Operating and Installation Manual

FLE850MP
Clarus Control

438 9052-01/01
02.33

Washer extractor, drum volume 843 litres

Contents

438 9095-61/01
02.33

Safety

This machine can only be used with water.
Never use dry cleaning agents.

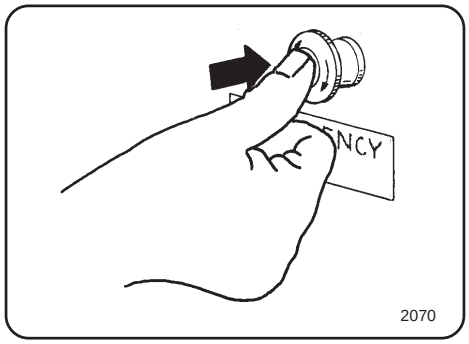
Do not allow children to operate the machine.

Do not hose down or spray the machine with water.

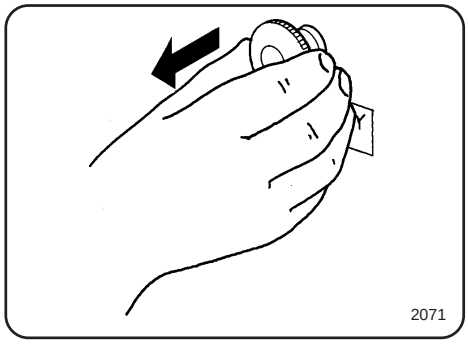
All mechanical and electrical installation must be carried out by qualified personnel.

Do not bypass the door locking device.

Should the machine malfunction, please report the fault to the technician responsible for the machine.



Emergency stop
If the machine for some reason has to be stopped – press emergency stop button



When necessary measures have been taken, the emergency button can be reset by pulling it out.

All external equipment which is connected to the machine must be CE/EMC-approved and connected using an approved shielded cable.

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

General description

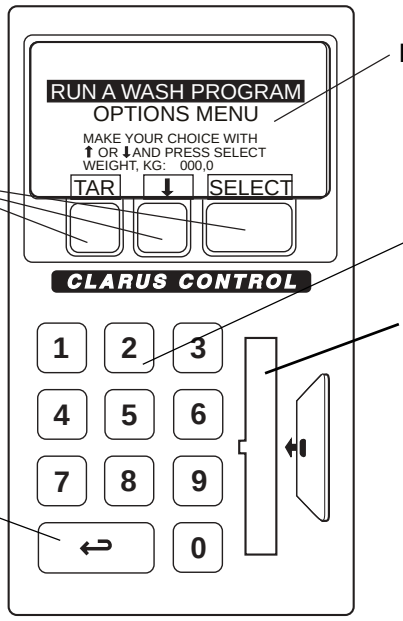
Fig. 1 This washer extractor is controlled by a microprocessor-based program control unit. There are many advantages to this equipment, including:

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

1

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

During a wash:
Pause key
Before and after a wash, and during programming:
"Move back" key
By pressing this key repeatedly you can move backwards through the menus you have navigated through. This will always bring you back to the menu shown on the display in this illustration.



Display screen

Numeric keyboard

Card reader for memory cards

4115 3651

Automatic operation

Preparations

- Open the machine door and check that the drum is empty.
- Load the laundry items into the drum and close the door.
- Check that the emergency stop button has not been pressed inwards (see "Machine safety").

For machines with forward and backward tilt

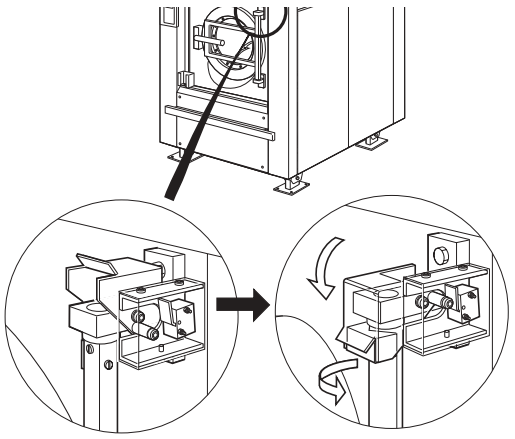
Fig. 2
- Open the door and lock it open by lowering the catch by the door hinge.

Fig. 3
- Turn the uppermost switch on the tilt control unit anticlockwise. The machine will now tilt back.

Fig. 4
- Let the laundry items down into the drum, and use the bottom switch on the tilt control unit to rotate the drum. This helps load the drum.
- Press the middle switch on the tilt control unit. The machine will now return to its normal position.

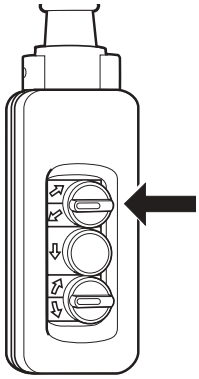
Fig. 5
- Close the machine door. The machine is now ready to begin washing.

2



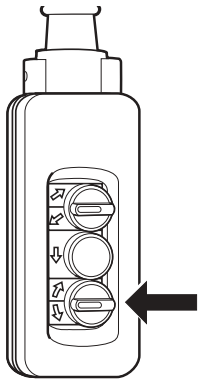
4574

3



4119

4



4238

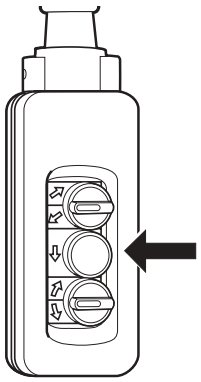
Add detergent and other laundry products

Fig. 6

If you are using the machine's built-in detergent dispensers, add the required detergent and other laundry products.

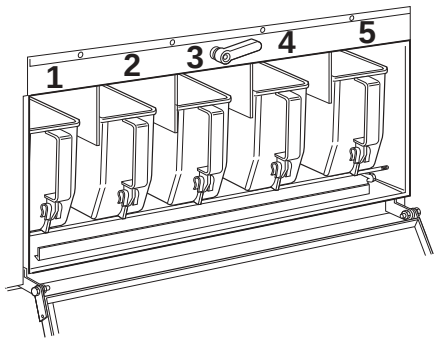
Warning!
Take care when adding laundry products. Powder or liquids left in the compartments (scoops) may be corrosive.

5



4237

6



3478

To run a wash program

Preparations

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

The ”Move back” key


3627

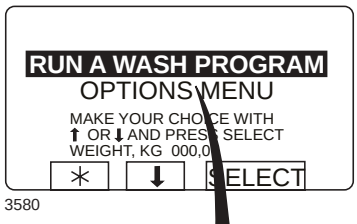
If you find you are in the wrong place, or if you want to undo earlier key presses:

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

The "Move back" function

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

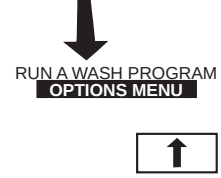
To start the wash program



3580

If this menu is not currently displayed:

Press ⮌ repeatedly.



If ”GO TO THE MENU” is highlighted:

Press ⬆.

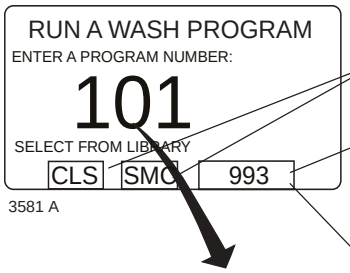
When ”RUN A WASH PROGRAM” is highlighted:

Press SELECT.

Two ways of starting a program

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

By starting from the program library (see section "To start a wash program from the program library)
If you are unsure about the programs available, you can select a program from the program library, where the programs are listed with their descriptions.



3581 A

for example: 991

SELECT

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

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

Press this key if you want to select this program.

Use the numeric keys to enter the program number

Press SELECT.

If you have entered the wrong number

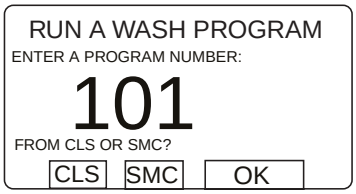
Enter the correct number to overstrike the earlier one.

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

Examples:

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

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



4031 A

CLS

SMC

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

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

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

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

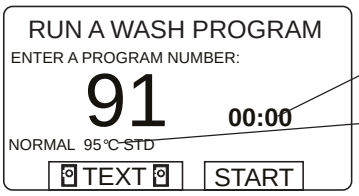
Memory cards

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

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

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

Machine operation



3582

Delayed start time (hrs:mins)

Program name

If you want to see the description of the program:

TEXT

Press TEXT.

Pressing "Text" displays more information

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

Choose 1 or 2:

① START

1 To start the program now:

Press START.

② 1 2 3 4 5 6 7 8 9 0

2 Delayed start

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

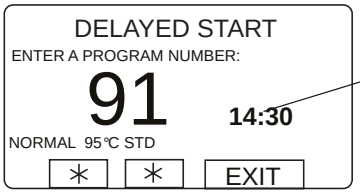
START

Press START.

Delayed start

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

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



Time left before the machine is to start

If you want to cancel the delayed start:
Press EXIT

EXIT

3627

During a wash program:

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

Two ways of pausing during a wash program

There are two ways of pausing during a wash program:

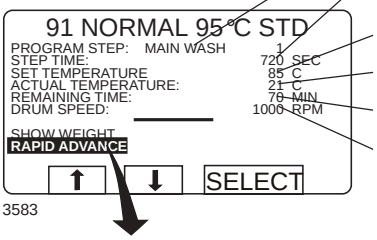
1 By pressing ⮌.

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

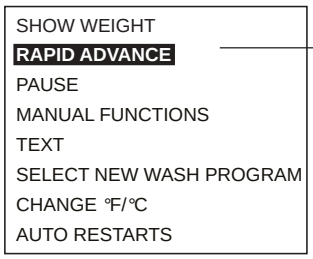
Please note!

On this machine the drum speed will not be displayed during a wash, although the illustration below includes this menu line. This function is available only on machines with a frequency-controlled motor.

The following information is displayed during the wash program:



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



If required:

Select a function using the cursor keys.

Press SELECT.

To terminate a program before it has finished

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

To change parameters in the current program step

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

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

Function not allowed

In Settings 1 you can determine whether the use of these functions will be allowed. If you have entered "N" alongside any of these functions in Settings 1, the text FUNCTION NOT ALLOWED will be displayed.

Additional functions during the program

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

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

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

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

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

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

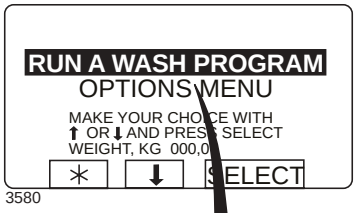
Text (see section ”Text”)
Display description of wash program (if available).

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

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

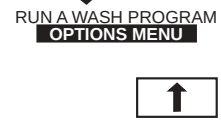
Auto restart (see section ”Auto restart”)
Here you enter the number of times you wish the wash program to restart automatically.

To start a wash program from the program library



If this menu is not currently displayed:

Press ⮌ repeatedly.



If "GO TO THE MENU" is highlighted:

Press ⬆.

When "RUN A WASH PROGRAM" is highlighted:

Press SELECT.

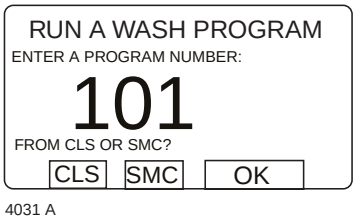
What is the program library?

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

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

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

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



4031 A

To select a program from the PCU program library:

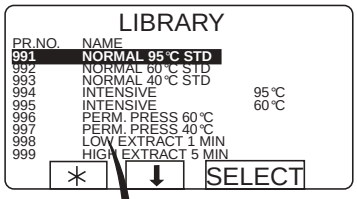
Press CLS.

CLS

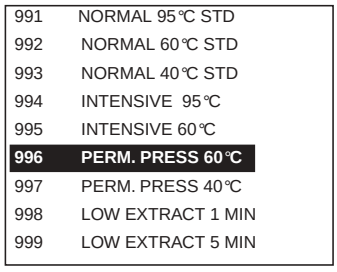
If there is a memory card in the PCU and you wish to select a program on that:

Press SMC.

SMC



3591



Press ⬇ the required number of times...

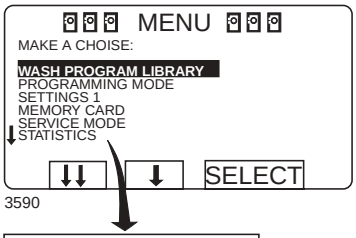
...to highlight the wash program required.

SELECT

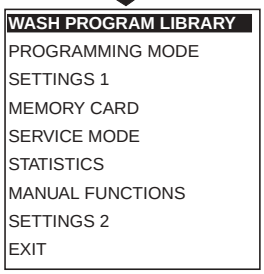
Press SELECT.

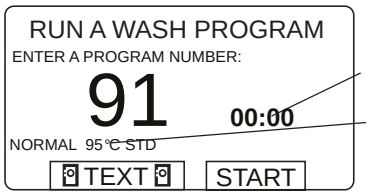
Select library via menu

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



3590





3582

Delayed start time (hrs:mins)

Program name

If you want to see the description of the program:

Press TEXT

Pressing "Text" displays more information

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

Choose 1 or 2:

① START

1 To start the program now:

Press START.

② 1 2 3 4 5 6 7 8 9 0

2 Delayed start

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

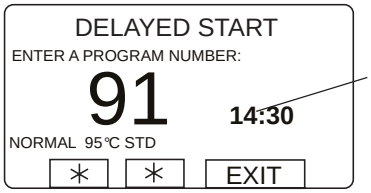
START

Press START.

