OPERATING & MAINTENANCE MANUAL

EX-12 FC

EX-22 FC

471 1562-63/01
95.38

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 MACHINE(S) DATA PLATE(S).

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, insert the proper coins to start the machine.

   For manually operated models, place the ON-OFF switch in the ON position and press the Start switch.

   For FL and EX models, insert a program card, turn the starter knob to the Start position and place the ON-OFF switch in the ON position.

   For HI-TEK microprocessor models, turn the key switch to the RUN position, choose a program and press the START button.

   For SELECTA 28 models, select a wash program and press the Start button.

   THE MACHINE(S) SHOULD NOT START !

   (b) CLOSE THE DOOR to start machine operation and, while it is operating, attempt to open the door without exerting extreme force on 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 interlock is no longer operating properly. The machine must be placed out of order and the interlock immediately repaired or replaced. (See the door interlock 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 Telephone - 516/ 371-0700.

All requests for assistance must include the model, serial number and electrical characteristics as they appear on the machine identification plate. Insert this information in the space provided on the previous page of this manual.

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 terminado 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

LOCATED AT THE REAR OF THE MACHINE:

INSTALLATION AND MAINTENANCE WARNINGS

1. **This machine MUST be securely bolted to an uncovered concrete floor, according installation instructions, to reduce the risk of fire and to prevent serious injury, or damage to the machine.**
2. **When installed on a floor of combustible material, the floor area below this machine must be covered by a metal sheet extending to the outer edges of the machine.**
3. **This machine MUST be connected to a dedicated electrical circuit to which no other lighting unit or general purpose receptacle is connected.**
4. **This machine MUST be serviced and operated in compliance with manufacturer's instructions. CHECK DOOR LOCKS EVERY DAY FOR PROPER OPERATION TO PREVENT INJURY OR DAMAGE. IF THE DOOR LOCK FAILS TO OPERATE PROPERLY, PLACE THE MACHINE OUT OF ORDER UNTIL THE PROBLEM IS CORRECTED.**
5. **Disconnect power prior to servicing of machine.**
6. **To remove top panel for service first remove screws at rear. Be certain to reinstall screws when remounting the top panel.**

MANUFACTURED BY WASCATOR
DISTRIBUTED BY WASCOMAT INWOOD, NEW YORK, USA

471 76 62 02

LOCATED ON THE DOOR:

WARNING !

DO NOT ATTEMPT TO OPEN DOOR
UNTIL PROGRAM HAS FINISHED AND
DRUM HAS STOPPED ROTATING.

471 7651-17

If you need to order more safety or warning signs, call Wascomat's parts department at 516-371-2000, or call your local dealer.

Contents

Introduction 1
Technical data 2
Installation 5
Installation of external liquid supply 9
Electro-Lube Dispenser 12
Function check 18
Safety Rules 19
Mechanical and electrical design 20
Procedure 40
Programming 48
Service information 70
Maintenance 71
Trouble-shooting 72

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

Safety instructions

- **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 bypassed.**
- **All seepage in the system, due to faulty gaskets etc., 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.**
- **Fabric softeners with volatile or inflammable fluids are not to be used in the machine.**

Introduction

Fig. 1 The EX-FC model washer/extractor has been developed to cover the heavy duty requirements of hotels, motels, nursing homes, hospitals, professional laundries, restaurants, airlines, schools, colleges and all on-premises laundries where flexibility and quick formula variation, coupled with high quality automatic washing, are required.

The microcomputer controlled model allows for complete programming of water temperatures, water levels, wash and extraction periods extraction speeds and supply injections.

The machines are free-swinging, i.e., the drum is moveable and spring suspended in relation to the frame. This minimises vibrations transferred to the frame thus simplifying installation, as no concrete base is required.

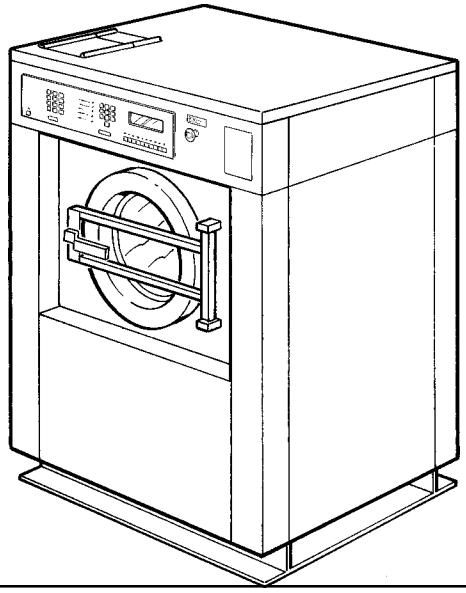
The highest speed spin gives a G factor of approximately 300, providing very efficient water removal during the spin.

All parts of the machine which come into contact with the items being washed are made of heavy gauge surgical stainless steel, ensuring long life and lasting beauty, as well as full protection for no-iron fabrics. All electrical components are made accessible for servicing by simply removing the top panel.

This manual contains a technical description of the machine and instructions for its installation, operation and maintenance. Together with the wiring diagram which accompanies each individual machine it should be kept in a safe place for easy reference.

When ordering spare parts or contacting Wascomat for any purpose always give the machine serial number, model, voltage and other electrical characteristics appearing on the nameplate at the rear of the machine.

1



0148

Technical data

EX-12 FC

Dry load capacity	up to		30 lbs
Overall dimensions	Width	870 mm	34 1/4''
	Depth	900 mm	35 15/16''
	Height	1302 mm	51 1/4''
	Net weight	290 kg	639 lbs
	Dyn.weight		120 lbs./sqft
Crated dimensions	Volume	1.25 m^3	44 cu.ft
	Weight	315 kg	695 lbs
Inner drum	Diameter	620 mm	24 7/16''
	Depth	412 mm	16 5/16''
	Volume	120 litre	4.4 cu.ft
Speed of rotation	Wash		48 r.p.m.
	Distribution		78 r.p.m
	Low extract		340-510 r.p.m.
	High extract		590-950 r.p.m.
G-factor	During wash		0.8
	During high extract		120-310
Voltage requirements	208-240 V 1-Phase 60 Hz		
Rated power			
	Motor, extraction		1000 W 1.34 HP
Overcurrent protection	1-Phase		20 A
Water connections			
Water pressure, max	10 kp/cm^2		142 psi
Recommended water pressure	2-6 kp/cm^2		25-85 psi
Hose connection, water	20 mm		3/4''
Hose connection, drain	75 mm		3''

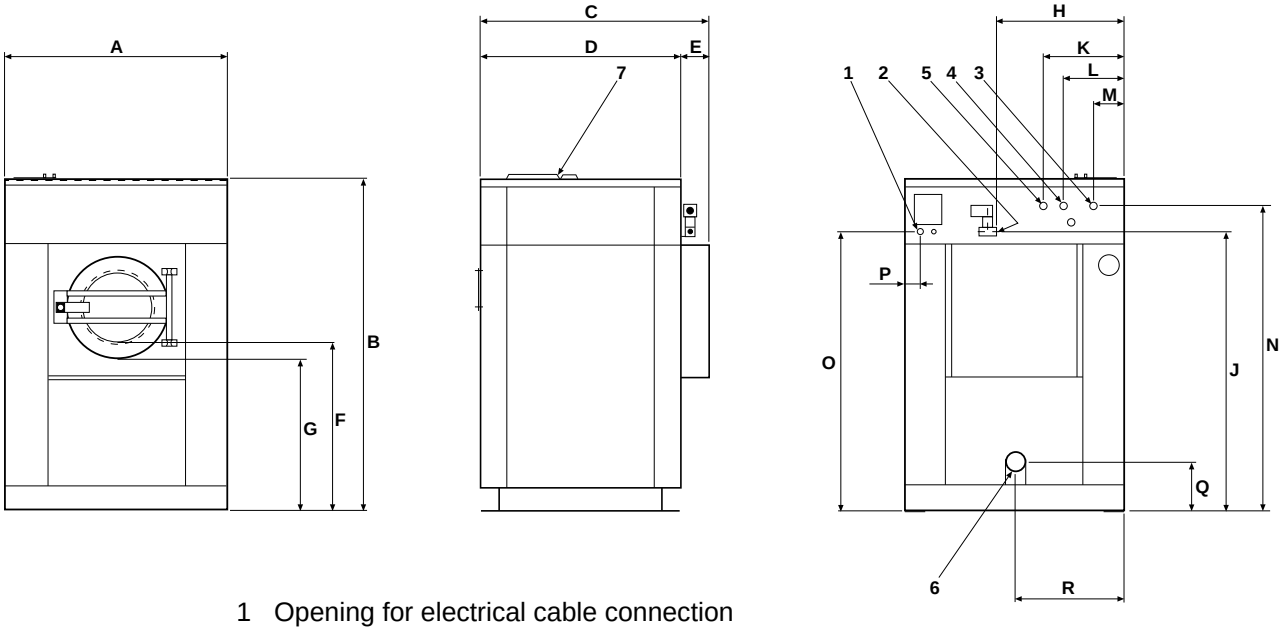
Technical data

EX-22 FC

Dry load capacity	up to		50 lbs
Overall dimensions	Width	1000 mm	39 3/8''
	Depth	1102 mm	43 3/8''
	Height	1412 mm	55 9/16''
	Net weight	553 kg	1218 lbs
	Dyn.weight		157 lbs./sqft
Crated Dimensions	Volume	2.05 m^3	72.3 cu.ft
	Weight	588 kg	1295 lbs
Inner drum	Diameter	750 mm	29 1/2''
	Depth	500 mm	19 11/16''
	Volume	220 litre	7.8 cu.ft
Speed of rotation	Wash		44 r.p.m.
	Distribution		70 r.p.m.
	Low Extract		300-460 r.p.m.
	High Extract		540-850 r.p.m.
G-factor	During wash		0.8
	During High Extract		120-300
Voltage requirements	208-240 V 1-Phase 60 Hz		
Rated power	Motor, wash		450 W 0.6 HP
	Motor, extraction		3600 W 4.8 HP
Overcurrent protection	1-Phase		25 A
Water connections			
Water pressure, max	10 kp/cm^2		142 psi
Recommended water pressure	2-6 kp/cm^2		25-85 psi
Hose connection, water	20 mm		3/4''
Hose connection, drain	75 mm		3''

Technical data

Outline and dimensions



2664

1 Opening for electrical cable connection
2 Steam connection (optional)
3 Cold water
4 Hot water
5 Hot water (only EX22)
6 Drain outlet
7 Soap box

	EX12		EX 22	
	mm	inches	mm	inches
A	870	34 1/4	1000	39 3/8
B	1302	51 1/4	1412	55 9/16
C	913	36	1102	43 3/8
D	792	31 3/16	906	35 3/32
E	121	4 3/4	196	7 3/4
F	625	24 5/8	630	24 13/16
G	570	22 1/2	560	22
H	480	18 15/16	610	24
J	1100	43 5/16	1210	47 5/8
K	–	–	320	12 5/8
L	240	9 1/2	240	9 1/2
M	120	4 3/4	120	4 3/4
N	1200	47 1/4	1310	51 9/16
O	1110	43 11/16	1220	48
P	85	3 11/32	85	3 11/32
Q	203	8	203	8
R	433	17	498	19 5/8

Installation

The machine is delivered with expansion bolts and other items packed inside the drum.

Shipping securities

Fig. 2 The machine is shipped with four large metal brackets bolted to the suspension legs, as well as a support between the pulley and the back plate.

Prior to installation, follow these steps:

- Unpack the machine.
- Fig. 3 Remove the lower front panel and the two rear panels.
- Remove the support from the pulley at the back of the machine.
- Remove both front brackets.
- Remove both rear brackets.

Placement

The machine should be installed close to a floor drain or open drain to make installation, use and service easier.

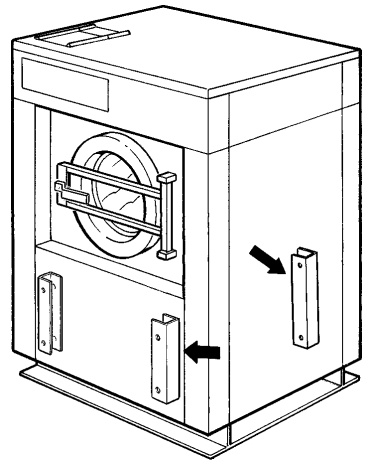
The following clearances are recommended for ease of installation and service:

- Fig. 4 At least 20 inches between the machine and the wall behind it.
- At least 2 inches on each side.

The floor must be able to support a static load of 790 lbs for the EX-12 FC and 1440 lbs for the EX-22 FC.

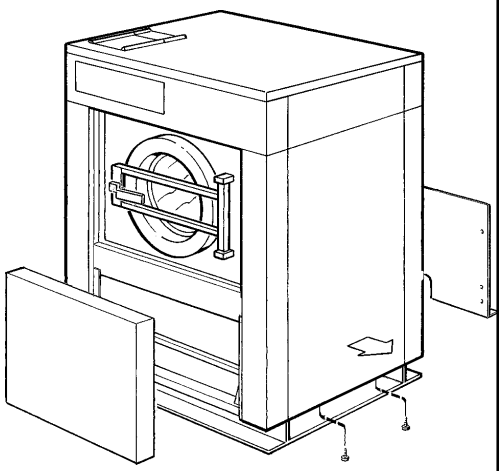
The maximum impact load at extraction is 260 lbs force for the EX-12 FC and 480 lbs for the EX-22 FC

2



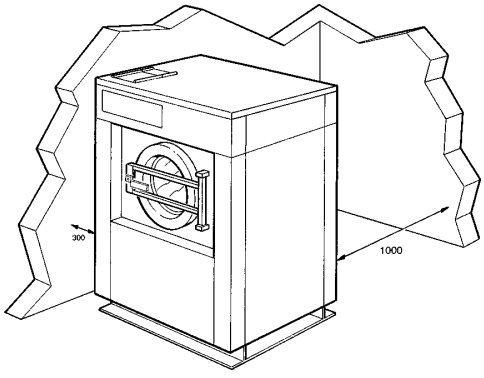
1247

3



1248

4



1249

Mechanical installation

Fig. 5

- Mark and drill two holes 3/8" in (8 mm) in diameter and approximately 3 1/2" in. (90 mm) deep according to the dimensions in figure 5.
- Place the machine in position. Never lift the machine by the door or handle.

Fig. 6

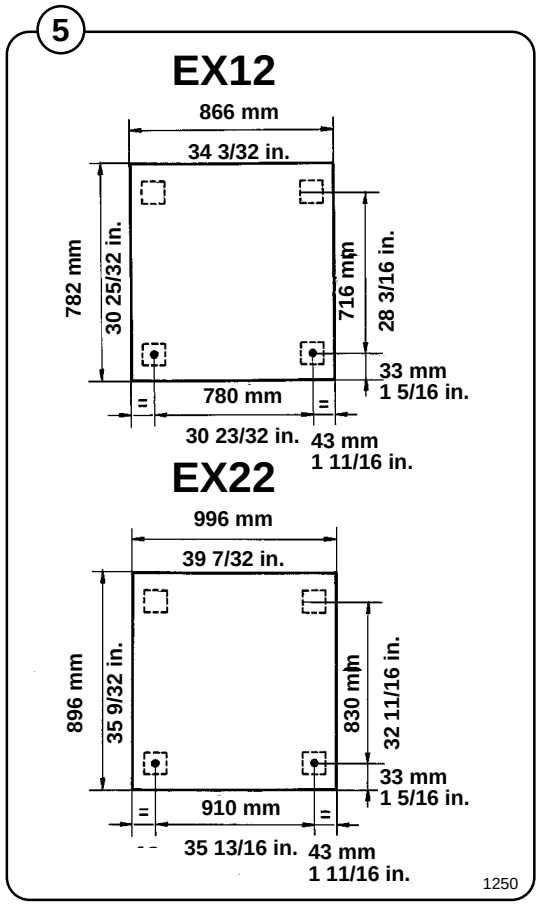
- Check that the machine is level and steady. Use stainless or galvanized washers between the machine and the floor.

Fig. 7

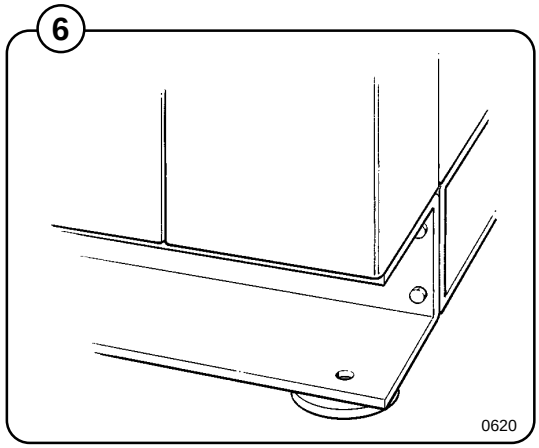
- Insert the expansion bolts supplied with the machine. Fit the washers and nuts.

It is of utmost importance that the machine is level, from side-to-side as well as front-to-rear. If the machine is not properly levelled, it may result in out-of-balance cutout without a real out-of-balance in the drum.

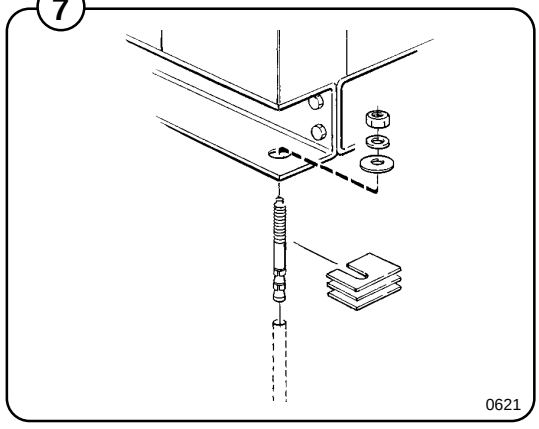
5



6



7



Electrical installation

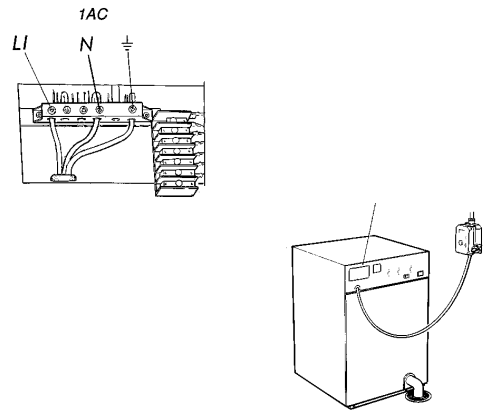
Fig. (8) Connect L1, L2 and ground wires according to the markings of the terminal block. The cable is to hang in a large loose loop, supported by the clip of the terminal block.

Although the machines are fitted with a thermal overload in the motor windings and separate fuses for the control circuit, a separate circuit breaker must be installed.

Fig. (9) For proper overcurrent protection, check the data plate at the rear of the machine. Also consult local electrical code for special requirements.

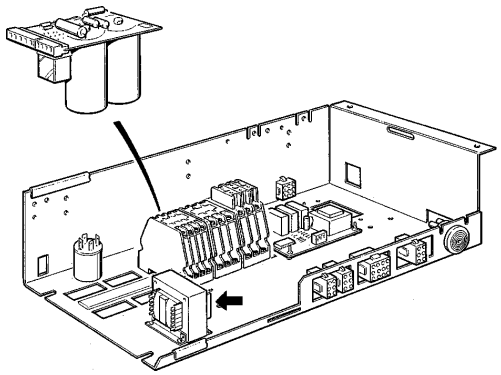
The machine is equipped with a control circuit transformer, mounted on the control unit and connected for 220 volt operation. If your incoming voltage is below 210 volts move the wire connection to the 208 volt tab on the transformer. If it is above 230 volts move the wire to the 240 volt tab on the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

8



2483

9



2500

Water connection

> **NOTE**
>
> **All plumbing must conform to national and local plumbing codes.**

Incoming water lines do not require non-return valves, as the machine is already fitted with a siphon breaker. However, all incoming lines must be fitted with shut-off valves and strainers.

Fig. (10)

- Water inlets are labelled for hot and cold water connection.

Fig. (11)

- Flush the water system thoroughly and check that the strainer at the machine inlet is fitted correctly.
- Connect the machine to the water mains with 3/4'' reinforced rubber hosing not to exceed 6 ft in length. Hang the hosing in a large loop. Do not use rigid piping.

Fig. (12)

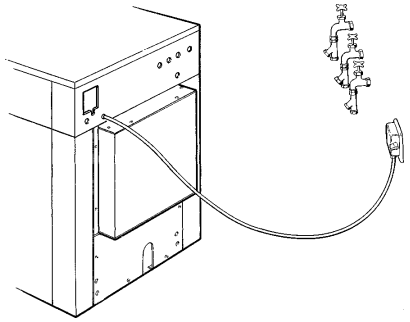
Drain connection

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

The drain house 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.

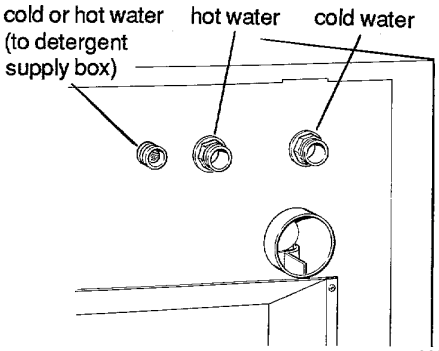
Do not reduce the size of the drain connection from the machine to the waste line.

10



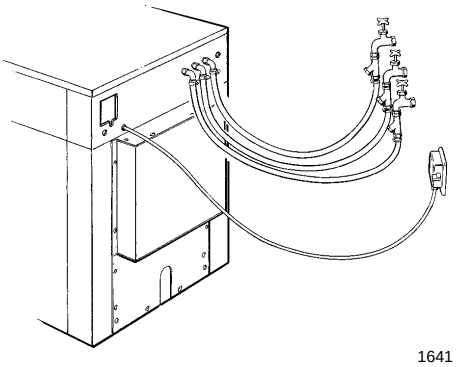
1252

11



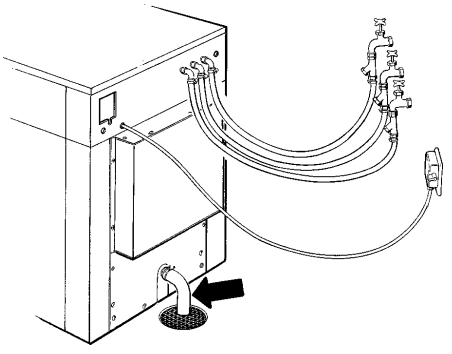
0626

12



1641

13



1628

Connection of external liquid supply

Remove cover and cover support over the soap box.

Fig. 14 Bend all the way back the metal plate in compartment 3.

Fig. 15 Pull the knobs up and forward.

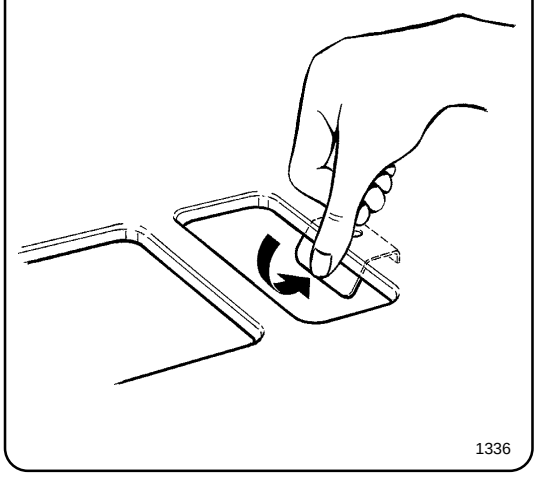
Fig. 16

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

Note:

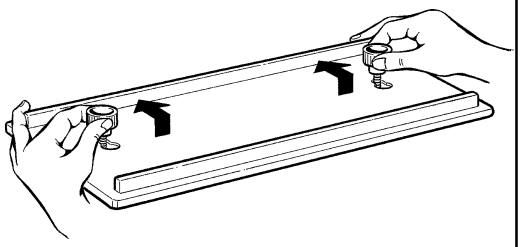
If the supply injector does not fit turn it around. You have it in backwards.

