SERVICE MANUAL

DOC. NO. 438.9227-06/03 EDITION 2010.08.27

EX618cl – EX677cl
Clarus Control

Wascomat provides efficient washers, dryers, flatwork ironers and wetcleaning systems in a size and model for every laundry and wetcleaning need!

Wascomat Laundry Equipment
516-371-4400 • www.wascomat.com

WASCOMAT CUSTOMER SUPPORT

Whether you need spare parts or technical advice to guide you to the source of a malfunction, our nationwide network of authorized dealers are able and ready to serve your needs, or call the Wascomat Customer Service Hotlines listed below.

SPARE PARTS

516-371-2000

Before ordering parts, refer to the Wascomat spare parts manual (also available on www.wascomat.com) to determine the part number(s) for the item(s) you need.

For quick service, please have the following information available:

1. Part Number of the item(s) you need.
2. Model of the machine.
3. Serial number of the machine.
4. Electrical data for the machine:
   – 120 or 208-240 Volt?
   – Single or three phase?
   – 50 or 60 Cycle?

To insure parts order accuracy, only fax or email parts orders are accepted:

– Fax: 516-371-4029
– email: parts@wascomat.com

TECHNICAL SUPPORT

516-371-0700

For service information, first contact your local authorized Wascomat dealer.

Wascomat technical support can assist you or your technician to diagnose and repair your laundry machines over the phone. Please call from the location where the machines are installed (we suggest you use a cellular or cordless phone), and have the following information available:

1. Model of the machine.
2. Serial number of the machine.
3. Electrical data for the machine:
   – 120 or 208-240 Volt?
   – Single or three phase?
   – 50 or 60 Cycle?
4. An accurate description of the malfunction.

To expedite parts order shipment, please use your credit card.
We accept: American Express, Mastercard, Visa, Discover, Diner's Club.

WARRANTY CLAIMS

Wascomat's Technical Support staff will honor valid manufacturer's parts warranty claims providing your Wascomat machines are registered for warranty coverage upon installation. If they are not registered, you can validate your warranty claim by providing information about when and where you purchased the Wascomat machine(s), the model and serial number(s). Additional warranty proof may also be required.

461 Doughty Blvd., Inwood, N.Y. 11096-0338 | Sales and Administration – Tel: 516-371-4400 • Fax: 516-371-4204 • e-mail: sales@wascomat.com
Spare Parts – Tel: 516-371-2000 • Fax: 516-371-4029 • e-mail: parts@wascomat.com | Technical Support – Tel: 516-371-0700 • Fax: 516-371-4029
En Mexico: Llame gratis a este numero 001-800-010-1010

NOTICE TO SERVICE PERSONNEL

INSTALLATION

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

REFER INSTALLATION TO QUALIFIED PERSONNEL!

RISK OF ELECTRIC SHOCK

The equipment utilizes high Voltages. Disconnect electric power before servicing.
The use of proper service tools and techniques, and the use of proper repair procedures, is essential to the safety of service personnel and equipment users.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL!

RISK OF PERSONAL INJURY

This equipment contains moving parts, and some components that may have sharp edges. Improper or careless service procedures may result in serious injury to service personnel.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL!

ABOUT THIS MANUAL

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

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL!

NOTE:

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

Intentionally blank

Service Manual

EX618cl – EX677cl
Clarus Control

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

PLEASE ENTER THE FOLLOWING INFORMATION AS IT APPEARS ON THE MACHINE(S) DATA PLATE(S).

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

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

Intentionally blank

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 MUST 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 – *AVERTISSEMENT*

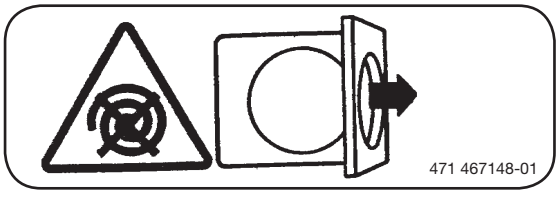
1. **This machine MUST be securely bolted according to the installation instructions, to reduce the risk of fire and to prevent serious injury, or damage to the machine.**
   Pour reduire les risques d'incendie, fixer cet appareil sur un plancher beton sans revetement.
2. **If installed on a floor of 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 LOCK 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 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 provided in the drum package. Be certain to relock after remounting the top panel.**

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

471 766202-04

LOCATED ON THE DOOR:

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



471 467148-01

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) MUST 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'S 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 Technical Support Department - 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!

Contents

Contents

Safety Precautions

- The machine is only intended for washing with water.
- Do not allow minors to operate the machine.
- Installation and maintenance work should only be done by authorized persons
- Do not bypass the door lock of the machine.
- Any leaks, e.g. a worn-out door seal, should be repaired immediately.
- Prior to repairs or maintenance, be sure to read the corresponding handbooks and service manuals.
- Do not flush the machine with water.

Warnings

The service manual includes the following warnings that warn of possible injuries. Next to each warning text, a page reference refers to the page where the warning can be found in the manual.

DANGER

Be careful when measuring the electric components in the motor control. All components have a potential difference of approx. 300 V in relation to protective earth and neutral. When the green LED on the motor control card is lit, the components carry dangerous voltages. The motor control lose all voltage about 10-30 seconds after the voltage has been disconnected and the motor has stopped.

Technical data

Physical features

Model types							
Washer extractor		EX618	EX625	EX630	EX645	EX660	EX677
Inner drum							
Volume	litres/ft^3	75/2.6	105/3.7	130/4.6	180/6.4	240/8.5	300/10.6
Diameter	mm/inch	520/20 1/2	595/23 7/16	650/25 9/16	725/28 9/16	795/31 5/16	795/31 5/16
Capacity, dry weight							
up to	kg/lbs	8/18	11/25	13.5/30	18/40	25/55	30/66
Drum speed							
Washing	rpm	49	49	49	44	42	42
Extraction	rpm	1100	1025	980	930	890	820
G factor							
Extraction		350	350	350	350	350	300
Weight							
Net	kg/lbs	159/350	201/443	267/588	350/771	400/882	509/1122

Technical data

	EX618	EX625	EX630	EX645	EX660	EX677
Innerdrum volume litres/ft³	75/2.6	105/3.7	130/4.6	180/6.4	240/8.5	300/10.6
diameter mm/inch	520/20 1/2	595/23 7/16	650/25 9/16	725/28 9/16	795/31 5/16	795/31 5/16
Drum speed wash rpm	49	49	49	44	42	42
extraction rpm	1100	1025	980	930	890	820
Heating electricity kW	5.4/7.5	7.5/10	13	18	23	23
steam	x	x	x	x	x	x
hot water	x	x	x	x	x	x
G-factor	350	350	350	350	350	300
Weight, net kg/lbs	159/350	201/443	267/588	350/771	400/882	509/1122

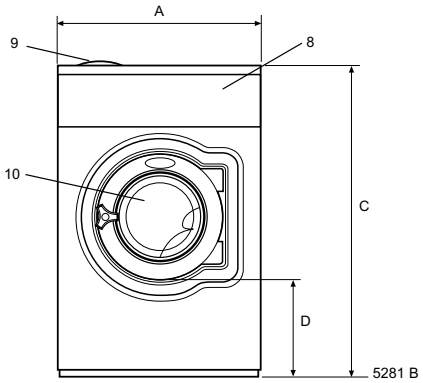
Connections

	EX618	EX625	EX630	EX645	EX660	EX760
Water valves connection	DN20 3/4"	DN20 3/4"	DN20 3/4"	DN20 3/4"	DN20 3/4"	DN20 3/4"
Rec. water pressure psi	30-90	30-90	30-90	30-90	30-90	30-90
kPa	200-600	200-600	200-600	200-600	200-600	200-600
Functioning limits psi	8-145	8-145	8-145	8-145	8-145	8-145
for water valve kPa	50-1000	50-1000	50-1000	50-1000	50-1000	50-1000
Capacity at 45 psi (300 kPa) gallon/min	5	5	5	8	5	5
l/min	20	20	20	30	60	60
Drain valve outer Ø mm/inch	75/3	75/3	75/3	75/3	75/3	75/3
Draining capacity gallon/min	45	45	45	45	45	45
l/min	170	170	170	170	170	170
Steam valve connection	DN15 1/2"	DN15 1/2"	DN15 1/2"	DN15 1/2"	DN15 1/2"	DN15 1/2"
Rec. steam pressure psi	45-90	45-90	45-90	45-90	45-90	45-90
kPa	300-600	300-600	300-600	300-600	300-600	300-600
Functioning limits for psi	8-115	8-115	8-115	8-115	8-115	8-115
steam valve kPa	50-800	50-800	50-800	50-800	50-800	50-800

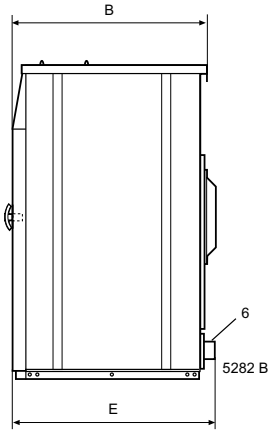
1	Electrical connection
2	Cold water
3	Hot water
4	Hard water (option)
5	Steam connection
6	Drain
7	Liquid detergent supply
8	Control panel
9	Soap box
10	Door opening, EX618: ø 310 mm/12 3/16", EX625: ø 365 mm/14 3/8", EX630: ø 395 mm/15 9/16", EX645, EX660, EX677: ø 435 mm/17 1/8"

in mm	A	B	C	D	E	F	G	H	I	K	L	M	N	O	P	R	S
EX618	720	690	1115	355	720	825	45	1030	220	1010	135	910	830	360	100	240	–
EX625	830	705	1200	365	740	910	45	1115	220	1100	135	995	910	415	100	295	–
EX630	910	785	1325	435	825	1035	125	1245	215	1225	300	1125	–	–	100	305	455
EX645	970	870	1410	470	910	1120	115	1330	240	1290	330	1205	370	410	100	335	485
EX660	1020	915	1445	500	955	1155	100	1365	225	1325	310	1240	350	390	100	360	510
EX677	1020	1060	1445	500	1135	1155	100	1360	215	1320	300	380	–	–	100	360	335

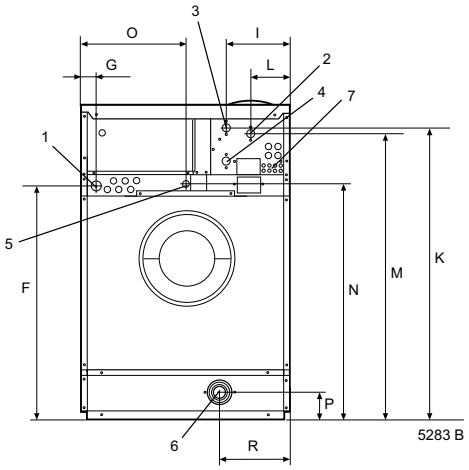
EX618, EX625, EX630



Front

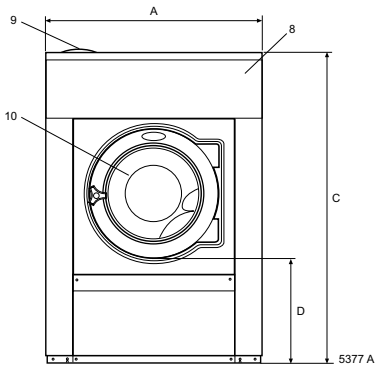


Right side

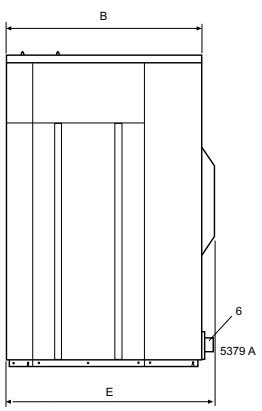


Rear side

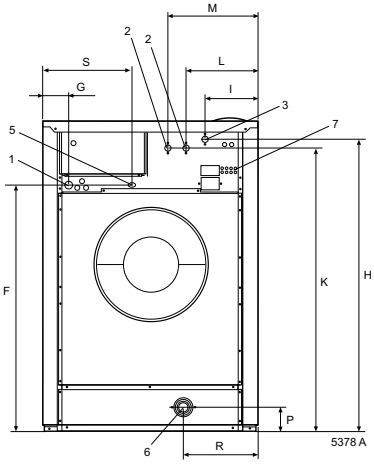
EX645, EX660, EX677



Front



Right side



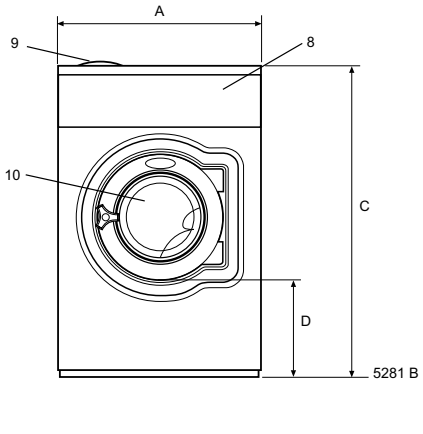
Rear side

Technical data

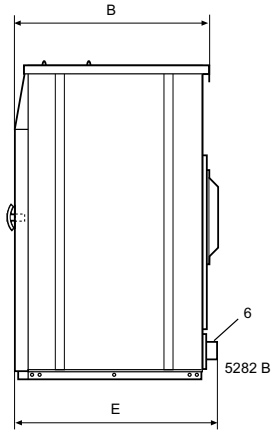
in inch	A	B	C	D	E	F	G	H	I	K
EX618	28 3/8	27 3/16	43 7/8	14	28 3/8	32 1/2	1 3/4	40 9/16	8 11/16	39 3/4
EX625	32 11/16	27 3/4	47 1/4	14 3/8	29 1/8	35 13/16	1 3/4	43 7/8	8 11/16	43 5/16
EX630	35 13/16	30 7/8	52 3/16	17 1/8	32 1/2	40 3/4	4 15/16	49	8 7/16	48 1/4
EX645	38 3/16	34 1/4	55 1/2	18 1/2	35 13/16	44 1/8	4 1/2	52 3/8	9 7/16	50 13/16
EX660	40 3/16	36	56 7/8	19 11/16	37 5/8	45 1/2	3 15/16	53 3/4	8 7/8	52 3/16
EX677	40 3/16	41 3/4	56 7/8	19 11/16	44 11/16	45 1/2	3 5/16	53 9/16	8 7/16	51 15/16

in inch	L	M	N	O	P	R	S
EX618	5 5/16	35 13/16	32 11/16	14 3/16	3 5/16	9 7/16	–
EX625	5 5/16	39 3/16	35 13/16	16 5/16	3 5/16	11 5/8	–
EX630	11 13/16	44 5/16	–	–	3 5/16	12	17 15/16
EX645	13	47 7/16	14 9/16	16 1/8	3 5/16	13 3/16	19 1/8
EX660	12 3/16	48 13/16	13 3/4	15 3/8	3 5/16	14 3/16	20 1/16
EX677	12 3/16	14 15/16	–	–	3 15/16	14 3/16	13 3/16

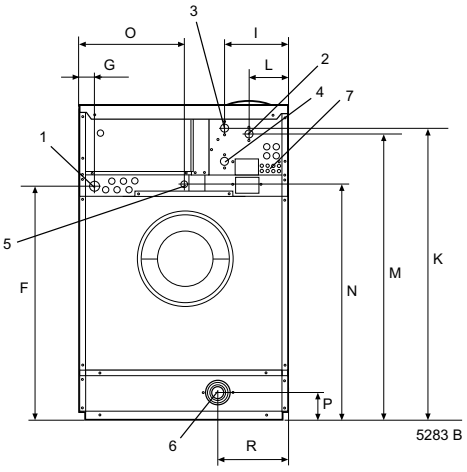
EX618, EX625, EX630



Front

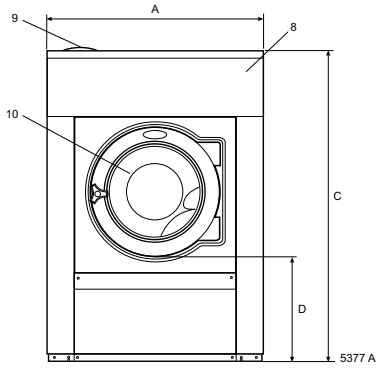


Right side

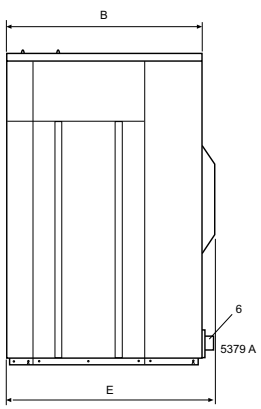


Rear side

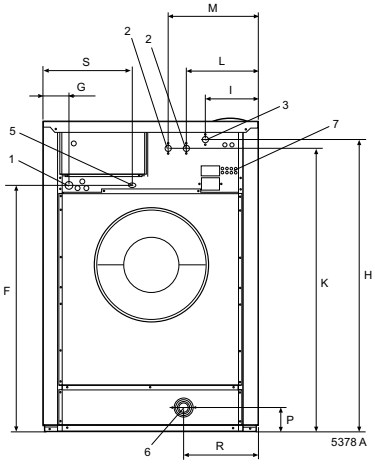
EX645, EX660, EX677



Front



Right side



Rear side

	EX618	EX625	EX630	EX645	EX660	EX677
Frequency of the dynamic force Hz	18.3	17.1	16.3	15.5	14.8	13.7
Max floor load lbs force	417±110	560±112	703±114	944±221	1158±221	1387±277
at extraction kN	1.9±0.5	2.5±0.5	3.1±0.5	4.2±1.0	5.2±1.0	6.2±1.2

Machine presentation

General

(1) The machines covered in this manual include:

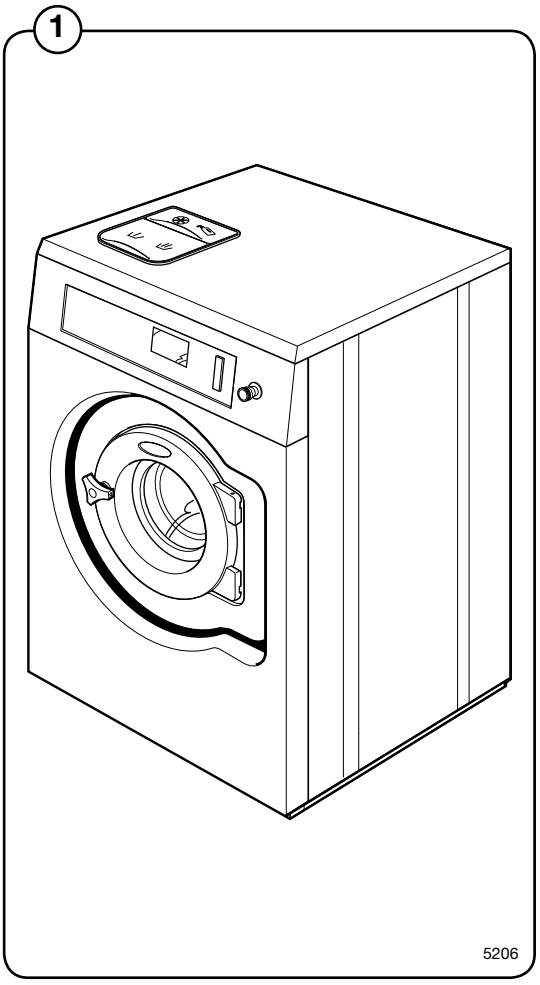
Drum volume litres/ft³	Model type
75/2.6	EX618
105/3.7	EX625
130/4.6	EX630
180/6.4	EX645
240/8.5	EX660
300/10.6	EX677

The programme unit contains a microprocessor with a number of standard programmes for normal wash cycles. New programmes, specially prepared for specific applications, can be easily programmed by the customer, either using the control panel on the washing machine or using a special computer application. The programmes are then transferred to the washing machine on memory cards.

The motor is frequency-controlled and is controlled by an advanced motor control. This allows precise and flexible control of the motor rpm for any application.

The machines are supplied to customer specifications with e.g. electric or steam heating or no heating, and may be connected to various combinations of cold, warm and hard water.

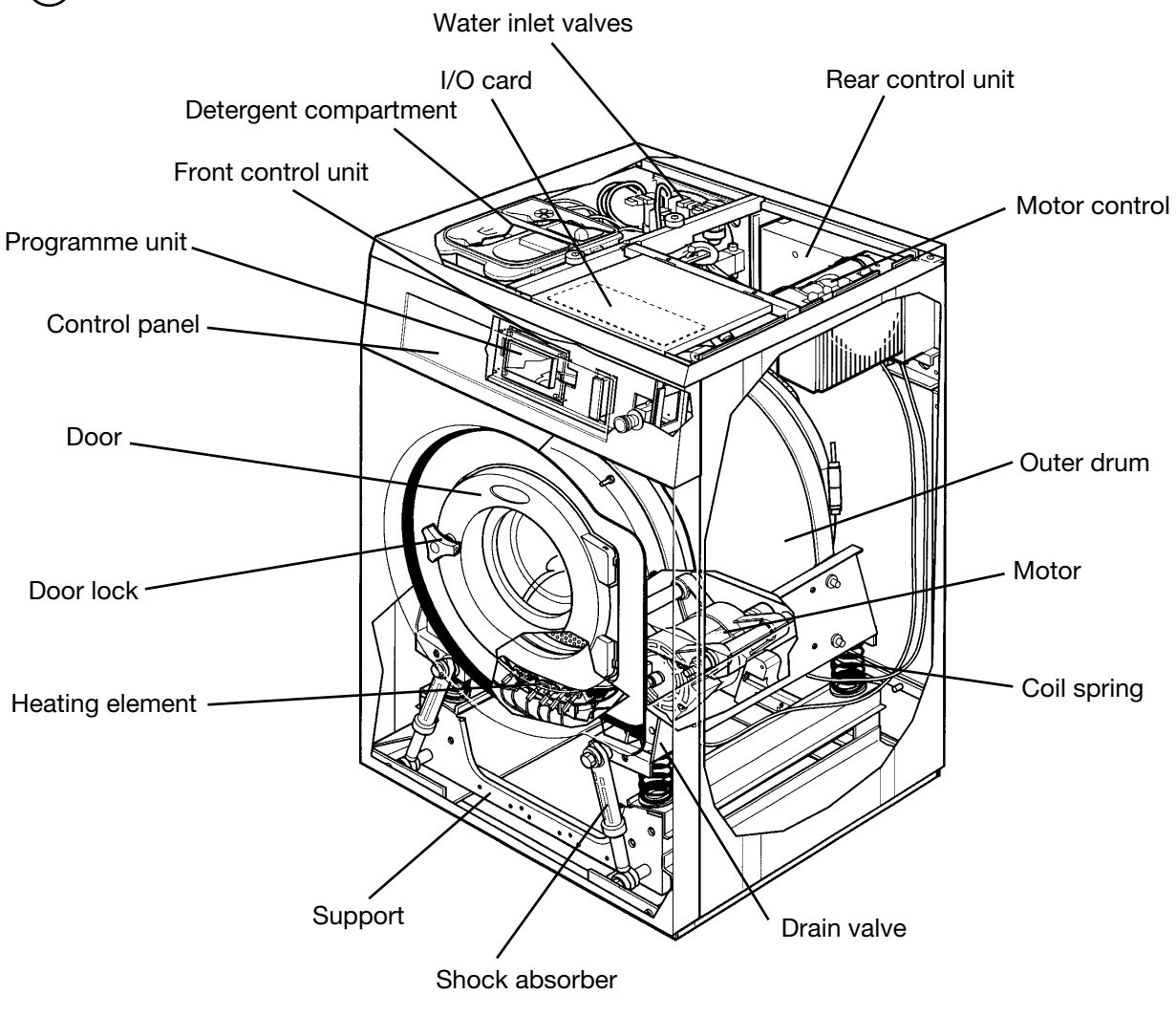
The machines are designed for installation in hotels, laundries, factories, hospitals, various institutions, etc.



Function

(2) This section presents an overview of the functions of the machine. Most functions are then presented in detail in separate chapters in the service manual.

(2)



Programme unit

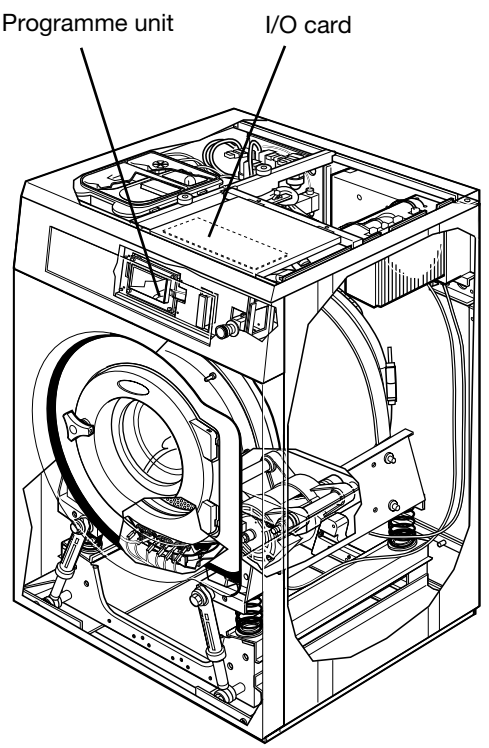
(3) The programme unit is made up of the CPU card, the display card, card reader and one or two I/O cards. The programme unit holds a (4) number of standard programmes, but it is also possible to programme user-specific washing programmes, either using the control panel on the machine or a computer.

The programme unit card reader is used to transfer programmes between a computer and the washing machine or between different washing machines.

The programme unit communicates with the motor control through a serial interface. One or more I/O cards control the water valves, drain and heating of the machine. The control signals are sent via a communication card in the rear control unit to the various components. The communication card has connectors for connecting to various external components, such as detergent pumps or external water valves.

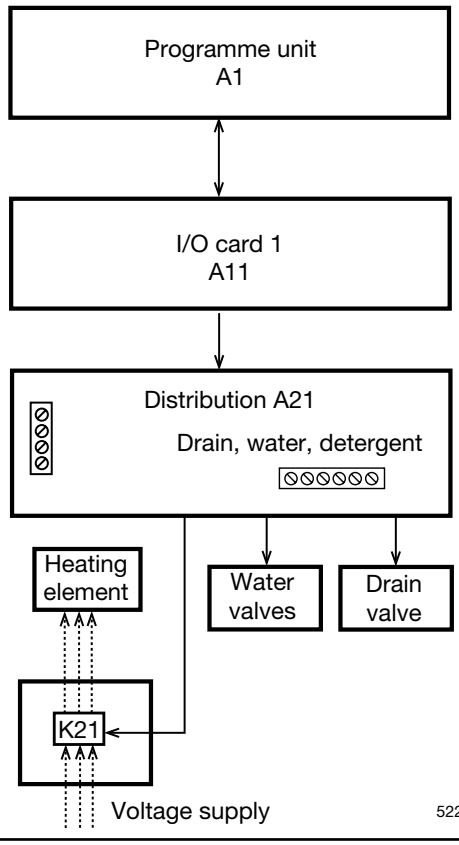
The programme unit of the machine is described in detail in section **Programme unit.**

3



5207

4



5223

Motor and motor control

(5) A frequency-regulated motor using a drive belt drives the drum. The motor is situated on a motor shelf, under the outer drum with a tensioner device for the drive belt.

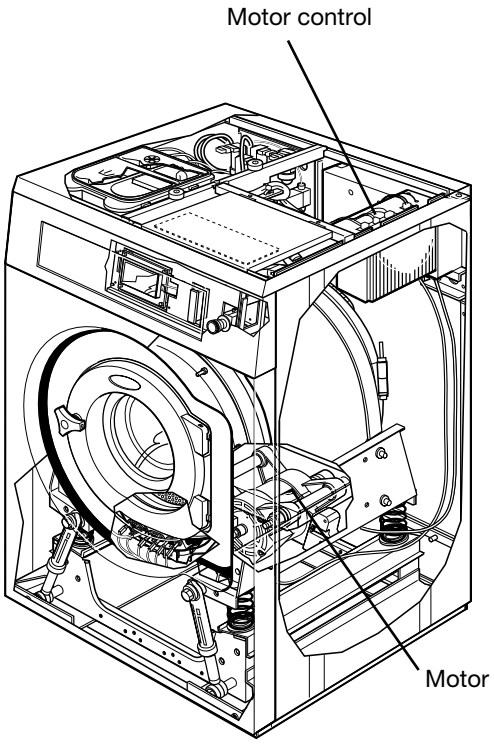
(6) The motor control relies on microcomputer control and controls acceleration, rpm and retardation of the drum with high precision. Further, the motor control can supply simultaneous values that can be used as warnings for unbalanced loads and to calculate the weight of the load.

The motor control communicates with the programme unit through a serial interface.

The motor control is voltage-fed over a cable which includes two fuses.

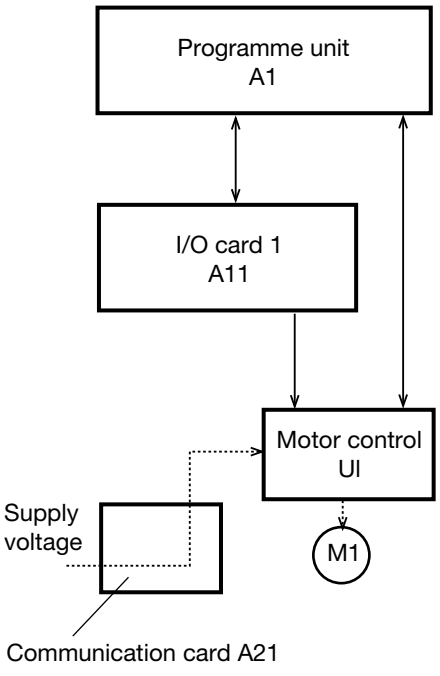
The motor and motor control is described in detail in section **Motor and motor control.**

5



5207

6



5189

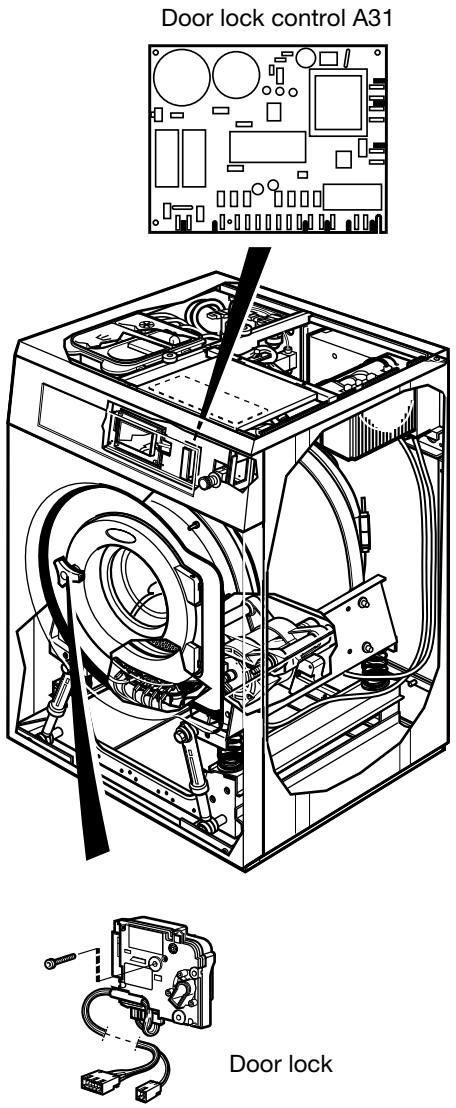
Door lock

(7) The door lock is an electro-mechanical type with double safety switches. The lock is bi-stable, i.e., it needs to receive an active pulse from the control in order to both lock and unlock the door.

(8) A separate printed circuit board, called door lock control, can be fitted onto the programme unit. This board controls locking and unlocking. The card has separate checks for empty drum and stopped drum. Together with the checks built into the programme unit, this guarantees that the door cannot be opened by a mistake.

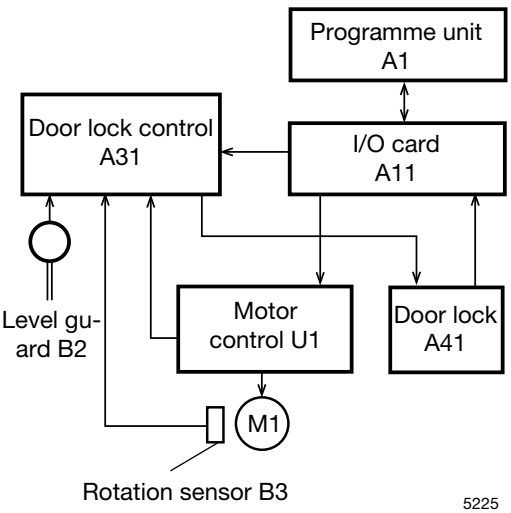
The door lock on the machine is described in detail in section **Door and door lock.**

7



6109

8



5225

Heating

(9) When using electric heating, the water for washing is heated by three heating elements accessible from the front of the machine.

The machine can also be fitted with steam heating using a steam valve fitted on the rear of the machine.

The heating system of the machine is described in detail in section **Heating.**

Water connections

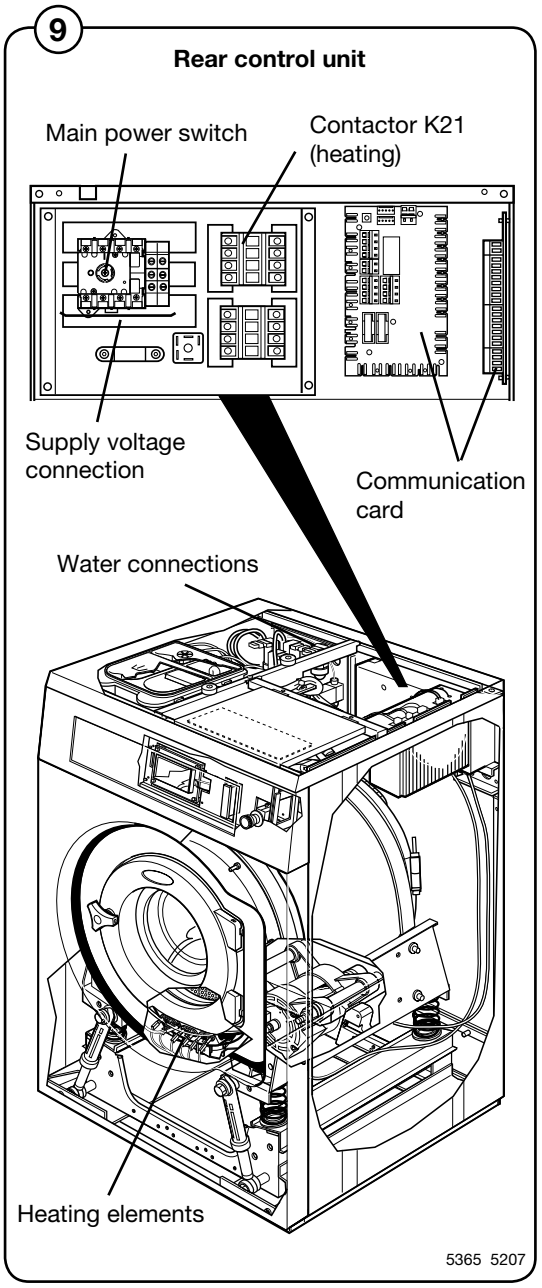
(9) Depending on the machine size and customer specifications, the machine has one, two, three or four inlet valves.

This unit also has eight connections for external detergent supply.

Rear control unit

(9) This unit contains the main power switch and connection block for the input voltage, heating contactor and one or two communication cards with outputs that control the water and drain valves of the machine as well as the heating. There are also connection blocks for connection to e.g., an external detergent supply.

The rear control unit of the machines is described in detail in section **Control unit.**



Detergent compartment

(10) The compartment is divided into four for pre-wash, main wash, rinse and bleaching-agent/ liquid detergent.

The detergent compartment of the machines is described in detail in section **Detergent compartment.**

Drain valve

(10) This valve is a diaphragm valve that opens and closes by way of the water pressure. The control valve is situated next to the water valves.

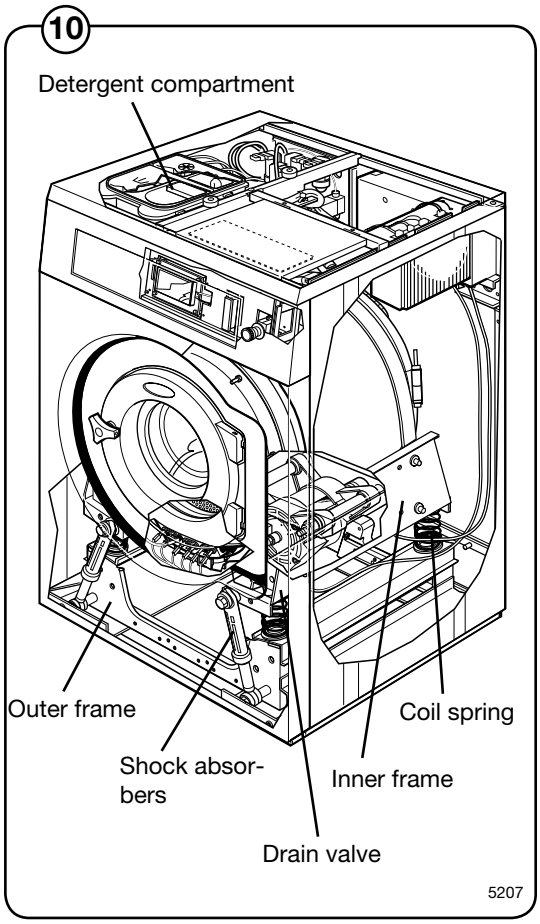
The drain valve of the machine is described in detail in section **Drain valve.**

Frame and dampers

(10) The drum assembly is freely suspended by springs and is allowed to move in relation to the frame. This means a minimum of vibrations are transferred to the frame, which implies simplified installation since the machine need not be placed on a concrete base.

The machine uses four coil springs between the frame and drum assembly. Each spring is fitted to one or two shock absorbers that dampen drum movement.

The machine support is described in detail in section **Frame.**



Troubleshooting

The troubleshooting section is used to pinpoint a fault on the machine to a specific defective component or unit.

If the power supply is interrupted, the programme memory will keep the select programme in its memory for approx. 3-5 minutes.

Within this time period, the machine automatically restarts after the power interruption.

Precautions

Only authorized personnel is allowed to troubleshoot the machine.

Prior to commencing troubleshooting, pay close attention to the precautions in section 1.

If the power is on, be very careful when working on the the machine.

DANGER

Be very careful when measuring the motor controller since all components have a potential difference of about 300 V compared to Ground and Neutral.
When the green LED is lit, all components are powered with dangerous voltage.
When the power supply to the machine is interrupted and the motor has stopped, the motor controller will does lose power until after 10-30 seconds.

Measurements

For information about measurement points, components and voltages, please refer to the wiring diagrams for the machine.

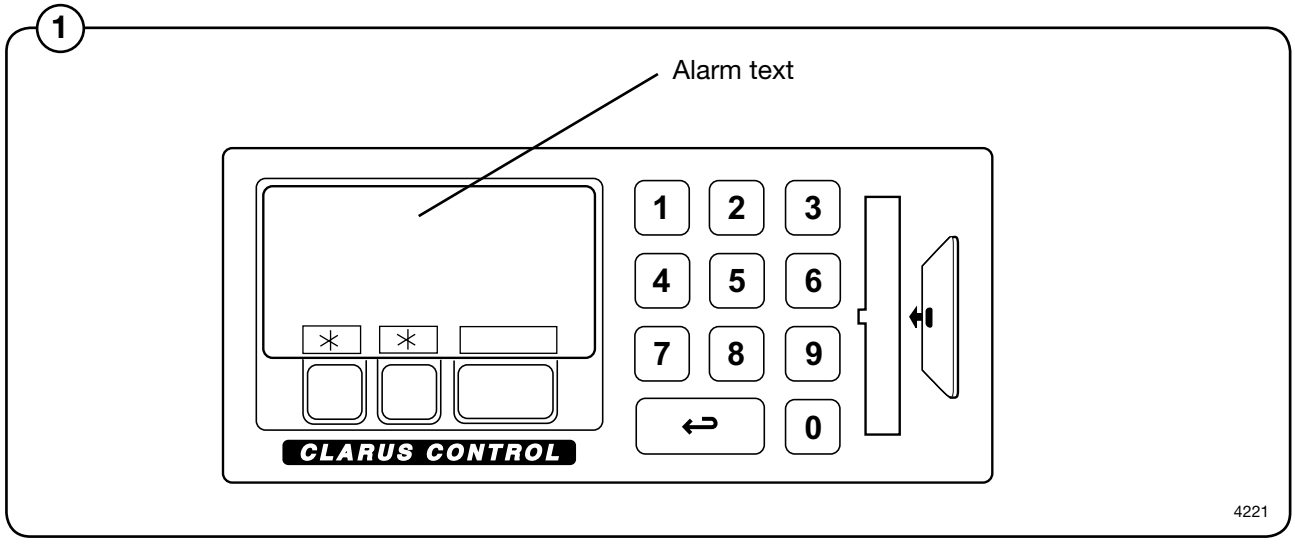
Errors with no error codes

This section includes troubleshooting charts for errors for which no error code is generated.

Errors with error codes

Error indication

(1) Programme or machine errors are indicated by an alarm text in the display window.



Resetting an error indication

Error indications can be reset in two different ways:

(1)
- By pressing START, the error may be temporarily reset. The machine then continuous the programme that was already started.
- By pressing ↩ the error is reset and the started programme is cancelled.

Error codes

A brief summary of all error codes and the possible cause for each error is presented below. Troubleshooting charts for all errors are presented on the following pages.

List of errors, functions monitored and relevant error messages displayed

Error/Function	Error message displayed
01 ERROR. NO WATER Water level has not reached set level within time set. After this error message appears and the machine is reset, the machine will try again.	NO WATER
02 ERROR. OPEN DOOR Signal from microswitch which checks door status absent at program start. After this error message appears and the machine is reset, the machine will try again.	DOOR OPEN
03 ERROR. DOOR LOCK Signal from microswitch which detects when the door is locked absent at program start.	DOOR UNLOCKED
04 ERROR. LOW TEMPERATURE The temperature is below the lowest value allowed (open circuit in temperature sensor).	NTC LOW TEMP
05 ERROR. HIGH TEMPERATURE The temperature is above the highest value allowed (short-circuit in temperature sensor).	NTC HIGH TEMP
06 ERROR. WATER IN MACHINE The water level is higher that the level EMPTY at the start of the program.	WATER IN DRUM
07 ERROR. OVER-FILLED The water level is higher than the ”LEVEL OVERFILL” (i.e. DRUM OVER-FILLED) level. If this function is switched off (=N), instead the drain valve will open for a short time and discharge some of the water. This is described under the function ”DRAIN TIME WHEN OVERFILL” (i.e. DRAIN TIME AFTER OVER-FILLING) earlier in this section.	MACHINE OVER-FILLED
08 ERROR. NO HEAT The temperature has not increased by the number of degrees specified in the function ”MIN. TEMPERATURE INCREASE” (see back in this section), over the period of time specified in the function MAXIMUM HEATING TIME (see ”SETTINGS 1”).	NO HEATING
10 ERROR. REMAINING WATER When the drain sequence has finished, the water level is still higher than the EMPTY level.	NOT DRAINED
11 ERROR. UNBALANCE SWITCH The imbalance switch is closed when the machine is starting on a drain sequence.	UNBALANCE SENSOR FAULT
13 ERROR. MOTOR COMMUNICATION Communication between PCU and motor control unit interrupted or disturbed.	NO MOTOR COMM
14 ERROR. LEVEL ADJUST Every machine has individual level calibration at the factory. If these calibration values are missing or fall outside the limit values, an error warning will be flagged at each program start-up. The program can still be started, however, by pressing START. It will then use standard (default) values, which means that the levels will not be as precise as intended.	LEVEL CALIBRATION

List of errors, functions monitored and relevant error messages displayed, cont.

