OPERATING & MAINTENANCE MANUAL
WASCOMAT
W 245 Selecta 28

438 9030-10/01
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WARNING: ALL OPERATING AND MAINTENANCE PROCEDURES SHOWN ON THE NEXT PAGE OF THIS MANUAL MUST BE FOLLOWED DAILY FOR PROPER OPERATION OF YOUR WASCOMAT MACHINE.

PLEASE ENTER THE FOLLOWING INFORMATION AS IT APPEARS ON THE WASHER DATA PLATE LOCATED AT TOP LEFT OF THE REAR PANEL. SERIAL NUMBER IS ALSO LOCATED ON A STICKER ON THE INSIDE OF THE DOOR.

MACHINE TYPE OR MODEL	
MACHINE SERIAL NUMBER(S)	
ELECTRICAL CHARACTERISTICS: _____ VOLTS, _____ PHASE, _____ HZ.	

MAKE CERTAIN TO KEEP THIS MANUAL IN A SECURE PLACE FOR FUTURE REFERENCE.

NOTICE TO: OWNERS, OPERATORS AND DEALERS OF WASCOMAT MACHINES

IMPROPER INSTALLATION AND INADEQUATE MAINTENANCE, POOR HOUSEKEEPING AND WILLFUL NEGLECT OR BYPASSING OF SAFETY DEVICES MAY RESULT IN SERIOUS ACCIDENTS OR INJURY. TO ASSURE THE SAFETY OF CUSTOMERS AND/OR OPERATORS OF YOUR MACHINE, THE FOLLOWING MAINTENANCE CHECKS MUST BE PERFORMED ON A DAILY BASIS.

1. Prior to operation of the machine, check to make certain that all operating instructions and warning signs are affixed to the machine and legible. (See the following page of this manual for description and location of the signs.) Missing or illegible ones must be replaced immediately. Be sure you have spare signs and labels available at all times. These can be obtained from your dealer or Wascomat.

2. Check the door safety interlock, as follows:

   (a) OPEN THE DOOR of the machine and attempt to start in the normal manner:

   For coin-operated models, select a program, insert the proper coins and press the START button.

   For manually operated models, select a cycle and press the START button.

   THE MACHINE(S) SHOULD NOT START !

   (b) CLOSE THE DOOR and press the START button. Now attempt to open the door by turning the door handle. The door should remain locked!

   If the machine can start with the door open, or can continue to operate with the door unlocked, the door lock is no longer operating properly. The machine must be placed out of order and the lock immediately replaced. (See the door lock section of the manual.)

3. DO NOT UNDER ANY CIRCUMSTANCES ATTEMPT TO BYPASS OR REWIRE ANY OF THE MACHINE SAFETY DEVICES AS THIS CAN RESULT IN SERIOUS ACCIDENTS.

4. **Be sure to keep the machine(s) in proper working order**: Follow **all** maintenance and safety procedures. Further information regarding machine safety, service and parts can be obtained from your dealer or from Wascomat through its Teletech Service Hotline - (516) 371-0700.

All requests for assistance must include the model, serial number and electrical characteristics as they appear on the machine identification plate at the top rear of the washer. Insert this information in the space provided on the previous page of this manual. You can also find the serial number on a sticker on the inside of the door.

5. **WARNING**: DO NOT OPERATE MACHINE(S) WITH SAFETY DEVICES BYPASSED, REWIRED OR INOPERATIVE! DO NOT OPEN MACHINE DOOR UNTIL DRUM HAS STOPPED ROTATING!

SAFETY AND WARNINGS SIGNS

Replace If Missing Or Illegible

One or more of these signs must be affixed on each machine as indicated, when not included as part of the front instruction panel.

LOCATED ON THE OPERATING INSTRUCTION SIGN OF THE MACHINE:

CAUTION

1. Do not open washer door until cycle is completed, operating light is off, and wash cylinder has stopped rotating.
2. Do not tamper with the door safety switch or door lock.
3. Do not attempt to open door or place hands into washer to remove or add clothes during operation. This can cause serious injury.

MACHINE SHOULD NOT BE USED BY CHILDREN

PRECAUCION

1. No abra la puerta de la máquina lavadora sino hasta que la máquina haya termonado su ciclo, la luz operativa esté apaga da y el cilindro de lavado haya completamento terminado de girar.
2. No interferia o manipule el switch o la cerradura de la puerta.
3. No trate de abrir la puerta o meta las manos dentro de la máquina para meter o sacar ropa mientras la máquina está en operación, pues puede resultar seriamento herido.

LAS MÁQUINAS NO DEBEN SER USADAS POR NIÑOS

Contents

The manufacturer reservs the right to make changes to design and material specifications.

Safetyinstructions

- **The machine is designed for water washing only.**
- **The machine must not be used by children.**
- **All installation operations are to be carried out by qualified personnel. Licensed personnel are necessary for all electric power wiring.**
- **The interlock of the door must be checked daily for proper operation and must not be bypased.**
- **Any water leaks must be repaired immediately.**
- **All service personnel must be fully familiar with the operating manual before attempting any repair or maintenance of the machine.**
- **The machine must not be sprayed with water, otherwise short circuiting may occur.**
- **Volatile or flammable liquids are not to be used.**

General

Fig. 1

Wascomat Selecta 28 washer/extractors have been developed to meet the needs of state-of-the-art professional laundromats. EMERALD models are unique because you can program different prices for the seven wash cycles, giving the customer a real choice and allowing you to maximize revenue by charging what each cycle is worth. In addition, you can charge a higher price if the customer selects the Extra Extract option. Using an external clock and wiring harness, these models may be programmed to lower prices by any percentage between any hours of any days, for the ultimate in pricing flexibility!

The seven cycles offer different water temperatures, wash times, extraction times, and normal or gentle drum rotation. EMERALD SERIES washers achieve maximum environmental efficiency because only the minimum amount of water is used for each cycle, which vary in duration.

When ordering spare parts or contacting Wascomat or your dealer for service, always give the machine serial number, model, voltage and other electrical characteristics appearing on the data plate at the top left of the rear panel of the machine. The serial number is also printed on a sticker inside the door.

KEEP THIS MANUAL IN A SAFE PLACE FOR FUTURE REFERENCE!

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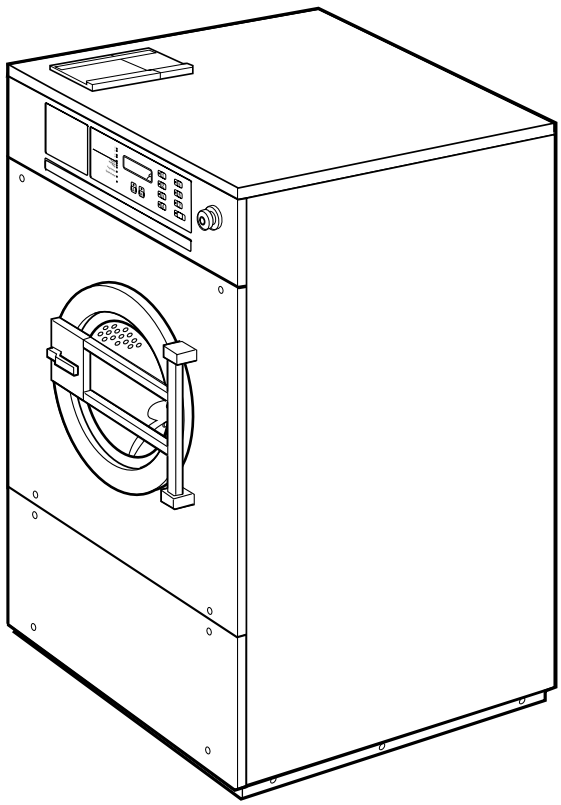

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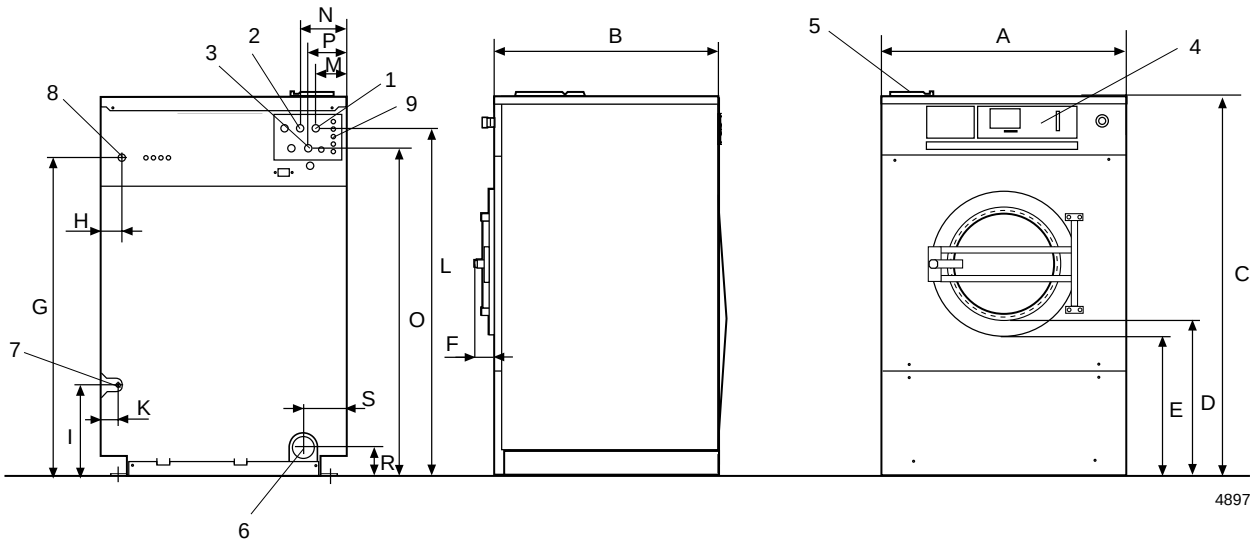
Technical data Wascomat W 245 Selecta 28

Dry load capacity	up to		75 lbs
Dimensions	Width	933 mm	36 7/8 in
	Depth (at the base)	985 mm	38 9/16 in
	Height	1430 mm	55 in
	Net weight	380 kg	837 lbs
Crated dimensions	Volume	1.74 m^3	61.5 cu.ft
	Weight	395 kg	870 lbs
Inner drum dimensions	Diameter	830 mm	32 11/16 in
	Depth	590 mm	23 1/4 in
	Volume	325 litre	11.3 cu.ft
Speed of rotation	Wash	41 r.p.m.	
	Distribution	60 r.p.m.	
	Extraction	410 r.p.m.	
G-factor	During wash	0.8	
	During extraction	79	
Floor loading	Dyn force	4.25 ± 5.5 kN	1020 ± 1320 lbs
Motor speed	During wash	540 r.p.m.	
	During extraction	860 r.p.m.	
	During extraction	1740 r.p.m.	
Voltage requirements		208-240 V 3-Phase 60 Hz	
Rated output power	Motor, wash,	650 W 0.9 HP	
	Motor, extract.	1100 W 1.5 HP	
Overcurrent protection	Three-phase	15 A	

Water connections

Recommended water pressure	2 - 6 kp/cm^2	25 - 85 psi
Hose connection, water	DN 20	3/4"
Hose connection, drain	75 mm	3"

Outline and dimensions



	mm
A	935
B	985
C	1430
D	595
E	525
F	110
G	1210
H	75
I	335
K	55
L	1315
M	115
N	175
O	1240
P	175
R	105
S	135

W 245

1. Cold water inlet
2. Hot water inlet
3. Hot water inlet
4. Control panel
5. Soap box
6. Drain outlet
7. Steam connection (optical)
8. Electrical connection
9. Liquid supply connection

Installation

Machine foundation

The machines are designed to be securely bolted to a concrete pad. A template showing the size of the pad and positioning of the bolts is delivered with each machine.

For installation on an existing concrete floor, the floor must be at least 8" thick and of good quality. If the floor does not meet these requirements, then a 6-8" high concrete pad should be made. A prefabricated steel base is available for mounting machines without pouring a pad.

Follow the instructions below when making a concrete foundation:

Fig. (2)

1. Decide where to place the machine and consider maintenance requirements, i.e. determine a suitable distance from the rear of the pad to the wall, and the distance from the pad to the nearest side wall. The distance should be at least 16 and 12 inches, respectively. Leave 3/4" between washers.

Fig. (3)

2. Break up the floor to a minimum depth of 3 inches, making sure that the sides of the hole slope away - the bottom of the hole should be 5 inches longer than the upper length.
3. Wet the hole well. Brush the bottom and sides with cement grout.
4. Prepare a casing and fill with 3.000 PSI concrete to form pad. Make sure the foundation is level.

Fig. (4)

5. Use the template to position the bolts correctly. Bolts are to extend 1 1/2" above the concrete.

   NOTE: A prefabricated steel frame, designed to be placed in the concrete instead of the individual mounting bolts, is available.

	mm	inches
A	575	22 5/8
B	975	38 3/8
C	1040	40 15/16
D	135	5 5/16
E	800	31 1/2
G	985	38 25/32
H	985	38 25/32
I	1180	46 15/32
K	293	11 17/32

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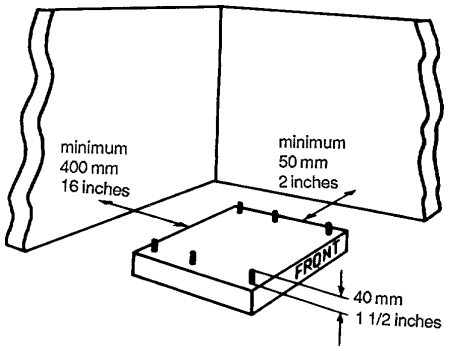

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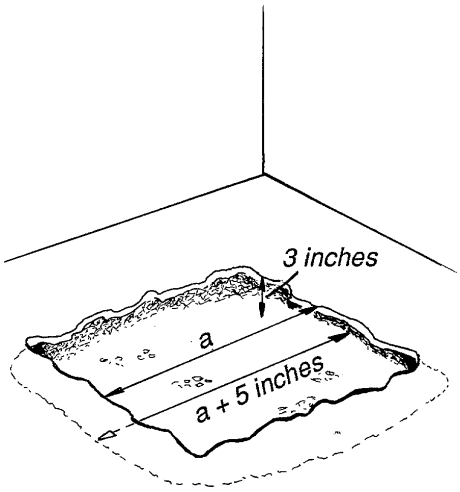

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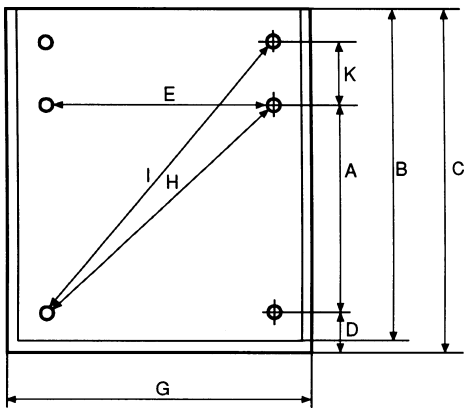

B = machine outline to edge of front panel
C, G = minimum foundation for one machine

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If you form a lip on top of the concrete pad in front of the washers, be sure you leave enough room to remove the bolts which secure the bottom of the front panel and enough room to swing out and remove the panel!

Mechanical installation

Fig. 5
- Place wide steel shims on the concrete foundation over the bolts.
- Lift the machine and lower it in position. Never use the door or the door handle to lift or lower the machine.

Fig. 6
- Check that the machine is level front-to-rear and side-to-side and standing firmly on the six supporting points. Spacing washers must be mounted if one or more of these points is not resting against the concrete.

Fig. 7
- Place flat washers over the foundation bolts and secure the machine in position by tightening the self-locking nuts. See illustration below.
- Check and tighten the nuts every week for the first month.

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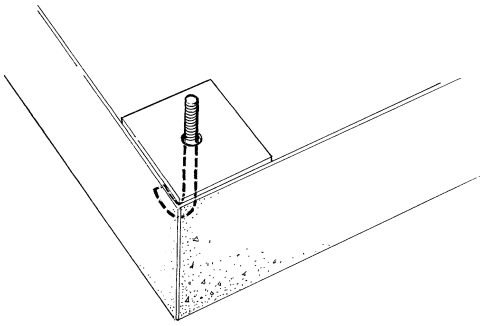

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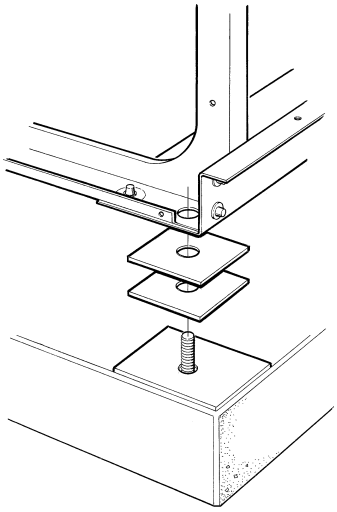

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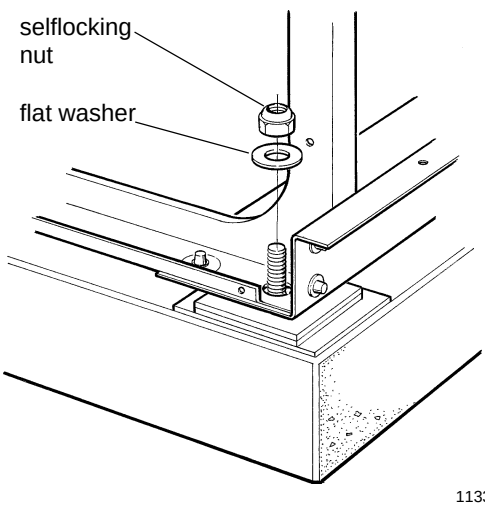

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Electrical Installation

All electrical installations are to be carried out by licensed personal.

Fig. 8 Although the machines are fitted with a thermal overload in the motor windings, a separate three-phase common-trip circuit breaker must be installed for all three-phase machines.

For proper circuit breaker protection, check the data plate at the rear of the machine. Also consult local electrical code for special requirements.

Fig. 9 Connect L1, L2, L3 and ground wires according to the markings of the terminal block. The cable is to hang in a loose loop, supported by the clip of the terminal block.

Make sure the machine is properly grounded electrically.

After installation do the following for 3-phase machines.

Check the incoming power for a high voltage leg. If present, connect that line to L2 on the terminal block.

Fig. 10 Start the machine and check that the drum rotates in the proper direction during extraction, i.e. counter-clockwise when seen from the front. If the drum rotates in the wrong direction intercharge line L1 and L3 at the power connection terminal.

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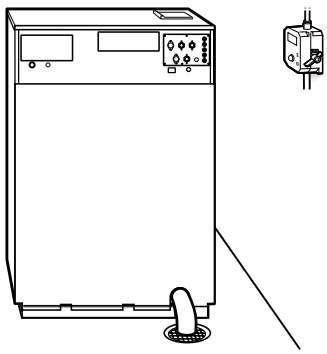

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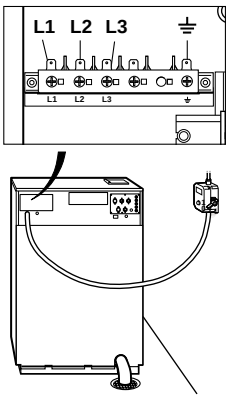

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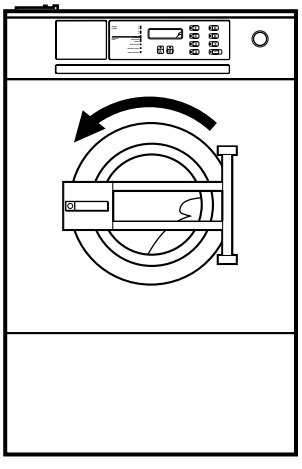

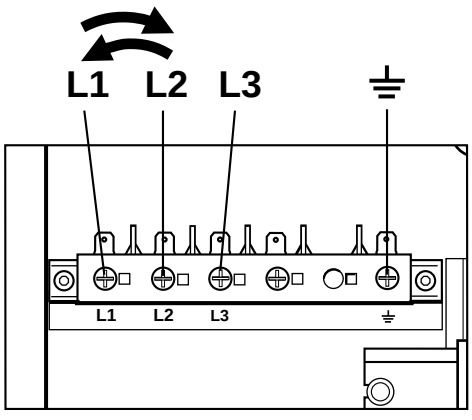

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The machine is equipped with a control circuit transformer, mounted on the control unit and connected for 220 volt operation. If your incoming voltage is below 210 volts move the wire connection to the 208 volt tab on the transformer. If it is above 230 volts move the wire to the 240 volt tab on the transformer.

