Service Manual

Clarus Control

438 9050-01/02

Contents

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

General

This service manual describes the general features of the Clarus Control program control unit, i.e. the features which remain the same no matter which washer extractor the unit is installed in. As a result, at certain points in the troubleshooting procedures set out in detail in the section ”Fault-finding” you will be referred to the manual for the specific washer extractor you are working on. Similarly, because this manual is a general one some of the variables described in the sections ”Settings 1” and ”Settings 2” will not be found on all washer extractors.

The service manual is divided into the following sections:

Circuit boards

Descriptions of the display circuit board, the CPU circuit board and the I/O circuit boards, plus identification of all outputs.

The service program

The service program is a valuable asset in tracing faults in the washer extractor, since it allows you to control all of the various machine functions separately:

01	COLD WATER	27	LIQUID DETERGENT 12
02	HOT WATER	28	LIQUID DETERGENT 13
03	COLD HARD WATER	32	MOTOR CLOCKWISE
04	TANK 1 WATER	33	MOTOR COUNTERCLOCKWISE
05	TANK 2 WATER	34	DISTRIBUTION
06	FLUSH	35	LOW EXTRACT
07	FLUSH COLD WATER	36	MEDIUM EXTRACT
08	FLUSH HOT WATER	37	HIGH EXTRACT
09	DETERGENT POWDER 1	38	TURBO EXTRACT
10	DETERGENT POWDER 2	39	NORMAL DRAIN
11	DETERGENT POWDER 3	40	DRAIN BLOCKING
12	DETERGENT POWDER 4	41	RECYCLE DRAIN 1
13	DETERGENT POWDER 5	42	RECYCLE DRAIN 2
16	LIQUID DETERGENT 1	43	RECYCLE DRAIN 3
17	LIQUID DETERGENT 2	48	OIL (PULS)
18	LIQUID DETERGENT 3	50	DOOR LOCK/AUTOMATIC LUBR.
19	LIQUID DETERGENT 4	54	HEAT
20	LIQUID DETERGENT 5	55	HEAT 2
21	LIQUID DETERGENT 6	57	TILT INTERLOCK
22	LIQUID DETERGENT 7	58	TILT BACKWARDS
23	LIQUID DETERGENT 8	59	TILT NEUTRAL
24	LIQUID DETERGENT 9	60	TILT FORWARDS
25	LIQUID DETERGENT 10	63	BUZZER/FLASHLIGHT
26	LIQUID DETERGENT 11		

You can also call up display screens which show exactly which input signals to the various I/O boards are activated:

I/O-PCB 1:	I/O-PCB 2:	I/O-PCB 3:
EMERGENCY STOP	TILT BACKWARDS	SWITCH DOOR OPEN
TEMPORARY PAUSE	TILT FORWARDS	CHUTE SECURED
OIL		TILT MOTOR CLOCKWISE
REMOTE START		TILT MOTOR COUNTERCLOCKWISE
REPEAT RINSE		BUTTON TILT BACKWARDS
PHASE CHECK		BUTTON TILT FORWARDS
DOOR LOCKED		
DOOR CLOSED		
IMBALANCE		

Settings 1 and Settings 2

”Settings 1” gives you access to a set of variables which you can change without needing to obtain a special password from the supplier. ”Settings 2” contains variables which, if changed without sufficient care or knowledge on the part of the person changing them, could jeopardise the machine’s safety system(s) or its reliability. For this reason, the variables in ”Settings 2” are protected by a password system. Every time you access ”Settings 2” you have to obtain a new password from the supplier.

The following variables are accessed under ”Settings 1”:

ADJUST TIME ALLOWED	LOCKED STANDARD WASH PROGRAMS
ADJUST TEMPERATURE ALLOWED	LEVEL QUICK COOL-DOWN
RAPID ADVANCE ALLOWED	LEVEL IMBALANCE
WEIGHT DISPLAY ALLOWED	LEVEL LOW
NO WATER LEVEL REDUCTION ALLOWED	LEVEL MEDIUM
PAUSE ALLOWED	LEVEL HIGH
MANUAL FUNCTIONS ALLOWED	MIDDEL TEMPERATURE COOL-DOWN
FREE TEXT ALLOWED	DEFAULT MOTOR ON TIME
CHANGE WASH PROGRAM ALLOWED	DEFAULT MOTOR OFF TIME
AUTO RESTART ALLOWED	FLUSH DELAY TIME
ADJUST EXTR. SPEED ALLOWED	FLUSH ON TIME
DISPLAY REMAINING TIME	BUZZER ON BUTTON
DISPLAY ACTUAL TEMPERATURE	MAX FILLING TIME
DISPLAY ACTUAL SPEED	MAX HEATING TIME
MACHINE NOT HEATED	TIME FOR WEIGHT DISPLAY
TEMPERATURE CONTROL OF WATER	PC5 INTERLOCK, HEATING
TEMPERATURE IN °C	PC5 INTERLOCK, EXTRACTION
REPEAT PROG. MODE QUESTION	

The following variables are accessed under ”Settings 2”:

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

Fault-finding

In the section headed ”Fault-finding” you will find detailed troubleshooting instructions for all error messages which may appear on the display. The following error messages are used:

NO WATER
DOOR OPEN
DOOR UNLOCKED
NTC LOW TEMP
NTC HIGH TEMP
WATER IN DRUM
MACHINE OVER-FILLED
NO HEATING
NOT DRAINED
IMBALANCE SENSOR
NO MOTOR COMM
DOOR LOCK
INTERLOCK STATUS
I/O COMMUNICATION
HEAT SINK TOO HOT
MOTOR TOO HOT
NO INTERLOCK
INTERLOCK HARDWARE
MOTOR SHORT
LOW DC VOLTAGE
HIGH DC VOLTAGE
LEVEL CALIBRATION
EMERGENCY STOP
LOW OIL LEVEL
PHASE
PRESS. SENSOR TILT
PRESS. SENS. TIMEOUT
DOOR SWITCH TILT

Circuit board

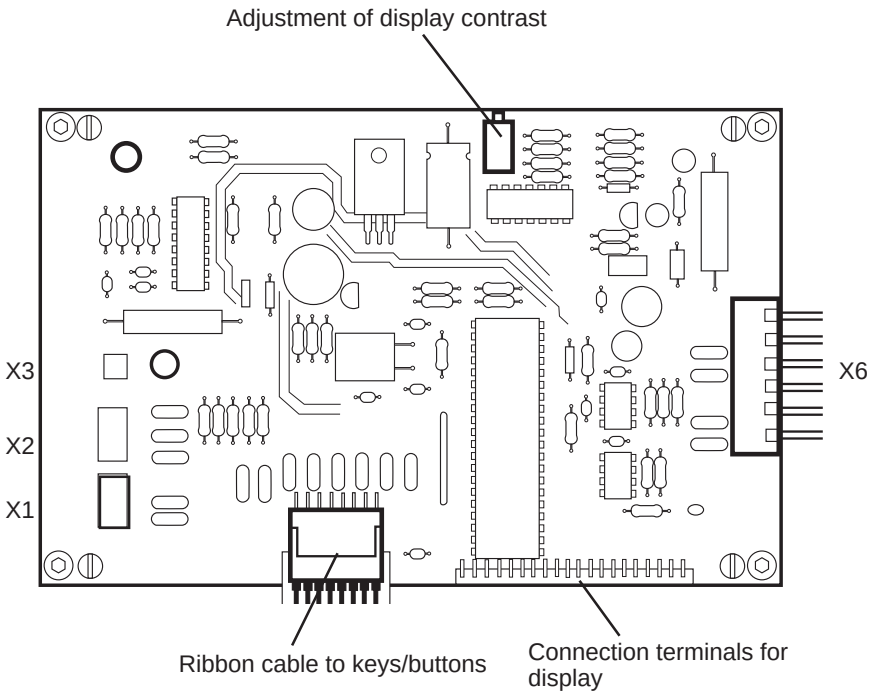
The program control unit consists of three circuit boards: the CPU board, one or more I/O boards and the display board.

The display circuit board

Fig. 1 The display board communicates with the CPU board via a serial interface. The CPU board sends signals to tell what needs to be shown on the display, and the display board converts these signals into data which controls the alphanumeric display.

The display board also detects which buttons/keys on the control panel have been pressed and communicates that information to the CPU board.

1



PCB connector	Function
X1	Not used
X2	Communication with memory card reader
X3	Not used
X6: 1-2	Voltage feed from CPU board
X6: 3-7	Serial interface with CPU board

4233

The CPU circuit board

Fig. (2) The CPU board controls all the functions of the washer extractor by means of the various control programs stored in the CPU board program memory. The CPU board communicates with the I/O board(s), display board and motor control unit via serial interfaces.

These are the control possibilities:

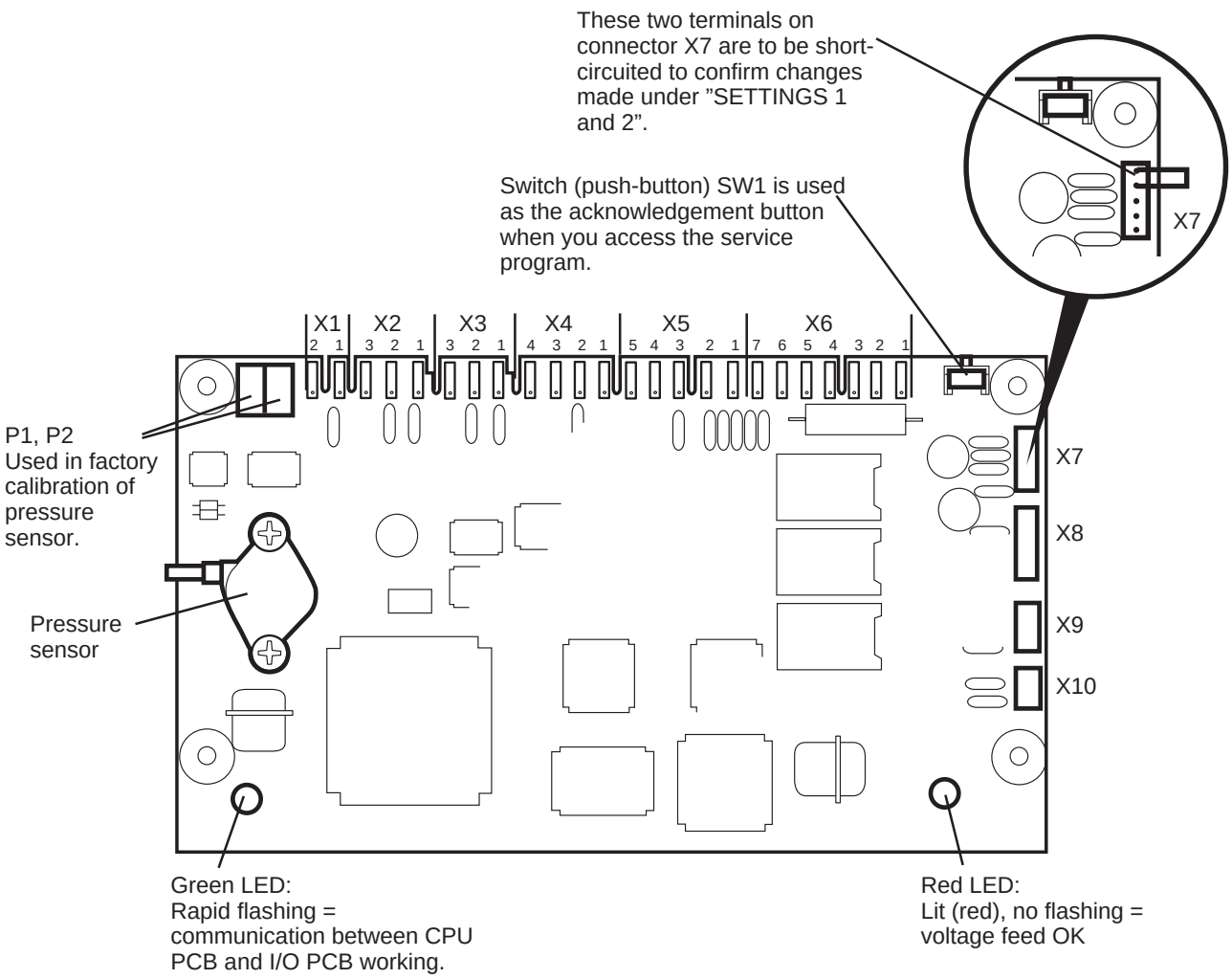
- The CPU board controls water valves, detergent dispensing, draining and heating with the aid of one, two or three I/O boards. The number of I/O boards varies from one washer extractor to another, depending on how many functions there are to control.
- The CPU board controls the alphanumeric display on the display board.
- The CPU board controls the motor via a motor control unit.

To receive information on the various activities of the washer extractor, there are the following inputs:

- on the CPU board there are inputs for temperature sensors, external water metering devices and the speed sensor on the motor shaft.
- the CPU board receives information from inputs on the I/O boards, about the status of the door lock, external switches (e.g. Start/Stop and Pause) where relevant, and of safety switches and controls for machine tilt where relevant.
- on the CPU board there is a pressure sensor to which a tube for measuring the water level in the drum can be connected.
- the CPU board receives information from the display board on which buttons/keys have been pressed.

Please note that the CPU board does not have any removable memory chips. If the CPU board should need to be replaced, the correct software for that particular washer extractor will have to be loaded onto the new board using a portable PC with special software, see the section ”To replace the CPU board”. Wash programs created by the user can be transferred by means of a memory card.

2



PCB connector	Function
X1	Input from water temperature sensor
X2	Input from water metering device
X3	Input from speed sensor on motor
X4	Output to motor control unit
X5: 1-3	Serial communication with I/O PCB 1
X5: 4-5	Voltage feed from I/O PCB 1
X6: 1-5	Serial communication with display PCB
X6: 6-7	Voltage feed to display PCB
X7	Interface with PC
X8	Motor communication
X9	IDAS communication
X10	Internal communication

The I/O circuit board(s)

Fig. 3

The I/O circuit boards are controlled by the CPU board, and communication is via a serial interface. A single program control unit may have 1, 2 or 3 I/O boards, depending on the inputs and outputs it needs.

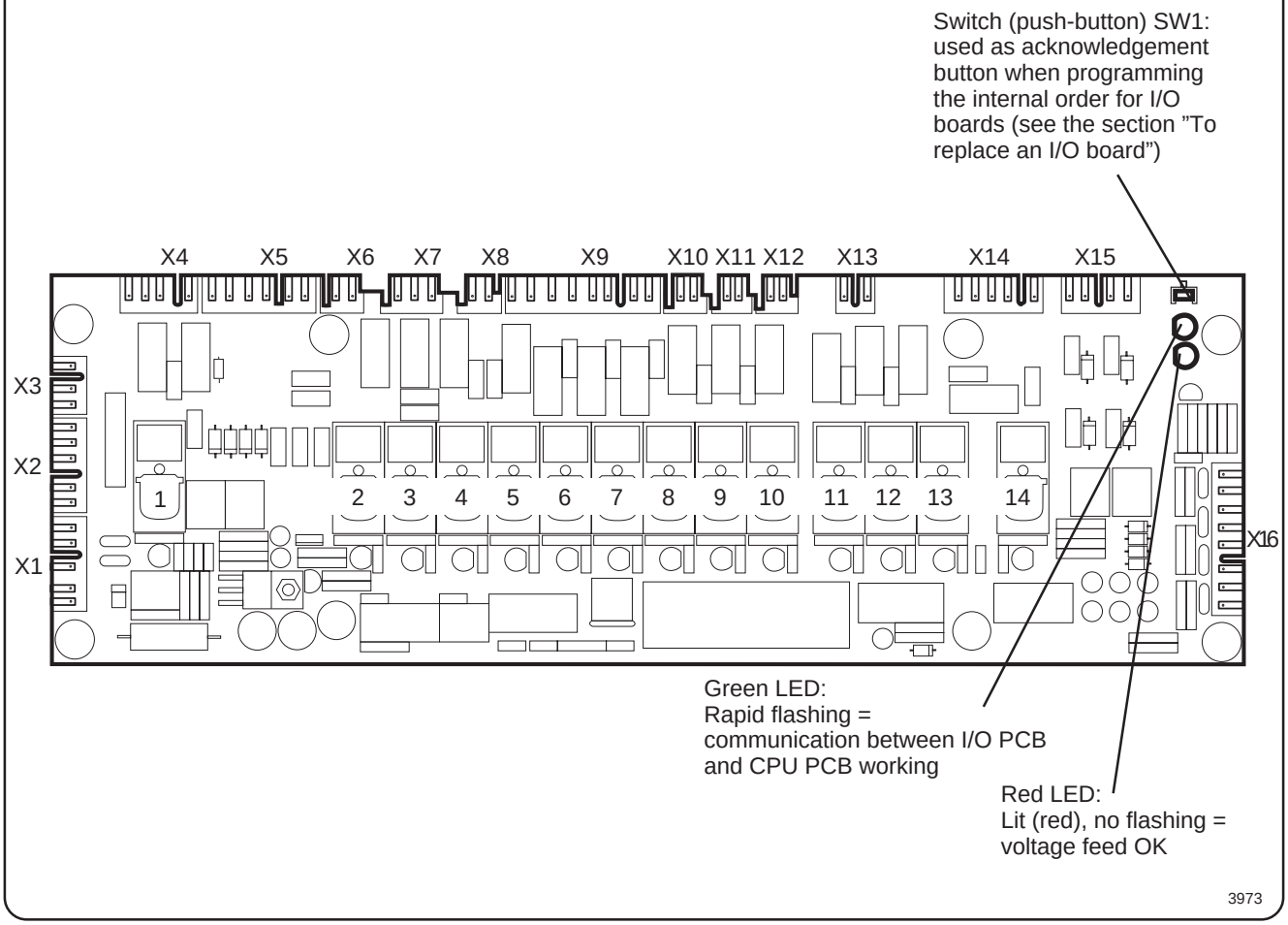
On the I/O boards there are inputs from the door lock, external switches (e.g. Start/Stop and Pause) where relevant, and safety switches and controls for machine tilt where relevant. These input signals are sent to the CPU board.