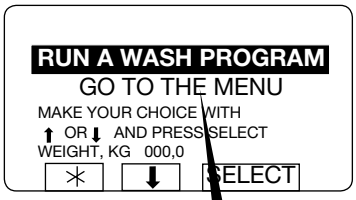
Error/Function	Error message displayed
15 ERROR. EMERGENCY STOP The emergency stop button has been pressed.	EMERGENCY STOP
17 ERROR. DOOR LOCK SWITCH Even though the door lock microswitch indicates that the door is locked, the signal from the microswitch which is used to detect when the door is closed is absent.	DOOR LOCK
18 ERROR. START NOT ALLOWED Network does not allow programme start.	START NOT ALLOWED
19 ERROR. MIS COMMUNICATION Machine has lost contact with network.	MIS COMMUNICATION
20 ERROR. EWD INTERLOCK The motor control system for frequency-controlled motors (EWD) receives a signal direct from the door lock which indicates that the door really is closed. If this signal is lost, a fault signal is sent to the PCU	INTERLOCK STATUS
21 ERROR. I/O COMMUNICATION Communication between the CPU board and one of the I/O boards interrupted or disturbed.	I/O COMMUNICATION
22 ERROR. LOW OIL LEVEL In machines with an oil lubrication system, indicates low level in the oil container.	LOW OIL LEVEL
23 ERROR. LOW OR HIGH VOLTAGE Incorrect input voltage/power supply (voltage too low or too high, phase fault etc.) to the motor control unit.	PHASE
27 ERROR. LEVEL OFFSET The pressure sensor for the water level signals a value that is so different from the empty machine state that the automatic level calibration cannot adjust the level system.	AUT. LEVEL CALIB.

List of errors, functions monitored and relevant error messages displayed, cont.

Error/Function	Error message displayed
ERROR CODES FROM MOTOR This function includes a number of error warnings from the motor control system for frequency-controlled motors (EWD)	
31 Temperature of MCU control circuits too high	HEAT SINK TOO HOT
32 Motor thermal protection has tripped	MOTOR TOO HOT
33 The motor has received a start command from the PCU without receiving an interlock signal from the door lock. The MCU receiving circuitry for the interlock signal is not faulty	NO INTERLOCK
35 Short-circuit between motor windings or to earth.	MOTOR SHORTNING
36 Fault in MCU receiving circuitry for lock acknowledgement signal.	INTERLOCK HARDWARE
37 DC voltage too low	LOW DC VOLTAGE
38 DC voltage too high	HIGH DC VOLTAGE
39 DC level varying too much	RIPPEL ON DC BUS
40 One phase missing for/at motor control unit	LINE INTERRUPT
41 Hardware fault, temperature monitoring, motor	KLIXON CIRCUITS
42 The motor controller (MCU) (inverter) contains several different parameter sets for different motors. During power up the timer checks that the correct parameter set digit is written into the MCU. If not, the timer will write down the parameter set digit defined in fixed config. If the MCU discovers that no parameter set value is written down into the MCU, the error coce will be displayed.	NO PARAM. SET IN MCU

Service programme

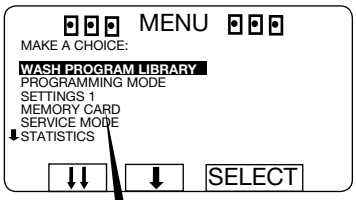
Opening the service programme



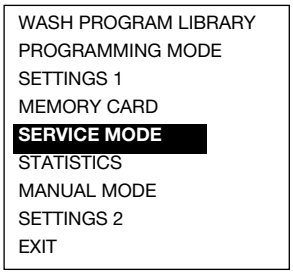
If this menu is not currently displayed:
Press ↩ repeatedly.

Press ↓ to highlight "GO TO THE MENU".

SELECT **Press SELECT.**



Press ↓ four times.



... to highlight "SERVICE PROGRAM".

SELECT **Press SELECT.**

The service program

The service program makes fault-finding on the machine easier, as it allows you to control the various machine functions individually:

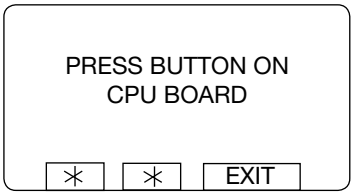
- water filling
- detergent flushing
- motor rotation, clockwise and counterclockwise
- motor action, distribution and extraction
- drain
- door lock
- heating
- buzzer

You can also check which input signals to the PCU are activated:

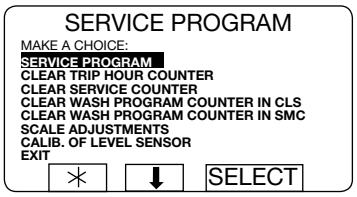
- emergency stop
- remote start
- oil lubrication
- service
- repeat rinse
- phase check
- door locked
- door closed
- imbalance

The following values will also be displayed at all times:

- water level in machine
- water temperature
- motor speed
- whether drain is open or closed



Press the button on the CPU circuit board.

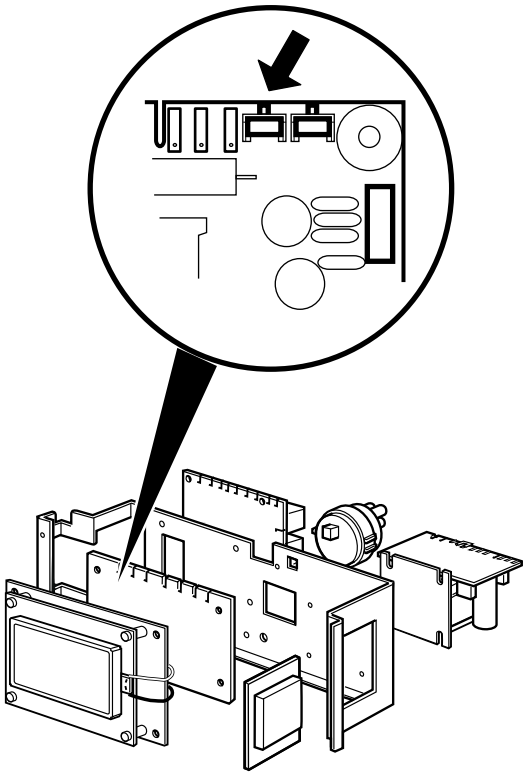


To access the service program:

SELECT **Press Select.**

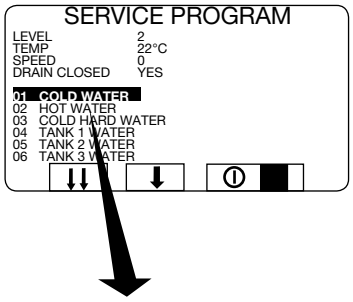
To prevent unauthorised or accidental use

Unauthorised or accidental use of the service program is prevented by requiring the user to locate and press the button on CPU board.



6675, 5227

To control the machine functions



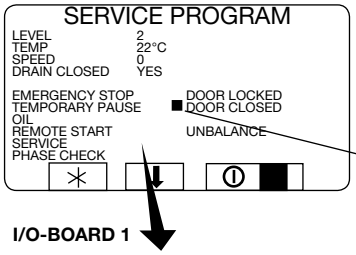
01 COLD WATER
02 HOT WATER
03 COLD HARD WATER
04 TANK 1 WATER
05 TANK 2 WATER
06 TANK 3 WATER
07 FLUSH
10 DETERGENT POWDER 1
11 DETERGENT POWDER 2
12 DETERGENT POWDER 3
13 DETERGENT POWDER 4
14 DETERGENT POWDER 5
17 LIQUID DETERGENT 1
18 LIQUID DETERGENT 2
19 LIQUID DETERGENT 3
20 LIQUID DETERGENT 4
21 LIQUID DETERGENT 5
22 LIQUID DETERGENT 6
23 LIQUID DETERGENT 7
24 LIQUID DETERGENT 8
25 LIQUID DETERGENT 9
26 LIQUID DETERGENT 10
27 LIQUID DETERGENT 11
28 LIQUID DETERGENT 12
29 LIQUID DETERGENT 13
33 MOTOR CLOCKWISE
34 MOTOR COUNTERCLOCKWISE
35 DISTRIBUTION
36 LOW EXTRACT
37 MEDIUM EXTRACT
38 HIGH EXTRACT
39 TURBO EXTRACT
40 NORMAL DRAIN
41 DRAIN BLOCKING
42 RECYCLE DRAIN A
43 RECYCLE DRAIN B
44 RECYCLE DRAIN C
45 RECYCLE DRAIN D
49 OIL (PULS)
51 DOOR LOCK
55 HEAT
56 HEAT 2 AS STANDARD
64 BUZZER
EXIT

To activate the various machine functions:

Use ↓ or ↑ to highlight the function. Press ⏻ to switch the function on and off.

I/O card inputs

1 **Press 1.**



Now you can check the various input signals from I/O board 1.

A black square in front of the name indicates that the input is active.

I/O-BOARD 1

EMERGENCY STOP
TEMPORARY PAUSE
OIL
REMOTE START
SERVICE
PHASE CHECK
DOOR LOCKED
DOOR CLOSED
UNBALANCE

Press any key to go back to the previous display.

When the programme unit has two I/O cards:

2 **Press 2.**

I/O-BOARD 2

CHANGE HEATING SYSTEM
REPEAT RINSE

It is now possible to verify the various input signals from I/O card 2.

Press any key to go back to the previous display.

To end the service programme

End the service programme by pressing ↩.

Errors with no error codes

No indication in the display window (machine not responding or operates apart from this).

If the power is on, be very careful when working on the the machine.

Verify that:

- the machine receives power.
- the machine has not been emergency stopped.

(2) (3) • the red LEDs on the programme unit card and the I/O card light steadily. (Verify through measurement that X3:1 - 2 at A11 is 16 V. If not, troubleshoot the voltage supply circuit.)

- verify that the green LEDs on the programme unit card and the I/O card blink quickly.

(4) • verify the fuses F11 and F12 (T 1.25 A) on the communication card A21. Replace burnt-out fuses.

1. Perform a communication test using the test box. Refer to the manual "Instructions for Clarus Communication Tests".

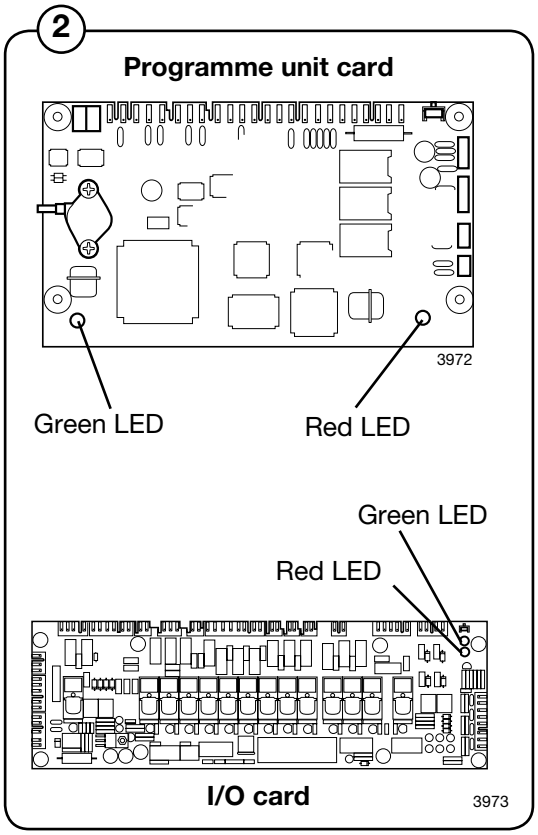
OK LED on test box

The display or display cable is probably defective.

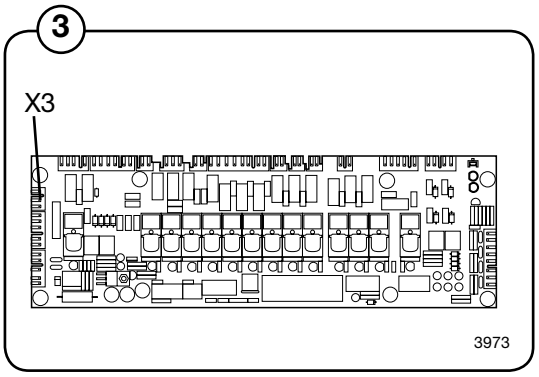
Defective LEDs on test box

Troubleshoot according to the manual "Instructions for Clarus Communication Tests".

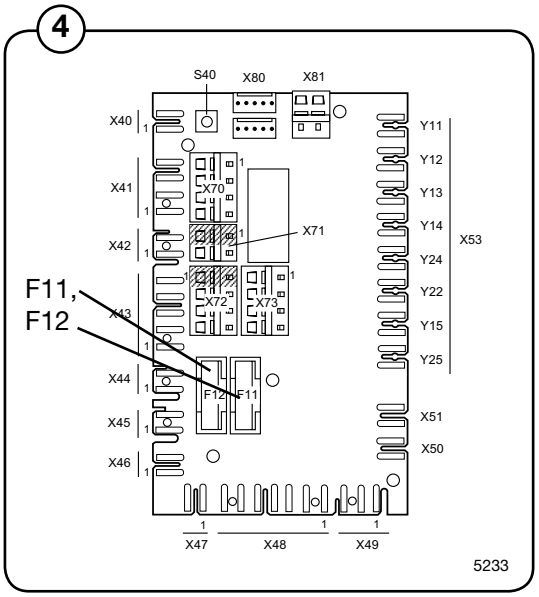
(2)



(3)



(4)



Errors with error codes

NO WATER

The water level has not reached the selected level within the given time. Following an alarm and subsequent, the machine will make a new attempt.

First verify that:

- the programme unit was not incorrectly programmed
- the inlet filter is not blocked
- all water faucets are open
- the drain is not leaking
- Reset the error code. Continue with troubleshooting if the error code appears again.

(5) **1. Enter the service programme and the activate water valves on the machine, one after the other.**

All valves fill up with water

One of the valves does not fill up with water

2. Activate the defective valve in the service programme and measure the voltage (230 V) at the water valve.

No voltage

Voltage OK

The valve is probably defective.
Verify and remedy

(5) **3. Depending on the valve, measure the supply voltage (230 V) of the water valve at switch X9 on I/O card 1, A11.The relay functions can also be verified using the LEDs on I/O card 1.**

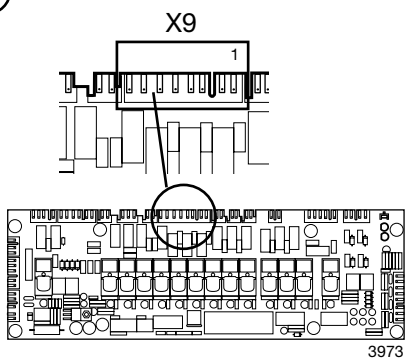
No voltage

Voltage OK

Defective cables between the communication card A11 and the water valve, or defective programme unit card A1.
Verify and remedy.

Probably defective control output from the programme unit card A1 or I/O card 1 A11.

(5)



Valve		Switch	Relay
Y11	cold/warm compartment 1	X9:7	4
Y12	cold/warm compartment 2	X9:6	5
Y13	cold/warm compartment 3	X9:5	6
Y15	cold mix box	X9:4	7
Y22	warm compartment 2	X9:2	8
Y25	warm mix box	X9:1	9
Y14/24	cold/warm compartment 4	X9:3	10

Continued on next page

Continued from previous page

5. Activate (close) the drain valve in the service programme. Activate another of the water valves and verify the drain valve function.

Drain valve OK

Drain valve defective

Troubleshoot the drain valve according to the instructions under error code **WATER IN DRUM** later in this troubleshooting section.

(6) **6. Verify that the level hose is not damaged, bent, blocked and has not come lose from the T-joint, drum, programme unit card A1 or level guard B2.**

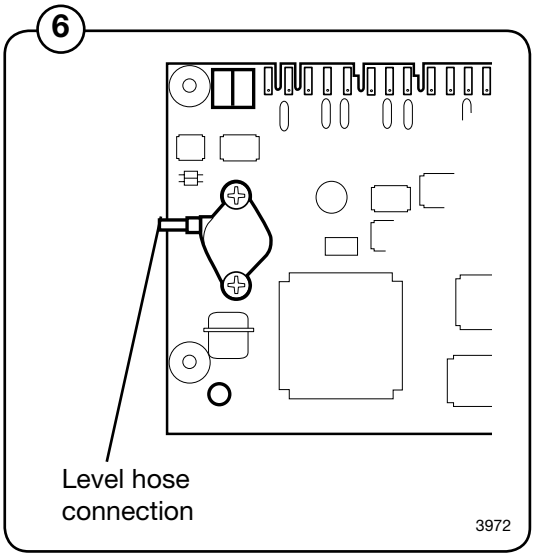
Level hose OK

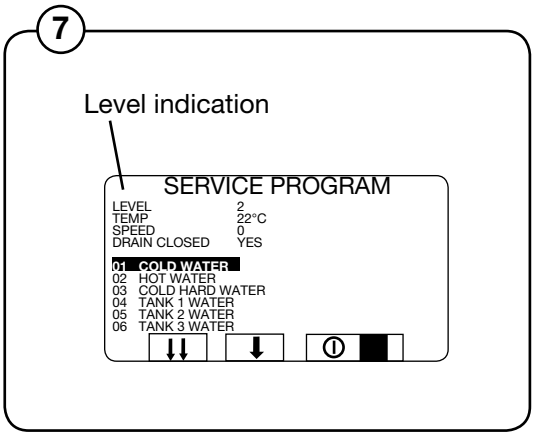
Defective level hose

Fit the hose correctly or replace it.

(7) Level detector on programme unit card A1 probably defective.

- Enter the service programme and verify that the level indication is stable.
- Blow into the level hose and check the level indication increases.
- Check the level system for leakage.





DOOR OPEN

No signal from the ”Door closed” during programme operation. If the input signal for ”Door closed” is lost during programme operation, the OPEN DOOR error code is immediately generated.

If the power is on, be very careful when working on the the machine.

1. Try to restart the machine (i.e. reset the error code) by pressing START.

Error message returns

No error message

Temporary error (probably defective contact)

(8) **2. Exit the programme using ↩. Enter the service programme (unlock the door if it is locked). Verify voltage supply is present between X5:4 - 5 when the door is closed.**

(9) No voltage

Voltage present but black square does not light

I/O card 1 A11 probably defective.

3. Verify voltage is present between X5:3 - 5.

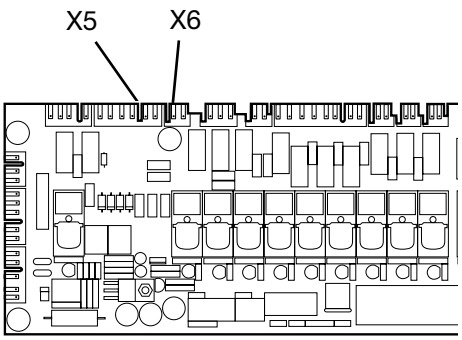
Voltage present

No voltage

Troubleshoot the cabling for the voltage supply (between the main power switch Q1 and X6).

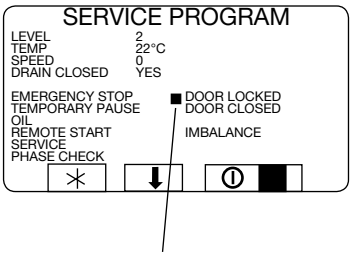
Continued on next page

8



3973

9



Indication **Door locked**

5390

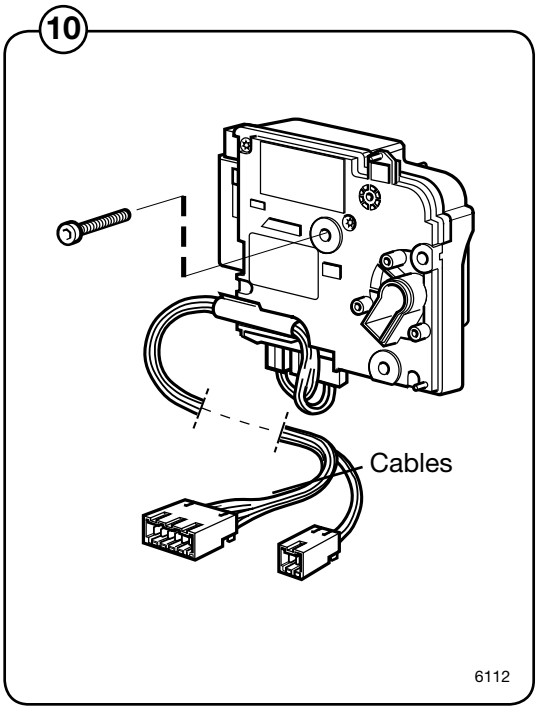
Continued from previous page

(10) **4. Disassemble the door lock and verify the function of S3 using an ohm meter.**

Correct function

Incorrect function

Change Door lock.



DOOR UNLOCKED

No signal from the ”Door locked” during programme operation.

If the input signal for the "Door locked" is lost during programme operation, the "DOOR UNLOCKED" error code is immediately genrerated.

At programme start, this error code is suppressed for a few seconds.

If the power is on, be very careful when working on the the machine.

1. Try to restart the machine (i.e. reset the error code) by pressing START.

Error message returns

No error message

Temporary error in the door lock or programme unit

(11) **2. Exit the programme using ⏎. Enter the service programme and verify that there is voltage between X5:2 - 6 when the door lock is engaged.**

(12) No voltage

Voltage present but black square does not light

I/O card 1 A11 probably defective

3. Verify that there is voltage supply between X5:1 - 5 when the door lock is switched on.

Voltage present

No voltage

Troubleshoot the cabling for the voltage supply (between the main power switch Q1 and X6).

(13) **4. Is the lock command present? Measure X:92 on the door lock controller.**

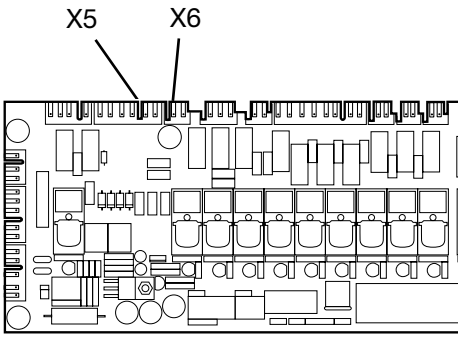
Yes

No

Troubleshoot according to the error codes in section 29.

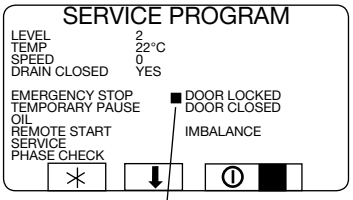
Troubleshoot cabling between X5 and the actuator/door lock. The actuator/door lock could be defective.

11



3973

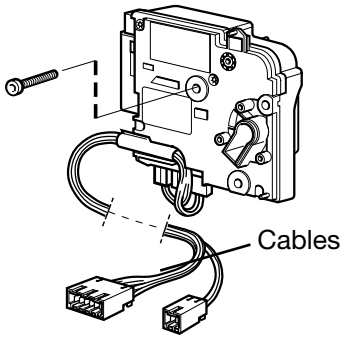
12



Indication **Door locked**

5390

13



6112

NTC LOW TEMP

The programme unit indicates an interruption with the temperature sensor or the temperature is below -5 °C.

Try to restart the machine (i.e. reset the error code) by pressing START.

(14) **1. Undo the temperature sensor connections and measure the resistance of the sensor. The resistance should be as in the table below:**

Approximate values for a fully functional temperature sensor

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

Resistance OK — Incorrect resistance

The temperature sensor is probably defective.

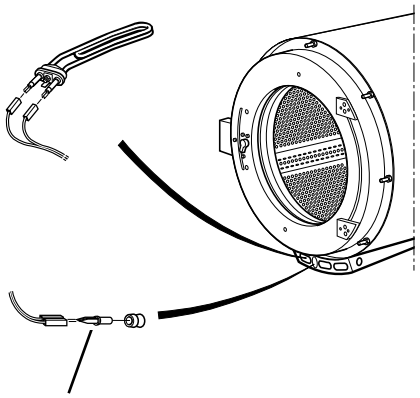
(15) **2. Exit the programme using ⮌. Enter the service programme and read the temperature (the display window shows 0°C). Short-circuit inputs 1 and 2 on**
(16) **card switch X1. Verify that the display window shows 100°C.**

Yes — No

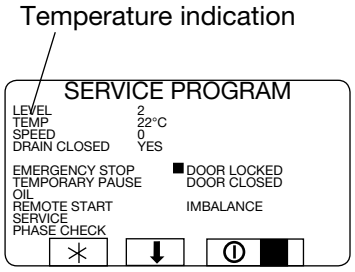
Incorrect temperature sensing on the programme unit card. Replace the card.

Incorrect cabling to the . Verify and replace if necessary.

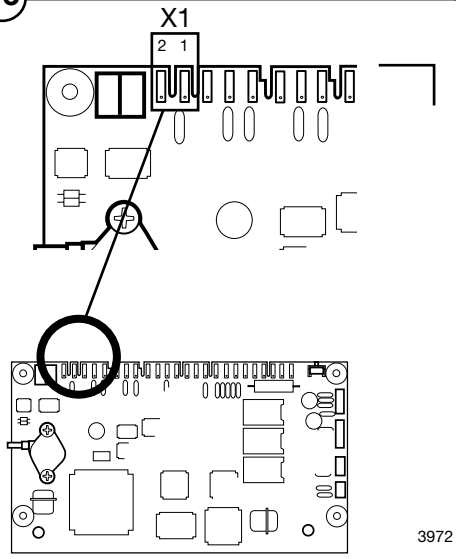
(14)



(15)



(16)



NTC HIGH TEMP

The programme unit indicates a short-circuit with the temperature sensor or the temperature exceeds 98°C.

Try to restart the machine (i.e. reset the error code) by pressing START.

(17) **1. Undo the temperature sensor connections and measure the resistance of the sensor. The resistance should be as in the table below:**

Approximate values for a fully functional temperature sensor	
T (°C)	R (ohm)
19	6100
20	5850
21	5600
22	5350
23	5100

Resistance OK

Incorrect resistance

The temperature sensor is probably defective.

(18) (19) **2. Reset the connection on the sensor and exit the programme using ⏎. Enter the service programme and read the temperature. Disconnect one of the inputs 1 and 2 on card switch X1. Verify that the display window shows 0°C.**

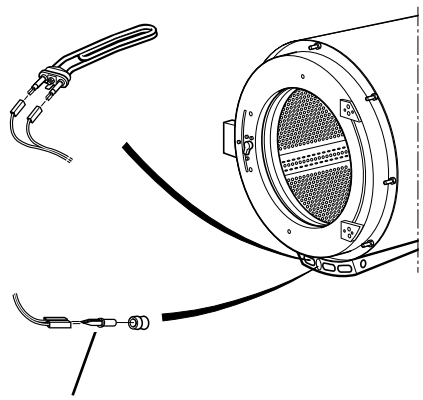
Yes

No

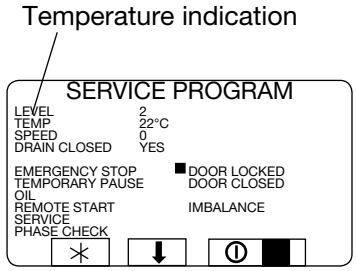
Incorrect temperature sensing on the programme unit card.

Incorrect cabling to the temperature sensor. Verify and replace if necessary.

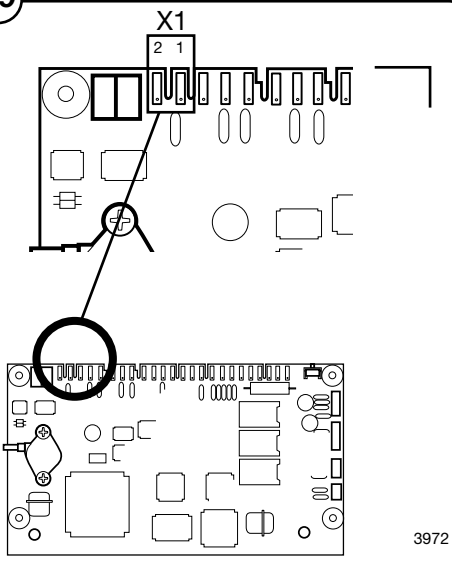
(17)



(18)



(19)



WATER IN DRUM

The water level is higher than EMPTY at programme start.

First verify whether:

- the same error appears again following resetting of the error code
- the drain is blocked by fluff or foam
- the level hose and air box are blocked (blow into the level hose)
- For machines with a drain pump, verify correction operation.

Pay attention to temperature extremes in the surrounding which may affect the level system, generating this error code.

1. Verify whether there is any water in the drum.

Water in drum

No water in drum

2. Enter the service program and record the actual level value. Disconnect the level hose from the programme unit card A1.

(20)

(21)

Level value does not change

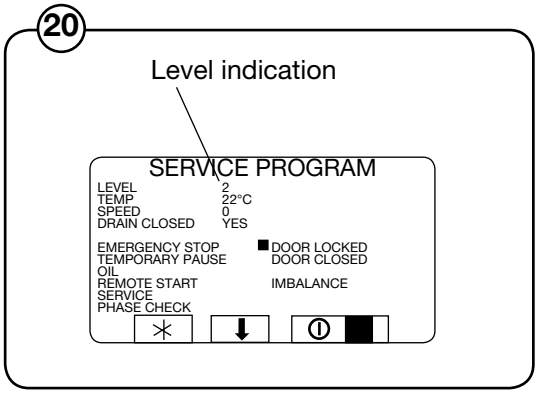
Level value falls

The level hose is probably blocked by fluff or due to incorrect installation. Verify and clean, or replace the hose.

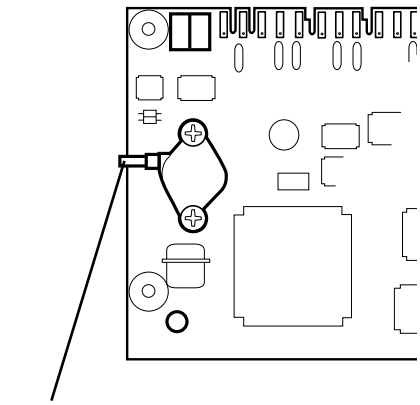
Level detector on programme unit card A1 is defective.

Verify the operation of the drain valve using the service programme. Remedy or replace the defective drain valve if necessary.

(20)



(21)



MACHINE OVERFILLED

The water level is above the level for OVER-FILLED MACHINE. If this function is switched off (=N) the drain valve will open instead for a short while to drain some of the water.

If the power is on, be very careful when working on the the machine.

Try to restart the machine (i.e. reset the error code) by pressing START.
If the error returns, first make sure that:

- the level hose and air box are not blocked (blow into the level hose)
- that none of the water valves has locked (i.e. poured in continuously).

1. Visually inspect. Is there too much water in the machine?

No

Yes

Exit the programme and drain the machine.

(22) **2. Exit the programme using ⏎. Enter the service programme and record the actual level value. Undo the**

(23) **level hose from the programme unit and verify whether the level falls.**

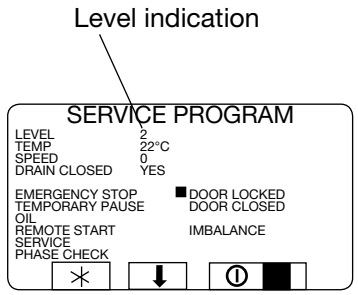
No

Yes

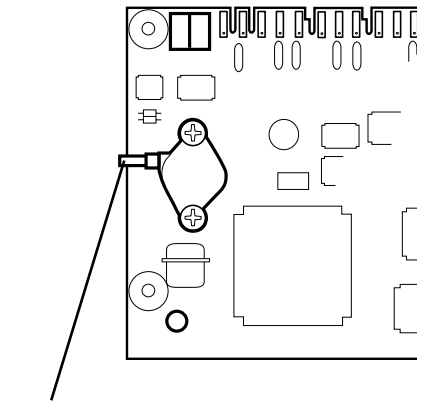
Inspect the level system (hoses, nipples and air box).

3. Inspect whether the level input on the programme unit is blocked. If this is not the case, the the programme unit is probably defective.

(22)



(23)



NO HEATING

The temperature has not increased the number of degrees specified in the function MIN ALLOWABLE TEMPERATURE INCREASE (see settings 2) during the time that is programmed in the function MAXIMUM HEATING TIME (Configuration 1).

If the power is on, be very careful when working on the the machine.

Try to restart the machine (i.e. reset the error code) by pressing START.
If the error returns, first make sure that:

- the programme module is not incorrectly programmed
- the heat supply is intact (all phases OK and the steam or gas boiler is operating)
- the drain does not leak.

1. Exit the programme using ⏎. Enter the service programme and fill up water to above the safety level (5-10 cm above the lower edge of the inner drum). Switch on the heating. Does the heat contactor go high?

Yes

No

Troubleshoot the operating circuits of the contactor

(24) **2. Measure the operating voltage across each element.**

No voltage

Voltage present

3. Use a clip-on ammeter and verify that all phases draw current (6 - 25 A depending on the element rating) or, alternatively, switch off the voltage with the wall-mounted power switch and measure the resistance of the elements, which should be 20 - 25 ohms (2.5 kW) or 40 - 50 ohms (1 kW).

Resistance OK

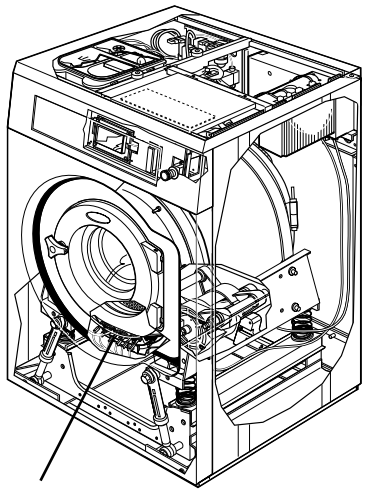
Inspect the elements for lime deposits. Decalcify if necessary

Incorrect resistance

Replace the defective element

4. Troubleshoot the voltage supply circuit for the elements.

(24)



Element connectors

5207

NOT DRAINED

The water level exceeds EMPTY at wash program start.

Try to restart the machine (i.e. reset the error code) by pressing START. If the error returns, first verify these items:

- Is the drain is blocked by fluff or foam?
- Are the the level hose and air box blocked (blow into the level hose)?
- For machines with a drain pump, verify correction operation.
- Does water run out when the power switch on the machine is switched off?
- Verify the operation of the drain using the service programme.
- Is the drain in the room capable of receiving the water from the machine?

UNBALANCE SENSOR FAULT

The imbalance switch is closed during program start.


If the power is on, be very careful when working on the the machine.

Try to restart the machine (i.e. reset the error code) by pressing START.
If the error returns, troubleshoot as follows:

Verify:

- the mechanical function of the imbalance switch
- the resistance between the imbalance switch and the cabling.

If the error remains, there is probably an internal error in the motor controller.

NO MOTOR COMM.

Communication between the programme unit and the motor controller has been interrupted or interfered.


If the power is on, be very careful when working on the the machine.

Try to restart the machine (i.e. reset the error code) by pressing START.
If the error returns, troubleshoot as follows:

1. Perform a communication test using the test box. Refer to the manual ”Instructions for Clarus Communication Tests”.

OK LED on test box

Defective LEDs on test box

Troubleshoot according to the manual ”Instructions for Clarus Communication Tests”.

The motor controller or cabling for the motor controller is probably defective.

Check the fuses in the Protection Cable.
If one of the components in the Protection Cable is damaged, the cable must be replaced.

LEVEL CALIBRATION

The water level system has not been correctly calibrated.

Each machine has been individually level adjusted at the factory. If the calibration values are missing or outside the limits, an error is generator at programme start. The programme can, however, be started by pressing START once more. In this case the standard values are used and the level swill not be as exact.

Carry out programming anew and make sure the calibration values are within the allowed limits.

EMERGENCY STOP

The emergency stop button was pressed.


If the power is on, be very careful when working on the the machine.

Find out the reason for the emergency stop button having been pressed.

Take the necessary measures.

Reset the emergency stop button by turning it counter-clockwise.

Restart the machine by pressing START or ⏎.

DOOR LOCK

The signal from the ”Door locked ” switch is present although there is no signal from the ”Door closed” switch.

This error code can only be generated prior to programme start.

If the power is on, be very careful when working on the the machine.

Try to restart the machine (i.e. reset the error code) by pressing START.
If the error returns, troubleshoot as follows:

(25) **1. Undo the card connection X5 on I/O card 1, A11**

Error message returns

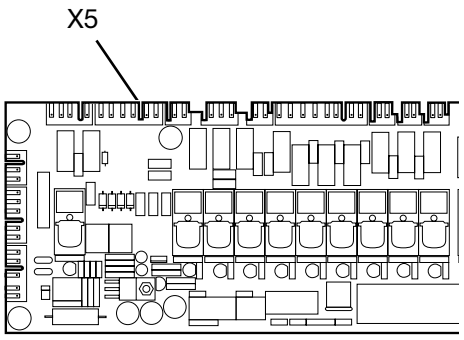
(26)

I/O card A11 probably defective.

No error message

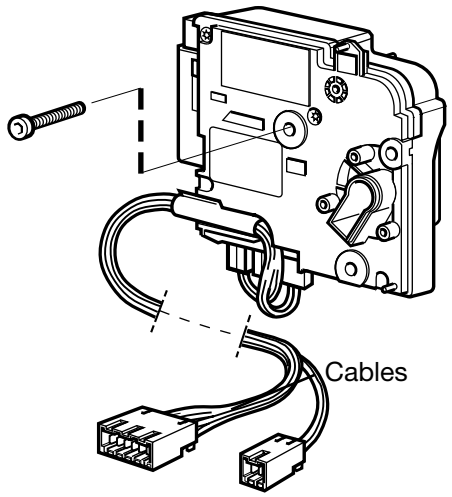
Troubleshoot the door lock and the cabling for electric or mechanical short-circuit.

(25)



3973

(26)



6112

START NOT ALLOWED

The network does not allow start of the washing programme.

Try to reset the error code.

If the error remains, contact the responsible person for the network and have the error fixed.

MIS COMMUNICATION

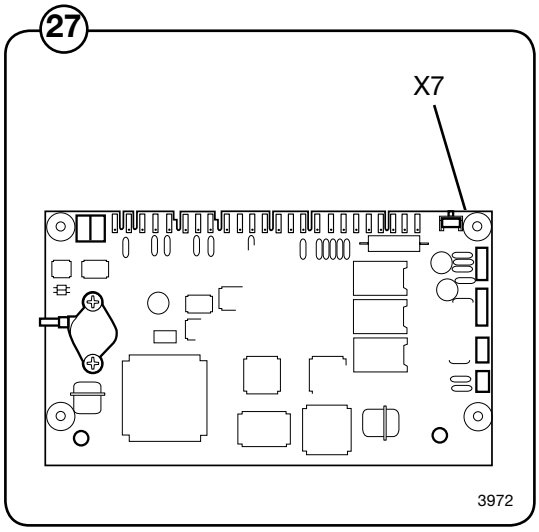
Communication between the programme unit card A1 and the network has been interrupted.

If the power is on, be very careful when working on the the machine.

Try to restart the machine (i.e. reset the error code) by pressing START.
If the error returns, troubleshoot as follows:

(27) Verify that the cable between the network and X7 on programme unit card A1 is connected.
If the cable is properly connected, contact the person responsible for the network.

Note!
This error code will disappear by itself after several programme starts. In case communication has been interrupted intentionally, the machine can be operated with no further intervention required.



INTERLOCK STATUS

The motor controller does not receiving an interlock signal during programme operation.

If the power is on, be very careful when working on the the machine.

Switch off the machine for at least 30 seconds to ensure the motor controller has been completely reset. Then try to start the machine again. If the error returns, troubleshoot as follows:

(28) **1. Measure the interlock signal on the motor controller U1:X302.**

No signal

Signal OK

Troubleshoot the motor controller.

(29) **2. Measure the signal on the I/O card 1 interlock bus A11:X10.**

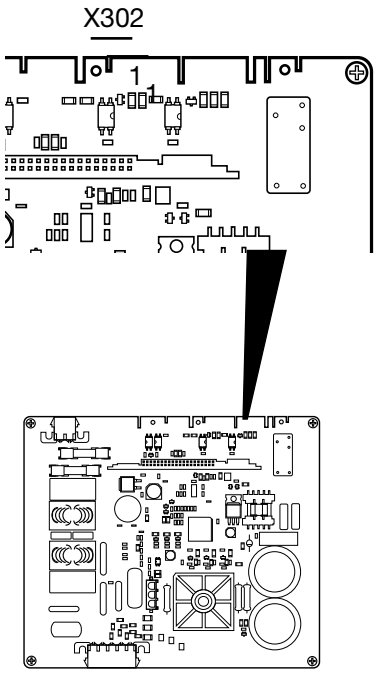
No signal

Signal OK

Troubleshoot the cabling between the motor controller and programme unit. Inspect the cabling and replace if necessary.

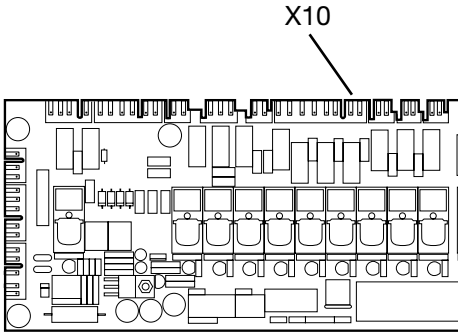
Troubleshoot the interlock circuits.

28



5181

29



3973

IO COMMUNICATION

Communication between programme unit A1 and one of the I/O cards has been interfered with or interrupted, or incorrect configuration of the I/O cards.


If the power is on, be very careful when working on the the machine.

Try to restart the machine (i.e. reset the error code) by pressing START.
If the error returns, troubleshoot as follows:

1. Perform a communication test using the test box. Refer to the manual ”Instructions for Clarus Communication Tests”.

OK LED on test box

Defective LEDs on test box

Troubleshoot according to the manual ”Instructions for Clarus Communication Tests”.

The motor controller or cabling for the motor controller is probably defective.

LOW OIL LEVEL

Low oil level in the oil container. Applies only to machines with oil lubrication.

Fill up with oil and restart the machine.

Verify for any leaks.

PHASE

Alarm from the mains monitoring equipment.

An input on I/O card 1 (X16:7-8) can be connected to external equipment that monitors received mains signals in terms of voltage levels, loss of phase, etc. If this input goes high, the error message is displayed.

Find out the reason for the error indication by inspecting the mains monitoring equipment.

For more on this troubleshooting, refer to the manual supplied with the mains monitoring equipment in use.

AUT. LEVEL CALIB.

The pressure sensor for the water level signals a value that is so incorrect when the machine is empty that automatic level calibration of the level system is not possible.

If the power is on, be very careful when working on the the machine.

Try to restart the machine (i.e. reset the error code) by pressing START.
If the error returns, troubleshoot as follows:

(30) **1. Verify the level indication in the service programme when the drum is empty. Does the level indication exceed the set limit value?**

Yes

Temporary error.

No

2. Try to restart a washing programme again.

No error code

Error remains

The level hose is probably blocked.
Replace or clean the level hose.

(31) **3. Undo the level hose from the programme unit card A1. Does the level indication still exceed the set limit value?**

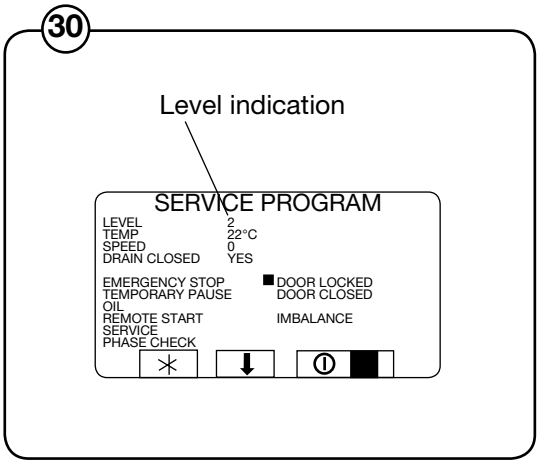
Yes

The programme unit card A1 is probably defective.

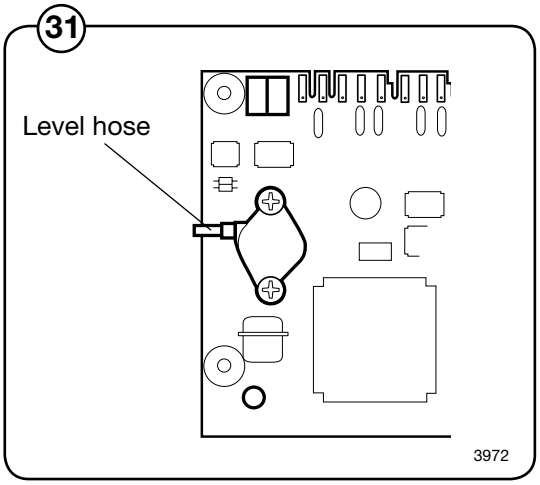
No

The level hose is probably blocked.
Replace or clean the level hose.

(30)



(31)



HEAT SINK TOO HOT

The motor controller indicates too high a temperature at the heat dissipator.