14



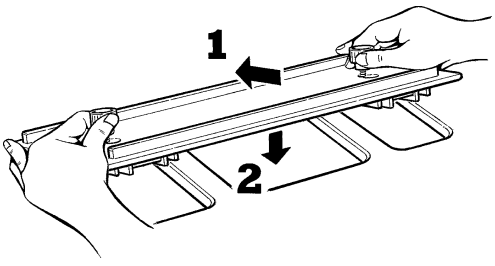
1336

15



1334

16



1333

Installation

Fig. (17)

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

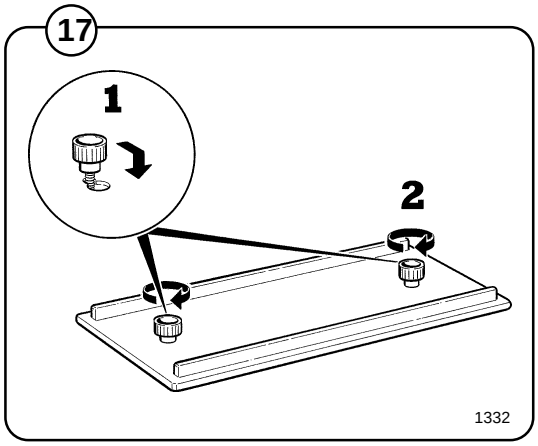
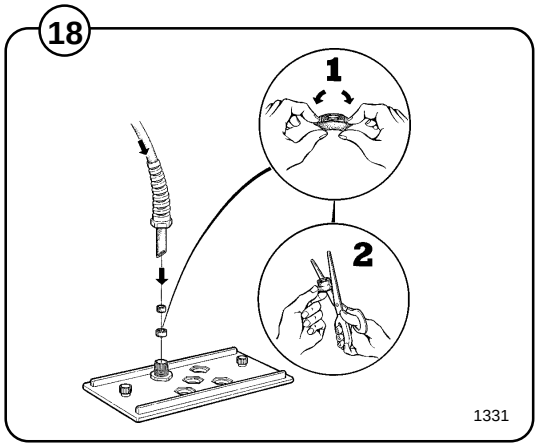
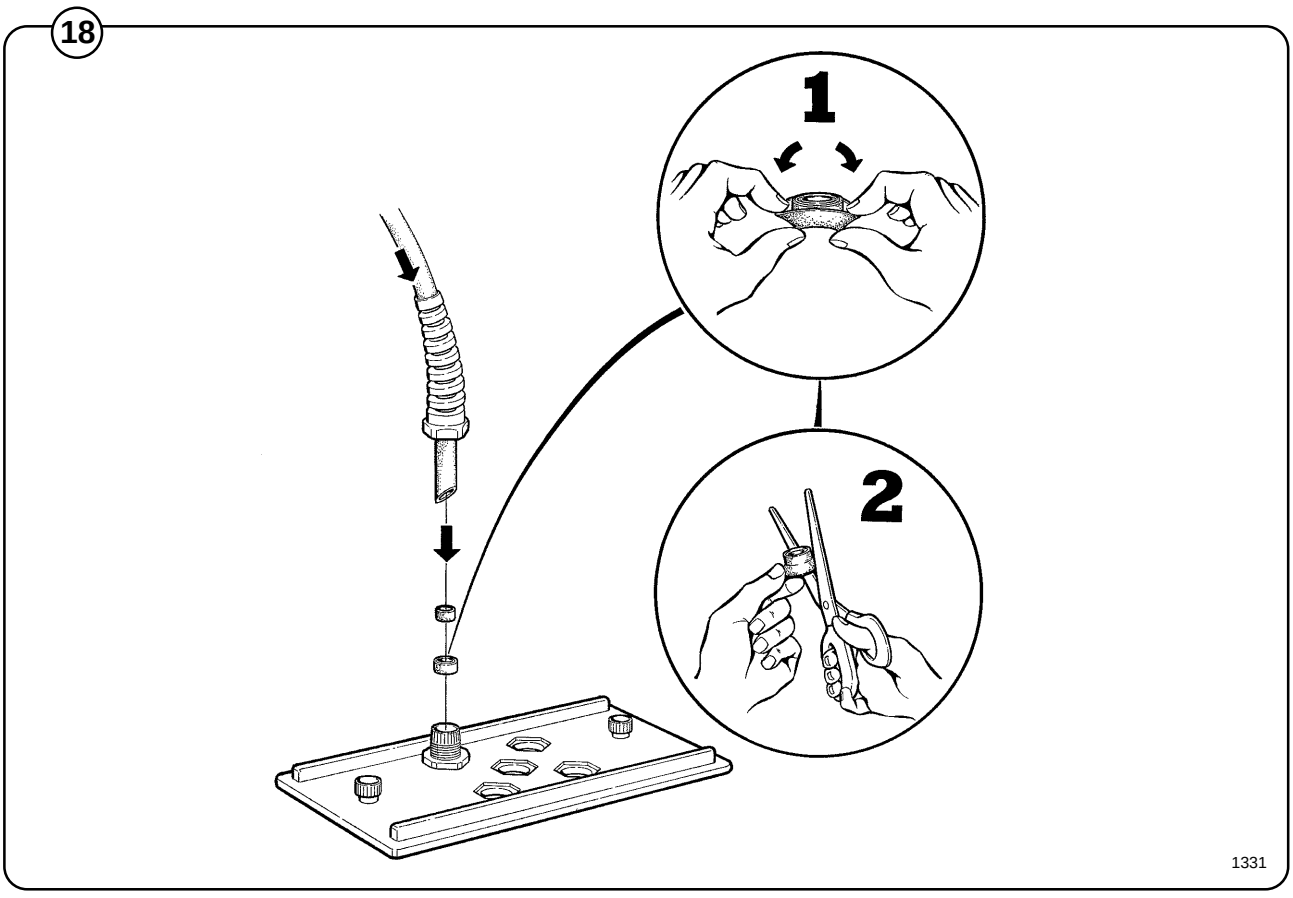


Fig. (18)

1. Stretch the multi-rubber ring B and select the correct size ring which will fit snuggly on the chemical tube you are using. Ring A is used for tubes with Ø 1/3" (8mm).
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 trough the plastic nipple. Run the tube through the compression nut to the bottom of the compartment. Cut the end of the tube at an angle. Hand tighten the plastic nipple on to the compression nut.





Liquid feed signal connection

Fig. (19) To the right of the incoming power terminal block connection is the electrical connection block for supplying signals to an external supply injector. Depending on the number of signals needed, they shall be connected to terminals 1-4 with the common on C. The pumps obtain signals from the Hi-TEK PC-board.

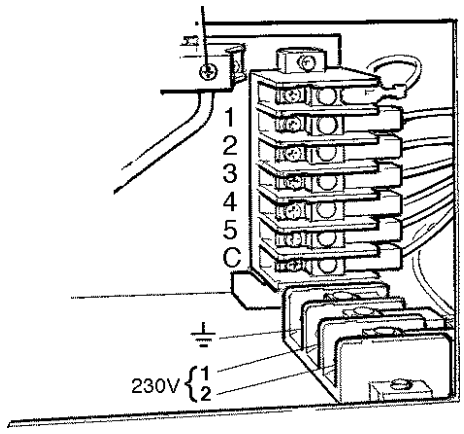
NOTE!

Common terminal C has no direct connection to L1/L2 on the incomming power terminal block. When the door lock catch is released the connection is broken. Connection C shall only be used together with the signals on terminals 1-4.

Connection C can not be used as Neutral for external equipment.

The smaller connection block to the rear of the signals connections can provide 230V AC power for a separate supply injector.

19



2642b

Instruction for setting timing on electro-lube oil dispensing

Fig. 20 Pry off the switch panel cap with a screwdriver.

- Under the cap are the switches for time setting.

Fig. 21

- Set the "Light" and "12M" dip switches to the "On" position. Make certain all other switches are in "Off" position.

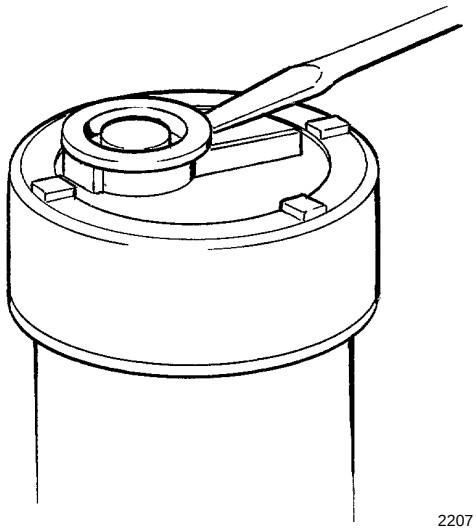
Fig. 22

- The light will start flashing after a few minutes and will continue to flash every 15th to 20th seconds as long as the dispencer is in operation.

Fig. 23

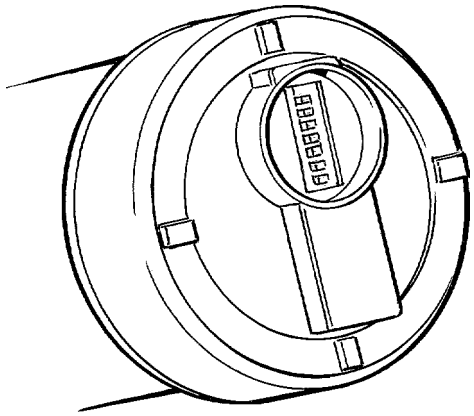
- The decal shown below should be affixed at the front of the machine and updated as required.

20



2207

21



2208

23

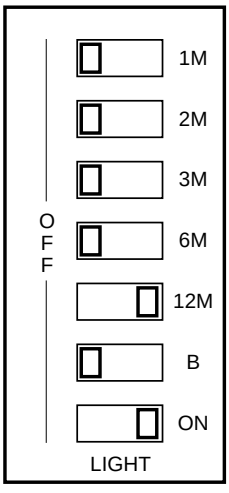
IMPORTANT

NOTICE

This machine is equipped with an automatic oiler, located at the right rear of the machine, which keeps it lubricated for long bearing and seal life.
The amount of oil in the container is sufficient for approximately one year's lubrication. It is of utmost importance that the oiler does not become empty. Therefore we recommend that the rear panel to be removed and a visual inspection to be made on a bimonthly basis. When the oil reaches a low level, the cannister must be replaced with a new one available from Wascomat as Part No. 827601.

Date Last Replaced	Date Last Replaced

22



2733

Steam connections (optional steam heating)

Steam pressure required:

- minimum 7 PSI
- maximum: 110 PSI
- recommended: 40-85 PSI

A steam valve for this machine type is fitted separately in a bracket on the upper rear cover plate. The steam valve, hose and filter are supplied with the machine.

Steam-flush all pipes and hoses before connection.

Installation instructions:

- Install rear cover plates.

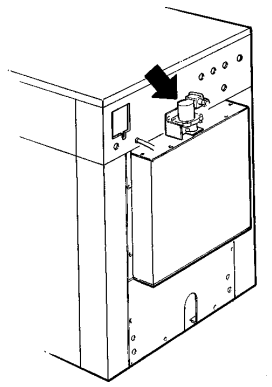
Fig. 24
- Install steam valve bracket and valve. The steam valve must be vertical..

Fig. 25
- Connect the steam hose between the steam valve and the steam intake on the machine.

Fig. 26
- The steam inlet pipe must be fitted with a manual cut-off valve. Fit the filter supplied to the manual cut-off valve.

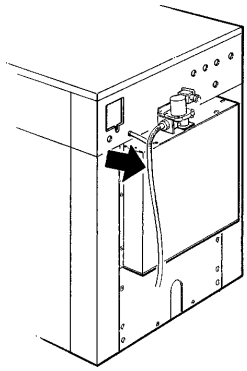
Fig. 27
- Connect an approved 1/2'' hose between the steam valve and the filter. The connection must be vertical or be fitted with a pipe connector in order to avoid sharp angles in the hose.
- The connection hose must be of type ISO/ 1307-1983 or equivalent. Connection size at filter: DN15 (R 1/2'''). Check there are no sharp angles or bends in the connection hose.

24



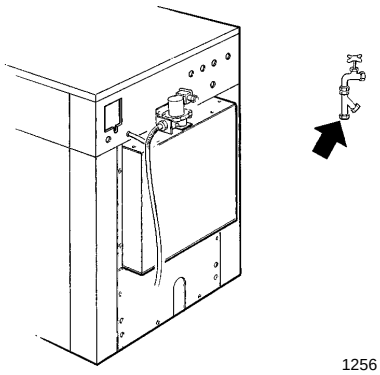
1254

25



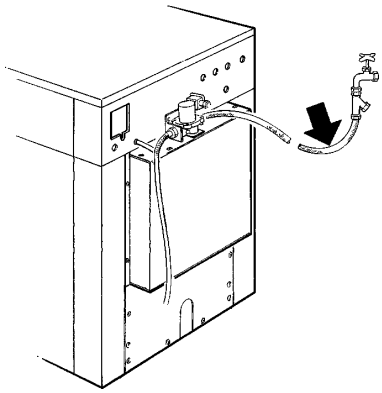
1255

26



1256

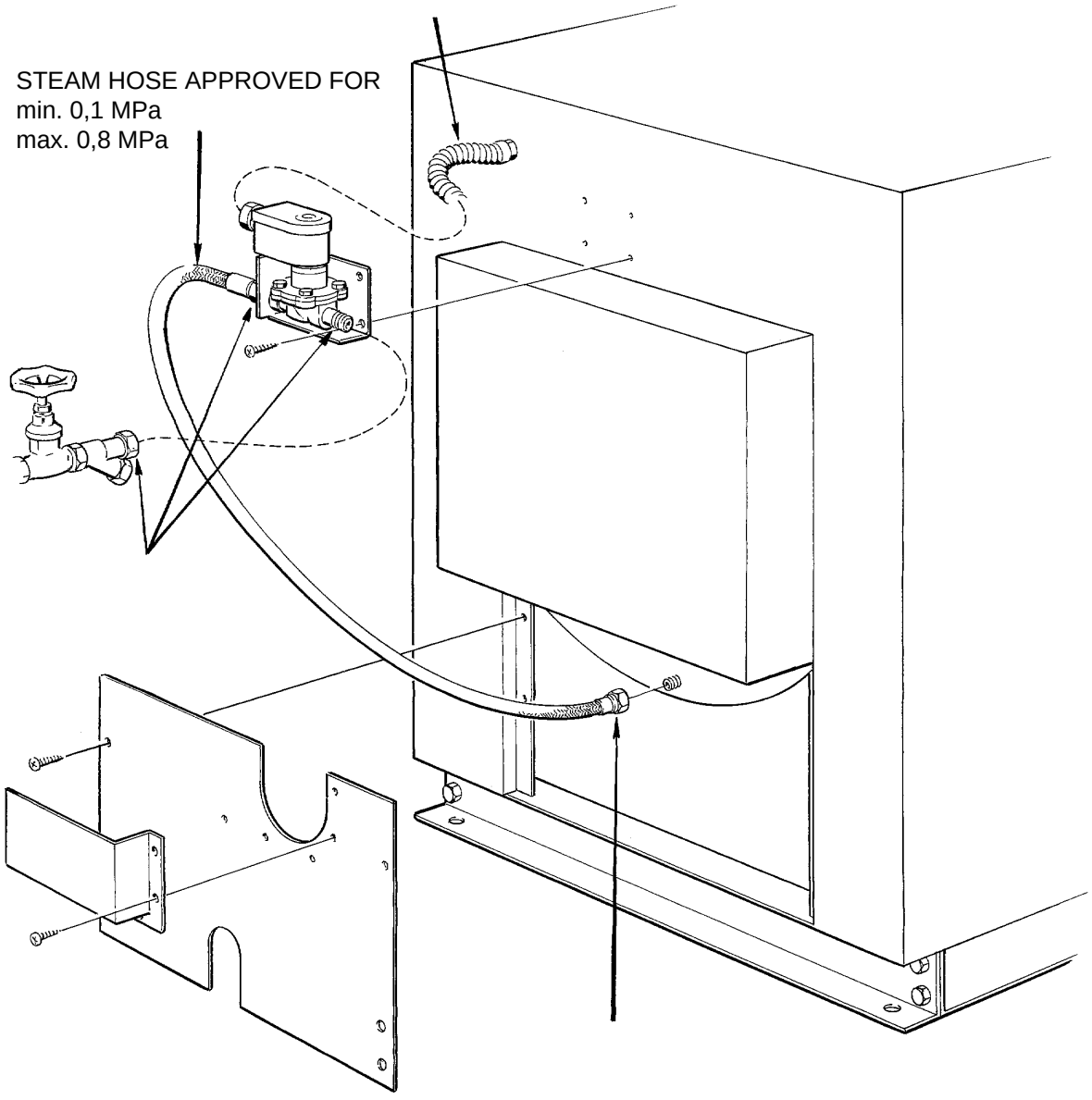
27



1257

Installation

28



1719

Steam connection (compressed air operated)

The following steam pressure values apply:

- min: 10 psi
- max: 110 psi
- recommended: 25-85 psi

Before they are connected, pipes and hoses should first be flushed out with steam.

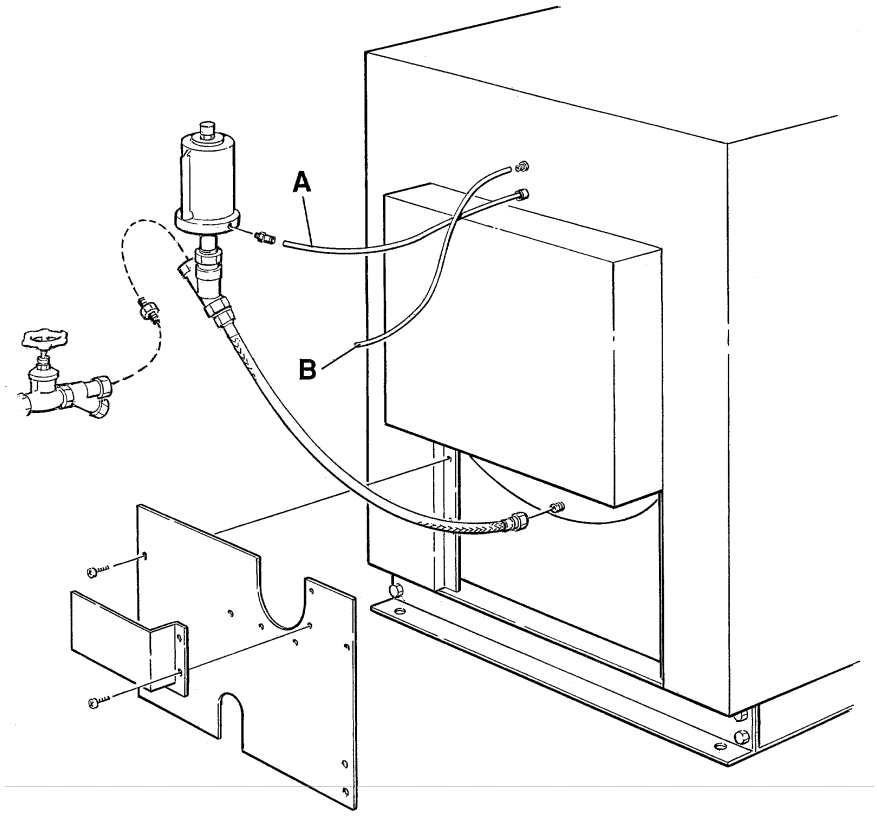
Procedure:.

Fig. 29

- Fit the steam valve.
- Fit the steam hose between the steam valve and the machine's steam inlet.
- The steam supply line must be fitted with a manual shut-off valve. Fit the filter on the shut-off valve.
- The hose should be of a type corresponding to ISO/1307-1983. Connecting dimension at the filter: DN 15 (R 1/2''). After it is installed, the hose should hang in a gentle curve.
- Fit the compressed air hose (A) between the steam valve and the machine.
- Connect the compressed air supply to the machine (B).

  To achieve slow opening of the valve, the air pressure should not exceed 50 psi.

29



2442

Start-up and safety checklist

Before initial start-up of a Wascomat washer-extractor, the following safety checks must be performed:

Fig. (30)

- Make sure that all electrical and plumbing connections have been made in accordance with applicable local codes.
- Use only flexible water fill and drain hoses of the proper length to avoid sags and kinks.
- Make sure the machine is properly grounded electrically.

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

Fig. (31)

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

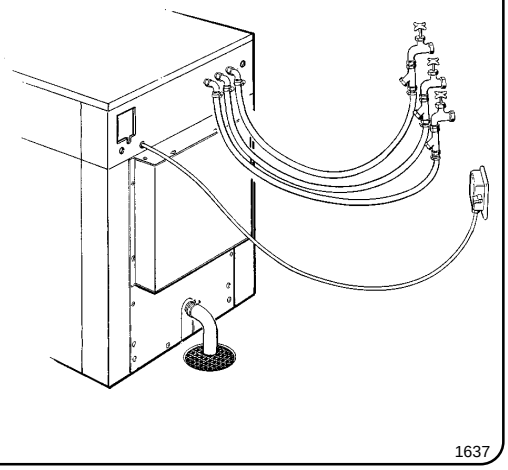
Fig. (32)

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

Door safety interlock must be checked daily in accordance with above procedure.

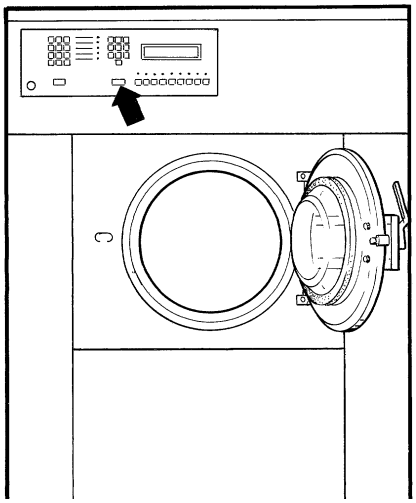
Before servicing Wascomat equipment, disconnect electrical power.

30



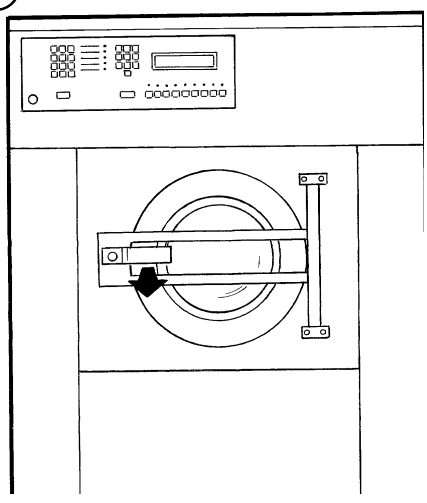
1637

31



1638

32



1639

Function control check-out list

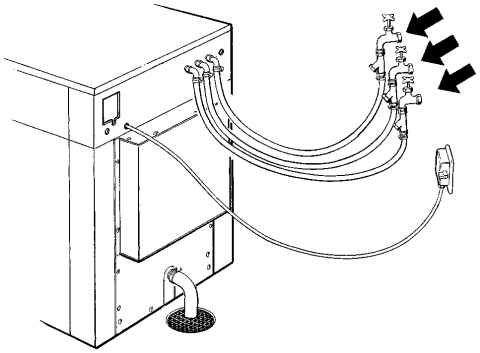
In the machine cylinder, you will find the warranty registration card, a copy of the warranty policy and other pertinent material.

The warranty card should be completed and sent to Wascomat. 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 fabrics:

1. Check the incoming power for proper voltage, phase and cycles.
2. Open manual shut-off valves to the machine.
3. Turn on electric power.
4. Check the door safety interlock as detailed on page 11 of this manual.
5. Run through a complete cycle, checking for water temperature, drain operation and the extract function. For operating instructions, see the section marked ''Procedure''.

Fig. 33



NOTE

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

Function checks

After installation the machine should be cleaned and an empty-machine test program with detergent carried out. Close the door.

Fig. 34 Open the manual water and steam valves.

Add detergent and conditioner.

Fig. 35 Choose program 6 by entering two numbers 06.

Fig. 36 Press **START** to begin test cycle The machine will start up and the display window will show cycle information.

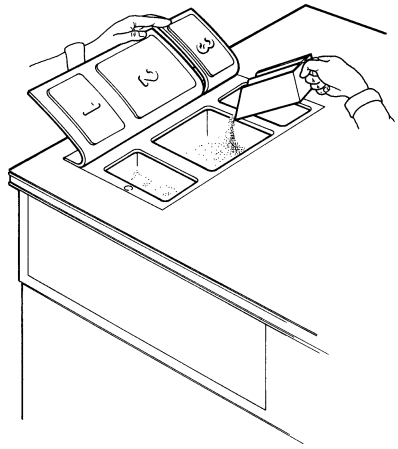
Check that:

- the drum is rotating normally at all program steps and that there are no unusual noises.
- there are no leaks from the water/steam connections and the drain valve.
- the detergent/conditioner compartments are flushed down.
- the door cannot be opened during the program and not until thirty seconds after the program has finished. No time delay on EX22 machine.

Fit the panels and covers removed during installation. Wipe the machine clean with a damp cloth.

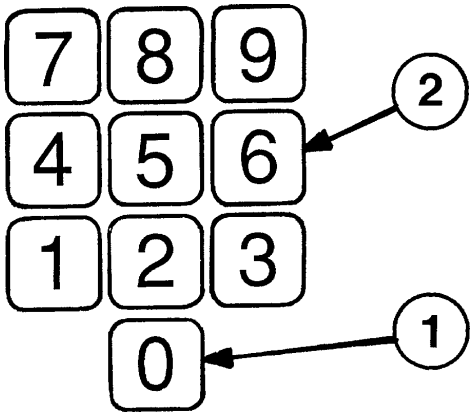
If no problems were encountered, the machine is ready for use.

34



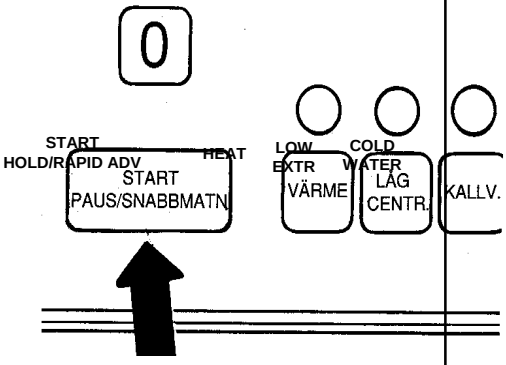
0256

35



1260

36



0155

Safety rules

- **This machine is designed for water washing only.**
- **Machines 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 bypassed.**
- **All seepage in the system, due to faulty gaskets etc., must be repaired immediately.**
- **All service personnel must be fully familiar with the operating manual before attempting any repair or maintenance of the machine.**
- **This machine must not be sprayed with water, otherwise short circuiting may occur.**
- **Fabric softeners with volatile or inflammable fluids are not to be used in this machine.**

General

Fig. 37 These machines are free-swinging models i.e. the outer drum and motor bridge are suspended in the machine chassis via a spring suspension with a strong spring in each corner of the machine. Each spring has a shock absorber which dampens the movement of the machine.

The inner drum is driven by a motor via a V-belt: one motor is used washing and distribution speed and for extract speeds. The inner drum is mounted in the outer drum with two heavy duty bearings at the back plate and is sealed with two V-rings.

The motor is suspended underneath on a motor support with a belt tensioning device.

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

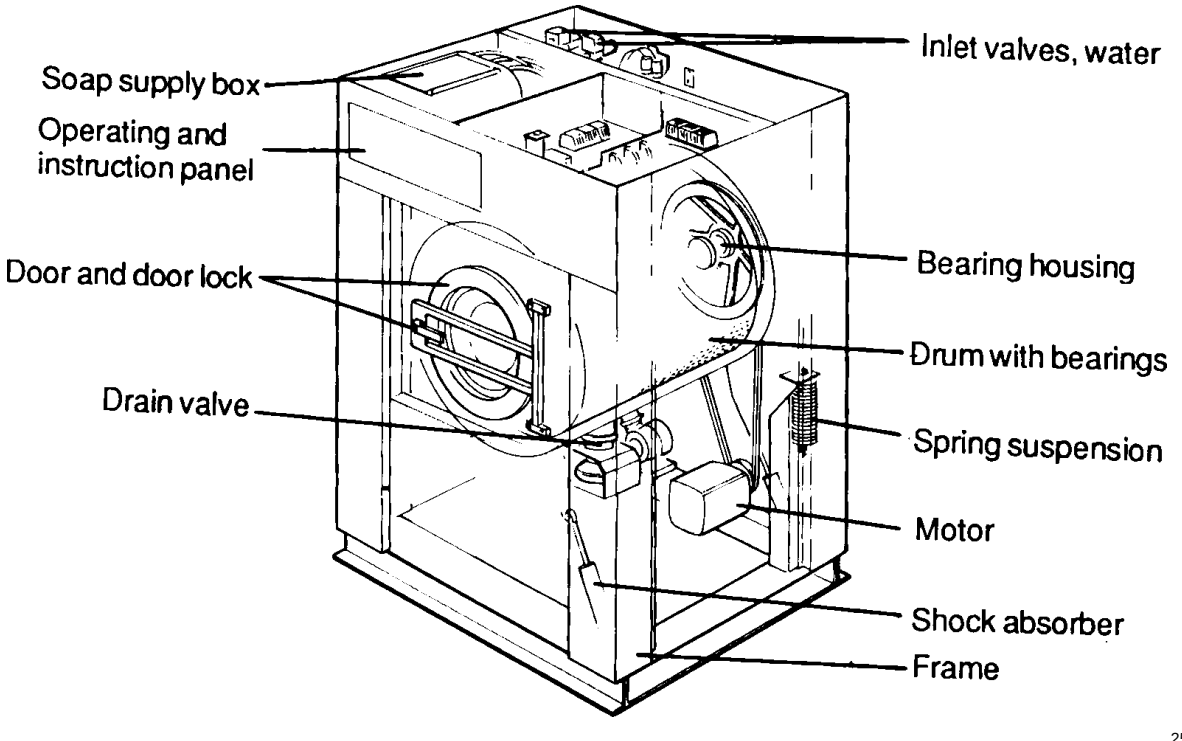
The robust square door is locked with a handle which is interlocked by a safety device when the machine is running.