The I/O boards have outputs for controlling water valves, detergent dispensing, draining and heating, and the tilt function where relevant.

The voltage feed to the CPU board and I/O board(s) goes via I/O board 1 which supplies the voltage feed to both the CPU board and, where relevant, to any other I/O boards.

Please note that if there is more than one I/O board in the program control unit and one of the I/O boards should need to be replaced, special programming will have to be done. Using a portable PC with special software, you have to program in information concerning which I/O board (1, 2 or 3) the new board is, see the section ”To replace an I/O board”.

3



PCB connector	Relay no.	I/O-PCB 1	I/O-PCB 2	I/O-PCB 3
Serial interface and voltage feed				
X1: 1-3		Serial interface to PCB 2	Serial interface to PCB 3	-
4		Feed 16 V + to PCB 2	Feed 12 V + to PCB 3	-
5		Feed 0 V - to PCB 2	Feed 12 V - to PCB 3	-
X2: 1		Feed 0 V - to CPU	Feed 12 V - from PCB 1	Feed 12 V - from PCB 2
2		Feed 16 V + to CPU	Feed 12 V + from PCB 1	Feed 12 V + from PCB 2
3-5		Serial interface to CPU	Serial interface to PCB 1	Serial interface to PCB 2
X3: 1		Feed 16 V + from T10	-	-
2		Feed 0 V - from T10	-	-
X6: 1		Feed 230 V from emerg. stop, phase	Direct feed 230 V, phase	-
2		Feed 230 V from emerg. stop, neutral	Direct feed 230 V, neutral	-
X10: 1		Interlock signal to MCU, phase	Feed relays from I/O 1, phase	Program signal for acknowledge, phase
2		Interlock signal to MCU, neutral	Feed relays from I/O 1, neutral	Program signal for acknowledge, neutral
X11: 1		Feed to relays I/O 2, phase	Feed to relays I/O 3, phase	Feed relays from I/O 2, phase
2		Feed to relays I/O 2, neutral	Feed to relays I/O 3, neutral	Feed relays from I/O 2, neutral
X12: 1		To X13: feed relay 11-14, phase	To X13: feed relay 11-14, phase	-
2		To X13: feed relay 11-14, neutral	To X13: feed relay 11-14, neutral	-
X13: 1		Feed relay 11-14, neutral	Feed relay 11-14, neutral	Feed relay 11-14, neutral
2		Feed relay 11-14, phase	Feed relay 11-14, phase	Feed relay 11-14, phase (from S25, door open and secured)
Outputs				
X4: 1	1	Relay door lock	-	-
2	1	Relay door lock	Flashlight, phase	Oil lubrication E20
3-4	1	Feed to I/O X6:1-2	-	-
X7: 1	2	Drain 1 (Y1), phase (normally open)	Drain 2 (Y2), phase (normally open)	Drain 3 (Y3), phase (normally open)
2		Common neutral	Common neutral	Neutral
3	2	Drain 1 (Y1), phase (normally closed)	Drain 2 (Y2), phase (normally closed)	-
X8: 1-2	3	Heating relay (K21)	Heating relay 2 (K22)	Drain 4 (Y4)
X9: 1	9	Detergent powder 1 (Y11)	Detergent powder 5 (Y21)	Detergent powder 6
2	8	Detergent powder 2 (Y12)	Detergent liquid 5 (Y65)	Detergent powder 7
3	10	Detergent powder 3 (Y13)	Detergent liquid 10 (Y75)	Detergent liquid 12
4	7	Cold water (Y14)	Detergent liquid 11 (spray)	Detergent liquid 13
5	6	Flush 1 (Y15)	Drain blocking (Y1b)	Flush powder (Y16)
6	5	Detergent powder 4 (Y22)	Tank 1 water (Y44)	Oil lubrication (programmable)
7	4	Hot water	Cold hard water (Y34)	Tank 2 water (Y54)
8		N (common neutral)	N (common neutral)	N (common neutral)
X14: 1	14	Detergent liquid 1 (Y61)	Detergent liquid 6 (Y66)	Tilt forward (Y9a)
2	12	Detergent liquid 2 (Y62)	Detergent liquid 7 (Y67)	Tilt back (Y10a)
3	13	Detergent liquid 3 (Y63)	Detergent liquid 8 (Y68)	Tilt to neutral pos. (Y9b+Y10b)
4	11	Detergent liquid 4 (Y64)	Detergent liquid 9 (Y69)	Tilt interlock (K72)
5		N (common neutral)	N (common neutral)	N (common neutral)

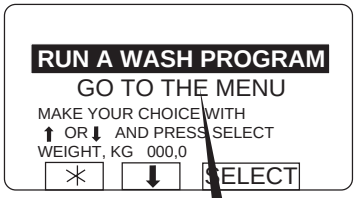
Circuit board

Inputs

X5	1	Door lock microswitch S4/N	Flashlight, neutral	-
	2	Door lock microswitch S4/N	-	-
	3-4	Door status microswitch S3/N	-	-
	5-6	Door lock microswitch S4/Phase	-	-
X15:	1	External start/stop signal, phase	Machine tilted forward (B9), phase	Hopper secured (S29), phase
	2	External start/stop signal, neutral	Machine tilted forward (B9), neutral	Hopper secured (S29), neutral
	3	External pause signal or PC5 connection, phase	Machine tilted back (B8), phase	Door secured open (S25), phase
	4	External pause signal or PC5 connection, neutral	Machine tilted back (B8), neutral	Door secured open (S25), neutral
X16:	1-2	Acknowledgement, emergency stop (S2)	-	Motor clockwise
	3-4	Repeat rinse	-	Motor counterclockwise
	5-6	Low oil level	-	Tilt back
	7-8	Phase fault	-	Tilt forward

The service program

To select the ”Service Program” function

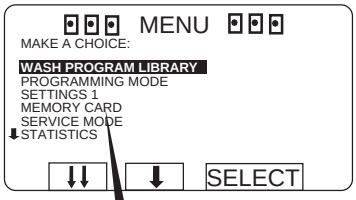


If this menu is not currently displayed:
Press ↩ repeatedly.

Press ↓ to highlight ”GO TO THE MENU”.

RUN A WASH PROGRAM
GO TO THE MENU

SELECT **Press SELECT.**



Press ↓ five times...

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

... 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
- temporary pause
- 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

The service program

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 PCS
CLEAR WASH PROGRAM COUNTER IN SMC
EXIT

✳ ⬇ SELECT

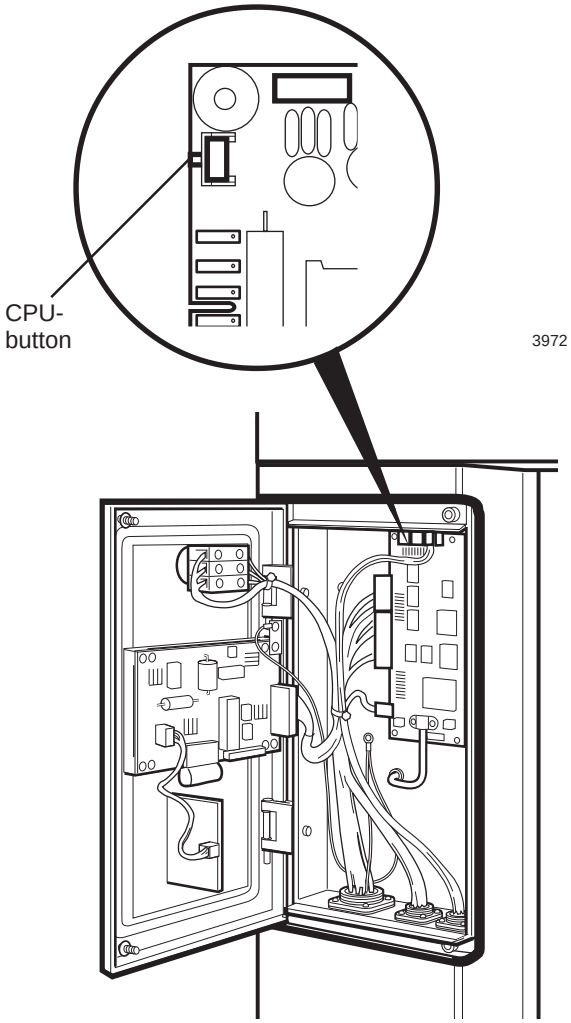
To access the service program:

SELECT

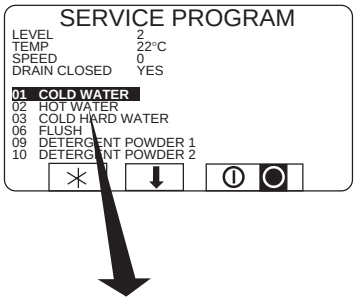
Press Select.

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. The CPU board is located behind the control panel. Two screws must be undone to open the control panel.



To control the machine functions



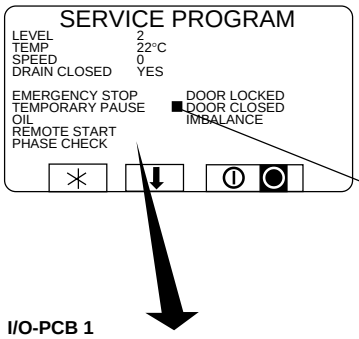
01 COLD WATER
02 HOT WATER
03 COLD HARD WATER
04 TANK 1 WATER
05 TANK 2 WATER
06 FLUSH
07 FLUSH COLD WATER
08 FLUSH HOT WATER
09 DETERGENT POWDER 1
10 DETERGENT POWDER 2
11 DETERGENT POWDER 3
12 DETERGENT POWDER 4
13 DETERGENT POWDER 5
16 LIQUID DETERGENT 1
17 LIQUID DETERGENT 2
18 LIQUID DETERGENT 3
19 LIQUID DETERGENT 4
20 LIQUID DETERGENT 5
21 LIQUID DETERGENT 6
22 LIQUID DETERGENT 7
23 LIQUID DETERGENT 8
24 LIQUID DETERGENT 9
25 LIQUID DETERGENT 10
26 LIQUID DETERGENT 11
27 LIQUID DETERGENT 12
28 LIQUID DETERGENT 13
32 MOTOR CLOCKWISE
33 MOTOR COUNTERCLOCKWISE
34 DISTRIBUTION
35 LOW EXTRACT
36 MEDIUM EXTRACT
37 HIGH EXTRACT
38 TURBO EXTRACT
39 NORMAL DRAIN
40 DRAIN BLOCKING
41 RECYCLE DRAIN 1
42 RECYCLE DRAIN 2
43 RECYCLE DRAIN 3
48 OIL (PULS)
50 DOOR LOCK/AUTOMATIC LUBRIC.
54 HEAT
55 HEAT 2
57 TILT INTERLOCK
58 TILT BACKWARDS
59 TILT NEUTRAL
60 TILT FORWARDS
63 BUZZER/FLASHLIGHT
EXIT

To activate the various machine functions:

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

Inputs from sensors and external controls

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.

Press any key to go back to the previous display.

I/O-PCB 1

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

If the washer extractor has more than one I/O board, you can check the input signals of the other board(s) too:

2 **Press 2 to inspect the inputs from I/O board 2.**

I/O-PCB 2

TILT BACKWARDS
TILT FORWARDS

Press any key to go back to the previous display.

3 **Press 3 again to inspect the inputs from I/O board 3.**

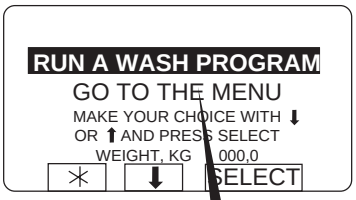
I/O-PCB 3

SWITCH DOOR OPEN
CHUTE SECURED
TILT MOTOR CLOCKWISE
TILT MOTOR COUNTERCLOCKWISE
BUTTON TILT BACKWARDS
BUTTON TILT FORWARDS

Press any key to go back to the previous display.

Settings 1

To select the ”SETTINGS 1” function

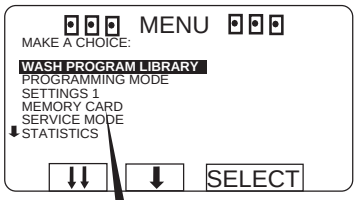


If this menu is not currently displayed:
Press ↩ repeatedly.

Press ⬇ to highlight ”GO TO THE MENU”.

RUN A WASH PROGRAM
GO TO THE MENU

SELECT **Press SELECT.**



Press ⬇ twice...

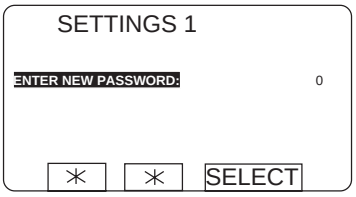
WASH PROGRAM LIBRARY
PROGRAMMING MODE
SETTINGS 1
MEMORY CARD
SERVICE MODE
STATISTICS
MANUAL MODE
SETTINGS 2
EXIT

... to highlight ”SETTINGS 1”.

SELECT **Press SELECT.**

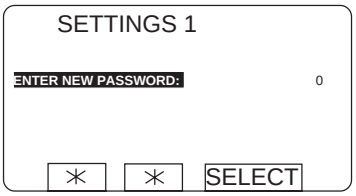
Password

To open the function without a password



SELECT **Press SELECT.**

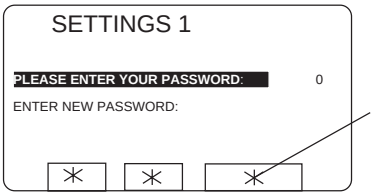
To enter a password the first time



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.

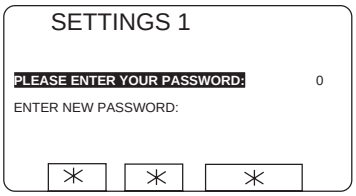
At any time you can change this password, or remove password protection from these functions.

Three attempts only

If you enter the wrong password, you have only two more attempts left. If the third password entered is incorrect too, you will have to exit the ”SETTINGS 1” function by pressing ↩ .

Each time you access ”SETTINGS 1” you can have three attempts only at entering the correct password.

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**.

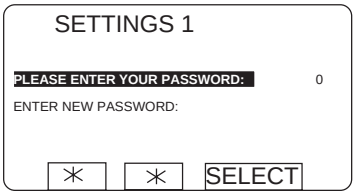
⬇ **Press ⬇.**

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**.