This error code appears if the external temperature has been very high. It his has been the case, lower the temperature by e.g., ventilation the room.

If the power is on, be very careful when working on the the machine.

First verify that:

- the machine is not overloaded
- the machine is not covered
- any fan for the motor controller operates correctly
- the motor controller heat dissipator is not blocked by dust
- the motor controller LEDs do not indicate and error (see the description of the motor controller in section 30).

Switch off the machine for at least 30 seconds to ensure the motor controller has been completely reset. Then try to start the machine again. If the error returns, troubleshoot as follows:

1. Verify that the drum and motor operate smoothly.

Drum/motor OK

Heavy operation of the drum/motor

Defective bearings in drum or motor, or there is an object between the outer and inner drum. Inspect and remedy.

2. Enter the service programme. Run the motor at different washing revolutions, clockwise and counter-clockwise. Verify that no noise can be heard from the drum/motor.

Drum/motor OK

Noise from drum/motor

Defective bearings in drum or motor, or there is an object between the outer and inner drum. Inspect and remedy.

The motor controller is probably defective.

MOTOR TOO HOT

The motor controller indicates the thermal protector of the motor has triggered.

If the power is on, be very careful when working on the the machine.

First verify that:

- the machine is not overloaded
- the ventilation openings of the machine are blocked
- the external temperature is very high
- the motor is not abnormally warm.

Switch off the machine for at least 30 seconds to ensure the motor controller has been completely reset. Then try to start the machine again. If the error returns, troubleshoot as follows:

1. Switch off the machine and verify that the drum and motor operate smoothly.

Drum/motor OK

Heavy operation of the drum/motor

Defective bearings in drum or motor, or there is an object between the outer and inner drum. Inspect and remedy.

2. Wait for at least 10 minutes to allow the motor to cool down. Then switch on the machine again. Enter the service programme and run the motor at low washing revolutions. Verify whether the error indication immediately returns.

No error indication

Immediate error indication

(32)

3. Switch off the machine. Undo the contactor at X3 on the motor. Use an ohmmeter to measure the resistance in the between the contactor and the motor between X3:7 - 9.

Contact

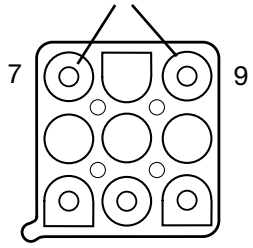
Interruption

Thermal protector of motor interrupted. Replace the motor.

Continued on next page

(32)

Measure the resistance between pins 7 and 9



Contactor X3, female towards motor

5420

Continued from previous

(33) **4. Replace X3. Remove the contactor X312 and measure the resistance of the contactor with the motor cabling between X312:4 - 5.**

Contact

Interruption

Defective cabling between motor controller and motor. Inspect the cabling and replace if necessary.

Internal error in the thermal sensor of the motor controller detector.

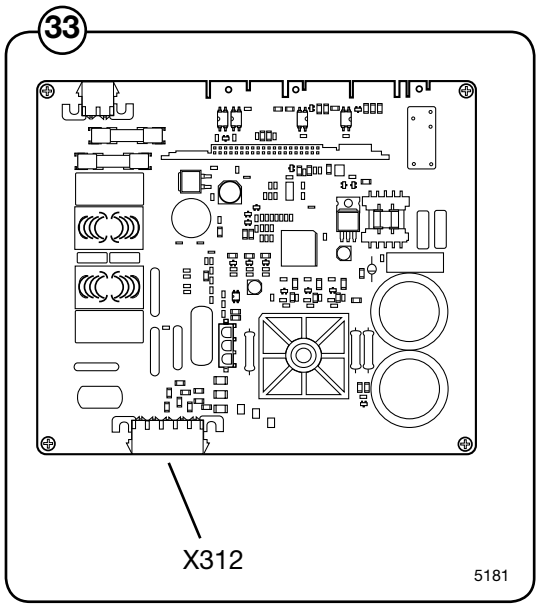
(34) **5. Switch of the wall-mounted power switch. Undo the contactor at X3 on the motor. Use an ohmmeter to measure the resistance towards the motor. Measure between 1-2, 1-3, and 2-3.**

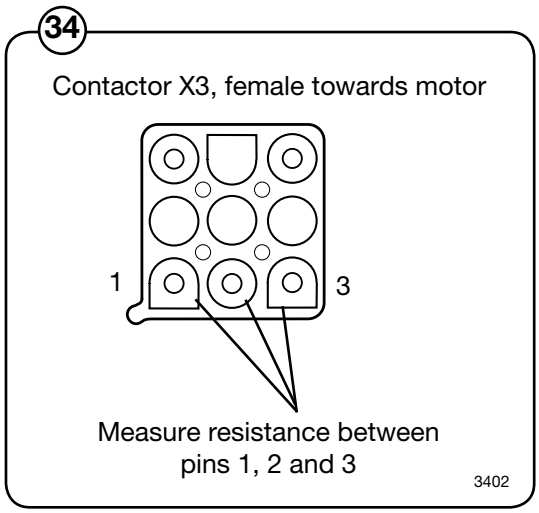
Correct resistance

One of the resistance values is incorrect

The motor is probably defective.

Troubleshoot the cabling between the motor and motor controller.





NO INTERLOCK

The motor controller received the rotation command from the programme unit but receives no interlock ACK (”Door locked” signal).

If the power is on, be very careful when working on the the machine.

Switch off the machine for at least 30 seconds to ensure the motor controller has been completely reset. Then try to start the machine again. If the error returns, troubleshoot as follows:

(35) **1. Measure the interlock signal on the motor controller U1:X302.**

No signal

Signal OK

Troubleshoot the motor controller.

(36) **2. Measure the signal on the I/O card 1 interlock bus A11:X10.**

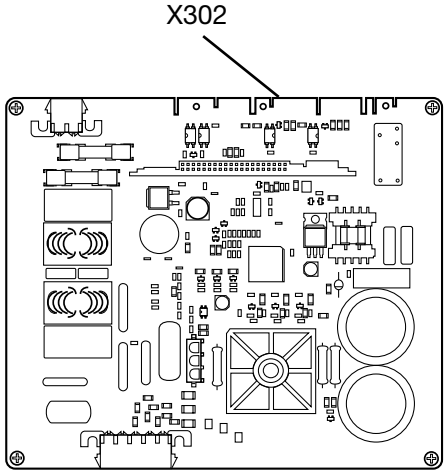
No signal

Signal OK

Troubleshoot the cabling between the motor controller and programme unit. Inspect the cabling and replace if necessary.

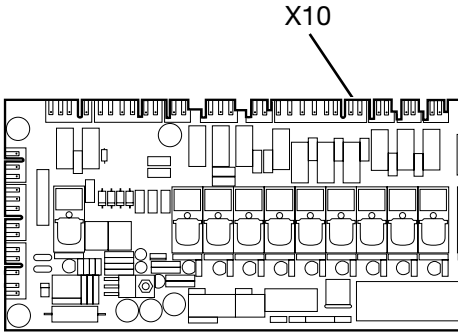
Troubleshoot the interlock circuits.

35



5181

36



3973

MOTOR SHORTNING

The motor controller indicates a short-circuit in the motor windings, cabling or internally in the motor controller.

If the power is on, be very careful when working on the the machine.

Switch off the machine for at least 30 seconds to ensure the motor controller has been completely reset. Then try to start the machine again. If the error returns, troubleshoot as follows:

(37) **1. Switch off the machine. Undo the contactor at X3 on the motor. Use an ohmmeter to measure the resistance towards the motor. Measure between 1-2, 1-3, and 2-3.**

Correct resistance

One of the resistance values is incorrect

The motor is probably defective.

(38) **2. Inspect the cabling from X312 on the motor controller to X3 on the motor. Use an ohmmeter and measure the five leads as follows:**

X312:	**1**	**2**	**3**	**4**	**5**	
X3:	**1**	**2**	**3**	**7**	**9**	**(X3:4 - 6, 8 not used)**

Also measure the five leads to be sure there is no short-circuit between any two leads.

Cabling OK

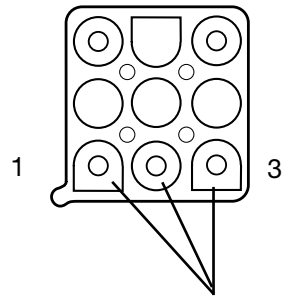
Incorrect cabling

Inspect the cabling and replace if necessary.

The motor controller output is defective.

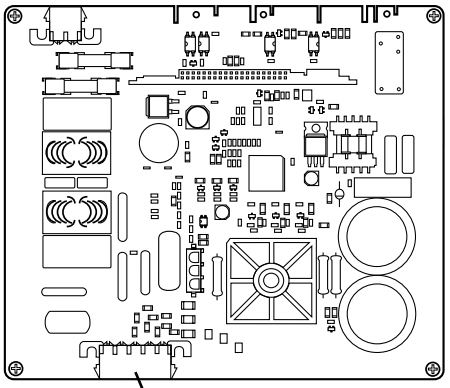
37

Contactor X3, female towards motor



Measure resistance between pins 1, 2 and 3

38



X312

5181

INTERLOCK HARDWARE

The motor controller indicates an error in the interlock receiving circuit.


If the power is on, be very careful when working on the the machine.

Switch off the machine for at least 30 seconds to ensure the motor controller has been completely reset. Then try to start the machine again.

If the error returns, the motor controller is probably defective.

LOW DC VOLTAGE

The motor controller indicates the DC level is too low.

If the power is on, be very careful when working on the the machine.

Switch off the machine for at least 30 seconds to ensure the motor controller has been completely reset. Then try to start the machine again. If the error returns, troubleshoot as follows:

(39) **1. Verify the voltage supply (230 V) to the motor controller at the contactor X311.**

Voltage too low

Voltage OK

The motor controller is probably defective.

(40) **2. Inspect the power supply (230 V) at the main power switch Q1 on the machine.**

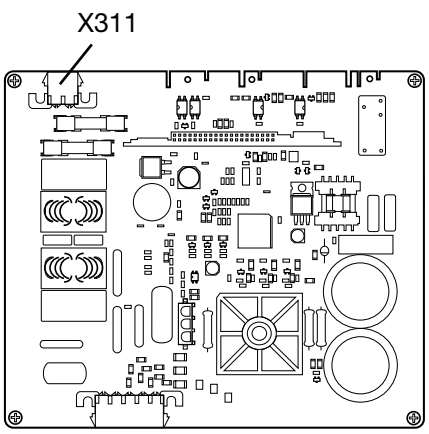
Voltage too low

Troubleshoot the mains.

Voltage OK

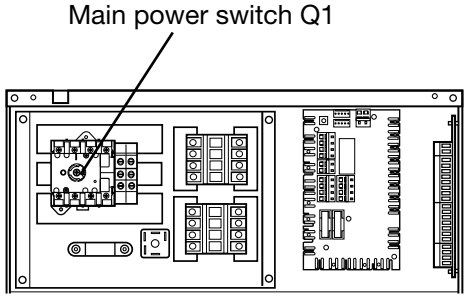
Defective cabling.

39



5181

40



5365

HIGH DC VOLTAGE

The motor controller indicates the DC level is too high.

If the power is on, be very careful when working on the the machine.

Switch off the machine for at least 30 seconds to ensure the motor controller has been completely reset. Then try to start the machine again. If the error returns, troubleshoot as follows:

(41) **1. Verify the voltage supply (230 V) to the motor controller at the contactor X311.**

Voltage too high

Voltage OK

The motor controller is probably defective.

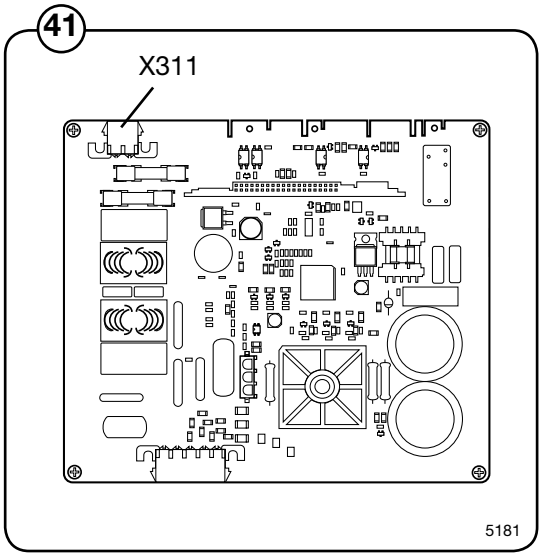
(42) **2. Inspect the power supply (230 V) at the main power switch Q1 on the machine.**

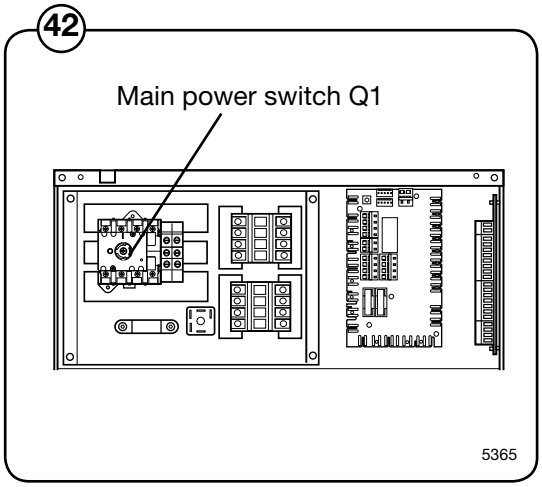
Voltage too high

Troubleshoot the mains.

Voltage OK

Defective cabling.





RIPPEL ON DC BUS

The DC voltage level fluctuates too much.

If the power is on, be very careful when working on the the machine.

Switch off the machine for at least 30 seconds to ensure the motor controller has been completely reset. Then try to start the machine again. If the error returns, troubleshoot as follows:

(43) **1. Verify the voltage supply (230 V) to the motor controller at the contactor X311.**

Large voltage fluctuations

Voltage OK

The motor controller is probably defective.

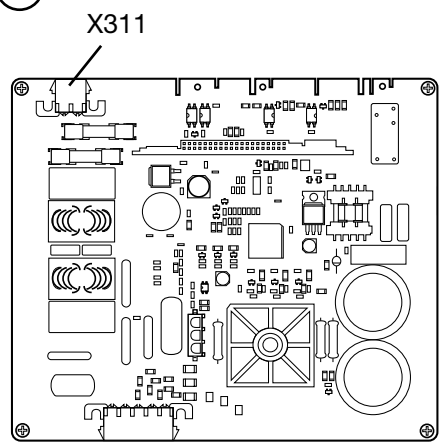
(44) **2. Inspect the power supply (230 V) at the main power switch Q1 on the machine.**

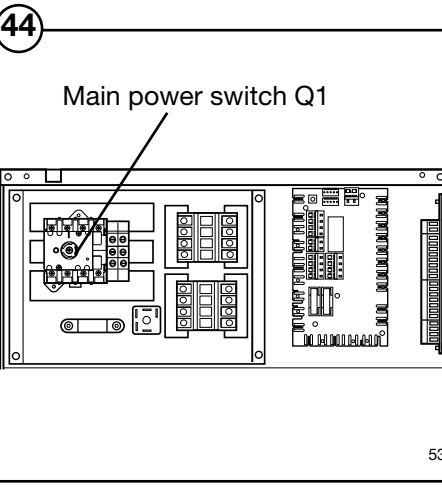
Large voltage fluctuations

Voltage OK

Defective cabling.

Troubleshoot the mains.





LINE INTERRUPT

The motor controller is missing a phase.

If the power is on, be very careful when working on the the machine.

Switch off the machine for at least 30 seconds to ensure the motor controller has been completely reset. Then try to start the machine again. If the error returns, troubleshoot as follows:

(45) **1. Verify the voltage supply (230 V) to the motor controller at the contactor X311.**

No voltage

Voltage OK

The motor controller is probably defective.

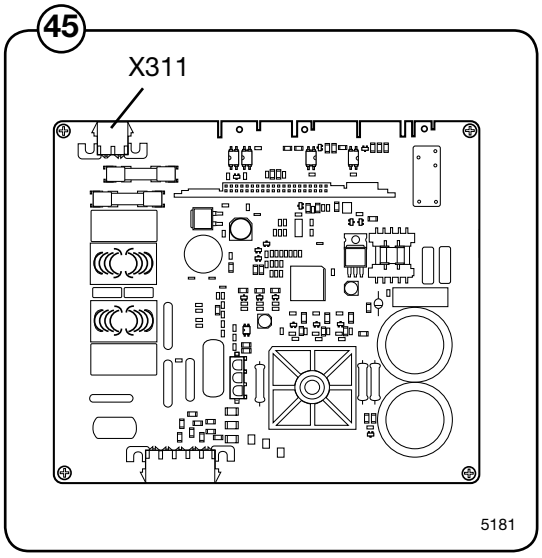
(46) **2. Inspect the voltage supply (230 V) at the main power switch Q1 of the machine. For machine with neutral leads, measure between L1 and N; for machines without neutral leads, measure between L1 and L2.**

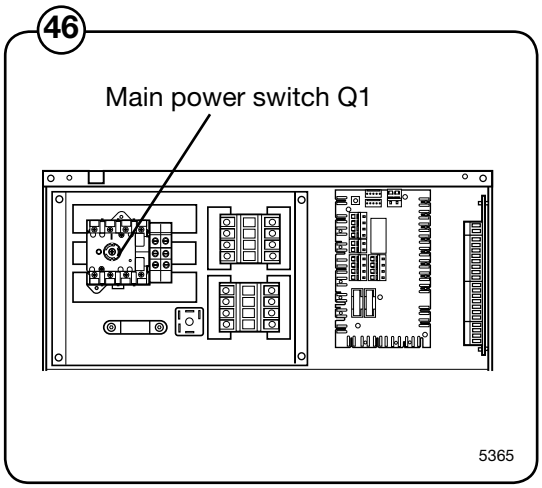
No voltage

Troubleshoot the mains.

Voltage OK

Defective cabling.





KLIXON CIRCUIT

The motor controller indicates an error inn the thermal protection circuits of the motor.


If the power is on, be very careful when working on the the machine.

Switch off the machine and for about 30 seconds. Then switch on the machine again and start a programme.

If the error returns, the motor controller is probably defective.

NO PARAM. SET IN MCU

The motor controller indicates no parameter set value in motor controller (MCU).


If the power is on, be very careful when working on the the machine.

Switch off the machine for at least 30 seconds to ensure the motor controller (MCU) has been completely reset. Then try to start the machine again.

If the error returns, make sure that the timer system has the latest software version. If not, please update.

If the error still remains, replace the motor controller (MCU).

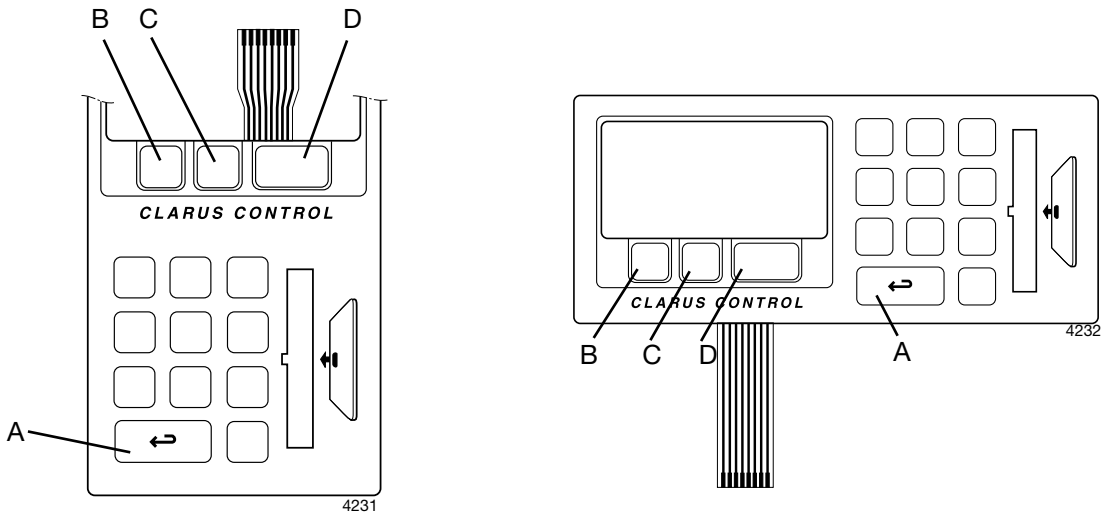
Troubleshooting the keypad in the display unit

When a key is pressed on the keypad of the programme unit, two of the outputs on the keypad close. By disconnected the flat cable from the display card, pressing a key and the measuring the resistance between the outputs that should close, it is possible to determine correct operation of any one key.

(47) The table below shows the outputs that need to be closed for each key:

Key	Outputs that should close
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

(47)



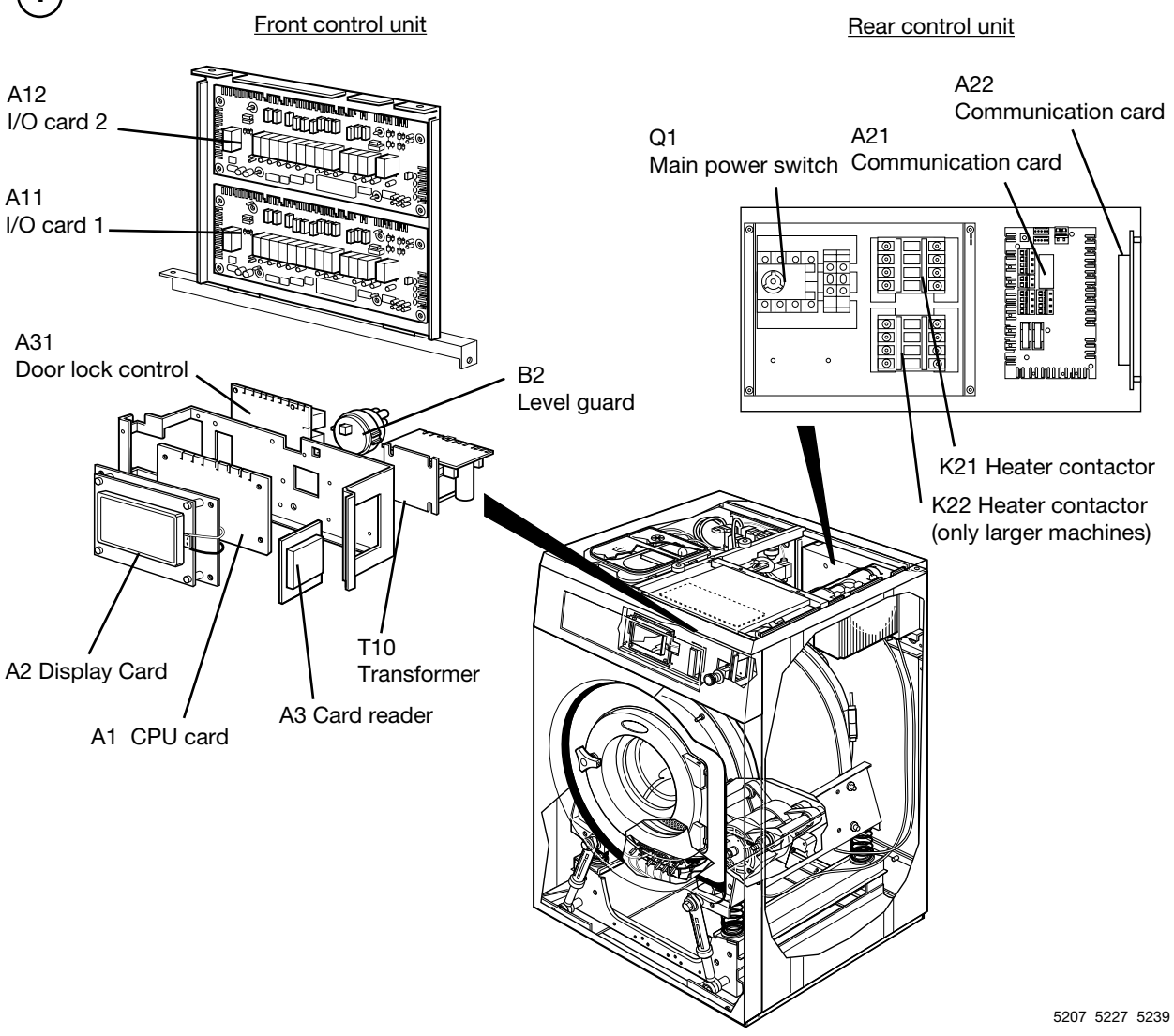
Control unit

Description

(1) The control unit of the machine consists of the following parts:

- **Front control unit**
  This unit contains two microcomputer controlled electronic programme units consisting of a CPU card A1, display card A2, card reader A3 and one or two I/O cards A11 and A12. The front control unit also holds a door lock control A31 (double check of door lock), a level guard B2 and a lower-voltage transformer T10 that supplies power to the programme unit.
- **Rear control unit**
  This unit contains the main power switch Q1 or a connection block with connectors for voltage supply, one or two heating contactors K21 and K22 and one or two communication cards A21 and A22 with outputs for, among others, detergent supply.

(1)



Front control unit

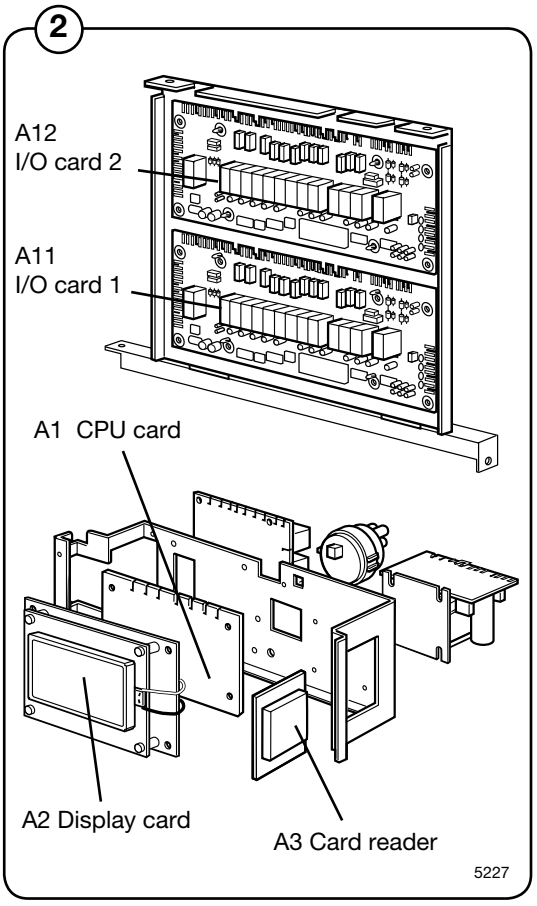
Programme unit

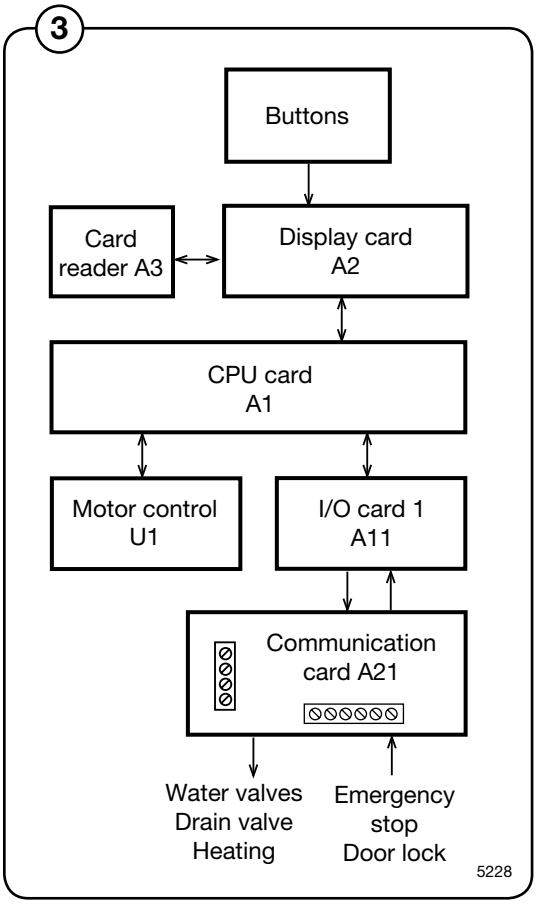
(2) The programme unit consists of the following parts:

(3)

- **CPU card A1**
  The CPU card uses the various control programmes in the card programme memory to check the various functions of the washing machine. The standard programmes are also stored in the programme memory (programme numbers 991 - 999) together with any user-specified programmes.
- **Display card A2**
  The display card communicates with the CPU card A1 through a serial interface. It converts data from the CPU card for display in the character display.

  The display card also detects which buttons are pressed on the control panel.
- **Card reader A3**
  Using the card reader and a memory card, wash programmes can be copied from one washing machine to another or between washing machines and a computer. The card reader is connected to the display card A2.





- **I/O cards A11 and A12**
  Most smaller machines have only one card: A11. The I/O cards are controlled by the CPU card via a serial interface. The I/O cards feature outputs, which, via the communication card in the rear control unit, control various machine functions, such as the water valves, heating connection and drain valve. The cards also have inputs for emergency stop and door lock.

The programme unit is described in detail in section **Programme unit.**

Level guard B2

(4) Control of the water level and turning of the drum are controlled with a backup guard, to ensure that the door will not open with water in the drum or when the drum rotates.

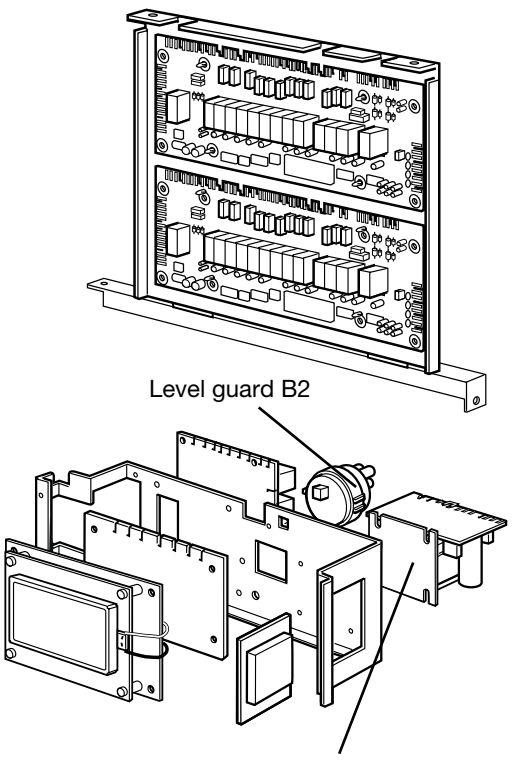
Apart from the level guard on the CPU card, there is a level guard B2, connected to the door lock control A31. This card controls door locking action as well as the level and drum rpm speed.

Transformer T10

(5) The low voltage transformer supplying power to the various cards operates on DC power.

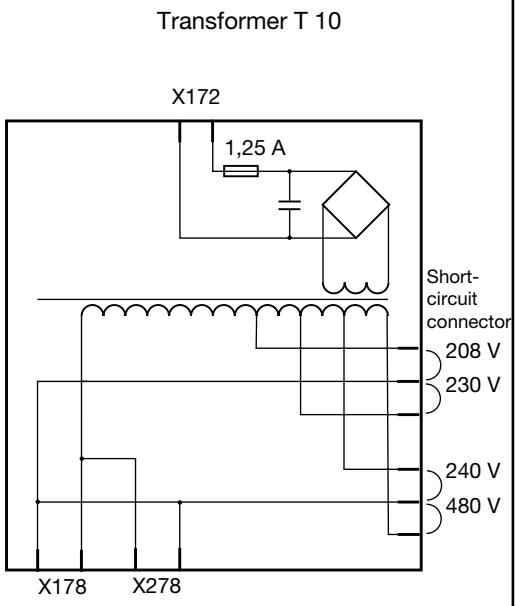
Using the short-circuit connectors on the PCB, the transformer can be switched to one of four different voltage supplies.

4



5227

5



5231

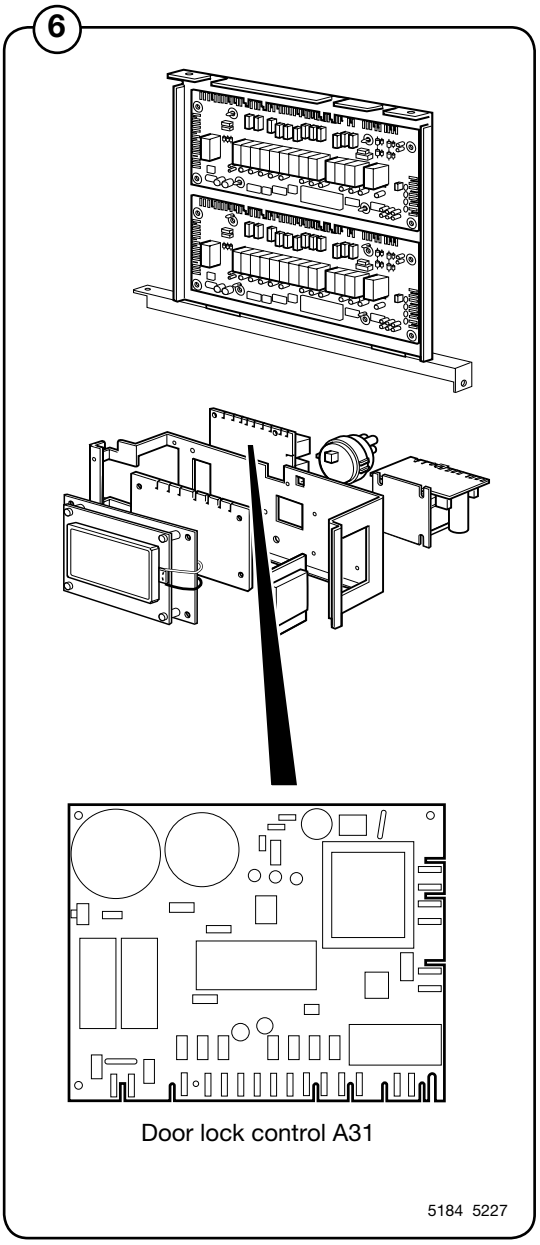
Door lock control A31

(6) This card serves to perform a safety check of the door lock function.

The card checks the water level using level guard B2 and the drum speed by way of a rotation sensor B3. The card receives a signal from the CPU card when the door should be locked or opened.

The door lock control controls the door lock coil and the door lock does not open or close until the card itself and the programme unit have verified that the drum is not turning and that there is no water remaining in the drum.

The door lock control is described in detail in section **Door and door lock.**



Door lock control A31

Rear control unit

Main power switch Q1

(7) The main power switch interrupts all received power phases and is situated on the outside of the connection box cover.

The cover cannot be removed unless the main power switch is turned to the 0 position.

The received voltage supply is connected to the lower connection block row of the main power switch or, alternatively, to the input connection block.

Heating contactor K21

This contactor is only featured on machines with electric heating.

It activates the three heating elements at the front, lower part of the outer drum. It is controlled by I/O card 1 output X8.

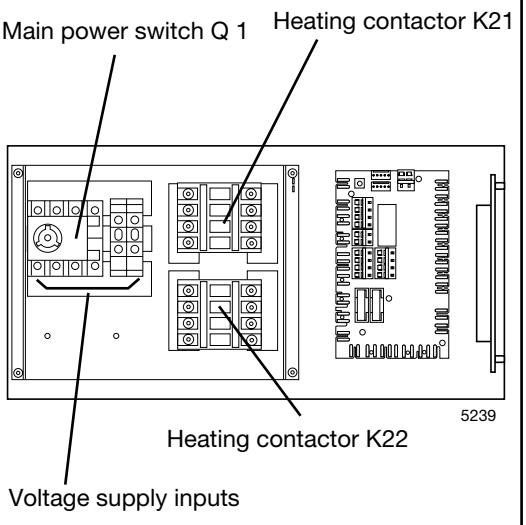
Heating contactor K22

This contactor is only featured on larger machines with three heating elements, with each element having two cores.

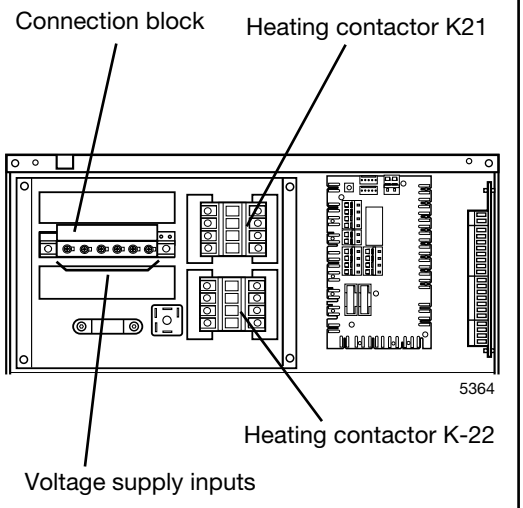
It activates the three heating elements at the front, lower part of the outer drum. It is controlled by I/O card 1 output X8.

7

Model with main power switch



Model with connection block



Communication card A21

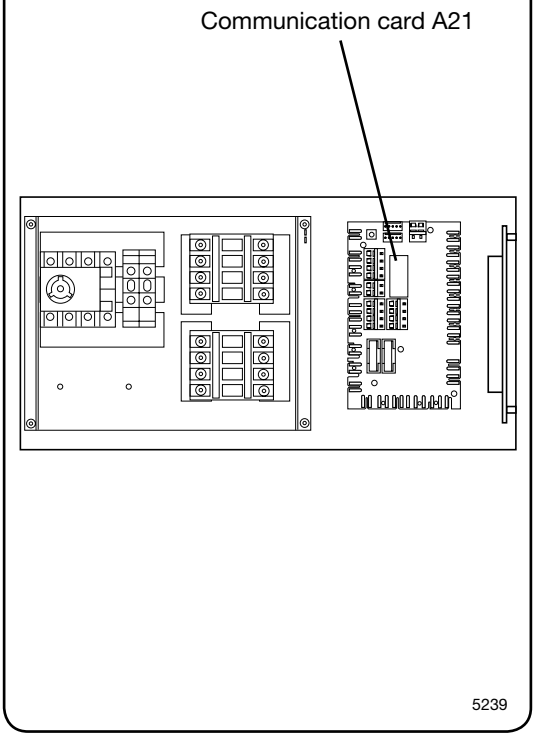
(8) This card is used to send and receive signals from I/O card 1. It contains:

(9)

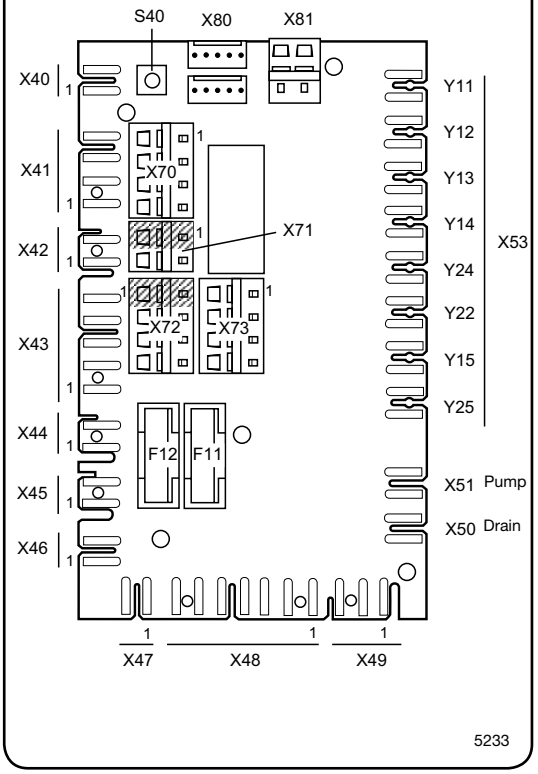
- **Fuses F11 and F12 (T 1.25 A)**
  Protects the received voltage supply in the timer and door lock controller.
- **Service button S40**
  Used to engage service mode of the programme unit.
- **Input/output connection blocks**

Card No.		Function
Outputs (200 - 240 V AC)		
X71	:1,2	Signal “Door locked, program on”
X72	:2	Liquid detergent 1
	:3	Liquid detergent 2
	:4	Liquid detergent 3
	:5	Liquid detergent 4
	:1	0 V (common)
X73	:1	Powder 1 (Y11)
	:2	Powder 2 (Y12)
	:3	Powder 3 (Y13)
	:4	Powder 4 (Y14)
	:5	Powder 2 (Y22)
Input		
X70	:1,2	Start/Stop
	:3,4	Pause/PC5

8



9

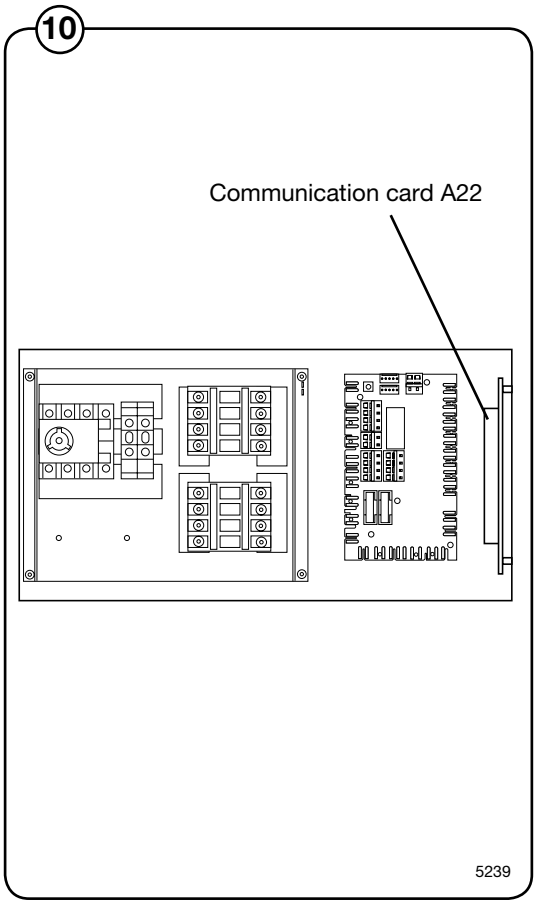


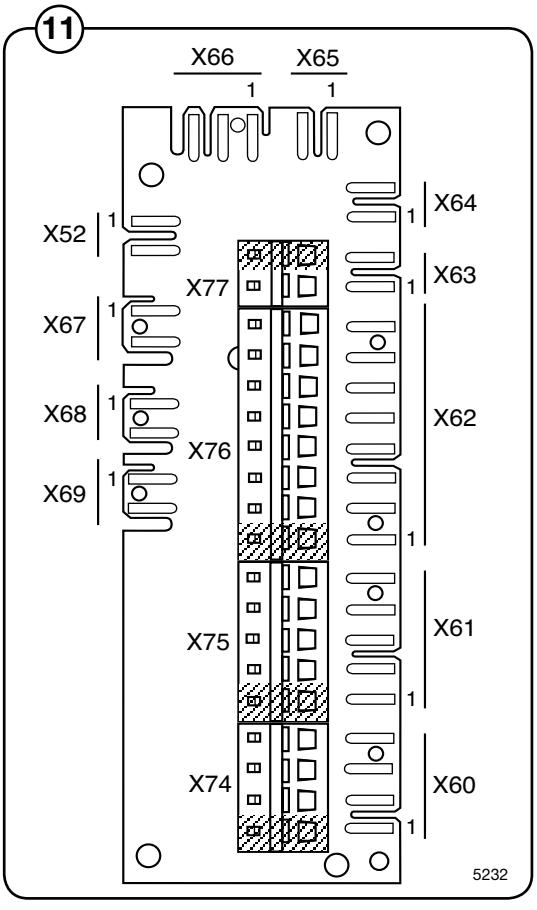
Communication card A22

(10) This card is used to send and receive signals from I/0 card 1. It contains:

(11) • **Input/output connection blocks**

Card No.		Function
Output	(200 - 240 V AC)	
X75	:1	0 V (common)
	:2	Liquid detergent 5
	:3	Liquid detergent 6
	:4	Liquid detergent 7
	:5	Liquid detergent 8
X76	:1	0 V (common)
	:2	Drain block
	:3	Drain A
	:4	Drain B
	:5	Drain C
	:6	Inlet A
	:7	Inlet B
	:8	Inlet C
X77	:1,2	Buzzer
Input		
X74	:1,2	Switching between heater 1/heater 2
	:3,4	No function





Programme unit

Description

(1) The programme unit of the machine consists of the following parts:

(2)

- **CPU card A1**
  The CPU card uses the various control programmes in the card programme memory to check all the functions of the washing machine. The standard programmes are also stored in the programme memory (programme numbers 991 - 999) together with any user-specified programmes.

