Service Manual

WE66MP – WE106MP

438 9011-51/02

Electrolux

Wascator

NOTICE TO SERVICE PERSONNEL

INSTALLATION

Improper installation of Wascomat laundry and wet cleaning equipment can result in personal injury and severe damage to the machine.

REFER INSTALLATION TO QUALIFIED PERSONNEL!

RISK OF ELECTRIC SHOCK

The equipment utilizes high Voltages. Disconnect electric power before servicing.

The use of proper service tools and techniques, and the use of proper repair procedures, is essential to the safety of service personnel and equipment users.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL!

RISK OF PERSONAL INJURY

This equipment contains moving parts, and some components that may have sharp edges.

Improper or careless service procedures may result in serious injury to service personnel.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL!

ABOUT THIS MANUAL

This manual is intended to provide service guidance to qualified service personnel.

Wascomat and its authorized dealers make no determination regarding the qualification of individuals requesting this service manual. The service provider assumes all risks inherent to the servicing of this equipment and any risks that arise as result of the lack of knowledge or ability of any person servicing this equipment.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL!

NOTE:

Improper installation or servicing of Wascomat equipment will void the manufacturer's warranty!

1. Machine presentation

Fig. ①

The washer extractors described in this manual are high-spin machines with a drum volume of 65 and 100 litres and built-in wash programs. It is designed for use in applications such as apartment-house laundries, hotels, commercial laundries, in industry, hospitals, small institutions, and by other users who require a machine with a high level of reliability, good performance and easy maintenance.

The drum assembly on this model is of the suspended type, in other words not rigidly mounted on the machine base. This means that a minimum of vibration is transferred to the frame, which in turn simplifies installation as no concrete foundation is required.

Vibration due to imbalance is further reduced because the drum begins the extraction cycle at distribution speed, to distribute the load before extraction at high speed.

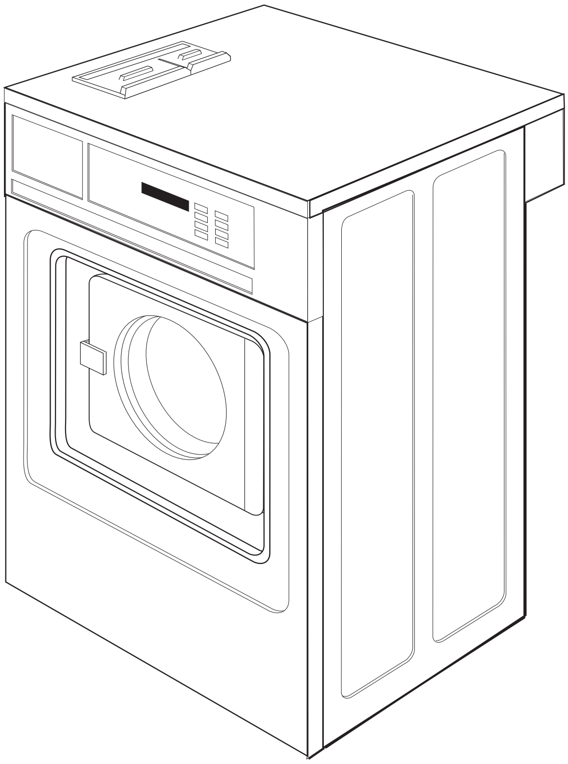
The high extraction speed of the drum produces a G factor of approx. 300, which ensures a high degree of water extraction.

The machine has an electronic program control unit with built-in wash programs which can be modified through the use of option buttons. The program control unit also includes a built-in service program to assist in tracing faults quickly and efficiently.

The frequency-controlled motor is controlled by an advanced motor control unit. This means that the motor speed can be controlled with precision and flexibility at every stage in the program. At the start of each program, an automatic weighing system uses data gathered by the motor to calculate the weight of the wash load automatically, to adjust the quantity of water used to the size of the load.

The machines are equipped according to customer requirements, with electric or steam heating or the option of no heating. The water intake can be adapted for various combinations of cold, hot and hard water supply.

①



Machine safety

- The machine is intended only for washing in water (not dry-cleaning chemicals).
- The machine must not be operated by children.
- Installation and servicing must be carried out by competent, authorised personnel.
- Do not under any circumstances attempt to bypass the door lock.
- Any leakages in the system, for example a worn door seal, must be rectified immediately.
- Before starting on repair or servicing work, the personnel undertaking the work must study the relevant manuals.
- Do not hose down or pour water over the machine.

		65 l		100 l	
Capacity, dry weight with filling factor 1:10		6.5	kg	10	kg
Drum volume		65	l	100	l
diameter		520	mm	520	mm
depth		310	mm	470	mm
no. of lifters		3		3	
Drum speed	wash	48	rpm	48	rpm
	wash, mild and wool programs	30	rpm	30	rpm
	extraction	700/1020	rpm	700/1020	rpm
G factor	extraction 1020 rpm	300		300	
Dimensions	width	720	mm	720	mm
	depth	660	mm	820	mm
	height	1100	mm	1100	mm
Clearance for servicing, recommended					
	each side	20	mm	20	mm
Weight	net	169	kg	255	kg
Max. floor load during extraction		1,6 ±0,7	kN	2,5 ±0,95	kN
Frequency (dynamic load)		17	Hz	17	Hz
Water valves	connection	DN 20 BSP 3/4	"	DN 20 BSP 3/4	"
	rec. water pressure	200-600	kPa	200-600	kPa
	pressure limits	40-1000	kPa	40-1000	kPa
Discharge valve	connection outer diameter	50	mm	50	mm
	capacity	160	l/min	160	l/min
Steam valve	connection	DN15 BSP 1/2	"	DN15 BSP 1/2	"
	recommended steam pressure	300-600	kPa	300-600	kPa
	pressure limits	50-800	kPa	50-800	kPa

Fig. ①

This machine has a suspended drum, which means that the outer drum and motor rest on a ”cradle” with four counterweights and a broad retaining strap. The cradle rests on four coil springs and has four alt. five shock absorbers which, together with the counterweights, are highly effective in counteracting any imbalance which may arise from the load.

The inner drum has belt drive from its motor. This motor is located above the outer drum, and has a device for belt tensioning. The motor is frequency-controlled, which allows precise and reliable control of its speed during wash, distribution and extraction stages of the program.

The union between the inner drum and the outer drum is at the rear and uses two sealed bearings.

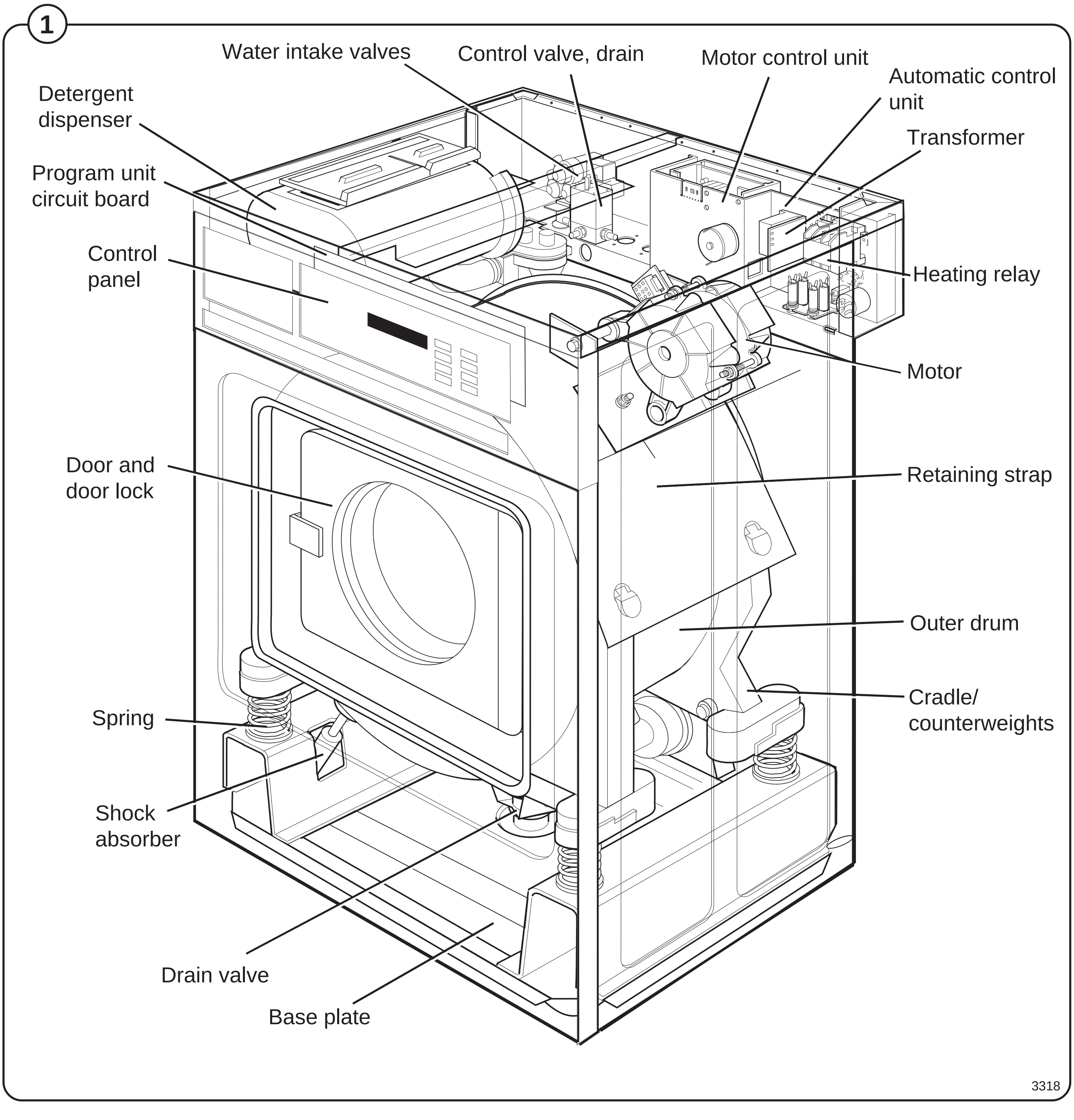
The water drain valve is a membrane-type valve which is controlled by water pressure. If ordered before delivery, the machine can be equipped with a drain pump.

The machine door is of the rectangular type, a heavy-duty door, which is locked shut while the machine is operating.

The control panel has seven program-selection buttons, either two or four option buttons, and a combined start/pause and rapid-advance button. Each button has an LED to show the current program selected. There are a further eleven LEDs on the panel which are used to indicate the current status of the program. The control panel display is used to show temperature, time left for the program to run and error codes.

The program control unit is directly behind the control panel. Components such as the motor control unit, relays, water valves are on a component shelf at the rear of the machine, with easy access from above.

The side and front exterior panels may be of either stainless steel or of cold-rolled, galvanised and enamelled sheet steel. The machine top is of stainless steel.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Water intake valves
Control valve, drain
Motor control unit
Automatic control unit
Detergent dispenser
Transformer
Program unit circuit board
Control panel
Heating relay
Motor
Door and door lock
Retaining strap
Outer drum
Spring
Cradle/ counterweights
Shock absorber
Drain valve
Base plate
3318

Description of programs, electronic program unit

The machines have 7 permanent programs. The basic programs can also be modified using the option buttons. Programs are selected using buttons on the control panel.

The machine can be equipped to provide the following program variants:

PE01a*	**PE01i***	**HE02b* (Hospital)**	**PE02b,f***
Normal 95° Normal 60° Normal 40° Mild 30° Wool Permanent Press 40° Permanent Press 60° **Options:** • Express • Intensive • Rinse stop • Extra rinse	Normal 95° Normal 60° Normal 40° Mild 30° Wool Permanent Press 40° Permanent Press 60° **Options:** • Heavily soiled • Gentle extraction	Warm 60° Delicate 40° Delicate 30° Polycotton 50° Polycotton 65° Cotton 71° Cotton 93° **Options:** • With sluice • With prewash	Delicate 30° Perm Press 40° Warm 60° Hot 90°

PE11b*	**PE21f,g***	**HE22a* (Hygenic)**	**PE22b***
Normal 95° Normal 60° Normal 40° Mild 30° Wool Permanent Press 40° Permanent Press 60° **Options:** • Heavily soiled • Gentle extraction	Normal 95° Normal 60° Normal 40° Mild 30° Wool Permanent Press 40° Permanent Press 60° **Options:** • Heavily soiled • Gentle extraction g=coin-op 4 free progs	Normal 95° Normal 60° Polycotton 50° Mild Cotton 71° Cotton 65° Sluice program **Options:** • No prewash • With sluice	Normal 95° Normal 60° Normal 40° Mild 30° Wool Permanent Press 40° Permanent Press 60° **Options:** • No prewash • Gentle extraction

PE31d*	PE41a*	P61a*
Normal 95° Normal 60° Normal 40° Mild 30° Wool Permanent Press 40° Permanent Press 60° **Options:** • Heavily soiled • Gentle extraction	Normal 95° Normal 60° Normal 40° Mild 30° Wool Permanent Press 40° Permanent Press 60° **Options:** • Express • Intensive • Rinse stop • Extra rinse	Normal 95° Normal 60° Normal 40° Mild 30° Wool Permanent Press 40° Permanent Press 60° **Options:** • Heavily soiled • Gentle extraction

* The program number shows which market the program is intended for, as follows:

PE01 = Wascator, export
PE11 = Wascator, Sweden
PE21 = Nyborg
PE31 = Osby, Sweden
PE41 = Wascator, Switzerland
PE51 = Zanussi
PE61 = Wascator, Finland

The letters after the program number show the water intakes applicable to the program. C = cold water, CH = cold and hot water, and Hd = hard water.

The times, temperatures, water levels etc. of the various programs are shown in the special tables for each program. The program is at a standstill during cool-down, water filling and heating. The times required for these parts of the cycle are not included in the times stated in the tables.

The temperature during the main wash (and prewash if selected) is automatically controlled by the thermostat.

During cool-down after the main wash (for permanent press 95° and 60°) the water intake is pulsed to prevent creasing. The temperature normally falls to 55°C.

Program table PE 01a

PROGRAM	NORMAL 95°							NORMAL 60°							NORMAL 40°							MILD 30°							WOOL							PERM PRESS 40°							PERM PRESS 60°						
	1							2							3							4							5							6							7						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E	3					70	E	3					70	E															3					70	E	3					70	E
WEIGHING	3					35	E	3					35	E	3					35	E	3					35	E	3				35	E		3					35	E	3					35	E
PREWASH																																																	
DRAIN																																																	
MAIN WASH	3	W	2	L	-	-	N	3	W	2	L	-	-	N	3	W	2	L	-	-	N															3	W	2	L	-	-	N	3	W	2	L	-	-	N
SOAKING	3	W	-	L	-	6	N	3	W	-	L	-	6	N	3	W	-	L	-	6	N	3	C	2	h	-	-	-	3	C	2	h	-	-	-	3	W	2	L	-	6	N	3	W	2	L	-	6	N
HEATING	3	-	-	L	80	-	N	3	-	-	L	55	-	N	3	-	-	L	40	-	N															3	-	-	-	40	-	N	3	-	-	-	55	-	N
WASH	3	-	-	-	80	12	N	3	-	-	-	55	12	N	3	-			40	12	N	3	C	2	h	30	-	R	3	C	2	h	40	-	R	3	-	-	-	40	12	N	3	-	-		55	12	N
DRAIN	4	-	-	-	-	1	D	4	-	-		-	1	D	4	-	-	-	-	1	D	3				30	15	R	3				40	15	R	4	-	-	-	-	1	D	4	-	-		-	1	D
EXTRACTION																						4					1	-	4					1	-														
RINSE 1																																																	
DRAIN																																																	
EXTRACTION																																																	
RINSE 2	6	C	-	h	-	3	N	6	C	-	h	-	3	N	6	C	-	h	-	3	N	6	C	-	h	-	2	R	6C	-	h	-	2	R		6	C	-	M	-	3	N	6	C	-	M	-	3	N
DRAIN	6					40	ND	6					40	ND	6					40	ND	6					1	-	6					1	-	6					1	D	6					1	D
EXTRACTION	6					30	E	6					30	E	6					30	E	-					-		-						-	-							-						
RINSE 3	7	C	-	h	-	3	ND	7	C	-	h	-	3	N	7	C	-	h	-	3	N	7	C	-	h	-	2	R	7	C	-	h	-	2	R	7	C	-	M	-	3	N	7	C	-	M	-	3	N
DRAIN	7					40	ND	7					40	ND	7					40	ND	7					1	-	7					1	-	7					1	D	7					1	D
EXTRACTION	7					30	E	7					30	E	7					30	E	-						-	-					-	-	-							-						
RINSE 4	8	C	3	h	-	3	N	8	C	3	h	-	3	N	8	C	3	h	-	3	N	8	C	3	h	-	2	R	8	C	3	h	-	2	R	8	C	3	M	-	3	N	8	C	3	M	-	3	N
DRAIN	9					40	ND	9					40	ND	9					40	ND	9					40	RD	9					40	RD	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E	9					6	E	9					6	E	9					6	E	9					6		9					6	
DRAIN	9					50	ND	9					50	ND	9					50	ND	9					50	ND	9					50	ND	9					50	ND	9					50	ND
EXTRACTION	9					5	E	9					5	E	9					5	E	9					1,5	E	9					1,5	E	9					1,5	E	9					1,5	E
PROGRAM TIME	38							38							38							28							28							38							38						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 01a

PROGRAM / PROGRAM STEP	NORMAL 95°							NORMAL 60°							NORMAL 40°							MILD 30°							WOOL							PERM PRESS 40°							PERM PRESS 60°						
	8							9							10							11							12							13							14						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					70	E	1					70	E	1					70	E															1					70	E	1					70	E
WEIGHING	1					35	E	1					35	E	1					35	E	3					35	E	3					35	E	1					35	E	1					35	E
PREWASH	1	W	1	L	-	-	N	1	W	1	L	-	-	N	1	W	1	L	-	-	N															1	W	1	L	-	-	N	1	W	1	L	-	-	N
	1	W	1	L	30	6	N	1	W	1	L	30	6	N	1	W	1	L	30	6	N															1	W	1	L	30	6	N	1	W	1	L	30	6	N
DRAIN	2					1	D	2					1	D	2					1	D															2					1	D	2					1	D
MAIN WASH	3	H	2	L	-	-	N	3	H	2	L	-	-	N	3	W	2	L	-	-	N	3	C	2	h	-	-	-	3	C	2	h	-	-	-	3	W	2	L	-	-	N	3	W	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-														-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEATING	3	-	-	L	85	-	N	3	-	-	L	60	-	N	3	-	-	L	40	-	N	3	C	2	h	30	-	R	3	C	2	h	40	-	R	3	-	-	-	40	-	N	3	-	-	-	60	-	N
WASH	3	-	-	-	85	24	N	3	-	-	-	60	24	N	3	-	-	-	40	24	N	3				30	15	R	3				40	15	R	3	-	-	-	40	24	N	3	-	-	-	60	24	N
DRAIN	4	-	-	-	-	1	D	4	-	-	-	-	1	D	4	-	-	-	-	1	D	4					1	-	4					1	-	4	-	-	-	-	1	D	4	-	-	-	-	1	D
EXTRACTION															-																																		
RINSE 1	5	C	-	M		2	N	5	C	-	M	-	2	N	5	C	-	M	-	2	N																												
DRAIN	5					1	D	5					1	D	5					1	D																												
EXTRACTION	-							-							-																																		
RINSE 2	6	C	-	M	-	2	N	6	C	-	M	-	2	N	6	C	-	M	-	2	N	6	C	-	h	-	2	R	6	C	-	h	-	2	R	6	C	-	M	-	3	N	6	C	-	M	-	3	N
DRAIN	6					40	ND	6					40	ND	6					40	ND	6					1	-	6					1	-	6					1	D	6					1	D
EXTRACTION	6					30	E	6					30	E	6					30	E	-						-	-						-	-							-						
RINSE 3	7	C	-	h	-	2	N	7	C	-	h	-	2	N	7	C	-	h	-	2	N	7	C	-	h	-	2	R	7	C	-	h	-	2	R	7	C	-	M	-	3	N	7	C	-	M	-	3	N
DRAIN	7					40	ND	7					40	ND	7					40	ND	7					1	-	7					1	-	7					1	D	7					1	D
EXTRACTION	7					30	E	7					30	E	7					30	E	-						-	-					-	-	-							-						
RINSE 4	8	C	3	h	-	2	N	8	C	3	h	-	2	N	8	C	3	h	-	2	N	8	C	3	h	-	2	R	8	C	3	h	-	2	R	8	C	3	M	-	3	N	8	C	3	M	-	3	N
DRAIN	9					40	ND	9					40	ND	9					40	ND	9					40	RD	9					40	RD	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E	9					6	E	9					6	E	9					6	E	9					6		9					6	
DRAIN	9					50	ND	9					50	ND	9					50	ND	9					50	ND	9					50	ND	9					50	ND	9					50	ND
EXTRACTION	9					5	E	9					5	E	9					5	E	9					1,5	E	9					1,5	E	9					1,5	E	9					1,5	E
PROGRAM TIME	51							51							51							28							28							47							47						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 02b

PROGRAM	DELCATE							PERMANENT PRESS							WARM							HOT						
	30°							40°							60°							90°						
	1							2							3							4						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					70	E	1					70	E	1					70	E	1					70	E
WEIGHING	1					35	E	1					35	E	1					35	E	1					35	E
PREWASH	1	C	1	LL	30	4	G	1	W	1	LL	40	4	N	1	W	1	LL	40	4	N	1	W	1	LL	40	4	N
DRAIN	2					1	G	2					1	N	2					1	N	2					1	N
MAIN WASH	3	C	2	LL	30	8	G	3	W	2	LL	40	8	N	3	H	2	LL	60	8	N	3	H	2	LL	90	8	N
DRAIN	4	-	-	-	-	1	D	4	-	-	-	-	1	D	4	-	-	-	-	1	D	4	-	-	-	-	1	D
RINSE 1	5	C	-	HL		1	G	5	C	-	HL		1	N	5	C	-	HL		1	N	5	C	-	HL		1	N
DRAIN	5					1	D	5					40	ND	5					40	ND	5					40	ND
EXTRACTION	-							5					30	E	5					30	E	5					30	E
RINSE 2	6	C	-	HL	-	2	G	6	C	-	HL	-	2	N	6	C	-	HL	-	2	N	6	C	-	HL	-	2	N
DRAIN	6					1	D	6					40	ND	6					40	ND	6					40	ND
EXTRACTION								6					30	E	6					30	E	6					30	E
RINSE 3	7	C	3	HL	-	2	G	7	C	3	HL	-	2	N	7	C	3	HL	-	2	N	7	C	3	HL	-	2	N
DRAIN	9					40	GD	9					40	ND	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E	9					6	E	9					6	E
DRAIN	9					20	G	9					20	N	9					20	N	9					20	N
DISTRIBUTION	9					30	D	9					30	D	9					30	D	9					30	D
EXTRACTION	9					1,5	E	9					1,5	E	9					5	E	9					5	E
PROGRAM TIME	26							26							29,5							29,5						

PROGRAM																					
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION																					
WEIGHING																					
PREWASH																					
DRAIN																					
MAIN WASH																					
DRAIN																					
RINSE 1																					
DRAIN																					
EXTRACTION																					
RINSE 2																					
DRAIN																					
EXTRACTION																					
RINSE 3																					
DRAIN																					
EXTRACTION																					
DRAIN																					
DISTRIBUTION																					
EXTRACTION																					
PROGRAM TIME																					

- = NO DRUM ACTION
G = GENTLE ACTION
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D = DISTRIBUTION SPEED
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C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
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Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 02f

PROGRAM / PROGRAM STEP	DELCATE							PERMANENT PRESS							WARM							HOT																											
	30°							40°							60°							90°																											
	1							2							3							4																											
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					70	E	1					70	E	1					70	E	1					70	E																					
WEIGHING	1					35	E	1					35	E	1					35	E	1					35	E																					
PREWASH	1	C	1	HL	-	5	G	1	C	1	HL	-	5	N	1	W	1	HL	40	5	N	1	W	1	HL	40	7	N																					
DRAIN	2					1	G	2					1	N	2					1	N	2					1	N																					
MAIN WASH	3	W	2	HL	30	7	G	3	W	2	HL	40	10	N	3	W	2	HL	60	10	N	3	H	2	HL	90	15	N																					
DRAIN	4	-	-	-	-	1	D	4	-	-	-	-	1	D	4	-	-	-	-	1	D	4	-	-	-	-	1	D																					
RINSE 1	5	C	-	HL		1	G	5	C	-	HL		1	N	5	C	-	HL		1	N	5	C	-	HL		1	N																					
DRAIN	5					1	D	5					40	ND	5					40	ND	5					40	ND																					
EXTRACTION	-							5					30	E	5					30	E	5					30	E																					
RINSE 2	6	C	-	HL	-	1	G	6	C	-	HL	-	1	N	6	C	-	HL	-	1	N	6	C	-	HL	-	1	N																					
DRAIN	6					1	D	6					40	ND	6					40	ND	6					40	ND																					
EXTRACTION								6					30	E	6					30	E	6					30	E																					
RINSE 3	7	C	3	HL	-	2	G	7	C	3	HL	-	2	N	7	C	3	HL	-	2	N	7	C	3	HL	-	2	N																					
DRAIN	9					40	GD	9					40	ND	9					40	ND	9					40	ND																					
EXTRACTION	9					6	E	9					6	E	9					6	E	9					6	E																					
DRAIN	9					20	G	9					20	N	9					20	N	9					20	N																					
DISTRIBUTION	9					30	D	9					30	D	9					30	D	9					30	D																					
EXTRACTION	9					2,5	E	9					6	E	9					6	E	9					6	E																					
PROGRAM TIME	26							32,5							32,5							39,5																											