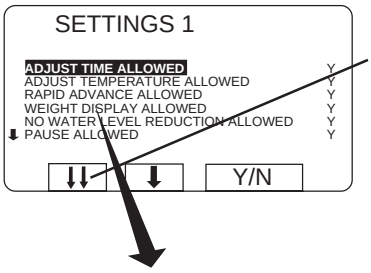
⬇ **Press ⬇.**

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
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	Y
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 PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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
TIME FOR WEIGHT DISPLAY	0:20
PC5 INTERLOCK, HEATING	N
PC5 INTERLOCK, EXTRACTION	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 0 Times, temperatures, levels.

⇓ **Press ⇓ to move on to the next question.**

⇑ **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 nine 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".

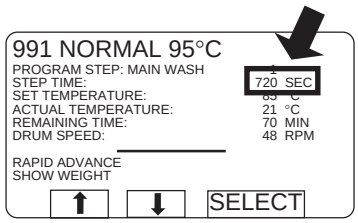
ADJUST TIME ALLOWED	**Y**
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

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.

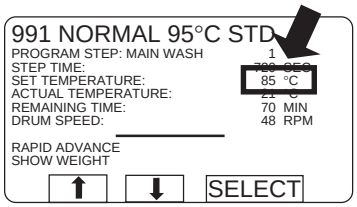
ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	**Y**
RAPID ADVANCE ALLOWED	Y
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

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.

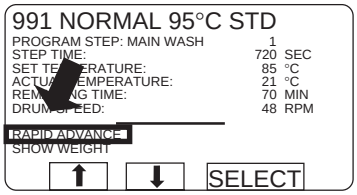
ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	**Y**
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

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!

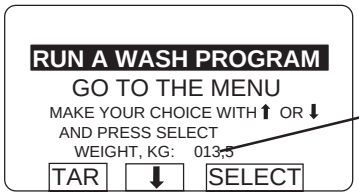
ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
WEIGHT DISPLAY ALLOWED	**Y**
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

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

⬇ Press ⬇.

Weight display allowed

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



Menu line showing actual weight

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
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	**Y**
PAUSE ALLOWED	Y
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

"No water level reduction" 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 "NO WATER LEVEL REDUCTION".

If you answer **Yes (Y)**:
The function "NO WATER LEVEL REDUCTION" can be used.

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

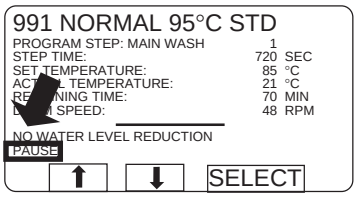
Y/N **Answer Yes (Y) or No (N).**

Press ⬇.

ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	**Y**
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

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.

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

Press ⬇.

Settings 1

ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	Y
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

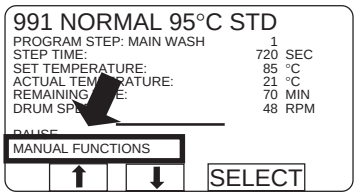
Y/N **Answer Yes (Y) or No (N).**

Press ⬇.

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 <u>not</u> be allowed.

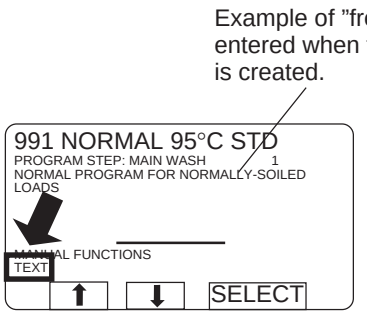
ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
FREE TEXT ALLOWED	**Y**
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

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.



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.

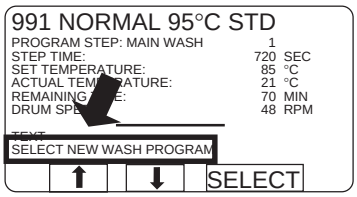
ADJUST TIME ALLOWED	Y
ADJUST TEMPERATURE ALLOWED	Y
RAPID ADVANCE ALLOWED	Y
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	**Y**
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N

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
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	Y
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

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

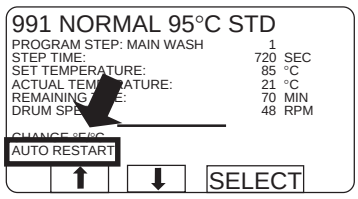
Press ⬇ **.**

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.

Settings 1

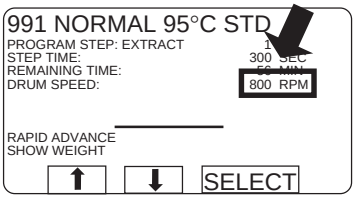
RAPID ADVANCE ALLOWED	Y
WEIGHT DISPLAY ALLOWED	Y
NO WATER LEVEL REDUCTION ALLOWED	Y
PAUSE ALLOWED	Y
MANUAL FUNCTIONS ALLOWED	Y
FREE TEXT ALLOWED	Y
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	**Y**
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y

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.

PAUSE ALLOWED	Y
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 PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175

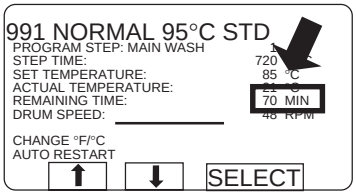
Y/N **Answer Yes (Y) or No (N)..**

⬇ **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.

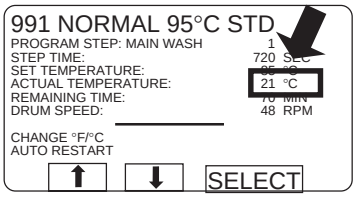
If you answer **No (N)**:

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 PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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 <u>not</u> be displayed.

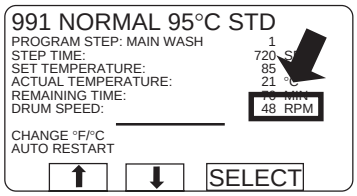
Y/N **Answer Yes (Y) or No (N).**

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 PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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 <u>not</u> be displayed.

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

Press ⬇ .

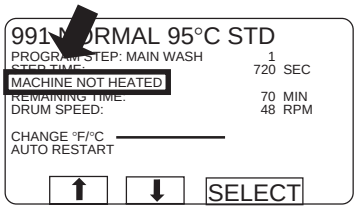
CHANGE WASH PROGRAM ALLOWED	Y
AUTO RESTART ALLOWED	Y
ADJUST SPIN SPEED ALLOWED.	Y
DISPLAY REMAINING TIME	Y
DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	**N**
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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 wash sequence starts, or if the wash 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 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 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 PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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.

If the temperature set is exceeded, the hot water valve will close. When the temperature falls below the temperature limit set, the hot water valve will open again, depending on how the temperature hysteresis has been set.

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 PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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 PROG. MODE QUESTION	**N**
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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 ⬇ .

Settings 1

DISPLAY ACTUAL TEMPERATURE	Y
DISPLAY ACTUAL SPEED	Y
MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	**N**
LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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 PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL- DOWN	**175**
LEVEL IMBALANCE	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

Water level for quick cool-down

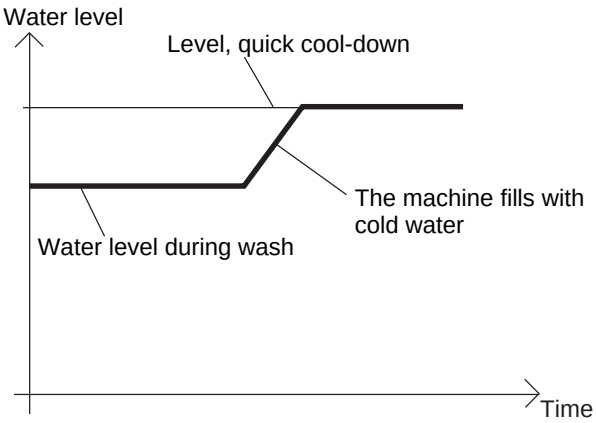
Here you determine the level to which the machine fills with cold water for quick cool-down.

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".



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 ⬇ .

MACHINE NOT HEATED	N
TEMPERATURE CONTROL OF WATER	Y
TEMPERATURE IN °C	Y
REPEAT PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	**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

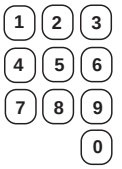
Water level after imbalance halt

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

If the machine's imbalance-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".

Use the numeric keys to enter the value.



If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

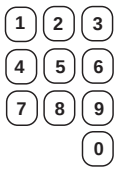
TEMPERATURE IN °C	Y
REPEAT PROG. MODE QUESTION	N
LOCKED STANDARD WASH PROGRAMS	N
LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	0
LEVEL LOW	**135**
LEVEL MEDIUM	**150**
LEVEL HIGH	**175**
MIDDLE TEMPERATURE COOL-DOWN	70 °C
DEFAULT MOTOR ON TIME	0:12
DEFAULT MOTOR OFF TIME	0:03
FLUSH DELAY TIME	0:06
FLUSH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

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".

Use the numeric keys to enter the value.



If you make a mistake while entering digits:

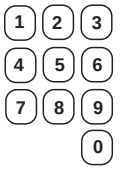
Press ERASE.

When you have finished:

Press ⬇ .

LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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
TIME FOR WEIGHT DISPLAY	0:20
PC5 INTERLOCK, HEATING	N
PC5 INTERLOCK, EXTRACTION	Y
READY	

Use the numeric keys to enter the value.



If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

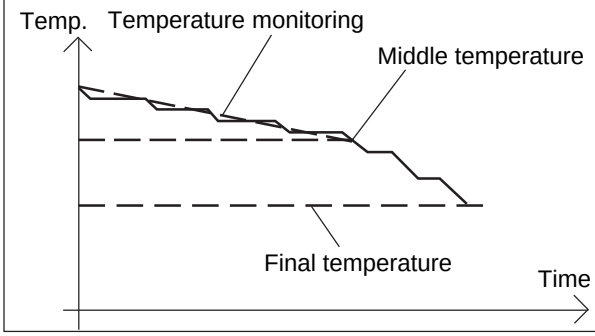
Middle temperature cool-down

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 QUICK COOL-DOWN	175
LEVEL IMBALANCE	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
TIME FOR WEIGHT DISPLAY	0:20
PC5 INTERLOCK, HEATING	N
PC5 INTERLOCK, EXTRACTION	Y
READY	

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

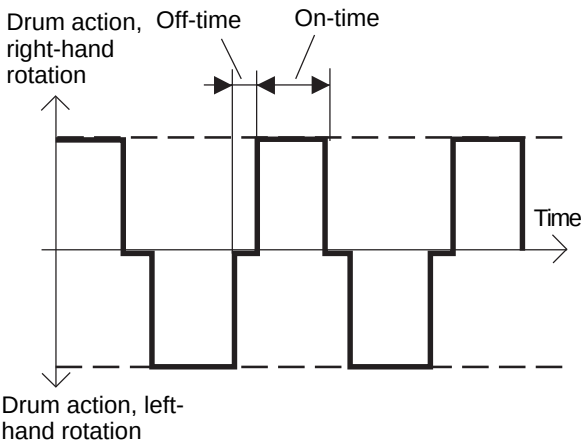
Press ⬇ .

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 QUICK COOL-DOWN	175
LEVEL IMBALANCE	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
TIME FOR WEIGHT DISPLAY	0:20
PC5 INTERLOCK, HEATING	N
PC5 INTERLOCK, EXTRACTION	Y
READY	

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”.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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
TIME FOR WEIGHT DISPLAY	0:20
PC5 INTERLOCK, HEATING	N
PC5 INTERLOCK, EXTRACTION	Y
READY	

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.

Answer Yes (Y) or No (N).

Press ⬇ .

LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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
TIME FOR WEIGHT DISPLAY	0:20
PC5 INTERLOCK, HEATING	N
PC5 INTERLOCK, EXTRACTION	Y
READY	

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 ⬇ .

LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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**
TIME FOR WEIGHT DISPLAY	0:20
PC5 INTERLOCK, HEATING	N
PC5 INTERLOCK, EXTRACTION	Y
READY	

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.

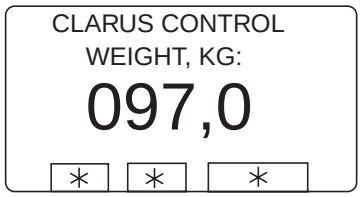
When you have finished:

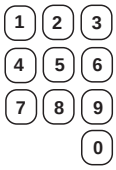
Press ⬇ .

LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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
TIME FOR WEIGHT DISPLAY	**0:20**
PC5 INTERLOCK, HEATING	N
PC5 INTERLOCK, EXTRACTION	Y
READY	

Time for weight display

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





Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

LEVEL QUICK COOL-DOWN	175
LEVEL IMBALANCE	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
TIME FOR WEIGHT DISPLAY	0:20
PC5 INTERLOCK, HEATING	**N**
PC5 INTERLOCK, EXTRACTION	**Y**
READY	

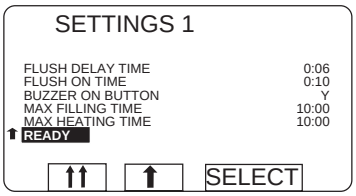
PC5, Power Control

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.

Answer Yes (Y) or No (N).

Press ⬇ .

To conclude making changes in variables under ”SETTINGS 1”

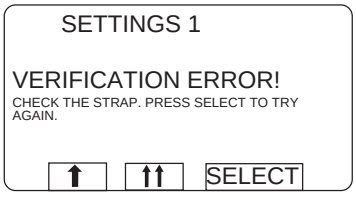


Press ⬇ to highlight READY.

Insert a suitable strap to short-circuit terminals X7:1-2 on the CPU circuit board.

SELECT

Press SELECT.



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

Check that the strap between X7:1-2 is intact and in place.

Press SELECT and try again.

The variables will now have been stored in the PCU.

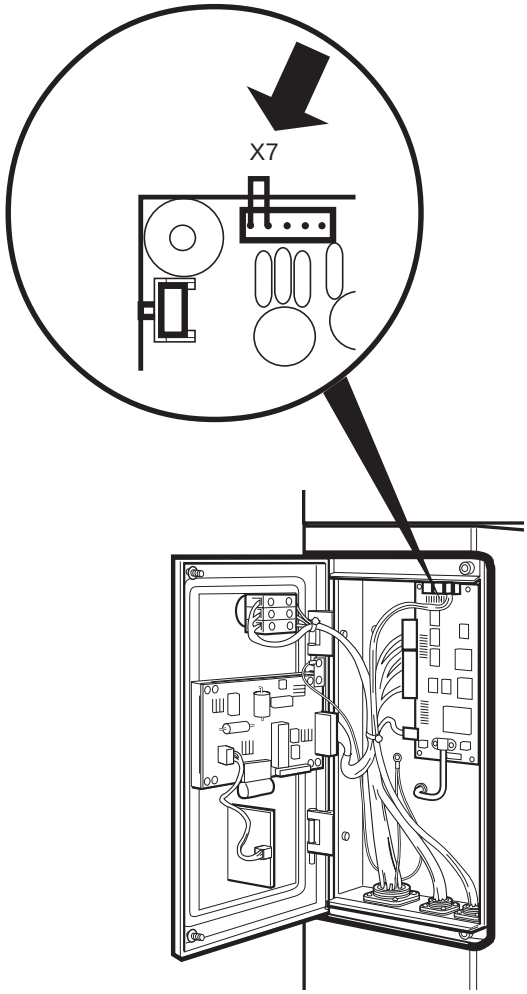
Remove the strap between terminals X7:1-2 on the CPU circuit board.

SELECT

Press SELECT.

To prevent inadvertent changes in variables

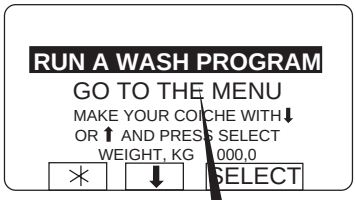
If you have changed any variables under "Settings 1", after keying in the individual changes line by line you need finally to insert a strap between two terminals on the CPU circuit board to confirm and store the changes in the CPU. This is an extra safeguard to prevent unintended changes in variables.



