OPERATING & MAINTENANCE MANUAL
EX 30 C and EX 50 C
Clarus Control

438 9030-11/01
99.13

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:	

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 CLARUS microprocessor models, choose a 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 according to the installation instructions, to reduce the risk of fire and to prevent serious injury, or damage to the machine.**
   Pour reduire les risques d'incendie, fixer cet appareil sur un plancher beton sans revetement.
2. **If 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 lightning unit or general purpose receptacle is connected. Use copper conductor only.**
   Utiliser seulement des conducteurs en cuivre.
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.**
   Deconnecter cet appareil del'alimentation avant de proceder a l'entretien.
6. **To remove top panel, first remove enventual screws at the rear. When remounting the top, reinstall them. To remove the top panel on models on which it is secured by one or two keylocks, use the keys originally shipped in the drum package. Be certain to relock after remounting the top panel.**

MANUFACTURED BY WASCATOR
DISTRIBUTED BY AQUA CLEAN SYSTEMS INWOOD, NEW YORK, USA

471 1766202-04

LOCATED ON THE DOOR:

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

WARNING !

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

471 7651-17

Contents

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 30 C and EX 50 C washers were developed to meet the heavy duty requirement 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.

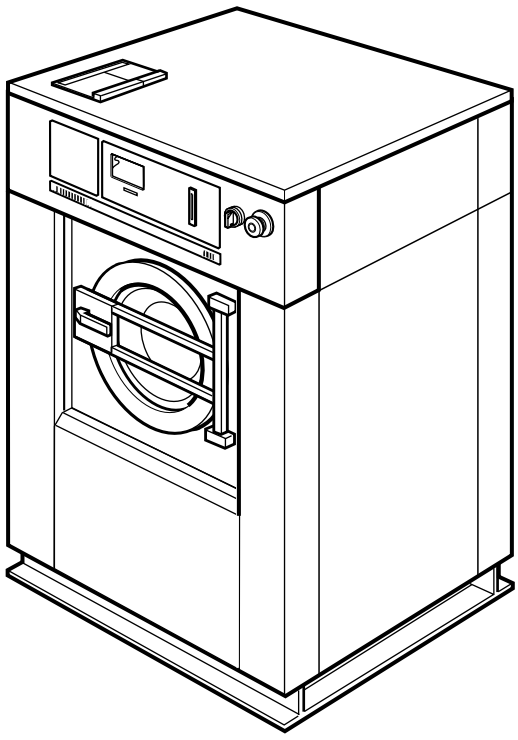
The highest speed spin gives a G factor of approximately 300, providing very efficient water removal during the spin.

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



4734

Technical data

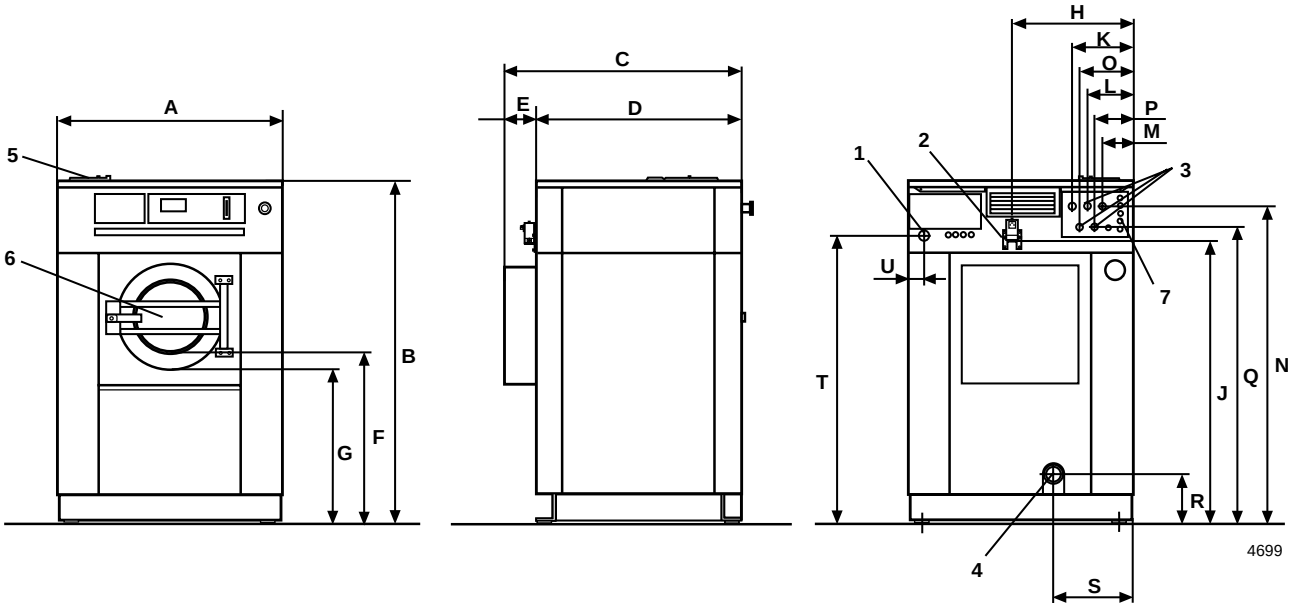
EX 30 C

Dry load capacity	up to		30 lbs
Overall dimensions	Width	870 mm	34 1/4''
	Depth	790 mm	
	Height	1325 mm	
	Net weight	290 kg	639 lbs
	Floor load	3.3 ± 1.1 kN	790 ± 264 lbs force
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		24-48 r.p.m.
	Distribution		78 r.p.m
	Extraction		up to 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 system		598 W
	Extraction		1900 W
Overcurrent protection	1-Phase		15 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''

EX 50 C

Dry load capacity	up to		50 lbs
Overall dimensions	Width	1000 mm	39 3/8''
	Depth	900 mm	
	Height	1435 mm	
	Net weight	553 kg	1218 lbs
	Floor load	6.0 ± 2.0 kN	1440 ± 480 lbs force
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.
	Extraction		up to 850 r.p.m.
G-factor	During wash		0.8
	During High Extract		120-300
Voltage requirements	Motor system		208-240 V 1-Phase 60 Hz
Rated power	Wash		756 W
	Motor, extraction		3000 W
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''

Outline and dimensions



1. Opening for electrical cable connection
2. Steam connection (optional)
3. Cold water
4. Hot water
5. Hot water (only EX 22 FC)
6. Drain outlet
7. Soap box
8. Liquid supply connections

	EX 30 C	EX 50 C
	mm	mm
A	870	1000
B	1325	1435
C	915	1100
D	790	900
E	125	200
F	630	615
G	570	550
H	470	600
J	1075	1170
K	200	230
L	170	170
M	110	110
N	1215	1325
O	–	200
P	140	140
Q	1140	1235
R	175	175
S	305	370
T	1110	1220
U	60	60

Installation

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

The warranty card should be completed and sent to Wascomat. All other items should be stored in a safe place for future reference.

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

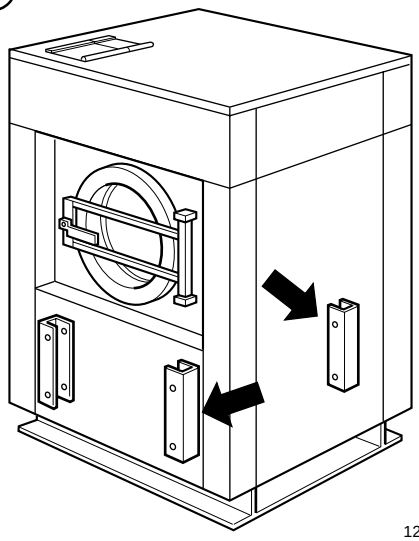
The machine should be installed close to a floor drain or open drain to make installation, use and service easier.

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.

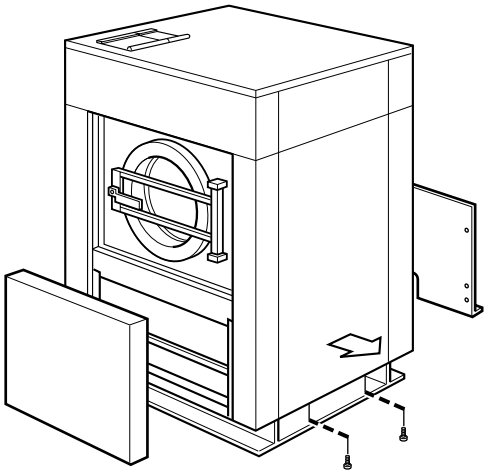
The floor must be able to support a static load of 790 lbs for the EX 30 C and 1440 lbs for the EX 50 C.

2



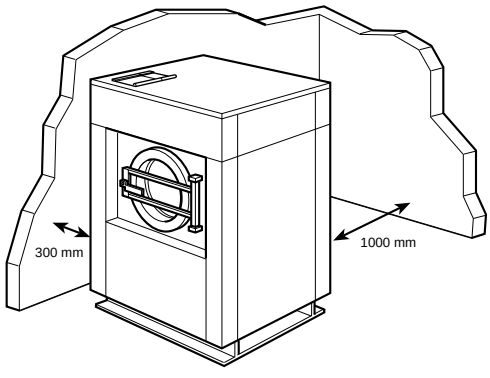
1247 B

3



1248 B

4



1249 B

Mechanical installation

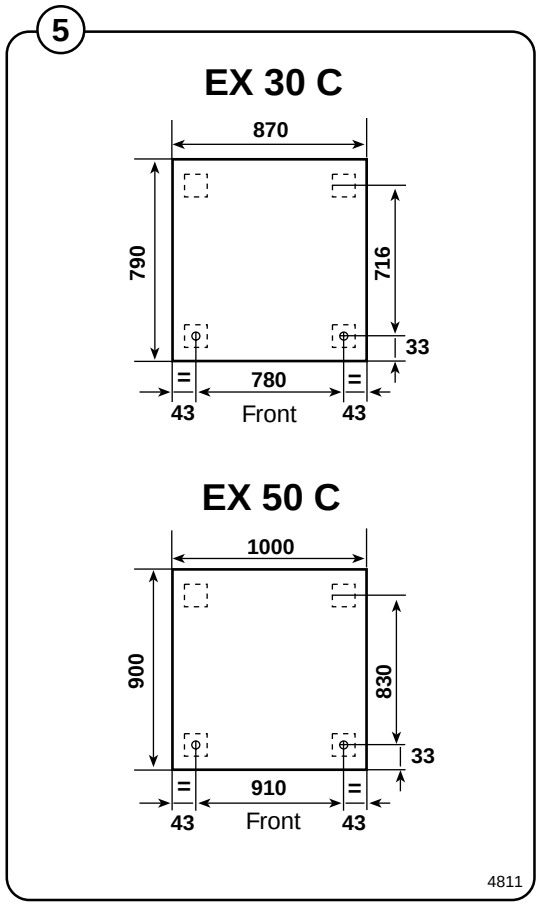
Fig. 5
- Mark and drill two holes 3/8" in (8 mm) in diameter and approximately 3 1/2" in. (90 mm) deep according to the dimensions in figure 5.
- Place the machine in position. Never lift the machine by the door or handle.

Fig. 6
- Check that the machine is level and steady. Use stainless or galvanized washers between the machine and the floor.

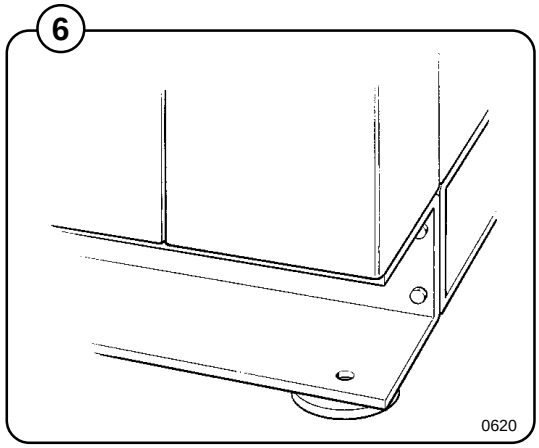
Fig. 7
- Insert the expansion bolts supplied with the machine. Fit the washers and nuts.

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.

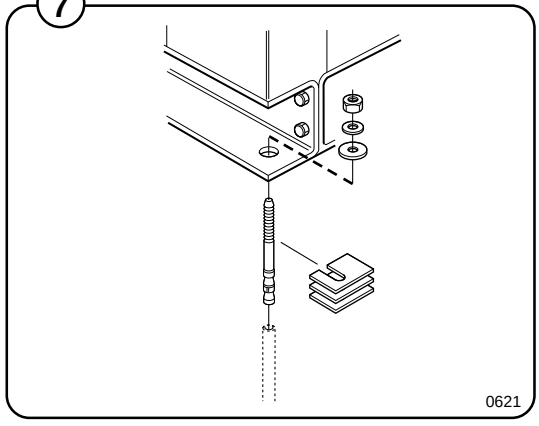
5



6



7



Electrical installation

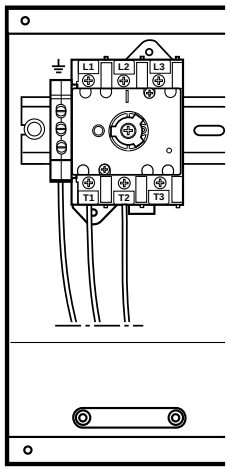
Fig. 8 Connect L1, L2 and ground wires according to the markings of the terminal block. The cable is to hang in a large loose loop, supported by the strain relief clamp below the terminal block.

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.

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



4724 A

Connection of external units (optional equipment)

Electrical installation must be carried out by an authorized personnel!

All optional equipment connected must be EMC-approved to EN 50081-1 or EN 50082-2.

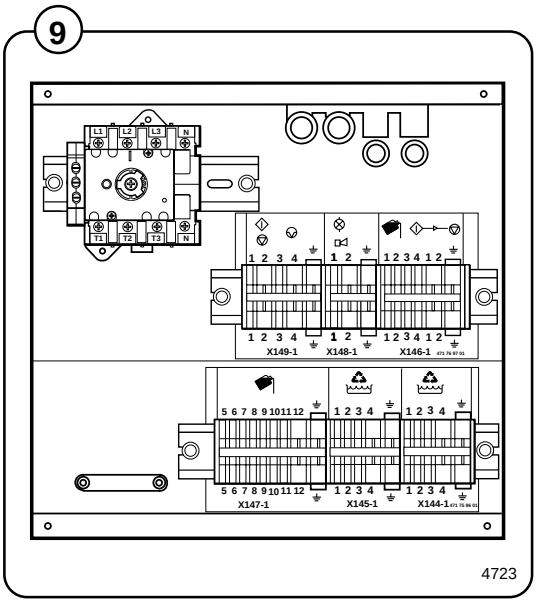


Fig. 9

Connector X149-1.

Connector for external START/STOP/PAUSE function for machine.

Connector X148-1 (only on machines with at least two I/O boards).

Connector for external buzzer or signal.

Connector X146-1.

Connector for external liquid supply pumps. Control signals on 1-4 on left and Neutral to be connected to 1 and Phase to 2 on right-hand side.

Connector X147-1 (only on machines with at least two I/O boards).

Connector for additional external liquid supply pumps.

Connector X145-1 (only on machines with three I/O boards).

Connections for recycling system 2.

Connector X144-1 (only on machines with at least two I/O boards).

Connections for recycling system 1.

Water connections

All intake connections to the machine are to be fitted with manual shut-off valves and filters, to facilitate installation and servicing. In certain cases non-return valves will need to be fitted before the machine to comply with local plumbing regulations.

Water pipes and hoses should be flushed clean before installation. After installation hoses should hang in gentle arcs.

The machine may have between two and four DN 20 (R 3/4") water connectors. All connectors present on the machine must be connected up. The table shows the possible connection options, which will depend on the water types to be connected to the machine. Check the machine plates too.

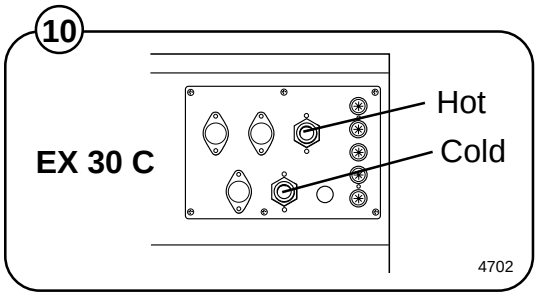
All water connectors must be connected up, otherwise the wash program will not function correctly.

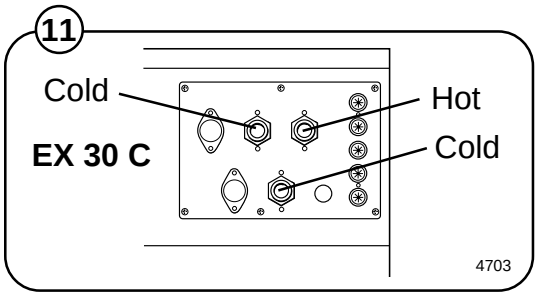
Hoses are to be of an approved type and grade, to comply with national regulations.

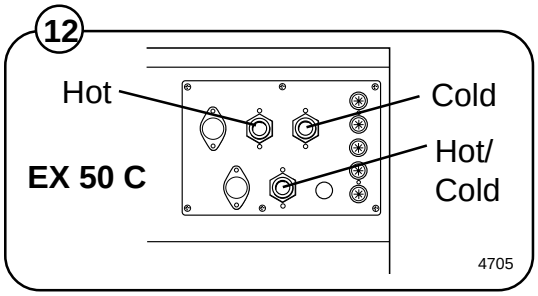
The water pressure data is as follows:

- min: 40 kPa (0,4 kp/cm^2)
- max: 1 MPa (10 kp/cm^2)
- recommended: 200-600 kPa (2-6 kp/cm^2)

	Water type	Water connection			
		1	2	3	4
Fig. 10	cold and hot	cold	hot		
Fig. 11	cold, hot and cold/hard	cold	hot	cold/hard	
Fig. 12	cold and hot	cold	hot		cold or hot





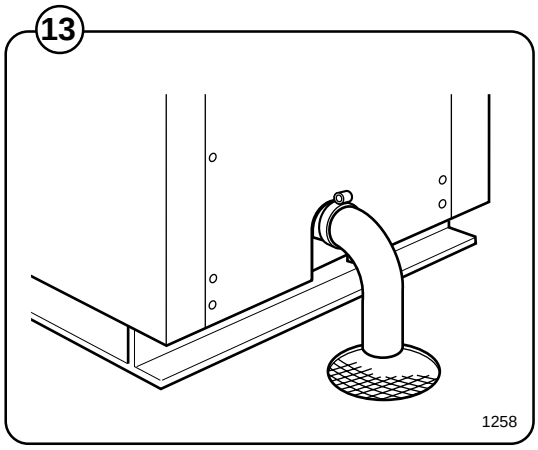


Drain connection

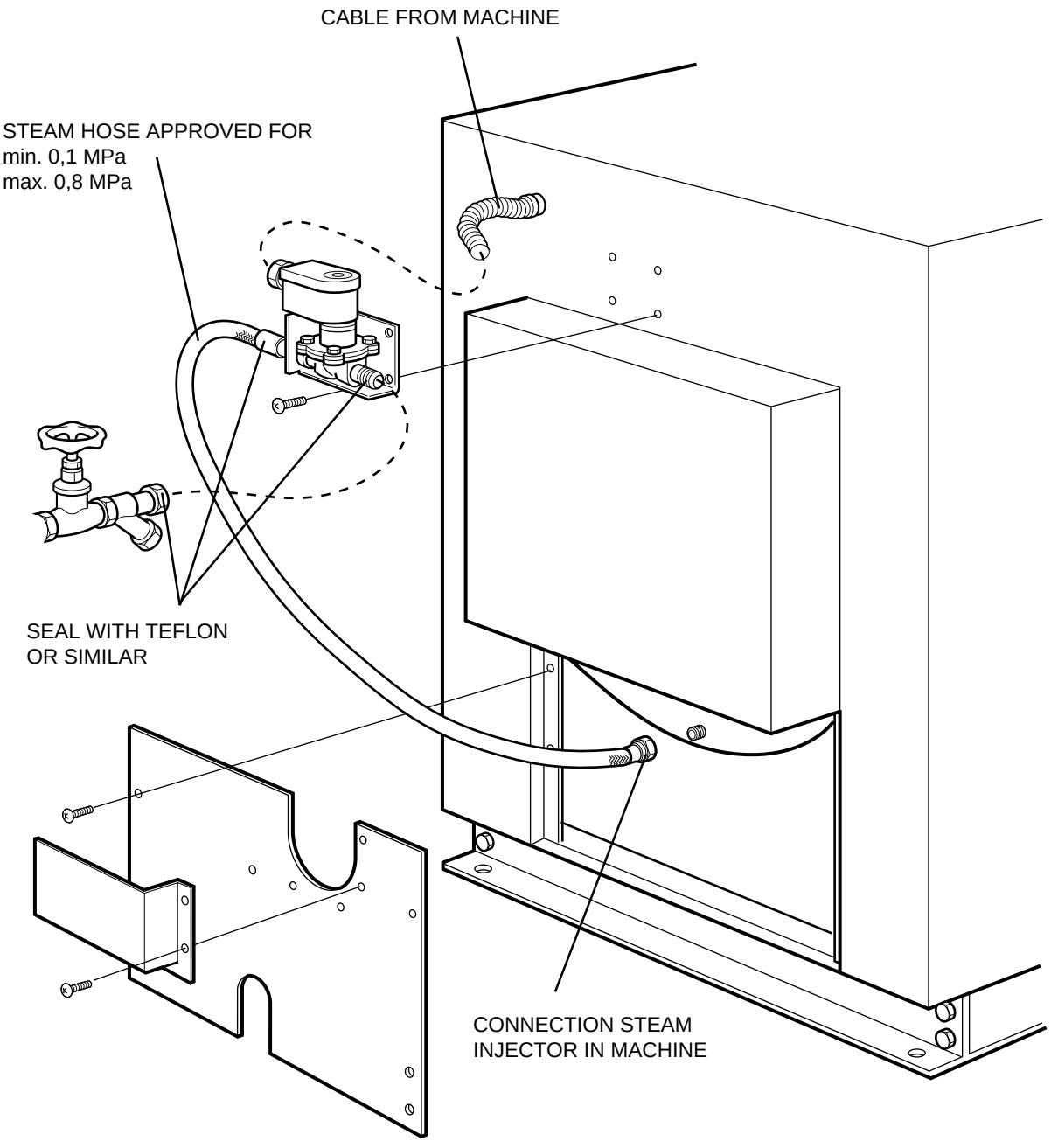
Fig. (13) Connect a 3'' (75 mm) flexible hose to the drain outlet of the machine.

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

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



14



For rebuilding look at the wiring diagram of the machine.

1719

Steam connections (optional steam heating)

Steam pressure required:

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

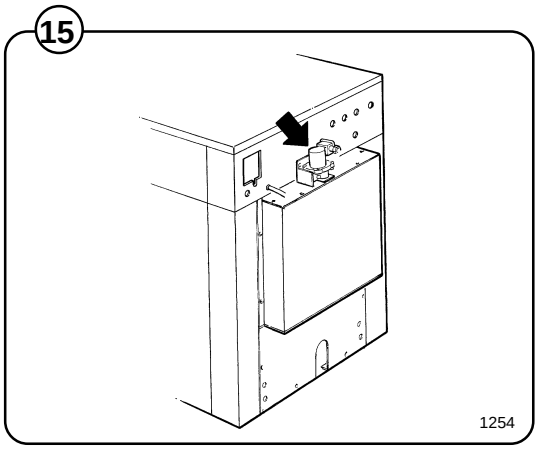
A steam valve for this machine type is fitted separately in a bracket on the upper rear cover plate. The steam valve, hose and filter are supplied with the machine.

Steam-flush all pipes and hoses before connection.

Installation instructions:

- Install rear cover plates.
- Install steam valve bracket and valve. The steam valve must be mounted in upright position.
- Connect the steam hose between the steam valve and the steam intake on the machine.
- The steam inlet pipe must be fitted with a manual cut-off valve. Fit the filter supplied with the machine to the manual cut-off valve.
- Connect an approved 1/2" steam 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.
- Connection size at filter: DN15 (R 1/2'"). Check that there are no sharp angles or bends in the connection hose.

Fig. 15



Setting the timing on the electro-lube oil dispenser

This machine is equipped with an electronic oiler which lubricate the seals on a timed bases. With the rear panel removed locate the oiler, which is attached to the base frame at the lower rear.

Fig. 16 Pry off the switch panel cap with a screwdriver.

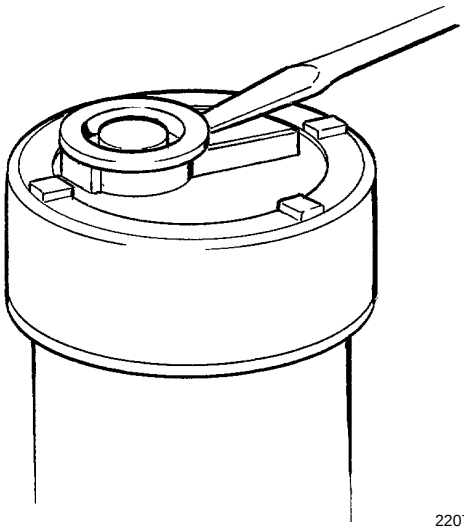
- Under the cap are the switches for time setting.
- The light will start flashing after a few minutes and will continue to flash every 15th to 20th seconds as long as the dispencer is in operation.

Fig. 17

Fig. 18

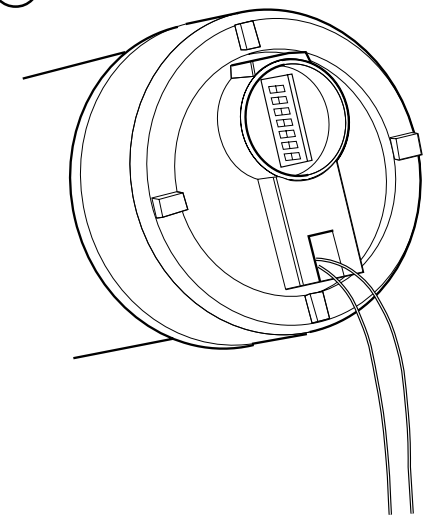
- The decal shown below should be affixed at the front of the machine and updated as required.

16



2207

17



2208 A

18

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 be removed and a visual inspection 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

Start-up and safety checklist

Before initial start-up of an EX 30 C/EX 50 C washer, the following safety checks must be performed:

- 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:

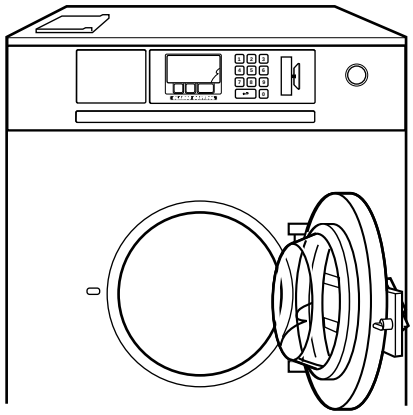
Fig. 19
- When washer loading door is open, the machine must not start. Verify this by attempting to start washer with door open.

Fig. 20
- When washer is in operation, the 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 safety interlock or call a qualified serviceman.

If the machine starts with the door open or the door can be opened after machine is running, the machine must immediately be placed OUT OF ORDER and the door interlock system must be repaired or replaced. Disconnect electrical power from the machine until the necessay repairs are made.
Door safety interlock must be checked daily in accordance with above procedure.

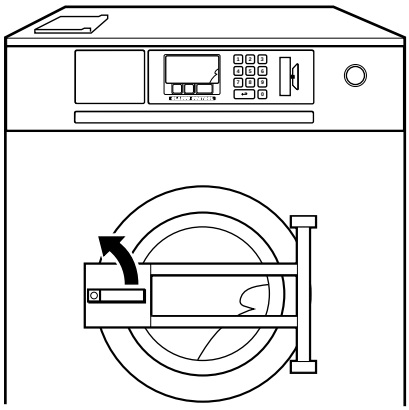
Before servicing Wascomat equipment, disconnect electrical power.

19



4944

20



4945

Function checks

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

Fig. 21

Open the manual water and steam valves.

Add detergent and conditioner.

Choose a program.

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

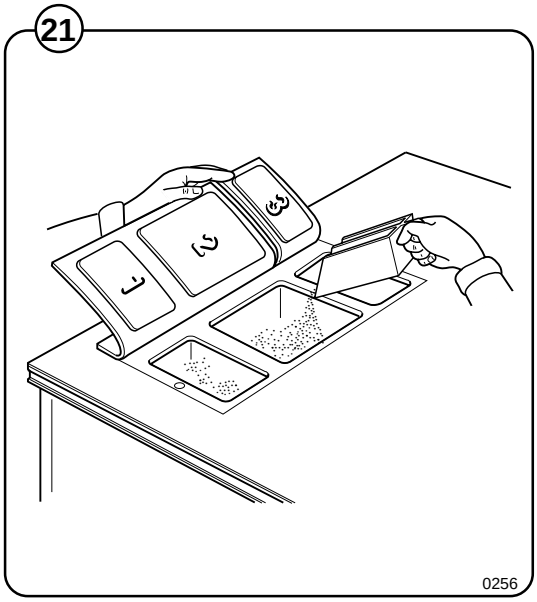
Check that:

- 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 at the proper times.
- the door cannot be opened during the program and it remains locked until the program is completed.

Run through a complete cycle, checking for water temperature, drain operation and the extract function. 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.

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



General

Fig. 22 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 for 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.

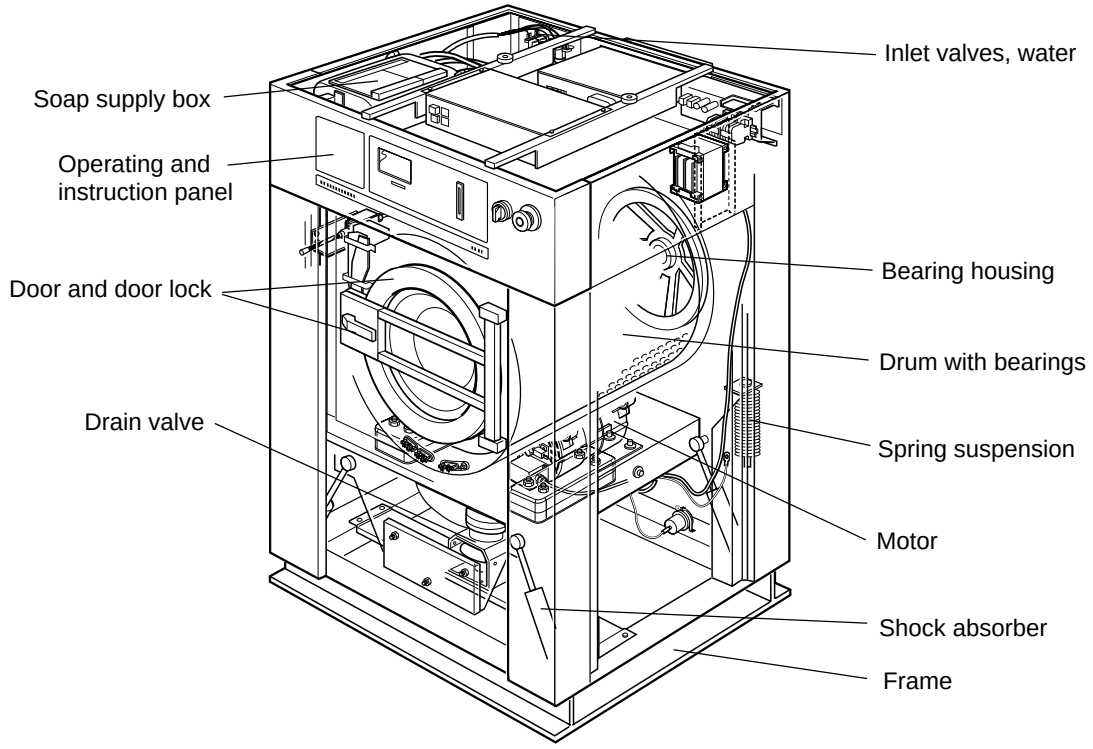
The robust square door is locked with a handle which is interlocked by a safety device when the machine is running.

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.

22



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.
- 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.

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.
- maximum water removed 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 C-machines are equipped with a frequency control and a multi-speed motor. This gives advantages such as:

- 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. 23 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 30 model has twin shock absorbers at the front.)

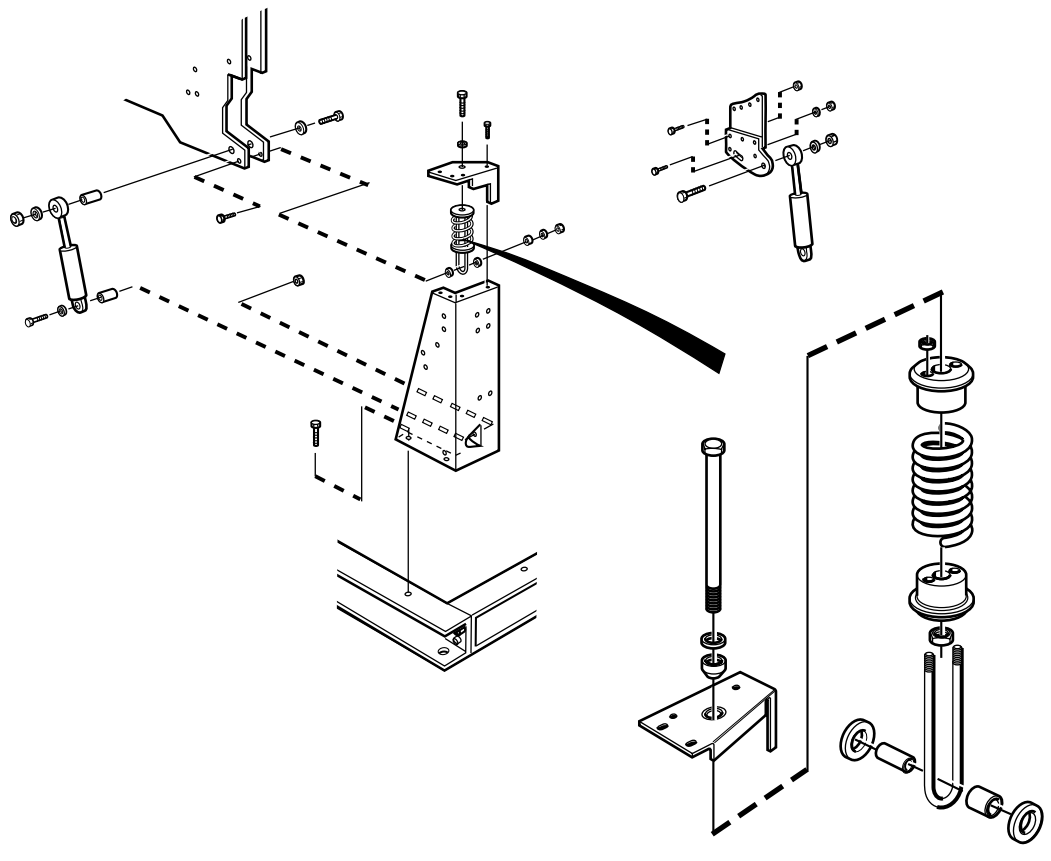
Repair instructions

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.

23



4709

Drum with bearings

Description

Fig. 24 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.

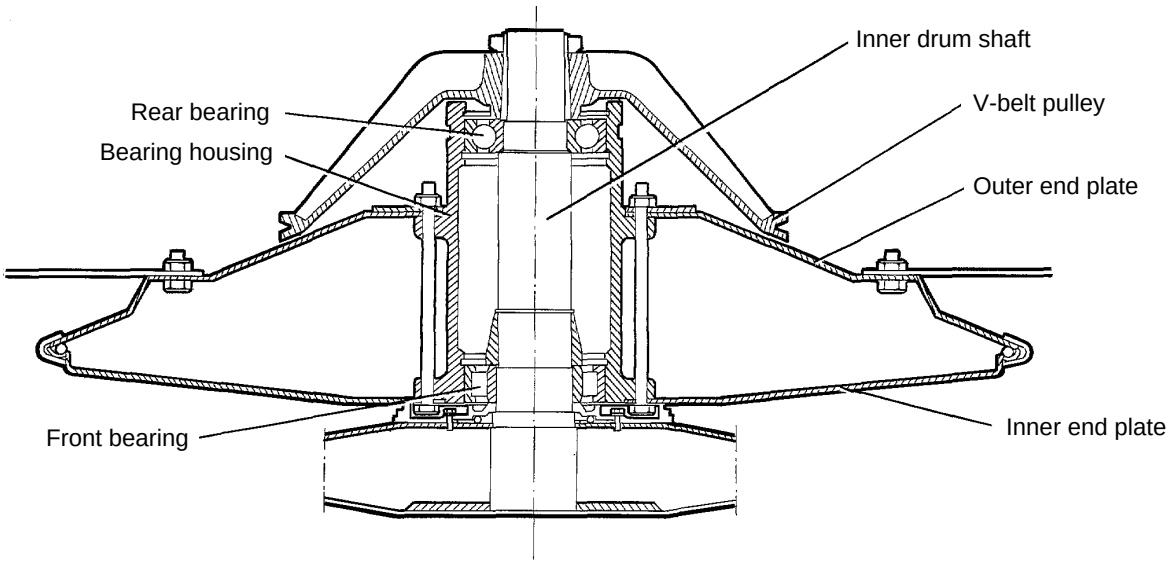
The inner drum shaft is continuous, and the V-belt pulley is attached to the protruding journal by an adapter sleeve.