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 11b

PROGRAM	NORMAL 95°							NORMAL 60°							NORMAL 40°						
	1							2							3						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E	3					70	E	3					70	E
WEIGHING	3					35	E	3					35	E	3					35	E
PREWASH																					
MAIN WASH	3	C	2	L	-	-	N	3	C	2	L	-	-	N	3	C	2	L	-	-	N
SOAKING	3	C	-	L	-	6	N	3	C	-	L	-	6	N	3	C	-	L	-	6	N
HEATING	3	-	-	L	73	-	N	3	-	-	L	55	-	N	3	-	-	L	40	-	N
WASH	3	-	-	L	-	12	N	3	-	-	L	55	12	N	3	-	-	L	40	12	N
DRAIN	4	-	-	-	-	1	D	4	-	-	-		1	D	4					1	D
RINSE 1	5	C	-	M	-	2	N	5	C	-	M	-	2	N	5	C	-	M	-	2	N
DRAIN	5	-	-			1	D	5					1	D	5					1	D
EXTRACTION	5					-	-	5							5						
RINSE 2	6	C	-	M	-	2	N	6	C	-	M	-	2	N	6	C	-	M	-	2	N
DRAIN	6					40	ND	6					40	ND	6					40	ND
EXTRACTION	6					30	E	6					30	E	6					30	E
RINSE 3	7	C	-	M	-	2	N	7	C	-	M	-	2	N	7	C	-	M	-	2	N
DRAIN	7					40	ND	7					40	ND	7					40	ND
EXTRACTION	7					30	E	7					30	E	7					30	E
RINSE 4	8	C	3	M	-	2	N	8	C	3	M	-	2	N	8	C	3	M	-	2	N
DRAIN	9					40	ND	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E	9					6	E
DRAIN	9					50	ND						50	ND	9					50	N
EXTRACTION	9					5	E								9					5	E
PROGRAM TIME	38							38							38						

PROGRAM	MILD 30°							WOOL 40°							PERM PRESS 40°							PERM PRESS 60°						
	4							5							6							7						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION															3					70	E	3					70	E
WEIGHING	3					35	E	3					35	E	3					35	E	3					35	E
PREWASH																												
MAIN WASH	3	C	2	h	-	-	-	3	C	2	h	-	-	-	3	C	2	L	-	-	N	3	C	2	L	-	-	N
SOAKING	-						-	-						-	3	C	2	L	-	6	N	3	C	2	L	-	6	N
HEATING	3	C	2	h	30	-	R	3	C	2	h	40	-	R	3	-	-	-	40	-	N	3	-	-	-	55	-	N
WASH	-				30	15	R	-				40	15	R	3	-	-	-	40	12	N	3	-	-	-	55	12	N
DRAIN	4					1	-	4					1	-	4	-	-	-	-	1	D	4	-	-		-	1	D
RINSE 1																												
DRAIN																												
EXTRACTION																												
RINSE 2	6	C	-	h	-	2	R	6	C	-	h	-	2	R	6	C	-	M	-	3	N	6	C	-	M	-	3	N
DRAIN	6					1	-	6					1	-	6					1	D	6					1	D
EXTRACTION	-						-	-						-	-						-	-						-
RINSE 3	7	C	-	h	-	2	R	7	C	-	h	-	2	R	7	C	-	M	-	3	N	7	C	-	M	-	3	N
DRAIN	7					1	-	7					1	-	7					1	D	7					1	D
EXTRACTION	-						-	-						-	-						-	-						-
RINSE 4	8	C	3	h	-	2	R	8	C	3	h	-	2	R	8	C	3	M	-	3	N	8	C	3	M	-	3	N
DRAIN	9					40	RD	9					40	RD	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E	9					6	E	9					6	E
DRAIN	9					50	RD	9					50	RD	9					50	RD	9					50	ND
EXTRACTION	9					1,5	E	9					1,5	E	9					1,5	E	9					1.5	E
PROGRAM TIME	28							28							34							34						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 11b

PROGRAM	NORMAL 95°							NORMAL 60°							NORMAL 40°						
	8							9							10						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					70	E	1					70	E	1					70	E
WEIGHING	1					35	E	1					35	E	1					35	E
PREWASH	1	C	1	L	-	-	N	1	C	1	L	-	-	N	1	C	1	L	-	-	N
SOAKING	1	C	1	L	-	6	N	1	C	1	L	-	6	N	1	C	1	L	-	6	N
DRAIN	2					1	D	2					1	D	2					1	D
MAIN WASH	3	C	2	L	-	-	N	3	C	2	L	-	-	N	3	C	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEATING	3	-	-	L	80	-	N	3	-	-	L	60	-	N	3	-	-	L	40	-	N
WASH	3	-	-	-	80	12	N	3	-	-	-	60	12	N	3	-	-	-	40	12	N
DRAIN	4	-	-	-	-	1	D	4	-	-	-	-	1	D	4	-	-	-	-	1	D
RINSE 1	5	C	-	M	-	2	N	5	C	-	M	-	2	N	5	C	-	M	-	2	N
DRAIN	5					1	D	5					1	D	5					1	D
EXTRACTION	5					-	-	5							5						
RINSE 2	6	C	-	M	-	2	N	6	C	-	M	-	2	N	6	C	-	M	-	2	N
DRAIN	6					40	ND	6					40	ND	6					40	ND
EXTRACTION	6					30	E	6					30	E	6					30	E
RINSE 3	7	C	-	h	-	2	N	7	C	-	h	-	2	N	7	C	-	h	-	2	N
DRAIN	7					40	ND	7					40	ND	7					40	ND
EXTRACTION	7					30	E	7					30	E	7					30	E
RINSE 4	8	C	3	h	-	2	N	8	C	3	h	-	2	N	8	C	3	h	-	2	N
DRAIN	9					40	ND	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E	9					6	E
DRAIN	9					50	ND	9					50	ND	9					50	ND
EXTRACTION	9					5	E	9					5	E	9					5	E
PROGRAM TIME	39							39							39						

PROGRAM	MILD 30°							WOOL 40°							PERM PRESS 40°							PERM PRESS 60°						
	11							12							13							14						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION															1					70	E	1					70	E
WEIGHING	3					35	E	3					35	E	1					35	E	1					35	E
PREWASH															1	C	1	L	-	-	N	1	C	1	L	-	-	N
SOAKING															1	C	1	L	-	6	N	1	C	1	L	-	6	N
DRAIN															2					1	D	2					1	D
MAIN WASH	3	C	2	h	-	-	-	3	C	2	h	-	-	-	3	C	2	L	-	-	N	3	C	2	L	-	-	N
SOAKING	-						-	-							3	C	2	L	-	6	N	3	C	2	L	-	6	N
HEATING	3	C	2	h	30	-	R	3	C	2	h	40	-	R	3	-	-	-	40	-	N	3	-	-	-	60	-	N
WASH	-				30	15	R	-				40	15	R	3	-	-	-	40	12	N	3	-	-	-	60	12	N
DRAIN	4					1	-	4					1	-	4	-	-	-	-	1	D	4	-	-	-	-	1	D
RINSE 1																												
DRAIN																												
EXTRACTION																												
RINSE 2	6	C	-	h	-	2	R	6	C	-	h	-	2	R	6	C	-	M	-	3	N	6	C	-	M	-	3	N
DRAIN	6					1	-	6					1	-	6					1	D	6					1	D
EXTRACTION	-						-	-						-	-						-	-						-
RINSE 3	7	C	-	h	-	2	R	7	C	-	h	-	2	R	7	C	-	M	-	3	N	7	C	-	M	-	3	N
DRAIN	7					1	-	7					1	-	7					1	D	7					1	D
EXTRACTION	-						-	-						-	-						-	-						-
RINSE 4	8	C	3	h	-	2	R	8	C	3	h	-	2	R	8	C	3	M	-	3	N	8	C	3	M	-	3	N
DRAIN	9					40	RD	9					40	RD	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E	9					6	E	9					6	E
DRAIN	9					50	RD	9					50	RD	9					50	RD	9					50	ND
EXTRACTION	9					1,5	E	9					1,5	E	9					1,5	E	9					1,5	E
PROGRAM TIME	28							28							34							34						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
□ = TIME MIN.

Program table PE 21f

PROGRAM	NORMAL 95°						
	1						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	-	L	-	6	N
HEATING	3	-	-	L	85	-	N
WASH	3	-	-	-	85	12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	3	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	h	-	3	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	Hd	3	h	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					5	E
PROGRAM TIME	38						

PROGRAM	NORMAL 60°						
	2						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	-	L	-	6	N
HEATING	3	-	-	L	55	-	N
WASH	3	-	-	L	55	12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	3	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	h	-	3	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	Hd	3	h	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					5	E
PROGRAM TIME	38						

PROGRAM	NORMAL 40°						
	3						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	-	L	-	6	N
HEATING	3	-	-	L	40	-	N
WASH	3	-	-	-	40	12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	3	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	h	-	3	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	Hd	3	h	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					5	E
PROGRAM TIME	38						

PROGRAM	MILD 30°						
	4						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION							
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	C	2	h	-	-	-
SOAKING	-						
HEATING	3	C	2	h	30	-	R
WASH	3	-	-	-	30	15	R
DRAIN	4					1	-
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	2	R
DRAIN	6					1	-
EXTRACTION	-						-
RINSE 3	7	C	-	h	-	2	R
DRAIN	7					1	-
EXTRACTION	-						-
RINSE 4	8	Hd	3	h	-	2	R
DRAIN	9					40	RD
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	28						

PROGRAM	WOOL						
	5						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION							
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	C	2	h	-		-
SOAKING							
HEATING	3	C	2	h	40	-	R
WASH	3	-	-	-	40	15	R
DRAIN	4					1	-
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	2	R
DRAIN	6					1	-
EXTRACTION	-						-
RINSE 3	7	C	-	h	-	2	R
DRAIN	7					1	-
EXTRACTION	-						-
RINSE 4	8	Hd	3	h	-	2	R
DRAIN	9					40	RD
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	28						

PROGRAM	PERM PRESS 40°						
	6						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	2	L	-	6	N
HEATING	3	-	-	-	40	-	N
WASH	3	-	-	-	40	12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	M	-	3	N
DRAIN	6					1	D
EXTRACTION	-						-
RINSE 3	7	C	-	M	-	3	N
DRAIN	7					1	D
EXTRACTION	-						-
RINSE 4	8	Hd	3	M	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	34						

PROGRAM	PERM PRESS 60°						
	7						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	2	L	-	6	N
HEATING	3	-	-	-	55	-	N
WASH	3	-	-	-	55	12	N
DRAIN	4	-	-		-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	M	-	3	N
DRAIN	6					1	D
EXTRACTION	-						-
RINSE 3	7	C	-	M	-	3	N
DRAIN	7					1	D
EXTRACTION	-						-
RINSE 4	8	Hd	3	M	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	34						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 21f

PROGRAM	NORMAL 95°						
	8						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					70	E
WEIGHING	1					35	E
PREWASH	1	C	1	L	-	-	N
SOAKING	1	C	1	L	-	6	N
DRAIN	2					1	D
MAIN WASH	3	C	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-
HEATING	3	-	-	L	90	-	N
WASH	3	-	-	-	90	12	N
DRAIN	4	-	-	-	-	1	D
EXTRACTION							
RINSE 1	5	C	-	M	-	2	N
DRAIN	5					1	D
EXTRACTION	-						-
RINSE 2	6	C	-	M	-	2	N
DRAIN	6					▨	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	h	-	2	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	Hd	3	h	-	2	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					5	E
PROGRAM TIME	39						

PROGRAM	NORMAL 60°						
	9						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					▨	E
WEIGHING	1					▨	E
PREWASH	1	C	1	L	-	-	N
SOAKING	1	C	1	L	-	6	N
DRAIN	2					1	D
MAIN WASH	3	C	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-
HEATING	3	-	-	L	60	-	N
WASH	3	-	-	-	60	12	N
DRAIN	4	-	-	-	-	1	D
EXTRACTION	-						
RINSE 1	5	C	-	M	-	2	N
DRAIN	5					1	D
EXTRACTION	-						-
RINSE 2	6	C	-	M	-	2	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	h	-	2	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	Hd	3	h	-	2	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					5	E
PROGRAM TIME	39						

PROGRAM	NORMAL 40°						
	10						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					70	E
WEIGHING	1					35	E
PREWASH	1	C	1	L	-	-	N
SOAKING	1	C	1	L	-	6	N
DRAIN	2					1	D
MAIN WASH	3	C	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-
HEATING	3	-	-	L	40	-	N
WASH	3	-			40	12	N
DRAIN	4	-	-	-	-	1	D
EXTRACTION							
RINSE 1	5	C	-	M	-	2	N
DRAIN	5					1	D
EXTRACTION	-						-
RINSE 2	6	C	-	M	-	2	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	h	-	2	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	Hd	3	h	-	2	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					5	E
PROGRAM TIME	39						

PROGRAM	MILD 30°						
	11						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION							
WEIGHING	3					35	E
PREWASH							
SOAKING							
DRAIN							
MAIN WASH	3	C	2	h	-	-	-
SOAKING	-						-
HEATING	3	C	2	h	30	-	R
WASH	3				30	15	R
DRAIN	4					1	-
EXTRACTION							
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	2	R
DRAIN	6					1	-
EXTRACTION	-						-
RINSE 3	7	C	-	h	-	2	R
DRAIN	7					1	-
EXTRACTION	-						-
RINSE 4	8	Hd	3	h	-	2	R
DRAIN	9					40	RD
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					1,5	E
PROGRAM TIME	28						

PROGRAM	WOOL 40°						
	12						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION							
WEIGHING	3					35	E
PREWASH							
SOAKING							
DRAIN							
MAIN WASH	3	C	2	h	-		-
SOAKING	-						
HEATING	3	C	2	h	40	-	R
WASH	3				40	15	R
DRAIN	4					1	-
EXTRACTION							
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	2	R
DRAIN	6					1	-
EXTRACTION	-						-
RINSE 3	7	C	-	h	-	2	R
DRAIN	7					1	-
EXTRACTION	-						-
RINSE 4	8	Hd	3	h	-	2	R
DRAIN	9					40	RD
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	28						

PROGRAM	PERM PRESS 40°						
	13						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					70	E
WEIGHING	1					35	E
PREWASH	1	C	1	L	-	-	N
SOAKING	1	C	1	L	-	6	N
DRAIN	2					1	D
MAIN WASH	3	C	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-
HEATING	3	-	-	-	40	-	N
WASH	3	-	-	-	40	12	N
DRAIN	4	-	-	-	-	1	D
EXTRACTION							
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	M	-	3	N
DRAIN	6					1	D
EXTRACTION	-					-	
RINSE 3	7	C	-	M	-	3	N
DRAIN	7					1	D
EXTRACTION	-						
RINSE 4	8	Hd	3	M	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	35						

PROGRAM	PERM PRESS 60°						
	14						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					70	E
WEIGHING	1					35	E
PREWASH	1	C	1	L	-	-	N
SOAKING	1	C	1	L	-	6	N
DRAIN	2					1	D
MAIN WASH	3	C	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-
HEATING	3	-	-	-	60	-	N
WASH	3	-	-	-	60	12	N
DRAIN	4	-	-	-	-	1	D
EXTRACTION							
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	M	-	3	N
DRAIN	6					1	D
EXTRACTION	-						-
RINSE 3	7	C	-	M	-	3	N
DRAIN	7					1	D
EXTRACTION	-						
RINSE 4	8	Hd	3	M	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	35						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 22 b

PROGRAM	NORMAL 95°							NORMAL 60°							NORMAL 40°							MILD 30°							WOOL							PERM PRESS 40°							PERM PRESS 60°						
	1							2							3							4							5							6							7						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
WEIGHING						100	E						100	E						100	E																				100	E						100	E
PREWASH 1	1	W		LL	40	5	N	1	W		LL	40	5	N	1	W		LL	40	4	N															1	W		LL	40	5	N	1	W		LL	40	5	N
DRAIN	2					20	N	2					20		2					1	N															2					20	N	2					20	N
DISTRIBUTION	2					20	D	2					20	D																						2					20	D	2					20	D
EXTRACTION	2					50	E	2					50	E																						2					50	E	2					50	E
PREWASH 2	3	H		LL	70	50	N	3	H		LL	60	50	N	3	W		LL	40	30	N															3	W		LL	60	50	N	3	H		LL	70	50	N
DRAIN	3					1	N	3					1	N	3					1	N															3					1	N	3					1	N
MAIN WASH	4	H	4	LL	90	7	N	4	H	4	LL	60	7	N	4	W	2	LL	40	5	N	4	W	2	HL	30	5	R								4	W	4	LL	60	7	N	4	H	4	LL	90	7	N
COOL-DOWN																																				4				55		N	4	C			55		N
DISTRIBUTION	5					1	D	5					1	D	5					1	D															5					1	D	5					1	D
DRAIN																						5					1	G																					
RINSE 1	6	C		HL		100	N	6	C		HL		100	N	6	C		HL		70	N	6	C		HL		70	R								6	C		HL		100	N	6	C		HL		100	N
DRAIN	6					20	N	6					20	N	6					20	N	6					1	G								6					20	N	6					20	N
DISTRIBUTION	6					20	D	6					20	D	6					20	D															6					20	D	6					20	D
EXTRACTION	6					50	E	6					50	E	6					50	E															6					50	E	6					50	E
RINSE 2	7	C		HL		100	N	7	C		HL		100	N	7	C		HL		100	N	7	C		HL		100	R								7	C		HL		100	N	7	C		HL		100	N
DRAIN	7					20	N	7					20	N	7					20	N	7					1	G								7					20	N	7					20	N
DISTRIBUTION	7					20	D	7					20	D	7					20	D															7					20	D	7					20	D
EXTRACTION	7					50	E	7					50	E	7					50	E															7					50	E	7					50	E
RINSE 3	8	Hd	3	HL		2	N	8	Hd	3	HL		2	N	8	Hd	3	HL		2	N	8	Hd	3	HL		2	R								8	Hd	3	HL		2	N	8	Hd	3	HL		2	N
DRAIN	9					20	N	9					20	N	9					20	N	9					20	G								9					20	N	9					20	N
DISTRIBUTION	9					20	D	9					20	D	9					20	D	9					20	D								9					20	D	9					20	D
EXTRACTION	9					6	E	9					6	E	9					6	E	9					6	E								9					6	E	9					6	E
DRAIN	9					20	N	9					20	N	9					20	N	9					20	G								9					20	N	9					20	N
DISTRIBUTION	9					30	D	9					30	D	9					30	D	9					30	D								9					30	D	9					30	D
EXTRACTION	9					5	E	9					5	E	9					5	E	9					1,5	E								9					1,5	E	9					1,5	E
PROGRAM TIME	39							39							39							28							28							35							35						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 31d

PROGRAM	NORMAL 95°						
	1						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3	-	-	-	-	70	E
WEIGHING	3					35	E
PREWASH							
DRAIN							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	-	L	-	6	N
HEATING	3	-	-	L	73	-	N
WASH	3	-	-	L		12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1	5	C	-	M	-	2	N
DRAIN	5	-	-			1	D
EXTRACTION	5					-	-
RINSE 2	6	C	-	M	-	2	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	M	-	2	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	C	3	M	-	2	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION							
PROGRAM TIME	39						

PROGRAM	NORMAL 60°						
	2						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3	-	-	-	-	70	E
WEIGHING	3					35	E
PREWASH							
DRAIN							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	-	L	-	6	N
HEATING	3	-	-	L	55	-	N
WASH	3	-	-	L	55	2	N
DRAIN	4	-	-	-	-	1	D
RINSE 1	5	C	-	M	-	2	N
DRAIN	5					1	D
EXTRACTION	5						
RINSE 2	6	C	-	M	-	2	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	M	-	2	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	C	3	M	-	2	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					5	E
PROGRAM TIME	38						

PROGRAM	NORMAL 40°						
	3						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3	-	-	-	-	70	E
WEIGHING	3					35	E
PREWASH							
DRAIN							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	-	L	-	6	N
HEATING	3	-	-	L	40	-	N
WASH	3	-	-	L	40	12	N
DRAIN	4					1	D
RINSE 1	5	C	-	M	-	2	N
DRAIN	5					1	D
EXTRACTION	5						
RINSE 2	6	C	-	M	-	2	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	M	-	2	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	C	3	M	-	2	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					5	E
PROGRAM TIME	38						

PROGRAM	MILD 30°						
	4						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION							
WEIGHING	3					35	E
PREWASH							
DRAIN							
MAIN WASH	3	C	2	M	-	-	-
SOAKING	-						
HEATING	3	C	2	M	30	-	R
WASH	-				30	15	R
DRAIN	4					1	-
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	M	-	2	R
DRAIN	6					1	-
EXTRACTION	-						-
RINSE 3	7	C	-	M	-	2	R
DRAIN	7					1	-
EXTRACTION	-						-
RINSE 4	8	C	3	M	-	2	R
DRAIN	9					40	RD
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	28						

PROGRAM	WOOL						
	5						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION							
WEIGHING	3					35	E
PREWASH							
DRAIN							
MAIN WASH	3	C	2	M	-	-	-
SOAKING	-						
HEATING	3	C	2	M	40	-	R
WASH	-				40	15	R
DRAIN	4					1	-
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	M	-	2	R
DRAIN	6					1	-
EXTRACTION	-						-
RINSE 3	7	C	-	M	-	2	R
DRAIN	7					1	-
EXTRACTION	-						-
RINSE 4	8	C	3	M	-	2	R
DRAIN	9					40	RD
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	28						

PROGRAM	PERM PRESS 40°						
	6						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3	-	-	-	-	70	E
WEIGHING	3					35	E
PREWASH							
DRAIN							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	2	L	-	6	N
HEATING	3	-	-	-	40	-	N
WASH	3	-	-	-	40	12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	M	-	3	N
DRAIN	6					1	D
EXTRACTION	-						-
RINSE 3	7	C	-	M	-	3	N
DRAIN	7					1	D
EXTRACTION	-						-
RINSE 4	8	C	3	M	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					1,5	E
PROGRAM TIME	34						

PROGRAM	PERM PRESS 60°						
	7						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3	-	-	-	-	70	E
WEIGHING	3					35	E
PREWASH							
DRAIN							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	2	L	-	6	N
HEATING	3	-	-	-	55	-	N
WASH	3	-	-	-	55	12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	M	-	3	N
DRAIN	6					1	D
EXTRACTION	-						-
RINSE 3	7	C	-	M	-	3	N
DRAIN	7					1	D
EXTRACTION	-						-
RINSE 4	8	C	3	M	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					1,5	E
PROGRAM TIME	34						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
□ = TIME MIN.