Check the incoming power for a high voltage leg. If present, connect that line to L2 on the terminal block.

Water Connections:

All plumbing must conform to national and local plumbing codes.

Fig. 11

Incoming water lines do not require non-return or back flow prevention valves, as the machine is already fitted with an approved siphon breaker. However, all incoming lines must be fitted with shut-off valves.

Fig. 12

- Water inlets are labelled for hot and cold water connection. The W245ES has two hot water and one cold water connections.
- Flush the water lines thoroughly before connecting hoses to the washers. Then check that all water valves are attached tightly and inlet screens not clogged. Use teflon pipe tape if necessary to ensure watertightness.
- Use 1/2" or 3/4" diameter reinforced rubber hosing not to exceed 6 feet in length. Let the hoses hang in a loop. Do not use rigid piping.

  Never force a hose onto the threads or you may cause cross-threading and leaks. If this occurs, place the threaded portion of the hose over the valve threads and push forward firmly, to catch the next thread. Then tighten.

  Depending how large your laundry is, your main incoming water line will generally be between 1-1/2" to 3" diameter to assure adequate water supply.

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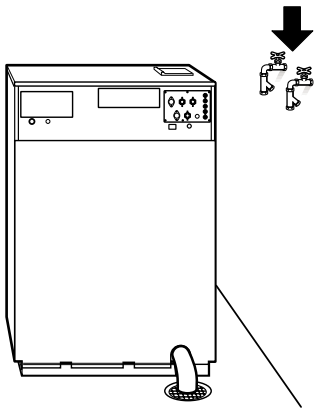

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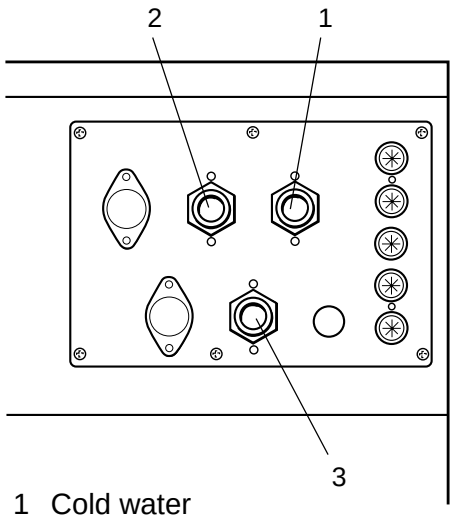

1 Cold water
2 Hot water
3 Hot or cold water

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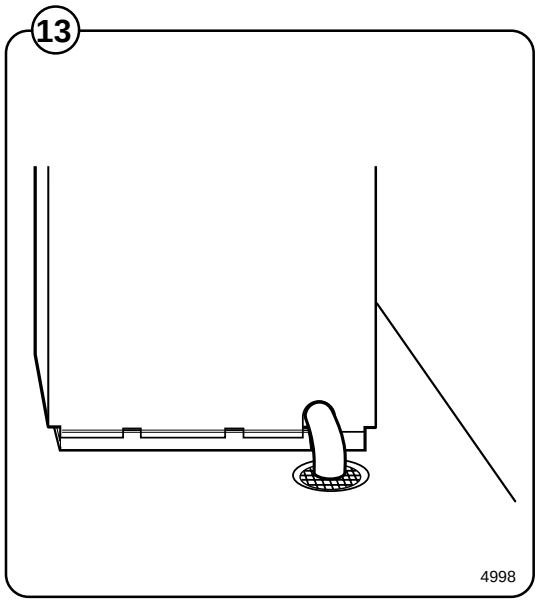
Drain connection

Fig. 13 Connect a 3" (75 mm) flexible hose to the drain outlet of the machine.

The drain hose must not have any sharp bends and must slope from the machine to assure proper drainage. The outlet must open freely to the main drains.

Do not reduce the size of the drain connection from the machine to the waste line.



Installing top-mount manifold for connection of liquid supplies

Remove the cover and cover support from over the soap box.

Fig. 14 Pull the manifold knobs up and forward.

1. Loosen both knobs so that one side of the metal fingers underneath can slide under the top lid of the machine, within the supply box.

Fig. 15

2. Fit the supply manifold into the supply box so that both sides are held securely in place by the metal fingers.

If the supply manifold does not fit turn it around. You have it in backwards.

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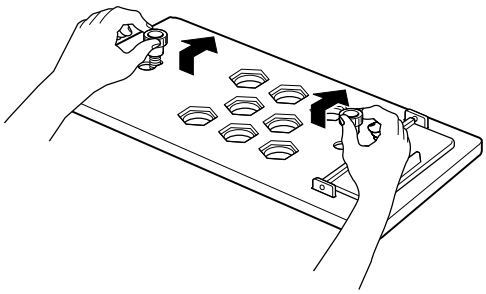

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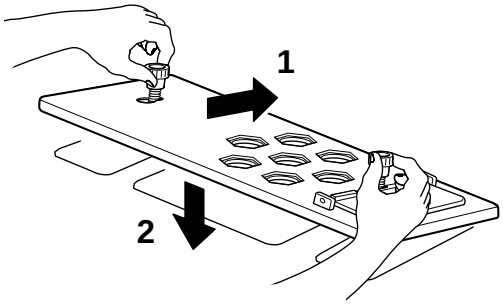

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Fig. 16

1. Drop the knob into the larger opening in the supply manifold lid.
2. Tighten securely. Do not overtighten! Do not use pliers or other tools to tighten the knobs!

Fig. 18

1. Select the correct size rubber ring which will fit snugly on the chemical tube you are using. Ring A is used for tubes with Ø 5 1/16".
2. Use scissors or a razor to carefully cut out the proper size rubber ring. Wrap the rubber ring around each tube after threading each tube through the strain relief. Run the tube through the compression nut to the bottom of the soap box compartment. Cut the end of the tube at an angle. Hand tighten the strain relief on to the compression nut.

Fig. 17

Separate lid which gives possibilities to add powder detergent in compartment 1.

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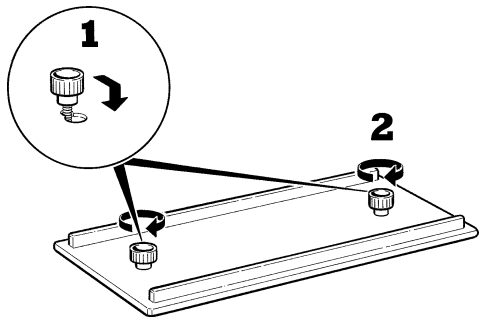

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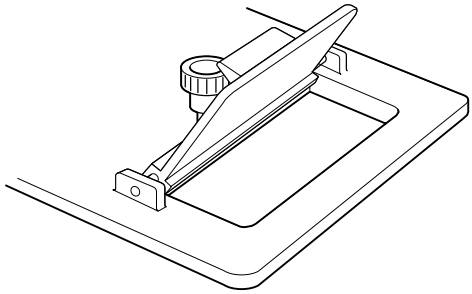

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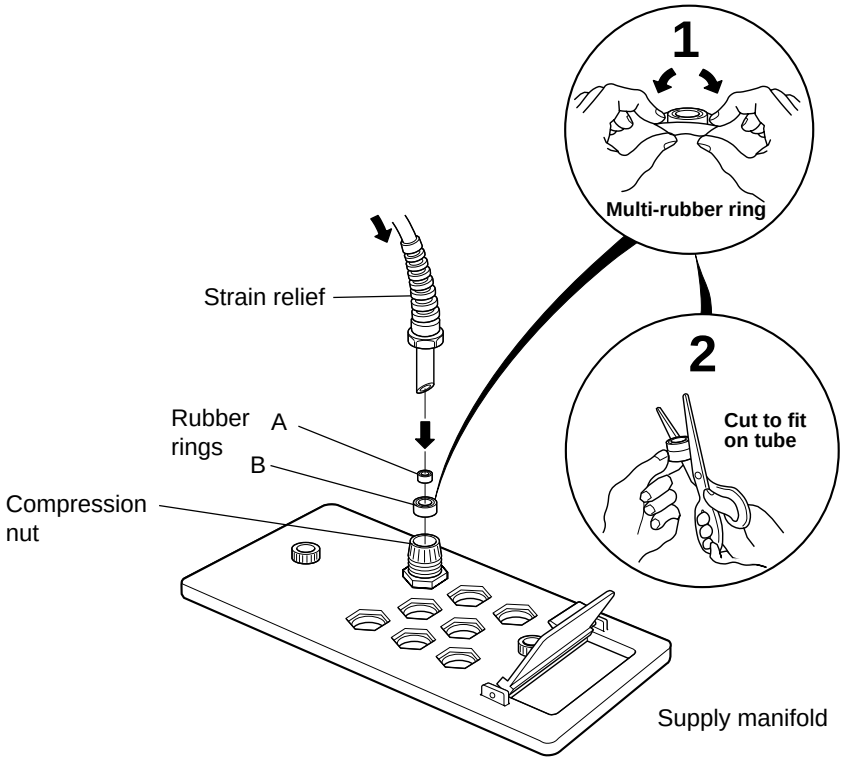

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Before the machine is operated, the door lock must be checked for proper operation as follows:

Fig. 19

- When washer door is open, the machine must not start. Verify this by attempting to start washer with door open.

Fig. 20

- When washer is in operation, the door is locked and cannot be opened. Verify this by attempting to open the door when the machine is operating. If necessary, consult this manual for proper operation of the door lock or call a qualified serviceman.

Door lock must be checked <u>daily</u> in accordance with above procedure.

Before servicing Wascomat equipment, disconnect electrical power.

If the side panels of the washer move during extraction, remove the shipping security which connects the top rear of the cylinder to the upper section of the back panel. It is used to prevent shipping damage but has no function when the washer is installed in a laundry. In some rare installations this bracket may transmit vibrations to the side panels. If it does, remove the shipping security; otherwise, leave it in place.

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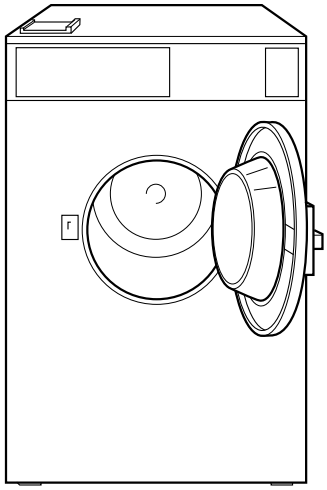

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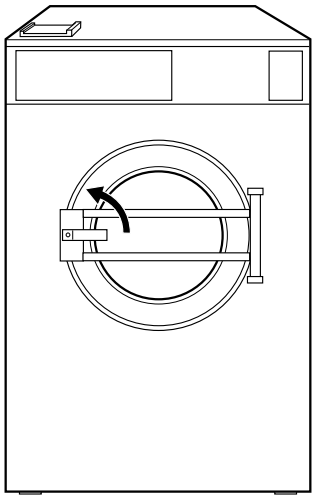

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Function control check-out list

In the cylinder you will find the warranty registration card, a copy of the warranty policy, the bolthole template, wiring diagram, and other pertinent material. The warranty card must be completed and sent to Wascomat immediately or your warranty coverage will start from the day we shipped the washer from our warehouse. All other items should be placed in a safe place for future reference.

The machine should be cleaned when the installation is completed, and checked out as detailed below without loading the machine with clothes:

1. Check the incoming power for proper voltage, phase and cycles.
2. Open water taps to the machine.
3. Turn on electric power.
4. Check the door lock as detailed in this manual.
5. Select the Warm cycle and then press the START button.
6. Run through a complete Warm cycle, checking for proper water temperature, drain operation and extract direction. To rapid advance the timer, press and hold down the START button until the indicator arrows reach the desired part of the cycle.

Fig. 21

7. Now select and run the Cold cycle. There is no hot water in the Cold cycle so if hot water enters the hoses are improperly connected. Reverse the hot and cold water hoses.

Fig. 22

8. The drum must extract in a counter-clockwise direction as seen from the front! If it does not, reverse incoming electric lines L1 and L3.

All machines are factory tested prior to shipment. Occasionally, some residual water may be found when the machine is installed.

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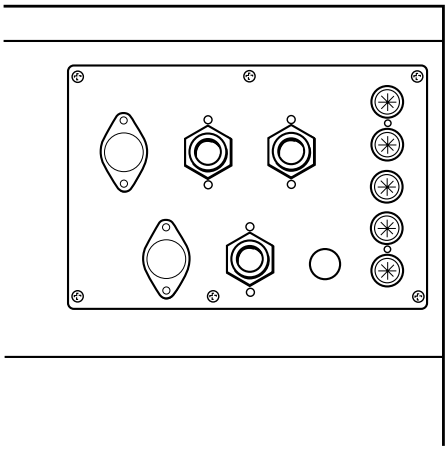

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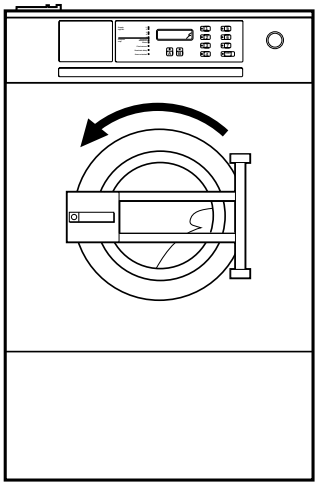

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Safety rules

- **All installation operations are to be carried out by qualified personnel. Licensed personnel are necessary for all electric power wiring.**
- **This machine is designed for water washing only.**
- **This machine must not be used by children.**
- **This machine must not be sprayed with water, otherwise short circuiting may occur.**
- **Fabric softener with volatile or inflammable fluids are not to be used in the machine.**
- **The interlock of the door must be checked daily for proper operation and must not be bypassed.**
- **All service personnel must be fully familiar with the operating manual before attempting any repair or maintenance of the machine.**
- **Any leakage in the system, due to faulty gaskets etc, must be repaired immediately.**

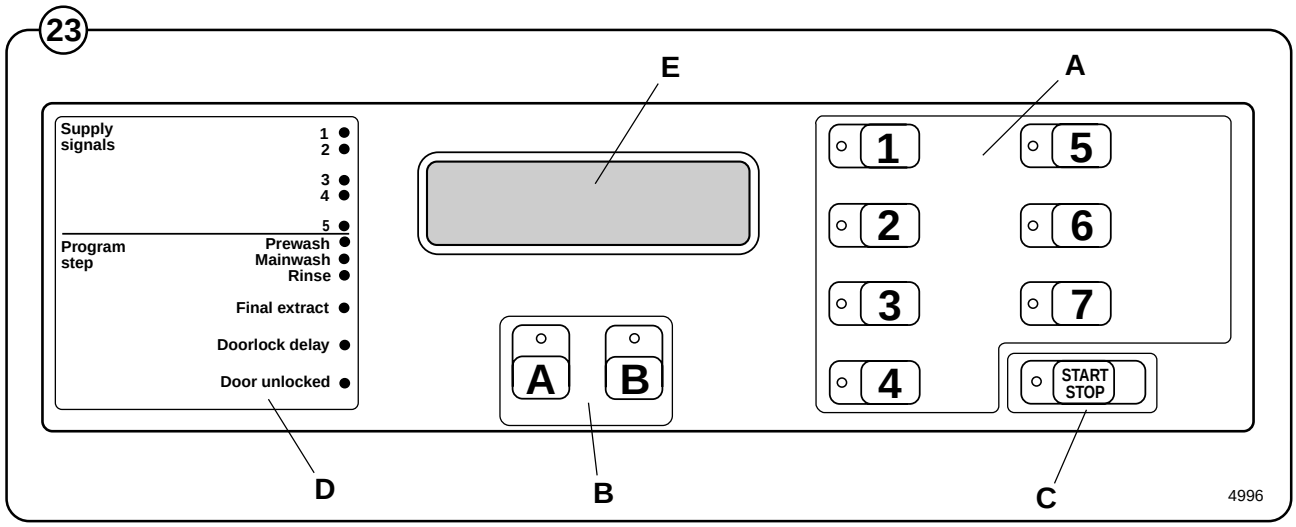
Operating instructions

The Emerald Series program unit controls the various functions of the machine in a certain time sequence with the aid of seven built-in standard programs. The standard programs can also be modified by selecting various options. By selecting options, the user has access to programs for all types of wash loads and degrees of soiling.

Fig. (23) The control panel consists of program selection buttons (A) and (B), a combined start, pause and rapid advance button (C), symbols with LEDs (D) which show the program selected and the program sequence, plus an alphanumeric display (E).

The alphanumeric display shows illuminated green characters.

In the event of faults, error codes will be displayed on this window. See Fault codes.



Explanation of control panel

A Program selection buttons

B Option buttons

C Start/pause and rapid advance button

D Symbols with LEDs to indicate program sequence

E Information display

Washing

Fig. 24
- Press the button for the desired program.

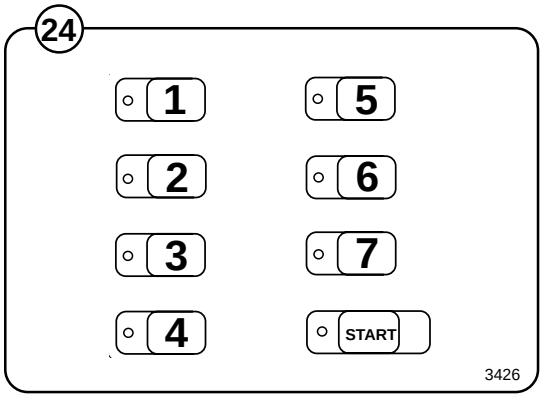
Fig. 25
- Now the LEDs alongside the program symbols will show what the selected program consists of.

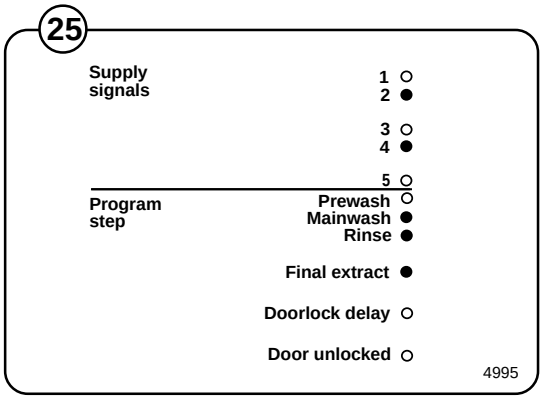
Fig. 26
- Press the button(s) for any options required.

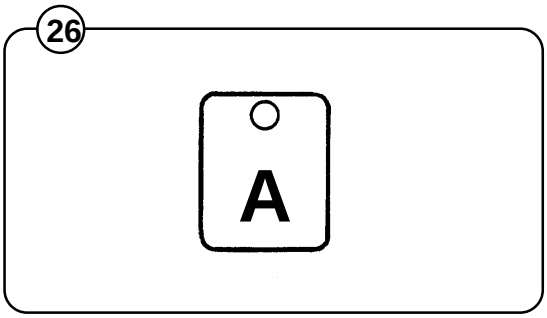
Fig. 27

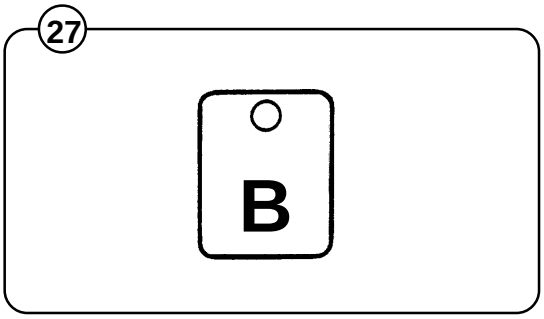
Gentle actions consists of 6 seconds rotation, as opposed to 18 seconds pause and 6 seconds pause and 14 seconds rotation for Normal action.

Fig. 28
- Press the **START** button.









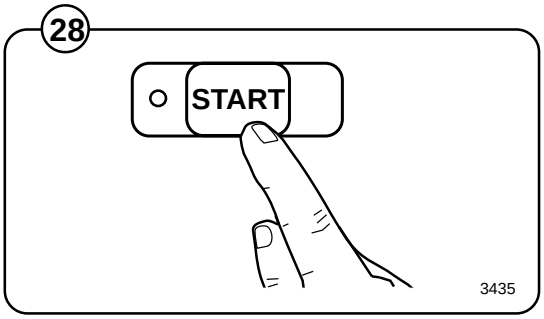


Fig. 29

- Now the display will show the clock symbol and two digits. The two digits are the time left before the wash will be finished.