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.

24



EX 30 C

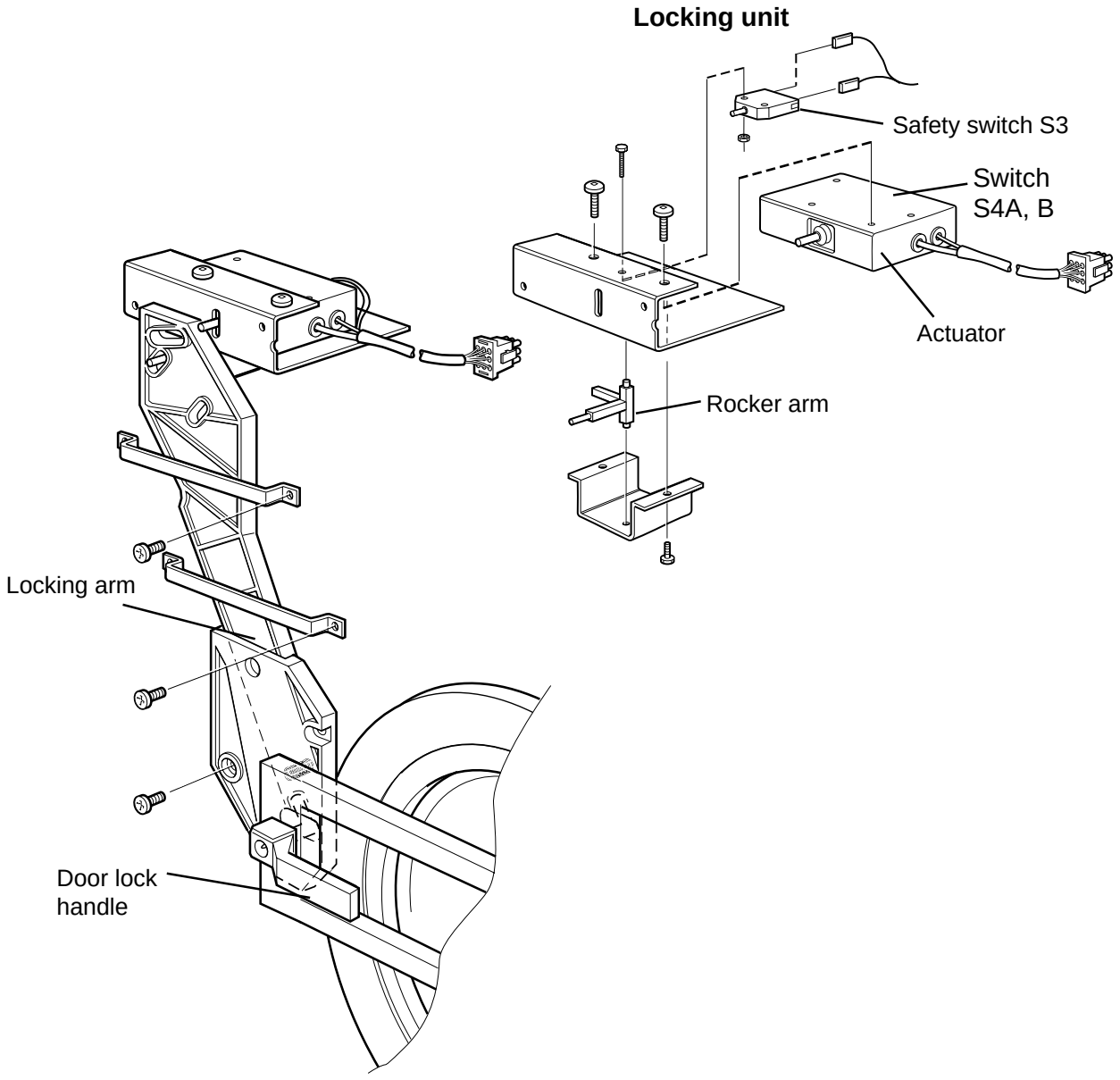
0635

Description

Fig. 25 The machine door lock consists of the following:

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

25



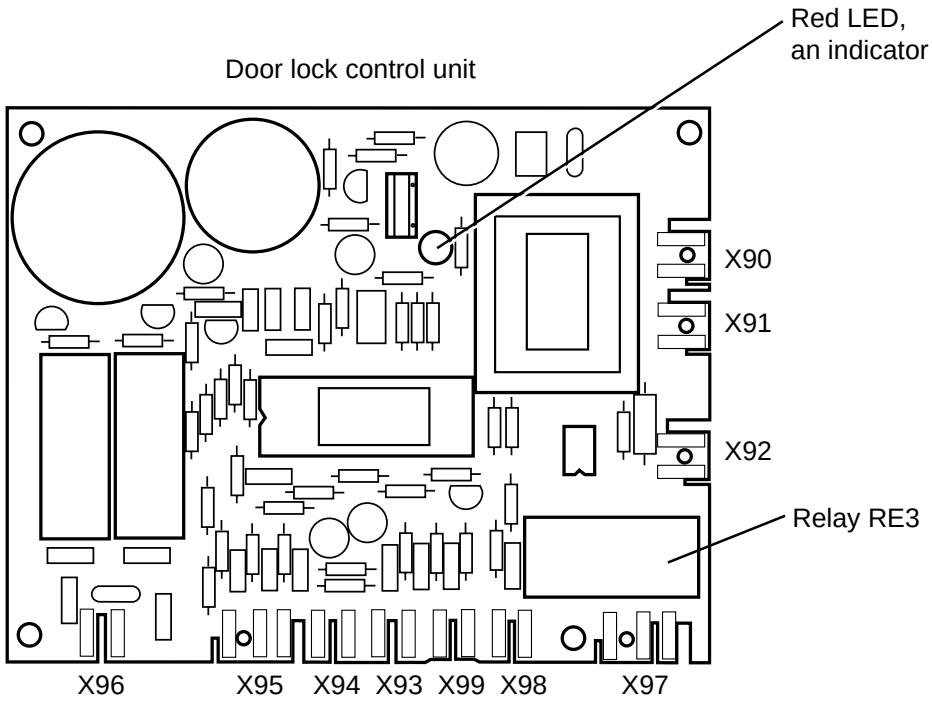
Door lock control unit

Fig. 26 The sole function of this control unit is to oversee the correct functioning of the door lock. The CPU board receives information from the motor control unit about motor rotation, and has its own level-monitoring device. The control unit also detects water level and motor speed through separate level measurement devices and the rotation guard (speed-monitoring device). Through this double monitoring, a very high level of safety can be achieved.

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

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

26



Error indication patterns

Fig. 27 If the door lock is working correctly, this is indicated by the red LED, by a pattern of flashes which indicates “OK”. The error indication patterns revealed by the LED flash at various frequencies for the various errors or faults. All error indication patterns have a frequency cycle of 50%, i.e. the LED will be on half the time, off half the time.

27

LED pattern of flashes during normal functioning

1 second

Pattern of flashes indicating “OK”, drum at standstill

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

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

4686

28

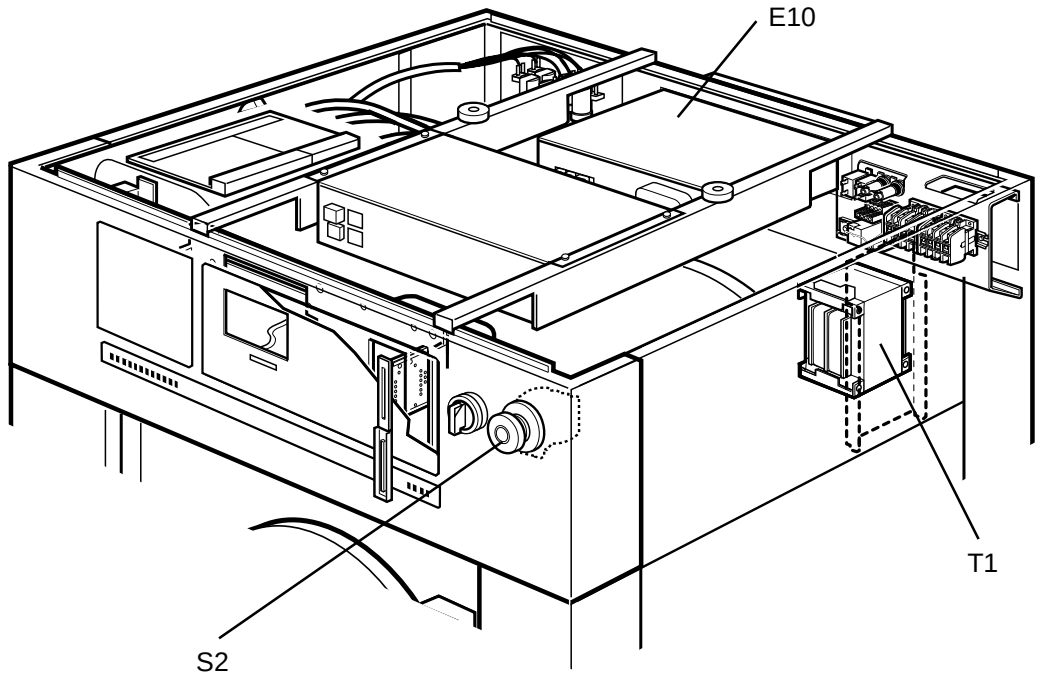


Fig. 28		
	E10	Motor control unit, microprocessor-controlled. Controls direction of rotation and speed of motor. The MCU is also used for imbalance detection and calculating weight of wash load.
	S2	Emergency stop switch
	T1	Transformer, low-voltage transformer which supplies the program control unit with various voltages.

Control unit

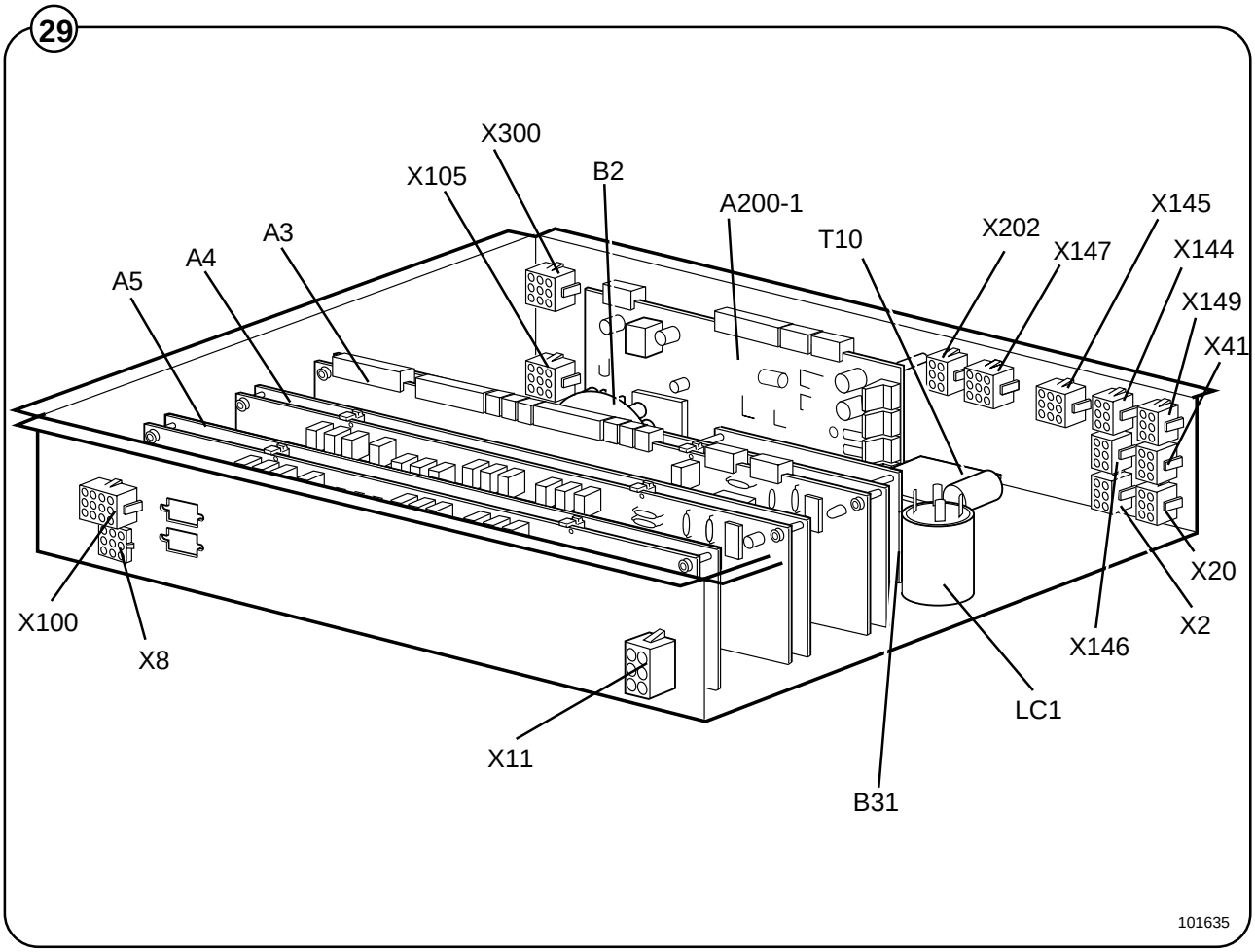


Fig. 29

A3-A5	I/O boards 1-3		
A200-1	CPU board		
B2	Level sensing device, door opening		
T10	Transformer, power supply to circuit boards		
B31	Rotation-monitoring device		
LC1	Suppression filter		
Connectors			
X2	6-pole, heating control (option)	X144	9-pole, recycling, I/O board 2
X8	9-pole, door	X145	9-pole, recycling I/O board 3
X11	6-pole, connection emergency stop switch	X146	6-pole, recycling TM1-4
		X147	9-pole, recycling TM5-11
X20	6-pole, inward	X149	6-pole, start, stop and pause
X41	6-pole, Hall element, speed sensor	X202	6-pole, weighing equipment (option)
X100	12-pole, display		
X105	9-pole, intakes/drain	X300	9-pole, communication, MCU

Supply unit

30

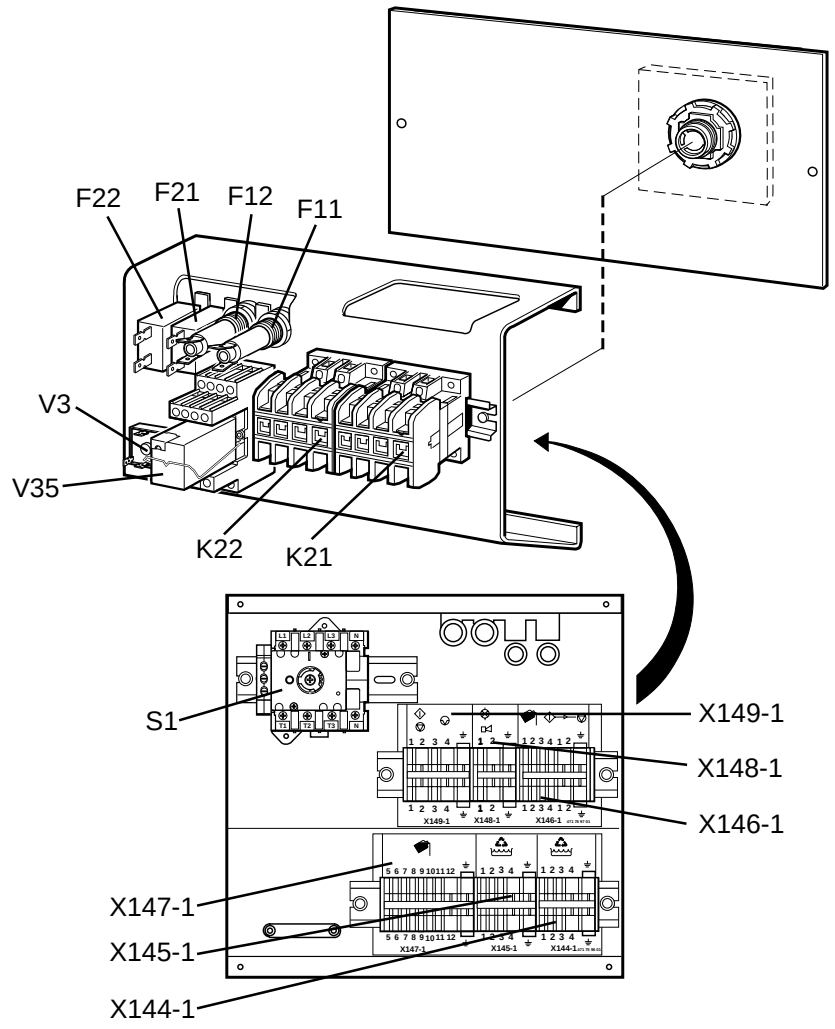


Fig. 30		
	K21, K22	Contactors for switching in heating elements (option)
	F11, F12	Fuses, inward power supply
	F21, F22	Fuses, motor control unit
	V3	Rectifier bridge
	S1	Main switch
	X144-1	External recycling I/O 2
	X145-1	External recycling I/O 3
	X146-1	Detergent signals 1-4
	X147-1	Detergent signals 5-11
	X148-1	External flashlight/siren (buzzer)
	X149-1	Start, stop and pause

Clarus Control

This chapter describes the components which are specific to this washer extractor. For a general description of the CPU board, display board and I/O board(s), refer to the Clarus Control service manual.

System structure

CPU board

Fig. 31

The machine's wash programs are stored in the CPU board memory. The CPU board controls the various washer extractor functions with the aid of the program data and signals from the control panel buttons.

The CPU board communicates with the display board, motor control unit and the three I/O boards via serial interfaces.

The CPU board has its own level switch and inputs from temperature sensors.

I/O boards

The I/O boards receive information from the CPU board about outputs to be controlled. The I/O boards can control the following functions:

I/O board 1:

door lock, water valves - cold and hot water, flush 1, drain 1, detergent dispensing 1-4, external detergent dispensing 1-4 and heating relay 1.

I/O board 2:

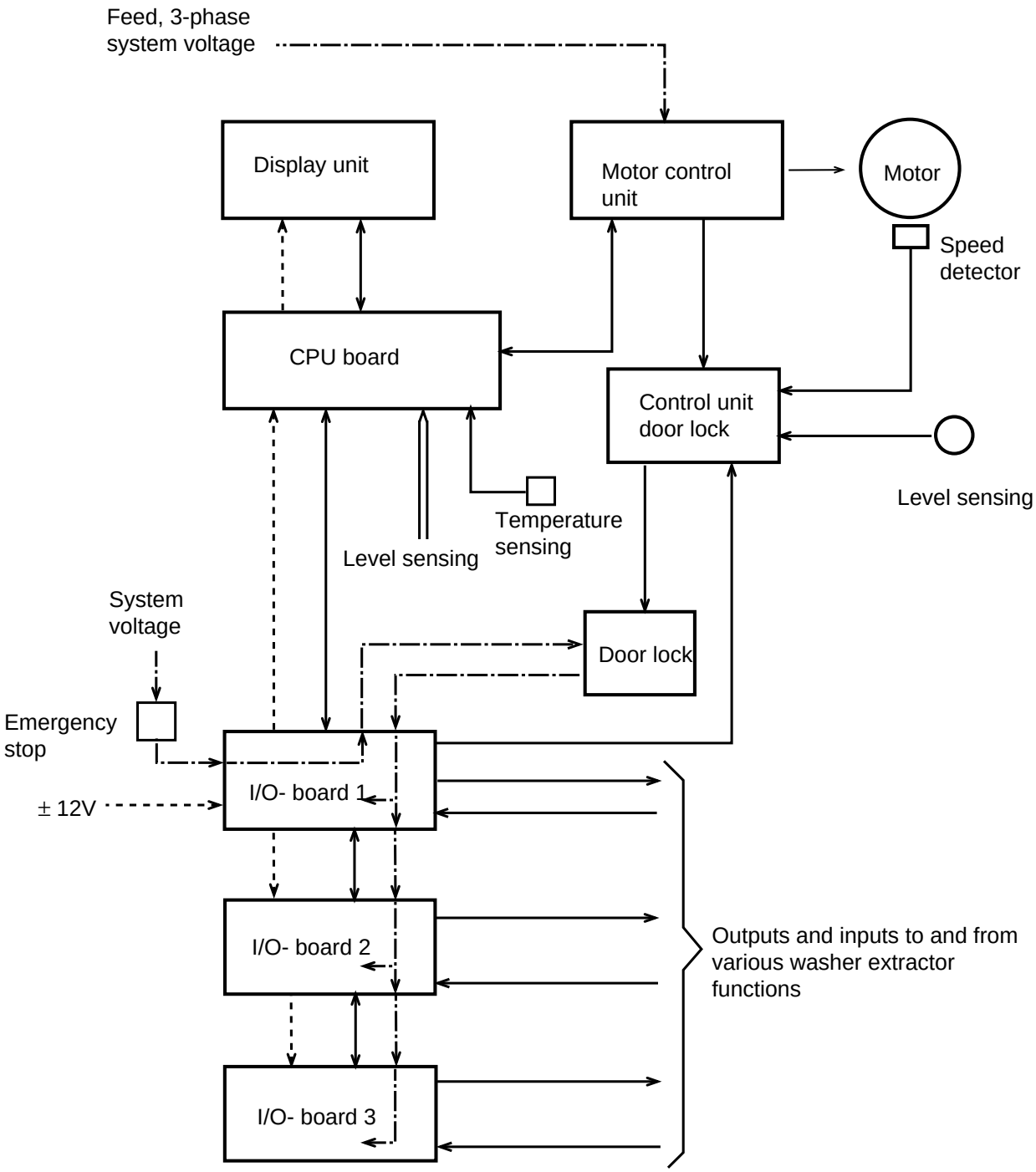
water valves - cold, hard water and tank 1, drain 2, detergent dispensing 5, external detergent dispensing 5-11, heating relay 2, stop valve drain 1 and external buzzer.

I/O board 3:

water valves - tank 2, drain 3 and 4, detergent dispensing 6-7, external detergent dispensing 12-13, flush powder, oil lubrication and (where applicable) tilt function.

From the I/O boards' inputs, the CPU board receives information on the door lock switch, door status switch, (where applicable) external start/stop and pause signals, low oil level and signals from tilt sensors and the tilt control unit.

31


Feed, 3-phase
system voltage
Display unit
Motor control
unit
Motor
Speed
detector
CPU board
Control unit
door lock
Level sensing
Temperature
sensing
Level sensing
System
voltage
Door lock
Emergency
stop
± 12V
I/O- board 1
I/O- board 2
I/O- board 3
Outputs and inputs to and from
various washer extractor
functions

4125

PCB connector *Function*

Fig. 32

X90: Inward voltage feed 200 - 240 V AC

X91: Spare connector for outward power supply

Fig. 31

Spare input/output which can be used to provide power supply to another circuit board.

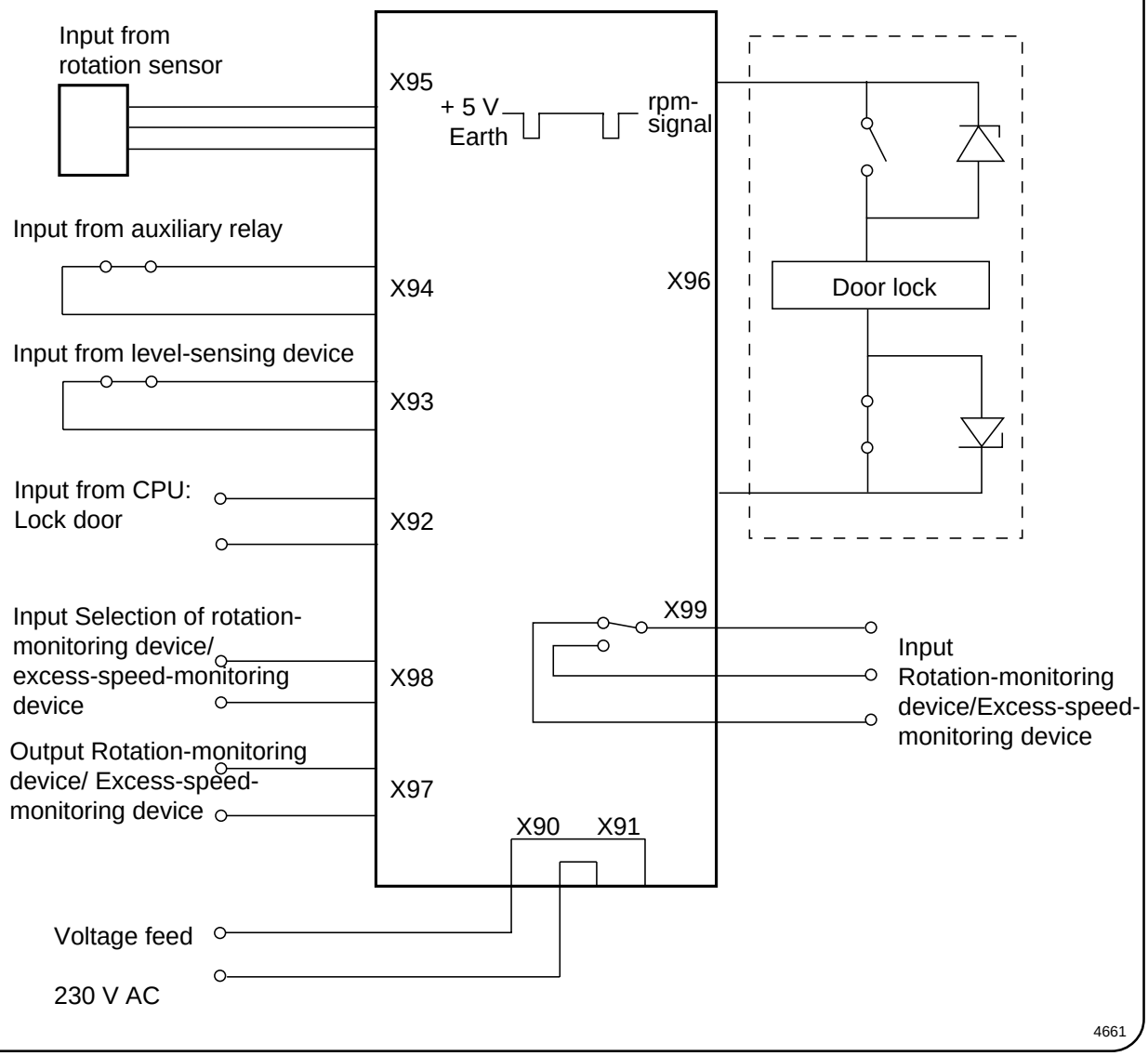
X92: Input from PCU: Lock door

230 V DC: Command from PCU for door locking

0 V: Command from PCU to open door

Before the control unit locks the door (output X96), a check is made that there is no water in the drum and that the motor is at a standstill.

32



X93: Input from level switch

5 V DC: Water in drum (level contact open)

0 V: Empty drum (level contact closed)

If the input voltage is 5 V DC when the door is not locked, door locking will be prevented. The LED on the control unit will then flash (specific pattern of flashes) to reveal an error code (see the section “Error indication patterns”).

X94: Input from:
auxiliary relay on motor contactor (machines without frequency control)
motor control unit (machines with frequency control)

5 V DC: Motor operating (contact open)

0 V: Motor not operating (contact closed)

If the input voltage is 5 V DC when the door is not locked, door locking will be prevented. The LED on the control unit will then flash (specific pattern of flashes) to reveal an error code (see the section “Error indication patterns”).

The input signal from X94 is also compared with the signal from the rotation sensor on the motor shaft (input X95) to check that both sensors are working normally.

X95: Input from rotation sensor on motor shaft

> 0.4 Hz: drum rotating

< 0.4 Hz: drum at standstill

Input voltage: 4-10 V DC

X96: Output to door lock

Output voltage: 17 - 31 V

Locks the door lock if the following conditions have been fulfilled:

- 230 V DC at input X92 (command from PCU for door locking)
- 0 V DC at input X93 (no water in drum)
- 0 V DC at input X94 (motor not operating)
- < 0.4 Hz at input X95 (drum at standstill)

Unlocks the door lock if the following conditions have been fulfilled:

- 0 V DC at input X92 (command from PCU for door opening)
- 0 V DC at input X93 (no water in drum)
- 0 V DC at input X94 (motor not operating)
- < 0.4 Hz at input X95 (drum at standstill)

X97, X98, X99: Rotation-monitoring device/Excess-speed-monitoring device

X97:	Output	
X98:	Input	0 = 0 V
		1 = 5 V
X99:	Input:	0 = closure between terminals 1 and 2 = Excess-speed-monitoring device
		1 = open input = Rotation-monitoring device

Excess-speed-monitoring device

X99 = 0

RE3 is deactivated if the drum speed exceeds 45 rpm. RE3 is reactivated when the drum speed falls below 20 rpm.

Rotation-monitoring device

X99 = 1 X98 = 1

RE3 is activated when the drum is at a standstill and deactivated when the drum is moving.

X99 = 1 X98 = 0

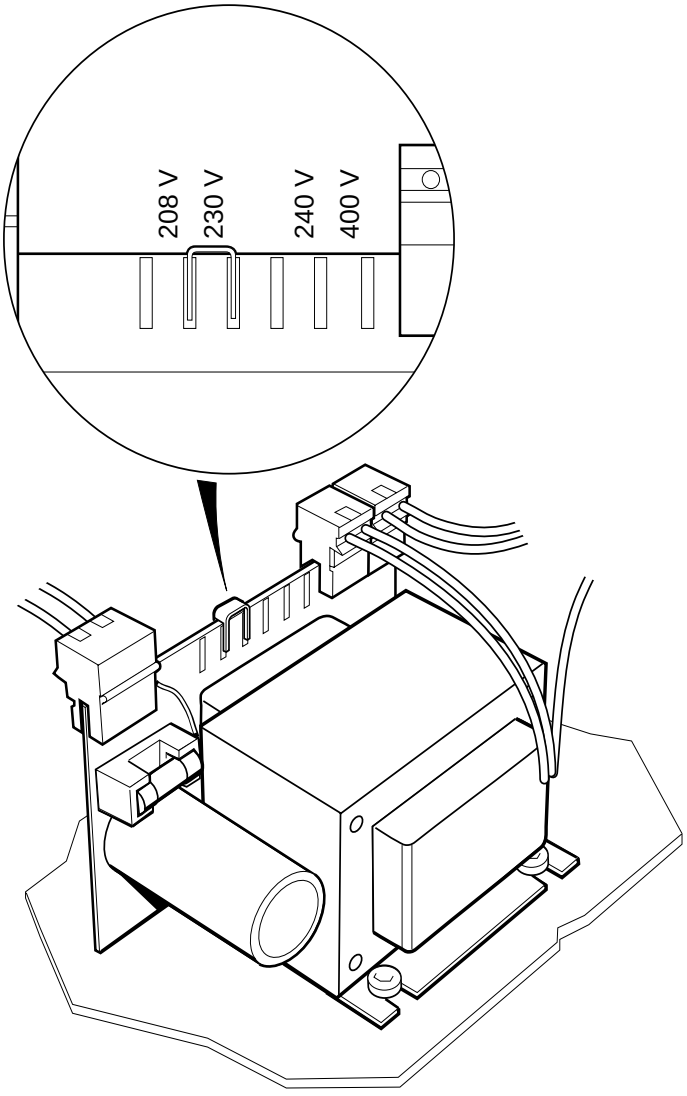
X97 is locked in the position it was in when X98 = 1, no matter what the current activity of the washer extractor.

Control system transformer T10

Fig. 33 The control system transformer is used to provide the voltage feed for the circuit boards. The transformer supplies 12 V on its secondary side, and can be adapted to suit any of four different primary voltages by moving a strap.

The transformer should normally be connected for a primary voltage of 230 V.

33



3970

Description

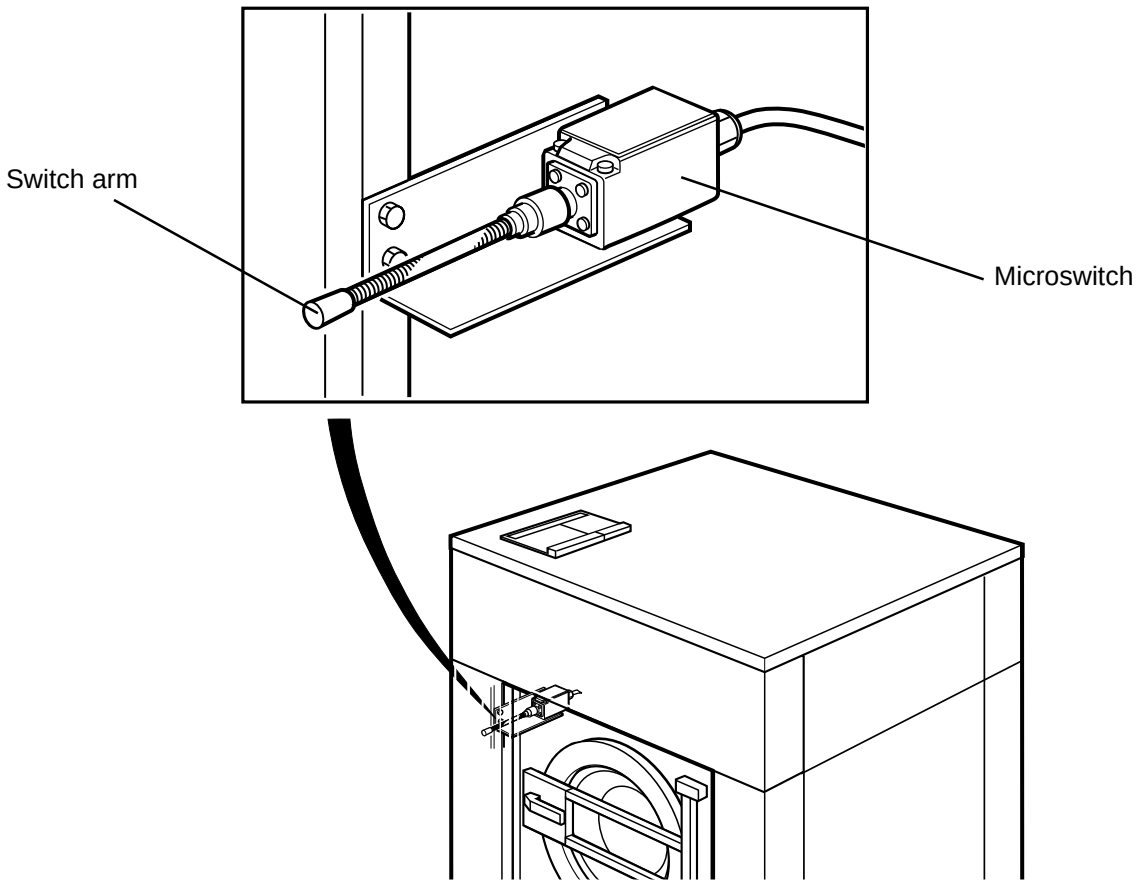
Fig. 34 The imbalance switch is a safety feature which protects the machine from damage during extraction caused by uneven distribution of the wash load.

The imbalance switch consists of a microswitch and a switch arm, mounted on the left-hand front pillar of the frame. If the inner frame moves outside a certain range, it will actuate the microswitch via the switch arm. As a result, extraction will be halted and the PCU will switch to wash speed. After that the PCU switches to distribution speed, before another attempt at extraction.

If the imbalance switch is being triggered repeatedly, possible causes are:

- Unsuitable wash loads.
- The dampers are in poor condition, see Chapter 43. Frame.
- High water level not programmed for extraction.