Program table PE 31d

PROGRAM	NORMAL 95°							NORMAL 60°							NORMAL 40°							MILD 30°							WOOL 40°							PERM PRESS 40°							PERM PRESS 60°						
	8							9							10							11							12							13							14						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1	-	-	-	-	70	E	1	-	-	-	-	70	E	1	-	-	-	-	70	E															1	-	-	-	-	70	E	1	-	-	-	-	70	E
WEIGHING	1					35	E	1					35	E	1					35	E	3					35	E	3					35	E	1					35	E	1					35	E
PREWASH	1	C	1	L	-	-	N	1	C	1	L	-	-	N	1	C	1	L	-	-	N															1	C	1	L	-	-	N	1	C	1	L	-	6	N
SOAKING	1	C	1	L	-	6	N	1	C	1	L	-	6	N	1	C	1	L	-	6	N															1	C	1	L	-	6	N	1	C	1	L	-	6	N
DRAIN	2					1	D	2					1	D	2					1	D															2					1	D	2					1	D
MAIN WASH	3	C	2	L	-	-	N	3	C	2	L	-	-	N	3	C	2	L	-	-	N	3	C	2	M	-	-	-	3	C	2	M	-	-	-	3	C	2	L	-	-	N	3	C	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-							-							3	C	2	L	-	6	N	3	C	2	L	-	6	N
HEATING	3	-	-	L	80	-	N	3	-	-	L	60	-	N	3	-	-	L	40	-	N	3	C	2	h	30	-	R	3	C	2	h	40	-	R	3	-	-	-	40	-	N	3	-	-	-	60	-	N
WASH	3	-	-	-	80	12	N	3	-	-	-	60	2	N	3	-	-	-	40	12	N	-				30	15	R	-				40	15	R	3	-	-	-	40	12	N	3	-	-	-	60	12	N
DRAIN	4	-	-	-	-	1	D	4	-	-	-	-	1	D	4					1	D	4					1	-	4					1	-	4	-	-	-	-	1	D	4	-	-	-	-	1	D
								-																																									
RINSE 1	5	C	-	M	-	2	N	5	C	-	M	-	2	N	5	C	-	M	-	2	N																												
DRAIN	5	-	-			1	D	5					1	D	5					1	D																												
EXTRACTION	5					-	-	5							5																																		
RINSE 2	6	C	-	M	-	2	N	6	C	-	M	-	2	N	6	C	-	M	-	2	N	6	C	-	M	-	2	R	6	C	-	M	-	2	R	6	C	-	M	-	3	N	6	C	-	M	-	3	N
DRAIN	6					40	ND	6					40	ND	6					40	ND	6					1	-	6					1	-	6					1	D	6					1	D
EXTRACTION	6					30	E	6					30	E	6					30	E	-						-	-						-	-					-		-						-
RINSE 3	7	C	-	h	-	2	N	7	C	-	h	-	2	N	7	C	-	h	-	2	N	7	C	-	M	-	2	R	7	C	-	M	-	2	R	7	C	-	M	-	3	N	7	C	-	M	-	3	N
DRAIN	7					40	ND	7					40	ND	7					40	ND	7					1	-	7					1	-	7					1	D	7					1	D
EXTRACTION	7					30	E	7					30	E	7					30	E	-						-	-						-	-						-	-						-
RINSE 4	8	C	3	h	-	2	N	8	C	3	h	-	2	N	8	C	3	h	-	2	N	8	C	3	h	-	2	R	8	C	3	h	-	2	R	8	C	3	M	-	3	N	8	C	3	M	-	3	N
DRAIN	9					40	ND	9					40	ND	9					40	ND	9					40	RD	9					40	RD	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E	9					6	E	9					6	E	9					6	E	9					6	E	9					6	E
DRAIN	9					50	ND	9					50	ND	9					50	ND	9					50	RD	9					50	RD	9					50	ND	9					50	ND
EXTRACTION	9					5	E	9					5	E	9					5	E	9					1,5	E	9					1,5	E	9					1,5	E	9					1,5	E
PROGRAM TIME	39							39							39							28							28							41							41						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 41a

PROGRAM	NORMAL 95°							NORMAL 60°						
	1							2						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E	3					70	E
WEIGHING	3					35	E	3					35	E
PREWASH														
DRAIN														
MAIN WASH	3	C	2	L	-	-	N	3	C	2	L	-	-	N
SOAKING	3	C	2	L	-	3	N	3	C	2	L	-	3	N
HEATING	3	-	-	L	90	-	N	3	-	-	L	60	-	N
WASH	3	-	-	L	90	12	N	3	-	-	-	60	12	N
DRAIN	4	-	-	-	-	40	ND	4	-	-		-	40	ND
EXTRACTION	4					6	E	4					6	E
FOAMINHIBITION	4	C	-	L	-	10	N	4	C	-	L	-	10	N
DRAIN	4					90	ND	4					90	ND
EXTRACTION	4					30	E	4					30	E
RINSE 2	6	C	-	h	-	2	N	6	C	-	h	-	2	N
DRAIN	6					40	ND	6					40	ND
EXTRACTION	6					30	E	6					30	E
RINSE 3	7	C	-	h	-	2	N	7	C	-	h	-	2	N
DRAIN	7					40	ND	7					40	ND
EXTRACTION	7					30	E	7					30	E
RINSE 4	8	C	3	h	-	2	N	8	C	3	h	-	2	N
DRAIN	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E
DRAIN	9					50	ND	9					50	ND
EXTRACTION	9					5	E	9					5	E
PROGRAM TIME	34,5							34,5						

PROGRAM	NORMAL 40°							MILD 30°						
	3							4						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E							
WEIGHING	3					35	E	3					35	E
PREWASH														
DRAIN														
MAIN WASH	3	C	2	L	-	-	N	3	C	2	h	-	-	-
SOAKING	3	C	2	L	-	6	N	-						
HEATING	3	-	-	L	40	-	N	3	C	2	h	30	-	R
WASH	3	-	-	-	40	12	N	3	-	-	-	30	15	R
DRAIN	4	-	-	-	-	40	ND	4					1	-
EXTRACTION	4					6	E	-						-
FOAMINHIBITION	4	C	-	L	-	10	N							
DRAIN	4					90	ND							
EXTRACTION	4					30	E							
RINSE 2	6	C	-	h	-	2	N	6	C	-	h	-	2	R
DRAIN	6					40	ND	6					1	-
EXTRACTION	6					30	E	-						-
RINSE 3	7	C	-	h	-	2	N	7	C	-	h	-	2	R
DRAIN	7					40	ND	7					1	-
EXTRACTION	7					30	E	-						-
RINSE 4	8	C	3	h	-	2	N	8	C	3	h	-	2	R
DRAIN	9					40	ND	9					40	RD
EXTRACTION	9					6	E	9					6	E
DRAIN	9					50	ND	9					50	ND
EXTRACTION	9					5	E	9					1,5	E
PROGRAM TIME	34,5							28						

PROGRAM	WOOL							PERM PRESS 40°						
	5							6						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION								3					70	E
WEIGHING	3					35	E	3					35	E
PREWASH														
DRAIN														
MAIN WASH	3	C	2	h	-	-	-	3	C	2	L	-	-	N
SOAKING	-							3	C	2	L	-	3	N
HEATING	3	C	2	h	40	-	R	3	-	-	-	40	-	N
WASH	3	-	-	-	40	15	R	3	-	-	-	40	12	N
DRAIN	4					1	-	4	-	-	-	-	40	ND
EXTRACTION	-						-	4					6	E
FOAMINHIBITION								4	C	-	L	-	10	N
DRAIN								4					90	ND
EXTRACTION								4					30	E
RINSE 2	6	C	-	h	-	2	R	6	C	-	M	-	3	N
DRAIN	6					1	-	6					1	D
EXTRACTION	-						-	-						
RINSE 3	7	C	-	h	-	2	R	7	C	-	h	-	3	N
DRAIN	7					1	-	7					1	D
EXTRACTION	-						-	-						
RINSE 4	8	C	3	h	-	2	R	8	C	3	M	-	3	N
DRAIN	9					40	RD	9					40	ND
EXTRACTION	9					6	E	9					6	E
DRAIN	9					50	ND	9					50	ND
EXTRACTION	9					1,5	E	9					1,5	E
PROGRAM TIME	28							34						

PROGRAM	PERM PRESS 60°						
	7						
PROGRAM STEP	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
DRAIN							
MAIN WASH	3	C	2	L	-	-	N
SOAKING	3	C	2	L	-	3	N
HEATING	3	-	-	-	60	-	N
WASH	3	-	-	-	60	12	N
DRAIN	4	-	-	-	-	40	ND
EXTRACTION	4					6	E
FOAMINHIBITION	4	C	-	L	-	10	N
DRAIN	4					90	ND
EXTRACTION	4					30	E
RINSE 2	6	C	-	M	-	3	N
DRAIN	6					1	D
EXTRACTION	-						
RINSE 3	7	C	-	M	-	3	N
DRAIN	7					1	D
EXTRACTION	-						
RINSE 4	8	C	3	M	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					1,5	E
PROGRAM TIME	34						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 41a

PROGRAM / PROGRAM STEP	NORMAL 95°							NORMAL 60°						
	8							9						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1	-	-	-	-	70	E	1	-	-	-	-	70	E
WEIGHING	1					35	E	1					35	E
PREWASH	1	C	1	L	-	-	N	1	C	1	L	-	-	N
SOAKING	1	C	1	L	40	6	N	1	C	1	L	40	6	N
DRAIN	2					1	D	2					1	D
MAIN WASH	3	C	2	L	-	-	N	3	C	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEATING	3	-	-	L	90	-	N	3	-	-	L	60	-	N
WASH	3	-	-	-	90	24	N	3	-	-	-	60	24	N
DRAIN	4	-	-	-	-	40	ND	4	-	-	-	-	40	ND
EXTRACTION *	4					6	E	4					6	E
RINSE 1	5	C	-	M	-	2	N	5	C	-	M	-	2	N
DRAIN	5	-	-			40	ND	5					40	ND
RINSE 2	5					30	E	5					30	E
DRAIN	6	C	-	M	-	2	N	6	C	-	M	-	2	N
EXTRACTION	6					40	ND	6					40	ND
RINSE 3	6					30	E	6					30	E
DRAIN	7	C	-	h	-	2	N	7	C	-	h	-	2	N
EXTRACTION	7					40	ND	7					40	ND
RINSE 4	7					30	E	7					30	E
DRAIN	8	C	3	h	-	2	N	8	C	3	h	-	2	N
EXTRACTION	9					40	ND	9					40	ND
DRAIN	9					6	E	9					6	E
EXTRACTION	9					50	ND	9					50	ND
PROGRAM TIME	9					5	E							
	52							52						

PROGRAM / PROGRAM STEP	NORMAL 40°							MILD 30°						
	10							11						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1	-	-	-	-	70	E							
WEIGHING	1					35	E	3					35	E
PREWASH	1	C	1	L	-	-	N							
SOAKING	1	C	1	L	40	6	N							
DRAIN	2					1	D							
MAIN WASH	3	C	2	L	-	-	N	3	C	2	h	-	-	-
SOAKING	-	-	-	-	-	-	-	-						-
HEATING	3	-	-	L	40	-	N	3	C	2	h	30	-	R
WASH	3	-			40	24	N	3				30	15	R
DRAIN	4					40	ND	4					1	-
EXTRACTION *	4					6	E	-						
RINSE 1	5	C	-	M	-	2	N							
DRAIN	5					40	ND							
RINSE 2	5					30	E							
DRAIN	6	C	-	M	-	2	N	6	C	-	h	-	2	R
EXTRACTION	6					40	ND	6					1	-
RINSE 3	6					30	E	-						-
DRAIN	7	C	-	h	-	2	N	7	C	-	h	-	2	R
EXTRACTION	7					40	ND	7					1	-
RINSE 4	7					30	E	-						-
DRAIN	8	C	3	h	-	2	N	8	C	3	h	-	2	R
EXTRACTION	9					40	ND	9					40	RD
DRAIN	9					6	E	9					6	E
EXTRACTION	9					50	ND	9					50	ND
PROGRAM TIME	9					5	E	9					1,5	E
	52							28						

PROGRAM / PROGRAM STEP	WOOL 40°							PERM PRESS 40°						
	12							13						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION								1	-	-	-	-	70	E
WEIGHING	3					35	E	1					35	E
PREWASH								1	C	1	L	-	-	N
SOAKING								1	C	1	L	40	6	N
DRAIN								2					1	D
MAIN WASH	3	C	2	h	-	-	-	3	C	2	L	-	-	N
SOAKING	-						-	-	-	-	-	-	-	-
HEATING	3	C	2	h	40	-	R	3	-	-	-	40	-	N
WASH	3				40	15	R	3	-	-	-	40	24	N
DRAIN	4					1	-	4	-	-	-	-	40	ND
EXTRACTION *	-							4						E
RINSE 1														
DRAIN														
RINSE 2														
DRAIN	6	C	-	h	-	2	R	6	C	-	M	-	3	N
EXTRACTION	6					1	-	6					1	D
RINSE 3	-						-	-					-	
DRAIN	7	C	-	h	-	2	R	7	C	-	M	-	3	N
EXTRACTION	7					1	-	7					1	D
RINSE 4	-						-	-						-
DRAIN	8	C	3	h	-	2	R	8	C	3	M	-	3	N
EXTRACTION	9					40	RD	9					40	ND
DRAIN	9					6	E	9					6	E
EXTRACTION	9					50	ND	9					50	ND
PROGRAM TIME	9					1,5	E	9					1,5	E
	28							47						

PROGRAM / PROGRAM STEP	PERM PRESS 60°						
	14						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1	-	-	-	-	70	E
WEIGHING	1					35	E
PREWASH	1	C	1	L	-	-	N
SOAKING	1	C	1	L	40	6	N
DRAIN	2					1	D
MAIN WASH	3	C	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-
HEATING	3	-	-	-	60	-	N
WASH	3	-	-	-	60	24	N
DRAIN	4	-	-	-	-	40	ND
EXTRACTION *	4					6	E
RINSE 1							
DRAIN							
RINSE 2							
DRAIN	6	C	-	M	-	3	N
EXTRACTION	6					1	D
RINSE 3	-						-
DRAIN	7	C	-	M	-	3	N
EXTRACTION	7					1	D
RINSE 4	-						-
DRAIN	8	C	3	M	-	3	N
EXTRACTION	9					40	ND
DRAIN	9					6	E
EXTRACTION	9					50	ND
PROGRAM TIME	9					1,5	E
	47						

* Foaminhibition after main wash

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
□ = TIME MIN.

Program table PE 61a

PROGRAM / PROGRAM STEP	NORMAL 95°						
	1						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	W	2	L	-	-	N
SOAKING	3	W	-	L	-	6	N
HEATING	3	-	-	L	85	-	N
WASH	3	-	-	-	85	12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	3	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	h	-	3	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	C	3	h	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					5	E
PROGRAM TIME	38						

PROGRAM / PROGRAM STEP	NORMAL 60°						
	2						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	W	2	L	-	-	N
SOAKING	3	W	-	L	-	6	N
HEATING	3	-	-	L	55	-	N
WASH	3	-	-	L	55	12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	3	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	h	-	3	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	C	3	h	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	ND
EXTRACTION	9					5	E
PROGRAM TIME	38						

PROGRAM / PROGRAM STEP	NORMAL 40°						
	3						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	W	2	L	-	-	N
SOAKING	3	W	-	L	-	6	N
HEATING	3	-	-	L	40	-	N
WASH	3	-	-	-	40	12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	3	N
DRAIN	6					40	ND
EXTRACTION	6					30	E
RINSE 3	7	C	-	h	-	3	N
DRAIN	7					40	ND
EXTRACTION	7					30	E
RINSE 4	8	C	3	h	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					5	E
PROGRAM TIME	38						

PROGRAM / PROGRAM STEP	MILD 30°						
	4						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION							
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	C	2	h	-	-	-
SOAKING	-						
HEATING	3	C	2	h	30	-	R
WASH	3	-	-	-	30	15	R
DRAIN	4					1	-
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	2	R
DRAIN	6					1	-
EXTRACTION	-						-
RINSE 3	7	C	-	h	-	2	R
DRAIN	7					1	-
EXTRACTION	-						-
RINSE 4	8	C	3	h	-	2	R
DRAIN	9					40	RD
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	28						

PROGRAM / PROGRAM STEP	WOOL						
	5						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION							
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	C	2	h	-		-
SOAKING							
HEATING	3	C	2	h	40	-	R
WASH	3	-	-	-	40	15	R
DRAIN	4					1	-
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	h	-	2	R
DRAIN	6					1	-
EXTRACTION	-						-
RINSE 3	7	C	-	h	-	2	R
DRAIN	7					1	-
EXTRACTION	-						-
RINSE 4	8	C	3	h	-	2	R
DRAIN	9					40	RD
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	28						

PROGRAM / PROGRAM STEP	PERM PRESS 40°						
	6						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	W	2	L	-	-	N
SOAKING	3	W	2	L	-	6	N
HEATING	3	-	-	-	40	-	N
WASH	3	-	-	-	40	12	N
DRAIN	4	-	-	-	-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	M	-	3	N
DRAIN	6					1	D
EXTRACTION	-						-
RINSE 3	7	C	-	M	-	3	N
DRAIN	7					1	D
EXTRACTION	-						-
RINSE 4	8	C	3	M	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	34						

PROGRAM / PROGRAM STEP	PERM PRESS 60°						
	7						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	3					70	E
WEIGHING	3					35	E
PREWASH							
MAIN WASH	3	W	2	L	-	-	N
SOAKING	3	W	2	L	-	6	N
HEATING	3	-	-	-	55	-	N
WASH	3	-	-	-	55	12	N
DRAIN	4	-	-		-	1	D
RINSE 1							
DRAIN							
EXTRACTION							
RINSE 2	6	C	-	M	-	3	N
DRAIN	6					1	D
EXTRACTION	-						-
RINSE 3	7	C	-	M	-	3	N
DRAIN	7					1	D
EXTRACTION	-						-
RINSE 4	8	C	3	M	-	3	N
DRAIN	9					40	ND
EXTRACTION	9					6	E
DRAIN	9					50	RD
EXTRACTION	9					1,5	E
PROGRAM TIME	34						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
☐ = TIME MIN.

Program table PE 61a

PROGRAM / PROGRAM STEP	NORMAL 95°							NORMAL 60°							NORMAL 40°						
	8							9							10						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					70	E	1					70	E	1					70	E
WEIGHING	1					35	E	1					35	E	1					35	E
PREWASH	1	W	1	L	-	-	N	1	W	1	L	-	-	N	1	W	1	L	-	-	N
SOAKING	1	W	1	L	-	6	N	1	W	1	L	-	6	N	1	W	1	L	-	6	N
DRAIN	2					1	D	2					1	D	2					1	D
MAIN WASH	3	H	2	L	-	-	N	3	H	2	L	-	-	N	3	H	2	L	-	-	N
SOAKING	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HEATING	3	-	-	L	80	-	N	3	-	-	L	60	-	N	3	-	-	L	40	-	N
WASH	3	-	-	-	80	12	N	3	-	-	-	60	12	N	3	-	-	-	40	12	N
DRAIN	4	-	-	-	-	1	D	4	-	-	-	-	1	D	4	-	-	-	-	1	D
RINSE 1	5	C	-	M	-	2	N	5	C	-	M	-	2	N	5	C	-	M	-	2	N
DRAIN	5					1	D	5					1	D	5					1	D
EXTRACTION	5					-	-	5							5						
RINSE 2	6	C	-	M	-	2	N	6	C	-	M	-	2	N	6	C	-	M	-	2	N
DRAIN	6					40	ND	6					40	ND	6					40	ND
EXTRACTION	6					30	E	6					30	E	6					30	E
RINSE 3	7	C	-	h	-	2	N	7	C	-	h	-	2	N	7	C	-	h	-	2	N
DRAIN	7					40	ND	7					40	ND	7					40	ND
EXTRACTION	7					30	E	7					30	E	7					30	E
RINSE 4	8	C	3	h	-	2	N	8	C	3	h	-	2	N	8	C	3	h	-	2	N
DRAIN	9					40	ND	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E	9					6	E
DRAIN	9					50	ND	9					50	ND	9					50	ND
EXTRACTION	9					5	E	9					5	E	9					5	E
PROGRAM TIME	39							39							39						

PROGRAM / PROGRAM STEP	MILD 30°							WOOL 40°						
	11							12						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION														
WEIGHING	3					35	E	3					35	E
PREWASH														
SOAKING														
DRAIN														
MAIN WASH	3	C	2	h	-	-	-	3	C	2	h	-	-	-
SOAKING	-						-	-						
HEATING	3	C	2	h	30	-	R	3	C	2	h	40	-	R
WASH	-				30	15	R	-				40	15	R
DRAIN	4					1	-	4					1	-
RINSE 1														
DRAIN														
EXTRACTION														
RINSE 2	6	C	-	h	-	2	R	6	C	-	h	-	2	R
DRAIN	6					1	-	6					1	-
EXTRACTION	-						-	-						-
RINSE 3	7	C	-	h	-	2	R	7	C	-	h	-	2	R
DRAIN	7					1	-	7					1	-
EXTRACTION	-						-	-						-
RINSE 4	8	C	3	h	-	2	R	8	C	3	h	-	2	R
DRAIN	9					40	RD	9					40	RD
EXTRACTION	9					6	E	9					6	E
DRAIN	9					50	RD	9					50	RD
EXTRACTION	9					1,5	E	9					1,5	E
PROGRAM TIME	28							28						

PROGRAM / PROGRAM STEP	PERM PRESS 40°							PERM PRESS 60°						
	13							14						
	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION	TPROGRAM IND.	INTAKE WATER	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTION
DRY EXTRACTION	1					70	E	1					70	E
WEIGHING	1					35	E	1					35	E
PREWASH	1	W	1	L	-	-	N	1	W	1	L	-	-	N
SOAKING	1	W	1	L	-	6	N	1	W	1	L	-	6	N
DRAIN	2					1	D	2					1	D
MAIN WASH	3	W	2	L	-	-	N	3	W	2	L	-	-	N
SOAKING	3	W	2	L	-	6	N	3	W	2	L	-	6	N
HEATING	3	-	-	-	40	-	N	3	-	-	-	60	-	N
WASH	3	-	-	-	40	12	N	3	-	-	-	60	12	N
DRAIN	4	-	-	-	-	1	D	4	-	-	-	-	1	D
RINSE 1														
DRAIN														
EXTRACTION														
RINSE 2	6	C	-	M	-	3	N	6	C	-	M	-	3	N
DRAIN	6					1	D	6					1	D
EXTRACTION	-						-	-						-
RINSE 3	7	C	-	M	-	3	N	7	C	-	M	-	3	N
DRAIN	7					1	D	7					1	D
EXTRACTION	-						-	-						-
RINSE 4	8	C	3	M	-	3	N	8	C	3	M	-	3	N
DRAIN	9					40	ND	9					40	ND
EXTRACTION	9					6	E	9					6	E
DRAIN	9					50	RD	9					50	ND
EXTRACTION	9					1,5	E	9					1,5	E
PROGRAM TIME	34							34						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15° C)

W = WARM WATER (APPROX. 35° C)
H = HOT WATER (APPROX. 65° C)
Hd = HARD WATER
LL = LOW WATER LEVEL
ML = MEDIUM WATER LEVEL
HL = HIGH WATER LEVEL
▨ = TIME SEC.
□ = TIME MIN.

The following maintenance routines should be adhered to for safe and efficient functioning and to prevent machine downtime.

The maintenance intervals should be adjusted according to the amount that the machine is used.

Every day

- Check the door and door lock:
  - Open the door and try to start the machine. The machine should not start.
  - Shut the door, start the machine and try to open the door. It should not be possible to open the door.
  - Check that the door is not leaking.
  - Clean the door seal, removing any traces of detergent or lint.
- Check that the water discharge valve does not leak while the machine is washing.
- Clean any left-over detergent from the detergent dispenser by using rapid advance through a program and letting the water flush the compartment clean.

Every three months

⚠ **To be carried out by authorised personnel only.** ⚠

- Check that the door has not been leaking.
- Check the water discharge from the machine and remove any lint present.
- Inspect the machine internally (straight after a wash so that any leaks will be apparent). Procedure:
  - Switch off the machine’s main power switch.
  - Remove the top cover and the front and back panels.
  - Check that all internal hose connections are sound, without leaks.
  - Check the drive belt, increase tension or replace if necessary (see section 30. Motor).
  - Check that water has not been leaking onto the floor.
  - If the heating time has been abnormally long, check the elements (see section 40. Heating). If the water supply is very hard water, check to see whether the elements have limescale deposits. If necessary descale them with a suitable descaling product. For the correct quantity of descaler, follow the manufacturer’s instructions.
  - Never activate the heating elements without water in the machine. Doing so will cause the element fuses to blow.
  - Check the dampers (”shock absorbers”).

Fault-finding

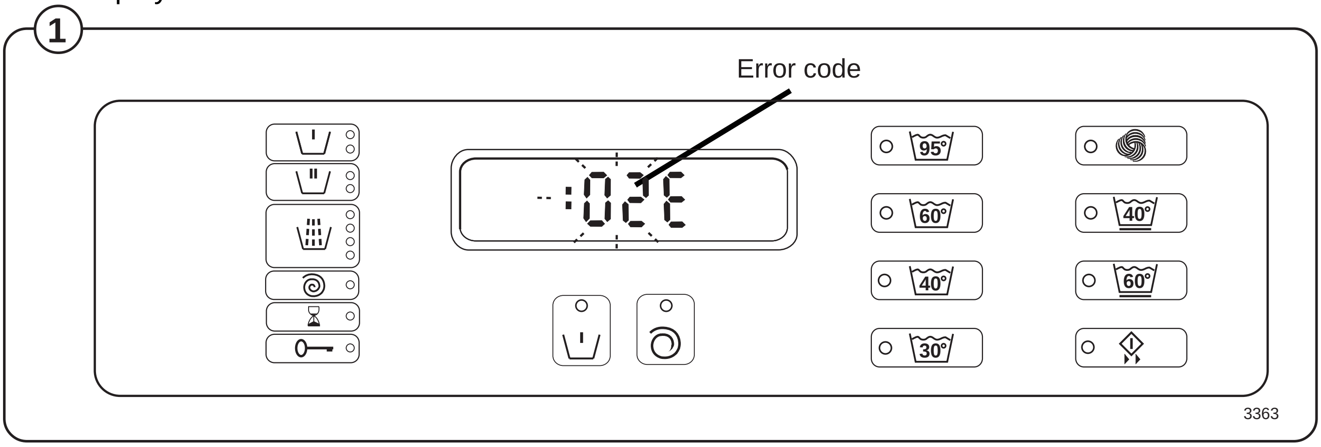
If the power supply to the machine should be cut while it is operating, the program unit has a memory which stores the program selected for about 3 to 5 minutes.