A keypad for operating and programming the machine is fitted at the front of the machine.

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

The machine housing consists of hot-dip galvanised, painted steel plates and stainless steel sheets, painted on the front and sides. It has a stainless door (and front, on request).

37



The washing machines are controlled by a microprocessor program unit. This provides several major advantages:

- The control of times, levels and temperatures takes place with considerable precision and flexibility
- The large character display provides detailed information in clear text about the different wash programs, the machine's different activities, relevant wash times and temperatures.
- The user is able to program new wash programs and adapt the programs exactly on the basis of previous experience, different kinds of materials, the degree of soiling etc. Depending on the length of the program, up to 90 different programs can be programmed. Refer to the separate appendix for programming.
- When supplied, the machine is provided with a number of standard programs. The maximum number is 9.
- Machine safety can be maintained at a very high level through continuous monitoring and integral safety checks.
- The machine has an integral service program for testing machine functions.

By using a special temperature-controlled cooling process before the first rinse cycle, mixed textiles can be washed at high temperature without the risk of creasing.

To avoid high mechanical stresses during the spin cycle, the machine is fitted with an automatic imbalance sensor. The spin cycle is discontinued if imbalance occurs, the machine is filled with water and the machine operates with a reversing action to redistribute the wash goods. The drain valve then opens, the machine operates at distribution speed and a new spin cycle starts.

The machine can also be operated manually.

The electronic controls together with carefully considered machine design based on long experience also provide:

- simple installation and a long service life.
- a low noise level thanks to the soft suspension of the drum and its dampened free-swinging operation.
- very good de-watering effect as a result of the high speed spin cycle and the large drum diameter.
- low water and power consumption in relation to capacity.
- extreme ease of servicing.

The FC-machines are equipped with a frequency control and a multi-speed motor. This gives advantages such as:

- a machine with possibilities to a very smooth drum rotation through a slow acceleration of the drum.
- wash with reduced speed.
- quiet operation.
- improved distribution of the load.

Frame

Description

Fig. 38 The frame is constructed on the free-swinging principle, i.e. the washing drum is freely and resiliently suspended in the fixed frame.

The entire frame is constructed of U-shaped iron beams forming a stable and torsionally rigid structure.

The suspension device for the drum unit and motors consists of four posts, one in each corner, each with a robust spring to which the washing drum supports are attached. In order to prevent excessively great vibrations which can be caused by imbalance in the drum, a shock absorber is fitted between the drum and frame by each spring. (The EX 12 model has twin shock absorbers at the front.)

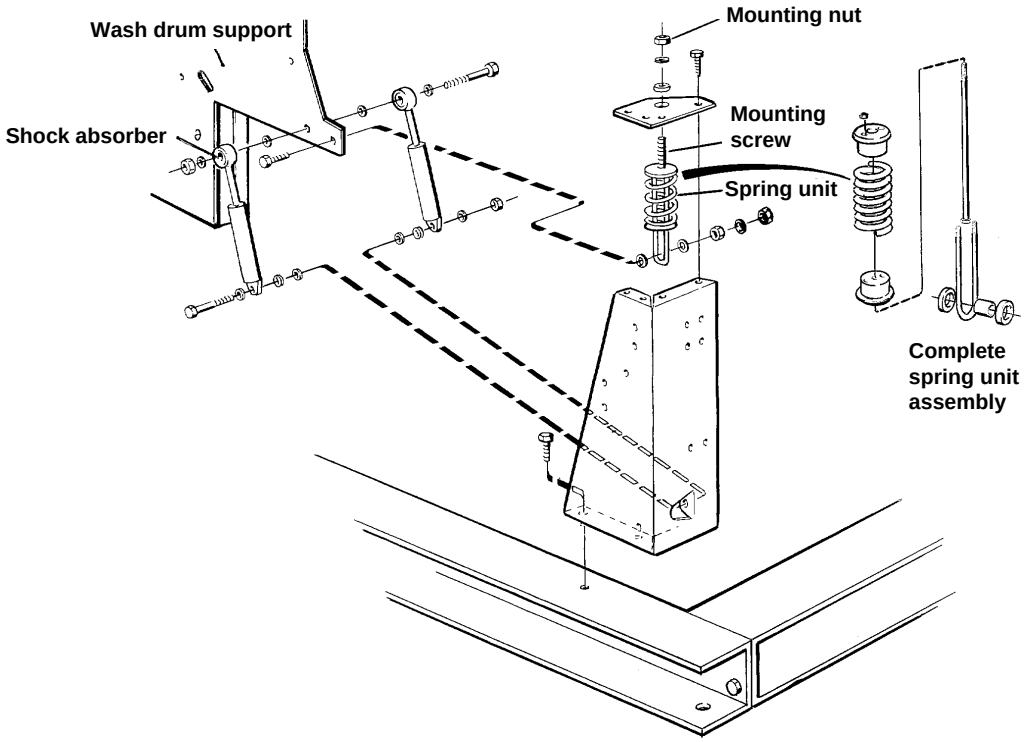
Repair instructions

If the out-of-balance cutout is repeatedly triggered

- Check the shock absorbers, replace them if required. Note that the shock absorbers should be fitted with the plunger rod upwards.
- Check the attachment of the springs:
  - the spring is attached by a bolt from above: Check that it has been properly tightened down.

The entire spring unit should be replaced in spring replacement.

38



1618

Drum with bearings

Description

Fig. 39 The inner drum is journalled to the outer drum by two robust bearings in a bearing housing which is bolted to the rear plate. The bearing unit supports the drum without any support being needed at the front. Shaft seals of the V-type, as well as O-rings, seal against leakage.

The space between the bearings is packed with grease during assembly. No additional grease is required.

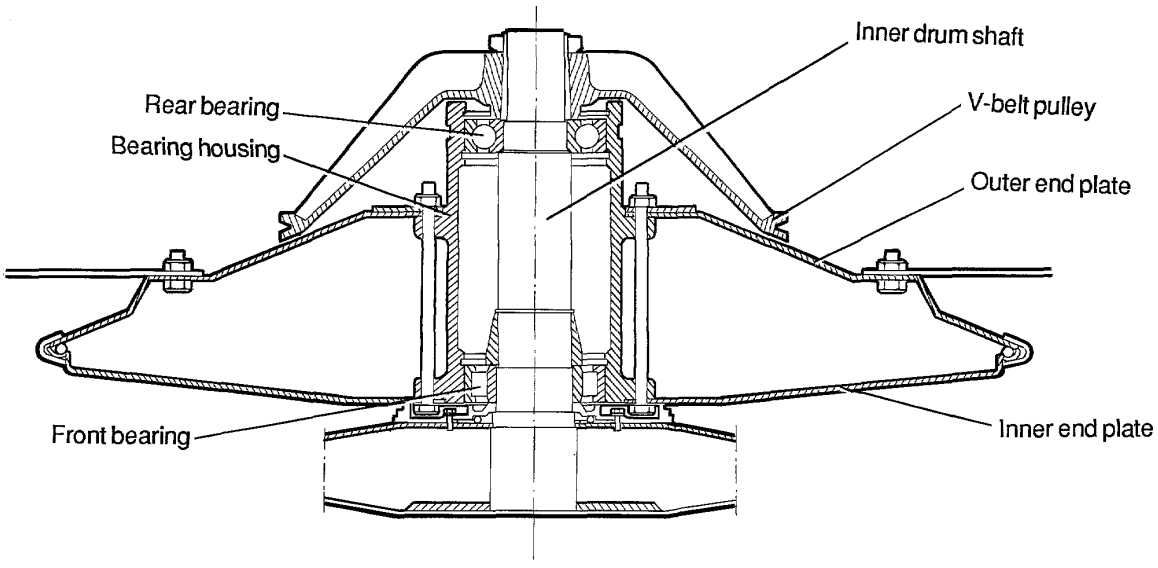
The inner drum shaft is continuous, and the V-belt pulley is attached to the protruding journal by an adapter sleeve.

The outer drum end plate consists of two parts, the inner and outer end plates which are bolted to the bearing housing with through bolts. NOTE: The inner and outer end plates must not be taken apart when the bearings are replaced.

The outer drum and rear plate are held together by 3 straps.

The outer drum is connected to its resilient suspension by four supports, bolted to the end plates. It is important that these supports are not loosened from the rear plate during repairs.

39



EX12

0635

Safety locking device

The machine safety locking device includes a safety interlock system which prevents personal injury through the following precautions:

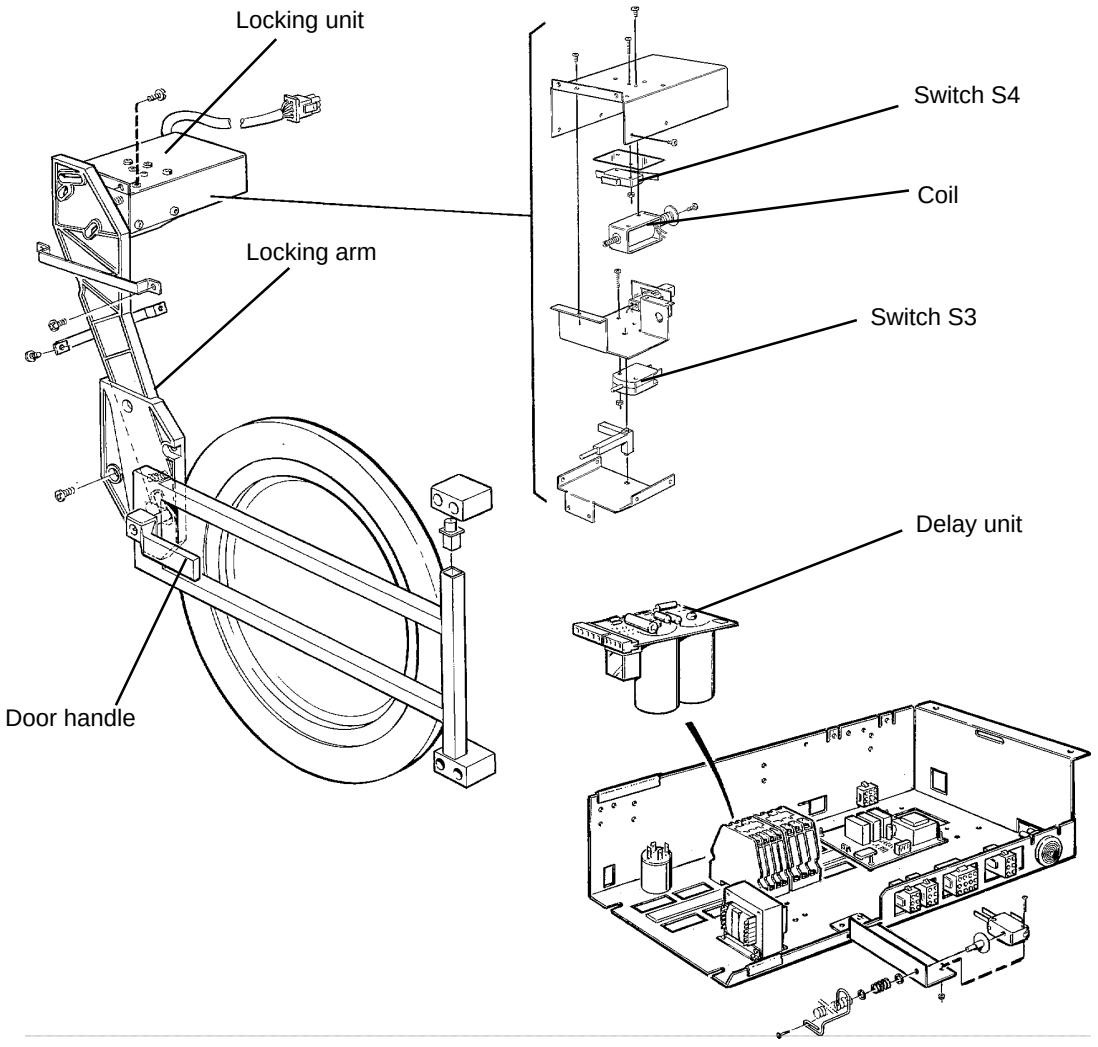
- The machine cannot be started until the door is shut.
- The door is automatically locked when the machine starts.
- It is not possible to open the door until 2-3 minutes have elapsed after the washing program has ended. This ensures that the drum is motionless when the door is opened.

The machine door lock is made up of the following main components:

Fig. 40

- Lock unit, located behind the front panel under the detergent compartment. The unit contains a coil which locks the door, and two microswitches. Switch S3 indicates that the door is locked and switch S4 that the coil is activated.
- Delay unit, located inside the automatic control unit. This unit consists of a circuit board which controls the time that the door remains locked in a power cut.
- Locking arm which connects the door handle with the lock unit. The arm relays the mechanical action of the door handle to the lock unit.

40



Rotation guard

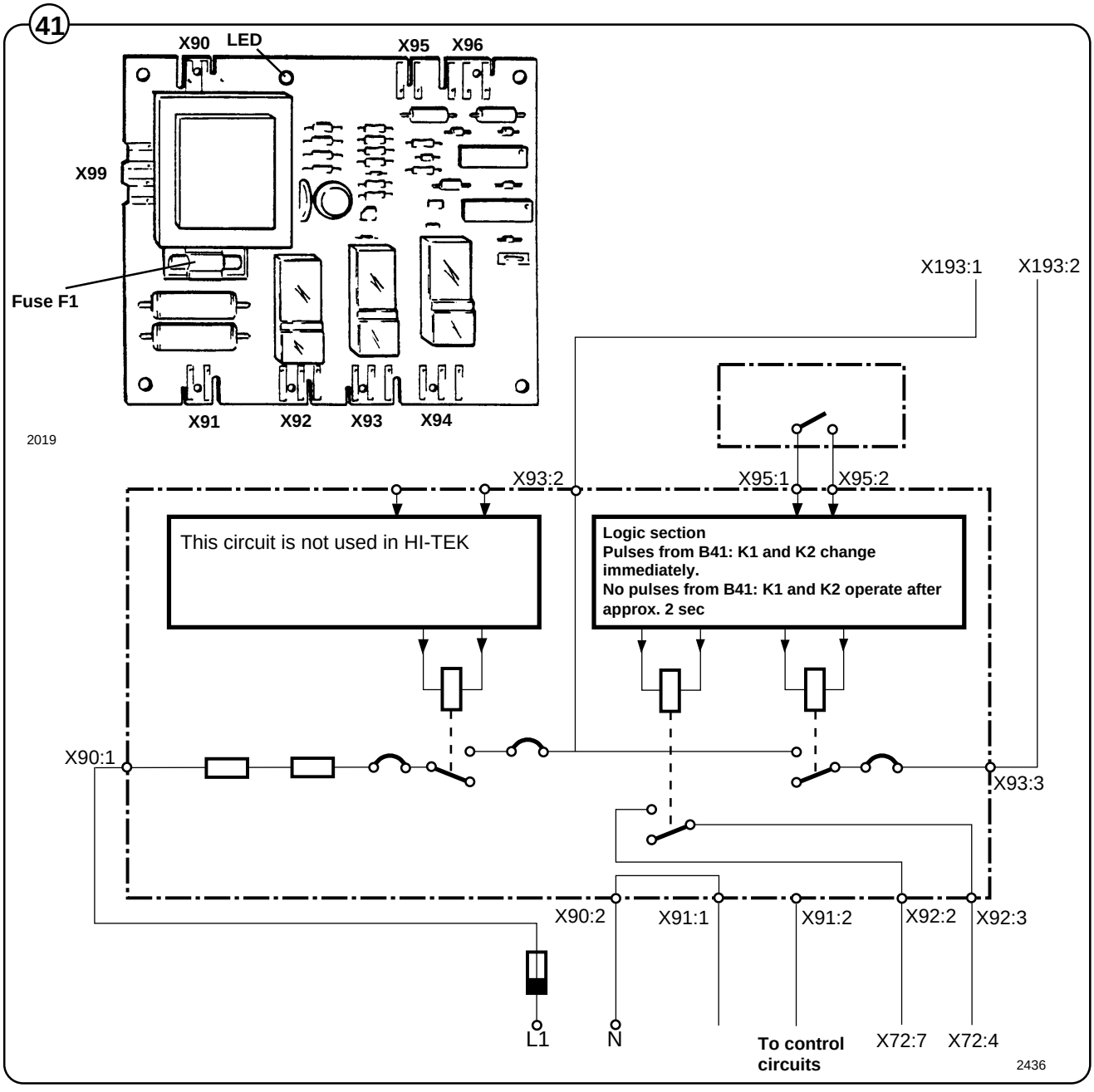
Description

Fig. 41

The rotation guard checks that the machine is completely at a standstill before the door can be opened. When the drum has been at a standstill for approx. two seconds the solenoid in the door lock is deactivated and the lock can be opened (provided that the machine has been emptied of water and the programmer has reset). The rotation guard also checks that the drum is revolving when the wash or extraction relays are operating.

The rotation guard consists of a circuit board in the automatic control unit and a sensor in a holder on the machine rear. There is a magnet on two of the spokes of the pulley. Each time a magnet passes the sensor, a contact closes inside the sensor and it relays a pulse to the rotation guard.

When the machine is at a standstill the rotation guard relays K1 and K2 are closed, which means that the delay unit and the HI-TEK receive confirmation that the drum is not moving, i.e. the rotation guard and the HI-TEK allow door opening.



Fault location

Door does not unlock

Conditions: wash program ended and drum at a standstill

Measure the voltage between the following points:

1. **X93:2 - X93:3** Should be 0 V DC. If the voltage is 220 V AC, check the rotation guard.
2. **X193:1 - X193:2** Should be 0 V DC. If the voltage is 220 V AC, check the rotation guard and the cables between rotation guard and delay unit.
3. **X194:1 - X194:4** Should be 220 V AC. If not, the ”open” signal from the programmer circuit board is absent. Check pcb and cables between pcb and delay unit.

If the door is still locked, replace the delay unit.

Door does not lock

Conditions: door closed and wash program activated.

Measure the voltage between the following points:

1. **X194:1 - X194:4** Should be 0 V AC. If the voltage is 220 V AC, the programmer circuit board will constantly send the ”open” signal. Check pcb and cables between pcb and delay unit.
2. **X194:2 - X194:3** Should be 200 V DC.
   - If there is no voltage, replace the delay unit.
   - If this voltage is present, check the door lock coil and its cables.

Function

If the machine has not been energised within the last three minutes, the door will remain unlocked. When the machine is energised the door will be locked if a program is activated or if the drum is rotating. Upon completion of a program the door will be unlocked automatically as soon as the drum has stopped rotating.

If the power supply is cut to a machine which was energised the door will remain locked for three minutes, after which time it will be unlocked automatically.

Fig. 42 The diagram below shows how the delay unit works.

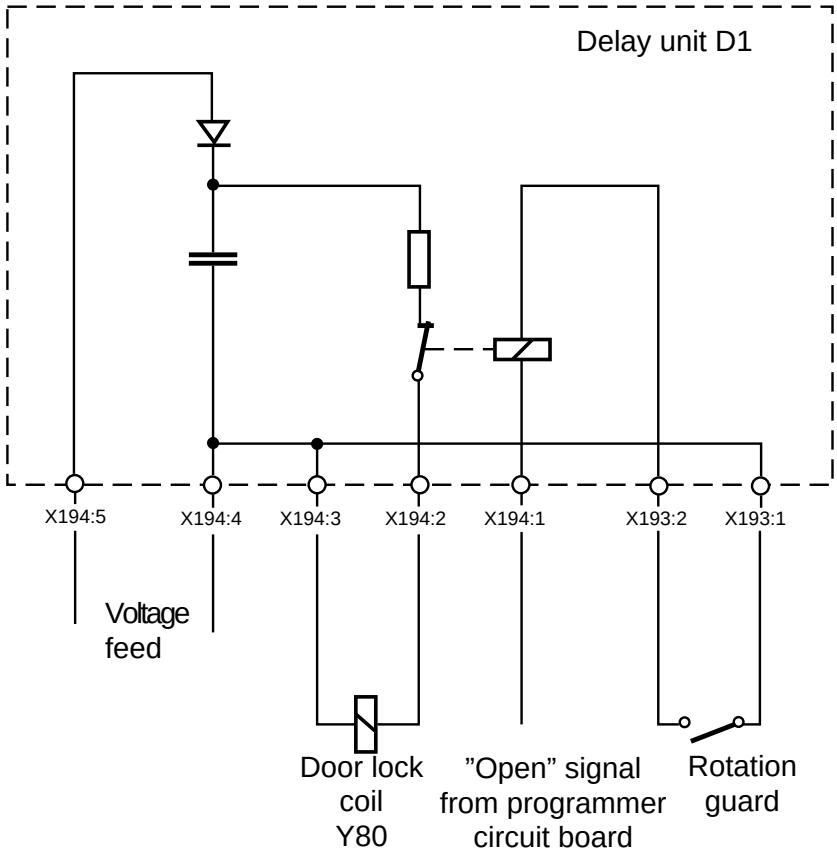
When the machine is energised the delay unit is fed phase and neutral on X194:5 and X194:4 respectively. The door lock coil Y80 is then fed phase (via a normally-closed relay contact) and neutral from X194:3. The relay coil acts on two conditions - that the drum is at a standstill and an ”open” signal from the programmer circuit board:

- One side of the relay coil receives a zero potential signal when the rotation guard short-circuits X193:1 and 2.
- The other side of the relay coil is supplied with phase from the programmer circuit board (”open” signal).

Both of these conditions must be fulfilled for the door to be unlocked.

In the event of a power cut the capacitor will discharge via the relay and the door lock solenoid. In this way the door lock solenoid continues to operate for three minutes, after which the door is unlocked automatically.

42



Control unit

Fig. (43) The control panel (1), mounted at the front, includes all components necessary for operating the machine, such as display window, control switches and a key-operated switch.

The printed circuit board with the microprocessor electronic timer is mounted just behind the control panel.

B31 Rotation guard for sensing that the drum has stopped before the door can be opened. This guard also indicates that the drum is actually rotating when the motor is operating..

B40 Buzzer to indicate program stop.

B51 Speed selector for extraction speed

D1 Delay unit - a capacitor circuit which delays switching off of the door lock solenoid, and thereby makes it impossible to open the door before the delay time has expired.

F12,F13 Motor fuses

K18 Relay - drain tank (for recycling system)

K19 Relay - pump (for impregnation spray)

K71 Relay MU1

LC1 Interference suppression unit

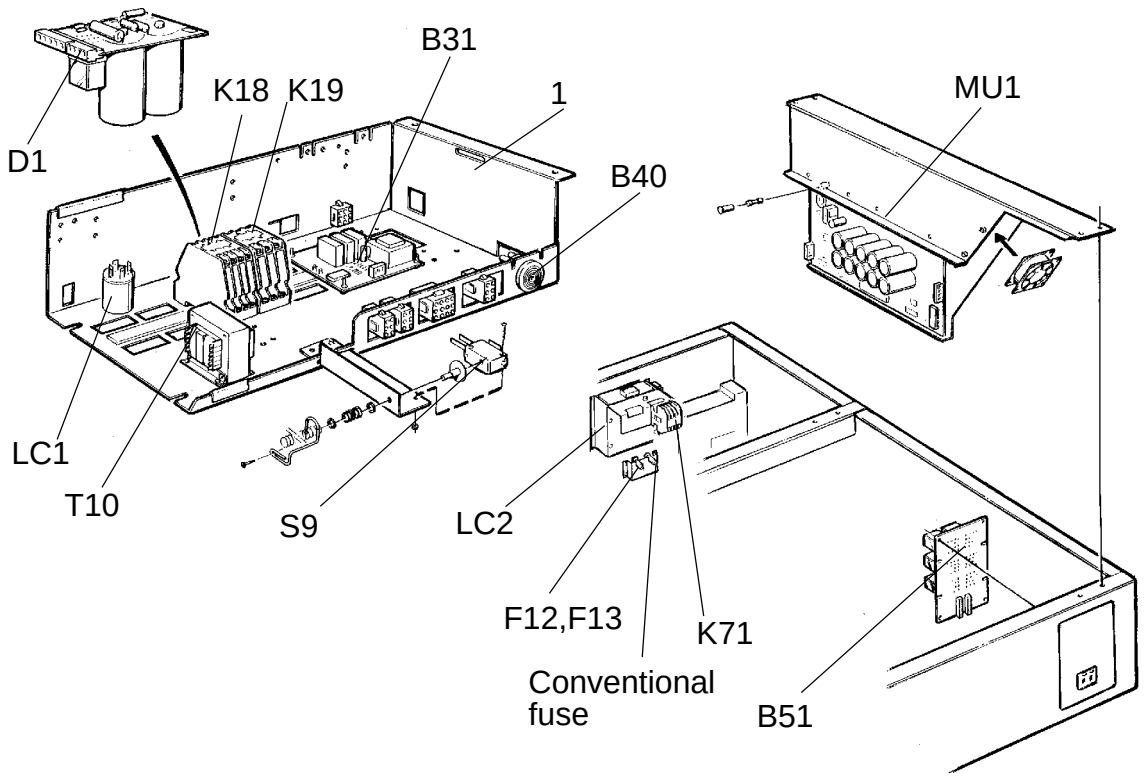
LC2 Interference suppression unit.

MU1 Motor control unit for main motor's direction of rotation, speed and times at various program steps.