4660

Settings 2

To select the ”SETTINGS 2” function



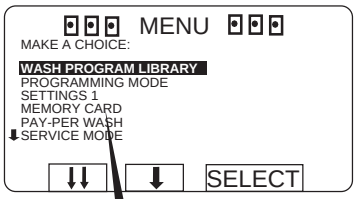
If this menu is not currently displayed:

Press ↩ repeatedly.

Press ⬇ to highlight ”GO TO THE MENU”.

RUN A WASH PROGRAM
GO TO THE MENU

SELECT **Press SELECT.**

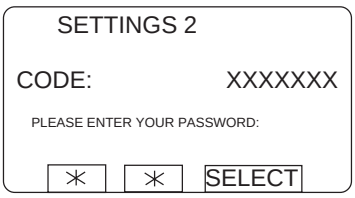


Press ⬇ several times...

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

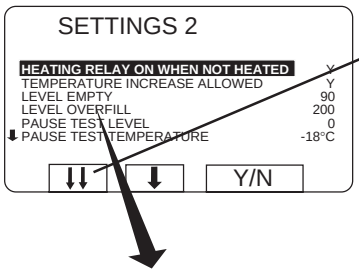
The variables which you can change via ”SETTINGS 2” belong to a category which, if they are changed carelessly or incorrectly, could jeopardise the machine’s safety system(s) or its reliability.

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 WHEN 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 IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	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, OVER FILLED	Y
ERROR, NO HEAT	Y
ERROR, REMAINING WATER	Y
ERROR, IMBALANCE SWITCH	Y
ERROR, MOTOR COMMUNICATION	Y
ERROR, LEVEL ADJUST	Y
ERROR, EMERGENCY STOP	Y
ERROR, DOOR LOCK SWITCH	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, PRESS. SENSOR TIMEOUT	Y
ERROR, DOOR SWITCH TILT	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
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 WHEN 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 IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

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.

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

Press ⬇.

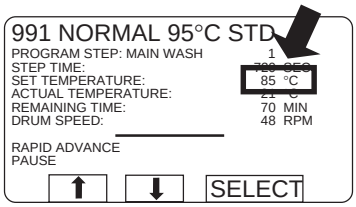
HEATING RELAY ON WHEN NOT HEATED	Y
TEMPERATURE INCREASE ALLOWED	Y
LEVEL EMPTY	90
LEVEL OVERFILL	200
PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT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

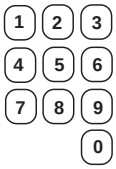
Level empty

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 WHEN 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 IMBALANCE 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 WHEN 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 IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

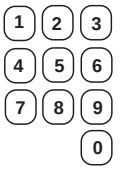
Test values for pause

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.



Use the numeric keys to enter the values.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

HEATING RELAY ON WHEN 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 IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30

Temperature hysteresis

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

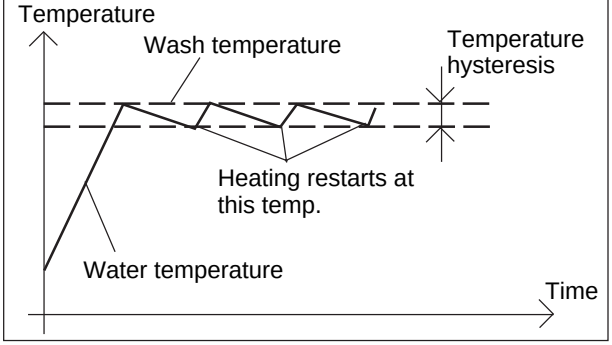
The temperature hysteresis can be programmed individually for each wash program. However, under certain circumstances, e.g. when the user has set the temperature manually, the PCU may not be able to find the temperature hysteresis values in the current wash program. That is when it needs to use the default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

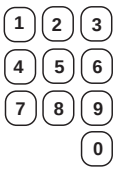
What is temperature hysteresis?

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.





Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Settings 2

HEATING RELAY ON WHEN 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 IMBALANCE 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?

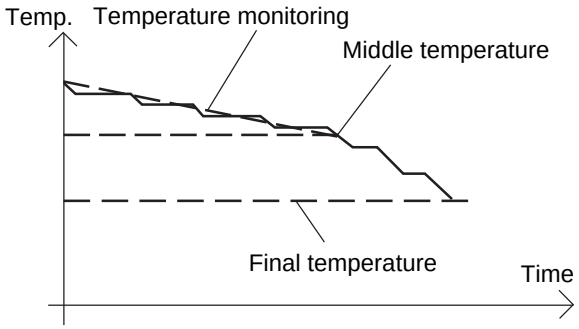
When creating a new wash program you can, to prevent creasing of the load, use the COOL-DOWN module to achieve controlled cool-down of the water in the drum. The cool-down sequence is divided into two stages:

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 WHEN 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 IMBALANCE 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:

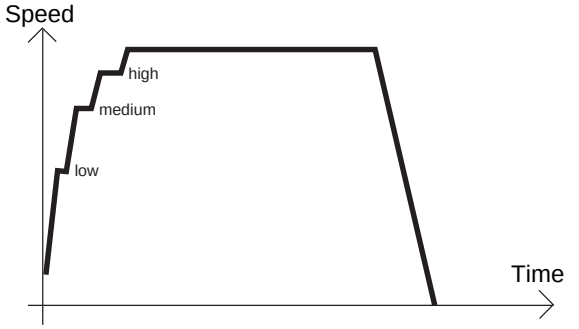
Press ⬇ .

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.

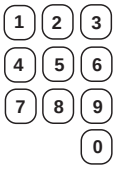


PAUSE TEST LEVEL	0
PAUSE TEST TEMPERATURE	-18 °C
DEFAULT TEMPERATURE HYSTERIS	4 °C
TEMPERATURE STEP IN COOL-DOWN	4 °C
DEFAULT LOW EXTRACT TIME	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	**00:00**
DEFAULT DISTR. TIME	**00:00**
DO IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	3

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 IMBALANCE MEASUREMENT	**N**
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	3
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 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 (this does not apply to washer extractors with suspended drums which have a separate unbalance switch).

Answer Yes (Y) or No (N).

Press ⬇.

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 IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	**0:13**
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100

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.

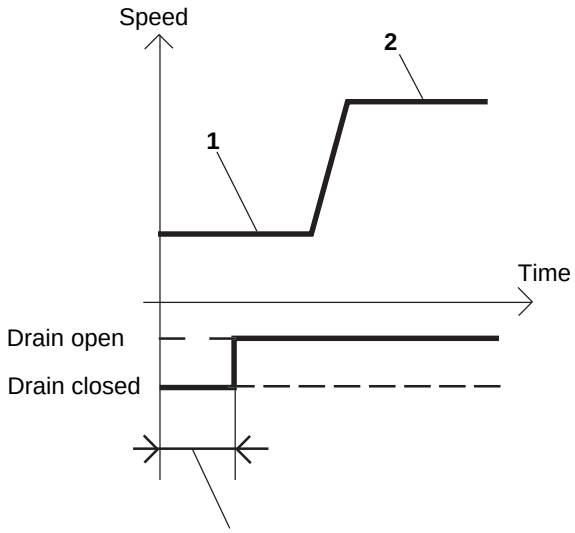
The drain module
may be structured according to point 1 (here) only, according to point 2 only, or a combination of 1 and 2, according to the way you program.

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	00:00
DEFAULT MEDIUM EXTRACT TIME	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	**00:30**
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100

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)

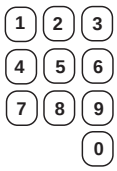
Here you determine the length of time for initial extraction (if used).

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	00:00
DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	**00:01**
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

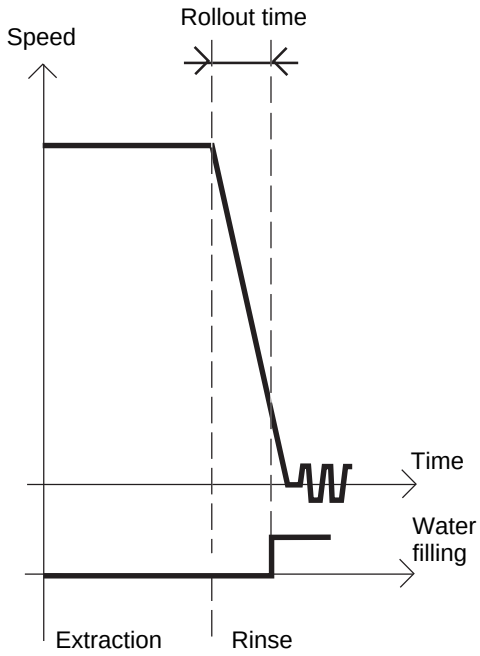
Press ⬇ .

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”.



Settings 2

DEFAULT HIGH EXTRACT TIME	00:00
DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	**0**
SERVICE ALARM HOURS	0
MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1

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.

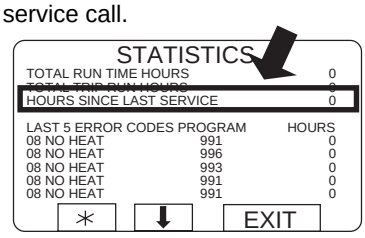
Press ↓ .

DEFAULT DRAIN TIME	00:00
DEFAULT DISTR. TIME	00:00
DO IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	**0**
MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20

Service alarm hours

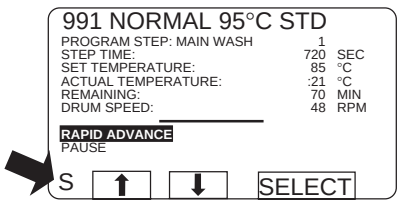
Here you determine the length of time you require between routine service calls.

In the PCU statistics function there is a register which can be reset to zero (cleared), which shows how many hours of effective wash time have elapsed since the last service call.



When the service engineer has serviced the machine, he resets this register to zero.

When the time recorded in this register exceeds the interval you have set, an ”S” will appear at the bottom left of the display, to warn that the machine needs routine service.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ↓ .

Settings 2

DEFAULT DISTR. TIME	00:00
DO IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	**3**
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10

Maximum number of imbalances

Here you determine how many fresh attempts at extraction the machine will make after it detects extraction imbalance, before it abandons that extraction sequence and moves on to the next program module.

When the machine detects imbalance during extraction, extraction is halted, the machine fills with water to a certain level, then operates at distribution speed while the water empties (if this has been selected in Settings 1 and 2). The machine then either starts a fresh attempt at extraction or moves on to the next program module, depending on the number of attempts made so far.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ **.**

DO IMBALANCE MEASUREMENT	N
DRAIN OPEN DELAY	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	3
LOCK TEST DELAY	**0:10**
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00

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.

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	0:13
START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	**0:05**
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00

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”.

START EXTRACT TIME	00:30
ROLLOUT TIME	00:01
PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	**0:02**
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00
TIMEOUT DURING PAUSE	0:00

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Delay heating relay 2

Here you determine how long after heating relay 1 the second heating relay - heating relay 2 - must wait before it is switched in.

Some of the larger machines have two heating relays, so to prevent uneven loading on the mains power supply it is desirable to ensure that both do not switch in simultaneously.

Settings 2

PAY PER WASH ALARM	0
SERVICE ALARM HOURS	0
MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	**100**
PULSE TIME OIL LUBR. SEC	**0:01**
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00
TIMEOUT DURING PAUSE	0:00
MINIMUM TEMPERATURE INCREASE	5°C
DOOR OPEN DELAY FOR MOTOR LOST	1:00

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:

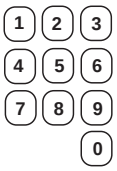
Press ⬇ .

SERVICE ALARM HOURS	0
MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	**1**
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00
TIMEOUT DURING PAUSE	0:00
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:

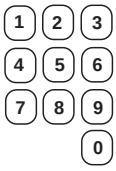
Press ⬇ .

MAX IMBALANCES	3
LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	**0:20**
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	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

Buzzer timeout at program end

Here you determine how long the buzzer should continue to sound at the end of the program if it is not turned off manually.

When you are programming ”main data” in a wash program, you can choose whether you wish the buzzer to sound when the program ends. The buzzer can be switched off manually by pressing a function key on the control panel.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

LOCK TEST DELAY	0:10
DRAIN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	**0:10**
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	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

Buzzer timeout for pause

Here you determine how long the buzzer should continue to sound during a programmed pause if it is not turned off manually.

When you are creating a wash program, you can specify at the beginning of any program module if you wish to include a pause plus buzzer before the module starts. The buzzer can be switched off manually by pressing a function key on the control panel.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

DRIAN TIME WHEN OVERFILL	0:05
DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	**04:00**
MAX DRAIN TIME	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

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 ⬇ .

DELAY HEATING RELAY 2	0:02
OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	**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

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:

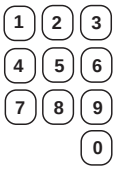
Press ERASE.

When you have finished:

Press ⬇ .

Settings 2

OIL LUBRICATION HOURS	100
PULSE TIME OIL LUBR. SEC	0:01
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	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



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

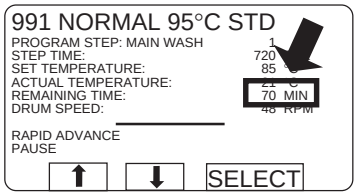
Press ERASE.

When you have finished:

Press ⬇ .

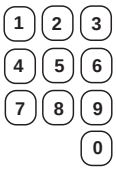
Timeout during pause

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)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TME	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, OVER-FILLED	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.

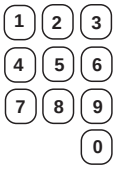
AMOUNT OF I/O MODULES (1-3)	1
BUZZER TIMEOUT AT END	0:20
BUZZER TIMEOUT IN PAUSE	0:10
DELAY CLEAR DOOR TEXT	04:00
MAX DRAIN TIME	4:00
TIMEOUT DURING PAUSE	0:00
MINIMUM TEMPERATURE INCREASE	5°C
DOOR OPEN DELAY FOR MOTOR LOST	**1:00**
ERROR, NO WATER	Y
ERROR, OPEN DOOR	Y
ERROR, DOOR LOCK	Y
ERROR, LOW TEMPERATURE	Y
ERROR, HIGH TEMPERATURE	Y
ERROR, WATER IN MACHINE	Y
ERROR, OVER-FILLED	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.



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, OVER-FILLED	**Y**
ERROR, NO HEAT	**Y**
ERROR, REMAINING WATER	**Y**
ERROR, IMBALANCE SWITCH	**Y**
ERROR, MOTOR COMMUNICATION	**Y**
ERROR, LEVEL ADJUST	**Y**
ERROR, EMERGENCY STOP	**Y**
ERROR, DOOR LOCK SWITCH	**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**

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.

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. IMBALANCE SWITCH The imbalance switch is closed when the machine is starting on a drain sequence.	IMBALANCE SENSOR
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
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

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

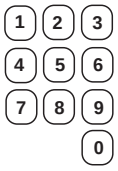
Error/Function	Error message displayed
20 ERROR. EWD INTERLOCK The motor control system for frequency-controlled motors (EWD) receives a signal direct from the door lock which indicates that the door really is closed. If this signal is lost, a fault signal is sent to the PCU	INTERLOCK STATUS
21 ERROR. 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
24 ERROR. PRESSURE SENSORS, TILT Both pressure sensors are active at the same time.	PRESSURE SENSORS, TILT
25 ERROR. PRESSURE SENSOR MAX. TIME No pressure at the relevant pressure sensor within the maximum time allowed for tilt backwards or forwards.	PRESSURE SENSOR MAX. TIME
26 ERROR. DOOR SWITCH, TILT Door closed (S3) is "on" at a time when the machine door is locked open (S25).)	DOOR SWITCH, TILT
ERROR. 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.	MOTOR SHORT
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 DC BUS
40 One phase missing for/at motor control unit	MAINS VOLTAGE
41 Hardware fault, temperature monitoring, motor	KLIXON CIRCUIT

ERROR, LEVEL ADJUST	Y
ERROR, EMERGENCY STOP	Y
ERROR, DOOR LOCK SWITCH	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
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

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, EMERGENCY STOP	Y
ERROR, DOOR LOCK SWITCH	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
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

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 open circuit in the sensor or wiring. LOW TEMPERATURE usually indicates a short-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.

