easy care	wool
type of spin		rinse spin	final spin 1.part	final spin 2.part	continuous spin	final spin
type with	push button					
3 spin speed	not in use	n1	n1	n2	n1	n1
	in use	n1	n1	n1	n0	n0
2 spin speed	not in use	n1	n1	n1	n1	n1
	in use	n0	n0	n0	n0	n0
1 spin speed	-----	n0	n0	n0	n0	n0
spin speed selector	n2	n1	n1	n2	n1	n1
	n1	n1	n1	n1	n1	n1
	n0	n0	n0	n0	n0	n0

* dependant on load

100 rpm : frontloader
90 rpm : toploader

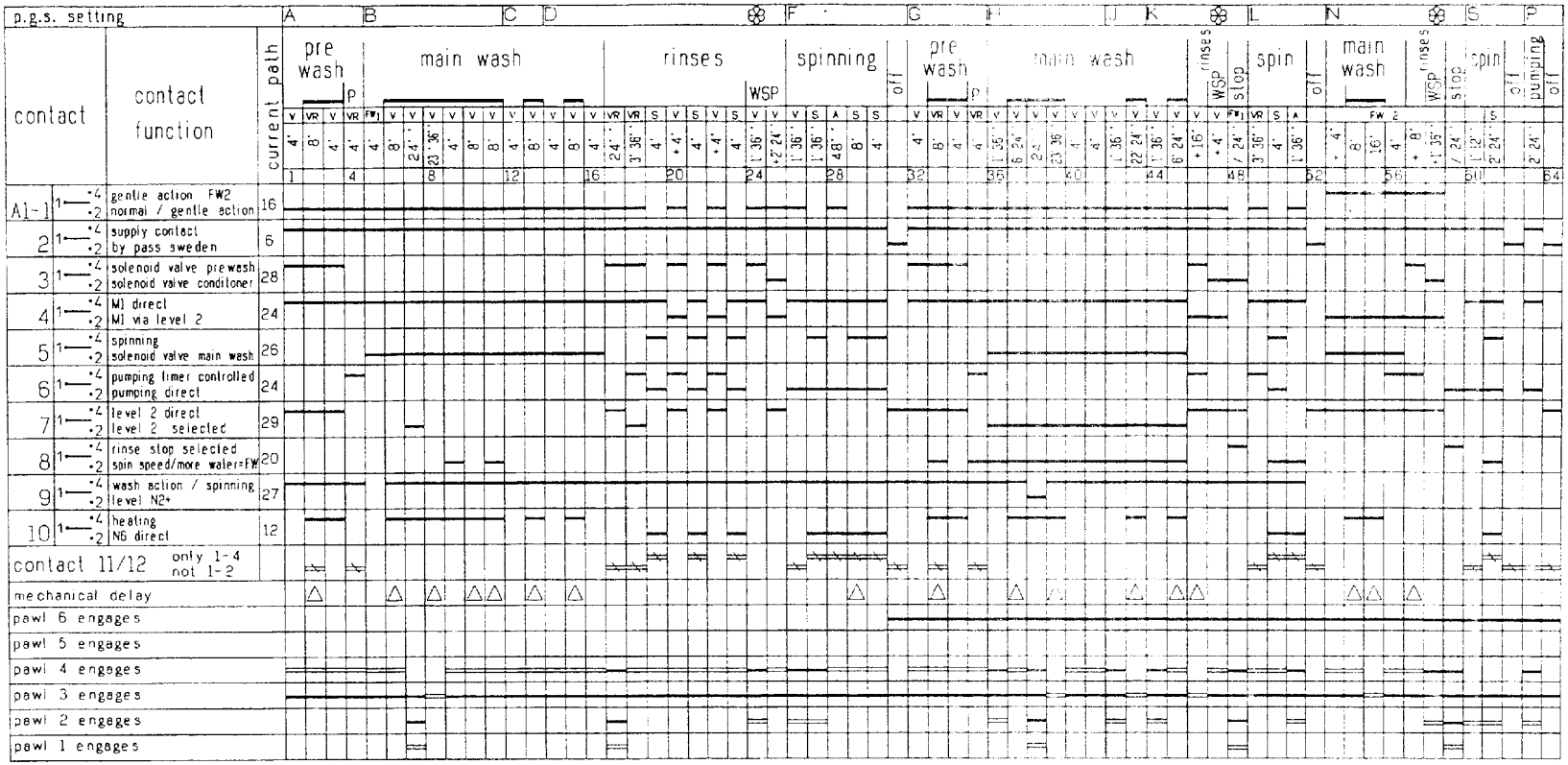
** out of balance measurement: 8 sec at 100 (90) rpm with too great out of balance load programme interrupted and restarts (max. 19x after which no spin)

°) not applicable after 7 attempts to spin

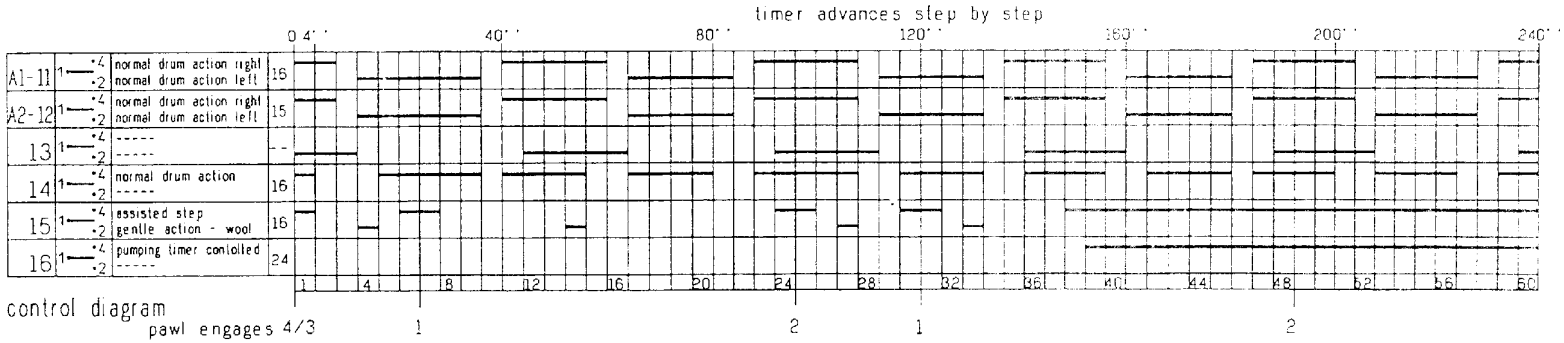
p.g.s.: 2HK 4 458-0N, 460-0N
2HK 4 531-0N, 534-0N
2HK 4 543-0N, 1N 544-0N, 1N

GB

	fig.: 1 02.94
KD-Modul	**20 / 0199**



programme diagram



control diagram

△ mechanically held in these position increases 4' steps

pawl operative with automatic programme progression

with gentle drum action the switch on time is limited to either 3 or 8 seconds

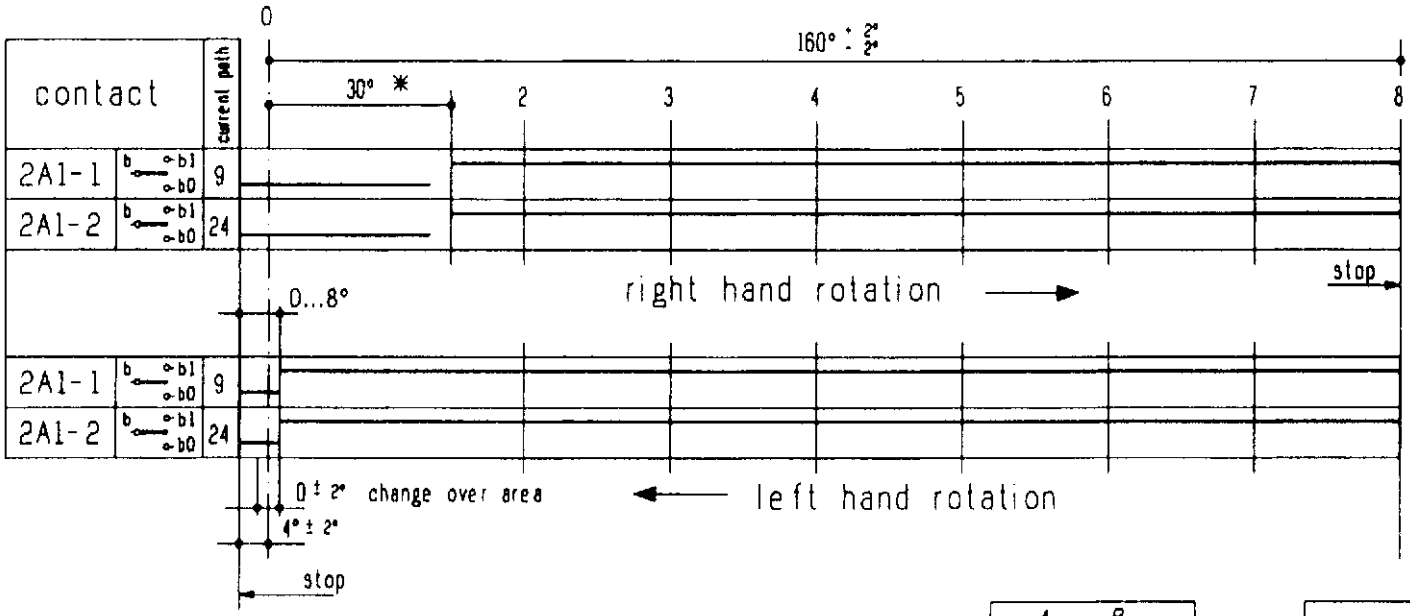
FW 1 gentle drum action-wool (27 rpm) short pauses
FW 2 gentle drum action-wool (27 rpm) long pauses

safety checks must be made with
Q1 contakt closed and timer in position 29, 30
thermostat set at 30° C.
motor: without water pos. 29, 30
heating: with water pos. 6 . . . 11

p.g.s.: 2HK4 531-0N

GB

243 5028 AA9	fig.: 2 04.91
	20/027



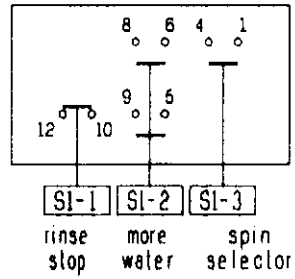
✳ no switching function when rotating right