S9 Unbalance switch

T10 Transformer

(43)



Relays

The FC models employ relays to control the following:

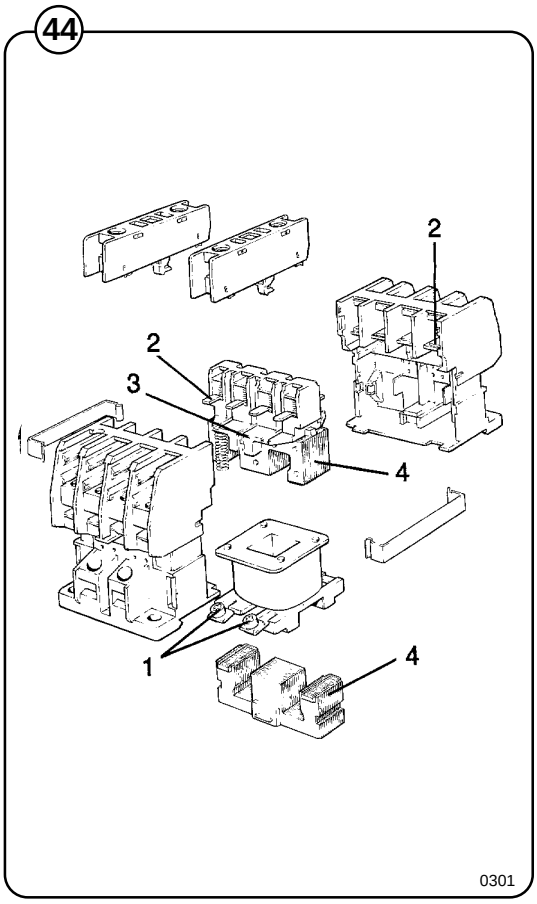
- switching between powder and liquid detergent.
- drain to tank. } for optional recovery and recycling
- pump from tank. } for optional recovery and recycling
- motor operation.

Construction

Fig. (44) The body of the relay holding the stationary contacts is made of current-resistant plastic. A solenoid and a contact bank hold the moving contacts. The contacts are spring-loaded to assure the correct contact pressure.

The relay is constructed for continuous operation, whether mounted horizontally or vertically.

Screw-type terminals provide perfect connections even when one or two wires have different diameters.



Operation

When the solenoid is energized, the two halves of the magnet core are drawn together, pulling down the moving contacts, thus making or breaking the circuit. When the current cuts out, springs force the contact bank into its original position, thus closing or opening the circuits.

Trouble shooting

If the relay fails to operate despite power to the coil, turn off the power and check the solenoid by measuring the resistance across the terminals (1).

If the relay hums when power is applied, this indicates either a break in the insulator holding the moving contacts at the axle where it holds the top half of core (3) or a rusty core (4), which can be cleaned.

Make sure that the moving contact assembly (4) moves freely. Always replace burnt or pitted contacts (2)... do not reuse contacts.

Motor

In machines with frequency control the same motor is used for wash speed, distribution speed and extraction. The motor is located on a motor mounting plate, and drives the drum via a belt.

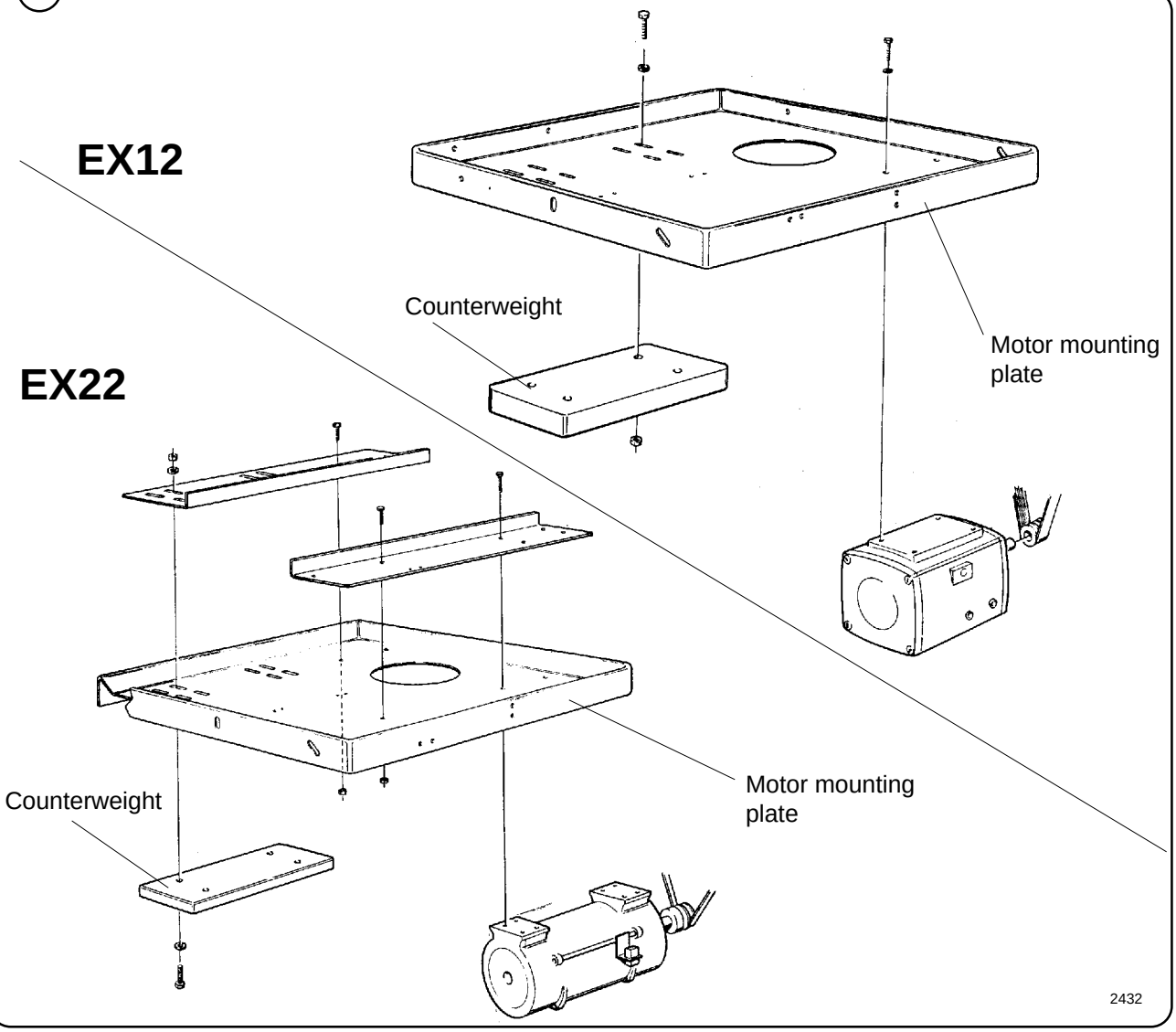
The tension of this drive belt can be altered by moving the entire motor mounting plate thanks to the mounting slots on one side. The motor has a thermal cut-out located in its windings. This thermal cut-out signals to the motor control unit in the event of the motor overheating, i.e. if the temperature exceeds 130°C.

The various motor speeds for normal action, distribution and extraction are controlled by a microprocessor-based motor control unit (MU1). The control signal for the motor control unit goes via a speed selector, which the operator can also use to select specific extraction speeds for low and high extraction.

Fig. 45

The illustration below shows how the motor is positioned. It is connected using a quick connector, which makes motor replacement easier.

45



Program start

The following conditions must be fullfilled before the motor can start:

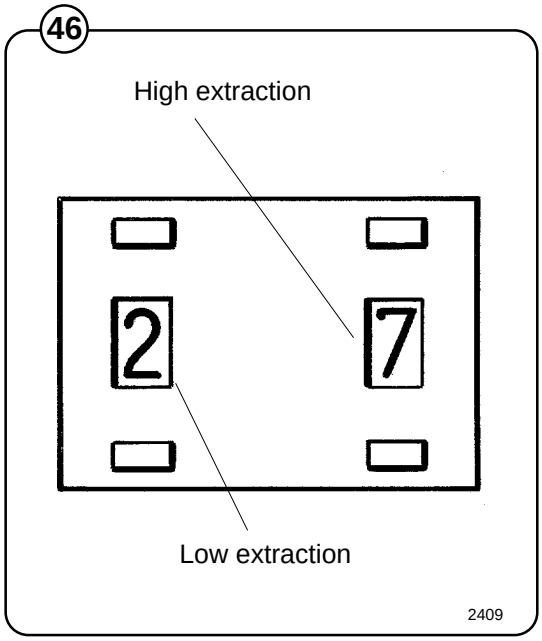
- Motor not overloaded.
- Door shut.
- Go-ahead signal from programmer.

When the door is locked relay K71 is activated feeding power to the electronic control unit and the motor is allowed to start.

Extraction

Fig. 46

For extraction the programmer sends signals for either low or high extraction. The operator selects the extraction speed required by means of the speed selector thumb wheel, on the machine front. The speeds are selected as follows:



EX12

Low extraction			High extraction		
	speed	G-factor		speed	G-factor
1	340	40	4	590	120
2	420	60	5	680	160
3	510	90	6	760	200
			7	850	250
			8	950	310

EX22

Low extraction			High extraction		
	speed	G-factor		speed	G-factor
1	300	40	4	540	120
2	380	60	5	620	160
3	460	90	6	700	200
			7	780	250
			8	850	300

Repair instructions

Overheated motor, motor not running

- Wait till motor has cooled down. Motor guards are automatically reset after 30 minutes. Restart.
- Possible cause of motor guards releasing repeatedly: short circuiting. In both cases the motor should be replaced.

Very noisy motor

- Breakdown of bearings – replace motor.

Motor locks

Breakdown of bearings – replace motor

Motor does not turn

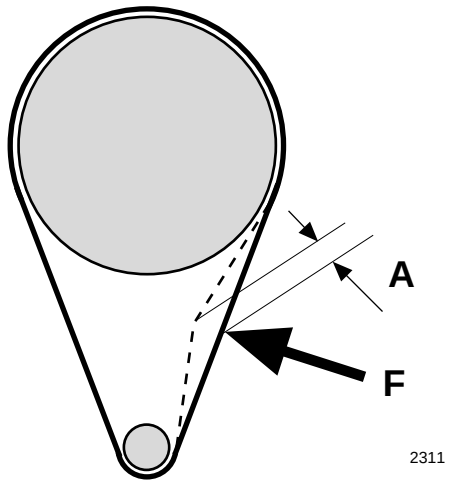
Fig. 47

- Check belt tension.

When checking the belt tension or when changing belt, follow the instructions shown.

NOTE!
Checking the belt tension should always be a part of the regular maintenance.

47



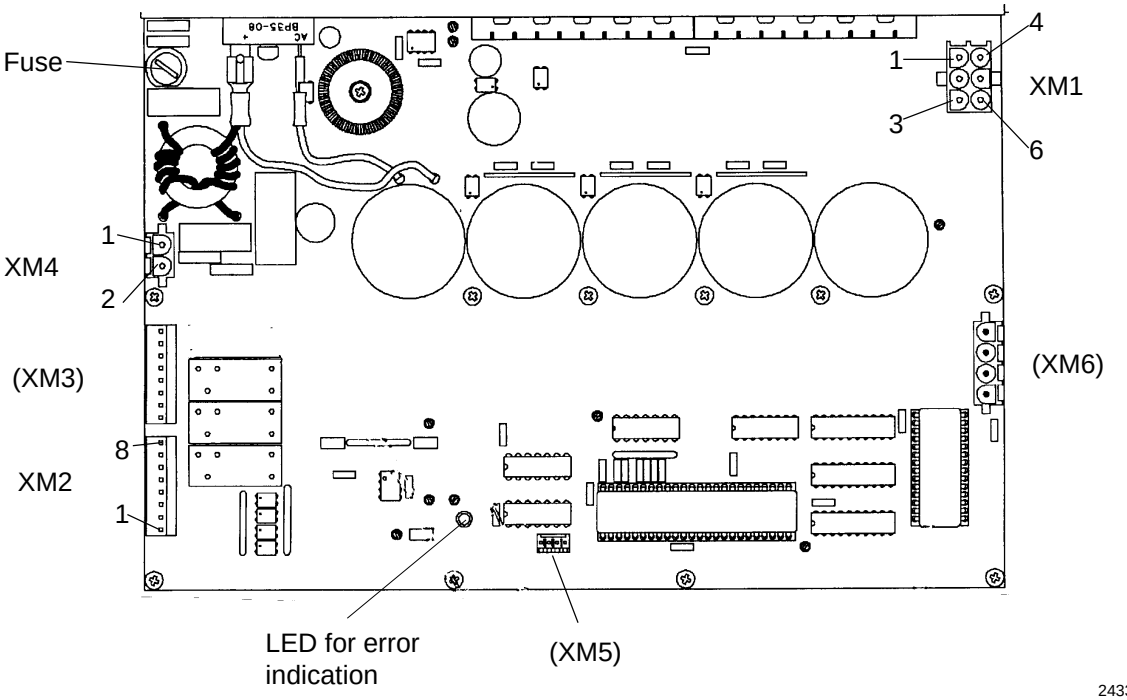
	EX12	EX22
F	67 lbs	67 lbs
A_{max}	12 mm	12 mm
A_{min}	10 mm	10 mm

Fig. 47 Loosen the screws holding the motor mounting plate on the motor side. Lower the motor mounting plate until the correct belt tension is obtained, as shown in Fig. 45. Secure the motor mounting plate in place.

Motor control

Fig. 48 On the motor control circuit board there is a yellow LED which indicates various types of fault:

48



Indication	Cause
The LED flickers.	Motor current is at its limit.
The LED comes on and stays on.	Undervoltage in feed to motor control.
The LED flashes for 15 sec and then the machine tries to start again.	Motor control has halted because of wrong signals in control circuit.
The LED shows double flashes.	The machine has been stopped on account of a fresh fault directly after the last sequence described.

In two cases the machine will be halted without indication:

- Overvoltage in feed.
- Motor and/or motor control overheated.

Motor does not operate when it should

- Check the voltage feed to the motor control unit by:
  - Disconnecting XM4 (quick connector)
  - Using a voltmeter (AC) to measure between pins XM4:1-2. Correct value = 220 V (208 - 240 V)
  - Using a voltmeter (DC) to measure between pins XM6:1-4. Correct value = 250 - 375 V. If not check fuse. Replace unit.

Motor does not operate or operates at wrong speed

- Check against the table below whether the motor is receiving the correct control code from the speed selector circuit board. Measure at connection X99:1 - 4 with XM2:1 as reference point.

Speed	pin 1	pin 2	pin 3	pin 4
0 Stop	0 V	0 V	0 V	0 V
1 Wash speed, right	0 V	0 V	0 V	24 V
2 Wash speed, left	0 V	0 V	24 V	0 V
3 Distribution	0 V	0 V	24 V	24 V
4 Speed when unbalanced	0 V	24 V	0 V	0 V
5 Not used	0 V	24 V	0 V	24 V
6 Not used	0 V	24 V	24 V	0 V
7 Stop	0 V	24 V	24 V	24 V
8 Extraction 8 (HC)	24 V	0 V	0 V	0 V
9 Extraction 1 (LC)	24 V	0 V	0 V	24 V
10 Extraction 2 (LC)	24 V	0 V	24 V	0 V
11 Extraction 3 (LC)	24 V	0 V	24 V	24 V
12 Extraction 4 (HC)	24 V	24 V	0 V	0 V
13 Extraction 5 (HC)	24 V	24 V	0 V	24 V
14 Extraction 6 (HC)	24 V	24 V	24 V	0 V
15 Extraction 7 (HC)	24 V	24 V	24 V	24 V

Supply injection valve

Construction

Fig. (49) This valve has a single-inlet with 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. The electrical connector terminals are spade lugs.

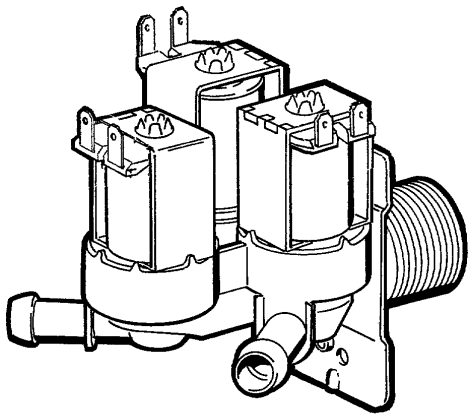
A filter screen on the inlet side prevents dirt from entering the valve. Flow restrictors can be placed at either the inlet or any of the outlets.

Operation

Fig. (50) 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.

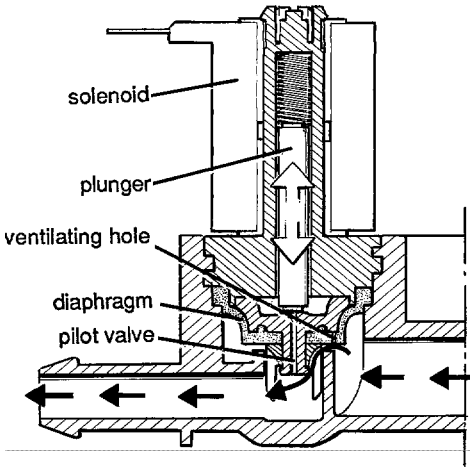
When the current to the solenoid is cut off, the plunger spring will press the plunger against the pilot opening of the diaphragm. The pressure above the diaphragm then rises to correspond to the water inlet pressure and the pressure of the spring will close the valve.

49



0306

50



0307

Repair instructions

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

Fig. (51) It is therefore advisable to dismantle and clean the valve at certain regular intervals. The frequency depends on operating conditions and the level of contamination in the water.

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.
- Dismantle 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).

Dismantling the valve.

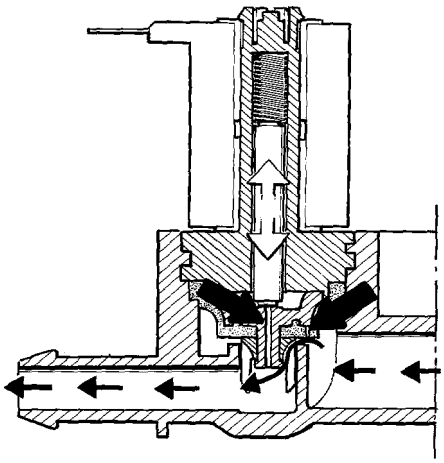
Fig. (52)

- Pull the coil stright upwards. Use a screwdriver if necessary to carefully undo the coil.

Fig. (53)

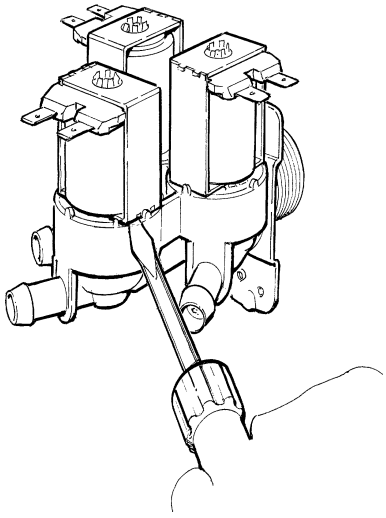
- Use the tool supplied (attached to one of the hoses when the machine is delivered) to open the valve housing. Slide the tool over the protruding plastic sleeve to that the pegs on the tool engage the corresponding sockets in the valve housing.
- Use a spanner or a pair of pliers and unscrew the upper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

51



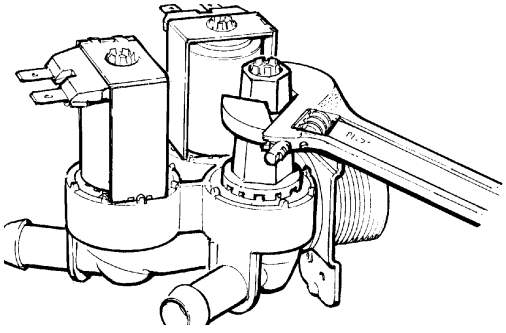
0308

52



0309

53



0310

Inlet valve - EX22

Fig. (54) The water inlets have brass bodies with a larger cross section of the outlet in order to acheive a shorter filling time for the machine.

Construction

The valve housing is made of pressed brass. The spring-loaded plunger is made of stainless steel and located at its lower end is a rubber gasket for the pilot valve.

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.

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

Clean out

At water temperatures of more than 60°C/140°F, the lime deposits are heavily increased. This can cause function problems due to blocking up the equalizing orifice of the valve.

Fig. (54) The fault can be eliminated by cleaning the equalizing orifice (marked A).

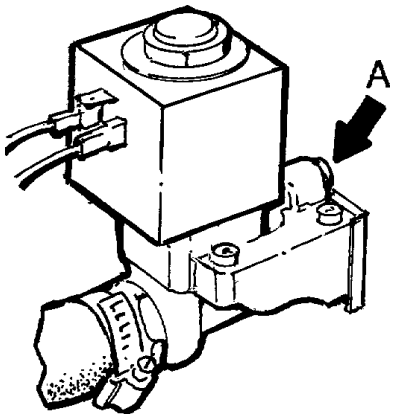
Fig. (55)

If there are much deposits the orifice can be changed from 0.5 mm to 0.8 mm. The screwhead of the orifice is marked with 1 ring for the size of 0.5 mm and 2 rings for the size of 0.8 mm.

Clean the orifice as follows:

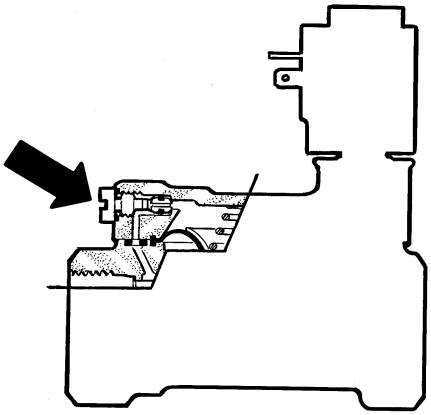
1. Shut off the main supply.
2. Unscrew the orifice
3. Fig. (56) Clean the hole in the orifice carefully with a pin or similar not thicker than 0.5 resp. 0.8 mm.
4. Mount the orifice, be careful with sealing and tighten.
5. Open the main supply.

54



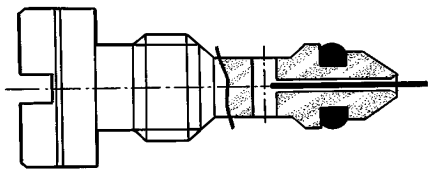
0311

55



0368

56



0369

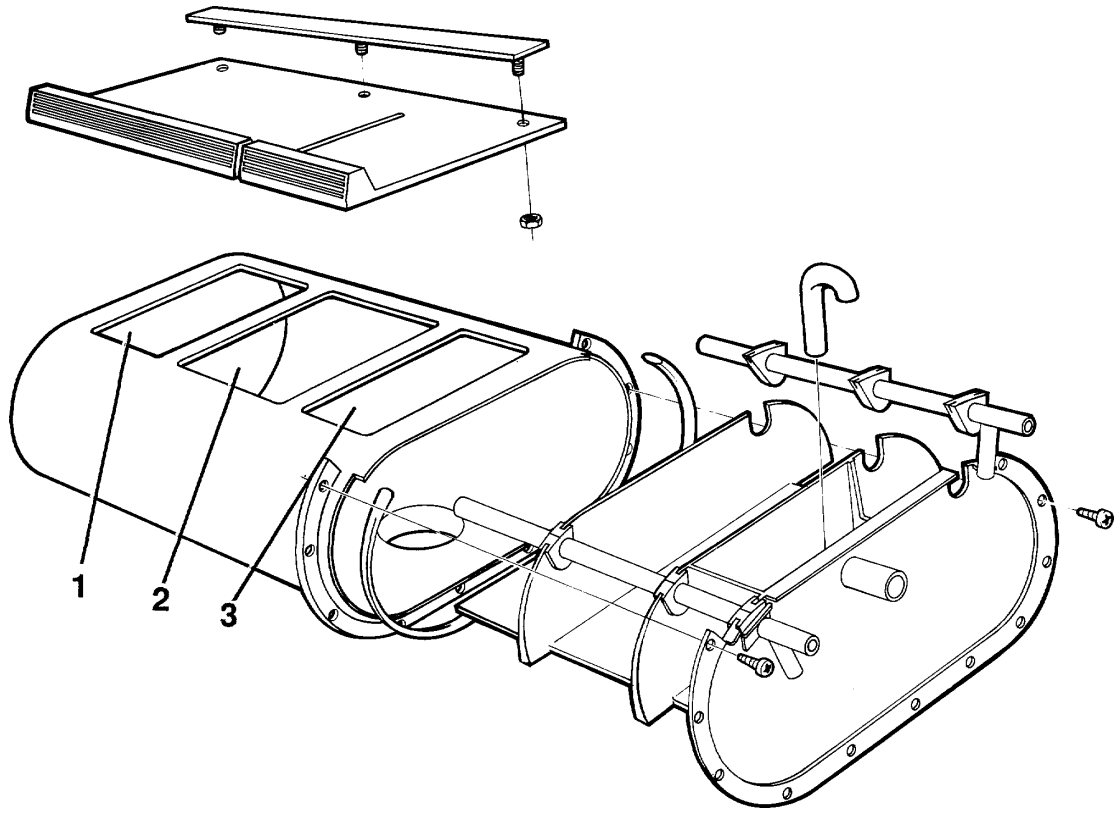
Soap supply box

Fig. 57 The three-compartment soap supply box is located at the top of the machine. Viewed from the front, the compartments are marked with figures 1, 2 and 3.

Compartment 1 and 2 are used for adding detergent directly to the wash. Compartment 3 is used for adding fabric softener. All three compartments can be programmed individually.

For liquid supplies compartment 2 is only used together with a top mounted supply injector connection. See page 9 for details and installation instructions.

57

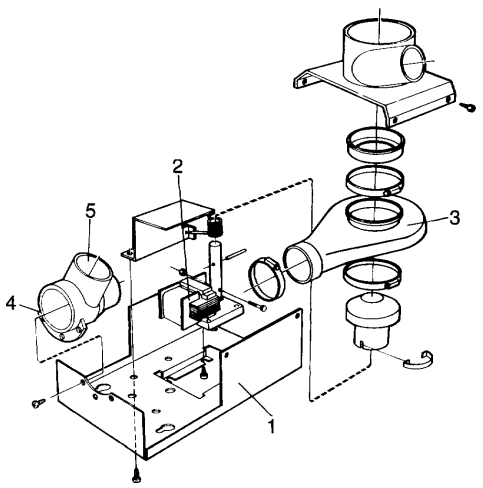


Drain valve

Description

Fig. 58 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.

58



0313

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.

Procedure for use

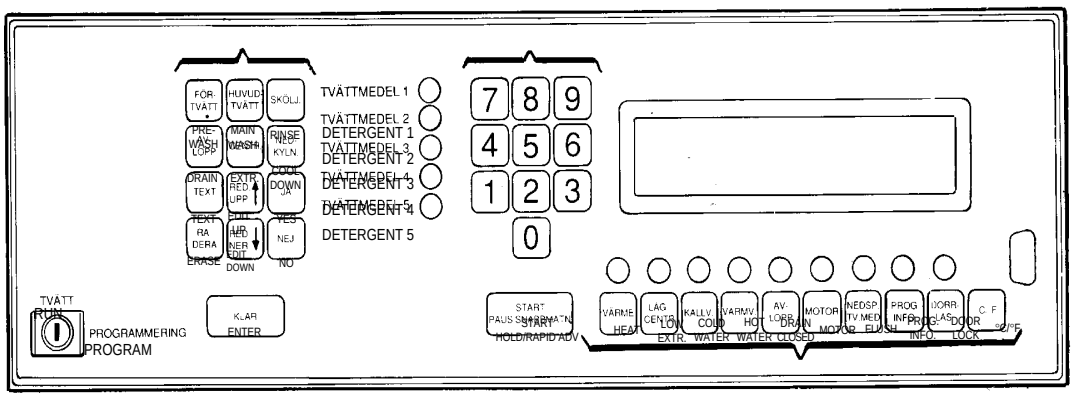
All operations, including the programming of new wash programs are carried out from the control panel on the front of the machine. During normal use, the programming keys to the left of the panel are inoperative.