The two digits indicating time left will not appear when the machine is first installed. Each program needs to have been used at least once before the time left will be displayed.

- For 5 minutes immediately after START is pressed the colon character (:) will flash on the display. As long as this character is still flashing a new program can be selected (without the drain opening). This means you still have the chance to change the setting if the wrong program has been selected. Do as follows:

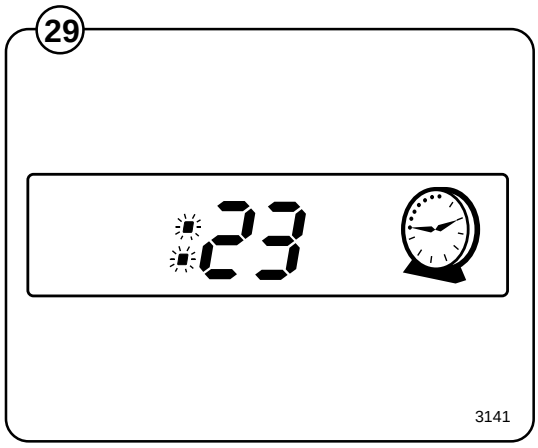
Fig. 30

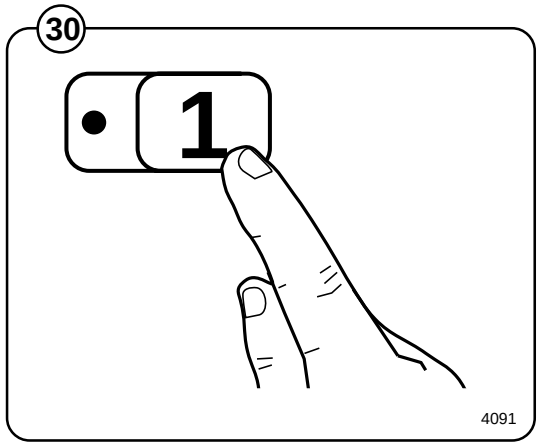
- Press **START**.
- Select a new program.
- Press **START** again after making any change in the program selected.

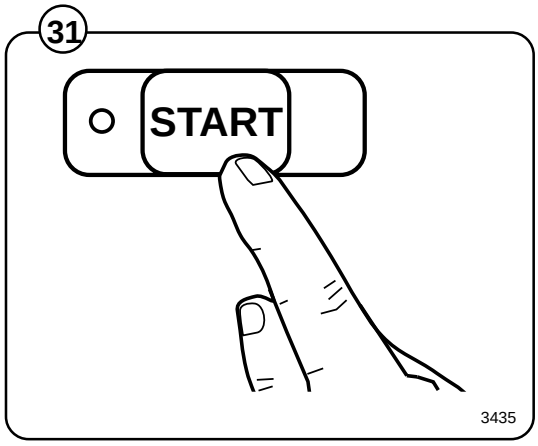
Fig. 31

If for any reason you wish to halt the wash cycle for a time, press the **START** button for a moment or two. The program will be suspended and the drain will remain closed.

To restart the program, press the **START** button again briefly.







For coin-operated machines

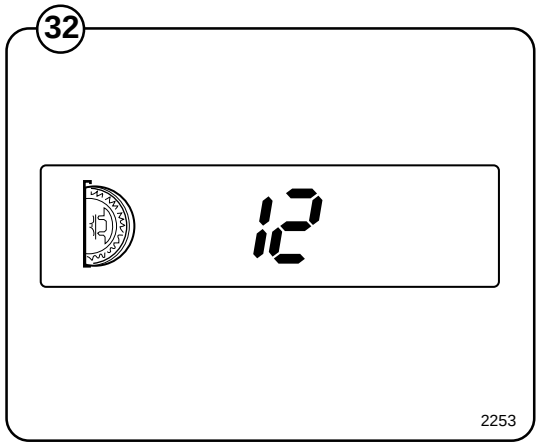
Fig. 32

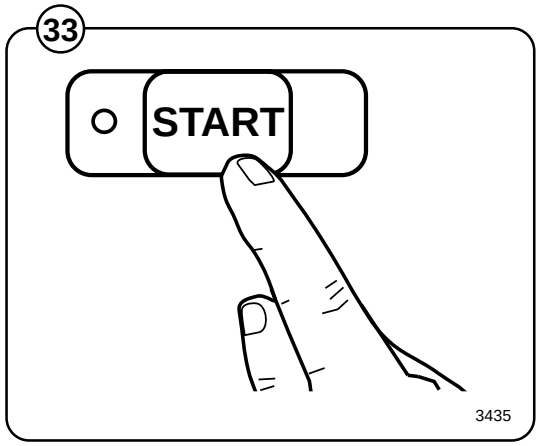
Select a wash program, then insert the number of coins corresponding to the figure shown on the display.

As each coin is added the machine counts backwards towards 00 on the display. The machine will not start until the display shows 00.

Fig. 33

- Press the START button.
- Now the display will show the clock symbol and two digits. The two digits are the time left before the wash will be finished.

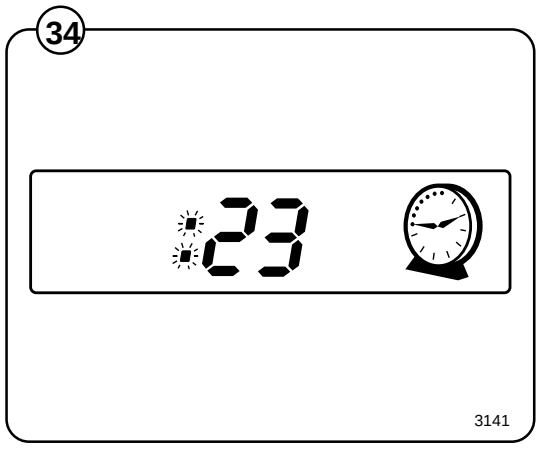




The two digits indicating time left will not appear when the machine is first installed. Each program needs to have been used at least once before the time left will be displayed.

Fig. 34

- For a time immediately after START is pressed the colon character (:) will flash on the display. As long as this character is still flashing a new program can be selected (without losing anything). This means you still have the chance to change the setting if the wrong program has been selected.
- Press **PAUSE/START**.
- Select a new program.
- If the new program costs more to run than the amount already paid, the difference will be shown on the display. Insert enough coins to make the display show 00 again.
- Press **START** again after making any change in the program selected.



Rapid advance

Whole steps in programs can be skipped using rapid advance.

Fig. 35

- Press and hold the **START** button until the program indicator LEDs have moved past the program steps you wish to skip.

Program end

Fig. 36 After final extraction, the LED by the "doorlock delay" comes on. This shows that the door lock will shortly be unlocked.

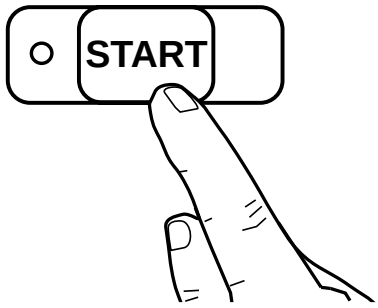
Fig. 37 The door will not actually be unlocked until the green LED by the "door unlocked" comes on, accompanied by an audible signal. This takes about 1 minute.

Troubleshooting

If the machine won't start, check that:

- the circuit breaker is on.
- the manual shut-off valves for water are open.
- a program has been selected.
- the door is properly locked.

35



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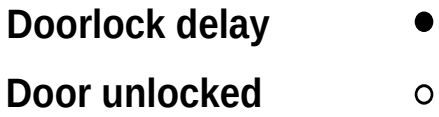

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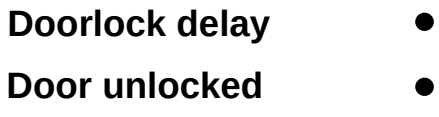

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Coin-operated machines

In coin-operated machines the prices for the various programs have to be programmed in.

Values from the coin mechanism (the accumulated value) can be read out with the aid of the service program.

If a machine is fitted with a coin mechanism after its original installation the relevant electronic circuitry will have to be activated before the prices can be programmed in.

Only trained service personnel may use the service program and program in prices for coin operation.

Activation of electronic circuitry in machines fitted with coin operation after original installation.

Fig. 38

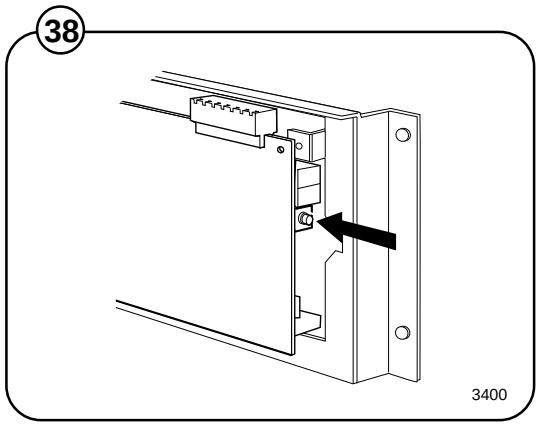
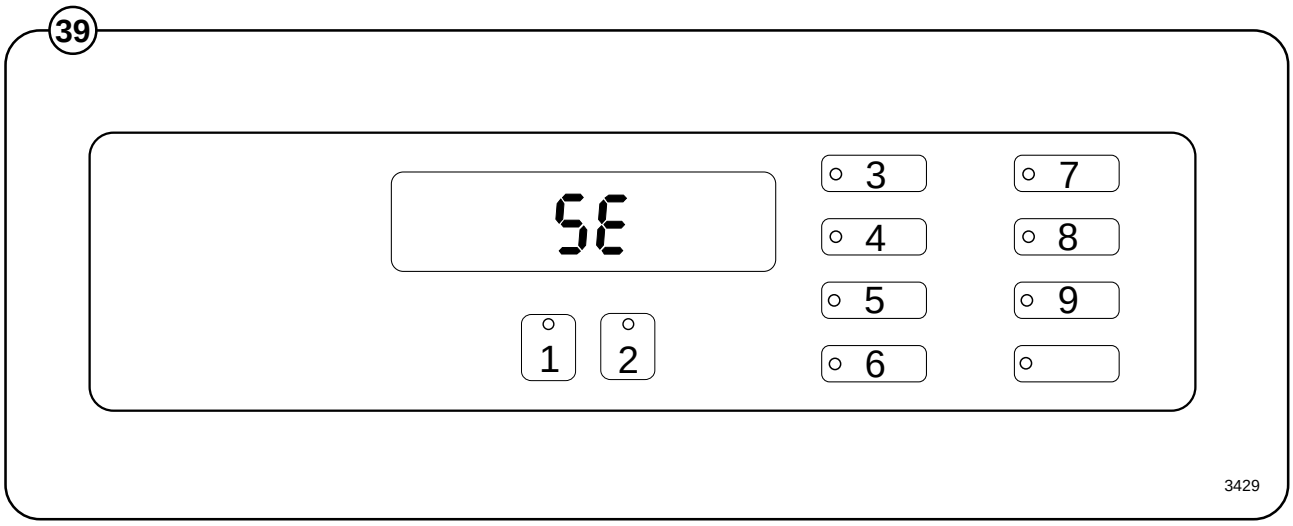


Fig. 39

- Press the service button.

  Now certain of the buttons switch to being number keys (1 to 9), with the START button being 0.



Codes 91 and 92 are used to store the values for coin slots 1 and 2. For mechanisms with only one slot, only code 91 is used.

The values to be stored are the ratio of one coin to the other.

For example: if the coin slots are for a 10 cent coin and a 50 cent coin. The value 10 should be stored under code 91, and the value 50 should be stored under code 92.

Fig. 40

- Enter code 91 using the buttons which have become number keys 9 and 1.

  The display will now show 91.

Fig. 41

- When entering the actual value: keep the price-programming button activated (the switch is located under the top cover at the right front edge). Enter the value 1 and then release the button.

Fig. 42

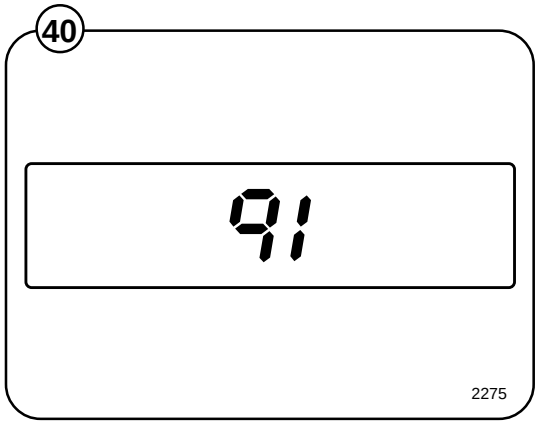
- Enter code 92. The display will now show 92.

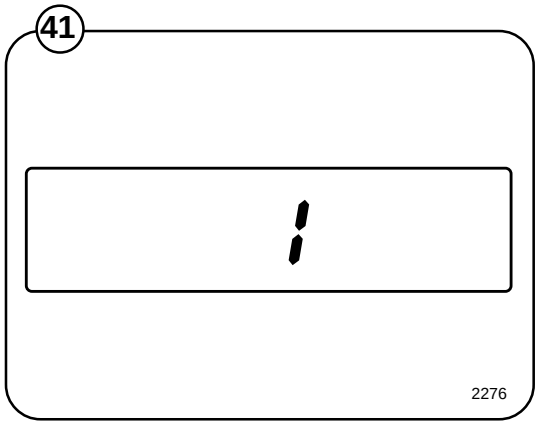
Fig. 43

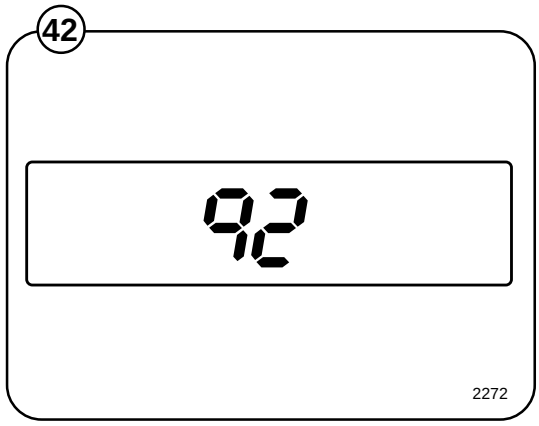
- Enter the value 5.

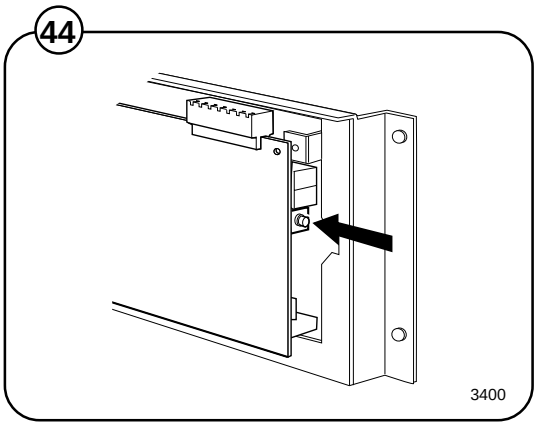
Fig. 44

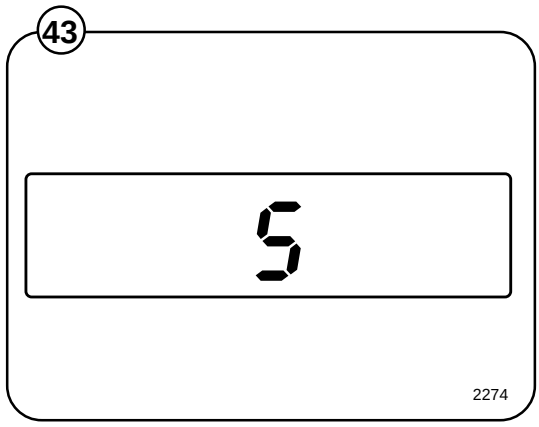
- Exit the service program by pressing the service button again.











Price programming:

- Press the relevant wash program selector button.

Fig. 45

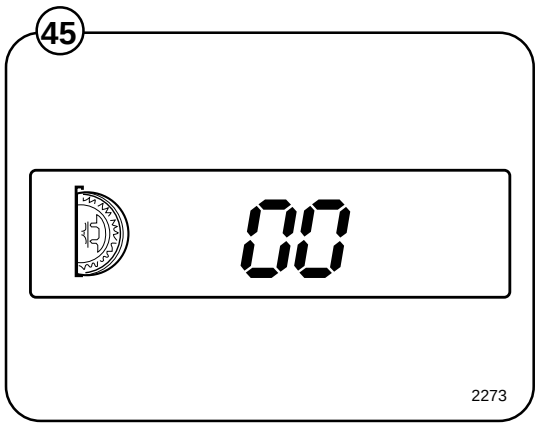
When programming the price of a wash program plus options, press both the relevant program selector button and the option button.

- Keep the price-programming button activated.

  Now the display shows 00 plus the coin symbol.

- Enter the price via the numerical key functions. The START button can be used to enter 0.
- Release the price-programming button.

This procedure should be repeated for all wash programs.



Hospitality wash formulas

For hotels/motels, restaurants, retirement communities, schools and universities, commercial and institutional laundries.

1	White uniforms sheets & pillow-cases (light soil)	1A	White towels (medium soil short program)	1B	White table linen (bleach, no starch)	1AB	White table linen (bleach and starch)
2	White uniforms sheets & pillow-cases (light/ medium soil)	2A	Colored towels	2B	Colored table linen (bleach, no starch)	2AB	Colored table linen (bleach and starch)
3	White uniforms, sheets, pillow-cases (medium soil)	3A	White towels (heavy soil)	3B	White or colored table linen (no bleach, no starch)	3AB	White or colored table linen (starch, no bleach)
4	Colored uni-forms, sheets, pillowcases (light soil)	4A	Bedspreads/ delicates (cold water)	4B	White 100% polyester (VISA) table linen	4AB	Bedspreads/ delicates (warm water)
5	Color uniforms, sheets, pillow-cases (medium soil)	5A	Kitchen & housekeeping rags	5B	Colored 100% polyester (VISA) table linen	5AB	Light soil general wash formula
6	White towels (light soil)	6A	Mops	6B	Chef coats	6AB	Extra rinsing with extract
7	White towels (medium soil)	7A	Stain treat-ment (short formula)	7B	Stain treat-ment (long formula)	7AB	Test program

Healthcare wash formulas

For nursing homes, hospitales and medical center.

1	White uniforms sheets & pillow-cases (very light soil)	1A	Diapers/pads medium soil	1B	Colored uni-forms, sheets & pillowcases (light soil)	1AB	White cotton or blend table linen
2	White uniforms sheets & pillow-cases (medium/ heavy soil)	2A	Diapers/pads heavy soil	2B	Colored towels	2AB	Colored cotton or blend table linen
3	White uniforms, sheets, pillow-cases (medium/ heavy soil)	3A	Diapers/pads extra heavy soil	3B	Dietary and kitchen rags	3AB	100% polyester (VISA) table linen
4	White uniforms sheets, pillow-cases (heavy soil)	4A	100% polyester pads	4B	Housekeeping rags	4AB	AIDS/ infectious disease iso-lation in water soluble bags
5	Color uniforms sheets, pillow-cases (medium soil)	5A	Delicates/ bedspreads	5B	Mops	5AB	Rinse and extract (cotton/terry)
6	White towels (light/medium soil)	6A	Sheepskins/ cubicle curtains	6B	Stain treatment (short formula)	6AB	Rinse and extract (polyester)
7	White towels (heavy soil)	7A	Personals/ general ldry.	7B	Stain treatment (long formula)	7AB	Test program

Shirt laundry formulas

1	Shirts (starch, cold rinses)	1A	Short formula shirts (no starch) (may use with 5 or 6)	1B	Delicates	1AB	White or colored blend table linen (with bleach, no starch)
2	Shirts (starch, warm rinses)	2A	Heavy soil shirts (one starch injection)	2B	Mops	2AB	White or colored blend table linen (with bleach and starch)
3	Shirts (no starch) (may use with formula 5 or 6)	3A	Shirts (pause for starch)	3B	Extra heavy soil – no – iron fabrics	3AB	White or colored 100% polyester (VISA) table linen (white bleach, no starch)
4	Shirts (no starch, no bleach) (may use with formula 5 or 6)	4A	Light soil general wash no-iron fabrics	4B	Extra heavy soil – cotton fabrics	4AB	White or colored 100% polyester (VISA) table linen (with bleach and starch)
5	One starch injection with extract	5A	Light soil general wash (cotton)	5B	Wool blankets	5AB	White cotton blankets
6	Two starch injections with extract	6A	Shirts (no starch, short extract) (may use with formula 5 or 6)	6B	Stain treat-ment	6AB	Uniforms
7	Short rinse and extract	7A	Shirts (starch, short extract)	7B	Stain soak (supplies added manually)	7AB	Test program

General

The door and the electronic timer with display and program-selection buttons are fitted at the front of the machine.