Delayed start

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

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



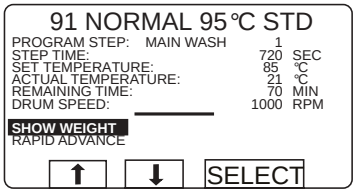
Time (in hours and minutes) left before the machine is to start.

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

EXIT

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

To change parameters in the current program step



3584

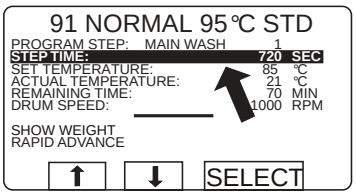
During program operation the display will look like this (see section "To start the wash program").

You can alter the following program steps:

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

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

Press ⬆ one or more times...



...to highlight the line required.

If you have entered the wrong parameter

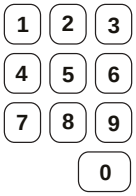
Continue pressing numeric keys to overstrike the incorrect parameter.

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

Example:

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

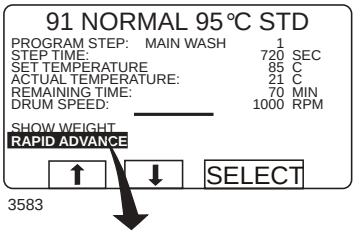
Press SELECT.



Use the numeric keys to enter the new parameter.

Press SELECT.

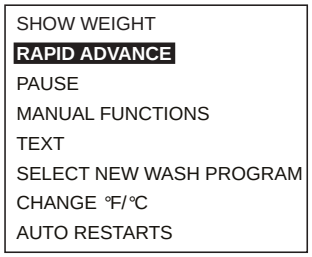
Rapid advance



3583

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

Check that ”RAPID ADVANCE” is highlighted.

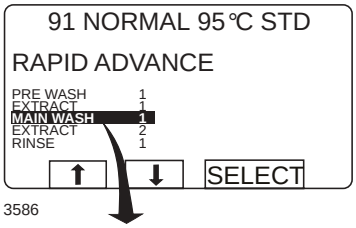


If it is not highlighted:
Press ⬆ or ⬇ one or more times to highlight ”RAPID ADVANCE”.

Press SELECT.

To terminate a program before it has finished

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



3586

PRE WASH	1
EXTRACT	1
MAIN WASH	**1**
EXTRACT	2
RINSE	1
EXTRACT	3
RINSE	2
EXTRACT	4
RINSE	3
EXTRACT	5
END OF PROGRAM	

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

SELECT **Press SELECT.**

Rapid advance works in both directions

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

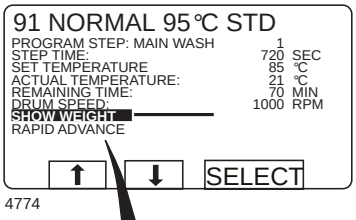
Using rapid advance to move forwards allows you to skip one or more program steps. Using rapid advance backwards allows you to repeat one or more program steps.

Automatic return to normal display

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

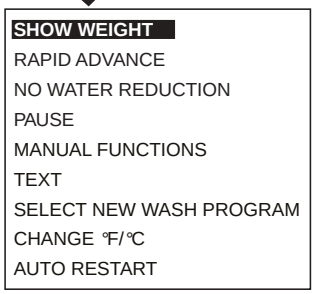
For machines with weighing equipment installed only!

Show weight



4774

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



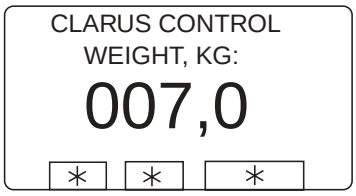
Press ⬆ or ⬇ one or more times to highlight ”SHOW WEIGHT”.

Press SELECT.

Show weight

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

To display the line "WEIGHT, KG", the weighing equipment must be connected up.



4775

Weight display mode:

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

Return to normal display

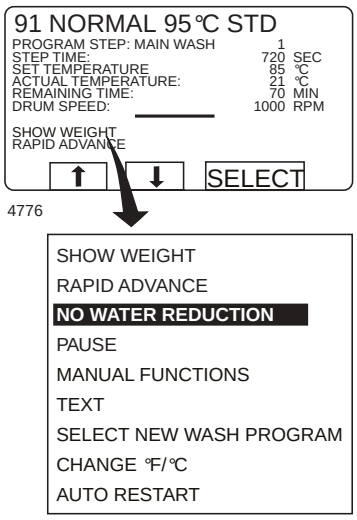
The display will return to normal at the end of the ”time for weight display” set as a parameter in Settings 1. The manufacturer’s default parameter is 20 seconds.

To end weight display sooner

Press ↩ .

For machines with weighing equipment installed only!

No water reduction



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

No water reduction

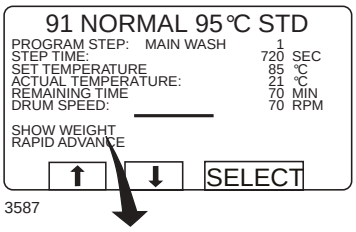
The wash load is weighed during the program and the water level is adjusted automatically according to its weight. If the load is not a full one, the water level will be reduced. You can switch off water level reduction at any stage of a program.

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

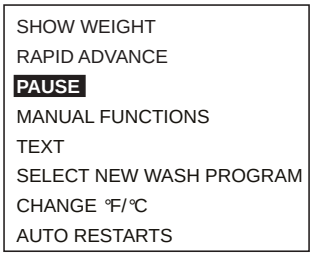
Press ⬆ or ⬇ one or more times to highlight "NO WATER REDUCTION".

Press SELECT.

Pause



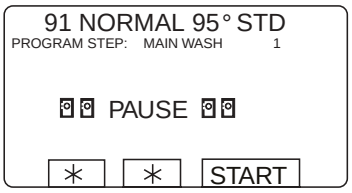
3587



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

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

Press SELECT.



3588

Press START to restart the wash program.

Two ways of pausing during a wash program

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

There are two ways of pausing during a wash program:

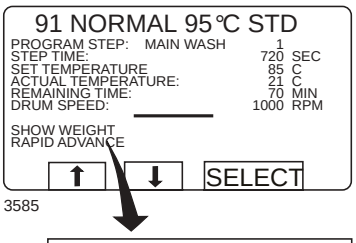
1 As an additional function. This is described in this section.

2 By pressing ⮌.

When the machine pauses:

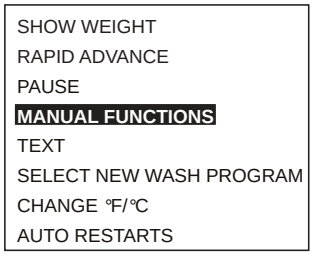
- Program operation is halted.
- Filling is halted (where applicable).
- Heating is halted (where applicable).
- The motor stops.
- The drain valve remains closed.
- The door cannot be opened.

Manual operation during a program



3585

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



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

Press SELECT.

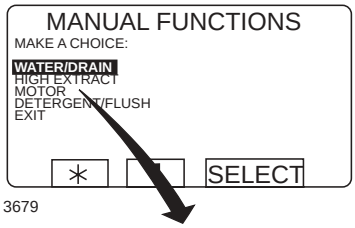
Two types of manual operation

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

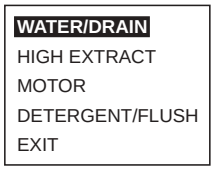
- **Manual operation during a program**

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

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



3679



Use the cursor keys to select the function.

SELECT **Press SELECT.**

Automatic return to normal display

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

Manual functions during a wash program

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

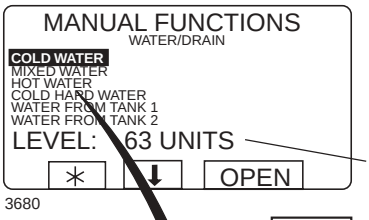
Highest extraction speed (see section "Maximum extraction speed")
Note: this function is available only on machines with a frequency-controlled motor.

Here you can limit the maximum extraction speed for the current program.

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

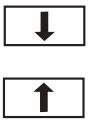
Detergent valves (see section "Detergent signals and water flushing")
Allows you to control all valves in the detergent compartment or in external detergent supply system.

Water/drain

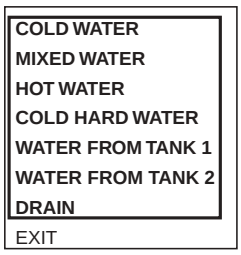


To access this function, see instructions in section "Manual operation".

Water level in drum



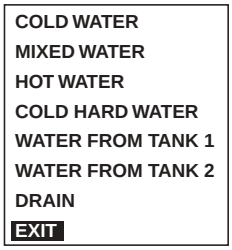
Use ⬇ and ⬆ to select the water/drain option you require.



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

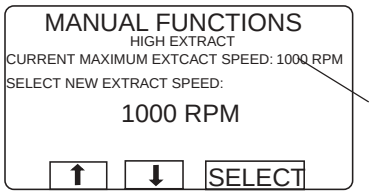
When you have finished:

Press ⬇ repeatedly to highlight "EXIT".



Press SELECT.

Maximum extraction speed



3681

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

Maximum extraction speed in current program.

1 2 3
4 5 6
7 8 9
0

Enter the maximum extraction speed you require for this program.

SELECT **Press SELECT.**

Please note!

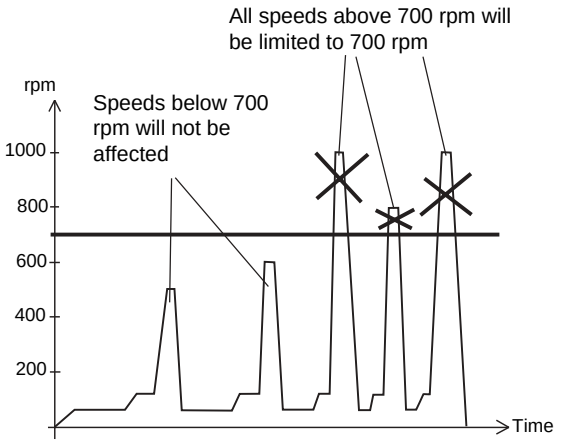
This function is available only on machines with a frequency-controlled motor.

To limit the program's highest extraction speed

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

Example:

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

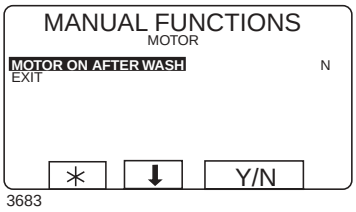


3682

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

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

Motor on after wash



3683

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

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

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

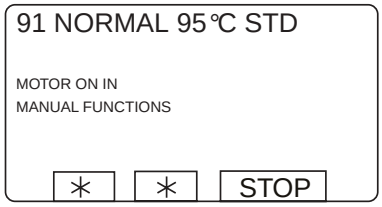
Press SELECT.

Motor to rotate after program has ended

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

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

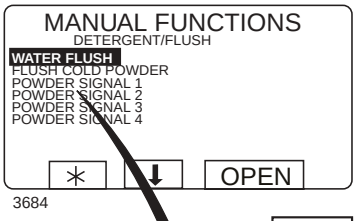
When the program has ended, the display will look like this:



4111

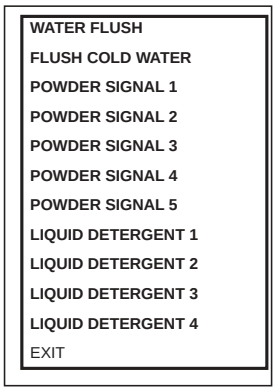
Press STOP to stop the motor.

Detergent signals and water flushing



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

Use ⬇ and ⬆ to select the function you require.

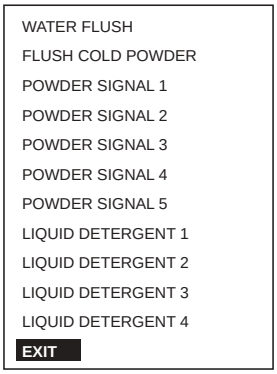


Detergent signals and water flushing

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

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

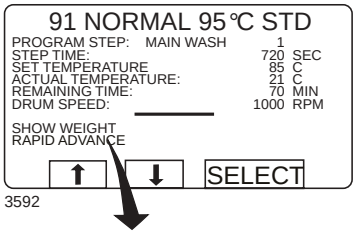
Press OPEN.
The function will be activated for as long as you press and hold this key. The function ceases as soon as you release the key.



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

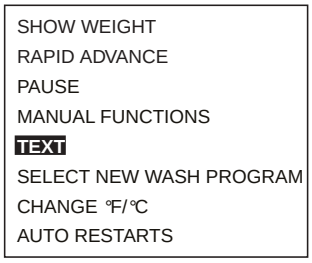
Press SELECT.

Text



3592

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

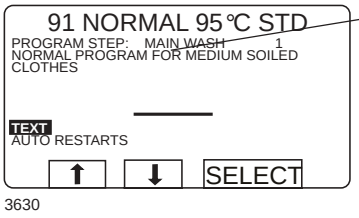


Pressing "Text" displays more information

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

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

Press SELECT.



3630

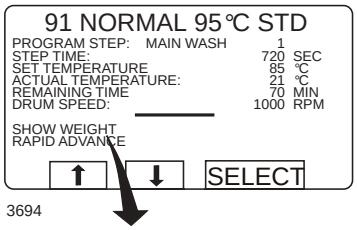
Description of wash program

To return to the normal display:
Press SELECT again.