Within this period the machine will restart automatically once the power supply is restored.

Indication of faults/errors

Fig. ① Faults/errors in the program or machine are indicated by a numerical error code followed by the letter E flashing on and off on the control panel display.

1



In the case of error codes 01E, 02E, 03E and 14E, an attempt to restart the machine may be made as soon as the fault/error has been remedied, without the power supply being switched off. For the other error codes, a service engineer must be called.

WARNING
Be careful when measuring on the motor frequence control as all components potential difference of up to 300V in comparision to ground and zero. About 10 sec after the power is cut off to the machine and the motor has come to a stop, the motor control has no tension.

Error codes

Given below is a brief summary of all the error codes and their causes. Starting on page 5 of this section there are fault-finding charts for all error codes.

At the end of the chapter there are also charts for faults which do not generate error codes.

Error code	Cause
01E	Acknowledgement signal for water level not received within time allowed.
02E	Door status acknowledgement signal not received during program operation.
03E	Door lock acknowledgement signal not received within time allowed.
04E	Temperature sensing device indicates temperature below -5°C (continuity fault).
05E	Temperature sensing indicates temperature above 98°C (short-circuit).
06E	Water level signal above parameter set, on program start-up.
07E	Water level signal above parameter set for safety, during program.
08E	Increase in water temperature is below parameter set.
10E	Water level signal is above parameter set (10 scale units) after water discharge.
12E	The program control unit cannot read the program EPROM.
13E	The program control unit receives no response from the motor control unit.
14E	Water level system not calibrated.
17E	Door status acknowledgement signal not received, although door lock acknowledgement signal has been received.
18E	Only with CALCAD 4400. Start not allowed because full payment has not been made for that program, or the booking time is too short to allow completion of the wash program selected.
19E	Communications between the CALCAD 4400 and the program control unit board interrupted.
20E	Motor control unit has not received signal for lock acknowledgement, during program.
31E	Temperature of motor control unit heat sink too high.
32E	Thermal protection for motor has cut out.
33E	The motor control unit has received a start command from the program control unit without having the interlock signal. No fault in motor control unit interlock hardware.
35E	Motor control unit indicating short-circuit between motor winding outputs.
36E	Motor control unit indicating fault/error in receiving circuitry for lock acknowledgement signal.
37E	Motor control unit indicating DC voltage level too low.
38E	Motor control unit indicating DC voltage level too high.

Built-in service program

The machine has a built-in service program to facilitate function checking and fault-finding.

> ⚠ **This program may only be used by trained and authorised service personnel.** ⚠

To switch on service mode

- Remove the machine top and the cover for the program unit circuit board.

Fig ②

- Press the service switch. This switch is on the left-hand edge of the circuit board when viewed from the machine front. The display will now show SE, which means that the service program is activated.

Controls in service mode

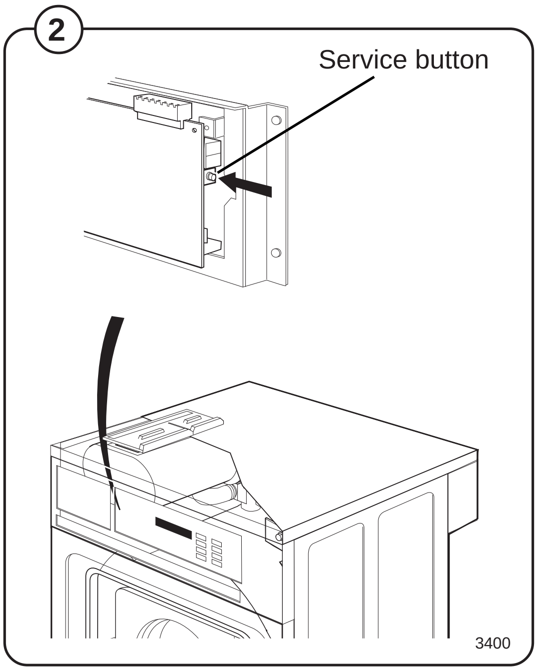
Fig ④ Now some of the buttons switch to being number keys (1 to 9). The start/door-open button becomes an **ON/OFF** key. The various machine functions can be tested using numerical codes (see table on next page).

Fig ③ The LEDs to the left of the display show which input signals to the program control unit are active.

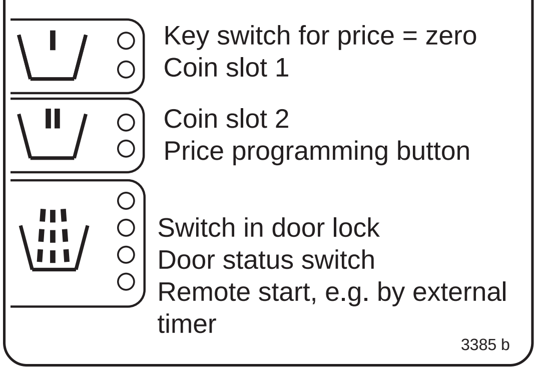
To switch off service mode

Fig ② Press the service switch again, or switch off the machine power supply.

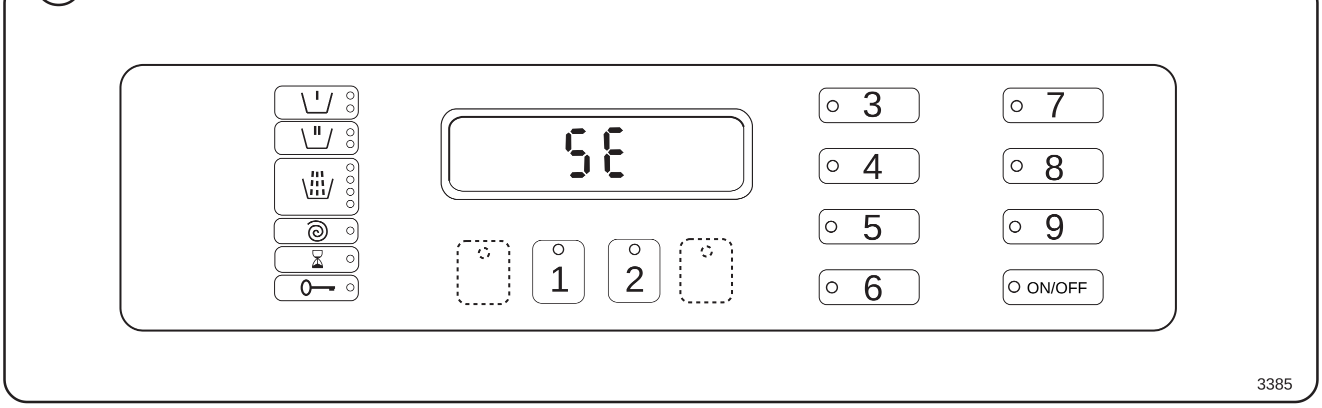
②



③



④



Simulation of functions

Some machine functions can be simulated by entering a numerical code via the keys. This function can then be switched on and off with the **ON/ OFF** key.

Code	Function
11	Detergent signal 1, liquid detergent.
12	Detergent compartment 2, cold water /Detergent signal 2, liquid detergent.
13	Detergent compartment 3, cold water /Detergent signal 3, liquid detergent.
14	Detergent compartment 2, hot water /Detergent signal 4, liquid detergent.
15	Detergent signal 5, liquid detergent.
16	Hot water in drum.
17	Detergent compartment 1, cold water.
18	Hard water in drum.
19	Heat: display shows actual temperature in drum, not code 19. When ”START” is pressed, the heating relay reacts if the water level is above 64 scale units. (Safety level).
21	Discharge valve/pump
23	Activate door lock. When it is deactivated, the water dis charge will also open.
24	Level check. The parameter corresponding to the actual level will be shown on the display, not code 24. When ”START” is pressed, filling with cold water commences via detergent compartment 1.
25	Motor, wash speed low (30 rpm), anticlockwise.
26	Motor, wash speed low (30 rpm), clockwise.
27	Motor, wash speed high (48 rpm), anticlockwise.
28	Motor, wash speed high (48 rpm), clockwise.
29	Distribution speed (90 rpm), clockwise.
31	Extraction, low (550 rpm), clockwise.
32	Extraction, medium (700 rpm), clockwise.
33	Extraction, high (1000 rpm), clockwise.
34	Extraction, high (1000 rpm), clockwise.
35	Display, test of segments, LED test, and buzzer.
36	Buzzer

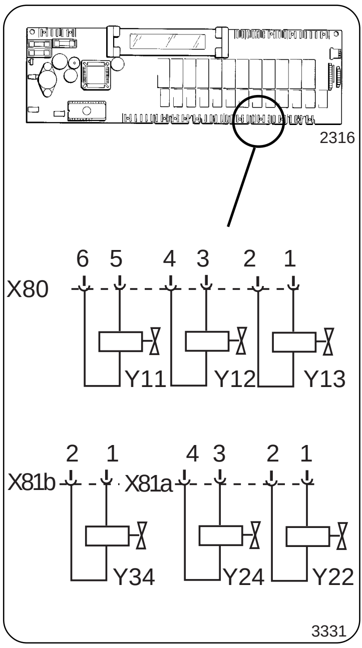
Code	Function
37	LED test
41-42	Coin mechanism (see Chapter 23, Program control unit).
43-44	Counter (hours) for accumulated operating time (see Chapter 23, Program control unit).
45	Last error code flagged.
51-54	Program EPROM part number (see Chapter 23, Program control unit).
91	Coin value, coin slot 1. This is set using the price-programming switch (see Chapter 23, Program control unit).
92	Coin value, coin slot 2. This is set using the price-programming switch (see Chapter 23, Program control unit).
93	Availability of pause function in coin-operated machines. Can be 1 = Yes or 0 = No. This is set using the price-programming switch (see Chapter 23, Program control unit).
94	Availability of rapid advance function in coin-operated machines. Can be 1 = Yes or 0 = No. This is set using the price-programming switch (see Chapter 23, Program control unit).
95	Activate coin-op input. Can be 1 = Active or 0 = Off. This is set using the price-programming switch (see Chapter 23, Program control unit).
96	Resetting of CALCAD 4400 setting. Can be 1 = Active or 0 = Reset. This is set using the price-programming switch. When installing CALCAD 4400 this parameter will automatically be set to 1.
97	To program a price reduction on a coin-operated machine, use the price-programming button. You set a price reduction as a percentage between 0 and 99. Rounding-up will take place to the next coin value upwards. A price reduction of 99% means a free wash program.

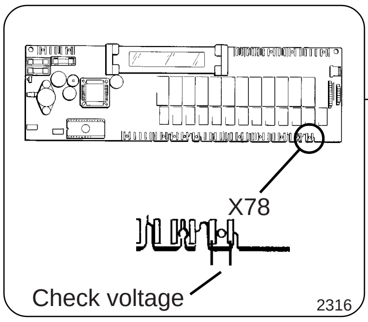
Error codes which may arise on the control panel display

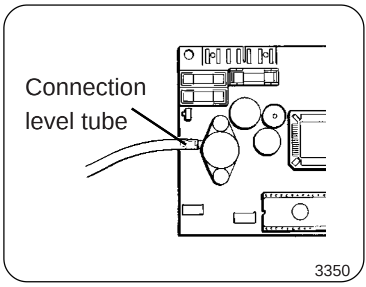
Error code/symptoms | Fault-finding | Cause/Action

01E

Acknowledgement signal for water level not received within time allowed.







Check that the manual water valves (taps) are open.

Taps turned on. → Taps turned off. → Open taps. Press START again.

Restart the program and use rapid advance to get to main wash. Check that the machine is filling with water.

Machine filling | Machine not filling

Check input voltage on relevant water valve (See Program Tables, Chapter 4).

Voltage not correct | Voltage correct → Faulty valve. Check function as described in Chapter 34.

Check water valve input voltage at PCB connector X80, X81a or X81b, according to valve.

Voltage not correct | Voltage correct → Faulty wiring between program control unit PCB and water valve. Check wiring and replace where necessary.

Check input voltage (230 V) at PCB connector X78.

Voltage not correct | Voltage correct → Faulty control output from program control unit PCB. Replace PCB.

Voltage not correct → Faulty wiring program control unit PCB - transformer T10, or faulty/ incorrect strapping on transformer T10.

Check that the discharge valve is closed, i.e. water level rising in drum.

Discharge valve closed | Discharge valve open → Follow fault-finding procedure for error code 06E in this chapter.

Check that level tube is sound, not kinked, not come loose from mother board.

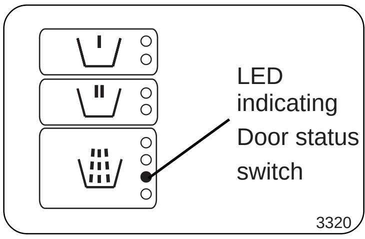
Level tube OK | Level tube not OK → Fit tube properly or replace it.

Level tube OK → Level detection function on program control unit PCB faulty. Replace PCB.

Error code/symptoms | Fault-finding | Cause/Action

02E

Door status acknowledgement signal not received during program operation.



Open door. Close door and try to restart the machine.

Error code returns — No error code

No error code → Transient fault in door lock or program PCB.

Error code returns ↓

Set program control unit to service mode (see ”To switch on service mode”). The door status switch will now be indicated by the LED (illustrated).

Press in the door status switch manually and check if this is indicated by the LED.

LED does not light. — LED lights.

LED lights. → Check whether the pin on the door or the plastic slide which the pin presses against are worn. Replace any worn parts (see Chapter 29. Door and door lock).

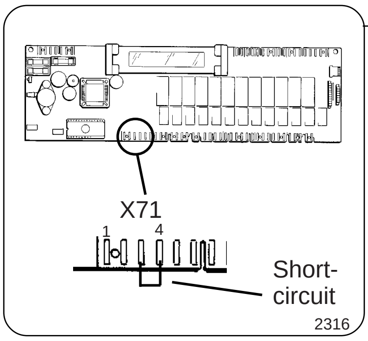
LED does not light. ↓

Disconnect the two wires from the switch. Short-circuit the two wires.

LED does not light. — LED lights.

LED lights. → Door lock switch faulty. Replace switch (see Chapter 29. Door and door lock).

LED does not light. ↓



Remove connector X71 from the program control unit PCB. Short-circuit between inputs 3 and 4.

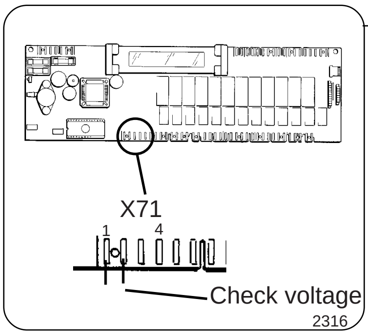
LED does not light. — LED lights.

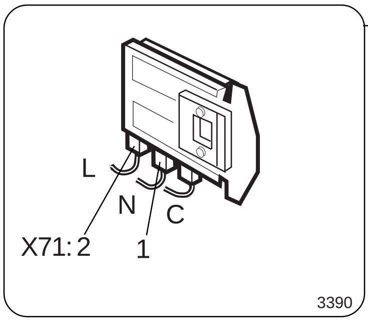
LED lights. → Continuity fault in wiring or connectors. Check wiring and replace if necessary.

LED does not light. → Fault in program control unit PCB. Replace PCB.

Error codes which may arise on the control panel display

Error code/symptoms	Fault-finding	Cause/Action
03E Door lock acknowledgement signal not received within time allowed.	Open door. Close door and try to restart the machine.	
	Error code returns No error code	Transient fault in door lock or program PCB.
	Start service program and activate door lock (code 23, press START). Check input voltage to door lock, PCB connector X71 between terminals 1 and 2.	
	Voltage correct. Voltage absent or wrong.	Faulty control output from program control unit PCB. Replace PCB.
	Unscrew the door lock (see Chapter 29, Door and door lock). Check voltage at door lock between terminals X71:1 and 2 as illustrated.	
	Voltage correct. Voltage absent or wrong.	Faulty wiring between program control unit PCB and door lock. Check wiring and change if necessary.
	Voltage correct.	Faulty door lock. Replace door lock.



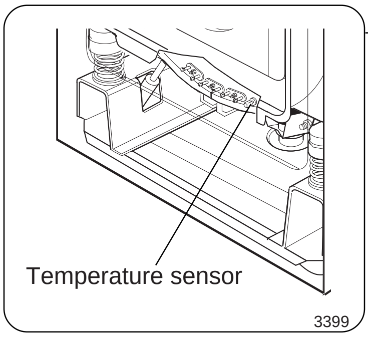


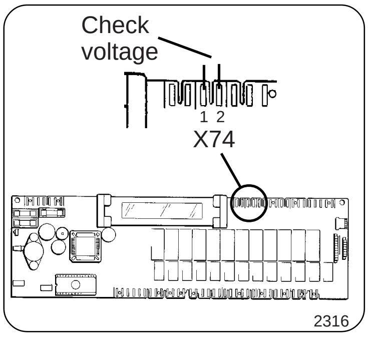
Error codes which may arise on the control panel display

Error code/symptoms | Fault-finding | Cause/Action

04E

Temperature sensing device indicates temperature below -5°C (continuity fault).





Turn the machine’s wall switch off and on again. Start a program.

Error code returns → Short-circuit the temperature sensor by the sensor. Turn the machine’s wall switch off and on again. Start a program. Check whether the error displayed is 04E or 05E.

No error code → Transient fault.

04E → Remove PCB connector X74 on program control unit PCB. Short-circuit inputs 1 and 2. Turn the machine’s wall switch off and on again. Start a program. Check whether the error displayed is 04E or 05E.

05E → Temperature sensor faulty. Replace sensor.

04E → Fault in temperature sensing device on program control unit PCB. Replace PCB.

05E → Fault in wiring to temperature sensor. Check wiring and replace if necessary.

Rough values on the temp. sensor

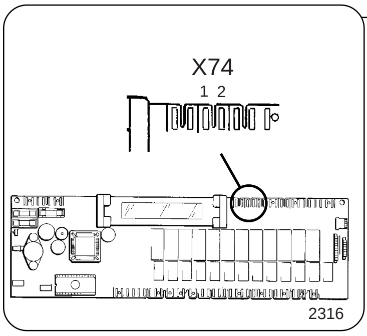
T (°C)	R (ohm)
19	6100
20	5850
21	5600
22	5350
23	5100

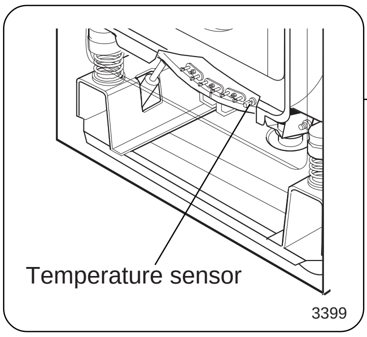
Error codes which may arise on the control panel display

Error code/symptoms — Fault-finding — Cause/Action

05E

Temperature sensing indicates temperature above 98°C (short-circuit).





Turn the machine's wall switch off and on again. Start a program.

Error code returns → Remove PCB connector X74 on program control unit PCB.

No error code → Transient fault.

Remove PCB connector X74 on program control unit PCB. Turn the machine's wall switch off and on again. Start a program. Check whether the error displayed is 04E or 05E.

04E → Put back X74.

05E → Fault in temperature sensing device on program control unit PCB. Replace PCB.

Put back X74. Disconnect the link between wiring and sensor by the temperature sensor. Turn the machine's wall switch off and on again. Start a program. Check whether the error displayed is 04E or 05E.

05E → Fault in wiring to temperature sensor. Check wiring and replace if necessary.

04E → Temperature sensor faulty. Replace sensor.

Rough values on the temp. sensor

T (°C)	R (ohm)
19	6100
20	5850
21	5600
22	5350
23	5100

Error codes which may arise on the control panel display

Error code/symptoms | Fault-finding | Cause/Action

06E

Water level signal above parameter set, on program start-up.

Are there water in the drum?

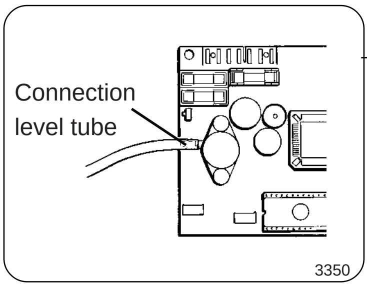
Yes | No

Disconnect the level tube from the program PCB. Turn the machine’s wall switch off and on again. Start a program.

Error code 06E | No error code or error code 01E

No error code or error code 01E → Level tube probably blocked, due to fluff of wrongly mounted. Clean or replace tube. Nipple blocked on drain valve.

Error code 06E → Level sensing device on program control unit PCB not working or incorrectly calibrated. Check zero level in the service program see chapter 12 page 4, code 24, zero level shall be between 0 and 4.



Turn the machine’s wall switch off. Does water run out of the drum?

Yes | No

No → Check the discharge valve (see Chapter 38). The service program can be used (code 21) to open and close the control valve for the discharge valve.

Yes → Turn on wall switch. Start a program and let it run.

Still an error code. | No error code.

No error code. → Transient fault. No action required.

Still an error code. → Check to see if the discharge valve is partially blocked or not opening fully.

Discharge valve OK | Discharge valve not OK

Discharge valve not OK → Check to see if the discharge valve is partially blocked or not opening fully (see Chapter 38).

Discharge valve OK → Faulty control signal to discharge valve from program control unit PCB. Replace PCB.

Error codes which may arise on the control panel display

Error code/symptoms | Fault-finding | Cause/Action

07E

Water level signal above parameter set for safety, during program.

Turn the machine's wall switch off and on. Start a program.

Error code 06 | No error code

No error code → Transient fault or water has been added manually.

Error code 06 → Is there a valve still drawing water?

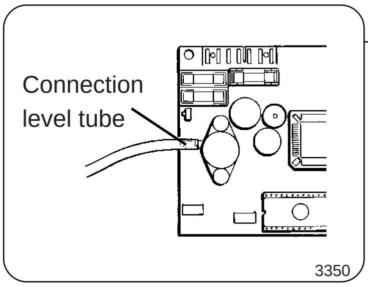
Yes | No

No → Turn the wall switch off and on. Disconnect level tube from level sensing device on PCB. Start a program.

Error 07 or 06 returns | No error code

No error code → Level tube probably blocked, due to fluff or wrongly mounted. Clean or replace tube. Nipple blocked on drain valve.

Error 07 or 06 returns → Level sensing device on program control unit PCB not working or incorrectly calibrated. Check zero level in the service program, see chapter 12 page 4, code 24, zero level shall be between 0 and 4.



Yes → Remove connector for valve input voltage.

Valve stops drawing water. | Valve still drawing water.

Valve still drawing water → Faulty water valve. Clean or replace valve (see Chap. 34).

Valve stops drawing water → Fault in control signal from program PCB. Replace PCB.

Error codes which may arise on the control panel display

Error code/symptoms | Fault-finding | Cause/Action

08E

Increase in water temperature is below parameter set.

Turn the machine’s wall switch off and on again. Start a program.

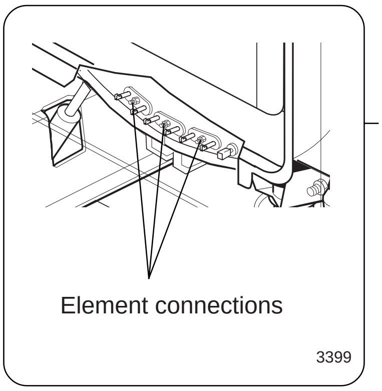
Error code returns — No error code

No error code → Transient fault. No action required.

Error code returns → Check the input voltage to the machine. All fuses sound?

Input voltage correct. — Input voltage wrong.

Input voltage wrong. → Replace fuse(s).



Input voltage correct. → Start the service program and fill with water (code 24) to at least level 80.

Start heating (code 19). Measure voltage across each element at element connections, alt measure all phases with a clip-on ammeter (6-25A depending on the heating element effect).

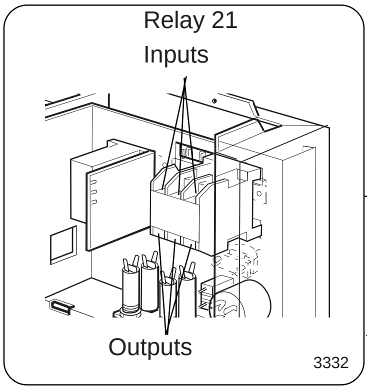
Voltage wrong — Voltage correct

Voltage correct → Switch off power supply at wall switch. Measure resistance of elements: should be 20 - 25 Ω (2.5 kW) or 40 - 50 Ω (1 kW).