Fig. 59

The control panel comprises the following:

- a display window with four lines each of 40 characters. This shows the relevant program information, the programming instructions, error messages etc.
- a keypad with button controls for:
  - start/hold/rapid advance
  - blocking high speed spin during automatic washing
  - manual washing (motor, filling with water, flushing down detergent, heating and draining)
  - programming new programs
  - figure values (program selection/programming)
- a key switch for switching between the operating position and the programming position.
- indicators for dispensing supplies.

59



0149

Preparation

- Sort the wash according to the washing instructions on the garment labels. Check that there are no foreign objects in the garments. Pull up zipper fasteners.
- Open the washing machine door, check that the drum is empty, insert the wash goods and close the door.

Automatic washing

The manual controls can be used during automatic washing.

Program selection

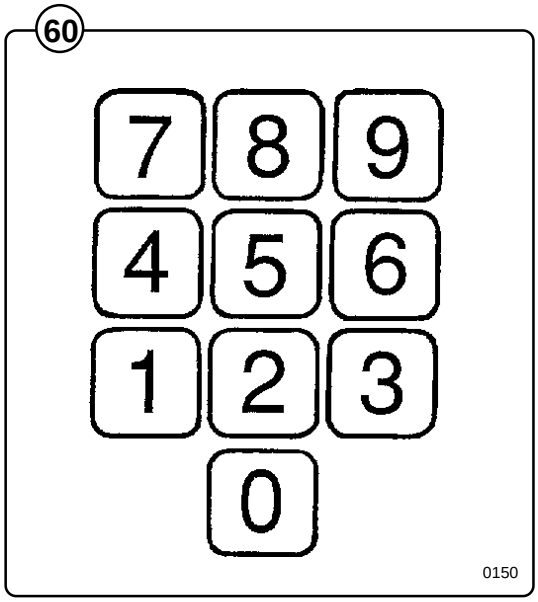
When supplied, the machine is provided with a number of standard programs (program numbers 01-09). Program numbers 10-99 are intended for your own programs (refer to the separate programming appendix).

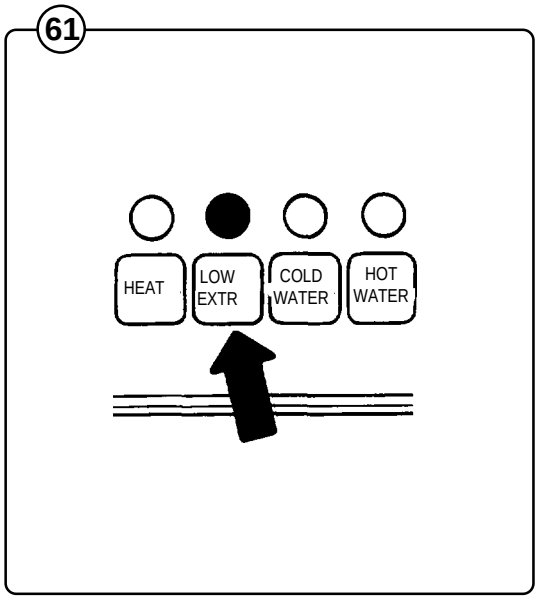
Fig. 60

- Select a program number by entering <u>two digits</u> with the digit keys. Note that program numbers 01-09 must also be entered as two digits (e.g. **0 3**).
- A number that has been entered incorrectly can be changed by entering the correct number directly after the incorrect one.

Fig. 61

If only slow spin is required, enter **LOW EXTR.**





Program information

Fig. (62) When a program has been selected and **PROG. INFO.** is pressed, further information about the program is shown in the display window's bottom three lines (see "TEXT" in programming section).

Measuring the detergent

Fig. (63) Five lights on the panel indicate which detergent compartments will be used, or supply signals provided during washing. Will be lit when specific detergent compartment is used, or signal provided.

Fig. (64) If the machine's system for powder detergent is used: meter the detergent and any additives according to the lamp indication.

Indicator lights

The indicator lights vary according to the type of machine:

EX12

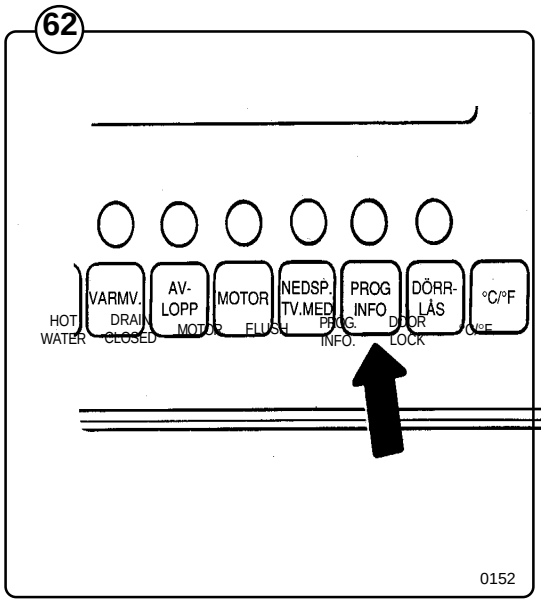
- Light 1 flushing with cold water in compartment 1.
- Light 2 flushing with cold water in compartment 2.
- Light 3 flushing with cold water in compartment 3.

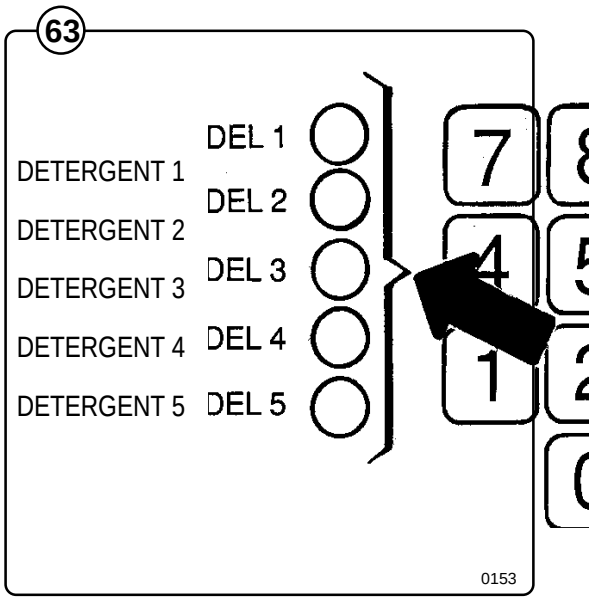
EX22

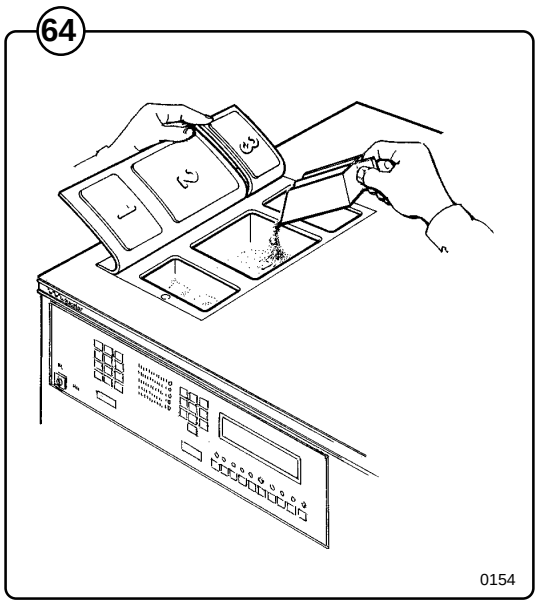
- Light 1 flushing in compartment 1.
- Light 2 flushing in compartment 2.
- Light 3 flushing in compartment 3.

Light 4 lights when the spray system is in use.

On an FC-machine light 5 (Detergent 5) is lit when reduced speed is in use.







Starting the program

Fig. (65) Fig. (66)

Press **START/HOLD/RAPID ADV.** button**.** The wash cycle will commence and the display window will display wash information as shown in the figure below.

Temporary stop

Fig. (65)

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

Fig. (65)

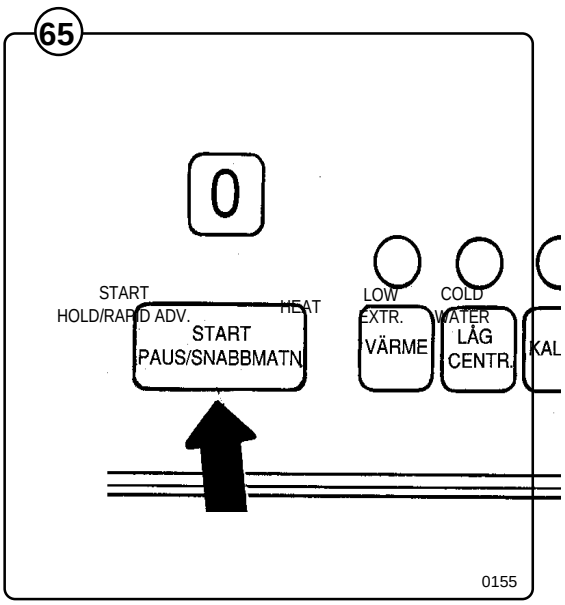
- The program is restarted by pressing **START/ HOLD/RAPID ADV.** again. It starts from the position where it had stopped unless the pause was made during a spin cycle. The program will then continue with the program section after the spin cycle.

Fast forward

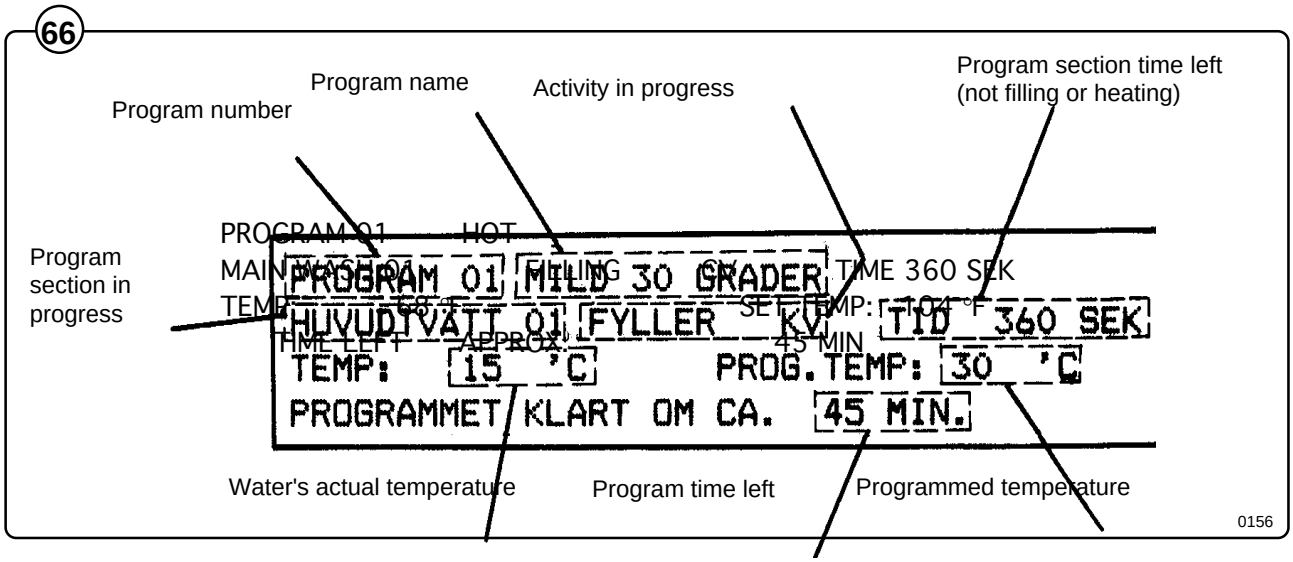
Fig. (65)

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

65



66



Programmed stop

Fig. (67) If there is a programmed stop in the program, the machine stops and a buzzer sounds. The buzzer is switched off by pressing **START/ HOLD/RAPID ADV.** The program is restarted by pressing the button again.

Tumble drying after the program is completed

Fig. (68) If the **DOOR LOCK** and **MOTOR** buttons are pressed before starting or while a program is operating, the drum will continue to rotate after the program is completed. The drum is stopped again by pressing **MOTOR** again. Press **DOOR LOCK** when the extraction is finished and the drum has come to a complete stop.

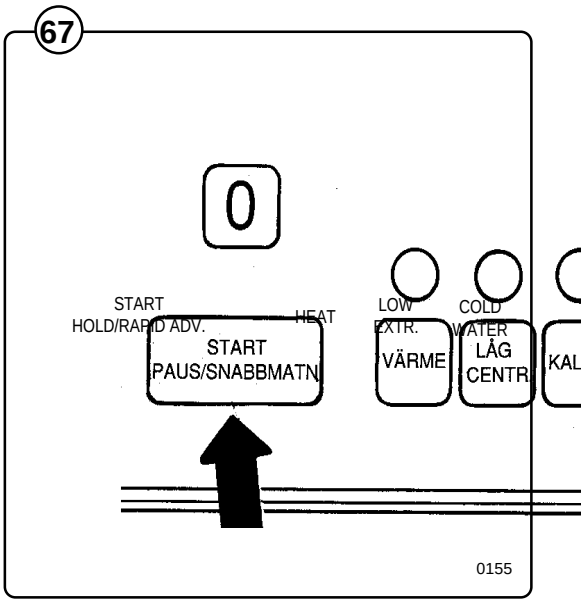
Finishing off

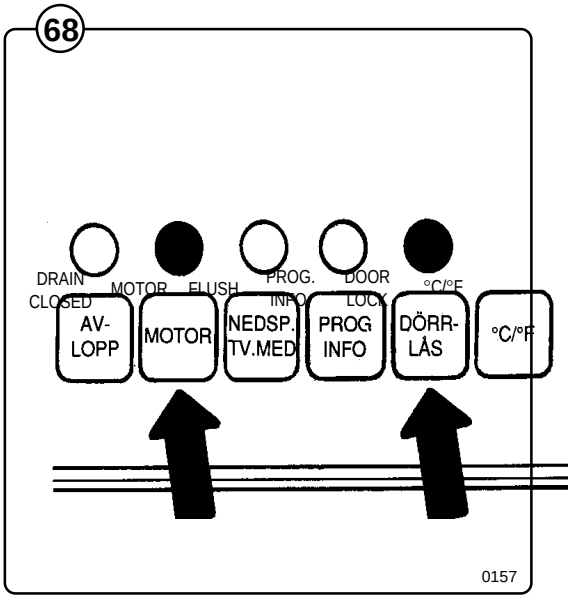
When the wash is completed, buzzer may sound if this function is programmed.

Open the door and take out the wash.

After use

Switch off all manual buttons so that all the indicator lights above the buttons are off.





Manual washing

- The indiciator lamps above the control buttons indicate that the function is active. **COLD WATER, HOT WATER** and **FLUSH** must be kept pressed to remain active. Other control buttons change function (ON-OFF) each time they are pressed.

Fig. 69
- Lock the door by pressing **DOOR LOCK** (the lamp above the shall light up). Note that the door must be locked for other manual operations to be possible.

Fig. 70
- The wash motor is started and operates with a reversing action when the **MOTOR** button is pressed.

Fig. 71
- Water is filled with **COLD WATER** and **HOT WATER. FLUSH** is used to wash down detergent from compartment 1 (pre-wash) or detergent valve 1.

Fig. 72
- The wash water is heated by pressing HEAT.

When **HEAT** is pushed in, the character display shoows:

```
            **MANUAL HEATING OFF**
TEMP 25°C              FINAL TEMP°C
SELECT TEMPERATURE. PUSH START
```

Indicate desiried temperature by using the key board. Push **START** to begin the heating. The display will now show:

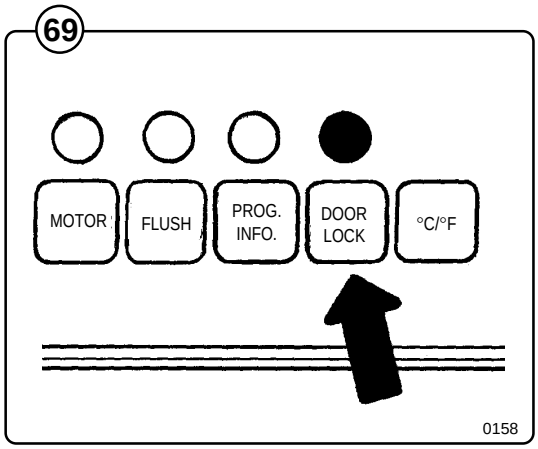
```
**MANUAL HEAING ON**
TEMP 25°C                  FINAL TEMP 60°C
HEAT SHUT-OFF: PUSH HEAT
```

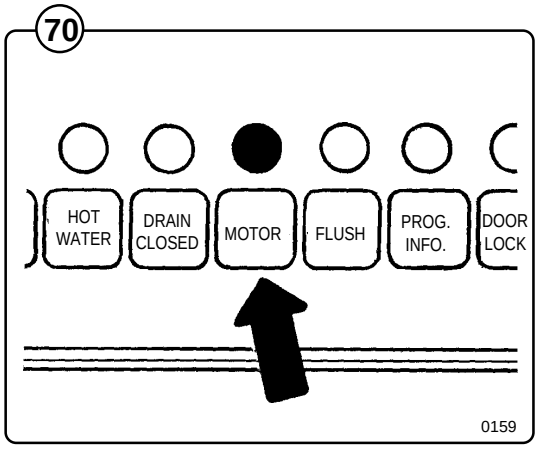
If a new heating temperature is desired, push **HEAT** to shut off heat. A new cycle can now be selected. The first line in the display will show whether the heat is turned on or off.

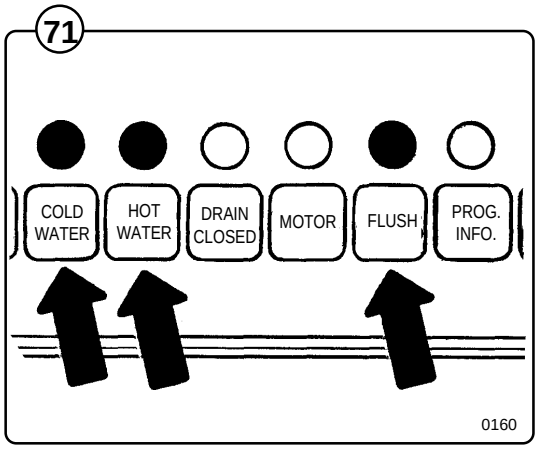
When the programmed temperature is reached, the heat turns off automatically.

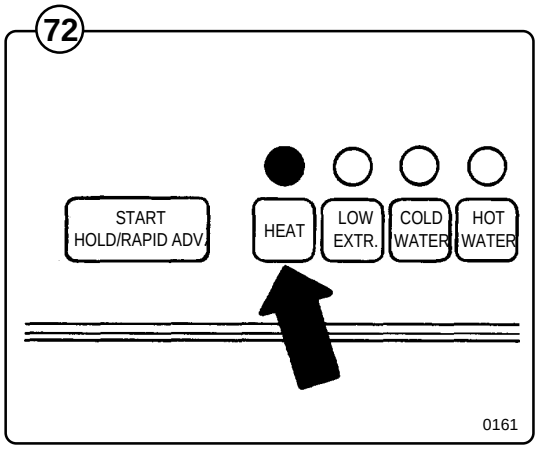
Note that there is no temperature limit or indication of the temperature during manual washing. Heating is discontinued however at 208°F (98°C).

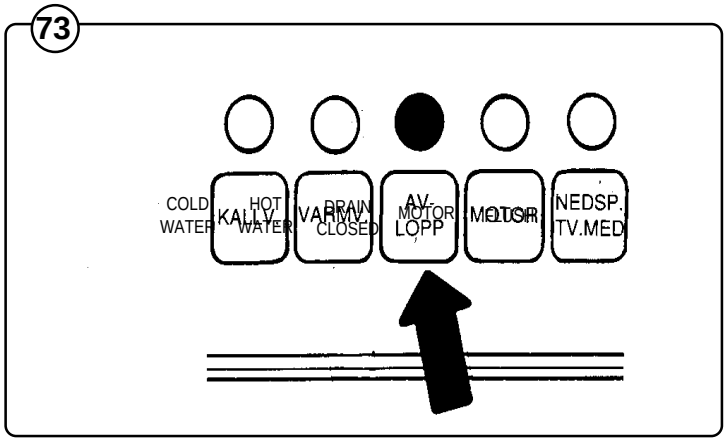
Fig. 73
- The drain valve is operated with **DRAIN.** The valve is closed when the light is on.











Extract cycle

For safety reasons, there is no manual button for the extract cycle. There are two choices if extracting is required during manual operation:

- 1. Select one of the standard programs and fast forward to the "Extract" cycle.
- 2. Program your own program by draining and extracting for the required time.

Remember the following when programming: Let the drain valve be open for at least 30 seconds before starting the spin cycle and program for distribution speed during the drain sequence.

Finishing off

Fig. 74

- Switch off the activated function so that all control lamps above the controls go out.

Program statistics

Fig. 75

- By selecting program number 00 and pressing **PROG. INFO,** the character display shows program statistics.

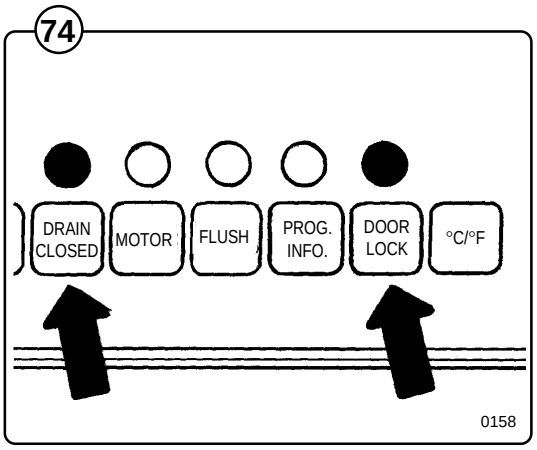
Fig. 76

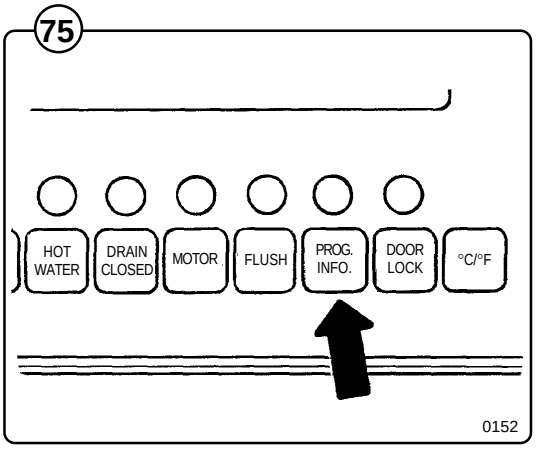
Fig. 77

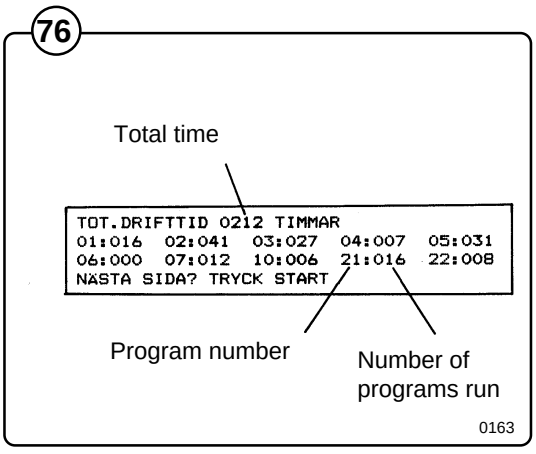
- The machine's operating time in hours is displayed first followed by the number of programs operated for the different programs. New programs are brought forward by repeatedly pressing **START/HOLD/ RAPID ADV.**

Fig. 75

- Press **PROG. INFO** once again to get back to the normal position.







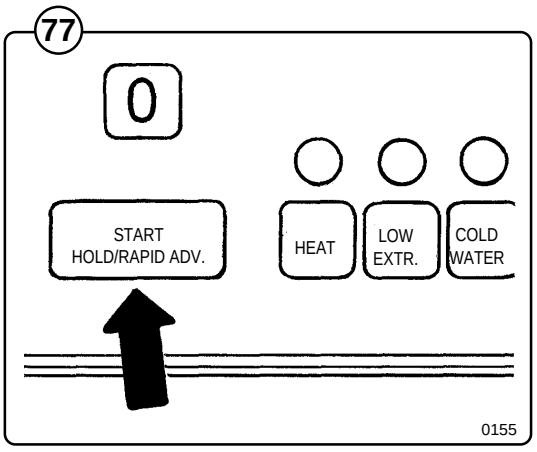
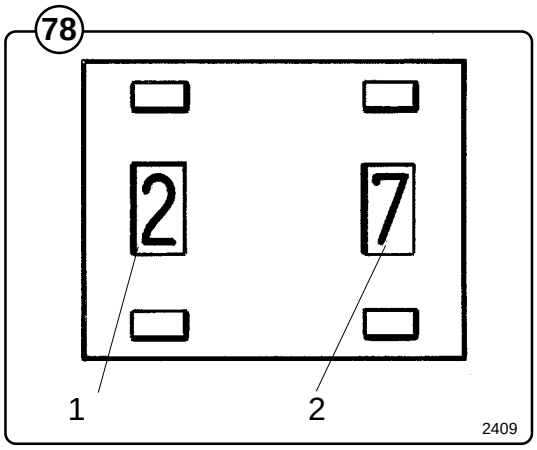


Fig. 78



The machine has two thumb wheel switches for determining the speed for low and high extraction.

The value on these switches can be changed while the machine is in operation.

The time for low extraction (Switch 1) shall be programmed under question "Low extraction XX min XX sec" and high extraction (switch 2) under question "High extraction XX mini XX sec".

EX12

Switch 1 is used for low extraction and can be set on the following values:

Position	1	340 rpm	(40G)
	2	420 rpm	(60G)
	3	510 rpm	(90G)

Position 4-9 and 0 can not be used.