Automatic return to normal display

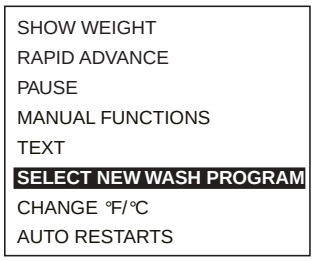
If you do not press SELECT within 20 seconds, the display will revert automatically.

To change the wash program after program operation has commenced



3694

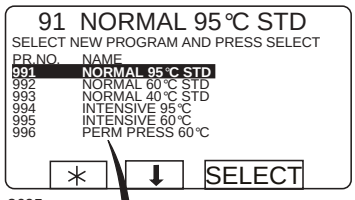
During program operation the display will look like this (see section "To start the wash program".



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

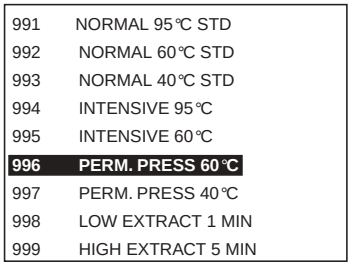
Press SELECT.

> ***To change the wash program after program operation has commenced***
>
> You can change to a different wash program at any time during program operation. When you do, the current function (for example, rinse) will be interrupted. The new program will start immediately after that (from the beginning).
>
> This function is useful, for example, if you discover that you have started the wrong program.



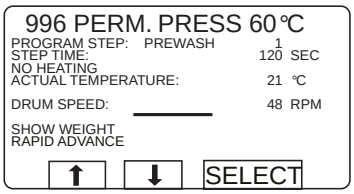
3695

Press ⬇ one or more times as required...



...to highlight the new wash program.

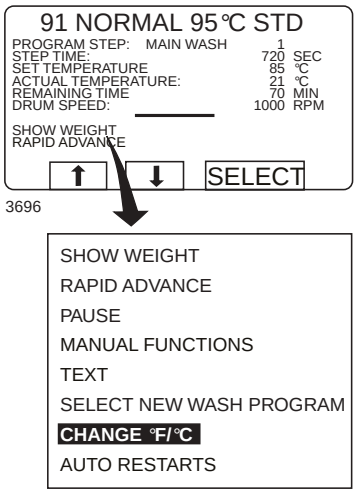
Press SELECT.



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

> ***Automatic return to normal display***
>
> If no key is pressed within 20 seconds, the display will revert automatically.

To change temperature scale ℃/℉



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

Press ⬆ or ⬇ one or more times to highlight "CHANGE ℃/℉".

Press SELECT.

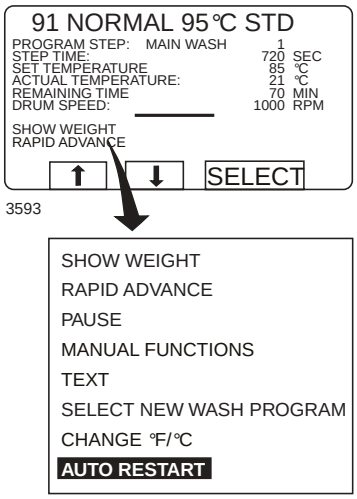
To change temperature scale ℃/℉

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

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

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

Auto restart



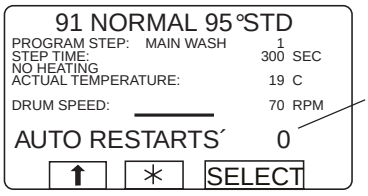
What is Auto restart?

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

This function is used primarily for testing.

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

Press SELECT.



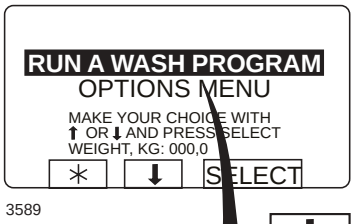
Shows the number of times the program will restart.

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

Press SELECT.

Manual operation

To select manual operation

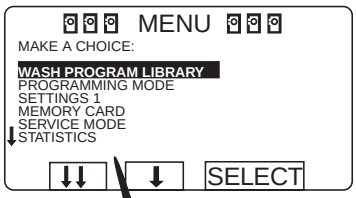


3589

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

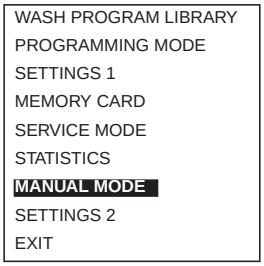
Press ⬇ to highlight ”GO TO THE MENU”.

Press SELECT.



3685

Press ⬇ six times...



....to highlight ”MANUAL MODE”.

Press SELECT.

Two types of manual operation

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

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

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

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

Always lock the door first!

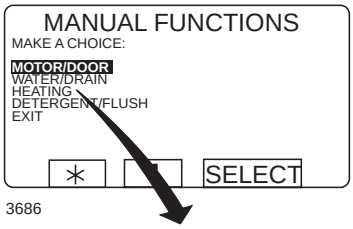
You must always close and lock the door first before you can operate the machine manually.

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

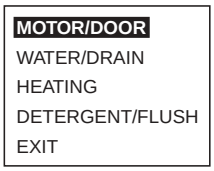
All manual settings are cancelled when you exit manual operation

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

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



3686



Select the function required using the cursor keys.

Press SELECT.

Manual operation when no program is running

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

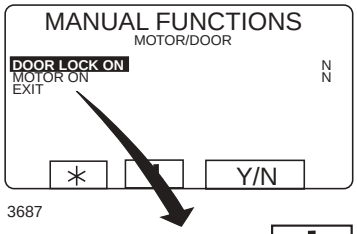
Water and drain valves (see section "Water/drain")
Operation of drain valve and all water valves.

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

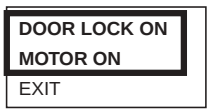
Detergent valves (see section "Detergent signals and water flushing")
Allows manual operation of all valves in detergent compartment or external detergent supply system.

Exit
Returns you to the MENU display.

Motor/door



3687



Press ⬇ as required to select a function.

A toggle function:

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

When you have finished:

Press ⬇ to highlight "EXIT".

Press SELECT.

Lock the door and start the motor

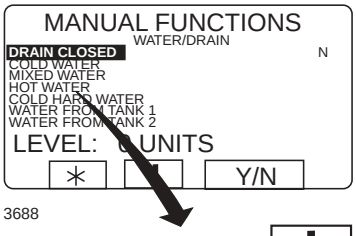
DOOR LOCK ON
If you answer **Yes (Y):**

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

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

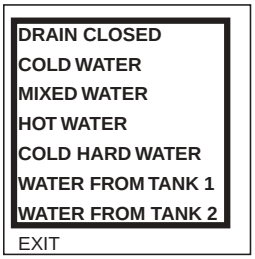
The motor will start and operate, using normal action.

Water/drain



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

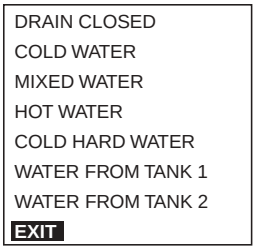
Use ⬇ or ⬆ to select Drain or one of the six Water filling alternatives.



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

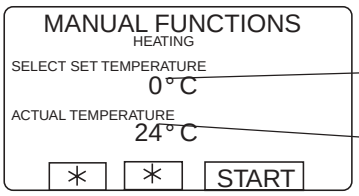
Water filling:
Press OPEN.
The function will be activated for as long as you press and hold this key. The function ceases as soon as you release the key.

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



Press SELECT.

Heating

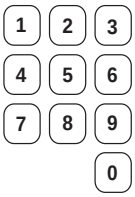


3689

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

Temperature selected

Actual temperature



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

START

Press START.
Heating will now begin.

STOP

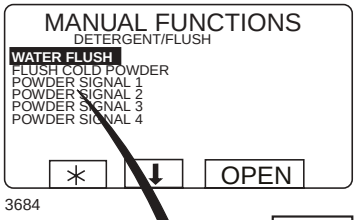
If you wish, you can cancel heating before the set temperature is reached:

Access this function again and press STOP.

Please note!

The drum must have filled to above the safety level before manual heating can take place.

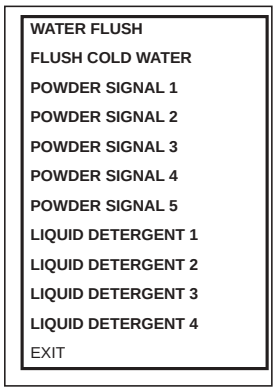
Detergent signals and water flushing



3684

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

Use ⬇ and ⬆ to select the function you require.



Detergent signals and water flushing

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

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

Press OPEN.

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

When you have finished:

Press ⬇ repeatedly to highlight "EXIT".

SELECT **Press SELECT.**

At the end of the wash

Machines without tilt function:

Open the machine door and remove the washed load.

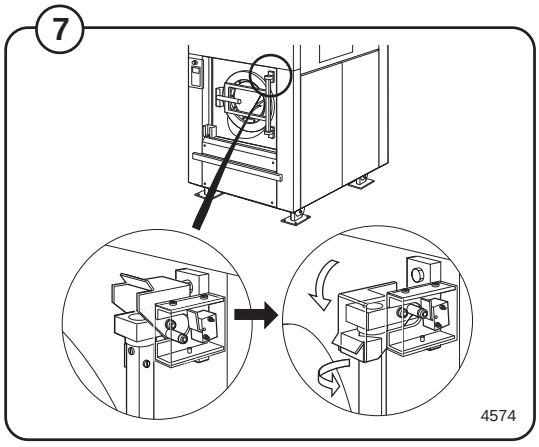
Machines with tilt function forward:

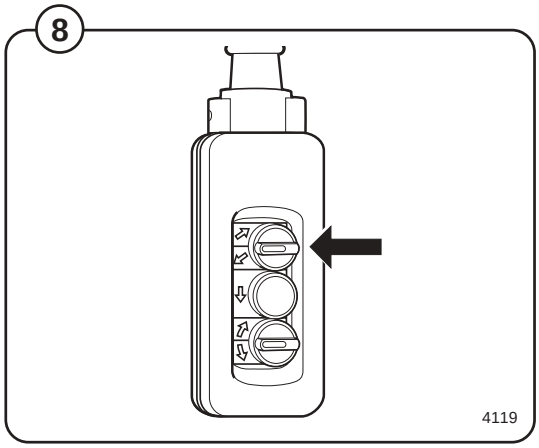
Fig. 7
- Open the door and lock it open by lowering the catch by the door hinge.

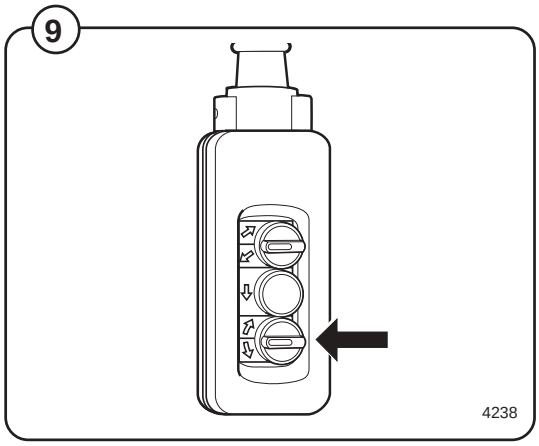
Fig. 8
- Turn the uppermost switch on the tilt control unit clockwise. The machine will now tilt forward.

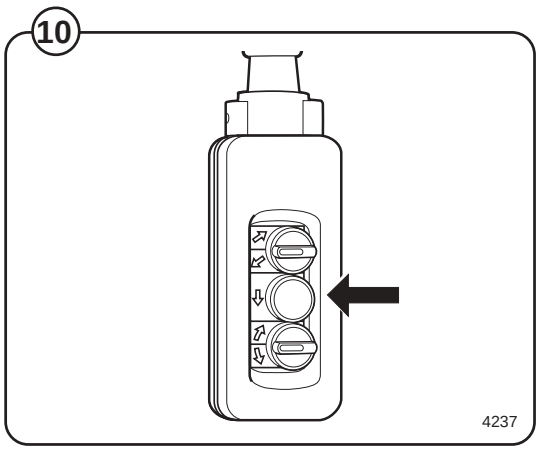
Fig. 9
- Use the bottom switch on the tilt control unit to rotate the drum, either to the right or the left. This makes it easier to empty the drum.

Fig. 10
- Press the middle switch on the tilt control unit. The machine will now return to its normal position.



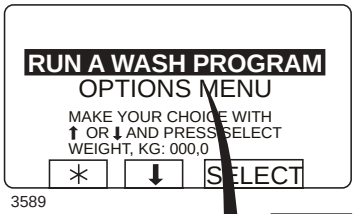






Statistics

To select Statistics



3589

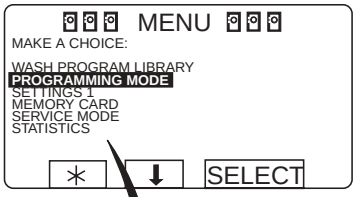
If this menu is not currently displayed:

Press ⮌ repeatedly.

Press ⬇ to highlight ”GO TO THE MENU”.

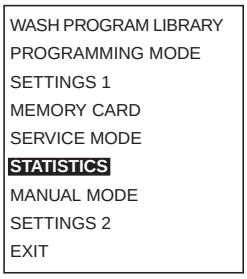
RUN A WASH PROGRAM
OPTIONS MENU

Press SELECT.



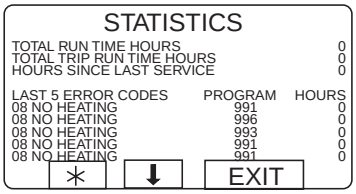
3691

Press ⬇ five times...



...to highlight ”STATISTICS”.