angle of rotation of the time switch

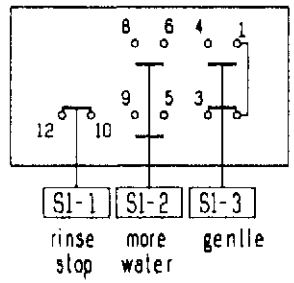
switching - spin speed selector S2

contact	current path	ratch position 1000 900	750	600
1a	18			
2a	19			

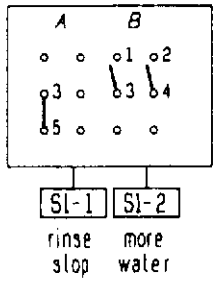
push button switches



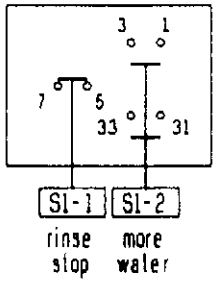
current path 21 18/ 27 18



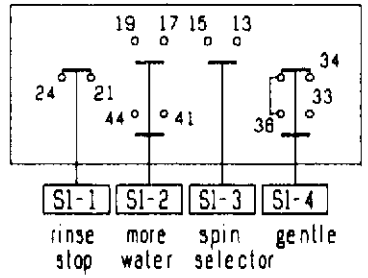
current path 21 18/ 27 16/ 17



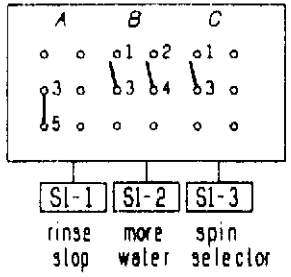
current path 21 18/ 27



current path 21 18/ 27



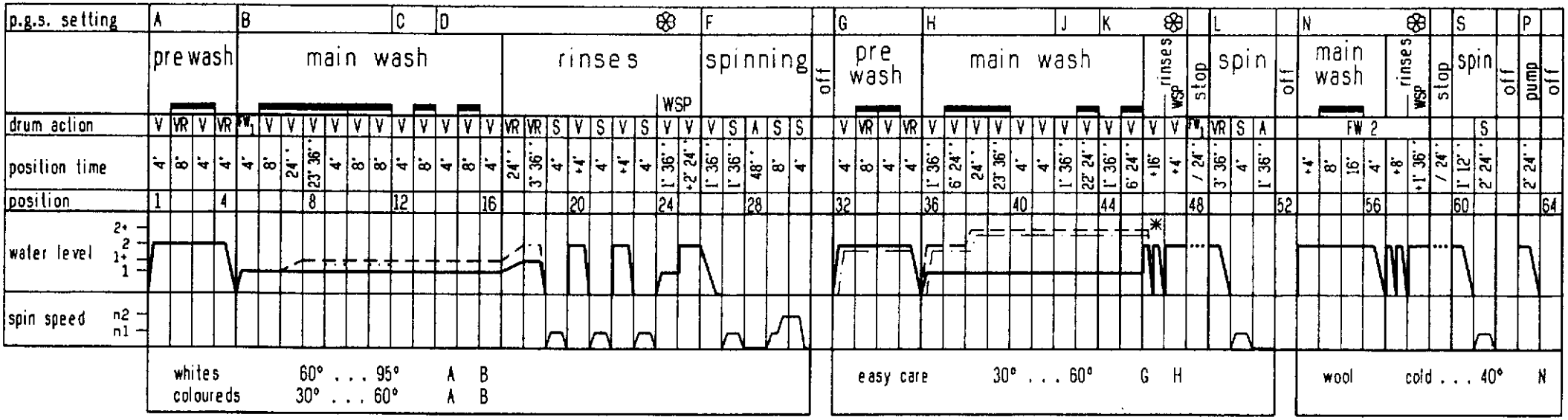
current path 21 18/ 27 18 16/ 17



current path 21 18/ 27 18

GB

243 5028 AA9	fig.: 3 10.95
P 7...	S0-20/0029



legend:

- heating
- normal programme
- programme with higher water level button pressed
- by pass
- WSP conditoning
- V normal drum action (56 rpm)
- VR reduced drum action
- A loosening
- S spinning see page 2-
- ✳ cooling + 3 rinses
- FW 1 gentle drum action - wool (27 rpm) short pauses
- FW 2 gentle drum action - wool (27 rpm) long pauses

with gentle drum action the switch on time is limited to either 3 or 8 seconds

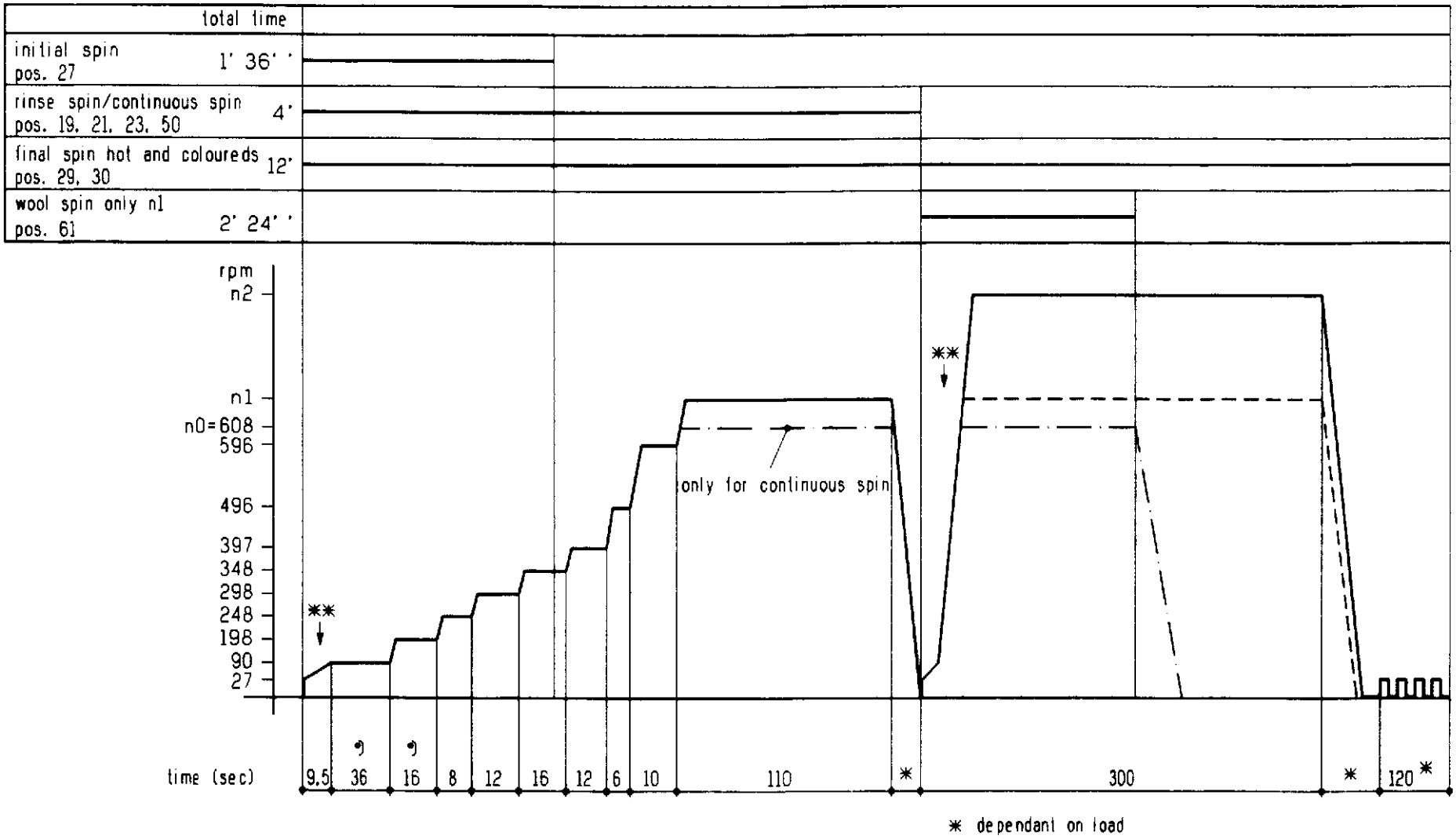
push buttons:

- rinse stop : rinse stop activated
- higher water level: see programme chart - - - -
  gentle drum action
  see position 9, 11 and — · —
- gentle : gentle drum action
- spin selector : final spin speed reduced
  whites / coloureds n2 → n1
  easy care / wool n1 → n0

p.g.s.: 2HK4 531-0N
2HK4 534-0N

GB

243 5038 AA8	fig.: 3	04.91
		20/031



* dependant on load

type of wash		whites / coloureds			easy care	wool
type of spin		rinse spin	final spin 1.part	final spin 2.part	continuous spin	final spin
3 spin speed	not in use	n1	n1	n2	n1	n1
	in use	n1	n1	n1	n0	n0
2 spin speed	not in use	n1	n1	n1	n1	n1
	in use	n0	n0	n0	n0	n0
spin speed selector	n2	n1	n1	n2	n1	n1
	n1	n1	n1	n1	n1	n1
	n0	n0	n0	n0	n0	n0

up to FD 7202

** out of balance measurement at 70...95 rpm with too great out of balance load programme interrupted and restarts (max. 10 x after which no spin)

from FD 7203

** out of balance measurement at 70...95 rpm with too great out of balance load programme interrupted and restarts (max. 16 x after which no spin)

*) not applicable after 11 attempts to spin

GB

p.g.s.: 2HK4 531-ON
2HK4 534-ON

Before carrying out fault diagnosis, safety checks must be carried out !
1. Earth continuity 2. Insulation resistance 3. Earth leakage

Attention ! Low voltage at motor electronic.

Main switch on, timer set to spin position, no water in tub.

normal spin program

yes

Set timer to wash position, water intake to level.

Motor reverses ?

yes

Appliance in order

no

Main voltage at motor electronic = X11–2.5–2.6 = 220V check.
Rated value 28 min $^{-1}$ = X11–2.5–5.2 220V check.
Rated value 56 min^{-1} =X11–2.5–5.2 and X11–2.5–5.3 220V check.

no

Motor turns ?

yes, for approx 1,3 sec then stops

yes, but jerks through to final spin

Replace motor electronic
Triac short circuit

Tacho generator defective or tacho lead broken. With appliance disconnected from supply measure resistance (approx. 20–30 Ω) between X11–1.2–1.3 .
Turn drum by hand. Measure voltage (>1V~) between X11–1.3–1.2.

no

Mains voltage at motor electronic = X11–2.5–2.6 = 220V check.
Rated value in spin position = X11–2.5–5.4 = 220V check.

