Operating and Installation Manual

FOM71MP LAB

471 1562-82/02
96.51

Electrolux

Wascator

Contents

General 5
Technical data 6
Description 7
Program description 9
Installation 11
Procedure for use 18
Programming 27
Maintenance 49
Service information 50
Control unit 51
Electronic board 52
Contactor 53
Level sensor 54
Thermostat 56
Door locking unit 57
Motor 58
Inlet valve 60
Drain valve 61
Detergent compartment 63
Heating elements 64
Drum with bearings 65
Frame 72
Calibration protocol 73
Appendix 1,2

General

Fig. 1

The machine described in this manual, FOM 71 MP LAB, is a microprocessor controlled washing machine designed for laboratory purpose.

The memory of the microprocessor can be programmed with up to 99 programs.

A cassette is available as option. This cassette can be used for transferring a program content from one machine to another.

The machine drum is rigidly attached to the frame, and the machine must therefore be provided with a foundation by the installation.

The extraction speed gives a G-factor of approximately 72.

The machine is designed for heating with electricity.

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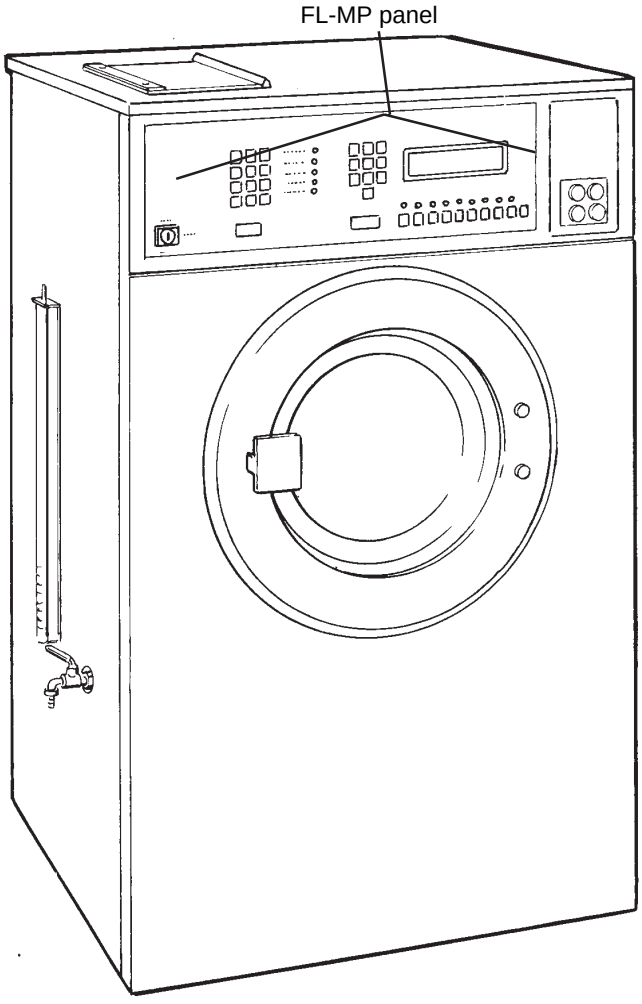

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Technical data

Dry with capacity for filling factor 1:13		kg	5
Drum volume (net)		l	65
	diameter	mm	515
	depth	mm	340
Drum speed	washing	rpm	52
	extraction	rpm	500
G-factor	washing		0.8
	extraction		72
Dimensions	width	mm	690
	depth	mm	595
	height	mm	1055
Recommended service space			
	side	mm	250
	rear	mm	500
Min. space when machine can be moved during service			
	side	mm	50
	rear	mm	250
Weight	net	kg	123
	gross, crate-packed	kg	133
	gross, box-packed	kg	160
Shipping volume			
	crate-packed	m2	0.57
	box-packed	m2	0.72
Max. floor load during extraction		kN	1.4±2.6
Frequency (dynamic load)		Hz	9
Mounting bolt		diam.	M16
		quantity	4
Motor 3AC 50/60 Hz (power rating)			
input power,	washing speed	kW	0.3
	extraction speed	kW	0.9
output power	washing speed	kW	0.1
	extraction speed	kW	0.55
speed at washing		rpm	290/360
speed at extraction		rpm	2800/3350
Water valves	connection	DN20	
	thread	3/4" BSP	
recommended water pressure		kPa	200-600
pressure limits		kPa	40-1000
capacity		l/min	16
Drain valve			
connection outer diameter		mm	75
capacity		l/min	160
Element, rating		kW	5.4±2%
resistance at 20°C		Ω	25.9–27.1 (220/380V)
		Ω	30.9–27.1 (240/415 V)
		Ω	34.6–36.0 (254/440 V)

Description – principal components

Fig. 2

The machine drum is permanently mounted in the frame by means of steel straps.

The wash drum or inner drum is driven by one motor and a V-belt. The inner drum is mounted in the outer drum with two strong bearings at the back plate. It is sealed with three radial seals.

The motor is suspended in the frame by means of a shaft and rubber grommets. A cover is fitted over the motor as a drip guard.

The inlet and drain are both situated under the outer drum. This improves the flow during filling and prevents lye fumes from entering the detergent compartment.

The door is a robust, round type with a handle which is interlocked by a safety locking device during machine operating.

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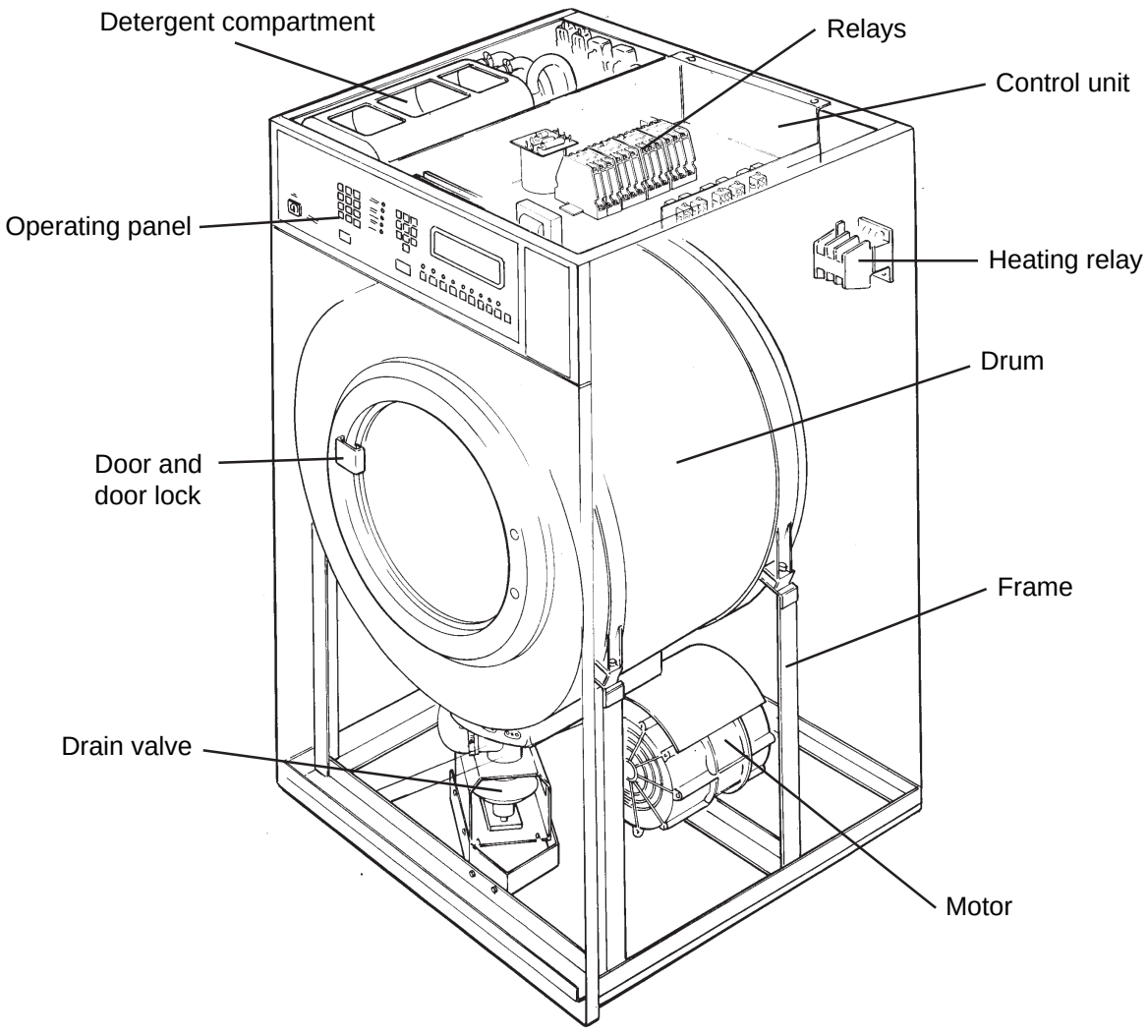


Description – principal components

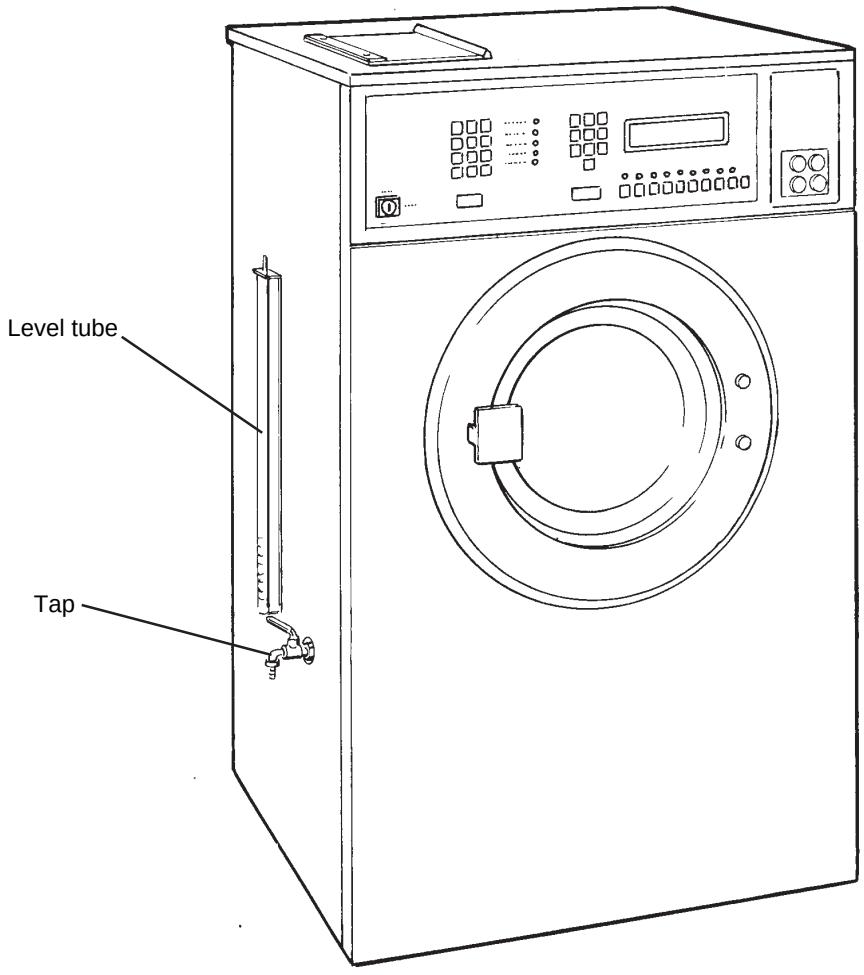
The electronic programme unit, level sensor, motor contactors, etc. are installed in the control box which is easily accessible from the top and exchangeable as a plug-in assembly.

The casing is of stainless steel in the lid, front, and sides.

Fig. 3 On the left side of the machine is a level tube indicating the water level in the machine. A tap, intended to be installed in the outlet beside the level tube, is delivered with the machine.

On the left side of the element box there is an outlet with the internal thread 1/2" BSP for fitting of e.g. a sensor for temperature recording. The dip tube shall have a length of min. 50 mm and max. 200 mm including the length of the thread.

3



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Program description

The following programs are fixed programmes in memory.

Prgr.no.	Name	Contents/Application
1.	Level check	Program fills machine with water to a reference level at 160 mm, maintains this level 20 seconds and empties the machine. This process is repeated five times. After that, the program fills machine with water to the following levels one after the other: 100 mm, 130 mm, 160 mm and 200 mm. Each level is maintained 40 seconds before emptying.
2.	Temperature check	Program fills machine with water to 130 mm level and warms it in five steps: 25°C for 2 minutes, 40°C for 2 minutes, 60°C for 2 minutes and 90°C for 2 minutes. The machine is emptied, filled twice with cold water to a high level (about 50 litres) and finishes with a two minute spin cycle. The buzzer sounds at the end of the program.
3.	Start-up program	If the machine has been idle more than two hours, this program should be run before any other program is run.
4-9		BSEN ISO 26330 program 2A, 3A, 6A, 7A, 8A, Handwash.

Program description

PROGRAM / CYCLE	4						5					
	2A						3A					
	TIME	INLET WATER	TEMP °C	LEVEL	DETERGENT	ACTION	TIME	INLET WATER	TEMP °C	LEVEL	DETERGENT	ACTION
WASH	12´	C	60	100	2	N	8´	C	60	100	2	G
COOL DOWN	2´			130		N	2´			130		G
DRAIN	1´					G	1´					G
RINSE	3´	C	–	130	–	N	3´	C	–	130	–	G
DRAIN	1´					G	1´					G
EXTR.	–					–	–					–
RINSE	3´	C	-	130	-	N	3´	C	-	130	-	G
DRAIN	1´					G	1´					G
EXTR.	1´					E	–					–
RINSE	2´	C	-	130	-	N	2´	C	-	130	-	G
DRAIN	1´					G	1´					G
EXTR.	1´					E	1´					E
RINSE	2´	C	-	130	3	N	2´	C	-	130	–	G
DRAIN	1´					G	1´					G
EXTR.	6´					E	1´					E
SPIN DOWN												
TOTAL TIME												

PROGRAM / CYCLE	6						7					
	6A						7A					
	TIME	INLET WATER	TEMP °C	LEVEL	DETERGENT	ACTION	TIME	INLET WATER	TEMP °C	LEVEL	DETERGENT	ACTION
WASH	6´	C	40	130	2	G	3´	C	40	130	2	G
COOL DOWN	–					–	–					–
DRAIN	1´					G	1´					G
RINSE	3´	C	–	130	–	G	3´	C	–	130	–	G
DRAIN	1´					G	1´					G
EXTR.	–					–						
RINSE	3´	C	-	130	-	G	3´	C	-	130	-	G
DRAIN	1´					G	1´					G
EXTR.	–					–	1´					E
RINSE	2´	C	-	130	-	G	2´	C	-	130	-	G
DRAIN	1´					G	1´					G
EXTR.	1´					E	6´					E
RINSE	2´	C	-	130	–	G						
DRAIN	1´					G						
EXTR.	2´					E						
SPIN DOWN												
TOTAL TIME												

PROGRAM / CYCLE	8						9																	
	8A						Handwash																	
	TIME	INLET WATER	TEMP °C	LEVEL	DETERGENT	ACTION	TIME	INLET WATER	TEMP °C	LEVEL	DETERGENT	ACTION	TIME	INLET WATER	TEMP °C	LEVEL	DETERGENT	ACTION	TIME	INLET WATER	TEMP °C	LEVEL	DETERGENT	ACTION
WASH	3´	C	30	130	2	G	1´´	C	20	130	2	G												
COOL DOWN	–					–	1´		40			G												
DRAIN	1´					G	1´					G												
RINSE	3´	C	–	130	–	G	2´	C	-	130	-	G												
DRAIN	1´					G	1´					G												
EXTR.	–					–	–					–												
RINSE	3´	C	-	130	-	G	2´	C	-	130	-	G												
DRAIN	1´					G	1´					G												
EXTR.	–					–	2´					E												
RINSE	2´	C	-	130	-	G																		
DRAIN	1´					G																		
EXTR.	2´					E																		
RINSE																								
DRAIN																								
EXTR.																								
SPIN DOWN																								
TOTAL TIME																								

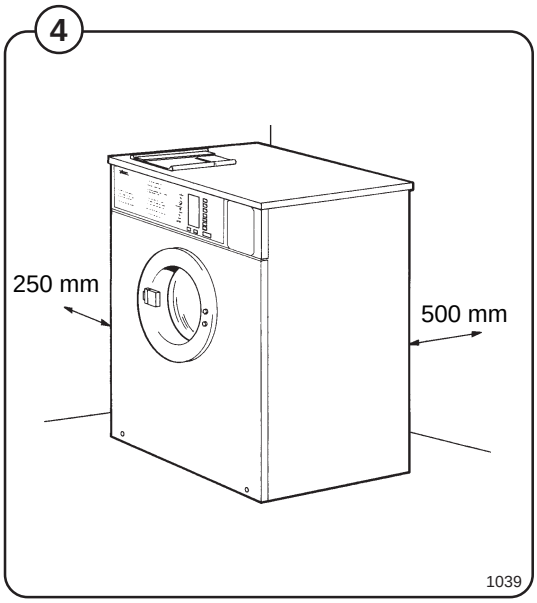
– = NO ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION
E = EXTRACTION

´ = MINUTES
" = SECONDS

C = COLD WATER (15°C)
W = WARM WATER (35°C)
H = HOT WATER (65°C)
Hd = HARD WATER

LL = LOW LEVEL
ML = MEDIUM LEVEL
HL = HIGH LEVEL

Installation



The machine is delivered complete with bolts, template etc. packed inside the machine in the drum. Move the machine on its pallet to where it is to be installed before removing the pallet retaining bolts.

Position

Install the machine close to a floor drain or open drain.

In order to make installation and servicing the machine easier the following clearances are recommended:

Fig. 4

- At least 500 mm between the machine and the wall behind.
- A minimum clearance of 250 mm at the sides between the machine and a wall or other machine, where more than one machine is installed.

Floor

In this type of machine the drum is attached directly to the frame. As a result the floor under the machine must be stable enough to absorb the dynamic forces generated during the spin cycles of the machine's programme. The mounting bolts require casting into the floor material itself.

Where the machine is to be mounted directly on an existing concrete floor, first check that the concrete is at least 100 mm thick and in good condition.

The floor must be able to withstand the loads according to the table here under.

Bolts that use "chemical anchors" are an alternative to casting the bolts into the floor. For further information please contact your local dealer.

Static	1,4 kN
Dynamic	1,4±2,6 kN
Frequency of dynamic force	9 Hz

Casting a plinth

A plinth should be used where the existing floor is less than 100 mm thick or in order to ensure that the machine is above the level of any water leakages.

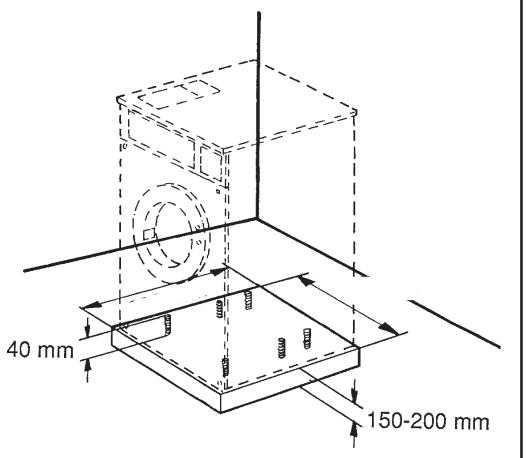
The plinth should be approximately 150–200 mm in height.

Proceed as follows:

- Break up the existing floor to a depth of approx. 75 mm and check that the sides of the hole are tapered outward so that the longest side at the bottom measures 120 mm more than at the top.
- Make the mould for the plinth.
- Moisten the hole well and apply cement to the sides and bottom.
- The 4 or 6 mounting bolts must be positioned in the hole before continuing with casting the plinth itself. Use the template provided to locate the bolts correctly in the hole and place them so that 40 mm of the each bolt will be visible above the surface of the plinth. Pour the cement into the mould and check with a spirit level that it is horizontal.
- The concrete should be left for at least two days to set before mounting the machine on the plinth.

A	B	C	D	E	F
635	700	530	364	87	–

5



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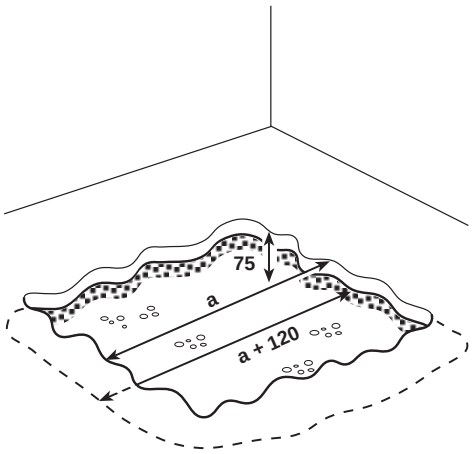

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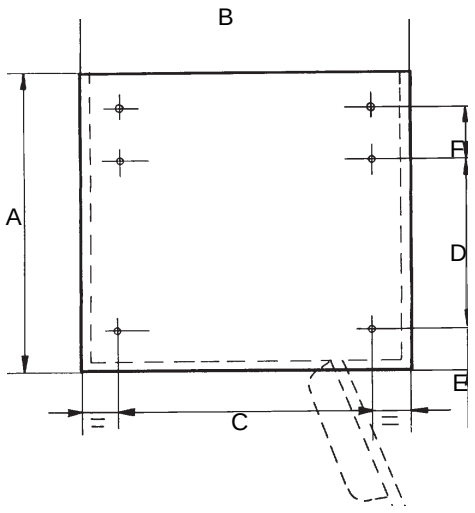

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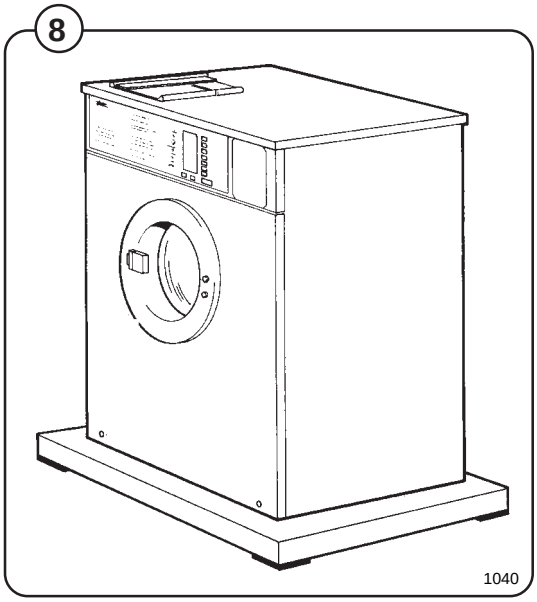
Floating plinth installation

A "floating" plinth should be used wherever there is a risk that vibration from the machine when in operation can cause a nuisance by resonating with the materials in the building where it is installed.

In principle a floating plinth is a block of concrete of sufficient strength and stability to absorb the dynamic forces generated by the machine in operation. This block is insulated from the floor by attaching rubber elements under it using a special adhesive in order to eliminate vibrations spreading through the floor to rest of the building.

Fig. 8

If you thin the installation site might require a floating plinth, please contact your local dealer for more information.



Installing the machine

To install the machine:

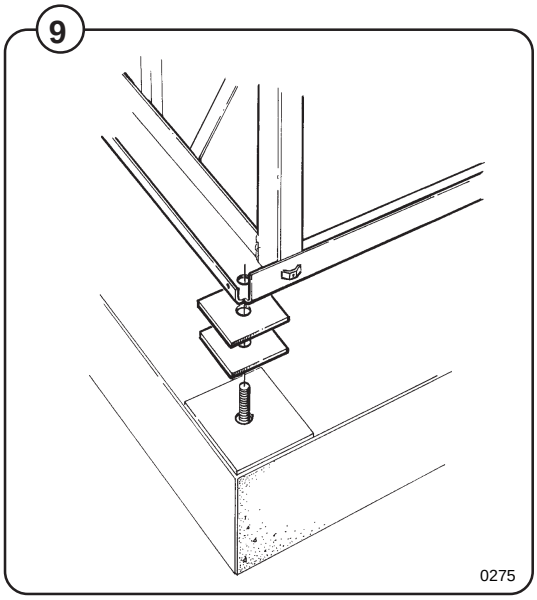
- Remove the transport packaging.
- Remove the front panel and the rear safety panel.
- Remove the machine from the transport pallet and locate it on the bolts, lifting the machine by the frame, never by door or door handle.
- Check that the machine is level and steady at all four corners. Adjust using stainless steel washers or galvanised plate metal between the machine and the flooring or plinth. The washers or metal plates should cover the whole supporting corner.

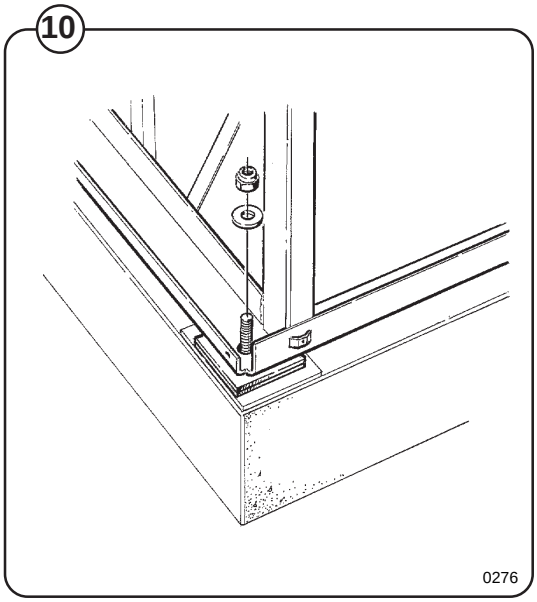
Fig. 9

- Use the washers and self-locking nuts supplied to fasten the machine to the installation site. Tighten well.

Fig. 10

After the machine has been in use for a while check and re-tighten the nuts if necessary.