All control and indicating components, i.e. relays, level control, etc are assembled under the top cover, easily accessible from the top of the machine for simplified servicing.

Main units

Fig. 46

1 Keypad.

2 Wash cycle buttons.

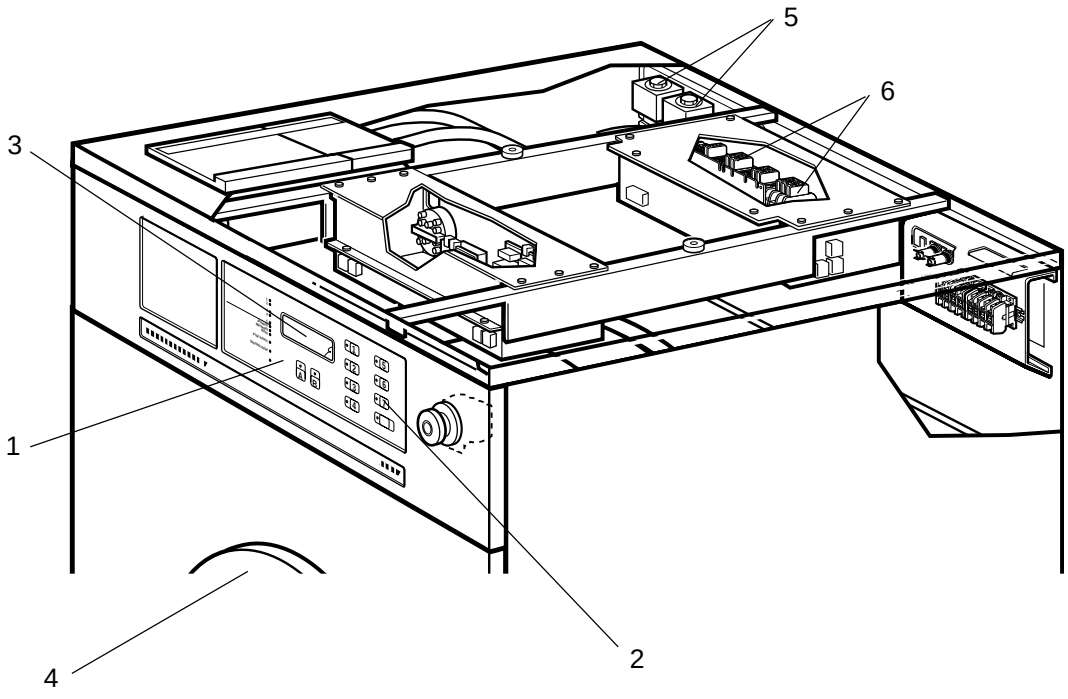
3 Electronic microprocessor with display .

4 Door - with automatic locking device which remains locked throughout the different wash processes.

5 Hot and cold water valves - program and level controlled solenoid valves for filling with water, and for flushdown of automatic detergent dispenser.

6 Relays - for wash and extraction.

46



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Panels

The machines are equipped with a top panel made of stainless steel. The front panel is available in different colours or in stainless steel. The coloured panels are made of phosphatized steel plate. For servicing purposes, the panels can easily be removed.

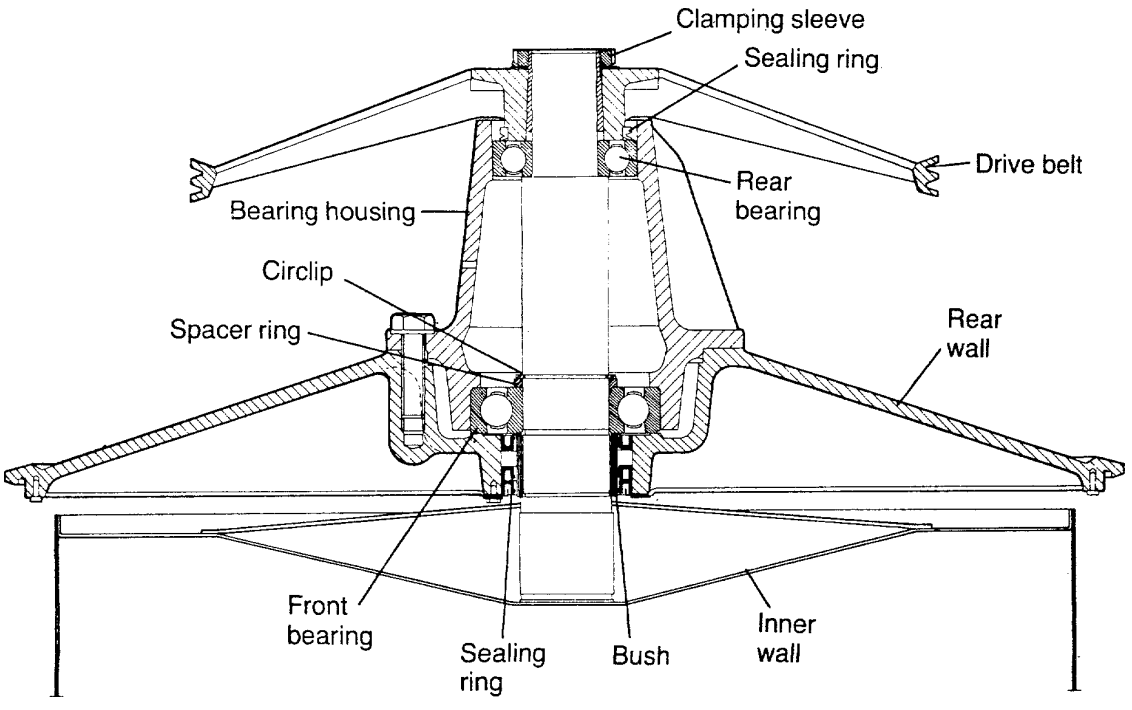
Back gable and bearing

Fig. 47 The back gable and the bearing trunnion housing are constructed of a webbed heavy casting for extra rigidity. The bearings are protected against imfiltration of water by three neoprene seals. An intermediate safety outlet provides an escape for any possible condensation.

The seals are mounted on a stainless steel sleeve bushing that is mounted on the drive shaft to prevent wear of the seals and shaft. The main bearing is fitted machinetight into the bearing trunnion housing. A nut is tightened on the shaft to prevent the cylinder from moving in and out.

The extension of the bearing trunnion housing supports the rear bearing holding the shaft. A grease seal is mounted to prevent escape of grease. The bearings are permanently lubricated and need no maintenance. Wascomat's design transfers the weight of the loaded wash cylinder to the largest possible surface area away from the bearings, for longest machine life.

47



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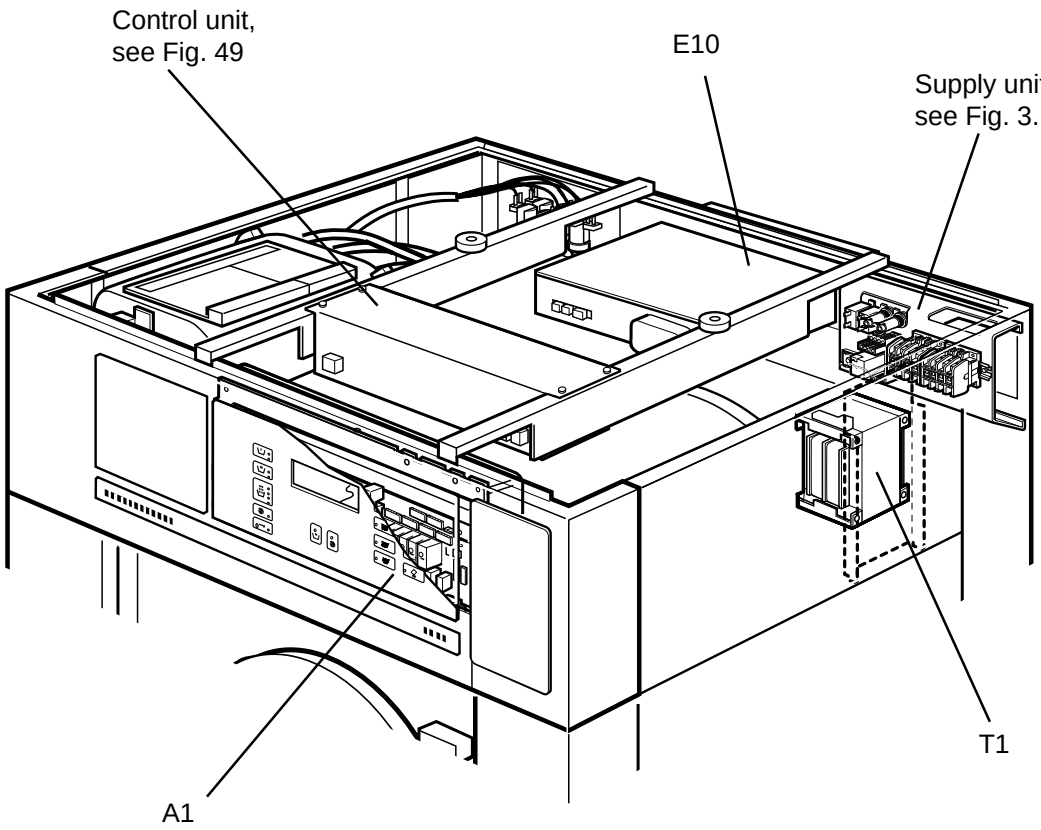


Fig. 48

A1	Electronic, microprocessor-controlled program control unit. Controls program sequences as shown in the program charts.
E10	Relay control with RDC-card.
T1	Transformer, low-voltage transformer which supplies the program control unit with various voltages.

Control unit

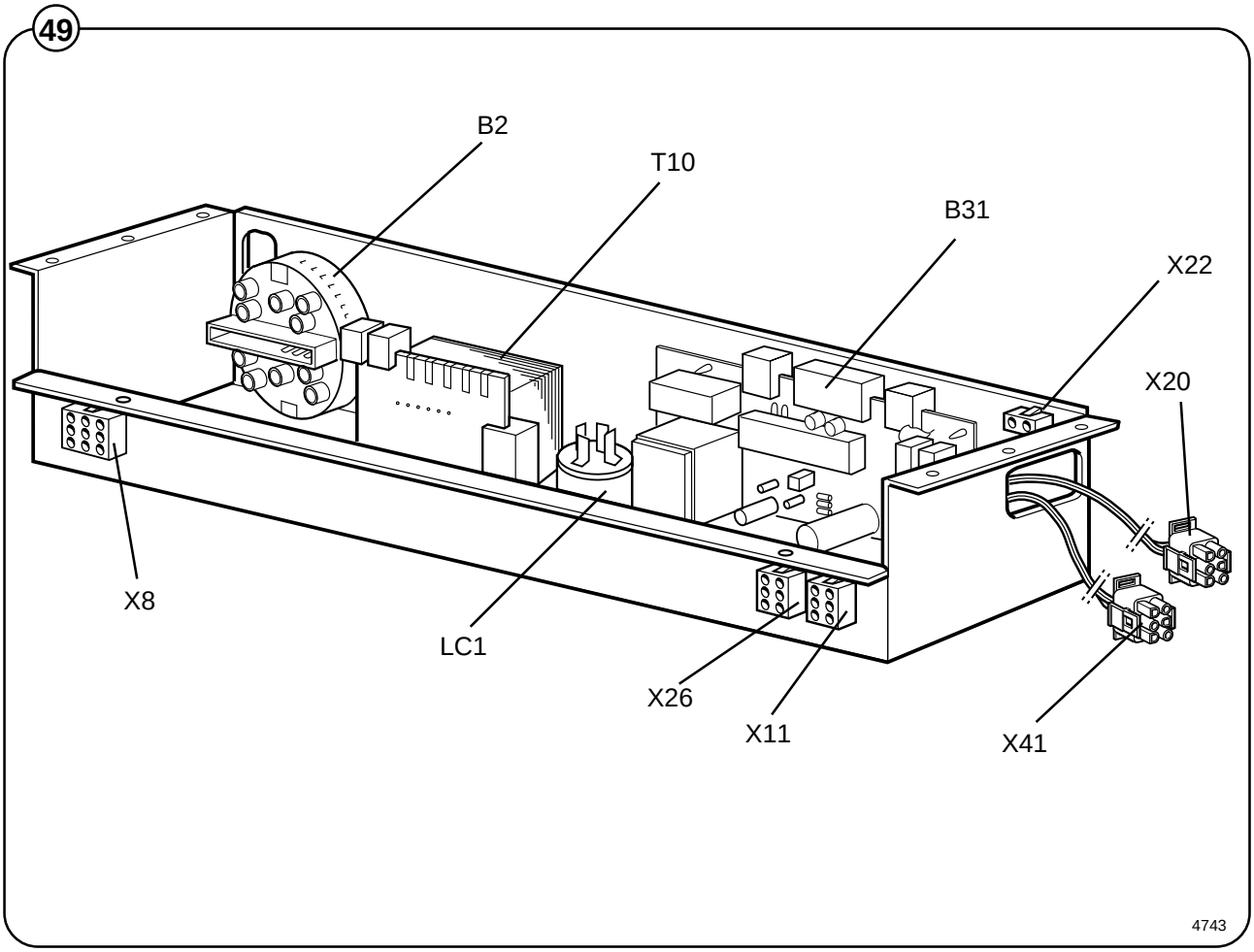


Fig. 49		
	B2	Level sensor, door opening
	B31	Rotation-monitoring device
	T10	Transformer, power supply to circuit boards
	LC1	Suppression filter
	Connectors	
	X8	9-pole, door lock
	X11	6-pole, supply, coin-op system
	X20	6-pole, inward
	X22	2-pole, program signal
	X26	6-pole, coin-op
	X41	6-pole, speed sensor on motor

Supply unit

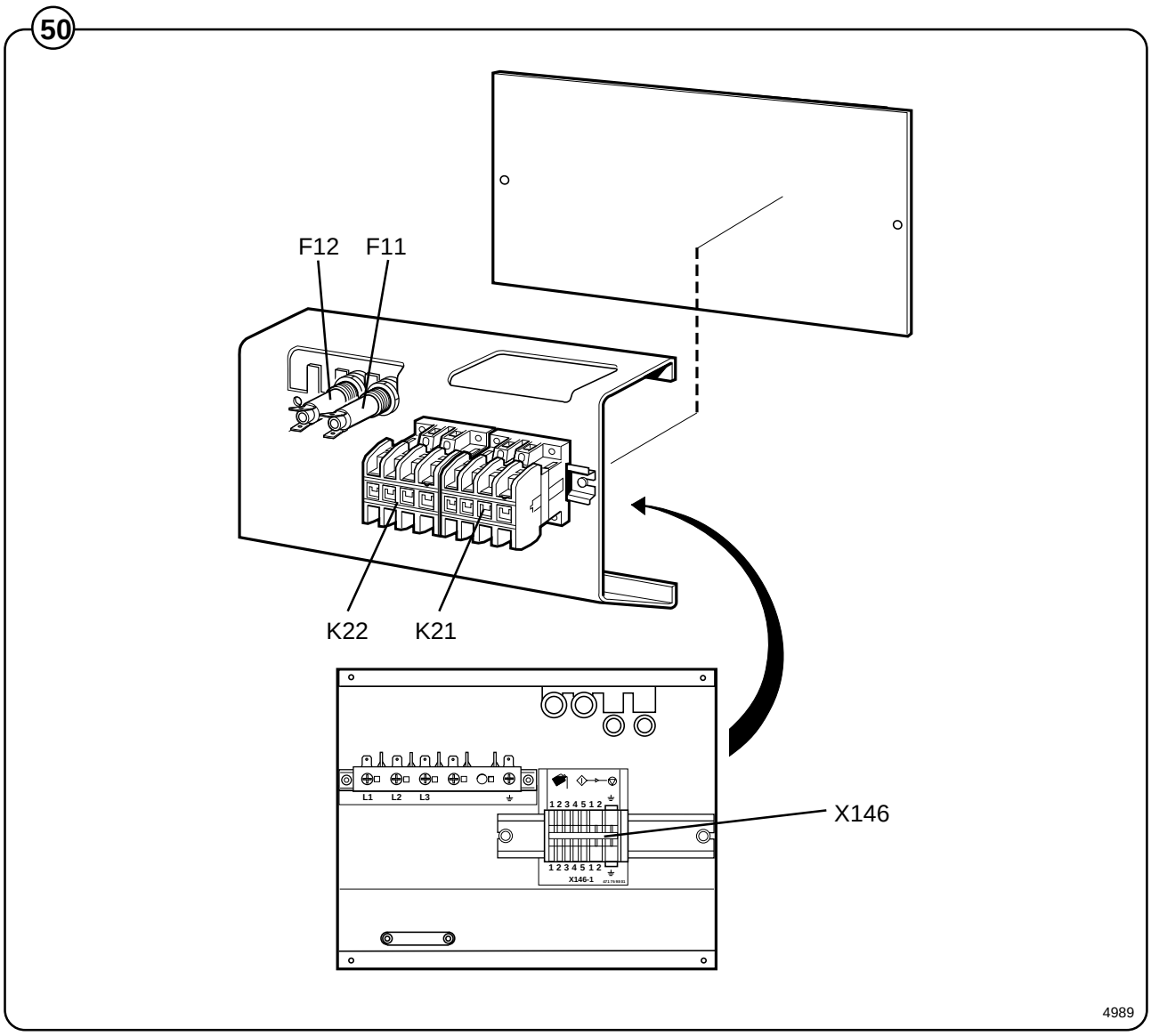
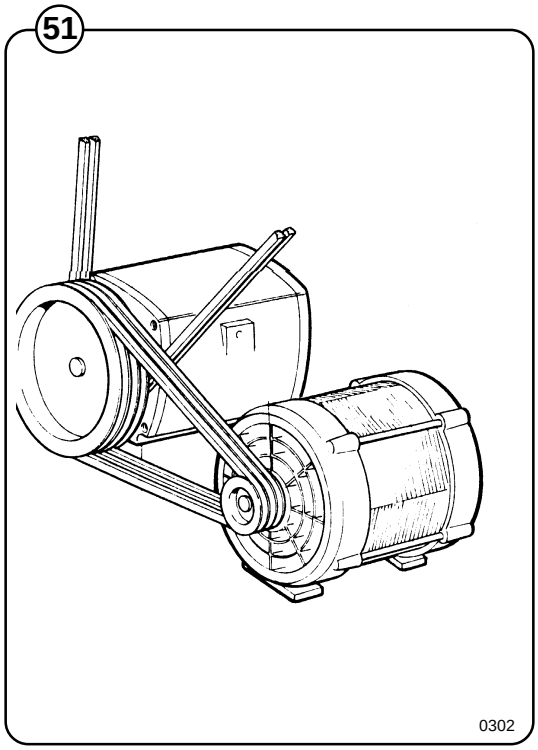


Fig. 50

K21, K22	Contactors for switching in heating elements (option)
F11, F12	Fuses, inward power supply
X146	External liquid supply

Drive motor description

Fig. (51) The three-speed operation of the wash cylinder is achieved by two motors. One 2-speed motor for wash speed (12-pole drive) and distribution speed (8-pole drive) and one single speed motor for extraction speed (4-pole drive). The motors are mounted on a motor bracket, the extract motor fixed the bracket, the wash and distribution motor in slots which allow adjusting the distance between the two motors for proper belt tension by adjusting screws. For silent operation the motor bracket is mounted to the base of the machine by rubber bushings. Correct tension to the main belt, between the cylinder and the extract motor, is obtained by the weight of the motors and the motor bracket and by the spring loaded set screws.



Construction of three-phase motors

The motor consists of stator, rotor and end-shields with ball-bearings. The stator and the rotor consists of plates, insulated from each other and welded together. The stator is provided with slots in which the 2-pole and 18-pole windings are wound. The windings are impregnated with a temperature-resistant sound-insulating resin varnish according to class B. The end-shields are die-cast. The ball bearings are permanently lubricated.

Function of motors

When the stator winding is charged, a magnetic field will occur, which in turn will rotate the motor at a fixed RPM depending upon the number of poles in the winding. The 12-pole winding gives the wash speed and the 8-pole winding in the same motor gives the distribution speed. The separate 4-pole motor gives the extraction speed. When operating with load, the speed deviates slightly from the synchronous (no-load) speed. This difference is called the slip and usually expressed as a percentage of the synchronous speed. The motors will work satisfactory at nominal voltage +10%-15%.