Main voltage rated values correct ?

yes

Check main voltage and rated values using circuit diagrams.

no

Test motor circuit using circuit diagram. Compare test results with table or values.

Motor OK ?

yes

Replace motor electronic

no

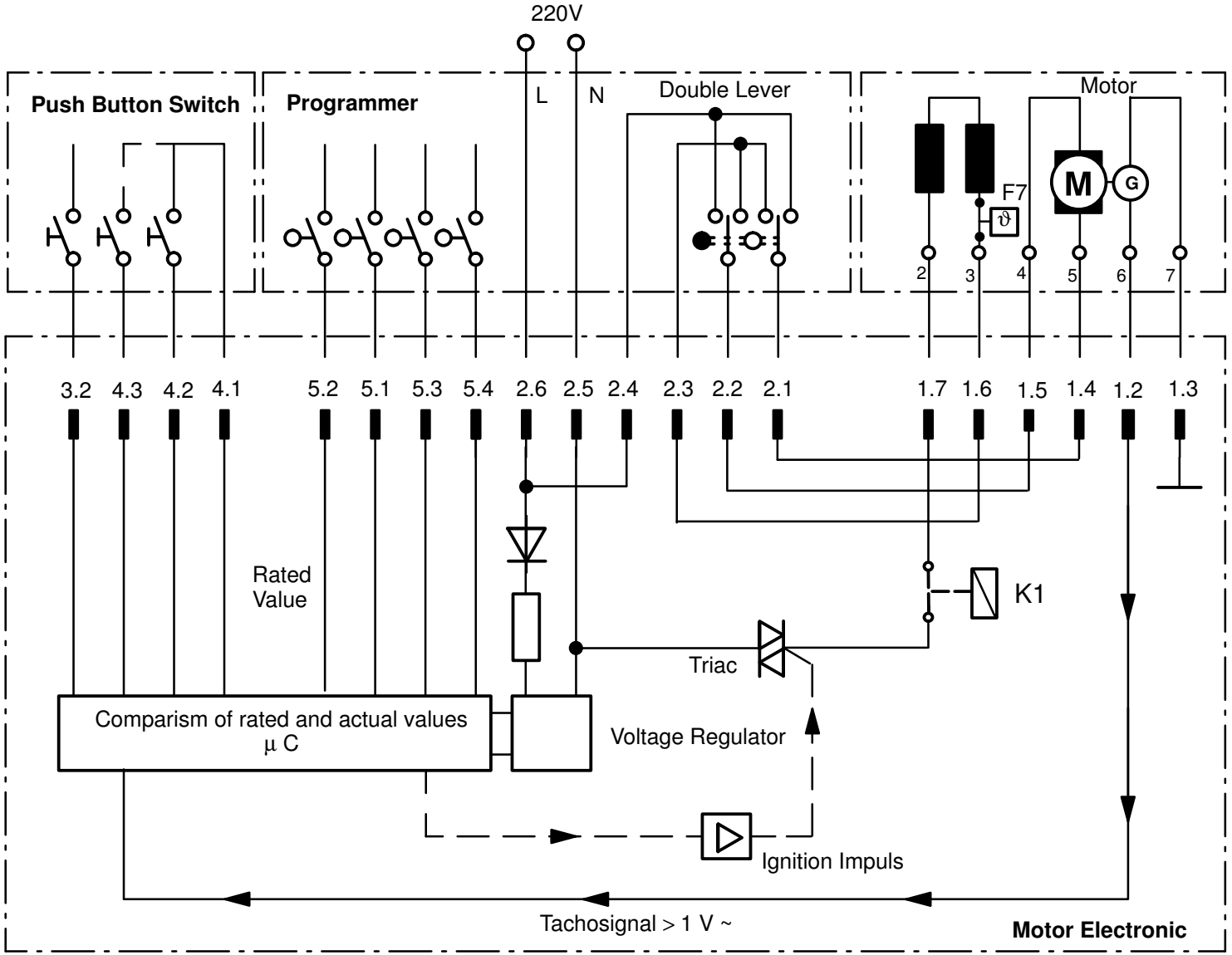
Replace Motor

Test values 1BA67..			
Component	Testpoint	Connection	Resistance
Tachogenerator	X11–1.3–1.2	6 – 7	ca. 20–30 Ω
Field winding	X11–1.6–1.7	3 – 2	ca. 1–3 Ω
Rotor winding	X11–1.4–1.5	5 – 4	ca. 2–16 Ω
Test values MCA 52/64.			
Tachogenerator	X11–1.3–1.2	6 – 7	ca. 69 Ω
Field winding	X11–1.6–1.7	3 – 2	ca. 1–3 Ω
Rotor winding	X11–1.4–1.5	5 – 4	ca. 4–16 Ω
Tachosignal >1V~ Turn drum by hand, measure at X11–1.3–1.2			
Attention ! Low voltage at X11–1.3–1.2 !			

GB

P70..	edition: 0594
Fault finding chart motor electronic	S0–20/0033

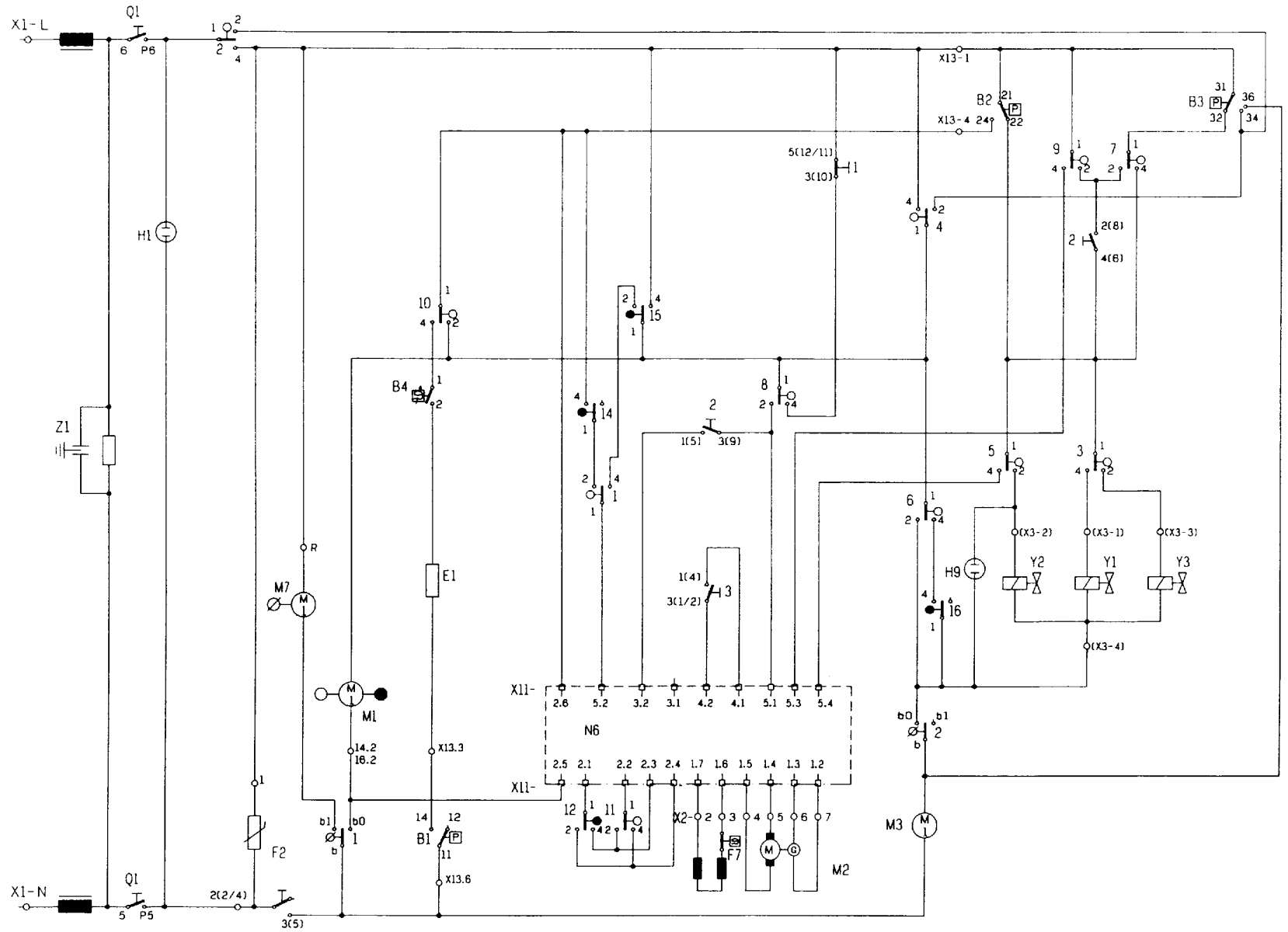
Spin Speeds	Rated Value Input Motor Electronic	
28 rpm	**5.2**	***ED=3”**
56 rpm	**5.2 + 5.3**	
56 rpm	**5.2 + 5.3 + 3.2**	***ED=8”**
Variant 1 Spin Speed		
n0/n1	**5.3 + 5.4**	
n0/n1 (Easy Care)	**5.1 + 5.3 + 5.4**	
n0/n1 (Wool)	**5.1 + 5.4**	
Variant 2 Spin Speeds		
n1	**5.3 + 5.4**	
n0	**5.3 + 5.4 + 4.2**	
n1 (Easy Care)	**5.1 + 5.3 + 5.4**	
n0 (Easy Care)	**5.1 + 5.3 + 5.4 + 4.2**	
n1 (Wool)	**5.1 + 5.4**	
n0 (Wool)	**5.1 + 5.4 + 4.2**	
Variant 3 Spin Speeds		
n2	**5.3 + 5.4**	
n1	**5.3 + 5.4 + 4.2**	
n1 (Easy Care)	**5.1 + 5.3 + 5.4**	
n0 (Easy Care)	**5.1 + 5.3 + 5.4 + 4.2**	
n1 (Wool)	**5.1 + 5.4**	
n0 (Wool)	**5.1 + 5.4 + 4.2**	
Variant Spin Speed Selector		
n2	**5.3 + 5.4**	
n1	**5.3 + 5.4 + 4.3**	
n0	**5.3 + 5.4 + 4.3 + 4.2**	
n1 (Easy Care)	**5.1 + 5.3 + 5.4**	
n0 (Easy Care)	**5.1 + 5.3 + 5.4 + 4.3 + 4.2**	
n1 (Wool)	**5.1 + 5.4**	
n0 (Wool)	**5.1 + 5.4 + 4.3 + 4.2**	