Switch 2:

Position	4	590 rpm	(120G)
	5	680 rpm	(160G)
	6	760 rpm	(200G)
	7	850 rpm	(250G)
	8	950 rpm	(310G)

Position 0-3 and 9 can not be used.

EX22

Switch 1:

Position	1	300 rpm	(40G)
	2	380 rpm	(60G)
	3	460 rpm	(90G)

Position 4-9 and 0 can not be used.

Switch 2:

Position	4	540 rpm	(120G)
	5	620 rpm	(160G)
	6	700 rpm	(200G)
	7	780 rpm	(250G)
	8	850 rpm	(300G)

Position 0-3 and 9 can not be used.

General

Fig. 79

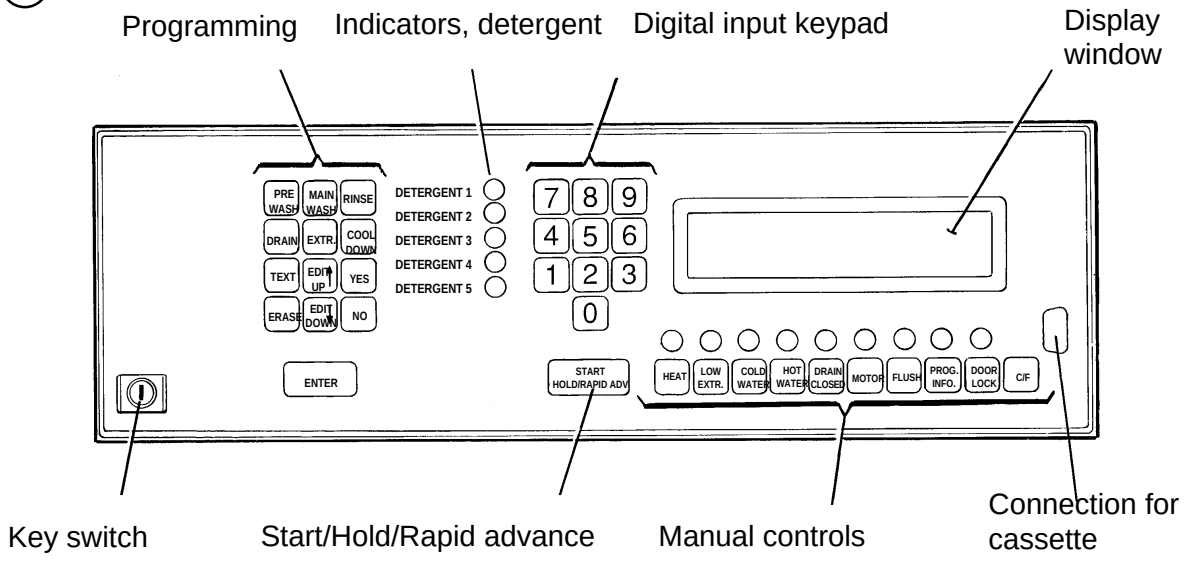
The washing machine's program operation is controlled by a microcomputer and the wash programs are stored in an electronic memory. Program controls are very exact and the wash programs can be easily adapted to the end user's individual requirements.

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

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

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

79



Programming - general description

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

Programming a completely new program

Fig. 80

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

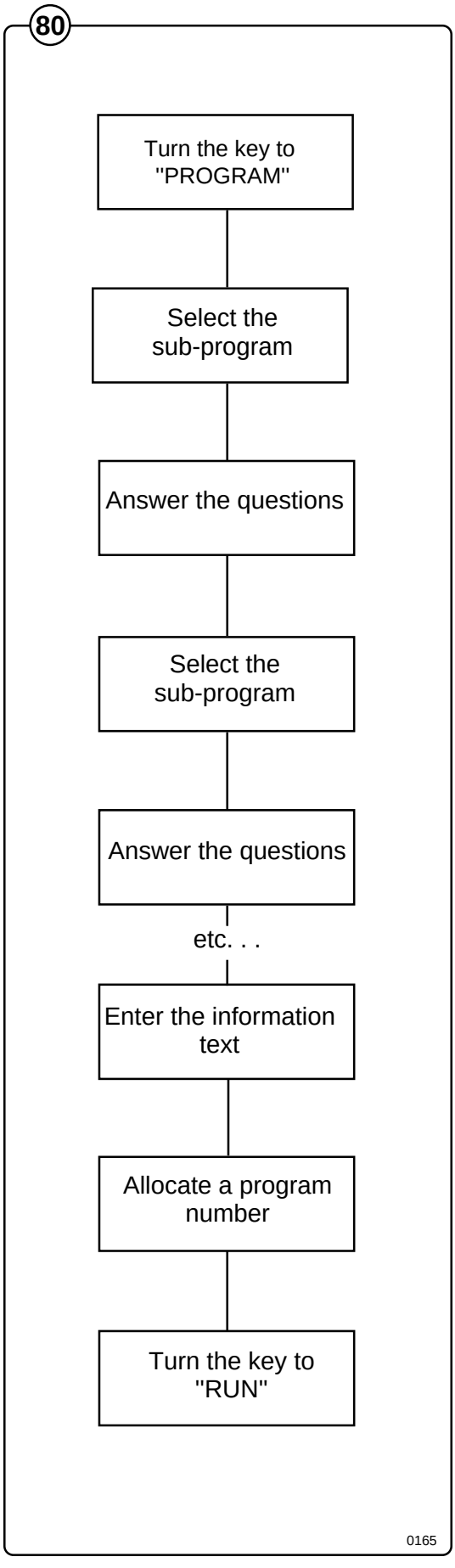
A program can, for example, be built up in the following way:

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

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

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

The last thing to be done is to store the program in the program memory under an unused program number.

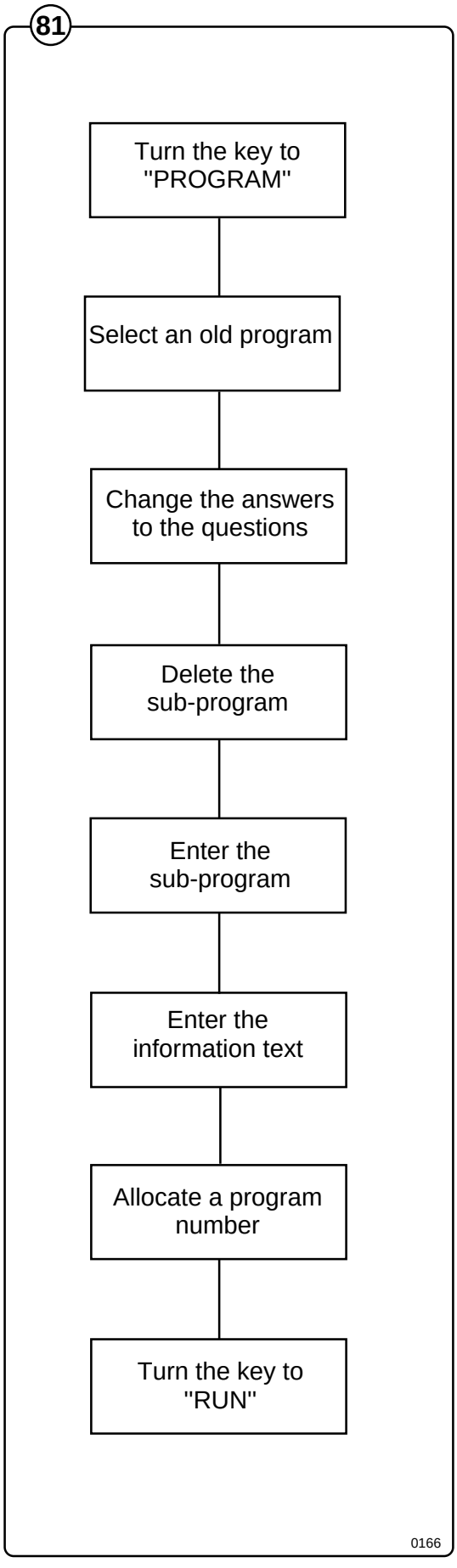


Using and old program as a background

Fig. 81

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

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



Controls

The key switch

Fig. (82) Turn the switch to the **PROGRAM** position if the wash program is to be programmed or changed.

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

ENTER

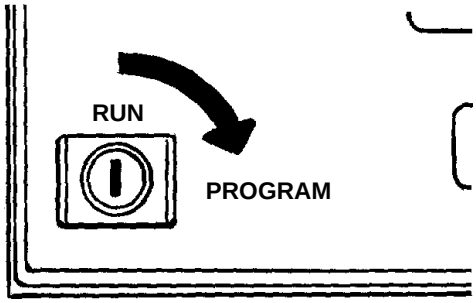
Fig. (83) An important principle when programming is that all commands (such as the choice of sub-program, answers to questions, text input) must be followed by **ENTER.**

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

EDIT UP and EDIT DOWN

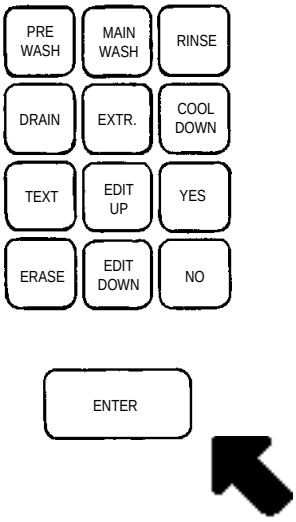
Fig. (84) The **EDIT UP** and **EDIT DOWN** buttons are used to go backwards or forwards in the program without its being affected, e.g. to go through the questions in a sub-program. The buttons are also used to enter program text (see under the heading ''Entering text'').

82



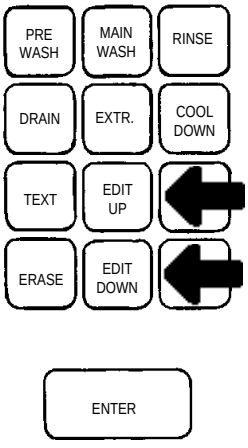
0167

83



0168

84



0169

Erase

Fig. (85) This button can be used in three different ways:

- Deleting a complete program.

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

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

Fig. (86)

- Deleting a section of a program.

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

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

Fig. (87)

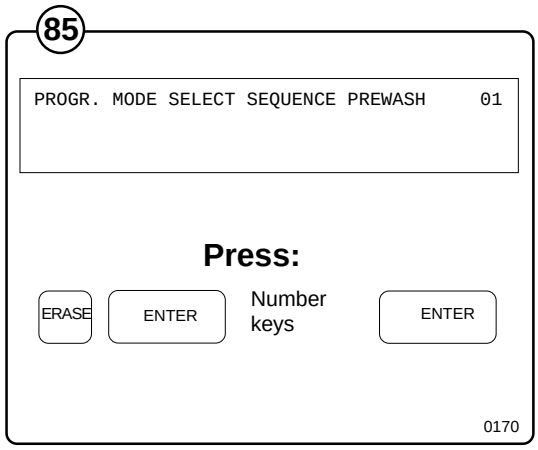
- Deleting characters when entering text.

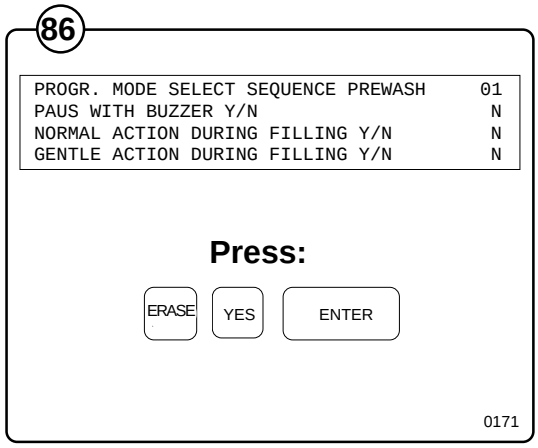
  To delete individual characters when programming text, press **ERASE**. The last character you entered will disappear. (see under the heading ''TEXT'').

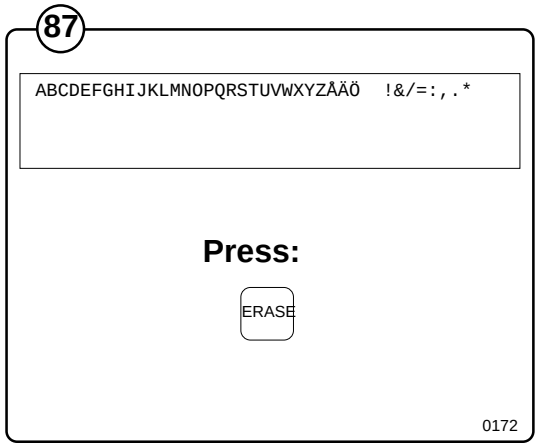
Selecting sub-programs

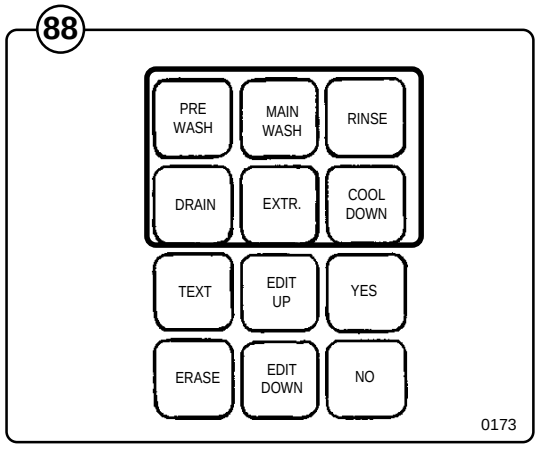
Fig. (88) Press buttons **PRE WASH, MAIN WASH, RINSE, DRAIN, EXTR**. and **COOL DOWN** designate different sub-programs and can be used to construct complete wash programs.

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









YES, NO, number keys

Fig. (89) These keys are used to answer the different questions which are found under each sub-program. All answers must be followed by pressing **ENTER** for the answer to be registered.

TEXT

Fig. (90) The key for **TEXT** is used for entering the explanatory text which is displayed when **PROG.INFO**. is pressed after that a program is selected.

Proceed as follows:

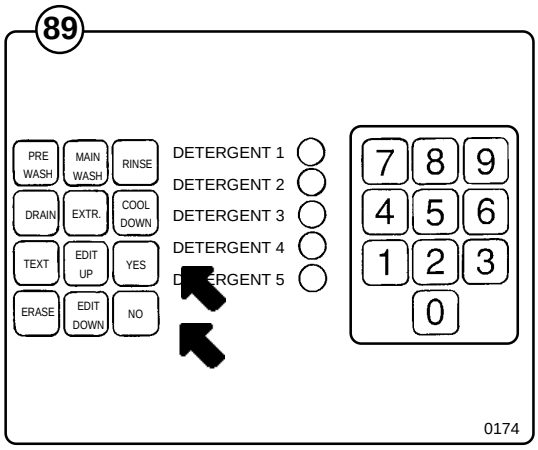
- Press **TEXT** when the display window displays ''PROG. MODE SELECT SEQUENCE''. Press **ENTER.**

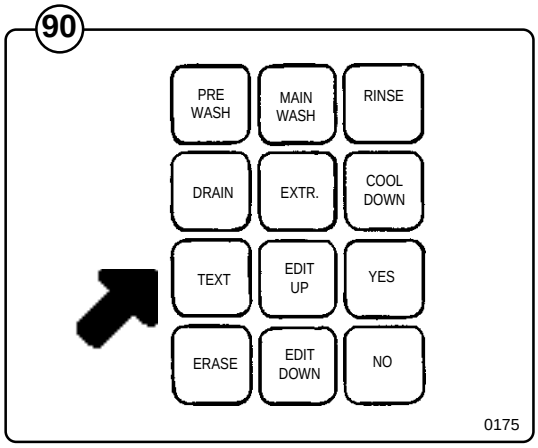
Fig. (91)

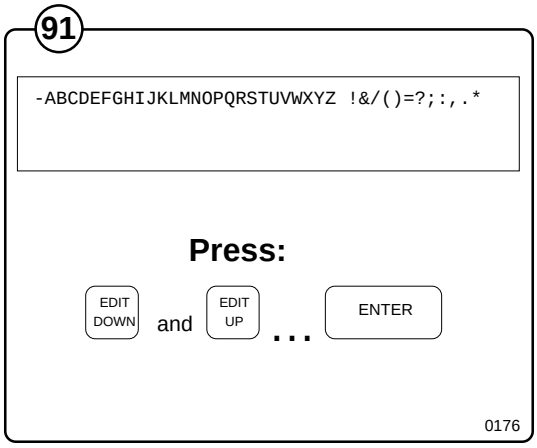
- The alphabet is then displayed together with a number of special characters in the display window. By using the **EDIT UP** and **EDIT DOWN** keys, the cursor (the flashing square) can be moved along the character line.
- The first character of the text is entered by pressing **ENTER** when the cursor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

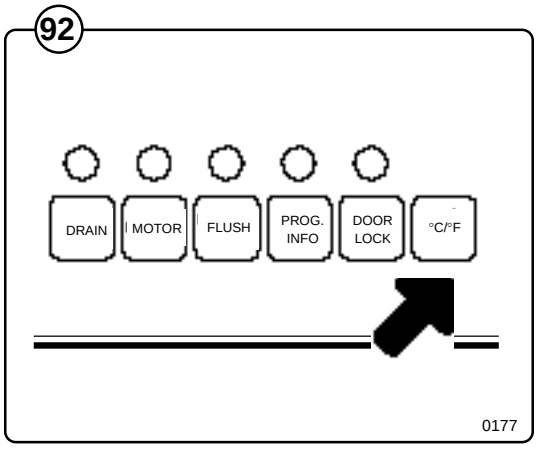
°C/°F

Fig. (92) The temperature range required can be selected by pressing °**C/**°**F**. The button has an alteration function.









Programming a new program

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

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

Turn the key

Fig. (93) Turn the key to the **PROGRAM** position. The first character will then be displayed in the display window.

Select ''New program''

Fig. (94) Answer **NO** to the question ''DO YOU WANT AN OLD PROG. AS BACKGROUND?''. Press **ENTER**.

Select sub-program

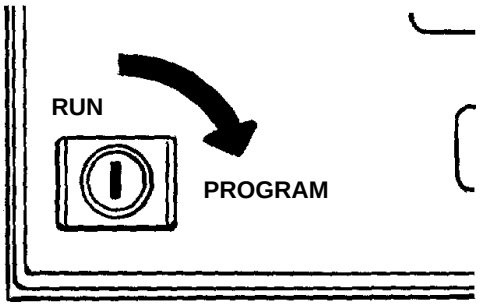
Fig. (95) Select one of the following: **PRE WASH, MAIN WASH, RINSE, DRAIN, EXTR, COOL DOWN, TEXT** or **ERASE**. Press **ENTER** immediately after the first selection is pressed.

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

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

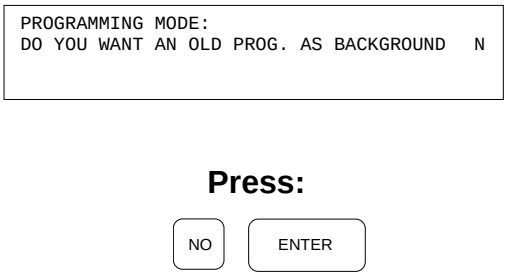
If **ERASE** is pressed, an entire program can be deleted.

93



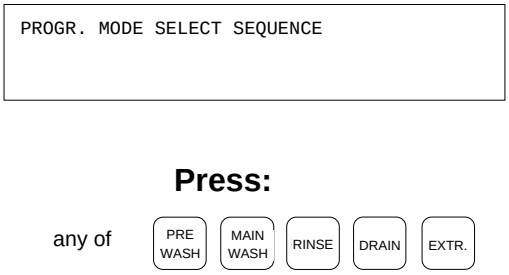
0167

94



0178

95



0179

Answering questions

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

- The cursor (the flashing square) is always to the right of line three in the display window. This means that it is the question on line three that is to be answered.
- The list of questions can be moved up or down in the display window with the **EDIT UP** and **EDIT DOWN** buttons.
- Begin by answering the questions from the top. You may need to press **EDIT UP** once to answer the first question.
- Questions which are answered with either YES or NO are pre-programmed to NO. To answer YES, press **YES** and then **ENTER**. The **NO** button can be used to correct an incorrect YES answer. Each time **ENTER** is pressed, the next question will appear so that it can be answered.
- Questions which are answered with a number are pre-programmed to O. Use the number keys and press **ENTER** when the number is correct.
- When ''END OF SEQUENCE'' appears on the third line in the display window, and all questions are answered, press **EDIT DOWN**. A new sub-program can now be selected.

Fig. 96

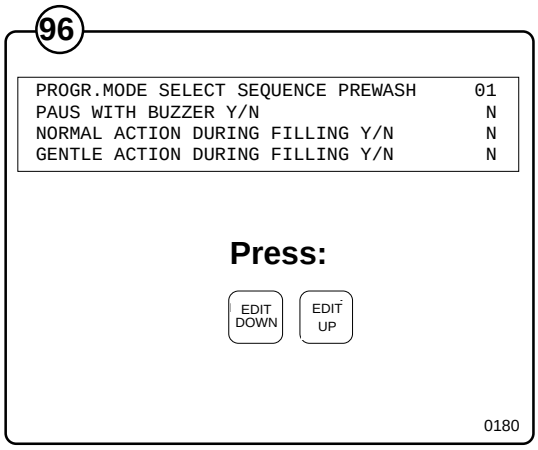


Fig. 97

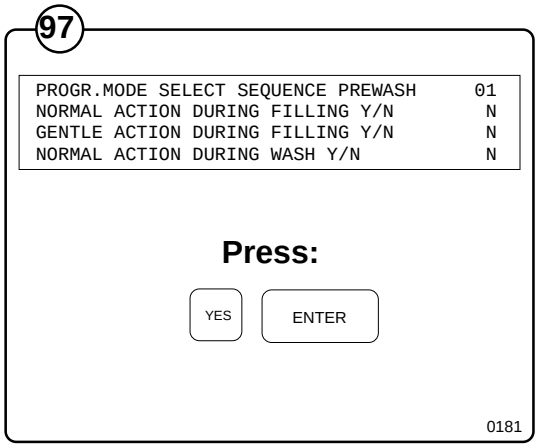


Fig. 98

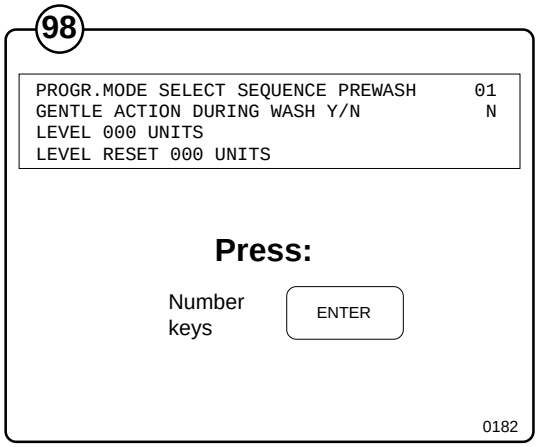
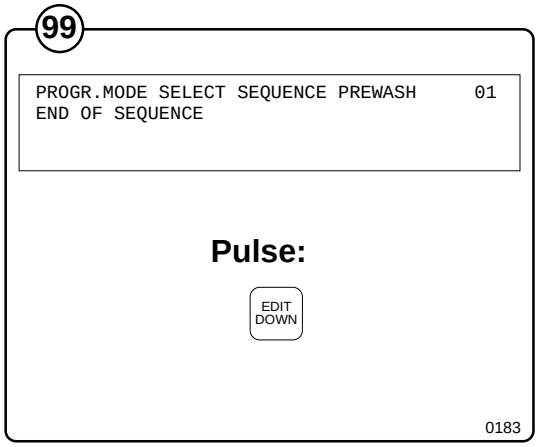


Fig. 99



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

> **NOTE:**
>
> **The questions which are described do not apply to all machines. On certain types of machines, some of the values are programmed as standard values and need therefore not be answered.**

Pre wash, main wash, rinsing

The questions in these three sub-programs are identical.

Pause with signal

Fig. (100) If the question is answered with YES, the machine stops before the sub-program is started and a buzzer sounds.

Normal action/gentle action

Fig. (101) Select the action while filling, heating and washing. One of the alternatives under each sequence shall be answered with YES, NO to all six questions will result in a stationary drum.

Level

Fig. (102) The water level can be programmed according to 255 scale divisions (units). Level 255 corresponds to a pressure of 600 mm wc. This means that the values for normal and high level can vary between different sizes of machines.

Fig. (103) The table shows the recommended values for the relevant machines.

100

```
PROGR.MODE SELECT SEQUENCE  PREWASH    01
PAUS WITH BUZZER Y/N                    N
NORMAL ACTION DURING FILLING Y/N        N
```

Press:

YES | ENTER | or | EDIT DOWN

0184

101

```
PROGR.MODE SELECT SEQUENCE  PREWASH    01
PAUS WITH BUZZER Y/N                    N
NORMAL ACTION DURING FILLING Y/N        N
GENTLE ACTION DURING FILLING Y/N
```

Press:

YES | ENTER | or | EDIT DOWN

0185

102

```
PROGR.MODE SELECT SEQUENCE   PREWASH   01
GENTLE ACTION DURING WASH Y/N           N
LEVEL 000 UNITS
LEVEL RESET 000 UNITS
```

Press:

Number keys | ENTER | or | EDIT DOWN

0188

103

Machines with fixed drums

Model	Level (units) Low	High
FL 125	40	80
FL 185	40	80
FL 244	45	90
S 150	40	80
S 230	45	90

Free-swinging machines

Model	Level (units) Low	High
EX 12	145	175
EX 22	160	195
EX 80	85	150
EX 100	140	220
EX 200	100	220

Refilling

Fig. (104) LEVEL RESET is value which regulates at which level water is to be refilled if the water level drops while a wash is in progress.

Example:

The following values are programmed:

- Level: 130 units
- Level reset: 10 units

This means that:

- Water is filled to level 130 at the beginning of the sub-program. If the water level drops below level 120 (130-10) during the course of the program, the water level is refilled to level 130.
- Select a level between 0-255. Values greater than the level value mean that no water will be added.
- The recommended value is 20 units.

Temperature

Fig. (105) The water temperature can be programmed either in °C or °F. Use the °C/°F button to change between scales (note that the change is not displayed until the next change in the display window is made).

Temperatures can be selected within the range of 32-212°F (0-100°C) in stages of 1°.

Time

Fig. (106) A sub-program can be timed in stages of 10 seconds. The longest time that can be programmed is 41 min. 40 sec (2500 seconds). The time does not include the time for water filling or heating.