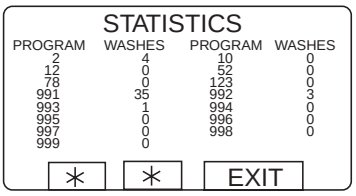
Press SELECT.



3690

To display the next page of statistics:

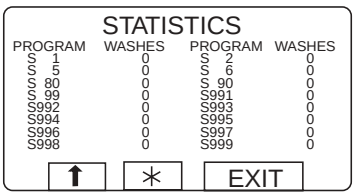
Press ⬇.



3958

To display the next page of statistics:

Press ⬇.



4040

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

When you want to cancel the display of statistics:

Press EXIT.

The Statistics function

The Statistics function gives you access to the following information:

TOTAL RUN TIME HOURS:

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

TOTAL TRIP RUN TIME HOURS:

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

HOURS SINCE LAST SERVICE

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

LAST 5 ERROR CODES:

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

NO. OF TIMES EACH PROGRAM USED:

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

Resetting statistic registers

If this menu is not currently displayed:

Press ⮌ repeatedly.

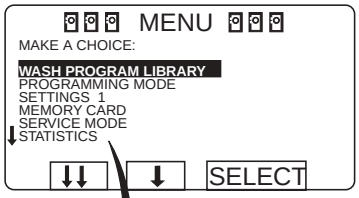
Press ⬇ to highlight "GO TO THE MENU".

Press SELECT.

Statistics registers which can be reset to zero

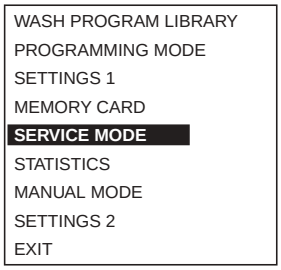
The following registers in the statistics function can be cleared (reset to zero):

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



3693

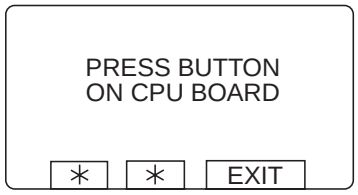
Press ⬇ ..four times....



... to highlight "SERVICE PROGRAM".

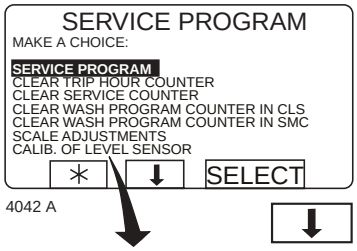
SELECT

Press SELECT



4209

Press the button on the CPU circuit board.



4042 A

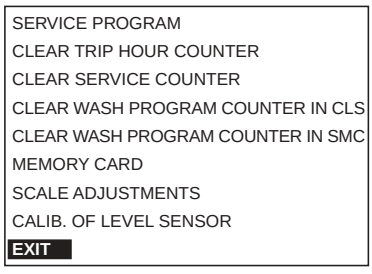
Now you can choose either to clear/reset a register or to adjust the weighing equipment.

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

SELECT

If you want to exit:

Press ⬇ repeatedly until EXIT is highlighted.

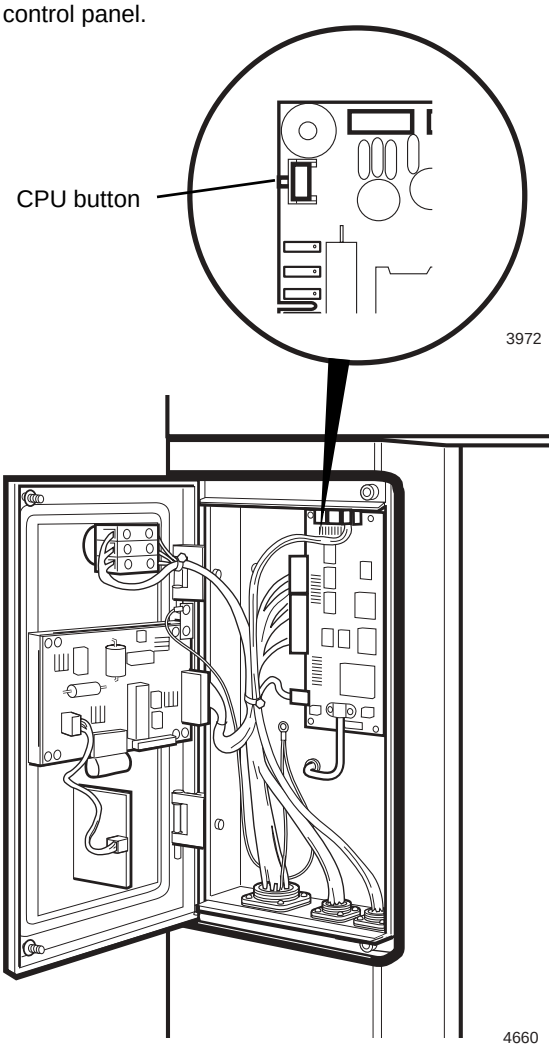


SELECT **Press SELECT.**

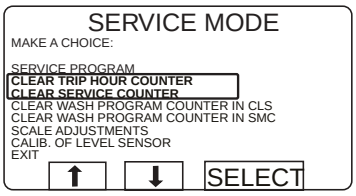
The service program may only be used by authorised personnel, because all safety interlocks are disabled when it is in use.

Prevention of unauthorised access

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



Time counter, hours after last service

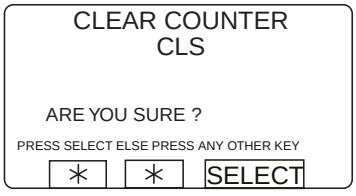


4041 A

Both counters can be reset in the same way.

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

Press SELECT.



4043 A

First you have a chance to change your mind.

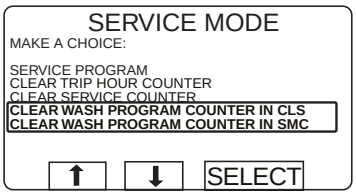
If you **do not want to reset** the register:

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

If you want to reset the register:

Press SELECT.

Number of washes for program in timer or memory card

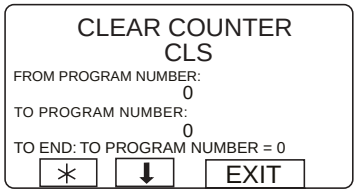


4044 A

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

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

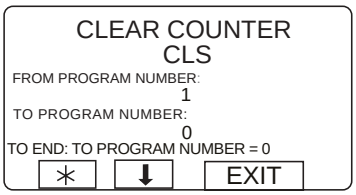
Press SELECT.



4045 A

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

Press ⬇.



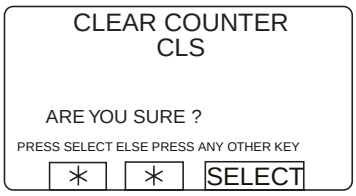
4046 A

1 2 3
4 5 6
7 8 9
0

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

ERASE

Press ERASE.



4043 A

First you have the chance to change your mind.

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

Press any key other than SELECT.

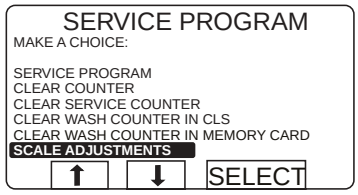
If you do want to reset the register:

SELECT

Press SELECT.

For machines with weighing equipment installed only!

Scale adjustments

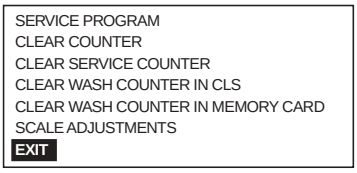


4777 A

Press ⬇ repeatedly until SCALE ADJUSTMENTS is highlighted.

Press SELECT.

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



Press SELECT.

Scale adjustments

The following functions are accessed via the SCALE ADJUSTMENTS menu:

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

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

Tare scale (see section ”Tare scale”)
Used to set the weighing equipment to disregard a given weight, such as the weight of water left in the machine (so it will not be included in the net weight of the load).

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

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

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

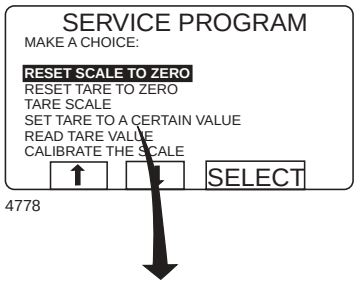
Zero calibration (see section ”Zero calibration”)
Used to increase the accuracy of the weighing equipment.

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

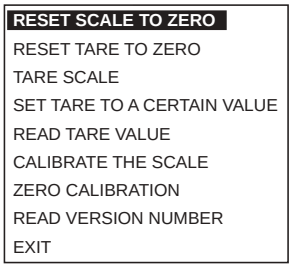
If the weighing equipment is not connected, the error message “WEIGHING EQUIPMENT NOT CONNECTED” will be displayed. Connect the weighing equipment and try again. If necessary, see the section “Fault-finding, weighing equipment” in the machine manual.

For machines with weighing equipment installed only!

Reset scale to zero



4778

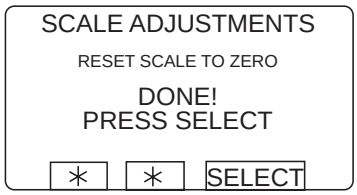


Check that ”RESET SCALE TO ZERO” is highlighted.

If it isn't...

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

Press SELECT.



4779

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

Press SELECT.

Reset scale to zero

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

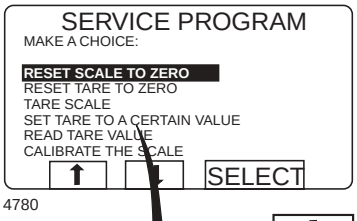
If your attempt to reset the weighing equipment fails at this point, you will see an error message equivalent to: “FAILED. PRESS SELECT” on the display. For troubleshooting, see the section “Fault-finding, weighing equipment” in the machine manual.

Please note:

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

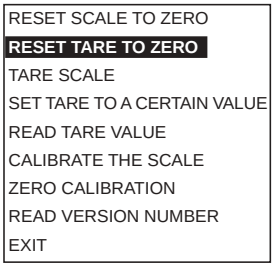
For machines with weighing equipment installed only!

Reset tare to zero

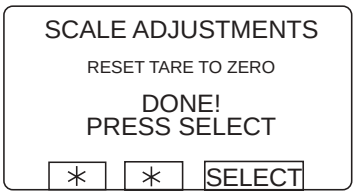


4780

Press ⬇ once to highlight ”RESET TARE TO ZERO”.



SELECT **Press SELECT.**



4781

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

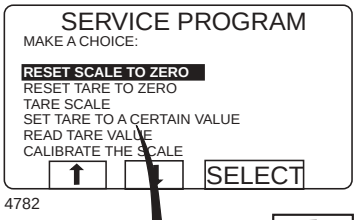
SELECT **Press SELECT.**

Reset tare to zero

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

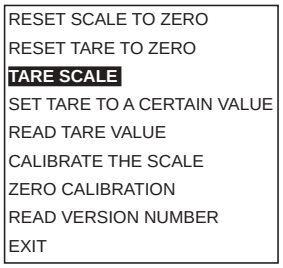
For machines with weighing equipment installed only!

Tare scale

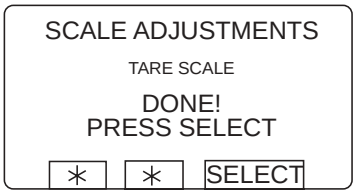


4782

Press ⬇ twice to highlight ”TARE SCALE”.



SELECT **Press SELECT.**



4783

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

SELECT **Press SELECT.**

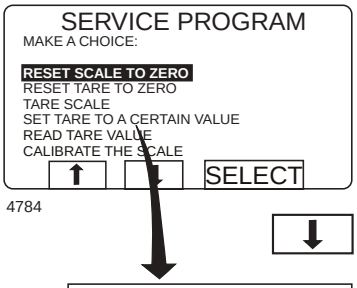
Tare scale

This function is used to set the weighing equipment to disregard a given weight (such as water left inside the drum) so it will not be included in the net weight of the load.

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

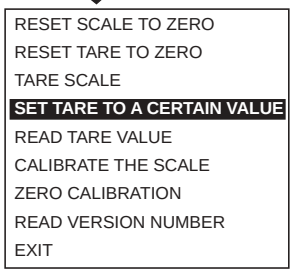
For machines with weighing equipment installed only!

Set tare to a certain value

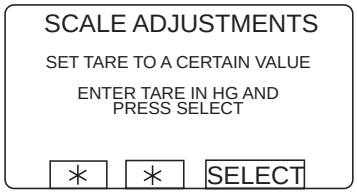


4784

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



SELECT **Press SELECT.**

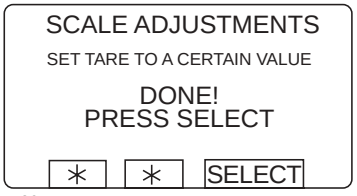


4785

1 2 3
4 5 6
7 8 9
0

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

SELECT **Press SELECT.**



4786

This screen shows that the parameter has been entered successfully.

SELECT **Press SELECT.**

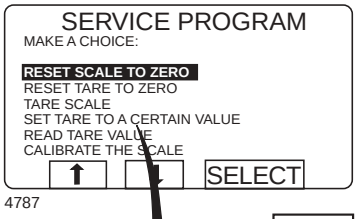
Set tare to a certain value

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

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

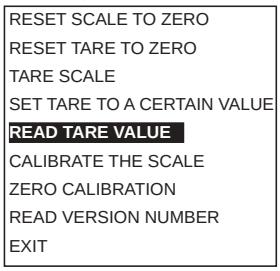
For machines with weighing equipment installed only!