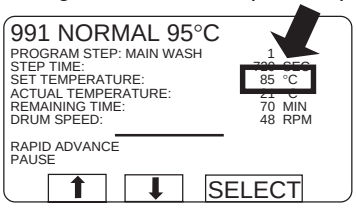
When you have finished:

Press ⬇ .

ERROR, 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
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

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.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

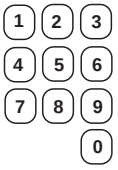
Press ⬇ .

ERROR, I/O COMMUNICATION	Y
ERROR, LOW OIL LEVEL	Y
ERROR, LOW OR HIGH VOLTAGE	Y
ERROR, ERROR CODES FROM MOTOR	Y
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

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.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

ERROR, LOW OIL LEVEL	Y
ERROR, LOW OR HIGH VOLTAGE	Y
ERROR, ERROR CODES FROM MOTOR	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

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 of the drain sequence.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

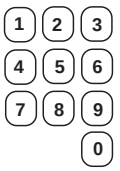
When you have finished:

Press ⬇ .

ERROR, LOW OR HIGH VOLTAGE	Y
ERROR, ERROR CODES FROM MOTOR	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

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 ⬇ .

Settings 2

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

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished**:**

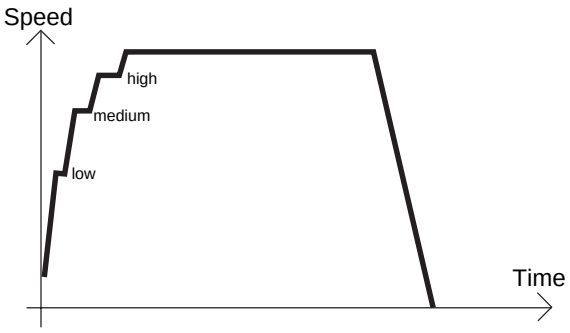
Press ⬇ .

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.



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
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

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

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
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.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

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
READY	

Distribution acceleration

Here you determine the acceleration and deceleration 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.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

Settings 2

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
READY	

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.

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

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
READY	

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

Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

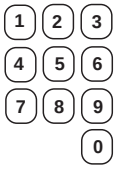
When you have finished:

Press ⬇ .

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
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.



Use the numeric keys to enter the value.

If you make a mistake while entering digits:

Press ERASE.

When you have finished:

Press ⬇ .

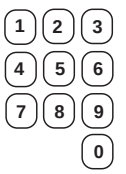
Max. speed during filling

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”.

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**
READY	



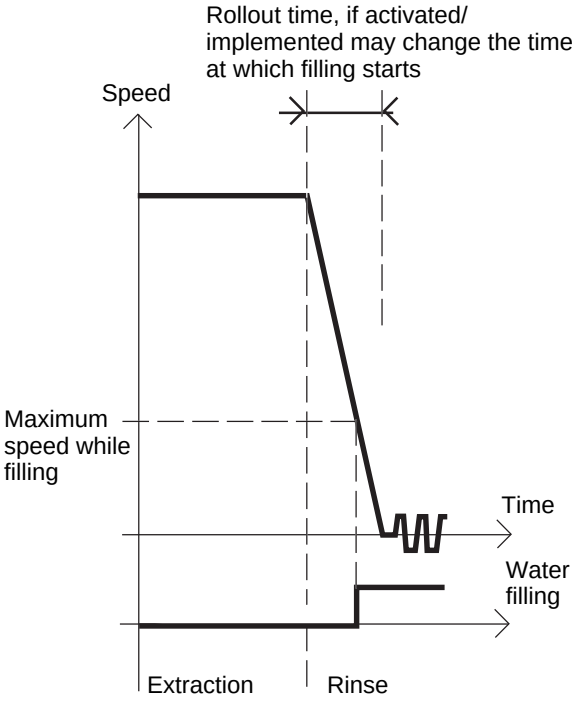
Use the numeric keys to enter the value.

If you make a mistake while entering digits:

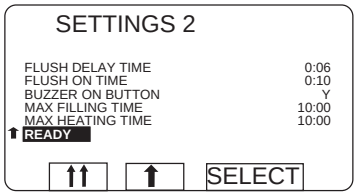
Press ERASE.

When you have finished:

Press ⬇ .



To conclude making changes in variables under ”SETTINGS 2”

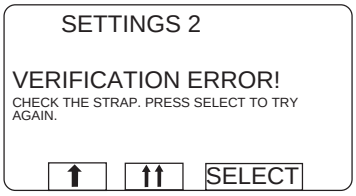


Press ⬇ to highlight READY.

Insert a suitable strap to short-circuit terminals X7:1-2 on the CPU circuit board.

SELECT

Press SELECT.



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

Check that the strap between X7:1-2 is intact and in place.

Press SELECT and try again.

The variables will now have been stored in the PCU.

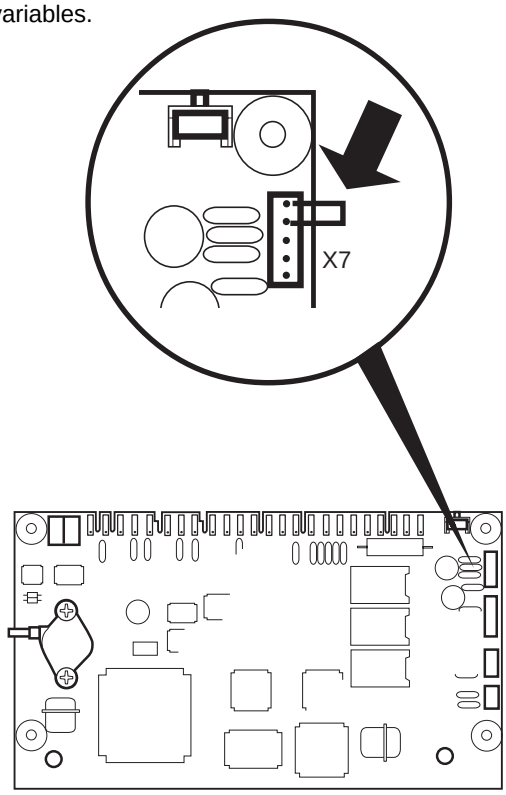
Remove the strap between terminals X7:1-2 on the CPU circuit board.

SELECT

Press SELECT.

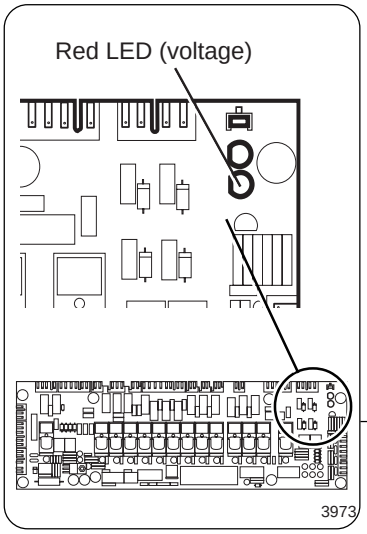
To prevent inadvertent changes in variables

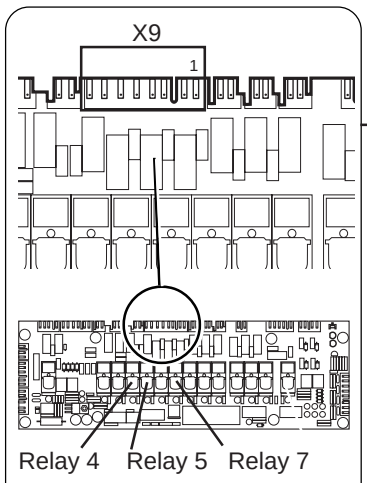
If you have changed any variables under ”SETTINGS 2”, after keying in the individual changes line by line you need finally to short-circuit two terminals on the CPU circuit board to confirm and store the changes in the CPU. This is an extra safeguard to prevent unintended changes in variables.



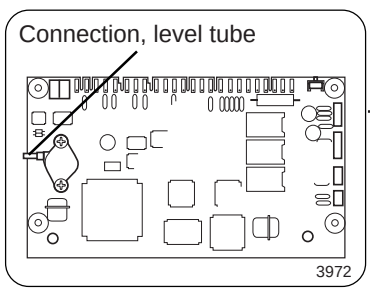
Fault-finding

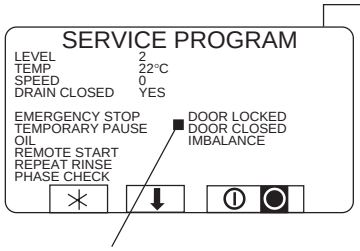
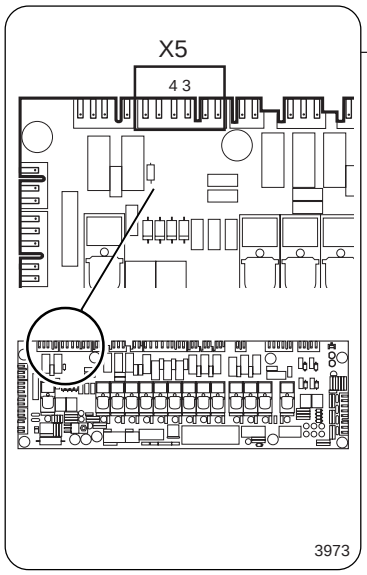
Error message	Fault-finding	Cause/Action
NO WATER Water level has not reached set level within set time	Check that the manual water valves (taps) are open.	
	Taps turned on.	Taps turned off. → Open taps. Restart program.
	Access the service program and activate the water valves which should open in program in question. Check whether machine is filling.	
	Machine filling	Machine not filling
	Check input voltages to relevant water valves.	
	Voltages not correct	Voltages correct → Faulty valve. Check function and rectify problem as described in manual for relevant machine.
	On I/O PCBs check that the red LEDs are lit distinctly and without flashing.	
	LEDs OK	LEDs not OK → Fault in voltage feed to I/O PCB. Check voltage at X3:1-2 (16 V=). If wrong, continue tracing fault in voltage feed as described in manual for relevant machine.
	Check on I/O PCBs that the LEDs for the relays you have activated are lit. Check also feed voltages at PCB connector X9 to the water valves you have activated.	
	LEDs and voltages OK	LEDs and/or voltages not OK → Faulty I/O PCB. Replace PCB according to instructions in ”To replace an I/O board”.
		Faulty wiring between I/O PCB and water valve. Check wiring and replace as required.
	Close the drain valve via the service program and check that it really is closed, i.e. that water level is rising in drum.	
	Drain valve closed.	Drain valve open. → Trace drain valve fault as described in manual for relevant machine.
	Check that level tube is sound, not kinked, not come loose from mother board.	
	Level tube OK	Level tube not OK → Fit tube properly or replace it.
		Level detection function on CPU PCB faulty. Replace PCB according to instructions in ”To replace the CPU board”.





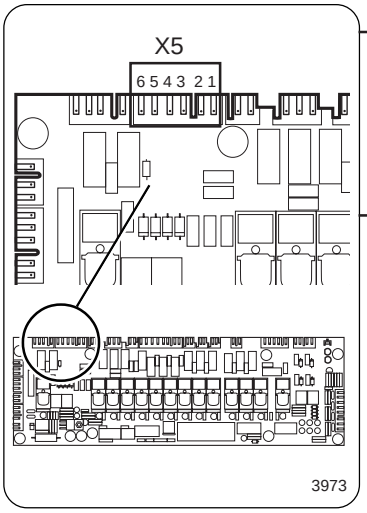
Function	I/O PCB	Relay	Output
Hot water	1	4	X9:7
Cold water	1	7	X9:4
Cold hard water	2	4	X9:7
From tank 1	2	5	X9:6
From tank 2	3	4	X9:7
Common earth	1,2,3		X9:8

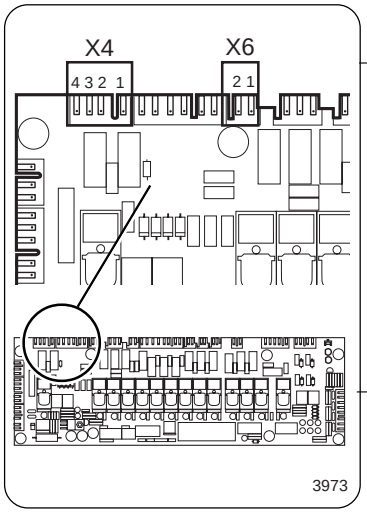


Error message	Fault-finding	Cause/Action
DOOR OPEN Door status switch open during wash.	Switch off power supply to machine and wait a minute or so, to let any water be discharged. Open the door, switch on power supply, close door again and try restarting. Error message returns → No error message	Transient fault in door lock, CPU PCB or I/O PCB.
 Door status switch indicator	Access service program to view indicator for ”DOOR CLOSED”. Press door status switch inwards by hand and check whether this change is indicated on display. No indicator → Indicator appears	Check function of door status switch in door lock. See description of door lock in manual for relevant machine.
	Remove connector X5 on I/O PCB 1. Short-circuit between inputs 3 and 4. No indicator → Indicator appears	Door lock switch or wiring to switch faulty. Check and replace faulty components according to description of door lock in manual for relevant machine.
		Faulty I/O PCB. Replace PCB according to instructions in ”To replace an I/O board”.

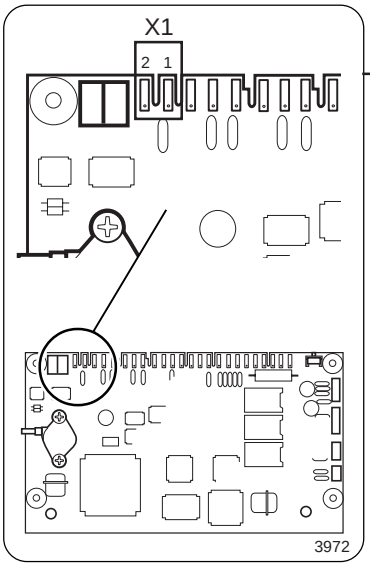
Fault-finding

Error message	Fault-finding	Cause/Action
DOOR UNLOCKED Signal from door lock switch absent at program start.	Test whether door really locked. Door not locked / Door locked	
	Check voltage (= feed voltage to machine) on I/O PCB 1, PCB connector X5 between terminals 1 and 5. Voltage correct / Voltage incorrect	Fault in voltage feed to I/O PCB. Trace fault as described in manual for relevant machine.
	Check voltage (= feed voltage to machine) on I/O PCB 1, PCB connector X5 between terminals 2 and 6. Voltage correct / Voltage incorrect	Fault in door lock switch or in wiring to I/O PCB. Trace fault and replace wiring or door lock as appropriate.
		Faulty input on I/O PCB. Replace I/O PCB 1 according to instructions in ”To replace an I/O board”.
	Open the door and switch off power supply to machine. Wait a minute or so, switch on power supply, close door again and try restarting. Error message returns / No error message	Transient fault in door lock, CPU PCB or I/O PCB.
	Check feed voltage to door lock, I/O PCB 1, PCB connector X4 between terminals 1 and 2 (NO) or 3 and 4 (NC). NO: no voltage or incorrect voltage / NO: voltage correct NC: voltage present / NC: no voltage	Faulty door lock. Replace lock as described in manual for relevant machine.
	Check feed voltage to each I/O PCB, X6:1 (phase), X6:2 (neutral) and the voltage at the outputs which are activated (see section X.X). Voltage correct / Voltage incorrect	Faulty output on I/O PCB. Replace I/O PCB 1 according to instructions in ”To replace an I/O board”. Trace fault in voltage feed as described in manual for relevant machine.
		Faulty output on I/O PCB. Replace I/O PCB 1 according to instructions in ”To replace an I/O board”.