*ED= Switch on time is limited by electronic

GB

	Bloc schematic Motor Electronic
	S0–20/0034



list of components		current path
B1	pressure switch (no water safely cut out)	12
B2	pressure switch level 1	25
B3	pressure switch level 2	31
B4	variable termostat	11
E1	heater	11
F2	lid switch with interlock	7
F7	motor overload	19
H1	on/off lamp (indicator light)	5
H9	indicator lamp aqua spar	25
M1	programme switch motor	9
M2	wash/spin motor	18 - 21
M3	pump motor	23
M7	time switch motor	8
N6	motor electronic module	14 - 21
Q1	main switch on/off thermostat	4
X1	mains terminal block	1
X2	motor connector plug	18 - 21
X11	plug in connection module	14 - 21
X13	test connection	11. 24
Y1	solenoid valve prewash	28
Y2	solenoid valve main wash	26
Y3	solenoid valve conditioner	29
Z1	mains suppressor	3

time switch contact 2A1

programme contact 1A1

control contact 1A2

push button switch contact S1

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33

(...) optional

GB

243 5088 AA3	fig.: 7	10.95
P 732..	S0-20/0039	

Contents:

I. GENERAL TECHNICAL DESCRIPTION

1. Type Survey

E Number	Sales designation	Date of manufacture	Features
WOH 1000GR/01	WOH 1000	7005-7012	Greece, 2 push-buttons: rinse hold, more water, spin speed 600 rpm; otherwise as WOH 2000.
WOH 1000IL/01	WOH 1000	7005-7102	Israel, 2 push-buttons: rinse hold, more water; spin speed 600 rpm; otherwise as WOH 2000.
WOH 1000SI/01	WOH 1000	7005-7010	Finland, Norway, Italy, convertible, 2 push-buttons: rinse hold, more water; spin speed 600 rpm; otherwise as WOH 2000
WOH 1010II/01	WOH 1010	7005-7410	Italy, white, 2 push-buttons: rinse hold; more water; spin speed 700 rpm; otherwise as WOH 2000.
WOH 1010II/06	WOH 1010	7411-	Synchronous evacuating pump; otherwise as WOH 1010II/01.
WOH 1010IL/01	WOH 1010	7103-7404	Israel, white, 2 push-buttons: rinse stop, more water, spin speed 700 rpm; otherwise as WOH 2000
WOH 1010IL/06	WOH 1010	7411-	Synchronous evacuating pump; otherwise as WOH 1010IL/01.
WOH 1010SN/01	WOH 1010	7106-7403	Finland, Norway, convertible; otherwise as WOH 1010IL/01.
WOH 1010SN/06	WOH 1010	7411-	Synchronous evacuating pump; otherwise as WOH 1010/01.

WOH 1020FF/01	TOP 1020	7005-7101	France, mobile, 2 push-buttons; rinse hold, more water, spin speed 700 rpm; otherwise as WOH 1010II/01.
WOH 1020FF/02	TOP 1020	7102-7301	New mobile system; otherwise as .../01.
WOH 1600II/04	Praktika	7309-7410	Italy, 3 push-buttons: rinse hold, more water, selectable speed; spin speed 700/600 rpm; otherwise as WOH 2000
WOH 1600II/06	Praktika	7411-	Synchronous evacuating pump; otherwise as WOH 1600II/04.
WOH 2000/01	WOH 2000	7005-7010	Germany, top loaded appliance for 4.5 kg dry laundry, 2 knob operation and 2 push-buttons: rinse hold, more water, universal motor with motor electronics; spin speed 750 rpm.
WOH 2100GR/01	WOH 2100	7101-7104	Greece, 3 push-buttons: rinse hold, more water, selectable speed, spin speed 800/600 rpm; otherwise as WOH 2000.
WOH 2100GR/03	WOH 2100	7104-7410	New pushbutton switch; otherwise as .../01.
WOH 2100GR/06	WOH 2100	7411-	Synchronous evacuating pump; otherwise as WOH 2100GR/03.
WOH 2100IL/01	WOH 2100	7005-7102	Israel, 3 push-buttons; rinse hold, more water, selectable speed; spin speed 800/600 rpm; otherwise as WOH 2000.
WOH 2110FG/01	WOH 2110	7005-7104	General export, white, 3 push-buttons: rinse hold, more water, selectable speed; spin speed 750/600 rpm; otherwise as WOH 2000.
WOH 2110FG/03	WOH 2110	7104-7409	New pushbutton switch; otherwise as ../01.
WOH 2110FG/06	WOH 2110	7411-	Synchronous evacuating pump; otherwise as WOH 2110FG/03.

WOH 2110II/01	WOH 2110	7004-7104	Italy, white, 3 push-buttons: rinse hold, more water, selectable speed; spin speed 750/600 rpm; otherwise as WOH 2000.
WOH 2110II/03	WOH 2110	7104-7405	New pushbutton switch; otherwise as .../01.
WOH 2110II/06	WOH 2110	7411-	Synchronous evacuating pump; otherwise as WOH 2110IL/03.
WOH 2110IL/03	WOH 2110	7104-7306	Israel, white 3 push-buttons; otherwise as WOH 2110II/03.
WOH 2110IL/06	WOH 2110	7411	Synchronous evacuating pump; otherwise as WOH 2110IL/03.
WOH 2120FF/01	WOH 2120	7005-7101	France, mobile, 3 push-buttons: rinse hold, more water, selectable speed; spin speed 750/600 rpm; otherwise as WOH 2000.
WOH 2120FF/02	TOP 2120	7102-7104	New mobile system; otherwise as .../01.
WOH 2120FF/03	TOP 2120	7104-7109	New pushbutton switch; otherwise as .../02.
WOH 2130FF/01	TOP 2130	7004-7101	France, mobile, white, 3 push-buttons: rinse hold, more water, selectable speed; spin speed 750/600 rpm; otherwise as WOH 2000.
WOH 2130FF/02	TOP 2130	7102-7105	New mobile system; otherwise as .../01.
WOH 2130FF/03	TOP 2130	7104-7410	New pushbutton switch; otherwise as .../02.
WOH 2130FF/06	TOP 2130	7411-	Synchronous evacuating pump; otherwise as WOH 2130FF/03.
WOH 2600II/04	Praktika	7309-7309	Italy, white, 4 push-buttons: rinse hold, more water, selectable speed, gentle action; time presetting, spin speed 800/600 rpm; otherwise as WOH 1600II/04.
WOH 3000/01	WOH 3000	7006-7010	Germany, 2 push-buttons: rinse hold, more water; spin speed 850 rpm; otherwise as WOH 2000.

WOH 3010/01	WOH 3010	7010-7410	Germany, white; otherwise as WOH 3000/01.
WOH 3010/06	WOH 3010	7411-	Synchronous evacuating pump; otherwise as WOH 3010/03.
WOH 3010SI/01	WOH 3010	7101-7410	Finland, Norway, Italy, white, convertible; otherwise as WOH 3010/01.
WOH 3010SI/06	WOH 3010	7411-	Synchronous evacuating pump; otherwise as WOH 3010SI/03.
WOH 3110/01	WOH 3110	7103-7104	Germany, white, 3 push-buttons: rinse hold, more water, selectable speed; spin speed 850/750/600 rpm; otherwise as WOH 2000.
WOH 3110/03	WOH 3110	7104-7408	New pushbutton switch; otherwise as .../01.
WOH 3110/06	WOH 3110	7411-	Synchronous evacuating pump; otherwise as WOH 3110/03.
WOH 3110II/01	WOH 3110	7010-7012	Italy, white; otherwise as WOH 3110/01.
WOH 3110II/03	WOH 3110	7104-7410	New pushbutton switch; otherwise as .../01.
WOH 3110II/06	WOH 3110	7411-	Synchronous evacuating pump; otherwise as WOH 3110II/03.
WOH 3220FF/01	TOP 3220	7009-7012	France, mobile. 3 push-buttons: rinse hold, more water, selectable speed; spin speed 850/750/600 rpm; otherwise as WOH 2000.
WOH 3220FF/02	TOP 3220	7104-7104	New mobile system; otherwise as .../01.
WOH 3220FF/03	TOP 3220	7106-7305	New pushbutton switch; otherwise as .../02.
WOH 3230FF/03	TOP 3230	7312-7403	France, white, mobile. 3 push-buttons: rinse hold, more water, selectable speed; spin speed 850/750/600 rpm; otherwise as WOH 3220FF/03.
WOH 3230FF/06	TOP 3230	7411-	Synchronous evacuating pump; otherwise as WOH 3230FF/03.

WOH 3510/01	WOH 3510	7110-7110	Germany, white, new push-button switch. 3 push-buttons; rinse hold, more water, selectable speed; spin as WOH 2000.
WOH 3510/03	WOH 3510	7111-7408	Appliance as .../01.
WOH 3510/06	WOH 3510	7411-	Synchronous evacuating pump; otherwise as WOH 3510/03.
WOH 4130FF/01	TOP 4130	7003-7101	France, mobile, white, 4 push-buttons: rinse hold, more water, selectable speed, gentle action; spin speed 900/750/600 rpm, otherwise as WOH 2000.
WOH 4130FF/02	TOP 4130	7102-7410	New mobile system; otherwise as .../01.
WOH 4130FF/06	TOP 4130	7411-	Synchronous evacuating pump; otherwise as WOH 4130FF/02.
WOH 4200/01	WOH 4200	7002-7011	Germany, 3 push-buttons: rinse hold, more water, selectable speed; time presetting; spin speed 900/750/600 rpm; otherwise as WOH 2000.
WOH 4210/01	WOH 4210	7010-7104	Germany, white, 3 push-buttons; otherwise as WOH 4200/01.
WOH 4210/03	WOH 4210	7104-7408	New pushbutton switch; otherwise as .../01.
WOH 4210/06	WOH 4210	7411-	Synchronous evacuating pump; otherwise as WOH 4210/03.
WOH 4210FG/01	WOH 4210	7003-7104	General export, white, 3 push-buttons: rinse hold, more water, selectable speed; time presetting; spin speed 900/750/600 rpm; otherwise as WOH 2000.
WOH 4210FG/03	WOH 4210	7104-7306	New pushbutton switch; otherwise as .../01.
WOH 4210FG/06	WOH 4210	7411-	Synchronous evacuating pump; otherwise as WOH 4210FG/03.