Correct — Wrong

Wrong → Replace faulty element.

Correct → Check through hatch in drum whether the elements are coated with limescale. If necessary de-scale them.



Voltage wrong → Check voltage at outputs of relay 21.

An incorrect voltage — Voltages correct

Voltages correct → Fault in wiring between relay and element. Check wiring and replace it if necessary.

An incorrect voltage → Check voltage at inputs of relay 21.

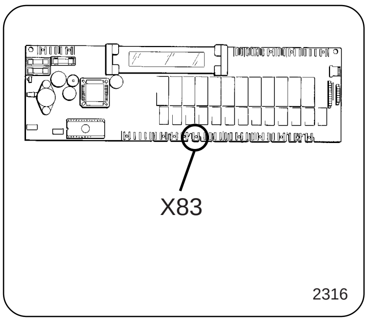
Voltages correct — An incorrect voltage

An incorrect voltage → Fault in wiring between relay and connection block X1. Check wiring and replace if necessary.

Voltages correct → Check visually that the relay has reacted.

Relay has not reacted — Relay has reacted

Relay has reacted → Relay faulty. Replace relay.



Relay has not reacted → On program control unit PCB check the voltage at connector X83 between 1 and 2 (230 V).

Voltage correct — Voltage wrong

Voltage wrong → Faulty control signal from program PCB. Replace PCB.

Voltage correct → Check input voltage to relay coil (230 V) on relay 21 between connections A1 and A2.

Voltage wrong — Voltage correct

Voltage correct → Relay faulty. Replace relay.

Voltage wrong → Fault in wiring between PCB and relay. Check wiring and replace if necessary.

Error codes which may arise on the control panel display

Error code/symptoms | Fault-finding | Cause/Action

10E

Water level signal is above parameter set (10 scale units) after water discharge.

Turn the machine off and on again.

Error code returns

No error code. → Transient fault.

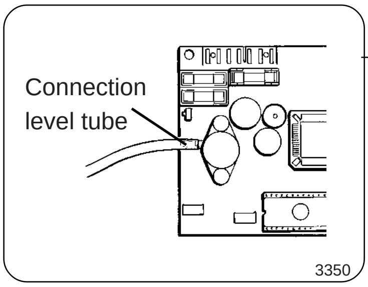
Is water visible in the drum?

Yes

No → Remove the water discharge valve from the drum. Is there water at the bottom of the drum?

Yes

No



Disconnect the level tube from the program PCB. Turn the machine's wall switch off and on again. Start a program.

Error code 06E or error code 10E → Level sensing device on program control unit PCB not working or incorrectly calibrated.

No error code or error code 01E → Level tube probably blocked. Clean or replace tube.

Turn the machine's wall switch off. Does water run out of the drum?

Yes

No → Check the discharge valve (see Chapter 38). The service program can be used (code 21) to open and close the control valve for the discharge valve.

Turn on wall switch. Start a program and let it run.

Still an error code.

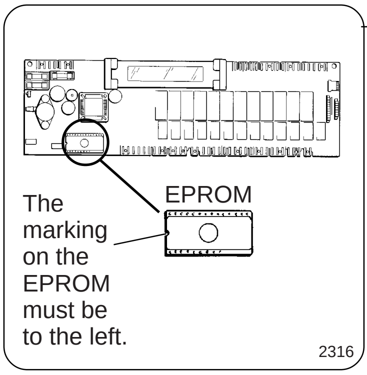
No error code. → Transient fault. No action required.

Check to see if the discharge valve is partially blocked or not opening fully.

Discharge valve OK → Faulty control signal to discharge valve from program control unit PCB. Replace PCB.

Discharge valve not OK → Check to see if the discharge valve is partially blocked or not opening fully (see Chapter 38).

Error codes which may arise on the control panel display

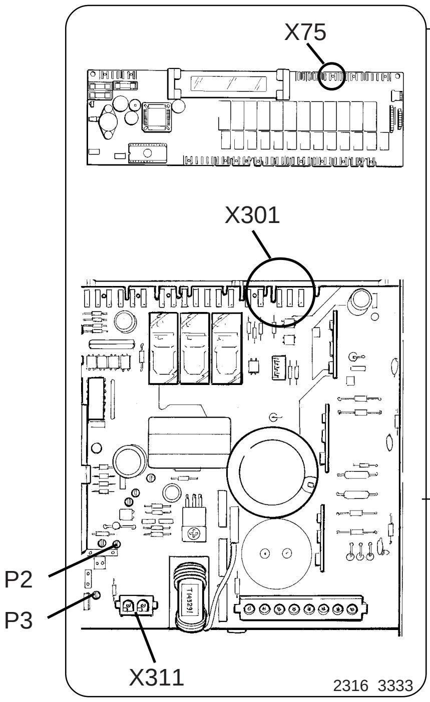
Error code/symptoms	Fault-finding		Cause/Action
12E The program control unit cannot read the program EPROM.	Turn the machine's wall switch off and on again. Start a program.		
	Error code returns	No error code	Transient fault. No action required.
 The marking on the EPROM must be to the left.	Unscrew the program control unit PCB. Remove the EPROM, then refit the same one. Check that the EPROM is turned the right way and that all its leg connectors enter the holder correctly. Restart the machine.		
	Error code 12E returns	Machine normal	Temporary loss of contact or EPROM fitted incorrectly.
	Replace the EPROM. Check that the new one has the correct program version. Restart machine.		
	Error code 12E returns	Machine normal	Old EPROM was faulty.
			Faulty program control unit PCB. Replace PCB. The old EPROM can probably be reused.

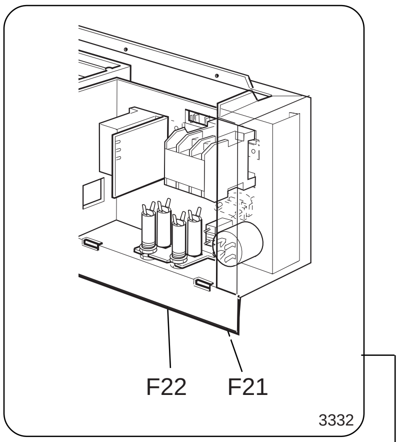
Error codes which may arise on the control panel display

Error code/symptoms | Fault-finding | Cause/Action

13E

Program control unit receiving no response from the motor control unit.





Turn the machine’s wall switch off and on again. Start a program.

Error code returns — No error code

No error code → Transient fault. No action required.

Error code returns ↓

Check wiring from X75 on program control unit PCB to X301 on motor control unit. Loosen the wire harness in both ends from the PCB boards. Use an ohmmeter to check that the four conductors are sound as follows:

X75:		X301:
1	-	4
2	-	3
3	-	2
4	-	1

Measure also between the four connections in X75 to eliminate possibility of short-circuits between two conductors.

Wiring sound — Wiring faulty

Wiring faulty → Check wiring and replace if necessary.

Wiring sound ↓

Check input voltage (230 V) to the motor control unit on contact X 311 (measure on rear of PCB).

Wrong voltage — Voltage correct

Voltage correct ↓

Measure between TP2 and TP3 with a multimeter set at DCV. Voltage should be 5V DC:

Voltage correct — Wrong voltage

Wrong voltage → Motor control not working. Change motor control.

Voltage correct ↓

To avoid another fault in the motor control, change it.

Still error in function — Function OK

Function OK → Fault in motor control unit communications circuits.

Still error in function → Probable fault in program control unit PCB communications circuits. Refit the original motor control unit and replace the program control unit PCB.

Wrong voltage ↓

Check voltage (230 V) across fuses F21 - F22.

Wrong voltage — Voltage correct

Voltage correct → Coil L1 faulty. Replace coil.

Wrong voltage → Input voltage to machine incorrect.

WARNING
Be careful when measuring on the motor frequence control as all components potential difference of up to 300V in comparision to ground and zero. About 10 sec after the power is cut off to the machine and the motor has come to a stop, the motor control has no tension.

Error codes which may arise on the control panel display

Error code/symptoms	Fault-finding	Cause/Action
14E Water level system not calibrated.	Turn the machine’s wall switch off and on again. Start a program.	
	No error code →	Transient fault. No action required.
	Error code returns →	Replace program control unit PCB. (By processing START wash programs can be used until PCB has been changed, but then only standard water levels will be used).

Error codes which may arise on the control panel display

Error code/symptoms — Fault-finding — Cause/Action

17E

Door status acknowledment signal not received, although door lock acknowlwdgement signal has been received.

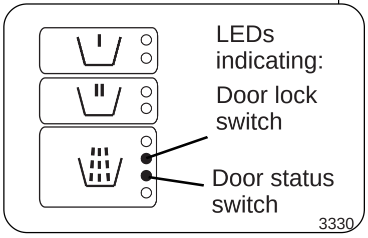
Turn the machine’s wall switch off and on again. Start a program.

Error code returns — No error code

No error code → Transient fault. No action required.

Error code returns ↓

Set program control unit to service mode. The door status switch and door lock switch will now be indicated by the LEDs shown left. Follow this procedure (the door can be locked using code 23 and one press of the START button):

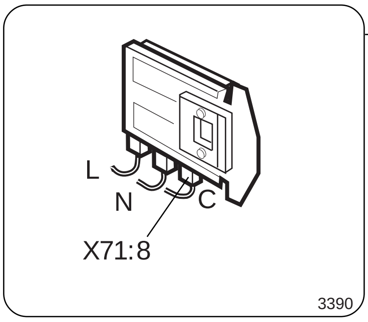


Door	Status of LEDs should be for door lock switch:	for door status switch
open	OFF	OFF
closed, not locked	OFF	ON
closed and locked	ON	ON

Door lock switch LED ON when door not locked — Door status switch LED OFF when door closed

Door status switch LED OFF when door closed → Follow the chart for error code 02E to identify fault.

Door lock switch LED ON when door not locked ↓



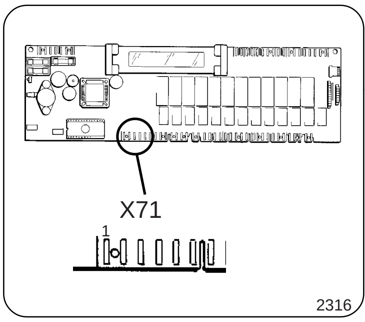
Unscrew the door lock (see Chapter 29, Door and door lock). Remove connection to door lock switch "C" on door lock as illustrated.

LED ON — LED goes out

LED goes out → Door lock faulty. Replace lock (see Chapter 29).

LED ON ↓

Remove PCB connector X71 from program control unit PCB.



LED ON — LED goes out

LED goes out → Fault in wiring between PCB and door lock. Check wiring and replace if necessary.

LED ON → Fault in program control unit PCB. Replace PCB.

Error codes which may arise on the control panel display

Error code/symptoms	Fault-finding	Cause/Action
18E Start not allowed.	→	Only occurs with CALCAD 4400. Full payment has not been made for program. Booking time left is too short to allow completion of wash program selected.

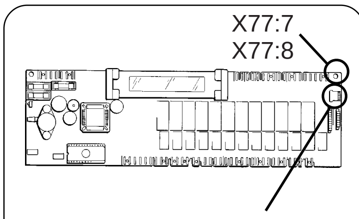
19E

Communications between the CALCAD 4400 and the program control unit board interrupted.

Turn the machine's wall switch off and on again. Start a program.

- Error code returns
  - Is the machine connected to CALCAD 4400?
    - Yes
      - Check that the CALCAD is working and that the network cabling is correctly connected to the Gateway card.
        - OK
          - Check the cabling in the RS232 interface between the program control unit PCB and the CALCAD equipment. Use an ohmmeter to check the four conductors colour by colour, to ensure the interface is functioning properly.

            Also measure between the connections to eliminate short-circuits between two conductors.
            - Wiring sound → Follow instructions in CALCAD manual to trace fault in CALCAD.
            - Wiring faulty → Check wiring and replace if necessary.
        - Not OK → Follow instructions in CALCAD manual to trace fault in CALCAD.
    - No
      - Enter the service program code 96. Short circuit between X77:7 and X77:8 and read the display.
        - 0 is shown → Chance PCB.
        - 1 is shown → Press the button ON/OFF with the short circuit as above so that 0 is shown. Leave the service program and remove the short circuit. Test run the machine.
- No error code → Transient fault. No action required.



Connections RS232 interface

Error codes which may arise on the control panel display

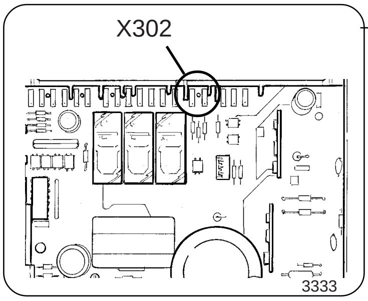
Error code/symptoms

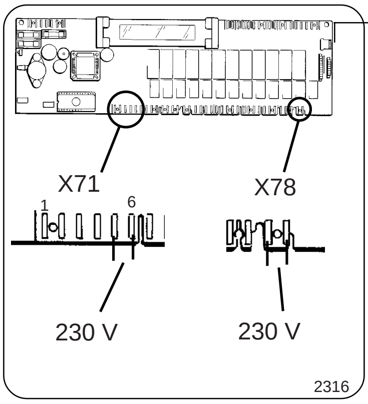
Fault-finding

Cause/Action

20E

Motor control unit has not received signal for lock acknowledgement, during program.





Turn the machine's wall switch off and on again. Start a program.

Error code returns

No error code → Transient fault. No action required.

Check the voltage between terminals 1 and 2 at PCB connector X302 on motor control unit. The voltage should be 230 V when the door is closed and locked.

Voltage wrong

Voltage correct → Faulty signal detection on motor control unit. Replace motor control unit.

Check the voltage between terminals 5 and 6 on PCB connector X71 on program control unit PCB. The voltage should be 230 V when the door is closed and locked.

Voltage wrong

Voltage correct → Fault in wiring between program control unit PCB and motor control unit. Check wiring and replace if necessary.

Check the input voltage to PCB connector X78 (230 V)

Wrong voltage → Faulty wiring between transformer T10 and program control unit PCB. Check wiring and replace if necessary.

Voltage correct → Faulty output signal on program control unit PCB. Replace PCB.

Error codes which may arise on the control panel display

Error code/symptoms — Fault-finding — Cause/Action

31E

Temperature of motor control unit heat sink too high.

This error code can occur if the ambient temperature has been extremely high. If so, lower the temperature, e.g. by opening a window.

Turn off the machine's wall switch. Wait at least 10 minutes for the heat sink to cool, then switch on the machine power supply again. Check that the drum and motor rotate smoothly.

Drum/motor OK ↓

Drum/motor not rotating smoothly → Bearing failure in drum or motor or objects between inner and outer drum. Investigate and remedy.

Start the service program. Run the motor on low wash speed, anticlockwise (code 25) and clockwise (code 26). Check for any abnormal noise from drum/motor.

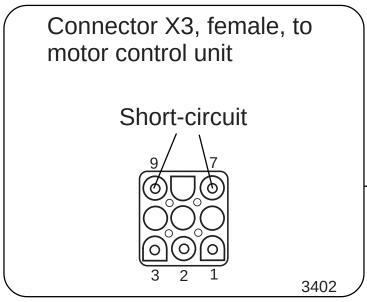
Drum/motor OK ↓

Noise from drum/motor → Bearing failure in drum or motor or objects between inner and outer drum. Investigate and remedy.

Run the motor at increasing speeds (high wash speed code 27-28, distribution speed code 29, extraction code 31-34). If no error code arises, finally run motor for at least 10 minutes on its highest extraction speed (code 33).

Error code returns ↓

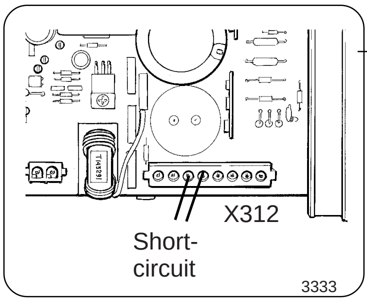
No error code → Transient fault. No action required.


Connector X3, female, to motor control unit

Turn off the machine's wall switch and wait 10 minutes. Disconnect connector X3 by motor. Short-circuit X3:7 and 9 as illustrated (to simulate motor thermal cut-out). Switch on machine power supply, start service program and simulate extraction with code 33 for at least 10 minutes.

Error code returns ↓

No error code → Internal fault in motor causing excessively high currents in motor control unit. Replace motor.



Turn off the machine's wall switch and wait 10 minutes. Disconnect connector X312 on motor control unit. Short-circuit X312:3 and 4 as illustrated. Switch on machine power supply, start service program and simulate extraction with code 33.

Error code returns → Internal fault in motor control unit. Replace motor control unit.

No error code → Fault in wiring between motor control unit and motor. Check wiring and replace it if necessary.

Error codes which may arise on the control panel display

Error code/symptoms | Fault-finding | Cause/Action

32E

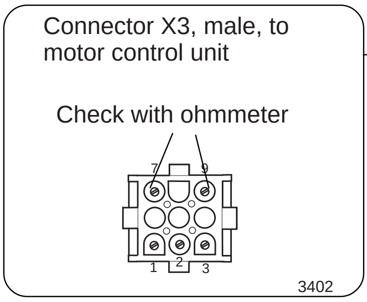
Thermal protection for motor has cut out.

Turn off the machine's wall switch. Check that the drum and motor rotate smoothly.

Drum/motor OK | Drum/motor not rotating smoothly → Bearing failure in drum or motor or objects between inner and outer drum. Investigate and remedy.

Wait at least 10 minutes to let motor cool, then switch on machine power supply. Start a program. Does the error code recur immediately?

Not immediately | Error code immediately

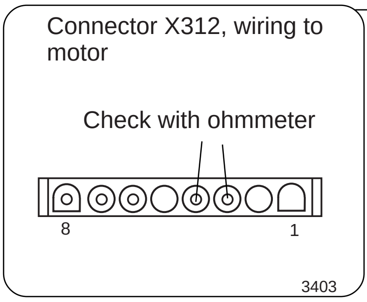


Switch off the main switch. Loosen connector X3 on the motor. Measure the resistance on the motor. Measure between 1-2, 1-3, 2-3. The value should read 2,9 Ω.

Ω value OK: | Some Ω value incorrect.

Turn off the machine's wall switch. Disconnect connector X3 by motor. Use an ohmmeter to check between X3:7 - 9 on the fixed half of the connector (motor side).

Circuit closed | Circuit closed → Failure in motor thermal cutout. Replace motor.



Reconnect X3. Disconnect connector X312 and use an ohmmeter on the part of the connector with wiring to the motor to check between X312:3 - 4.

→ Replace motor.

Circuit open | Circuit closed → Internal fault in motor control unit detection of thermal cutout protection. Replace motor control unit.

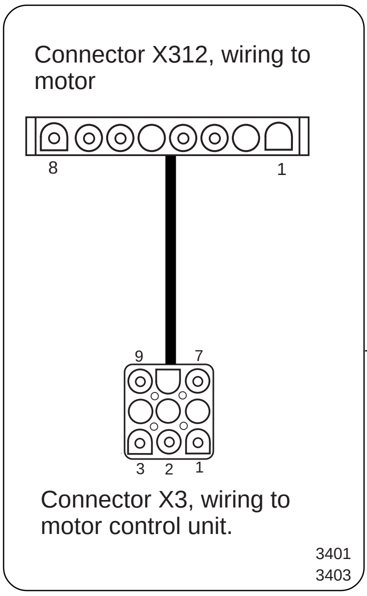
Circuit open → Fault in wiring between motor control unit and motor. Check the wiring and replace it if necessary.

Start the service program. Run the motor on low wash speed, anticlockwise (code 25) and clockwise (code 26). Check for any abnormal noise from drum/motor.

Drum/motor OK | Noise from drum/motor → Bearing failure in drum or motor. Investigate and remedy.

Run the motor at increasing speeds (high wash speed code 27-28, distribution speed code 29, extraction code 31-34). If no error code arises, finally run motor for at least 10 minutes on its highest extraction speed (code 33).

Error code returns | No error code → Transient fault. No action required.


Connector X312, wiring to motor
8
1
9
7
3
2
1
Connector X3, wiring to motor control unit.
3401
3403

Check the wiring from X312 on motor control unit to X3 by motor. Use an ohmmeter to check five conductors as follows:

X312:	3	4	6	7	8
X3:	7	9	1	2	3

Also check between the five conductors to eliminate possibility of shorts between any two.

Wiring OK | Wiring faulty → Check the wiring and replace it if necessary.

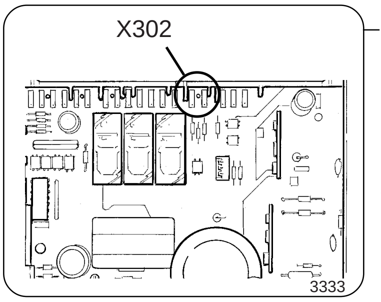
Wiring OK → Internal fault in motor causing it to overheat. Replace motor.

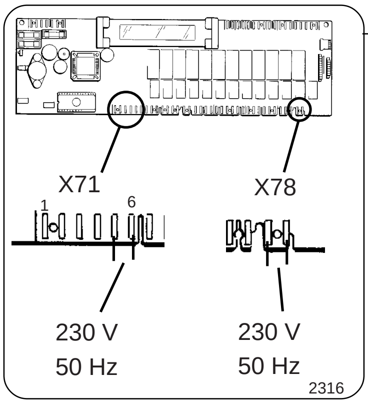
Error codes which may arise on the control panel display

Error code/symptoms	Fault-finding	Cause/Action

33E

Motor control unit receiving start command from program control unit without first receiving lock acknowledgement signal. Motor control unit receiving circuitry for lock acknowledgement signal is not faulty.





Turn the machine's wall switch off and on again. Start a program.

Error code returns → next check

No error code → Transient fault. No action required.

Check voltage between terminals 1 and 2 in PBC connector X302 on motor control unit. The voltage should be 230 V when door is closed and locked.

Voltage wrong → next check

Voltage correct → Faulty signal detection on motor control unit. Replace motor control unit.

Check voltage between terminals 5 and 6 on PCB connector X71 on program control unit PCB. The voltage should be 230 V when the door is closed and locked.

Voltage wrong → next check

Voltage correct → Faulty wiring between program control unit PCB and motor control unit. Check wiring and replace if necessary.

Check voltage on connection X78 (230V)

Voltage wrong → Wrong wire harness between transformer T10 and PCB. Check and replace if necessary.

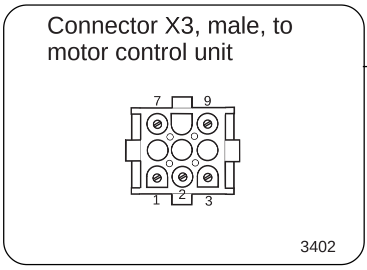
Voltage correct → Wrong output signal on PCB. Change PCB.

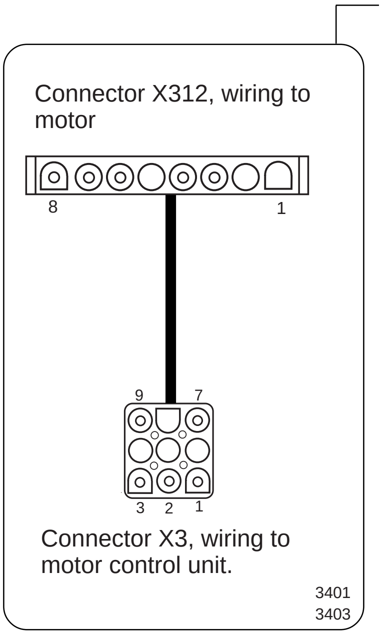
Error codes which may arise on the control panel display

Error code/symptoms | Fault-finding | Cause/Action

35E

Motor control unit indicating short-circuit between outputs for motor windings.


Connector X3, male, to motor control unit


Connector X312, wiring to motor

Connector X3, wiring to motor control unit.

Turn the machine’s wall switch off and on again. Start a program.

Error code returns → Disconnect connector X3 by motor (see below).

No error code → Transient fault. No action required.

Disconnect connector X3 by motor and use an ohmmeter to check the motor windings. Check between 1 - 2, 2 - 3 and 1 - 3. Correct reading: 2.9 Ω.

Resistances correct → Disconnect connectors X312 (see below).

Any resistance wrong → Replace motor.

Disconnect connectors X312 by motor control unit and X3 by motor. Check wiring by using ohmmeter to measure the three conductors as follows:

X312:		X3:
6	-	1
7	-	2
8	-	3

Also check between the three conductors to eliminate shorts between any two.

Wiring OK → Fault in motor control unit output stage. Replace motor control unit.

Wiring faulty → Check the wiring and replace if necessary.