104

```
PROGR. MODE SELECT SEQUENCE   PREWASH  01
LEVEL 000 UNITS
LEVEL RESET 000 UNITS
TEMPERATURE  000 °C
```

Press:

Number keys — ENTER or EDIT DOWN

0190

105

```
PROGR.MODE SELECT SEQUENCE PREWASH     01
LEVEL RESET 000 UNITS
TEMPERATURE  000 °C
WASHTIME    00 MIN.  00 SEC.
```

Press:

Number keys — ENTER or EDIT DOWN

0191

106

```
PROGR.MODE SELECT SEQUENCE PREWASH     01
TEMPERATURE  000 °C
WASHTIME    00 MIN.  00 SEC.
COLD WATER Y/N                          N
```

Press:

Number keys — ENTER or EDIT DOWN

0192

Water filling

Fig. 107

One or several water valves can be selected.

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

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

Supply injector

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

Fig. 108

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

* Liquid from tank valid only for machine with external tanks.

Fig. 109

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

* Reduced speed valid only for FC-macines.

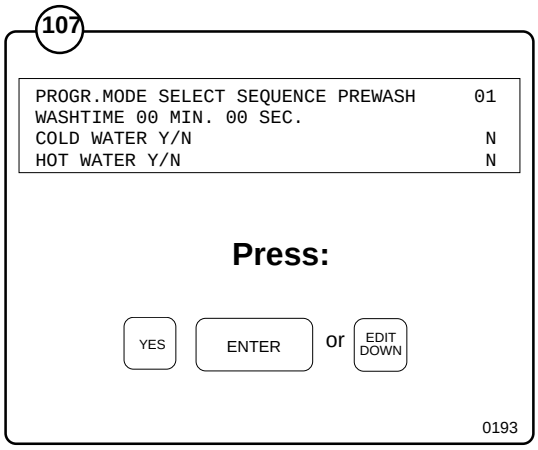
Special programming applies to certain machine sizes:

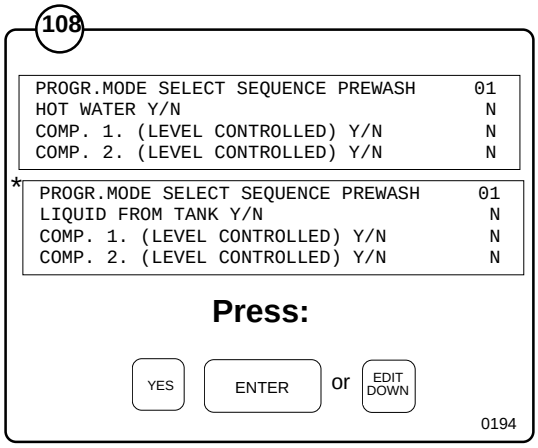
EX12

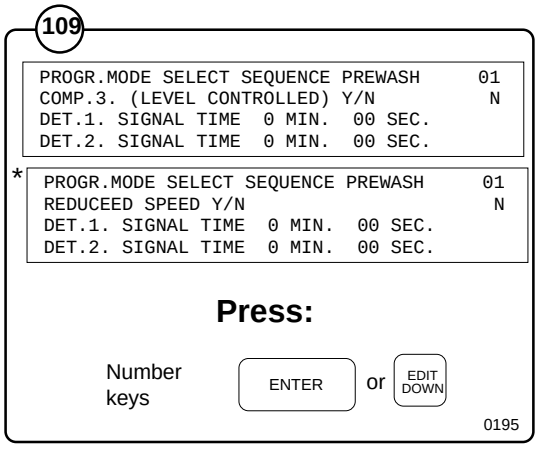
- detergent compartment/signal 2:
  flushing with cold water in compartment 2
- detergent compartment/signal 4:
  flushing with hot water in compartment 2

EX22

- detergent compartment/signal 2
  flushing with cold/hot water in compartment 2







Drain

Pause with signal

Fig. (110) If the question is answered with YES, the washing machine will stop before the sub-program starts and a buzzer will sound.

Normal action/gentle action/distribution

Fig. (111) Select the method of working while draining. Distribution action is used before a spin cycle so that garments are equally distributed around the drum.

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

Drain 1/Drain 2

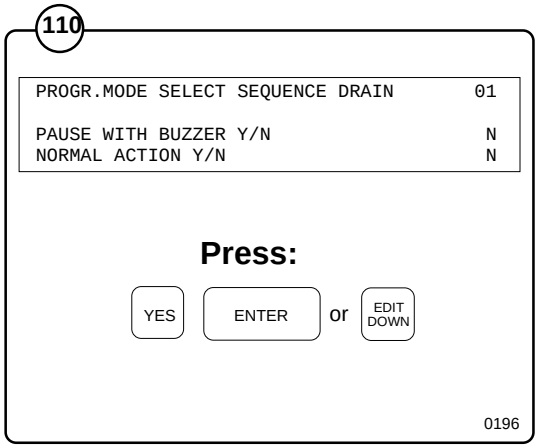
Fig. (112) These two questions need to be asked if the machine is fitted with an additional drain valve (e.g.) for recycling the rinse water). This determines the route the drain water takes.

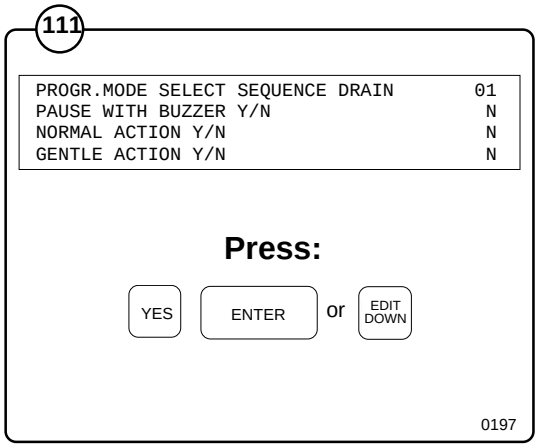
✱ Liquid to tank, answer Yes. No gives normal drain.

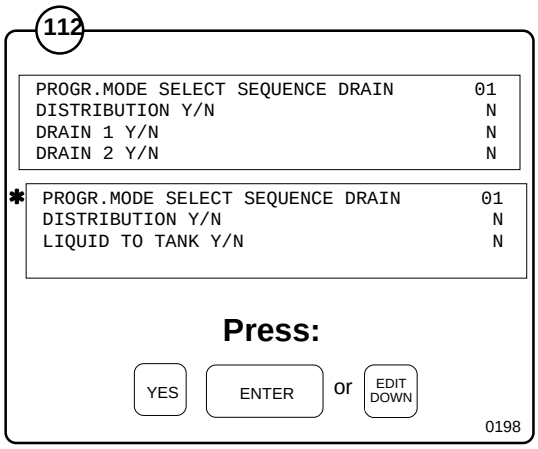
The machine's own drain valve opens automatically during the drain function.

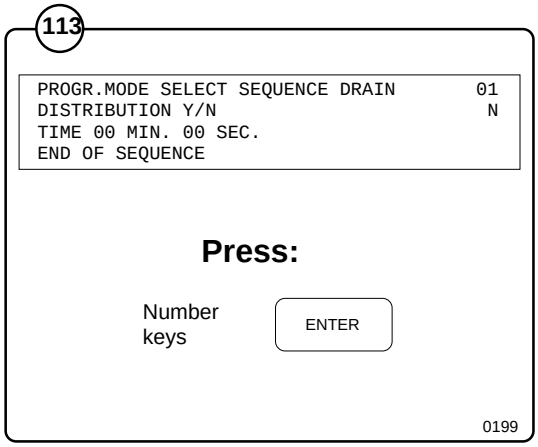
Time

Fig. (113) The emptying time can be programmed in stages of 10 seconds. The longest time that can be programmed is 41 minutes 40 seconds (2500 seconds).









Programming complete

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

Extract cycle

Extract cycle times

Fig. (114) The time can be programmed in stages of 10 seconds. The longest time that can be programmed is 42 minutes 30 seconds (2550 seconds) for high and low speed extracting.

If both extract speeds are selected, the low speed will precede the high speed extracting.

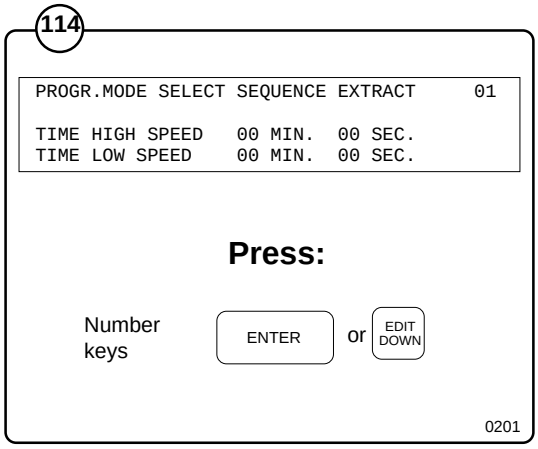
Programming complete

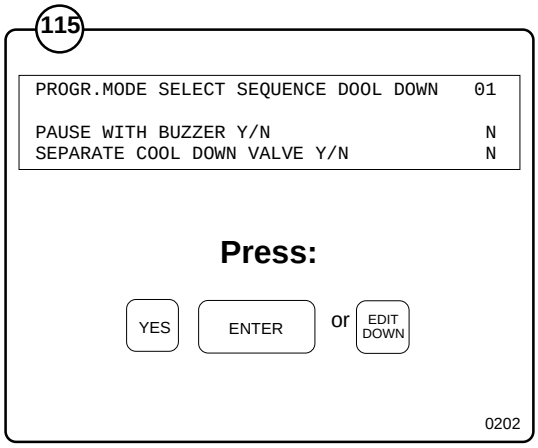
- When ''END OF SEQUENCE'' appears on the third line of the display window and all questions are answered, press **EDIT DOWN**.
- Answer NO to the question ''END PROG. SESSION Y/N?'' if there are more sub-programs to be answered. Answer YES if the sub-program is the last in the completed program. The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

Cooling

Pause with signal

Fig. (115) If the question is answered with YES, the machine will stop before the sub-program starts and a buzzer will sound.





Special cooling valve

Fig. (116) Answer YES is there is a separate water valve use for cooling. If the answer is NO, the standard cold water inlet is used.

Gentle action

Fig. (117) Answer YES if the machine is to operate on gentle action during cooling. The machine will operate on normal action if the answer is NO.

Times

Fig. (118) Cold water is supplied in stages by the water valve opening and closing according to a particular pattern. The time for an opening or closing sequence is 30 seconds. This time is permanently programmed and cannot be changed. All that can be programmed is the ratio between open and closed valve.

Fig. (119) The time the valve i open (ON time) can be programmed separately between 1 and 15 seconds. The valve is closed during the remaining time up to 30 seconds. The ON time is programmed separately within two temperature ranges: 212-158°F (100-70°C) and 158°F (70°C) — final temperature.

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

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

116

```
PROGR.MODE SELECT SEQUENCE COOL DOWN   01
PAUSE WITH BUZZER Y/N                   N
SEPARATE COOL DOWN VALVE Y/N            N
GENTLE ACTION Y/N                       N
```

Press:

YES ENTER or EDIT DOWN

0203

117

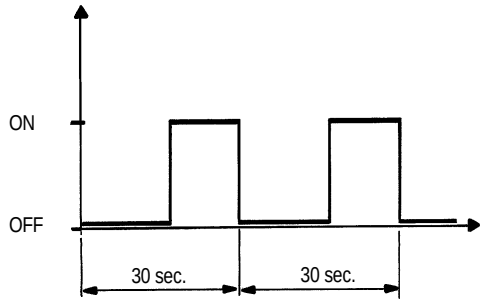
```
PROGR.MODE SELECT SEQUENCE COOL DOWN   01
SEPARATE COOL DOWN VALVE Y/N            N
GENTLE ACTION Y/N                       N
ON TIME 212-158°F (100-70°C)   000 SEC..
```

Press:

YES ENTER or EDIT DOWN

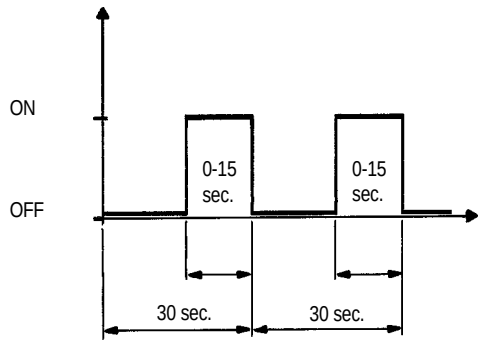
0204

118



0205

119



0206

Example:

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

The following takes place:

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

Fig. 120

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

Fig. 121

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

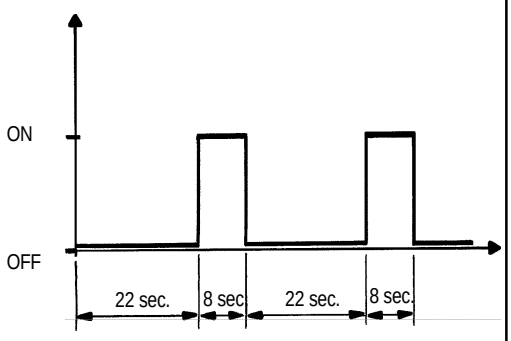
Fast cool down

Fig. 122 Fast cool down takes place if cool down is selected and END TEMP is set to 0. The water level is raised to the level set by the factory as the high level without the cold water valve being shut off.

Programming complete

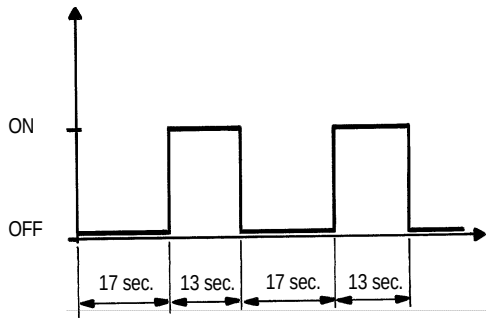
- When ''END OF SEQUENCE'' appears on the third line of the display window and all questions are answered, press **EDIT DOWN**.
- Answer NO to the question ''END PROG: SESSION Y/N? if there are more sub-programs to be answered. Answer YES if the sub-program is the last in the completed program. The continue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

120



0207

121



0208

122

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

Pulse:

EDIT DOWN EDIT DOWN ...

0209

Text

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

Fig. 123

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

Fig. 124

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

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

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

End questions

Fig. 125

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

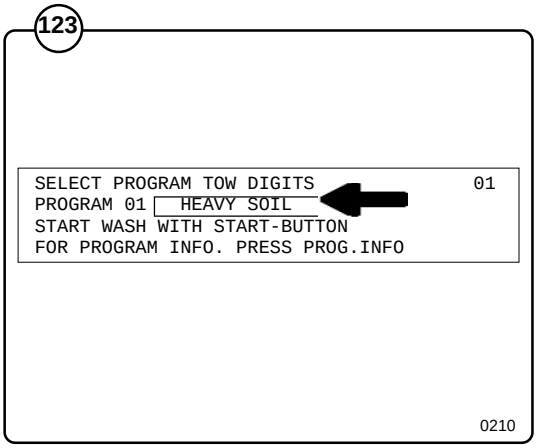
  Answer YES when the programming of sub-programs is to be finished. The end questions will then appear on the display.

Signal at the end of the program

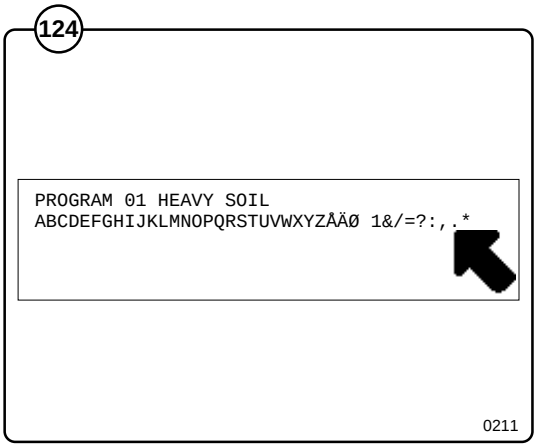
Fig. 126

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

123

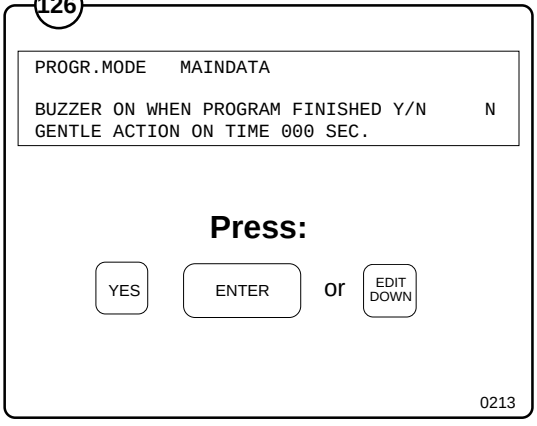


124



125

126



Times for normal action and gentle action

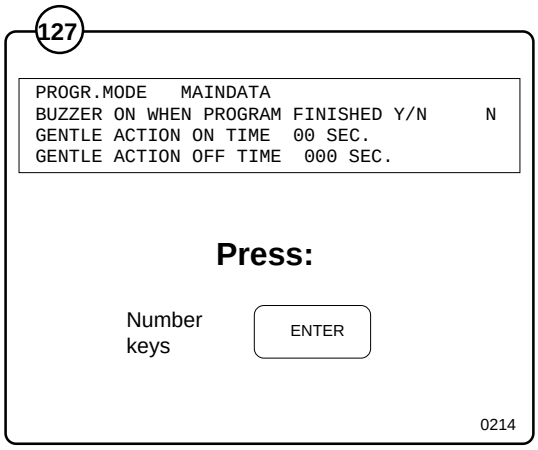
Fig. (127) The times for rotating and stationary drum during normal and gentle action can be programmed. All times can be selected within the range of 0-30 seconds with 1 second intervals.

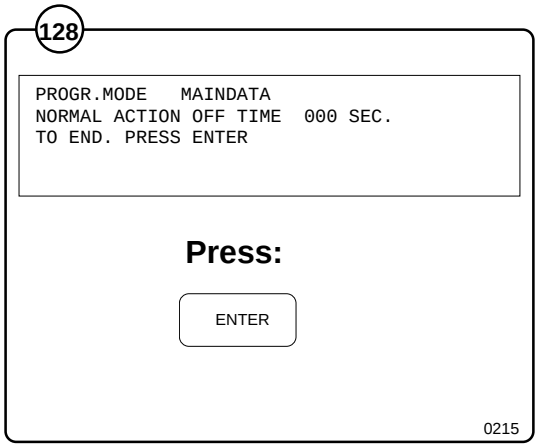
Fig. (128) Press **ENTER** when ''TO END. PRESS ENTER'' is displayed in the display window.

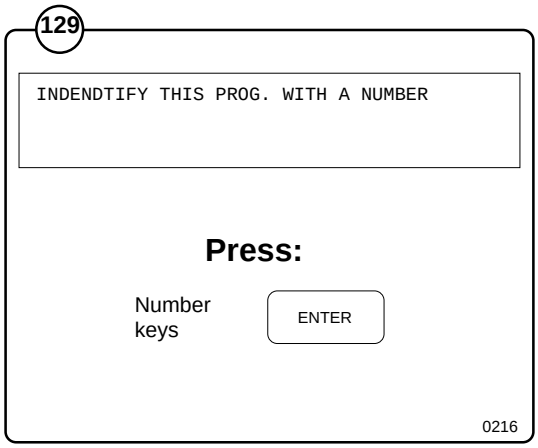
Entering the program number

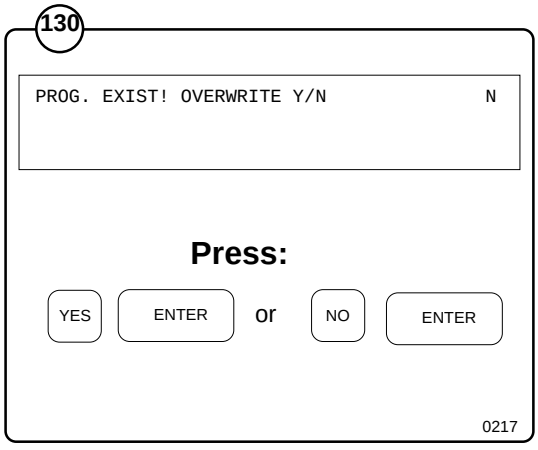
Fig. (129) Enter a two-digit number and press **ENTER**. Note that the numbers 01-09 are reserved for factory programs.

Fig. (130) If the program number selected is already in use, there is the option of either deleting the old program (not applicable to factory programs) or selecting a new program number.









Program names

Fig. (131) You can now give the program a name which will be displayed when the program is selected during washing. The text can be up to 29 characters long.

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

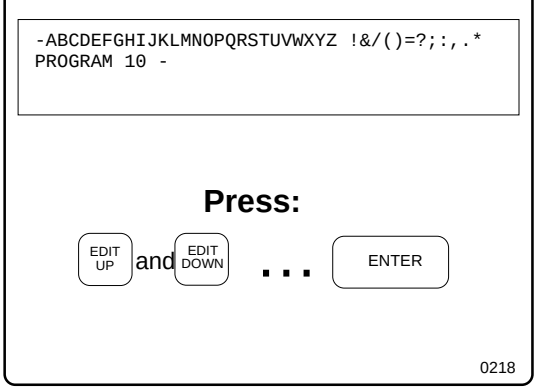
Saving programs

Fig. (132) When the program has been given a name, the program is saved in the program memory.

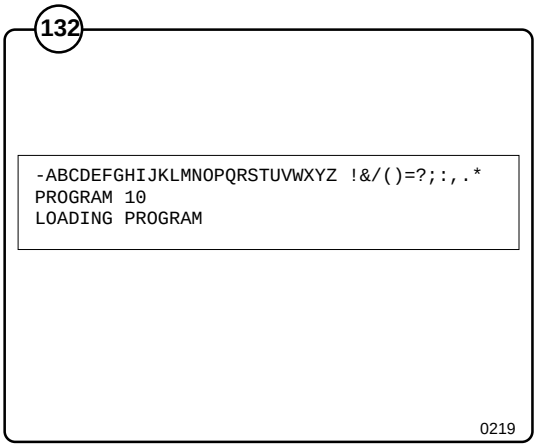
Fig. (133) You are then asked if further programs are to be programmed. Press **YES** and **ENTER** if this is the case.

Fig. (134) If you do not wish to program more programs, turn the key switch to **RUN**.

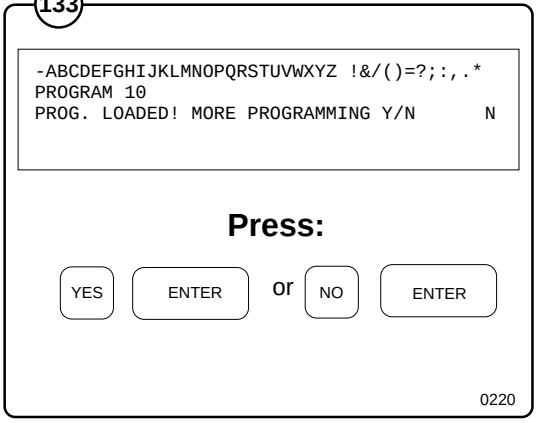
131



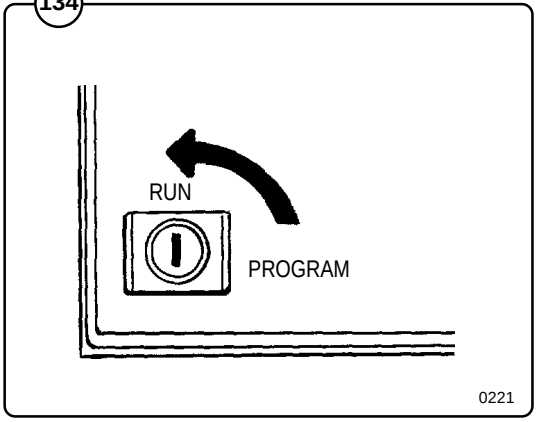
132



133



134



Starting from a previously saved program

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

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

Turn the key

Fig. 135 Turn the key to the **PROGRAM** position. The first question will now be displayed in the display window.

Select an old program

Fig. 136 Answer YES to the question ''DO YOU WANT AN OLD PROGR. AS BACKGROUND?''. Press **ENTER**.

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

Looking through the program

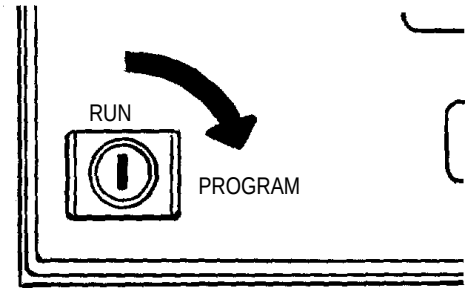
Fig. 137 To rapidly reach the module in the wash program that is to be altered you can rapid advance through the program module-by-module by keeping the **EDIT DOWN** button continuously depressed.

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

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

Fig. 138 Depress **ENTER** once.

135



0167

136

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

Press:

YES | ENTER | Number keys | ENTER

0222

137

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

Press:

EDIT DOWN

0223

138

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

Press:

ENTER

0224

Fig. 139 The cursor will appear on the first line of this sub-program.

Fig. 140 Use **EDIT UP** and **EDIT DOWN** to move within the sub-program to reach the line(s) to be altered.

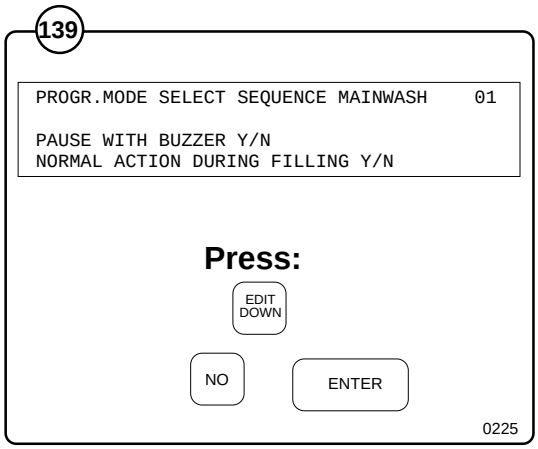
NOTE

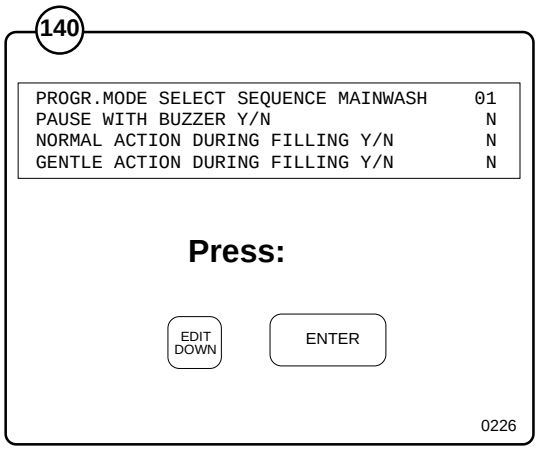
ENTER is to be used only as an acknowledgement when sub-questions are to be altered. Use buttons EDIT UP and EDIT DOWN to move around within the program.