Read tare value

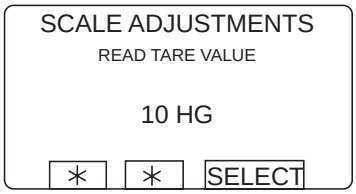


4787

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



Press SELECT.



4788

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

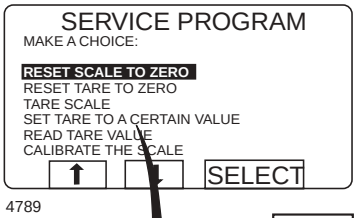
Press SELECT.

Read tare value

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

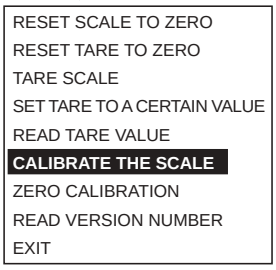
For machines with weighing equipment installed only!

Calibrate the scale

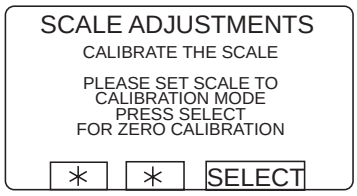


4789

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



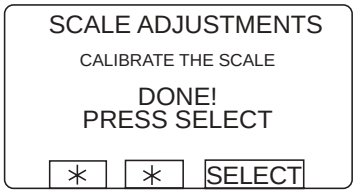
SELECT **Press SELECT.**



4790

Set the calibration switch to calibration mode.

SELECT **Press SELECT.**



4791

SELECT **Press SELECT.**

Please note:

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

Calibrate the scale

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

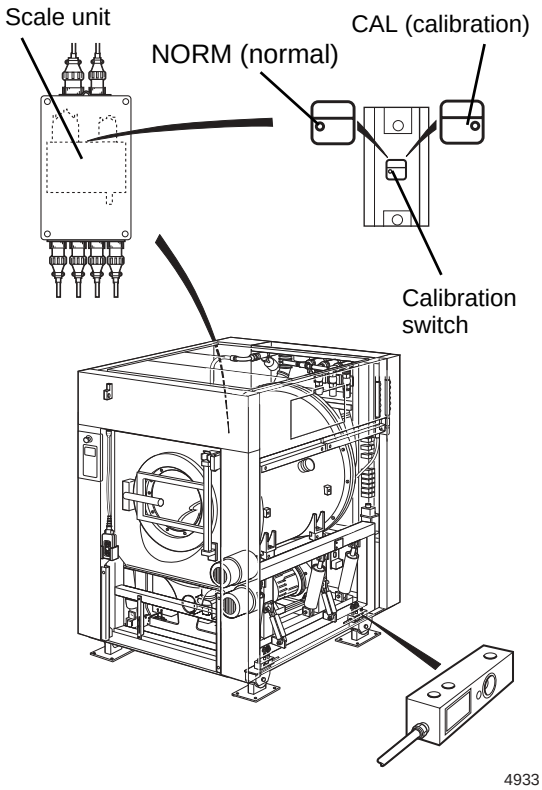
Please note:

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

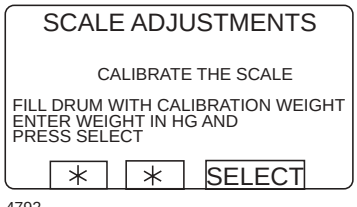
All removable parts such as side panels and top cover must be in place on the machine for this calibration.

Calibration mode/normal mode

To gain access to the calibration switch in the scale unit, the left-hand rear side panel has to be taken off. Remove the four screws on the scale unit cover. Then the calibration switch can be switched between normal mode ”NORM” and calibration mode ”CAL”.



For machines with weighing equipment installed only!



4792

Put the calibration weight inside the drum or on top of the machine.

Calibration weight

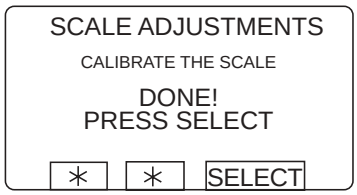
A weight of between 40 kg and 400 kg should be used as a calibration weight.

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

1 2 3
4 5 6
7 8 9
0

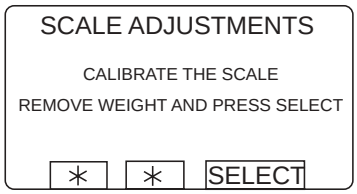
Use the numeric keys to enter the calibration weight in hg (1 hg = 100 grams).

SELECT **Press SELECT.**



4791

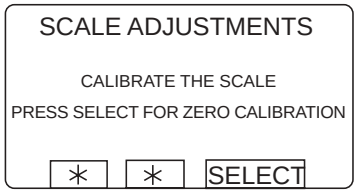
SELECT **Press SELECT.**



4793

Remove the calibration weight.

SELECT **Press SELECT.**

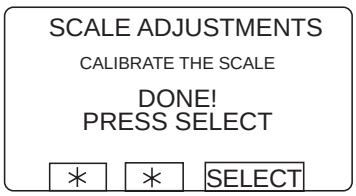


4794

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

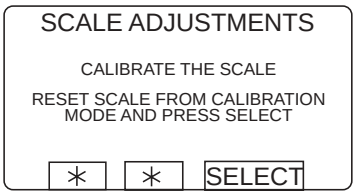
SELECT **Press SELECT.**

For machines with weighing equipment installed only!



4791

SELECT **Press SELECT.**



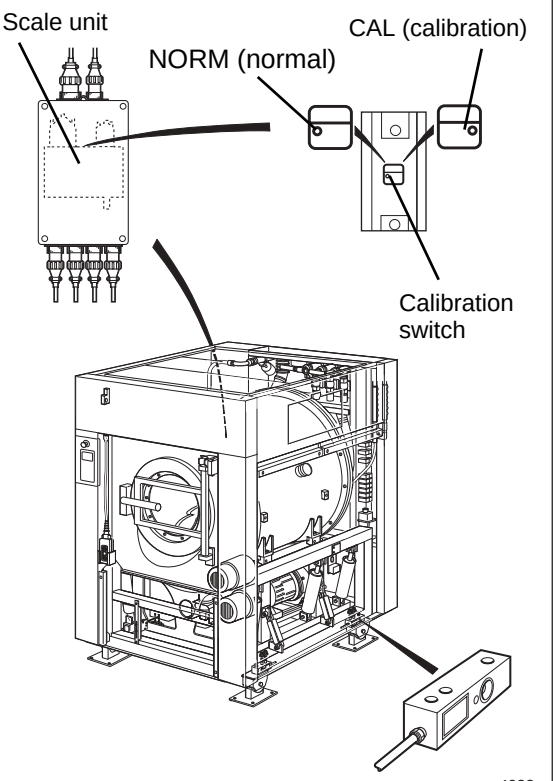
4795

Restore the calibration switch to normal mode.

SELECT **Press SELECT.**

Calibration mode/normal mode

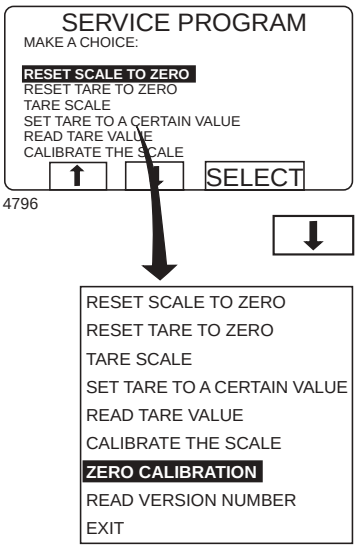
To gain access to the calibration switch in the scale unit the left-hand rear side panel has to be taken off. Remove the four screws on the scale unit cover. Then the calibration switch can be switched between normal mode ”NORM” and calibration mode ”CAL”.



4933

For machines with weighing equipment installed only!

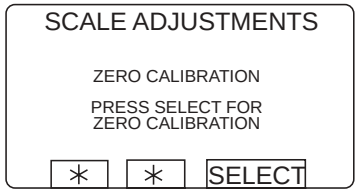
Zero calibration



4796

Press ⬇ six times to highlight ”ZERO CALIBRATION”.

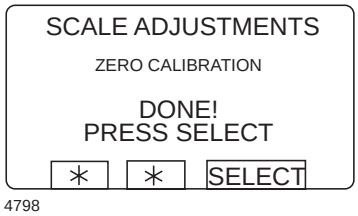
SELECT **Press SELECT.**



4797

If you wish to calibrate zero for the weighing equipment:

SELECT **Press SELECT.**



4798

This screen shows you have calibrated zero.

SELECT **Press SELECT.**

Zero calibration

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

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

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

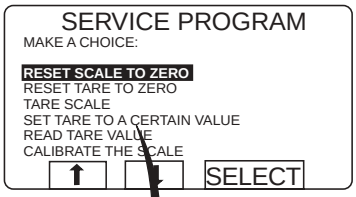
Please note:

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

All removable parts such as side panels and top cover must be in place on the machine for this calibration.

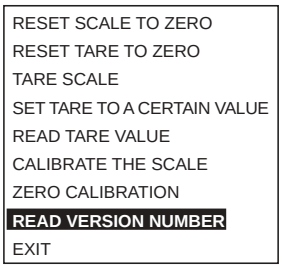
For machines with weighing equipment installed only!

Read version number

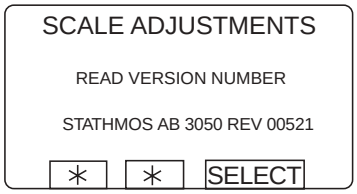


4799

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



Press SELECT.



4800

The screen shows the version number.

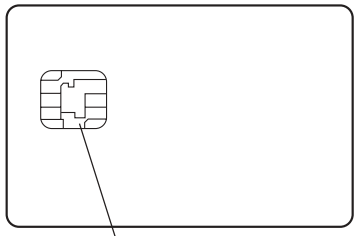
Press SELECT.

Read version number

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

Memory card

General introduction



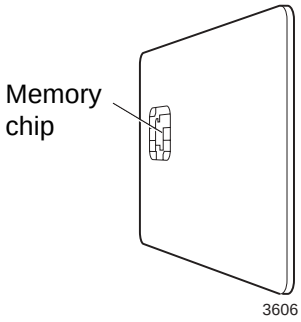
A memory card is a plastic card, the size of a credit card, with an electronic memory chip inside it. This memory card is capable of storing 10 to 15 wash programs of normal size. If the programs are mostly small ones, more of them can be stored, whereas larger programs will reduce the number which can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

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

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

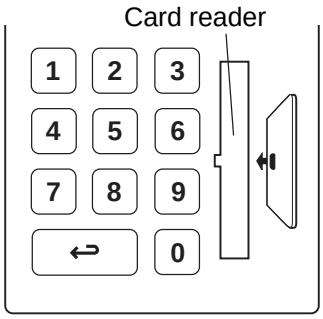
- The program cannot be deleted or copied to the program control unit of a washer extractor.
- You cannot alter the program or inspect the way it is written.
- To run the program you have to have the memory card and to insert it into the program control unit when the program is to be started.

To select the ”Memory card” function



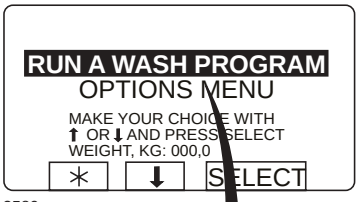
3606

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



4115

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



3589

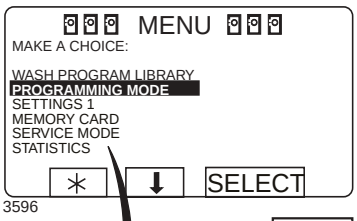
If this menu is not currently displayed:

Press ⮌ repeatedly.

Press ⬇ to highlight ”GO TO THE MENU”.

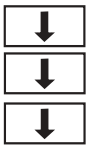
RUN A WASH PROGRAM
OPTIONS MENU

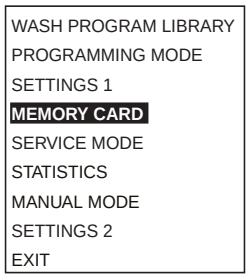
SELECT **Press SELECT.**



3596

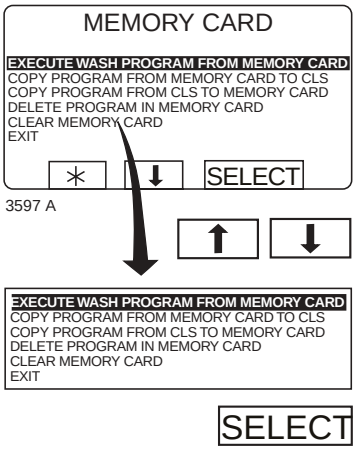
Press ⬇ three times...





...to highlight ”MEMORY CARD”.

SELECT **Press SELECT.**



Select the function required using the cursor keys.

SELECT **Press SELECT.**

"The "Memory card" functions

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

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

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

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

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

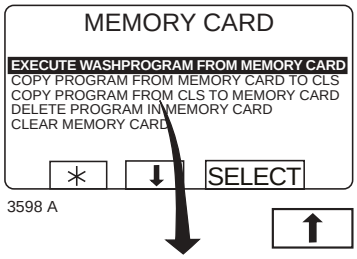
Copy program from PCS to memory card (see section "To copy a program from the program control unit to a memory card")

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

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

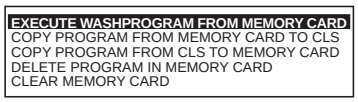
Clear memory card (see section "To delete all programs on a memory card")

To run a wash program straight from a memory card

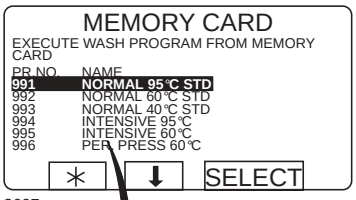


To access this menu, follow the instructions in section "To select the "Memory card" function".