WOH 4210II/01	WOH 4210	7004-7104	Italy, white, 3 push-buttons: rinse hold, more water, selectable speed; time presetting; spin speed 900/750/600 rpm; otherwise as WOH 2000.
WOH 4210II/03	WOH 4210	7104-7406	New pushbutton switch; otherwise as .../01.
WOH 4210II/06	WOH 4210	7411-	Synchronous evacuating pump; otherwise as WOH 4210II/03.
WOH 4210SI/01	WOH 4210	7005-7104	Finland, Norway, Italy, convertible, white, 3 push-buttons: rinse stop, more water, selectable speed; time presetting; spin speed 900/750/600 rpm; otherwise as WOH 2000.
WOH 4210SI/03	WOH 4210	7104-7408	New pushbutton switch; otherwise as .../01.
WOH 4210SI/06	WOH 4210	7411-	Synchronous evacuating pump; otherwise as WOH 4210SI/03.
WOH 5210/01	WOH 5210	7004-7406	Germany, white, 4 push-buttons: rinse hold, more water, selectable speed, gentle action, time presetting, spin speed 1000/800/600 rpm; otherwise as WOH 2000.
WOH 5210/06	WOH 5210	7411-	Synchronous evacuating pump; otherwise as WOH 5210/01.
WOH 5210FG/01	WOH 5210	7004-7410	General export, white, 4 push-buttons: rinse hold, more water, selectable speed, gentle action, time presetting, spin speed 1000/800/600 rpm; otherwise as WOH 2000.
WOH 5210FG/06	WOH 5210	7411-	Synchronous evacuating pump; otherwise as WOH 5210FG/01.
WOH 5210II/01	WOH 5210	7004-7306	Italy, white, 4 push-buttons: rinse hold, more water, selectable speed, gentle action; time presetting, spin speed 1000/800/600 rpm; otherwise as WOH 2000.
WOH 5210II/06	WOH 5210	7411-	Synchronous evacuating pump; otherwise as WOH 5210II/01.

WOH 5210SI/01	WOH 5210	7202-7406	Finland, Norway, Italy, convertible, white, 4 push-buttons: rinse hold, more water, selectable speed, gentle action; time presetting; spin speed 900/750/600 rpm; otherwise as WOH 4210SI/01.
WOH 5210SI/03	WOH 5210	7402-7410	Appliance as .../01.
WOH 5210SI/06	WOH 5210	7411-	Synchronous evacuating pump; otherwise as WOH 5210SI/03.
WOH 5220FF/01	TOP 5220	7003-7006	France, mobile, 4 push-buttons: rinse hold, more water, selectable speed, gentle action, time presetting, spin speed 1000/800/600 rpm; otherwise as WOH 2000.
WOH 5230FF/01	TOP 5230	7004-7012	France, mobile, white, 4 push-buttons: rinse hold, more water, selectable speed, gentle action; time presetting, spin speed 1000/800/600 rpm; otherwise as WOH 2000.
WOH 5230FF/02	TOP 5230	7108-7410	New mobile system; otherwise as .../01.
WOH 5230FF/06	TOP 5230	7411-	Synchronous evacuating pump; otherwise as WOH 5230FF/02.
WOH 5530/02	WOH 5530	7312-7410	Germany, mobile, 10/16 A, 4 push-buttons, spin speed 1000/800/600 rpm; otherwise as WOH 2000.
WOH 5530/06	WOH 5530	7411-	Synchronous evacuating pump; otherwise as WOH 5630/02.
WOH 5620/03	WOH 5620	7108-7201	Germany, exclusive design, 3 push-buttons: rinse hold, more water, selectable speed; speed selector, spin speed 1000/800/600 rpm; otherwise as WOH 2000.
WOH 5620/04	Praktika	7305-7406	New design; otherwise as .../03.
WOH 5620/06	Praktika	7411-	Synchronous evacuating pump; otherwise as WOH 5620/04.
WOH 5620FG/03	WOH 5620	7111-7301	General export; otherwise as WOH 5620/03.

WOH 5620FG/04	Praktika	7305-7410	New design; otherwise as .../03.
WOH 5620FG/06	Praktika	7411-	Synchronous evacuating pump; otherwise as WOH 5620FG/04.
WOH 5630/04	Praktika	7404-7405	Mobile; otherwise as WOH 5620/04.
WOH 5630/06	Praktika	7411-	Synchronous evacuating pump; otherwise as WOH 5630/04.
WOH 5710/01	WOH 5710	7101-7407	Germany, white, 4 push-buttons; rinse hold, more water, selectable speed, gentle action; spin speed 1000/800/600 rpm; aqua stop.
WOH 5710FG/01	WOH 5710	7101	General export; otherwise as WOH 5710/01.
WOH 6210/01	WOH 6210	7302-7410	Germany, white, 4 push-buttons; rinse hold, more water, selectable speed, gentle action, time presetting, spin speed 1100/800/600 rpm; otherwise as WOH 5210/01.
WOH 6210/06	WOH 6210	7411-	Synchronous evacuating pump; otherwise as WOH 6210/01.
WOH 6210FG/01	WOH 6210	7304-7304	General export; otherwise as WOH 6210/01.
WOH 6210FG/06	WOH 6210	7411-	Synchronous evacuating pump; otherwise as WOH 6210FG/01.
WOH 6210SI/01	WOH 6210	7303-7404	Finland, Norway, Italy; otherwise as WOH 6210FG/01.
WOH 6210SI/06	WOH 6210	7411-	Synchronous evacuating pump; otherwise as 6210SI/01.
WOH 6230FF/02	TOP 6230	7305-7406	France, white, mobile, 4 push-buttons, rinse hold, more water, selectable speed, gentle action, time presetting, spin speed 1100/800/600 rpm; otherwise as WOH 5210/01.
WOH 6230FF/06	TOP 6230	7411-	Synchronous evacuating pump; otherwise as WOH 6230FF/02.

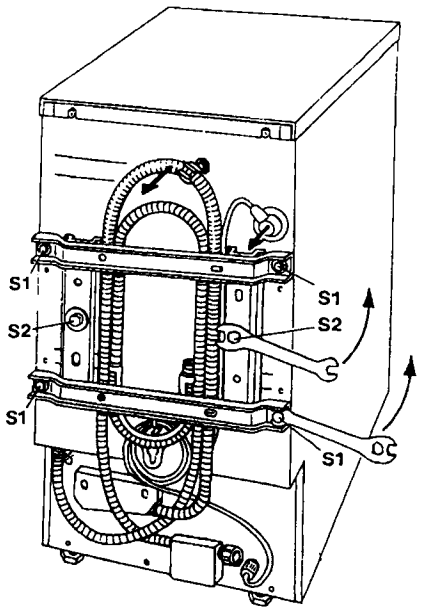
WOH 6710SI/01	WOH 6710	7308-7406	Finland, Norway, Italy, white, with aqua-stop, 4 push-buttons; rinse hold, more water, selectable speed, gentle action, time presetting, spin speed 1100/800/600 rpm; otherwise as WOH 5210/01.
WOV 4800/02	WOV 4800	7101-7104	Germany, trade design, mobile, 3 push-buttons: rinse hold, more water, selectable speed, time presetting, spin speed 900/800/600 rpm; otherwise as WOH 2000.
WOV 4800/03	WOV 4800	7104-7410	New pushbutton switch; otherwise as .../02.
WOV 4800/06	WOV 4800	7411-	Synchronous evacuating pump; otherwise as WOV 4800/03.
WOV 4900/03	BOSCH EXCLUSIVE	7203-7407	Germany, trade design, mobile, 3 push-buttons: rinse hold, more water, selectable speed; time presetting, spin speed 900/800/600 rpm; aqua stop, otherwise as WOV 4800/03.
WOV 4900/05	BOSCH EXCLUSIVE	7409-	Germany, convertible 16/10 A; otherwise as .../03.
WOV 5800/01	WOV 5800	7003-7012	Germany, trade design, mobile, 4 push-buttons: rinse hold, more water, selectable speed, gentle action, time presetting, spin speed 1000/800/600 rpm; otherwise as WOH 2000
WOV 5800/02	WOV 5800	7102-7409	New mobile system; otherwise as .../01.
WOV 5800/06	BOSCH EXCLUSIVE	7411-	Synchronous evacuating pump; otherwise as WOV 5800/02.
WOV 5800FG/02	BOSCH EXCLUSIVE	7205-7410	General export: otherwise as WOV 5800/02.
WOV 5800FG/06	BOSCH EXCLUSIVE	7411-	Synchronous evacuating pump; otherwise as WOV 5800FG/02.
WOV 6900/02	BOSCH EXCLUSIVE	7303-7407	Germany, trade design, mobile and aqua stop, 4 push-buttons: rinse hold, more water, selectable speed, gentle action; time presetting, spin speed 1100/800/600 rpm; otherwise as WOH 6800/02.

2. Setting-up and connection

2.1
Remove transportation lock.
Completely unscrew bolts S1.

Unscrew bolts S2 to such a degree that they hang loose in the transportation lock.

Remove transportation lock and close both openings in the back cover by pressing in supplied plastic caps.



2.2 Connection
Cold water supply hose 3/8" compressive resistance 60 bar, length 1.5 m. Water pressure at least 1 bar. Throughput 8 l/min. output hose 1.3 m long, 3/4".

Attachment height	min. 0.6 m
of outlet hose	max. 1.1 m

3. Operation

A wash program is set with the program selector (right-hand rotary knob) and the temperature selector which is combined with the main switch.
There are pushbuttons and multifunction selector switches available, depending on the appliance:

<u>Pushbuttons</u>

Rinse hold	-	Rinse hold for non-iron and woollens
More water	-	Increases the level of water
Speed	-	Changing the spin speed
Gentle action	-	Reduction of mechanical washing action

Multifunction selector

Time presetting	-	Time presetting up to 8 hours
Speed	-	Changing the spin speed

II. TECHNICAL SPECIFICATIONS

1. Dimensions, Weight and General Technical Data

Height	800 mm
Depth	600 mm
Width	450 mm
Weight	approx. 76 kg
Voltage	230 V AC
Connected load/fuse prot ection	
D/FF/IL/GR/FG	2800 W / 16 A
II/CH	2200 W / 10 A
SI	1900 W + 600 W 10/16 A
Drum capacity	42 l
Speed (wash)	28 - 56 rpm
Speed (spin)	600 - 1000 (1100) rpm
Direction of rotation during spin	Counterclockwise (when facing drive unit)

2. Consumption Data

Program		Position	Load kg	Water l	Energy kWh	Time min
Whites	95 °C	B	4.5	78	1.9	125
Colours	60 °C	B	4.5	78	1.3	125
Wash'n'wear	60 °C	H	1.5	64	0.6	100
Wool	30 °C	N	1	60	0.3	45

The specified values should only be considered as reference values since fluctuations can occur due to different laundry quality, water temperature, load volume, voltage etc.