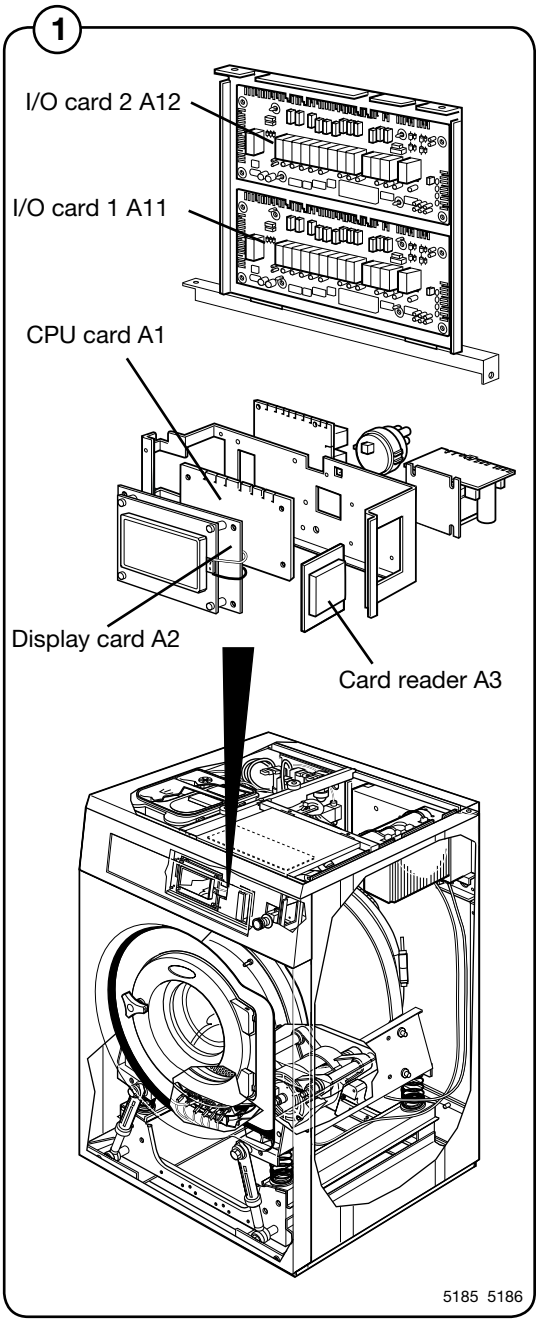
  The CPU card controls the display card A2 (display window, control panel and the A3 card reader), I/O cards A11 and A12 and the motor controller U1 via the serial data interface.

- **Display card A2**
  The display card receives data from CPU card A1 about which text to display in the display window. The display card converts this data and control the display window in order that the correct data is shown.

  The display card also senses which keys are pressed on the keyboard and sends the received information to the CPU card.

- **Card reader A3**
  Using the card reader, it is possible to copy washing programmes from the CPU card memory to a memory card or from memory cards to the CPU memory.

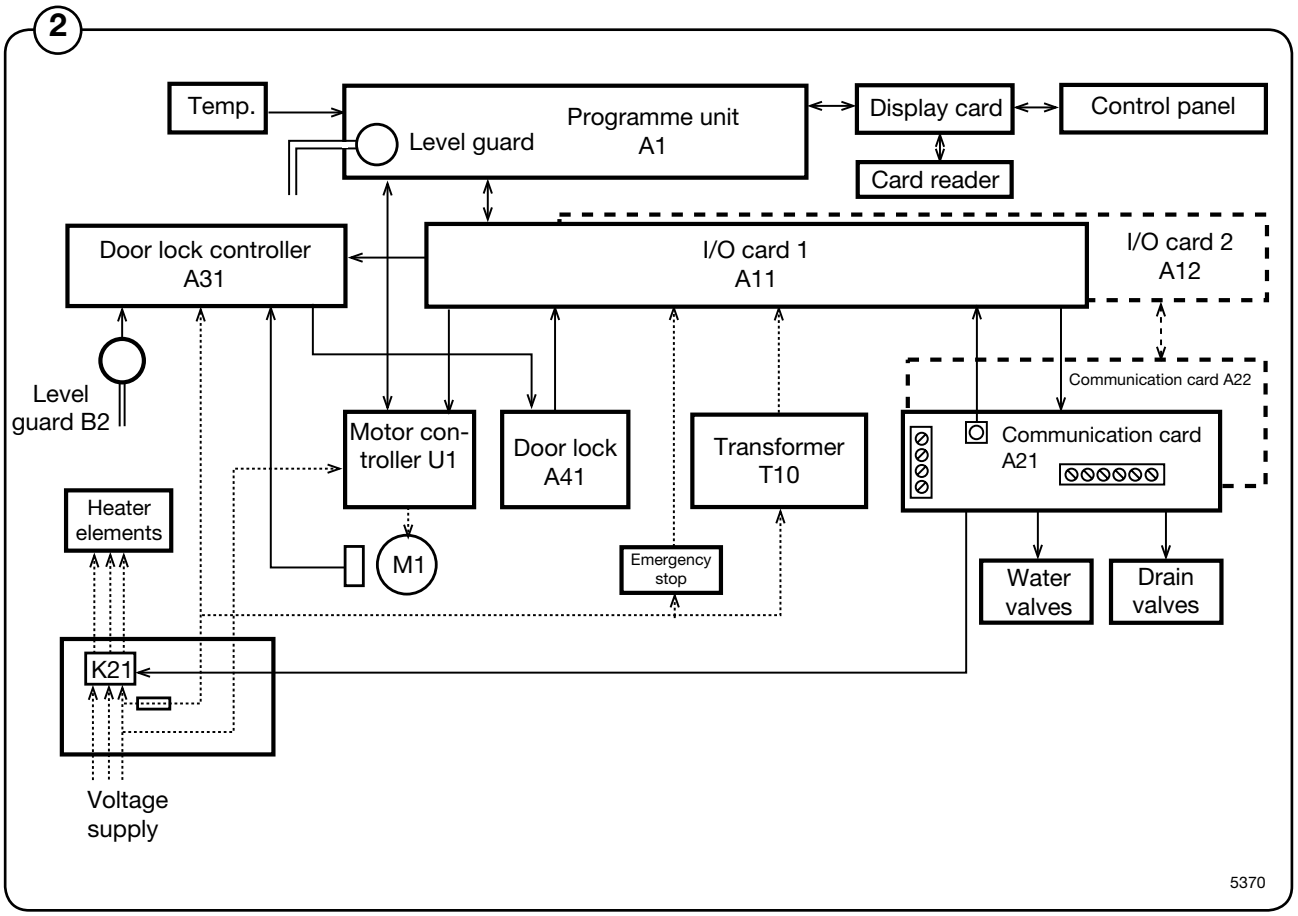
  The memory cards can then be inserted in a card reader of another washing machine or in a reader connected to a PC. This allows copying of washing programmes from one machine to another or between a PC and washing machines. The card reader is connected to the display card A2.



- **I/O cards A11 and A12**
  Most smaller machines have only one card: A11. On some machines, there is a greater need for outputs, in which case two I/O cards are used.

  The I/O cards are controlled by the CPU card via a serial interface. The I/O cards feature outputs, which, via the communication cards in the rear electric box, control various machine functions, such as the water valves, heater connection and drain valve. On the input connection blocks of the communication cards, it is possible to connect signals for control of e.g. the detergent supply.

  The cards also have inputs for emergency stop and door lock ACK.



CPU card A1

(3) The CPU card controls all functions of the washing machine using various control programmes in the CPU card memory. The CPU card communicates with the I/O card, display card and motor controller using a serial interface.

The following functions are controlled:

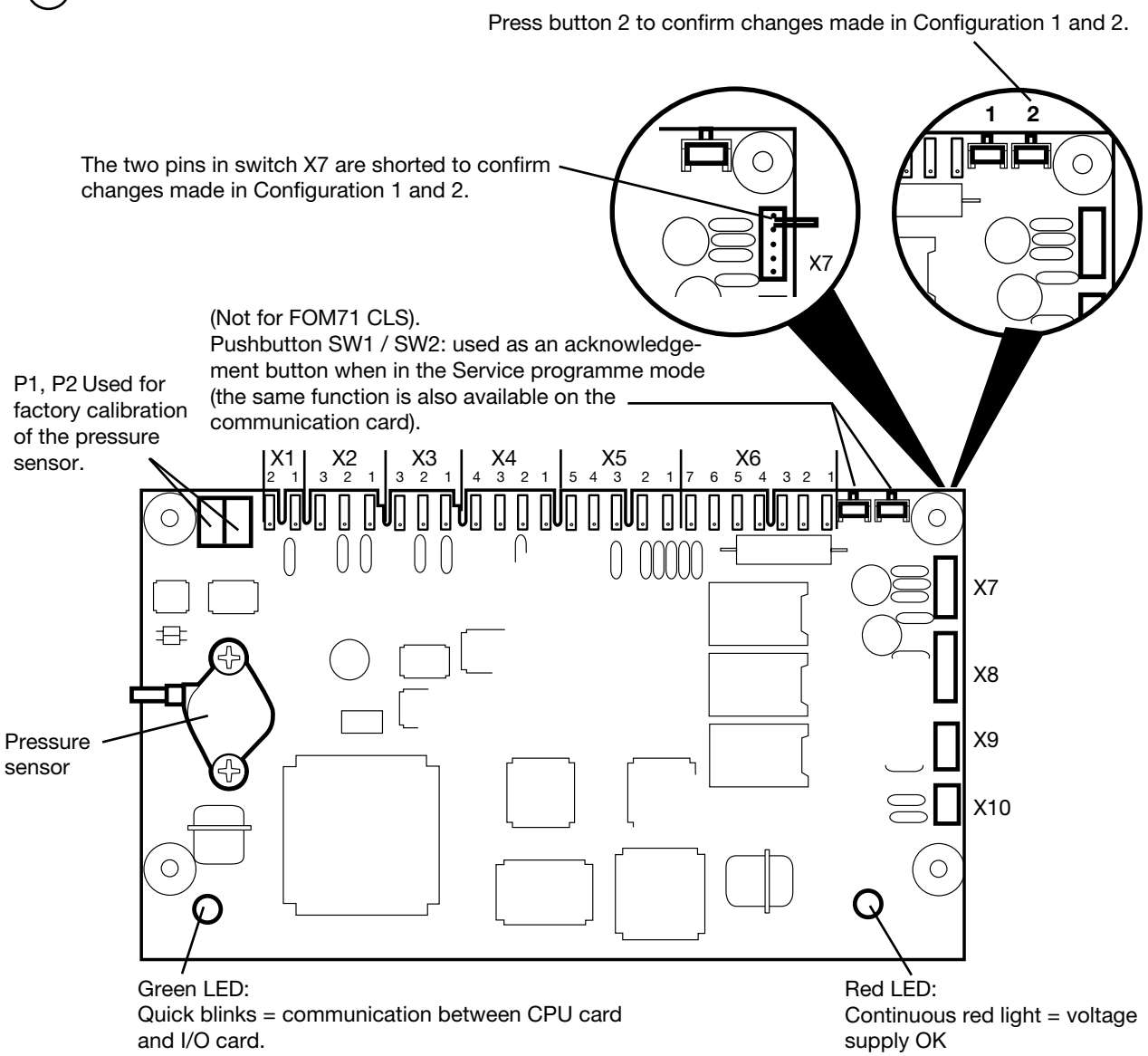
- The CPU card controls the water valves, detergent supply, drain and heating using one or two I/O cards. Depending on the number of functions to be controlled, the number of I/O cards varies between different machines.
- The CPU card controls the alphanumeric display window on the display card.
- The CPU card controls the motor via a motor controller.

To obtain information about the various operations of the washing machine, the following inputs are used:

- The CPU card has inputs for e.g., temperature sensors.
- The CPU card receives information from the I/O card inputs about door locking state and any external switches (e.g., Start/Stop and Pause).
- The CPU card has a pressure sensor to which a hose for measuring the water level in the drum can be connected.
- The CPU card receives information from the display card about which buttons were pressed.

Note that the CPU card does not contain any removable memory chips. If the CPU card needs replacement, the correct software for the machine needs to be programmed in the new card using a laptop with special software. See the section “Replacing the CPU card”. Personalised washing programmes can be transferred using a Smart card.

3



Card Switch	Function
X1	Input from water temperature sensor
X2	not used
X3	not used
X4	Output to motor controller
X5: 1-3	Serial communication with I/O card 1
X5: 4-5	Voltage supply from I/O card 1
X6: 1-5	Serial communication with display card
X6: 6-7	Voltage supply to display card
X7	PC communication
X8	Motor communication (reserved)
X9	Scale communication
X10	Internal communication (not used)

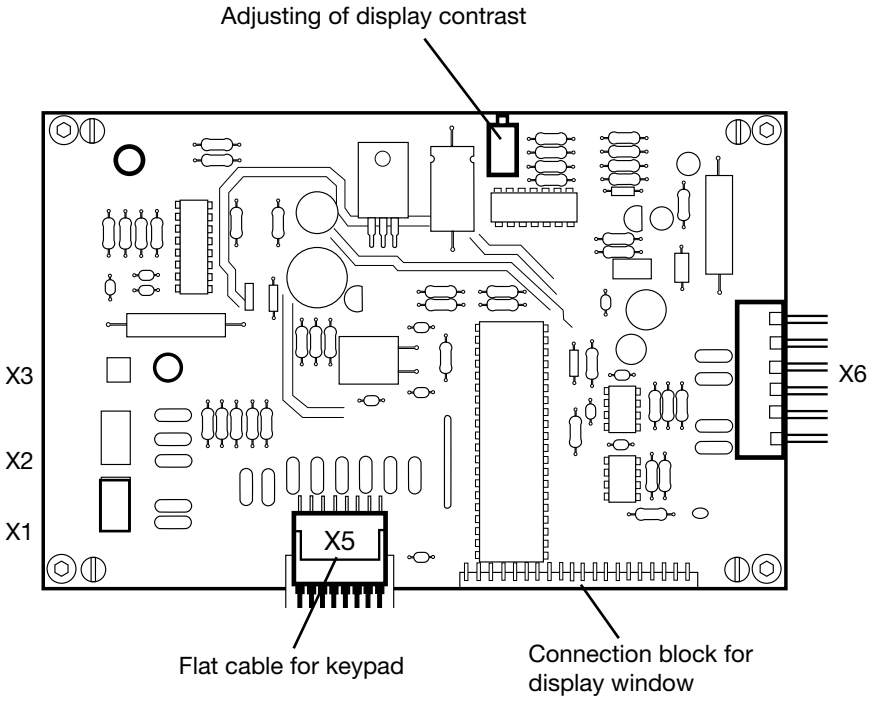
6673, 6677

Display card A2

(4) The display card communicates with the CPU card through a serial interface. The CPU card informs what should be displayed in the display window and the display card converts these messages to information that controls the alphanumeric display window.

The display card also detects which buttons are pressed on the control panel and sends these signals to the CPU card.

(4)



Card switch	Function
X1	Not used
X2	Communication with card reader for memory cards
X3	Not used
X4	Not used
X5	Connection from front key board
X6: 1-2	Voltage supply from CPU card
X6: 3-7	Serial communication with CPU card

4233

I/O cards

(5) The I/O cards are controlled by the CPU card and communicate via a serial interface. Depending on the need for inputs and outputs, one programme unit may have one or two I/O cards.

All inputs and outputs are switched from the I/O card to the various functions via the communication cards in the rear electric module. Each I/O card is connected to a separate communication card: I/O card A11 uses communication card A21 and I/O card A12 uses communication card A22.

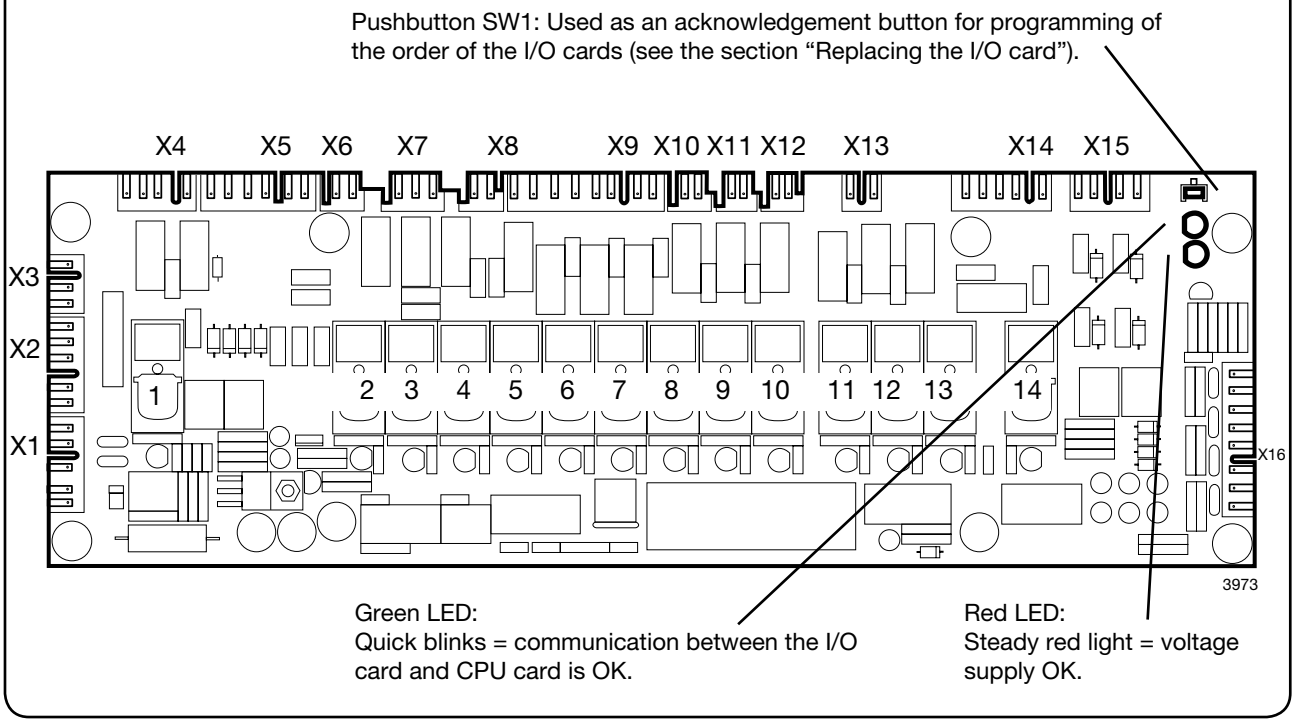
There are inputs for door lock and external switches (e.g. Start/Stop and Pause). Signals on these inputs are passed on to the CPU card.

The outputs control water valves, detergent supply, drain and heating.

The voltage supply to the CPU and I/O cards takes place via I/O card 1 A11, which feeds voltage to both the CPU card A1 and a possible I/O card 2 A12.

Note that if the programme unit uses two cards and one needs to be replaced, special programming is required. It is necessary to programme the new card with the correct I/O card number (1 or 2) using a laptop and special software. See the section “Replacing the I/O card”.

(5)



Input and outputs on I/O cards 1 and 2

Card switch	I/O-card 1 A11	I/O-card 2 A12
Serial interface and voltage supply		
X1: 1-3	Serial interface to card 2	-
4	16 V+ supply to card 2	-
5	0 V– supply to card 2	-
X2: 1	0 V– supply to CPU	12 V- from card 1
2	16 V+ supply to CPU	12 V+ supply from card 1
3-5	Serial interface to CPU	Serial interface to card 1
X3: 1	16 V+ supply from T10	-
2	0V- supply from T10	-
X6: 1	230 V supply from emergency stop, phase	230 V direct supply, phase
2	230 V supply from emergency stop, neutral	230 V direct supply, neutral
X10:1	Interlock signal to motor controller, phase	Supply to relays from I/O 1, phase
2	Interlock signal to motor controller, neutral	Supply to relays from I/O 1, neutral
X11:1	Supply to relays from I/O 2, phase	-
2	Supply to relays from I/O 2, neutral	-
X12:1	To X13: supply to relays 11-14, phase	To X13: supply to relays 11-14, phase
2	To X13: supply to relays 11-14, neutral	To X13: supply to relays 11-14, neutral
X13:1	Supply to relays 11-14, neutral	Supply to relays 11-14, neutral
2	Supply to relays 11-14, phase	Supply to relays 11-14, phase

Inputs and outputs on I/O cards 1 and 2

I/O-card Connection block No.	Switch No.	D.card A21 Relay No.	I/O-card 1 A11 Function
Outputs			
X4: 1			Neutral
2	1		Door lock relay, phase (normally open)
3			Neutral
4	1		Door lock relay, phase (normally open)
X7: 1	2		Drain 1 (Y1), phase (usually open)
2			Common neutral
3	2		Drain 1 (D1), phase (usually closed)
X8: 1	3		Heater relay (K21)
2			Neutral
X9: 1	9		Hot water inlet (Y25)
2	8	X73: 5	Powder 5 (Y22)
3	10	X73: 4	Powder 4 (Y14/24)
4	7		Cold water inlet (Y15)
5	6	X73:3	Powder 3 (Y13/Y23)
6	5	X73:2	Powder 2 (Y12/Y22)
7	4	X73:1	Powder 1 (Y11/Y21)
8			N (common neutral)
X14:1	14	X72:5	Signal 4, external detergent pump
2	12	4	Signal 3, external detergent pump
3	13	3	Signal 2, external detergent pump
4	11	2	Signal 1, external detergent pump
5		1	N (common neutral)

Inputs and Outputs on I/O card 1 and 2

I/O-card Connection block No.	Switch No.	D.card A22 Relay No.	I/O-card 2 A12 Function
Outputs			
X4: 1			-
2	1	X77:1	Flashlight, phase
3			-
4	1		
X7: 1	2		Cold, hard water (Y35)
2			N (neutral)
3	2		-
X8: 1	3		Heater relay (K22)
2			Neutral
X9: 1	9	X76:8	Inlet C (Y65)
2	8	7	Inlet B (Y55)
3	10	6	Inlet A (Y45)
4	7	5	Drain C (Y4)
5	6	4	Drain B (Y3)
6	5	3	Drain A (Y2)
7	4	2	Drain stop (Y1b)
8		1	N (common neutral)
X14:1	14	X75:5	Signal 8, external detergent pump
2	12	4	Signal 7, external detergent pump
3	13	3	Signal 6, external detergent pump
4	11	2	Signal 5, external detergent pump
5		1	N (common neutral)

I/O-card Connection block No.	Opto-coupler	D.card A21 Relay No.	I/O-card 1 A11 Function
Inputs			
X5: 1			Door lock micro-switch S4/N, Com
2			Door lock micro-switch S4/N, No
3-4	1		Door lock position micro-switch S3/N
5-6	2		Door lock micro-switch S4/Phase
X15:1	4	X70:4	External start/stop signal, phase
2	4	3	External start/stop signal, neutral
3	3	2	External pause signal, phase
4	3	1	External pause signal, neutral
X16:1-2			ACK, emergency stop (S2)
3-4			External service switch
5-6			-
7-8			-

I/O-card Connection block No.	Opto-coupler	D.card A22 Relay No.	I/O-card 2 A12 Function
Inputs			
X5: 1			-
2			-
3-4	1		-
5-6	2		-
X15:1	4		-
2	4		-
3	3	X74:2	Switch heat 1/heat 2, phase
4	3	1	Switch heat 1/heat 2, neutral
X16:1-2			-
3-4			-
5-6			-
7-8			-

The service program

The service programme facilitates troubleshooting on the machine by enabling control of **all machine functions**. **Input signals to the various I/O cards** that are active are also indicated.

The following functions can be controlled:

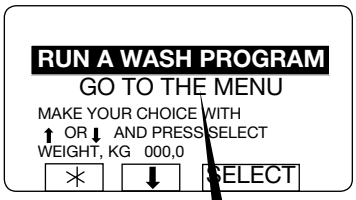
01	COLD WATER	36	LOW EXTRACT
02	HOT WATER	37	MEDIUM EXTRACT
03	COLD HARD WATER	38	HIGH EXTRACT
04	TANK 1 WATER	39	TURBO EXTRACT
05	TANK 2 WATER	40	NORMAL DRAIN
06	TANK 3 WATER	41	DRAIN BLOCKING
07	FLUSH	42	RECYCLE DRAIN A
10	DETERGENT POWDER 1	43	RECYCLE DRAIN B
11	DETERGENT POWDER 2	44	RECYCLE DRAIN C
12	DETERGENT POWDER 3	45	RECYCLE DRAIN D
13	DETERGENT POWDER 4	46	FLASHING LIGHT
14	DETERGENT POWDER 5	51	DOOR LOCK
17	LIQUID DETERGENT 1	55	HEAT 1
18	LIQUID DETERGENT 2	56	HEAT 2
19	LIQUID DETERGENT 3	64	BUZZER
20	LIQUID DETERGENT 4		
21	LIQUID DETERGENT 5		
22	LIQUID DETERGENT 6		
23	LIQUID DETERGENT 7		
24	LIQUID DETERGENT 8		
33	MOTOR CLOCKWISE		
34	MOTOR COUNTERCLOCKWISE		
35	DISTRIBUTION		

These signals can be read:

I/O-BOARD 1:
EMERGENCY STOP
TEMPORARY PAUSE
OIL
REMOTE START
SERVICE
PHASE CHECK
DOOR LOCKED
DOOR CLOSED
UNBALANCE

I/O-BOARD 2:
CHANGE HEATING SYSTEM
REPEAT RINSE

To select the ”Service Program” function

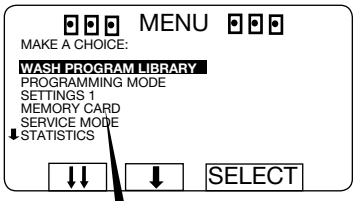


If this menu is not currently displayed:
Press ↩ repeatedly.

Press ⬇ to highlight ”GO TO THE MENU”.

RUN A WASH PROGRAM
GO TO THE MENU

SELECT **Press SELECT.**



Press ⬇ four times.

WASH PROGRAM LIBRARY
PROGRAMMING MODE
SETTINGS 1
MEMORY CARD
SERVICE MODE
STATISTICS
MANUAL MODE
SETTINGS 2
EXIT

... to highlight ”SERVICE MODE”.

SELECT **Press SELECT.**

The service program

The service program makes fault-finding on the machine easier, as it allows you to control the various machine functions individually:

- water filling
- detergent flushing
- motor rotation, clockwise and counterclockwise
- motor action, distribution and extraction
- drain
- door lock
- heating
- buzzer

You can also check which input signals to the PCU are activated:

- emergency stop
- remote start
- oil lubrication
- service
- repeat rinse
- phase check
- door locked
- door closed
- unbalance

The following values will also be displayed at all times:

- water level in machine
- water temperature
- motor speed
- whether drain is open or closed

PRESS BUTTON ON
CPU BOARD

✳ ✳ EXIT

Press the button on the CPU circuit board.

SERVICE PROGRAM

MAKE A CHOICE:
SERVICE PROGRAM
CLEAR TRIP HOUR COUNTER
CLEAR SERVICE COUNTER
CLEAR WASH PROGRAM COUNTER IN CLS
CLEAR WASH PROGRAM COUNTER IN SMC
SCALE ADJUSTMENTS
CALIB. OF LEVEL SENSOR
EXIT

✳ ⬇ SELECT

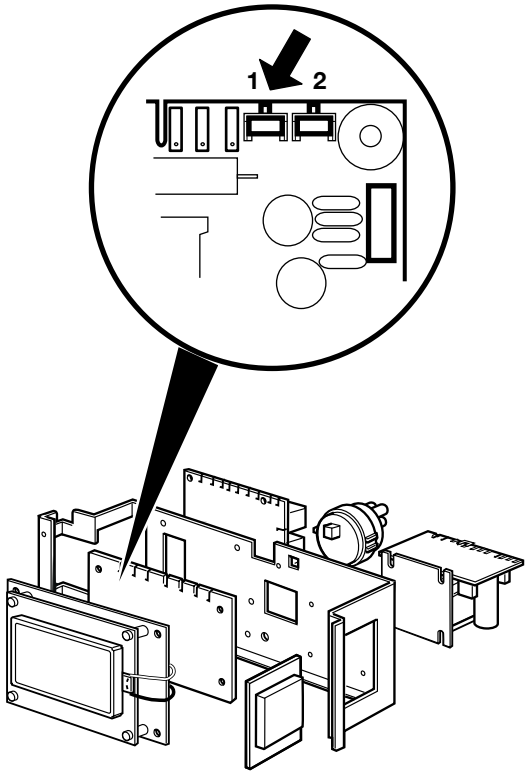
To access the service program:

SELECT

Press Select.

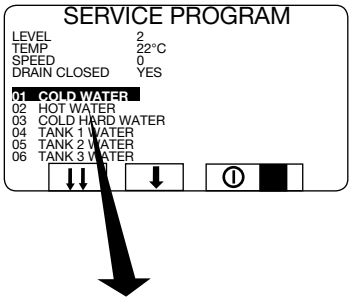
To prevent unauthorised or accidental use

Unauthorised or accidental use of the service program is prevented by requiring the user to locate and press the button on CPU board.



6675, 5227

To control the machine functions



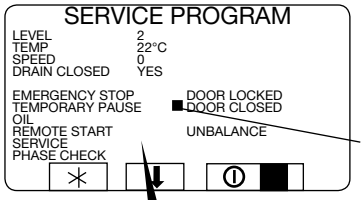
01 COLD WATER
02 HOT WATER
03 COLD HARD WATER
04 TANK 1 WATER
05 TANK 2 WATER
06 TANK 3 WATER
07 FLUSH
10 DETERGENT POWDER 1
11 DETERGENT POWDER 2
12 DETERGENT POWDER 3
13 DETERGENT POWDER 4
14 DETERGENT POWDER 5
17 LIQUID DETERGENT 1
18 LIQUID DETERGENT 2
19 LIQUID DETERGENT 3
20 LIQUID DETERGENT 4
21 LIQUID DETERGENT 5
22 LIQUID DETERGENT 6
23 LIQUID DETERGENT 7
24 LIQUID DETERGENT 8
25 LIQUID DETERGENT 9
26 LIQUID DETERGENT 10
27 LIQUID DETERGENT 11
28 LIQUID DETERGENT 12
29 LIQUID DETERGENT 13
33 MOTOR CLOCKWISE
34 MOTOR COUNTERCLOCKWISE
35 DISTRIBUTION
36 LOW EXTRACT
37 MEDIUM EXTRACT
38 HIGH EXTRACT
39 TURBO EXTRACT
40 NORMAL DRAIN
41 DRAIN BLOCKING
42 RECYCLE DRAIN A
43 RECYCLE DRAIN B
44 RECYCLE DRAIN C
45 RECYCLE DRAIN D
46 FLASHING LIGHT
51 DOOR LOCK
55 HEAT
56 HEAT 2 AS STANDARD
64 BUZZER
EXIT

To activate the various machine functions:

Use ⬇ or ⬆ to highlight the function. Press ⏻ to switch the function on and off.

I/O card inputs

1 **Press 1.**



Now you can check the various input signals from I/O board 1.

A black square in front of the name indicates that the input is active.

I/O-BOARD 1

EMERGENCY STOP
TEMPORARY PAUSE
OIL
REMOTE START
SERVICE
PHASE CHECK
DOOR LOCKED
DOOR CLOSED
UNBALANCE

Press any key to go back to the previous display.

When the programme unit has two I/O cards:

2 **Press 2.**

I/O-BOARD 2

CHANGE HEATING SYSTEM
REPEAT RINSE

It is now possible to verify the various input signals from I/O card 2.

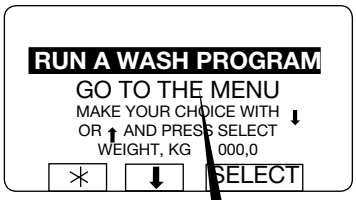
Press any key to go back to the previous display.

Settings 1

In the Configuration 1 mode, the variables can be changed without requesting a special password from the supplier:

ADJUST TIME ALLOWED
ADJUST TEMPERATURE ALLOWED
RAPID ADVANCE ALLOWED
SHOW WEIGHT ALLOWED
WATER REDUCTION NOT ALLOWED
MANUAL FUNCTIONS ALLOWED
PAUSE ALLOWED
FREE TEXT ALLOWED
CHANGE WASH PROGRAM ALLOWED
AUTO RESTART ALLOWED
ADJUST SPIN SPEED ALLOWED
DISPLAY REMAINING TIME
DISPLAY ACTUAL TEMPERATURE
DISPLAY ACTUAL SPEED
MACHINE NOT HEATED
TEMPERATURE CONTROL OF WATER
TEMPERATURE IN °C
REPEAT PROGR. MODE QUESTION
LOCKED STANDARD WASH PROGRAMS
LEVEL QUICK COOL-DOWN
LEVEL UNBALANCE
LEVEL LOW
LEVEL MEDIUM
LEVEL HIGH
MIDDEL TEMPERATURE COOL-DOWN
DEFAULT MOTOR ON TIME
DEFAULT MOTOR OFF TIME
FLUSH DELAY TIME
FLUSH ON TIME
BUZZER ON BUTTON
MAX FILLING TIME
MAX HEATING TIME
SHOW WEIGHT TIMEOUT
PC5 BLOCKING OF HEATING
PC5 BLOCKING OF SPINNING
HEAT 2 AS STANDARD
SERVICE ALARM HOURS
BUZZER TIMEOUT AT END
BUZZER TIMEOUT AT PAUS
ERROR, OVERFILLED
BACK LIGHT TIME SEC.

To select the ”SETTINGS 1” function

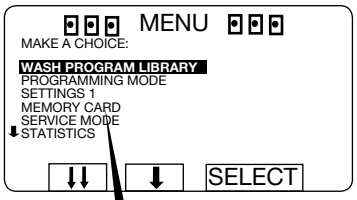


If this menu is not currently displayed:
Press ↩ repeatedly.

Press ⬇ to highlight ”GO TO THE MENU”.

RUN A WASH PROGRAM
GO TO THE MENU

SELECT **Press SELECT.**



Press ⬇ twice...

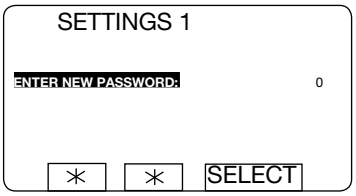
WASH PROGRAM LIBRARY
PROGRAMMING MODE
SETTINGS 1
MEMORY CARD
SERVICE MODE
STATISTICS
MANUAL MODE
SETTINGS 2
EXIT

... to highlight ”SETTINGS 1”.

SELECT **Press SELECT.**

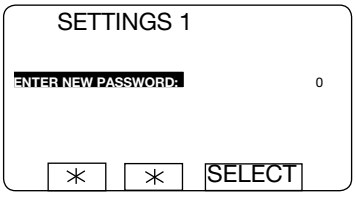
Password

To open the function without a password



SELECT **Press SELECT.**

To enter a password the first time

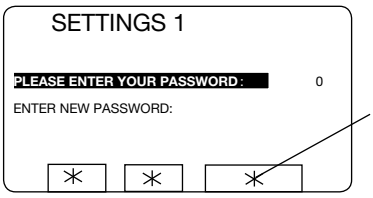


1 2 3
4 5 6
7 8 9
0

Enter a password consisting of any four digits.

SELECT **Press SELECT.**

To open the function using a password



If the function has already been password-protected, you will see an asterisk here instead of the word SELECT.

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter your four-digit password.

Once the correct password has been entered, the display will show ⬇ and **SELECT**.

SELECT **Press SELECT.**

Password protection or not?

It is for you to decide whether or not the functions SETTINGS 1 and PROGRAMMING will be password-protected. Please note that if you do decide to implement password protection for either of them, then access to **both** these functions will be by means of the same password.

The password consists of any four digits, chosen by you.

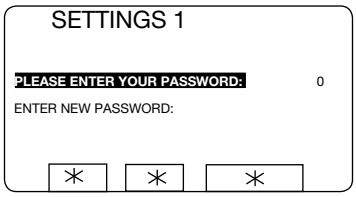
At any time you can change this password, or remove password protection from these functions.

Password set or not set

In Configuration 1, it is possible to select whether or not to use a password.

If the password is not used, the password explanations can be disregarded.

To change the password



1 2 3
4 5 6
7 8 9
0

Enter your four-digit password.

Once the correct password has been entered, the display will show ⬇ and **SELECT**.

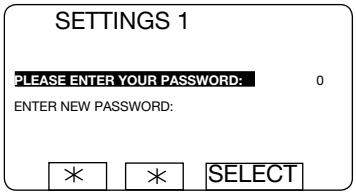
⬇ **Press ⬇.**

1 2 3
4 5 6
7 8 9
0

Enter the new four-digit password.

SELECT **Press SELECT.**

To remove the password protection



1 2 3
4 5 6
7 8 9
0

Enter your four-digit password.

Once the correct password has been entered, the display will show ⬇ and **SELECT**.

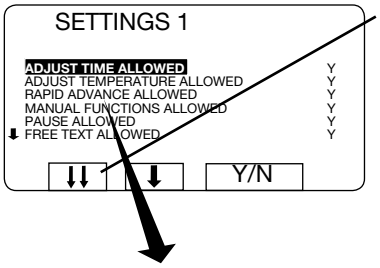
⬇ **Press ⬇.**

1 2 3
4 5 6
7 8 9
0

Enter four noughts (0000).

SELECT **Press SELECT.**

Variables under ”SETTINGS 1”



When the top line of a menu is highlighted you have the option of scrolling down through the menu faster by pressing ⇊. When you do, the next portion of the menu is displayed, with its last line highlighted.

ADJUST TIME ALLOWED	**Y**
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175
MIDDEL TEMPERATURE COOL-DOWN	70° C
DEFAULT MOTOR ON TIME	0:12
DEFAULT MOTOR OFF TIME	0:03
FLUSH DELAY TIME	0:06
FLUSH ON TIME	0:10
BUZZER ON BUTTON	Y
MAX FILLING TIME	10:00
MAX HEATING TIME	10:00
SHOW WEIGHT TIMEOUT	0:20
PC5 BLOCKING OF HEATING	N
PC5 BLOCKING OF SPINNING	Y
HEAT 2 AS STANDARD	Y
SERVICE ALARM HOURS	Y
BUZZER TIMEOUT AT END	Y
BUZZER TIMEOUT AT PAUS	Y
ERROR, OVERFILLED	Y
PASSWORD ACTIVE	Y
CMIS ADDRESS	Y
LEVEL IN MM ACTIVE	Y
START SLOW FILLING, HG	Y
OFFSET LEVEL, HG	Y
BACK LIGHT TIME SEC.	Y
READY	

Answer the questions using the function key or the numeric keys.

Y/N Yes/No question

1 2 3 4 5 6 7 8 9 Times, temperatures, levels.

Press ⇓ to move on to the next question.

0 **You can go back and change a question you have answered already by pressing ⇑ repeatedly. Then simply change the value in the normal way.**

⇓

⇑

Different types of question

The questions in the various modules are of two different types, each of which needs to be answered in a different way:

Yes/No questions
The function key display shows **Y/N** , which is a toggle function (the letter to the right of the highlighted question toggles between **N** and **Y** each time it is pressed).

Times, temperatures, water levels
To answer these questions, use the numeric keys. The number of digits required will vary. If you make a mistake while entering digits, delete it by pressing **ERASE** one or more times.

No confirmation of value entered
Once you have entered the right value, you simply move on to the next by pressing ⇓ . There is no enter or return key to press to confirm each value.

To alter the value for a question you have already answered
Press ⇑ to highlight the question you want, then simply change the value.

Your changes can affect program operation

If you have answered any of the first 11 variables in the menu with N (No), and later during program operation you attempt to activate one of these, a message equivalent to "FUNCTION NOT ALLOWED" will appear on the display. You can then press any key to return to normal program operation.

Confirm changes before you exit Settings 1

If you have changed any of the variables, this change must be confirmed when you exit Settings 1. To do this you have to use a strap to short-circuit two terminals on the CPU board, see section headed "To conclude making changes in variables under SETTINGS 1".

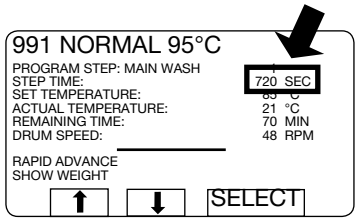
ADJUST TIME ALLOWED	**Y**
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

Y/N **Answer Yes (Y) or No (N).**

↓ **Press ↓ .**

Altering ”step time” allowed

Here you determine if manual adjustment of the remaining ”step time” (by using ↑ to move to the line for ”STEP TIME” then entering a new time) will be allowed.



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

Changing the ”step time” during program operation will be allowed.

If you answer **No (N)**:

Changing the ”step time” during a wash program will not be allowed.

ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	**Y**
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

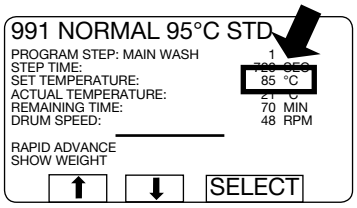
Y/N **Answer Yes (Y) or No (N).**

↓ **Press ↓ .**

Altering temperature allowed

Here you determine if manual adjustment of the wash temperature (by using ↑ to move to the line for ”SET TEMPERATURE” then entering a new wash temperature) will be allowed.

The following functions determine how the temperature may be altered:



ADJUST TEMPERATURE ALLOWED

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

Altering the temperature will be allowed.

If you answer **No (N)**:

Altering this temperature parameter will not be allowed.

The following two functions are under ”SETTINGS 2”:

TEMPERATURE INCREASE ALLOWED

which determines whether it is allowed to alter the temperature parameter to higher than the original temperature in the wash program or not.

MAX ADJUST TEMPERATURE

which determines the upper temperature limit for manual temperature adjustment.

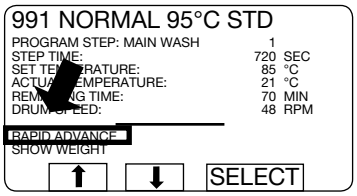
ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	**Y**
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

Y/N **Answer Yes (Y) or No (N).**

↓ Press ↓.

Rapid advance allowed

Here you determine whether it is allowed to use rapid advance forwards or backwards through the wash program during program operation.



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

Rapid advance is allowed.

If you answer **No (N)**:

Rapid advance is not allowed. If you have answered N (No), and subsequently during program operation you wish to terminate a program before it has ended, press the emergency stop button.

For machines with weight measurement installed only!

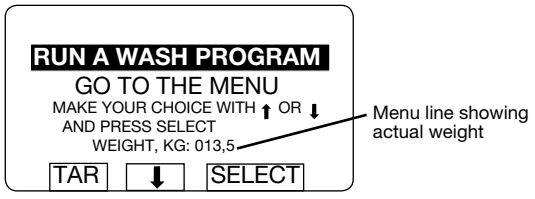
ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

Y/N **Answer Yes (Y) or No (N).**

↓ Press ↓.

Show weight allowed

Here you determine whether the menu line showing actual weight will be displayed or not.



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

Menu line showing current weight will be displayed.

If you answer **No (N)**:

Menu line showing current weight will not be displayed.

For machines with weight measurement installed only!

ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

Water reduction not allowed

If the weight measurement function is installed, the water level will be reduced automatically if the machine does not have a full load.

Here you determine whether it will be possible to switch off the water level reduction during a wash program, using the function "WATER REDUCTION NOT ALLOWED".

If you answer **Yes (Y)**:
The function "WATER REDUCTION NOT ALLOWED" can be used.

If you answer **No (N)**:
The function "WATER REDUCTION NOT ALLOWED" **cannot** be used.

Y/N **Answer Yes (Y) or No (N).**

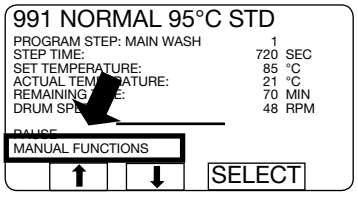
Press ⬇.

ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

Manual functions allowed

Here you determine whether it will be possible to use certain functions manually during the wash program:

- Control water valves and drain valve
- Determine the highest extraction speed allowed
- Motor action after program end
- Control detergent valves



If you answer **Yes (Y)**:
These manual functions will be allowed.

If you answer **No (N)**:
These manual functions will not be allowed.

Y/N **Answer Yes (Y) or No (N).**

Press ⬇.