Error codes which may arise on the control panel display

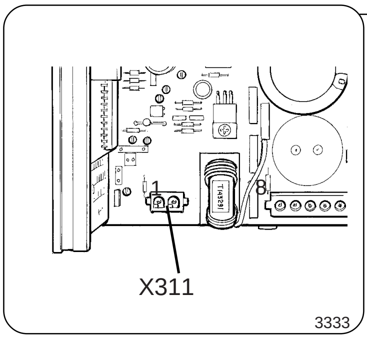
Error code/symptoms	Fault-finding	Cause/Action
36E Motor control unit indicates fault in receiving circuitry for lock acknowledgement signal.	Turn the machine's wall switch off and on again. Start a program.	
	No error code →	Transient fault. No action required.
	Error code returns →	Fault in motor control unit. Replace unit.

Error codes which may arise on the control panel display

Error code/symptoms
Fault-finding
Cause/Action

37E

Motor control unit indicating DC voltage level too low.



Turn the machine’s wall switch off and on again. Start a program.

Error code returns
No error code

Transient fault. No action required.

Check the motor control unit input voltage (230 V) at connector X311.

Voltage too low
Voltage correct

Fault in motor control unit. Replace unit.

Check input voltage at machine connection terminal X1.

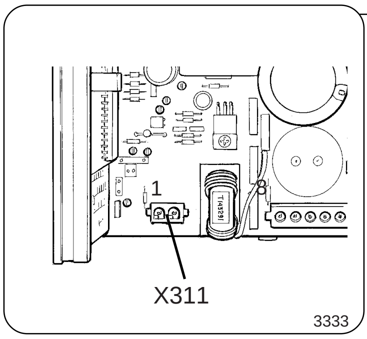
Voltage too low
Voltage correct

Fault in wiring, in interference suppression circuits LC1 or L1.

Investigate cause of fault in power supply beyond the machine.

Error codes which may arise on the control panel display

Error code/symptoms	Fault-finding	Cause/Action
38E Motor control unit indicating DC voltage level too high.	Turn the machine’s wall switch off and on again. Start a program.	
	No error code	Transient fault. No action required.
	Error code returns Check the motor control unit input voltage (230 V) at connector X311.	
	Voltage OK.	Fault in motor control unit. Replace unit.
	Voltage too high.	Check that the wire harness is correctrly connected. Investigate cause of fault in power supply beyond the machine.



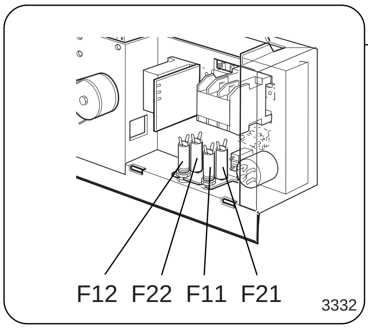
12. Fault-finding

Error code/symptoms | Fault-finding | Cause/Action

Machine completely ”dead”.
Display blank.

Turn the machine’s wall switch off and on again.

Fault persists. / Machine working → Transient fault. No action required.

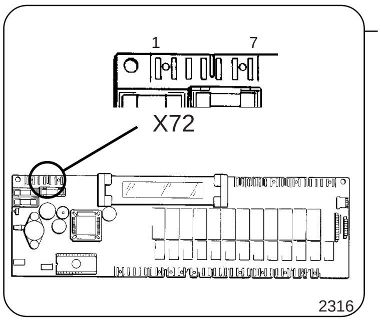


Check fuses F11, F12, F21 and F22.

Fuses sound / Fuse fault → Change/reset fuse and check function.

Check that the input voltages to the PCB are correct. Measure on PCB connector X72 between the following inputs:

X72:1 - 2 ca 1,75 V ~
X72:2 - 3 ca 1,75 V ~
X72:4 - 5 ca 14,5 V ~
X72:6 - 7 ca 13,5 V ~

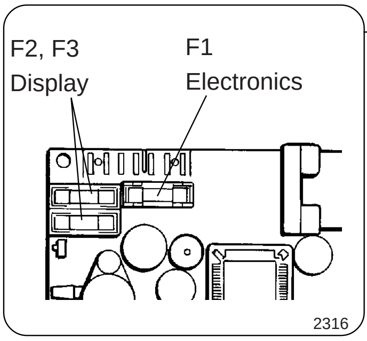


An incorrect voltage / Voltages correct

Voltages correct: Check the three glass-tube fuses on the PCB. Rating: 1 A/250 V.

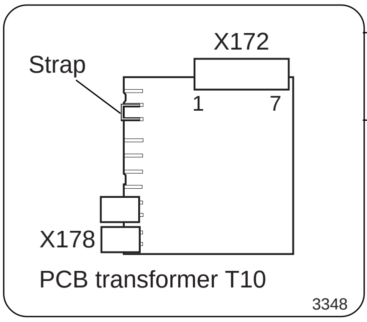
OK / Fuse fault → Change fuse(s) and check functioning.

OK → Replace program control unit PCB.



An incorrect voltage: Remove connector X172 on transformer T10. Measure the voltages between the following outputs on the transformer board.

5 - 6 ca 1,75 V ~
6 - 7 ca 1,75 V ~
3 - 4 ca 14,5 V ~
1 - 2 ca 13,5 V ~



Voltages correct / An incorrect voltage

An incorrect voltage: On T10 check the input voltage at connector X178 (220 V).

Voltage OK / A fault → Check the voltage from connection over filter and fuses to transformer T10.

Voltage OK: Check that the clamp is correctly placed.

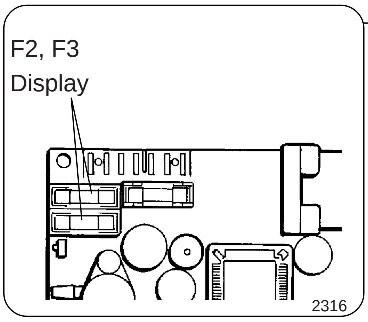
Clamp OK. / Fault in clamp. → Rectify and test run.

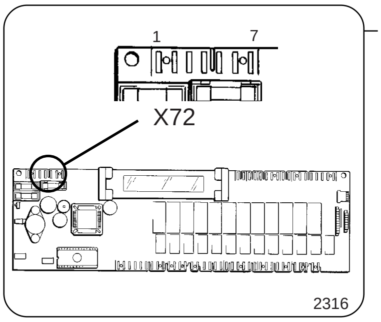
Clamp OK. → Replace transformer T10.

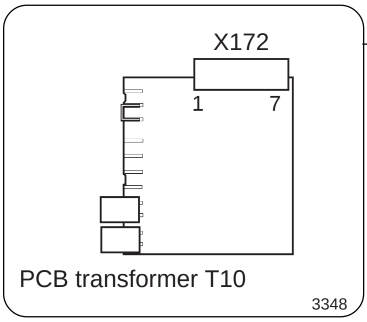
Voltages correct → Fault in wiring between transformer and circuit board. Check wiring and replace if necessary.

Error code/symptoms	Fault-finding	Cause/Action

Display blank, but machine is working otherwise.







Turn the machine's wall switch off and on again.

Fault persists. Machine working

Machine working → Transient fault. No action required.

Fault persists ↓

Check glass-tube fuses F2 and F3 on program control unit PCB. Rating: 1 A/250 V.

Fuses sound Fuse fault

Fuse fault → Change fuse(s) and check functioning.

Fuses sound ↓

Check that input voltages to PCB are correct. At connector X72, measure between the following inputs:

X72:1 - 2 ca 1,75 V ~
X72:2 - 3 ca 1,75 V ~
X72:6 - 7 ca 13,5 V ~

An incorrect voltage Voltages correct

Voltages correct → Program control unit PCB faulty. Replace PCB.

An incorrect voltage ↓

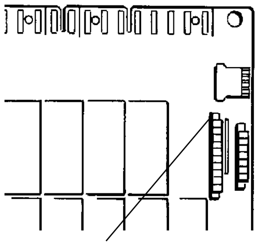
Remove connector X172 on transformer T10. Measure the voltages between the following outputs on the transformer board.

5 - 6 ca 1,75 V ~
6 - 7 ca 1,75 V ~
1 - 2 ca 13,5 V ~

Voltages correct An incorrect voltage

An incorrect voltage → Replace transformer T10.

Voltages correct → Fault in wiring between transformer and circuit board. Check wiring and replace if necessary.

Error code/symptoms	Fault-finding	Cause/Action
One or some of the option buttons are not working.  Ribbon cable to buttons.	Check all push buttons by entering the service program and press each button. Check that buzzer comes on and that resp. figure is shown on the display. See page 3. One or some of the buttons are not working. →	Bad connection between cable and connector. Loosen the cable from the connector and cut off about 10 mm. Mount the cable and check the function. If the fault remains, change the push button panel.

21. Automatic control unit

①

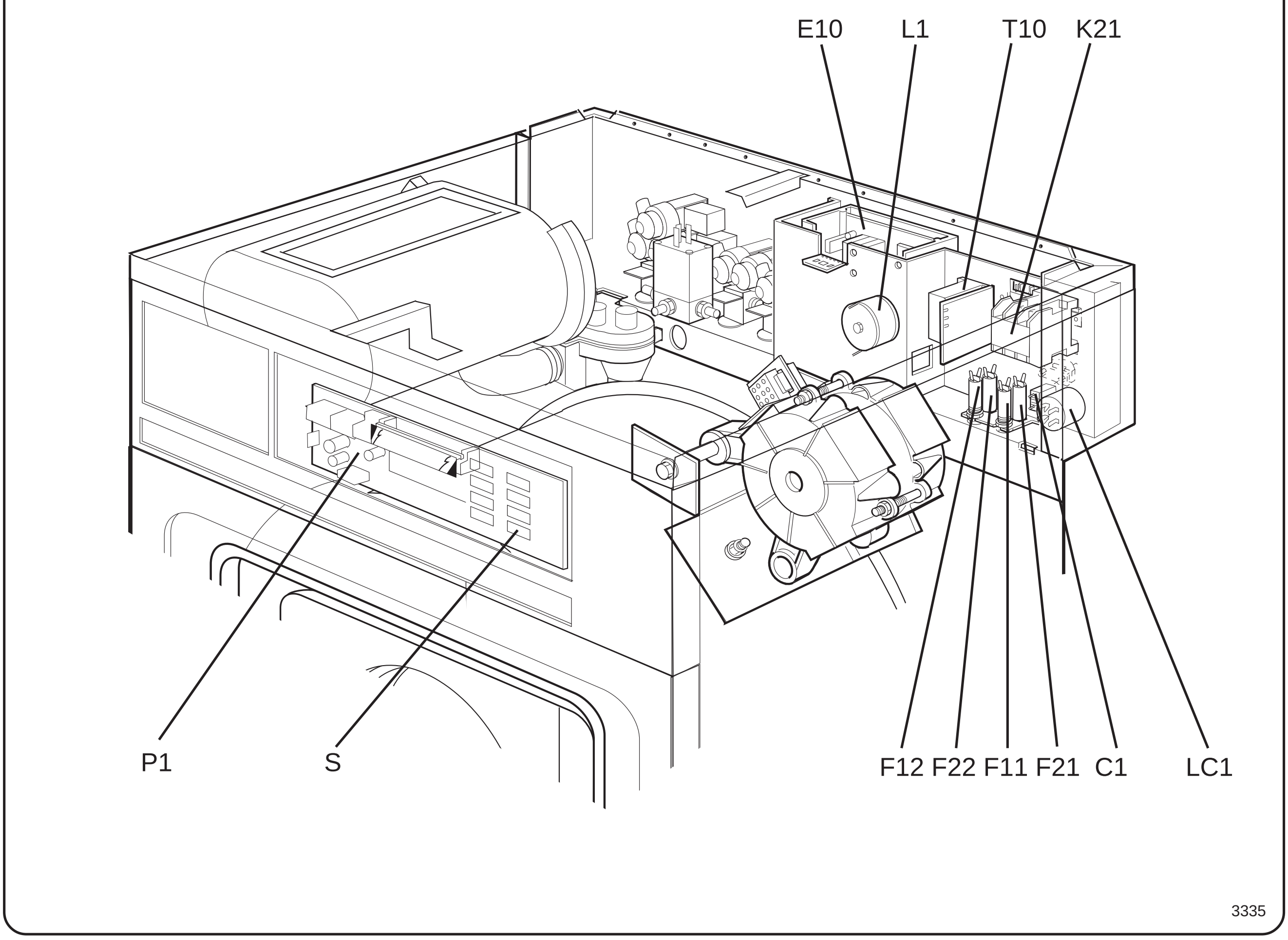


Fig. ①

P1	Electronic, microprocessor-controlled program control unit. Controls the sequences of the various programs as set out in program tables.
E10	Motor control unit, microprocessor-controlled. Controls the motor direction of rotation and speed. The motor control unit is also used for imbalance monitoring and for calculating the weight of the wash load.
K21	Relay for heating elements.
LC1	Surge protection filter
C1	Surge protection (capacitance)
T10	Transformer, low-voltage transformer which supplies the program control unit with a number of voltages.
F11 - F22	Fuses
S	Control panel plate with integral push-buttons
L1	Surge protection (inductance)

Electronic program control unit

Description

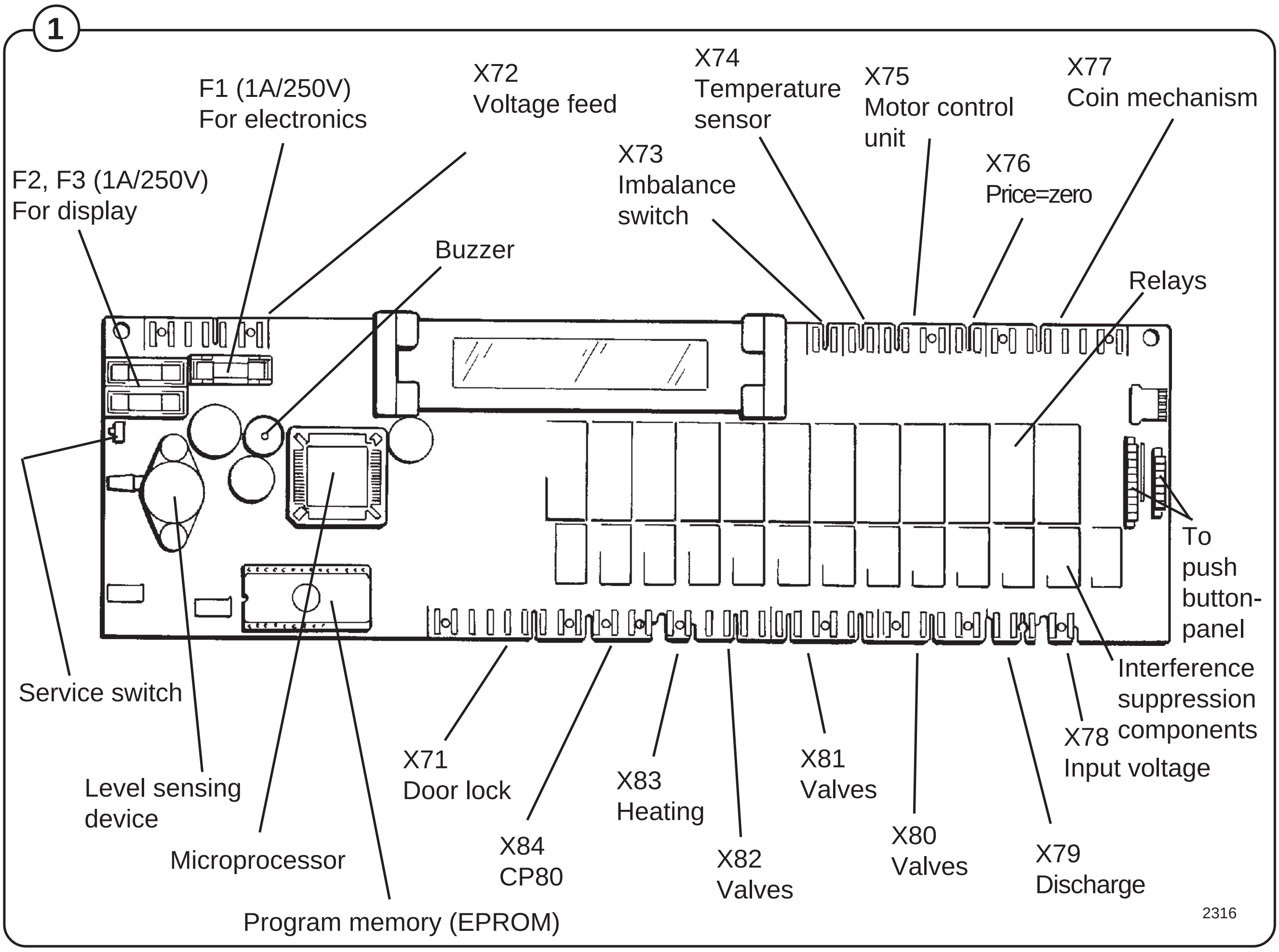
Fig. 1

The program control unit is electronic and consists of a circuit board. On one half are the microprocessor, program memory (EPROM), power supply circuits, temperature and level control devices and so on. On the other half are the relays and interference suppression components. The program control unit has the following inputs and outputs:

- Inputs reacting to push-buttons on the control panel.
- Inputs which provide information on the machine’s door lock status, level control, temperature sensors and coin mechanism if installed.
- Outputs which via relays directly control the various functions of the machine, e.g. water valves and door lock.
- Outputs to the pushbutton panel.
- Serial communication with the motor control unit.

The program control unit is controlled by the microprocessor, which fetches its instructions from the program memory (EPROM). The EPROM contains instructions for operation, the service program, control of relays, sensing of inputs etc. The EPROM also contains the standard programs supplied with the machine.

1



Operating time, accumulated coin value, EPROM no.

The machine's built-in service program can be used to check the machine's accumulated operating time, the accumulated coin value (for coin-operated machines), and the program EPROM part number. To do so, you first have to switch the machine to service mode.

To switch on service mode

Fig. ②
- Remove the machine top and the cover for the program unit circuit board.

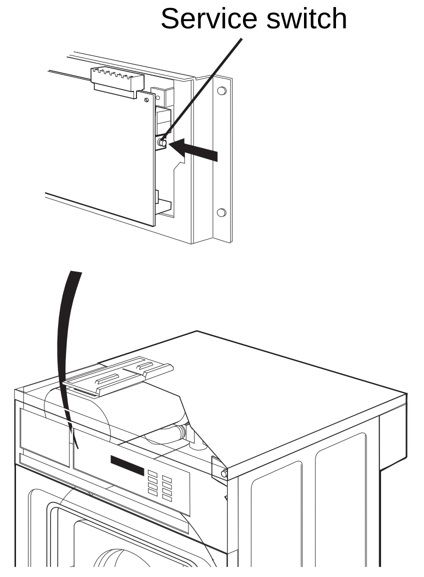
Fig. ③
- Press the service switch. This switch is on the left-hand edge of the circuit board when viewed from the machine front. The display will now show SE, which means that the service program is activated.

Fig. ④ Now some of the buttons switch to being number keys (1 to 9). The start/door-open button becomes an **ON/OFF** key.

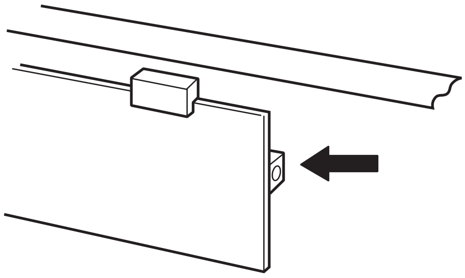
To switch off service mode

Press the service switch again, or switch off the machine power supply.

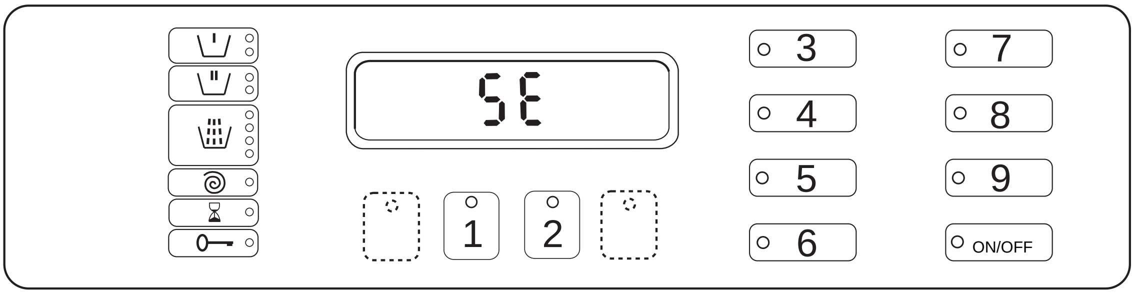
②



③



④



Accumulated operating time

To check during normal operation

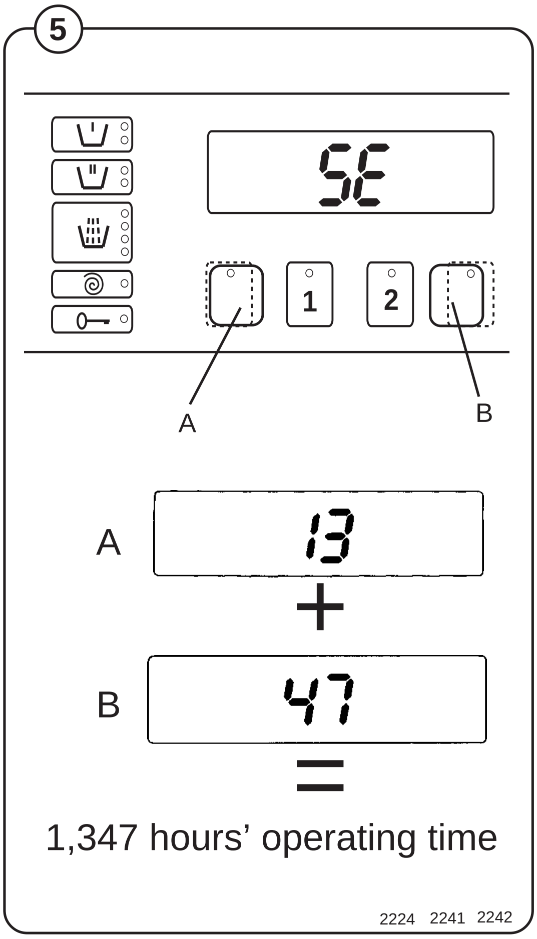
Fig. ⑤ The machine needs to be actually operating (program selected and started).

The buttons identified as A and B in the illustration may be ”concealed” on some machines, in other words, have no symbols or other markings. They will still be usable for this function, however.

Press button A. The first two digits of a four-digit number will now be displayed, e.g. 13.

Press button B. The last two digits of a four-digit number will now be displayed, e.g. 47.

This means that the machine’s accumulated operating time is 1,347 hours.

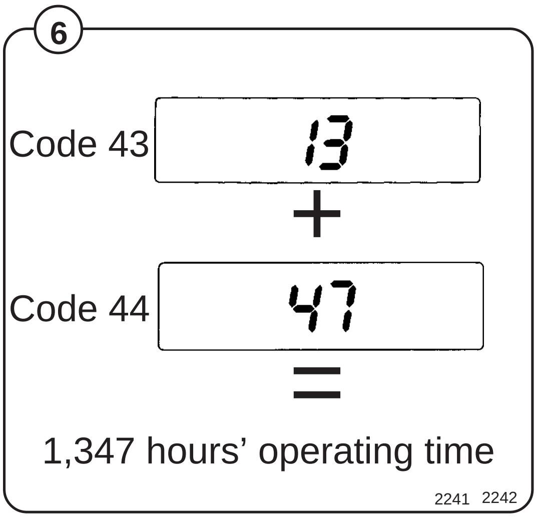


To check in service mode

Fig. ⑥ Enter code 43. The first two digits of a four-digit number will now be displayed, e.g. 13.

Enter code 44. The last two digits of a four-digit number will now be displayed, e.g. 47.

This means that the machine’s accumulated operating time is 1,347 hours.



Accumulated coin value

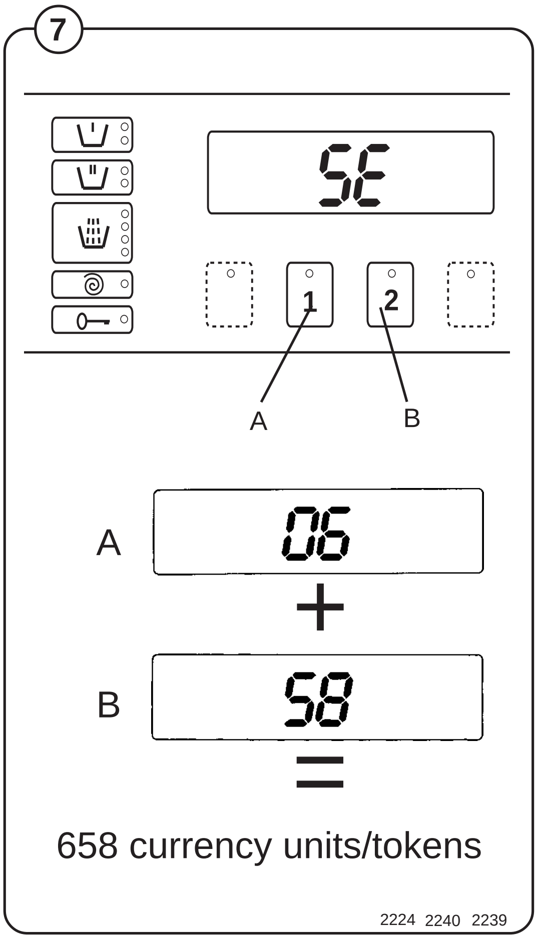
To check during normal operation

Fig. 7 The machine needs to be actually operating (program selected and started).