3. Technical Data of Main Components

3.1 Control Units

3.1.1

Control	E3P
Type	2HK4 531-0N
Voltage	220 - 240 V AC, 50 Hz
Drive	Synchronous motor with gearbox
Motor winding resistance	7.9 kOhm ± 10 %
Number of steps	64
Step rate	4 min
Contacts	11 program switch contacts 5 time contacts

3.1.2

Control	E3P aqua stop
Type	2HK4 534-0N
Voltage	220 - 240 V AC, 50 Hz
Drive	Synchronous motor with gear unit
Motor winding resistance	7.9 kOhm ± 10 %
Number of steps	64
Step rate	4 min
Contacts	13 program switch contacts 5 time contacts

3.2 Switches

3.2.1 Pushbutton switch

Type	9.00 190.019
Push-buttons	2
Contacts	Breaker, maker/breaker
Load capacity	(1) A, 250 V AC

3.2.2 Pushbutton switch

Type	3-DF/05
Push-buttons	3
Contacts	Breaker, maker/maker, maker
Load capacity	(1) A, 250 V AC

3.2.3 Pushbutton switch

Type	3-DF/07
Push-buttons	3
Contacts	Breaker, maker/maker, change-over
Load capacity	(1) A, 250 V AC

3.2.4 Pushbutton switch

Type	4-DF/09
Push-buttons	4
Contacts	Breaker, maker/maker, maker, change-over
Load capacity	(1) A, 250 V AC

3.3 Thermostat with Main Switch

Control range	35 °C ± 45 °C -
(continuously variable with latch	
position at 60 °C)	91 °C ± 25 °C
Contacts (thermostat)	1 changeover switch
Load capacity	13 A / 380 V
Contacts (main switch)	2 make contacts
Load capacity	13 A / 380 V

3.4 Pressostat

Type	742
Switching points	
Safety volume	450/220 ± 50 Pa
Level I	670/335 ± 50 Pa
Level II	1375/775 ± 50 Pa
Overflow level	2940 ± 290 Pa

Water level in drum (without laundry approx.)

Level I	55 mm
Level II	130 mm
Level I	7.5 l
Level II	18.0 l
Contacts	3 changeover switches
Load capacity	16 (4) A 250 V AC

3.5 Solenoid Valves

3.5.1 Triple

Type		3090
Voltage		220/240 V AC, 50/60 Hz
Current consumption		0.05 A + 10 %
Winding resistance		3 kOhm + 10 %
Flow rate	Valve 1	10 l ± l/min
at a flow pressure	Valve 2	10 l ± l/min
of 1 - 6 bar	Valve 3	10 l ± l/min
Valve operating range		0.3 - 10 bar

3.5.2 Triple, aqua stop

Type		3090
Voltage		220/240 V AC, 50/60 Hz
Current consumption		0.05 A ± 10 %
Winding resistance		3 kOhm ± 10 %
Flow rate	Valve 1	>30 l/min
at a flow pressure	Valve 2	>30 l/min
of 1 - 6 bar	Valve 3	>30 l/min

3.5.3 Aqua stop valve

Type	329.6
Voltage	220/240 V AC, 50/60 Hz
Current consumption	0.05 A ± 10 %
Winding resistance	4 kOhm ± 10 %
Flow rate	10 l ± 1 l/min
at a flow pressure of	1 - 6 bar

3.6 Heater

3.6.1

Type	99
Output/voltage	1900 W / 230 V AC
Cold resistance (20 °C)	25.7 Ohm
Identification colour	red / grey-white

3.6.2

Type	100
Output/voltage	1900 W / 600 W / 230 V AC
Cold resistance (20 °C)	25.7 Ohm / 81.3 Ohm
Identification colour	red / red

3.6.3

Type	98
Output/voltage	2500 W / 230 V AC
Cold resistance (20 °C)	19.5 Ohm
Identification colour	red / yellow

3.7 Lock

Type	16115.0.602
Switching capacity	16 (5) A; 250 V AC (closing)
Locking time	< 12 s (RT 20 - 25 °C)
Unlocking time	= 35 + 35 S, after 1 min excitation

3.8 Indicator Lamp

Type	Glow lamp
Rated voltage	230 V AC
Power consumption	0.2 W

3.9 Interference Suppression Capacitor

Rated voltage	250 V AC
Load capacity	15 A HPF
Combination	0.24 µF X + 2 x 0.027 µF V + 2 x 300 µH + 1 MOhm

3.10 Time switch

Type	SN 1960
Rated voltage	230 V, 50 Hz
Load capacity	16 (6) A / 250 AC
	1 mA / 220 V AC
Switches	2 changeover switches
Winding resistance	7.5 kOhm

3.11 Speed selector

Type	2-CH/147
Design	3 lock positions
Load	16 (4) A; 250 V AC

3.12 Motor electronics

Rated voltage	220/230 V AC, 50 Hz
3.12.1	
Type	544 141
Speed	600 rpm
Code marking	Red
3.12.2	
Type	544 142
Speed	600/750 rpm
Code marking	Grey
3.12.3	
Type	544 143
Speed	600/750/900 rpm
Code marking	Yellow
3.12.4	
Type	544 144
Speed	600/750/1000 rpm
Code marking	Blue
3.12.5	
Type	544 227
Speed	600/750/1100 rpm
Code marking	Brown
3.12.6	
Type - KD module	544 188
Speed	600 - 1100 rpm
Code marking	Blue

3.13 Drive motor

Universal motor - 900 rpm	
Type designation	1 BA 6750-0PA
Rated voltage	220/230 V AC, 50 Hz
Wash	56 (rpm) 110 W; 1.9 A
Spin	600 (rpm) 300 W; 1.9 A } ± 10 %
	750 (rpm) 325 W; 2.0 A
	900 (rpm) 390 W; 2.1 A
3.13.2	
Universal motor - 1000 rpm	
Type designation	1 BA 6755-0PA
Rated voltage	220/230 V AC, 50 Hz
Wash	56 (rpm) 105 W; 1.9 A
Spin	600 rpm 300 W; 1.9 A
	750 (rpm) 325 W; 2.0 A } ± 10 %
	900 (rpm) 390 W; 2.1 A
	1000 (rpm) 425 W; 2.1 A

Power consumption measured at no-load operation, whites program and more-water button.

Winding resistance at approx. 20 °C

Connection	2 - 3 (field winding)	approx. 1 - 3 Ohm
	4 - 5 (armature)	approx. 2 - 16 Ohm
	6 - 7 (tachogenerator)	16 - 30 Ohm

3.13.3
Universal motor - 1100 rpm

Type designation	MCA 52/64.148 BC1
Rated voltage	220/230 V AC, 50 Hz
Wash	56 (rpm) 110 W; 1.9 A
Spin	750 (rpm) 325 W; 2.1 A } ± 10 %
	900 (rpm) 390 W; 2.2 A
	1000 (rpm) 425 W; 2.2 A

Power consumption measured respectively with no laundry, whites and level I.

Winding resistance at approx. 20 °C

Connection	2 - 3 (field winding)	approx. 1 Ohm
	4 - 5 (armature)	approx. 4 - 16 Ohm
	6 - 7 (tachogenerator)	69 Ohm

3.14 Evacuating Pump

Type designation	2 AL 2612 4 BM
Rated voltage	220/230 V AC, 50 Hz
Power consumption	60 W
Winding resistance (at approx. 20 °C)	41.5 Ohm ± 10 %
Delivery capacity	at 1 m delivery head
	approx. 15 to 20 l/min

3.14.1 Evacuating Pump, Asynchronous with Thermal Cutout

Type designation	2 AL 1502-4 BD
Rated voltage	220/230 V AC, 50 Hz
Power consumption	25 W
Winding resistance (at approx. 20 °C)	180 Ohm ± 10 %
Delivery capacity	at 1 m delivery head
	approx. 15 to 20 l/min