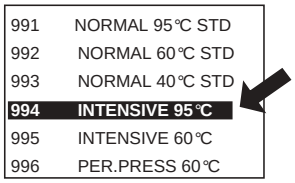
Highlight "EXECUTE WASH PROGRAM FROM MEMORY CARD" (press ⬆ if necessary).



Press SELECT.



If necessary, use ⬇ to...



... highlight the wash program required.

Press SELECT.

Program name

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

Press TEXT.

To start the program:

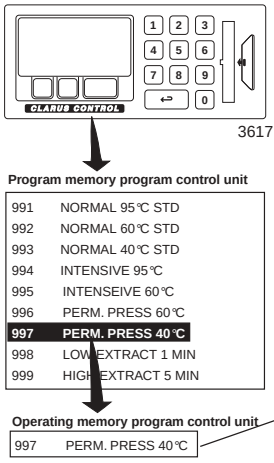
Press START.

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

To run a program from the memory card

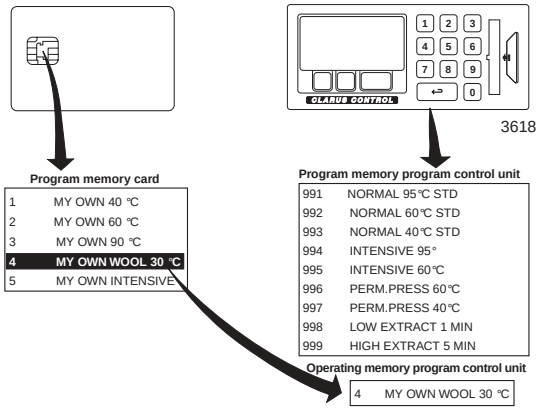
In broad terms, the program control unit has two different memories. One is a "**program memory**" where all its wash programs are stored, the other is an "**operating memory**", which is used to hold the program currently in use. The program control unit takes the instructions it needs to run the program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

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



Program currently being used

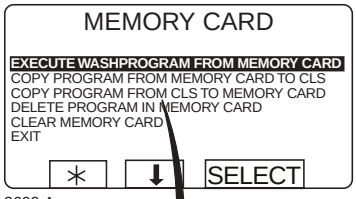
A parallel process takes place when a program is started from a memory card. In other words, the program is copied from the memory card into the operating memory, and the machine runs the program entirely from the set of instructions in the operating memory.



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

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

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

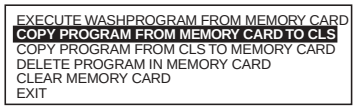


3609 A

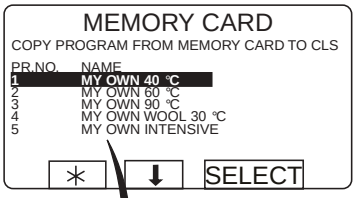
To access this menu, follow the instructions in section "To select the "Memory card" function".

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

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

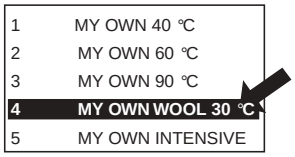


SELECT **Press SELECT.**



3610 A

If necessary, use ⬇ to...



... highlight the wash program required.

SELECT **Press SELECT.**

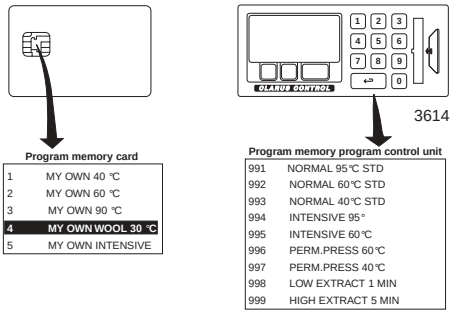
What is a restricted-use program?

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

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

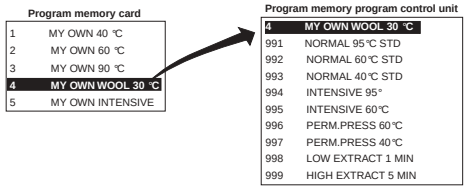
What happens when a program is copied?

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



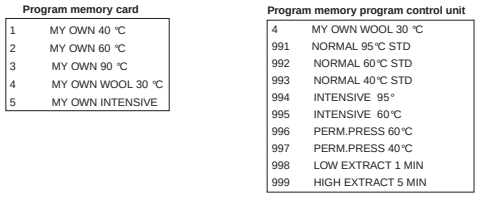
3614

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

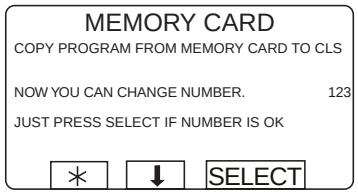


3615

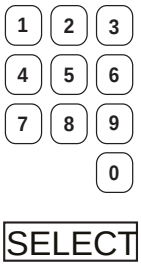
The program remains on the memory card, but another copy of it has now been stored in the program control unit.



3616



3611 A



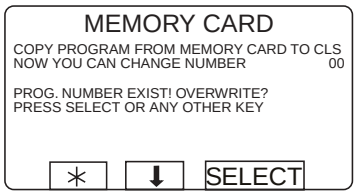
Choose 1 or 2:

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

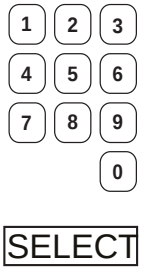
Use the numeric keys to enter the new program number, then press SELECT.

2 If the existing number is suitable:

Press SELECT.



4114 A



If the number you have choosen is already used:

1 Select another number.

Enter the new number and press SELECT.

2 Erase the old program number.

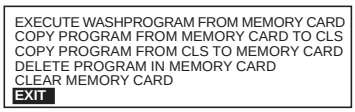
Press SELECT.

3612 A

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

If you want to copy more programs:

Press any key to continue.



4210 A

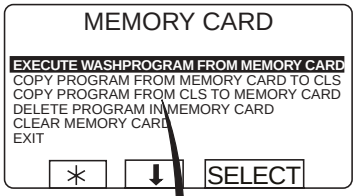
When you have finished:

Press ↓ repeatedly tohighlight "EXIT".

SELECT

Press SELECT.

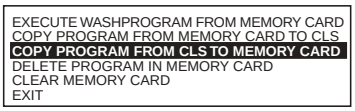
To copy a program from the program control unit to a memory card



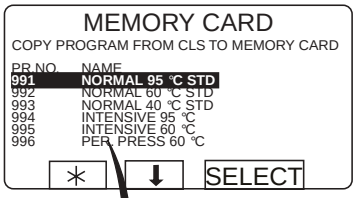
3619 A

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

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

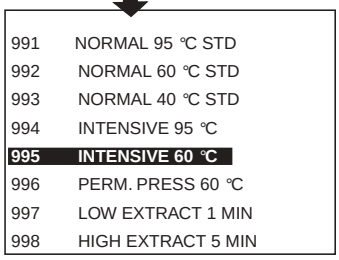


SELECT **Press SELECT.**



3620 A

If necessary, use ⬇ to...

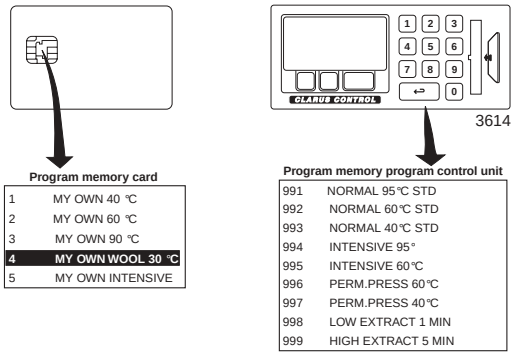


... highlight the wash program required.

SELECT **Press SELECT.**

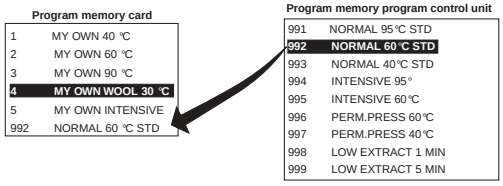
What happens when a program is copied?

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



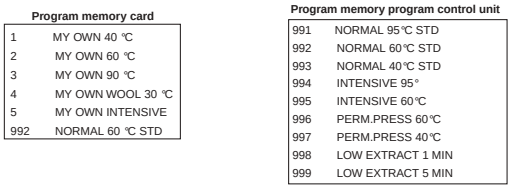
3614

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

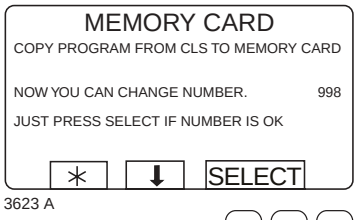


3621

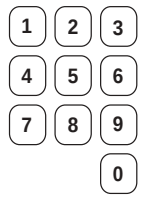
The program remains in the program control unit, but another copy of it has now been stored on the card.



3622



3623 A



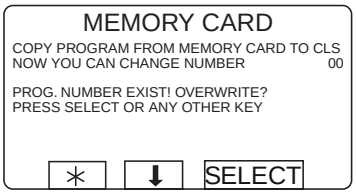
Choose 1 or 2:

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

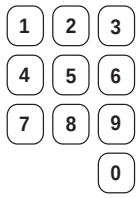
Use the numeric keys to enter the new program number, then press SELECT.

2 If the existing number is suitable:

Press SELECT.



4114 A



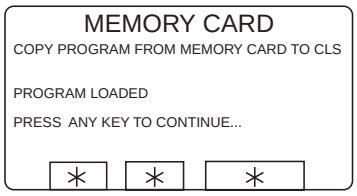
If the number you have choosen is already used:

1 Select another number.

Enter the new number and press SELECT.

2 Erase the old program number.

Press SELECT.

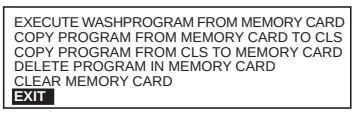


3612 A

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

If you want to copy more programs:

Press any key to continue.



4210 A

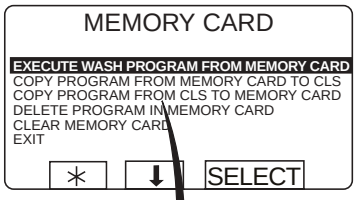
When you have finished:

Press ⬇ repeatedly to highlight "EXIT".

SELECT

Press SELECT.

To delete a program on a memory card



3625 A

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

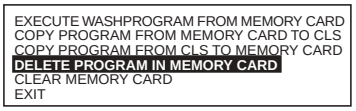
Note that restricted-use programs on a memory card cannot be deleted.

What is a restricted-use program?

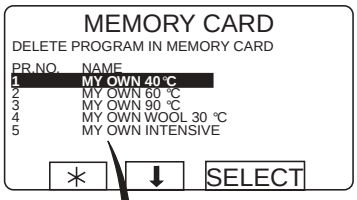
A wash program which has been created on a PC can be made a ”restricted-use” program. This means that:

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

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

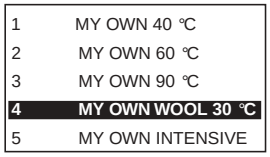


SELECT **Press SELECT.**



3626

If necessary, use ⬇ to...



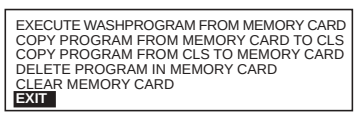
.... highlight the wash program required.

SELECT **Press SELECT.**

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

If you want to delete more programs:

Continue in the same way as described above.



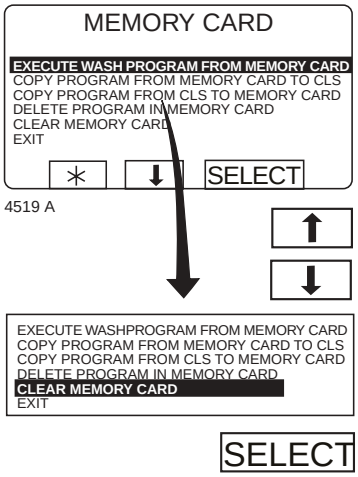
4210 A

When you have finished:

Press ⬇ repeatedly to highlight "EXIT".

SELECT **Press SELECT.**

To delete all programs on a memory card



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

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

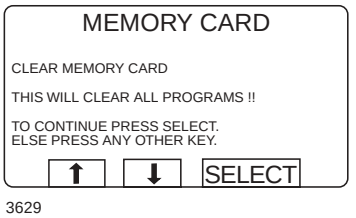
Highlight ”CLEAR MEMORY CARD” (press ⬇ or ⬆ if necessary).

Press SELECT.

What is a restricted-use program?

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

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



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

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

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

Press SELECT.

Description of main units

Fig. 7

The washer extractor described in this manual is a high-spin machine, volume 843 litres, with flexible wash programs. It is suitable for use in applications such as hotels, commercial laundries, in industry, hospitals, large institutions etc.

The drum assembly on this model is of the suspended type, in other words not rigidly mounted relative to the machine frame. This means that a minimum of vibration is transferred to the frame, which in turn simplifies installation.

Vibration due to imbalance is further reduced because the drum begins the extraction cycle at distribution speed, to distribute the load before extraction at high speed.

Distribution speed combined with the drain function achieves good distribution .

High extraction speed provides a G factor of approx. 500, which ensures a high degree of water extraction.