Mains water supply

The water supply to the machine should be fitted with manual shut-off valves to facilitate installation and servicing. National Water and Drainage ordinances and regulations may vary so always check them regarding installation of non-return valves and filters.

Connecting hoses should be of high-pressure type and approved for 2.5 MPa (25 atm) according to ISO 1403-1976.

Water pressure should be:

- minimum: 40 kPa (0.4 kp/cm2)
- maximum: 1 MPa (10 kp/cm2)
- recommended: 200-600 kPa (2-6 kp/cm2)

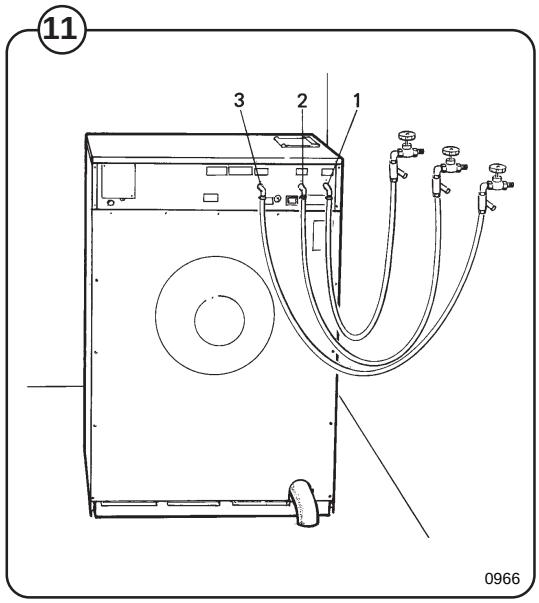
Hoses and pipes should be flushed through before being connected to the machine. Make sure the hoses have no sharp bends or angles.

The machine is fitted with 2 or 3 supply hoses, DN 20 (3/4'').

The table shows alternative connections depending on what type of water is to be used in the machine:

Water quality	Water connection		
	1	2	3
Hot and cold	cold	hot	
Hot, cold and cold hard	cold	hot	cold hard

Fig. (11)



Steam connections

The steam inlet pipe must be fitted with a manual cut-off valve in order to facilitate installation and service operations.

Fig. (12) Fit the filter supplied to the manual cut-off valve.

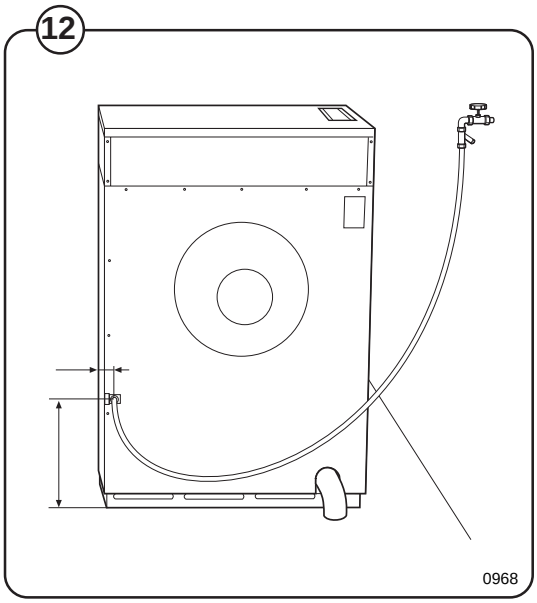
The connections hose must be of type ISO/1307-1983 or equivalent.

Connections size at filter: DN 15 (1/2").

Steam pressure required:

- minimum: 50 kPa (0.5 kp/cm2)
- maximum: 800 kPa (8kp/cm2)

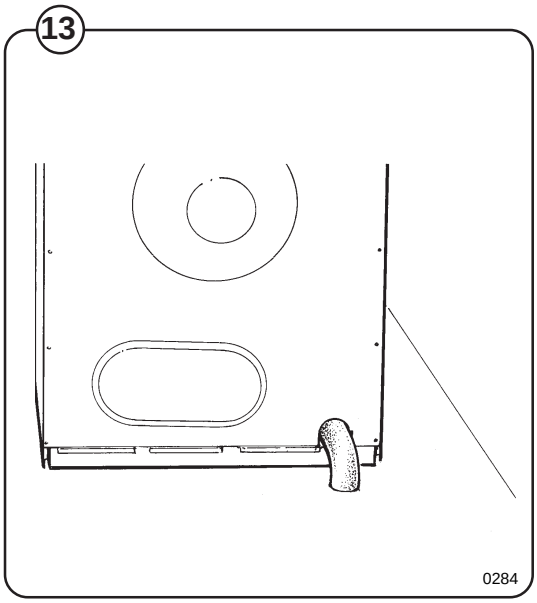
Check there are no sharp angles or bends in the connection hose.



Drain connection

Fig. (13) Connect a 75 mm (2") pipe or rubber hose to the machine's drain pipe. Avoid sharp bends which may prevent proper draining.

The drainage pipe should be located over a floor drain, drainage channel or similar so that the distance between the outlet and the drain is at least 25 mm (1"). Refer to local regulations on water supply and drainage.



Electrical installation

Electrical installation must be carried out by an authorized electrician!

Fig. 14

Mount a multi-pole switch prior to the machine to facilitate installation and service operations.

Use cable of a least grade 1105VV-F or better and check that it hangs in a gentle arc.

The machine must have its own fused connection to the mains supply.

Make sure that a protective earth connections is correctly connected.

Cable cross-section and fuses should be as shown.

(Refer to local regulations regarding mains cable sizes.)

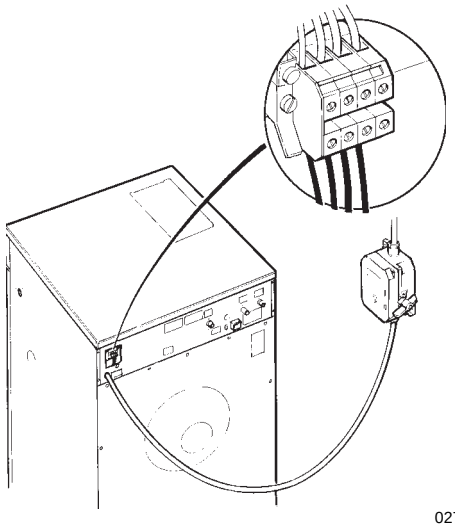
Fig. 15

When performing the final checks on the machine make sure that during the spin cycle the drum turns anti-clockwise (seen from the front of the machine).

If it's rotating the wrong way:

- Turn of the power supply at the mains.
- Swap two of the phase connections on the terminal block.

14



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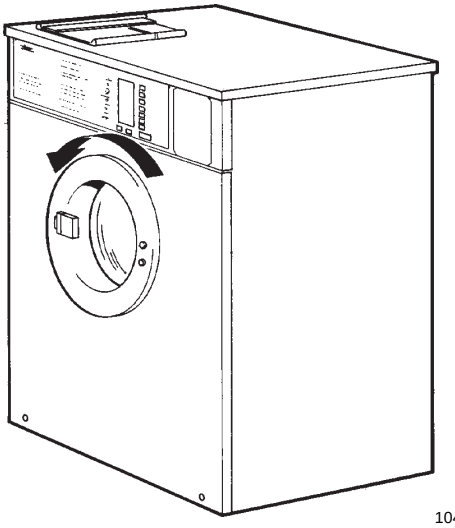

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Heating type	Voltage	Total rating kW	Fuse A	Cable cross section mm^2
El 5.4 kW	208-240 V 3 AC 60 Hz	5.8	16	4 x 2.5
	230V 3 AC 50 Hz	5.7	16	4 x 2.5
	240V 1 AC 50 Hz	5.7	25	3 x 6
	400V 3N AC 50 Hz	5.7	10	5 x 1.5
	415V 3N AC 50 Hz	5.7	10	5 x 1.5

Procedure for use

All operations, including programming take place from the machine's control panel. During normal use, the programming keys to the left of the panel are inoperative.

Fig. 16 The control panel comprises:

- a character window with four lines each of 40 characters. This displays current program information, programming instructions, fault messages etc.
- control buttons for:
  - start/hold/rapid advance
  - low speed spin only during automatic washing (high speed spin blocked)
  - manual washing (motor, filling with water, flushing down detergent, heating and draining)
  - programming new programs
  - figure values (program selection/programming)
- key switch for switching between the normal position and the programming position.
- indicator lights for dispensing equipment.

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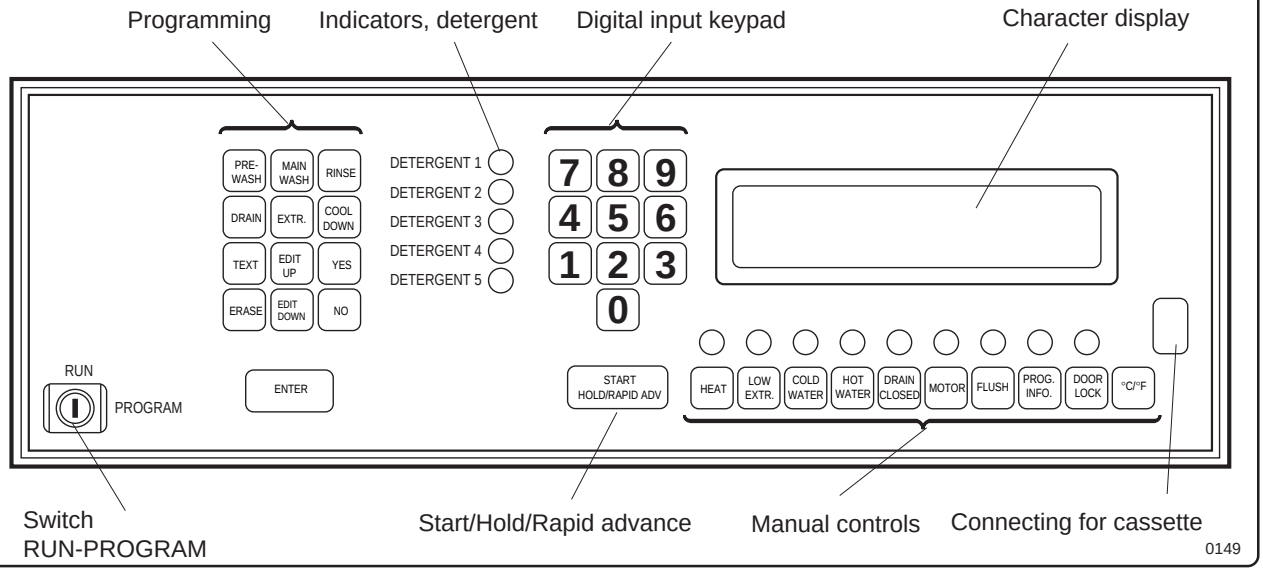


Preparation

- Sort the wash according to the advice given on the garment labels. Empty pockets and pull up zips.
- Open the washing machine door, check that the drum is empty, insert the wash goods and close the door.
- Check that the Emergency button is not activated. (See "Safety")

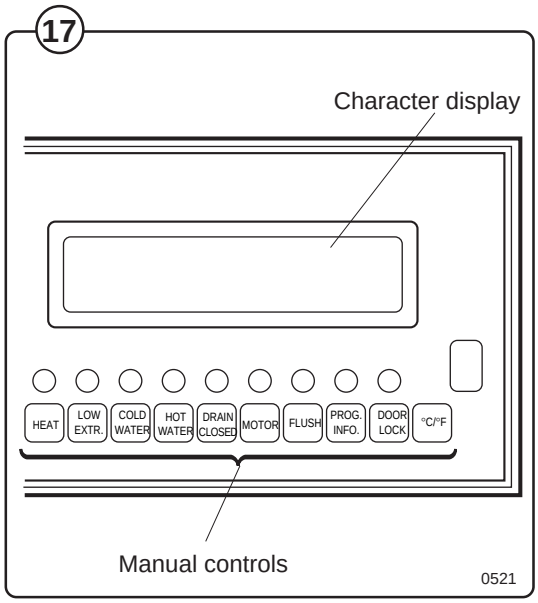
Automatic washing

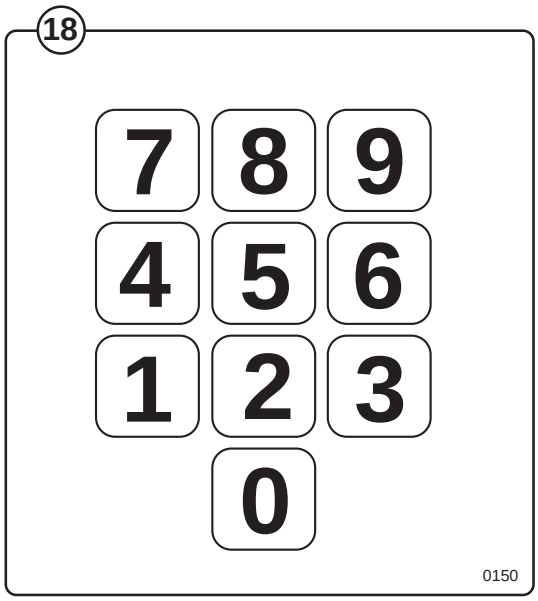
Fig. 17 The manual functions can still be used while automatic washing is in progress.

Select the program

When supplied, the machine is provided with a number of standard programs (program numbers 01-09). Program numbers 10-99 are intended for your own programs (refer to the separate programming appendix).

Fig. 18
- Select a program number by entering <u>two digits</u> with the digit keys. Note that program numbers 01-09 must also be entered as two digits (e.g. **0 2**).
- A number that has been entered incorrectly can be changed by entering the correct number directly after the incorrect one.





Program information

Fig. 19 When a program has been selected and **PROG. INFO. i**s pressed, further information about the program is displayed in the character window's bottom three lines (refer also to "TEXT" in the programming appendix).

Measuring the detergent

Fig. 20 Five indicator lights on the panel indicate which detergent compartments or connections from a central system will be used during the wash cycle.

Fig. 21 If the machine's system for powder detergent is used: measure the detergent and other additives according to the indicator lights.

Indicator lights

The indicator lights vary according to the type of machine:

70-152 litre drum volume

- light 1 flushing with cold water in compartment 1
- light 2 flushing with cold water in compartment 2
- light 3 flushing with cold water in compartment 3
- light 4 flushing with hot water in compartment 2

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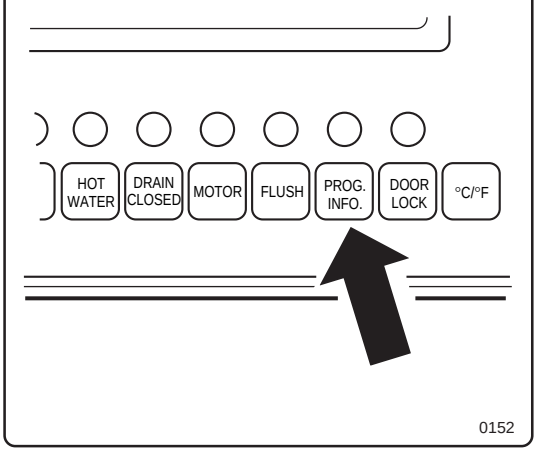

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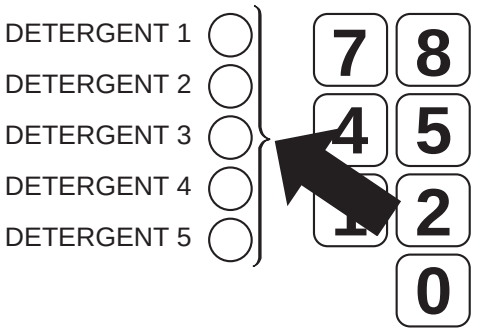

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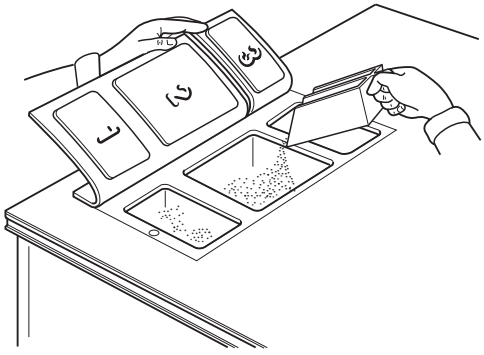

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Starting the program

Fig. 22 Fig. 23

Press **START/HOLD/RAPID ADVANCE.** The wash cycle will start and the display will show the wash information as illustrated below.

Temporary stop

Fig. 22

- Press **START/HOLDRAPID ADVANCE.** All active functions (motor, filling with water and heating) are switched off. The drain will remain closed and the door locked.

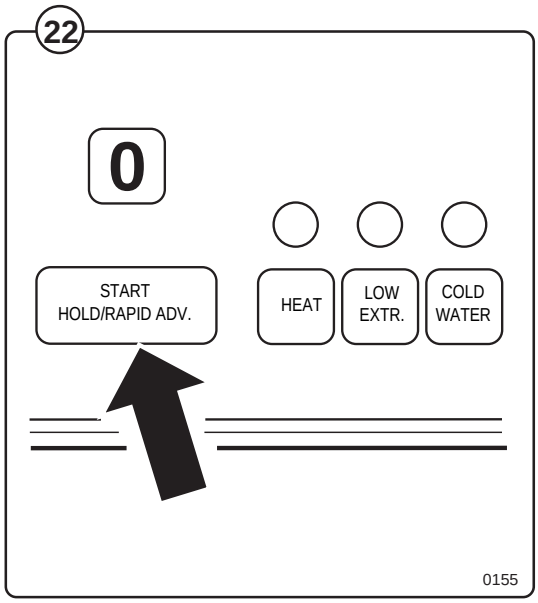
Fig. 22

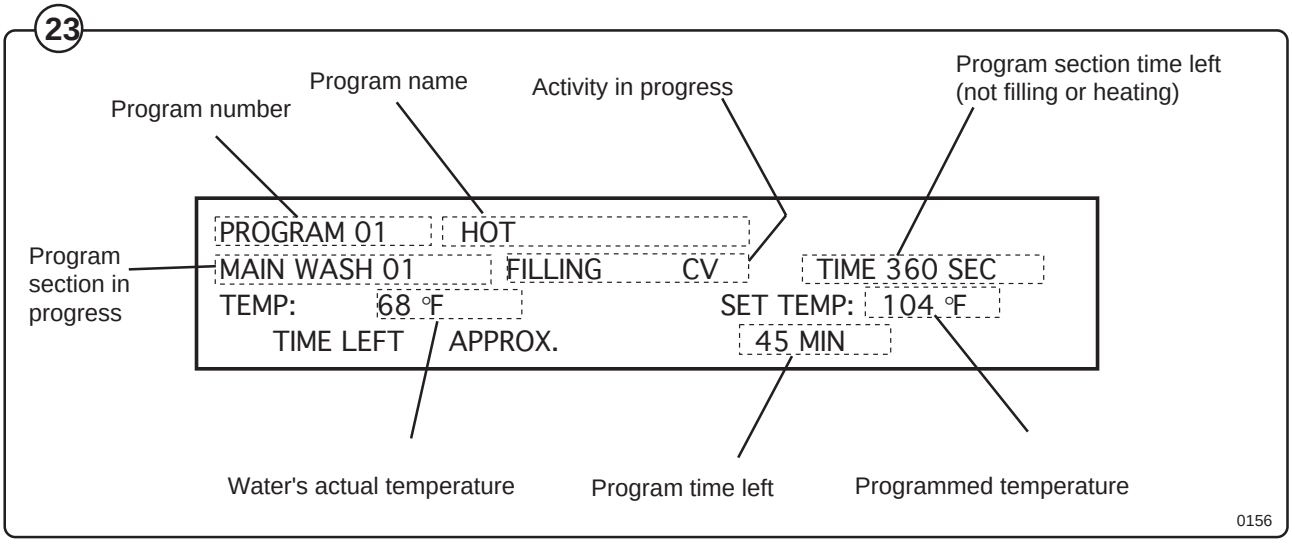
- The program is restarted by pressing **START/ HOLDRAPID ADVANCE** again. If the pause was made during a spin cycle, the program resumes with the program section after the spin cycle.

Fast forward

Fig. 22

- Press **START/HOLD/RAPID ADVANCE** and keep the button pressed. After 1.5 seconds, the different program sections will be fast forwarded at a rate of one section per second.
- Program sections which are longer that 300 seconds (5 minutes) are however divided into several steps for fast forwarding. At each step the time is reduced by 300 seconds.





Programmed stop

Fig. (24) If there is a programmed stop in the program, the machine stops and a buzzer sounds. The buzzer is switched off by pressing **START/HOLD/RAPID ADVANCE.** The program is restarted by pressing the button again.

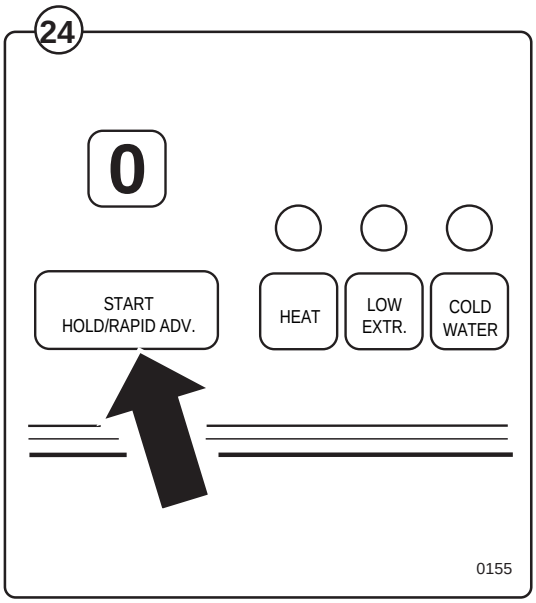
Tumbling after the program is completed

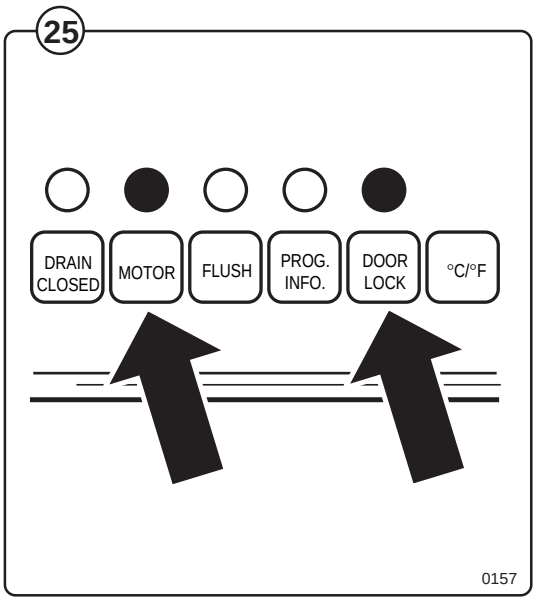
Fig. (25) If the manual program buttons **DOOR LOCK** and **MOTOR** are pressed before starting or while a program is operating, the drum will continue to rotate after the program is completed. The drum is stopped again by pressing **MOTOR** again. Then press **DOOR LOCK.** The door can then be opened after 30 seconds, but no earlier than 2 min. (for 120 litres) or 3 min. (for 220 litres) after completed spin cycle..

After use

Switch off the functions that have been used so that all indicator lights above the button go out. The door can then be opened after 30 seconds.

Open the door and take out the wash.





Manual operation

The manual buttons — **HEAT, LOW EXTRACT, COLD WATER, HOT WATER, DRAIN, MOTOR, FLUSH** — may either be used during the running of a program to override it or operate the machine manually.

The **DOOR LOCK** button must always be pressed prior to manual washing to lock the door, and afterwards must be pressed again. The door may then be opened after thirty seconds.

For safety reasons, there is no manual button for an extraction sequence. Instead, simply first create a program which consists of a minimum thirty-second drain and an extraction sequence, and then run that program whenever you need extraction after a manual wash.

The manual buttons operate the washer as follows:

Manual heating

Press button **HEAT**. The following text appears on the display:

```
 ** MANUAL HEATING OFF **

TEMP: 25 °C                        SET TEMP  °C
SELECT SET TEMP. AND PRESS START BUTTON
```

Program the required heating temperature and press START. The display will now read:

```
 ** MANUAL HEATING ON **

TEMP: 25 °C                        SET TEMP 60 °C
CANCEL BY PRESSING HEAT - BUTTON
```

Heating can now be switched on and off with the start button. The upper line on the display contains an indication that states whether or not heating has been activated.

Low Extract (only when running a program)

If the program you are about to run has both a low speed and high-speed extraction, but you want low-speed extraction only, press the **LOW EXTRACT** button before starting the program. Any programmed high-speed extraction will be skipped.

Cold water

To admit cold water into the drum, keep pressing the **COLD WATER** button. When you stop pressing, the cold water valve will close.

Hot water

To admit hot water into the drum, keep pressing the **HOT WATER** button. When you stop pressing, the hot water valve will close.

Drain

Manual

The drain valve is closed by pressing the DRAINbutton. Press again to open the drain valve.

Running a program

When a program is run, the drain valve will open when the button is kept depressed and closes again when it is released.

Motor

The wash motor is started and operates with normal reverse wash action by pressing the **MOTOR** button. Press the button again to stop the wash motor.

Flush

Keep pressing the **FLUSH** button to flush down compartment 1 (prewash) of the built-in detergent supply box.

> **Note!**
>
> **The FLUSH button will also send a signal to a free-standing supply injector, signal 1, if in use.**

°C/°F

The **°C/°F** button can be used to select whether the temperature is to be displayed in degrees Celsius or Fahrenheit.

Prog info

The **PROG INFO** button is used to display both information on a selected program and statistics on the various programs.

Pressing **PROG INFO** when a program is selected displays information on it in plain language on the bottom three lines of the display.

To obtain program statistics, select 00 and press **PROG INFO**. The display then shows the total machine operating time in hours, followed by the number of totally implemented programs by the various program numbers. New program numbers are entered by repeatedly pressing **START/HOLD/ RAPID ADVANCE**.

To return to the normal mode, press PROG INFO again.