34



4752 A

Description

General

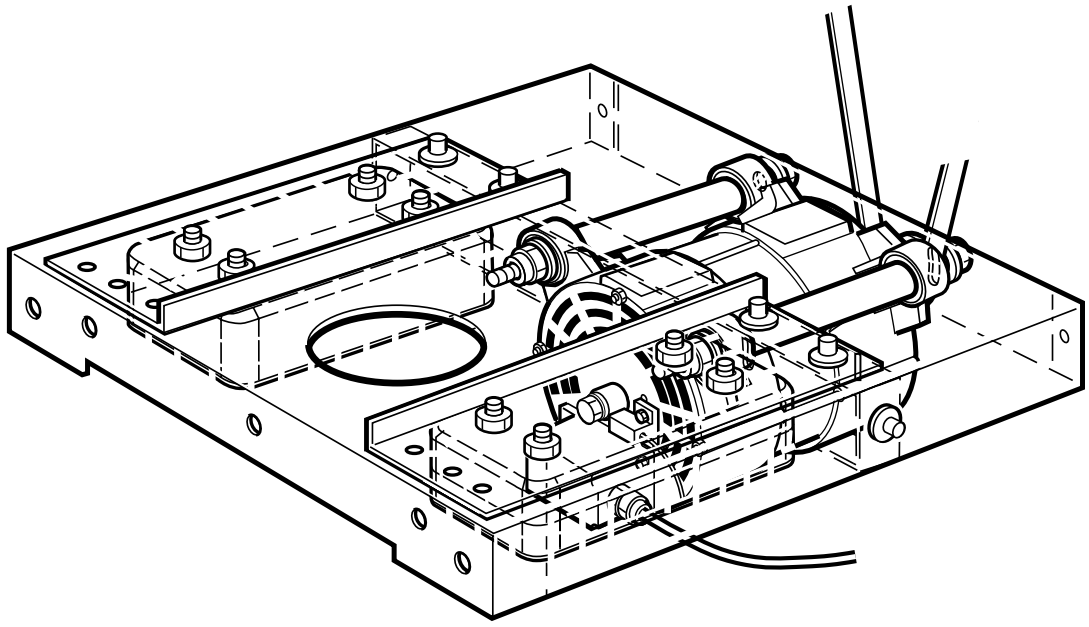
Fig. 35 The motor is mounted inside a motor mounting unit beneath the outer drum. It drives the inner drum via a drive belt. The drive belt tension is adjusted with the aid of two retaining screws on the side of the motor mounting unit. See the section “Belt tension” in this chapter.

Electrical connection for the motor is by quick-connector.

This is a frequency-controlled motor, and its speeds for normal action, distribution and extraction are controlled by E10, which is a microprocessor-based motor control unit in the automatic control unit.

The motor windings have overload protection in the form of a thermal protection device which resets automatically.

35



4740

Motor control unit E10

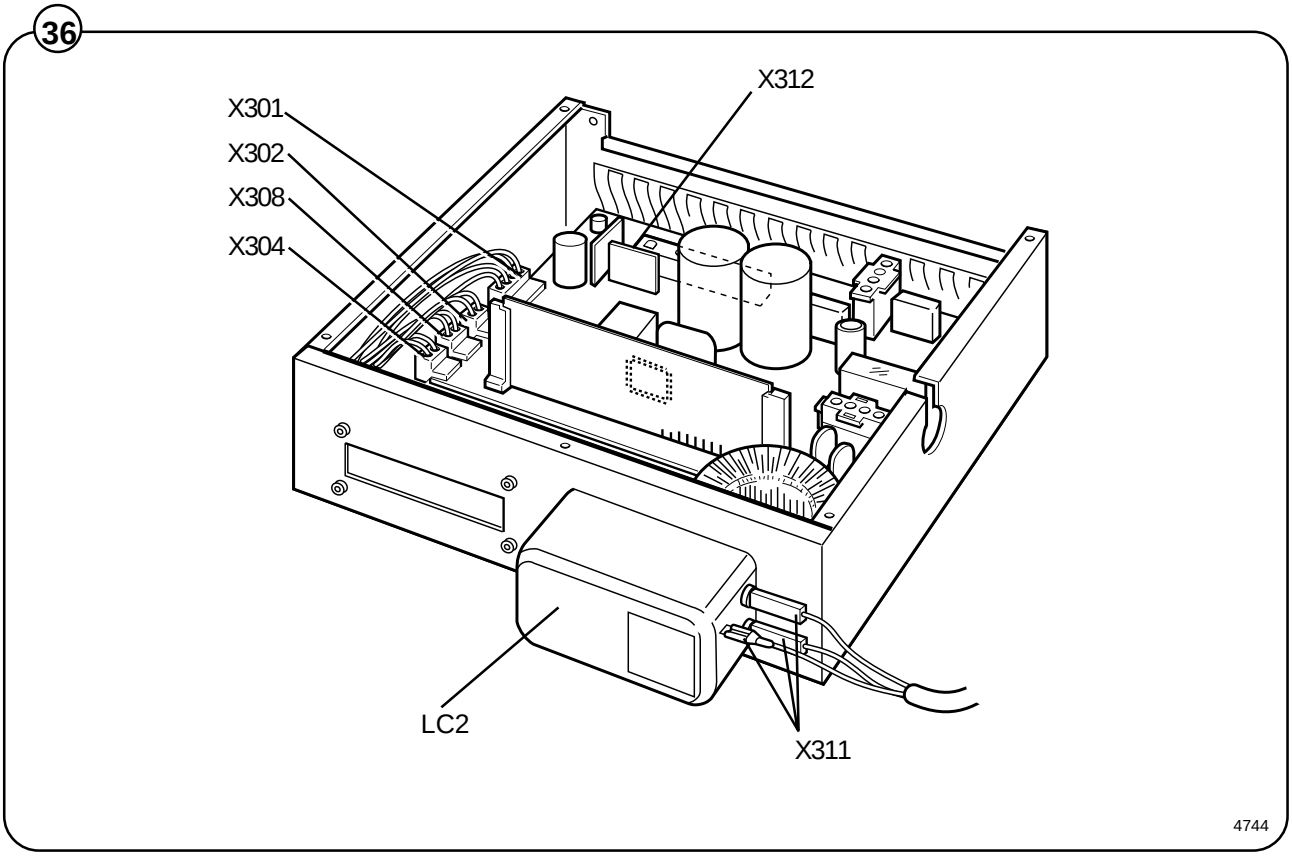


Fig. 36

LC2	Suppression filter
Connectors	
X301	Serial communication with PCU
X302	Input, lock sequence
X304	Relay output
X308	Imbalance input
X311	Main input
X312	Connection, motor and thermal protection device (Klixon)

Motor control unit

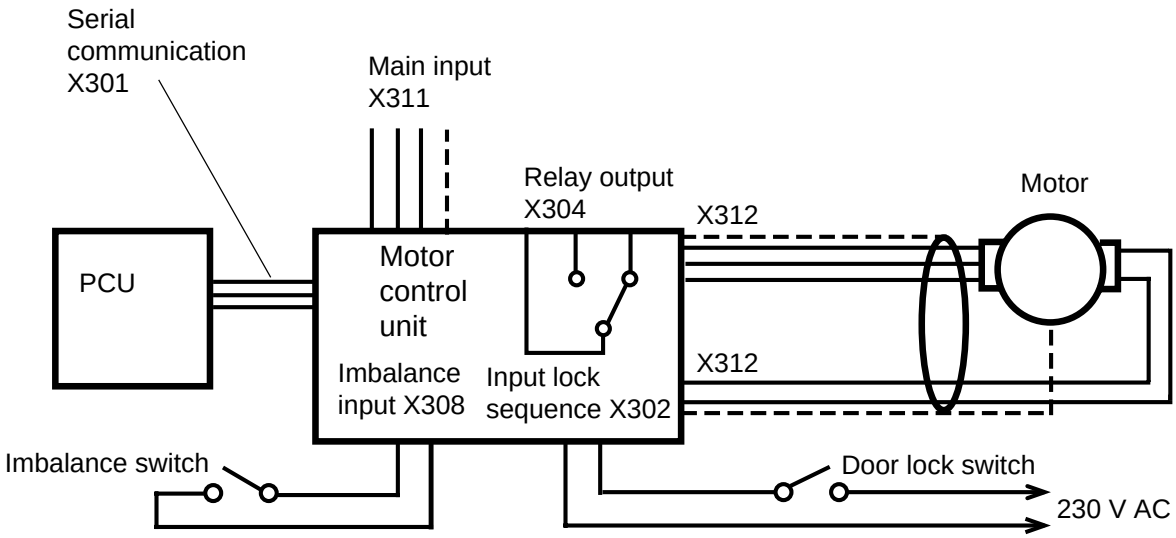
Fig. 37 Fig. 39

The motor control unit communicates with the PCU board via a serial duplex interface. With the aid of the MCU, the PCU board can not only control the speed the motor is to have at any given moment, but also control the acceleration and deceleration rates the motor will use to reach the speed commanded. The MCU constantly relays information back to the PCU board on current operating status, e.g. whether everything is proceeding without problems or if a fault or error has arisen.

The MCU can also supply data on the torque of the motor at constant speed and when accelerating and decelerating. This data is used both for calculating the weight of the wash load and for detecting any imbalance present.

WARNING
Take great care when using measuring instruments on the MCU, since all components have a potential difference of approx. 300 V in relation to earth and neutral.
The MCU will not be de-energised until 10-30 seconds after the machine is isolated from the power supply and the motor has stopped.
The green LED on the MCU board will remain lit for as long as there are hazardous voltages present in components.

37



4711

For the 220 l machine there is a cooling fan on the MCU, on account of its higher wattage. The fan starts up automatically when the heat sink reaches a temperature of approx. 65°C, which can arise during extraction if the load is unfavourable or if the ambient temperature is high. When the machine power supply is first switched on the fan operates for a short time.

The MCU has an interlock signal input connected to a switch in the door, which supplies the input with main voltage when the door is locked.

PCB connector/Function

X301: Serial communication

Communications between MCU and PCU. With an interface it is possible to connect a PC for testing machine operation/functions.

X 301:2 Gnd
X 301:3 Txd
X 301:4 Rxd

X302: Input lock sequence

An input voltage of 96-276 VAC is required to start the motor.
The function of this input is to stop/not start the motor when the door lock is open.

Input voltage: 120 V-20 % (=96 V) - 240 V+15 % (=276 V), 50/60 Hz
Current: Max. 0.01 A

X304: Relay output

The relay is controlled via commands from the PCU (X301). The relay is not to be activated if communication with the PCU is lost.

Isolation voltage: 3750 V
Voltage: 250 VAC
Current: max. 2 A
Relay connections: 1-pole, 2-way (three connections)

Connector:	X304:1	Normally open
	X304:2	Normally closed
	X304:3	Common

X307: Internal

For 220 l machines, this contact is used for connection of a fan for cooling the MCU.

X308: Imbalance input

The function of the imbalance input is to stop the motor if the drum's movement is too great. (The imbalance switch is normally open.) When the imbalance switch is activated (closes) a voltage of 96 - 276 V AC is supplied to the MCU. The MCU detects that imbalance has arisen and stops the motor.

Input voltage: 120 V-20 % (=96 V) - 240 V+15 % (=276 V), 50/60 Hz
The imbalance input receives its supply from Input lock sequence (X302).

Current: Max. 0.01 A

X311: Main input

Input voltage: Single-phase or DC three-phase: 200 V-15%(=170 V) - 240 V+10% (264 V)

X312: Output to motor and input thermal protection device (Klixon)

The output is connected to a thermal protection device, located on the motor windings, with a connection back to the input. If the motor becomes overheated, the thermal protection device switch opens. The yellow LED reveals an error code through its pattern of flashes, see the section "Error indication patterns".

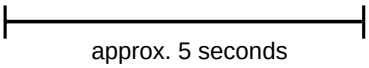
Current, max. 0.01 A

Error indication patterns

Fig. 38 Fig. 39 If a fault or error occurs in the motor or motor control unit, the MCU sends an error signal to the PCU board. In addition to an error code showing on the display, errors/faults are revealed by the flashing of a yellow LED on the MCU board. The table below shows how to identify the error/fault on the basis of the flashing pattern of this LED.

38

	LED pattern of flashes	Error code/message on display	Cause
1		HEAT SINK TOO HOT	Heat sink on MCU too hot.
2		MOTOR TOO HOT	Motor thermal protection device activated
3		NO INTERLOCK	MCU has received start command, but not received interlock signal.
4		NO MOTOR COMM	Communication error MCU – PCU
5		-	Short in motor windings, wiring or internally in MCU. MCU will restart automatically.
6		MOTOR SHORT	Once again short in motor windings, wiring or internally in MCU.
7		INTERL HARDWARE	Fault in interlock circuits in MCU.
8		LOW DC VOLTAGE	MCU DC voltage too low.
9		HIGH DC VOLTAGE	MCU DC voltage too high
10		RIPPLE DC BUS	Ripple DC-bus (EWD 4000 only).
11		KLIXON CIRCUIT	Fault/error in MCU overheating circuits.

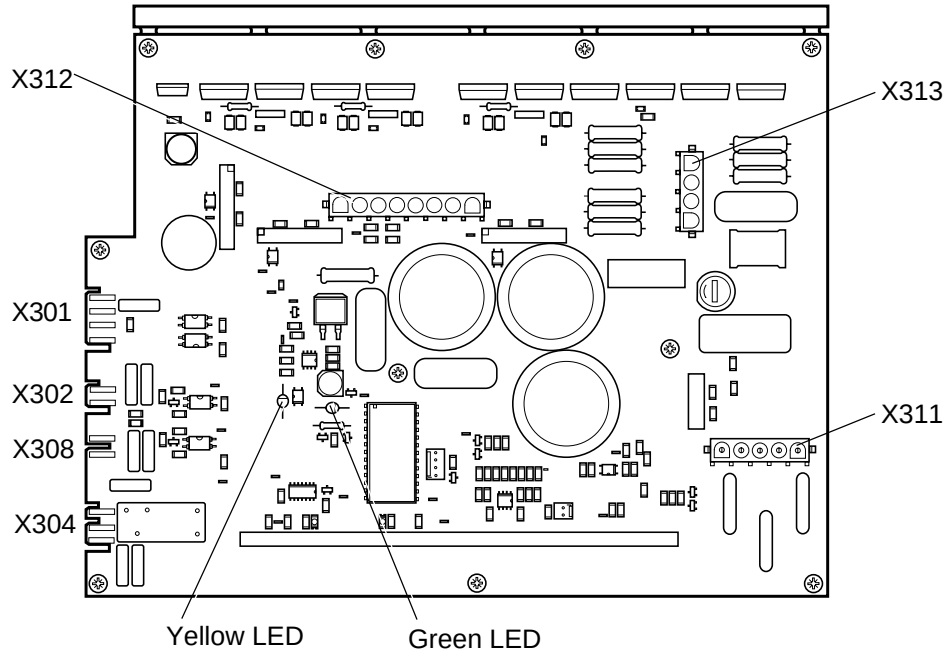


4710

Fault-finding

There are fault-finding charts for all error codes in “Fault-finding”.

39



4708

Error indication patterns, green LED

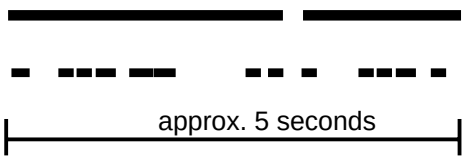
Fig. 40

The green LED on the MCU board is normally lit except for a brief pause approx. once every five seconds (pattern which indicates “OK”).

When the microprocessor for the PCU is removed from the machine or has reset status, the LED will be lit without flashing.

When the MCU current-limiting function is activated, the LED will instead flicker, and the flashing pattern which indicates “OK” will be suspended for as long as the current-limiting function is activated. When the MCU current-limiting function ceases, the pattern of flashes indicating “OK” will return after 10 seconds.

40



Pattern indicating “OK”

Flickering when MCU current-limiting function is activated.

4712

Extraction

Fig. 41 During extraction, the motor speeds follow an extraction sequence which is always the same. This extraction sequence is used for all standard programs 991-999 for CLARUS machines.

The table shows the extraction speeds during the various phases of the sequence, for various drum volumes.

The extraction sequence is as follows:

Phase 1. Distribution period of 40 seconds, with imbalance sensing. Imbalance sensing takes place during the last 5 seconds.

Phase 2. Extraction for 30 seconds.

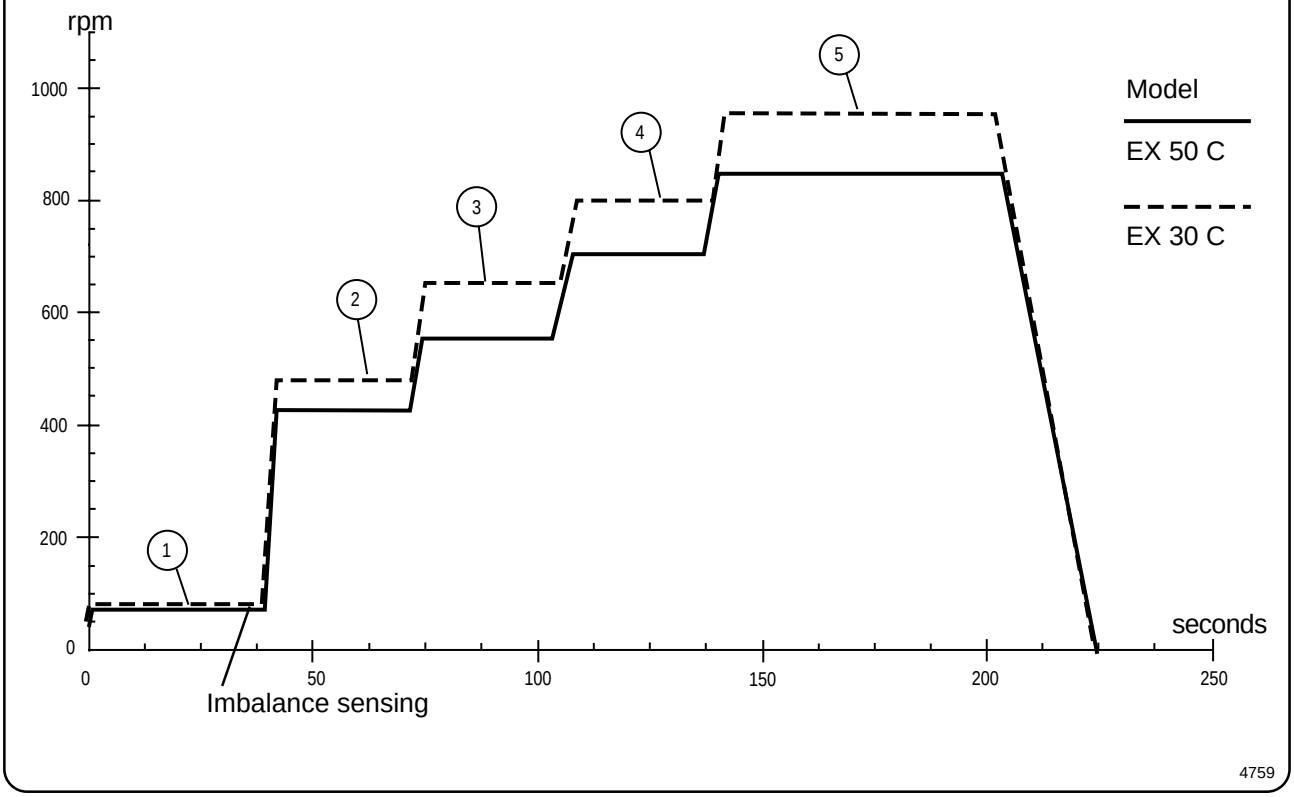
Phase 3. Extraction for 30 seconds.

Phase 4. Extraction for 30 seconds.

Phase 5. Extraction for remainder of the program's total extraction time.

Drum volume l / Speed rpm	EX 30	EX 50
Phase 1	85	78
Phase 2	475	425
Phase 3	650	550
Phase 4	800	700
Phase 5	950	850

41



Imbalance measurement

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

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

Belt tension

Fig. 42

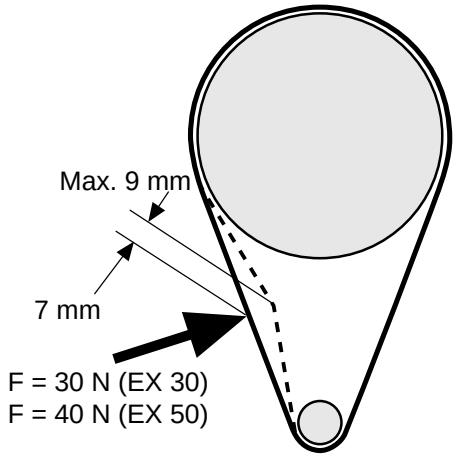
Fig. 43

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

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

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

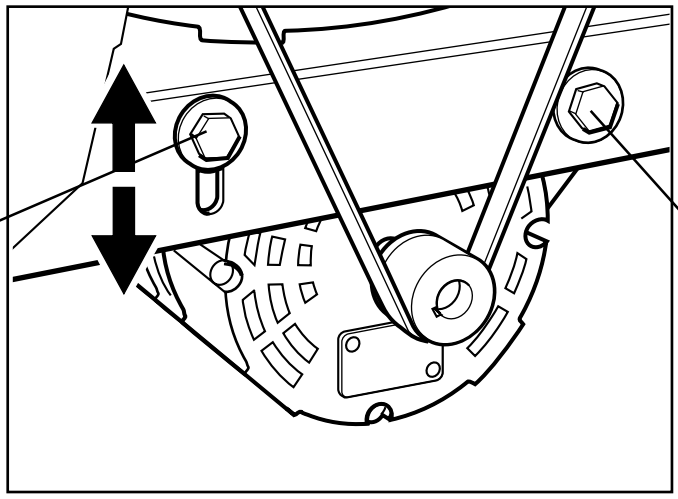
42



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

4741

43



4832

Inlet valve (EX 30 C) and supply injection valve

Construction

Fig. (44) This valve has a single-inlet with one, two or three outlets, each with its own solenoid coil.

The body is made of heat-resistant polyamid plastic and the solenoids encased in water-tight plastic. The electrical connector terminals are spade lugs.

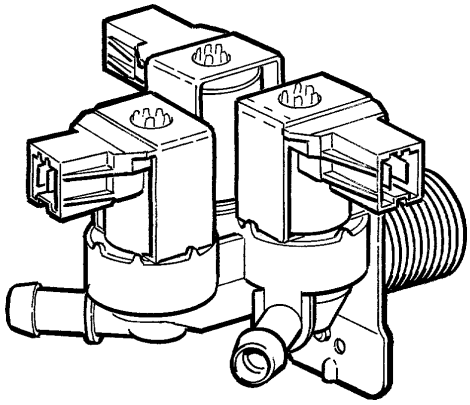
A filter screen on the inlet side prevents dirt from entering the valve. Flow restrictors can be placed at either the inlet or any of the outlets.

Operation

Fig. (45) 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.

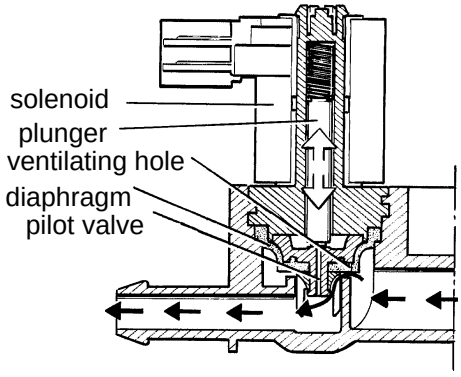
When the current to the solenoid is cut off, the plunger spring will press the plunger against the pilot opening of the diaphragm. The pressure above the diaphragm then rises to correspond to the water inlet pressure and the pressure of the spring will close the valve.

44



1161

45



1185

Repair instructions

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

Fig. (46) 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.
- Remove the coil and clean the surfaces of the magnetic core.

If the valve does not close

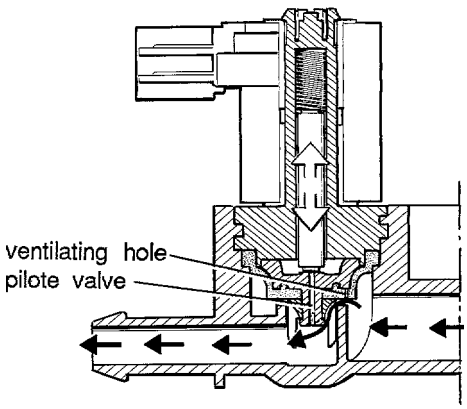
- Check that the coil is not live. The valve is normally closed when the magnet is not energised.
- Check the return spring.
- Check the diaphragm (pilot pressure opening).

Dismantling the valve.

Fig. (47)
- Shut off the water supply and pull the coil stright upwards. Use a screwdriver if necessary to carefully undo the coil.

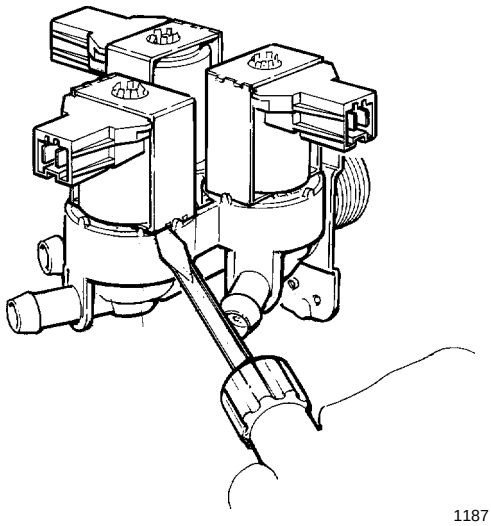
Fig. (48)
- Use the tool supplied (attached to one of the hoses when the machine is delivered) to open the valve housing. Slide the tool over the protruding plastic sleeve to that the pegs on the tool engage the corresponding sockets in the valve housing.
- Use a spanner or a pair of pliers and unscrew the upper part of the valve housing.

46



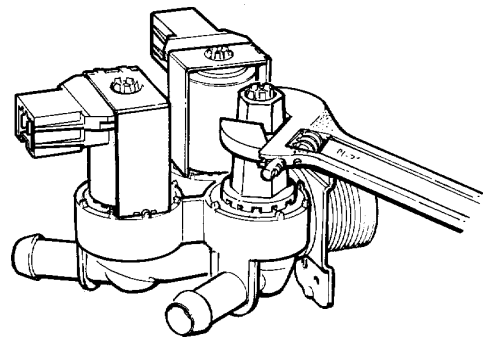
1186

47



1187

48



1181

Inlet valve for EX 50 C

Fig. 49 The water inlets have brass bodies with larger cross section of the outlet in order to achieve a shorter filling time for the machine.

Construction

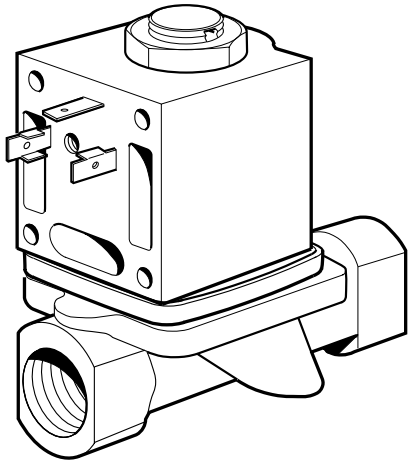
Fig. 50 The valve housing is made of pressed brass. The spring-loaded plunger is made of stainless steel and located at its lower end.

Operation

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

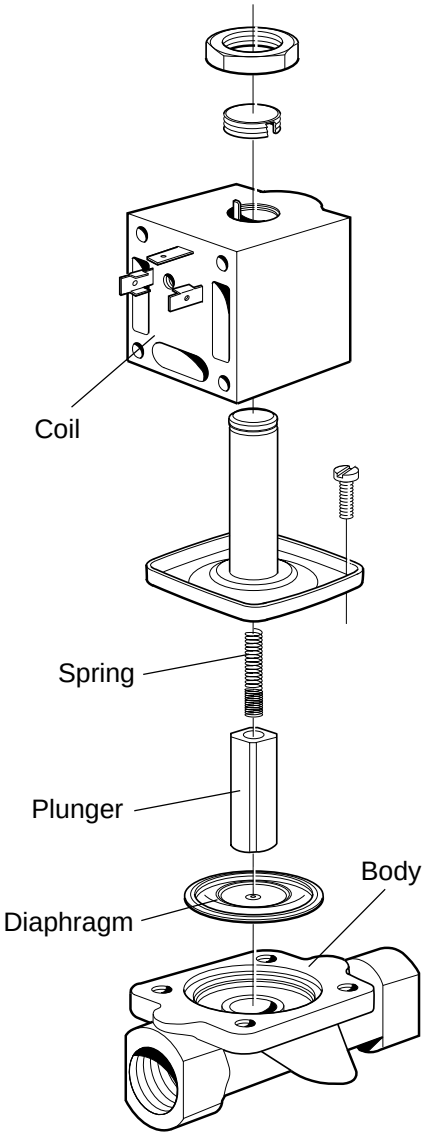
To strip, clean, re-assemble and troubleshoot the inlet valve, follow the instructions outlined for the supply injector valve.

49



3963

50



3961

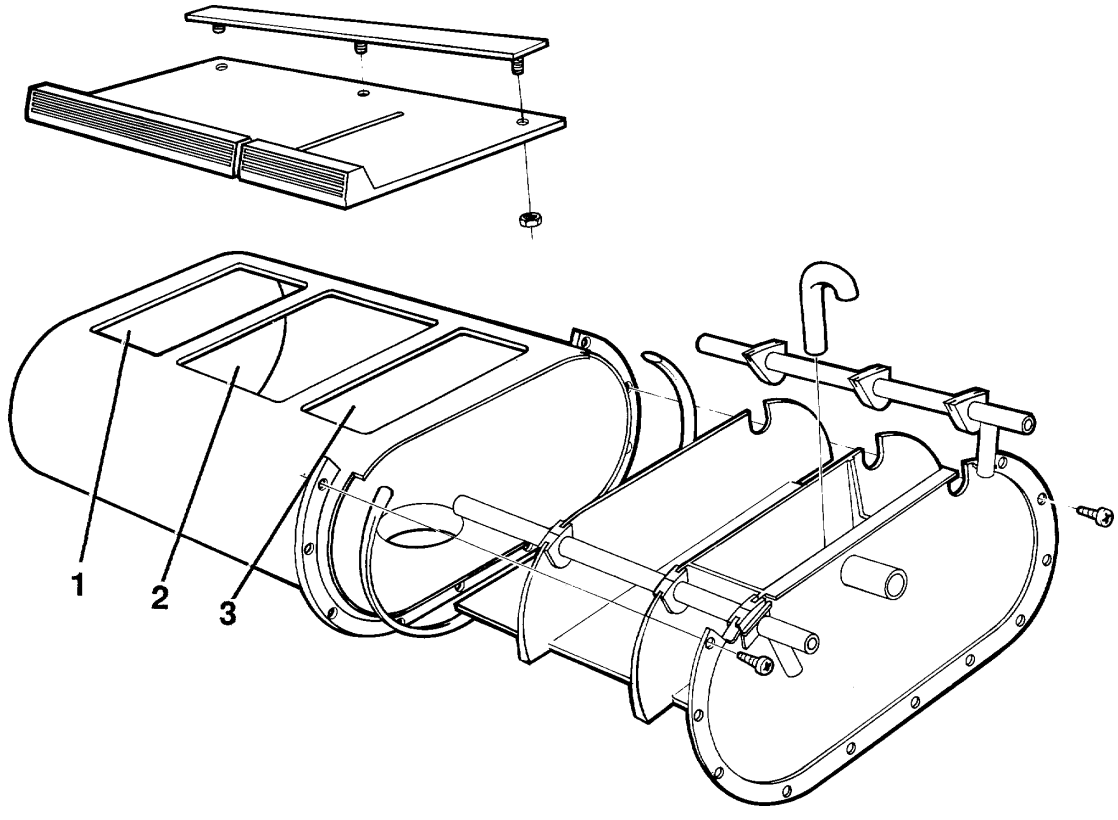
Soap supply box

Fig. 51 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.

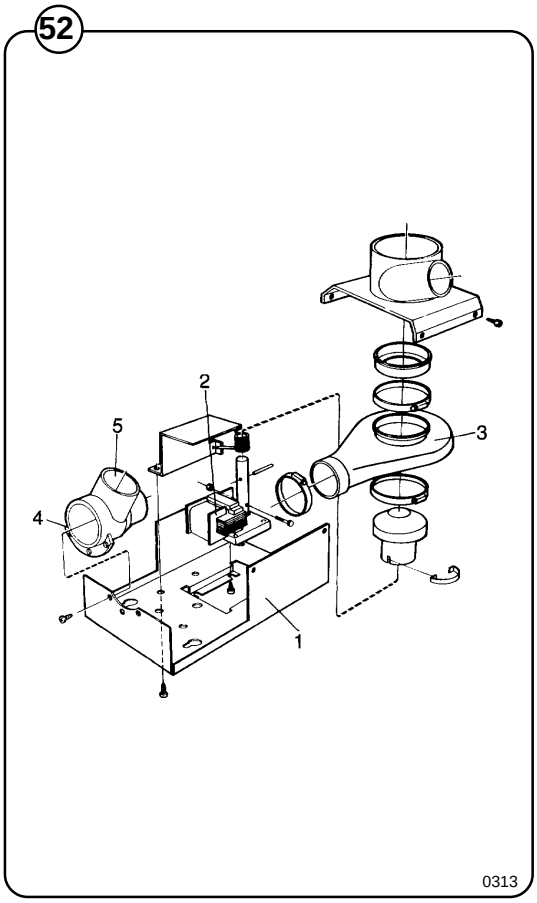
51



Drain valve

Description

Fig. (52) The drain valve consists of a bracket (1), on which are mounted the motor and gear (2) and diaphragm (3). The rubber diaphragm is resistant to a water temperature up to 100°C (212•F). The installation of a lint trap is not necessary. The machine is equipped with an overflow, which bypasses the drain valve. The drain can be cleaned by removing the drain connection (4) outside of the machine or by removing the rubber diaphragm (3). The motor and gear assembly is covered by a plate and provided with quick-disconnect electrical connections. The stator coil is constructed for continuous operation.



Operation

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

Trouble-shooting

If the valve does not open or close properly:

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

Clean out

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

Heating (option)

Fig. 53

Fig. 54

The machine elements are in the lower part of the outer drum, accessible from the machine front. They are switched in by heating relays, controlled by the program control unit. For input voltage 400-440 V one heating relay is used (K21), and for 208-240 V, two are used (K21 and K22).

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

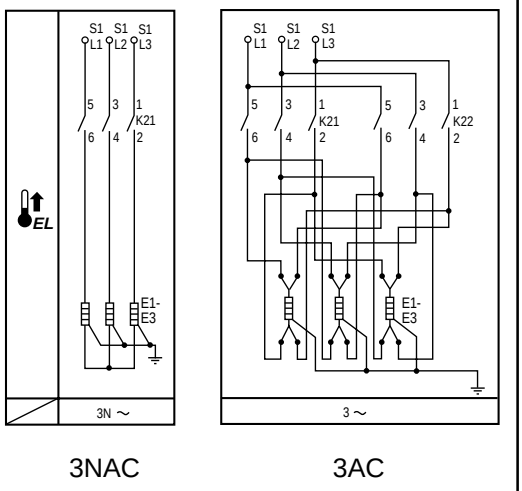
Fault-finding

To be carried out by authorised personnel only.

If heating time is abnormally long:

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

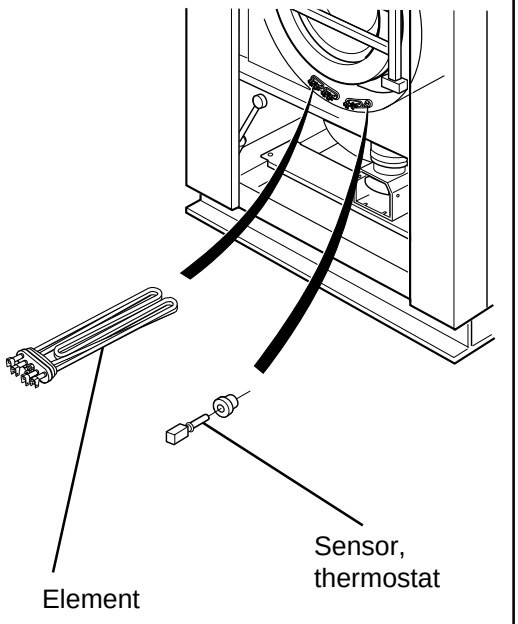
53



3NAC 3AC

4728

54



4742

To replace an element

- Switch off the power supply to the machine at the main switch/wall switch and check that the machine is isolated from the power supply. Remove the front panel.
- Note exactly how the elements electrical connections are arranged, then disconnect them.
- Undo the nut between the element’s connections and turn the screw a half turn.
- Remove the inspection cover in the inner drum. Turn the drum so the opening is at the bottom. This will give access to the nut for the element holder through the opening. Release the nut for the element holder enough to allow the element to be pulled out.
- Guide the new element into the element holder at the rear of the drum, turn the screw one half turn and tighten the nut.
- Connect the element’s electrical connections.
- Tighten the nut on the element holder.
  Refit the inspection cover.
- Fill the machine and check that there are no leaks from the element seal.