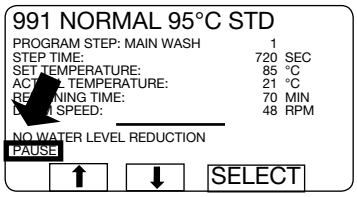
ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	**Y**
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

Y/N **Answer Yes (Y) or No (N).**

Press ⬇.

Pause allowed

Here you determine whether it is allowed to use the pause function during the wash program. This function will not work until the second time the program is run. Before that the line will be blank even if you have inserted Y (Yes) here.



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

The use of the pause function during the wash program will be allowed. Pause is selected either through the PAUSE function or by pressing ↵.

If you answer **No (N)**:

The use of the pause function during the wash program will not be allowed. It is still possible, however, to pause using the ↵ key.

ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	**Y**
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

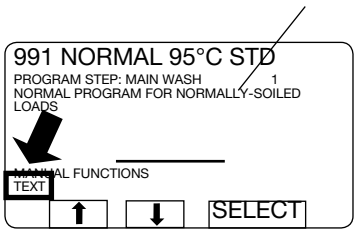
Y/N **Answer Yes (Y) or No (N).**

Press ⬇.

Display of free text about program allowed

Here you determine whether the display of free text about the wash program will be allowed.

Example of ”free text”, entered when the program is created.



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

Display of free text will be allowed.

If you answer **No (N)**:

Display of free text will <u>not</u> be allowed.

ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	**Y**
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

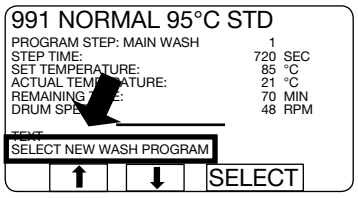
Y/N **Answer Yes (Y) or No (N).**

↓ **Press ↓ .**

Changing wash program allowed

Here you determine whether it is allowed to change to a different wash program during program operation.

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



Changing to a different wash program allowed.

If you answer **No (N)**:

Changing to a different wash program not allowed.

ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	**Y**
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y

Y/N **Answer Yes (Y) or No (N).**

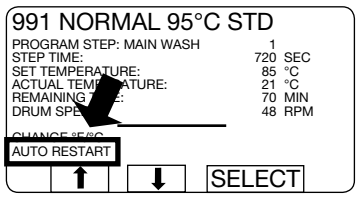
↓ **Press ↓ .**

Automatic restart allowed

Here you determine whether automatic restart of a wash program is allowed.

Automatic restart means that the same program will be repeated the number of times entered. The program will restart immediately, and it will not be possible to open the door in between. If automatic restart has been programmed, the display will show the number of restarts left.

The function is mostly used for testing.



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

Automatic restart will be allowed.

If you answer **No (N)**:

Automatic restart will not be allowed.

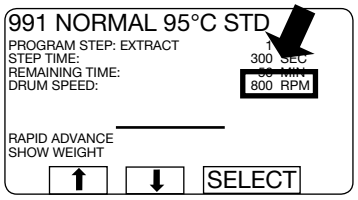
RAPID ADVANCE ALLOWED	Y
SHOW WEIGHT ALLOWED	Y
WATER REDUCTION NOT ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	**Y**
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y

Y/N **Answer Yes (Y) or No (N)..**

↓ **Press ↓ .**

Altering extraction speed allowed

Here you determine whether it is allowed to alter the extraction speed during the current extraction sequence by using ↑ to move to the DRUM SPEED line and entering a new value.



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

Altering extraction speed will be allowed.

If you answer **No (N)**:

Altering extraction speed will not be allowed.

MANUAL FUNCTIONS ALLOWED	Y
PAUSE ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	**Y**
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175

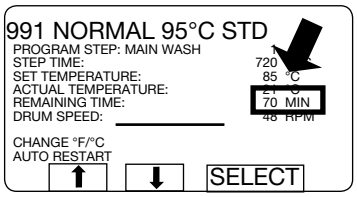
Y/N **Answer Yes (Y) or No (N)..**

↓ **Press ↓ .**

Display time left

Here you determine whether the time the program has left to run will be displayed during the program. This function will not work until the second time the program is run. Before that the line will be blank even if you have inserted Y (Yes) here.

The time displayed will be based on the average of the last five times the program was used.



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

The time the program has left to run will be displayed.

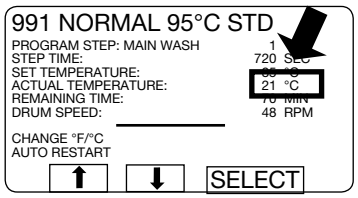
If you answer **No (N)**:

The time the program has left to run will not be displayed.

MANUAL FUNCTIONS ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	**Y**
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	0

Display actual temperature

Here you determine whether the actual water temperature will be displayed during the program.



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

Actual water temperature will be displayed.

If you answer **No (N)**:

Actual water temperature will not be displayed.

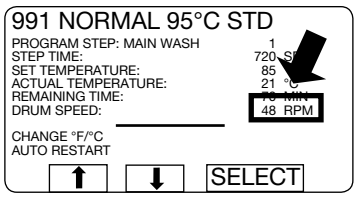
Y/N **Answer Yes (Y) or No (N).**

Press ⬇.

FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	**Y**
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	0
LEVEL LOW	135

Display actual speed

Here you determine whether the actual drum speed will be displayed during the program.



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

Actual drum speed will be displayed.

If you answer **No (N)**:

Actual drum speed will not be displayed.

Y/N **Answer Yes (Y) or No (N).**

Press ⬇.

CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	**N**
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150

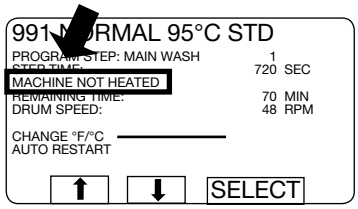
Y/N **Answer Yes (Y) or No (N)..**

Press ⬇ .

Machine not heated

Here you determine if the machine is to heat the water to the required temperature before the time the wash sequence starts, or if the wash time of the sequence is to begin directly after water filling.

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



The machine will not wait for the water to heat, but will begin to count down the time of on the wash sequence immediately.

The temperature of the water will, however, still be monitored and adjusted during filling if the answer Yes has been inserted for the question ”TEMPERATURE CONTROL OF WATER” (see next question).

If the answer ”Yes” is in place (Yes is the default) for the question ”HEATING RELAY ON WHEN NOT HEATED” (see "Settings 2") the heating relay (if machine is equipped with one) will switch on. This means you can heat the water while wash action is in progress. If you do not want the heating relay to switch on, you must insert the answer ”No” for the question ”HEATING RELAY ON WHEN NOT HEATED”.

If you answer **No (N)**:

The machine will heat the water to the set temperature before the count down of the wash sequence begins. The temperature values will be shown on the display (if you have ”allowed” their display).

AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	**Y**
TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175

Y/N **Answer Yes (Y) or No (N).**

Press ⬇ .

Temperature control of water

Here you determine whether the machine will monitor and adjust the water temperature during filling, by opening and closing the cold and hot water valves.

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

This function will be activated.

If you answer **No (N)**:

Temperature control not activated. Both the hot and the cold water valves will be opened until the machine has filled to the correct level.

ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	**Y**
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175
MIDDLE TEMPERATURE COOL -DOWN	70 °C

Temperature in °C

Here you determine if all temperatures are to be shown in °C or °F.

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

All temperatures will be shown in °C.

If you answer **No (N)**:

All temperatures will be shown in °F.

Y/N **Answer Yes (Y) or No (N).**

Press ⬇ .

DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	**N**
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175
MIDDLE TEMPERATURE COOL-DOWN	70 °C
DEFAULT MOTOR ON TIME	0:12

Repeat program mode question

Here you determine whether you (or the user) will be given the chance to select either Standard or Advanced mode for each new program module you are programming, if you start programming in Standard mode.

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

You can select either Standard or Advanced mode for each new program module you program.

If you answer **No (N)**:

All modules must be programmed using either Standard mode or Advanced mode consistently, whichever is selected when you begin programming.

Y/N **Answer Yes (Y) or No (N).**

Press ⬇ .

DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	**N**
LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175
MIDDLE TEMPERATURE COOL-DOWN	70 °C
DEFAULT MOTOR ON TIME	0:12
DEFAULT MOTOR OFF TIME	0:03

No access to standard programs

Here you determine whether the user will have access to the machine's standard programs (numbered 991-999) or not.

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

The user will not have access to the standard programs.

If you answer **No (N)**:

The user will have access to the standard programs.

Y/N **Answer Yes (Y) or No (N).**

Press ⬇ .

DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL- DOWN	**175**
LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175
MIDDLE TEMPERATURE COOL-DOWN	70 °C
DEFAULT MOTOR ON TIME	0:12
DEFAULT MOTOR OFF TIME	0:03
FLUSH DELAY TIME	0:06

Use the numeric keys to enter the value.

1 2 3
4 5 6
7 8 9
0

If you make a mistake while entering digits:

Press ERASE.

⬇

When you have finished:

Press ⬇ .

Water level for quick cool-down

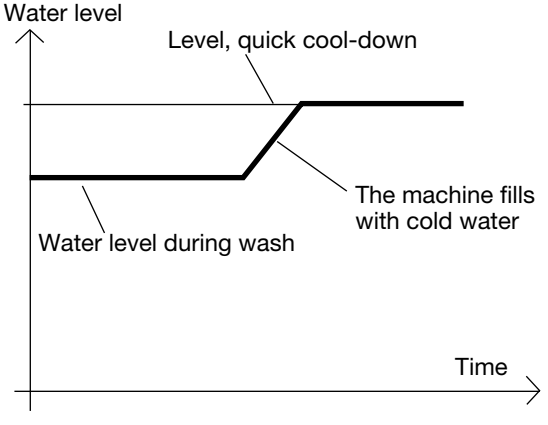
Here you determine the level to which the machine fills with cold water for quick cool-down.

When you are creating a wash program, in the module "COOL-DOWN" there is an option for programming "QUICK COOL-DOWN".

Quick cool-down means that the machine will fill with cold water to a higher level.

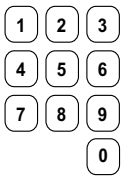
This function is used mainly for reducing the temperature of the water before it is discharged.

For information on the levels used for the various machines, see the manual "Programming, PCS Program Control Unit".



MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	**0**
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175
MIDDLE TEMPERATURE COOL-DOWN	70 °C
DEFAULT MOTOR ON TIME	0:12
DEFAULT MOTOR OFF TIME	0:03
FLUSH DELAY TIME	0:06
FLUSH ON TIME	0:10

Use the numeric keys to enter the value.



If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Water level after unbalance halt

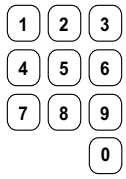
Here you determine the water level to which the machine fills after a halt in extraction due to unbalance.

If the machine's unbalance-sensing equipment is activated when extraction begins, that extraction will halt and a new attempt will begin. If you want the drum to be filled with water to a certain level before the drain valve opens and the machine makes a fresh attempt at extraction, you can set that level here. Level 0 means that the drum will not fill.

For information on the levels used for the various machines, see the manual "Programming, PCS Program Control Unit".

TEMPERATURE IN °C	Y
REPEAT PROGR. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	0
LEVEL LOW	**135**
LEVEL MEDIUM	**150**
LEVEL HIGH	**175**
MIDDLE TEMPERATURE COOL-DOWN	70 °C
DEFAULT MOTOR ON TIME	0:12
DEFAULT MOTOR OFF TIME	0:03
FLUSH DELAY TIME	0:06
FLUSH ON TIME	0:10
BUZZER ON BUTTON	Y
MAX FILLING TIME	10:00

Use the numeric keys to enter the value.



If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Low / Medium / High levels

Here you determine the water levels which are to correspond to L (low), M (medium) and H (high). These levels are used when you are programming in Standard mode.

For information on the levels used for the various machines, see the manual "Programming, PCS Program Control Unit".

LEVEL QUICK COOL-DOWN	175
LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175
MIDDLE TEMPERATURE COOL-DOWN	**70 °C**
DEFAULT MOTOR ON TIME	0:12
DEFAULT MOTOR OFF TIME	0:03
FLUSH DELAY TIME	0:06
FLUSH ON TIME	0:10
BUZZER ON BUTTON	Y
MAX FILLING TIME	10:00
MAX HEATING TIME	10:00
SHOW WEIGHT TIMEOUT	0:20
PC5 BLOCKING OF HEATING	N
PC5 BLOCKING OF SPINNING	Y
HEAT 2 AS STANDARD	Y
SERVICE ALARM HOURS	Y

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇.

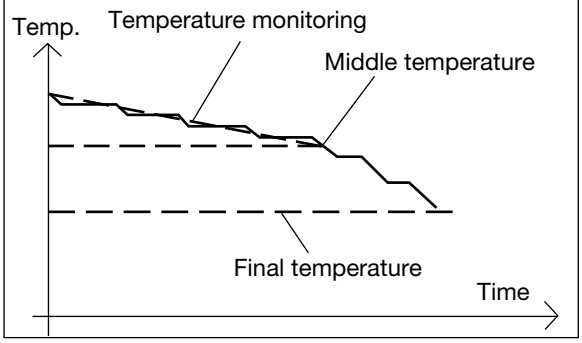
Middle temperature cool-down

Here you determine the middle temperature for cool-down.

When creating a new wash program you can, to prevent creasing of the load, use the COOL-DOWN module to achieve controlled cool-down of the water in the drum. The cool-down sequence is divided into two stages:

1 **wash temperature to middle temperature**
Throughout this stage the machine will monitor the cool-down rate, to ensure it does not exceed the cool-down rate set (4°C per minute when the machine leaves the factory). If the rate set is exceeded, no water will be added until the mean value is acceptable again.

2 **middle temperature to final temperature**
The rate of cool-down is not monitored during this stage. The valve opens and shuts as you have programmed it to do.



LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175
MIDDLE TEMPERATURE COOL-DOWN	70 °C
DEFAULT MOTOR ON TIME	**0:12**
DEFAULT MOTOR OFF TIME	**0:03**
FLUSH DELAY TIME	0:06
FLUSH ON TIME	0:10
BUZZER ON BUTTON	Y
MAX FILLING TIME	10:00
MAX HEATING TIME	10:00
SHOW WEIGHT TIMEOUT	0:20
PC5 BLOCKING OF HEATING	N
PC5 BLOCKING OF SPINNING	Y
HEAT 2 AS STANDARD	Y
SERVICE ALARM HOURS	Y

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

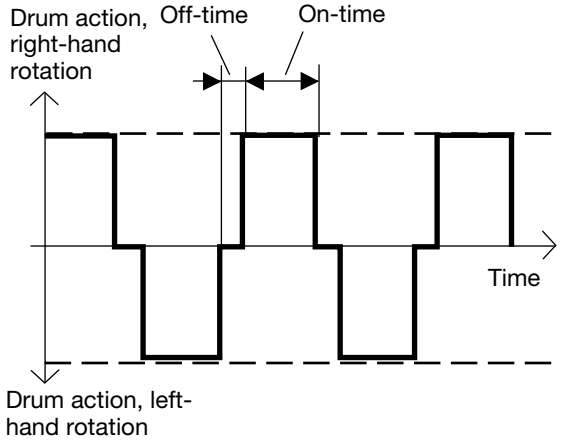
Press ⬇.

Default motor on-time / off-time

Here you determine the machine default times for motor rotation, both ”on-time” and ”off-time”.

Under certain circumstances during a wash program, e.g when the machine starts up again after a halt in extraction due to imbalance, the machine cannot find the ”on-time” and ”off-time” values for its motor action in the current wash program. That is when it needs to be able to find and use the default ”on-time” and ”off-time” values stored here.

The values shown are those recommended by the supplier.



LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175
MIDDLE TEMPERATURE COOL-DOWN	70 °C
DEFAULT MOTOR ON TIME	0:12
DEFAULT MOTOR OFF TIME	0:03
FLUSH DELAY TIME	**0:06**
FLUSH ON TIME	**0:10**
BUZZER ON BUTTON	Y
MAX FILLING TIME	10:00
MAX HEATING TIME	10:00
SHOW WEIGHT TIMEOUT	0:20
PC5 BLOCKING OF HEATING	N
PC5 BLOCKING OF SPINNING	Y
HEAT 2 AS STANDARD	Y
SERVICE ALARM HOURS	Y

Flush times

Here you determine times relating to flushing clean the supply lines of an external system for liquid detergent: the delay time and the length of time ”on”.

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

⬇

When you have finished:

Press ⬇ .

LEVEL UNBALANCE	0
LEVEL LOW	135
LEVEL MEDIUM	150
LEVEL HIGH	175
MIDDLE TEMPERATURE COOL-DOWN	70 °C
DEFAULT MOTOR ON TIME	0:12
DEFAULT MOTOR OFF TIME	0:03
FLUSH DELAY TIME	0:06
FLUSH ON TIME	0:10
BUZZER ON BUTTON	**Y**
MAX FILLING TIME	10:00
MAX HEATING TIME	10:00
SHOW WEIGHT TIMEOUT	0:20
PC5 BLOCKING OF HEATING	N
PC5 BLOCKING OF SPINNING	Y
HEAT 2 AS STANDARD	Y
SERVICE ALARM HOURS	Y

Key click on

Here you determine whether or not there will be an audible click (or beep) each time a key on the PCU control panel is pressed.

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

Click (beep) for each key press.

If you answer **No (N)**:

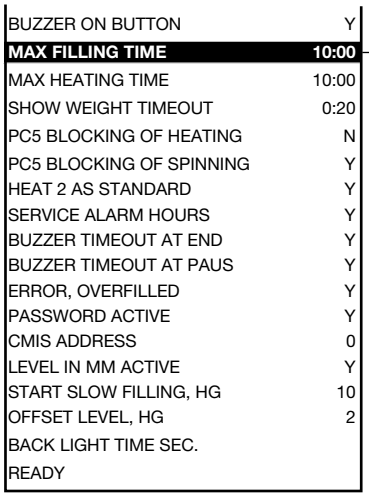
No click or beep audible when keys pressed.

Y/N

Answer Yes (Y) or No (N).

⬇

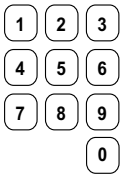
Press ⬇ .



Maximum filling time

Here you determine the maximum time to be allowed for filling the machine with water to the level set.

If the correct level has not been reached within this time, the error message ”NO WATER” will appear on the display.



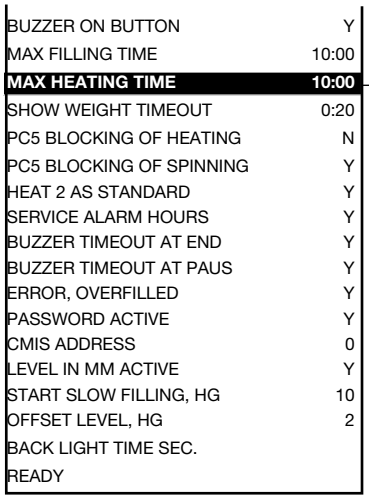
Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

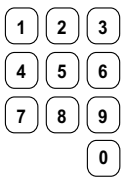
Press ⬇ .



Maximum heating time

Here you determine the maximum time to be allowed to heat the water a certain number of degrees (the number of degrees can be set as a parameter via the function ”MINIMUM TEMPERATURE INCREASE” under ”SETTINGS 2”).

If the water has not been heated within this time, the error message ”NO HEATING” will appear on the display.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

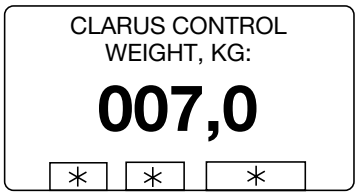
When you have finished:

Press ⬇ .

BUZZER ON BUTTON	Y
MAX FILLING TIME	10:00
MAX HEATING TIME	10:00
SHOW WEIGHT TIMEOUT	**0:20**
PC5 BLOCKING OF HEATING	N
PC5 BLOCKING OF SPINNING	Y
HEAT 2 AS STANDARD	Y
SERVICE ALARM HOURS	Y
BUZZER TIMEOUT AT END	Y
BUZZER TIMEOUT AT PAUS	Y
ERROR, OVERFILLED	Y
PASSWORD ACTIVE	Y
CMIS ADDRESS	0
LEVEL IN MM ACTIVE	Y
START SLOW FILLING, HG	10
OFFSET LEVEL, HG	2
BACK LIGHT TIME SEC.	
READY	

Show weight timeout

Here you determine the length of time the weight will be displayed, before the normal display is restored.



Weight display mode

1 2 3 4 5 6 7 8 9 0 **Use the numeric keys to enter the value.**

If you make a mistake while entering digits:

Press ERASE.

⬇ When you have finished:

Press ⬇ .

BUZZER ON BUTTON	Y
MAX FILLING TIME	10:00
MAX HEATING TIME	10:00
SHOW WEIGHT TIMEOUT	0:20
PC5 BLOCKING OF HEATING	**N**
PC5 BLOCKING OF SPINNING	**Y**
HEAT 2 AS STANDARD	Y
SERVICE ALARM HOURS	Y
BUZZER TIMEOUT AT END	Y
BUZZER TIMEOUT AT PAUS	Y
ERROR, OVERFILLED	Y
PASSWORD ACTIVE	Y
CMIS ADDRESS	0
LEVEL IN MM ACTIVE	Y
START SLOW FILLING, HG	10
OFFSET LEVEL, HG	2
BACK LIGHT TIME SEC.	
READY	

PC5, Power Control

Here you determine whether input X15 on I/O PCB 1 (external pause signal) will have the ”external pause signal” function (for this, the letter ”N” (No) should be inserted on both option lines), or the Power Control (PC5) function. For detailed instructions on PC5 connection and settings, see relevant manual section.

Y/N **Answer Yes (Y) or No (N).**

⬇ **Press ⬇ .**

BUZZER ON BUTTON	Y
MAX FILLING TIME	10:00
MAX HEATING TIME	10:00
SHOW WEIGHT TIMEOUT	0:20
PC5 BLOCKING OF HEATING	N
PC5 BLOCKING OF SPINNING	Y
HEAT 2 AS STANDARD	**Y**
SERVICE ALARM HOURS	Y
BUZZER TIMEOUT AT END	Y
BUZZER TIMEOUT AT PAUS	Y
ERROR, OVERFILLED	Y
PASSWORD ACTIVE	Y
CMIS ADDRESS	0
LEVEL IN MM ACTIVE	Y
START SLOW FILLING, HG	10
OFFSET LEVEL, HG	2
BACK LIGHT TIME SEC.	
READY	

Relay for steam as standard

Here you decide if the machine should heat with steam or el. Yes (Y) the machine will heat with steam (standard) and No (N) the machine will heat with el.

Y/N **Answer Yes (Y) or No (N).**

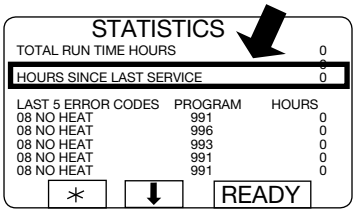
Press ⬇ .

SERVICE ALARM HOURS	**0**

Service interval

Here you determine the interval between service interventions on the machine.

The statistics function of the programme unit contains a counter that can be reset to show the number of hours of effective washing on the machine since the last service intervention.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

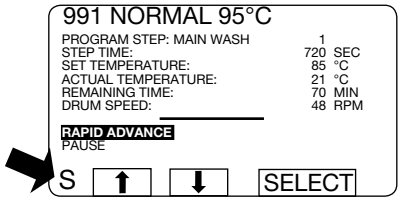
Press ERASE.

When you have finished:

Press ⬇ .

When the service technician has serviced the machine, this counter is reset.

When the time on the counter exceeds the programmed interval, “S” is displayed in the lower, left corner of the display indicating the need for Service.



Buzzer length at programme end

Here you determine for how long the buzzer should sound at the end of the programme unless it is not turned off manually.

When programming the main data for a washing programme, it is possible to select whether or not to sound the buzzer at the programme end. The buzzer is switched off by pressing a function button on the control panel.

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

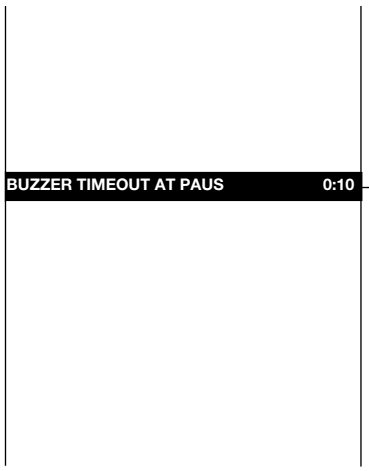
If you make a mistake while entering digits:

Press ERASE.

⬇

When you have finished:

Press ⬇ .



Buzzer length at pause

Here you determine for how long the buzzer should sound at a programmed pause unless it is not turned off manually.

When programming a washing programme, it is possible to select whether or not to pause and sound the buzzer for each washing module before that module starts. The buzzer is switched off by pressing a function button on the control panel.

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

⬇

When you have finished:

Press ⬇ .

PASSWORD SET Y

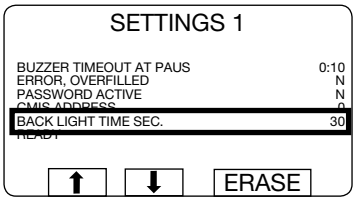
Password set

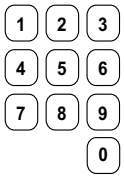
Here you determine whether or not to set a password according to the explanations.

BACK LIGHT TIME SEK. Y

Back light time sec.

Default value is 30 sec. Specify how long in seconds that the display lighting should be on without the control knob being activated.
The value 0 means that the lighting is on all the time.





Use the numeric keys to enter the value.

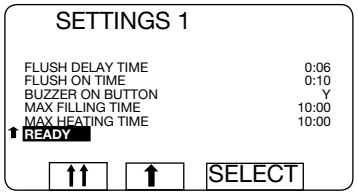
If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

To conclude making changes in variables under ”SETTINGS 1”



Press ↓ to highlight READY.

Insert a suitable strap to short-circuit terminals X7:1-2 on the CPU circuit board, alt. press the button and keep it pressed.

SELECT **Press SELECT.**

The display illustrated left will appear if you fail to insert the strap to short-circuit terminals X7:1-2, alt. keep the button pressed.

Check that the strap between X7:1-2 is intact and in place, alt. press the button again and keep it pressed.

Press SELECT and try again.

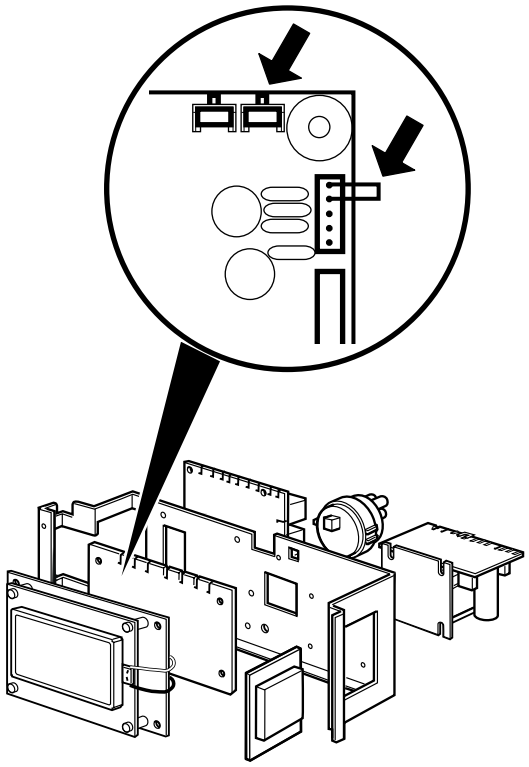
The variables will now have been stored in the PCU.

Remove the strap between terminals X7:1-2 on the CPU circuit board. Release the button.

SELECT **Press SELECT.**

To prevent inadvertent changes in variables

If you have changed any variables under “Settings 1”, when you have finished keying in the changes, you need to insert a strap between two terminals on the CPU circuit board to register the changes in the CPU. Alt. keep the button pressed.



6676, 5227

WARNING!

Use a short circuit jumper when strapping pin X7:1-2.
Do not use a screwdriver or similar as short circuiting a pin to ground may destroy the CPU card.

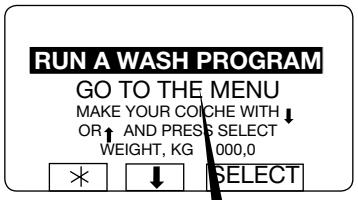
Settings 2

In Configuration 2, there are variables that, in case of carelessness or lack of knowledge, may affect the safety systems or operating safety of the machine. Because of this, these variables are protected by a code system. Each time a variable needs to be changed, it is necessary to obtain a new code from the manufacturer.

The following variables are available in **Configuration 2**:

HEATING RELAY ON IF NOT HEATED	ERROR, REMAINING WATER
TEMPERATURE INCREASE ALLOWED	ERROR, UNBALANCE SWITCH
LEVEL EMPTY	ERROR, MOTOR COMMUNICATION
LEVEL OVERFILL	ERROR, LEVEL ADJUST
PAUSE TEST LEVEL	ERROR, EMERGENCY STOP
PAUSE TEST TEMPERATURE	ERROR, DOOR LOCK SWITCH
DEFAULT TEMPERATURE HYSTERIS	ERROR, START NOT ALLOWED
TEMPERATURE STEP IN COOL-DOWN	ERROR, MIS COMMUNICATION
DEFAULT LOW EXTRACT TIME	ERROR, EWD INTERLOCK
DEFAULT MEDIUM EXTRACT TIME	ERROR, I/O COMMUNICATION
DEFAULT HIGH EXTRACT TIME	ERROR, LOW OIL LEVEL
DEFAULT DRAIN TIME	ERROR, LOW OR HIGH VOLTAGE
DEFAULT DISTR. TIME	ERROR, ERROR CODES FROM MOTOR
DO UNBALANCE MEASUREMENT	ERROR, PRESS. SENSOR TILT
DRAIN OPEN DELAY	ERROR, PRESSURE SENSOR TIMEOUT
START EXTRACT TIME	ERROR, DOOR SWITCH TILT
ROLLOUT TIME	ERROR, LEVEL OFFSET
PAY PER WASH ALARM	TIME DELAY BEFORE DOOR OPENING
LOCK TEST DELAY	UPPER TEMPERATURE FOR ERROR
DRAIN TIME WHEN OVERFILL	LOWER TEMPERATURE FOR ERROR
OIL LUBRICATION HOURS	MAX ADJUST TEMPERATURE
PULSE TIME OIL LUBR. SEC	MAXIMUM EXTRACT SPEED
AMOUNT OF I/O MODULES (1-3)	DEFAULT WASH SPEED
DELAY CLEAR DOOR TEXT	DISTRIBUTION SPEED 1
MAX DRAIN TIME	DISTRIBUTION SPEED 2
TIMEOUT DURING PAUSE	DEFAULT LOW EXTRACT SPEED
MINIMUM TEMPERATURE INCREASE	DEFAULT MEDIUM EXTRACT SPEED
DOOR OPEN DELAY FOR MOTOR LOST	DEFAULT HIGH EXTRACT SPEED
ERROR, NO WATER	START EXTRACT SPEED
ERROR, OPEN DOOR	DEFAULT WASH ACCELERATION
ERROR, DOOR LOCK	DISTRIBUTION ACCELERATION
ERROR, LOW TEMPERATURE	EXTRACT ACCELERATION
ERROR, HIGH TEMPERATURE	START EXTRACT ACCELERATION
ERROR, WATER IN MACHINE	EXTRACT RETARDATION
ERROR, NO HEAT	MAX SPEED DURING FILLING

To select the ”SETTINGS 2” function



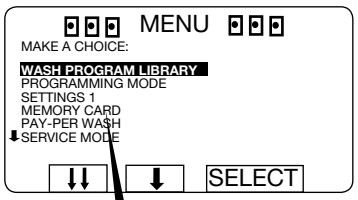
If this menu is not currently displayed:

Press ↩ repeatedly.

Press ↓ to highlight ”GO TO THE MENU”.

RUN A WASH PROGRAM
GO TO THE MENU

SELECT **Press SELECT.**

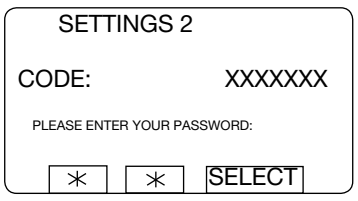


Press ↓ several times...

WASH PROGRAM LIBRARY
PROGRAMMING MODE
SETTINGS 1
MEMORY CARD
PAY-PER-WASH
SERVICE MODE
STATISTICS
MANUAL FUNCTIONS
SETTINGS 2
EXIT

... to highlight ”SETTINGS 2”.

SELECT **Press SELECT.**



1 2 3
4 5 6
7 8 9
0

Enter the four-digit code supplied by the supplier.

SELECT **Press SELECT.**

Changes in ”SETTINGS 2” must be approved by the supplier

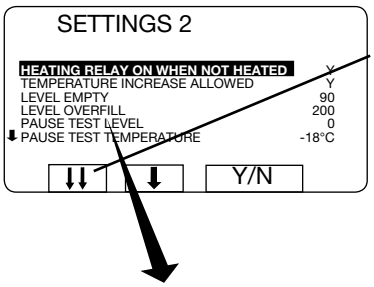
The variables which you can change via ”SETTINGS 2” belong to a category which, if they are changed carelessly or incorrectly, could jeopardise the machine’s safety system(s) or its reliability.

For this reason SETTINGS 2 is protected by a code/password system. Every time you access SETTINGS 2 you have to obtain a new password from the supplier.

The system works like this:

- When you open SETTINGS 2, you will see an eight-digit code. This code will be different each time you open SETTINGS 2.
- You need to tell the supplier, Sweden exactly what this code was. Using a special computer program, they will then ascertain the four-digit password which unlocks this code, and give it to you. This password will work only with the eight-digit code you have noted this time.
- Once you have entered the password, you have access to SETTINGS 2, and can change functions as required.

Variables in Settings 2



When the top line of a menu is highlighted you have the option of scrolling down through the menu faster by pressing [⇊] . When you do, the next portion of the menu is displayed, with its last line highlighted.

HEATING RELAY ON IF NOT HEATED	Y
TEMPERATURE INCREASE ALLOWED	Y
LEVEL EMPTY	90
LEVEL OVERFILL	200
PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO UNBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
DELAY CLEAR DOOR TEXT	04:00
TIMEOUT DRAIN AT PROGRAM START	4:00
TIMEOUT DURING PAUSE	0:00
MINIMUM TEMPERATURE INCREASE	5 °C
DOOR OPEN DELAY FOR MOTOR LOST	1:00
ERROR, NO WATER	Y
ERROR, OPEN DOOR	Y
ERROR, DOOR LOCK	Y
ERROR, LOW TEMPERATURE	Y
ERROR HIGH TEMPERATURE	Y
ERROR, WATER IN MACHINE	Y
ERROR, NO HEAT	Y
ERROR, REMAINING WATER	Y
ERROR, UNBALANCE SWITCH	Y
ERROR, MOTOR COMMUNICATION	Y
ERROR, LEVEL ADJUST	Y
ERROR, EMERGENCY STOP	Y
ERROR, WEIGHT FROM SCALE	Y
ERROR, DOOR LOCK SWITCH	Y
ERROR, START NOT ALLOWED	Y
ERROR, MIS COMMUNICATION	Y
ERROR, EWD INTERLOCK	Y
ERROR, I/O COMMUNICATION	Y
ERROR, LOW OIL LEVEL	Y
ERROR, LOW OR HIGH VOLTAGE	Y
ERROR, ERROR CODES FROM MOTOR	Y
ERROR, PRESS. SENSOR TILT	Y
ERROR, PRESSURE SENSOR TIMEOUT	Y
ERROR, DOOR SWITCH TILT	Y
ERROR, LEVEL OFFSET	Y
ERROR, LEVEL SYSTEM NOT CALIB	Y
TIME DELAY BEFORE DOOR OPENING	0:30
UPPER TEMPERATURE FOR ERROR	98°C
LOWER TEMPERATURE FOR ERROR	-9 °C
MAX ADJUST TEMPERATURE	97 °C
MAXIMUM EXTRACT SPEED	1200
DEFAULT WASH SPEED	48
DISTRIBUTION SPEED	90
DEFAULT LOW EXTRACT RPM	550
DEFAULT MEDIUM EXTRACT RPM	700
DEFAULT HIGH EXTRACT RPM	900
START EXTRACT SPEED	1000
DEFAULT WASH ACCELERATION	20
DISTRIBUTION ACCELERATION	9
EXTRACT ACCELERATION	40
START EXTRACT ACCELERATION	40
EXTRACT RETARDATION	50
MAX SPEED DURING FILLING	100
MAX LEVEL OFFS. FOR AUT. CALIB.	
TIME AT DISTRIBUTION SPEED 2	
NUMBER OF REDIST LOW 1 UNB.	
NUMBER OF REDIST LOW 2 UNB.	
NUMBER OF REDIST MEDIUM UNB.	
NUMBER OF REDIST HIGH UNB.	
NUMBER OF REDIST EXTREME UNB.	
DRAIN TIME AT PROG. START	
DRAIN TIME AT PROG. END	
READY	

Answer the questions using the function key or the numeric keys.

Press [⇓] to move on to the next question.

You can go back and change a question you have answered already by pressing [⇑] repeatedly.

Different types of question

The questions in the various modules are of two different types, each of which needs to be answered in a different way:

Yes/No questions
The function key display shows [Y/N] , which is a toggle function (the letter to the right of the highlighted question toggles between **N** and **Y** each time it is pressed).

Times, temperatures, water levels
To answer these questions, use the numeric keys. The number of digits required will vary. If you make a mistake while entering digits, delete it by pressing **ERASE** one or more times.

No confirmation of value entered
Once you have entered the right value, you simply move on to the next by pressing [⇓] . There is no enter or return key to press to confirm each value.

To alter the value for a question you have already answered
Press [⇑] to highlight the question you want, then simply change the value.

Confirm changes before you exit Settings 2

If you have changed any of the variables, this change must be confirmed when you exit Settings 2. To do this you have to use a strap to short-circuit two terminals on the CPU board, see section headed "To conclude making changes in variables under SETTINGS 2".

HEATING RELAY ON IF NOT HEATED	Y
TEMPERATURE INCREASE ALLOWED	Y
LEVEL EMPTY	90
LEVEL OVERFILL	200
PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO UNBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

Y/N **Answer Yes (Y) or No (N).**

Press ↓.

Heating relay on

Here you determine whether the heating relay will switch on when heating begins.

Note that the heating relay switches on even if the answer ”Yes” is in place for the function ”MACHINE NOT HEATED” (see ”SETTINGS 1”).

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

The heating relay will switch on when heating begins. This is the normal sequence in machines with heating.

If you answer **No (N)**:

The heating relay will not switch on. Used for machines without heating (not using heating), which are equipped with a heating relay.

HEATING RELAY ON IF NOT HEATED	Y
TEMPERATURE INCREASE ALLOWED	Y
LEVEL EMPTY	90
LEVEL OVERFILL	200
PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO UNBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

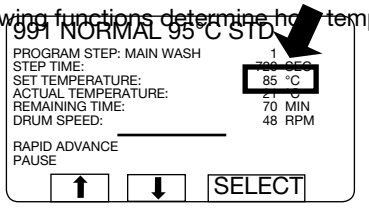
Y/N **Answer Yes (Y) or No (N).**

Press ↓.

Temperature increase allowed

Here you determine whether or not it will be possible for the user, during a wash program, to adjust the wash temperature to a level **higher than the temperature set** (this would be done by highlighting the line ”SET TEMPERATURE” and entering a different wash temperature).

The following functions determine how temperatures may be changed:



TEMPERATURE INCREASE ALLOWED

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

This allows the temperature to be changed to a value which is either **higher or lower** than the original ”set temperature” of the wash program.

If you answer **No (N)**:

The only type of change allowed will be to a value which is **lower** than the original ”set temperature”.

Under ”SETTINGS 1” there is the function:

ADJUST TEMPERATURE ALLOWED

which determines whether or not altering the temperature is allowed at all.

Under ”SETTINGS 2” (i.e. later in this section) there is the function:

MAX ADJUST TEMPERATURE

which determines the upper temperature limit for manual temperature adjustment.

HEATING RELAY ON IF NOT HEATED	Y
TEMPERATURE INCREASE ALLOWED	Y
LEVEL EMPTY	**90**
LEVEL OVERFILL	200
PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO UNBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

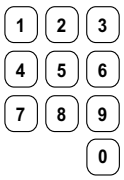
Level empty

Here you determine the water level at which the drum will be regarded as empty.

It is advisable to set this level so that the inner drum will have emptied, but so that some water remains in the outer drum.

If the water has not fallen to this level before the drain time has ended, the message ”NOT DRAINED” will appear on the display.

For information on the levels used for the various machines, see the manual ”Programming, PCS Program Control Unit”.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

HEATING RELAY ON IF NOT HEATED	Y
TEMPERATURE INCREASE ALLOWED	Y
LEVEL EMPTY	90
LEVEL OVERFILL	**200**
PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO UNBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

Level for over-filled drum

Here you determine the water level at which the drum will be regarded as over-filled.

Over-filling can occur if a water valve is faulty, or if you have over-filled the machine manually.

For information on the levels used for the various machines, see the manual ”Programming, PCS Program Control Unit”.

Under ”SETTINGS 2” (i.e. later in this section) there are two functions which influence the way the machine reacts to over-filling:

”DRAIN TIME WHEN OVERFILL”

(i.e. DRAIN TIME AFTER OVER-FILLING)

If you have the answer N (No) inserted for the function ”ERROR OVER-FILLED” (described below, this page), the drain valve will open and discharge water for the time inserted as a parameter under ””DRAIN TIME WHEN OVERFILL”. The level will be checked after that, and the same sequence will be repeated until the level is back to normal.

ERROR OVER-FILLED

If you answer Y (Yes): if the drum becomes over-filled, the machine will stop and the error message ”MACHINE OVER-FILLED” will be displayed.

If you answer N (No): the drain valve will open as described above.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

HEATING RELAY ON IF NOT HEATED	Y
TEMPERATURE INCREASE ALLOWED	Y
LEVEL EMPTY	90
LEVEL OVERFILL	200
PAUSE TEST LEVEL	**0**
PAUSE TEST TEMPERATURE	**-18 °C**
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO UNBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

Use the numeric keys to enter the values.

1 2 3
4 5 6
7 8 9
0

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Test values for pause

Here you determine whether, and if relevant, the conditions under which it will be allowed for the user to open the door during a wash program, for example to take samples of the water.

The following conditions must be fulfilled before it will be possible to open the door:

- The user must have pressed Pause.
- The water level must not exceed the level parameter you have programmed as PAUSE TEST LEVEL.
- The temperature must not exceed the temperature you have programmed as PAUSE TEST TEMPERATURE.

If one or both of the parameters above is set at 0, this function will be disabled and it will not be possible to open the door during the wash program.

HEATING RELAY ON IF NOT HEATED	Y
TEMPERATURE INCREASE ALLOWED	Y
LEVEL EMPTY	90
LEVEL OVERFILL	200
PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	**4 °C**
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO UNBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

Use the numeric keys to enter the value.

1 2 3
4 5 6
7 8 9
0

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Temperature hysteresis

Here you determine a default value for the machine's temperature hysteresis.

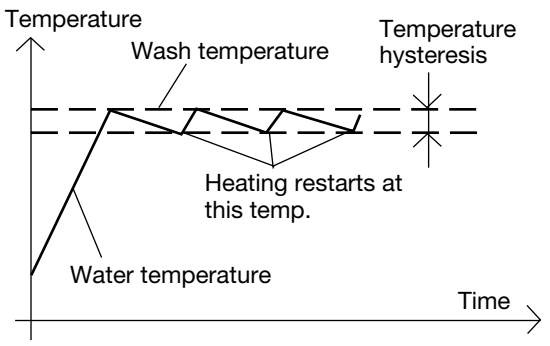
The temperature hysteresis can be programmed individually for each wash program. However, under certain circumstances, e.g. when the user has set the temperature manually, the PCU may not be able to find the temperature hysteresis values in the current wash program. That is when it needs to use the default value stored here.

What is temperature hysteresis?

Once the drum has filled with water to the right level, it is heated to the wash temperature you have programmed. During the wash the water will cool down somewhat.

When the water temperature has reached a lower limit, heating restarts and the water temperature is brought back up to the correct level.

Temperature hysteresis is the number of degrees between the wash temperature and the temperature at which heating needs to restart.