Description of FOM71MP LAB start question

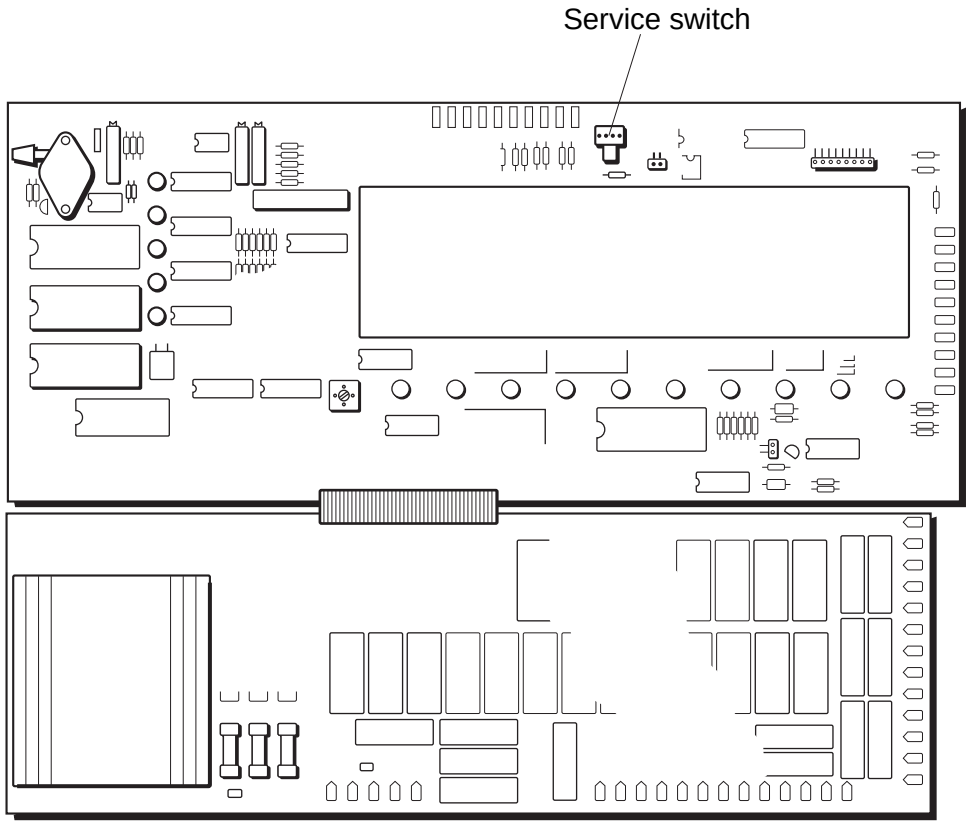
Service switch

Fig. 26

The various service switch positions are used as follows:

0	Run position. Programming in simple way.
1	Run position. Programming with complete questions ex. reversing times, hystereses and cool down.
2	Run position with two start questions. See "Special start questions". Programming in simple way.
3	Run as position 2. Programming as position 1.
4	Service program.
5-9	Not in use.

26



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Special start questions

General

If the rotary switch on the timer board is in position two, two questions will be presented on the display which normally not occur.

> **NOTE!**
>
> **These questions will only be presented if the software for FOM71MP LAB is used. Normally this position will give function ''automatic restart''.**

Description

When a programme is selected and the start button is pressed, the machine will not start if the rotary switch on the board is in position two. Instead two new question will appear on the display;

WASH CYCLE WITHOUT THERMOSTOP (Y/N)

By answering Y the machine will not wait for selected temperature to be reached before time is started in the different wash programme sequences.

By answering N the machine will not start count down of sequence time before temperature is reached.

After selection the start button should be pressed to confirm the choice. A new line will then be presented on the display;

REQUESTED WASHES XX WASHES DONE XX

With the numerical buttons it is now possible to select how many times the selected wash programme will be automatically restarted.

After selection the start button should be pressed to confirm the choice. Digits between 1 and 99 are allowed. When start is pressed the above line will be present during the complete wash programme showing how many automatic starts that are done.

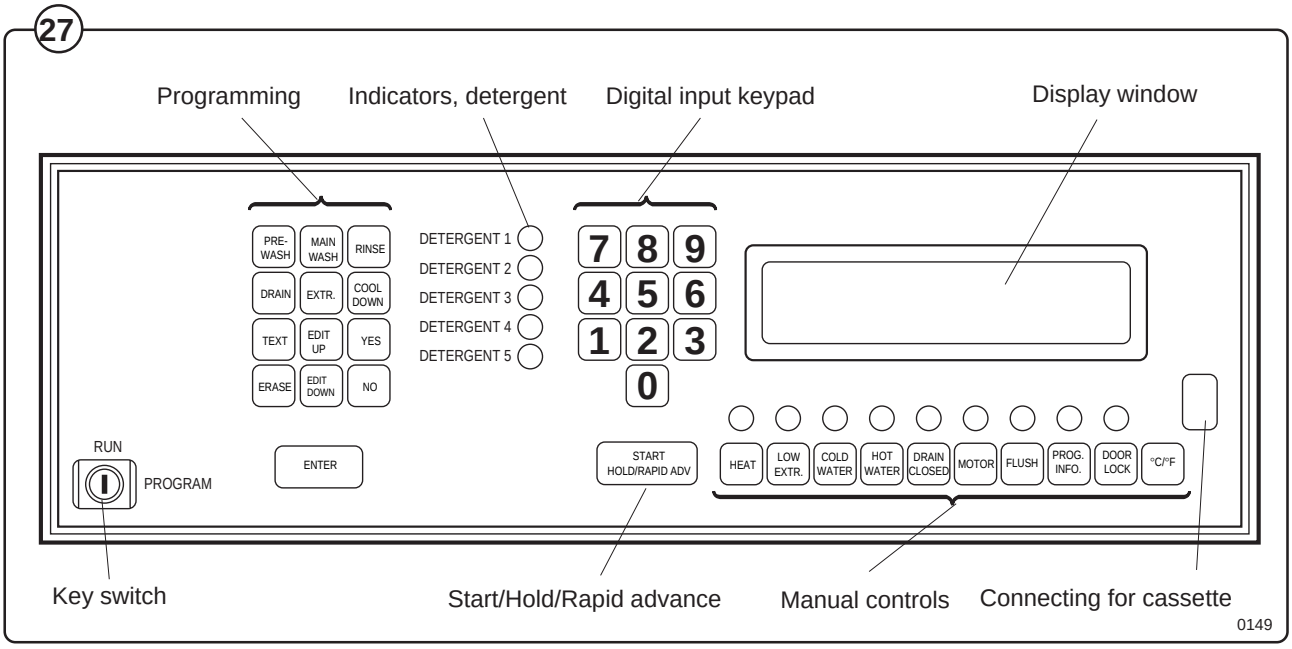
General

Fig. 27 The washing machine's program operation is controlled by a microcomputer and the wash programs are stored in an electronic memory. Program controls are very exact and the wash programs can be easily adapted to the end user's individual requirements.

The machine is supplied with a number of fixed basic programs which cannot be deleted or modified. However, they can be used as a background for programming end user programs. It is also possible to compose entirely new programs. 90 such programs can be stored in the program unit's memory.

The following parts of the control panel are used when programming:

- the key switch is used to switch the machine to the programming position.
- 13 press button switches which are used only for programming.
- the numeric keys which are used to enter different program data
- °C/°F press button to select the temperature scale (°Celsius/°Fahrenheit)
- display window where the programming is controlled with the aid of questions and selections.



Programming - general description

Programming can be divided into two programming principles: Programming a new program or using an old program as a background.

Programming a completely new program

Fig. 28

The wash program is constructed by selecting different sub-programs with the buttons on the panel. These sub-programs, when stored after each other, form the complete final wash program. Sub-programs can be selected in an optional sequence.

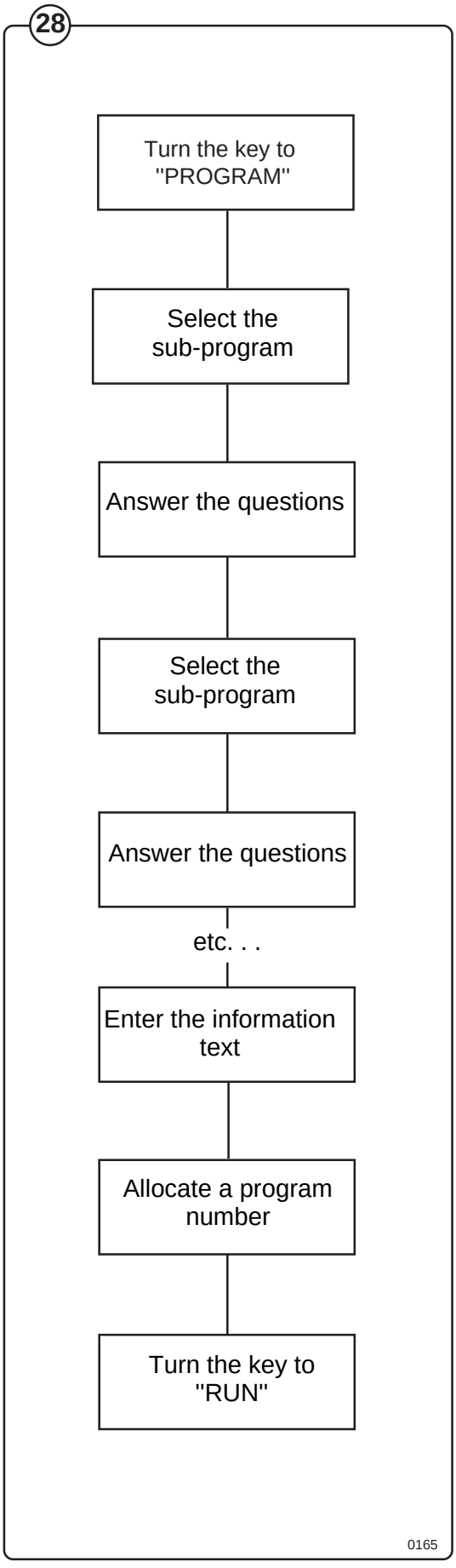
A program can, for example, be built up in the following way:

- Pre-wash 1, Drain 1
- Main wash 1, Cool down 1, Drain 2
- Rinsing 1, Drain 3, Extract 1
- Rinsing 2, Drain 4
- Rinsing 3, Drain 5, Extract 2.

When programming, a number of questions must be answered for each sub-program. The questions are answered with the **YES, NO** buttons and the number keys.

When all sub-programs are programmed, any questions which apply to the whole program must be answered. AN explanatory text can also be entered (this is displayed when **PROG.INFO.** is pressed after selection a program).

The last thing to be done is to store the program in the program memory under a vacant program number.

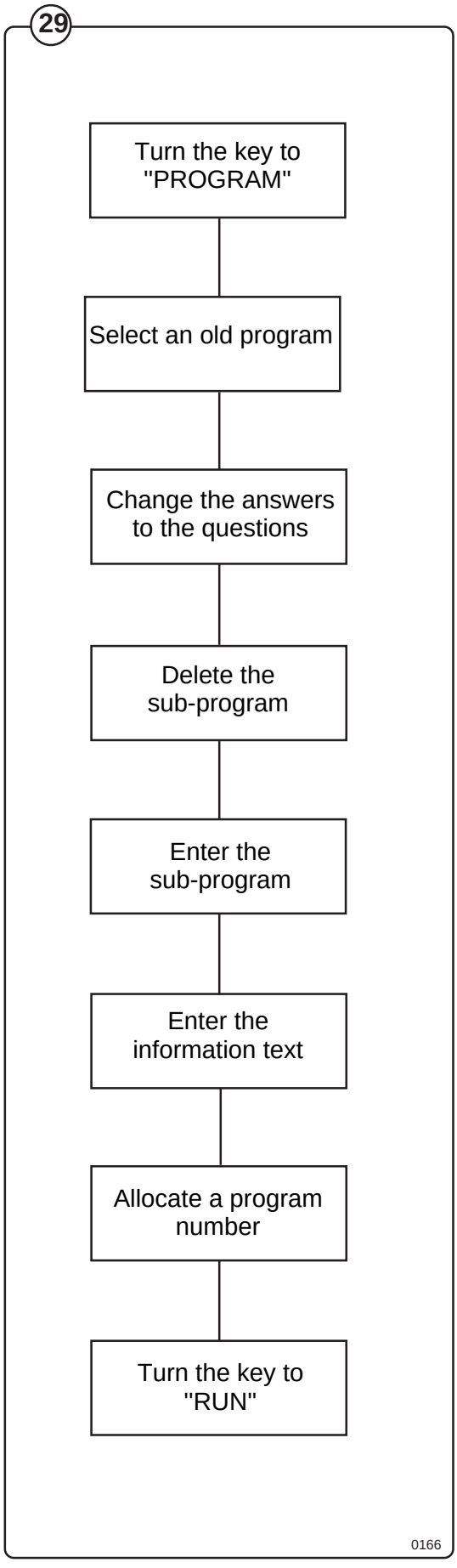


Using and old program as a background

Fig. 29

In this operation, an old program is selected as a background for the new one. The answers to the questions and the written texts can be changed to create a new program. Furthermore, sub-programs can be erased and new sub-programs entered in optional positions.

When the changes are complete, the new program is entered under a vacant program number. The program which was ''borrowed'' at the start of the programming is retained unchanged under its old program number.



Controls

The key switch

Fig. 30 Turn the switch to the **PROGRAM** position of the wash program is to be programmed or changed.

If for any reason you wish to discontinue programming and start again, turn the switch to the **RUN** position and then back to **PROGRAM** again. Any programming that you have done so far will be deleted but other programs already stored will not be affected.

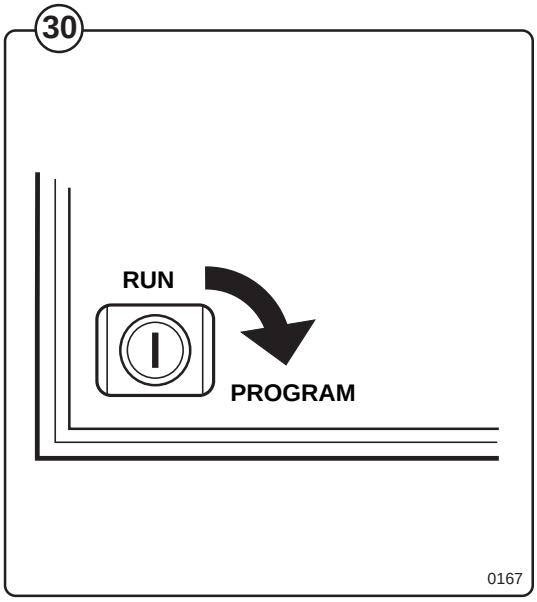
ENTER

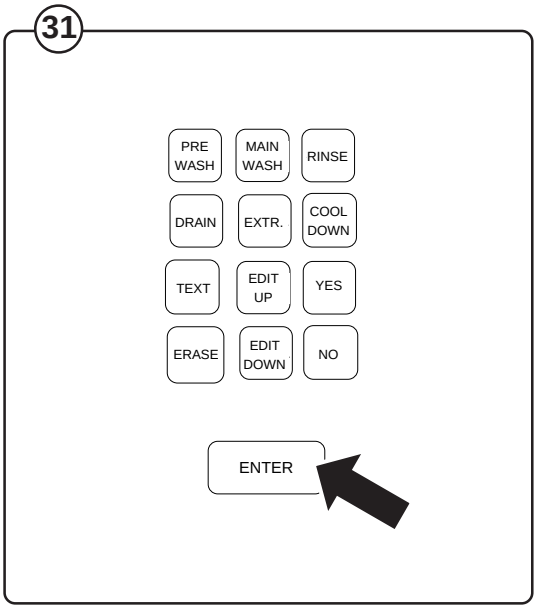
Fig. 31 An important principle when programming is that all commands (such as the choice of sub-program, answers to questions, text input) must be followed by **ENTER**.

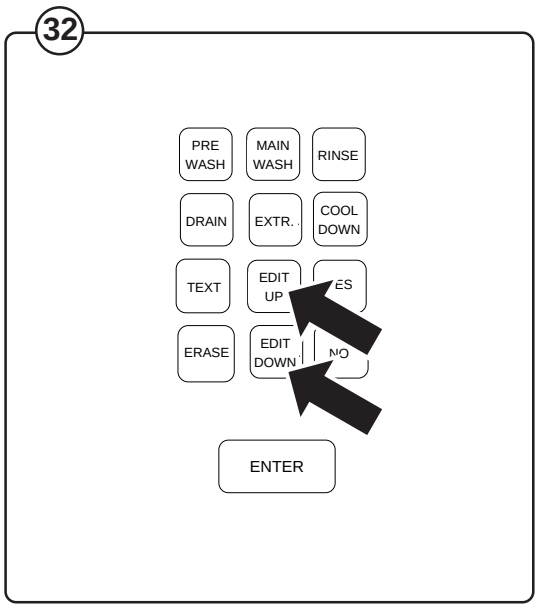
The command can always be changed or deleted before **ENTER** is pressed.

EDIT UP and EDIT DOWN

Fig. 32 The **EDIT UP** and **EDIT DOWN** buttons are used to go backwards or forwards in the program without its being affected, e.g. to go through the questions in a sub-program. The buttons are also used to enter program text (see under the heading "Entering text").







Erase

This button can be used in three different ways:

Fig. 33

- Deleting a complete program.

Press **ERASE** when the display window displays the adjacent text.

A warning text will then be displayed. Press **ENTER**, enter the program number with the number keys and press **ENTER** again.

Fig. 34

- Deleting a section of a program.

Move forwards or backwards in the program by using **EDIT UP** or **EDIT DOWN** so that you reach the program section to be deleted. See under the heading "Looking through the program". Press **ERASE**.

Answer **YES** and **ENTER** to the question "ERASE THIS MODULE".

Fig. 35

- Deleting characters when entering text.

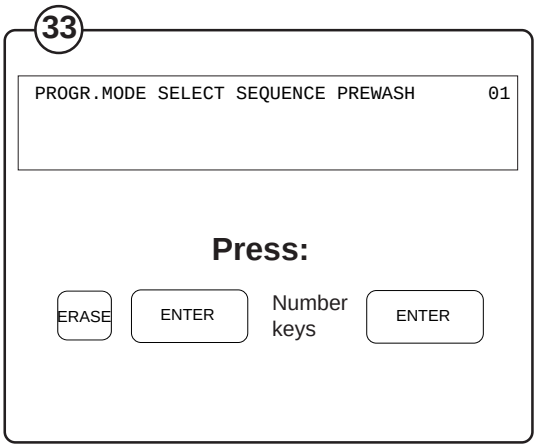
To delete individual characters when programming text, press **ERASE**. The last character you entered will disappear. (see under the heading "TEXT").

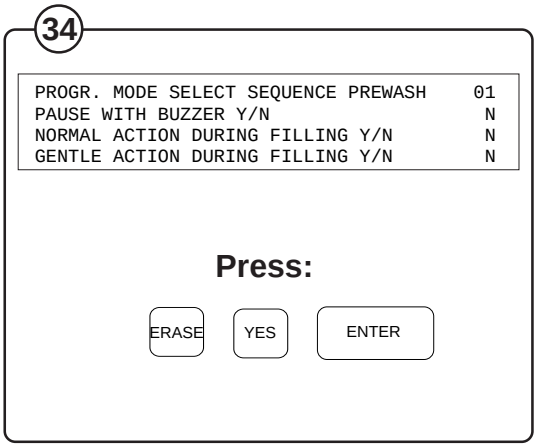
Selecting sub-programs

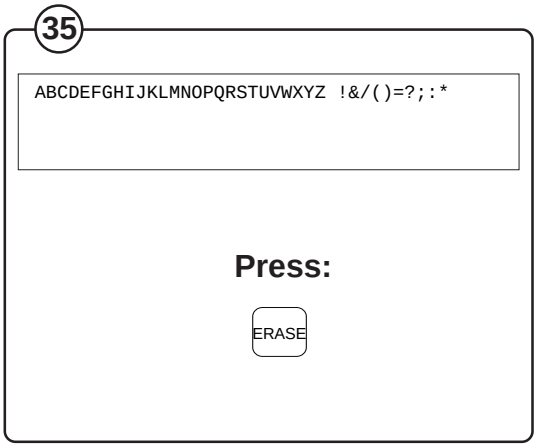
Fig. 36

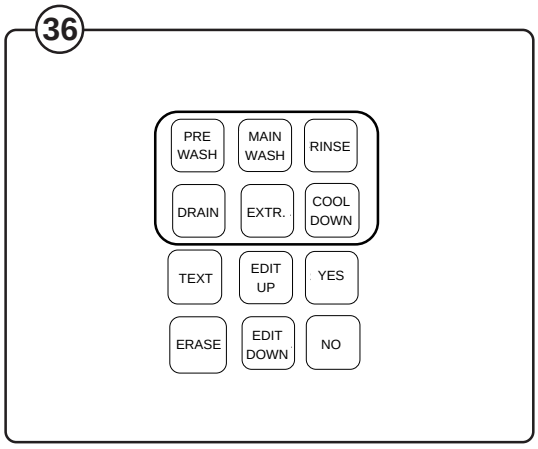
Press buttons **PRE WASH, MAIN WASH, RINSE, DRAIN, EXTR.** and **COOL DOWN** designate different sub-programs and can be used to construct complete wash programs.

When necessary, the same sub-program can be used several times in the same wash program. Each sub-program is allocated its own number (e.g. RINSE 01, RINSE 02 etc.) so that the different sections can be easily identified.









YES, NO, number keys

These keys are used to answer the different questions which are found under each subprogram. All answers must be followed by pressing **ENTER** for the answer to be registered.

TEXT

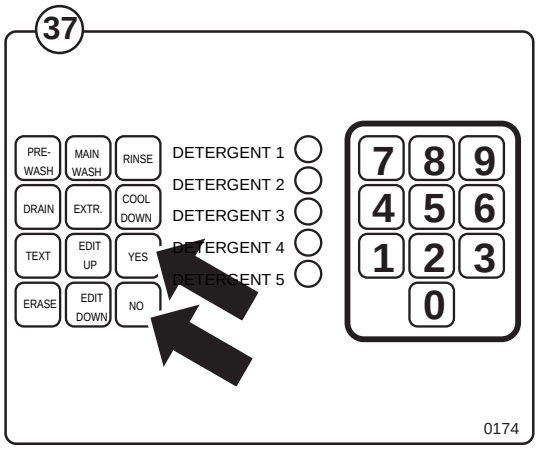
The key for **TEXT** is used for entering the explanatory text which is displayed when **PROG.INFO**. is pressed after that a program is selected.

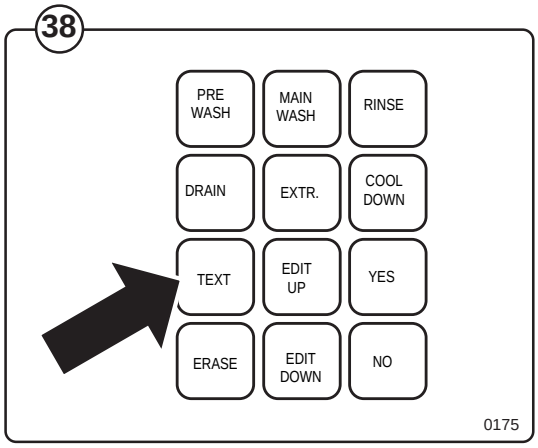
Proceed as follows:

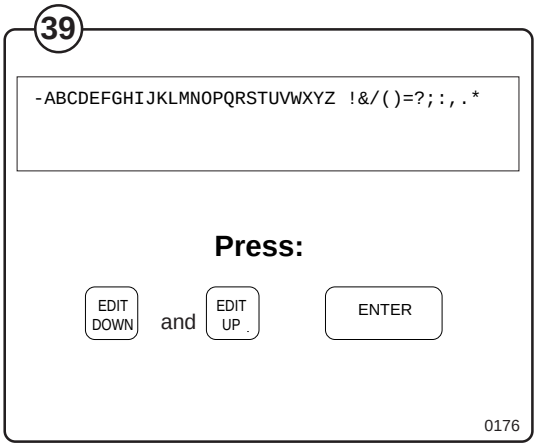
- Press **TEXT** when the display window displays "PROGR. MODE SELECT SEQUENCE". Press **ENTER**.
- The alphabet is then displayed together with a number of special characters in the display window. By using the **EDIT UP** and **EDIT DOWN** keys, the cursor (the flashing square) can be moved along the character line.
- The first character of the text is entered by pressing **ENTER** when the cursor is in the correct position. Move the cursor to the next character and press **ENTER** again.
- An incorrectly entered character can be deleted by entering **ERASE**.
- When the text is complete, move the cursor to the arrow marker to the far left and press **ENTER**. The display window will then revert to the position for selecting a sub-program.

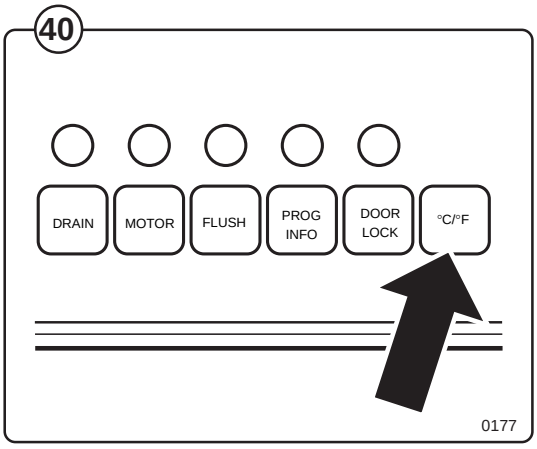
°C/°F

The temperature range required can be selected by pressing **°C/°F**. The button has an alternating function.









Programming a new program

If you make a mistake or get stuck, there is always a final resort:

Turn the key to the RUN position and then to PROGRAM again. Any programming you have carried out so far will be lost but other programs will not be affected.

Turn the key

Fig. (41) Turn the key to the **PROGRAM** position. The first character will then be displayed in the display window.