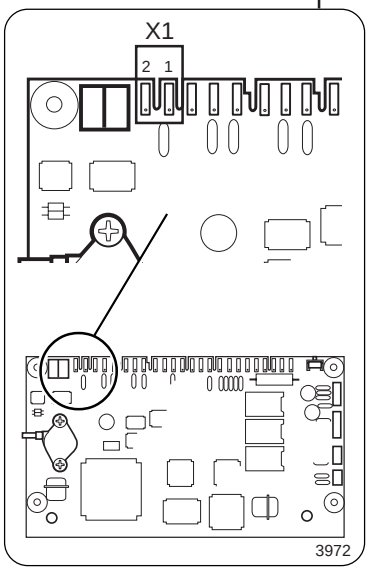


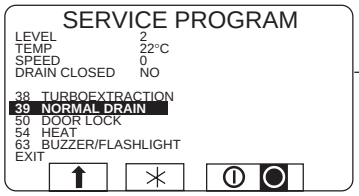
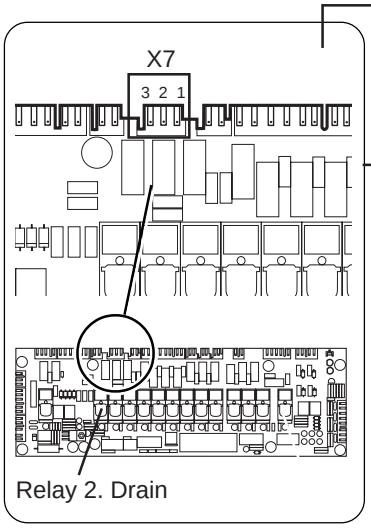


Error message	Fault-finding	Cause/Action
NTC LOW TEMP. Temperature sensor indicating a temperature below lowest allowable value. This suggests open circuit (continuity fault) in sensor or wiring.	Turn the machine's wall switch off and on again. Start a program. Error message returns / No error message	Transient fault.
	Short-circuit the temperature sensor by the sensor. Turn the machine's wall switch off and on again. Start a program. Check whether the display now shows NTC LOW TEMP. or NTC HIGH TEMP. LOW / HIGH	Temperature sensor faulty. Replace sensor.
	Disconnect PCB connector X1 on CPU PCB. Short-circuit inputs 1 and 2. Turn the machine's wall switch off and on again. Start a program. Check whether the display now shows NTC LOW TEMP. or NTC HIGH TEMP. LOW / HIGH	Fault in wiring to temperature sensor. Check wiring and replace if necessary.
		Fault in temperature sensing device on CPU PCB. Replace PCB according to instructions in "To replace the CPU board".



Error message	Fault-finding	Cause/Action
NTC HIGH TEMP. Temperature sensor indicating a temperature above highest allowable value. This suggests short-circuit in sensor or wiring.	Turn the machine's wall switch off and on again. Start a program. Error message returns → Disconnect PCB connector X1 on CPU PCB. Turn the machine's wall switch off and on again. Start a program. Check whether the display now shows NTC LOW TEMP. or NTC HIGH TEMP. No error message →	Transient fault.
	LOW → Reconnect PCB connector X1. Disconnect the link between wiring and sensor by the temperature sensor. Turn the machine's wall switch off and on again. Start a program. Check whether the display now shows NTC LOW TEMP. or NTC HIGH TEMP. HIGH →	Fault in temperature sensing device on CPU PCB. Replace PCB according to instructions in "To replace the CPU board".
	LOW → HIGH →	Fault in wiring to temperature sensor. Check wiring and replace if necessary. Temperature sensor faulty. Replace sensor.

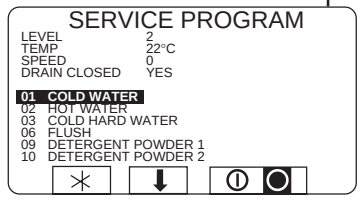


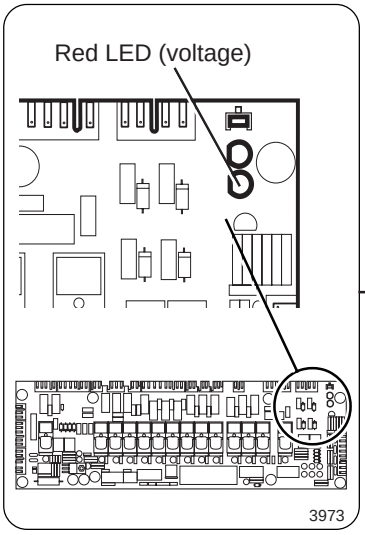
Error message	Fault-finding	Cause/Action
WATER IN DRUM The water level is higher than the EMPTY level at start of program.	Is there any water in the drum? (Even if no water is visible in the inner drum, check for presence of water in outer drum by inserting suitable object through inner drum perforations.) Yes → No Disconnect the level tube from the CPU PCB. Turn the machine's wall switch off and on again. Restart the program. "WATER IN DRUM" message returns. → "NO WATER" message, or no message displayed.	Level tube probably blocked. Clean or replace tube. Level sensing device on CPU PCB not working or incorrectly calibrated.
	Access service program and open drain valve. Is water being discharged? Yes → No Check on I/O PCB 1 that the LED on relay 2 for drain is lit.	Check that the red LED on the I/O PCB is lit. LED OK: Faulty I/O PCB. Replace I/O PCB according to instructions in "To replace an I/O board". LED not lit: Trace fault in voltage feed to I/O PCB as described in manual for relevant machine.
	LED lit → Check voltage (= feed voltage to machine) on I/O PCB 1, X7: 1 - 2 (NO) or X7:2-3 (NC). LED not lit →	NO: normally open NC: normally closed
	NO: Voltage incorrect NC: Voltage present →	Faulty I/O PCB. Replace PCB according to instructions in "To replace an I/O board".
	NO: Voltage correct NC: No voltage →	Faulty drain valve or wiring to drain valve. Check functioning and rectify problem as described in manual for relevant machine.
	Restart and run the program. Error message. →	Check incoming voltage at X5: 2-6. If incorrect, trace fault in feed voltage to I/O PCB 1 (X3: 1-2).
	No error message. →	Transient fault. No action required.
	Check to see if drain valve is partially blocked or not opening fully. Drain valve not OK →	Check valve functioning and take action required according to description in manual for relevant machine.
	Drain valve OK →	Access the programming function. Check that the drain valve is programmed correctly.

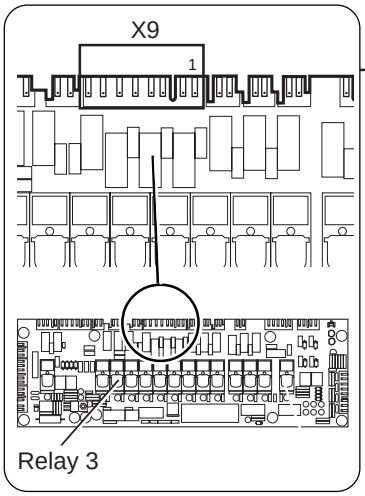
Fault-finding

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

Error message	Fault-finding	Cause/Action
NO HEATING Rate of temperature increase in water slower than minimum value allowed (normally 5°C/10 min).	Turn the machine's wall switch off and on again. Start a program. Error message returns → Check the input voltage to the machine. All fuses sound? No error message →	Transient fault. No action required.
	Input voltage correct → Access service program and fill machine with water to half-way up drum. Start heating. Measure voltage across each element at element connections. Input voltage wrong →	Replace fuse(s).
	Voltage wrong → Switch off power supply at wall switch. Measure resistance of elements, to see if any element is faulty (open circuit). Voltage correct →	
	Not faulty → Check whether LED for feed voltage to I/O PCB 1 is lit. Faulty →	Replace faulty element.
	LED lit → Check on I/O PCB 1 whether the LED for relay 3 is lit. Check also that the voltage feed to the machine's heating relay on X8:1-2 is OK. LED not lit →	Check through hatch in drum whether the elements are coated with limescale. If necessary descale them. Trace voltage feed fault as described in manual for relevant machine.
	LED and voltage OK → Measure voltage on outputs on machine's heating relay. LED or voltage not OK →	Faulty I/O PCB. Replace PCB.
	A voltage incorrect → Measure voltage on inputs on machine's heating relay. Voltages correct →	Fault in wiring between relay and element(s). Check wiring and replace as required.
	Voltages correct → Measure control voltage to heating relay. A voltage incorrect →	Fault in wiring between relay and machine voltage feed. Check wiring and connection blocks (where appropriate).
	Voltage incorrect. → Fault in wiring between I/O PCB 1, output X8 and relay. Check wiring and replace if required. Voltage correct. →	Relay faulty. Replace relay.

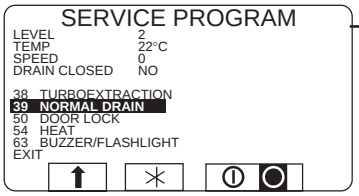


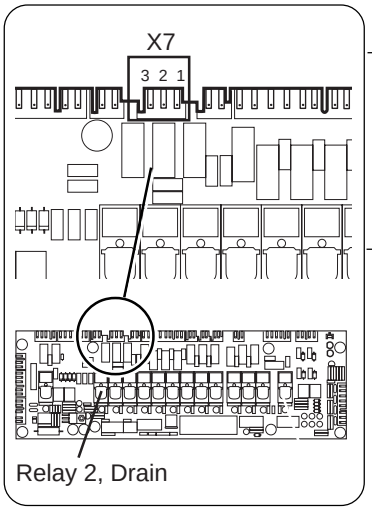




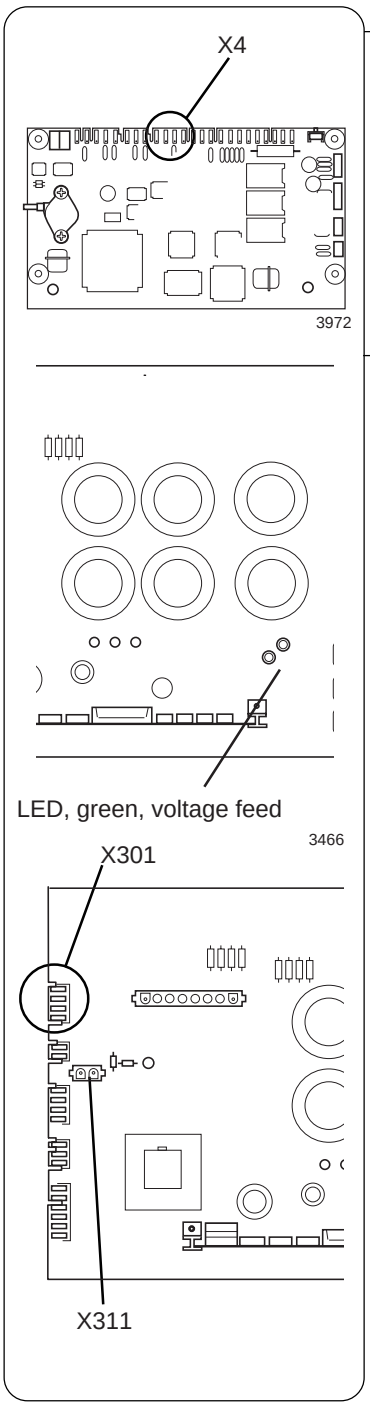
Fault-finding

Error message	Fault-finding	Cause/Action
NOT DRAINED The water level is higher than the EMPTY level after drain sequence.	Is there any water in the drum? (Even if no water is visible in the inner drum, check for presence of water in outer drum by inserting suitable object through inner drum perforations.) Yes → No Disconnect the level tube from the CPU PCB. Turn the machine's wall switch off and on again. Restart the program. "WATER IN DRUM" or "NOT DRAINED" message displayed → "NO WATER" message, or no message displayed Access service program and open drain valve. Is water being discharged? Yes → No Check on I/O PCB 1 that the LED on relay 2 for drain is lit. LED lit → LED not lit Check voltage (= feed voltage to machine) on I/O PCB 1, X7: 1 - 2 (NO) or X7:2-3 (NC). NO: Voltage incorrect NC: Voltage present → NO: Voltage correct NC: No voltage Restart and run the program. Error message. → No error message. Check to see if drain valve is partially blocked or not opening fully. Drain valve OK → Drain valve not OK	Level tube probably blocked. Clean or replace tube. Level sensing device on CPU PCB not working or incorrectly calibrated. Check that the red LED on the I/O PCB is lit. LED OK: Faulty I/O PCB. Replace I/O PCB according to instructions in "To replace an I/O board". LED not lit: Trace fault in voltage feed to I/O PCB as described in manual for relevant machine. NO: normally open NC: normally closed Faulty drain valve or wiring to drain valve. Check functioning and rectify problem as described in manual for relevant machine. Faulty I/O PCB. Replace PCB according to instructions in "To replace an I/O board". Check incoming voltage at X5: 2-6. If incorrect, follow fault-finding procedure for door lock as described under "DOOR UNLOCKED". Transient fault. No action required. Check valve functioning and take action required according to description in manual for relevant machine. Access the programming function. Check that the drain valve is programmed correctly





Error message	Fault-finding	Cause/Action
NO MOTOR COMM Communication between PCU and motor control unit interrupted or disturbed	Turn the machine's wall switch off and on again. Start a program. Error message returns → No error message →	Transient fault. No action required.
	Check that the green LED on the MCU is lit distinctly and without flashing. LED OK → LED not lit →	Trace fault in voltage feed to MCU PCB as described in manual for relevant machine. If the voltage feed is OK, replace the MCU.
	Check wiring from X4 on CPU PCB to X301 on motor control unit. Use an ohmmeter to check that the four conductors are sound as follows: X4: X301: 1 - 4 2 - 3 3 - 2 4 - 1 Measure also between the four connections in X4 to eliminate possibility of short-circuits between two conductors. Wiring sound → Wiring faulty →	If the wiring has connectors, disconnect these one by one and continue fault tracing to identify the section of wiring where the fault is. Replace faulty wiring.
	Check input voltage (230 V 50 Hz) to the motor control unit on contact X311 (measure on rear of PCB). Wrong voltage → Voltage correct →	
	Replace motor control unit. Fault persists → Function normal →	Fault in motor control unit communications circuits. Replace MCU.
		Probable fault in CPU PCB communications circuits. Refit the original motor control unit and replace the CPU PCB according to instructions in "To replace the CPU board".
		Trace fault in voltage feed to MCU PCB as described in manual for relevant machine.



Error message	Fault-finding	Cause/Action

DOOR LOCK

Signal absent from door status switch, although door is locked.

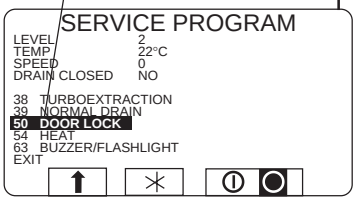
Turn the machine's wall switch off and on again.
Start a program.
Error message returns

No error message → Transient fault. No action required.

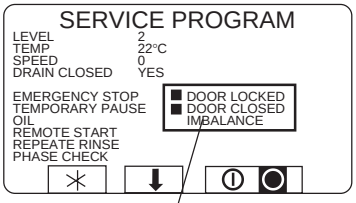
Access the service program and check the door lock function. Carry out three different tests as shown in this table:

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

Use this function to lock the door.



Use 1 to switch between these.



Indicators for switch(es) in door lock.

DOOR LOCKED activated when door is not locked

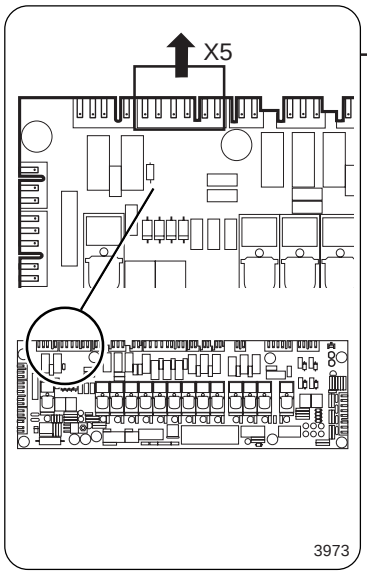
DOOR CLOSED activated when door is closed → Trace fault as described under "DOOR OPEN".

Disconnect PCB connector X5 from I/O PCB 1.

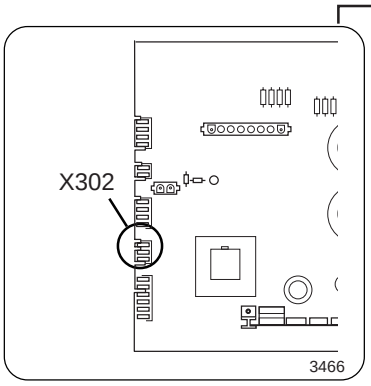
DOOR LOCKED still activated

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

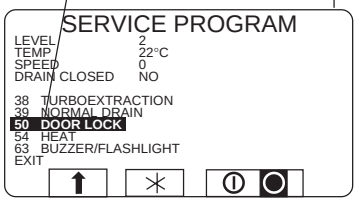
Faulty I/O PCB 1. Replace PCB according to instructions in "To replace an I/O board".