HEATING RELAY ON IF NOT HEATED	Y
TEMPERATURE INCREASE ALLOWED	Y
LEVEL EMPTY	90
LEVEL OVERFILL	200
PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	**4 °C**
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO UNBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Temperature step in cool-down

Here you determine the maximum reduction in temperature per minute during the first stage of cool-down.

How does cool-down work?

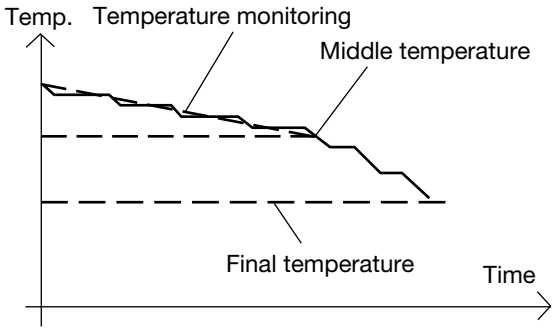
When creating a new wash program you can, to prevent creasing of the load, use the COOL-DOWN module to achieve controlled cool-down of the water in the drum. The cool-down sequence is divided into two stages:

1 wash temperature to middle temperature

Throughout this stage the machine will monitor the cool-down rate, to ensure it does not exceed the limit value you are determining here. If the rate set is exceeded, no water will be added until the mean value is acceptable again.

2 middle temperature to final temperature

The rate of cool-down is not monitored during this stage. The valve opens and shuts as you have programmed it to do.



HEATING RELAY ON IF NOT HEATED	Y
TEMPERATURE INCREASE ALLOWED	Y
LEVEL EMPTY	90
LEVEL OVERFILL	200
PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	**00:00**
DEFAULT MEDIUM EXTRACT TIME	**00:00**
DEFAULT HIGH EXTRACT TIME	**00:00**
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO UNBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

Applies only to machines with frequency-controlled motor.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

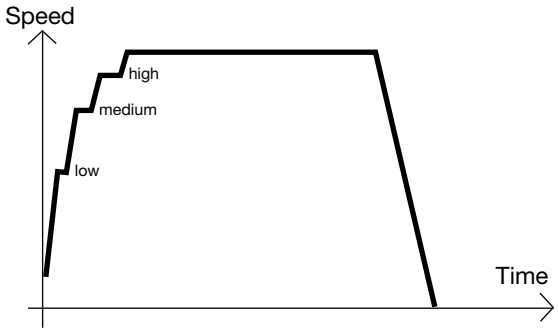
Press ⬇ .

Default values, extraction time

Here you determine how long the machine will extract at the speeds low, medium and high. Later in this section you will find the instructions for programming the actual speeds to be used for low, medium, high and ”turbo” extraction.

How an extraction sequence works:

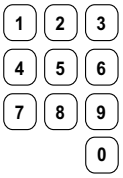
In order to extract some of the water from the load at lower speeds, the drum does not accelerate to its highest speed immediately. Instead it accelerates in several steps. This means that the drum first accelerates to a low speed level, remains at that for a certain time, then accelerates to a higher level, extracts at that speed for a certain time, and so on until it reaches its final (maximum) extraction speed. If you program a low extraction speed, the number of steps at the beginning of the extraction sequence may be reduced.



PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	**00:00**
DEFAULT DISTR. TIME	**00:00**
DO UNBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0

Default values for re-start after unbalance

Here you determine the drain time and distribution time the machine will use if it cannot find the time parameters it requires, e.g. during manual operation of the drain in a washer extractor with a suspended drum.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇.

DEFAULT TEMPERATURE HYSTERIS	4°C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO UNBALANCE MEASUREMENT	**N**
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05

Unbalance measurement

Here you determine whether the machine will calculate unbalance before it accelerates to extraction speed. Drum unbalance can only be calculated in washer extractors with suspended drums. It uses torque data from the motor control unit to determine whether the imbalance is too high.

For washer extractors with suspended drums without frequence control and which have a separate unbalance switch, the answer to this question should be No.

If you answer Yes (Y):

The machine will calculate unbalance before every extraction sequence.

If you answer No (N):

The machine will not calculate unbalance.

Answer Yes (Y) or No (N).

Press ⬇.

TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:10
DEFAULT MEDIUM EXTRACT TIME	00:15
DEFAULT HIGH EXTRACT TIME	00:20
DEFAULT DRAIN TIME	00:40
DEFAULT DISTR. TIME	00:30
DO UNBALANCE MEASUREMENT	Y
DRAIN OPEN DELAY	**0:13**
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
OIL LUBRICATION HOURS	100

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Drain open delay

Here you determine whether you want a delay before the drain valve opens, for example if you want the drum to have time to gather speed first, before the valve opens.

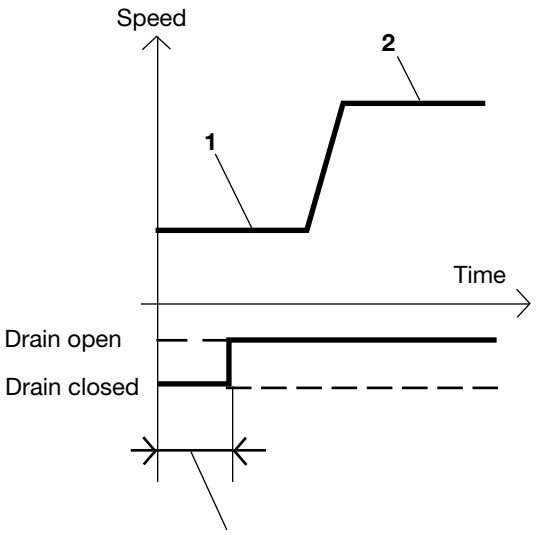
The drain module
may be structured according to point 1 (here) only, according to point 2 only, or a combination of 1 and 2, according to the way you program.

1 Drain time

The drain will be open. The motor may be at a standstill, on gentle action or normal action.

2 Distribution time

The drain will be open. The motor runs at distribution speed. During this time the wash load will be distributed evenly around the walls of the inner drum.



You can program this time here

DEFAULT LOW EXTRACT TIME	00:10
DEFAULT MEDIUM EXTRACT TIME	00:15
DEFAULT HIGH EXTRACT TIME	00:20
DEFAULT DRAIN TIME	00:40
DEFAULT DISTR. TIME	00:30
DO UNBALANCE MEASUREMENT	Y
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	**00:30**
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Start extract time (i.e. Initial extraction time)

Here you determine the length of time for initial extraction (if used).

When you are programming the ”main data” for a wash program you can determine whether the program is to begin with initial extraction. Initial extraction is used to spin the load outwards against the drum walls, which makes it absorb water more readily on first filling. As a result of this the machine will not require so much extra filling (repeated topping up) later (to maintain its required water level).

There are two other functions affecting initial extraction which can be programmed under SETTINGS 2:

- START EXTRACT SPEED
- START EXTRACT ACCELERATION

DEFAULT MEDIUM EXTRACT TIME	00:15
DEFAULT HIGH EXTRACT TIME	00:20
DEFAULT DRAIN TIME	00:40
DEFAULT DISTR. TIME	00:30
DO UNBALANCE MEASUREMENT	Y
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	**00:01**
PAY PER WASH ALARM	0
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	3

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

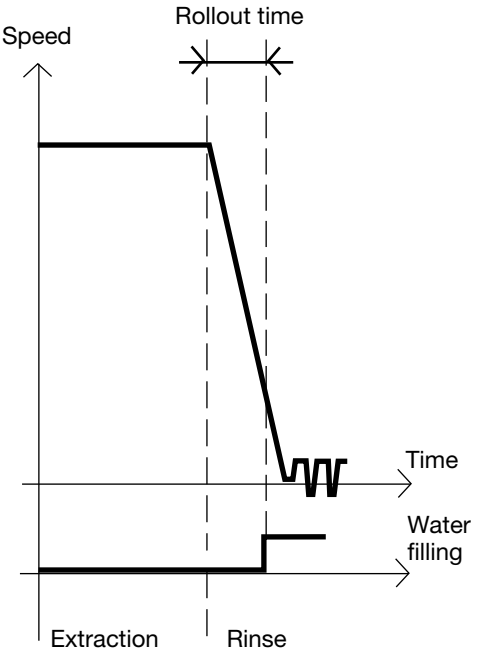
Press ⬇ .

Rollout time

Here you determine whether you want a time delay after each extraction before the machine starts to fill with water, to give the motor time to slow down. This function is useful if the motor is not a frequency-controlled one.

Another function, intended primarily for frequency-controlled motors (which continuously report motor speed to the PCU), is called ”MAX. SPEED DURING FILLING” (SETTINGS 2, described later in this section). This function allows you to specify a speed which the motor must drop below before water filling can begin.

If these functions are combined, you must ensure that the ”rollout time” will have ended before water filling is allowed to begin, regardless of whether the drum speed has, prior to that, dropped below the speed specified in ”MAX. SPEED DURING FILLING”.



DEFAULT HIGH EXTRACT TIME	00:20
DEFAULT DRAIN TIME	00:40
DEFAULT DISTR. TIME	00:30
DO UNBALANCE MEASUREMENT	Y
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	**0**
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	3

Pay per wash

This question is for special installations with pay systems. How to use it is described in the documentation supplied with these systems.

Press ⬇ **.**

DO UNBALANCE MEASUREMENT	Y
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
LOCK TEST DELAY	**0:10**
DRAIN TIME WHEN OVERFILL	0:05
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	3
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00

Lock test delay

Here you determine the length of time between when the door is locked and when the check should be made of the lock's microswitch.

When the machine commands that the door be locked, the door lock is activated. The lock actuates a microswitch which signals whether or not the door is really locked.

Note that the machine always begins its wash sequence immediately after the door has been locked, and that the time you program here will not affect that. If, when this check is made, the microswitch should signal that the door is not locked, the machine will stop and the error message DOOR UNLOCKED will be displayed.

1 2 3
4 5 6
7 8 9
0

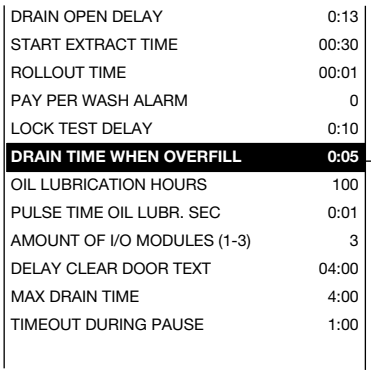
Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ **.**



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Time drain to open after over-filling

Here you determine how long the drain valve should open for if the machine has over-filled, provided you ensure that the parameter (response) stored for the function ERROR OVER-FILLED is N (No) (see below). The drain valve will open for the time programmed and the level will then be checked. If the level is still too high, the drain valve will open again, and so on.

Over-filling can occur if a water valve is faulty, or if you have over-filled the machine manually.

Also under ”SETTINGS 2” there are two functions which influence the way the machine reacts to over-filling:

ERROR OVER-FILLED

If you answer Y (Yes): if the drum becomes over-filled, the machine will stop and the error message ”MACHINE OVER-FILLED” will be displayed.

If you answer N (No): the drain valve will open as described above.

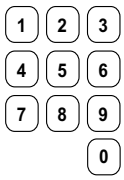
LEVEL OVERFILL (i.e. DRUM OVER-FILLED)

Here you specify the level at which the drum is considered to be ”over-filled”.

PAY PER WASH ALARM	0
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
OIL LUBRICATION HOURS	**100**
PULSE TIME OIL LUBR. SEC	**0:01**
AMOUNT OF I/O MODULES (1-3)	3
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00
TIMEOUT DURING PAUSE	1:00
MINIMUM TEMPERATURE INCREASE	5°C
DOOR OPEN DELAY FOR MOTOR LOST	1:00
ERROR, NO WATER	Y

Oil lubrication

Here you determine the lubrication interval and pulse time for the oil lubrication systems used on larger washer extractors.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

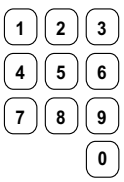
Press ⬇.

PAY PER WASH ALARM	0
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	**3**
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00
TIMEOUT DURING PAUSE	1:00
MINIMUM TEMPERATURE INCREASE	5°C
DOOR OPEN DELAY FOR MOTOR LOST	1:00
ERROR, NO WATER	Y

Number of I/O circuit boards

Here you specify how many I/O circuit boards the PCU has.

Different types of washer extractor may be equipped with one, two or three I/O boards, according to how many inputs and outputs the particular machine needs (e.g. for external liquid supply, tilt function and extra water valves).



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇.

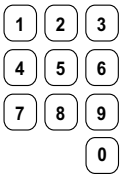
DRAIN TIME WHEN OVERFILL	0:05
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	3
DELAY CLEAR DOOR TEXT	**04:00**
MAX DRAIN TIME	4:00
TIMEOUT DURING PAUSE	1:00
MINIMUM TEMPERATURE INCREASE	5°C
DOOR OPEN DELAY FOR MOTOR LOST	1:00
ERROR, NO WATER	Y
ERROR, OPEN DOOR	Y
ERROR, DOOR LOCK	Y
ERROR, LOW TEMPERATURE	Y
ERROR, HIGH TEMPERATURE	Y

Delay clear door text

Here you determine how long the text ”WAITING FOR DOOR TO UNLOCK” will remain visible if, for some reason, the door is not unlocked at the right time.

When a wash program has ended, the text above will be displayed until the door is unlocked. The door is normally unlocked within one minute on most machines.

If the door is not unlocked within a reasonable time, the most common cause is probably jamming in the lock mechanism. In these cases, the text above may mislead the user, causing him to think that the normal unlocking sequence is not yet finished.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

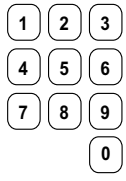
When you have finished:

Press ⬇ .

OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	3
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	**4:00**
TIMEOUT DURING PAUSE	1:00
MINIMUM TEMPERATURE INCREASE	5°C
DOOR OPEN DELAY FOR MOTOR LOST	1:00
ERROR, NO WATER	Y
ERROR, OPEN DOOR	Y
ERROR, DOOR LOCK	Y
ERROR, LOW TEMPERATURE	Y
ERROR, HIGH TEMPERATURE	Y
ERROR, WATER IN MACHINE	Y

Max drain time

This function is not currently being used.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	3
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00
TIMEOUT DURING PAUSE	**1:00**
MINIMUM TEMPERATURE INCREASE	5°C
DOOR OPEN DELAY FOR MOTOR LOST	1:00
ERROR, NO WATER	Y
ERROR, OPEN DOOR	Y
ERROR, DOOR LOCK	Y
ERROR, LOW TEMPERATURE	Y
ERROR, HIGH TEMPERATURE	Y
ERROR, WATER IN MACHINE	Y

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

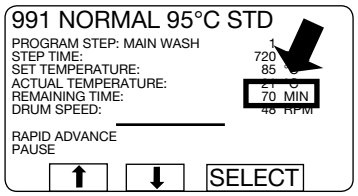
Press ERASE.

When you have finished:

Press ⬇ .

Timeout during pause

Here you determine the maximum time for a pause in the program, if it is to be available for use in calculating the average length of the program.



The time shown on the display alongside ”REMAINING TIME” is based on the average of the last five times this program was used. This time also includes pauses in the program. If the pause time in the program exceeds the time parameter you have programmed, it will not be used for average-time calculation derived from the current program operation.

PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	3
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00
TIMEOUT DURING PAUSE	1:00
MINIMUM TEMPERATURE INCREASE	**5°C**
DOOR OPEN DELAY FOR MOTOR LOST	1:00
ERROR, NO WATER	Y
ERROR, OPEN DOOR	Y
ERROR, DOOR LOCK	Y
ERROR, LOW TEMPERATURE	Y
ERROR, HIGH TEMPERATURE	Y
ERROR, WATER IN MACHINE	Y

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Minimum temperature increase

Here you determine the smallest temperature increase allowed during the time specified in MAXIMUM HEATING TIME (see below).

These three functions are linked:

The following two functions also affect the way in which the machine is controlled during heating:

MAXIMUM HEATING TIME (SETTINGS 1)

Here you determine the maximum time it may take to heat the water the number of degrees you have specified above.

The function ERROR, NO HEAT (SETTINGS 2)

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

If the temperature has not increased by the number of degrees you program here over the time which is specified in MAXIMUM HEATING TIME, the error message NO HEATING will appear on the display.

If you answer **N (No)**:

Monitoring of heating will be switched off, and no error message will be displayed.

AMOUNT OF I/O MODULES (1-3)	3
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00
TIMEOUT DURING PAUSE	1:00
MINIMUM TEMPERATURE INCREASE	5°C
DOOR OPEN DELAY FOR MOTOR LOST	**1:00**
ERROR, NO WATER	Y
ERROR, OPEN DOOR	Y
ERROR, DOOR LOCK	Y
ERROR, LOW TEMPERATURE	Y
ERROR, HIGH TEMPERATURE	Y
ERROR, WATER IN MACHINE	Y
ERROR, NO HEAT	Y

Door open delay for ”motor lost”

Here you determine the length of time during which the door will be prevented from opening if, (in machines with frequency control) the MCU loses control of braking at the end of extraction.

In machines with frequency-controlled motors it is the MCU which ensures that the motor and drum are braked smoothly after extraction speed.

If anything should go wrong at this stage so that the MCU loses control of the braking process (colloquially referred to as ”motor lost”) the MCU will inform the PCU. If the program has reached the final extraction sequence, the PCU will ensure that the door cannot be opened until the time you program here has elapsed.

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

ERROR, NO WATER	**Y**
ERROR, OPEN DOOR	**Y**
ERROR, DOOR LOCK	**Y**
ERROR, LOW TEMPERATURE	**Y**
ERROR, HIGH TEMPERATURE	**Y**
ERROR, WATER IN MACHINE	**Y**
ERROR, NO HEAT	**Y**
ERROR, REMAINING WATER	**Y**
ERROR, UNBALANCE SWITCH	**Y**
ERROR, MOTOR COMMUNICATION	**Y**
ERROR, LEVEL ADJUST	**Y**
ERROR, EMERGENCY STOP	**Y**
ERROR, WEIGHT FROM SCALE	**Y**
ERROR, DOOR LOCK SWITCH	**Y**
ERROR, START NOT ALLOWED	**Y**
ERROR, MIS COMMUNICATION	**Y**
ERROR, EWD INTERLOCK	**Y**
ERROR, I/O COMMUNICATION	**Y**
ERROR, LOW OIL LEVEL	**Y**
ERROR, LOW OR HIGH VOLTAGE	**Y**
ERROR, ERROR CODES FROM MOTOR	**Y**
ERROR, PRESS SENSOR TILT	**Y**
ERROR, PRESSURE SENSOR TIMEOUT	**Y**
ERROR, DOOR SWITCH TILT	**Y**
ERROR, LEVEL OFFSET	**Y**
ERROR, LEVEL SYSTEM NOT CALIB.	**Y**

Switch on/off monitoring of machine functions/error message display

All of these options (involving monitoring of machine functions and display of the related error message if flagged) can be switched on or off here.

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

This enables function monitoring/error message display for this particular line.

If you answer **No (N)**:

This disables function monitoring/error message display for this particular line.

On the next two pages is a summary of all the options accessible here, the errors monitored and the error message which will be displayed for each.

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

List of errors, functions monitored and relevant error messages displayed

Error/Function	Error message displayed
01 ERROR. NO WATER Water level has not reached set level within time set. After this error message appears and the machine is reset, the machine will try again.	NO WATER
02 ERROR. OPEN DOOR Signal from microswitch which checks door status absent at program start. After this error message appears and the machine is reset, the machine will try again.	DOOR OPEN
03 ERROR. DOOR LOCK Signal from microswitch which detects when the door is locked absent at program start.	DOOR UNLOCKED
04 ERROR. LOW TEMPERATURE The temperature is below the lowest value allowed (open circuit in temperature sensor).	NTC LOW TEMP
05 ERROR. HIGH TEMPERATURE The temperature is above the highest value allowed (short-circuit in temperature sensor).	NTC HIGH TEMP
06 ERROR. WATER IN MACHINE The water level is higher that the level EMPTY at the start of the program.	WATER IN DRUM
07 ERROR. OVER-FILLED The water level is higher than the ”LEVEL OVERFILL” (i.e. DRUM OVER-FILLED) level. If this function is switched off (=N), instead the drain valve will open for a short time and discharge some of the water. This is described under the function ”DRAIN TIME WHEN OVERFILL” (i.e. DRAIN TIME AFTER OVER-FILLING) earlier in this section.	MACHINE OVER-FILLED
08 ERROR. NO HEAT The temperature has not increased by the number of degrees specified in the function ”MIN. TEMPERATURE INCREASE” (see back in this section), over the period of time specified in the function MAXIMUM HEATING TIME (see ”SETTINGS 1”).	NO HEATING
10 ERROR. REMAINING WATER When the drain sequence has finished, the water level is still higher than the EMPTY level.	NOT DRAINED
11 ERROR. UNBALANCE SWITCH The imbalance switch is closed when the machine is starting on a drain sequence.	UNBALANCE SENSOR FAULT
13 ERROR. MOTOR COMMUNICATION Communication between PCU and motor control unit interrupted or disturbed.	NO MOTOR COMM
14 ERROR. LEVEL ADJUST Every machine has individual level calibration at the factory. If these calibration values are missing or fall outside the limit values, an error warning will be flagged at each program start-up. The program can still be started, however, by pressing START. It will then use standard (default) values, which means that the levels will not be as precise as intended.	LEVEL CALIBRATION

List of errors, functions monitored and relevant error messages displayed, cont.

Error/Function	Error message displayed
15 ERROR. EMERGENCY STOP	
The emergency stop button has been pressed.	EMERGENCY STOP
17 ERROR. DOOR LOCK SWITCH	
Even though the door lock microswitch indicates that the door is locked, the signal from the microswitch which is used to detect when the door is closed is absent.	DOOR LOCK
18 ERROR. START NOT ALLOWED	
Network does not allow programme start.	START NOT ALLOWED
19 ERROR. MIS COMMUNICATION	
Machine has lost contact with network.	MIS COMMUNICATION
20 ERROR. EWD INTERLOCK	
The motor control system for frequency-controlled motors (EWD) receives a signal direct from the door lock which indicates that the door really is closed. If this signal is lost, a fault signal is sent to the PCU	INTERLOCK STATUS
21 ERROR. I/O COMMUNICATION	
Communication between the CPU board and one of the I/O boards interrupted or disturbed.	I/O COMMUNICATION
22 ERROR. LOW OIL LEVEL	
In machines with an oil lubrication system, indicates low level in the oil container.	LOW OIL LEVEL
23 ERROR. LOW OR HIGH VOLTAGE	
Incorrect input voltage/power supply (voltage too low or too high, phase fault etc.) to the motor control unit.	PHASE
27 ERROR. LEVEL OFFSET	
The pressure sensor for the water level signals a value that is so different from the empty machine state that the automatic level calibration cannot adjust the level system.	AUT. LEVEL CALIB.

List of errors, functions monitored and relevant error messages displayed, cont.

Error/Function	Error message displayed
ERROR CODES FROM MOTOR This function includes a number of error warnings from the motor control system for frequency-controlled motors (EWD)	
31 Temperature of MCU control circuits too high	HEAT SINK TOO HOT
32 Motor thermal protection has tripped	MOTOR TOO HOT
33 The motor has received a start command from the PCU without receiving an interlock signal from the door lock. The MCU receiving circuitry for the interlock signal is not faulty	NO INTERLOCK
35 Short-circuit between motor windings or to earth.	MOTOR SHORTNING
36 Fault in MCU receiving circuitry for lock acknowledgement signal.	INTERLOCK HARDWARE
37 DC voltage too low	LOW DC VOLTAGE
38 DC voltage too high	HIGH DC VOLTAGE
39 DC level varying too much	RIPPEL ON DC BUS
40 One phase missing for/at motor control unit	LINE INTERRUPT
41 Hardware fault, temperature monitoring, motor	KLIXON CIRCUITS
42 The motor controller (MCU) (inverter) contains several different parameter sets for different motors. During power up the timer checks that the correct parameter set digit is written into the MCU. If not, the timer will write down the parameter set digit defined in fixed config. If the MCU discovers that no parameter set value is written down into the MCU, the error coce will be displayed.	NO PARAM. SET IN MCU

ERROR, EWD INTERLOCK	Y
ERROR, I/O COMMUNICATION	Y
ERROR, LOW OIL LEVEL	Y
ERROR, LOW OR HIGH VOLTAGE	Y
ERROR, ERROR CODES FROM MOTOR	Y
ERROR, PRESS SENSOR TILT	Y
ERROR, PRESSURE SENSOR TIMEOUT	Y
ERROR, DOOR SWITCH TILT	Y
ERROR, LEVEL OFFSET	Y
ERROR, LEVEL SYSTEM NOT CALIB.	Y
TIME DELAY BEFORE DOOR OPENING	**0:30**
UPPER TEMPERATURE FOR ERROR	98°C
LOWER TEMPERATURE FOR ERROR	-9°C
MAX ADJUST TEMPERATURE	97°C
MAXIMUM EXTRACT SPEED	825
DEFAULT WASH SPEED	37

Time delay before door opening

Here you determine the length of time during which the door will be prevented from opening if the machine has detected a fault-error and is displaying an error message. This must give enough time for the water to empty and drum speed to be reduced.

Please note that the water will not be emptied as a result of all types of error. In the case of the HIGH TEMPERATURE error, for example, the door will remain locked even though the time you have programmed has elapsed. One reason for this is to prevent the risk of a fire if the electrical heating equipment is still switched on and heating.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

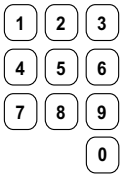
Press ⬇ .

ERROR, I/O COMMUNICATION	Y
ERROR, LOW OIL LEVEL	Y
ERROR, LOW OR HIGH VOLTAGE	Y
ERROR, ERROR CODES FROM MOTOR	Y
ERROR, PRESS SENSOR TILT	Y
ERROR, PRESSURE SENSOR TIMEOUT	Y
ERROR, DOOR SWITCH TILT	Y
ERROR, LEVEL OFFSET	Y
ERROR, LEVEL SYSTEM NOT CALIB.	Y
TIME DELAY BEFORE DOOR OPENING	0:30
UPPER TEMPERATURE FOR ERROR	**98°C**
LOWER TEMPERATURE FOR ERROR	**-9°C**
MAX ADJUST TEMPERATURE	97°C
MAXIMUM EXTRACT SPEED	825
DEFAULT WASH SPEED	37
DISTRIBUTION SPEED	63

Upper and lower temperature limits for errors

Here you determine the temperature limits for the errors HIGH TEMPERATURE and LOW TEMPERATURE respectively.

If the HIGH TEMPERATURE error is flagged, this usually indicates an short circuit in the sensor or wiring. LOW TEMPERATURE usually indicates a open circuit in sensor or wiring. That is why the default value for the low temperature limit is -9 C. If the sensor cools to this temperature, the resistance from the sensor will be 0 ohms, which corresponds to a short-circuit.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

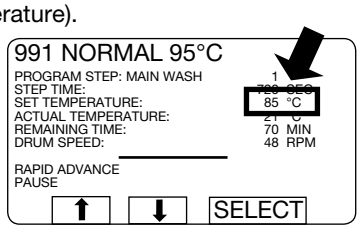
When you have finished:

Press ⬇ .

ERROR, I/O COMMUNICATION	Y
ERROR, LOW OIL LEVEL	Y
ERROR, LOW OR HIGH VOLTAGE	Y
ERROR, ERROR CODES FROM MOTOR	Y
ERROR, PRESS SENSOR TILT	Y
ERROR, PRESSURE SENSOR TIMEOUT	Y
ERROR, DOOR SWITCH TILT	Y
ERROR, LEVEL OFFSET	Y
ERROR, LEVEL SYSTEM NOT CALIB.	Y
TIME DELAY BEFORE DOOR OPENING	0:30
UPPER TEMPERATURE FOR ERROR	98°C
LOWER TEMPERATURE FOR ERROR	-9°C
MAX ADJUST TEMPERATURE	**97°C**
MAXIMUM EXTRACT SPEED	1200
DEFAULT WASH SPEED	48
DISTRIBUTION SPEED	90

Upper limit for manual temperature adjustment ("Max adjust temperature")

Here you determine the highest temperature the user may alter the wash temperature to manually (by using ⬆ to move to the line for "SET TEMPERATURE" then entering a new wash temperature).



The function above will be available only if the answer Y (Yes) is in place for these two functions:

- ADJUST TEMPERATURE (SETTINGS 1) which determines whether or not it will be allowed to alter the temperature during a program.
- TEMPERATURE INCREASE ALLOWED (SETTINGS 2) which determines whether or not it will be allowed to alter the temperature parameter to higher than the original temperature in the wash program or not.

1 2 3 4 5 6 7 8 9 0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

⬇

When you have finished:

Press ⬇ .

ERROR, I/O COMMUNICATION	Y
ERROR, LOW OIL LEVEL	Y
ERROR, LOW OR HIGH VOLTAGE	Y
ERROR, ERROR CODES FROM MOTOR	Y
ERROR, PRESS SENSOR TILT	Y
ERROR, PRESSURE SENSOR TIMEOUT	Y
ERROR, DOOR SWITCH TILT	Y
ERROR, LEVEL OFFSET	Y
ERROR, LEVEL SYSTEM NOT CALIB.	Y
TIME DELAY BEFORE DOOR OPENING	0:30
UPPER TEMPERATURE FOR ERROR	98°C
LOWER TEMPERATURE FOR ERROR	-9°C
MAX ADJUST TEMPERATURE	97°C
MAXIMUM EXTRACT SPEED	**1200**
DEFAULT WASH SPEED	48
DISTRIBUTION SPEED	90

Maximum extract speed

Here you determine the machine's maximum extraction speed.

This speed cannot be exceeded, neither by programming parameters in wash programs nor by manual adjustment.

1 2 3 4 5 6 7 8 9 0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

⬇

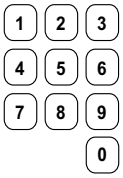
When you have finished:

Press ⬇ .

ERROR, PRESS SENSOR TILT	Y
ERROR, PRESSURE SENSOR TIMEOUT	Y
ERROR, DOOR SWITCH TILT	Y
ERROR, LEVEL OFFSET	Y
ERROR, LEVEL SYSTEM NOT CALIB.	Y
TIME DELAY BEFORE DOOR OPENING	0:30
UPPER TEMPERATURE FOR ERROR	98°C
LOWER TEMPERATURE FOR ERROR	-9°C
MAX ADJUST TEMPERATURE	97°C
MAXIMUM EXTRACT SPEED	825
DEFAULT WASH SPEED	**48**
DISTRIBUTION SPEED	90
DEFAULT LOW EXTRACT RPM	550
DEFAULT MEDIUM EXTRACT RPM	700
DEFAULT HIGH EXTRACT RPM	900
START EXTRACT SPEED	1000
DEFAULT WASH ACCELERATION	20

Default wash speed

Here you determine the wash speed the machine will use at any time when it cannot find instructions for the correct wash speed, e.g. in the event of manual operation.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ **.**

ERROR, PRESS. SENSOR TILT	Y
ERROR, PRESSURE SENSOR TIMEOUT	Y
ERROR, DOOR SWITCH TILT	Y
ERROR, LEVEL OFFSET	Y
ERROR, LEVEL SYSTEM NOT CALIB.	Y
TIME DELAY BEFORE DOOR OPENING	0:30
UPPER TEMPERATURE FOR ERROR	98°C
LOWER TEMPERATURE FOR ERROR	-9°C
MAX ADJUST TEMPERATURE	97°C
MAXIMUM EXTRACT SPEED	825
DEFAULT WASH SPEED	48
DISTRIBUTION SPEED 1	**90**
DISTRIBUTION SPEED 2	
DEFAULT LOW EXTRACT RPM	550
DEFAULT MEDIUM EXTRACT RPM	700
DEFAULT HIGH EXTRACT RPM	900
START EXTRACT SPEED	1000
DEFAULT WASH ACCELERATION	20

Distribution speed

Here you determine the machine's distribution speed. The distribution speed is not programmable when you create a wash program. Instead the machine always uses the value you set here.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ **.**

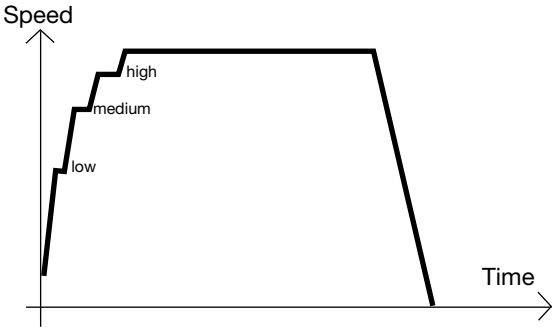
TIME DELAY BEFORE DOOR OPENING	0:30
UPPER TEMPERATURE FOR ERROR	98°C
LOWER TEMPERATURE FOR ERROR	-9°C
MAX ADJUST TEMPERATURE	97°C
MAXIMUM EXTRACT SPEED	1200
DEFAULT WASH SPEED	48
DISTRIBUTION SPEED	90
DEFAULT LOW EXTRACT RPM	**550**
DEFAULT MEDIUM EXTRACT RPM	**700**
DEFAULT HIGH EXTRACT RPM	**900**
START EXTRACT SPEED	1000
DEFAULT WASH ACCELERATION	20
DISTRIBUTION ACCELERATION	9
RETARDATION ACCELERATION	
EXTRACT ACCELERATION	40
START EXTRACT ACCELERATION	40
EXTRACT RETARDATION	50

Default value, extraction time

Here you determine the various speeds (low, medium and high) for extraction. The instructions for determining the length of extraction times are to be found earlier in SETTINGS 2.

How an extraction sequence works:

In order to extract some of the water from the load at lower speeds, the drum does not accelerate to its highest speed immediately. Instead it accelerates in several steps. This means that the drum first accelerates to a low speed level, remains at that for a certain time, then accelerates to a higher level, extracts at that speed for a certain time, and so on until it reaches its final (maximum) extraction speed. If you program a low extraction speed, the number of steps at the beginning of the extraction sequence may be reduced.



1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished**:**

Press ⬇ **.**

START EXTRACT SPEED	**1000**
DEFAULT WASH ACCELERATION	20
DISTRIBUTION ACCELERATION	9
RETARDATION ACCELERATION	
EXTRACT ACCELERATION	40
START EXTRACT ACCELERATION	40
EXTRACT RETARDATION	50
MAX SPEED DURING FILLING	100
MAX LEVEL OFFS FOR AUT. CALIB.	
TIME AT DISTRIBUTION SPEED 2	
NUMBER OF REDIST LOW 1 UNB.	
NUMBER OF REDIST LOW 2 UNB.	
NUMBER OF REDIST MEDIUM UNB.	
NUMBER OF REDIST HIGH UNB.	
NUMBER OF REDIST EXTREME UNB.	
DRAIN TIME AT PROGR. START	
DRAIN TIME AT PROGR. END	
READY	

Start extract speed (i.e. Initial extraction speed)

Here you determine the speed of initial extraction.

When you are creating a wash program you can determine (under ”Main data”) whether it is to begin with initial extraction. Initial extraction is used to spin the load outwards against the drum walls, which makes it absorb water more readily on first filling. As a result of this the machine will not require so much extra filling later.

There are two other functions affecting initial extraction which can be programmed under SETTINGS 2:

- START EXTRACT TIME
- START EXTRACT ACCELERATION

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ **.**

START EXTRACT SPEED	1000
DEFAULT WASH ACCELERATION	**20**
DISTRIBUTION ACCELERATION	9
RETARDATION ACCELERATION	
EXTRACT ACCELERATION	40
START EXTRACT ACCELERATION	40
EXTRACT RETARDATION	50
MAX SPEED DURING FILLING	100
MAX LEVEL OFFS FOR AUT. CALIB.	
TIME AT DISTRIBUTION SPEED 2	
NUMBER OF REDIST LOW 1 UNB.	
NUMBER OF REDIST LOW 2 UNB.	
NUMBER OF REDIST MEDIUM UNB.	
NUMBER OF REDIST HIGH UNB.	
NUMBER OF REDIST EXTREME UNB.	
DRAIN TIME AT PROGR. START	
DRAIN TIME AT PROGR. END	
READY	

Default wash acceleration

Here you determine the acceleration rate (rpm/second) which the machine can use to reach wash speed when it cannot find this value elsewhere, e.g. in the event of manual operation of the drain sequence in machines with suspended drum.

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

↓

When you have finished:

Press ↓ .

START EXTRACT SPEED	1000
DEFAULT WASH ACCELERATION	20
DISTRIBUTION ACCELERATION	**9**
RETARDATION ACCELERATION	
EXTRACT ACCELERATION	40
START EXTRACT ACCELERATION	40
EXTRACT RETARDATION	50
MAX SPEED DURING FILLING	100
MAX LEVEL OFFS FOR AUT. CALIB.	
TIME AT DISTRIBUTION SPEED 2	
NUMBER OF REDIST LOW 1 UNB.	
NUMBER OF REDIST LOW 2 UNB.	
NUMBER OF REDIST MEDIUM UNB.	
NUMBER OF REDIST HIGH UNB.	
NUMBER OF REDIST EXTREME UNB.	
DRAIN TIME AT PROGR. START	
DRAIN TIME AT PROGR. END	
READY	

Distribution acceleration

Here you determine the acceleration rate (rpm/second) the machine will use to reach distribution speed and to decelerate after distribution speed, respectively. This value is not programmable when you create a wash program. Instead the machine always uses the value you set here.

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

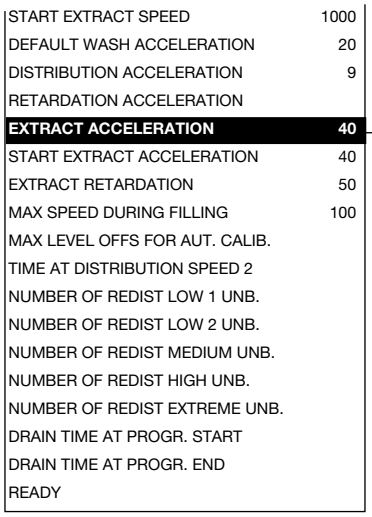
If you make a mistake while entering digits:

Press ERASE.

↓

When you have finished:

Press ↓ .



Extraction acceleration

Here you determine the acceleration rate (rpm/second) the machine will use to reach extraction speed. This value is not programmable when you create a wash program. Instead the machine always uses the value you set here.

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

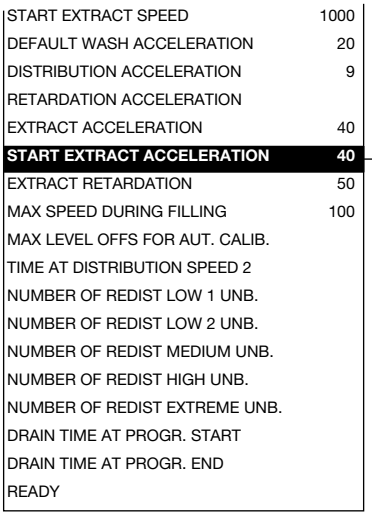
If you make a mistake while entering digits:

Press ERASE.

↓

When you have finished:

Press ↓ .



Start extract acceleration (i.e. Acceleration rate for initial extraction)

Here you determine the acceleration rate (rpm/second) which the machine will use to reach its initial extraction speed. This value is not programmable when you create a wash program. Instead the machine always uses the value you set here.

There are two other functions affecting initial extraction which can be programmed under SETTINGS 2:

- START EXTRACT TIME
- START EXTRACT SPEED

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

↓

When you have finished:

Press ↓ .

START EXTRACT SPEED	1000
DEFAULT WASH ACCELERATION	20
DISTRIBUTION ACCELERATION	9
RETARDATION ACCELERATION	
EXTRACT ACCELERATION	40
START EXTRACT ACCELERATION	40
EXTRACT RETARDATION	**50**
MAX SPEED DURING FILLING	100
MAX LEVEL OFFS FOR AUT. CALIB.	
TIME AT DISTRIBUTION SPEED 2	
NUMBER OF REDIST LOW 1 UNB.	
NUMBER OF REDIST LOW 2 UNB.	
NUMBER OF REDIST MEDIUM UNB.	
NUMBER OF REDIST HIGH UNB.	
NUMBER OF REDIST EXTREME UNB.	
DRAIN TIME AT PROGR. START	
DRAIN TIME AT PROGR. END	
READY	

Extract retardation (i.e. Deceleration rate after extraction)

Here you determine the deceleration rate (rpm/second) at which the drum will slow down after extraction speed. This value is not programmable when you create a wash program. Instead the machine always uses the value you set here.

1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

⬇

When you have finished:

Press ⬇ .

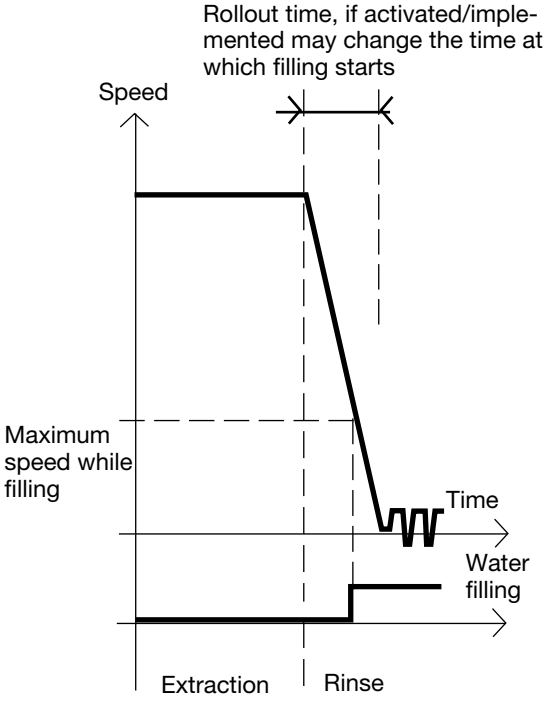
START EXTRACT SPEED	1000
DEFAULT WASH ACCELERATION	20
DISTRIBUTION ACCELERATION	9
RETARDATION ACCELERATION	
EXTRACT ACCELERATION	40
START EXTRACT ACCELERATION	40
EXTRACT RETARDATION	50
MAX SPEED DURING FILLING	**100**
MAX LEVEL OFFS FOR AUT. CALIB.	
TIME AT DISTRIBUTION SPEED 2	
NUMBER OF REDIST LOW 1 UNB.	
NUMBER OF REDIST LOW 2 UNB.	
NUMBER OF REDIST MEDIUM UNB.	
NUMBER OF REDIST HIGH UNB.	
NUMBER OF REDIST EXTREME UNB.	
DRAIN TIME AT PROGR. START	
DRAIN TIME AT PROGR. END	
READY	

Max. speed during filling

Here you specify a speed which the motor must drop below when it is being braked after extraction. Water filling will not take place until the motor has slowed to this speed. This function is useful for frequency-controlled motors.

Another function, intended primarily for motors without frequency control, is called ”ROLLOUT TIME” (accessed via SETTINGS 2, described earlier in this section). ROLLOUT TIME allows you to specify a time period which must elapse before water filling starts.

If these functions are combined, you must ensure that the ”rollout time” will have ended before water filling is allowed to begin, regardless of whether the drum speed has, prior to that, dropped below the speed specified in ”MAX. SPEED DURING FILLING”.



1 2 3
4 5 6
7 8 9
0

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

⬇

When you have finished:

Press ⬇ .

To conclude making changes in variables under ”SETTINGS 2”

SETTINGS 2

FLUSH DELAY TIME 0:06
FLUSH ON TIME 0:10
BUZZER ON BUTTON Y
MAX FILLING TIME 10:00
MAX HEATING TIME 10:00
READY

⇑⇑ ⇑ SELECT

Press ⇓ to highlight READY.

Insert a suitable strap to short-circuit terminals X7:1-2 on the CPU circuit board, alt. press the button and keep it pressed.

SELECT

Press SELECT.

SETTINGS 2

VERIFICATION ERROR!
CHECK THE STRAP. PRESS SELECT TO TRY AGAIN.

⇑ ⇑⇑ SELECT

The display illustrated left will appear if you fail to insert the strap to short-circuit terminals X7:1-2, alt. keep the button pressed.

Check that the strap between X7:1-2 is intact and in place, alt. press the button again and keep it pressed.

Press SELECT and try again.

SETTINGS 2

OK LOADED! DO NOT FORGET TO
REMOVE STRAP!

⇑ ✳ SELECT

The variables will now have been stored in the PCU.