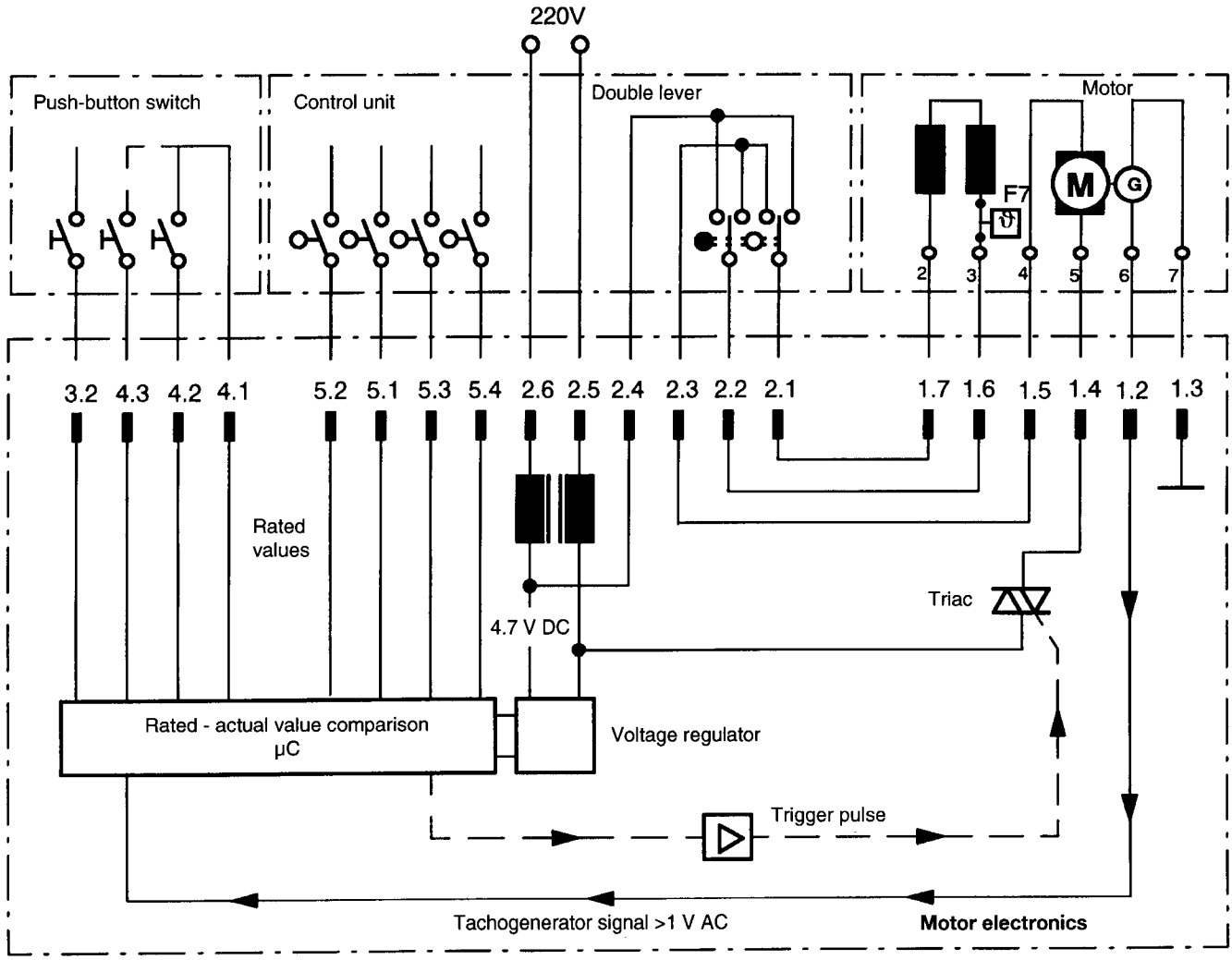
III. Functional Description

Genera information and mode of operation of the control unit is to be found in the „General information on washing and drying appliances“ microplan film 2/1.1.

Function of the motor electronics
The complete motor electronics consisting of one board is positioned in a plastic housing on the base plate of the appliance.

On the board of the motor electronics there are different components such as interference suppression filter, motor triac and microprocessor.

A block diagram is for illustrating the coherence between control unit, motor electronics and motor.

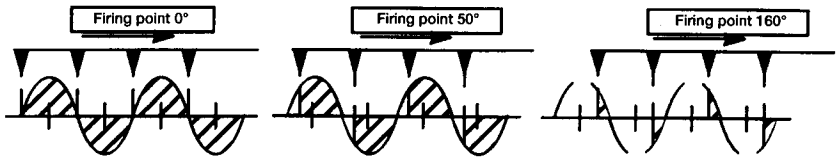


Control and Activation of the Drive Motor
An alternating current universal motor is used as the drive motor. The washing speed is 56 rpm or 28 rpm; spinning takes place at 600 rpm to 1000 rpm at different intervals, depending on the type of appliance and program.

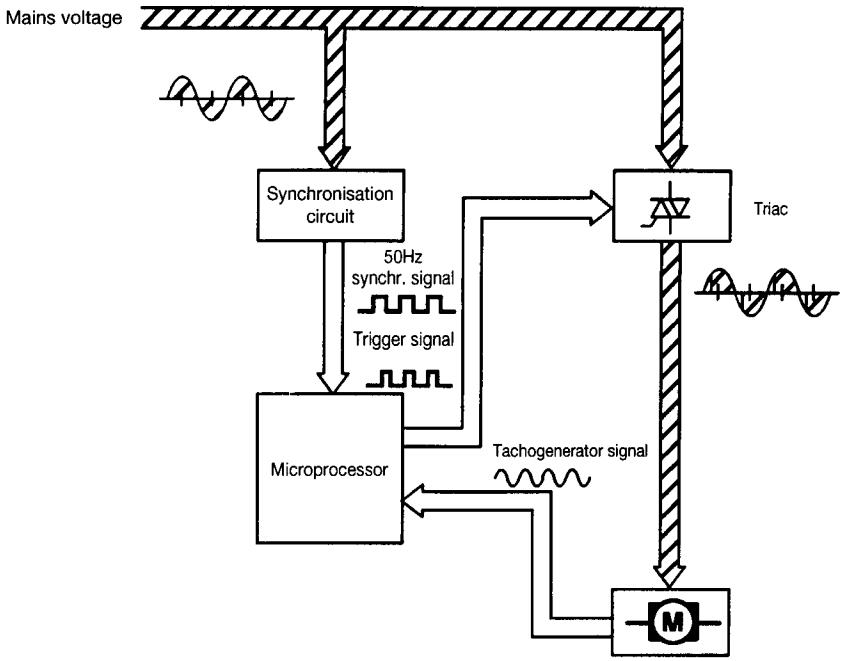
The speed of a universal motor is dependent on the applied voltage and load. Due to this dependency on load, it is not possible to set a speed by applying a fixed voltage. In order to achieve a constant speed, the motor voltage must be constantly adapted to the load conditions. This is achieved by the phase control principle. A triac is used for this purpose.

The motor voltage is greater or smaller dependent on the firing point of the triac. This means the motor does not receive voltage before the triac has fired at a certain point in time.

Phase control principle



Motor control principle



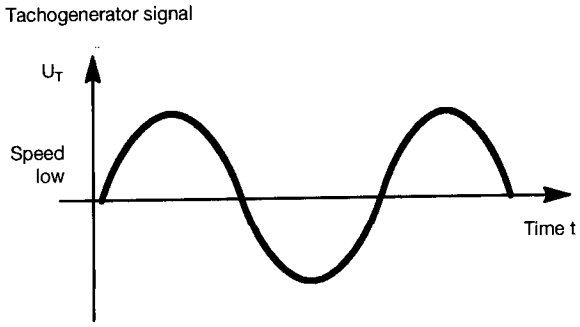
The motor control varies the firing angle of the triac and therefore the motor voltage accordingly. The firing angle is increased if the speed is too high. Consequently, the motor voltage becomes smaller and the speed is reduced. If the speed is too low, the firing angle is reduced so that the voltage and therefore the speed increases.

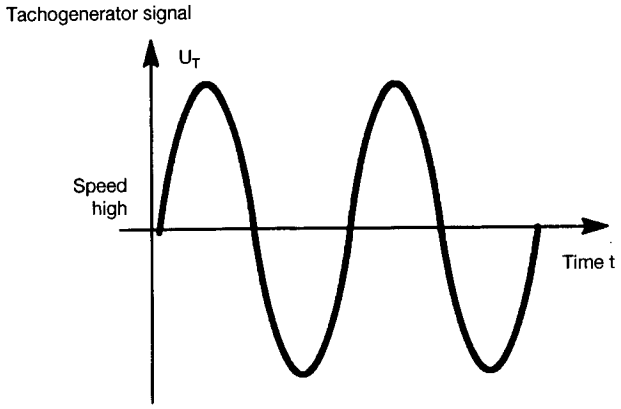
Universal motors have a very high starting torque. The motor voltage should therefore not be switched on abruptly. A smooth-start circuit ensures that the voltage is increased slowly.

The reversing of the motor is carried out by the control unit via a program contact and via a control contact (connected with double lever).
The driving of the rated values is also carried out via program and control contacts to the motor electronics.

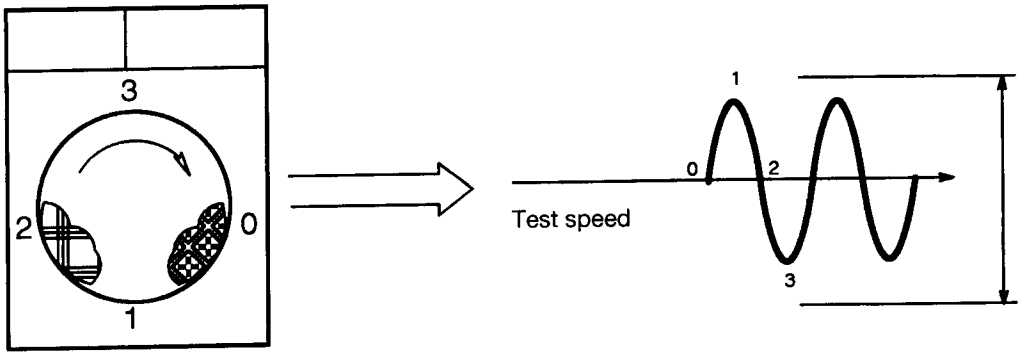
Tachogenerator (claw pole)
The tachogenerator produces a sinusoidal alternating voltage which is sent to the microprocessor as tachogenerator signal (UT). The level of the voltage is dependent on the motor speed and lies

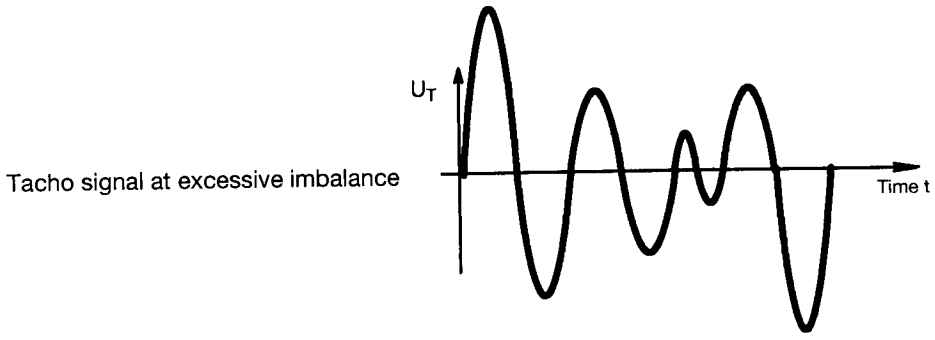
between approx. 1 V AC and approx. 36 V AC. The microprocessor converts the tachogenerator signal into a square wave signal and passes this on for speed control and imbalance detection.





Imbalance Detection
Before each increase in spin speed, the imbalance is measured for 9 sec during the initial speed from 70 rpm to 90 rpm.
A maximum of 10 start-up attempts are made. The spin function is not activated if a certain imbalance limit is exceeded.





IV. NOTES ON REPAIRS

1. General

Disconnect appliances from the mains before carrying out any repair. Always carry out a function check after each repair job as well as a leak test and a check procedure according to VDE 0701.