Press button A. The first two digits of a four-digit number will now be displayed, e.g. 06.

Press button B. The last two digits of a four-digit number will now be displayed, e.g. 58.

This means an accumulated coin value of 658 currency units or 658 tokens. In other words, it shows that 658 currency units or tokens have been inserted into the coin mechanism up until the time of the check.

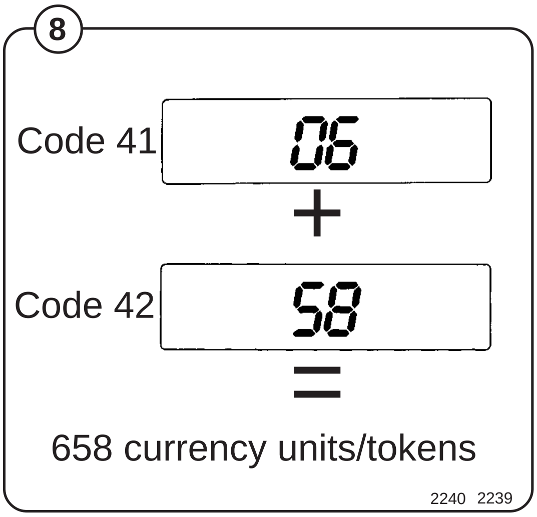


To check in service mode

Fig. 8 Enter code 41. The first two digits of a four-digit number will now be displayed, e.g. 06.

Enter code 42. The last two digits of a four-digit number will now be displayed, e.g. 58.

This means an accumulated coin value of 658 currency units or 658 tokens. In other words, it shows that 658 currency units or tokens have been inserted into the coin mechanism up until the time of the check.



Program EPROM part no. (check in service mode)

Fig. ⑨ Enter code 51. The letter A and two digits will be displayed, e.g. A47. ”A” denotes part no. (article no.).

Enter code 52. The display will show (e.g.) 195.

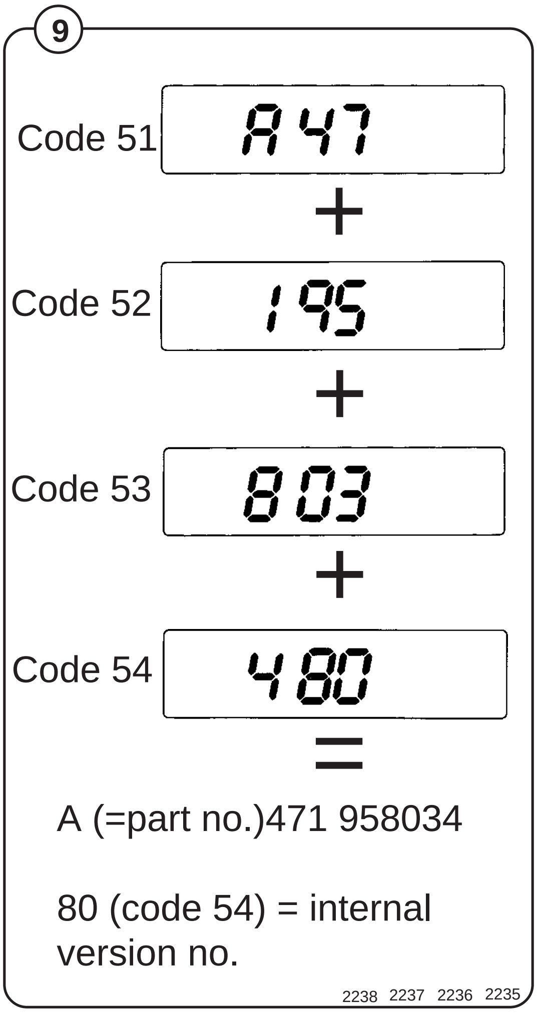
Enter code 53. The display will show (e.g.) 803.

Enter code 54. The display will show (e.g.) 480.

When these digits are put together they make up the full part number:

A471 958034. The two digits at the end are an internal version number.

⑨



A (=part no.)471 958034

80 (code 54) = internal version no.

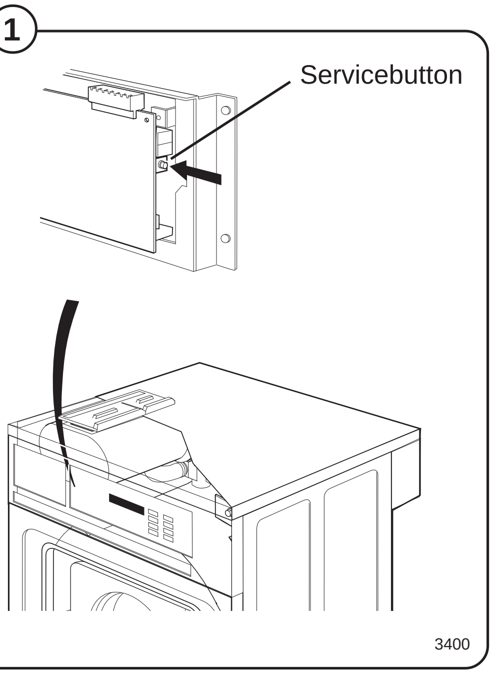
Machines with electronic timer

Description

The "level control", which is located on the circuit board, is a pressure switch which monitors the different water levels in the drum by sensing the air pressure in a tube which is connected to the bottom of the drum. As the water rises in the drum, the air inside the tube is compressed and at a set pressure ("cut-out-level") the microprocessor cuts out water filing.

When the water is emptied from the drum the microprocessor switches back to the starting position again, but now at lower water levels than were needed to switch when the drum was filling. These levels are called "on-levels". If during a wash the water should sink below on-level, the machine will be filled with water again, to cut-out-level.

①

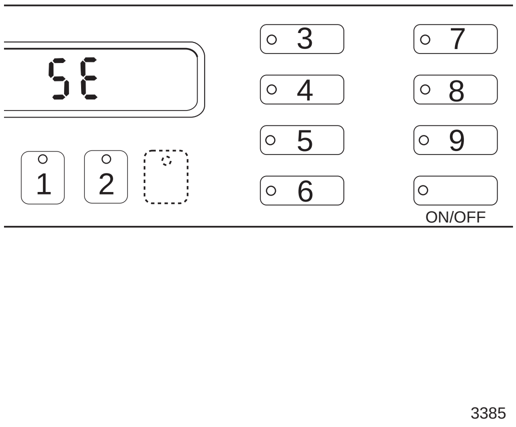


Checking functioning and fault location

To be carried out by authorised personnel only.

A faulty level control cannot be repaired. Instead the whole circuit board must be replaced.

②



To check functioning of the level control

- **Fig. ①** Start the service program by pressing the service button. Now certain of the buttons switch to being number keys (1 to 9).
- **Fig. ②** Enter code 24. Now the display will show the current level in the machine on a scale of 1 to 200. An empty machine should show a value between 0 and 4.
- Press the START button. The machine will start to fill.
- Check that the figure shown on the display is counting upwards as the water level rises.
- After completing your check, stop filling by pressing the START button.
- Enter code 21 and open the drain valve to empty the machine.
- Quit the service program by pressing the service button.

If machine is filling to a level which is too high:

- Check that the tube between the level control and drum is not blocked. If necessary clean it by disconnecting it at the level control end with no water in the machine and blowing it clean.
- Check that the tube is undamaged.
- Test the machine by running a program.

Door

Description

Fig. ① The door is mounted on the outer drum of the machine. The door glass is held inside the door by three retainers and is easy to replace. The door seal is retained by a flange on the outer drum and creates a seal directly against the door glass. This seal is not bonded in place, so is easy to replace.

Leaking door seal

If the seal shows no signs of scratches or other damage, a loss of elasticity in the seal may be the cause of a leak. Replace the seal.

Leaks from the door seal may also be caused by dirt and build-up of lint. Clean the seal.

Door lock

Description

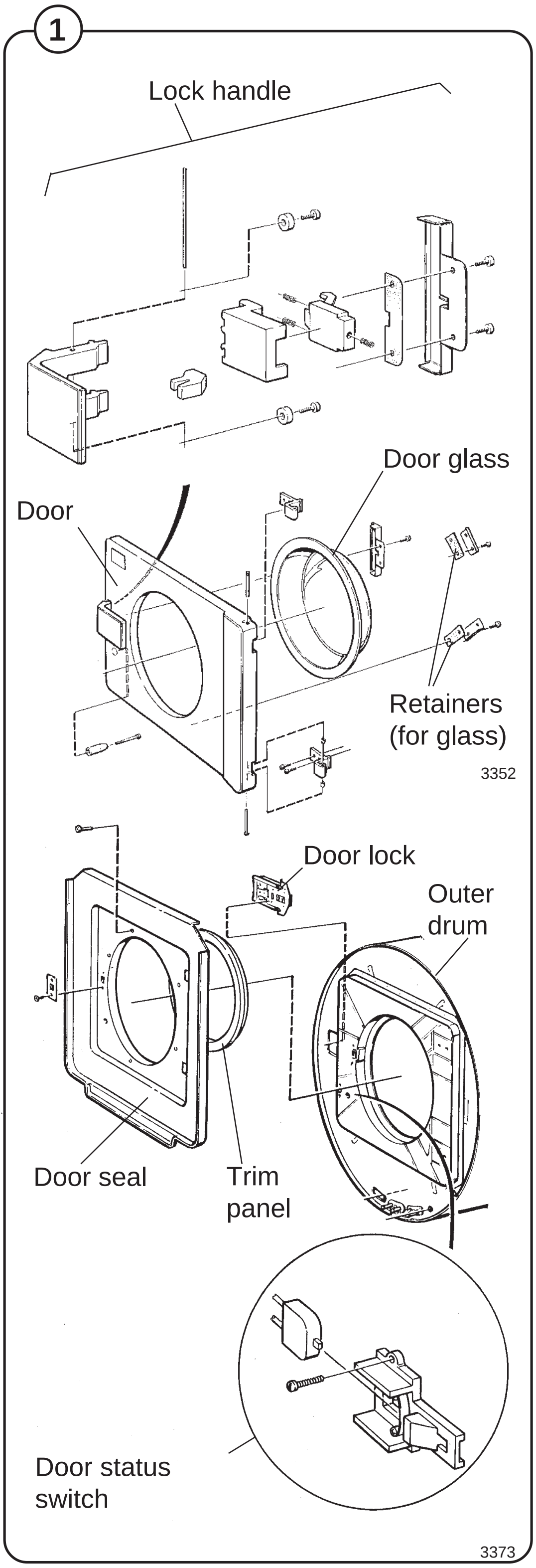
The machine door lock forms part of a safety system which prevents injury by ensuring that:

- The machine cannot be started until the door is closed.
- The door cannot be opened until the wash program is ended and the drum is at a standstill.

The lock consists of:

- The lock handle (door handle) which closes the door and presses it against the door seal.
- The door lock, which locks the door when the machine is operating. The lock contains a delay mechanism in the form of a bimetallic component which heats up when the lock is activated. The door lock also has a closing contact which sends a signal to the program control unit when the lock is activated.
- The door status switch which closes a circuit and sends a signal to the program control unit when the door is closed.

①



Function

When the door is closed, the door status switch closes a circuit and sends a signal to the program control unit to indicate the machine is ready to start.

When a program has been selected and the start button has been pressed, the door lock will be activated and will lock the door, at the same as the switch in the door status switch closes. Only now will the program control unit allow the program to start.

When the door lock is activated a bimetallic component in the lock heats up. If the power supply is interrupted, it takes about 1.5 minutes before the bimetal cools enough to release the door lock. This gives enough time for the drum to stop rotating and any water in the drum to be discharged (the discharge valve will open automatically if the power supply is cut).

If a fault or error relating to the door locking system should arise, the machine will stop and an error code will appear on the display (a flashing two-digit code followed by E). These are the error codes which involve the door lock:

Error code	Cause
02E	Door status switch open during program operation.
03E	The lock has not locked the door within the set time.
17E	Door status switch open, even though the door lock is locked.

To trace the cause of faults which initiate any of these codes, refer to Chapter 12, Fault-finding.

Instructions for repair

To replace the door lock

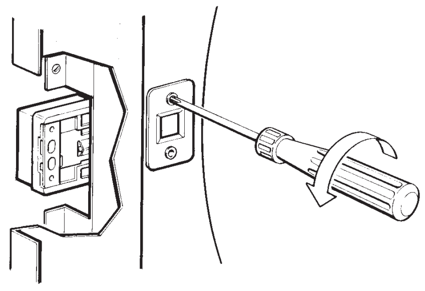
To be carried out by authorised personnel only.

- Remove the front panel.

Fig. ②

- Release the door lock by unscrewing the two screws.
- Pull out the lock mechanism. Transfer the electrical connections one by one from the old lock to the new.
- Insert the new unit and secure it with the screws. Close the door and check carefully that the lock will hold the door shut properly.
- Run a program, check that the door lock really locks the door and that the door can not be opened until the program is finished and the drum stopped rotate.

②



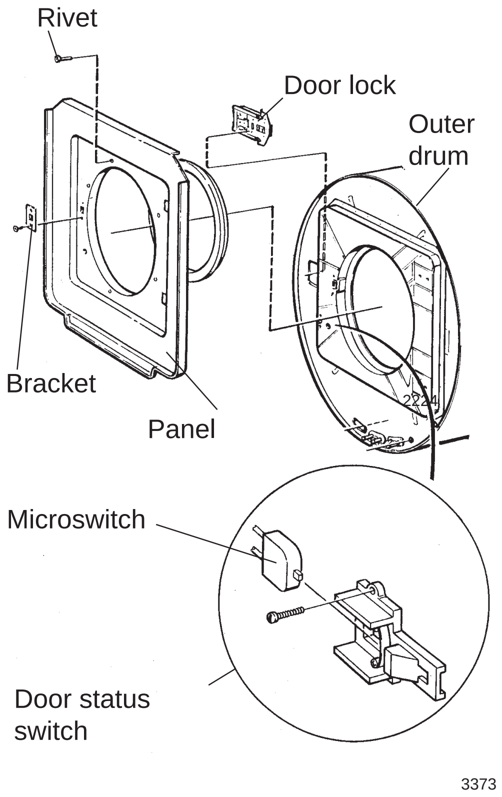
To replace the door status switch

To be carried out by authorised personnel only.

Fig. ③

- Remove the front panel.
- Undo the four screws for the hinges and remove the door.
- Unscrew the two screws holding the door lock and take off the mounting plate.
- Remove the trim panel as follows:
  - The trim panel is fixed to the outer drum by six plastic rivets. Each of these rivets was originally fixed by a wedge tapped into place at its centre, causing it to expand.
  - Use a suitable tool to tap these wedges, to release each one from its rivet. This will allow you to remove the trim panel.
- Unscrew the door status switch and replace the microswitch, or possibly the entire switch unit.
- Install the switch unit and fix the trim panel back in place. New wedges for the rivets are supplied in the spare parts kit for the door status switch.
- Refit the door lock and door.
- Check the door status switch functions with the aid of the service program (see Chapter 12, Fault-finding).

③



Description

General notes

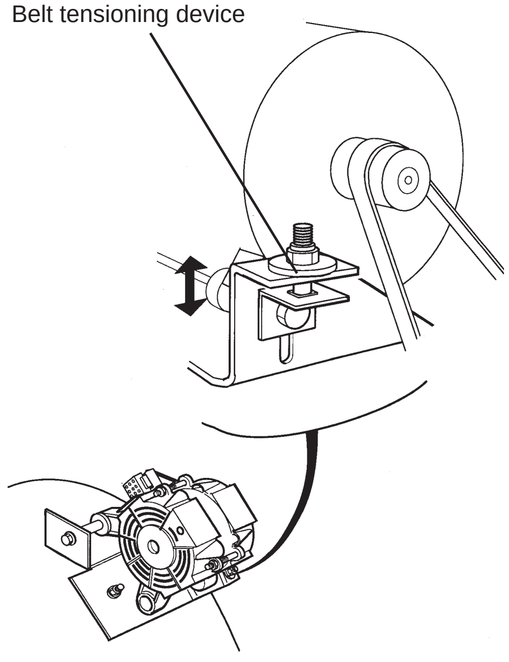
Fig. ① The motor is mounted on a motor mounting plate above the outer drum. It drives the inner drum via a drive belt. There is a belt-tensioning device on the motor mounting plate.

The motor is connected to the electrical system via a quick-connector.

This is a frequency-controlled motor. Its various operating speeds (normal, distribution, extraction) are controlled by a microprocessor-based motor control unit, E10, in the automatic control unit.

The motor windings are protected by a thermal cutout device.

①



3354

Motor control unit

Fig. ② Fig. ④

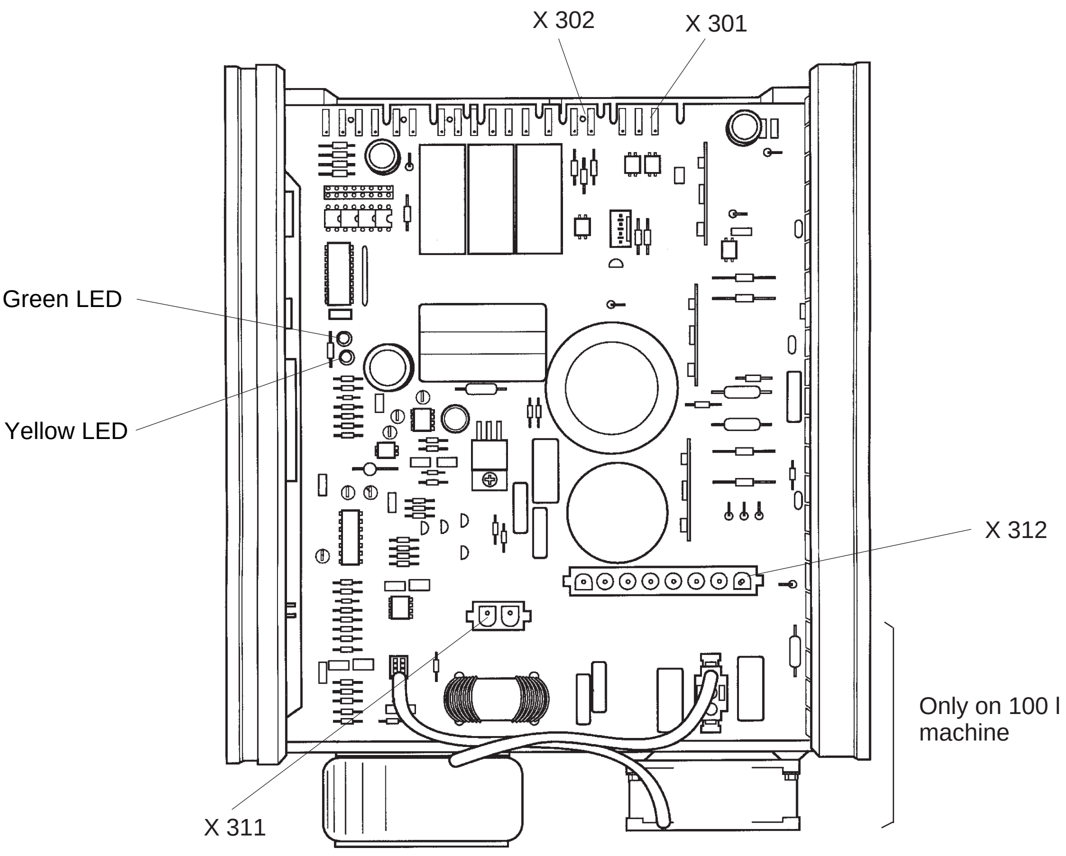
The motor control unit communicates with the program control unit board via a serial (input/output) interface. With the aid of the motor control unit the program control unit can control not only the speed of the motor at any given point, but also the acceleration or deceleration rate at which the motor is to achieve the speed required. The motor control unit constantly feeds information on current status (both normal status and on any abnormalities arising) back to the program control unit board.

The motor control unit can also supply data on the different torque and effect of the motor at constant speed when accelerating and decelaration. These data are used both for calculating the weight of the load and for detecting any unbalance.

WARNING
The voltage at test points 1-4 (TP1-4) has a potential difference of approx. -100 V in relation to incoming neutral and earth. Because of this, be careful when measuring. Use unearthed oscilloscopes.
If the motor control unit has a green LED, this will remain lit for as long as there are hazardous voltages present in components.

The motor control unit on the 100-litre machine has a cooling fan. The fan starts automatically when the temperature reaches about 65°C which can happen during extraction or if the surrounding temperature is high. When the machine starts the fan is rotating for a short while.

②



Calculation of weight of wash load

Fig. 3

At the start of every program, the machine runs a special sequence (see Fig. 3). Four different torque parameters are calculated during this sequence.

1 Dry extraction, 1000 rpm, to distribute the load evenly in the drum. Then deceleration.

2 Constant speed, 100 rpm, first torque parameter is stored.

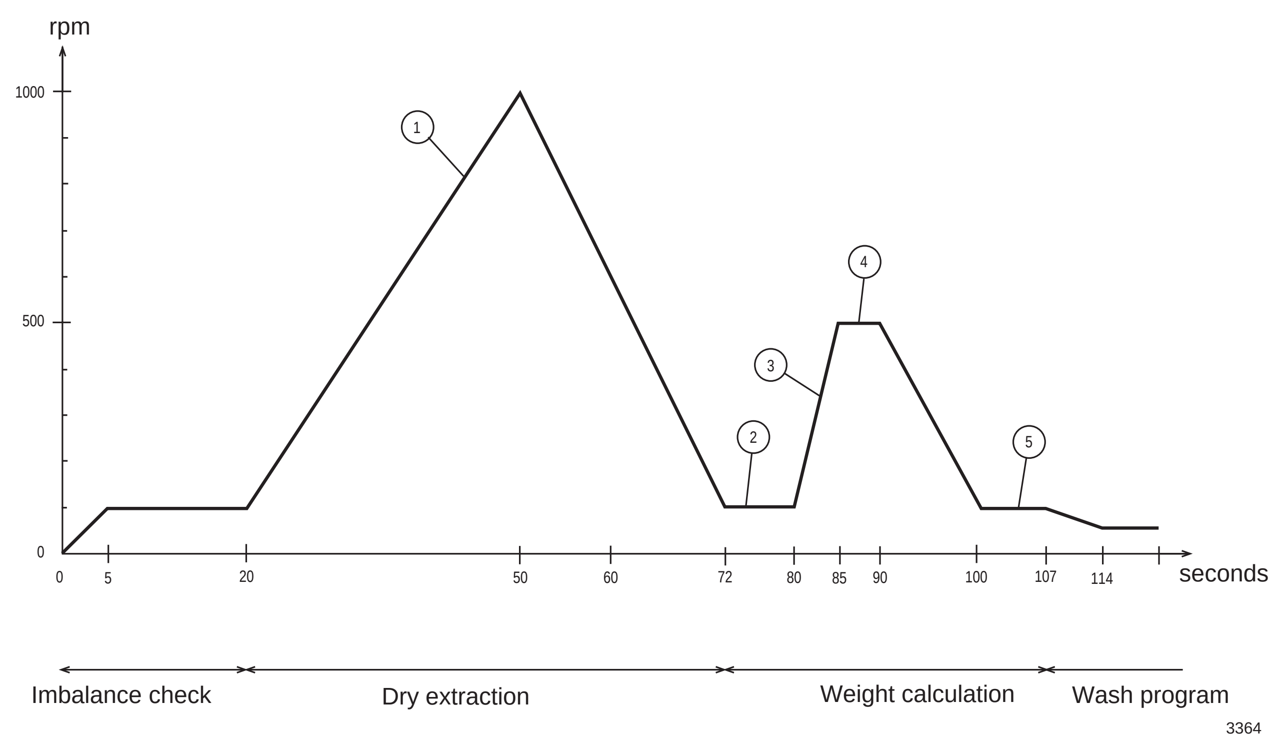
3 Acceleration at 80 rpm/s up to 500 rpm. Second torque parameter is stored.

4 Constant speed 500 rpm. Third torque parameter is stored. Then deceleration to 100 rpm.

5 Constant speed 100 rpm. The fourth torque parameter is stored.

These four parameters are then used to calculate the weight of the wash load so that the water level can be adjusted to the optimum level.