Motor connections

Fig. (52) The diagram in fig. 62 illustrates motor connections to the connector plug:

Wash/distribution motor:

1, 2 and 3: wash speed (12-pole winding).

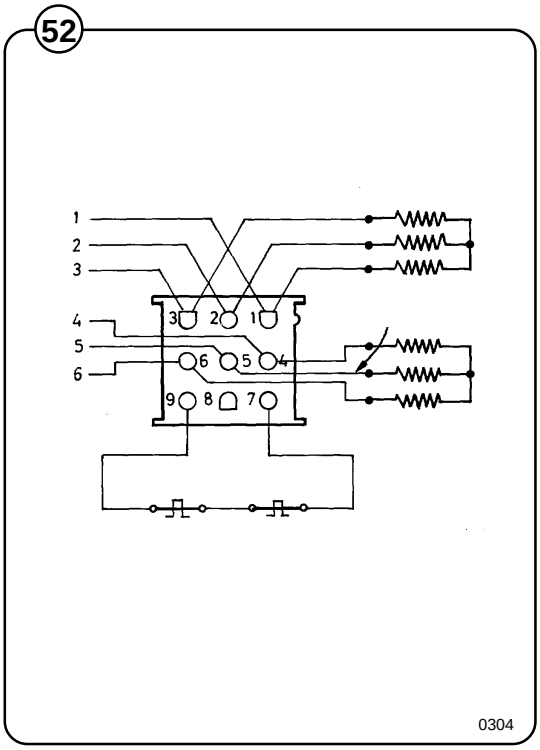
4,5 and 5: distribution speed (8-pole winding).

7 and 9: motor overload protector.

Extract motor:

1, 2 and 3: extract speed (4-pole winding).

7 and 9: motor overload protector.



Motor overload protector

The motor is equipped with two self-resetting, thermal overload protectors, situated one in the each winding of the stator. The protectors are connected in series and will trip at a temperature of 120°C (248°F) (3-phase) or 130°C (266°F) (single-phase). If the event the protectors fail but the motor remains otherwise undamaged, an overload protector may be mounted in the control unit of the machine. Before making such installation check to ascertain that the windings are not damaged. A burned out motor can be re-wound.

Before connecting a separate overload protector consult the local code.

Single-phase machines are also equipped with a manually set overload protector mounted on the extract relay in the control unit. This overload protector protects the motor during the start-up of the extraction.

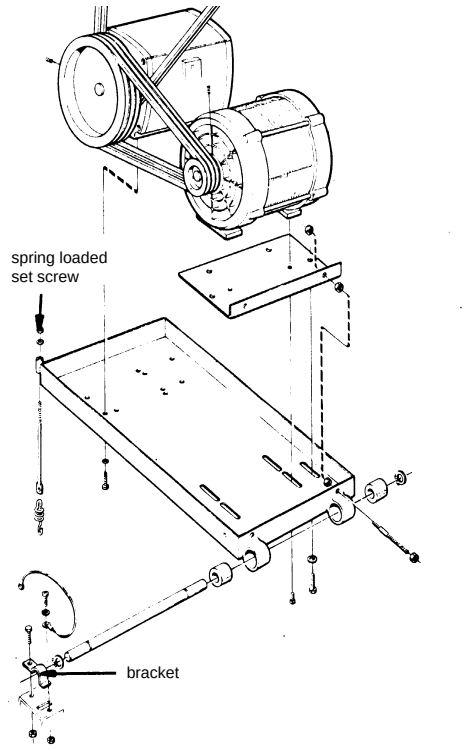
How to remove motors

Fig. (53) Loosen the spring loads set screw. Lift the motor unit and detach the V-belts. Dismount the bracket holding the motor hinge shaft. Lift out the motor bracket with motors mounted. Loosen the mounting screws of the wash/distribution motor and the set screws. Lift off the V-belts. Now remove the mounting screws for each motor and the guide pins for the wash/distribution motor.

How to mount motors

Place the motors on the table or bench with the mounting holes upwards. Mount the guide pins on the wash/distribution motor. Then mount the mounting bracket to the extract motor. Position the other motor and fasting the mounting screws. Mount the V-belts. Tighten the belts. Mount the bracket with motors in the machine in the opposite way as outlined above in "How to remove motors".

53



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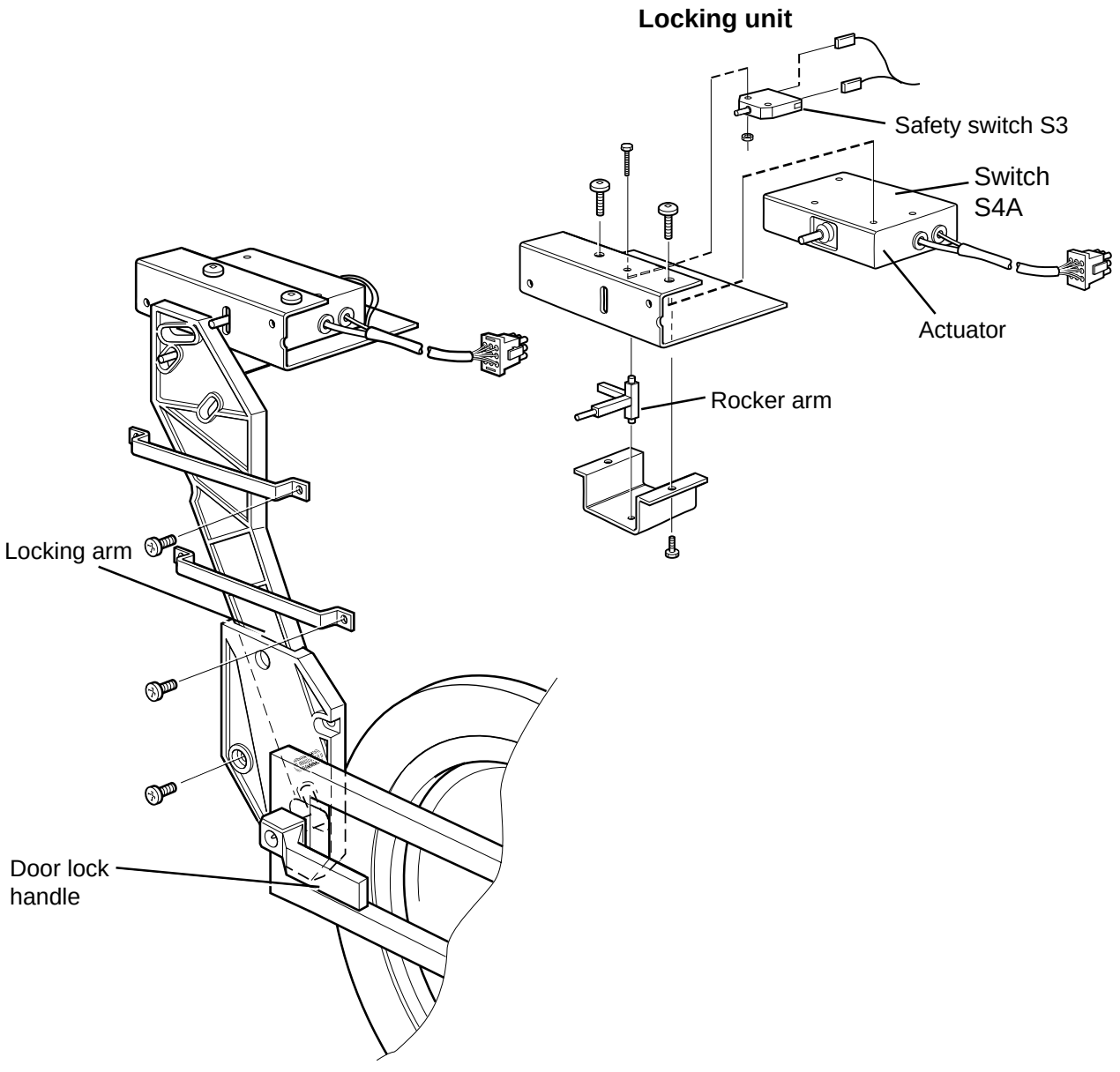
Description

Fig. 54 The machine door lock consists of the following:

- The locking unit, located behind the front panel below the detergent dispenser. The unit consists of a solenoid which locks the door, and two microswitches. Switch S4A indicates that the door is locked and switch S3 indicates that the door is closed.
- The door lock control unit, located in the automatic control unit. This unit consists of a circuit board for monitoring door lock functioning.
- The locking arm, located between the door lock handle and the locking unit. This arm provides the mechanical link between door lock handle and locking unit.

54



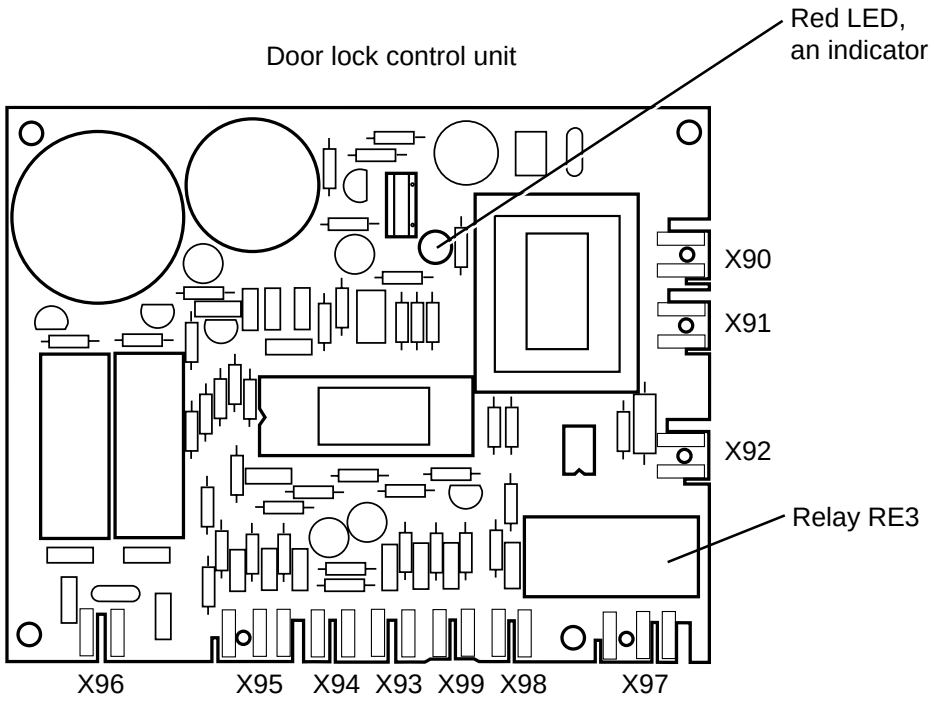
Door lock control unit

Fig. 55 The sole function of this control unit is to oversee the correct functioning of the door lock. The CPU board receives information from the motor control unit about motor rotation, and has its own level-monitoring device. The control unit also detects water level and motor speed through separate level measurement devices and the rotation guard (speed-monitoring device). Through this double monitoring, a very high level of safety can be achieved.

When the CPU board commands door locking, the control unit checks that there is no water in the drum and that the drum is not rotating. Only after that is a signal sent to the door lock. Level and rotation are checked in the same way before the door is allowed to open.

For even greater safety, the voltage feed to the I/O boards' outputs goes via both the emergency stop and the door lock switch. This means that no functions can proceed unless the emergency stop is in its normal position (not actuated) and the door is locked.

55



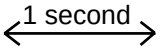
4697

Error indication patterns

Fig. 56 If the door lock is working correctly, this is indicated by the red LED, by a pattern of flashes which indicates “OK”. The error indication patterns revealed by the LED flash at various frequencies for the various errors or faults. All error indication patterns have a frequency cycle of 50%, i.e. the LED will be on half the time, off half the time.

56

LED pattern of flashes during normal functioning



Pattern of flashes indicating “OK”, drum at standstill

Pattern of flashes indicating “OK”, drum rotating, 5 Hz

Error indication pattern	Meaning/cause
	Level-sensing device indicates water in drum when door lock is open. 2.19 Hz
	Auxiliary relay for motor indicates that the motor contactor is activated when the door lock is open (this error indication pattern does not occur when the excess-speed-monitoring device is selected). 1.88 Hz
	Signals from rotation sensor and auxiliary relay do not correspond. 1.56 Hz
	The control unit sensor circuits indicate fault/ error in drive circuits for door lock including its wiring. 0.85 Hz
	Armament circuits for RE1/RE2 activated (capacitor C8 charged when it should be discharged). 0.37 Hz

4686

Inlet valve, detergent

Construction

Fig. 57 The valve has a single-inlet with either one, two or three outlets, each with its own solenoid coil. The body is made of heat-resistant polyamid plastic and the solenoids encased in water-tight plastic.

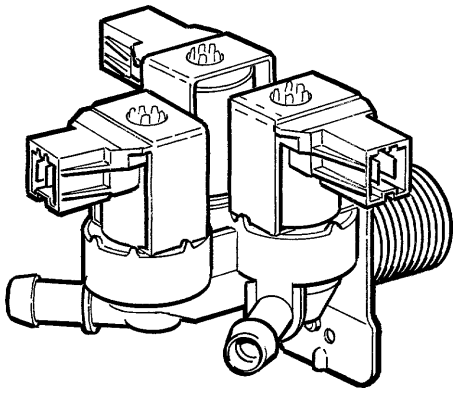
A filter screen on the inlet side prevents dirt from entering the valve. Flow restrictors can be placed at either the inlet or any of the outlets.

Operation

Fig. 58 When the solenoid is energized, the spring-loaded plunger is drawn up and the pilot valve in the center of the diaphragm open. Because of the difference in diameter between the pilot valve opening and the ventilating hole in the diaphragm, the pressure above the diaphragm drops to a point where the admission pressure below the diaphragm can lift the diaphragm, thus opening the valve.

When the current to the solenoid is cut off, the plunger spring will press the plunger against the pilot opening of the diaphragm. The pressure above the diaphragm then rises to correspond to the water inlet pressure and the pressure of the spring will close the valve.

57



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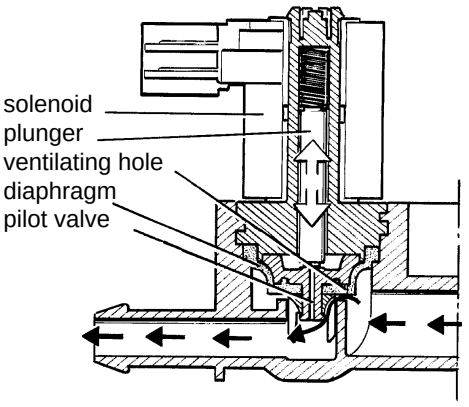


1185

Maintenance instructions

Lime scale can block the hole in the valve diaphragm and interfere with the function of the valve.

Fig. 59 It is therefore advisable to disassemble and clean the valve at certain regular intervals. The frequency depends on operating conditions and the level of contamination in the water.

Trouble shooting

If the valve does not open

- Check that power is supplied to the coil.
- Check the coil with an instrument to determine whether there is a break or a short circuit.
- Disassemble the valve (see below) and check the openings in the valve diaphragm.
- Check the inlet strainer and clean as required.
- Undo the coil and clean the surfaces of the magnetic core.

If the valve does not close

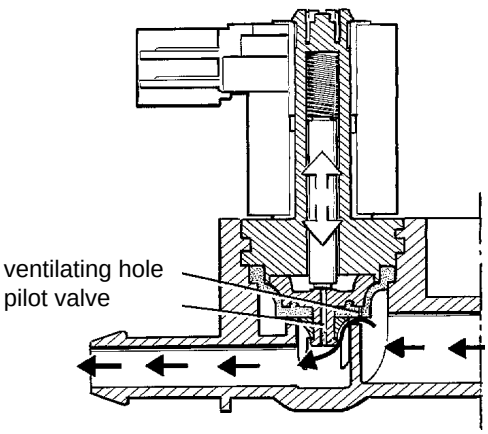
- Check that the coil is not live. The valve is normally closed when the magnet is not energised.
- Check the return spring.
- Check the diaphragm (pilot pressure opening).

Disassembling the valve

Fig. 60
- Pull the coil straight upwards. Use a screwdriver if necessary to carefully undo the coil.

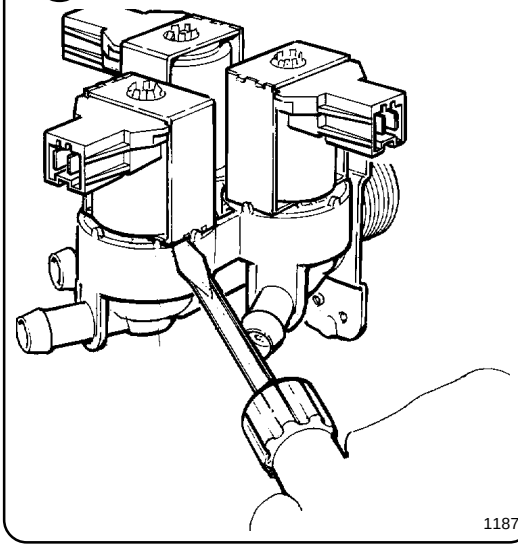
Fig. 61
- Use the tool supplied with the machine (attached to one of the hoses when the machine is delivered) to open the valve housing. Slide the tool over the protruding plastic sleeve to that the pegs on the tool engage the corresponding sockets in the valve housing.
- Use a wrench or a pair of pliers and unscrew the upper part of the valve housing.

59



1186

60



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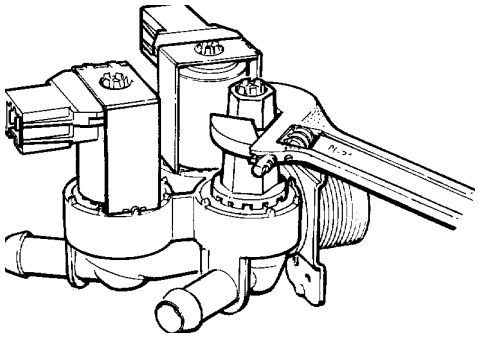
61



1181

Inlet valve

Fig. 62 The water inlets have brass bodies with larger cross section of the outlet in order to achieve a shorter filling time for the machine.

Construction

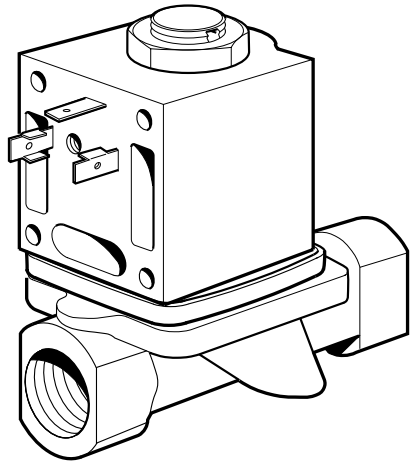
Fig. 63 The valve housing is made of pressed brass. The spring-loaded plunger is made of stainless steel and located at its lower end.

Operation

The valve is automatically operated by means of a rubber diaphragm and a pilot valve in exactly the same way as the supply injector valve.

To strip, clean, re-assemble and troubleshoot the inlet valve, follow the instructions outlined for the supply injector valve.

62



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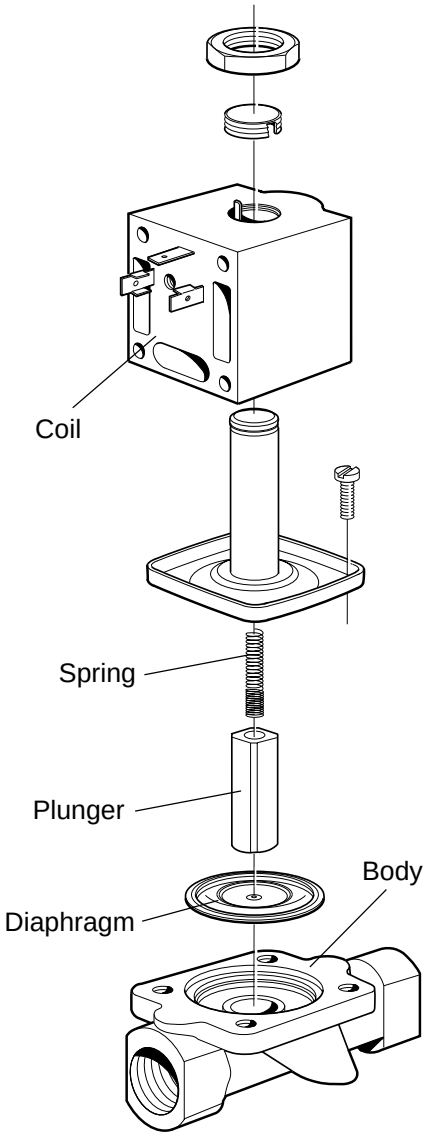
63



3961

Soap supply box

Fig. 64 The three-compartment soap supply box is located at the top of the machine. Viewed from the front, the compartments marked with figures 1, 2 and 3 are used as follows:

Compartment 1

This compartment is used for adding detergent at the beginning of the Prewash cycle. Powders may be loaded immediately; for liquids, wait until the display shows an arrow and the compartment flushes with water.