2. Side Panel

2.1 Loosen retaining screws and press down side panel.

3. Appliance Cover

3.1 Unscrew two screws at the rear of the cover frame and remove cover together with hinge.

4. Program Panel

4.1 Unscrew retaining screw on the right and left on the underside of the panel frame.

4.2 Slightly raise panel frame at front and lift up. Disconnect operation indicator lamp.

Note: Control unit, thermostat, pushbutton bank and timer/selector switch and cover lock can be dismantled from here.

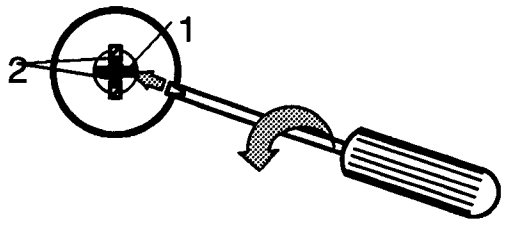
4.3 Component Support Bracket
Release screws at housing front and cover frame. Raise support plate and pull forward.

5. Panel Removal

5.1 Unclip the panel inlay with the studs from the panel frame.

6. Rotary Knobs

6.1 Program selector



6.1.2 Lever out pin (1) with screwdriver and pull out.

6.1.3 Press lock tabs (2) to centre and pull off rotary knob.

6.2 Temperature selector/multiselector

6.2.1 Press lock tabs to centre and pull off rotary knob.

7. Indicator Disc/Gear Cog

7.1 Detach universal joint

7.2 Press lock hook to centre and remove indicator disc.

8. Cover Lock

8.1 Remove panel frame

8.2 Fold out component support bracket

8.3 Unscrew lock

9. Control Unit

9.1 Detach panel frame

9.2 Fold out component support bracket

9.3 Unscrew control unit/time switch

10. Main Switch with Temperature Selector

10.1 Detach panel frame

10.2 Fold out component support bracket

10.3 Pull off plastic coupling on the controller shaft. Lightly press lock tab towards inside and at the same time turn the complete regulator with main switch out of the retaining fixture.

Note: In the event of repair pinch the old capillary and leave in the cable harness. Connect new capillary on cable harness.

11. Pushbutton Switch

11.1 Remove panel box.
11.2 Fold out component support bracket.
11.3 Slightly press in the lock hook of the pushbutton switch and push the pushbutton switch upward and disengage.

12. Water Level Regulator

12.1 Detach panel frame.
12.2 Fold out component support bracket.
12.3 Turn water level regulator through 90° and pull out of the plastic retaining fixture.

Note: The hose of the sending unit must not be kinked, twisted or chafe on other components. if water has entered the hose or the water level regulator, these parts must be replaced. Under no circumstances must there be moisture in the sensor system otherwise it is possible that the water level regulator will not respond.

13. Cover Frame

13.1 Remove screws on the periphery of the cover frame and plastic funnel.
13.2 Remove plastic funnel by pulling up.
13.3 Fold open program panel and unscrew cover lock
13.4 Press down sleeve.
13.5 Raise cover frame and detach the water hoses.
13.6 Remove cover frame.

14. Sleeve

14.1 Unscrew plastic funnel and remove sleeve from cover frame.
14.2 Remove cover frame.
14.3 Remove annular spring and detach sleeve from upper section of wash tank .

15. Upper Section of Wash Tank

15.1 Detach funnel, cover frame.
15.2 Remove screws, spring clip and securing rail. Remove upper section from wash tank.

Note: When reinstalling the upper section, ensure the gasket/seal is fitted correctly. Terostat putty should be applied to the corners of the wash tank.

16. Left Bearing Mount, Drive Side

16.1 Unscrew hexagon bolt from the shaft of the left bearing mount and turn out bearing mount to provide access to the belt pulley.
16.2 Unscrew the 6 hexagon bolts of the bearing mount and pull out of bearing mount.

17. Right Wash Drum Bearing Mount

17.1 Remove cover frame, sleeve, upper section of wash tank and plastic funnel.
17.2 Release hexagon bolts of the right bearing mount between the housing jacket and wash tank by firmly holding the spanner and turning the drum. Access is provided to drum nut (bushing) and gasket.

Note: If necessary use a screwdriver to press the hexagon screw towards the drum in order to release the drum nut (bushing) from its seat.

17.3 Unscrew the hexagon bolt from the shaft of the left bearing mount. The drum nut (bushing) and gasket can now be accessed.
17.4 Remove wash drum.

Note: Particular care must be taken when installing the wash drum to ensure that the bottom cover of the wash drum faces towards the operating panel.

17.5 Unscrew the hexagon bolts from the right bearing mount and press out the bearing mount.

Note: Before removing the bearing mounts, release the thrust rings secured with two slotted screws but on no account completely unscrew. The recessed slotted screws must be tightened after installation of the bearing mounts. Care must be taken to ensure that the marking lug faces upwards. (If the bearing mount is leaking, water can flow off via a drain hole.)

18. Heater
18.1 Disconnect electrical connections and remove protective cap.
18.2 Release securing nut and pull out heater.

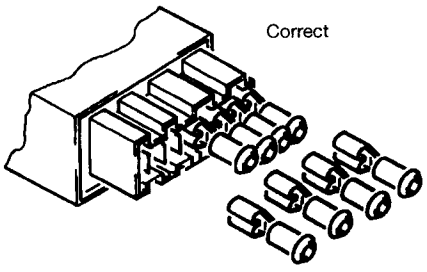
Note: Check during installation to ensure that the heater is slid into the guide strip of the wash tank.

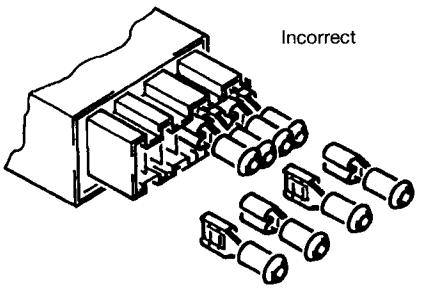
19. Wash Tank
19.1 Remove cover frame, sleeve, upper section of wash tank and plastic funnel, remove thermostat and sensor system.
19.2 Unscrew left and right drum bearing mounts and remove wash drum.
19.3 Remove hoses and drain funnel on wash tank and unscrew both flanges for both bearing mounts.
19.4 Pull out wash tank.

20. Spring Struts
Detach or remove the cover frame, side panel as well as the U-housing in order to renew the spring struts.

21. Electrical Connection Lines, Edge Connector
In the case of failure of the edge connectors, the electrical connection lines should be connected individually with insulating plug connections (see drawing).

V. SUPPLEMENTS





1. Delivery Head

The kit, Ident. no. 08 7571 can be used in order to achieve a delivery head of 1.5 m in individual cases.

2. New Mobile System, Service Index KI .../02

As of 02/91, all mobile appliances will feature a new base plate. This modification can be accompanied by a new roller system.
The new base plate Ident. no. 20 6933 should also be used for appliances with aqua stop.

3. New Pushbutton Switch, Service Index KI 03

As of 04/91, for appliances with 3 push-buttons, the electrical connection of the pushbutton switch is modified. The connection is now with a 10-pole connector instead of the single connection used to date.

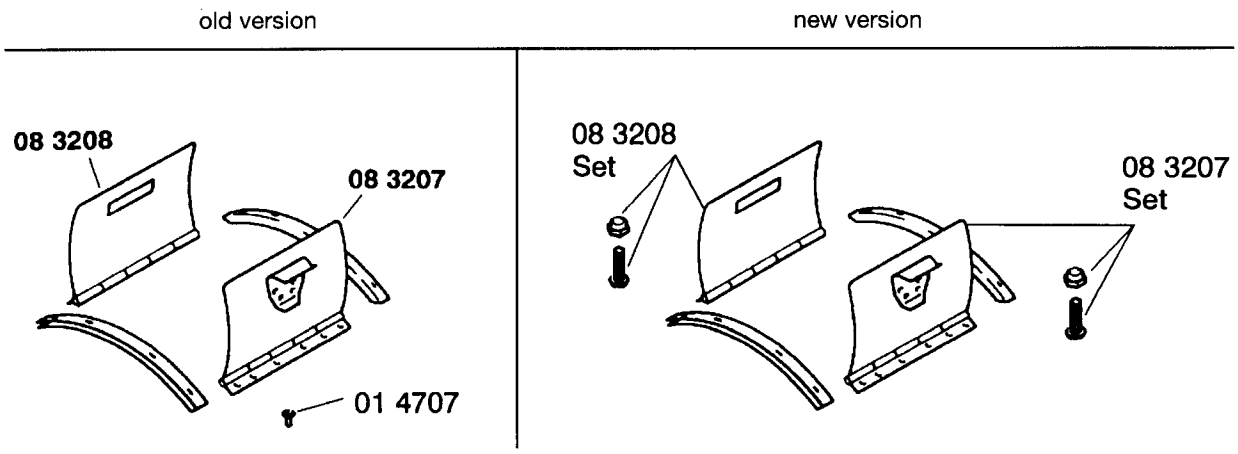
4. Imbalance Detection

As of FD 7203 the number of start-up attempts is increased from 11 to 16.

Note: In the case of several start-up attempts during the imbalance detection phase, it is possible that the maximum final spin time is no longer reached.

5. Easier Assembly

Drum cover Ident. no.: 08 3207, 08 3208
The tubular rivets (Ident. no. 01 4707) used in repair jobs for fastening the drum cover are omitted. In future, the set of bolts and nuts known under Ident. no. 03 1950 will be enclosed with the above mentioned parts.



6. New Motor

Since 08/93, in addition to the motor 1BA 6755.., Ident. No.: 14 0579, the motor MCA 52/64.18 BC1, Ident. No.: 14 1148 is also installed as standard.
Carbon brushes, Ident. No.: 15 1614 are available in spare parts for this motor (MCA 52/..).

7. KD Motor Electronics

As of approx. 11/93, the KD motor electronics, Ident. no. 09 4990 is available as a spare part. Allocation must be based on the spare parts list since the electronics unit is coded by removing resistors.

Note: The enclosed information leaflet must be observed when carrying out repairs.

8. New Cover Lock

A new cover lock, Ident. no. 09 5400 is used as standard as of 03/94. Electrical connection is made by means of special 5-plug connector (coded). The previous version, Ident. no. 08 8486 is replaced by Ident. no. 09 5400. Corresponding instructions are provided.

9. Synchronous Evacuating Pump, Ident. no. 14 1326, Service Index .../06

As of mid 10/94, all appliances with .../06 will be equipped with a synchronous evacuating pump. The maximum delivery head is 1 metre.