Select ''New program''

Fig. (42) Answer **NO** to the question ''DO YOU WANT AN OLD PROG. AS BACKGROUND?''. Press **ENTER**.

Select sub-program

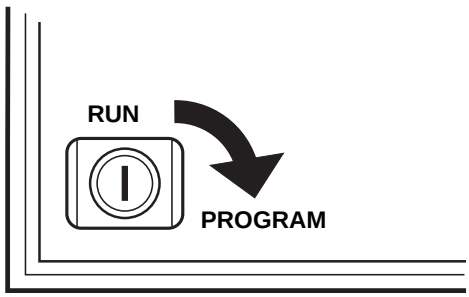
Fig. (43) Select one of the following: **PRE WASH, MAIN WASH, RINSE, DRAIN, EXTR, COOL DOWN, TEXT** or **ERASE**. Press **ENTER** immediately after the first selection is pressed.

The different sub-programs are selected with the first keys listed where a number of questions are answered.

TEXT is used to program the information text to be displayed when **PROG. INFO**. is pressed after that a program is selected.

If **ERASE** is pressed, an entire program can be deleted.

41



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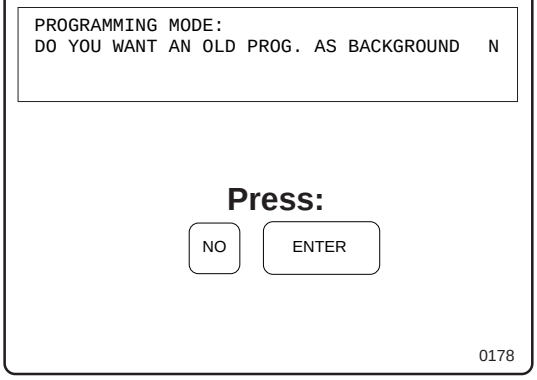

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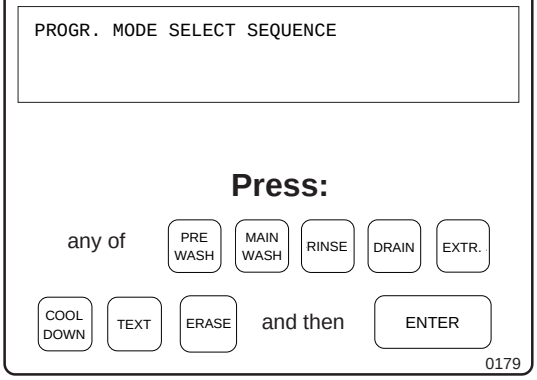

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Answering questions

The general principle for answering questions is the same for all sub-programs:

- The cursor (the flashing square) is always to the right of line three in the display window. This means that it is the question on line three that is to be answered.

Fig. 44

- The list of questions can be moved up or down in the display window with the **EDIT UP** and **EDIT DOWN** buttons.
- Begin by answering the questions from the top. You may need to press **EDIT UP** once to answer the first question.

Fig. 45

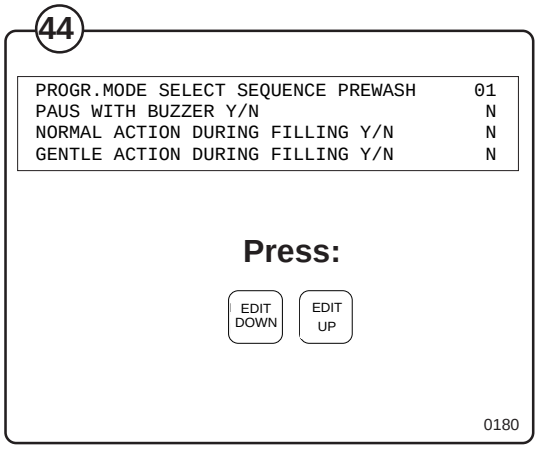
- Questions which are answered with either YES or NO are pre-programmed to NO. To answer YES, press **YES** and then **ENTER**. The **NO** button can be used to correct an incorrect YES answer. Each time **ENTER** is pressed, the next question will appear so that it can be answered.

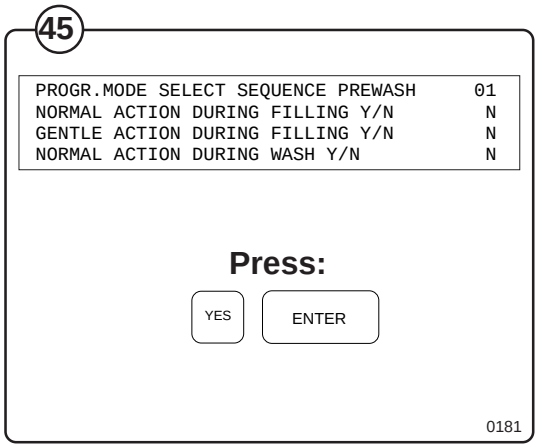
Fig. 46

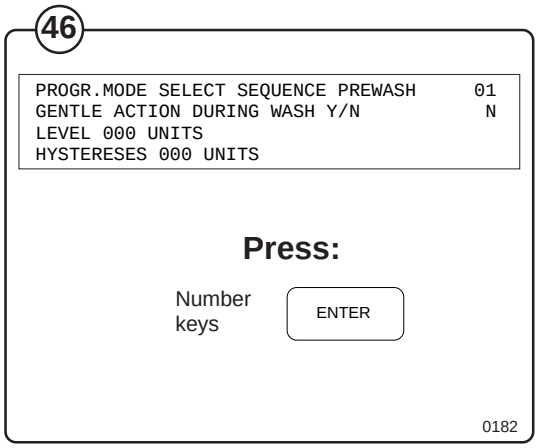
- Questions which are answered with a number are pre-programmed to O. Use the number keys and press **ENTER** when the number is correct.

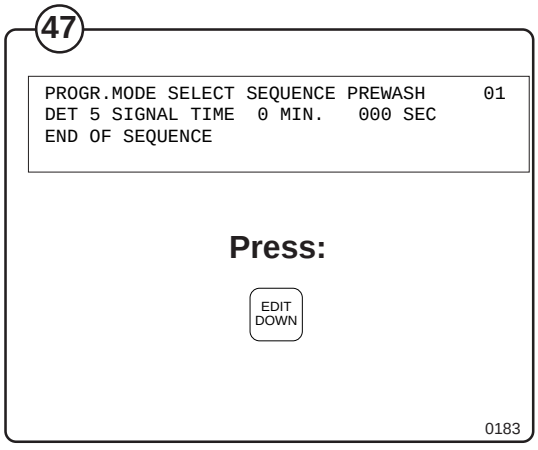
Fig. 47

- When ''END OF SEQUENCE'' appears on the third line in the display window, and all questions are answered, press **EDIT DOWN**. A new sub-program can now be selected.









The following is a summary of the different questions that can appear under the different buttons.

NOTE:

The question which are described do no apply to all machines. On certain types of machines, some of the values are programmed as standard values and need therefore not be answered.

Pre wash, main wash, rinsing

The questions in these three sub-programs are identical.

Pause with signal

Fig. 48 If the question is answered with YES, the machine stops before the sub-program is started and a buzzer sounds.

Normal action/gentle action

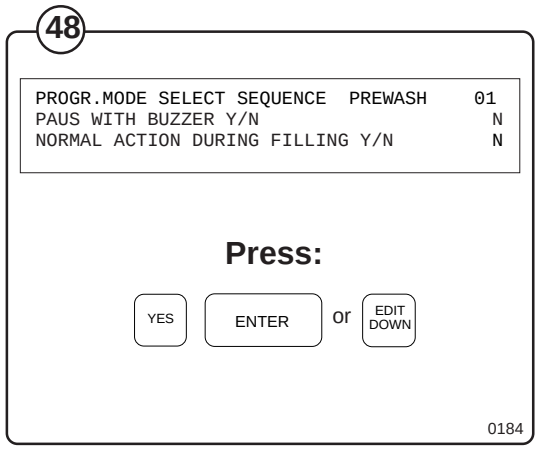
Fig. 49 Select the action while filling, heating and washing. One of the alternatives under each sequence shall be answered with YES, NO to all six questions will result in a stationary drum.

Level

Fig. 50 The water level can be programmed according to 255 scale divisions (units). Level 255 corresponds to a pressure of 600 mm wc.

Fig. 51 The table shows the FOM71MP LAB values.

48



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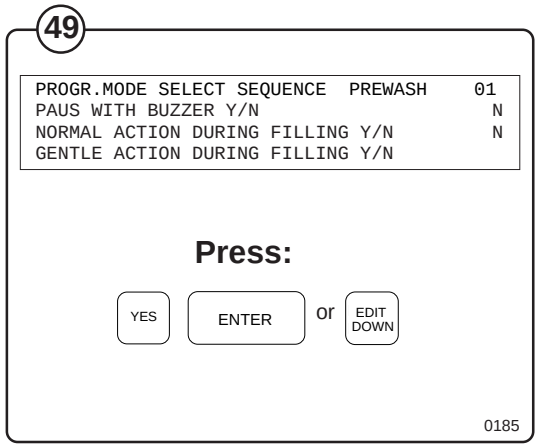

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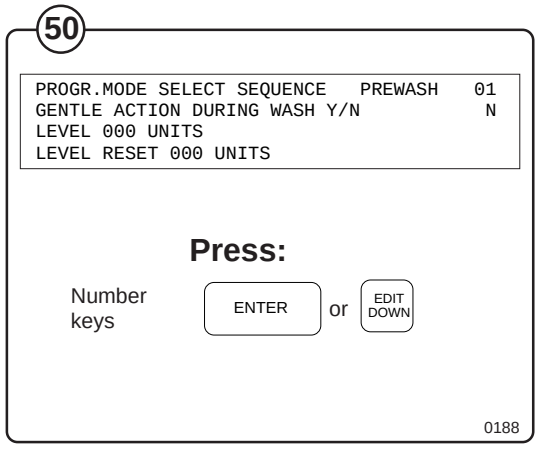

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Preliminary level settings
(No drum action during filling)

Water volume (litres)	Level in the inner drum (mm)	Scale units	Water volume (litres)	Level in the inner drum (mm)	Scale units
10	34	35	34	173	90
12	48	40	36	183	90
14	61	45	38	194	95
16	73	50	40	204	100
18	86	55	42	214	105
20	97	60	44	224	110
22	109	65	46	235	115
25	126	70	48	245	120
28	141	75	50	255	125
30	153	80	52	265	130
32	163	85			

Refilling

Fig. (52) HYSTERESES is the value which regulates at which level water is to be refilled if the water level sinks while a wash is in progress.

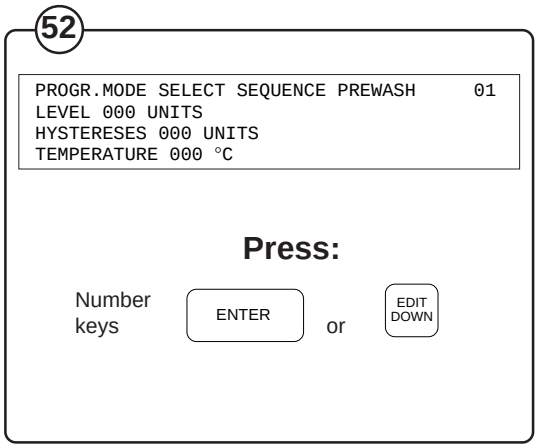
Example:

The following values are programmed:

- Level: 130 units
- Hystereses: 10 units

This means that:

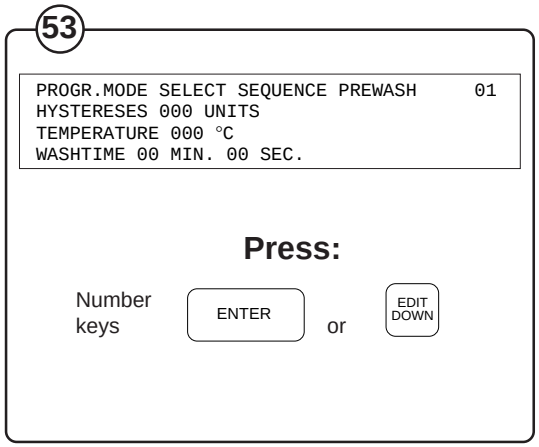
- Water is filled to level 130 at the beginning of the sub-program. If the water level sinks below level 120 (130-10) during the course of the program, the water level is refilled to level 130.
- Select a level between 0-255. Values greater than the level value mean that no water will be added.
- The recommended value is in the standard programs 31 units.



Temperature

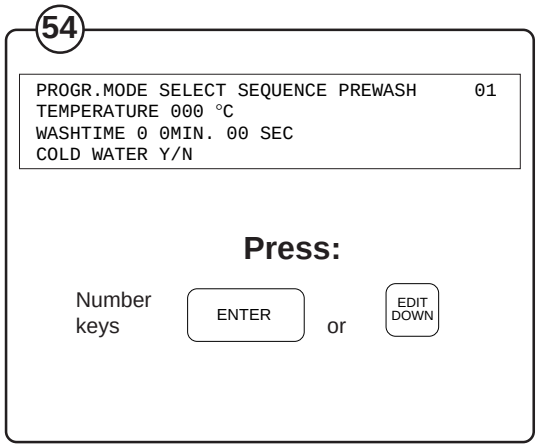
Fig. (53) The water temperature can be programmed either in °C or °F. Use the °C/°F button to change between scales (note that the change is not displayed until the next change in the display window is made).

Temperatures can be selected within the range of 32-208°F (0-98°C) in stages of 1°.



Time

Fig. (54) A sub-program can be timed in stages of 10 seconds. The longest time that can be programmed is 41 min 40 sec (2500 seconds). The time does not include the time for water filling or heating.



Water filling

Fig. (55) One or several water valves can be selected.

If you decide to use hot and cold water, both valves will be open while filling is in progress. The hot water valve will be automatically closed if the pre-set temperature is exceeded. The valve will open again if the temperature drops below the pre-set value.

If only hot water is chosen, the cold water valve automatically opens if the programmed temperature is exceeded. (Entered in new units on program memory, edition 2 beginning 91.05.10)

Water valves

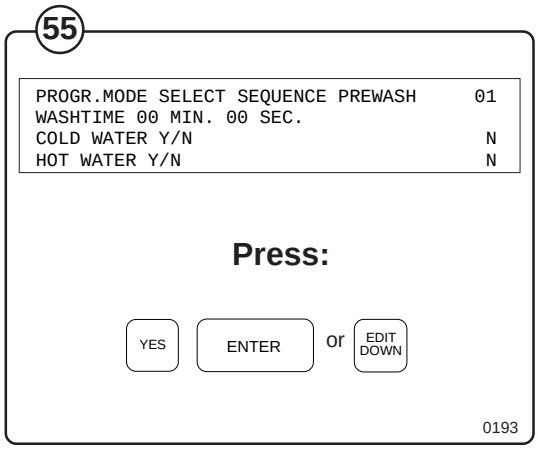
Programming	Gives
Cold water	Cold water Compartment 1
Hot water	Hot water directly in drum
Hard Water	–
Comp 1	– (Programme cold water)
Comp 2	Cold water compartment 2
Comp 3	Cold water compartment 3
Comp 4	Hot water compartment 2
Comp 5	–

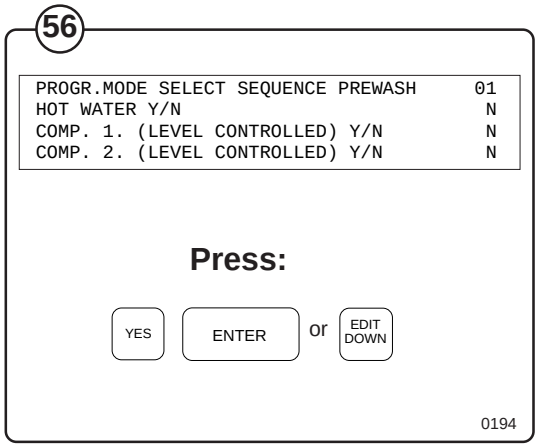
Supply injector

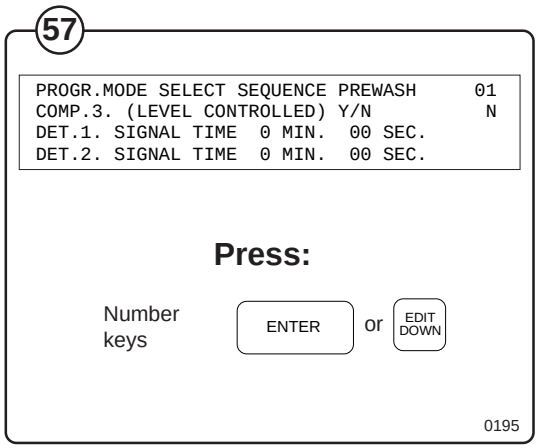
The supply injector valves can be controlled in two different ways. Select one of the methods for each activated valve:

Fig. (56)
- 1. By answering YES to the first five questions, the respective supply injector valve will be open all the time water filling is in progress.

Fig. (57)
- 2. By stating the times for the last five questions, the respective supply injector valve will open for the pre-programmed time. The valves will start to open when water is filled







Programming complete

- When ''END OF SEQUENCE'' appears on the third line of the display window and all questions are answered, press **EDIT DOWN**.
- Answer NO to the question ''END PROG. SESSION Y/N?'' if there are more sub-programs to be answered. Answer YES if the sub-program is the last in the completed program The continue under the heading ''Looking through the program''..

Drain

Pause with signal

Fig. (58) If the question is answered with YES, the washing machine will stop before the sub-program starts and a buzzer will sound.

Normal action/gentle action/distribution

Fig. (59) Select the method of working while draining. Distribution action is used before a spin cycle so that garments are equally distributed around the drum.

Machines with a fixed drum FOM71MP LAB do not have distribution speed. Select normal action or gentle action.

NO to all three questions will cause the drum to be stationary.

Drain 1/Drain 2

Fig. (60) These two questions need to be asked if the machine is fitted with an additional drain valve (e.g.) for recycling the rinse water). This determines the route the drain water takes.

* Liquid to tank, answer Yes. No gives normal drain.

The machine's own drain valve opens automatically during the drain function.

Time

Fig. (61) The emptying time can be programmed in stages of 10 seconds. The longest time that can be programmed is 42 minutes 30 seconds (2550 seconds).

58

```
PROGR.MODE SELECT SEQUENCE DRAIN        01

PAUSE WITH BUZZER Y/N                    N
NORMAL ACTION Y/N                        N
```

Press:

YES | ENTER | or | EDIT DOWN

0196

59

```
PROGR.MODE SELECT SEQUENCE DRAIN        01
PAUSE WITH BUZZER Y/N                    N
NORMAL ACTION Y/N                        N
GENTLE ACTION Y/N                        N
```

Press:

YES | ENTER | or | EDIT DOWN

0197

60

```
PROGR.MODE SELECT SEQUENCE DRAIN        01
DISTRIBUTION Y/N                         N
DRAIN 1 Y/N                              N
DRAIN 2 Y/N                              N
```

*

```
PROGR.MODE SELECT SEQUENCE DRAIN        01
DISTRIBUTION Y/N                         N
LIQUID TO TANK Y/N                       N
```

Press:

YES | ENTER | or | EDIT DOWN

0198

61

```
PROGR.MODE SELECT SEQUENCE DRAIN        01
DISTRIBUTION Y/N                         N
TIME 00 MIN. 00 SEC.
END OF SEQUENCE
```

Press:

Number keys | ENTER

0199

Programming complete

- When ''END OF SEQUENCE'' appears on the third line of the display window and all questions are answered, press **EDIT DOWN**.
- Answer NO to the question ''END PROG. SESSION Y/N?'' if there are more sub-programs to be answered. Answer YES if the sub-program is the last in the completed program. The continue under the heading ''Looking through the program''.

Extract cycle

Extract cycle times

Fig. (62) The time can be programmed in stages of 10 seconds. The longest time that can be programmed is 42 minutes 30 seconds (2550 seconds) for high and low speed extracting.

The machine FOM71MP LAB has only low speed extraction.

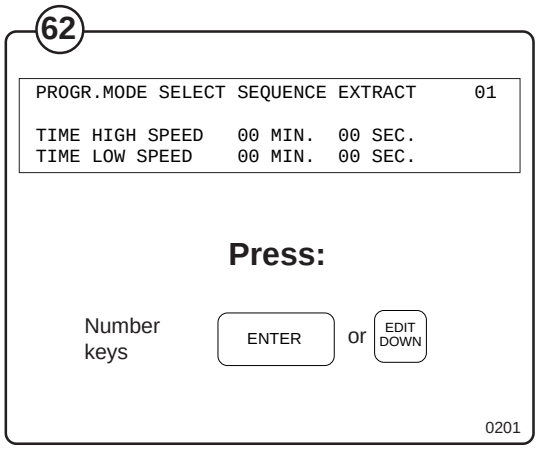
Programming complete

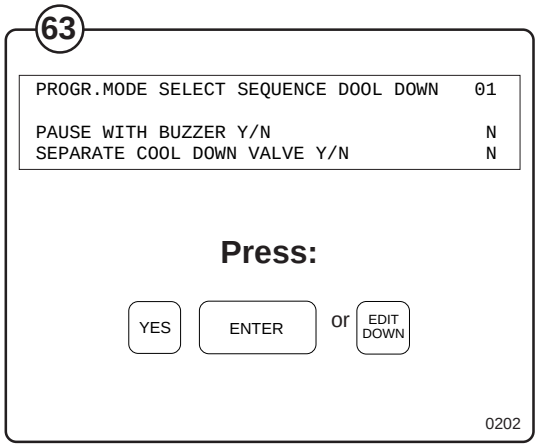
- When ''END OF SEQUENCE'' appears on the third line of the display window and all questions are answered, press **EDIT DOWN**.
- Answer NO to the question ''END PROG. SESSION Y/N?'' if there are more sub-programs to be answered. Answer YES if the sub-program is the last in the completed program. The continue under the heading ''Looking through the program''.

Cool down

Pause with signal

Fig. (63) If the question is answered with YES, the machine will stop before the sub-program starts and a buzzer will sound.





Gentle action

Fig. (64) Answer YES if the machine is to operate on gentle action during cooling. The machine will operate on normal action if the answer is NO.

Times

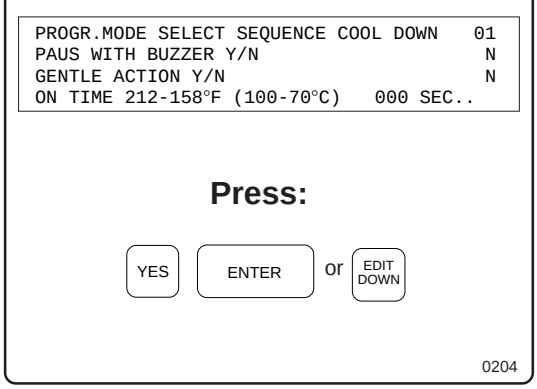
Fig. (65) Cold water is supplied in stages by the water valve opening and closing according to a particular pattern. The time for an opening or closing sequence is 30 seconds. This time is permanently programmed and cannot be changed. All that can be programmed is the ratio between open and closed valve.

Fig. (66) The time the valve i open (ON time) can be programmed separately between 1 and 15 seconds. The valve is closed during the remaining time up to 30 seconds. The ON time is programmed separately within two temperature ranges: 212-158°F (100-70°C) and 158°F (70°C) — final temperature.

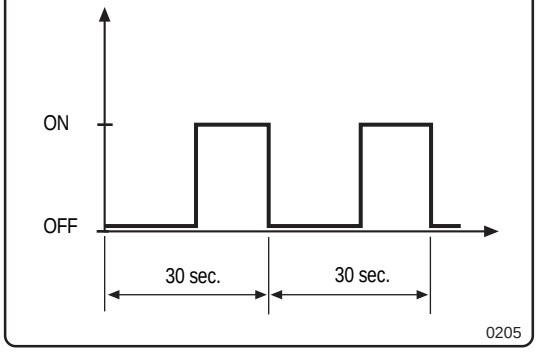
The rate of temperature reduction is monitored within the 212-158°F (100-70°C) range. If the ON time is selected so that the water temperature in the drum decreases by more than 7°F (4°C)/ minute, the valve is closed so that this value is not exceeded.

The final temperature can between 77-140°F (25-60°C) be programmed.

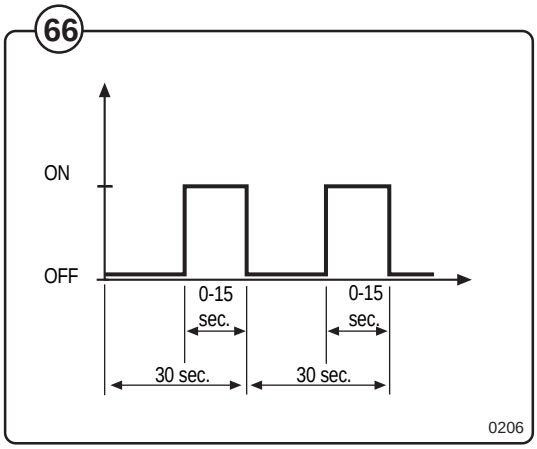
64



65



66



Example:

- ON TIME 212-158°F (100-70°C) 8 seconds.
- ON TIME 158°F (70°C) - END 13 seconds.
- END TEMP. 113°F (45°C).
- Wash temperature 194°F (90°C).

The following takes place:

- When the water in the drum reaches 194-158°F (90-70°C), the water valve is ON 8 seconds, OFF 22 seconds, ON 8 seconds, OFF 22 seconds etc. providing the temperature in the drum does not decrease by more than 7°F (4°C)/minute.

Fig. 67

- When the water in the drum is 158-113°F (70-45°C), the water valve i ON 13 seconds, OFF 17 seconds, ON 13 seconds, OFF 17 seconds etc.

Fig. 68

- When the temperature has reached 113°F (45°C), cooling is discontinued and the next sub-program commences.