The program control unit consists of a CPU board, a control unit on the machine front, and some I/O boards located in the automatic control unit. The program control unit contains a number of standard programs, developed for normal wash load conditions. For the customer or user there is also the option of creating programs to suit a whole range of specific laundry requirements. These are produced by the user, either via the control panel on the washer extractor or with the aid of a special program on a PC. The programs are transferred from PC to washer extractor on smart cards.

The machines are equipped according to customer requirements, with steam heating or the option of no heating.

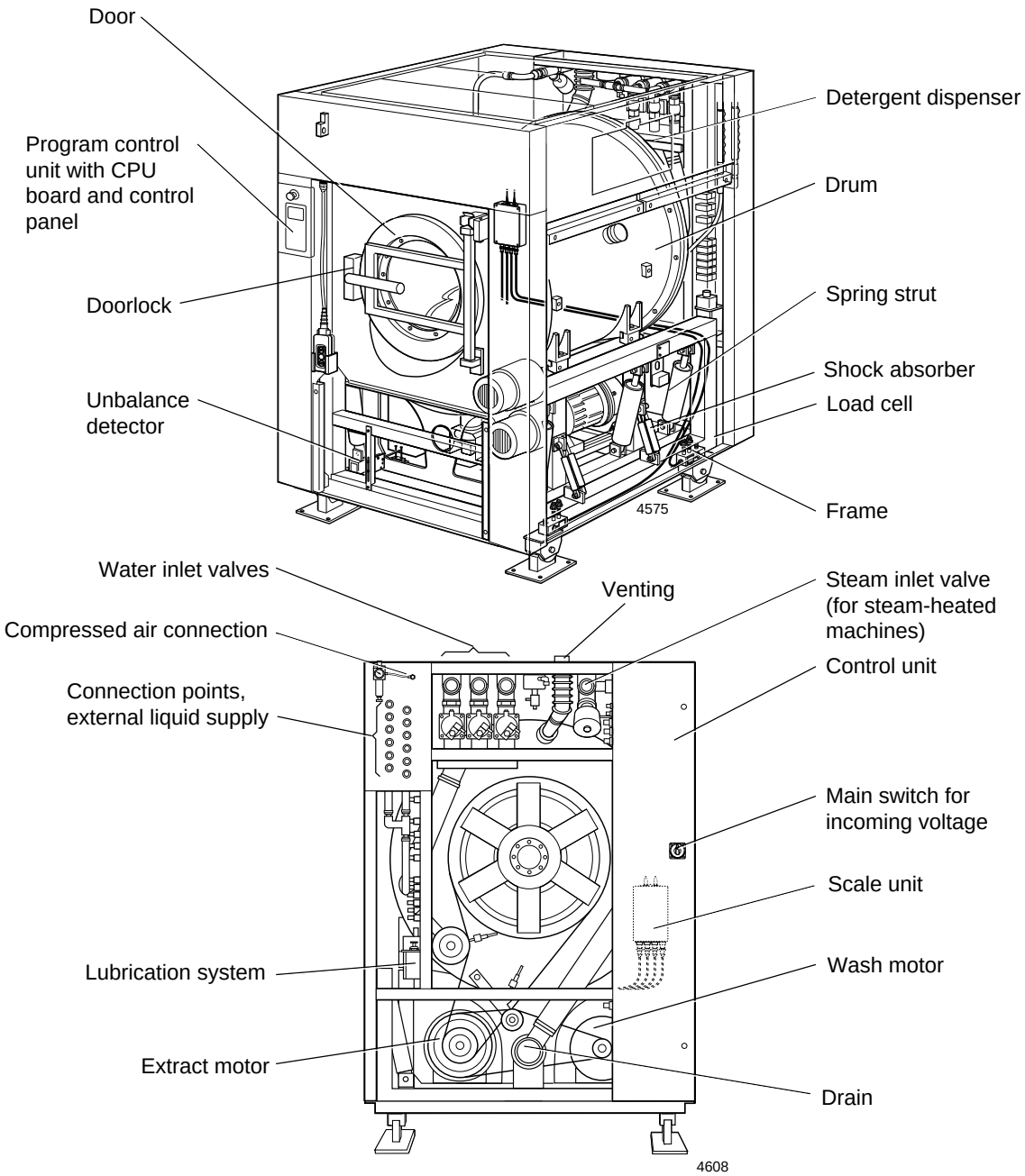
The drumunit and the motor assembly are supported by three strong coil springs on each side of the machine. Adjacent to the front and middle coil spring on each side is a damper, to counteract imbalance in the machine.

The inner drum is driven via V-belts by two motors; one for wash speed and distribution speed, the other for extraction speeds. The union between the inner drum and the outer drum (at the back) has two heavy-duty bearings and is sealed with three V-rings.

The motors are mounted within the inner frame and adjustable on rail mounts. The motor for wash speed is connected to the drum by means of V-belts via a belt gear with an electro-mechanical clutch. The motor for extraction speeds is connected to the drum via a hydrostatic clutch.

The automatic control unit / electrical compartment is located on the machine rear, and contains (amongst other things) circuit boards, relays and fuses.

7



Control unit

Fig. 8

LC1	LC-unit
LC2	LC-unit
T1	Transformer, for adaptation of feed voltage for program control unit andcontrol equipment
T3	Transformer, power supply hydrostatic clutch motor
T10	Transformer, power supply I/O board, CPU board, and display unit
B1	Level control, overfilling
B2	Level control, safety monitoring for control unit, door lock
B31	Control unit, door lock
S1	Main switch, isolating switch
A2	RDC-board
U3	Motor brake (optional equipment)
U4	"Gentle start-up", wash motor
F1, F11	Fuses, 1.6 AT, protection of 230 V power supply to I/O board, CPU board, display unit and control unit, door lock
F3	Motor cutout
X1	Distribution terminals for input voltage
V2	Rectifier bridge
K1	Relay for wash-speed motor, washing
K2	Relay for wash-speed motor, washing
K3	Relay for wash-speed motor, distribution
K9	Relay for extraction-speed motor, low-speed extraction
K10	Relay for extraction-speed motor, high-speed extraction
K11	Relay for extraction-speed motor, high-speed extraction

8

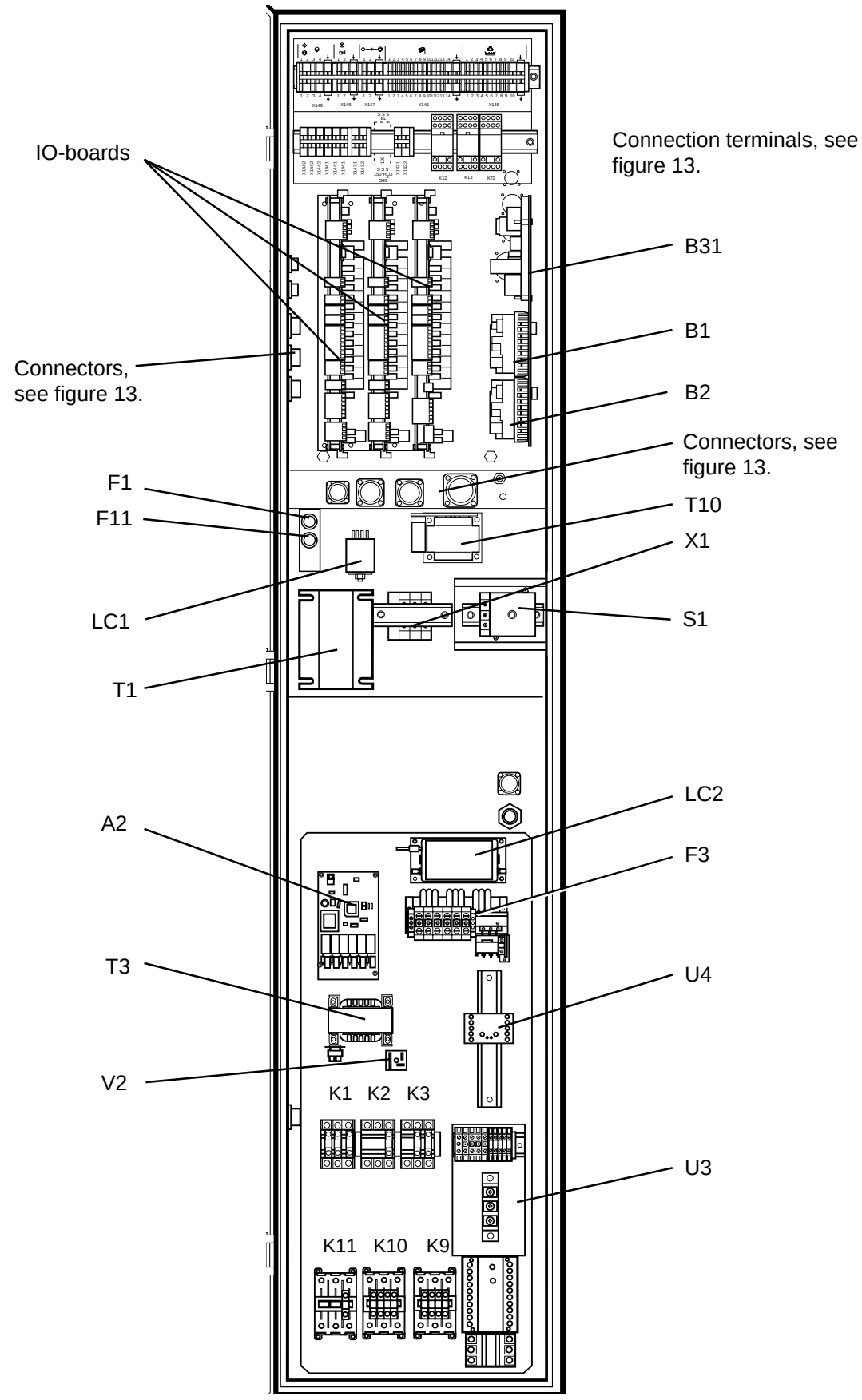

IO-boards
Connection terminals, see figure 13.
B31
B1
B2
Connectors, see figure 13.
Connectors, see figure 13.
F1
F11
T10
X1
LC1
S1
T1
LC2
A2
F3
T3
U4
V2
K1 K2 K3
U3
K11 K10 K9
4576

Fig. 9

Connectors

X100 Connector, 37 pole, control unit

X101 Connector, 14 pole, door lock

X102 Connector, 14 pole, control unit and sensor(s) for tilt function (optional equipment)

X103 Connector, 4 pole, speed sensor

X104 Connector, 4 pole, unbalance switch

X105 Connector, 14 pole, supply valve/drain valves

X106 Connector, 14 pole, detergent supply, powder (optional equipment)

X107 Connector, 14 pole, oil lubrication

X108 Connector, 14 pole, compressed air valves and compressed air switches, tilt function (optional equipment)

X109 Connector, 14 pole, valves for water recycling (optional equipment)

X110 Connector, 4 pole, water valve, cold, hard water (optional equipment)

X111 Connector, 4 pole, steam valve for heating

X112 Connector, clutch motor

External start/stop/pause (inputs)

X149: 1 start/stop, phase (mains voltage)

2 start/stop, neutral

3 pause, phase (mains voltage)

4 pause, neutral

A voltage between inputs 1 and 2 will cause the machine to stop if it has started and vice versa. The machine will pause for as long as a voltage remains between inputs 3 and 4.

External buzzer/flashlight (output)

X148: 1 phase (mains voltage)

2 neutral

"Program in progress" signal (output)

X147: 1 phase (mains voltage)

2 neutral

External detergent connections (outputs)

X146

total of 13 outputs

The terminal numbering corresponds to the numbering used in the liquid detergent function in programming.