Program chart Standard 1

PROGRAM / PROGRAM STEP		COLD						POLY COTTON						WARM						WARM						HOT						SLUICE					
		30°						50°						40°						60°						90°						3 rinses					
		991						992						993						994						995						997					
	PROGRAM IND.																																				
	WATER INTAKE			C	1	L	-			C	1	L	30			W	1	L	40			W	1	L	40										
	COMPARTMENT																																				
	LEVEL																																				
	TEMP °C																																				
	TIME				1	G					1	N					1	N					1	N												
PREWASH	DRUM ACTON																																				
DRAIN	PROGRAM IND.																																				
	WATER INTAKE	W	2	L	30	6	G			W	2	L	50			H	2	L	60			H	2	L	85			W	2	L	40						
	COMPARTMENT																																				
	LEVEL																																				
	TEMP °C																																				
	TIME				1	G					1	N					1	N					1	N					1	N						
MAIN WASH	DRUM ACTON																																				
DRAIN	PROGRAM IND.																																				
	WATER INTAKE	W	2	L	30	6	G			W	2	L	50			H	2	L	60			H	2	L	85			W	2	L	40						
	COMPARTMENT																																				
	LEVEL																																				
	TEMP °C																																				
	TIME				1	G					1	N					1	N					1	N					1	N						
EXTRACTION	DRUM ACTON																																				
DRAIN	PROGRAM IND.																																				
	WATER INTAKE																																				
	COMPARTMENT																																				
	LEVEL																																				
	TEMP °C																																				
	TIME																																				
EXTRACTION	DRUM ACTON																																				
RINSE 1	PROGRAM IND.																																				
	WATER INTAKE																																				
	COMPARTMENT																																				
	LEVEL																																				
	TEMP °C																																				
	TIME																																				
DRAIN	DRUM ACTON																																				
EXTRACTION	PROGRAM IND.																																				
	WATER INTAKE																																				
	COMPARTMENT																																				
	LEVEL																																				
	TEMP °C																																				
	TIME																																				
RINSE 2	DRUM ACTON																																				
DRAIN	PROGRAM IND.																																				
	WATER INTAKE	C	-	h	-	2	G	C	-	h	-	2	N	C	-	h	-	2	N	C	-	h	-	2	N	C	-	h	-	2	N						
	COMPARTMENT													C	3	h	-	2	N	C	3	h	-	2	N	C	3	h	-	2	N						
	LEVEL																																				
	TEMP °C																																				
	TIME				1	G					1	N					1	N					1	N					1	N						
EXTRACTION	DRUM ACTON																																				
RINSE 3	PROGRAM IND.																																				
	WATER INTAKE	C	-	h	-	2	G	C	-	h	-	2	N	C	-	h	-	2	N	C	-	h	-	2	N	C	-	h	-	2	N						
	COMPARTMENT													C	3	h	-	2	N	C	3	h	-	2	N	C	3	h	-	2	N						
	LEVEL																																				
	TEMP °C																																				
	TIME				1	G					1	N					1	N					1	N					1	N						
EXTRACTION	DRUM ACTON																																				
RINSE 4	PROGRAM IND.																																				
	WATER INTAKE	C	3	h	-	2	G	C	3	h	-	2	N	C	3	h	-	2	N	C	3	h	-	2	N	C	3	h	-	2	N						
	COMPARTMENT																																				
	LEVEL																																				
	TEMP °C																																				
	TIME				1	D					1	D					1	D					1	D					1	D						
DRAIN	DRUM ACTON																																				
EXTRACTION, LOW	PROGRAM IND.																																				
	WATER INTAKE				2	E					30	E					30	E					30	E					-	-						
	COMPARTMENT																																				
	LEVEL																																				
	TEMP °C																																				
	TIME																																				
EXTRACTION, HIGH	DRUM ACTON																																				
	PROGRAM IND.																																				
	WATER INTAKE										1	E					5	E					5	E					-	-						
	COMPARTMENT																																				
	LEVEL																																				
	TEMP °C																																				
	TIME																																				
	DRUM ACTON																																				
PROGRAM TIME		2 2						2 3 . 5						2 8 . 5						3 0 . 5						2 6 . 5						2 3 . 5					9

. = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15¡˚C)
W = WARM WATER (APPROX.35¡˚C)

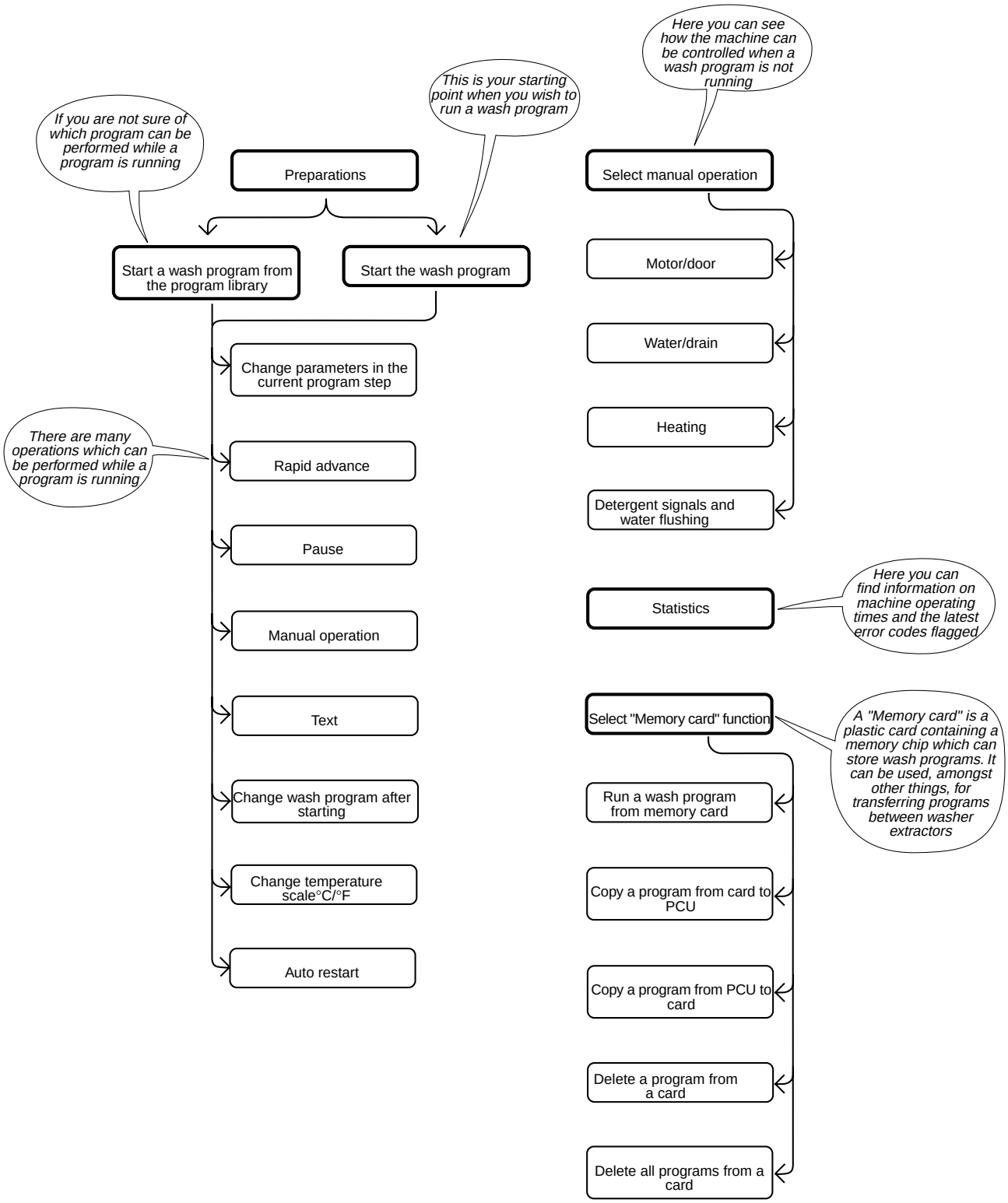
H = HOT WATER (APPROX. 65¡˚C)
Hd = HARD WATER
L = LOW WATER LEVEL
M = MEDIUM WATER LEVEL
h = HIGH WATER LEVEL
= TIME IN SECONDS
= TIME IN MINUTES
Y = YES

Program chart Standard 1

PROGRAM / PROGRAM STEP	EXTRACTION LOW 998: PROGRAM IND.	WATER INTAKE	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTON	EXTRACTION HIGH 999: PROGRAM IND.	WATER INTAKE	COMPARTMENT	LEVEL	TEMP °C	TIME	DRUM ACTON
PREWASH														
DRAIN														
MAIN WASH														
DRAIN														
EXTRACTION														
RINSE 1														
DRAIN														
EXTRACTION														
RINSE 2														
DRAIN														
EXTRACTION														
RINSE 3														
DRAIN														
EXTRACTION														
RINSE 4		C	3	h	-	2	N		C	3	h	-	2	N
DRAIN						1	D						1	D
EXTRACTION, LOW						30	E						30	E
EXTRACTION, HIGH						1	E						5	E
PROGRAM TIME	4.5							8.5						

- = NO DRUM ACTION
G = GENTLE ACTION
N = NORMAL ACTION
D = DISTRIBUTION SPEED
E = EXTRACTION
R = REDUCED GENTLE ACTION
C = COLD WATER (APPROX. 15¡˚C)
W = WARM WATER (APPROX.35¡˚C)

H = HOT WATER (APPROX. 65¡˚C)
Hd = HARD WATER
L = LOW WATER LEVEL
M = MEDIUM WATER LEVEL
h = HIGH WATER LEVEL
(shaded) = TIME IN SECONDS
(white) = TIME IN MINUTES
Y = YES

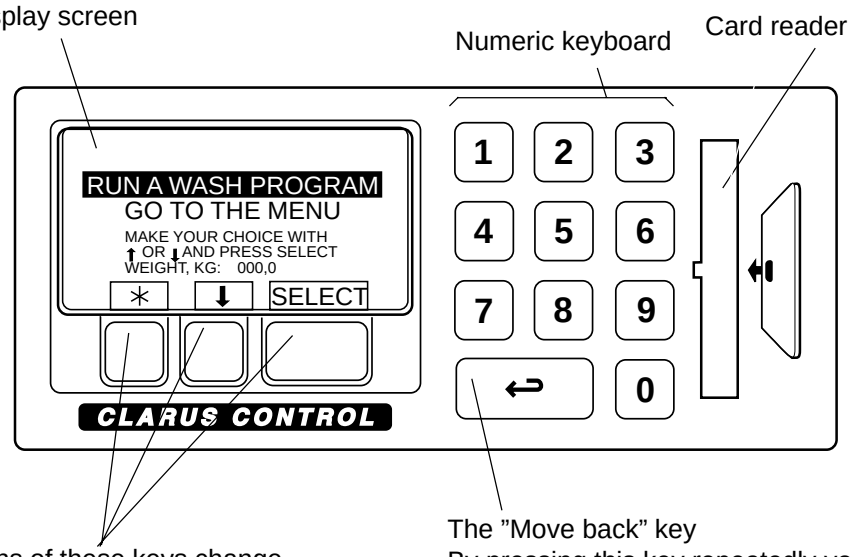

Here you can see how the machine can be controlled when a wash program is not running
This is your starting point when you wish to run a wash program
If you are not sure of which program can be performed while a program is running
Preparations
Select manual operation
Start a wash program from the program library
Start the wash program
Motor/door
Water/drain
Change parameters in the current program step
Heating
There are many operations which can be performed while a program is running
Rapid advance
Detergent signals and water flushing
Pause
Statistics
Here you can find information on machine operating times and the latest error codes flagged
Manual operation
Select "Memory card" function
A "Memory card" is a plastic card containing a memory chip which can store wash programs. It can be used, amongst other things, for transferring programs between washer extractors
Text
Change wash program after starting
Run a wash program from memory card
Change temperature scale°C/°F
Copy a program from card to PCU
Auto restart
Copy a program from PCU to card
Delete a program from a card
Delete all programs from a card
3657

General introduction

Fig. 55 This washer extractor is controlled by a microprocessor-based program control unit. There are many advantages to this equipment, including:

- timing, levels and temperatures are controlled with great precision and flexibility
- detailed information on wash programs, machine status and operations, wash times and temperatures can be accessed in plain language on the large display screen
- it is possible for the user to create new wash programs, and to adapt programs precisely on the basis of experience and to suit various types of textile, degrees of soiling etc.
- a very high level of machine safety through continuous monitoring and built-in safety interlocks
- the program control unit has a reader for ”memory cards”. These are cards the size of a credit card which contain a memory chip. Memory cards allow the user to:
  - transfer wash programs between a PC and the washer extractor, or from one washer extractor to another
  - run programs straight from a card
- great flexibility during program operation:
  - rapid advance both forwards and backwards in the program
  - change temperatures, program module lengths and extraction speeds directly, during program operation
  - start a different program at any time during program operation.

55



The functions of these keys change, depending on which menu or part of a menu you are using. Their current functions at any time are shown on the display immediately above each key.

The ”Move back” key
By pressing this key repeatedly you can move backwards through the menus you have navigated through. This will always bring you back to the menu illustrated here.

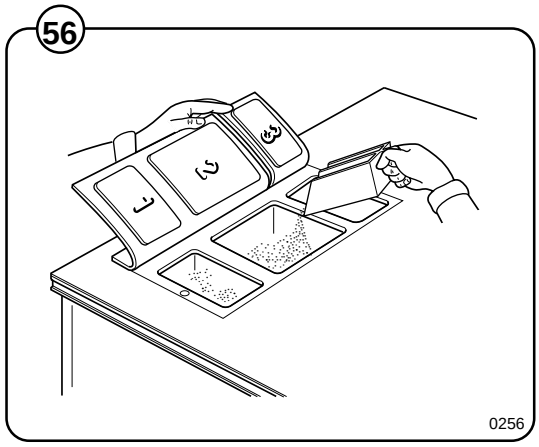
4115 3651

Preparations

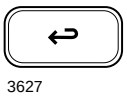
- Sort the load, paying attention to the textile care labels on the items. Empty all pockets and do up zip fasteners.
- Open the machine door, check that the drum is empty, load the items into the machine and close the door.
- Check that the emergency stop button has not been pressed inwards (see ”Machine safety”).

Measuring the detergent

Fig. (56) If the machine's system for powder detergent is used: measure the detergent and other additives according to the indicator lights.



The ”Move back” key



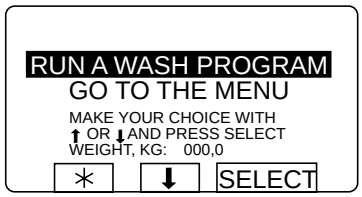
3627

If you find you are in the wrong place, or if you want to undo earlier key presses:

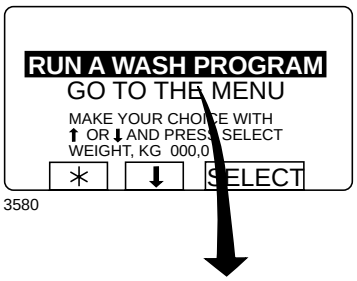
Press the ”Move back” key one or more times.

The "Move back" function

Each press of the ”Move back” key moves you back one menu, in reverse order. By pressing this key repeatedly you can return to this menu at any time:



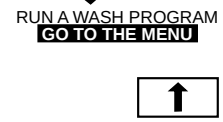
To start the wash program



3580

If this menu is not currently displayed:

Press ⮌ **repeatedly.**



If ”GO TO THE MENU” is highlighted:

Press ⬆.

When ”RUN A WASH PROGRAM” is highlighted:

Press SELECT.

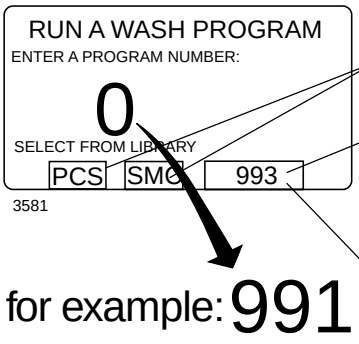
Two ways of starting a program

By entering the actual program number

Enter the actual program number if you know it, then press **SELECT**.

By starting from the program library (see section "To start a wash program from the program library)

If you are unsure about the programs available, you can select a program from the program library, where the programs are listed with their descriptions.



Here you can select programs from the program libraries. See the section entitled ”To start a wash program from the program library”.

Displayed here will be the number of the most frequently used program. S993 would indicate the number of a program on a memory card.

Press this key if you want to select this program.

SELECT

Use the numeric keys to enter the program number

Press SELECT.

If you have entered the wrong number

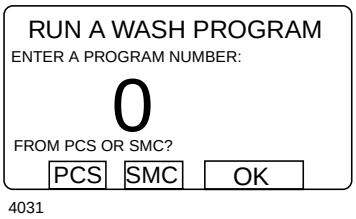
Enter the correct number to overstrike the earlier one.

Note: you must always enter three digits, even when the number is really only a one or two-digit number.

Examples:

The program number required is **9**. Enter **009** to overstrike all digits in the wrong number.

The program number required is **19**. Enter **019** to overstrike all digits in the wrong number.



If you have a memory card in the program control unit, and the program you selected is both on the memory card and in the PCU, you will be asked ”FROM PCS OR SMC?”.

PCS

Press PCS if you want to take the program from the PCU.

SMC

Press SMC if you want to take the program from the memory card.

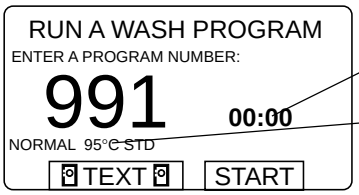
In some of the text shown on the display, Clarus Control is referred to as PCS and the memory card is referred to as SMC.

Memory cards

A memory card is a plastic card, the size of a credit card, with an electronic memory chip inside it. This card is capable of storing 10 to 15 wash programs of normal size. If the programs are mostly small ones, more of them can be stored, whereas larger programs will reduce the number which can be held by the card. Memory cards of this type can be used to:

- transfer wash programs from one washer extractor to another
- run wash programs straight from the card
- transfer wash programs from a PC to a memory card and from a memory card to a PC (these procedures, and how to write a wash program on a PC, are described elsewhere).

Memory cards are described in detail in the section entitled ”The Memory card”.



3582

Delayed start time (hrs:mins)

Program name

If you want to see the description of the program:

TEXT

Press TEXT.

Pressing "Text" displays more information

The text displayed is a description of the wash program selected. This text description is inserted when a new wash program is created. This procedure is described fully in the programming manual.

Choose 1 or 2:

① START

1 To start the program now:

Press START.

② 1 2 3 4 5 6 7 8 9 0

2 Delayed start

Use the numeric keys to enter a time (max. 24 hrs). This parameter appears on the right of the display.

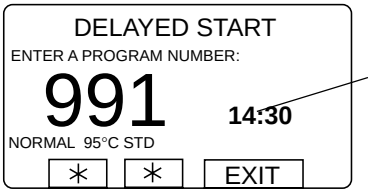
START

Press START.

Delayed start

Delayed start means that the machine will not start the wash program until the time entered has elapsed.

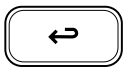
This function allows you, for example, to load the machine in the evening, but delay the start of the wash until early the next morning, to end in time for the next shift.



Time left before the machine is to start

If you want to cancel the delayed start:
Press EXIT

EXIT



3627

During a wash program:

Press ↩ to make the machine pause during the wash program.

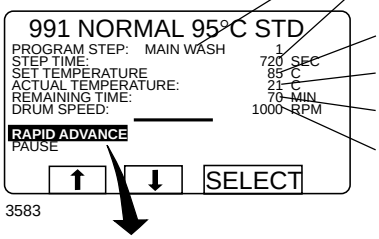
Two ways of pausing during a wash program

There are two ways of pausing during a wash program:

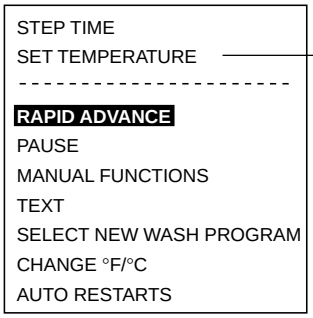
1 By pressing ↩.

2 As an additional function. This is described in section **"Pause"**.

The following information is displayed during the wash program:



- Current program step
- Time left for this program step
- Set temperature
- Actual temperature
- Remaining program time
- Drum speed



If required:

Select a function using the cursor keys.

Press SELECT.

To terminate a program before it has finished

- Select RAPID ADVANCE and press SELECT. Advance to ”END OF PROGRAM” and press SELECT.
- Wait until ”THE DOOR IS OPEN” appears on the display.
- Now the door can be opened.

To change parameters in the current program step

See section "To change parameters in the current program step".

Certain program step parameters can be altered during the course of the program. In the example (left), the length of the program step and the heating temperature can be altered.

Additional functions during the program

Rapid advance (see section ”To change parameters in the current program step”)
Rapid advance through the program to the program step required. Rapid advance can be used to move both forwards and backwards through the program.

Display weight (see section ”Display weight”)
The actual load weight is shown in large digits on the display (weight display mode). (On machines with weighing equipment only.)

No water level reduction (see section ”No water level reduction”)
Machines with weighing equipment installed adjust the water level automatically according to the load weight. This function lets you switch off water level reduction during the current program.

Pause (see section ”Pause”)
The machine stops. The drain valve remains closed. Another way to pause the program: Press ↩.

Manual functions (see section ”Manual operation during a program”)
The following functions can be controlled manually during the course of the program:

- all water valves, drain and pumps (where applicable).
- limit highest extraction speed.
- motor on/off after end of wash program.
- flush detergent.

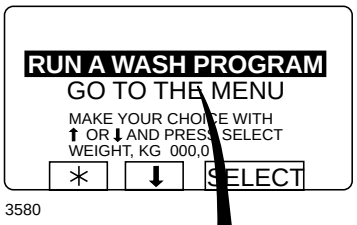
Text (see section ”Text”)
Display description of wash program (if available).

Select a different wash program (see section ”To change the wash program after program operation has commenced”)
You can switch to using a different wash program at any stage during the wash. Once this function has been selected, the current step (for example, rinse) of the earlier program will be allowed to finish and then the new program will start (from the beginning).

Change temperature scale °C or °F (see section ”To change temperature scale °C/°F”)

Auto restart (see section ”Auto restart”)
Here you enter the number of times you wish the wash program to restart automatically.

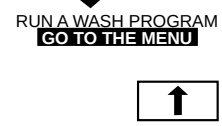
To start a wash program from the program library



3580

If this menu is not currently displayed:

Press ⮌ repeatedly.



If ”GO TO THE MENU” is highlighted:

Press ⬆.

When ”RUN A WASH PROGRAM” is highlighted:

Press SELECT.

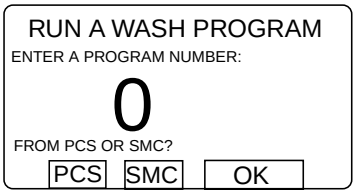
What is the program library?

The program library lists all wash programs, both user and standard programs, showing their program numbers and a description, for example:

1	MY OWN 40 °C
2	MY OWN 60 °C
3	MY OWN 90 °C
991	NORMAL 95°C STD
992	NORMAL 60°C STD
993	NORMAL 40°C STD
994	INTENSIVE 95°C
995	INTENSIVE 60°C
996	PERM. PRESS 60°C
997	PERM. PRESS 40°C
998	LOW EXTRACT 1 MIN
999	HIGH EXTRACT 5 MIN

Each time a new program is stored in the machine program memory, its number and description will be inserted automatically into the program library.

The program library may be used for starting a wash program, but is also used in programming, when a wash program needs to be modified or if a new program is to be created on the basis of an existing one.



4031

To select a program from the PCU program library:

Press PCS.

PCS

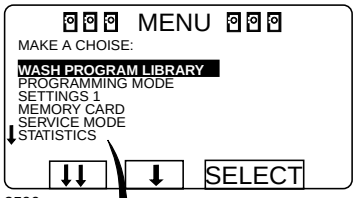
If there is a memory card in the PCU and you wish to select a program on that:

SMC

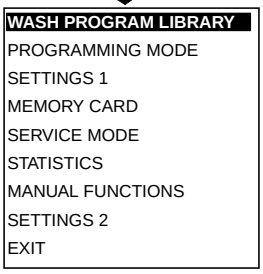
Press SMC.

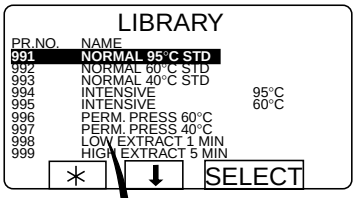
Select library via menu

You can also select the program library via the option ”GO TO THE MENU”. Then select ”WASH PROGRAM LIBRARY”.

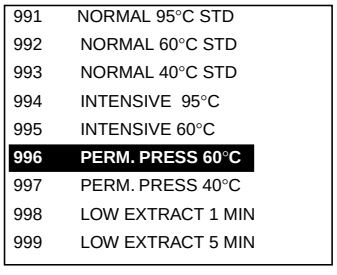


3590





3591

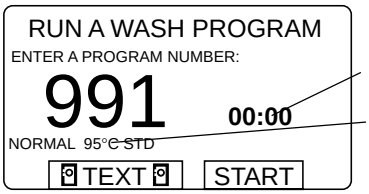


Press ⬇ the required number of times...

...to highlight the wash program required.

SELECT

Press SELECT.



3582

Delayed start time (hrs:mins)

Program name

If you want to see the description of the program:

Press TEXT

Pressing "Text" displays more information

The text displayed is a description of the wash program selected. This text description is inserted when a new wash program is created. This procedure is described fully in the programming manual.

Choose 1 or 2:

① START

1 To start the program now:

Press START.

② 1 2 3 4 5 6 7 8 9 0

2 Delayed start

Use the numeric keys to enter a time (max. 27 hrs). This parameter appears on the right of the display.

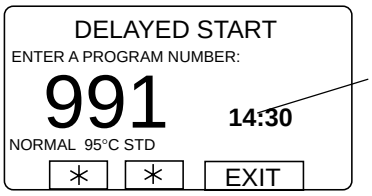
Delayed start

Delayed start means that the machine will not start the wash program until the time entered has elapsed.

This function allows you, for example, to load the machine in the evening, but delay the start of the wash until early the next morning, to end in time for the next shift.

START

Press START.



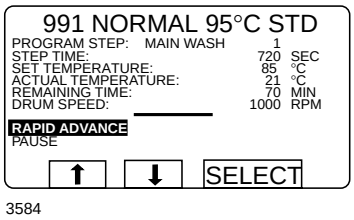
Time (in hours and minutes) left before the machine is to start.

OIf you want to cancel the delayed start:
Press EXIT.

EXIT

The functions which are available during program operation are described in sections "To change parameters in the current program step - Auto restart".

To change parameters in the current program step



3584

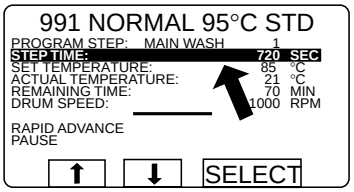
During program operation the display will look like this (see section "To start the wash program").

You can alter the following program steps:

Prewash, Main wash, Rinse, Drain, Soak
Length of program step (max. 9998 seconds), heating temperature (max. 97°C).

Extraction
Length of program step (max. 3600 seconds), extraction speed.

Press ⬆ one or more times...



...to highlight the line required.

If you have entered the wrong parameter

Continue pressing numeric keys to overstrike the incorrect parameter.

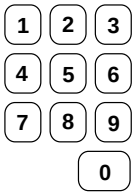
Note: always use the same number of digits as used on the display to overstrike the incorrect parameter.

Example:

To change the time for the program step to **30** seconds, enter **030** to overstrike the earlier parameter.

SELECT

Press SELECT.

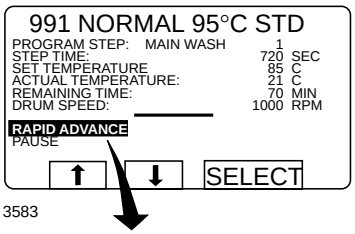


Use the numeric keys to enter the new parameter.

SELECT

Press SELECT.

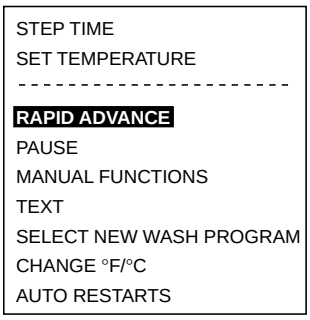
Rapid advance



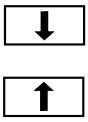
During program operation the display will look like this (see section "To start the wash program").

Check that "RAPID ADVANCE" is highlighted.

3583



If it is not highlighted:

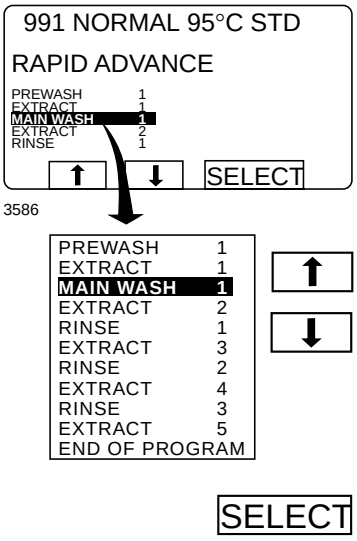


Press ⬆ or ⬇ one or more times to highlight "RAPID ADVANCE".

Press SELECT.

To terminate a program before it has finished

- Select RAPID ADVANCE and press SELECT. Advance to "END OF PROGRAM" and press SELECT.
- Wait until "THE DOOR IS UNLOCKED" appears on the display.
- Now the door can be opened.



Press ⬇ or ⬆ one or more times to highlight the program step you wish to advance to.

SELECT **Press SELECT.**

Rapid advance works in both directions

Rapid advance works in both directions, using ⬇ and ⬆.

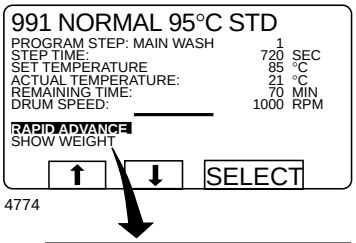
Using rapid advance to move forwards allows you to skip one or more program steps. Using rapid advance backwards allows you to repeat one or more program steps.

Automatic return to normal display

Once you have selected any of the functions below, you must make any changes required within 20 seconds. If no further keys are pressed within 20 seconds, the display will revert automatically to its normal appearance during a wash program.

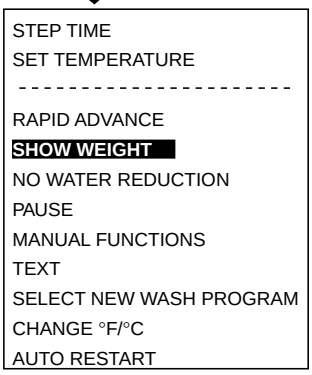
For machines with weighing equipment installed only!

Show weight



4774

During program operation the display will look like this (see section ”To start the wash program”).



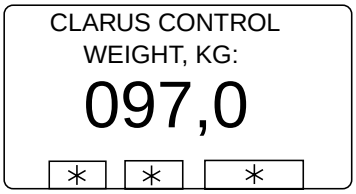
Press ⬆ or ⬇ one or more times to highlight ”SHOW WEIGHT”.

Press SELECT.

Show weight

The actual weight is shown in large digits on the display (weight display mode).

If the weighing equipment is not connected, the error message “FUNCTION NOT ALLOWED” will appear. See the section “Fault-finding, weighing equipment” in the machine manual.



4775

Weight display mode:

The actual net weight is shown in large digits on the display.

Return to normal display

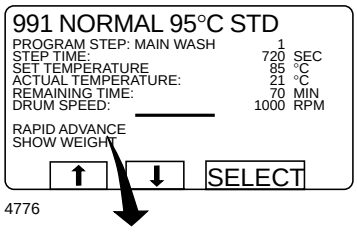
The display will return to normal at the end of the ”time for weight display” set as a parameter in Settings 1. The manufacturer’s default parameter is 20 seconds.

To end weight display sooner

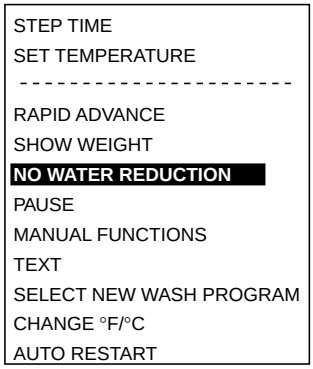
Press ↩ or use the numeric keys to enter a new program number.

For machines with weighing equipment installed only!

No water reduction



4776



During program operation the display will look like this (see section ”To start the wash program”).

Press ⬆ or ⬇ one or more times to highlight ”NO WATER REDUCTION”.

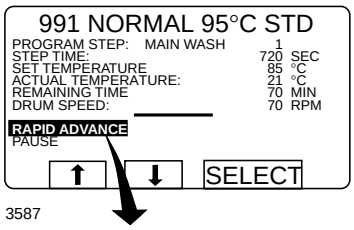
Press SELECT.

No water reduction

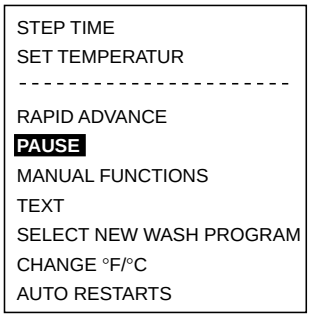
The wash load is weighed during the program and the water level is adjusted automatically according to its weight. If the load is not a full one, the water level will be reduced according to a water level reduction table. You can switch off water level reduction at any stage of a program.

Note that if you select ”NO WATER REDUCTION”, this applies only to the program currently running. The next time a program is started, water level reduction will occur automatically again.

Pause



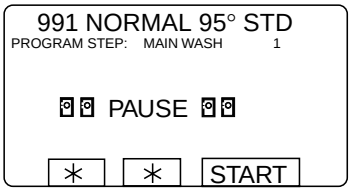
3587



During program operation the display will look like this (see section "To start the wash program").

Press ⬆ or ⬇ one or more times to highlight "PAUSE".

Press SELECT.



3588

Press START to restart the wash program.

Two ways of pausing during a wash program

Note that you must be in normal wash mode to be able to pause in this way. If, for example, you are using "Manual Functions", you will have to exit that first before you can use Pause.

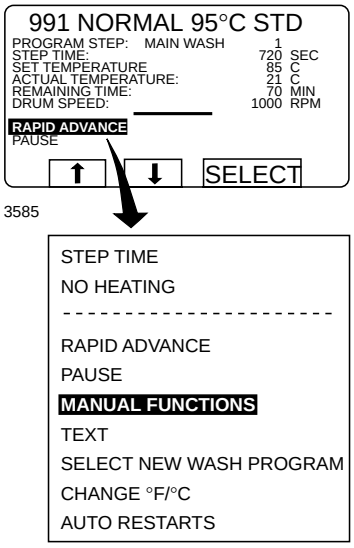
There are two ways of pausing during a wash program:

1 As an additional function. This is described in this section.
2 By pressing ⮌.

When the machine pauses:

- Program operation is halted.
- Filling is halted (where applicable).
- Heating is halted (where applicable).
- The motor stops.
- The drain valve remains closed.
- The door cannot be opened.

Manual operation during a program



During program operation the display will look like this (see section **"To start the wash program").**

Press ⬆ or ⬇ one or more times to highlight "MANUAL FUNCTIONS".

Press SELECT.

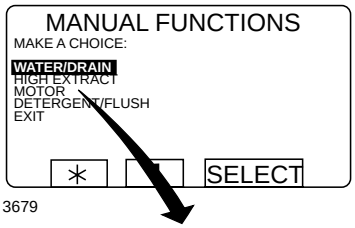
Two types of manual operation

There are two types of manual operation, which should not be confused:

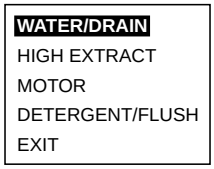
- **Manual operation during a program**

  These functions are described in this section.
- **Manual operation when no program is running**

  These functions are described in **section "Manual operation"**.