3



Fault/error indication

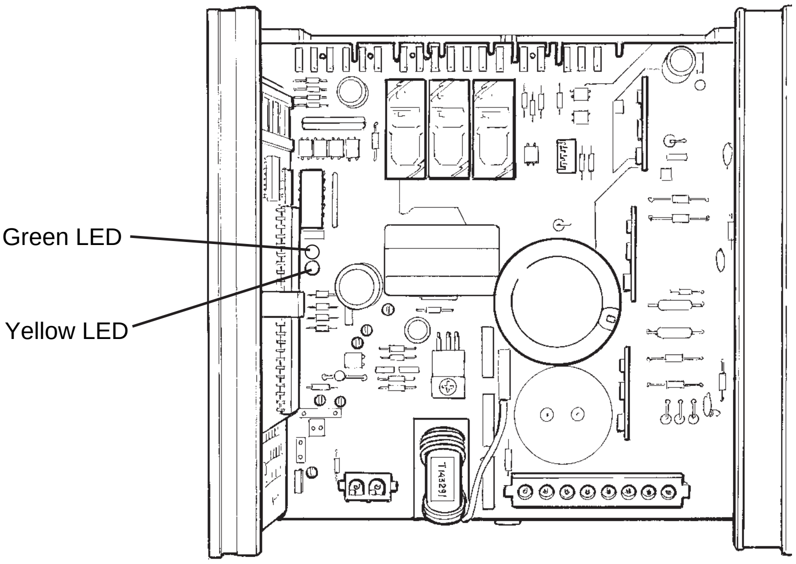
Fig. ④ Fig. ② If a fault or error occurs in the motor or motor control unit, the latter will indicate this to the program control unit board. Information on these errors, besides appearing as an error code on the display, is also provided by a yellow LED on the motor control unit board. To understand this additional inform-ation, the pattern of flashes from the LED has to be observed and compared with this chart:

	LED pattern of flashes	Error code	Cause
1	1 sec. ▬▬ ▬▬ ▬▬ ▬▬	31E	Heat sink temperature too high.
2	▬▬ ▪ ▬▬ ▪ ▬▬	32E	Thermal protection for motor has cut out.
3	▬▬▬　　　　▬	33E	The motor control gets start signal but lacks lock acknowledgement.
4	▪▪▪ ▪▪▪ ▪▪▪ ▪▪		Communications fault motor control-program control unit.
5	▪▪　▪▪　▪▪	35E	Short-circuit in motor windings, wire harness or internely in motor control.
6	▪▬　▪▬　▪▪	36E	Fault in receiving circuitry for lock acknowledgement signal.
7	▬▬▬▬▬▬▬▬	37E	Too low DC level in the motor control.
8	▬▬▬▬▬▬▬▬	38E	Too high DC level in the motor control.
9	▪▪▪▪▪▪▪▪▪▪▪▪▪▪		Motor control unit current-limiting function activated. Does not give an error code.

Fault-finding

The fault-finding charts for all error codes are in Chapter 12, Fault-finding.

4



Extraciton

Fig. ⑤ For extraction the motor operates in an extraction pattern which is always the same with regard to motor speed. The pattern is as follows:

1. A brief, fast extraction, which removes most of the water from the wash load.
2. A brief reversed drum action, to allow optimum distribution of the load.
3. A distribution period with imbalance sensing – 20 seconds.
4. Extraction at 550 rpm – 30 seconds.
5. Extraction at 700 rpm – 2 minutes.
6. Extraction at 1020 rpm – remaining time out of the program's total extraction time.

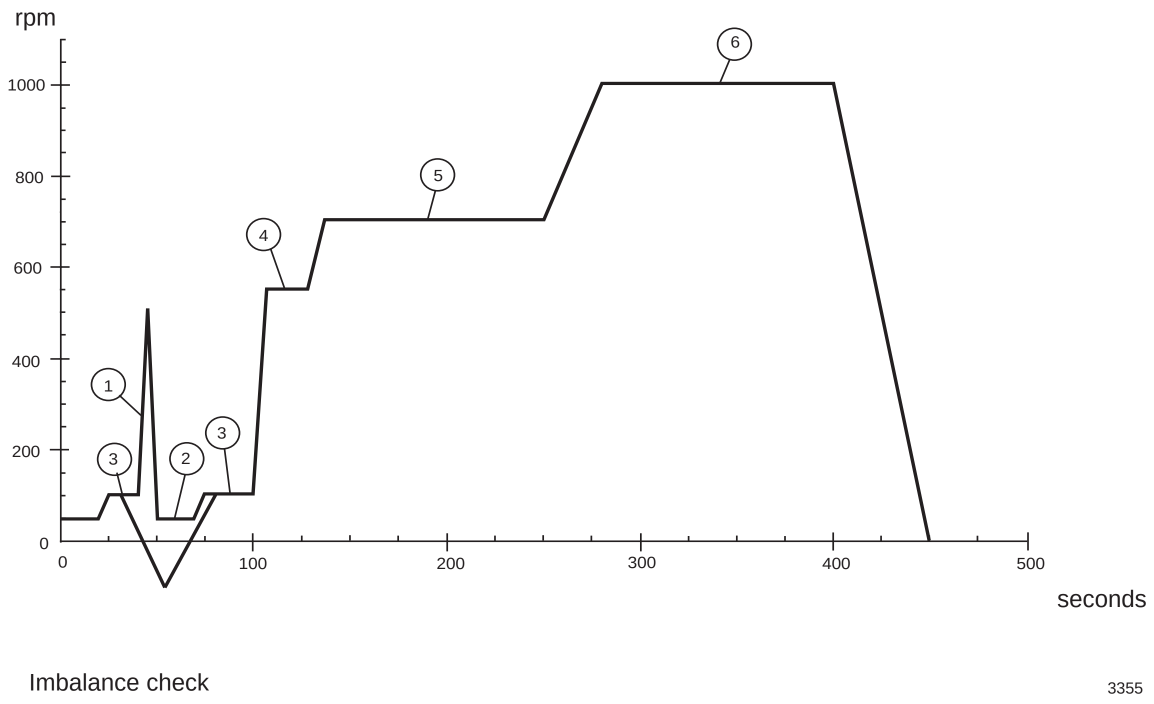
The different extraction cycles in the different programs are achieved by varying the time that the motor will follow this extraciton pattern.

Imbalance sensing

At the start of every extraction sequence, the system monitors variations in the motor torque while the drum is operating at distribution speed. If these variations are too great, it indicates that the load is unevenly distributed in the drum. At this point extraciton is halted, the motor speed is reduced to wash speed and a fresh attempt to begin extraction starts. This procedure will be repeated up to three times per extraction. After the third time the system will decide whether the imbalance is "great" or "small".

- If the imbalance is "great", the extraction stage of the program will end without extraction having taken place.
- If the imbalance is "small", extraction will take place, but at a reduced speed.

⑤



Belt tension

Fig. 6

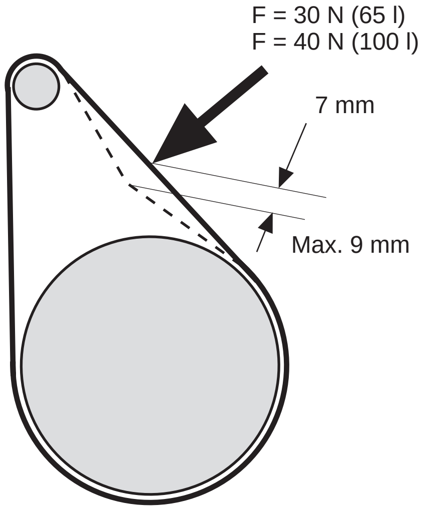
The tension of the drive belt is preset at the factory.

When checking belt tension, or after replacing components which affect belt tension, follow the instructions contained in the figure.

Note!

Correct belt tension is important. The tension should always be checked as part of service and maintenance.

6



X = 7 mm when belt is new. Max. 9 mm on subsequent checks of same belt. If X = more than 9 mm, increase belt tension.

Description

Fig. ①

The valve is electromagnetically operated and has a rubber diaphragm as its opening and closing element. The valve utilises the water supply pressure when opening and closing.

Fig. ②

When the valve coil is de-energized, the valve is closed. The water pressure builds up over the diaphragm through the diaphragm pilot pressure opening and holds the valve closed.

When the coil is energized, the plunger is pushed up and the water pressure above the diaphragm can be relieved through the pressure balancing canal to the valve outlet. At that point, the water pressure in the flow pipe can lift the diaphragm, allowing the valve to open.

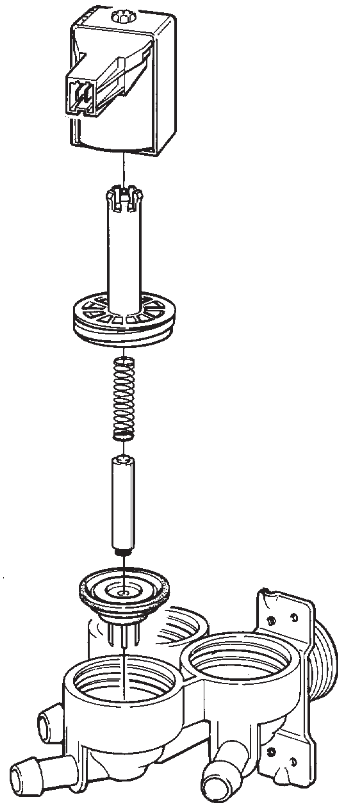
There is a close-meshed filter which filters polutants in the inlet pipe. The filter is easily removable for cleaning.

In the outlet, a throttle adjusts the water flow to the machine requirements.

Data

Max. capacity fully open	55 l/min.
Capacity at 0.3 bar	27 l/min.
Working range, water pressure	0.05 -1 bar
Rec. water pressure	0.3 bar
Number of outlets	1. 2 or 3

①



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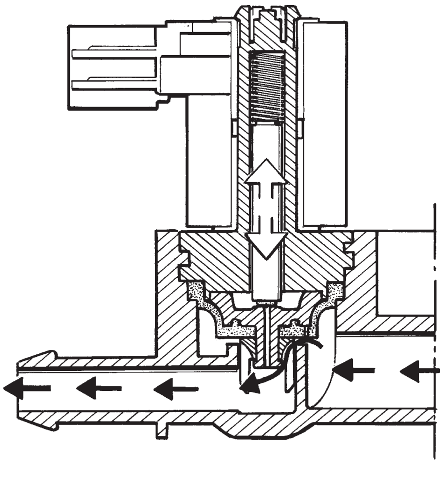


Repair instruction

Lime deposits can block the valve diaphragm hole and prevent the valve from functioning properly.

To be carried out by authorised personnel only.

It is therefore a good idea to take apart and clean the valve regularly depending on operation conditions and the degree of polutants and lime content present in the water.

Valve does not open

- Check that there is voltage supply to the coil.
- Measure the voltage supply to the coil to check for a possible power failure or short circuit.
- Take apart the valve and check the valve diaphragm openings.
- Check the inlet filter and clean it when necessary.
- Remove the coil and clean the coil core surfaces.

Valve does not close

- Check that there is no voltage across the coil. Normally the valve is closed when the coil is not energized.
- Check the return spring.
- Check the diaphragm (pilot pressure opening).

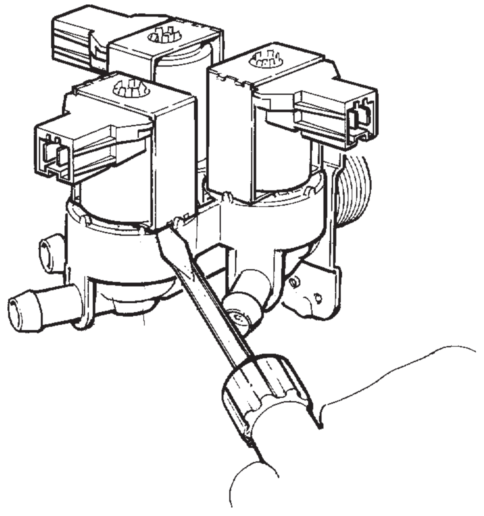
Dismantling of the valve

Fig. ③ 1. Carefully pry off the valve coil using a screw driver.

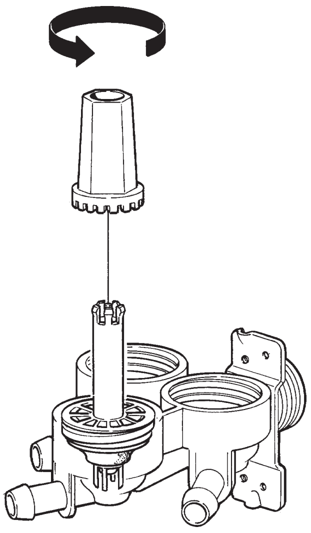
Fig. ④ 2. Turn and lift the valve cover using a special tool and a wrench. (The special tool is attached to one of the machine's water hoses upon delivery.)

Fig. ⑤ 3. Mount the valve and test the machine.

③



④



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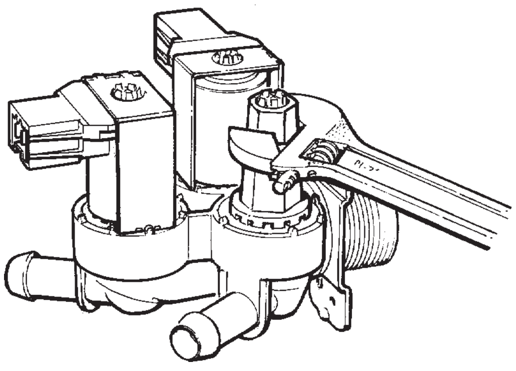


Drain valve

Description

Fig. ① The water pressure of the cold water intake is used for closing the drain valve. There is a hose (1) connected between the water intake and the control valve (2). When the control valve is activated it opens and lets water into the supply line (3) which is connected to the drain valve. The water presses up a rubber membrane (4) and a plunger (5) with a pressure plate (6) which closes the valve's rubber membrane (7).

When the control valve shuts off water pressure to the drain valve the springs (8) pull back the plunger. The return water passes the control valve and is discharged into the waste pipe via the return hose (9).

Fault-finding

⚠ **To be carried out by authorised personnel only.** ⚠

Drain valve will not close

Check that:

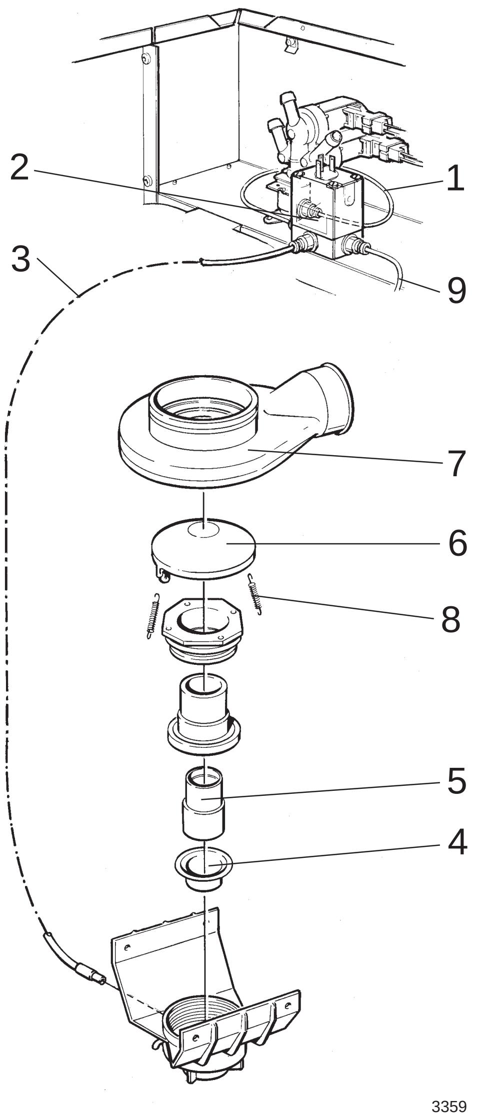
- Control valve (2) is energised.
- Hoses and control valve are not blocked, by disconnecting the supply line (3) from the drain valve and then activating the control valve.
- The rubber membrane (4) is sound.
- The plunger (5) is not binding.

Drain valve will not open

Check that:

- The return hose (9) is not blocked.
- The plunger (5) is not binding.

①



Drain pump

Description

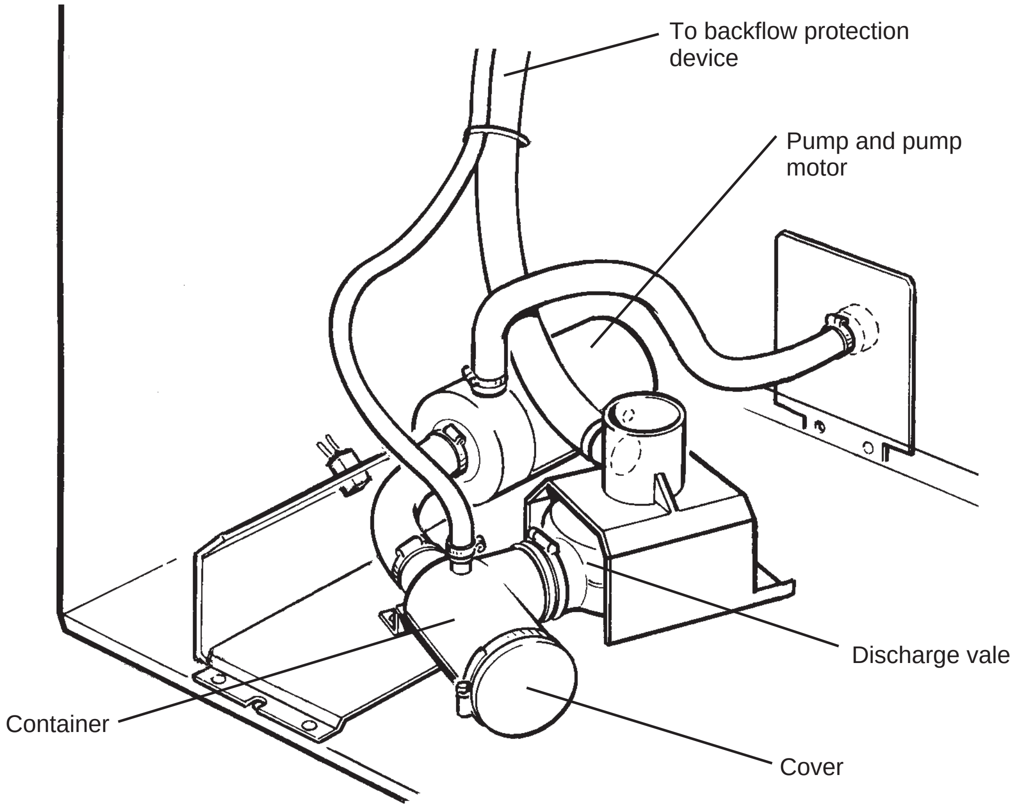
Fig. ② The pump is located under the drum and consists of a pump and pump motor, plus a container with cover between the drain valve and the pump. Because the hose diameter at the pump is less than the outlet of the drain valve there is the risk that solid matter and lint will lodge between valve and pump. Any obstructions to the water flow can easily be removed by taking off the cover on the container. There is also a hose connecting the container with the backflow protection devide.

Fault-finding

Machine will not empty

- Clean any foreign matter out of the pump.
- Check pump functioning:
  - Is the motor energised?
  - Has the impeller come loose from the motor shaft?

②



Description

Fig. ①

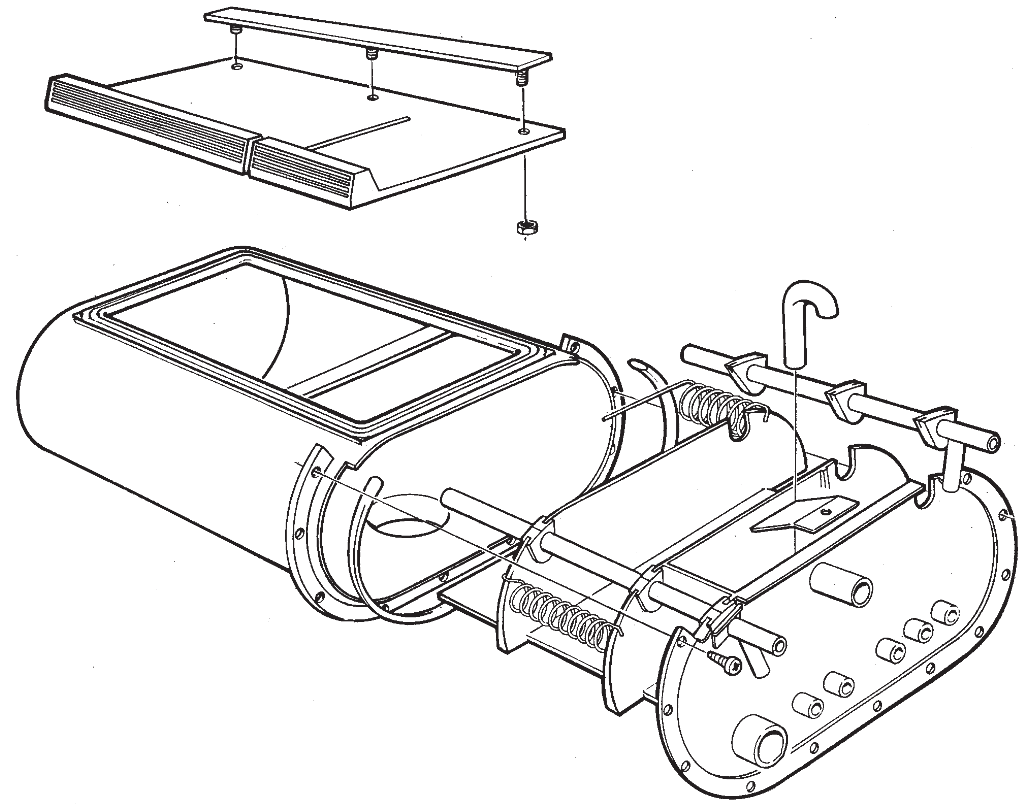
The detergent dispenser is divided into three compartments:

- Compartment 1 for prewash detergent
- Compartment 2 for main wash detergent
- Compartment 3 for fabric conditioner

Water connections into the dispenser are fitted with dispersers which mix the detergent thoroughly with water and also clear the compartments effectively.

From the bottom of the dispenser the water routed down to the outer drum.

②



Description

Fig. ① The heating elements are in the lower part of the outer drum, accessible from the machine front. They are switched in and out by a heating relay (K21) which is controlled by the program control unit.

Fig. ② The program control unit prevents the elements from being switched in when there is no water in the drum. If some fault should arise which causes the elements to heat with no water in the drum, their own fuses will blow.

Fault-finding

⚠ To be carried out by authorised personnel only. ⚠

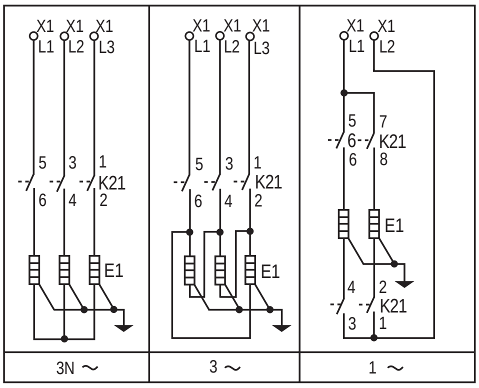
If heating time is abnormally long

- Check with a multimeter to see if one of the elements is burnt out. For access to the elements, remove the machine's front panel.
- Build-up of limescale can reduce the efficiency of the elements. If necessary descale them with a suitable descaling product. Follow the manufacturer's instructions concerning quantity of descaler.

To replace an element

- Switch off the power supply to the machine at the main switch/wall switch and check that the machine is isolated from the power supply. Remove the front panel.
- Note exactly how the element is connected to the power supply, then disconnect it.
- Loosen the nut on the element and turn the screw half a turn.
- Loosen and remove the inspection lid in the innerdrum. Turn the drum so that the opening is facing down. Loosen the hut on the element bracket in order to be able to take out the element.
- Guide the new element into the bracket and tighten the nut. Fasten the element with the screw and nut.
- Connect the electrical connections.
- Mount the inspection lid.
- Run a program and check that there are no leakage around the gasket of the heating element.

①



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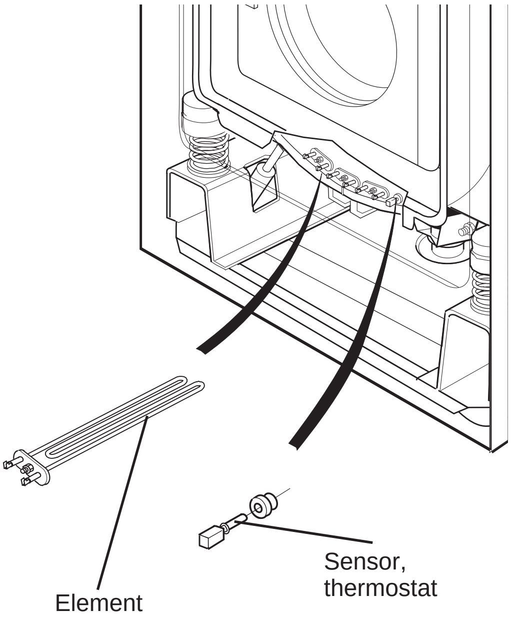

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