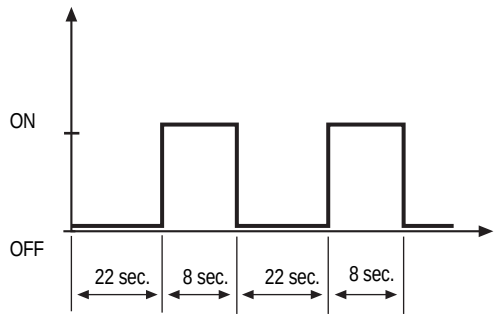
Fast cool down

Fig. 69 Fast cool down takes place if cool down is selected and END TEMP is set to 0. The water level is raised to the level set by the factory as the high level without the cold water valve being shut off.

Programming complete

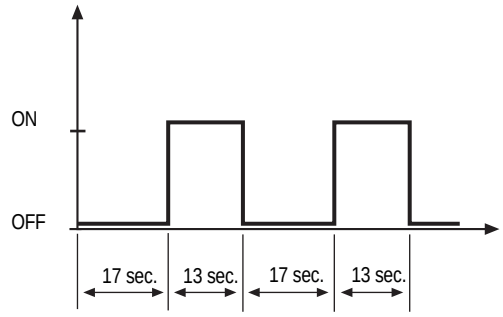
- When ''END OF SEQUENCE'' appears on the third line of the display window and all questions are answered, press **EDIT DOWN**.
- Answer NO to the question ''END PROG: SESSION Y/N? if there are more sub-programs to be answered. Answer YES if the sub-program is the last in the completed program. The continue under the heading ''Looking through the program''.

67



0207

68



0208

69

```
PROGR.MODE SELECT SEQUENCE COOL DOWN   01
ON TIME 212-158 °F (100-70 °C)     000 SEC.
ON TIME 158 °F-END (70 °C)         000 SEC.
END-TEMP    000 °F
```

Pulse:

EDIT DOWN EDIT DOWN ...

0209

Text

Each program can be provided with two types of informative text:

Fig. 70

- 1. A program name which is always displayed when the program is selected when washing. This text is programmed when the program number i selected. See under the heading ''Program names'' later on in the manual.

Fig. 71

- 2. Informative text which can comprise 120 characters (3 lines in the display window). This text is displayed when PROG.INFO is pressed after the program is selected.

  This text can be programmed by pressing TEXT when the display window displays ''PROG. MODE SELECT SEQUENCE''.

The procedure for this is described under the heading ''TEXT'' earlier in this manual.

End questions

Fig. 72

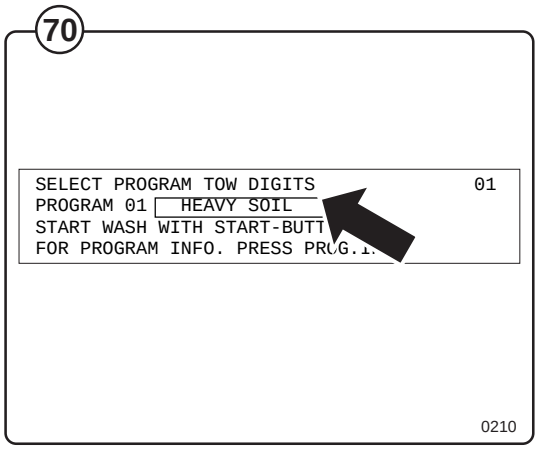
- When a sub-program has been programmed, ''END PROG. SESSION Y/N?'' appears. Answer NO when more sub-programs are wanted.

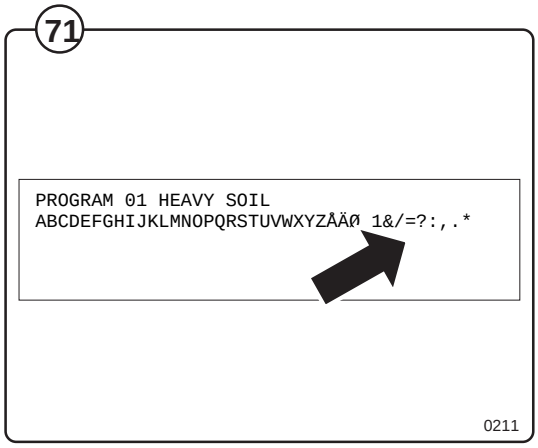
  Answer YES when the programming of sub-programs is to be finished. The end questions will then appear on the display.

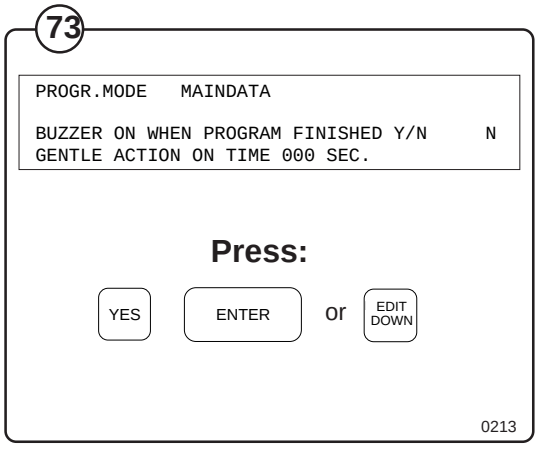
Signal at the end of the program

Fig. 73

If the question is answered with YES, the washing machine stops after the wash program is complete and a buzzer sounds.







Times for normal action and gentle action

Fig. (74) The times for rotating and stationary drum during normal and gentle action can be programmed. All times can be selected within the range of 0-30 seconds with 1 second intervals.

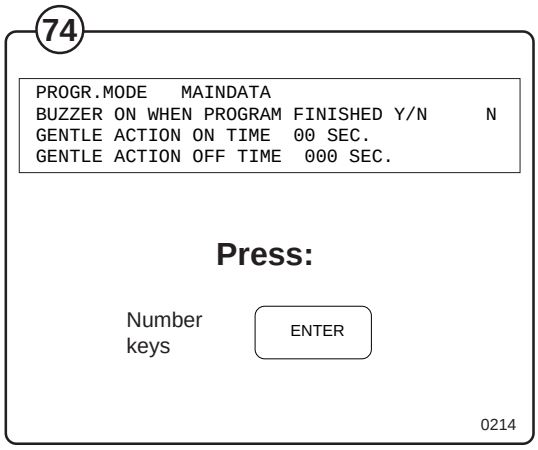
Fig. (75) Press **ENTER** when ''TO END. PRESS ENTER'' is displayed in the display window.

Entering the program number

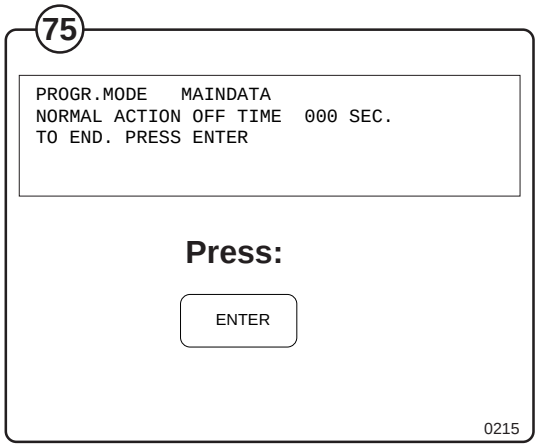
Fig. (76) Enter a two-digit number and press **ENTER**. Note that the numbers 01-09 are reserved for factory programs.

Fig. (77) If the program number selected is already in use, there is the option of either deleting the old program (not applicable to factory programs) or selecting a new program number.

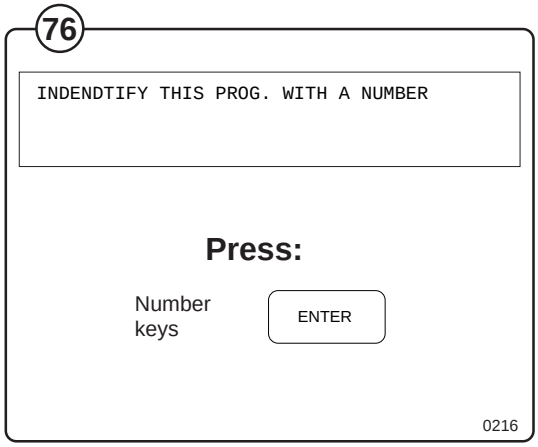
74



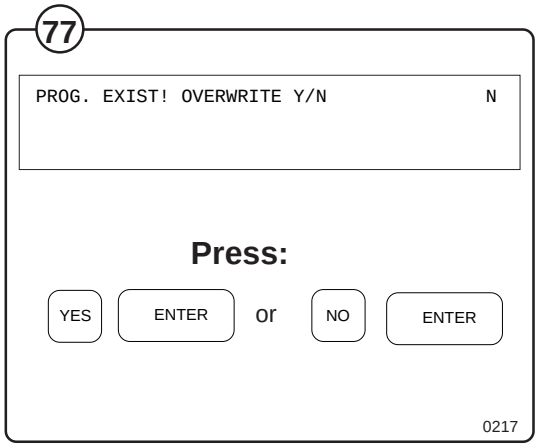
75



76



77



Program names

Fig. 78 You can now give the program a name which will be displayed when the program is selected during washing. The text can be up to 29 characters long.

The way in which text is entered described under the heading ''TEXT'' earlier in the manual.

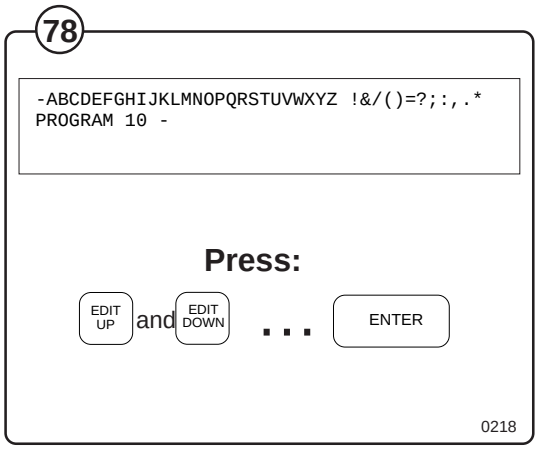
Saving programs

Fig. 79 When the program has been given a name, the program is saved in the program memory.

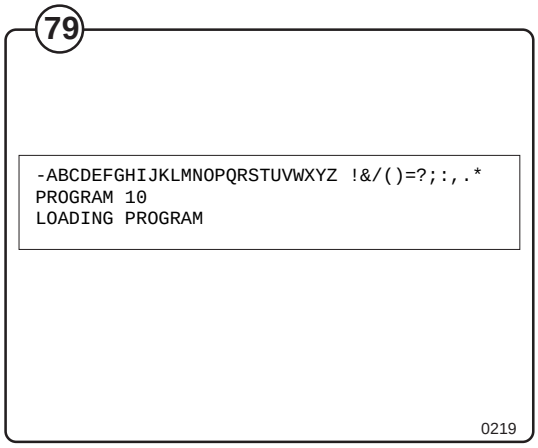
Fig. 80 You are then asked if further programs are to be programmed. Press **YES** and **ENTER** if this is the case.

Fig. 81 If you do not wish to program more programs, turn the key switch to **RUN**.

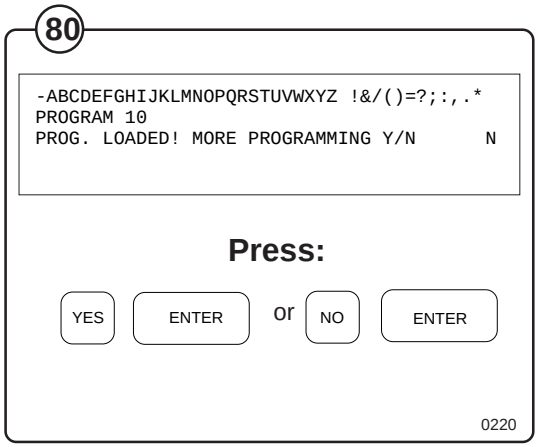
78



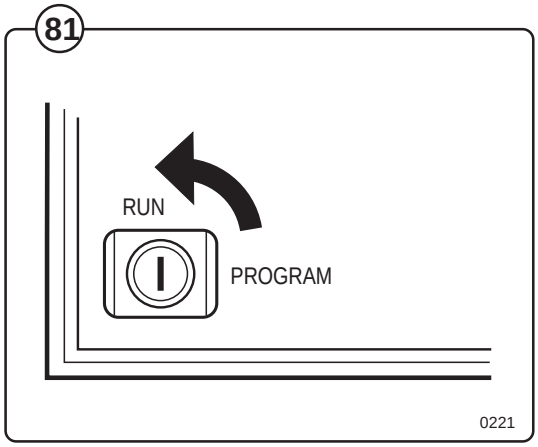
79



80



81



Starting from a previously saved program

If you make a mistake or get stuck, there is always a final resort:

Turn the key to the RUN position and then to PROGRAM again. Any programming you may have carried out so far will be lost but other programs will not be affected.

Turn the key

Fig. 82 Turn the key to the **PROGRAM** position. The first question will now be displayed in the display window.

Select an old program

Fig. 83 Answer YES to the question ''DO YOU WANT AN OLD PROGR. AS BACKGROUND?''. Press **ENTER**.

Enter the number of the old program to be used. (NOTE TWO digits) and press **ENTER**.

Looking through the program

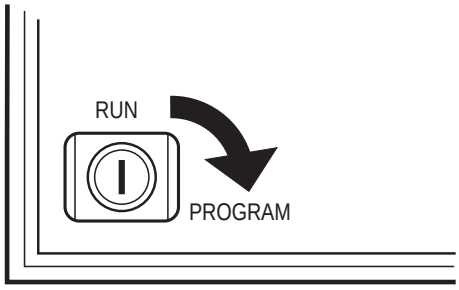
Fig. 84 To rapidly reach the module in the wash program that is to be altered you can rapid advance through the program module-by-module by keeping the **EDIT DOWN** button continuously depressed.

To scan backwards through the program use the button **EDIT UP** instead. On the right of the window there is an indicator which shows where you are in the wash program.

Release the button when you get to the module to be altered.

Fig. 85 Depress **ENTER** once.

82



0167

83

```
PROGRAMMING MODE
DO YOU WANT AN OLD PROG. AS BACKGROUND? N
```

Press:

YES | ENTER | Number keys | ENTER

0222

84

```
PROGR.MODE SELECT SEQUENCE PREWASH     01
EDIT DOWN IN PROGRAM
```

Press:

EDIT DOWN

0223

85

```
PROGR.MODE SELECT SEQUENCE MAINWASH    01
EDIT DOWN IN PROGRAM
```

Press:

ENTER

0224

Fig. 86 The cursor will appear on the first line of this sub-program.

Fig. 87 Use **EDIT UP** and **EDIT DOWN** to move within the sub-program to reach the line(s) to be altered.

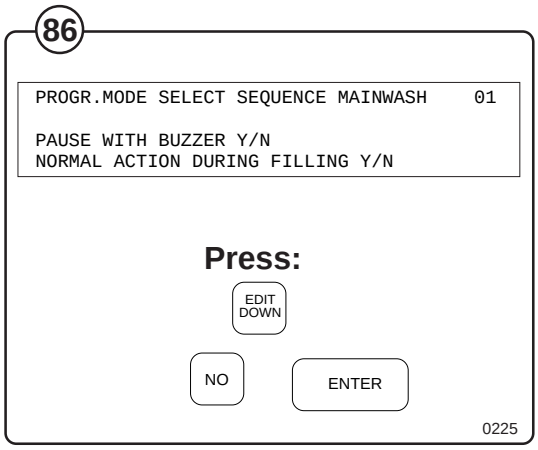
NOTE

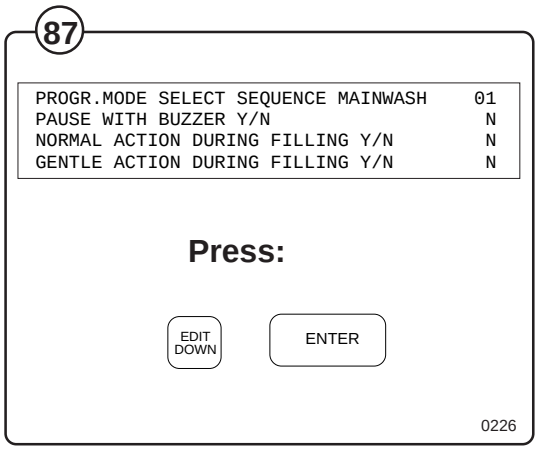
ENTER is to be used only as an acknowledgement when sub-questions are to be altered. Use buttons EDIT UP and EDIT DOWN to move around within the program.

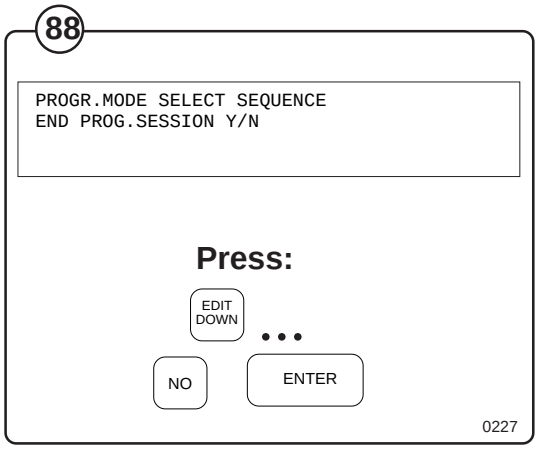
Fig. 88 When changes have been made to the module and you reach its last line, the ''END PROGR. SESSION Y/N'' query will appear. Enter **NO** if you wish to continue making changes to any other module and press **ENTER**.

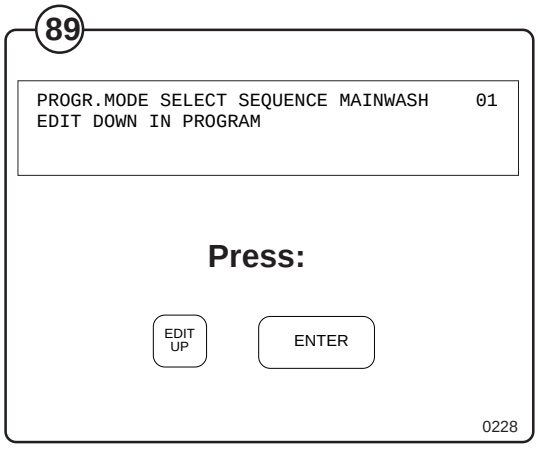
Fig. 89 To move to another module use **EDIT U**P or **EDIT DOWN** buttons and continue as described above.

(Depress and keep down).









NOTE

Use only EDIT UP and EDIT DOWN for looking through the program. ENTER shall only be used for making changes in the program.

Making changes to the program

Flg. 90 Use **EDIT UP** and **EDIT DOWN** so that the question to be changed is on the third line in the display window. The cursor (the flashing square) is on the far left of line three.

Comments on the different questions are found in the section ''Programming a new program'' earlier in the manual.

Fig. 91 Enter the new answer with **YES**, **NO** or the number keys. Then press **ENTER**.

Deleting sub-programs

It is possible to delete complete sub-programs. Go to the sub-program to be deleted (see the section ''Looking through the program''). Press **ERASE**.

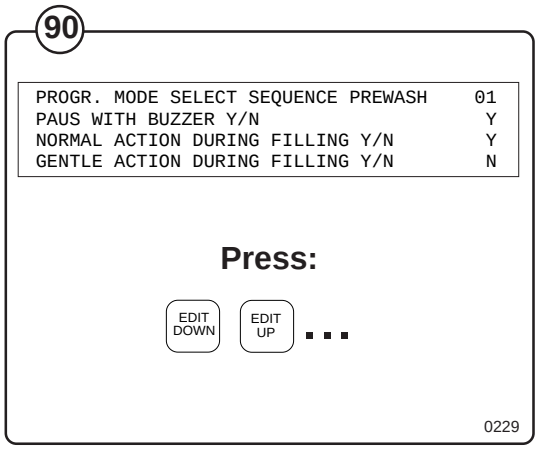
Fig. 92 Answer **YES** and **ENTER** to the question ''ERASE THIS MODULE Y/N?'' when you want the whole sub-program erased.

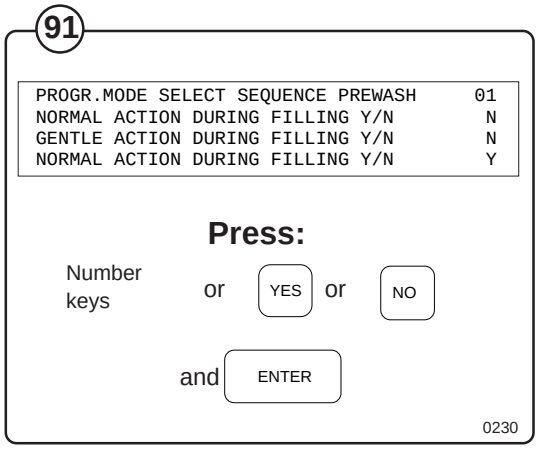
Adding sub-programs

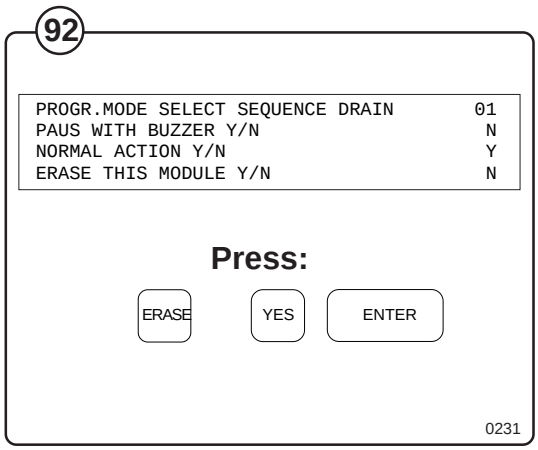
You can also add new sub-programs anywhere in the program.

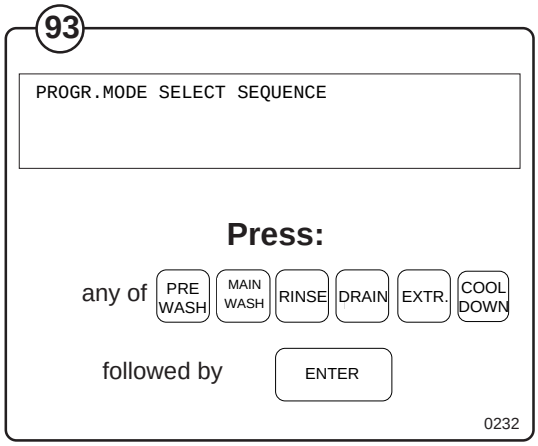
Go to the position between two sub-programs (see the section ''Looking through the program'').

Flg. 93 Press one of the following keys: **PRE WASH, MAIN WASH, RINSE, DRAIN, EXTR**. or **COOL DOWN**. Then press **ENTER**. The new module is now inserted between the other two modules and the questions can be answered in the normal manner.









Altering text

The text that is displayed when a program is selected and **PROG.INFO** is pressed can be altered.

Fig. 94 Go to the position between two sub-programs (see the section ''Looking through the program''). Press **TEXT** and **ENTER**. Any text that might have been programmed in the old program is displayed.

Fig. 95 The old text can be deleted with **ERASE**. Ifs the old text is to be partially altered, the text is deleted up to where the change is to be made and then rewritten.

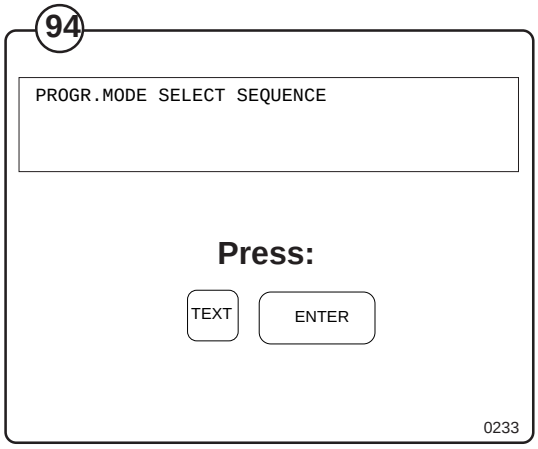
Refer to heading ''TEXT'' earlier in the manual when entering text.

Completing the programming

Fig. 96 Come out of the program you are in at the moment (see ''Looking through the program''). Answer YES to the question ''END PROGRAM. SESSION Y/N?''

Fig. 97 The questions displayed now apply to the entire program. Check and answer the questions in the same way as before. Press **ENTER** when ''TO END, PRESS ENTER'' is displayed in the display window. The last stages in the programming are identical to those under the headings ''Entering the program number'', ''Program names'' and ''Saving programs'' earlier in the manual.

94



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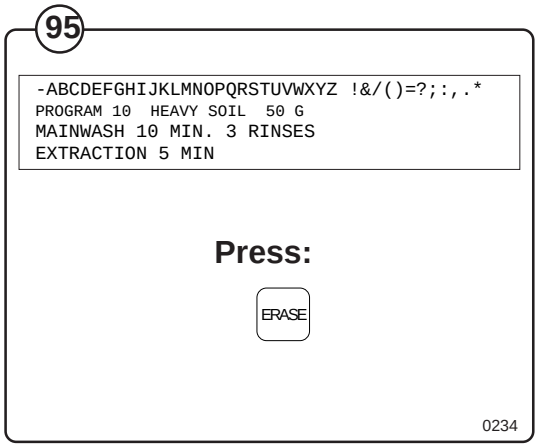

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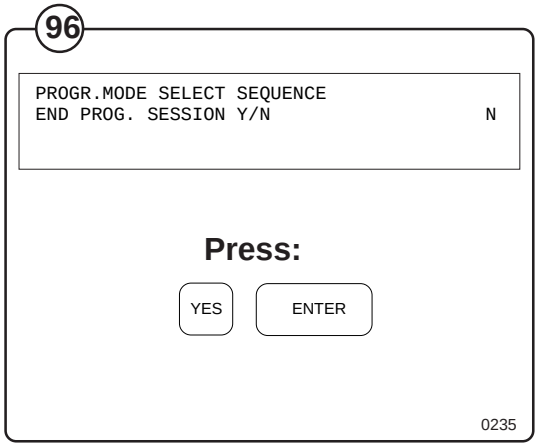

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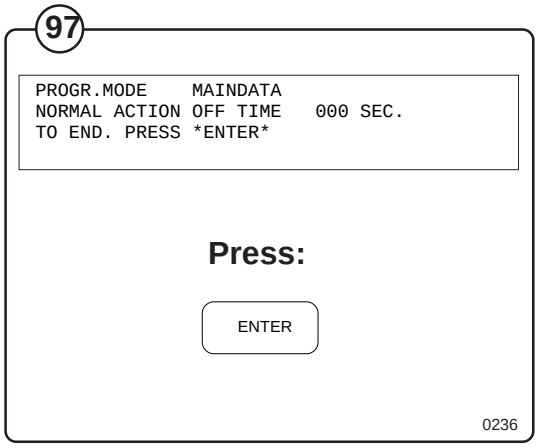


Maintenance

The carefully considered machine design means that preventive maintenance to reduce faults has been reduced to a minimum. The following measures should however be carried out at regular intervals and to the extent determined by the amount of time the machine is used.