3679



Use the cursor keys to select the function.

Press SELECT.

Automatic return to normal display

Once you have selected any of the functions below, you must make any changes required within 20 seconds. If no further keys are pressed within 20 seconds, the display will revert automatically to its normal appearance during a wash program.

Manual functions during a wash program

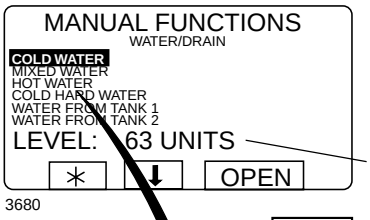
Water/drain (see section "Water/drain")
Allows manual operation of all water valves and the drain valve.

Highest extraction speed (see section "Maximum extraction speed")
Here you can limit the maximum extraction speed for the current program.

Motor (see section "Motor on after wash")
Motor on/off after program has ended.

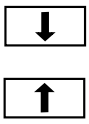
Detergent valves (see section "Detergent signals and water flushing")
Allows you to control all valves in the detergent compartment or in external detergent supply system.

Water/drain

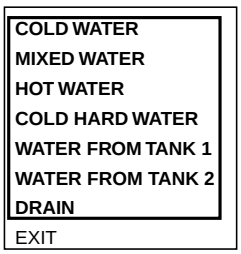


To access this function, see instructions in section "Manual operation".

Water level in drum



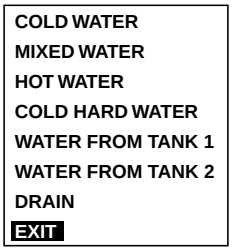
Use ⬇ and ⬆ to select the water/drain option you require.



Press OPEN.
The function will be activated for as long as you press and hold this key. The function ceases as soon as you release the key.

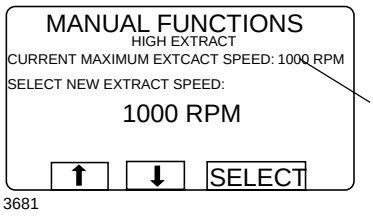
When you have finished:

Press ⬇ repeatedly to highlight ”EXIT”.



Press SELECT.

Maximum extraction speed



3681

To access this function, see instructions in section "Manual operation".

Maximum extraction speed in current program.

1 2 3
4 5 6
7 8 9
0

Enter the maximum extraction speed you require for this program.

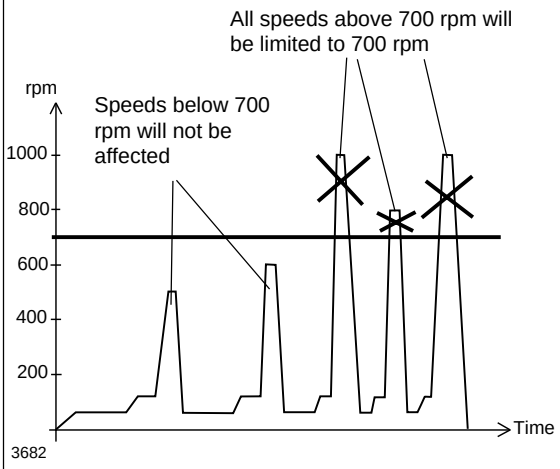
SELECT **Press SELECT.**

To limit the program's highest extraction speed

This function allows you to modify the highest extraction speed allowed during the program.

Example:

Assume that the highest speed in the program is 1000 rpm and that you have set 700 rpm as the highest speed allowed.

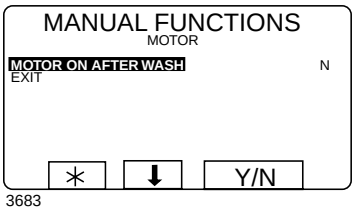


3682

This change will affect the current program only. No change will be implemented if extraction is taking place at the time of the (attempted) change.The next time that this program is used, the original maximum speed will apply.

This function does not allow you to set a **higher** speed than the usual maximum speed for the program.

Motor on after wash



3683

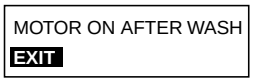
To access this function, see instructions in section "Manual mode".

Y/N

A toggle function:
Use Y/N to toggle the function from ON (Yes) to OFF (No).

⬇

When you have finished:
Press ⬇ to highlight "EXIT".



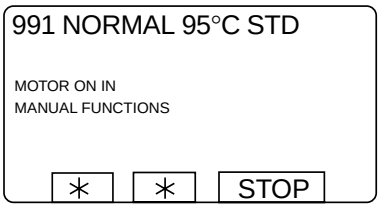
SELECT **Press SELECT.**

Motor to rotate after program has ended

If you answer **Yes (Y)**:

The motor will continue to rotate in alternative directions after the program has ended. This prevents creasing of the load.

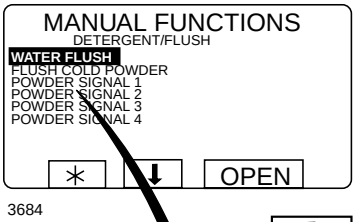
When the program has ended, the display will look like this:



4111

Press STOP to stop the motor.

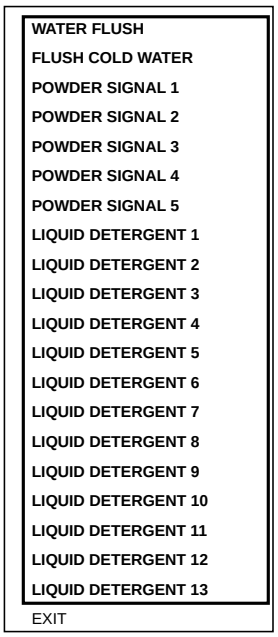
Detergent signals and water flushing



3684

To access this function, see instructions in section "Manual mode".

Use ⬇ and ⬆ to select the function you require.

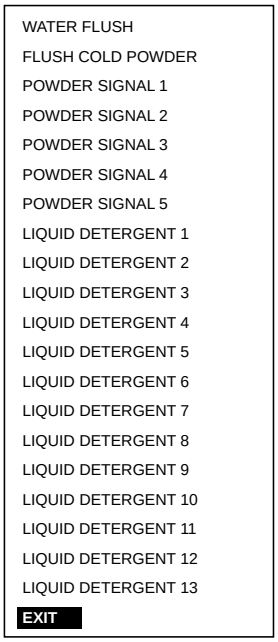


Detergent signals and water flushing

FLUSH WATER:
This function uses water to clear detergent from the supply tubes of the detergent dispensing system.

POWDER SIGNAL:
This function will either: a) use water to dispense detergent from machine compartments, or: b) dispense detergent from an external system. The number of valves present will vary according to the machine type.

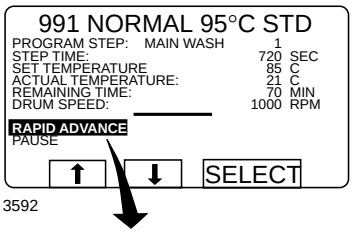
Press OPEN.
The function will be activated for as long as you press and hold this key. The function ceases as soon as you release the key.



When you have finished:
Press ⬇ repeatedly to highlight "EXIT".

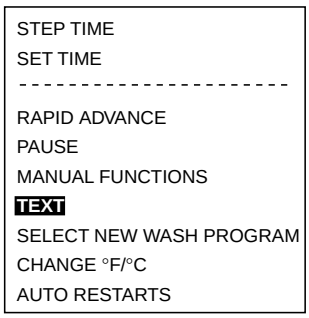
Press SELECT.

Text



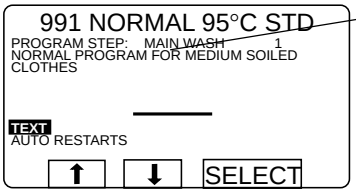
3592

During program operation the display will look like this (see section "To start the wash program".



Press ⬆ or ⬇ one or more times to highlight "TEXT".

Press SELECT.



3630

Description of wash program

To return to the normal display:
Press SELECT again.

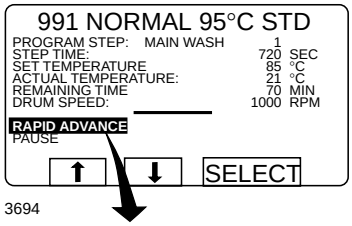
Pressing "Text" displays more information

The text displayed is a description of the wash program selected. This text description is inserted when a new wash program is created. This procedure is described fully in the programming manual.

Automatic return to normal display

If you do not press SELECT within 20 seconds, the display will revert automatically.

To change the wash program after program operation has commenced

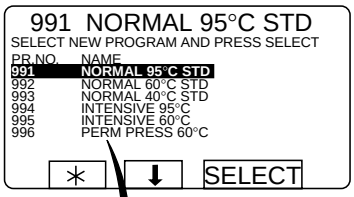


3694

During program operation the display will look like this (see section "To start the wash program".

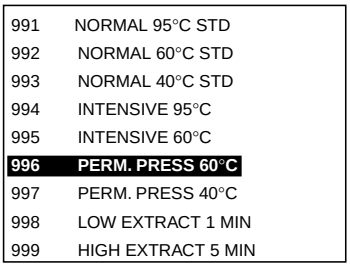
Press ⬆ or ⬇ one or more times to highlight "SELECT NEW WASH PROGRAM".

Press SELECT.



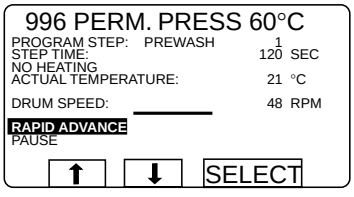
3695

Press ⬇ one or more times as required...



...to highlight the new wash program.

Press SELECT.



The existing wash program will now be interrupted and the new one will begin.

To change the wash program after program operation has commenced

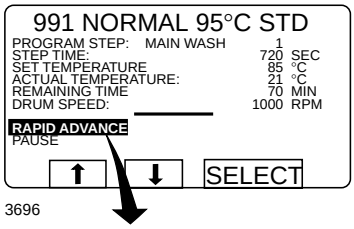
You can change to a different wash program at any time during program operation. When you do, the current function (for example, rinse) will be interrupted. The new program will start immediately after that (from the beginning).

This function is useful, for example, if you discover that you have started the wrong program.

Automatic return to normal display

If no key is pressed within 20 seconds, the display will revert automatically.

To change temperature scale °C/°F



3696

During program operation the display will look like this (see section "To start the wash program".

Press ⬆ or ⬇ one or more times to highlight ”CHANGE °C/°F”.

Press SELECT.

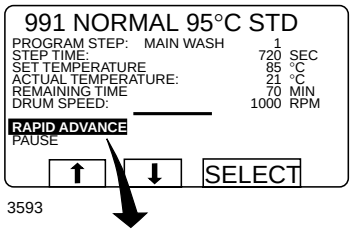
To change temperature scale °C/°F

This function changes the temperature scale used for all temperatures displayed during the wash program.

Please note that this scale change applies only to the current program. The default temperature scale will apply next time you run a program.

To change the default temperature scale for all programs, use the function ”SETTINGS”, which is described in the Service Manual.

Auto restart



3593

Press ⬇ one or more times to highlight "AUTO RESTART".

⬇

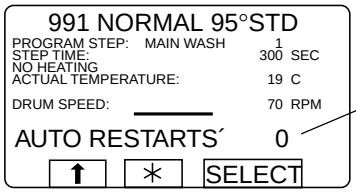
⬆

SELECT **Press SELECT.**

What is Auto restart?

Auto restart means that the same program will be repeated one or more times, according to the number set. The program will restart immediately, and the door will remain locked. If you have set auto restart, the display will show the number of restarts left.

This function is used primarily for testing.



3594

Shows the number of times the program will restart.

1 2 3
4 5 6
7 8 9
0

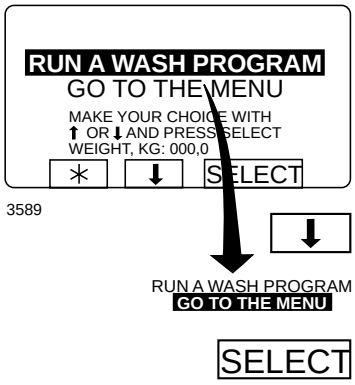
If required:
Use the numeric keys to change the required number of restarts.

SELECT

Press SELECT.

Manual operation

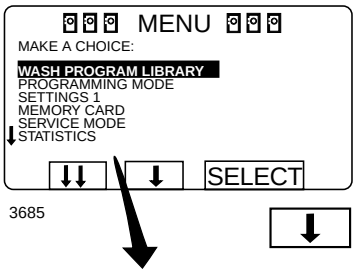
To select manual operation



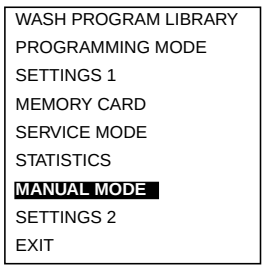
If this menu is not currently displayed:
Press ⮐ repeatedly.

Press ⬇ to highlight "GO TO THE MENU".

SELECT **Press SELECT.**



Press ⬇ six times...



....to highlight "MANUAL MODE".

SELECT **Press SELECT.**

Two types of manual operation

There are two types of manual operation, which should not be confused:

- **Manual operation when no program is running**

  These functions are described in this section.
- **Manual operation during a program**

  These functions are described in **section "Manual operation"**

Always lock the door first!

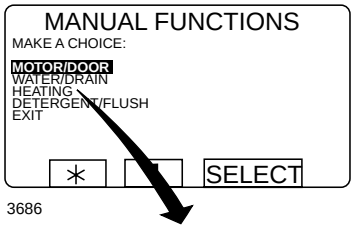
You must always close and lock the door first before you can operate the machine manually.

To lock the door, use the submenu MOTOR/DOOR, **see section "Motor/door"**.

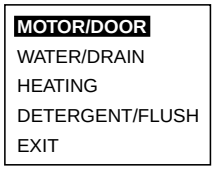
All manual settings are cancelled when you exit manual operation

All manual settings (such as door, motor, temperature, and drain) will be cancelled when you exit manual operation.

The door is unlocked, the motor stops, the drain opens, heating is halted, and the temperature is reset to zero.



3686



Select the function required using the cursor keys.

SELECT **Press SELECT.**

Manual operation when no program is running

Motor/door (see section "Motor/door")
Lock/unlock door. Switch motor on/off (normal drum action).

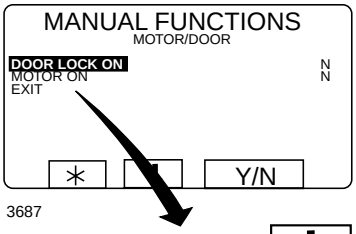
Water and drain valves (see section "Water/ drain")
Operation of drain valve and all water valves.

Heating (see section "Heating")
Heat water to any temperature required.

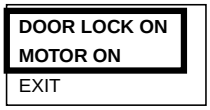
Detergent valves (see section "Detergent signals and water flushing")
Allows manual operation of all valves in detergent compartment or external detergent supply system.

Exit
Returns you to the MENU display.

Motor/door



3687



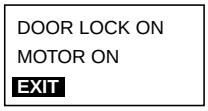
Press ⬇ as required to select a function.

A toggle function:

Y/N **Use Y/N to toggle the function from ON (Yes) to OFF (No).**

When you have finished:

Press ⬇ to highlight "EXIT".



SELECT **Press SELECT.**

Lock the door and start the motor

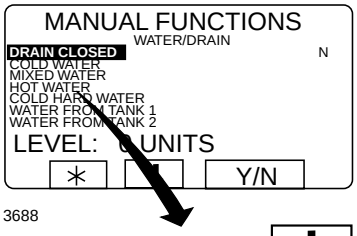
DOOR LOCK ON
If you answer **Yes (Y):**

The door will be locked. Note that you must always lock the door before you can operate the machine manually.

MOTOR ON
If you answer **Yes (Y)**:

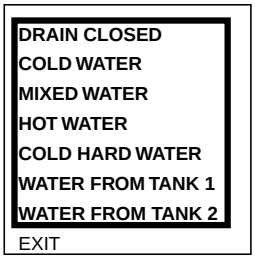
The motor will start and operate, using normal action.

Water/drain



To access this function, see instructions in section "To select manual operation".

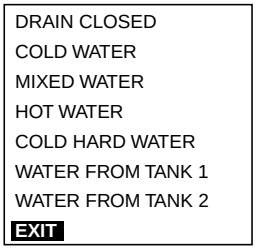
Use ⬇ or ⬆ to select Drain or one of the six Water filling alternatives.



Drain (a toggle function) :
Press Y/N to toggle the function from Yes (Y) and No (N).

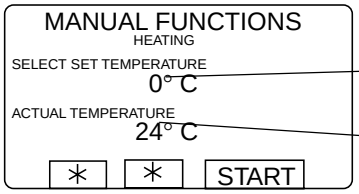
Water filling:
Press OPEN.
The function will be activated for as long as you press and hold this key. The function ceases as soon as you release the key.

When you have finished:
Press ⬇ to highlight ”EXIT”.



Press SELECT.

Heating

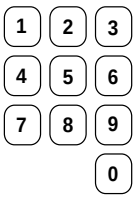


3689

To access this function, see instructions in section "To select manual operation".

Temperature selected

Actual temperature



Use the numeric keys to enter the temperature the water is to be heated to.

START

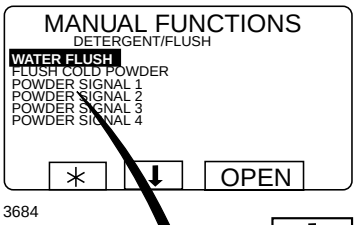
Press START.
Heating will now begin.

STOP

If you wish, you can cancel heating before the set temperature is reached:

Access this function again and press STOP.

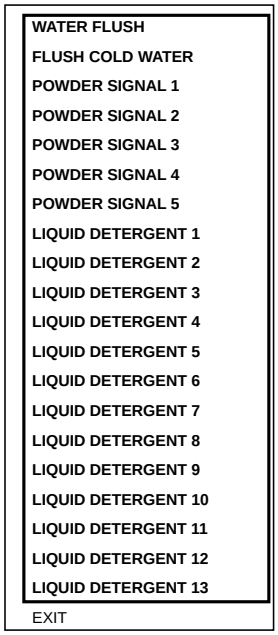
Detergent signals and water flushing



3684

To access this function, see instructions in section "To select manual operation".

Use ⬇ and ⬆ to select the function you require.



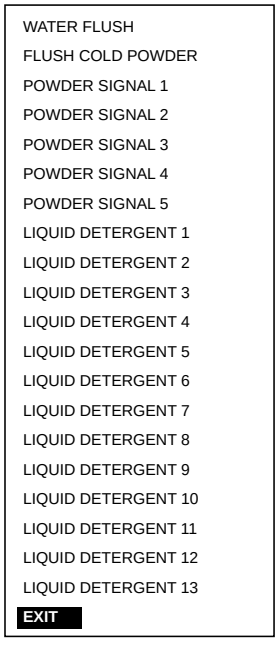
Detergent signals and water flushing

FLUSH WATER:
This function uses water to clear detergent from the supply tubes of the detergent dispensing system.

POWDER SIGNAL:
This function will either: a) use water to dispense detergent from machine compartments, or: b) dispense detergent from an external system. The number of valves present will vary according to the machine type.

Press OPEN.

The function will be activated for as long as you press and hold this key. The function ceases as soon as you release the key.



When you have finished:

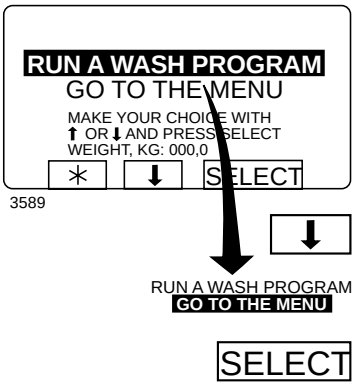
Press ⬇ repeatedly to highlight "EXIT".

SELECT

Press SELECT.

Statistics

To select Statistics

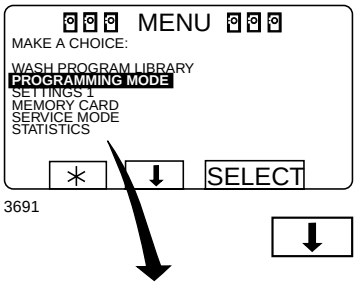


If this menu is not currently displayed:

Press ⮌ repeatedly.

Press ⬇ to highlight ”GO TO THE MENU”.

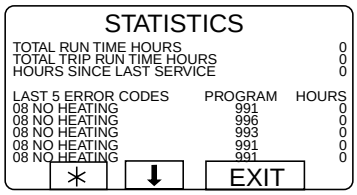
Press SELECT.



Press ⬇ five times...

...to highlight ”STATISTICS”.

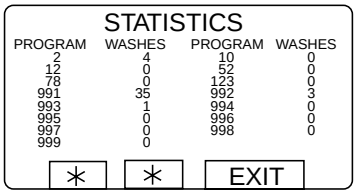
Press SELECT.



3690

To display the next page of statistics:

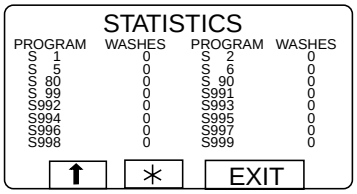
Press ⬇.



3958

To display the next page of statistics:

Press ⬇.



4040

If a memory card is in place in the PCU, the memory card program statistics will be displayed. An ”S” before the program number shows that it is a memory card program.

When you want to cancel the display of statistics:

Press EXIT.

The Statistics function

The Statistics function gives you access to the following information:

TOTAL RUN TIME HOURS:

Shows the total operating time for the machine since it was installed.

TOTAL TRIP RUN TIME HOURS:

This register records the total number of operating hours since it was last reset. It can, for example, be used to keep track of operating time since the last machine service. The procedure for resetting it is described in **section "To reset "Total trip run time hours" to zero"**.

HOURS SINCE LAST SERVICE

This register shows the time elapsed since the last service. The register can also be used to generate a signal on the display to show when service is needed (see the section ”Settings 1” in the service manual).

LAST 5 ERROR CODES:

This displays the most recent error codes, and tells which program was operating at the time and during which hour (according to the ”total run time” record) the error code was flagged.

NO. OF TIMES EACH PROGRAM USED:

Displays statistics for PCU programs and for programs on any memory card currently in place in the PCU.

Resetting statistic registers

If this menu is not currently displayed:

Press ⮌ repeatedly.

Press ⬇ to highlight "GO TO THE MENU".

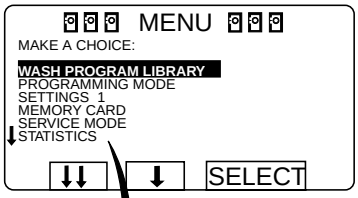
Press SELECT.

Statistics registers which can be reset to zero

The following registers in the statistics function can be cleared (reset to zero):

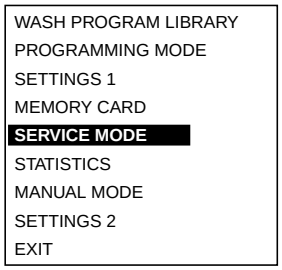
- Total trip run time hours.
- Hours since last service.
- No. of times each program used (PCU programs).
- No. of times each program used (programs on any memory card currently in the PCU).

Procedure for use



3693

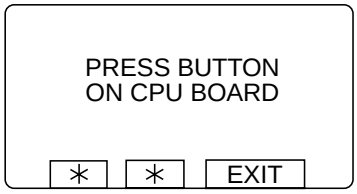
Press ⬇ ..four times....



... to highlight "SERVICE PROGRAM".

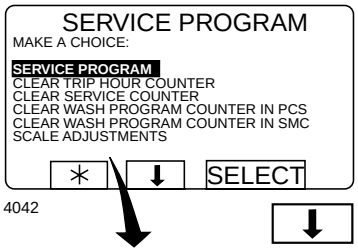
SELECT

Press SELECT



4209

Press the button on the CPU circuit board.



4042

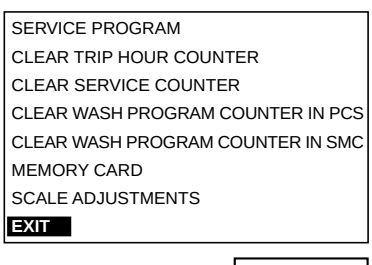
Now you can choose either to clear/reset a register or to adjust the weighing equipment.

Press ⬇ to highlight the option you want, then press SELECT.

SELECT

If you want to exit:

Press ⬇ repeatedly until EXIT is highlighted.



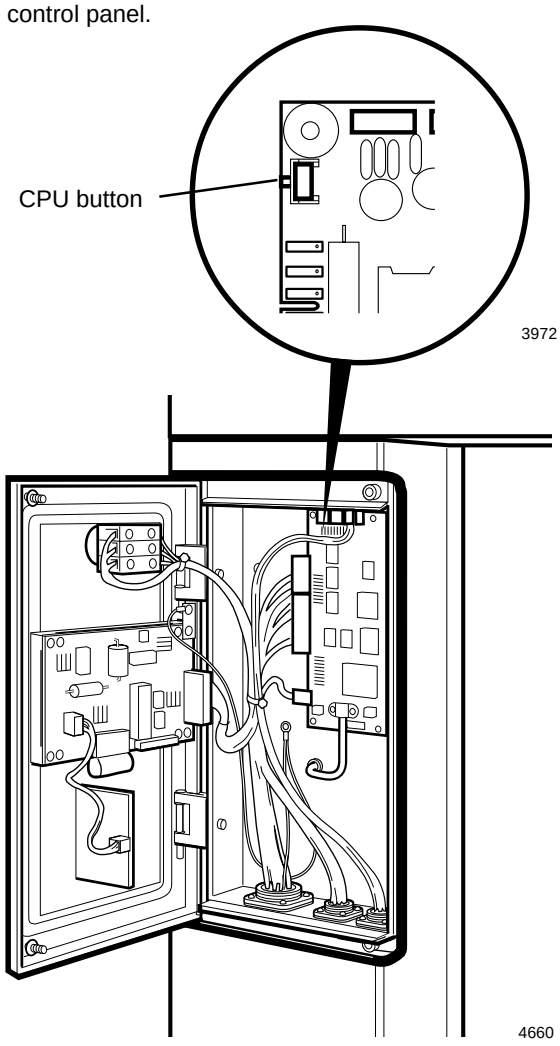
SELECT

Press SELECT.

The service program may only be used by authorised personnel, because all safety interlocks are disabled when it is in use.

Prevention of unauthorised access

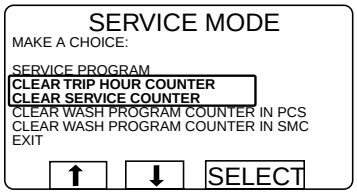
A button on the CPU circuit board has to be pressed to gain access to the service program, to prevent its unauthorised or inadvertent use. The CPU circuit board is located behind the control panel. Two screws have to be undone to open the control panel.



3972

4660

Time counter, hours after last service

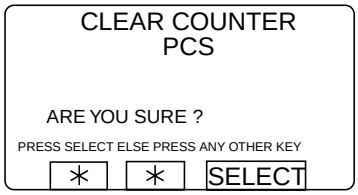


4041

Both counters can be reset in the same way.

Press ⬇ so that CLEAR TRIP HOUR COUNTER OR CLEAR SERVICE COUNTER will be marked.

Press SELECT.



4043

First you have a chance to change your mind.

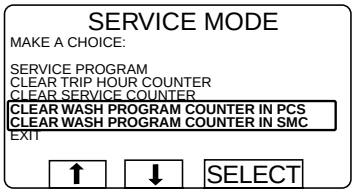
If you **do not want to reset** the register:

Press any key <u>other than</u> SELECT.

If you want to reset the register:

Press SELECT.

Number of washes for program in timer or memory card

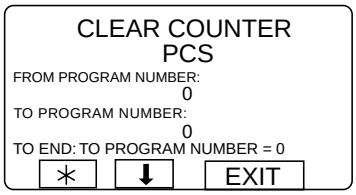


4044

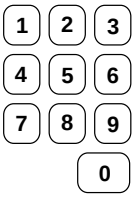
You can reset program in both timer and the memory card (if inserted).

Press ⬇ so that CLEAR WASH PROGRAM COUNTER IN PCS or CLEAR WASH PROGRAM COUNTER IN SMC will be marked.

SELECT **Press SELECT.**

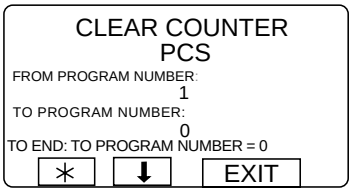


4045



Write from which program number you want to clear wash programs.

Press ⬇.



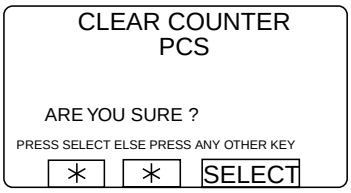
4046

1 2 3
4 5 6
7 8 9
0

Enter digits corresponding to the program number (inclusive) up to which you wish to clear the total counter.

ERASE

Press ERASE.



4043

First you have the chance to change your mind.

If you **do not want to** reset the register:

Press any key other than SELECT.

If you do want to reset the register:

SELECT

Press SELECT.

Now the totals of the program numbers you have specified will be cleared.

If you wish to change any numbers you have entered:

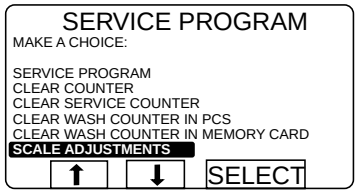
Press ⬆ if you want to change the first number entered. Enter the new number.

If you change your mind:

Press ⮌.

For machines with weighing equipment installed only!

Scale adjustments

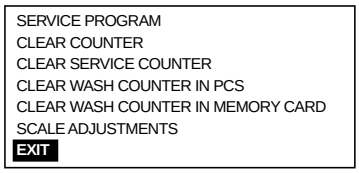


4777

Press ⬇ repeatedly until SCALE ADJUSTMENTS is highlighted.

Press SELECT.

When you have finished: Press ⬇ repeatedly until EXIT is highlighted.



SELECT **Press SELECT.**

Scale adjustments

The following functions are accessed via the SCALE ADJUSTMENTS menu:

Reset scale to zero (see section ”Reset scale to zero”)
Used to make the weighing equipment display 0 when the machine has no load in it.

Reset tare to zero (see section ”Reset tare to zero”)
Used to clear a stored tare parameter.

Tare scale (see section ”Tare scale”)
Used to reset the weighing equipment so that a weight such as a container will not be included when calculating net weight.

Set tare to a certain value (see section ”Set tare to a certain value”)
Used to enter a value for the tare parameter, a weight in hectograms.

Read tare value (see section ”Read tare value”)
Used to check the value currently stored as the tare parameter.

Calibrate the scale (see section ”Calibrate the scale”)
This function is used only on installation of a new scale unit.

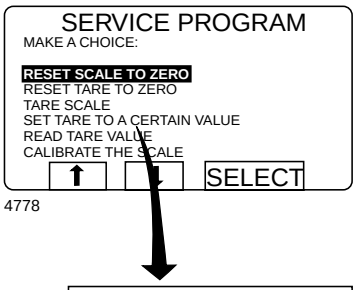
Zero calibration (see section ”Zero calibration”)
Used to increase the accuracy of the weighing equipment.

Read version number (see section ”Read version number”)
This is where you find the version number of the weighing equipment.

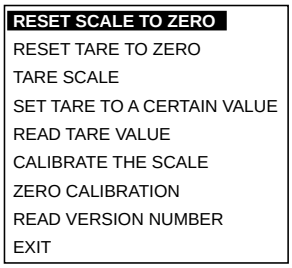
If the weighing equipment is not connected, the error message “WEIGHING EQUIPMENT NOT CONNECTED” will be displayed. Connect the weighing equipment and try again. If necessary, see the section “Fault-finding, weighing equipment” in the machine manual.

For machines with weighing equipment installed only!

Reset scale to zero



4778

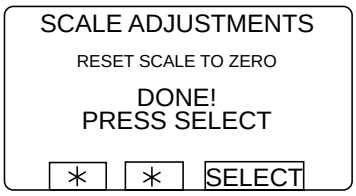


Check that ”RESET SCALE TO ZERO” is highlighted.

If it isn't...

Press ⬆ or ⬇ as required to highlight ”RESET SCALE TO ZERO”.

Press SELECT.



4779

This screen shows that the weighing equipment has been reset to zero.

Press SELECT.

Reset scale to zero

”Reset scale to zero” is used to make the weighing equipment display 0 when the machine has no load in it.

If your attempt to reset the weighing equipment fails at this point, you will see an error message equivalent to: “FAILED. PRESS SELECT” on the display. For troubleshooting, see the section “Fault-finding, weighing equipment” in the machine manual.

Please note:

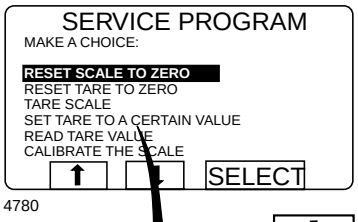
The machine must be unladen when you use this function, i.e. no water or wash load in the drum.

Please note:

After a power-cut, the weighing equipment will always display 0, no matter what the actual load in the drum. In this event you will have to use the “Reset scale to zero” function.

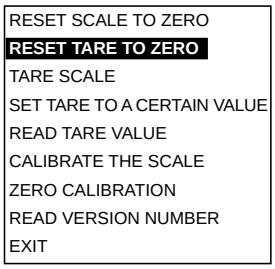
For machines with weighing equipment installed only!

Reset tare to zero

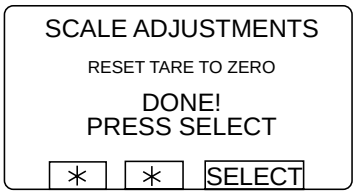


4780

Press ↓ once to highlight "RESET TARE TO ZERO".



SELECT **Press SELECT.**



4781

This screen shows that the stored tare parameter has been cleared.

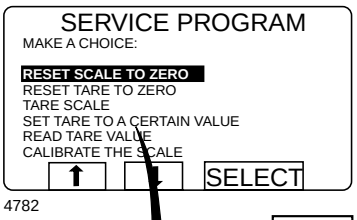
SELECT **Press SELECT.**

Reset tare to zero

If your attempt to clear the tare parameter fails at this point, you will see an error message equivalent to: "FAILED. PRESS SELECT" on the display. For troubleshooting, see the section "Fault-finding, weighing equipment" in the machine manual.

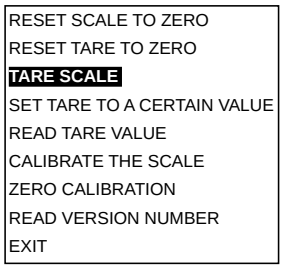
For machines with weighing equipment installed only!

Tare scale

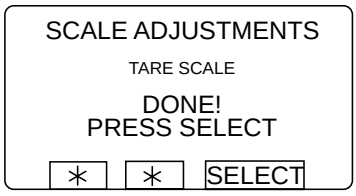


4782

Press ⬇ twice to highlight "TARE SCALE".



SELECT **Press SELECT.**



4783

This screen shows that the weighing equipment has been tared successfully.

SELECT **Press SELECT.**

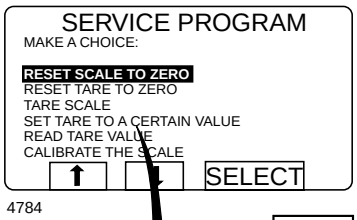
Tare scale

This function involves first loading the drum with, for example, a container, then taring (resetting) the weighing equipment so that the weight of the container will not be included when calculating net weight.

If your attempt to tare the weighing equipment fails at this point, you will see an error message equivalent to: "FAILED. PRESS SELECT" on the display. For troubleshooting, see the section "Fault-finding, weighing equipment" in the machine manual.

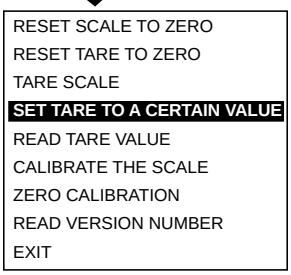
For machines with weighing equipment installed only!