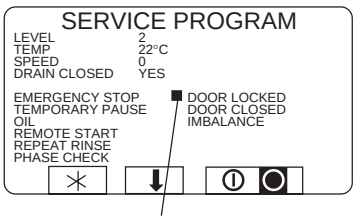


Error message	Fault-finding	Cause/Action
INTERLOCK STATUS MCU not receiving interlock signal during program operation.	Turn the machine's wall switch off and on again. Start a program. Error message returns / No error message	Transient fault. No action required.
	Check the voltage between terminals 1 and 2 at PCB connector X302 on motor control unit. The voltage should be the same as the power supply to the machine when the door is closed and locked. Voltage wrong / Voltage correct	Faulty signal detection on motor control unit. Replace motor control unit.
	Close the door. Access the service program and lock it. Check that the DOOR LOCKED switch is activated. Activated / Not activated	
	Check whether the door is locked The door is locked. / The door is not locked.	Trace fault as described under "DOOR UNLOCKED".
	Check the voltage between terminals 1 and 2 at PCB connector X10 on I/O PCB 1. The voltage should be the same as the power supply to the machine when the door is closed and locked. Voltage wrong / Voltage correct	Faulty door lock switch or fault in wiring between door lock and I/O PCB 1. Check and remedy problem as described in manual for relevant machine. Fault in wiring between I/O PCB 1 and MCU. Check wiring and replace if required.
		Faulty I/O PCB. Replace PCB according to instructions in "To replace an I/O board".

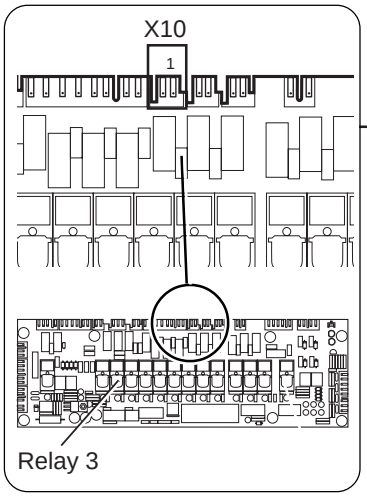


Use this function to lock the door.

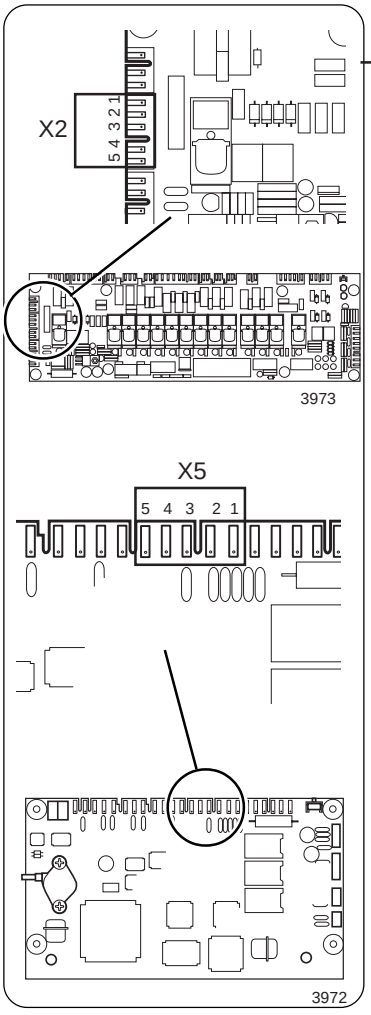


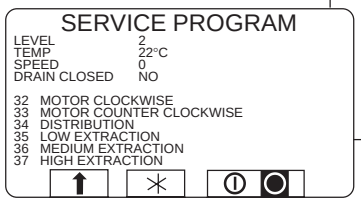
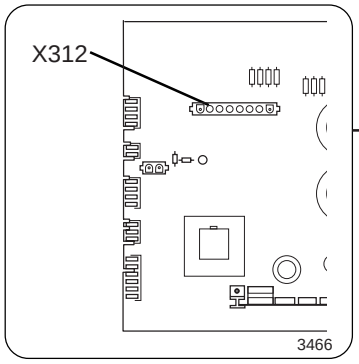


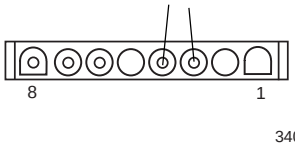
Indicators for switch(es) in door lock.



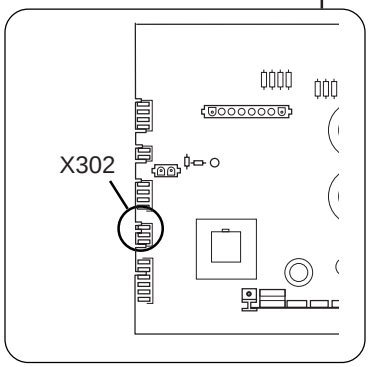
Error message	Fault-finding	Cause/Action
I/O COMMUNICATION Communication between the CPU board and one of the I/O boards disturbed or lost, or incorrect configuration of an I/O board.	Turn the machine's wall switch off and on again. Start a program. Error message returns → No error message	Transient fault. No action required.
	Check the red LEDs on all I/O PCBs. All LEDs lit. → One of LEDs not lit.	Internal fault on I/O PCB's voltage feed. Replace PCB according to instructions in "To replace an I/O board".
	On every CPU and I/O PCB there is a green LED which provides some indication of the functioning of the board's microprocessor. These LEDs should normally flash rapidly. Check the LEDs on each of the boards (CPU and I/O) present in the particular machine. All LEDs flashing. → One of the LEDs lit without flashing or not lit at all.	Replace the faulty PCB according to the instructions in "To replace an I/O board".
	Check the wiring from X5 on the CPU PCB to X2 on I/O PCB 1. If the machine has more than one I/O PCB, similarly use a meter to check the wiring between X1 on I/O PCB 1 and X2 on the next I/O PCB. Use an ohmmeter to check that the four conductors are sound as follows: X5 - X2 / X1 - X2 1 - 5 / 1 - 5 2 - 4 / 2 - 4 3 - 3 / 3 - 3 4 - 2 / 4 - 2 5 - 1 / 5 - 1 Measure also between the four connections in X5 and X2 respectively, to eliminate possibility of short-circuits between two conductors. Wiring sound → Wiring faulty	If the wiring has connectors, disconnect these one by one and continue fault tracing to identify the section of wiring where the fault is. Replace faulty wiring.
		Internal fault in program or communications circuits on CPU or I/O boards. Continue fault tracing as follows: 1. If there is more than one I/O PCB: re-program the addressing sequence for the existing I/O boards, as described in the section "To replace an I/O board". 2. First replace I/O PCB 1 as described in the section "To replace an I/O board". Check its functioning. 3. If the error message returns, replace the other I/O PCBs. 4. Replace the CPU PCB as described in "To replace the CPU board".

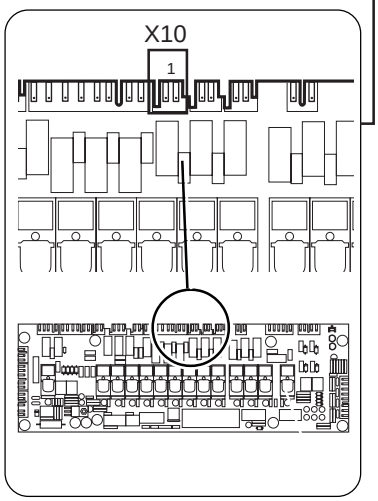


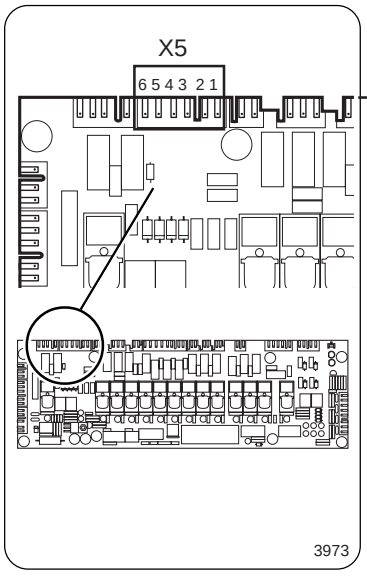
Error message	Fault-finding	Cause/Action
HEAT SINK TOO HOT Temperature of MCU heat sink too high.	This error message can occur if the ambient temperature has been extremely high. If so, lower the temperature, e.g. by opening a window. Check that the vanes on the MCU heat sink are not clogged and that the fan is working. Heat sink vanes and fan OK ↓ / Heat sink vanes and fan not OK →	Clean the heat sink vanes or replace the fan.
	Turn off the machine's wall switch. Wait at least 10 minutes for the heat sink to cool, then switch on the machine power supply again. Check that the drum and motor rotate smoothly. Drum/motor OK ↓ / Drum/motor not rotating smoothly →	Bearing failure in drum or motor or objects between inner and outer drum. Investigate and remedy.
	Access the service program. Operate the motor by means of the functions DRUM ROTATION CLOCKWISE and DRUM ROTATION COUNTER CLOCKWISE. Check for any abnormal noise from drum/motor. Drum/motor OK ↓ / Noise from drum/motor →	
	Run the motor at increasing speeds (functions DISTRIBUTION, LOW-SPEED EXTRACTION, MEDIUM-SPEED EXTRACTION AND HIGH-SPEED EXTRACTION). If no error message returns, finally operate the motor for at least 10 minutes on TURBO EXTRACTION. Error message returns ↓ / No error message →	Transient fault. No action required.
	Turn off the machine's wall switch and wait 10 minutes. Disconnect connector X312 on MCU. Short-circuit X312:3 and 4 as illustrated. Switch on machine power supply, access service program and operate the motor via the function TURBO EXTRACTION. Error message returns ↓ / No error message →	Fault in wiring between MCU and motor, or fault in motor. First check the wiring for short-circuits or continuity faults. If wiring is OK, replace the motor.
		Internal fault in MCU. Replace MCU.

Error message	Fault-finding	Cause/Action
MOTOR TOO HOT Thermal protection for motor has cut out.	Turn off the machine's wall switch. Check that the drum and motor rotate smoothly. Drum/motor OK ↓	Drum/motor not rotating smoothly → Bearing failure in drum or motor or objects between inner and outer drum. Investigate and remedy.
	Wait at least 10 minutes to let motor cool, then switch on machine power supply. Start a program. Does the error message recur immediately? Not immediately ↓	Error message returns immediately ↓
Connector X312, wiring to motor Check with ohmmeter  3403	Disconnect connector X312 and use an ohmmeter on the part of the connector with wiring to the motor to check between X312:3 - 4. Circuit open ↓	Circuit closed → Internal fault in motor control unit detection of thermal cutout protection. Replace motor control unit.
	Access the service program. Operate the motor by means of the functions DRUM ROTATION CLOCK-WISE and DRUM ROTATION COUNTER CLOCK-WISE. Check for any abnormal noise from drum/motor. Drum/motor OK ↓	Continuity fault in wiring to motor or in motor thermal cutout. Check wiring up to connector by motor for faults. If the wiring is sound, replace the motor. Noise from drum/motor → Bearing failure in drum or motor. Investigate and remedy.
	Run the motor at increasing speeds (functions DISTRIBUTION, LOW-SPEED EXTRACTION, MEDIUM-SPEED EXTRACTION AND HIGH-SPEED EXTRACTION). If no error message returns, finally operate the motor for at least 10 minutes on TURBO EXTRACTION. Error message returns ↓	No error message → Transient fault. No action required.
	Check the wiring from X312 on MCU to the connector by the motor. Use an ohmmeter to check the five conductors in the wiring. Also check between the five conductors to eliminate possibility of shorts between any two. Wiring OK ↓	Wiring faulty → Check wiring and replace it as required.
		→ Internal fault in motor causing high temperature. Replace the motor.

Error message	Fault-finding	Cause/Action
NO INTERLOCK Motor control unit receiving start command from program control unit without first receiving lock acknowledgement signal. Motor control unit receiving circuitry for lock acknowledgement signal is not faulty.	Turn the machine's wall switch off and on again. Check that the door is actually closed. Start a program. Error message returns →	No error message → Transient fault. No action required.
	Check voltage between terminals 1 and 2 in PCB connector X302 on motor control unit. The voltage should be the same as the power supply to the machine when door is closed and locked. Voltage wrong →	Voltage correct → Faulty signal detection on MCU. Replace MCU.
	Check voltage on I/O PCB 1, PCB connector X10 between terminals 1 and 2. The voltage should be the same as the power supply to the machine when door is closed and locked. Voltage wrong →	Voltage correct → Fault in wiring between I/O PCB 1 and MCU. Check wiring and replace as required.
	Check voltage on I/O PCB 1, PCB connector X5 between terminals 2 and 6. The voltage should be the same as the power supply to the machine when door is closed and locked. Voltage wrong →	Voltage correct → Faulty I/O PCB. Replace PCB according to instructions in "To replace an I/O board". Faulty door lock or wiring to door lock. Trace fault according to procedure under "DOOR UNLOCKED" earlier in this section.







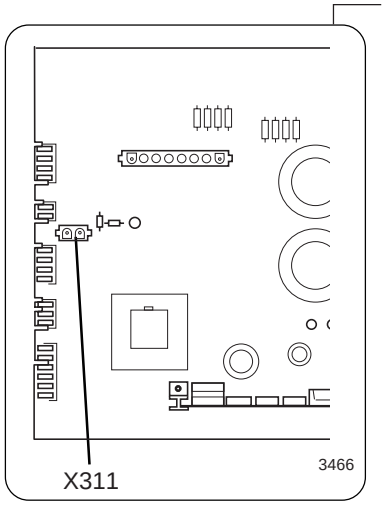
Error message	Fault-finding	Cause/Action
INTERLOCK HARDWARE Motor control unit indicates fault in receiving circuitry for lock acknowledgement signal.	Turn the machine's wall switch off and on again. Start a program. Error message returns No error message →	Transient fault. No action required. Fault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

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

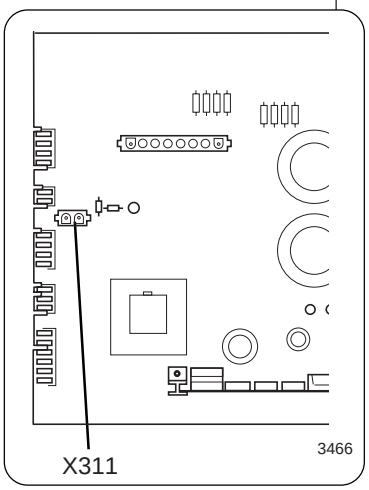
Connector X312, wiring to motor

Fault-finding

Error message	Fault-finding	Cause/Action
LOW DC VOLTAGE Motor control unit indicating DC voltage level too low.	Turn the machine's wall switch off and on again. Start a program. Error message returns →	No error message → Transient fault. No action required.
	Check the motor control unit input voltage at connector X311. Voltage too low →	Voltage correct → Fault in motor control unit. Replace unit.
	Check the input voltage on the machine's main set of connection terminals for input voltage. Voltage too low →	Voltage correct → Fault in wiring or suppression circuits between machine's main set of connection terminals for input voltage and connector X311 on MCU.
	→	Investigate cause of fault in mains power supply before the machine.