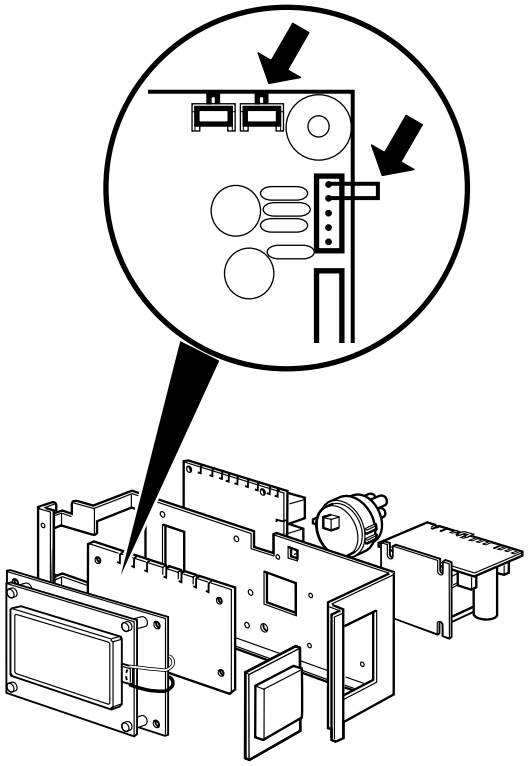
Remove the strap between terminals X7:1-2 on the CPU circuit board. Release the button.

SELECT

Press SELECT.

To prevent inadvertent changes in variables

If you have changed any variables under “Settings 2”, when you have finished keying in the changes, you need to insert a strap between two terminals on the CPU circuit board to register the changes in the CPU. Alt. keep the button pressed.



6676, 5227

To replace the CPU board

If the CPU board is faulty and has to be replaced. The correct software for the particular washer extractor has to be downloaded into the new timer.

For this you need:

1. A new CPU circuit board.
2. A PC service tool (ELS CST), including downloading cables.
3. A PC which corresponds to system requirements for the PC-tool.
4. Software which is correct for the model of washer extractor the CPU board is to be installed in, to be downloaded into that CPU board.

Instructions:

- Latest available software is always available by ordering the CD-rom (Part No. 438 713099) or for download on ELS Homepage.

  If possible it is recommended to get software from ELS Homepage (login could be required).
- A complete kit for ELS Common Service Tool (ELS CST) including PC software and downloading cables can be ordered (Part No. 988 802255). This is required.
- For system requirements on PC, please refer to product data sheet for ELS Common Service Tool. This is available on ELS Homepage.
- Launch ELS CST and open the software you want to upload. Follow on screen instructions. By pressing F1 (Help) instructions how to connect to the CPU is available.

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.

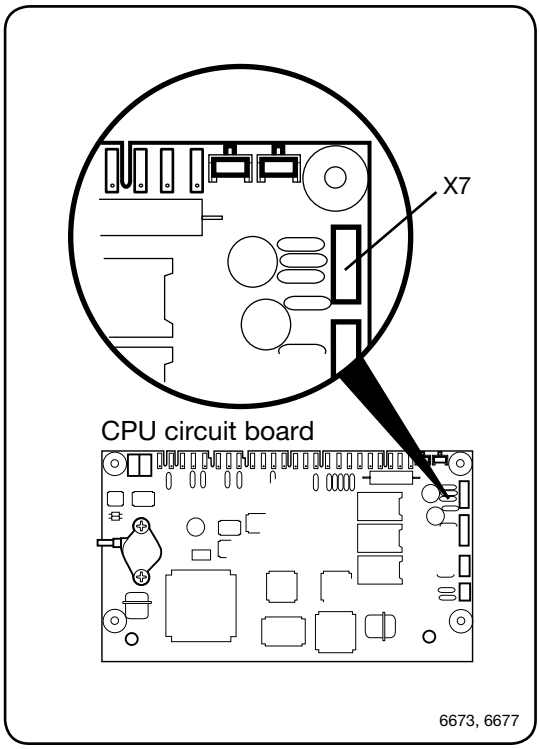
If there is more than one I/O circuit board, the processor must know whether the new circuit board is I/O board 1, I/O board 2 or I/O board 3:

For this you need:

- A PC service tool (ELS CST), including downloading cables.
- A PC which corresponds to system requirements for the PC-tool.

Instructions:

- Launch ELS CST and select Clarus Control, Service and Configuration.
- Press F1 (Help) to have instructions how to connect to the timer.
- Select I/O board adress and follow on screen instructions how to set the I/O board adress.



Door and door lock

General

The door lock part consists of the following:

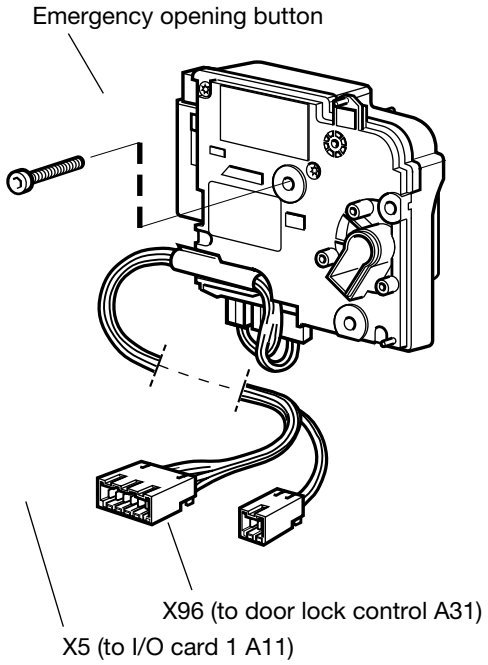
(1)

- **Door lock A41** that contains
  - an **actuator** that locks the door lock and which also has two built-in micro switches, S4a and S4b. The actuator is bi-stable, i.e., it has two stable positions: locked door and unlocked door. The actuator must receive a pulse to lock and unlock the door lock. S4a and S4b are both closed when the door is locked.
  - A **micro switch** that is closed when the door is closed.
  - An **emergency opening arm/emergency opening button** that can be used to open the door lock in an emergency.

(2)

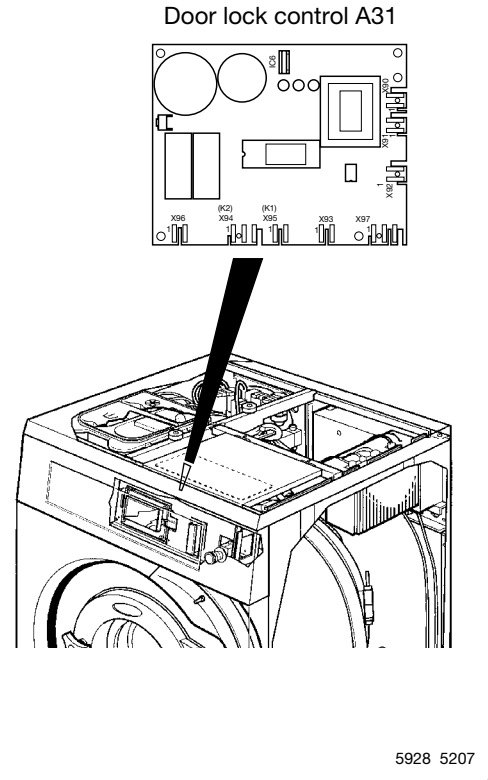
- **Door lock control A31** that is situated in the front control unit of the machine. This card controls the door lock function and whether the drum is empty and not rotating. It locks and unlocks the door lock when the programme unit requests door locking or unlocking.

1



6112

2



5928 5207

The door lock locks the door

(3) When the door is closed (closed door lock switch S3), the programme unit may request door locking by applying a voltage of 200-240 V on door lock controller A31 input X92.

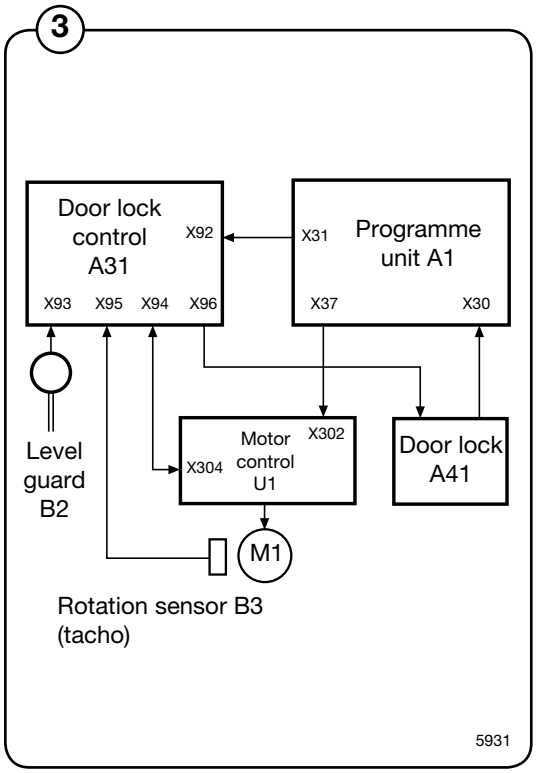
The following check is made by the A31 card prior to locking of the door:

- **No water in drum** - input X93 from level guard B2 is closed = 0 V
- **Motor not engaged** - input X94 from motor control U1 open = 5 V
- **Drum not rotating** - pulse frequency on input X95 from rotation sensor B3 less than 3 Hz.

When the above conditions are met, the card A31 outputs a closing pulse on output X96 to the door lock actuator/coil, which then locks the door. The micro switches S4a and S4b in the actuator/door lock are closed when the door is locked. These micro switches feed voltage to:

- **The output relays** on I/O card 1. The relays govern the machine's drain and water valves as well as heater switch-on.
- **Interlock signal** for motor control (input X302 via I/O card 1) that releases the motor start prevention state.

Programme operation is now possible.



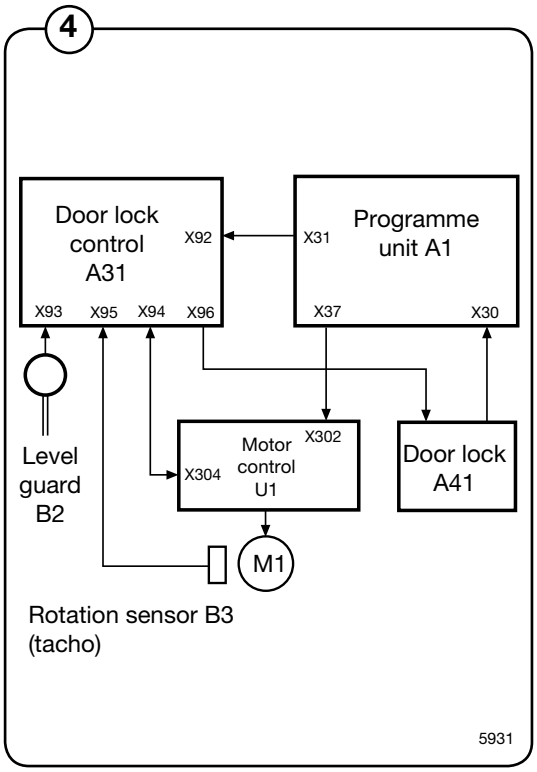
The door lock unlocks the door

④ The programme unit requests door unlocking by applying 0 V on input X92 of the door lock controller.

The following check is made prior to unlocking of the door:

- **No water in drum** - input X93 from level guard B2 is closed = 0 V
- **Motor not engaged** - input X94 from motor controller U1 open = 5 V
- **Drum not rotating** - pulse frequency on input X95 from rotation sensor B3 less than 3 Hz.

When the above conditions are met, the door lock controller outputs an opening pulse on output 96 to the door lock actuator/coil, which then unlocks the door. Micro switches S4a and S4b now interrupt the actuator/door lock and the I/O card 1 relays lose all voltage to prevent the motor from starting (interlock signal on motor controller input X302). The drain and water valves of the machine are now disabled and the heater and motor cannot be switched on.



Error codes

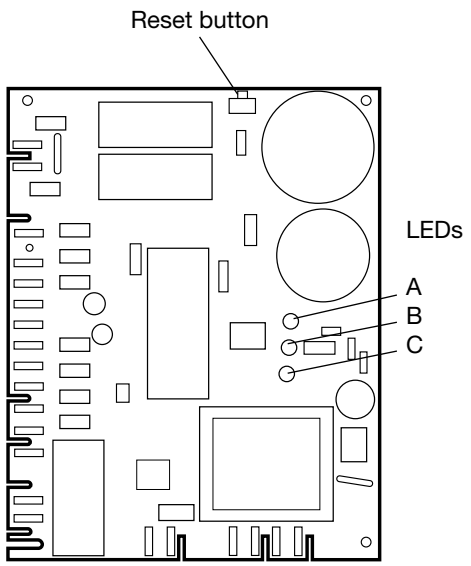
(5) The door lock control has three LEDs that show whether the door lock operates normally or whether an error has been detected. During normal operation, the LEDs blink when the drum is not turning and are off when the drum rotates. In case of an error, the three LEDs will show the error condition according to the table below. Any error codes are automatically cleared 5 minutes after the error has been remedied. In case the error occurred at the end of the programme, the door also unlocks after 5 minutes.

LEDs A	LEDs B	LEDs C	Normal operation
●	●	●	No error. The drum is not turning (no water in drum) (– – –)
●	●	●	Level switch B2 indicates water in drum when drum is stand-still (– – – – – –)
❍	❍	❍	No error. The drum is rotating

LEDs A	LEDs B	LEDs C	Error state
●	●	❍	Level guard B2 indicates water in drum when the door lock is open (input X93 open).
❍	●	●	Motor control indicates that motor is operating when door lock is open (input X94 closed).
●	❍	❍	No signal from rotation sensor B3 (frequency input X95 < 3 Hz) in spite of the motor control indicating motor operation.
❍	●	❍	No signal from motor control (input X94 open) in spite of rotation sensor B3 indicating motor operation (frequency input X95 > 3 Hz).
●	❍	●	Error in drive circuits for door lock (output X96) or error in door lock/cable harness for the door lock.
❍	❍	●	Internal error in the door lock control.

❍ = no lit, ● = lit

(5)



Reset button

The door lock control features a reset button used to reset the programme routines stored in the computer. When pressed, any error codes are erased;

Door lock control inputs/outputs

(6) **X90: AC 200-240 V feed**

X91: Transfer of voltage supply

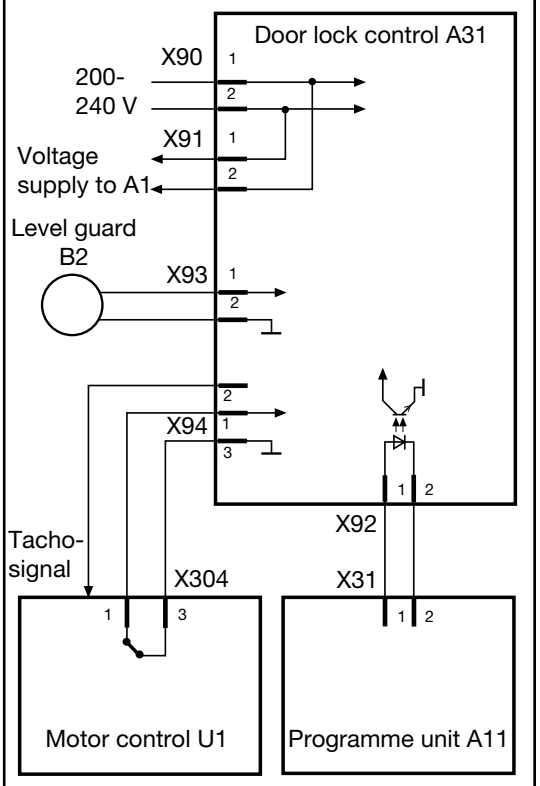
(7) Feeds the voltage to programme unit A1.

X92: Input from programme unit (via I/O card 1): Lock door

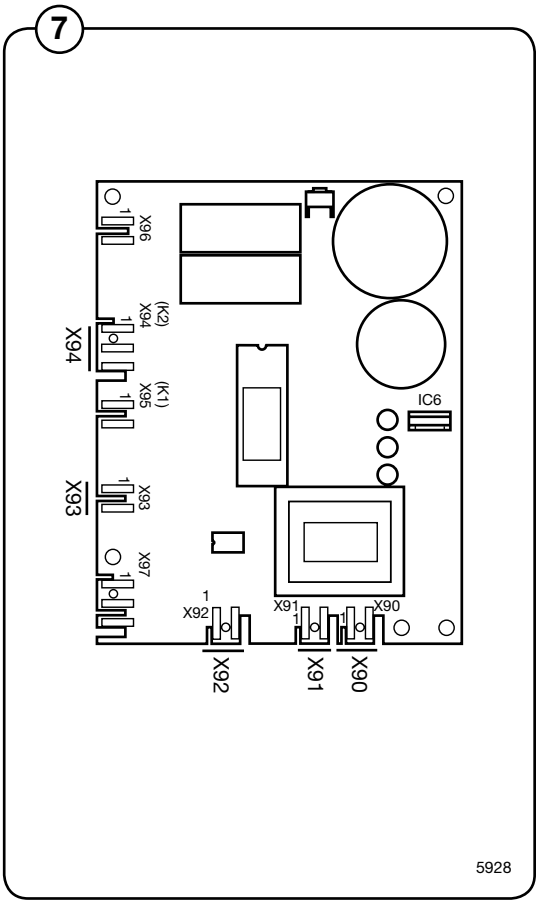
Prior to the door lock controller locking the door (output X96), a check is made of any water left in the drum (input X96 closed) and whether the drum is not rotating (input X94 open).

Input voltage	Function
200-240 V DC:	Programme unit requests door locking
0 V:	Programme unit requests door opening

6



7



(8) **X93: Input from level guard**

(9) If the input indicates “Water in drum” when the door is not locked, the door cannot be locked. The LEDs then show the error code ● ● ❍.

Input voltage	Function
5 V DC:	Water in drum (level guard open)
0 V:	Drum empty (level guard closed)

X94: Input from motor control

Only when door is open

If the input indicates “Motor operating”, the door cannot be locked. The LEDs then show the error code ❍ ● ●.

Only when door is locked

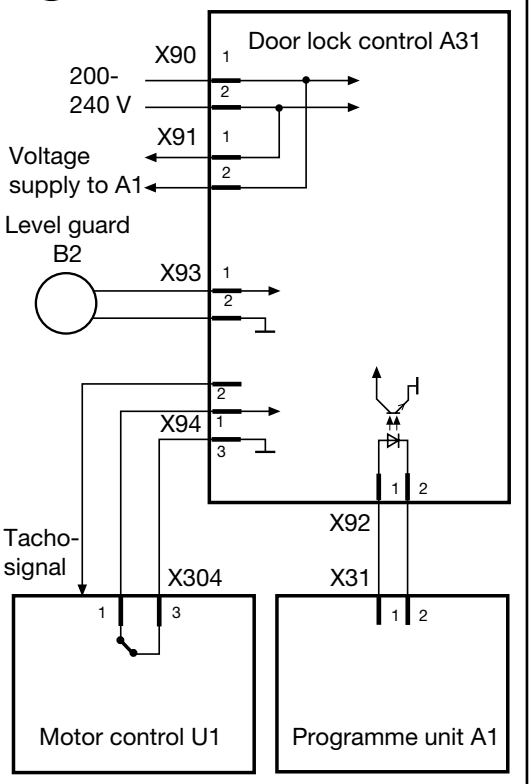
The input signal from X94 is compared with the signal from the rotation sensor B3 (input X95).

If the motor is operating, but the rotation sensor does not provide a signal, error code ● ❍ ❍ is shown.

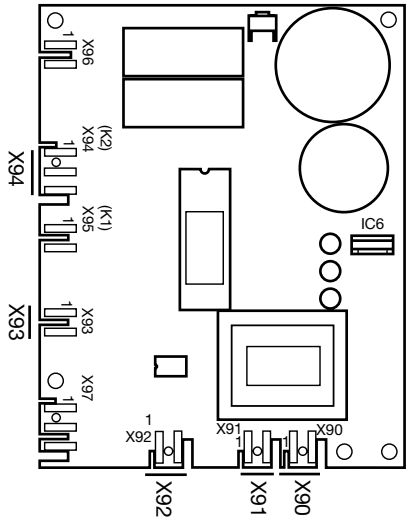
If the rotation sensor indicates motor operation when the motor is not operating, error code ❍ ● ❍ is shown.

Input voltage	Function
5 V DC:	Motor not operating (input open)
0 V:	Motor operating (input closed)

8



9



(10) **X95: Input from rotation sensor on motor shaft**

(11) When the motor is operating, a pulse train is applied on the input.

Input	Function
Pin 1:	0 V
Pin 2:	Tacho signal

X96: Output to door lock

Locks the door lock when the following conditions are met:

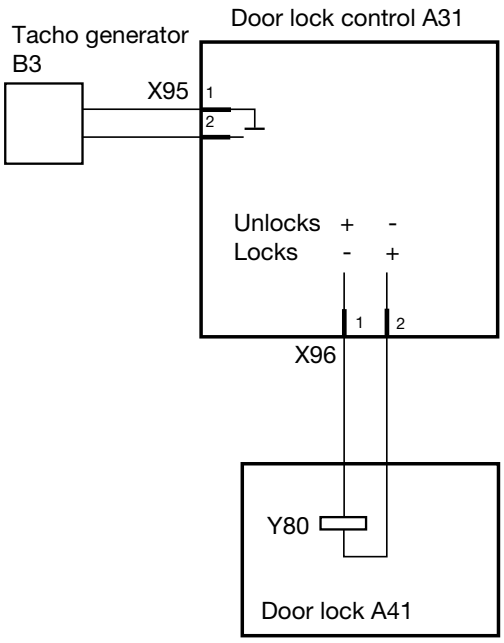
- DC 200-240 V on input X92 (programme unit request door locking)
- DC 0 V on input X93 (no water in drum)
- DC +5 V on input X94 (motor not activated)
- <3 Hz on input X95 (drum not rotating)
- No error code present

Unlocks the door lock when the following conditions are met:

- DC 0 V on input X92 (programme unit request door opening)
- DC 0 V on input X93 (no water in drum)
- DC +5 V on input X94 (motor not activated)
- <3 Hz on input X95 (drum not rotating)
- No error code present

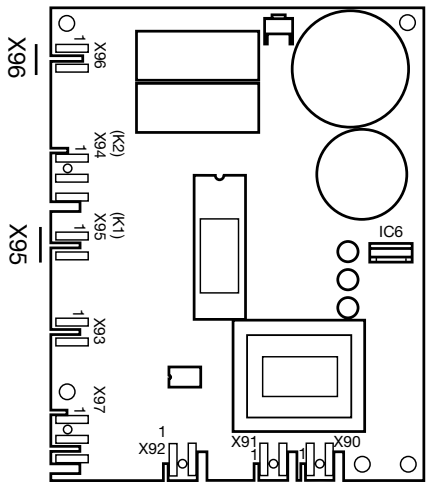
Voltage	Function
DC 17-31 V, + on pin 1, - on pin 2	Unlock the door
DC 17-31 V, - on pin 1, + on pin 2	Locks the door

(10)



5933

(11)



5928

Repairs

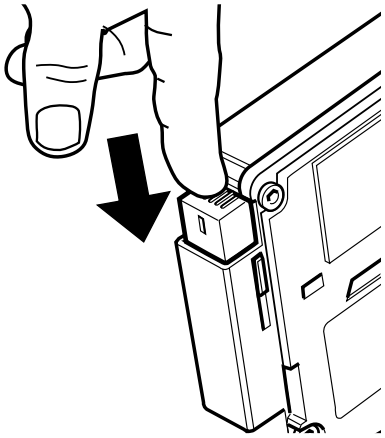
Repair work on the machine should only be done by specially trained personnel.

Emergency opening of door lock

(12) 1. Switch off power to the machine by turning the main power switch to the 0 position.

2. Remove the front cover or top cover. When replacing the door lock, it is recommended to remove the front cover.
Press down the emergency opening button.

(12)



6111

Replacing the door lock

1. Switch off power to the machine by turning the main power switch to the 0 position.
2. Remove the front cover alt. side pole.
3. Remove the door (two screws in each hinge).
4. Remove the front panel.
5. Remove the door lock (three holding screws).
6. Verify the strap positions on the cable for the lock. Cut open the necessary straps to undo the cables leading to the lock.
7. Undo the connectors.
8. Replace the door lock.
9. Reconnect the new door lock.
10. Assemble in reverse order.
11. Strap the cables for the lock according to the notes made in step 6.

Motor and motor control

DANGER

Be careful when measuring the electric components in the motor control. All components have a potential difference of approx. 300 V in relation to protective earth and neutral. When the green LED on the motor control card is lit, the components carry dangerous voltages. The motor control lose all voltage about 10-30 seconds after the voltage has been disconnected and the motor has stopped.

Motor

(1) The motor is fitted in a bridge carrier under the outer drum. It drives the washing drum using a drive belt.

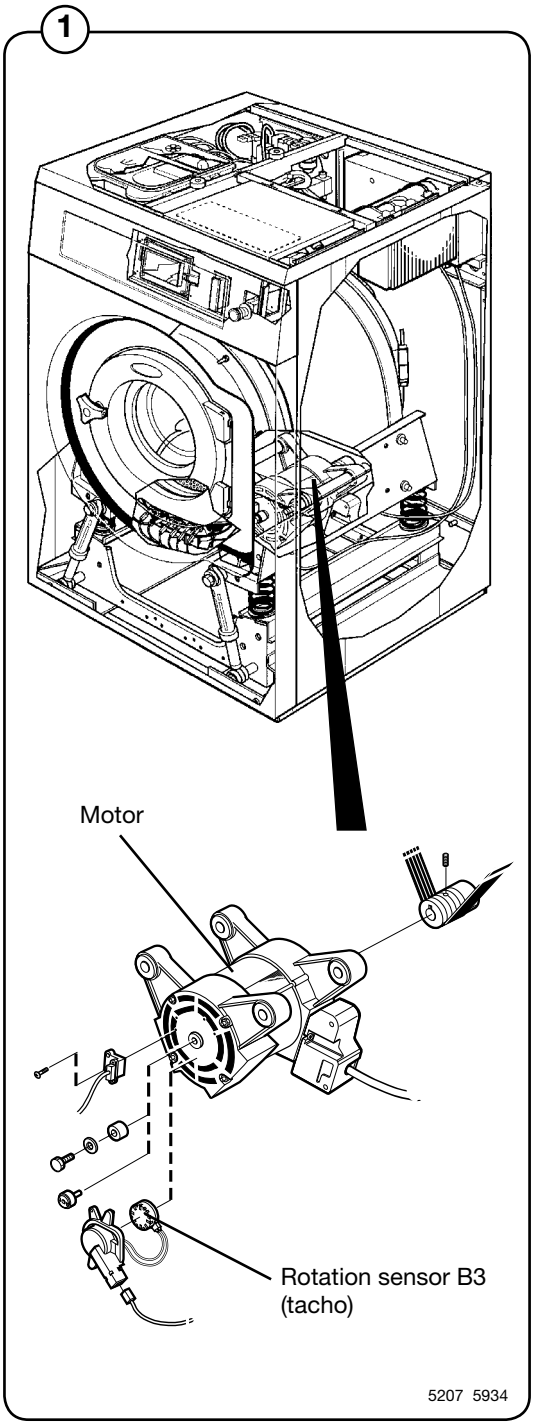
The motor is frequency-controlled and is controlled by microcomputer control. The various speeds for normal operation, distribution speeds and extraction as well as acceleration/retardation can be controlled with a high degree of precision.

The motor winding is protected against overloads using a thermal overheating protector that is automatically reset.

(1) The motor is connected directly to the motor control via a cable with quick connectors.

This cable contains two fuses and a VDR-resistance. The size of the fuses are different depending on machine size.

EX618, EX625	10A
EX630	15A
EX645, EX660, EX677	20A



Motor control

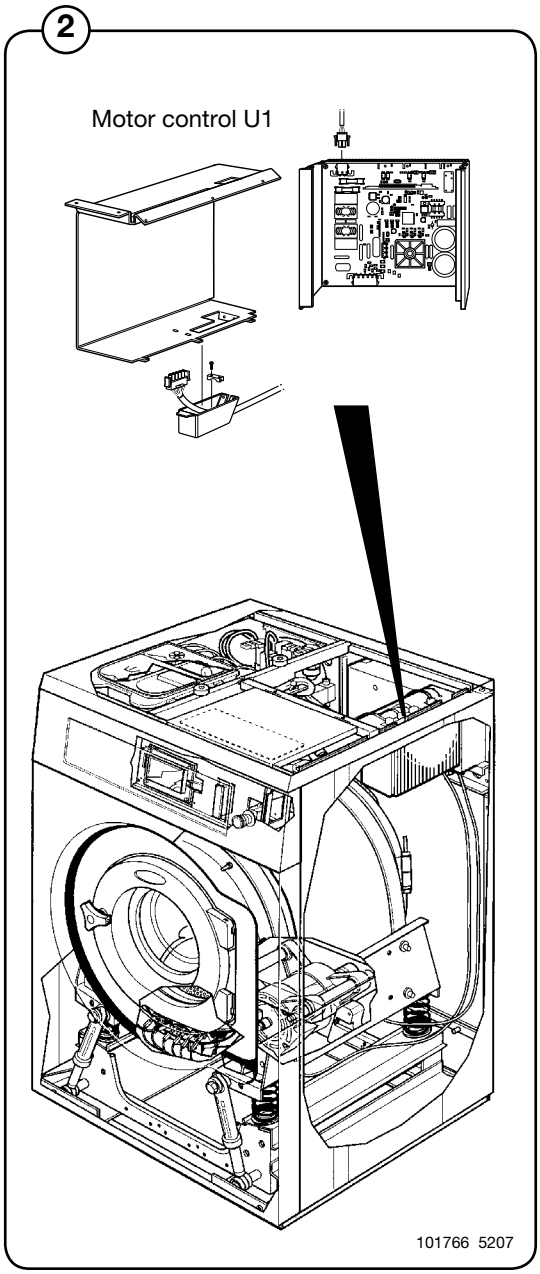
(2) The motor control unit is microcomputer controlled and is situated under the top cover of the machine, right above the outer drum.

The unit consists of a PCB (mother board) fitted on a heat sink that does double-duty as part of the housing.

(2) The cable harness is directly connected to the PCB, voltage supply input and the voltage supply to the motor using connectors; the other cables are connected with flat connectors to the PCB.

A detailed description of input and output cables is presented in the section “Function”.

Depending on the machine size, this unit comes in four different versions. The units have different sizes in order to be able to control motors of different sizes.



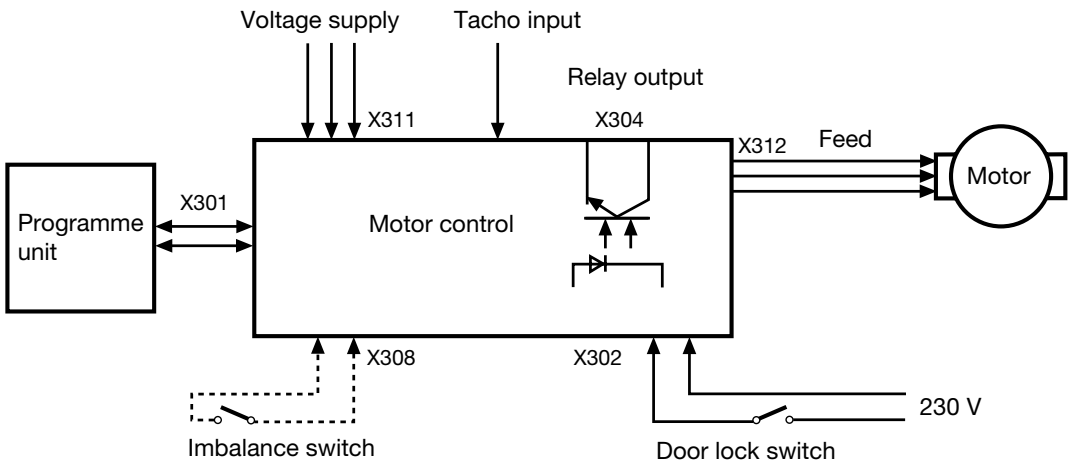
Function

DANGER

Be careful when measuring the electric components in the motor control. All components have a potential difference of approx. 300 V in relation to protective earth and neutral.
When the green LED on the motor control card is lit, the components carry dangerous voltages.
The motor control lose all voltage about 10-30 seconds after the voltage has been disconnected and the motor has stopped.

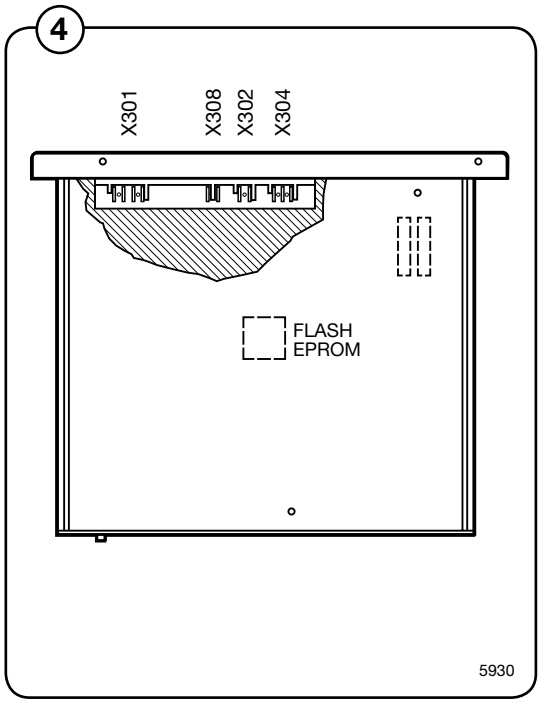
(3) The motor control communicates with the programme unit via a serial two-way interface. With the help of the motor control, the programme unit can control not only the instantaneous motor rpm, but also with high precision the acceleration and retardation of the motor in order to reach the target rpm. The motor control continuously replies with information to the programme unit PCB regarding the current operating state and sends reports if an error occurs.

(3)



The motor control is also able to deliver various instantaneous and output values during constant speed, acceleration and retardation. These values are used to calculate the weight of the loaded laundry and to detect any load imbalances. A separate imbalance breaker can also be connected to the motor control.

The safety system of the machine includes double detection of the door lock. Both the programme unit and motor control use different switches to detect proper door locking. The motor cannot start unless both switches verify the door is locked.



Inputs and outputs

(4) **X301: Serial communication**

Handles communication between the motor control and the programme unit. Using a special interface, it is possible to connect a PC for testing the motor control.

Card No.	Function
X 301:2	Gnd
X 301:3	Txd
X 301:4	Rxd

X302: Lock sequence input

Detects when the door is locked or unlocked. The motor cannot start until the door has been locked. If the indication disappears when the motor is operating, the motor stops and an error message is shown on the programme unit display.

Input voltage			
	min:	120 V-20 %	50/60 Hz
	max:	240 V+15 %	50/60 Hz
Current:	max:	0,01 A	

(5) **X304: Door lock connector**

The collector output function is controlled from the programme unit (X301). The collector output does not switch on if there is no communication with the programme unit.
Tacho signal from the motor (via door lock control A31) is needed to control the motor.

Card No.	Connection
X304:1	Common, 0V
X304:2	Tacho signal
X304:3	Collector for output

Voltage, max	:	30 VDC
Current, max:		10 mA

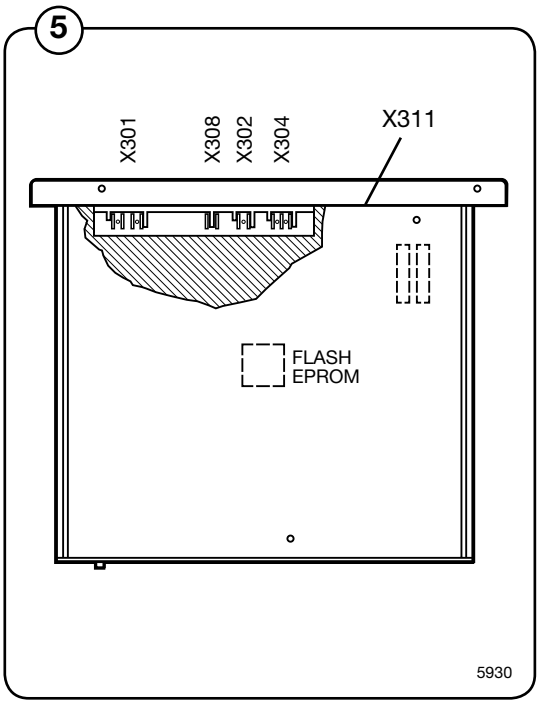
X308: Imbalance switch

Input from the imbalance switch (only fitted on some machines). The imbalance switch is normal open.

Input voltage			
	min:	120 V-20 %	50/60 Hz
	max:	240 V+15 %	50/60 Hz
Current:	max:	0,01 A	

X311: Voltage supply

Input voltage, single phase or rectified three-phase		
	min:	200V-15%
	max:	240V+10%



(6) X312: AC supply to motor and input from the motor thermal protector

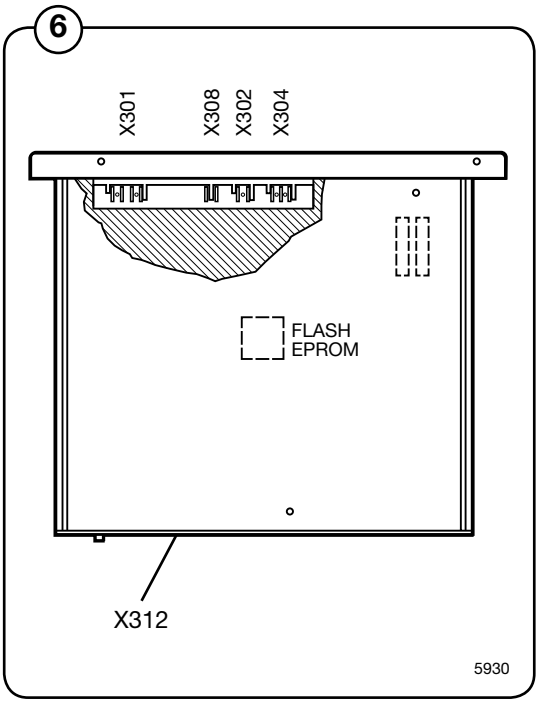
The motor is fed with alternating current with varying frequency that is proportional to the motor speed.

This connector also includes the input from the thermal protector of the motor.

The thermal protector switch is usually closed and triggers only in case of overheating.

EX618-EX677

Card No.	**Function**
X 312:1	AC supply to motor
X 312:2	AC supply to motor
X 312:3	AC supply to motor



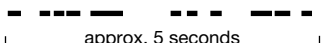
LED indications

Two LEDs, one yellow and one green, indicate any errors on the motor controller and motor.

(7) The table below shows the blinking patterns of the various error codes.

(7)

Green LED

LED blinking pattern	Cause
	OK blink (brief pause every 5 seconds)
	Microcomputor in motor control unit not working, voltage is on.
	Current limiter of motor control has switched on.

Yellow LED

LED blinking pattern	Error code on display EXACTA	CLARUS	Cause
	31E	HEAT SINK TOO HOT	Overheated heat sink on motor control.
	32E	MOTOR TOO HOT	Motor thermal protector has triggered.
	33E	NO INTERLOCK	Motor controller receives start request, but receives no lock ACK (input 302).
	13E	NO MOTOR COMM.	Communication error motor control - programme unit.
	-	-	Short-circuit in motor winding, harness or internally in motor control. Motor control restarts automatically.
	35E	MOTOR SHORTNING	Short-circuit in motor winding, harness or internally in motor control.
	36E	INTERLOCK HARDWARE	Error in lock ACK circuits in motor controller.
	37E	LOW DC VOLTAGE	DC level in motor control too low.
	38E	HIGH DC VOLTAGE	DC level in motor control too high.
	41E	KLIXON CIRCUITS	Error in motor control circuits used to detect motor thermal protector.
	45E	TACHO	Motor don't follow, error in tacho, tacho circuits, motor cable or contacts for motor cable.

Repairs

Repair work on the machine should only be done by specially trained personnel.

Motor replacement

Disassembly

(8) 1. Swith off power to the machine by turning the main power switch to the 0 position.

2. Remove the rear cover.

3. Undo the bracket for the drain hose connector from the lower rear piece, then remove the rear cover.

(9) 4. Undo the ground connection from the motor.

5. Remove the drive belt by pulling the belt towards you while rotating the drum by hand.

6. Undo the motor cable from motor.

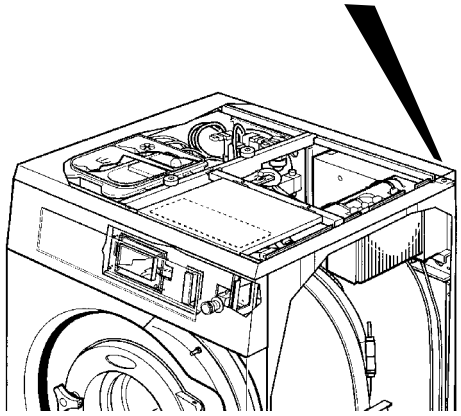
7. Lock the motor in place to avoid it from falling when lifting it out.

8. Undo and remove the two motor mounting bolts.

9. Lift out the motor.

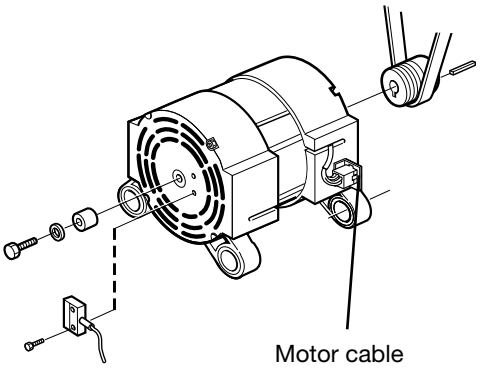
10. Replace the sensor and magnet from the old motor to the new one.

8



5207

9



5465

Assembly

1. Fit the new motor **without** locking the mounting bolts.
2. Fit the drive belt and adjust the belt tension with the tensioner on one side of the motor. Se section Adjustments - Drive belt tension for details.
3. Connect the new motor to the motor control and use straps to secure the cable.
4. Connect the motor cable to the motor.
5. Fit the lower rear piece and secure the drain hose connection with screws.
6. Fit the upper rear piece.
7. Connect the voltage supply and verify that the motor operates normally.

Adjustments

Drive belt tension

The drive belt is pre-tensioned upon delivery from the factory.

(10) The drive belt tension should be as follows:

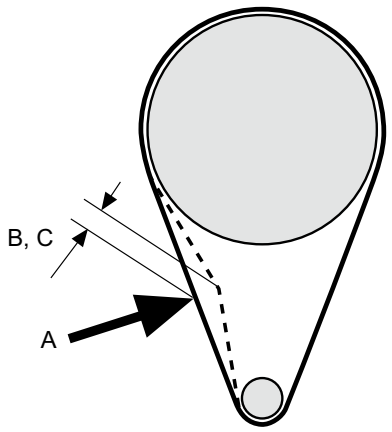
Model	Force A (N)	Post-tensioning B (mm)	New belt C (mm)
EX618*	30	9	8
EX618**	30	8	7
EX625	40	9	8
EX630	53	10	8
EX645	68	10	8
EX660	75	10	8
EX677	78	10	8

* up to machine No.
** from machine No.

Up to machine No.
-520/111627
520/111641-115133
520/115144-120398
520/120409-121020

(11) To adjust drive belt tension, first undo the motor retaining screw a couple of turns, then press down on the motor to achieve proper tensioning. Lock the locking nut when the tension is correct. Then lock the retaining screw.

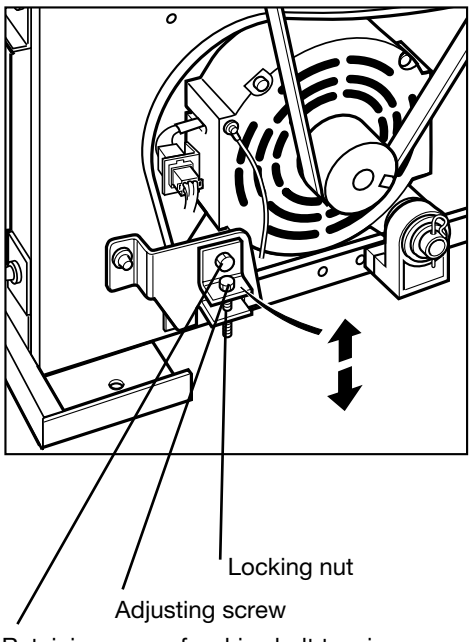
(10)



Adjust drive belt tension if values exceed those shown in the table.