Compartment 2

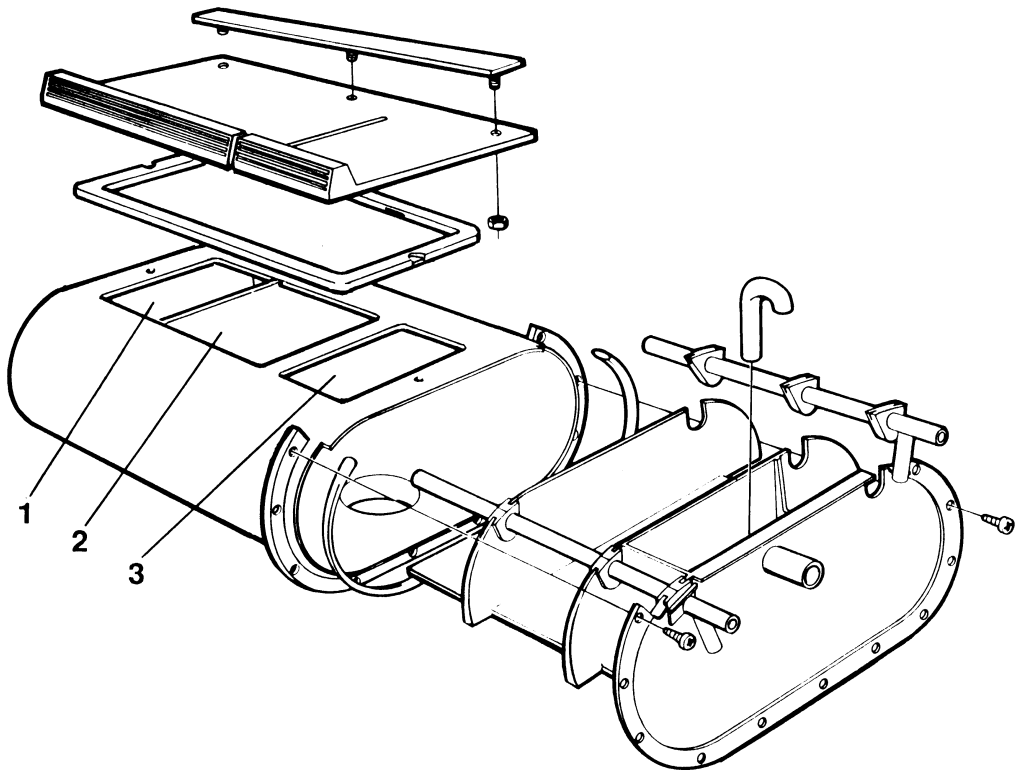
This compartment is used for adding detergent at the beginning of the Wash cycle. If bleach is used, it is added to this compartment when the display arrow appears.

The insert is used to help prevent oversudsing.

Compartment 3

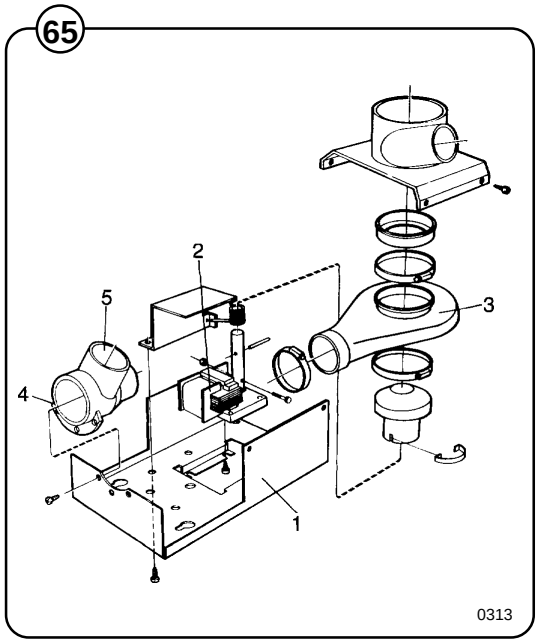
This compartment is used for liquid fabric softener, which is siphoned into the drum at the start of the third rinse. Liquid softener may be added at the beginning of the cycle or during the final rinse when the arrow appears.

64



1182 b

Drain valve



Description

Fig. 65 The drain valve consists of a bracket (1), on which are mounted the motor and gear (2) and diaphragm (3). The rubber diaphragm is resistant to a water temperature up to 100°C (212°F). The installation of a lint trap is not necessary. The machine is equipped with an overflow, which bypasses the drain valve. The drain can be cleaned by removing the drain connection (4) outside of the machine or by removing the rubber diaphragm (3). The motor and gear assembly is covered by a plate and provided with quick-disconnect electrical connections. The stator coil is constructed for continuous operation.

Operation

The drain valve is normally open, i.e. the motor does not close the valve until it receives current via a contact of the timer. As soon as the current is cut, the shaft turns and opens the diaphragm of the valve. This also permits the machine to drain, in the event of power failure. The overflow hose (5) leads excess water or suds directly to the waste line, in the event of failure in the inlet valves or level control.

Trouble-shooting

If the valve does not open or close properly:

1. Check that the shaft is moving freely.
2. Check that the diaphragm is not obstructed.
3. Check the coil for continuity.

Clean out

Periodic cleaning of the valve is recommended, depending upon how often the machines are used, as well as the type of wash handled most frequently.

Electronic program control unit

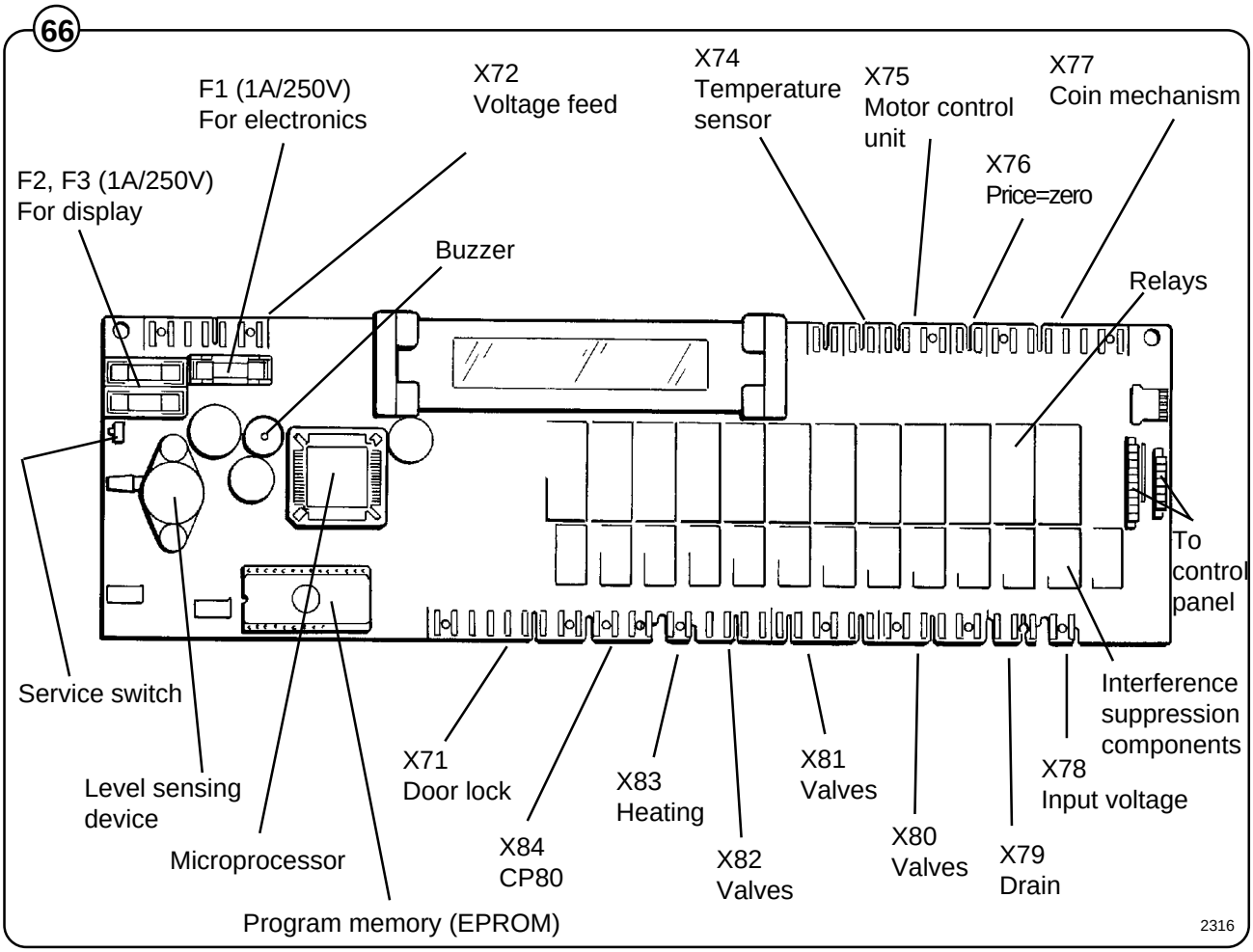
Description

Fig. 66 The program control unit is electronic and consists of a circuit board with components. On one half are the microprocessor, program memory (EPROM), power supply circuits, temperature and level control devices and so on. On the other half are the relays and interference suppression components. The program control unit has the following inputs and outputs:

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

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

66



Operating time, accumulated coin value, EPROM no.

The machine's built-in service program can be used to check the machine's accumulated operating time, the accumulated coin value (for coin-operated machines), and the program EPROM part number.

Accumulated operating time

To check during normal operation

Fig. 67 The machine needs to be actually operating (program selected and started).

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

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

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

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

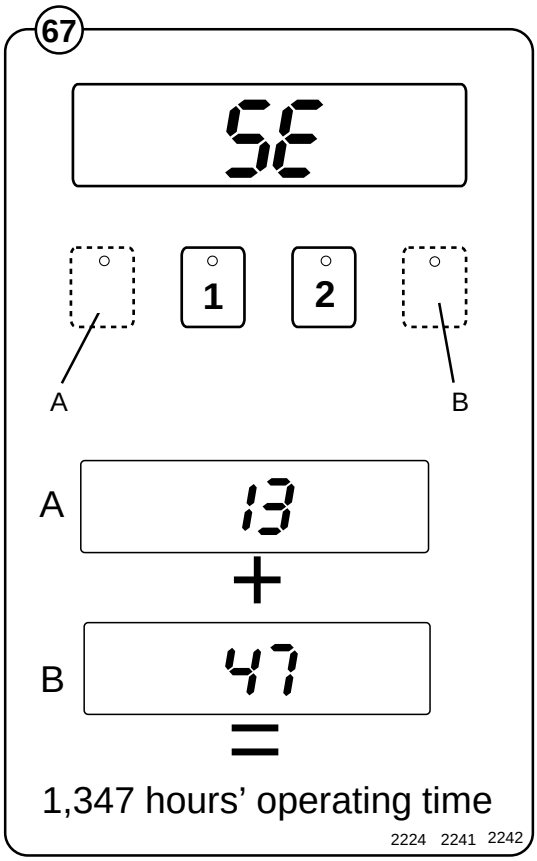
To switch on service mode

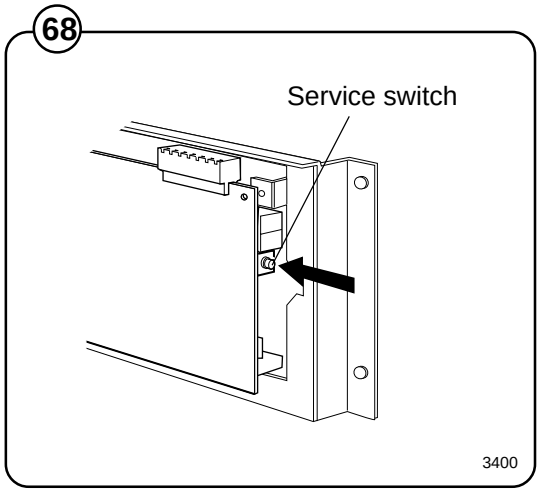
- Remove the machine top and the cover for the program unit circuit board.
- Fig. 68 Press the service switch. This switch is on the left-hand edge of the circuit board when viewed from the machine front. The display will now show SE, which means that the service program is activated.

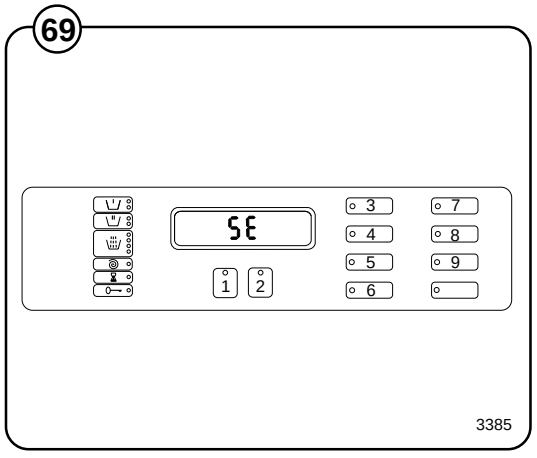
Fig. 69 Now some of the buttons switch to being number keys (1 to 9). The start button becomes an **ON/OFF** key.

To switch off service mode

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





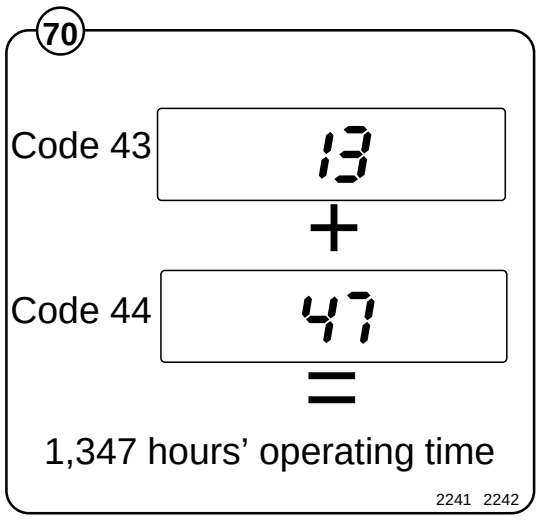


To check in service mode

Fig. 70 Enter code 43. The first two digits of a four-digit number will now be displayed, e.g. 13.

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

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



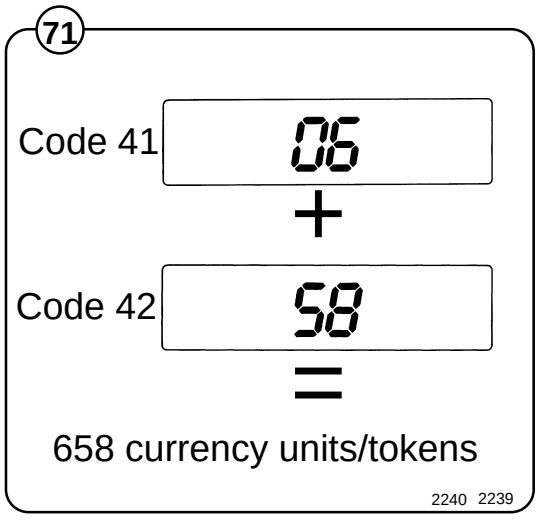
To check in service mode

Fig. 71

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

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

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



Program EPROM part no. (check in service mode)

Fig. (72) Enter code 51. The letter A and two digits will be displayed, e.g. A47. ”A” denotes part no. (article no.).

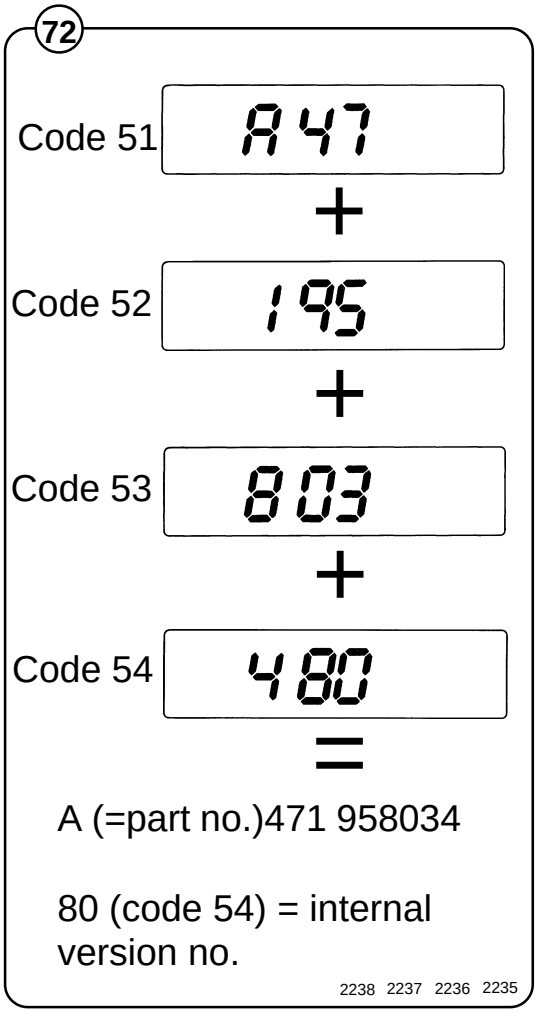
Enter code 52. The display will show (e.g.) 195.

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

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

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

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

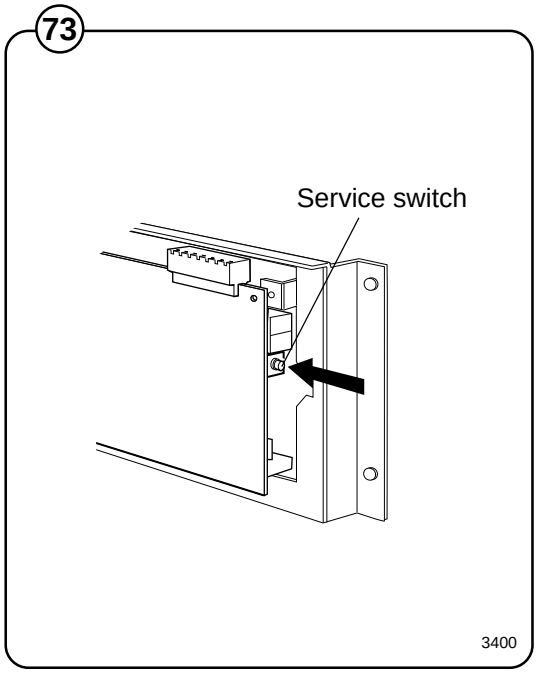


Level control

Description

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

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



Checking functioning and fault location

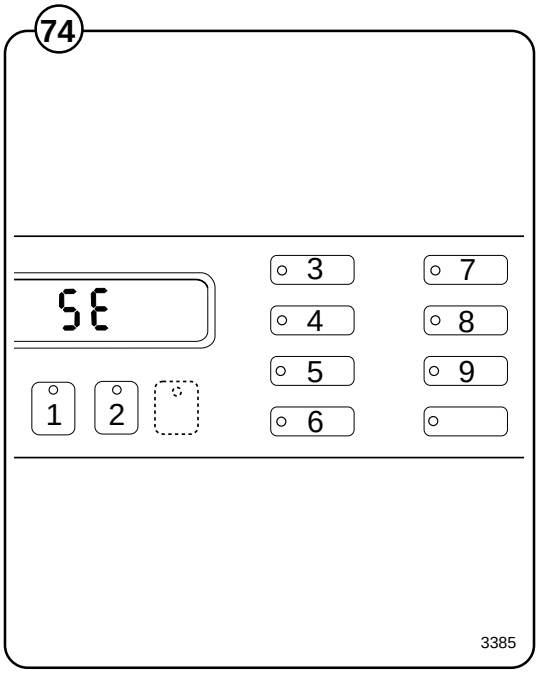
⚠ **To be carried out by authorized personnel only.** ⚠

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

To check functioning of the level control

Fig. 73
- Start the service program by pressing the service button. Now certain of the buttons switch to being number keys (1 to 9).