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



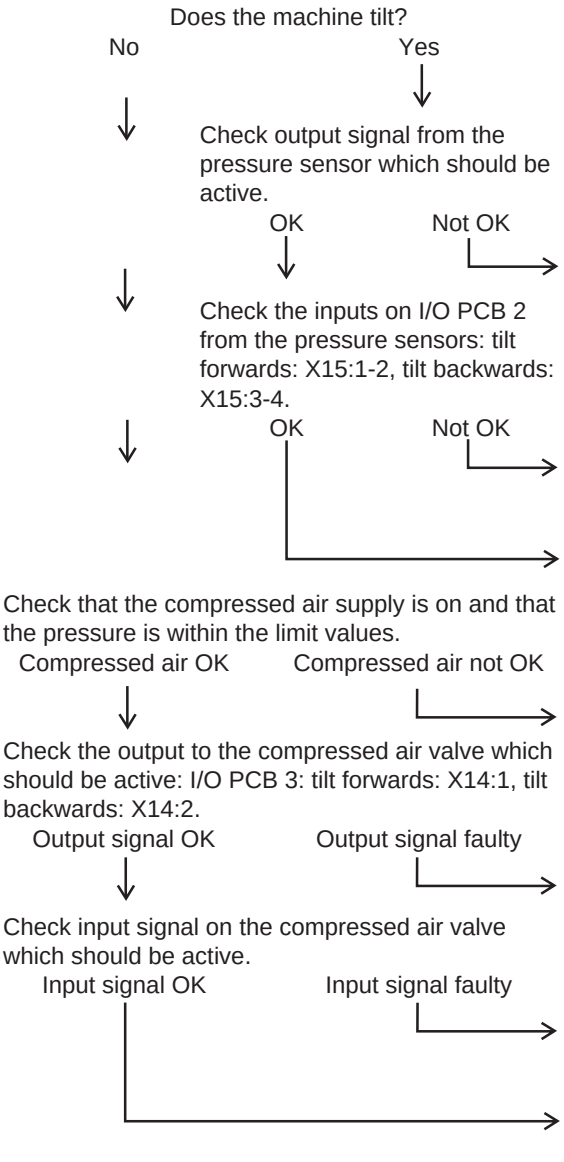
Error message	Fault-finding	Cause/Action
LEVEL CALIBRATION Level system not calibrated at factory.	If the level system has not been calibrated at the factory the error message will appear for five seconds immediately after every program start-up. The machine can be operated, but the levels will be slightly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

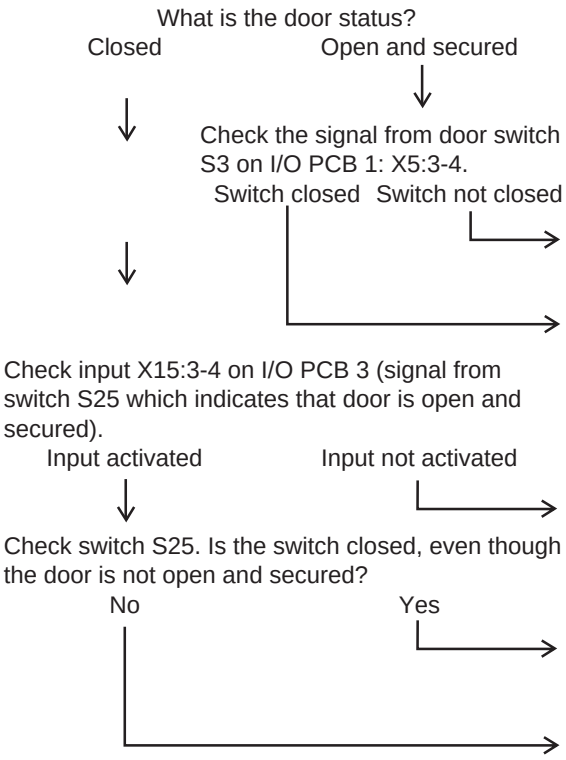
Error message	Fault-finding	Cause/Action
EMERGENCY STOP	After the problem which caused the emergency stop has been put right, you can reset the emergency stop button by turning it until it pops back out.	
The emergency stop button has been pressed.		

Error message	Fault-finding	Cause/Action
LOW OIL LEVEL The oil level in the machine's lubrication system is too low.	Larger machines have a lubrication system which greases the drum bearings at regular intervals. The lubrication system has an oil container with a level switch.	Top up the lubrication system oil container with oil.

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

Error message	Fault-finding	Cause/Action
PRESS. SENSOR TILT Both pressure sensors in the tilt system are signalling when the machine is in tilt mode (door open and secured) or one of the pressure sensors is signalling during a wash.	Is the machine in tilt mode (door open and secured)? Yes → Is one of the lifting bellows (air bellows) pressurised? No → Check the input signals from the pressure sensors on I/O PCB 2: tilt backwards: X16:5-6, tilt forwards: X16:7-8. If any of the inputs is activated, investigate and replace the pressure sensor. If no input is activated, replace I/O PCB 3, see ”To replace an I/O board”. Yes → Is the corresponding control output from I/O PCB 3 (tilt forwards: X14:1, tilt backwards: X14:2) activated? No → Trace fault in tilt system and replace faulty unit, see description in manual for relevant machine. Yes → Are both the machine’s lifting bellows activated? No → Check the output signal from the pressure sensor or sensors which should not be activated. Output signal OK → Check the inputs on I/O PCB 3 from the pressure sensors: Tilt backwards: X16:5-6, tilt forwards: X16:7-8. Input signals OK → Fault on I/O PCB 3. Replace PCB, see section ”To replace an I/O board”. Input signals faulty → Fault in wiring between pressure sensor and I/O PCB. Output signal faulty → Replace pressure sensor(s). Yes → You have a crisis on your hands! Switch off the compressed air supply at once! Check the outputs on I/O PCB 3 X14:1 (tilt forwards) and X14:2 (tilt backwards). If they are faulty, replace the I/O PCB. If they are sound, replace the compressed air valves. Yes → Faulty I/O PCB or faulty control signal from CPU PCB. First replace the I/O PCB, then if this doesn’t remove the problem replace the CPU PCB (see sections ”To replace an I/O board” and ”To replace the CPU board”.)	

Error message	Fault-finding	Cause/Action
PRESS. SENS. TIMEOUT No response from pressure sensor when tilt command issued from tilt control unit.		Replace the pressure sensor. Fault in wiring from pressure sensor to I/O PCB 2. Trace fault and replace wiring as required. Faulty I/O PCB 2. Replace I/O PCB, see section ”To replace an I/O board”. Trace problem in compressed air system. Faulty I/O PCB 3. Replace I/O PCB, see section ”To replace an I/O board”. Fault in wiring between compressed air valve and I/O PCB. Faulty compressed air valve. Replace valve.

Error message	Fault-finding	Cause/Action
DOOR SWITCH TILT No response from pressure sensor when tilt command issued from tilt control unit.		Probably fault on I/O PCB 1. Replace I/O PCB, see section ”To replace an I/O board”. Check switch S3 in door lock and its wiring. Faulty I/O PCB 3. Replace I/O PCB, see section ”To replace an I/O board”.". Replace switch S25. Check for fault in wiring between switch and I/O PCB. Faulty I/O PCB 3. Replace I/O PCB, see section ”To replace an I/O board”. Fault in wiring between compressed air valve and I/O PCB. Faulty compressed air valve. Replace valve.

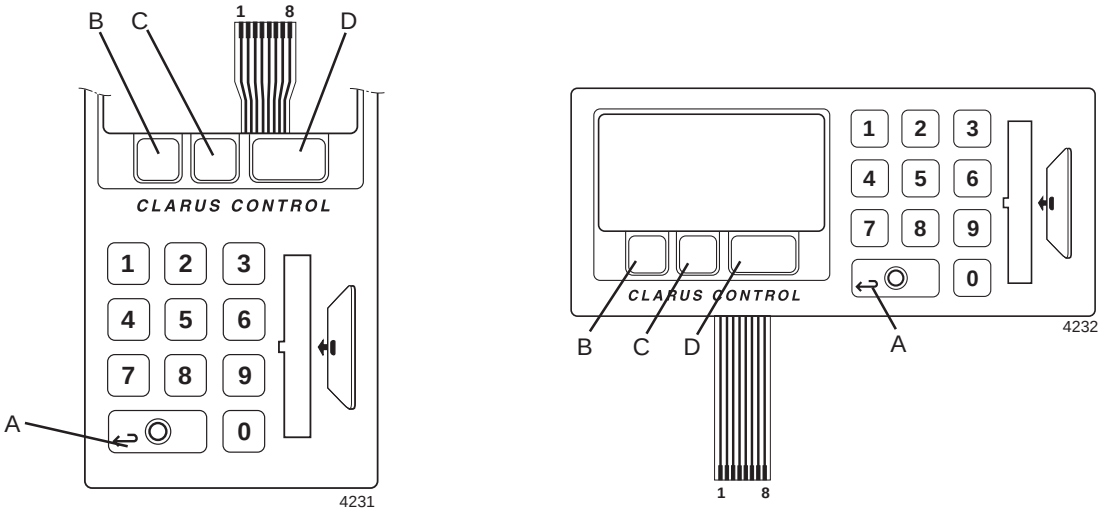
Tracing faults in display unit keys

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

Fig. 4 This table shows which outputs are short-circuited by each key:

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

4



To replace the CPU board

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

For this you need:

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

Instructions:

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

   ```
   W973401
   P973401
   S973401
   M973401
   F973401
   ```

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

Fig. 5

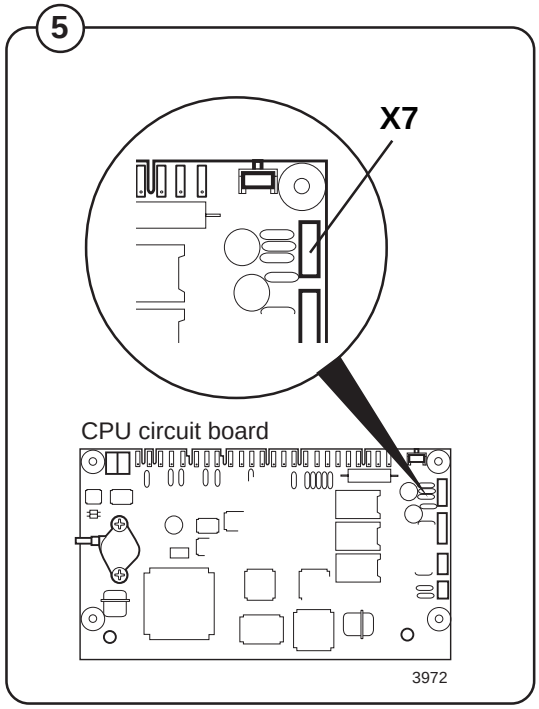
4. Switch off the machine's main power switch. Install the new CPU board and connect all the PCB connectors. Connect the correct cable between the computer (COM1 or COM2 port) and the interface connector X7 on the CPU board. Switch the machine's main power switch back on.
5. Start the "PCS DOWNLOADING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

   ```
   PLEASE ENTER W FILE NAME, SEVEN
   CHARACHTERS:
   ```

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

   ```
   WAIT WORKING
   ```

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



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

   ```
   DOWNLOADING PC PROGRAM
   ```

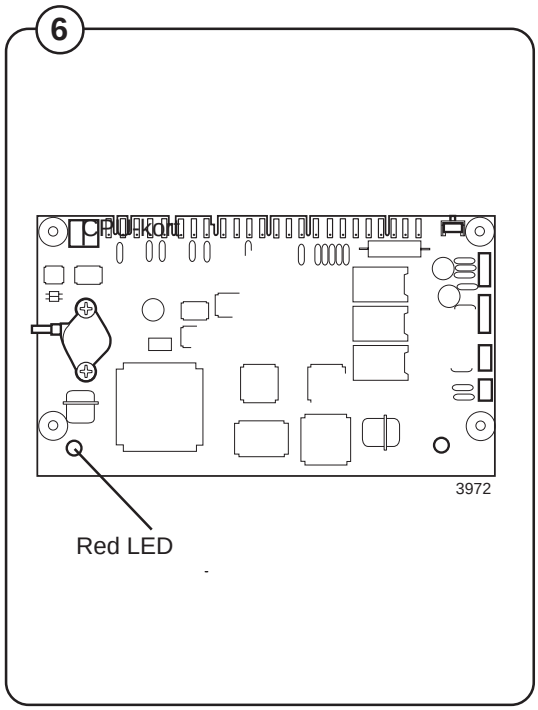
Fig. 6

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

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

   ```
   SOFTWARE WAS DOWNLOADED
   SUCCESSFULLY.
   ```

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



To replace an I/O board

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

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

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

Instructions:

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

Fig. 7

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

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

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

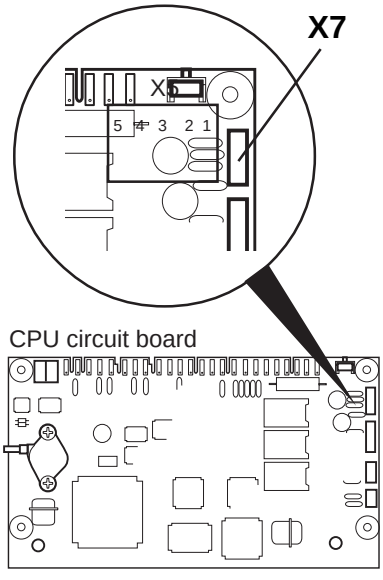
   SET IO ADDRESS 1

   SET IO ADDRESS 2

   SET IO ADDRESS 3

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

7

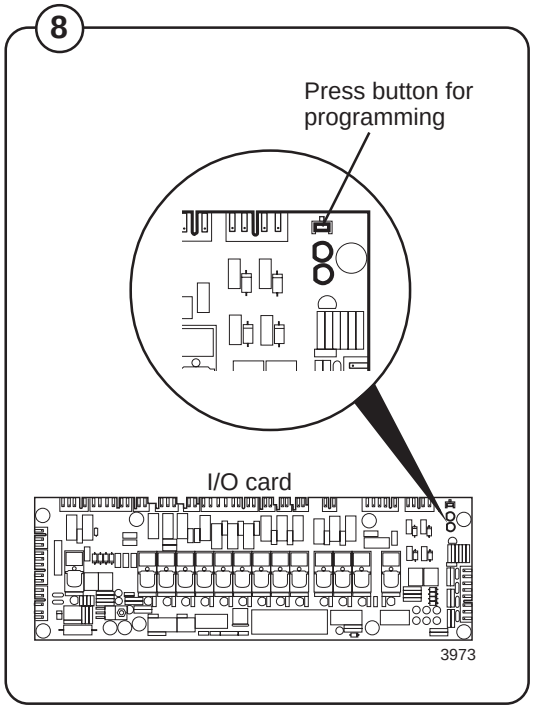


7. Enter the two-digit code for the new I/O board you wish to program (e.g. I/O board 1) and press ENTER. The PC will respond with instructions corresponding to this message:

```
PROGRAMMING OF I/O BOARD PRESS
PROGRAM BUTTON ON I/O BOARD 1
```

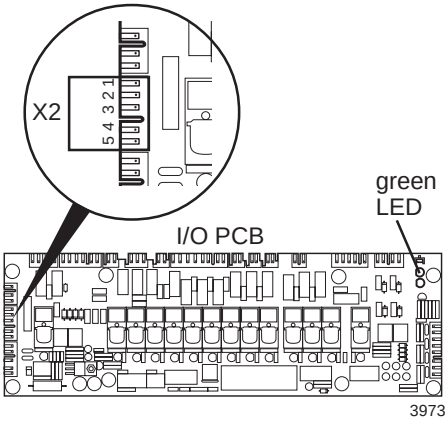
8. Press the button on I/O board 1.
9. If there are other new I/O boards which have not yet been programmed, continue in the same way.
10. When you have finished, enter code 41 to exit the service program.
11. Remove the cable linking the PC and the CPU board.

Fig. 8



Error message: I/O COMMUNICATION

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



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

Yes — No

↓ **Transient fault. No action required.**

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

Yes — No

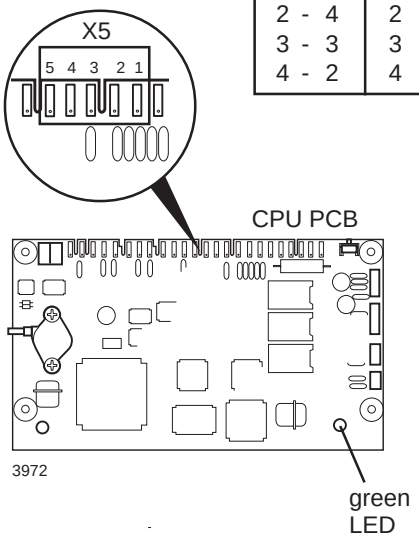
↓ **Internal fault on I/O PCB's voltage feed. Replace PCB according to instructions in "To replace an I/O board".**

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

Yes — No

↓ **Replace the faulty PCB according to the instructions in "To replace an I/O board".**

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



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

Yes — No

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

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