Daily

- Clean the door seal and remove detergent residue.

Fig. 98

- Check that the door does not leak.
- Clean the detergent compartment and wipe down the machine with a damp cloth.

Fig. 99

- Check that the drain valve does not leak.

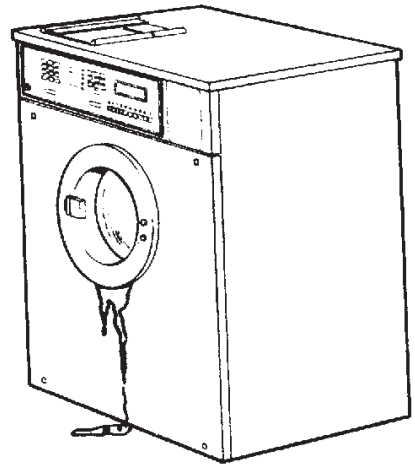
Weekly

- Start the machine and check that the door remains locked while the machine is operating. Fast forward the machine to the stop position and check that the door cannot be opened until 30 seconds after the program is completed.

Every three months

- Check that valves, hoses and connections do not leak.
- Remove any textile lint from the drain opening, joints in drain pipes etc.
- Check V-belts. Tighten or replace as necessary.
- If neating time is unusually long, check heating element.
- If water is very hard, check elements for lime scale. Where necessary, treat wuth descaling agent.

98



0237

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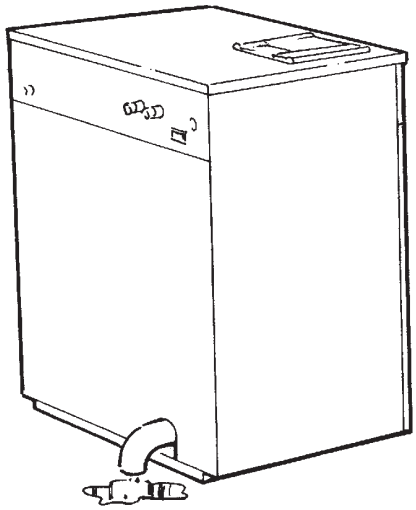


0238

Service information

The machine's mains connection cable shall be provided with a safety ground to avoid breakdowns in the machine's electronic program controls.
If interference problems do occur, check first that the machine is properly grounded.

The machine's operation is monitored continuously in terms of safety and function by the program unit. To facilitate troubleshooting, the display indicates in clear text what may have caused the fault or why a particular function cannot be operated. The table below shows the different texts and what action to take.

Fig. 100

100

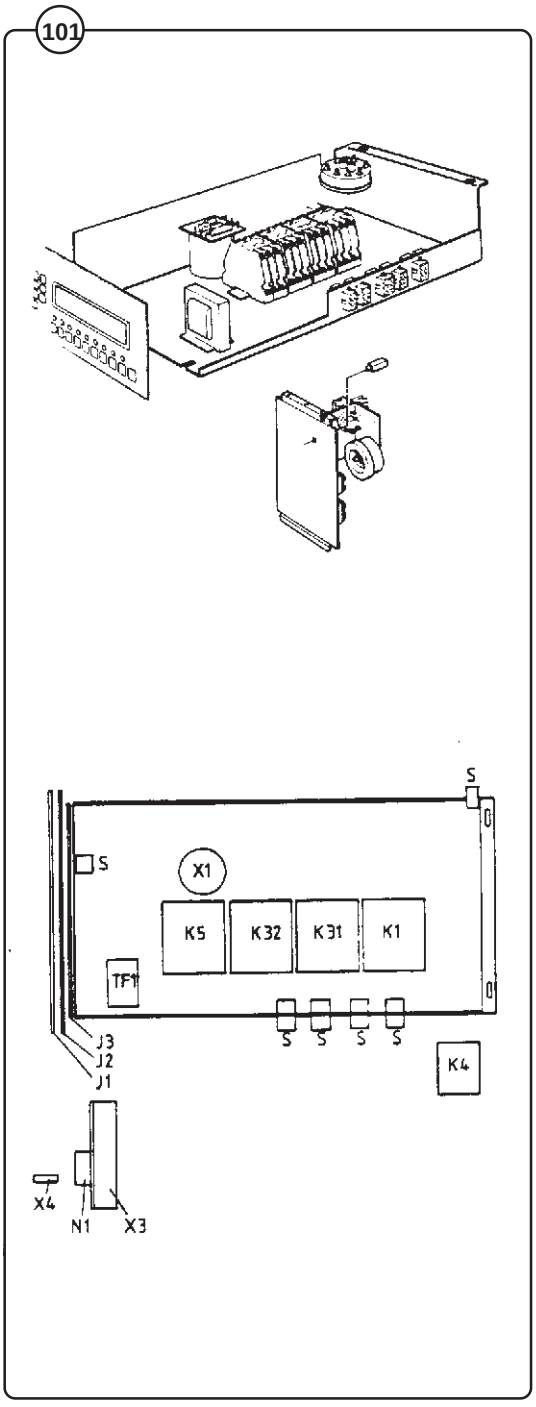
Text in the window display	Fault or action
NO WATER WHEN FILLING	Check that the manual shut-off valves are open and that water is reaching the machine.
DRAIN TIME TOO SHORT	Incorrect programming (the water is not able to drain away within the programmed time). Drain blocked.
OPEN CIRCUIT BEFORE/IN TEMPERATURE SENSOR	Contact the service personnel.
DOOR NOT LOCKED	Check that the door is locked. If this is the case, disconnect the power supply and close the door again. Then switch on the power. Contact the service personnel if the fault persists.
MAX TEMP EXCEEDED	Switch off the power. Contact theservicepersonne.
NOT HEATING UP	Check the machine’s fuses. Contact the service personnel if the fault persists.
LOW OIL LEVEL (applies only to certain machines)	Switch off the power. Replenish the oil in the lubricating reservoir for the axle ring.
PHASE FAULT	During installation: Refer to the headings “Electrical installation” and “Functionalchecks”.
!!!EMERGENCY STOP USED!!!	The emergency button is activated. See ''Safety''.
IMBALANCE SENSOR FAULT (applies only to certain machines)	Switch off the power supply. Check that the machine's imbalance switch is undagmaged and is correctly fitted.
DRAIN FAULT	Water in the machine when starting.Switch off the power supply. Check to ensure that the drain is not blocked.
DOOR LOCK FAULT	Door lock not locking correctly. Contact service personnel so that the door lock can be checked.
SPEED SENSOR FAULT	High speed indicated at low speed. Contact service personnel so that they can check the speed sensor.
NO SPEED SENSOR SIGNAL	Low speed indicated during extraction. Contact service person nel so that they can check the speed sensor.

0241

Control unit

Fig. 101

J1	Control board
J2	Relay board
J3	Interference suppression board
K1	Contactor for motor – extract speed
K4	Contactor for connection of heating elements
K5	Contactor for connecting the four manual control switches
K31	Contactor for motor – washing speed
K32	Contactor for motor – washing speed
N1	Level sensor – pressostat to guard water levels, connected to air chamber behind left side panel.
S	Quick connectors – permits simple exchange for control box.
TF1	Transformer – for low-voltage supply of the electronics
X1	Delay unit – capacitor circuit delaying the release of the door lock solenoid for 20-30 s.
X3	Buzzer
X4	Level system adjustment device



Electronic board

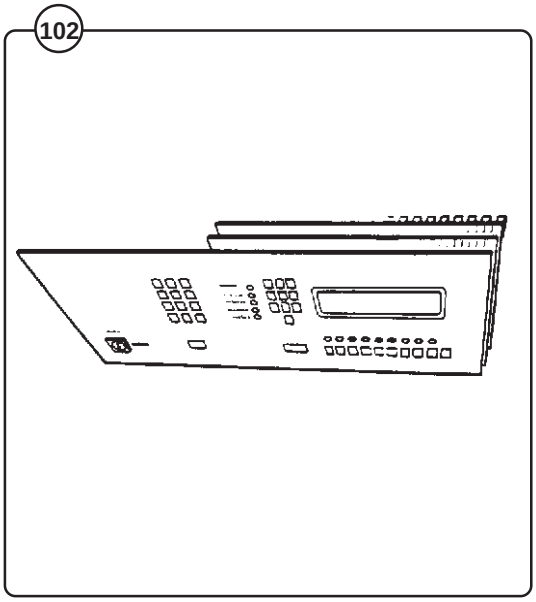
Description

Fig. 102

The electronic board consists of two circuit boards: control and relay board. The relay board supplies power to the control board and distributes the control voltages to the various machine components.

The control board includes a microprocessor that controls the relay board on the basis of information from the programme. A service programme is also contained in the control board software. In addition, the control board is provided with a number of LED:s (light-emitting diodes), and a display.

The relay board has components which suppresser disturbances arising from the machine components, there by preventing malfunction of the electronic timer.

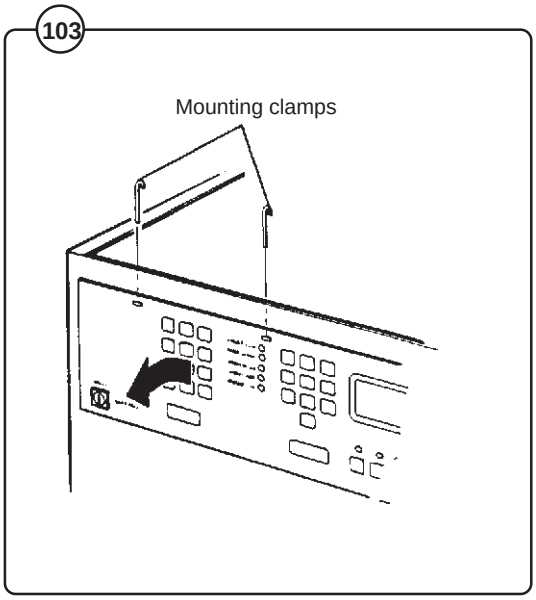


Repair instructions

No repairs to the programme unit are permitted, but the entire unit is to be exchanged in case of malfunction.

Removal and returning of defective programme units should always be done by removing the panel and the programme unit at the same time and returning them.

You should observe that the relay board includes a glass fuse for the low-voltage circuit of the transformer that supplies power to the electronic timer.



Removal

Fig. 103

- Loosen all edge connectors on the control board and relay board by pulling them right out.
- Loosen the panel mounting clamps below the top cover on the left by taking hold of the tabs and pulling directly upwards.
- Unfold the left-hand part of the panel about 20 mm towards you and also move it about 20 mm to the left, loosening the programme unit assembly. Lift it out by moving it straight towards you.
- Loosen the programme unit from the panel (4 screws). The carefully disconnect the flat cable connection to the programme cassette receptacle.

The programme unit assembly is installed in the reverse order.

When assembling, be careful to avoid bending of the control board LED:s.

Contactor

Description

Fig. 104

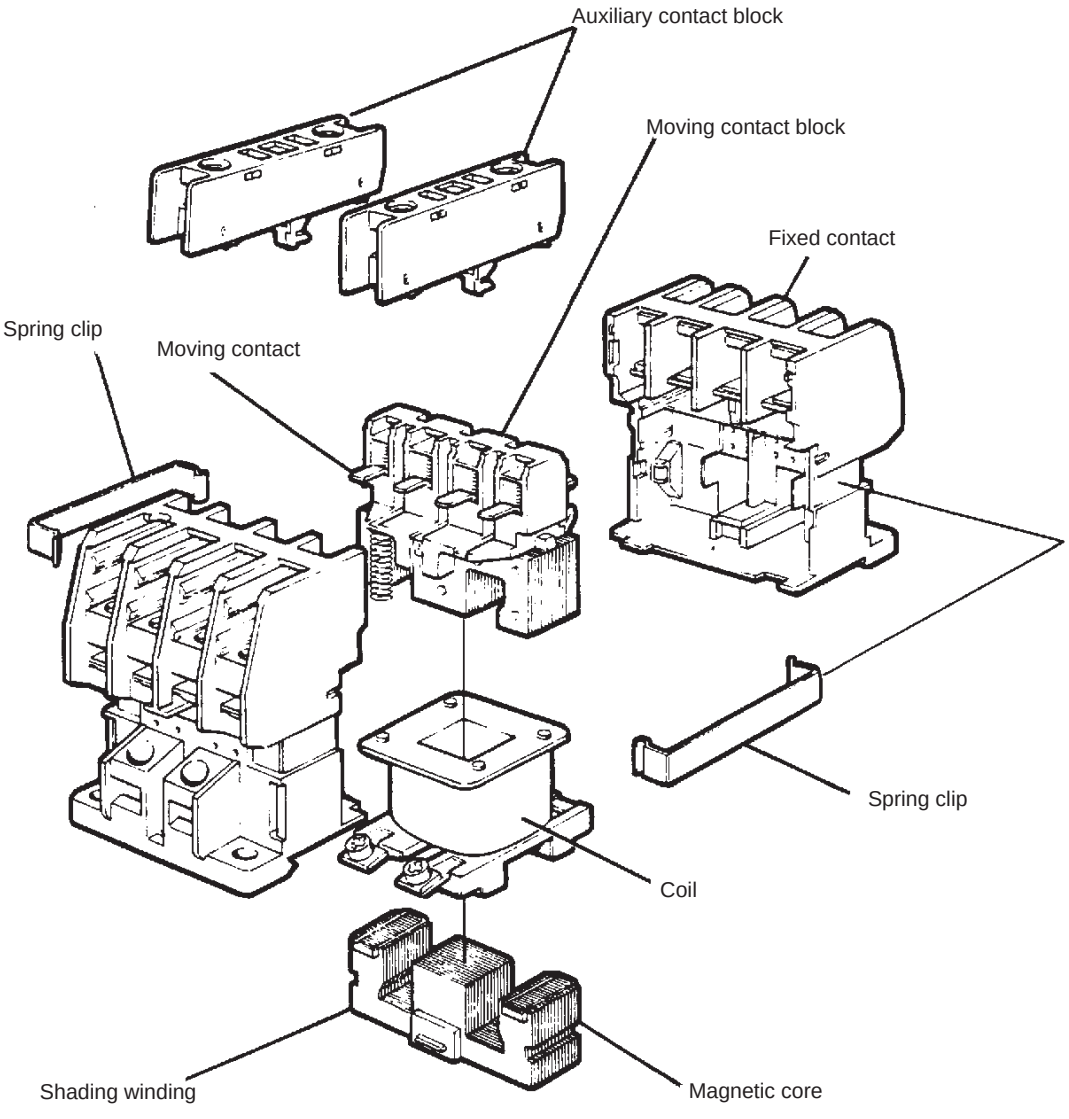
The contactor consists of:

- Housing in two halves with fixed, make and break, contacts. The halves are secured by spring brackets.
- Movable contact bridge with movable contacts.
- Solenoid with coil and core.

  The upper half of the core is suspended by springs and attached to the morning contact bridge.

  The fixed, lower half of the core is fitted with screen windings which divide the flow through the core. Thus, the flow never falls to zero and mains hum is prevented.

104



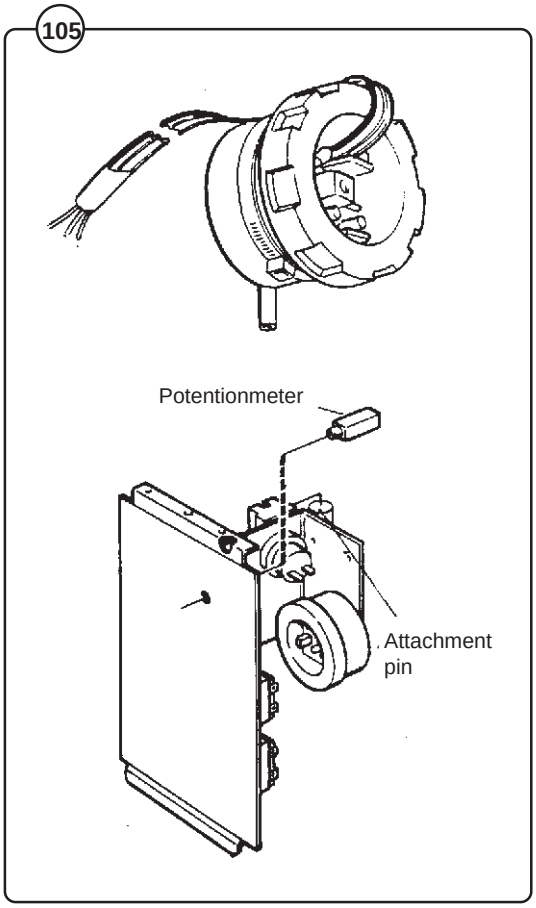
Level sensor

Electronic level sensor

Description

Fig. 105 The level sensor is a pressure sensor, that converts the pressure into a linear voltage. The level sensor is connected by a hose to an air box on the side of the element box, and it senses the pressure of the air enclosed by the water entering from below.

Electrically, the level sensor is connected to a calibration system concision for a capacitor, a resistor and a potentiometer.



Repair instructions

All level sensors have been adjusted by the manufacturer and must not be readjusted.

Remember that the machine guarantee becomes invalid if you have tinkered with the level sensor.

Any adjustments of the level sensor, output signal shall be made on the potentiometer in the calibration circuit. To adjust, turn the potentiometer anti-clockwise to lower the level or clockwise to raise the level. One turn on the potentiometer corresponds to a 3 mm change of the water level.

The table below vay serve as an aid for level sensor adjustments:

Fig. 106

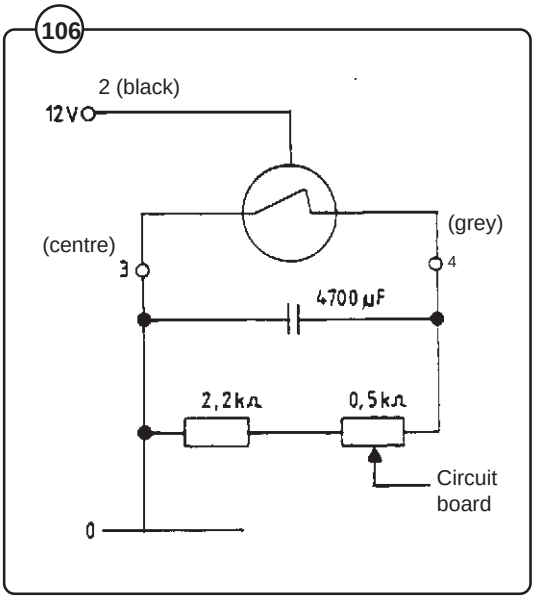
Water volume (l)	Level above bottom of inner drum (mm)	Output signal from cal. circuit (V)	Water volume (l)	Level above bottom of inner drum (mm)	Output signal from cal. circuit (V)
0	–	0.2-0.3	28	141	1.5
6	0	0.4	30	153	1.6
8	18	0.6	32	163	1.7
10	34	0.7	34	173	1.8
12	48	0.8	36	184	1.8
14	61	0.9	38	194	1.9
16	73	1.0	40	204	2.0
18	86	1.1	42	214	2.1
20	97	1.2	44	224	2.2
22	109	1.3	46	235	2.2
24	121	1.3–1.4	48	245	2.3
25	126	1.4	50	255	2.4
26	131	1.4–1.5	52	265	2.5

Level sensor replacement

Label the connections as required to ensure they can be reconnected correctly.

- Blow through the hose to make sure it is clean before fitting the new level sensor.
- Empty all water from the machine before replacing the sensor.

106



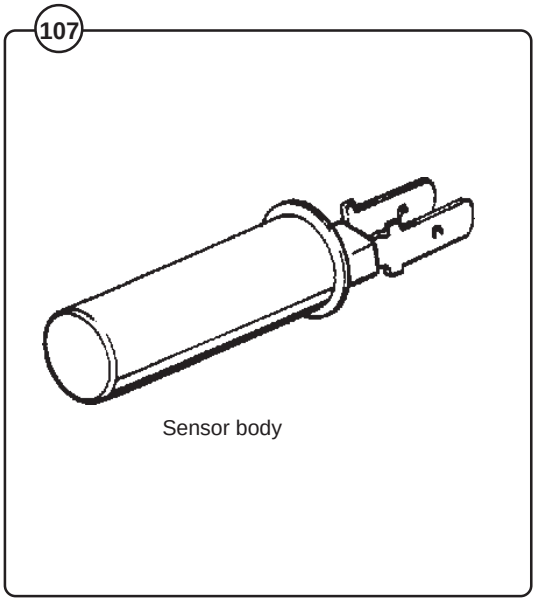
Thermostat

Description

The thermostat monitors the temperature through out the programme sequence. The thermostat is part of the electronic programme unit and acts on the contactor for the heating elements.

Fig. 107

The thermostat sensor (an NTC resistor) is installed at the bottom of the outer drum, to the left of the heating elements. The sensor wires are connected to the edge connector J3 (pins 5 and 6) of the control board. The water temperature determines the resistance of the sensor and thereby the signal to the circuit board. When the sensor signal has reached the value stored in the programme unit, the heating elements are switched off.



Repair instructions

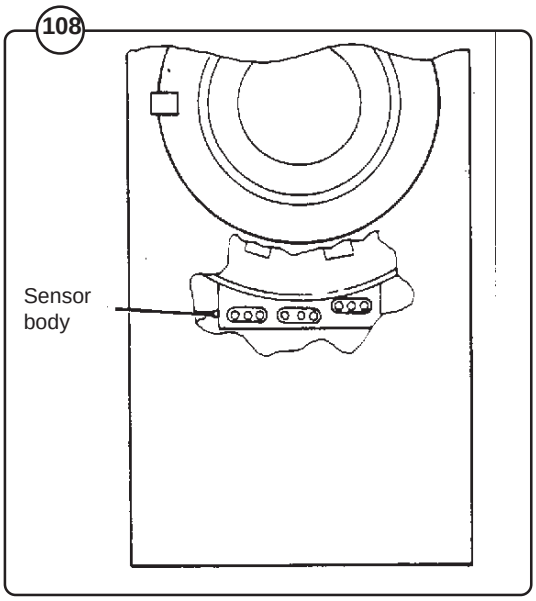
No repairs to the electronic programme unit are permitted, but the entire unit is to be exchanged in case of malfunction. See the section about the programme unit.

For sensor replacement:

(When measuring the sensor (NTC resistor), use a digital measuring instrument to avoid that the sensor becomes heated. The resistance between the sensor connections shall be as shown in the table to the below).

Fig. 108

- Remove the front plate of the machine.
- Disconnect the connections to the sensor pins. Remove the sensor and fit a new one. Connect the new sensor.
- Install the front plate of the machine.



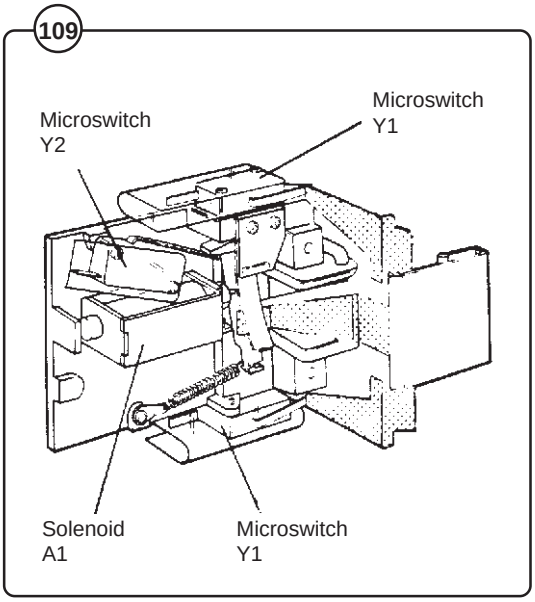
Ambient temperature °C	Sensor resistance kΩ
15	7.3
16	7.0
17	6.7
18	6.4
19	6.1
20	5.8
21	5.6
22	5.4
23	5.1
24	4.9
25	4.7

Door locking unit

Description

Fig. 109 The machine door lock is a safety system which prevents personal injury through the following precautions:

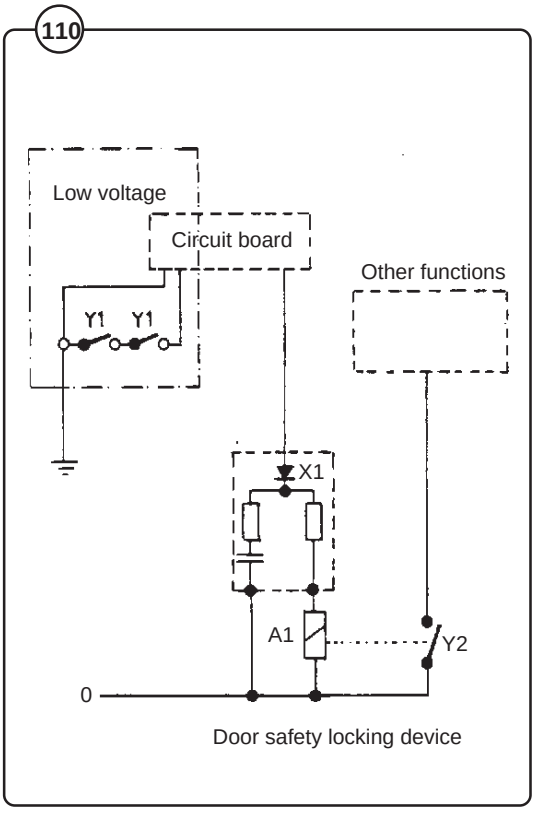
- The machine cannot be started until the door is shut.
- The door is automatically locked when the machine starts.
- It is not possible to open the door until 20–30 seconds after the washing programme has ended. This ensures that the drum is not rotating when the door is opened and that the door cannot be opened if there is water in the machine.