4741

(11)



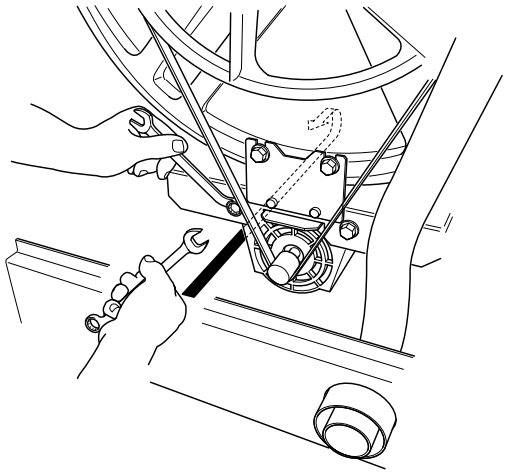
5466

From machine No.
520/111628-111640
520/115134-115143
520/120399-120408
520/121021-

(12) To adjust drive belt tension: first undo the motor retaining screw (A) by using two cap keys. When
(13) undoing screw (A) use one cap key as holder-on on the screw's nut. Press down the motor by using a screw driver in order to tension the belt. Tighten the retaining screw and check the tension according to table.

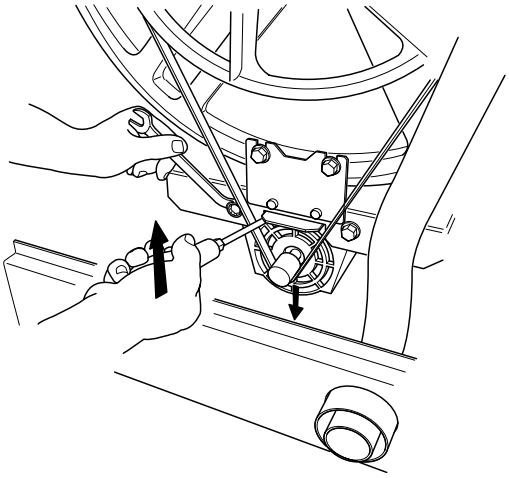
Inspection of the drive belt tension is an important part of general maintenance.

(12)



6888

(13)



6889

Drain valve

Description

(1) The drain valve is situated on a flange at the bottom of the outer drum and can be accessed from the front after removing the front cover.
The drain valve consists of the following principal parts:

- Lower part with rubber diaphragm
- Piston and cylinder
- Pressure plate and recoil springs
- Rubber diaphragm with drain connection
- Upper part with connection for outer drum.

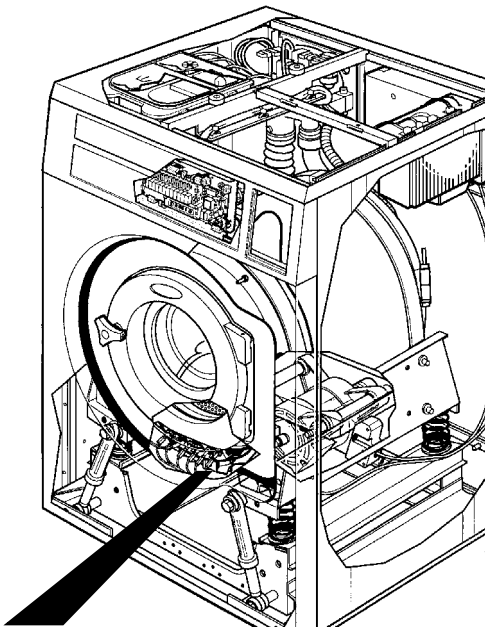
Function

(2) The drain valve uses the water pressure in the cold-water inlet to close the valve. A feed hose is connected between the water inlet and the control valve.

When the control valve operates (drain valve should be closed), the control valve opens the water pressure onto the feed hose, which is connected to the lower part of the drain valve. When the lower part is filled with water, the lower part diaphragm pushes up the piston. The piston lifts the pressure plate against the drain valve rubber diaphragm, which in turn forms a seal against the outer drum, effectively closing the valve.

When the drain valve should be opened, the control valve changes position to allow the water pressure to the lower part of the drain valve to close, instead opening the return hose to the drain. The pressure plate recoil springs pull the pressure plate back, upon which the piston is pressed back into the cylinder. The water from the lower part is fed through the feed hose and the control valve to the drain.

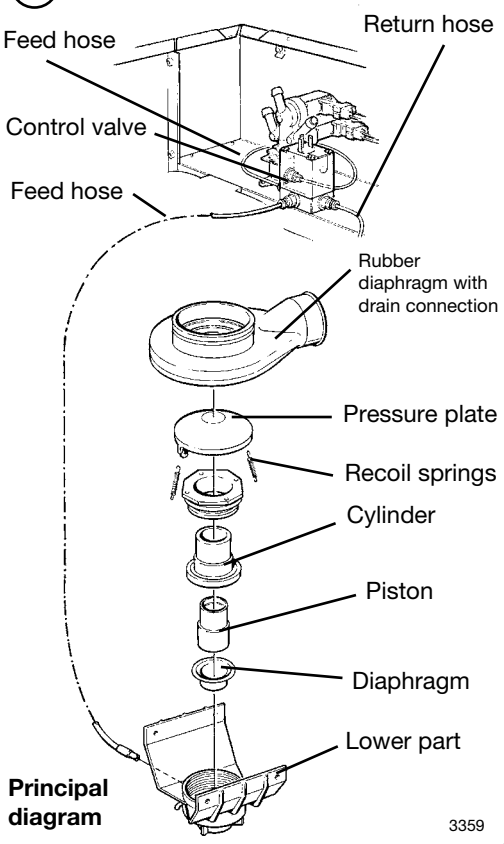
1



Drain valve

5185

2



Principal diagram

3359

Drain valve

Repairs

Repair work on the machine should only be done by specially trained personnel.

Disassembly

For repair works on the drain valve, there is a risk that water still left in the machine may flood onto the floor. Be sure to dry up any spilled water since it may cause people to slip and hurt themselves.

(3) 1. Take down power from the machine by turning the main power switch to the 0 position.

2. Remove the front cover.

(4) 3. Disconnect the drain hose from upper part of the valve.

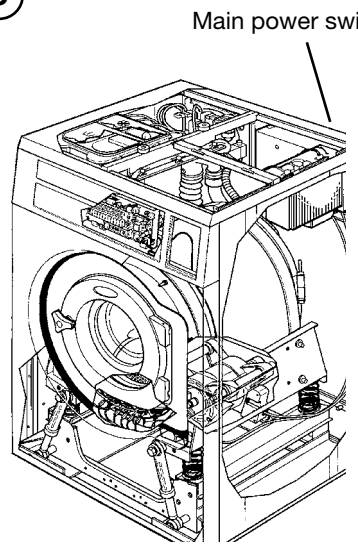
4. Undo the hose clamp holding the valve rubber bellows against the sleeve coupling of the outer drum.

(5) 5. Loosen and unscrew the 4 retaining nuts of the valve a couple of turns (use a socket, extender and ratchet wrench). Turn the valve and unhook it from the bolts.

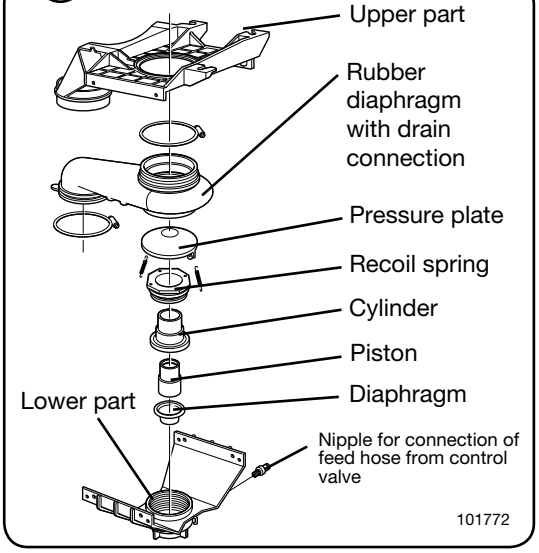
6. Disconnect the pressure hose from the lower part of the valve.

7. Replace the valve with a new one or replace the defective part.

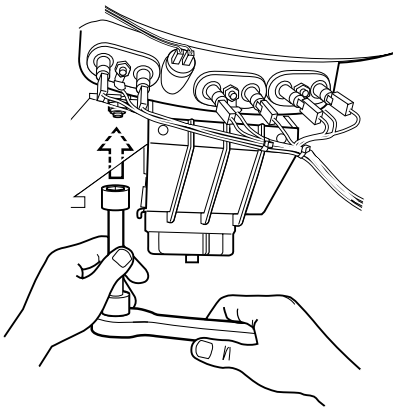
3



4



5



Assembling

(4) 1. Connect the pressure hose to the lower part of the valve. Verify that the hose is not bent or pinched.

2. Fit the rubber bellows onto the sleeve coupling.

(5) 3. Hook the valve onto the bolts and turn the valve into position. Secure the 4 retaining bolts of the valve.

4. Secure the hose clamp at the connection of the rubber bellows on the sleeve coupling.

5. Connect the drain hose to the upper part of the valve.

(3) 6. Turn the main power switch to position 1 and verify correct valve operation and that it does not leak.

7. Reattach the front cover.

Detergent compartment

Description

(1) The detergent compartment of the machine is designed for use with powder and liquid detergent. The compartment is divided into four sub-compartments as follows:

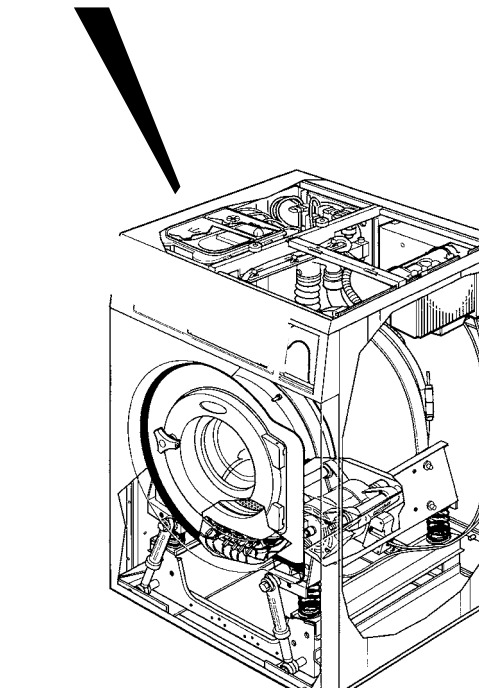
(2)
- Compartment 1 - For pre wash with powder or liquid detergent.
- Compartment 2 - For main wash with powder detergent.
- Compartment 3 - Rinse.
- Compartment 4 - Main wash with liquid detergent or bleaching-agent.

The connections for incoming water are situated on the rear side of the compartment. Compartments 3 and 4 each have one connector, while compartments 1 and 2 each have two connectors, one for cold water, the other for warm water.

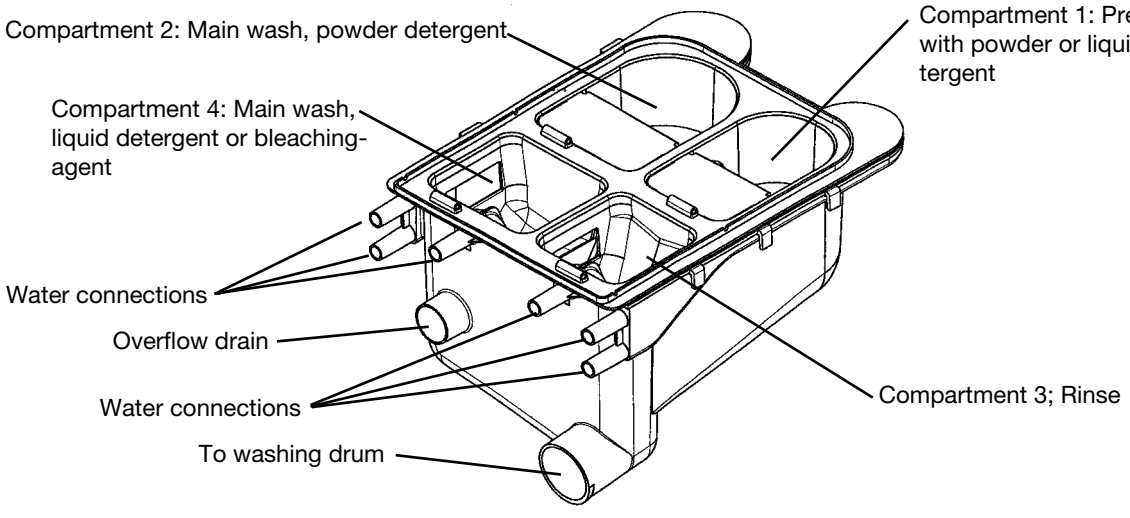
The detergent is routed from the bottom of the compartment to the outer drum through the combo module immediately behind the compartment.

To safeguard against overfilling, e.g., due to a blocked hose on its way to the drum, the combo module features an overflow drain directly connected to the drain of the machine.

1



2



Heating

Electric heating

(1) The heating system of the machine consists of:

- Three heating elements for heating the water in the drum.
- A temperature sensor to detect the water temperature in the drum.
- One or two heating contactors for switch-on/ switch-off of the heating elements.

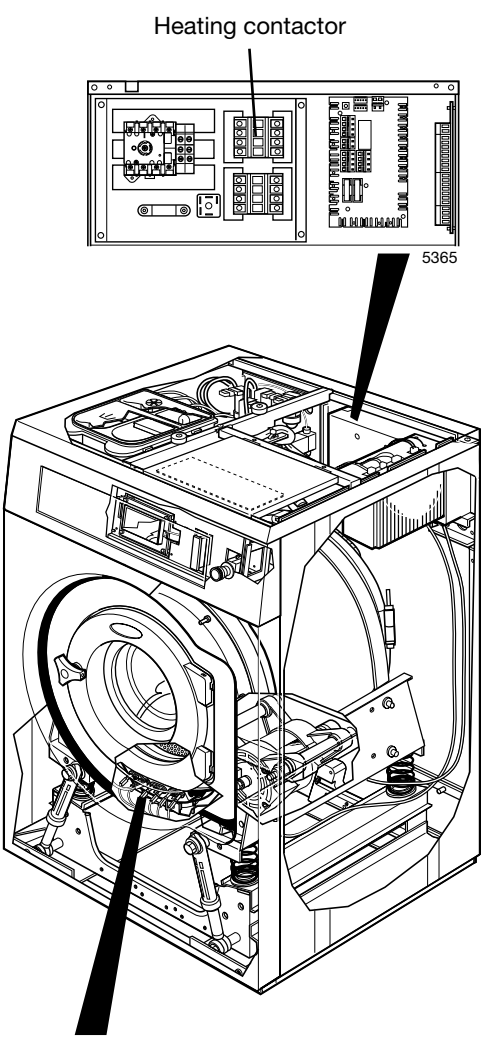
The heating elements and the temperature sensor are situated at the bottom of the outer drum close to the edge. They can be accessed front the front after the front plate is removed.

The contactor(s) is(are) placed in the rear control unit.

Depending on the size of the machine, the following heating elements are available:

Machine model	Heating element size (kW)
EX618	3x0,665, 3x1, 3x1,8, 3x2,5
EX630	3 x 2 x 2,165
EX645	3 x 2 x 3,0
EX660	3 x 2 x 3,83
EX677	3 x 7.66

(1)



Heating element and temperature sensor

5207

Function

Electric heating

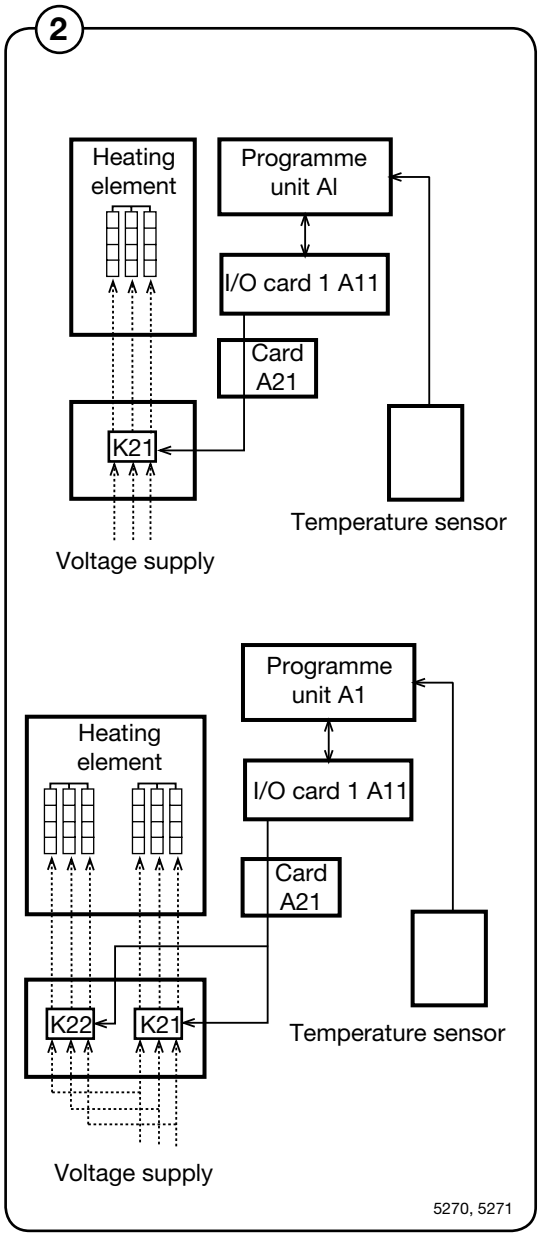
(2) The three heating elements in the machine are connected to separate phases and are switched on and using one or two heating contactors, K.21 and K22 (two contactors are used for higher heating power). The heating contactors are controlled by the programme unit A1 via output X8:1 on I/O card 1 A11. The control signal is fed via the communication card A21.

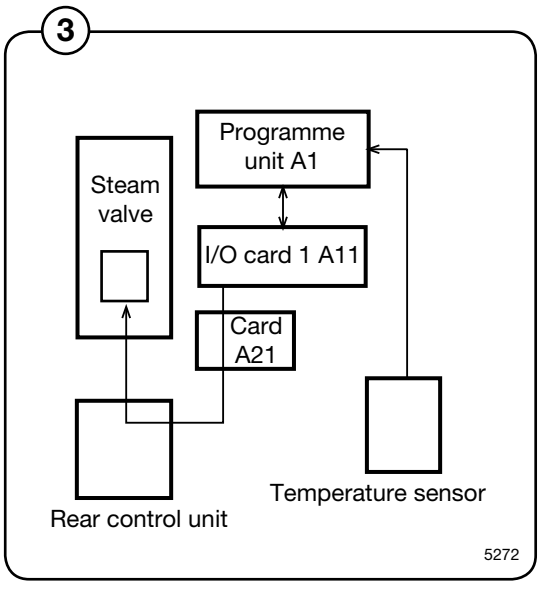
The programme unit receives information on the water temperature in the machine through an analogue signal from the temperature sensor situated in the outer drum. The programme unit controls the heating contactors to achieve the set water temperature for the current washing programme.

When there is no water in the drum, the programme unit prevents switch-on of the elements. If an error would nevertheless cause the elements to switch on, a slow-blow fuse triggers to switch them off again. Then the heating elements has to be changed.

Steam heating

(3) The steam valve is controlled by programme unit A1 via output X8:1 on I/O card 1 A11. The control signal is fed via the communication card A21.





Repairs

Repair work on the machine should only be done by specially trained personnel.

Replacing the heating elements

When replacing the heating elements, there is a risk that water still left in the machine may flood onto the floor. Be sure to dry up any spilled water since it may cause people to slip and hurt themselves.

(4) 1. Take down power from the machine by turning the main power switch to the 0 position.

2. Remove the front cover.

(5) 3. Make a note of how the heating elements are connected.

4. Disconnect the connection to the heating element to be replaced.

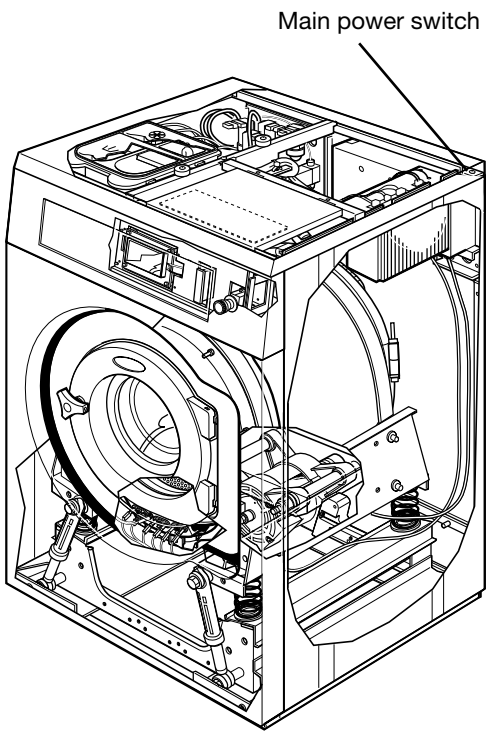
5. Unscrew the nut between the connections approx. 1 cm.

6. Push on the nut and bolt to undo the expansion bracket from the outer drum.

7. Remove the old heating element and install the new one. Be sure that the rear edge of is fitted into the element holder at the rear of the outer drum.

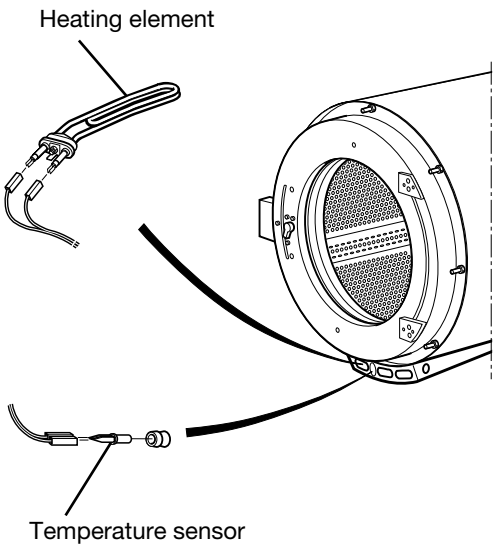
8. Assemble in reverse order.

4



5207

5



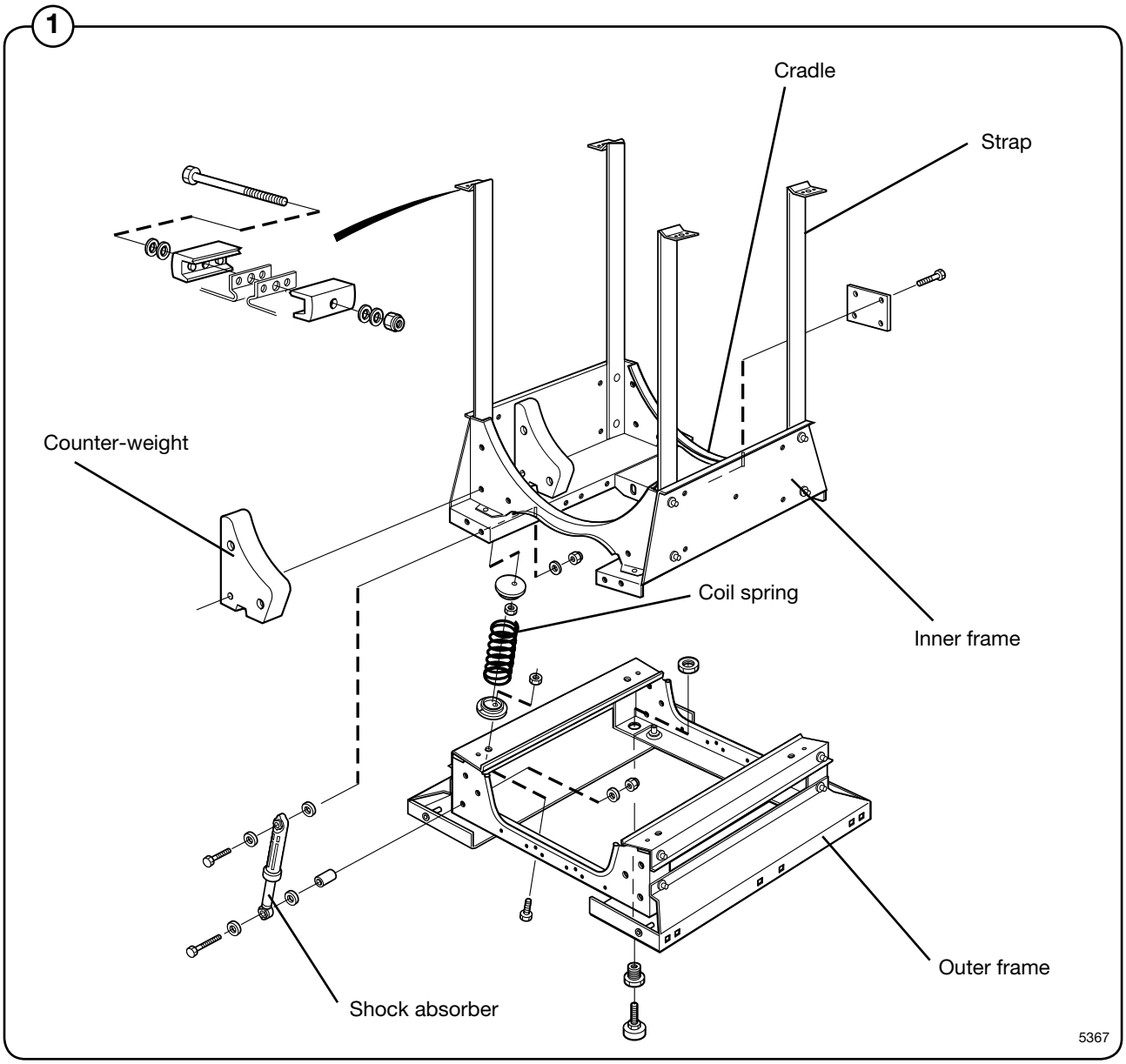
5204

Frame

Description

(1) The machine has a freely suspended drum assembly. The inner frame is suspended in an outer frame. The motor and drum assembly are fitted on the inner frame.

The inner frame is suspended in the outer frame by way of four coil springs. It has the shape of a cradle in which the outer drum is placed. To dampen vibrations, shock absorbers have been fitted in each corner of the machine. To improve the rigidity of the frame, two counter-weights are fitted at the front of the frame.



Weighing equipment

Water level reduction

To achieve optimum load volumes, the weight of the load can be seen on the display while the machine is being loaded. If the machine does not have a full load, the water level will be reduced according to a water-level reduction table. The water level can never be any lower than the safety level plus the hysteresis.

Actual weight display

(1) The Clarus control unit automatically detects if weighing equipment is connected, and the actual (current) weight is shown on the display, on one line of the menu (normal display mode).

(2) When the machine starts to be loaded, the display switches to showing the actual weight in large numerals (weight display mode).

Normal display mode is resumed:

- If a new program number is entered using the numeric keys.
- If ⏎ is pressed.
- Automatically after the time set via ”Settings 1” under ”Time for weight display”.

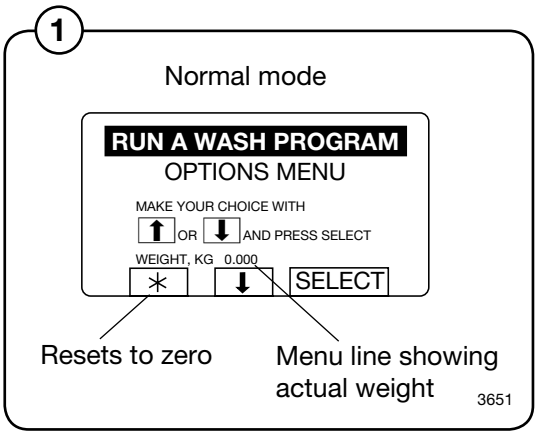
While a wash program is running, you can switch to weight display mode by selecting ”Show weight”, see the section ”Show weight” under ”Machine operation”.

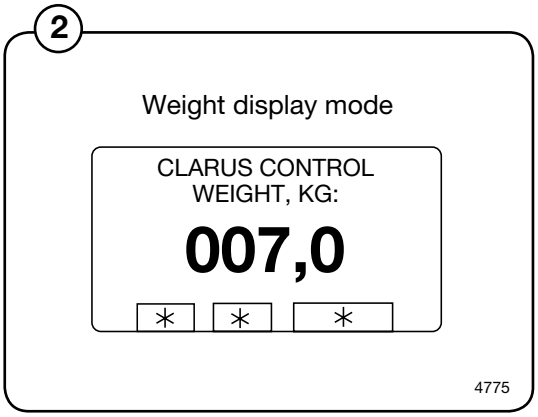
The weight shown on the display will always be the net weight (achieved because the weighing equipment has been ”tared”). A slight delay is built in to prevent the display from flickering.

Resetting the weighing equipment

(1) If the display does not show the weight (in an empty machine) as zero after a program, the weighing equipment can be reset to zero using the TAR key.

For a description of the functions used to set and check the tare value, see the section headed ”Scale adjustments” under ”Machine operation”.





Calibrating the weighing equipment

The “Zero calibration” function is used to increase the accuracy of the weighing equipment. This should be done once a month. See the section headed “Zero calibration” under “Machine operation”.

If a new scale unit is installed, it must be calibrated as described in the section ”Calibrate the scale” under ”Machine operation”.

Checking accuracy of weighing equipment display

Twice a year you need to check that the weighing equipment is displaying the accurate weight, with the aid of an object of known weight. If the weighing equipment does not show the real weight of this object, you will need to follow the “Zero calibration” procedure, a function in the Clarus software. Follow the instructions under “Zero calibration” in the “Machine operation” section of the manual. If this is unsuccessful, the weighing equipment will have to be recalibrated using the “Calibrate the scale” function, as described under “Machine operation”.

If the weighing equipment has a fault

Follow the troubleshooting procedure under the heading “Fault-finding, weighing equipment”.

If you cannot rectify the problem with the help of that section, make a note of the weighing equipment version number before you contact the service department.

To find the weighing equipment version number, access the service program, select “Scale adjustments”, then “Read version number”.

Fault-finding, weighing equipment

Error message on display:

Weight, kg:	**999,9 or -999,9**

Probable cause:

The weighing equipment is overloaded/”underloaded”, i.e. the load cells are sending a signal which is too high/low to the scale unit. Probable cause is one or more load cells faulty. The machine may be incorrectly installed.

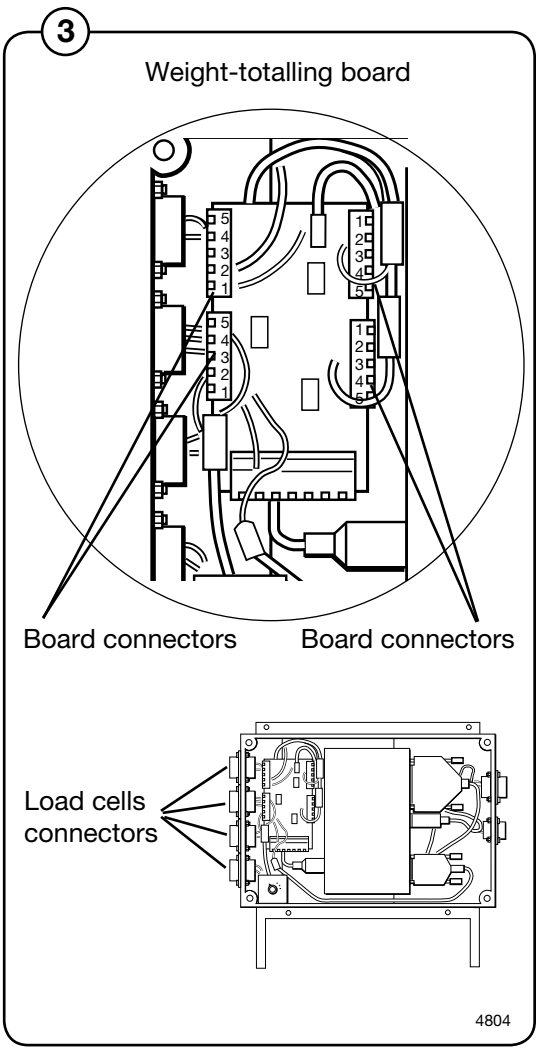
Fault-finding procedure:

- Check that all connections to the machine are flexible.
- If the weight displayed is -999.9, try following the "Zero calibration" procedure (described under "Zero calibration" in the "Machine operation" chapter).
- Check that the load cells are unobstructed. Remove any mechanical obstructions.

(3)

- Taking the load cell cables one at a time, disconnect the cable connecting each load cell to the scale unit. Continue one by one until a stable weight parameter is displayed (but not 999.9). When this stable parameter is displayed you will know which of the load cells must be faulty.

(3)



- If more than one load cell is faulty, the faulty cells can be identified using a multimeter on the scale unit weight-totalling board to check each cell in turn, as follows:
  - Remove the four screws on the scale unit cover.
  - Check that the four load cell cables are connected to the scale unit.
  - Measure the voltage at the connectors on the weight-totalling board, between terminal 2 and 3 for each load cell. The normal value for an unladen machine is approx. 3-5 mV (DC). A value different from this indicates that the load cell is faulty.

Menu line which should show actual weight not displayed.

Possible causes:

The option “DISPLAY WEIGHT ALLOWED” may be switched off (have the answer “No” alongside) in “Settings 1”. Possible fault in communication with CPU board or display. The fault can also be in the scale unit.

Fault-finding procedure:

- Check in “Settings 1” that the option “DISPLAY WEIGHT ALLOWED” has “Yes” alongside.
- Check that the cables/wiring for CPU communication and power supply are connected to the scale unit and in good condition.
- If the washer extractor appears to be working normally apart from the absence of weight parameter display, try replacing the scale unit as described under “To replace the scale unit”.

If you suspect that the weighing equipment is not displaying accurate weight value.

Probable cause:

Probably a faulty load cell.

Fault-finding procedure:

- Place an object of known weight at one corner on top of the washer extractor. Check the weight shown on the display. Move the weight to each of the other corners of the machine in turn, checking the display each time. If one corner is different from the others, this will reveal which load cell is faulty.
- Check that the load cell in question is mechanically unobstructed, free of anything which could affect its normal functioning.
- Replace the load cell as described under “To replace a load cell”.

Error message on display:

Failed. Press SELECT.

Possible causes:

Calibration switch incorrectly set. An incorrect calibration weight has been used for calibration.

Fault-finding procedure:

(4)

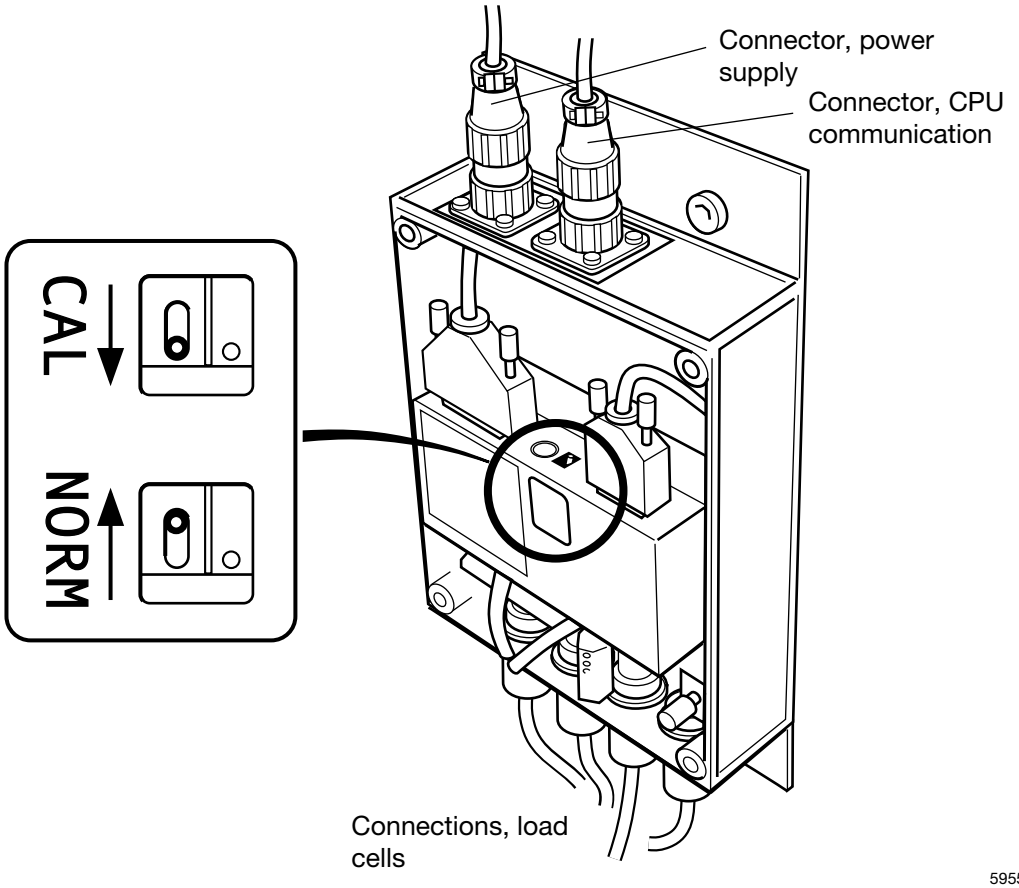
- If you are or have recently been calibrating the weighing equipment, the calibration switch may be incorrectly set, or an incorrect calibration weight may have been used for calibration.

  Check that the calibration switch is set correctly. It should normally be set to NORM. During calibration the switch should be set to CAL.

  If relevant/necessary, calibrate the weighing equipment, or follow the “Calibrate the scale” procedure under “Machine operation”.

- Check that all cables/wiring to the scale unit are sound and correctly connected.

(4)



Information in display:

Function not allowed.

Probable cause:

A function has been selected in the program which cannot be carried out.

Fault-finding procedure:

- Check that the function in question is switched on under “Settings”.
- Check that the cables for CPU communication, power supply and load cells are connected.
- Check that these cables are all in good condition.
- If any cable is faulty, replace it.

Information in display in service program:

Weighing equipment not connected.

Probable cause:

CPU board not communicating with scale unit.

Fault-finding procedure:

- Check that the connectors for CPU communication, power supply and load cells are connected on the scale unit.
- Check that their cables are all in good condition.
- If any cable is faulty, replace it.

Regular maintenance

To keep your machine in proper working order, follow the preventive maintenance recommendations provided below.

The maintenance interval should be adjusted according to machine usage. The suggested schedule assumes an 8 hour work day, and a 5 day work week..

Daily

- Check the door and door lock:
  - Open the door and try starting the machine. The machine MUST NOT START.
  - Close the door, start the machine and try opening the door. It MUST NOT BE POSSIBLE TO OPEN THE DOOR WHILE THE MACHINE IS OPERATING!
  - Check that the door does not leak.
  - Clean the door seal, removing any detergent and fluff.
- Check that the drain valve does not leak during the wash cycle.
- Clean out any detergent remaining in the detergent compartment. Rapid advance through a program and let the water rinse the compartment.
- Inspect liquid chemical tubing and connections for leaks. Repair as necessary.

Every third month


May only be carried out by authorized personnel.

- Check that the door does not leak.
- Check the drain valve and remove any lint.
- Inspect the interior of the machine (during an actual wash cycle to ensure that no leaks are noticed) by:
  - Turning of the main power switch of the machine.
  - Remove the top cover and the protective front and rear plates.
  - Cover the detergent dispenser to prevent water from splashing inside the machine.
  - Start a wash program.
  - KEEP CLEAR OF MOVING PARTS WHILE MACHINE IS OPERATING!!

- Inspect all internal hoses, seals and gaskets for signs of leakage. Repair as necessary.
- Check that water inlet screens are clean of debris. Dirty screens result in longer fill times, which reduce productivity.
- Inspect the drive belt. Adjust the tension or replace if necessary (see section 30. Motor).
- Check that there are no signs of leakage on the floor beneath the machine. Locate and repair any leak.
- On heated machines, if the heating time is unusually long, check the heating elements (see section 40. Heating). If the water is very hard, check whether there are lime deposits on the heating elements. Decalcify the elements if necessary. Adapt the amount of deliming agent to the manufacturer’s guidelines.
- Never switch on the heating elements when there is no water in the machine. This will cause the slow-blow fuse to trigger.
- Inspect the shock absorbers and coil springs. (Only EX- and H-model).

When reliable laundry and wetcleaning equipment is desired, the choice is Wascomat!

The world's oldest and leading manufacturer of commercial laundry equipment for coin laundries, hotels, motels, nursing homes and any other institutional laundry use, and the environmentally safe, wetcleaning "dual-use" systems for drycleaners.

WASCOMAT PROVIDES "PEACE OF MIND GUARANTEE"

Backed by a company that's been in the laundry equipment business for over 100 years and has earned a reputation as the standard of quality worldwide, Wascomat dealers provide:

– Free survey of your laundry needs

– Laundry design and layout

– Quality laundry equipment in a size and model for every need

– Installation, start-up and training

– Worldwide parts and service

– Best warranty in the business

– ***"Lease-a-Laundry Program"***, which includes the laundry equipment installation and ongoing service

EXPAND, MODERNIZE, RETOOL OR BUILD A NEW LAUNDRY WITH LOW-COST FINANCING OR LEASING FROM WASCOMAT*

With Wascomat/Viking financing or leasing you can obtain and install durable, efficient, state-of-the-art Wascomat washers, dryers and non-polluting, environmentally-friendly wetcleaning equipment to meet all anti-pollution regulations.

For more information and to apply for financing or leasing, call Viking Financial Services LLC 1-800-645-2209

* For qualified applicants and equipment only.

Wascomat provides efficient, quality washers, dryers, flatwork ironers and non-polluting wetcleaning equipment.

FRONT-LOAD WASHER MODELS

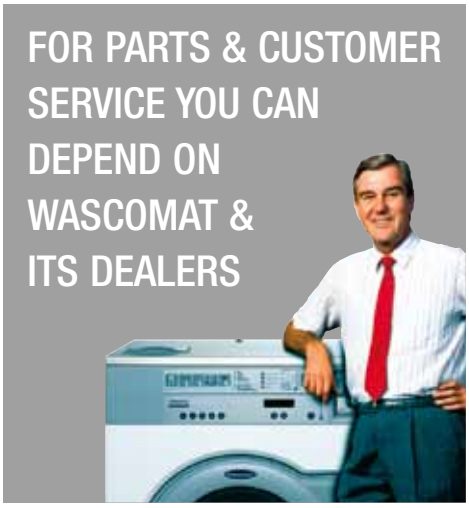
Solid and soft-mount, coin operated and commercial laundry washers in standard, high and ultra-high extract models. Designed for long life and efficient water and energy use. Available from 18 to 250 lb. capacities.

SIDE-LOAD WASHER MODELS

Pullman, Side-Load, Barrier and Clean Room washer models with high 300 to 350 G-Force extraction, designed and built for long, trouble-free life and big water and energy savings. Available from 55 to 250 lb. capacities.

GAS EFFICIENT DRYER MODELS

Coin operated and commercial energy and gas efficient, user friendly TD dryer models with optional unique Wascomat Residual Moisture Control (RMC). Available in a size and model for every laundry need.



AUTOMATIC FLATWORK IRONERS

A unique one-operator, fully automatic, labor saving, ironer that does it all: feeds, irons, folds, stacks and counts. Also available in fully and semi-automatic models in a size and model for every laundry need.

WASCOMAT NON-POLLUTING WETCLEAN EQUIPMENT

The best alternative to Perc, uses water and complies with OSHA, EPA and all other environmental, anti-pollution regulations. Wascomat state-of-the-art wetclean technology eliminates all pollution concerns and provides the best wetcleaning and washing results. Available in a size and model for every wetcleaning need.

With the push of a button, the unique Wascomat "Dual-Use" Wetcleaner converts to an ideal laundry washer for washing shirts, comforters, drapes, all other washable garments and cleaner's wash-dry-fold customer service.

WASCOMAT PROVIDES THE BEST CUSTOMER SERVICE WITH EXPERIENCED WORLDWIDE CUSTOMER SUPPORT, WITH AN OVER 100-YEAR TRACK RECORD.

WASCOMAT/VIKING FINANCIAL SERVICES PROVIDES LOW COST FINANCING AND LEASING* FOR YOUR BUSINESS GROWTH.

For more information call Wascomat at 516-371-4400

Wascomat Laundry Equipment

The Standard of Quality for Over 100 Years!

* For qualified applicants and equipment only.