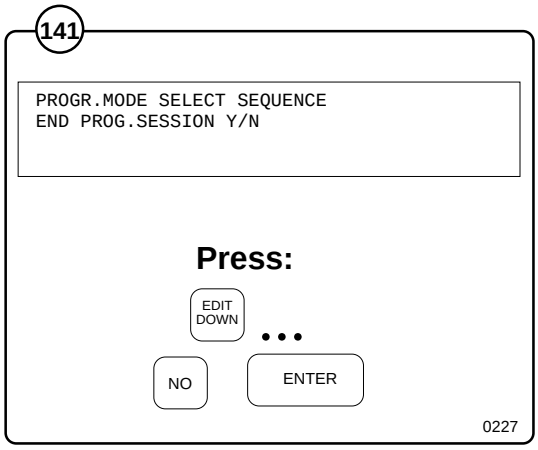
Fig. 141 When changes have been made to the module and you reach its last line, the ''END PROGR. SESSION Y/N'' query will appear. Enter **NO** if you wish to continue making changes to any other module and press **ENTER**.

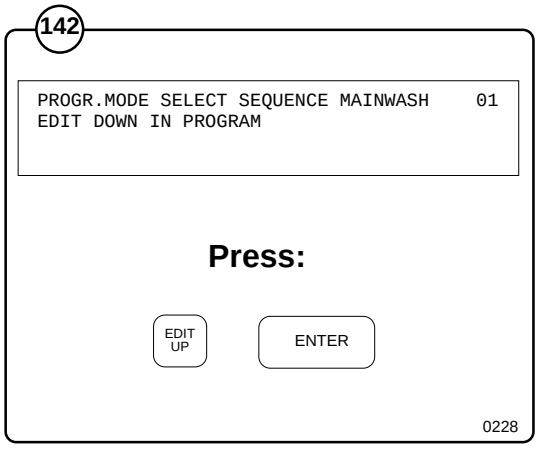
Fig. 142 To move to another module use **EDIT U**P or **EDIT DOWN** buttons and continue as described above.

(Depress and keep down).









NOTE

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

Making changes to the program

Fig. 143 Use **EDIT UP** and **EDIT DOWN** so that the question to be changed is on the third line in the display window. The cursor (the flashing square) is on the far left of line three.

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

Fig. 144 Enter the new answer with **YES**, **NO** or the number keys. Then press **ENTER**.

Deleting sub-programs

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

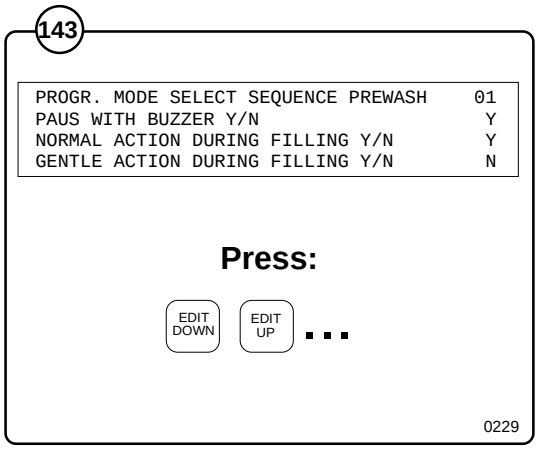
Fig. 145 Answer **YES** and **ENTER** to the question ''ERASE THIS MODULE Y/N?'' when you want the whole sub-program erased.

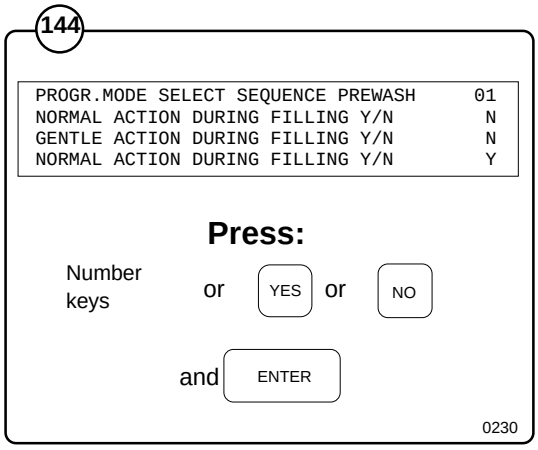
Adding sub-programs

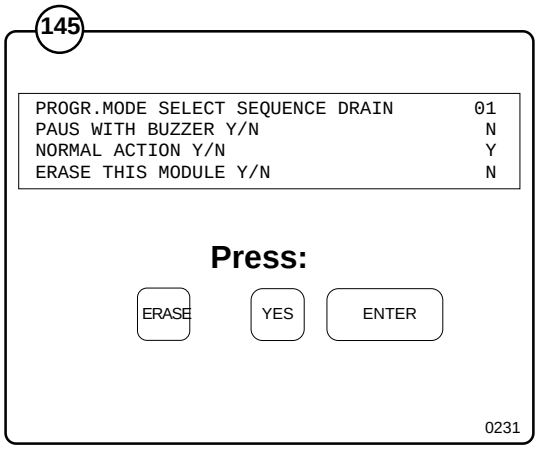
You can also add new sub-programs anywhere in the program.

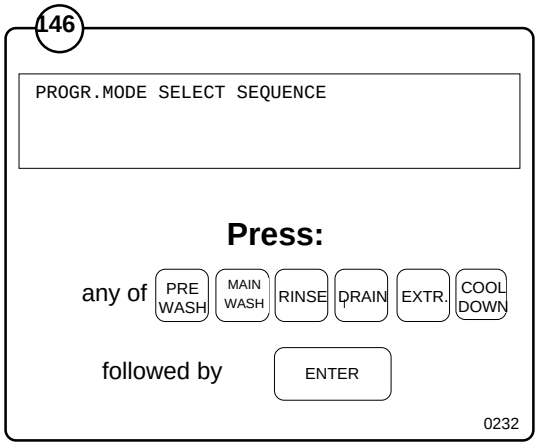
Go to the position between two sub-programs (see the section ''Looking through the program'').

Fig. 146 Press one of the following keys: **PRE WASH, MAIN WASH, RINSE, DRAIN, EXTR**. or **COOL DOWN**. Then press **ENTER**. The new module is now inserted between the other two modules and the questions can be answered in the normal manner.









Altering text

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

Fig. (147) Go to the position between two sub-programs (see the section ''Looking through the program''). Press **TEXT** and **ENTER**. Any text that might have been programmed in the old program is displayed.

Fig. (148) The old text can be deleted with **ERASE**. Ifs the old text is to be partially altered, the text is deleted up to where the change is to be made and then rewritten.

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

Completing the programming

Fig. (149) Come out of the program you are in at the moment (see ''Looking through the program''). Answer YES to the question ''END PROGRAM. SESSION Y/N?''

Fig. (150) The questions displayed now apply to the entire program. Check and answer the questions in the same way as before. Press **ENTER** when ''TO END, PRESS ENTER'' is displayed in the display window. The last stages in the programming are identical to those under the headings ''Entering the program number'', ''Program names'' and ''Saving programs'' earlier in the manual.

147

```
PROGR.MODE SELECT SEQUENCE
```

Press:

TEXT ENTER

0233

148

```
-ABCDEFGHIJKLMNOPQRSTUVWXYZ !&/()=?;:,.*
PROGRAM 10  HEAVY SOIL  50 G
MAINWASH 10 MIN. 3 RINSES
EXTRACTION 5 MIN
```

Press:

ERASE

0234

149

```
PROGR.MODE SELECT SEQUENCE
END PROG. SESSION Y/N                    N
```

Press:

YES ENTER

0235

150

```
PROGR.MODE    MAINDATA
NORMAL ACTION OFF TIME   000 SEC.
TO END. PRESS *ENTER*
```

Press:

ENTER

0236

Service information

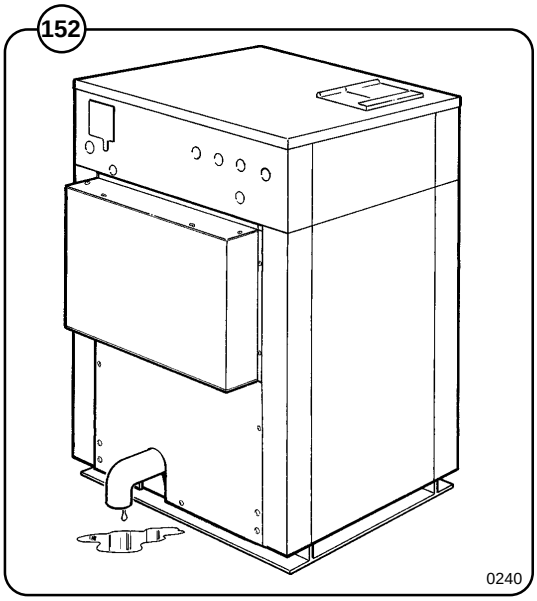
Fig. 151 The machine's electrical power connection cable shall be provided with a safety ground to avoid breakdowns in the machine's electronic program controls. If interference problems do occur, check first that the machine is properly grounded.

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

151

Text in the display window	Fault/Action
NO WATER. CHECK INLET!	Check that the manual shut-off valves are open and that water is reaching the machine.
WATER LEFT	Incorrect programming (the water is not able to be drained away within the programmed time). Drain blocked.
OPEN CIRCUIT IN TEMPERATURE SENSOR	Contact the service personnel.
THE DOOR IS OPEN	Check that the door is locked. If this is the case, disconnect the power supply and close the door again. Then switch on the power. Contact the service personnel if the fault persists.
HIGH TEMPERATURE	Switch off the power supply. Contact the service personnel.
NO HEAT	Check the machine's fuses. Contact the service personnel if the fault persists
LOW OIL LEVEL (applies only to certain machines)	Switch off the power. Replenish the oil in the lubricating reservoir for the axle ring.
PHASE ERROR	During installation: Refer to the headings "Electrical installation" and "Functional checks".
!!!EMERGENCY STOP USED!!!	The emergency button is activated. See "Safety".
SWITCH FOR UNBALANCE DETECTION IS ON	Switch off the power supply. Check that the machine's imbalance switch is undamaged and is correctly fitted.
WATER IN MACHINE	Water in the machine when starting. Switch off the power supply. Check to ensure that the drain is not blocked.
DOOR LOCK ERROR	Door lock not locking correctly. Contact service personnel so that the door lock can be checked.
TACHO ALWAYS INDICATING HIGH SPEED	High speed indicated at low speed. Contact service personnel so that they can check the speed sensor.
TACHO ALWAYS INDICATING LOW SPEED	Low speed indicated during extraction. Contact service personnel so that they can check the speed sensor.

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.

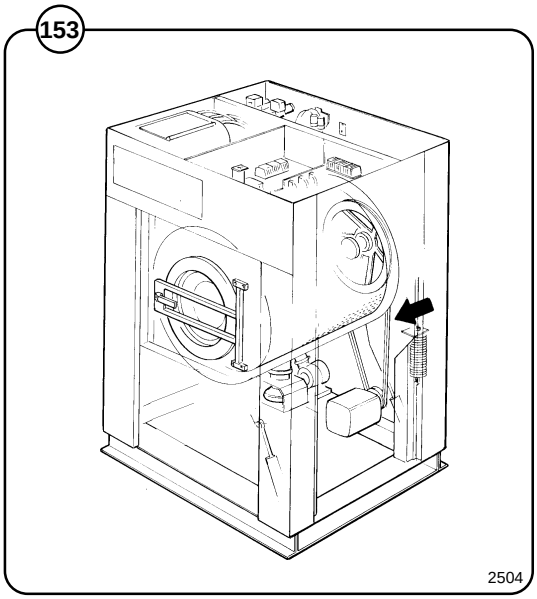
IMPORTANT!
Make certain that all electrical power to the machine is shut off before removing top or rear panels.

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 the loosened detergent with warm water.
  - Wipe dry and leave lid open.

Fig. 152

- 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

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

Every three months

Fig. 153

- Remove the cover plates of the machine and check that the V-belt of the 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.

Trouble-shooting

If machine does not start

Fig. (154)

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

B Check door safety switches.

C Check glass cartridge fuses.

D Check for fault indication on display (see under the heading "Service information").

If water does not drain

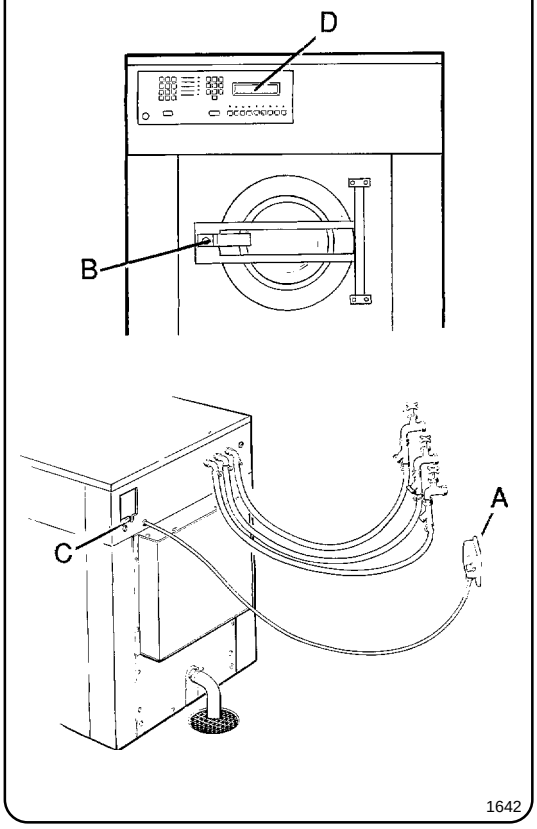
Fig. (155)

A Check for fault indication on display (see under the heading "Service information").

B Check drain valve and solenoid for proper operation.

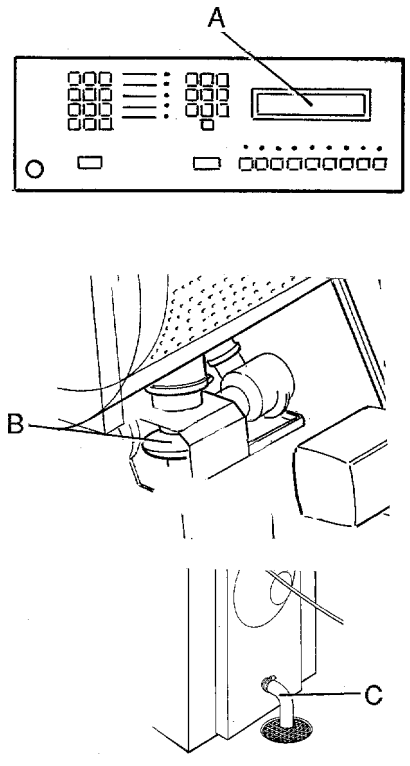
Disconnect drain hose connected to drain line. If full flow of water comes out, the problem is in the main waste line. If water flow is slow, the problem is accumulation of foreign materials between drain valve and shell outlet of machine. Clean valve body of any foreign objects found.

154



1642

155



2501

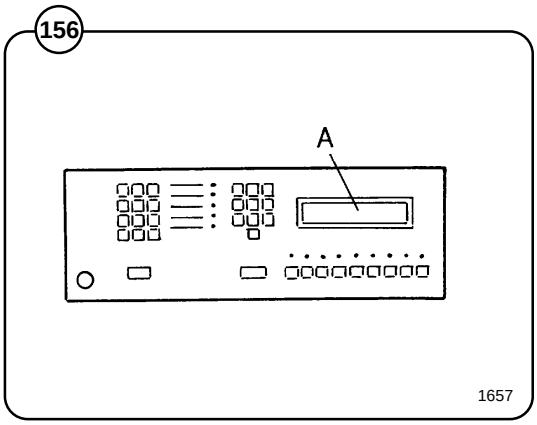
If machine does not extract

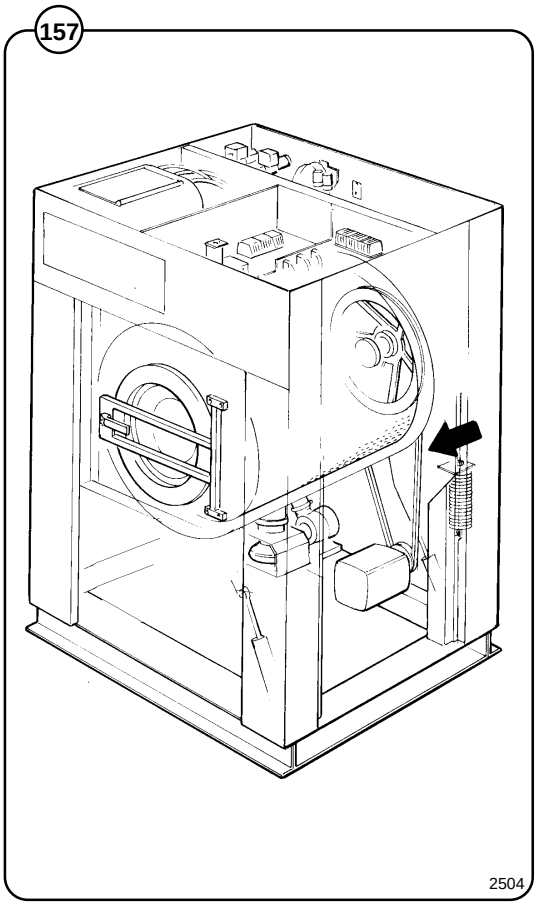
Fig. 156 A Check for fault indication on display (see under the heading "Service Information").

If motor does not operate at wash speed.

Fig. 157 A Check for fault indication on display (see under the heading "Service Information").

B Check motor and V-belts.





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

Fig. 158 A Replace V-belts

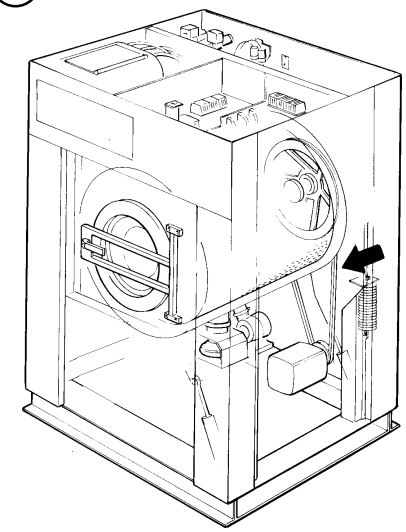
If a metallic noise can be heard at rear of machine.

Fig. 159 A Tighten lock screw on pulley on motor shaft.

If the door is leaking.

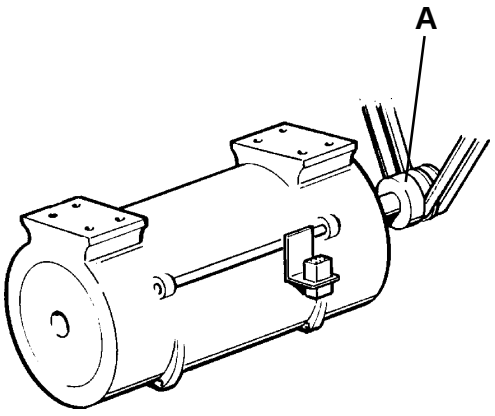
Fig. 160 A Check door gasket. If gasket is in good condition, check the tension between door gasket and door frame and adjust.

158



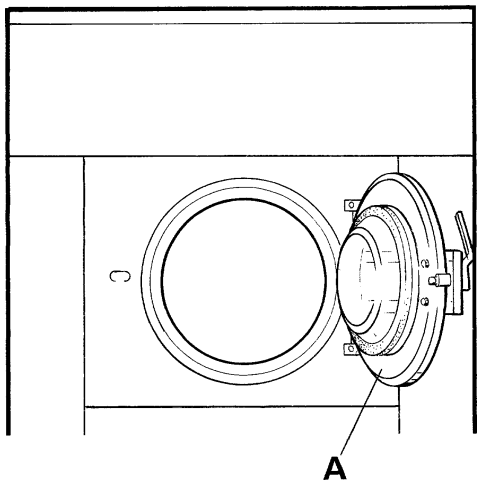
2504

159



2505

160



1622

If there is leaking around the glass.

Fig. 161

A Re-cement glass in door gasket, if worn.

Replace door gasket if worn.

If water does not enter the machine.

Fig. 162

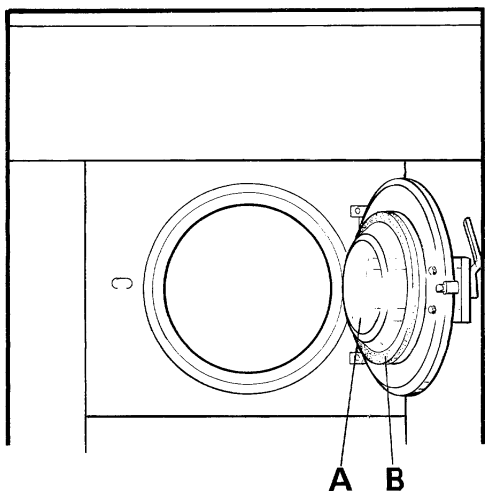
A Check for fault indication on display (see under the heading "Service Information").

B Check the valve coils on inlet valves.

C Check wires leading to electric coils.

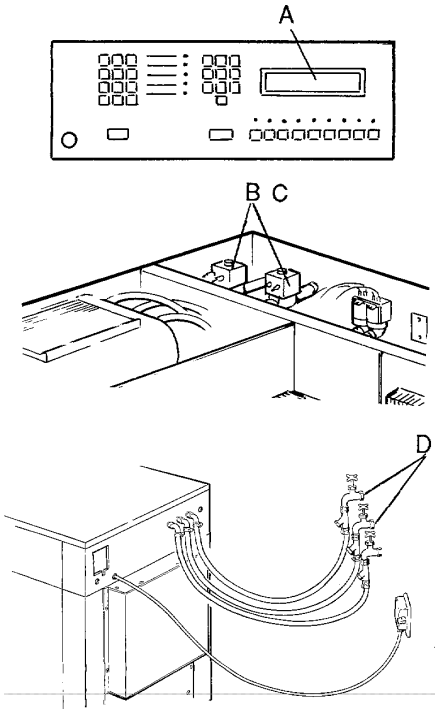
D Be sure manual shut-off valves are in open position.

161



1623

162



1643

If water continues to fill without stopping.

Fig. 163

A Check for incorrect programming.

B Check hose attached to level control unit on the printed circuit board.

C 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.

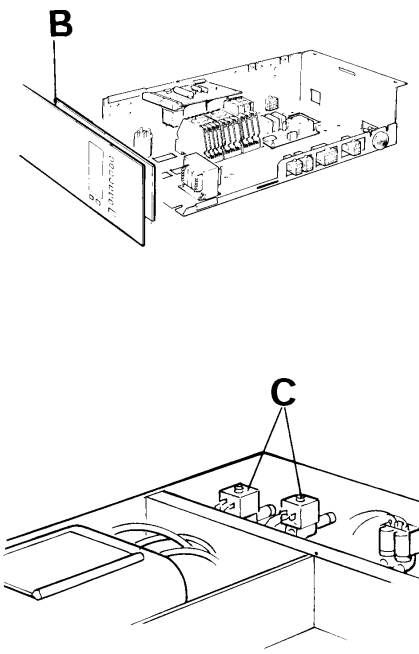
If water continues to flow without filling machine.

Fig. 164

A Check for fault indication on display (see under the heading "Service Information").

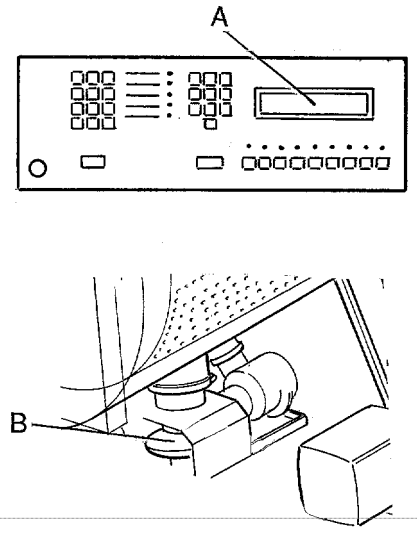
B Check seating of drain valve.

163



2508

164



2502

If machine vibrates excessively.

Fig. 165

A Check the out-of-balance detector switch.

B Check the shock absorbers and the springs of the drum suspension.

If safety fuse blows at the beginning of the cycle.

Fig. 166

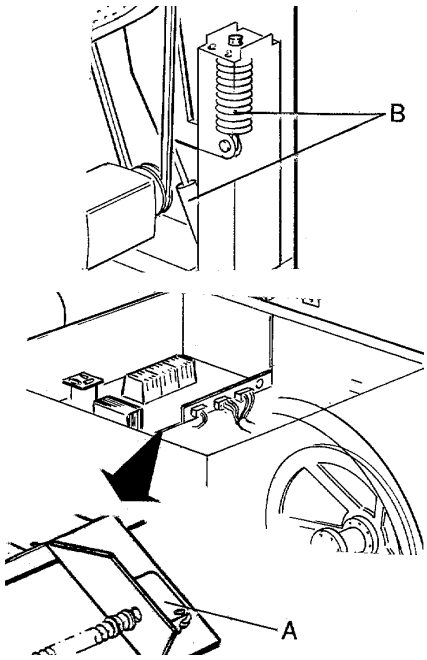
A Replace fuse.

B Disconnect wires leading to the delay circuit of the door lock. Replace fuse and start. If the machine now works, replace delay circuit.

NOTE

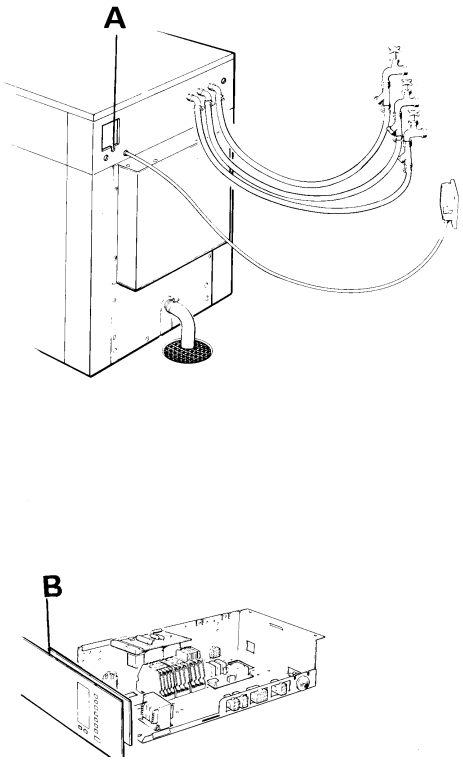
The electronic timer has a built in service program that can be useful when troubleshooting. Contact service personnel for further information.

165



2503

166



2509