Door lock function in brief.

Fig. 110

1. The door is locked.	Two microswitches Y1 on side of door lock are moved to ON.
2. START KNOB in position on	Door lock solenoid A1 locks handle., Door cannot be opened. Microswitch Y2 of door lock, actuated by solenoid, is switched ON.
3. Programme is running.	
4. Programme is ended.	Capacitor in delay circuit X1 is discharged through solenoid coil. Solenoid releases after 20–30 seconds. Handle disengaged, door may be opened.



Repair instructions

If the solenoid does not lock the door:

- Check that the coil receives 100-110 VDC. Make a continuity check of the coil to determine whether it is intact.
- Check that the armature of the solenoid is not stuck.
- Replace entire solenoid.

Other possible faults:

- Faulty microswitch.
- Faulty delay circuit.
- Moving parts jammed.
- Handle not in lock position.

Motor – drive assembly

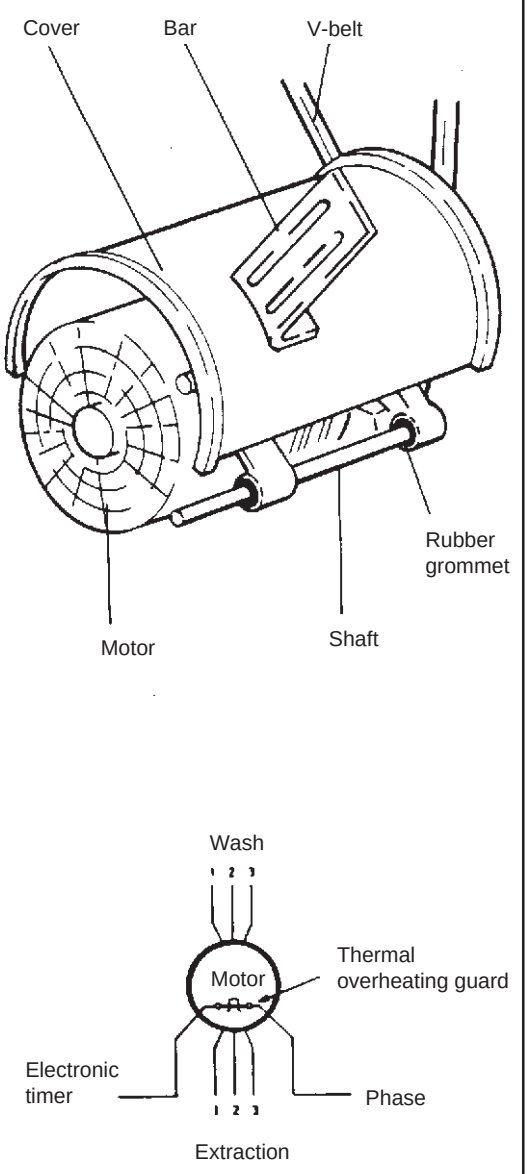
Description

Fig. 111 The motor drives the drum via V-belts, and it is secured in the machine frame by means of a shaft and rubber grommets. Over the motor there is a cover with a bar which presses the motor down. The bar and V-belt keep the motor in place. The bar can be adjusted in elongated holes and acts as a belt-tensioning device.

The motor is equipped with thermal guards located in the motor winding. In the case of motor overheating, i.e. if the temperature exceeds 130°C, the guard contacts cut the power to the motor contactors.

The following illustration shows the wiring of the motor. The connection is made with a quick connection which facilitates the change of motor.

111



Repair instructions

Overheated motor, motor not running

- Wait until motor has cooled down. Motor guards are automatically reset after about 30 minutes. Restart.
- Possible cause of motor guards tripping repeatedly: short circuiting. Another possible cause is bearing failure in the motor or in the drum.

In both cases the motor should be replaced.

Very noisy motor

- Bearing failure – replace motor. (Use a soap solution to facilitate putting the shaft through the rubber grommets.)

Motor running slowly

- The motor is probably running on two phases only – measure coils at terminal.-

Wash motor only runs at one of the speeds

- Check that quick-connectors correctly attached.
- Measure windings at terminal: the fault may be caused by a break in a winding.

Motor locks

- Bearing failure – replace motor.

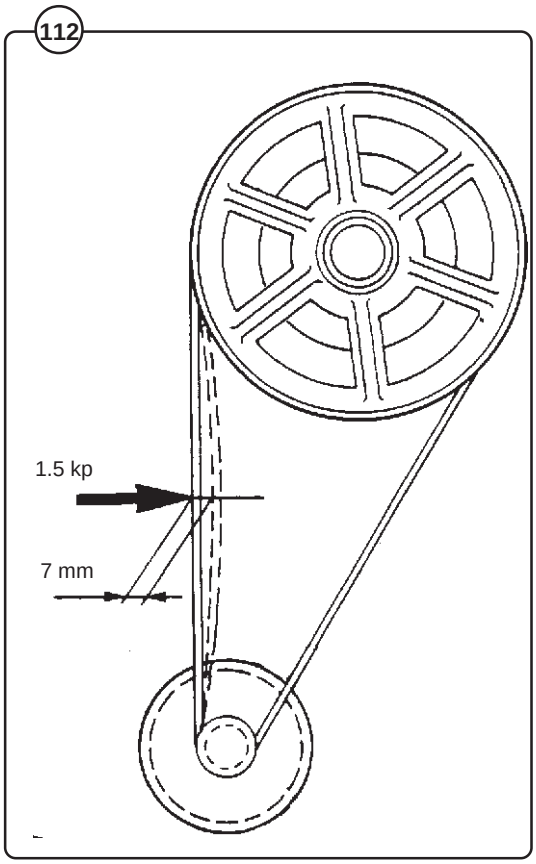
Motor does not turn

- Check belt tension.

Tensioning the V-belt

Fig. (112)

- Slacken the screw that holds the bar, move the bar down for correct belt tensio n and tighten the bar screw.



Inlet valve

Description

Fig. 113 The valve is operated by an electromagnet and has a rubber diaphragm as a closing and opening element. The valve utilises the water pressure in its opening and closing action.

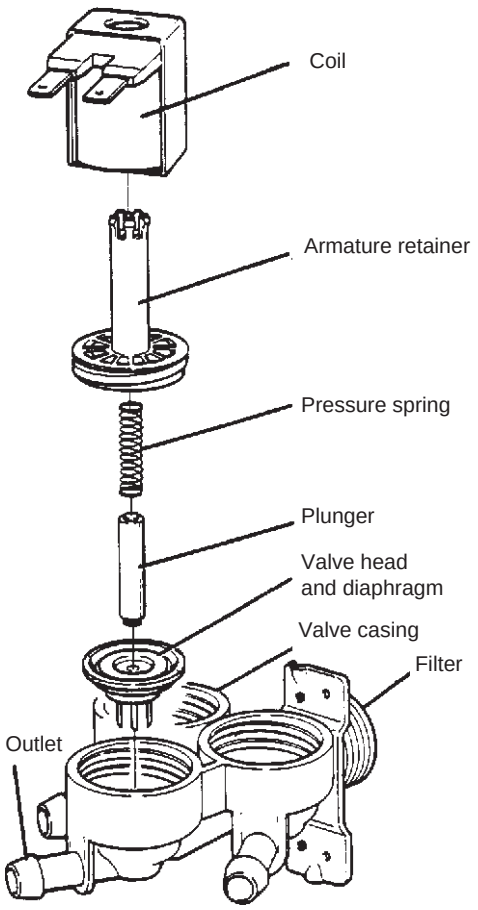
The valve is shut when the electromagnet is not energised. A pilot pressure opening in the diaphragm causes the water pressure to press the valve diaphragm against the valve seat and keeps the valve closed. The hole in the centre of the valve diaphragm is then sealed by the pressure spring of the electromagnet.

Fig. 114 When the magnet is energised the armature is lifted, opening the hole in the centre of the diaphragm so that the accumulated pressure can be relieved through the outlet. The water pressure in the supply line can then lift the diaphragm off the valve seat, and the valve opens.

A fine-mech strainer is fitted inside the inlet line in order to trap particles of dirt etc. The strainer can be easily removed for cleaning.

Throttles are mounted in the outlet or inlet to match the water flow to the needs of the machine in question.

113



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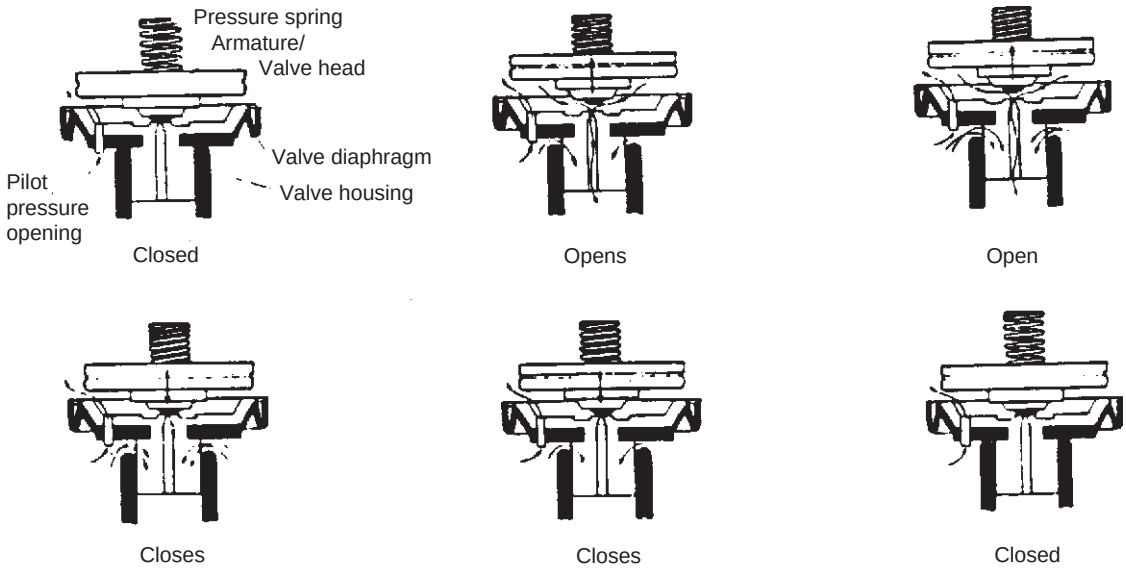
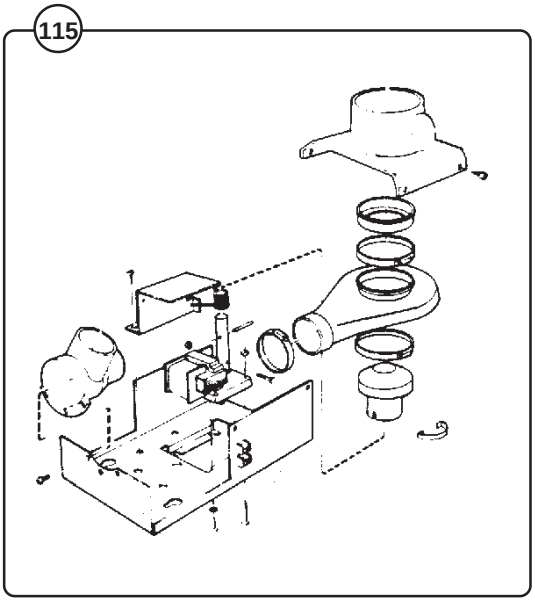


Drain valve



Description

Fig. 115 The drain valve is a motor-operated diaphragm valve which ensures rapid machine emptying by its opening on a large cross-sectional surface area. Its design is self-clearing, which eliminates the need for fluff filters.

Fig. 116 The main valve components are:

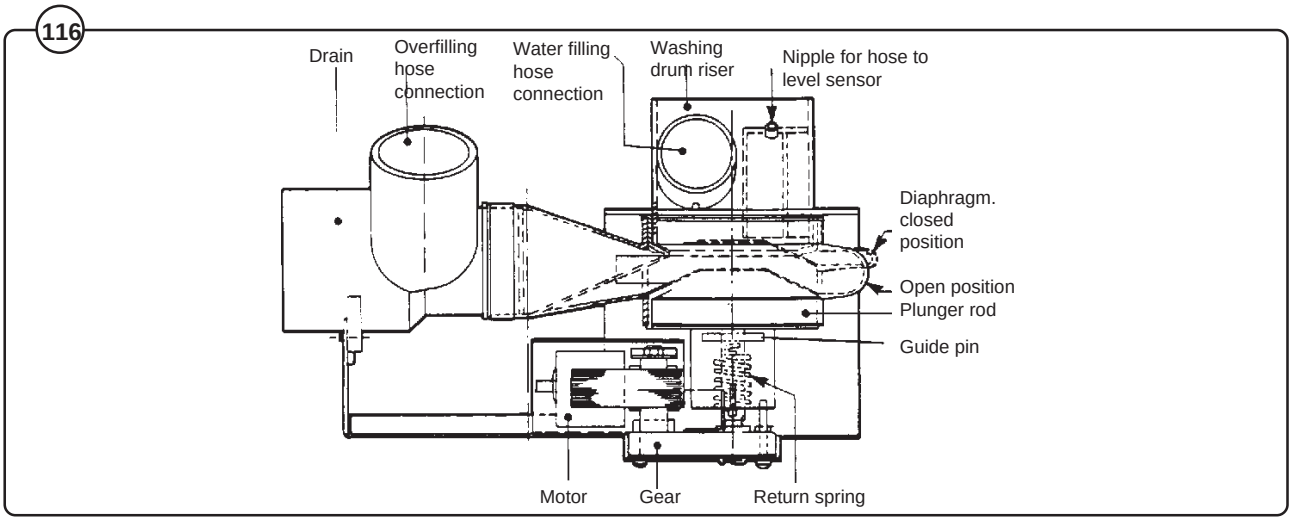
- motor with gear
- acme-threaded plunger rod with plunger and return spring
- rubber diaphragm
- connections for water filling, overfilling and drainage.

In the open position the valve is de-energised. The plunger rod is thus screwed down to its lowest position by the return spring. The diaphragm is compressed, forcing the piston downwards and opening the valve.

When the motor is activated and begins to rotate, the plunger rod is screwed upwards via the gear, the diaphragm is compressed, forcing the plunger upwards, and the valve closes.

The overfilling connection is connected to the upper half to the washing drum, and the water and suds are led directly tot he waste outlet, should the inlet valves or level control cease to function-

The water filling connection as well as a nipple for connection of the sensor hose line for the level sensor are located on the riser to the washing drum.



Repair instructions

Deposits of scale in the diaphragm may prevent the valve from closing or opening correctly. The valve should therefore be cleaned at specific intervals which depend on the operating conditions and the quality of the water.

The valve fails to open or close correctly

- Check that the motor has the correct supply voltage.
- Check that the plunger rod can move freely.
- Check that the diaphragm is not clogged by deposits of scale.

Comment

When replacing the motor:

Brown cable: 60 Hz

Blue cable: common.

Black cable: 50 Hz

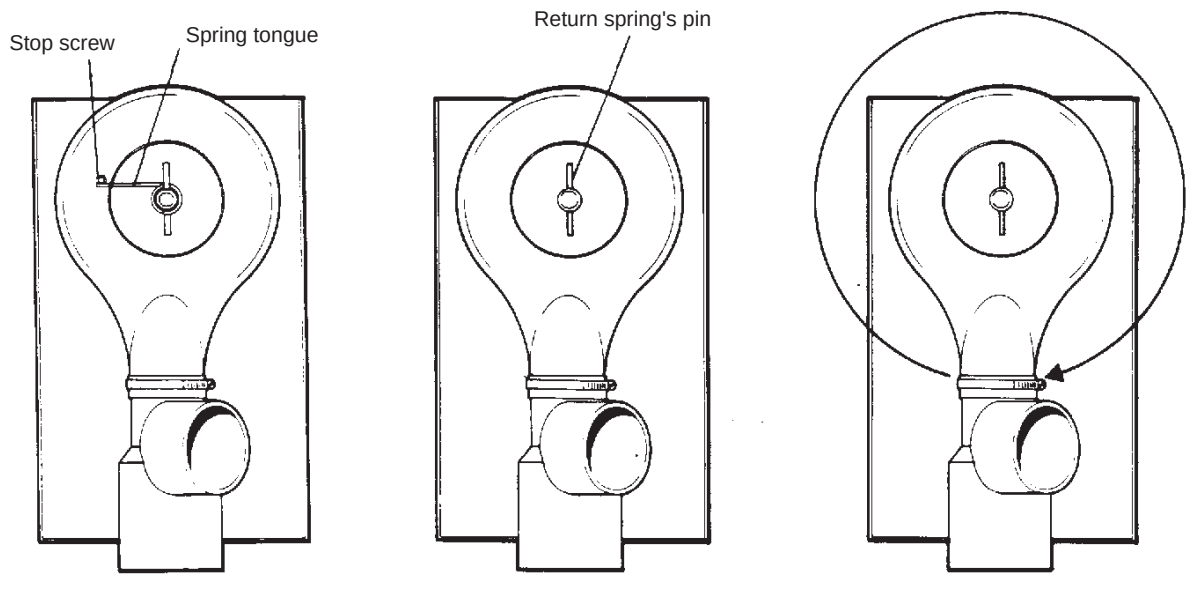
Tensioning the return springs

With the valve housing removed:

Fig. 117

- Turn the return spring so that the spring's "tongue" is resting against the stop screw.
- Place the valve housing over the return spring so that the pin on the spring fits into the inlet of the piston rod. (NOTE: The piston rod shall be fitted so that its input is longitudinal with the housing.)
- Then turn the housing one turn in a clockwise direction. (In these way the spring's pin will be threaded into the piston rod. The spring is then tensioned approximately 1/4 turn, as a result of the rise in the piston rod.)

117



Detergent compartment

Description

Fig. 118

The detergent container has three compartments

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

The container is fitted with nozzles coupled to the inlet valves. These ensure that the detergent dissolves properly in the water, as well as flushing the container clean.

A water-filling line runs from the bottom of the container down to the drain valve riser. This ensures favourable flow to the washing, while also stopping any fumes from the detergent solution from rising up into the detergent container.

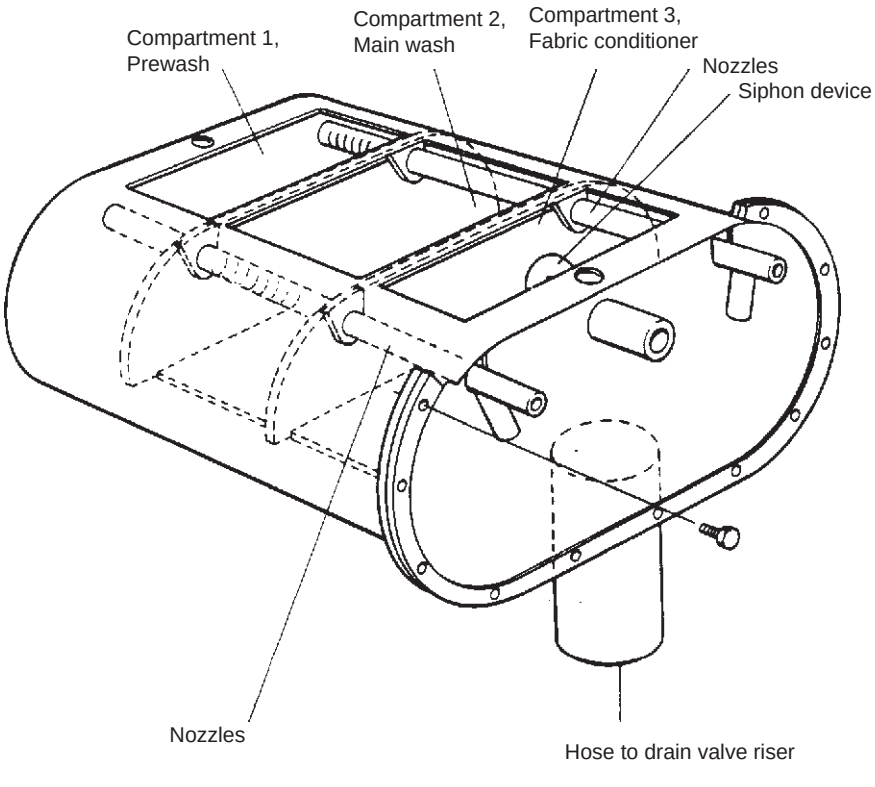
The lid of the container is made of rubber, has a simple and robust design and is bolted to the top panel of the machine.

A siphon device in the fabric softener compartment makes sure that it is completely emptied and that no conditioner remains behind.

Repair instructions

When replacing the container, 8 mm holes should be drilled for the connections on the nozzles according to the connection alternative chosen.

118



Heading elements

Description

Fig. 119 The three elements are situated at the bottom of the space between the inner and outer drum. They are connected by a heat relay which in drum is controlled by a timer, level switch and thermostat.

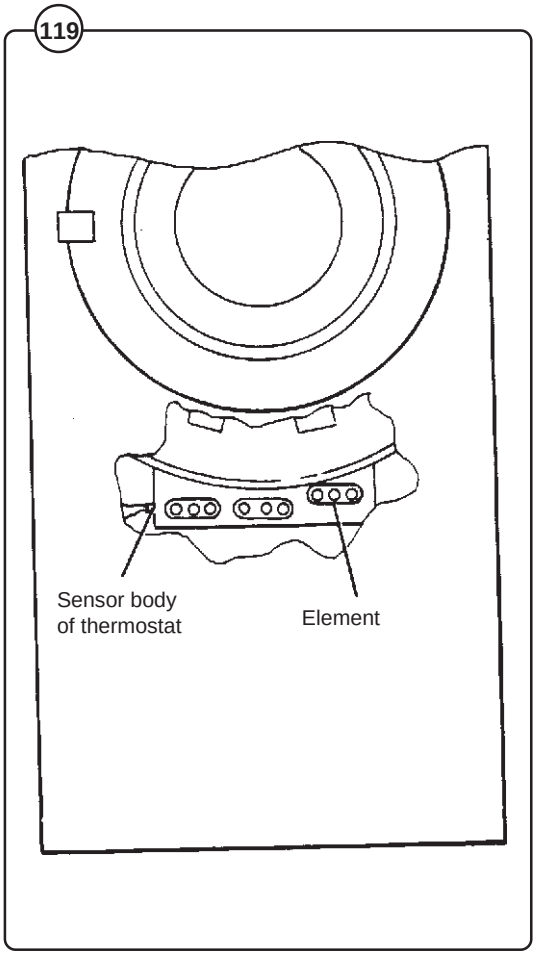
Repair instructions

Heating time unusually long

- Using a multimeter, check if any of the elements are burned off.
- Scale deposits can cause reduced element performance. Descale as required. Refer too manufacturer's instructions for correct use of descaler. Always use descaler without prewash.
- To access elements:
  - Remove front plate.

Element replacement

- Remove nut on middle screw of element. Turn screw a quarter of a revolution. The counterpart will then turn on the inside and the element can be pulled out.
- Insert new element. Check for correct voltage rating. Turn screw a quarter of a revolution and secure nut.
- Connect element. NOTE: Earthing.
- Check that there is no leak by the element and restore machine.



Drum with bearings

Description

Fig. 120

The inner drum is mounted in the outer drum by means of two strong bearings on the rear wall. The bearings carry the drum and no support is required at the front. Radial shaft seals prevent leakages.

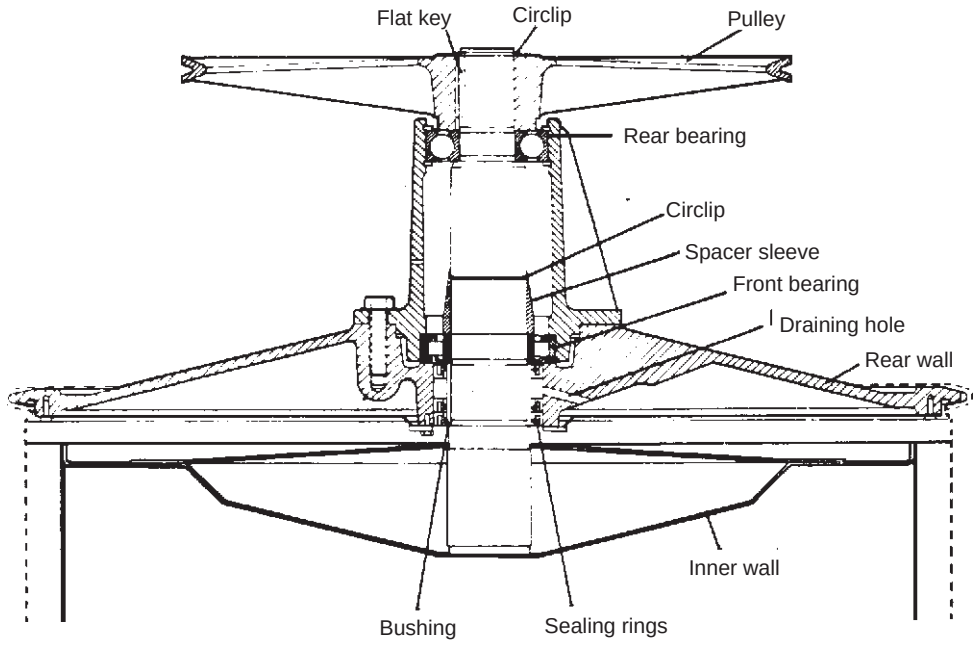
When assembled, the space between the bearings is filled with grease. Refilling is not required.