Fig. 74
- Enter code 24. Now the display will show the current level in the machine on a scale of 1 to 200. An empty machine should show a value between 0 and 4.
- Press the START button. The machine will start to fill.
- Check that the figure shown on the display is counting upwards as the water level rises.
- After completing your check, stop filling by pressing the START button.
- Enter code 21 and open the drain valve to empty the machine.
- Quit the service program by pressing the service button.



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

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

Built-in service program

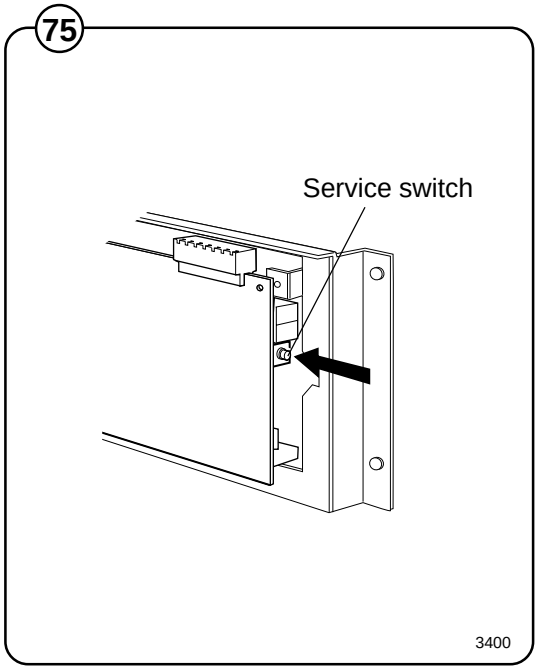
The machine has a built-in service program to facilitate function checking and fault-finding.

This program may only be used by trained and authorized service personnel.

To switch on service mode

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

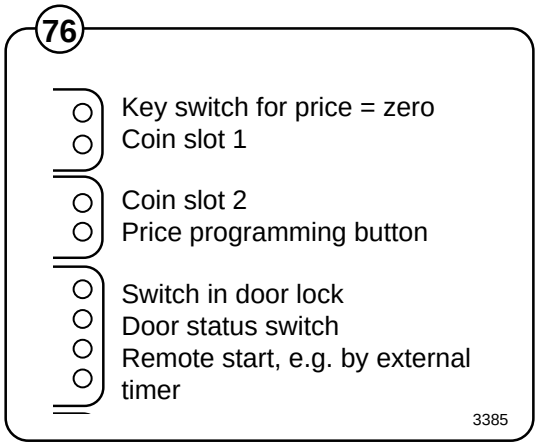
Fig 75



Controls in service mode

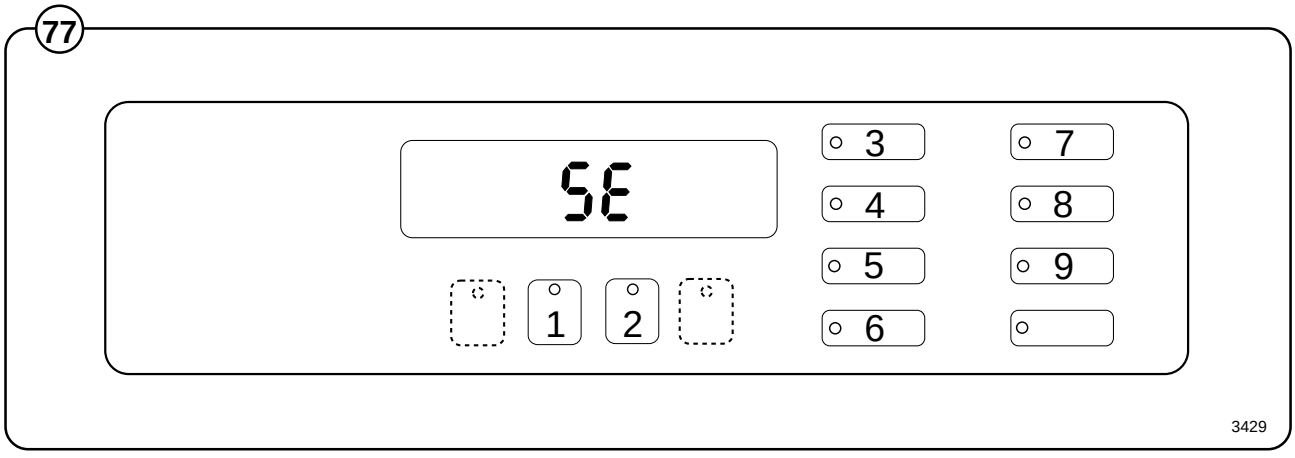
Fig 76 Now some of the buttons switch to being number keys (1 to 9). The start button becomes an **ON/OFF** key. The various machine functions can be tested using numerical codes (see table on next page).

Fig 77 The LEDs to the left of the display show which input signals to the program control unit are active.



To switch off service mode

Fig 75 Press the service switch again, or switch off the machine power supply.



Error codes

Given below is a brief summary of all the error codes and their causes.

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

Error Code	Cause
37	LED test
41-42	Coin mechanism (see Page 39, Program control unit).
43-44	Counter (hours) for accumulated operating time (see Page 39, Program control unit).
45	Last error code flagged.
51-54	Program EPROM part number (see Page 39, Program control unit).
91	Coin value, coin slot 1. This is set using the price-programming switch (see Page 39, Program control unit).
92	Coin value, coin slot 2. This is set using the price-programming switch (see Page 39, Program control unit).
93	Availability of pause function in coin-operated machines. Can be 1 = Yes or 0 = No. This is set using the priceprogramming switch (see Page 39, Program control unit).
94	Availability of rapid advance function in coin-operated machines. Can be 1 = Yes or 0 = No. This is set using the price-programming switch (see Page 39, Program control unit).
95	Activate coin-op input. Can be 1 = Active or 0 = Off. This is set using the price-programming switch (see Page 39, Program control unit).
97	To program a price reduction on a coin-operated machine, use the price-programming button. You set a price reduction as a percentage between 0 and 99. Rounding-up will take place to the next coin value upwards. A price reduction of 99% means a free wash program.

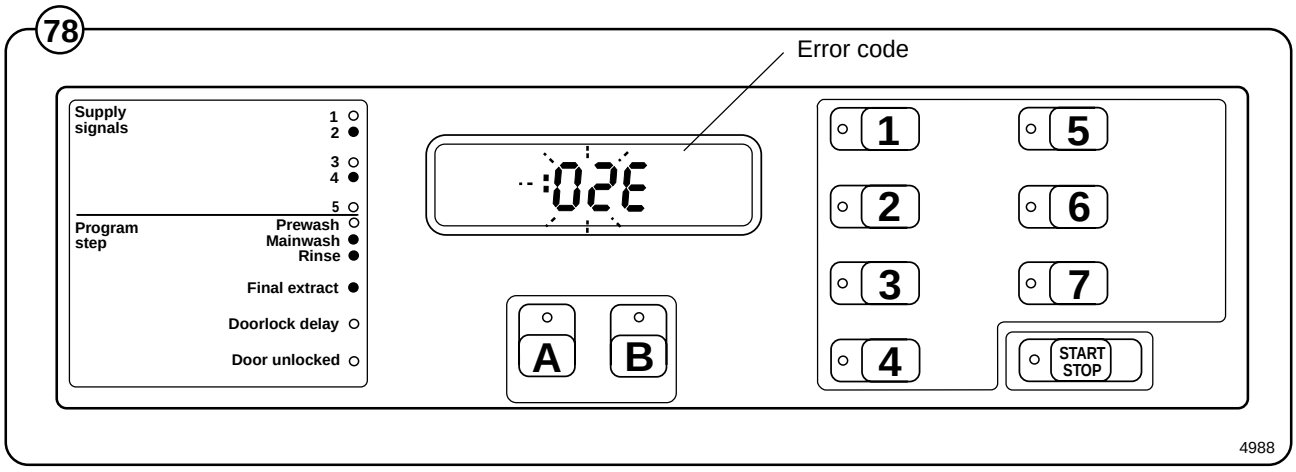
Trouble shooting

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

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

Indication of faults/errors

Fig. 78 Faults/errors in the program or machine are indicated by a numerical error code followed by the letter E flashing on and off on the control panel display.



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

WARNING
<u>When working on the motor control unit</u>
The voltage at test points 1 - 4 (TP1 - 4) has a potential difference of up to 300 V in relation to incoming neutral and ground. Because of this, be careful when measuring. Use ungrounded oscilloscopes.

The motor functions as a generator when decelerating. If the motor has not stopped, high voltages may be present on the motor control circuit board even though the power supply to the machine has been disconnected.

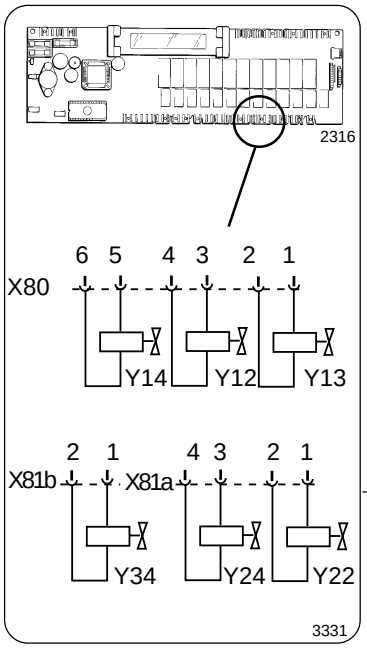
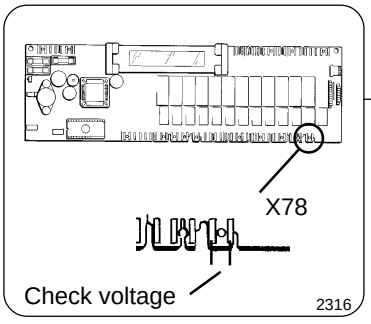
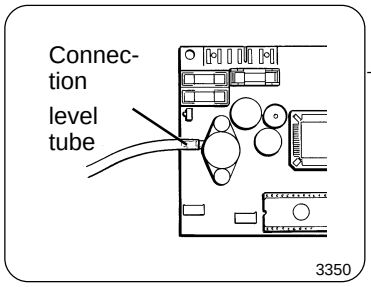
Error codes

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

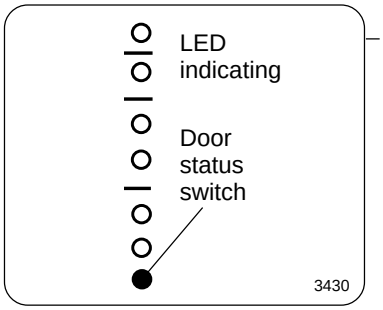
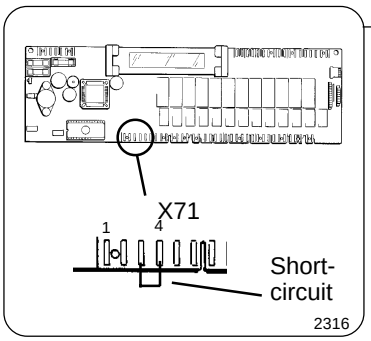
At the end of the chapter there are also charts for faults which do not generate error codes.

Error code	Cause
01E	Water level not reached within set time. Take necessary action. Press START again.
02E	Door status switch open during program operation. Take necessary action. Press START again.
03E	The lock has not locked the door within the set time. Take necessary action. Press START again.
04E	The temperature sensor indicates temperature below -5°C (open circuit).
05E	The temperature sensor indicates temperature above 98°C (short-circuit).
06E	The water level is above the safety level set for starting.
07E	The water level is above the safety level set for program operation.
08E	Temperature increase in water less than 5°C/10 min. (Heated machines).
10E	The water level is above the safety level set for after drain.
12E	The program control unit cannot read the program EPROM.
13E	Program control unit receiving no response from the motor control unit.
14E	Level system not temperature-calibrated. Press START to run the wash program. Program will run, but the water level will not be optimally adjusted.
17E	Door status switch open, even though the door lock is locked.
43E	Unbalance switch on when motor not rotating.
45E	Tacho error

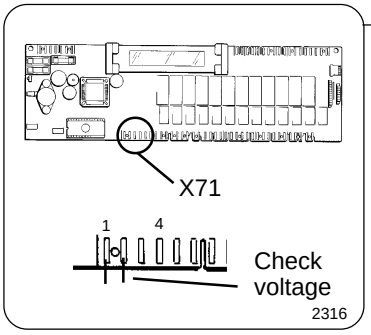
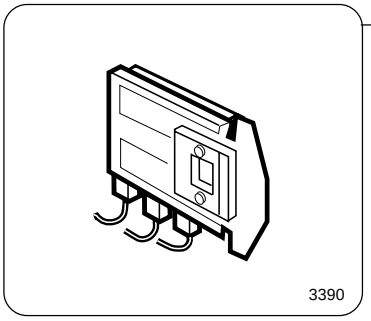
Error codes which may arise on the control panel display

Error code/symptoms	Fault-finding	Cause/Action
01E Acknowledgement signal for water level not received within time allowed.	Check that the manual water valves (taps) are open.	
	Taps turned on.	Taps turned off. → Open taps. Press START again.
	Restart the program and use rapid advance to get to main wash. Check that the machine is filling with water.	
	Machine filling	Machine not filling
		Check input voltage on relevant water valve (See Program Tables, Chapter 4).
		Voltage not correct → Faulty valve. Check function as described in Chapter 34.
		Voltage correct
		Check water valve input voltage at PCB connector X80, X81a or X81b, according to valve.
		Voltage not correct → Faulty wiring between program control unit PCB and water valve. Check wiring and replace where necessary.
		Voltage correct
		Check input voltage (230 V) at PCB connector X78.
		Voltage not correct → Faulty control output from program control unit PCB. Replace PCB.
		Voltage correct → Faulty wiring program control unit PCB - transformer T10, or faulty/incorrect strapping on transformer T10.
	Check that the discharge valve is closed, i.e. water level rising in drum.	
	Discharge valve closed	Discharge valve open → Follow fault-finding procedure for error code 06E in this chapter.
	Check that level tube is sound, not kinked, not come loose from mother board.	
	Level tube OK	Level tube not OK → Fit tube properly or replace it.
		Level detection function on program control unit PCB faulty. Replace PCB.

Error codes which may arise on the control panel display

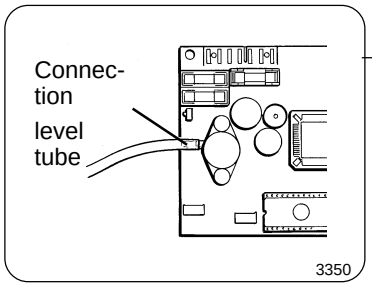
Error code/symptoms	Fault-finding	Cause/Action
02E Door status switch open during program operation.	Open door. Close door and try to restart the machine.	
	Error code returns	No error code → Transient fault in door lock or program PCB.
	Set program control unit to service mode (see ”To switch on service mode”). The door status switch will now be indicated by the LED (illustrated). Press in the door status switch manually and check if this is indicated by the LED.	
	LED does not light.	LED lights. → Check whether the pin on the door or the plastic slide which the pin presses against are worn. Replace any worn parts.
	Disconnect the two wires from the switch. Short-circuit the two wires.	
	LED does not light.	LED lights. → Door lock switch faulty. Replace switch.
	Remove connector X71 from the program control unit PCB. Short-circuit between inputs 3 and 4.	
	LED does not light.	LED lights. → Continuity fault in wiring or connectors. Check wiring and replace if necessary.
		Fault in program control unit PCB. Replace PCB.

Error codes which may arise on the control panel display

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

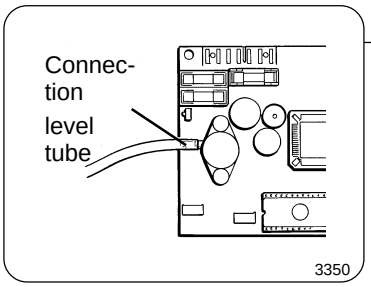
Error codes which may arise on the control panel display

Error code/symptoms	Fault-finding	Cause/Action
06E Water level signal above parameter set, on program start-up.	Are there water in the drum? Yes → No → Disconnect the level tube from the program PCB. Turn the machine's wall switch off and on again. Start a program. Error code 06E → No error code or error code 01E →	Level tube probably blocked, due to fluff of wrongly mounted. Clean or replace tube. Nipple blocked on drain valve. Level sensing device on program control unit PCB not working or incorrectly calibrated. Check zero level in the service program see chapter 12 page 4, code 24, zero level shall be between 0 and 4.
	Turn the machine's wall switch off. Does water run out of the drum? Yes → No →	Check the discharge valve (see Chapter 38). The service program can be used (code 21) to open and close the control valve for the discharge valve.
	Turn on wall switch. Start a program and let it run. Still an error code. → No error code. →	Transient fault. No action required.
	Check to see if the discharge valve is partially blocked or not opening fully. Discharge valve OK → Discharge valve not OK →	Check to see if the discharge valve is partially blocked or not opening fully (see Chapter 38). Faulty control signal to discharge valve from program control unit PCB. Replace PCB.



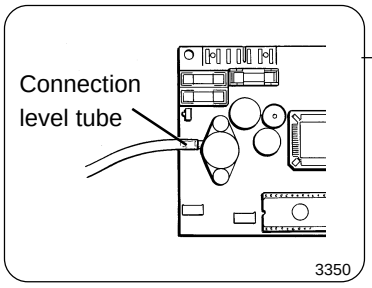
Error codes which may arise on the control panel display

Error code/symptoms	Fault-finding	Cause/Action
07E Water level signal above parameter set for safety, during program.	Turn the machine's wall switch off and on. Start a program. Error code 06 → Is there a valve still drawing water? No error code →	Transient fault or water has been added manually.
	Yes → Remove connector for valve input voltage. Valve stops drawing water →	Faulty water valve. Clean or replace valve (see Chap. 34).
	Valve still drawing water →	Fault in control signal from program PCB. Replace PCB.
	No → Turn the wall switch off and on. Disconnect level tube from level sensing device on PCB. Start a program. Error 07 or 06 returns →	Level tube probably blocked, due to fluff or wrongly mounted. Clean or replace tube. Nipple blocked on drain valve.
	No error code →	Level sensing device on program control unit PCB not working or incorrectly calibrated. Check zero level in the service program, see chapter 12 page 4, code 24, zero level shall be between 0 and 4.

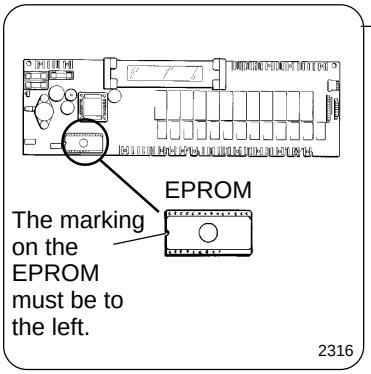


Error codes which may arise on the control panel display

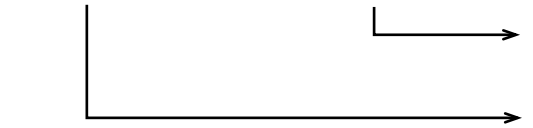
Error code/symptoms	Fault-finding	Cause/Action
10E The water level is above the safety level set for after drain.	Is water visible in the drum? Yes: Remove the water drain valve from the drum. Is there water at the bottom of the drum? Yes: Disconnect the level tube from the program PCB. Turn the machine's wall switch off and on again. Start a program. Error code 06E or error code 10E: Level sensing device on program control unit PCB not working or incorrectly calibrated. No error code or error code 01E: Level tube probably blocked. Clean or replace tube. No: Turn the machine's wall switch off. Does water run out of the drum? Yes: Turn on wall switch. Start a program and let it run. Still an error code: Check to see if the drain valve is partially blocked or not opening fully. Drain valve OK: Faulty control signal to drain valve from program control unit PCB. Replace PCB. Drain valve not OK: Check to see if the drain valve is partially blocked or not opening fully. No error code: Transient fault. No action required. No: Check the drain valve. The service program can be used (code 21) to open and close the control valve for the drain valve.	