Set tare to a certain value

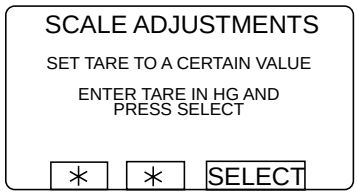


4784

Press ⬇ three times to highlight "SET TARE TO A CERTAIN VALUE"



SELECT **Press SELECT.**

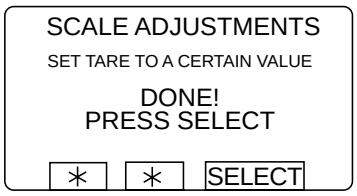


4785

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the tare you require, unit: hectograms; 1 hectogram = 100 grams).

SELECT **Press SELECT.**



4786

This screen shows that the parameter has been entered successfully.

SELECT **Press SELECT.**

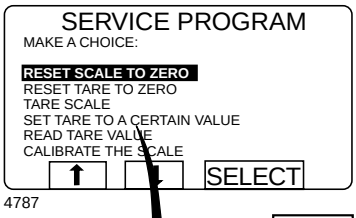
Set tare to a certain value

This function lets you enter a value for the tare parameter, i.e. a weight value which the weighing equipment will disregard when showing a net weight on the display. The function will automatically clear any earlier tare value when you enter a new one.

If your value is not entered successfully at this point, you will see an error message equivalent to: "FAILED. PRESS SELECT" on the display. For troubleshooting, see the section "Fault-finding, weighing equipment" in the machine manual.

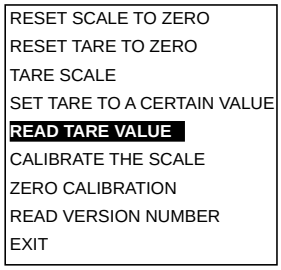
For machines with weighing equipment installed only!

Read tare value

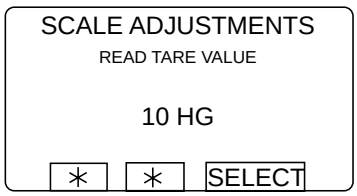


4787

Press ⬇ four times to highlight "READ TARE VALUE".



Press SELECT.



4788

This screen shows the stored tare parameter (unit: hectograms (1 hectogram = 100 grams).

Press SELECT.

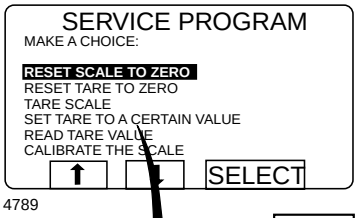
Read tare value

This function lets you check the value currently stored as the tare parameter.

Procedure for use

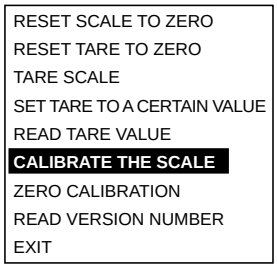
For machines with weighing equipment installed only!

Calibrate the scale

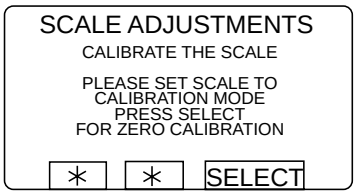


4789

Press ⬇ five times to highlight ”CALIBRATE THE SCALE”.



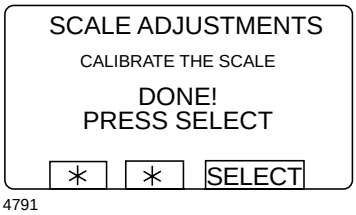
SELECT **Press SELECT.**



4790

Set the calibration switch to calibration mode.

SELECT **Press SELECT.**



4791

SELECT **Press SELECT.**

Please note:

This function is used only on installation of a new scale unit.

Calibrate the scale

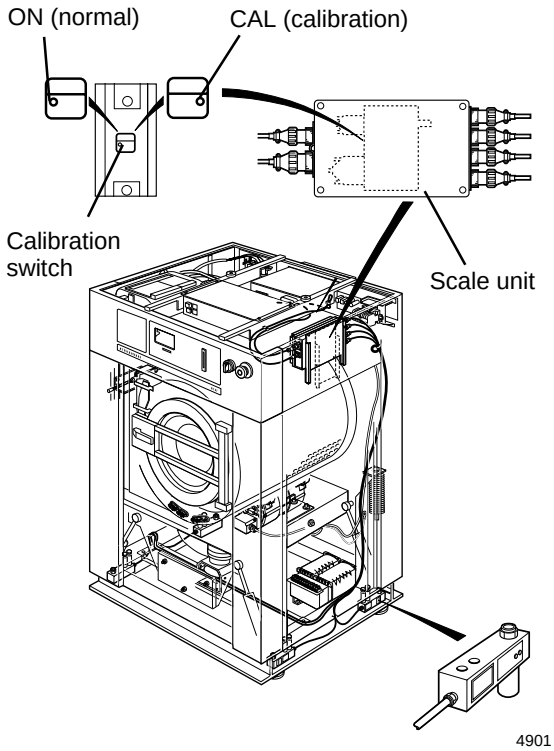
If this calibration has not succeeded you will see an error message equivalent to: “FAILED. PRESS SELECT” on the display. For troubleshooting, see the section “Fault-finding, weighing equipment” in the machine manual.

Please note:

The machine must be unladen at the start of calibration, i.e. no water or wash load in the drum.

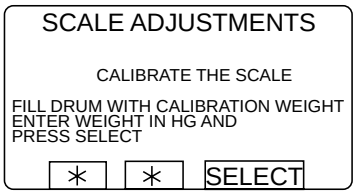
Calibration mode/normal mode

To gain access to the calibration switch in the scale unit, the top panel has to be taken off. Remove the four screws on the scale unit cover. Then the calibration switch can be switched between normal mode ”ON” and calibration mode ”CAL”.



4901

For machines with weighing equipment installed only!



4792

Put the calibration weight in the drum.

Calibration weight

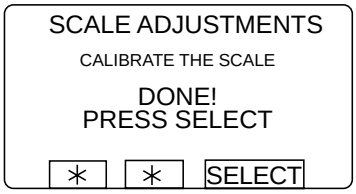
A weight of between 40 kg and 400 kg should be used as a calibration weight.

The higher the weight (within these limits), the better the weighing accuracy of the machine.

1 2 3
4 5 6
7 8 9
0

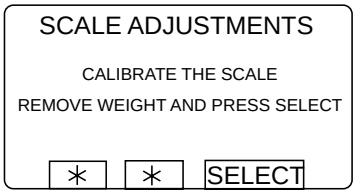
Use the numeric keys to enter the calibration weight in hg (1 hg = 100 grams).

SELECT **Press SELECT.**



4791

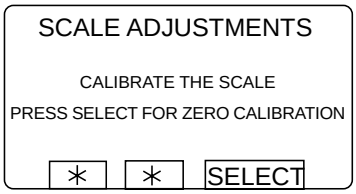
SELECT **Press SELECT.**



4793

Remove the calibration weight.

SELECT **Press SELECT.**



4794

If you want to use the ”Calibrate zero” function now:

SELECT **Press SELECT.**

Procedure for use

For machines with weighing equipment installed only!

SCALE ADJUSTMENTS

CALIBRATE THE SCALE

DONE!
PRESS SELECT

✳ ✳ SELECT

4791

SELECT **Press SELECT.**

SCALE ADJUSTMENTS

CALIBRATE THE SCALE

RESET SCALE FROM CALIBRATION MODE AND PRESS SELECT

✳ ✳ SELECT

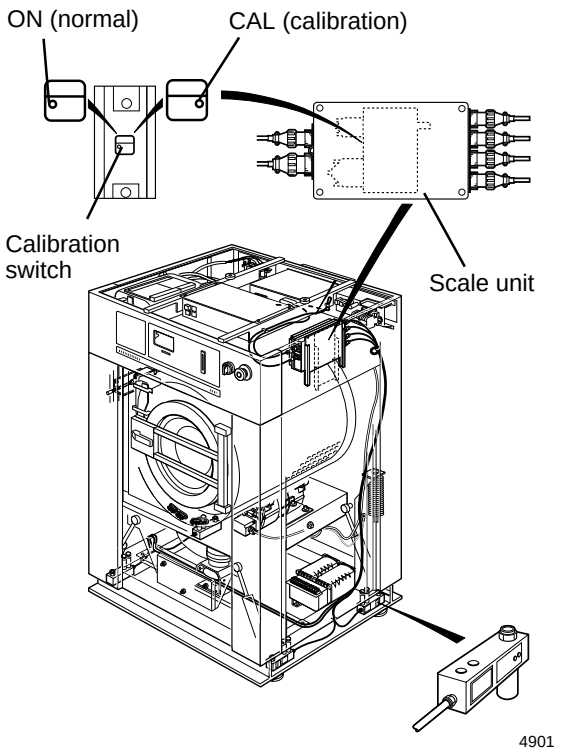
4795

Restore the calibration switch to normal mode.

SELECT **Press SELECT.**

Calibration mode/normal mode

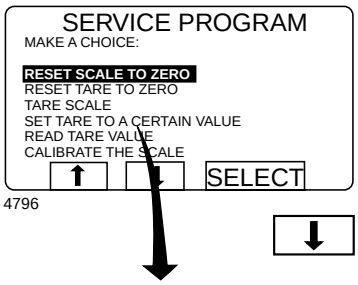
To gain access to the calibration switch in the scale unit, the top panel has to be taken off. Remove the four screws on the scale unit cover. Then the calibration switch can be switched between normal mode ”ON” and calibration mode ”CAL”.



4901

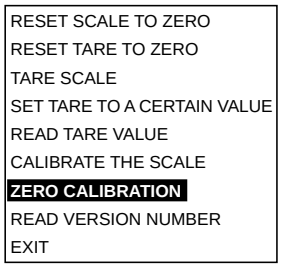
For machines with weighing equipment installed only!

Zero calibration

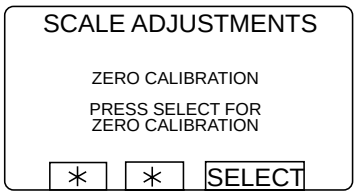


4796

Press ⬇ six times to highlight "ZERO CALIBRATION".



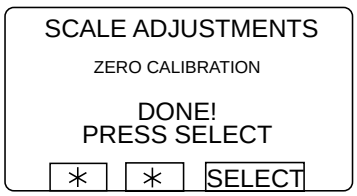
SELECT **Press SELECT.**



4797

If you wish to calibrate zero for the weighing equipment:

SELECT **Press SELECT.**



4798

This screen shows you have calibrated zero.

SELECT **Press SELECT.**

Zero calibration

The "Zero calibration" function is used to increase the accuracy of the weighing equipment. This should be done once a month.

If this calibration has not succeeded you will see an error message equivalent to: "FAILED. PRESS SELECT" on the display.

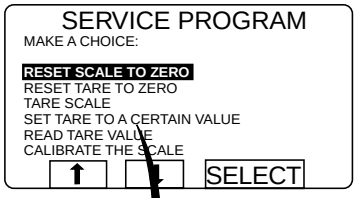
For troubleshooting, see the section "Fault-finding, weighing equipment" in the machine manual.

Please note:

The machine must be unladen during this calibration, i.e. no water or wash load in the drum.

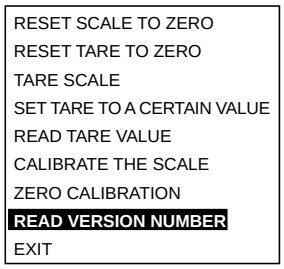
For machines with weighing equipment installed only!

Read version number

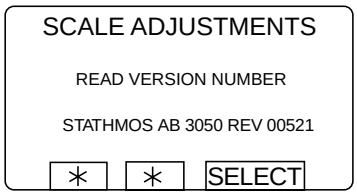


4799

Press ⬇ seven times to highlight ”READ VERSION NUMBER”.



SELECT **Press SELECT.**



4800

The screen shows the version number.

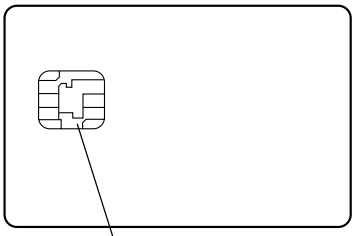
SELECT **Press SELECT.**

Read version number

In the event of a fault in the weighing equipment (which cannot be put right with the aid of the section “Fault-finding, weighing equipment” in the machine manual), make a note of the version number accessed via this function before you contact the supplier’s service department.

Memory card

General introduction



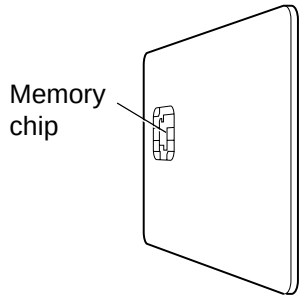
A memory card is a plastic card, the size of a credit card, with an electronic memory chip inside it. This memory card is capable of storing 10 to 15 wash programs of normal size. If the programs are mostly small ones, more of them can be stored, whereas larger programs will reduce the number which can be held by the memory card. Memory cards of this type can be used to:

- transfer wash programs from one machine to another
- run wash programs straight from the memory card
- transfer wash programs from a PC to a memory card and from a memory card to a PC (these procedures, and how to write a wash program on a PC, are described elsewhere)

A program stored on a memory card may be given restricted-use status. This means that:

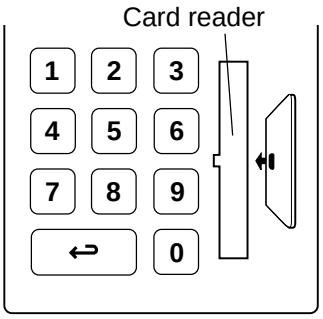
- The program cannot be deleted or copied to the program control unit of a washer extractor.
- You cannot alter the program or inspect the way it is written.
- To run the program you have to have the memory card and to insert it into the program control unit when the program is to be started.

To select the ”Memory card” function



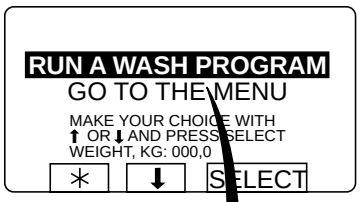
3606

Turn the memory card so its memory chip is at the far end, and on the left of the card...



4115

...then insert the memory card into the program control unit.



3589

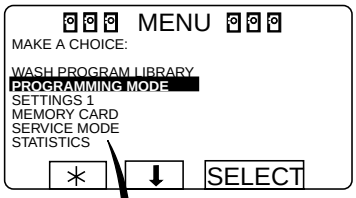
If this menu is not currently displayed:

Press ⮌ repeatedly.

Press ⬇ to highlight ”GO TO THE MENU”.

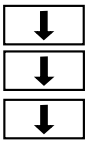
RUN A WASH PROGRAM
GO TO THE MENU

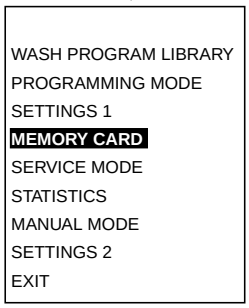
Press SELECT.



3596

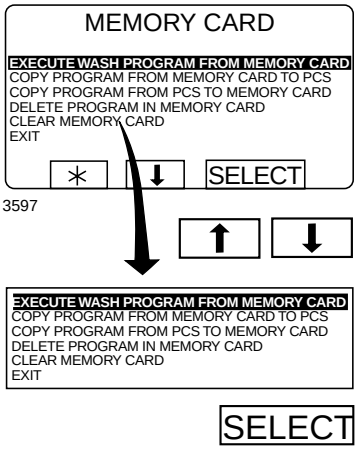
Press ⬇ three times...





...to highlight ”MEMORY CARD”.

SELECT **Press SELECT.**



Select the function required using the cursor keys.

SELECT **Press SELECT.**

"The "Memory card" functions

Run wash program straight from memory card (see section "To run a wash program straight from a memory card")

A wash program can be run from the memory card, without first being copied to the washer extractor. The memory card may be removed from the card reader after the program has started.

Programs on memory cards may have "restricted-use" status, which means that they can only be run straight from the memory card, not copied or modified.

Copy program from memory card to PCS (see section "To copy a program from a memory card to the machine´s program control unit")

One or more wash programs can be copied from the memory card to the memory chip in the machine's program control unit. Note that programs on the memory card with "restricted-use" status cannot be copied to the machine memory chip.

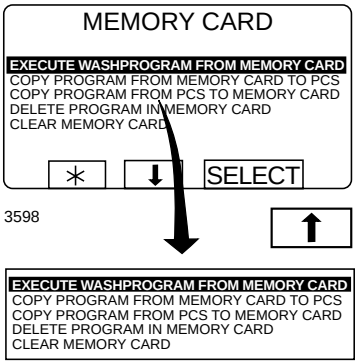
Copy program from PCS to memory card (see section "To copy a program from the program control unit to a memory card")

One or more wash programs can be copied from the memory chip in the machine's program control unit to the memory card. The memory card can hold 10 to 15 wash programs of normal size.

Delete program on memory card (see section "To delete a program on a memory card")

Clear memory card (see section "To delete all programs on a memory card")

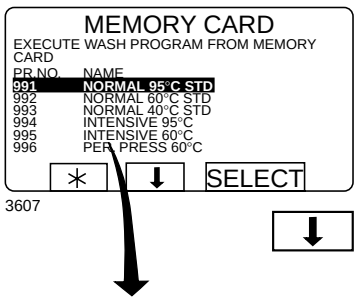
To run a wash program straight from a memory card



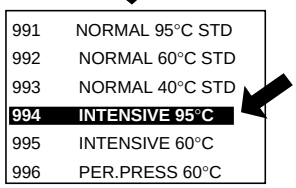
To access this menu, follow the instructions in section "To select the "Memory card" function".

Highlight ”EXECUTE WASH PROGRAM FROM MEMORY CARD” (press ⬆ if necessary).

SELECT **Press SELECT.**

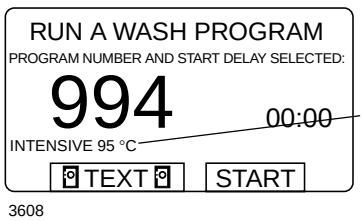


⬇ **If necessary, use ⬇ to...**



... highlight the wash program required.

SELECT **Press SELECT.**



Program name

If you want to see the description of the program (where available):

TEXT **Press TEXT.**

START To start the program:

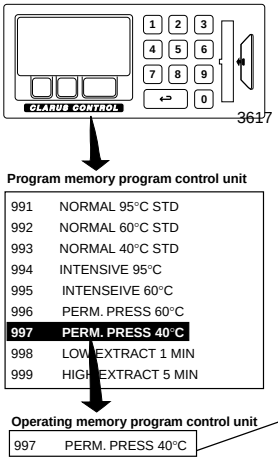
Press START.

Once the program has started, the memory card may be removed from the card reader.

To run a program from the memory card

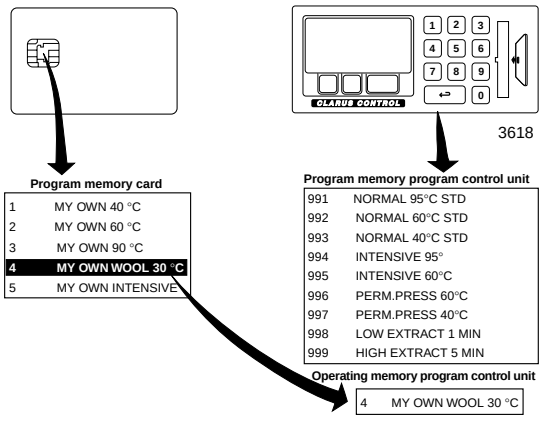
In broad terms, the program control unit has two different memories. One is a ”**program memory**” where all its wash programs are stored, the other is an ”**operating memory**”, which is used to hold the program currently in use. The program control unit takes the instructions it needs to run the program from the operating memory.

When a wash program is started, the correct program is retrieved from the program memory and copied into the operating memory.



Program currently being used

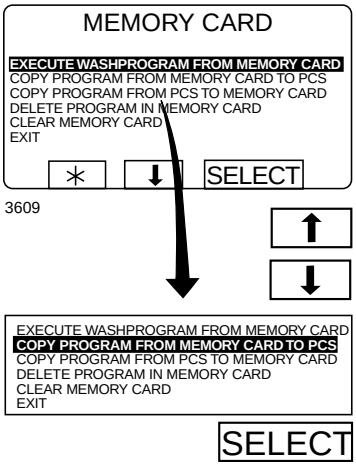
A parallel process takes place when a program is started from a memory card. In other words, the program is copied from the memory card into the operating memory, and the machine runs the program entirely from the set of instructions in the operating memory.



That is why you may remove the memory card from the card reader once the program has started.

Once the program has ended it is erased from the operating memory.

To copy a program from a memory card to the machine's program control unit

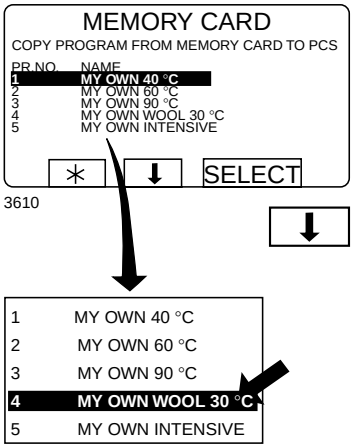


To access this menu, follow the instructions in section "To select the "Memory card" function".

Note that restricted-use programs on a memory card cannot be copied.

Highlight "COPY PROGRAM FROM MEMORY CARD TO PCS" (press ⬇ or ⬆ if necessary).

Press SELECT.



If necessary, use ⬇ to...

... highlight the wash program required.

Press SELECT.

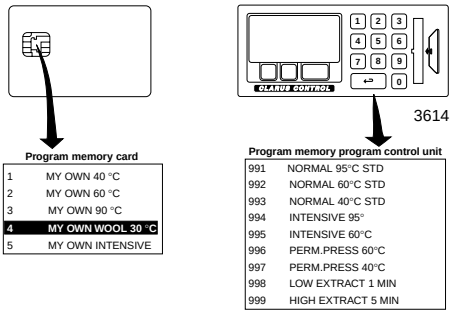
What is a restricted-use program?

A wash program which has been created on a PC can be made a "restricted-use" program. This means that:

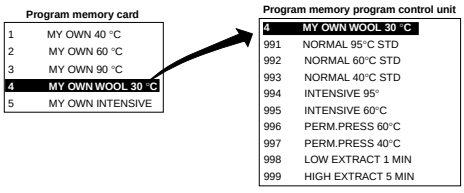
- The program cannot be deleted or copied to the program memory of a washer extractor.
- You cannot modify the program or examine its structure.
- To run the program you must have access to the memory card, and insert it into the card reader when the program is to be started.

What happens when a program is copied?

Both the memory card and the program control unit have memory chips capable of storing wash programs. The chip on the card can hold about 10 to 15 programs of normal size, while the chip in the program control unit has a capacity of several hundred programs.

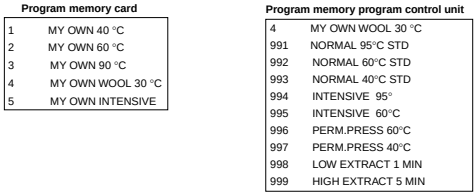


When a program is copied from a memory card to the machine's program control unit, it is copied, not moved (not deleted from the card). A copy is transferred from the chip on the memory card to the storage chip of the machine program control unit.

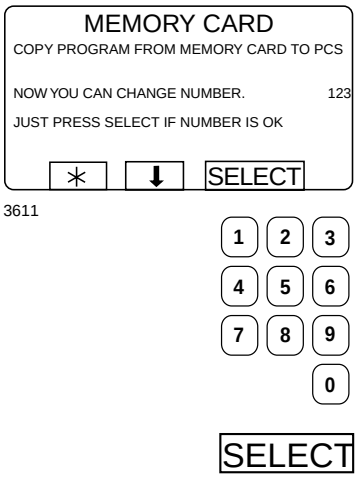


3615

The program remains on the memory card, but another copy of it has now been stored in the program control unit.



3616



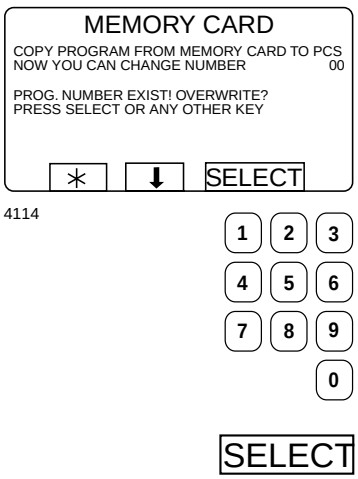
Choose 1 or 2:

1 If you want to give the program a different program number (from the one it had on the memory card):

Use the numeric keys to enter the new program number, then press SELECT.

2 If the existing number is suitable:

Press SELECT.



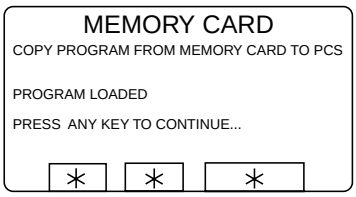
If the number you have choosen is already used:

1 Select another number.

Enter the new number and press SELECT.

2 Erase the old program number.

Press SELECT.

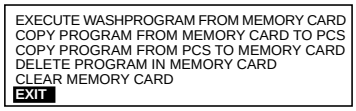


3612

After the program has been copied (it takes only a few seconds) the menu will look like this:

If you want to copy more programs:

Press any key to continue.



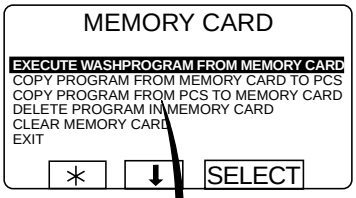
4210

When you have finished:

Press ⬇ repeatedly tohighlight "EXIT".

SELECT **Press SELECT.**

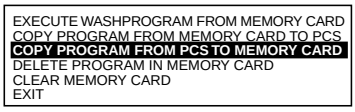
To copy a program from the program control unit to a memory card



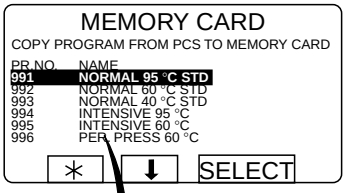
3619

To access this menu, follow the instructions in section "To select the "Memory card" function.

Highlight "COPY PROGRAM FROM PCS TO MEMORY CARD" (press ⬇ or ⬆ if necessary).



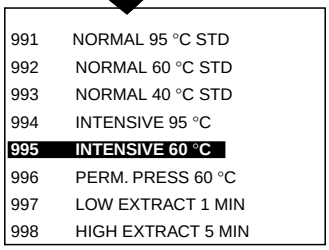
SELECT **Press SELECT.**



3620

If necessary, use ⬇ to...

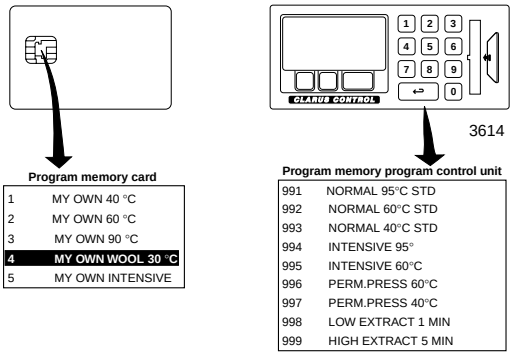
... highlight the wash program required.



SELECT **Press SELECT.**

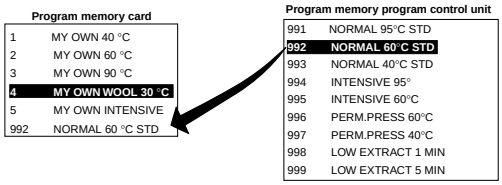
What happens when a program is copied?

Both the memory card and the program control unit have memory chips capable of storing wash programs. The chip on the memory card can hold about 10 to 15 programs of normal size, while the chip in the program control unit has a capacity of several hundred programs.



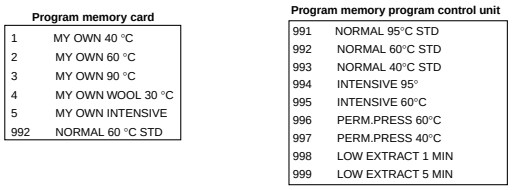
3614

When a program is copied from the machine's program control unit to a memory card, it is copied, not moved (not deleted from the machine). A copy is transferred from the storage chip of the machine program control unit to the chip on the card.

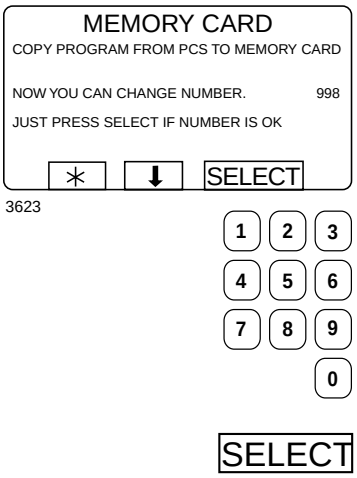


3621

The program remains in the program control unit, but another copy of it has now been stored on the card.



3622



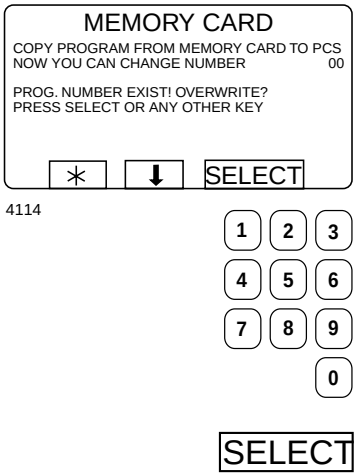
Choose 1 or 2:

1 If you want to give the program a different program number (from the one it had on the machine):

Use the numeric keys to enter the new program number, then press SELECT.

2 If the existing number is suitable:

Press SELECT.



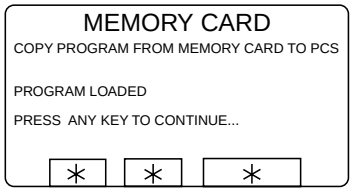
If the number you have choosen is already used:

1 Select another number.

Enter the new number and press SELECT.

2 Erase the old program number.

Press SELECT.

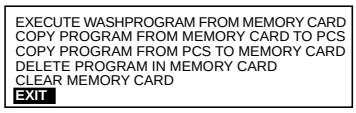


3612

After the program has been copied (it takes only a few seconds) the menu will look like this:

If you want to copy more programs:

Press any key to continue.



4210

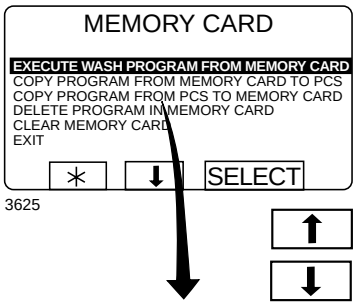
When you have finished:

Press ⬇ repeatedly to highlight "EXIT".

SELECT

Press SELECT.

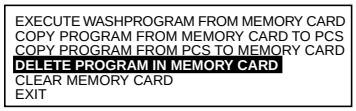
To delete a program on a memory card



To access this menu, follow the instructions in section "To select the "Memory card" function

Note that restricted-use programs on a memory card cannot be deleted.

Highlight "DELETE PROGRAM IN MEMORY CARD" (press ⬆ or ⬇ if necessary).



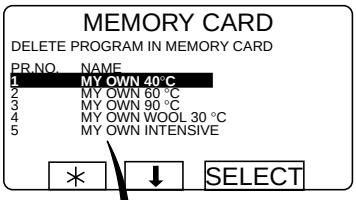
Press SELECT.

SELECT

What is a restricted-use program?

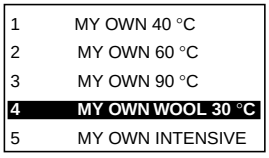
A wash program which has been created on a PC can be made a "restricted-use" program. This means that:

- The program cannot be deleted or copied to the program memory of a washer extractor.
- You cannot modify the program or examine its structure.
- To run the program you must have access to the memory card, and insert it into the card reader when the program is to be started.



⬇

If necessary, use ⬇ to...



.... highlight the wash program required.

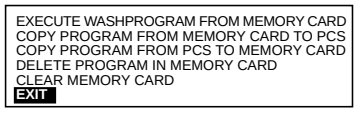
SELECT

Press SELECT.

The program will now be deleted from the memory card. This takes between 5 and 15 seconds.

If you want to delete more programs:

Continue in the same way as described above.



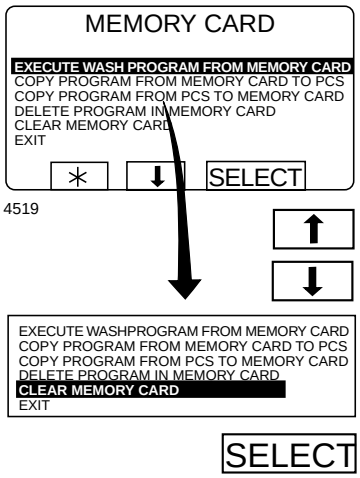
When you have finished:

Press ⬇ repeatedly to highlight "EXIT".

SELECT

Press SELECT.

To delete all programs on a memory card



To access this menu, follow the instructions in section "To select the "Memory card" function

Note that restricted-use programs on a memory card cannot be copied or deleted.

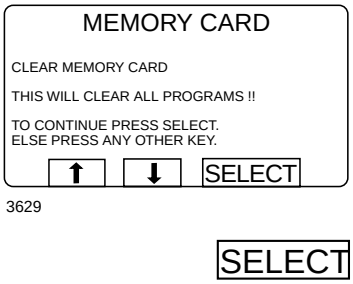
Highlight "CLEAR MEMORY CARD" (press ⬇ or ⬆ if necessary).

Press SELECT.

What is a restricted-use program?

A wash program which has been created on a PC can be made a "restricted-use" program. This means that:

- The program cannot be deleted or copied to the program memory of a washer extractor.
- You cannot modify the program or examine its structure.
- To run the program you must have access to the memory card, and insert it into the card reader when the program is to be started.



If you change your mind and do not want to delete the entire memory card:

Press any key <u>other than</u> SELECT.

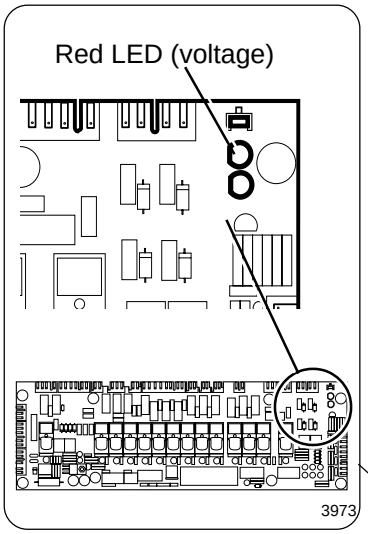
If you want to delete all programs on the memory card (with the exception of any restricted-use programs):

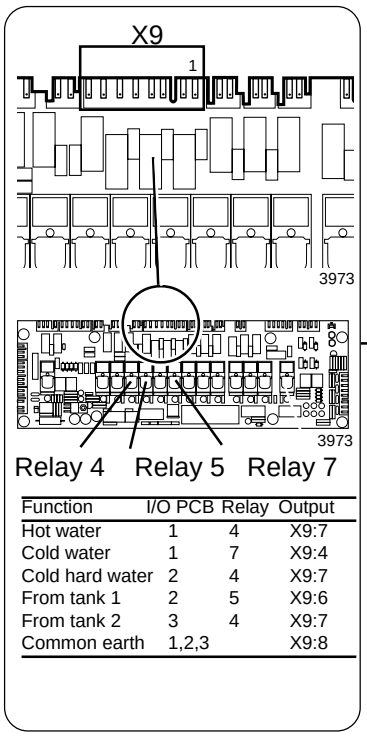
Press SELECT.

Error code, error message	Fault-finding	Cause/Action

01, NO WATER

Water level has not reached set level with 10 minutes.





Function	I/O PCB	Relay	Output
Hot water	1	4	X9:7
Cold water	1	7	X9:4
Cold hard water	2	4	X9:7
From tank 1	2	5	X9:6
From tank 2	3	4	X9:7
Common earth	1,2,3		X9:8

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

Taps turned on. / Taps turned off. → Open taps. Restart program.

Check that there is a water option (function) in the program.

Yes / No → Make changes in program.

Access the service program and activate the water valves which should open in program in question. Check whether machine is filling.

Machine filling / Machine not filling

Measure the feed voltages on the relevant water valve. Check that the I/O PCB is supplying voltage to the relevant valve.

Voltage(s) not correct / Voltage(s) correct → Faulty valve. Check function and rectify problem as described in manual for relevant machine.

On I/O PCBs check that the red LEDs are lit distinctly and without flashing.