There is a continuous line of shafting of the inner drum. The V-belt pulley is attached to the protruding shaft pivot by means of a flat key and a circlip.

The outer drum wall is made of aluminium. The wall is screwed to the bearing housing.

The outer drum is resting on the frame and secured by a rear and a front tensioning strap.

120

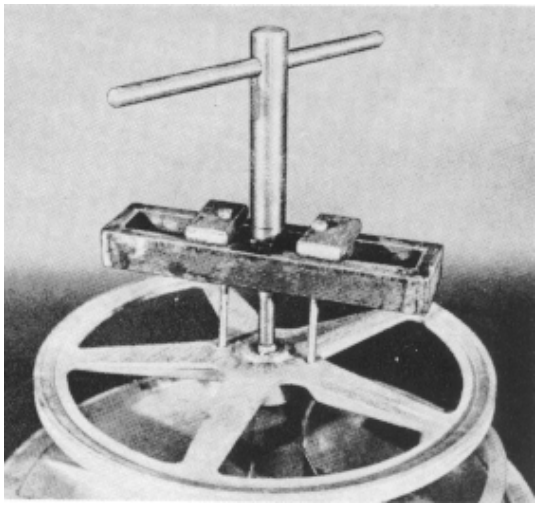


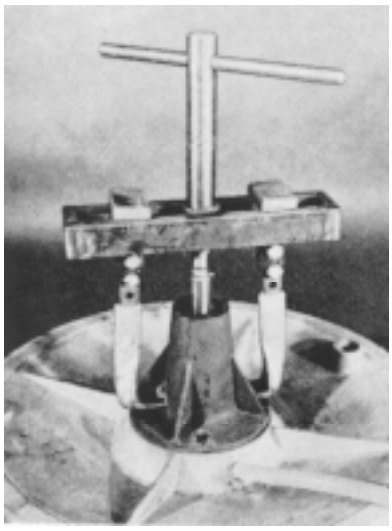
Drum with bearings

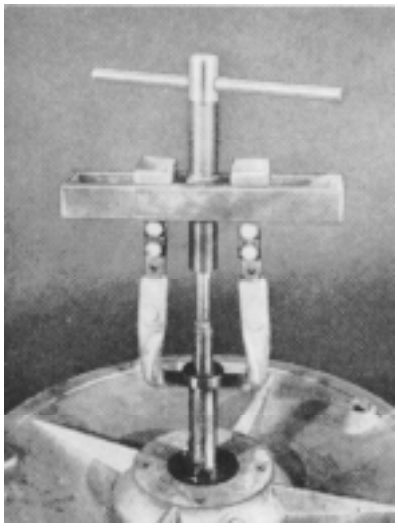
Repair instructions

Bearing replacement

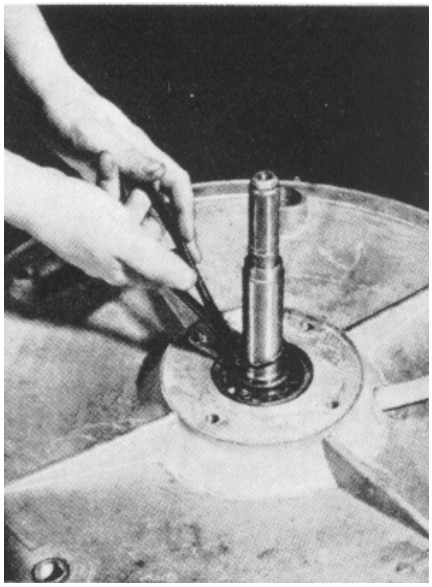
1. Undo and remove all machine connections for electricity, water, steam and drainage. Lift the machine away from the place of installation.
2. Remove the rear plate.
3. Remove the overfill guard hose and the belt between the drum and the motor.
4. Remove the rear wall attachment.
5. Undo both screws on the tensioning strap and slide the tensioning strap over the drum surface.
6. Remove the drum package and place the drum on its front.
7. Remove the circlip and pull off the drive pulley from the shaft by means of a puller.
8. Undo the bearing housings bolts and remove them. Pull off the bearing housing from the inner drum shaft with a puller. Remove the rear bearing with the same puller.



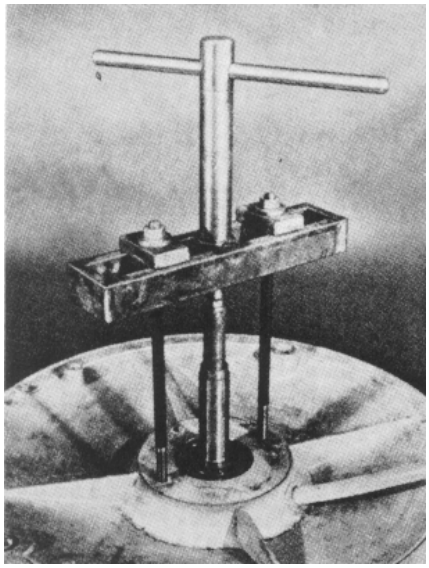




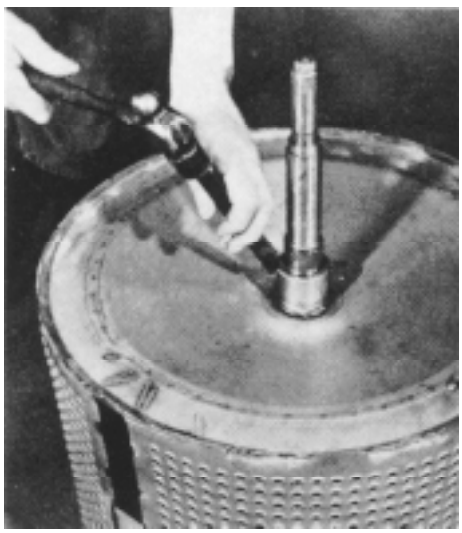
9. Remove circlip and spacer sleeve from shaft.



10. Using puller, remove rear wall from shaft of inner drum.



11. Remove the sealing rings. Grind or chip bushing from shaft. Take care not to damage shaft.



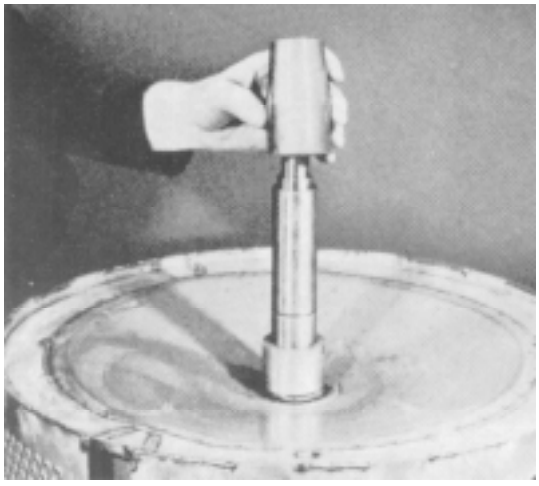
Drum with bearings

12. Heat the new bushing to approximately 150°C with the aid of a hotplate, an oven or similar device. Fit the bushing to the shaft.

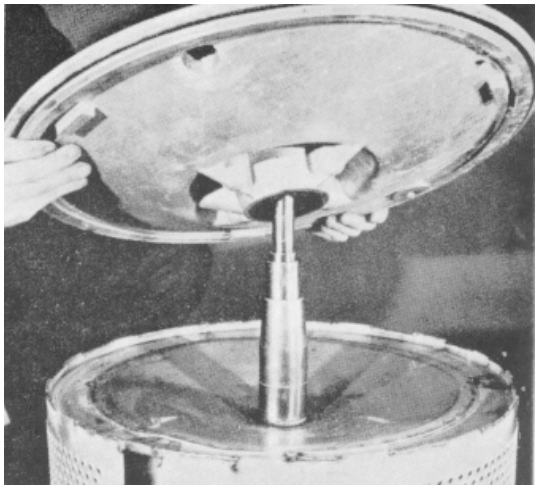
13. Fit two sealing rings from the inside of the wall and a seal from the outside of the wall. First lubricate the seals with a little grease.

    CAUTION: MAKE SURE THAT THE DRAINING HOLE BETWEEN THE SECOND AND THIRD RINGS IS NOT COVERED.

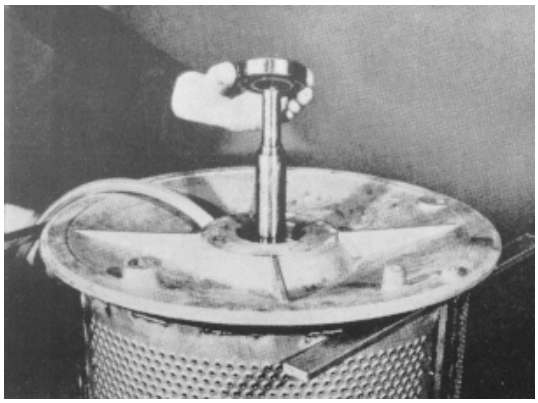
14. Fit the entry sleeve to protect the sealing rings when the rear wall is fitted.



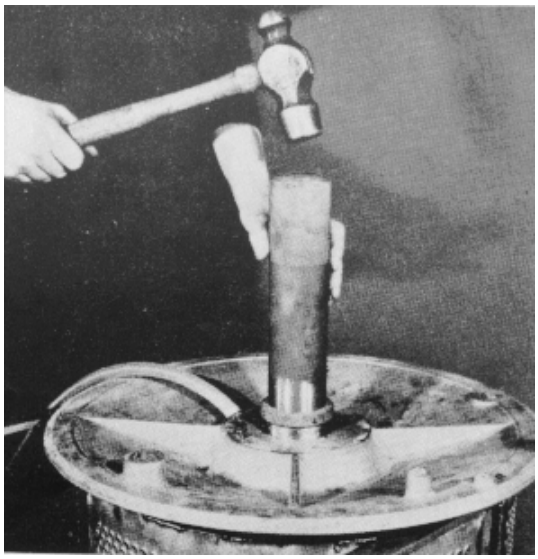
15. Fit the rear wall in position and remove the entry sleeve.



16. Place a couple of bars between the inner drum and the rear wall so that the front bearing bottoms in the rear wall before it bottoms on the shaft.



17. Fill the front bearing with grease and grease the bearing surfaces a little. Put the front bearing on the shaft and knock it into position in the rear wall. Remove the bars and knock the bearing into position on the shaft.



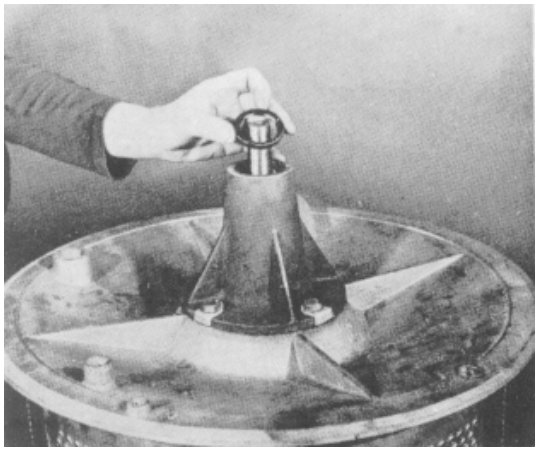
Drum with bearings

18. Fit the spacer sleeve and the circlip on the shaft. Place the spacer sleeve on the shaft's face for the rear bearing.

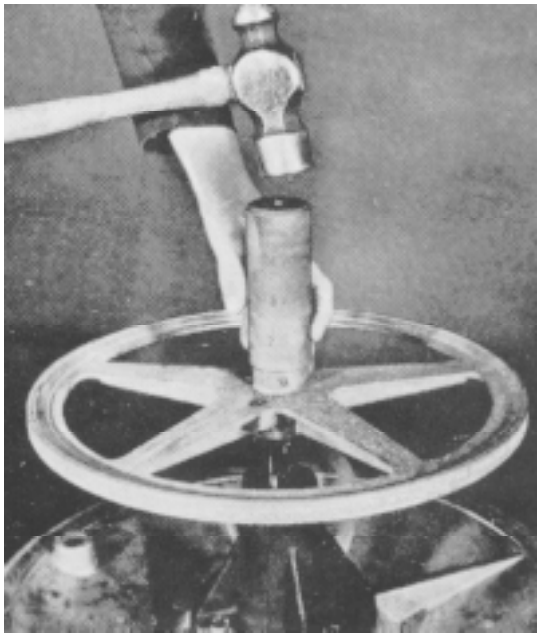
19 Pack grease around the shaft and then fit the bearing housing. Tighten the bearing housing bolts. N.B. Washers.

20. Grease the rear bearing and fit it on the shaft.

21. Fit the sealing ring and the flat key.



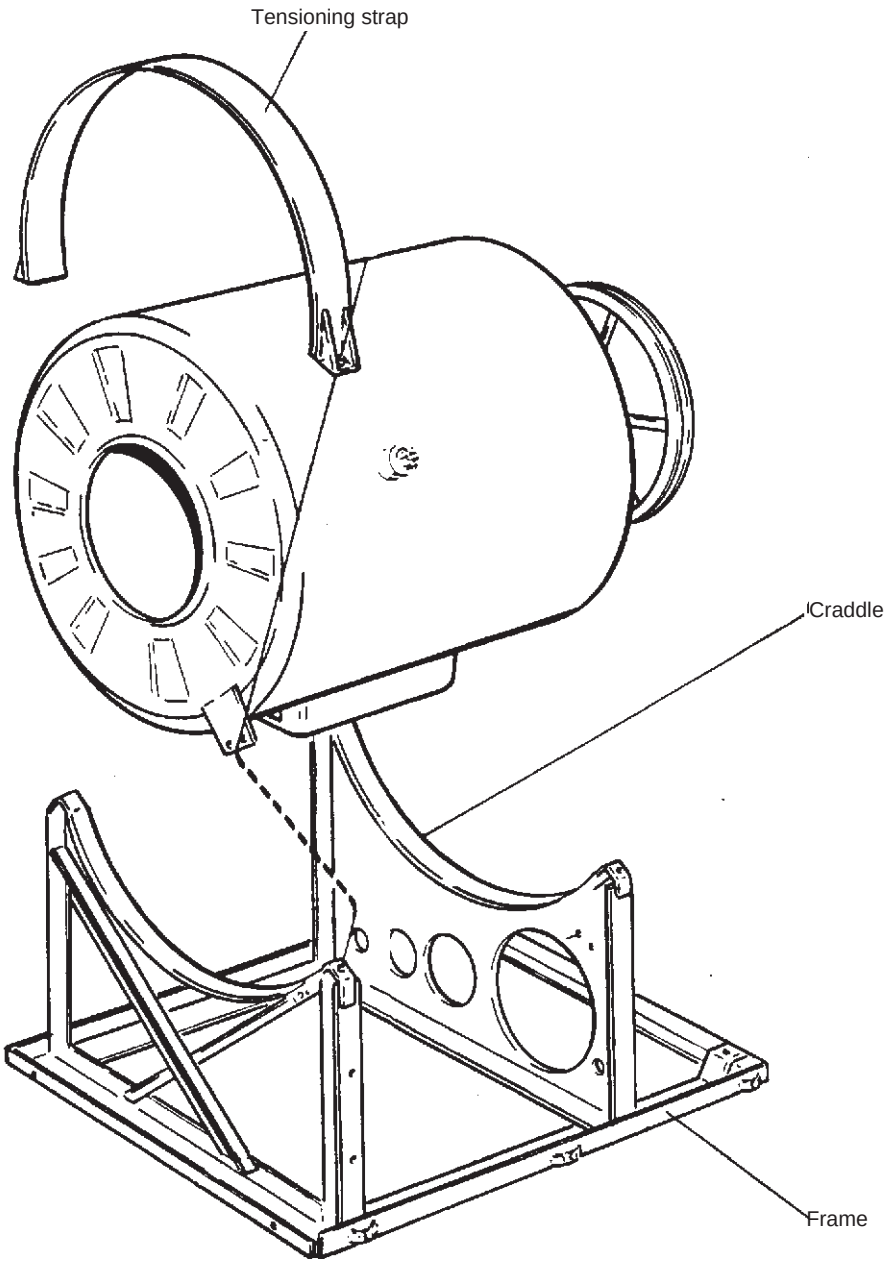
22. Fit the pulley and attach the circlip.
23. Fit the drum package in the washing machine in the reverse order of removal. CAUTION: Fit the drum package so that the bearing housing's draining hole points downwards.
24. Test the machine and check that there are no leakages.



Frame

Fig. 121 The frame is a strong, rigid construction made of sheet metal. It acts as a cradle for the drum unit and must be firmly secured to a base plate. The drum unit is rigidly secured to the frame by means of tensioning straps.

121



Checklist for calibration of FOM 71 MP/LAB

> **WARNING**
>
> **Some of the checkpoints results in exposure to dangerous line voltages or rotating parts and must be carried out only by authorized personnel.**

This approval inspection shall be performed at least once a year. All measurement equipment shall be of laboratory type (see list below) with identification labels and checked not more than 12 months prior the testing.

For calibration procedures see list below and the manual following the machine. Follow the instructions and report all values in Calibration protocol RL 943035 enclosed to this instruction.

A reference machine passing all the calibration checks will conform with the specification given in IEC 456.

Measurement equipment needed:

Water level

Multimeter

Speedo meter, digital tachometer

Temperature instrument

Time watch

Checks to be made

1. Heating element power ***WARNING***

Remove the lower front panel and measure the cold resistance of the heating elements. The elements shall be at ambient temperature and the machine should not have been run for at least 5 hours.

Resistance at 20° shall be:

Rated voltage according to data label attached on machine	Resistance
220 volts	25.9 - 27.1 ohms
230 volts	28.5 - 29.7 ohms
240 volts	30.9 - 32.2 ohms

2. Visual heating element inspection ***WARNING***

Remove one of the heating elements and visually inspect for and build up of lint, limestone, etc. which can cause reduced heater efficiency.

3. Line voltage ***WARNING***

Measure the rated voltage between L1 - L2 - L3 on the incoming mains to the machine.

4. Leveling of the machine

The machine must be installed on a flat horizontal surface. Check that the top of the machine is horizontal. Measure with a water-level. Deviation from horizontal at any top panel corner must not exceed 5 mm.

5. Drain installation

Check drain installation, minimum drain diameter 50 mm. A drain with a 150 mm free vertical flow is recommended but not compulsory.

6. Water supply

Check of water supply pressure and supply filling rate. Supply pressure shall be between 200 - 600 kPa (2-6 bar). Measure the supply time using the level check program:

FOM 71 MP/LAB Program 1 (level 160 mm)

The machines shall be without load.

Supply time to 160 mm waterlevel shall be 100 - 130 seconds.

7. Leakage at drain and inlet valve

Check for leakage at drain and inlet valves.

Run level check program (see 6).

Level 160 mm. Pause the machine for 15 minutes.

After 15 minutes the level shall not be changed.

Reading tolerances ± 1 mm.

8. Calibration of the external level scale

Fill the machine manually pouring water into the soap compartment. During this operation one of the lifting vanes of the inner drum shall be in next to lowest position. First row of the holes to the right of the vane shall be in the lowest position (6 o'clock). External level scale shall be set to zero at the waterlevel representing the very level when water first flows into inner-drum via the drum holes. Repeat above method at least once.

9. Water level

Water level adjustments and checks.

Use level check programs. The machine shall be without load and not rotating.

A: Calibration

Run level check program. Program 8 on FOM 71 MP and program 1 on FOM 71 MP/LAB. The program fills 5 times to 160 mm. Adjust to 160 mm on the external scale by turning the plus - minus adjustment screw on the front panel.

B. Repeatability

Run the level check program 8 (FOM 71 MP) or program 1 (FOM 71 MP/LAB). Read water level each time on the external scale. Max. deviation ± 5 mm.

C. Linearity

Run the level check program 9 (FOM 71 MP) or program last part (FOM 71 MP/LAB). The program fills repeatedly to 100, 130, 160 and 200 mm. Read water level at each stop on the external scale. Max. deviation ± 5 mm.

10. Drain time

Use level check program 8 (FOM 71 MP) or program 1 (FOM 71 MP/LAB). Fill to 160 mm. Drain the water. Measure the drain time until full flow is reduced. Max. allowable time 30 seconds.

11. Temperature control

Use temperature control program 10 (FOM 71 MP) or program 2 (FOM 71 MP/LAB). Put a temperature probe through the upper door gasket into the bath or use the laboratory temperature measurement system (must be calibrated separately in advance). Read the temperatures at 25°, 40°, 60°, 80° and 90° on the machine display and on the measurement instruments.
Max. deviation ± 1°C.

12. Drum speed at wash. ***WARNING***

Remove the back panel. Rum program 1 (FOM 71 MP) or program 4 (FOM 71 MP/LAB).

The wash speed shall be measured with a speedo meter (reflector type).

The reflector shall be placed on the big pulley. Wash speed shall be measured at nominal voltage and with a load of 5 kg of cotton as load and 25 litres of water in the drum.

Speed variation allowable in both directions: 52 ± 1 RPM.

13. Extraction speed ***WARNING***

Proceed as in 12, but rapid advance to last rinse and measure the extraction speed with a well balanced load of wet cotton (dry weight 5 kg) after one minute of extraction.

Extraction speed shall be within 500 ± 20 RPM.

14. Recording of complete program (not compulsory)

Record using the laboratory recording equipment the complete IEC 60° cotton program. For best calibration accuracy use no load.

Parameters to be recorded as a function of time:

Temperature
Amount of water
Speed

Electrolux
Wascator

CALIBRATION PROTOCOL

FOM 71 MP AND FOM 71 MP/LAB

Document number: .....

Machine location: .....

Calibration made by: .....

Date: ..... **Previous calibration date: .....**

Machine data:	**Measurement equipment:**
FOM 71	**.....**
Type 986	**.....**
Ser. nr. ...../.....	**.....**
Voltage .....V.....Hz	**.....**

Instructions:

Instructions how to calibrate the FOM 71 MP and FOM 71 MP/LAB are given in document: *Calibration of referencemachines FOM, 71 MP and FOM 71 MP/LAB.* All instruments and measurements devices needed for the calibration shall confirm with instructions given in above document.

Report summary:

1. Heating element power

220V: 25.9-27.1, 230V: 28.5-29.7, 240V: 39.9-32.2 ohm

2. Visual heating element inspection.

3. Line voltage.

4. Levelling of the machine.

5. Drain installation.

6. Water supply.

7. Leakage at drain and inlet valve.

8. Calibration of the external level scale.

	Mandatory	Measured	After adjust
R1 ohm			
R2 ohm			
R3 ohm			
Visual	OK		
L1-L2			
L1-L3			
L2-L3			
lf-lr	> 5 mm		
rf-rr	> 5 mm		
lf-rf	> 5 mm		
lr-rr	> 5 mm		
d (mm)	> 50 mm		
P (bar)	2-6 bar		
Filltime	100-130 sec		
Leakage	0 ± 1 mm		
Level	0		

9. Water level.

A: Calibration.

B: Repeatability 5 times to 160 mm.

C: Linearity 100, 130, 160 and 200 mm.

10. Drain time.

11. Temperature control.

12. Drum speed at wash.

5 Kg of load

13. Extraction speed.

5 Kg of load

14. Recording of complete program.

(Not compulsory)

	Mandatory	Measured	After adjust
1.	160±5 mm		
2.	160±5 mm		
3.	160±5 mm		
4.	160±5 mm		
5.	160±5 mm		
	100±5 mm		
	130±5 mm		
	160±5 mm		
	200±5 mm		
Drain time	< 30 sec		
Tol±1°C	25°C		
	40°C		
	60°C		
	80°C		
	90°C		
CW	52±1 rpm		
CCW	52±1 rpm		
n(rpm)	480-520 rpm		

Electrolux
Wascator

CALIBRATION PROTOCOL

FOM 71 MP AND FOM 71 MP/LAB

Document number: .....

Machine location: .....

Calibration made by: .....

Date: ..... **Previous calibration date: .....**

Machine data:	**Measurement equipment:**
FOM 71	.....
Type 986	.....
Ser. nr. ...../.....	.....
Voltage .....V.....Hz	.....

Instructions:

Instructions how to calibrate the FOM 71 MP and FOM 71 MP/LAB are given in document: *Calibration of referencemachines FOM, 71 MP and FOM 71 MP/LAB.* All instruments and measurements devices needed for the calibration shall confirm with instructions given in above document.

Report summary:

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220V: 25.9-27.1, 230V: 28.5-29.7, 240V: 39.9-32.2 ohm

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4. Levelling of the machine.

5. Drain installation.

6. Water supply.

7. Leakage at drain and inlet valve.

8. Calibration of the external level scale.

	Mandatory	Measured	After adjust
R1 ohm			
R2 ohm			
R3 ohm			
Visual	OK		
L1-L2			
L1-L3			
L2-L3			
lf-lr	> 5 mm		
rf-rr	> 5 mm		
lf-rf	> 5 mm		
lr-rr	> 5 mm		
d (mm)	> 50 mm		
P (bar)	2-6 bar		
Filltime	100-130 sec		
Leakage	0 ± 1 mm		
Level	0		

9. Water level.

A: Calibration.

B: Repeatability 5 times to 160 mm.

C: Linearity 100, 130, 160 and 200 mm.

10. Drain time.

11. Temperature control.

12. Drum speed at wash.

5 Kg of load

13. Extraction speed.

5 Kg of load

14. Recording of complete program.

(Not compulsory)

	Mandatory	Measured	After adjust
1.	160±5 mm		
2.	160±5 mm		
3.	160±5 mm		
4.	160±5 mm		
5.	160±5 mm		
	100±5 mm		
	130±5 mm		
	160±5 mm		
	200±5 mm		
Drain time	< 30 sec		
Tol±1°C	25°C		
	40°C		
	60°C		
	80°C		
	90°C		
CW	52±1 rpm		
CCW	52±1 rpm		
n(rpm)	480-520 rpm		

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