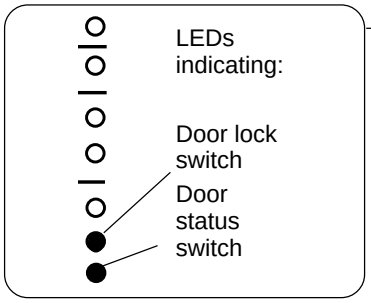
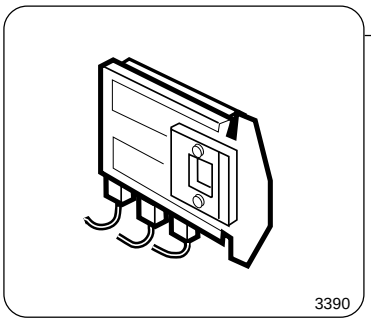
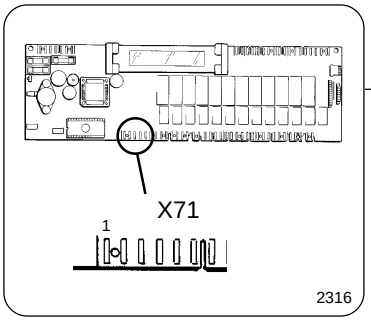
Error codes which may arise on the control panel display

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

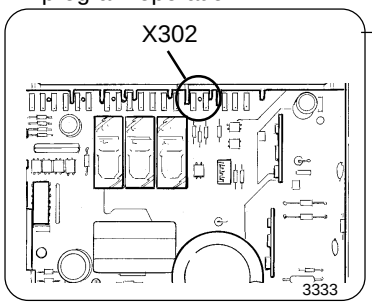
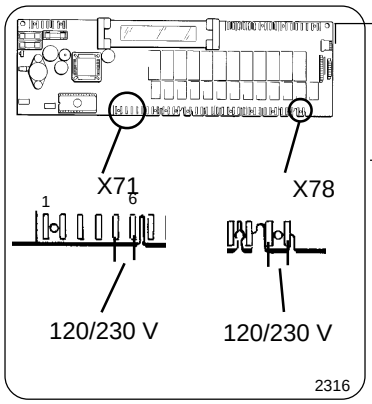
Error codes which may arise on the control panel display

Error code/symptoms	Fault-finding	Cause/Action
14E Level system not temperature-calibrated	When START is pressed wash programs will run, but the water level will not be optimally adjusted. Turn the machine's wall switch off and on again. Start a program. Error code returns  No error code 	Transient fault. No action required. Replace program control unit PCB.

Error codes which may arise on the control panel display

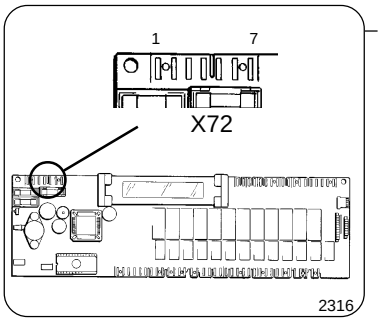
Error code/symptoms	Fault-finding	Cause/Action
17E Door status switch open, even though the door lock is locked.	Turn the machine's wall switch off and on again. Start a program. Error code returns → No error code → Transient fault. No action required.	
	Set program control unit to service mode. The door status switch and door lock switch will now be indicated by the LEDs shown left. Follow this procedure (the door can be locked using code 23 and one press of the START button):	
	Door switch: open — Status of LEDs should be: for door lock switch: OFF; for door status switch: OFF Door switch: closed, not locked — for door lock switch: OFF; for door status switch: ON Door switch: closed and locked — for door lock switch: ON; for door status switch: ON	
	Door lock switch LED ON when door not locked → Door status switch LED OFF when door closed	Follow the chart for error code 02E to identify fault.
	Unscrew the door lock. Remove connection to door lock switch "C" on door lock as illustrated. LED ON → LED goes out	Door lock faulty. Replace lock.
	Remove PCB connector X71 from program control unit PCB. LED ON → LED goes out	Fault in wiring between PCB and door lock. Check wiring and replace if necessary. Fault in program control unit PCB. Replace PCB.

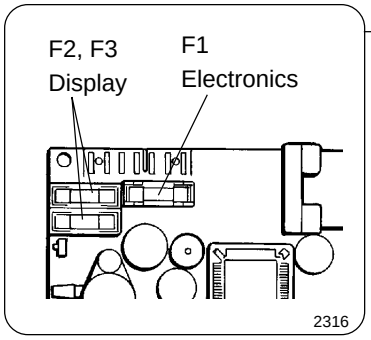
Error codes which may arise on the control panel display

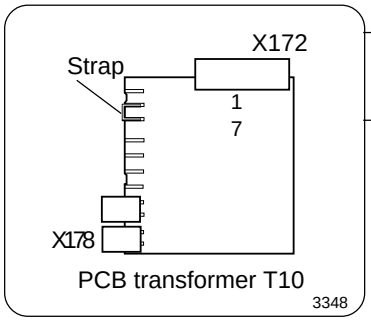
Error code/symptoms	Fault-finding	Cause/Action
20E Interlock signal absent at motor control unit during program operation.	Turn the machine's wall switch off and on again. Start a program. Error code returns — No error code	Transient fault. No action required.
	Check the voltage between terminals 1 and 2 at PCB connector X302 on motor control unit. The voltage should be 120/230 V when the door is closed and locked. Voltage wrong — Voltage correct	Faulty signal detection on motor control unit. Replace motor control unit.
	Check the voltage between terminals 5 and 6 on PCB connector X71 on program control unit PCB. The voltage should be 120/230 V when the door is closed and locked. Voltage wrong — Voltage correct	Fault in wiring between program control unit PCB and motor control unit. Check wiring and replace if necessary.
	Check the input voltage to PCB connector X78 (120/230 V) Wrong voltage — Voltage correct	Faulty output signal on program control unit PCB. Replace PCB.
		Faulty wiring between transformer T10 and program control unit PCB. Check wiring and replace if necessary.

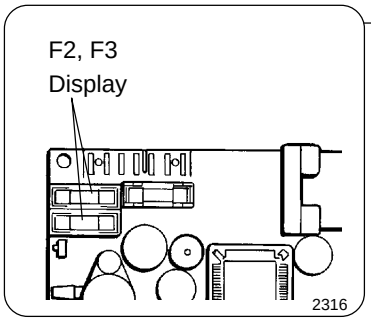
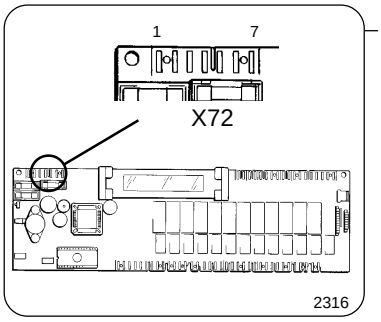
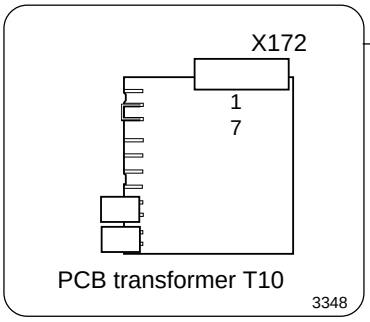
Trouble shooting

Error code/symptoms	Fault-finding	Cause/Action
Machine completely ”dead”. Display blank.	Turn the machine’s wall switch off and on again.	
	Fault persists.	Machine working → Transient fault. No action required.
	Check fuses F11, F12, F21 and F22.	
	Fuses sound	Fuse fault → Change fuse(s) and check functioning.
	Check that the input voltages to the PCB are correct. Measure on PCB connector X72 between the following inputs:	
	X72:1 - 2 ca 1,75 V ~	
	X72:2 - 3 ca 1,75 V ~	
	X72:4 - 5 ca 14,5 V ~	
	X72:6 - 7 ca 13,5 V ~	
	An incorrect voltage	Voltages correct
		Check the three glass-tube fuses on the PCB. Rating: 1 A/250 V.
		OK → Fuse fault → Change fuse(s) and check functioning.
		OK → Replace program control unit PCB.
	Remove connector X172 on transformer T10. Measure the voltages between the following outputs on the transformer board.	
	5 - 6 ca 1,75 V ~	
	6 - 7 ca 1,75 V ~	
	3 - 4 ca 14,5 V ~	
	1 - 2 ca 13,5 V ~	
	Voltages correct	An incorrect voltage
		On T10 check the input voltage at connector X178 (120/230 V) and that the strap is correctly located and in contact with the circuit board.
		OK → A fault → Voltage fault: investigate cause in power supply beyond machine.
		OK → Replace transformer T10.
		Fault in wiring between transformer and circuit board. Check wiring and replace if necessary.







Error code/symptoms	Fault-finding	Cause/Action
Display blank, but machine is working otherwise.	Turn the machine's wall switch off and on again.	
	Fault persists.	Machine working → Transient fault. No action required.
	Check glass-tube fuses F2 and F3 on program control unit PCB. Rating: 1 A/250 V.	
	Fuses sound	Fuse fault → Change fuse(s) and check functioning.
	Check that input voltages to PCB are correct. At connector X72, measure between the following inputs:	
	X72:1 - 2	ca 1,75 V ~
	X72:2 - 3	ca 1,75 V ~
	X72:6 - 7	ca 13,5 V ~
	An incorrect voltage	Voltages correct → Program control unit PCB faulty. Replace PCB.
	Remove connector X172 on transformer T10. Measure the voltages between the following outputs on the transformer board.	
	5 - 6	ca 1,75 V ~
	6 - 7	ca 1,75 V ~
	1 - 2	ca 13,5 V ~
	Voltages correct	An incorrect voltage → Replace transformer T10.
		Fault in wiring between transformer and circuit board. Check wiring and replace if necessary.
		

If the machine does not start

Fig. 79

A Check the circuit breaker in the power feed line to the machine.

B Check the door safety switches.

C Check the fuse.

D Check for fault indication on display (see under the heading "Fault finding").

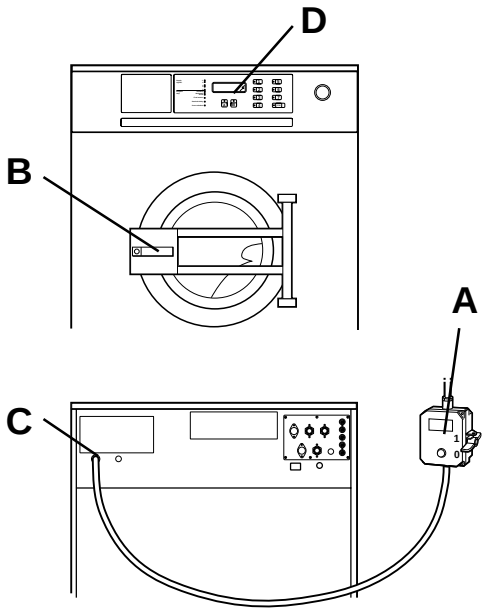
If water does not drain

Fig. 80

A Check the drain valve and drain solenoid for proper operation.

B Disconnect the drain hose connected to the drain line. If a full flow of water comes out, the problem is in the main waste line. If water flow is slow, the problem is the accumulation of foreign materials between the drain valve and shell outlet of machine. Clean the valve body of any foreign objects found.

79



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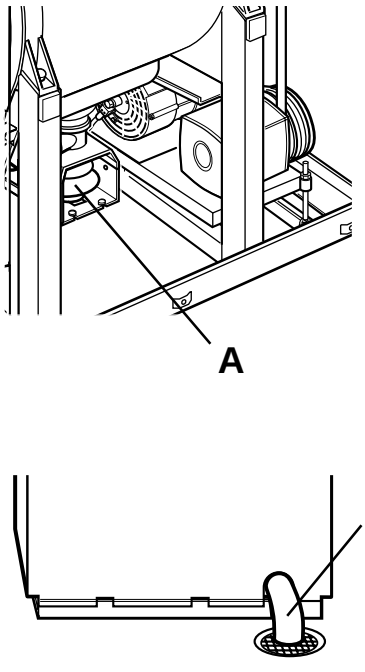

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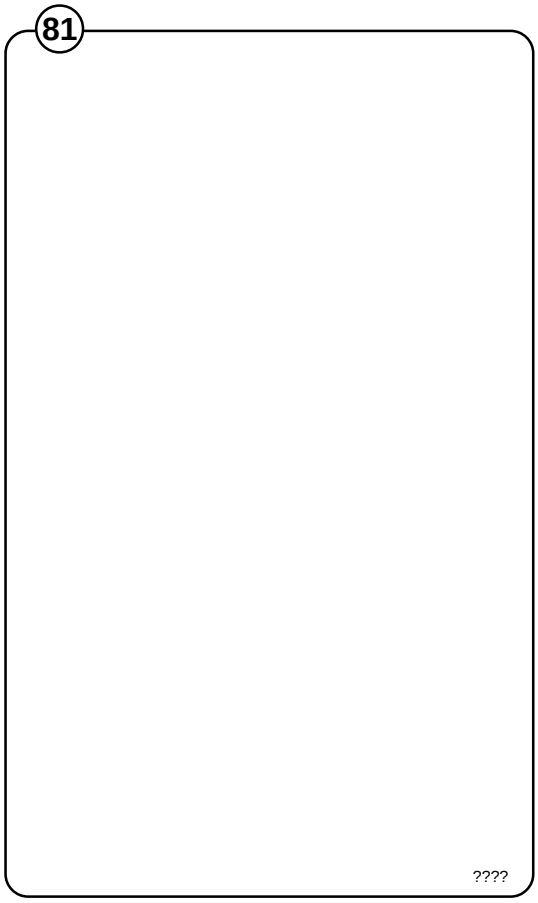
If the motor does not operate at wash speed

Fig. 81

A Check wash relays.

B Check motors and V-belts.

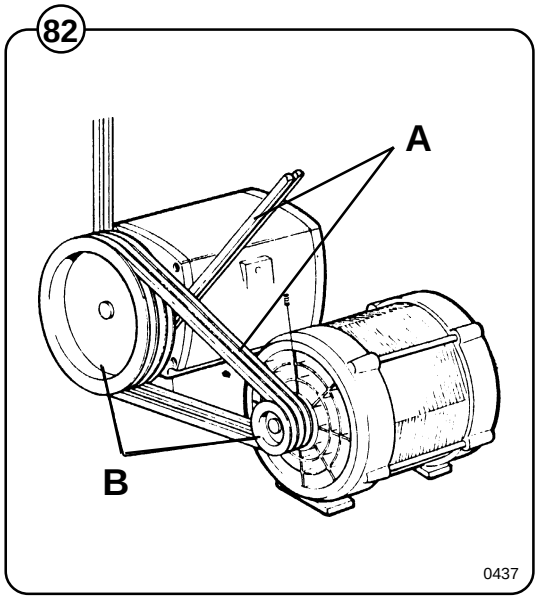


If the machine runs slowly on wash speed or there is a slapping or thumping noise.

A Replace V-belts

If a metallic noise can be heard at rear of machine

Fig. 82 B Tighten the pulley on motor shaft.



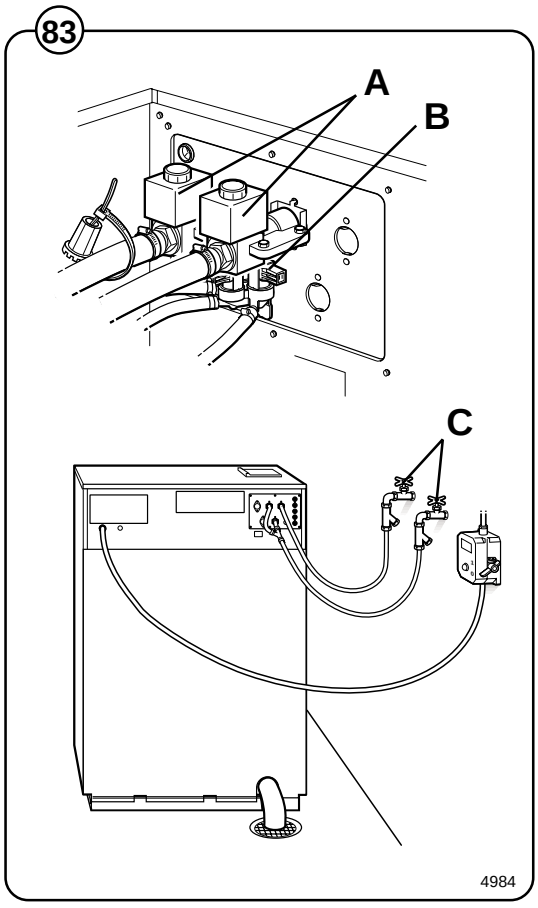
If water does not enter the machine.

Fig. 83

A Check the valve coils on the inlet valves.

B Check wires leading to the valve coils.

C Be sure manual shut-off valves are in open position.



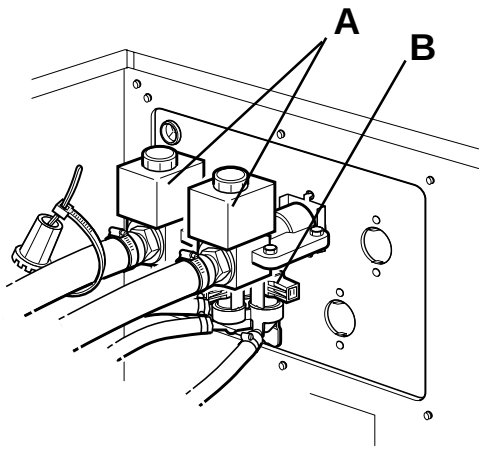
If water continues to fill without stopping.

Fig. 84 A Check inlet valves for dirt underneath the valve diaphragm. To localize, shut off power. If water continues to flow, inlet valves have foreign material in them and should be thoroughly cleaned.

If water continues to flow without filling machine.

Fig. 85 A Check seating of drain valve.

84



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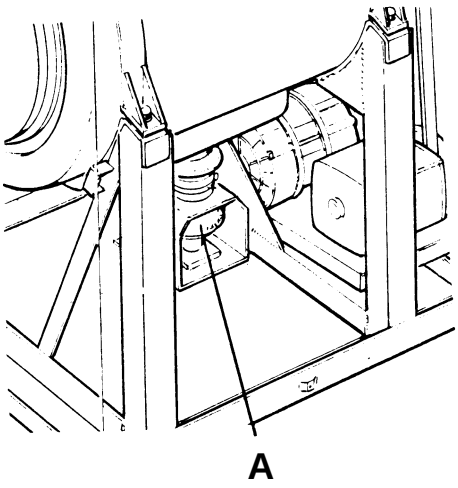


0409

Maintenance

Preventive maintenance has been reduced to a minimum by the careful design of reliable components and material.

However, the following measures should be taken at regular intervals and in proportion to the hours of service.

Make certain that all electrical power to the machine is shut off before removing top or rear panels.

Daily

- Check the door lock and interlock before starting operations.
- The soap supply box should be cleaned at the end of each working day as follows:
  - Use a spatula to scrape loose any detergent which may have stuck on the inside of the dispenser.
  - Flush th loosened detergent with warm water.
  - Wipe dry and leave lid open.

Fig. 86

- Check that the drain valve does not leak and that it opens properly.
- Check that the door does not leak. Clean residual detergent and foreign matter from the door gasket.
- Wipe the outside of the machine.
- When the machine is not in use, leave door slightly open to allow moisture to evaporate.

Weekly

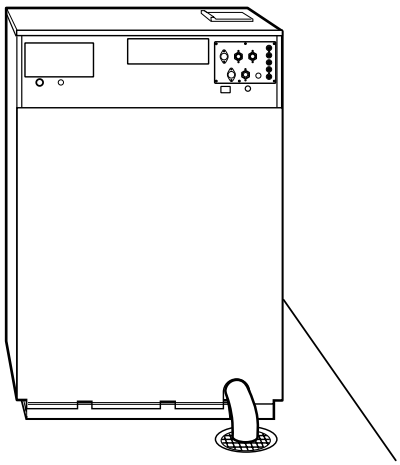
Fig. 87

- Remove hose from drain connection and clean inside drain valve.

Every three months

- Remove the cover plates of the machine and check that the V-belt of the wash motor is undamaged and correctly tensioned.
- Check that all tubing, piping and connections are free from leaks.
- Wipe and clean the inside of the machine, making sure that the control components are protected from moisture and dirt during the cleaning operation.

86



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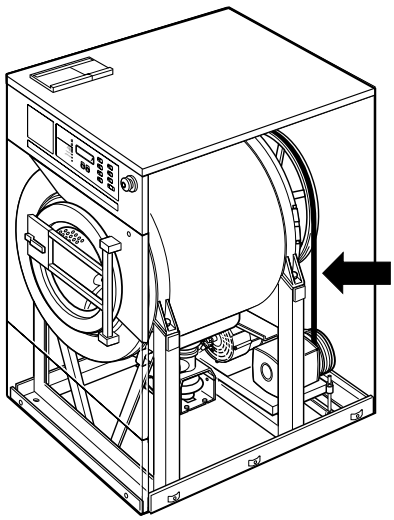

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