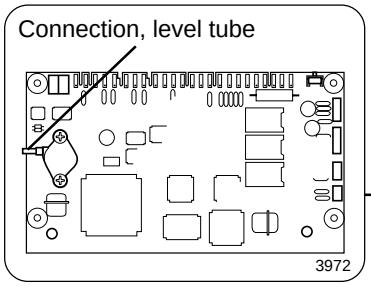
LEDs OK / LEDs not OK → Fault in voltage feed to I/O PCB. Check voltage at X3:1-2 (16 V=). If wrong, continue tracing fault in voltage feed as described in manual for relevant machine.

Check on I/O PCBs that the LEDs for the relays you have activated are lit. Check also feed voltages at PCB connector X9 to the water valves you have activated.

LEDs and voltages OK / LEDs and/or voltages not OK → Cause of voltage fault may be because feed to I/O PCB 2-3 is not OK, or because neutral from door lock PCB is absent. If an I/O PCB is faulty, replace according to instructions in “To replace an I/O board”.

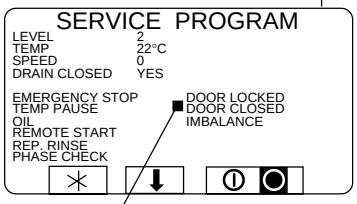
Faulty wiring between I/O PCB and water valve. Check wiring and replace as required.

Continued on next page.

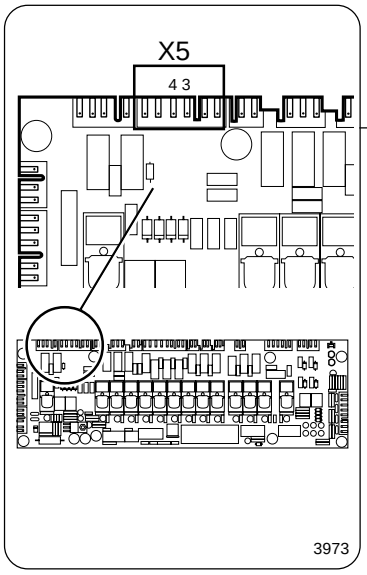
Error code, error message	Fault-finding	Cause/Action
01, NO WATER	**Continued from previous page.**	
	Close the drain valve via the service program and check that it really is closed, i.e. that water level is rising in drum. Drain valve closed. Drain valve open. → Trace drain valve fault as described in manual for relevant machine. ↓ Check that level tube is sound, not kinked, not blocked and has not come loose from mother board. Level tube OK → Level detection function on CPU PCB faulty. Replace PCB according to instructions in “To replace the CPU board”. Level tube not OK → Fit tube properly or replace it.	

Fault-finding

Error code, error message	Fault-finding	Cause/Action
02, DOOR OPEN Door status switch open during wash.	Press ↩. Error message returns	No error message → Transient fault in door lock, CPU PCB or I/O PCB.
	Access service program to view indicator for “DOOR CLOSED”. Remove door lock cover. Press door status switch inwards by hand and check whether this change is indicated on display.	
	No indicator	Indicator appears → Check function of door status switch in door lock. See description of door lock in manual for relevant machine.
	Remove connector X5 on I/O PCB 1. Short-circuit inputs 3 and 4.	
	No indicator	Indicator appears → Door lock switch or wiring to switch faulty. Check and replace faulty components according to description of door lock in manual for relevant machine.
		Poor contact or continuity fault to X6 on I/O PCB 1 may generate error code 02. Faulty I/O PCB. Replace PCB according to instructions in “To replace an I/O board”.

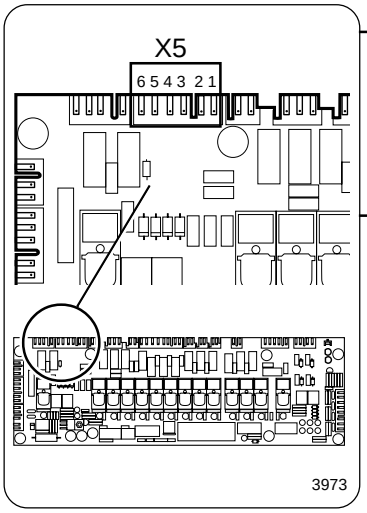


Door status switch indicator



Please note:

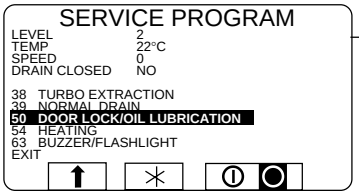
If the feed to X6 on I/O PCB 1 has intermittent loss of contact during a wash, error code 02 or 03 may be activated intermittently!

Error code, error message	Fault-finding	Cause/Action
03, DOOR UNLOCKED Acknowledgement signal from door lock switch absent at program start or during program.	Test whether door is really unlocked. Door not locked / Door locked	
	Check voltage (= feed voltage to machine) on I/O PCB 1, PCB connector X5 between terminals 1 and 5. Voltage correct / Voltage not correct	Fault in voltage feed to I/O PCB. Trace fault as described in manual for relevant machine.
	Check voltage (= feed voltage to machine) on I/O PCB 1, PCB connector X5 between terminals 2 and 6. Voltage correct / Voltage not correct	Fault in door lock switch or in wiring to I/O PCB. Trace fault and replace wiring or door lock as appropriate.
	Press ↵. Error message returns / No error message	Poor contact or continuity fault to X6 on I/O PCB 1 may generate error code 03. If input on I/O PCB faulty, replace I/O PCB 1 according to instructions in “To replace an I/O board”.
	Continued on next page.	Transient fault in door lock, CPU PCB, I/O PCB or feed to I/O PCB.

Error code, error message	Fault-finding	Cause/Action

03, DOOR UNLOCKED

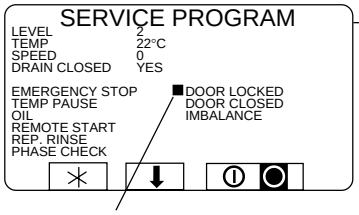
Continued from previous page.



Access the service program and activate the door lock.
Does it lock?

No ↓

Yes ↓



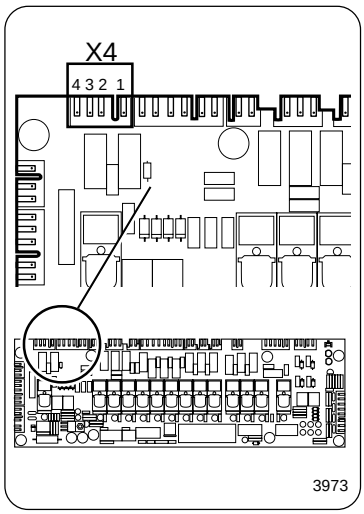
Door status switch indicator

Check inputs by pressing 1.
"Door locked" indicated?

Yes → Does relay 1 on I/O PCB 1 react?
Is there voltage at X4:1-2?

No → Look for fault in wiring of door lock system and MCU.

Yes → Probably poor contact in door lock system. Check the feed to X92 in MCU and power supply to whole machine. Check also for intermittent loss of contact to door status switch S4.



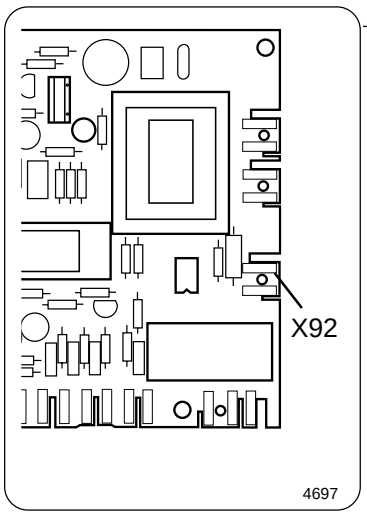
Yes → Is there voltage at X92 on door lock PCB?

No → Probably fault on I/O PCB 1. Replace I/O PCB according to instructions in "To replace an I/O board".

Yes → 1

No → Probably fault in wiring to door lock PCB.

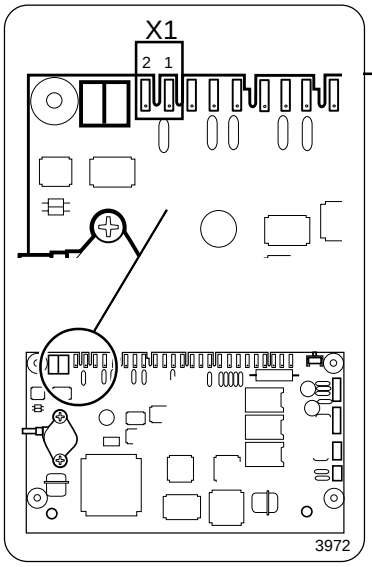
Check the door lock system with the aid of Chapter 23, "Program control unit".



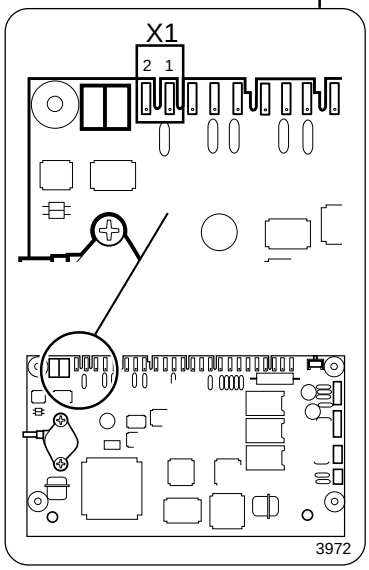
Please note:

If the feed to X6 on I/O PCB 1 has intermittent loss of contact during a wash, error code 02 or 03 may be activated intermittently!

Error code, error message	Fault-finding	Cause/Action
04, NTC LOW TEMPERATURE Temperature sensor indicating a temperature below lowest allowable value. This suggests open circuit (continuity fault) in sensor or wiring.	Use ⏎ to reset. Start a program. Error message returns No error message	Transient fault.
	Short-circuit the temperature sensor by the sensor. Use ⏎ to reset. Start a program. Check whether the display now shows NTC LOW TEMP. or NTC HIGH TEMP. LOW HIGH	Temperature sensor faulty. Replace sensor.
	Disconnect PCB connector X1 on CPU PCB. Short-circuit inputs 1 and 2. Use ⏎ to reset. Start a program. Check whether the display now shows NTC LOW TEMP. or NTC HIGH TEMP. LOW HIGH	Fault in wiring to temperature sensor. Check wiring and replace if necessary.
		Fault in temperature sensing device on CPU PCB. Replace PCB according to instructions in “To replace the CPU board”.



Error code, error message	Fault-finding	Cause/Action
05, NTC HIGH TEMPERATURE Temperature sensor indicating a temperature above highest allowable value. This suggests short-circuit in sensor or wiring.	Use ⏎ to reset. Start a program. Error message returns	No error message → Transient fault.
	Disconnect PCB connector X1 on CPU PCB. Use ⏎ to reset. Start a program. Check whether the display now shows NTC LOW TEMP. or NTC HIGH TEMP.	
	LOW	HIGH → Fault in temperature sensing device on CPU PCB. Replace PCB according to instructions in “To replace the CPU board”.
	Reconnect PCB connector X1. Disconnect the link between wiring and sensor by the temperature sensor. Use ⏎ to reset. Start a program. Check whether the display now shows NTC LOW TEMP. or NTC HIGH TEMP.	
	LOW	HIGH → Fault in wiring to temperature sensor. Check wiring and replace if necessary.
		Temperature sensor faulty. Replace sensor.



Error code, error message	Fault-finding	Cause/Action

06, WATER IN DRUM

The water level is higher than the EMPTY level at start of program.

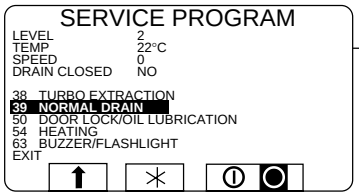
Is there any water in the drum? (Even if no water is visible in the inner drum, check for presence of water in outer drum by inserting suitable object through inner drum perforations.)

Yes → No

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

"WATER IN DRUM" message returns. → Level tube probably blocked. Clean or, if necessary, replace tube.

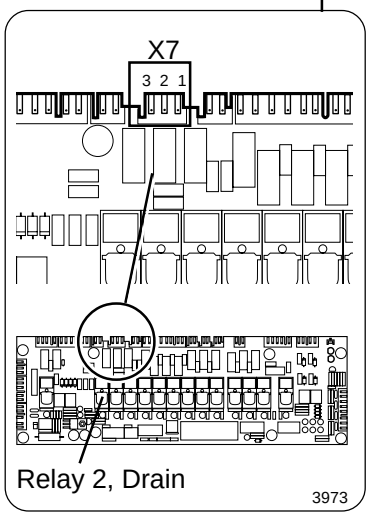
"NO WATER" or no message displayed. → Level sensing device on CPU PCB probably not working or incorrectly calibrated.



Access service program and open drain valve. Is water being discharged?

Yes → No

Check on I/O PCB 1 that the LED on relay 2 for drain is not lit.

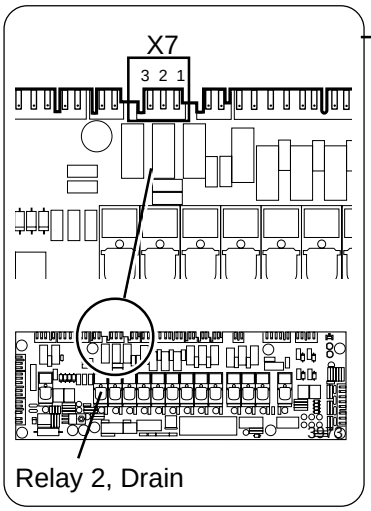


LED is not lit → **Continued on next page.**

LED is lit → Check that the red LED on the I/O PCB is lit.
LED OK: I/O PCB probably faulty. Replace PCB according to instructions in "To replace an I/O board".
LED not lit: Trace fault in voltage feed to I/O PCB as described in manual for relevant machine.

Error code, error message	Fault-finding	Cause/Action

06, WATER IN DRUM



Continued from previous page.

Check voltage (= feed voltage to machine) on I/O PCB 1, X7: 1 - 2.
Voltage present No voltage

Probably faulty drain valve or wiring to drain valve. Check whether the valve is blocked, clear it if necessary. Check functioning and rectify problem as described in manual for relevant machine.

I/O PCB probably faulty. Replace PCB according to instructions in “To replace an I/O board”.

Restart and run the program.
Error message No error message

Transient fault. No action required.

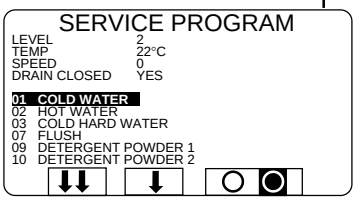
Check to see if drain valve is partially blocked or not opening fully.
Drain valve OK Drain valve not OK

Check valve functioning and take action required according to description in manual for relevant machine.

Access the programming function. Check that the drain valve is programmed correctly.

Error code, error message	Fault-finding	Cause/Action
07, MACHINE OVERFILLED The water level is above the set safety level during program operation or manual operation.	Turn the machine's wall switch off so that the water empties from the machine. Turn on the wall switch and start a program. Error message returns → No error message → Transient fault or water has been added manually. Is there a valve continuously drawing water? Drawing water → Not drawing water → Probably a fault in level sensing equipment or program. Check level sensing equipment before replacing the CPU PCB according to instructions in "To replace the CPU board". Remove connector for valve voltage feed. Valve stops drawing water. → Valve still drawing water. → Faulty water valve. Clean or replace valve as described in manual for relevant machine. Faulty I/O PCB. Replace PCB according to instructions in "To replace an I/O board".	

Error code, error message	Fault-finding	Cause/Action
08, NO HEATING Rate of temperature increase in water slower than minimum value allowed (normally 5°C/10 min).	Use ⮌ to clear the error message. Start a program which has heating. Error message returns → Check that the level in the program has not been programmed too low (below safety level) No error message →	Transient fault. No action required.
	Not too low → Access service program and fill machine with cold water to half-way up drum. Start heating. Check whether the heating relay (two relays in machines with incremental heating or 230 V) reacts, or whether the steam valve opens. Too low →	Program a higher level.
	Yes → Check on I/O PCB 1 at X8:1-2 (if incremental heating, also I/O PCB 2 at X8) whether the voltage feed to the machine's heating relay(s) or steam valve is present. No →	Fault in electrical/steam heating system, fuses/breakers, steam connection etc.
	Yes →	Fault in relay (two relays in machines with incremental heating or 230 V), or steam valve, or in wiring.
	No →	Faulty I/O PCB. Replace PCB according to instructions in "To replace an I/O board".



Error code, error message	Fault-finding	Cause/Action

10, NOT DRAINED

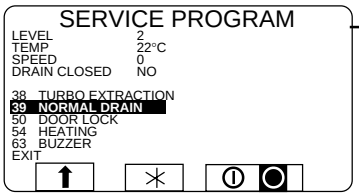
The water level is higher than the EMPTY level after drain sequence.

Is there any water in the drum? (Even if no water is visible in the inner drum, check for presence of water in outer drum by inserting suitable object through inner drum perforations.)

Yes → Disconnect the level tube from the CPU PCB. Turn the machine's wall switch off and on again. Restart the program.

"WATER IN DRUM" or "NOT DRAINED" message displayed → Level tube probably blocked. Clean or if necessary replace tube.

"NO WATER" message or no message displayed → Level sensing device on CPU PCB not working or incorrectly calibrated.

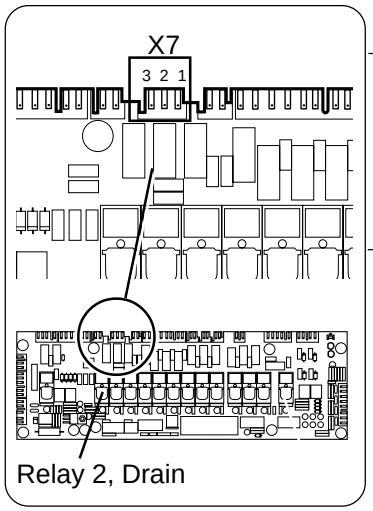


Access service program and open drain valve. Is water being discharged?

Yes → Check on I/O PCB 1 that the LED on relay 2 for drain is lit.

LED(s) not lit → Check that the red LED on the I/O PCB is lit.
LED OK: Faulty I/O PCB. Replace I/O PCB according to instructions in "To replace an I/O board".
LED not lit: Trace fault in voltage feed to I/O PCB as described in manual for relevant machine.

LED(s) lit → Check voltage (= feed voltage to machine) on I/O PCB 1, X7: 1 - 2.



No voltage → Probably faulty drain valve or wiring to drain valve. Check whether the valve is blocked, clear it if necessary. Check functioning and rectify problem as described in manual for relevant machine.

Voltage present → I/O PCB probably faulty. Replace PCB according to instructions in "To replace an I/O board".

Continued on next page.

Error code, error message	Fault-finding	Cause/Action
10, NOT DRAINED	**Continued from previous page.** Restart and run the program. Error message → Check to see if drain valve is partially blocked or not opening fully. No error message →	Transient fault. No action required.
	Drain valve OK →	Access the programming function. Check that the drain valve is programmed correctly.
	Drain valve not OK →	Check valve functioning and take action required according to description in manual for relevant machine.

Error code, error message	Fault-finding	Cause/Action

13, NO MOTOR COMM.

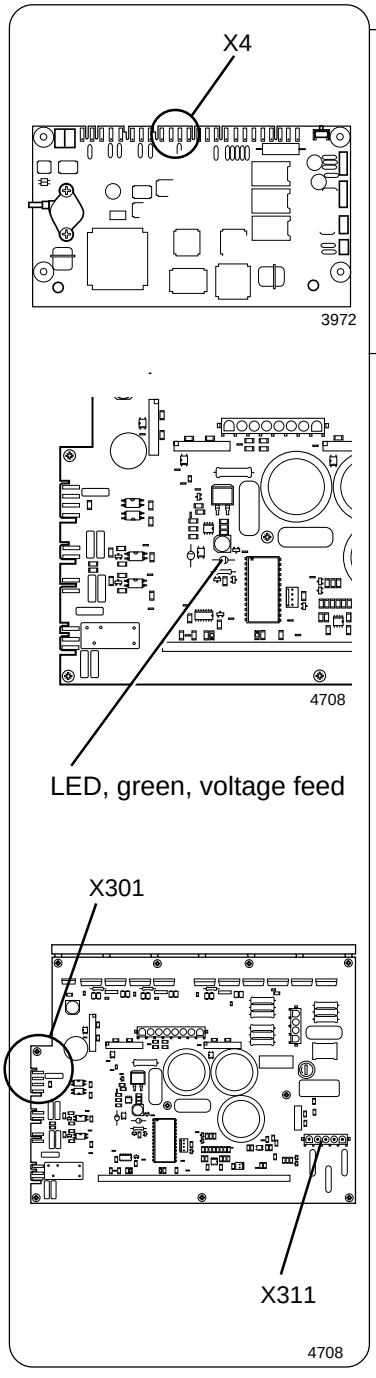
Communication between PCU and motor control unit interrupted or disturbed

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

Error message returns → No error message → Transient fault.No action required.

Check that the green LED on the MCU is lit distinctly and without flashing.

LED OK → LED not lit → Trace fault in voltage feed to MCU PCB as described in manual for relevant machine. If the voltage feed is OK, replace the MCU.



Check wiring from X4 on CPU PCB to X301 on motor control unit. Use an ohmmeter to check that the four conductors are sound as follows:

X4:		X301:
1	-	4
2	-	3
3	-	2
4	-	1

Measure also between the four connections in X4 to eliminate possibility of short-circuits between two conductors.

Wiring sound → Wiring faulty → If the wiring has connectors, disconnect these one by one and continue fault tracing to identify the section of wiring where the fault is. Replace faulty wiring.

Check input voltage (230 V 50 Hz) to the motor control unit on contact X311 (measure on rear of PCB).

Wrong voltage → Replace motor control unit. Fault persists Transient fault. → Probable fault in CPU PCB communications circuits. Refit the original motor control unit and replace the CPU PCB according to instructions in "To replace the CPU board".

Voltage OK → Function normal → Fault in motor control unit communications circuits. Replace MCU.

Trace fault in voltage feed to MCU PCB as described in manual for relevant machine.

Error code, error message	Fault-finding	Cause/Action
14, LEVEL CALIBRATION Level system not calibrated at factory.	If the level system has not been calibrated at the factory the error message will appear for five seconds immediately after every program start-up. The machine can be operated, but the levels will be slightly wrong, mostly too low.	

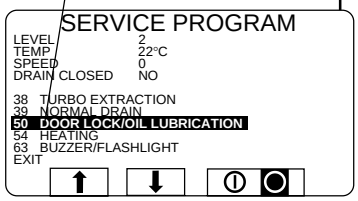
Error code, error message	Fault-finding	Cause/Action
15, EMERGENCY STOP The emergency stop button has been pressed.	After the problem which caused the emergency stop has been put right, you can reset the emergency stop button by turning it until it pops back out. Reset using ⏎.	

Error code, error message	Fault-finding	Cause/Action

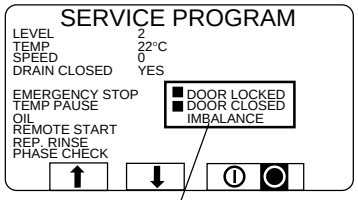
17, DOOR LOCK

No signal from door status switch, although door is locked.

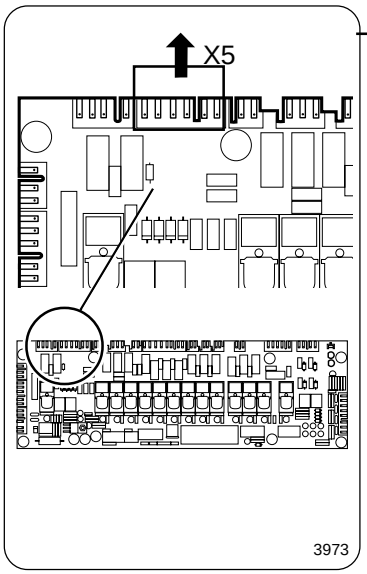
Use this function to lock the door.



Use (1) to switch between these.



Indicators for switch(es) in door lock.



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

Error message returns → Access the service program and check the door lock function. Carry out three different tests as shown in this table:

No error message → Transient fault. No action required.

Door	Indicator should be: DOOR LOCKED	DOOR CLOSED
1. open	not activated	not activated
2. closed, not locked	not activated	activated
3. closed and locked	activated	activated

DOOR LOCKED activated when door is not locked → Disconnect PCB connector X5 from I/O PCB 1.

DOOR CLOSED **not** activated when door is closed → Trace fault as described under "**DOOR OPEN**".

DOOR LOCKED still activated → Poor contact or continuity fault to X6 on I/O PCB 1 may generate error code 17. If I/O PCB 1 is faulty, replace PCB according to instructions in "To replace an I/O board".

DOOR LOCKED not activated → Faulty door lock or wiring between door lock and I/O PCB. See description of door lock for relevant machine.

Error code, error message	Fault-finding	Cause/Action

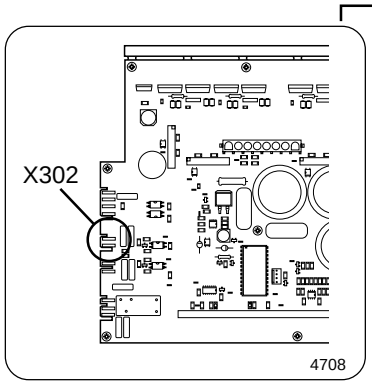
20, INTERLOCK STATUS

MCU not receiving interlock signal during program operation.

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

Error message returns → Check the voltage between terminals 1 and 2 at PCB connector X302 on motor control unit. The voltage should be the same as the power supply to the machine when the door is closed and locked.

No error message → Transient fault. No action required.



Voltage wrong → Close the door. Access the service program and lock it. Check that the DOOR LOCKED switch is activated.

Voltage correct → Faulty signal detection on motor control unit. Intermittent poor contact in the MCU can cause this error code without the MCU being faulty. Look for site of intermittent poor contact and if necessary replace the MCU.

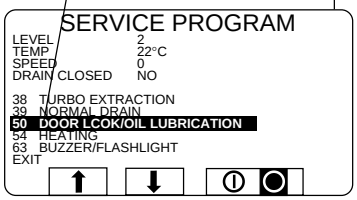
Activated → Check the voltage between terminals 1 and 2 at PCB connector X10 on I/O PCB 1. The voltage should be the same as the power supply to the machine when the door is closed and locked.

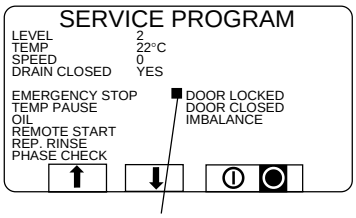
Not activated → Check whether the door is locked.

Door not locked → Trace fault as described under "DOOR UNLOCKED".

Door is locked → Faulty door lock switch or fault in wiring between door lock and I/O PCB 1. Check and remedy problem as described in manual for relevant machine.

Use this function to lock the door.

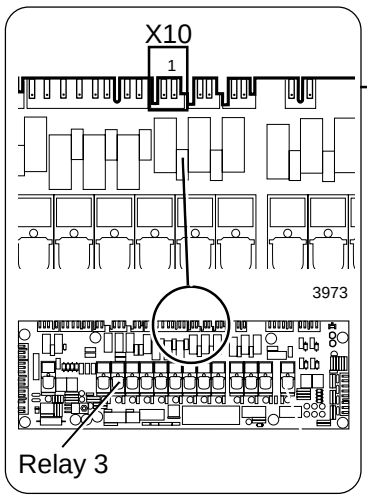




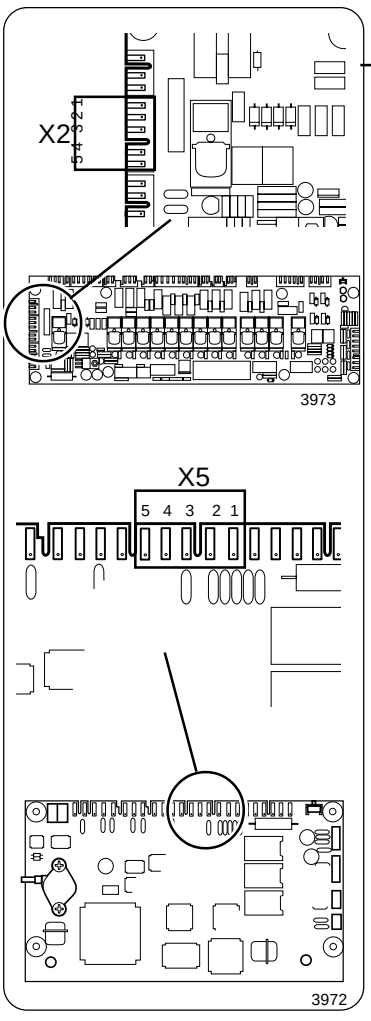
Indicators for switch(es) in door lock.

Voltage wrong → If neutral is absent from door lock PCB, interlock acknowledgement disappears and therefore I/O PCB 1 is OK.
A faulty I/O PCB should be replaced according to the instructions in "To replace an I/O board".

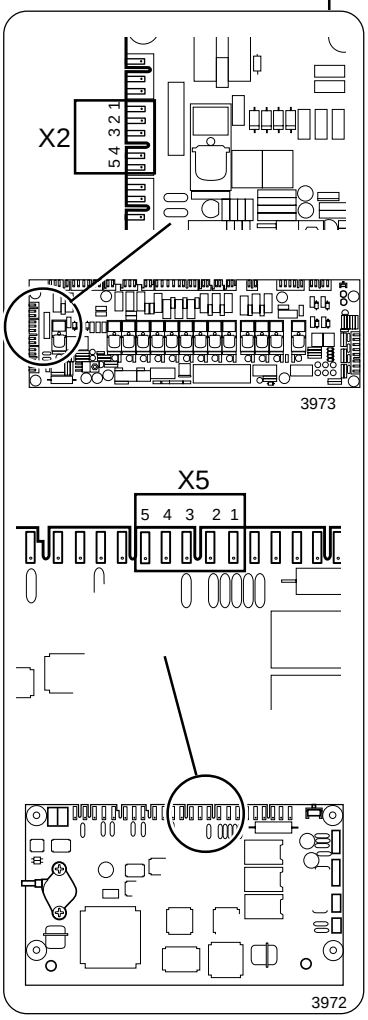
Voltage correct → Fault in wiring between I/O PCB 1 and MCU. Check wiring and replace if required.



Error code, error message	Fault-finding	Cause/Action
21, I/O COMMUNICATION Communication between the CPU board and one of the I/O boards disturbed or lost, or incorrect configuration of an I/O board.	Turn the machine's wall switch off and on again. Start a program. Error message returns → No error message → Transient fault. No action required. ↓ Check the red LEDs on all I/O PCBs. All LEDs lit → One of LEDs not lit → Probably internal fault in I/O PCB's voltage feed or the communications cables to the I/O PCBs. ↓ On every CPU and I/O PCB there is an LED which provides some indication of the functioning of the board's microprocessor. These LEDs should normally flash rapidly (CPU: green LED, I/O PCB: red). Check the LEDs on each of the boards (CPU and I/O) present in the particular machine. All LEDs flashing. → One of the LEDs lit without flashing or not lit at all. → Replace the PCB with the probable fault according to the instructions in "To replace an I/O board". ↓ Check the wiring from X5 on the CPU PCB to X2 on I/O PCB 1. If the machine has more than one I/O PCB, similarly use a meter to check the wiring between X1 on I/O PCB 1 and X2 on the next I/O PCB. Use an ohmmeter to check that the four conductors are sound as follows: X5 - X2: 1-5, 2-4, 3-3, 4-2, 5-1 X1 - X2: 1-5, 2-4, 3-3, 4-2, 5-1 **Continued on next page.**	



Error code, error message	Fault-finding	Cause/Action
21, I/O COMMUNICATION	**Continued from previous page.**	



Measure also between the four connections in X5 and X2 respectively, to eliminate possibility of short-circuits between two conductors.

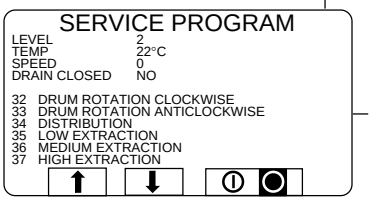
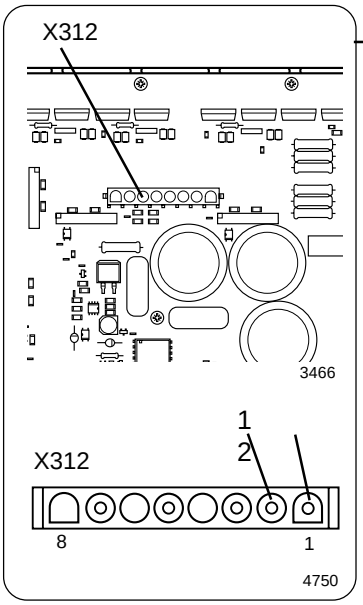
Wiring sound

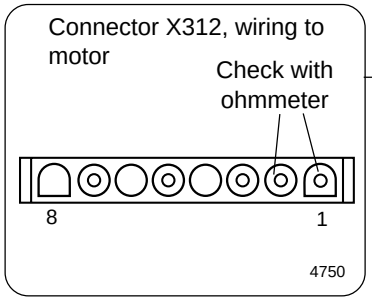
Wiring faulty → If the wiring has connectors, disconnect these one by one and continue fault tracing to identify the section of wiring where the fault is. Replace faulty wiring.

Internal fault in program or communications circuits on CPU or I/O boards. Continue fault tracing as follows:

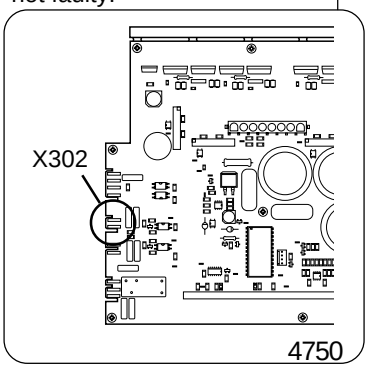
1. If there is more than one I/O PCB: re-program the addressing sequence for the existing I/O boards, as described in the section “To replace an I/O board”.
2. First try replacing I/O PCB 1 as described in the section “To replace an I/O board”. Check functioning.
3. If the error message returns, try replacing the other I/O PCBs.
4. Try replacing the CPU PCB as described in “To replace the CPU board”.

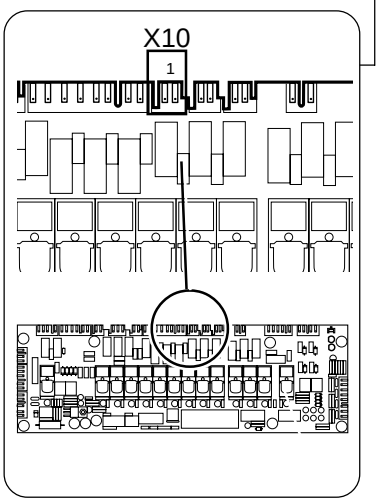
Error code, error message	Fault-finding	Cause/Action
23, PHASE Error message from equipment for monitoring mains power supply.	An input on I/O PCB 1 (X16:7-8) can be connected to external equipment for monitoring the mains power supply (for voltage levels, loss of phase etc.) If this input is activated, the error message will appear. Investigate the causes of the error being flagged by checking the power supply monitoring equipment. For more detailed troubleshooting instructions, refer to the separate manual supplied with the particular type of power supply monitoring equipment used.	

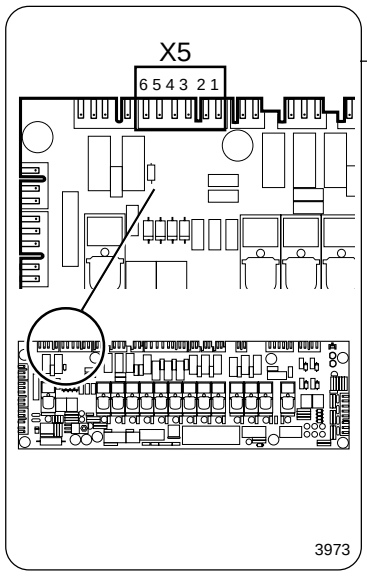
Error code, error message	Fault-finding	Cause/Action
31, HEAT SINK TOO HOT Temperature of MCU heat sink too high.	This error message can occur if the ambient temperature has been extremely high. If so, lower the temperature, e.g. by opening a window. Check that the vanes on the MCU heat sink are not clogged and that the fan is working. Heat sink vanes and fan OK ↓ / Heat sink vanes or fan not OK →	Clean the heat sink vanes. Check fan functioning by seeing if the fan starts every time the power supply to the machine is switched on. Replace the fan if faulty.
	Turn off the machine's wall switch. Wait at least 10 minutes for the heat sink to cool, then switch on the machine power supply again. Check that the drum and motor rotate smoothly. Drum/motor OK ↓ / Drum/motor not rotating smoothly →	Bearing failure in drum or motor, or objects between inner and outer drum. Investigate and remedy.
	Start a wash program and (if appropriate) use rapid advance to get to extraction. Check for any abnormal noise from drum/motor. Drum/motor OK ↓ / Drum/motor not rotating smoothly →	
	Start a wash program which includes high-speed or turbo extraction. If appropriate use rapid advance to get to extraction. Error message returns ↓ / No error message →	Transient fault. No action required.
	Turn off the machine's wall switch and wait 10 minutes. Disconnect connector X312 on MCU. Short-circuit X312:1 and 2 as illustrated and reconnect X312. Switch on machine power supply, start a wash program with high-speed or turbo extraction. Error message returns / No error message →	Fault in wiring between MCU and motor, or fault in motor. First check the wiring for short-circuits or continuity faults. If wiring is OK, replace the motor.
	Error message returns →	Internal fault in MCU. Replace MCU.

Error code, error message	Fault-finding	Cause/Action
32, MOTOR TOO HOT Thermal protection for motor has cut out.	Turn off the machine's wall switch. Check that the drum and motor rotate smoothly. Drum/motor OK ↓ Drum/motor not rotating smoothly →	Bearing failure in drum or motor, or objects between inner and outer drum. Investigate and remedy.
	Wait at least 10 minutes to let motor cool, then switch on machine power supply. Start a program. Does the error message recur immediately? Not immediately ↓ Error message returns immediately ↓	
	Disconnect connector X312 and use an ohmmeter on the part of the connector with wiring to the motor to check between X312: 1 - 2. Circuit open ↓ Circuit closed →	Internal fault in motor control unit detection of thermal cutout protection. Replace motor control unit.
		Continuity fault in wiring to motor or in motor thermal cutout. Check wiring up to connector by motor for faults. If the wiring is sound, replace the motor. Note! The motor may still be hot.
	Start a wash program which includes extraction and if appropriate use rapid advance to get to extraction. Check for any abnormal noise from drum/motor. Drum/motor OK ↓ Noise from drum/motor →	Bearing failure in drum or motor. Investigate and remedy.
	Start a wash program which includes high-speed or turbo extraction. If appropriate use rapid advance to get to extraction. Error message returns ↓ No error message →	Transient fault. No action required.
	Check the wiring from X312 on MCU to the connector by the motor. Use an ohmmeter to check the five conductors in the wiring. Also check between the five conductors to eliminate possibility of shorts between any two. Wiring OK ↓ Wiring faulty →	Check wiring and replace it as required.
		Internal fault in motor causing high motor temperature. Replace the motor.

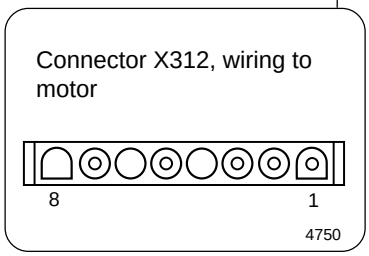
Error code, error message	Fault-finding	Cause/Action
33, NO INTERLOCK Motor control unit receiving start command from program control unit without first receiving lock acknowledgement signal. Motor control unit receiving circuitry for lock acknowledgement signal is not faulty.	Turn the machine's wall switch off, wait at least 10 seconds, then turn it on again. Check that the door is actually closed. Start a program. Error message returns →	No error message → Transient fault. No action required.
	Check voltage between terminals 1 and 2 in PCB connector X302 on motor control unit. The voltage should be the same as the power supply to the machine when door is closed and locked. Voltage wrong →	Voltage correct → Probably faulty signal detection on MCU. Intermittent poor contact in the system can also cause this error code. Look for possible cause of intermittent poor contact and replace MCU if necessary.
	Check voltage on I/O PCB 1, PCB connector X10 between terminals 1 and 2. The voltage should be the same as the power supply to the machine when door is closed and locked. Voltage wrong →	Voltage correct → Fault in wiring between I/O PCB 1 and MCU. Check wiring and replace as required.
	Check voltage on I/O PCB 1, PCB connector X5 between terminals 2 and 6. The voltage should be the same as the power supply to the machine when door is closed and locked. Voltage wrong →	Voltage correct → Probably faulty I/O PCB. Replace PCB according to instructions in "To replace an I/O board".
		Faulty door lock or wiring to door lock. Possibly intermittent poor contact in wiring to X5:2. Continue troubleshooting according to procedure under "DOOR UNLOCKED" earlier in this section.



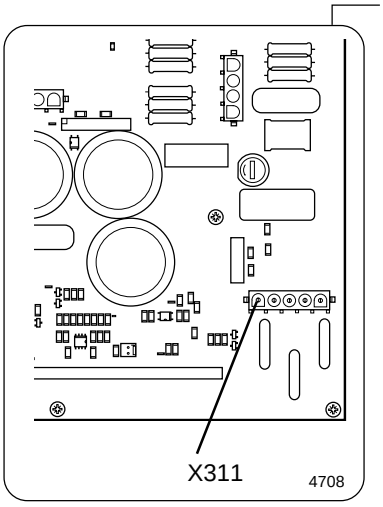




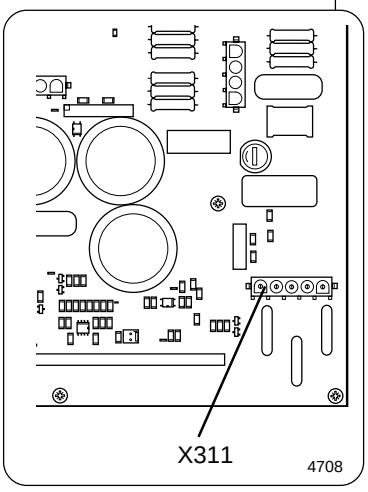
Error code, error message	Fault-finding	Cause/Action
35, MOTOR SHORT Motor control unit indicating short-circuit between outputs for motor windings.	Turn the machine's wall switch off and on again. Start a program. Error message returns	No error message → Transient fault. No action required.
	Disconnect the motor connector and use an ohmmeter to check the motor windings. Information on motor winding resistance and contact (terminal) numbers can be found in the manual for the relevant machine. Resistances correct	Any resistance wrong → Replace motor
	Check the wiring between X312 on the MCU and the connector by the motor using an ohmmeter to check the conductors. Also measure between the conductors to eliminate possibility of shorts between any two. Wiring OK	Wiring faulty → Check the wiring and replace as required.
		Fault in motor control unit output stage. Replace motor control unit.



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

Error code, error message	Fault-finding	Cause/Action
37, LOW DC VOLTAGE Motor control unit indicating DC voltage level too low.  	Turn the machine's wall switch off and on again. Start a program. Error message returns → ↓ No error message → Transient fault. No action required. Check the motor control unit input voltage at connector X311. Voltage too low → ↓ Voltage correct → This error code can occur if there are transient faults in the general power supply network. The cause may also be a fault in the motor control unit. Try replacing the unit. Check the input voltage on the machine's main set of connection terminals for input voltage. Voltage too low → ↓ Voltage correct → Fault in wiring or suppression circuits between machine's main set of connection terminals for input voltage and connector X311 on MCU. Investigate cause of fault in mains power supply before the machine.	

Error code, error message	Fault-finding	Cause/Action
38, HIGH DC VOLTAGE Motor control unit indicating DC voltage level too high.	Turn the machine's wall switch off and on again. Start a program. Error message returns ↓	No error message → Transient fault. No action required.
	Check the feed voltage to the MCU (230 V) at connector X311. Voltage too high ↓	Voltage correct → Fault in motor control unit. Replace unit.
		Investigate cause of fault in mains power supply before the machine.



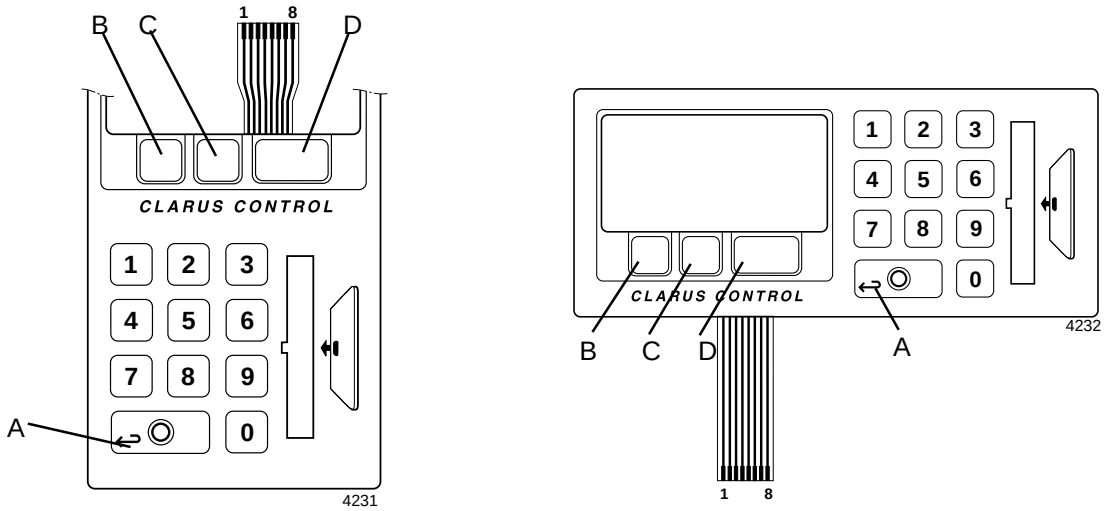
Tracing faults in display unit keys

For every press of a key in the PCU set, two of the outputs from the PCU set of keys close. To check the function of any given key in this set, disconnect the ribbon cable connecting the key set to the display circuit board, press the key you wish to check, and measure the resistance between the outputs which should be short-circuited.

Fig. 57 This table shows which outputs are short-circuited by each key:

Key	Outputs short-circuited
1	2 + 7
2	2 + 6
3	2 + 5
4	3 + 7
5	3 + 6
6	3 + 5
7	4 + 7
8	4 + 6
9	4 + 5
0	5 + 8
A	6 + 8
‘ B	1 + 2
C	1 + 3
D	7 + 8

57



To replace the CPU board

If the CPU board is faulty and has to be replaced, the correct software for the particular washer extractor will have to be downloaded onto the new CPU board. For this you need:

1. A new CPU circuit board.
2. A portable PC.
3. The correct cable for connecting the PC to the CPU board.
4. Software which is correct for the model of washer extractor the CPU board is to be installed in, to be downloaded onto that CPU board. These program files can be ordered from the machine supplier.
5. A special program called “PCS DOWNLOADING SOFTWARE”, used for converting and downloading the files onto the new CPU board. This program can also be ordered from the machine supplier.

Instructions:

1. Order the right software for your CPU board from the machine supplier. You must state the type and serial number of the machine to obtain the correct version of the program. If you do not have it already, you should order the program “PCS DOWNLOADING SOFTWARE” at the same time. The programs can be supplied on diskette or via E-mail.
2. Copy the software for the CPU board onto the PC. The software will consist of five files, which may have names like this:

   ```
   W973401
   P973401
   S973401
   M973401
   F973401
   ```

   The digits represent the year, the week and a serial number.
3. If you have not already installed it, install the program “PCS DOWNLOADING SOFTWARE” as well. Put it in the same directory or folder as the software for the CPU board(s).

Fig. 58

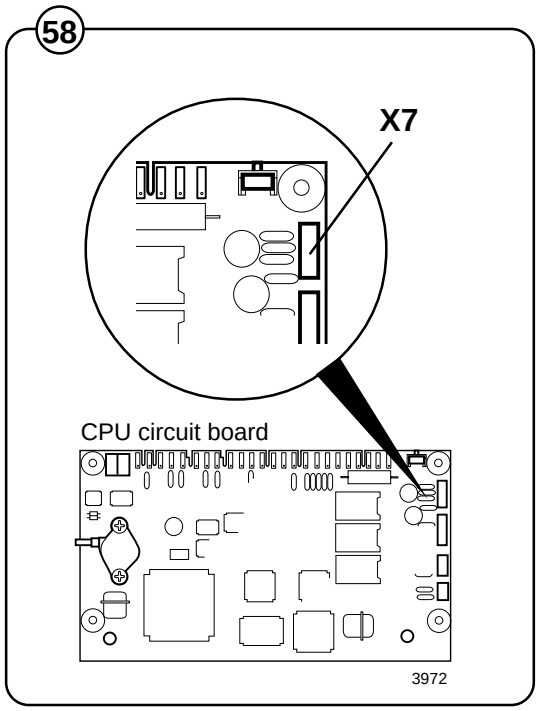
4. Switch off the machine's main power switch. Install the new CPU board and connect all the PCB connectors. Connect the correct cable between the computer (COM1 or COM2 port) and the interface connector X7 on the CPU board. Switch the machine's main power switch back on.
5. Start the "PCS DOWNLOADING SOFTWARE" by running the file (program) SLCOM1 or SLCOM2, depending on which port you have connected the cable to.
6. The computer will now ask you for the name of the first program file for the CPU board:

   `PLEASE ENTER W FILE NAME, SEVEN CHARACTERS:`

   Type the name of the file which starts with the letter "W", e.g. W973401, then press ENTER. Type the names of the other files when the computer asks for them.
7. Once you have typed all five file names and pressed ENTER, the PC will respond:

   `WAIT WORKING`

   The computer will now process and adapt the five files for downloading onto the CPU board. This will take a minute or so.



8. Once the new program file is ready, it will start to be downloaded onto the CPU board immediately. The PC screen will show:

   ```
   DOWNLOADING PC PROGRAM
   ```

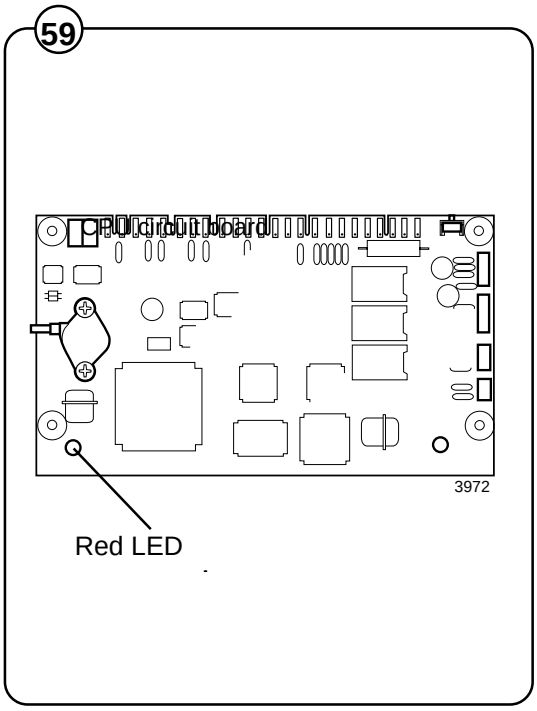
   to keep you informed. At the bottom of the screen you can see how many of the total of 1020 “pages” have been downloaded so far. You can also check the progress of downloading on the CPU board itself, by watching the red LED. This LED should flash rapidly, one flash for each “page” downloaded.

Fig. 59

9. When downloading is finished, the PC screen will show:

   ```
   SOFTWARE WAS DOWNLOADED
   SUCCESSFULLY.
   ```

10. Switch off the machine’s main power switch. Remove the cable linking PC and CPU board. Switch the machine’s main power switch back on. The PCU will now start up with the new software.



To replace an I/O board

The procedure described here is for machines with more than one I/O board. On machines with only one I/O board, that board can be replaced without any need for this procedure.

If there is more than one I/O circuit board, the processor must know whether the new circuit board is I/O board 1, I/O board 2 or I/O board 3. For this programming you need:

1. A portable PC.
2. The correct cable for connecting the PC to the CPU board.
3. A service program for the PCU which you can run on a PC. The program is called “PCS” and can be used for numbering the I/O boards correctly, amongst other things. This program can be ordered from the machine supplier.

Instructions:

1. Order a copy of the program “PCS” if you do not have it already. Programs can be supplied on diskette or via E-mail.
2. If you have not already installed it, install the program “PCS” on your computer.
3. Switch off the machine’s main power switch. Install the new I/O board and connect all the PCB connectors.

Fig. 60

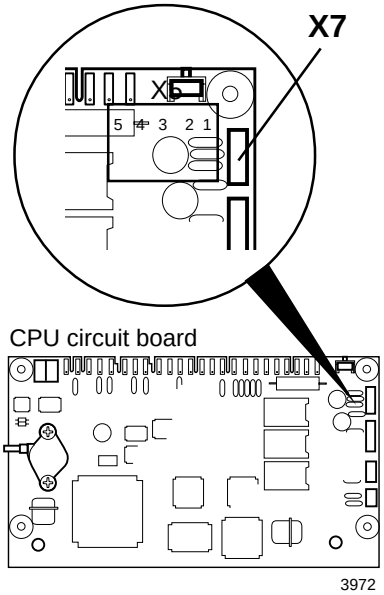
4. Switch the machine’s main power switch back on. Connect the correct cable between the computer (COM1 port) and the interface connector X7 on the CPU board.

It is important to ensure that the PCU is energised and running <u>before</u> you connect the cable to interface connector X7.

5. Start the “PCS” program by running the program file PCS.EXE. Choose the “SERVICE” option.
6. A menu will appear which allows you, using two-digit codes, to control the machine’s functions in the same way as you can in the machine’s built-in service program. The last three functions in this menu are:
   SET I/O ADDRESS 1
   SET I/O ADDRESS 2
   SET I/O ADDRESS 3

   These functions are used for programming the internal numbering (addressing sequence) of the I/O boards.

60



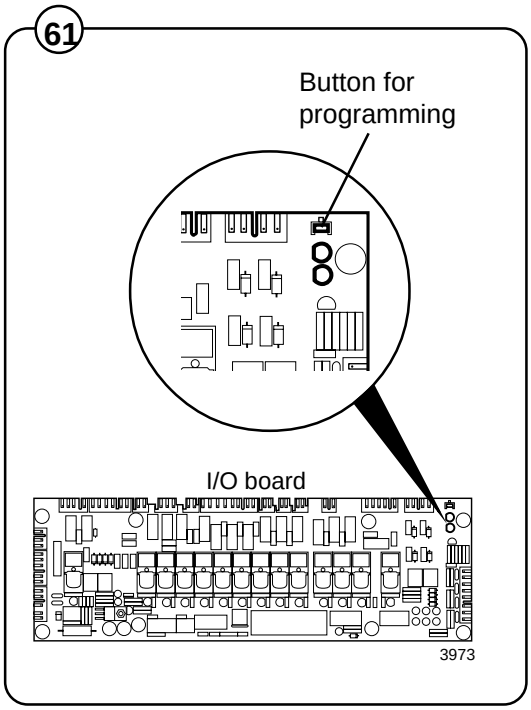
7. Enter the two-digit code for the new I/O board you wish to program (e.g. I/O board 1) and press ENTER. The PC will respond with instructions corresponding to this message:

   PROGRAMMING OF I/O BOARD

   PRESS PROGRAM BUTTON ON I/O BOARD 1

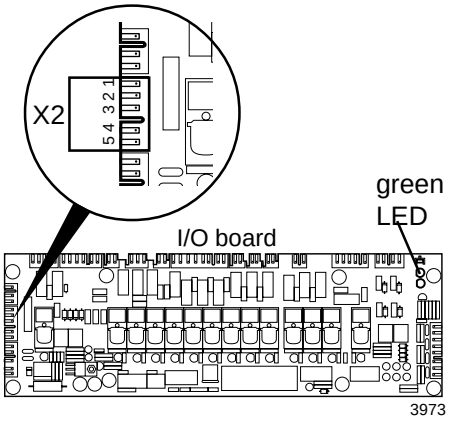
Fig. 61

8. Press the button on I/O board 1.
9. If there are other new I/O boards which have not yet been programmed, continue in the same way.
10. When you have finished, enter code 41 to exit the service program.
11. Remove the cable linking the PC and the CPU board.



Error message: I/O COMMUNICATION

Communication between the CPU board and one of the I/O boards disturbed or lost.



1. Turn the machine's wall switch off and on again. Start a program. Does the error message return?

Yes ↓

No
Transient fault. No action required.

2. Check the red LEDs on all I/O PCBs. Are all the red LEDs lit?

Yes ↓

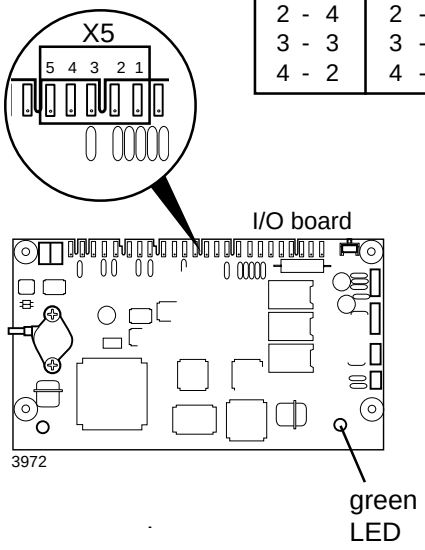
No
Internal fault on I/O PCB's voltage feed. Replace PCB according to instructions in "To replace an I/O board".

3. On every CPU and I/O PCB there is a green LED which provides some indication of the functioning of the board's microprocessor. Are the LEDs on the CPU and I/O boards present in this washer extractor flashing rapidly on and off?

Yes ↓

No
Replace the faulty PCB according to the instructions in "To replace an I/O board".

X5 X2	X1 X2
1 - 5	1 - 5
2 - 4	2 - 4
3 - 3	3 - 3
4 - 2	4 - 2



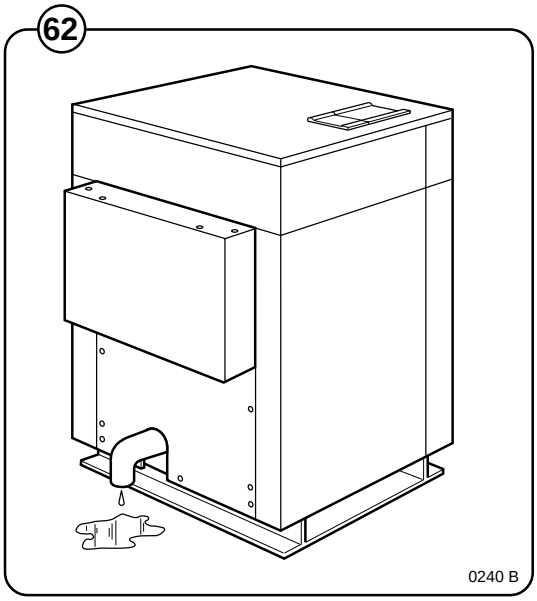
4. Check the wiring from X5 on the CPU PCB to X2 on I/O PCB 1. If the machine has more than one I/O PCB, similarly use a meter to check the wiring between X1 on I/O PCB 1 and X2 on the next I/O PCB. Use an ohmmeter to check that the four conductors are sound, as shown in the table (left).
Measure also between the four connections in X5 and X2 respectively, to eliminate possibility of short-circuits between two conductors.
Is the wiring sound?

Yes ↓

No
If the wiring has connectors, disconnect these one by one and continue fault tracing to identify the section of wiring where the fault is. Replace faulty wiring.

Internal fault in program or communications circuits on CPU or I/O boards. First replace I/O PCB 1 as described in the section "To replace an I/O board". Check functioning. If the error message returns, replace the other I/O PCBs and then the CPU PCB as described in "To replace the CPU board".

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. 62

- 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

- 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. 63

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

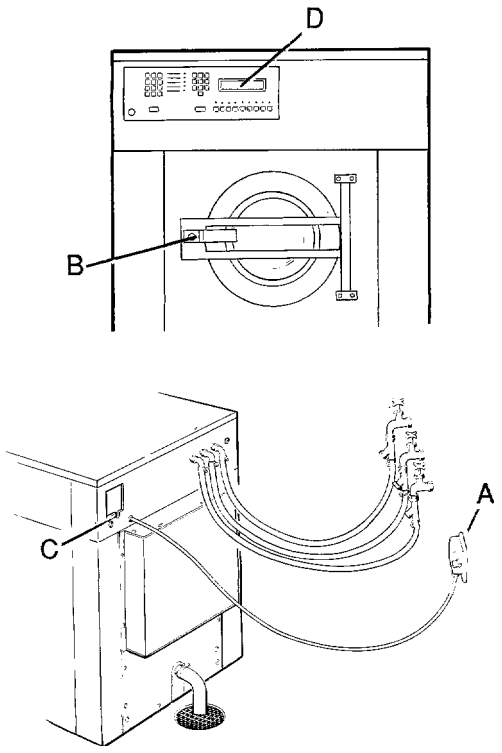
Fig. 64

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

B Check drain valve and solenoid for proper operation.

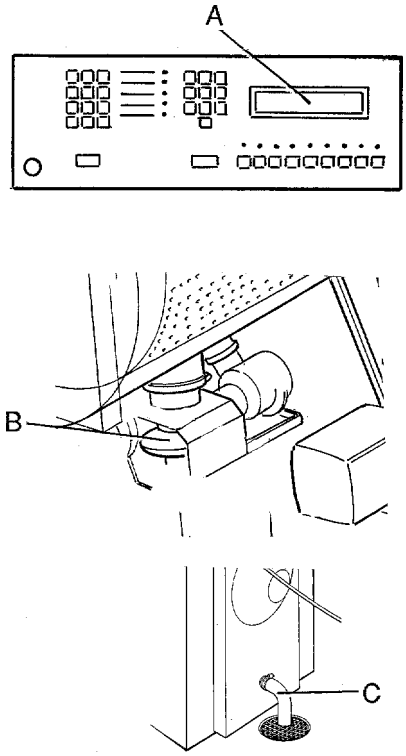
Disconnect drain hose connected to drain line. If full flow of water comes out, the problem is in the main waste line. If water flow is slow, the problem is accumulation of foreign materials between drain valve and shell outlet of machine. Clean valve body of any foreign objects found.

63



1642

64



2501

If machine does not extract

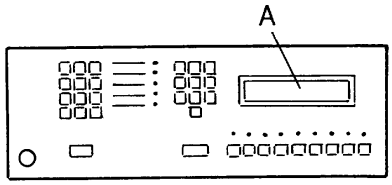
Fig. (65) A Check for fault indication on display (see under the heading "Service Information").

If motor does not operate at wash speed.

Fig. (66) A Check for fault indication on display (see under the heading "Service Information").

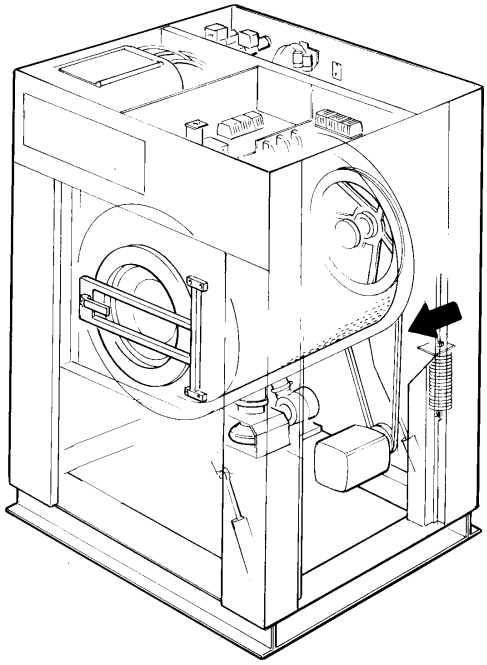
B Check motor and V-belts.

65



1657

66



2504

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

Fig. 67 A Replace V-belts

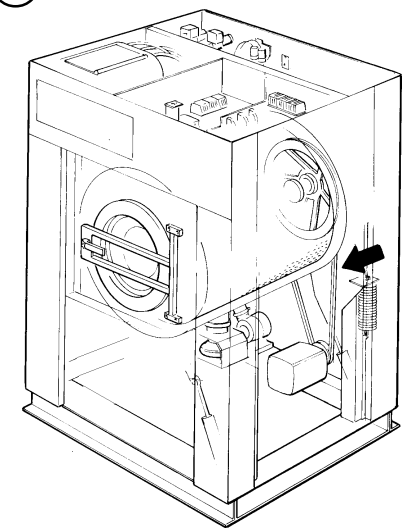
If a metallic noise can be heard at rear of machine.

Fig. 68 A Tighten lock screw on pulley on motor shaft.

If the door is leaking.

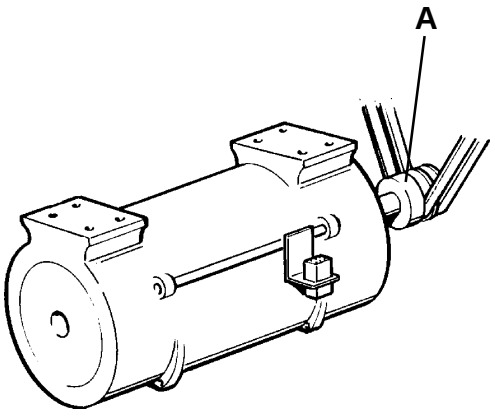
Fig. 69 A Check door gasket. If gasket is in good condition, check the tension between door gasket and door frame and adjust.

67



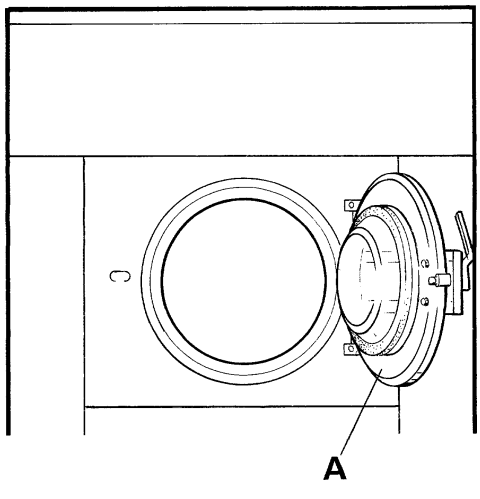
2504

68



2505

69



1622

If there is leaking around the glass.

Fig. 70

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

Replace door gasket if worn.

If water does not enter the machine.

Fig. 71

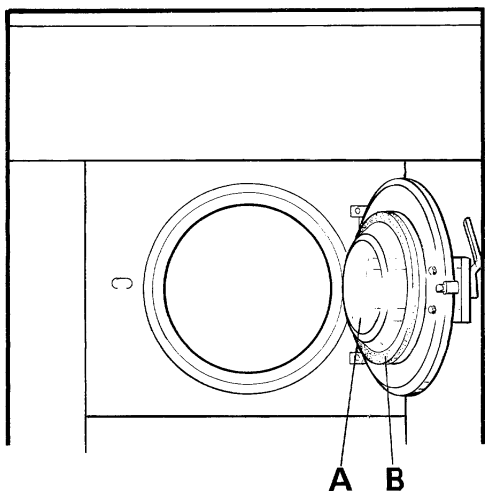
A Check for fault indication on display (see under the heading "Service Information").

B Check the valve coils on inlet valves.

C Check wires leading to electric coils.

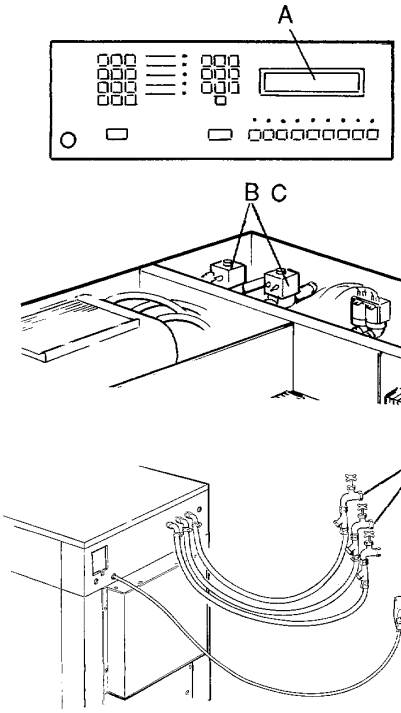
D Be sure manual shut-off valves are in open position.

70



1623

71



1643

If water continues to fill without stopping.

Fig. 72

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.

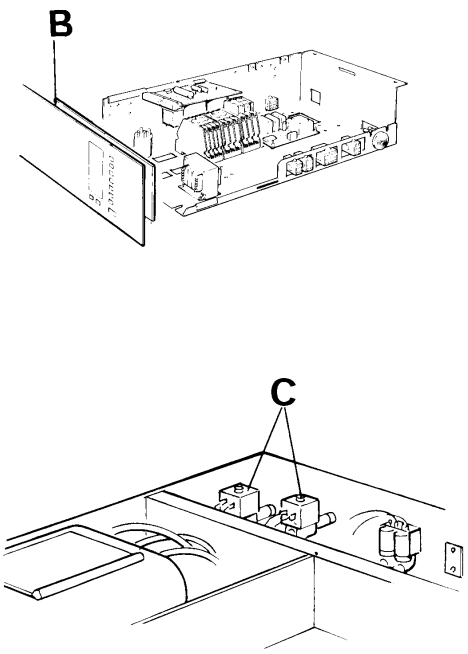
If water continues to flow without filling machine.

Fig. 73

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

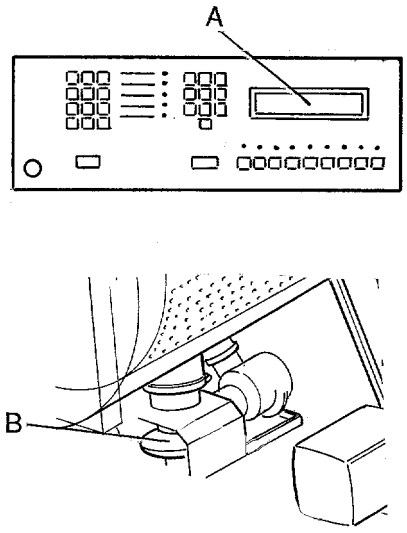
B Check seating of drain valve.

72



2508

73



2502

If machine vibrates excessively.

Fig. 74

A Check that the out-of-balance detector switch is fitted properly and functional and that the out-of-balance relay is functional.

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

C Verify that all shipping securities have been removed from the machine. See "Installation" earlier in this manual.

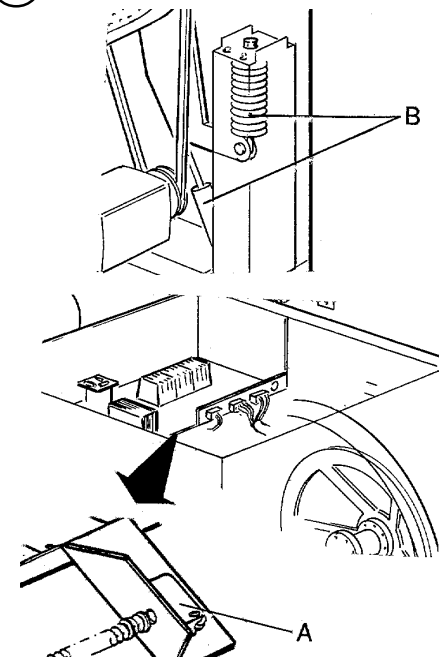
If safety fuse blows at the beginning of the cycle.

Fig. 75

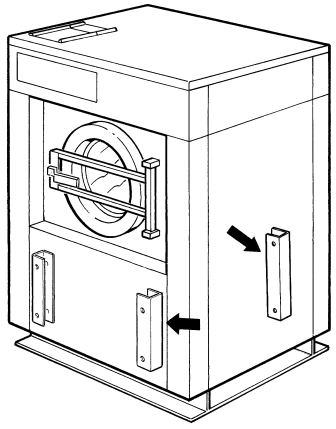
A Replace fuse. If fuse blows again, contact service personnel.

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

74

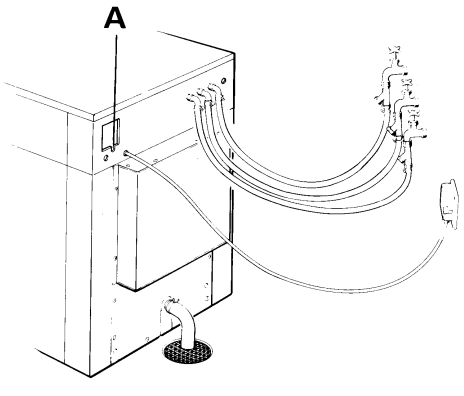


2503



1247

75



2509