X146:14 common neutral

Water recycling (outputs)

X145: 1 Drain 1 (Y1)

2 Pump 1

3 Stop drain (Y1b)

4 Drain 2 (Y2) (normally open)

5 Drain 2 (Y2) (normally closed)

6 Drain 3

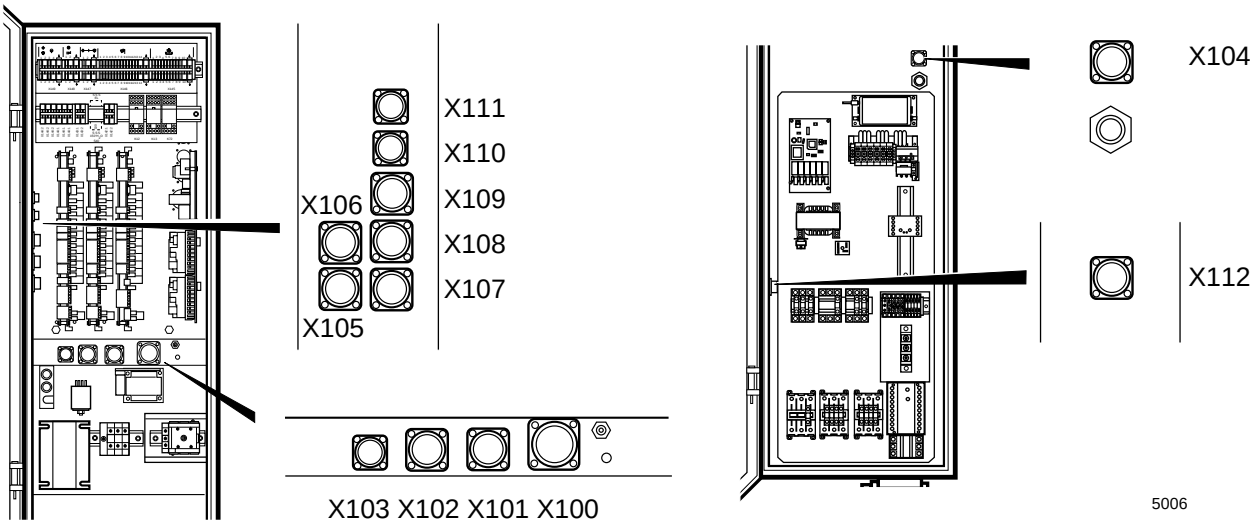
7 Drain 4

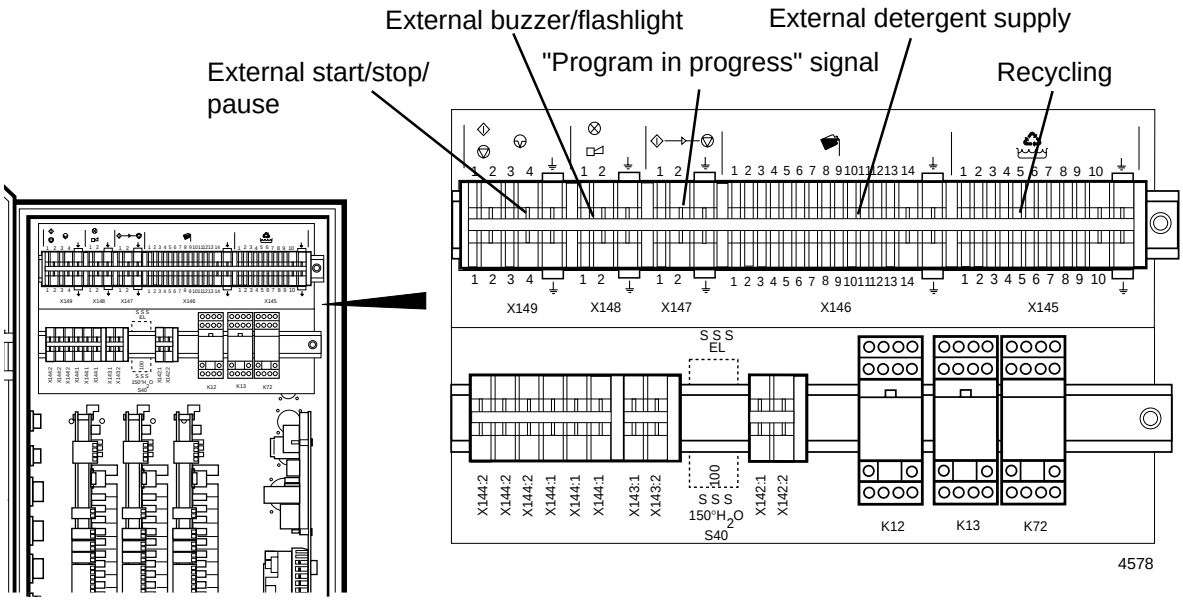
8 Tank 1 water valve (Y44)

9 Tank 2 water valve (Y54)

10 Common neutral

9

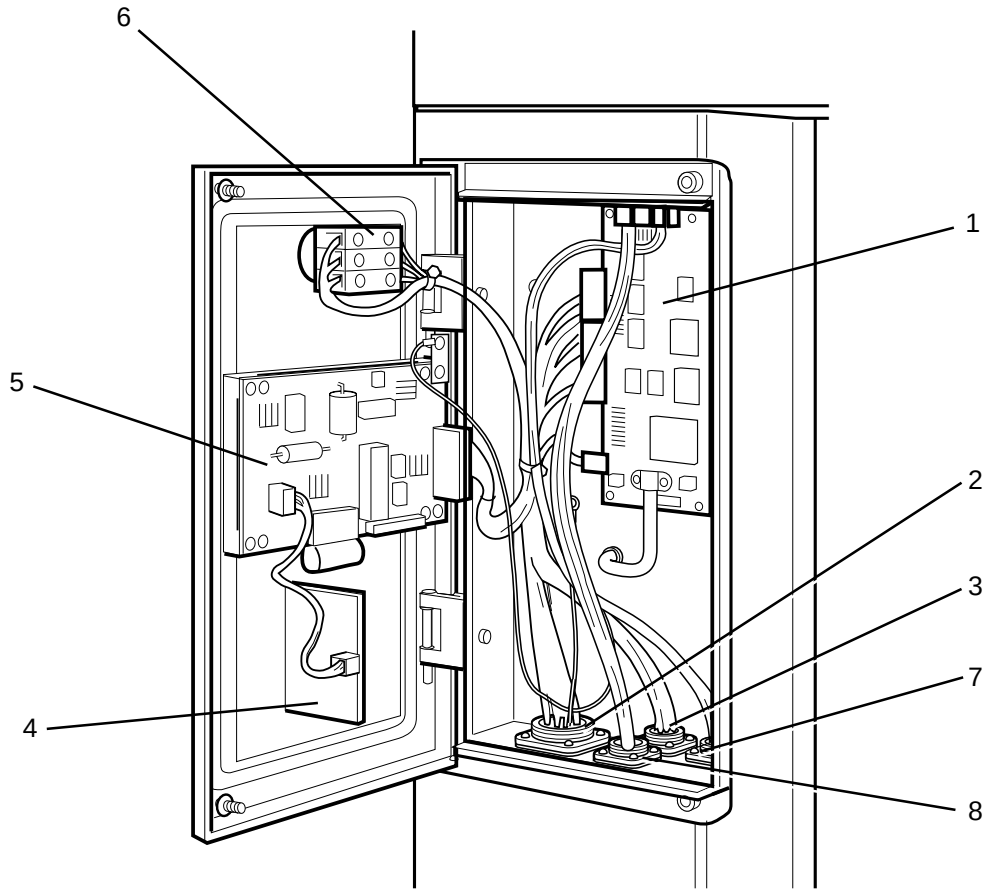

X111
X110
X109
X108
X107
X106
X105
X103 X102 X101 X100
X104
X112
5006


External buzzer/flashlight
External detergent supply
"Program in progress" signal
External start/stop/
pause
Recycling
X149
X148
X147
X146
X145
S S S
EL
X144:2
X144:2
X144:2
X144:1
X144:1
X144:1
X143:1
X143:2
100
S S S
150°H2O
S40
X142:1
X142:2
K12
K13
K72
4578

Clarus control unit

Fig. 10			
	1	A200-1	CPU circuit board
	2	X200	Connector, 37 pole, operator unit
	3	X201	Connector, 4 pole, sensor(s) thermostat
	4	A200-3	Card reader
	5	A200-2	Display circuit board
	6	S2	Connection terminals, emergency stop
	7	X202	Connector, 4 pole, weighing equipment
	8	X203	Connector, 4 pole, external PC connection

10



4929

Program control unit

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

System structure

CPU board

Fig. 11

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

The CPU board communicates with the display board, RDC-board and the three I/O boards via serial interfaces.

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

I/O boards

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

I/O board 1:

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

I/O board 2:

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

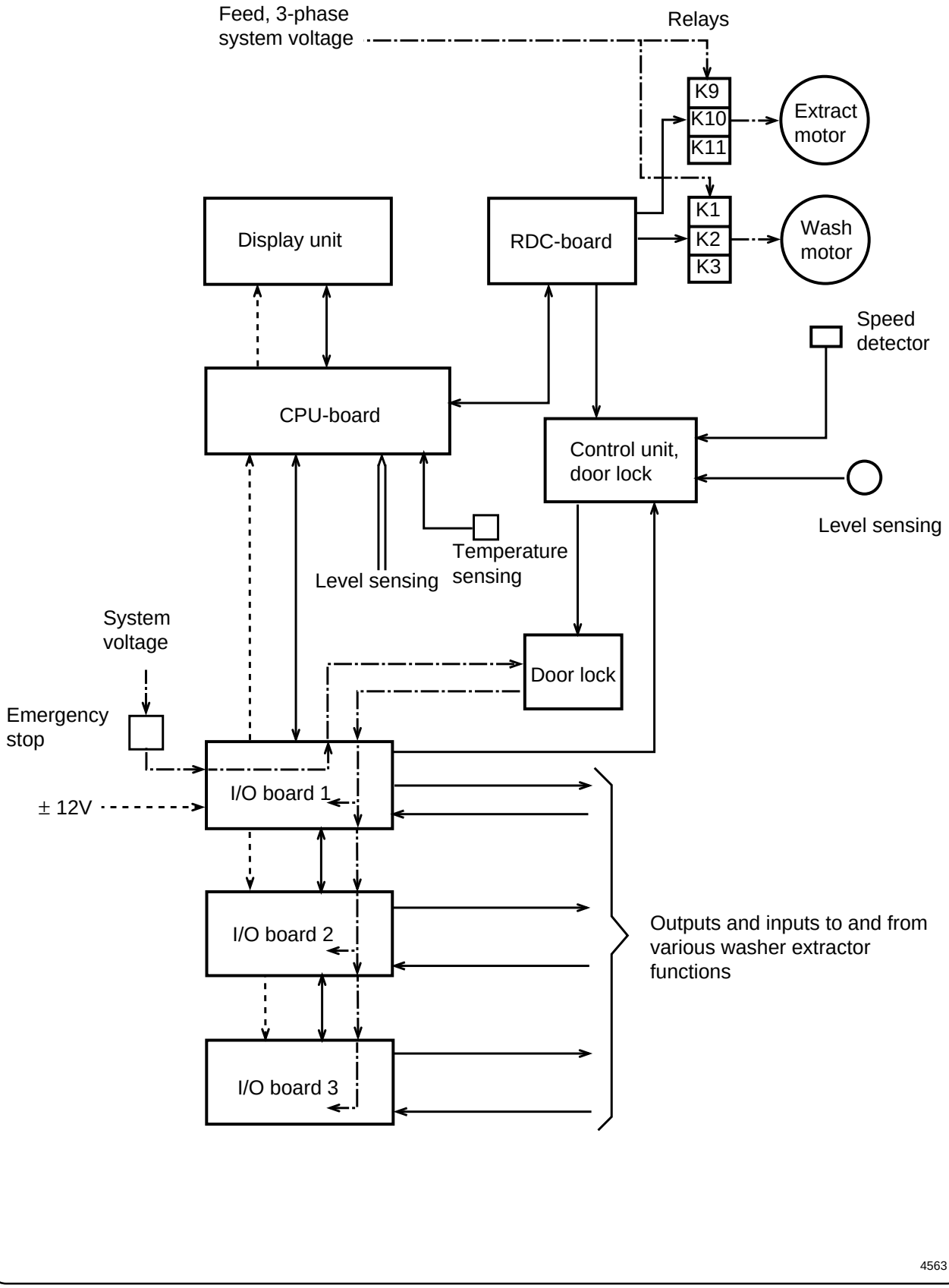
I/O board 3:

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

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

Program control unit

11



Door lock control unit

Fig. 12

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

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

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

PCB connector: Function

Fig. 12

X90: Inward voltage feed 200 - 240 V AC

X91: Spare connector for outward power supply

Fig. 13

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

X92: Input from PCU: Lock door

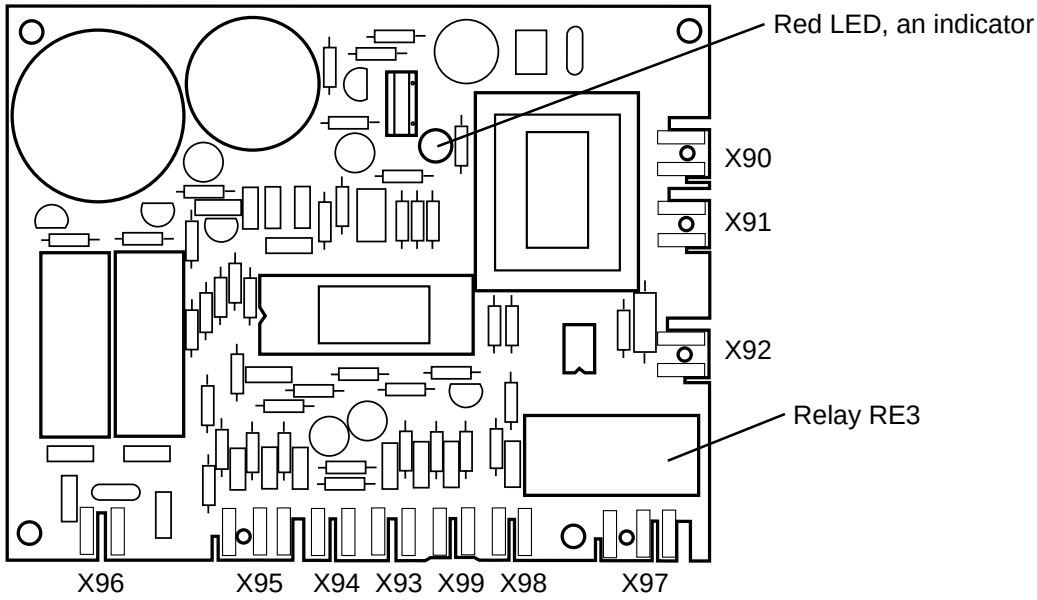
230 V DC: Command from PCU for door locking

0 V: Command from PCU to open door

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

12

Control unit, door lock



X93: Input from level switch

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

0 V: Empty drum (level contact closed)

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

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

5 V DC: Motor operating (contact open)

0 V: Motor not operating (contact closed)

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

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

X95: Input from rotation sensor on motor shaft

> 0,4 Hz: drum rotating

< 0,4 Hz: drum at standstill

Input voltage: 4-10 V DC

X96: Output to door lock

Output voltage: 17 - 31 V

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

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

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

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

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

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

Excess-speed-monitoring device

X99 = 0

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

Rotation-monitoring device

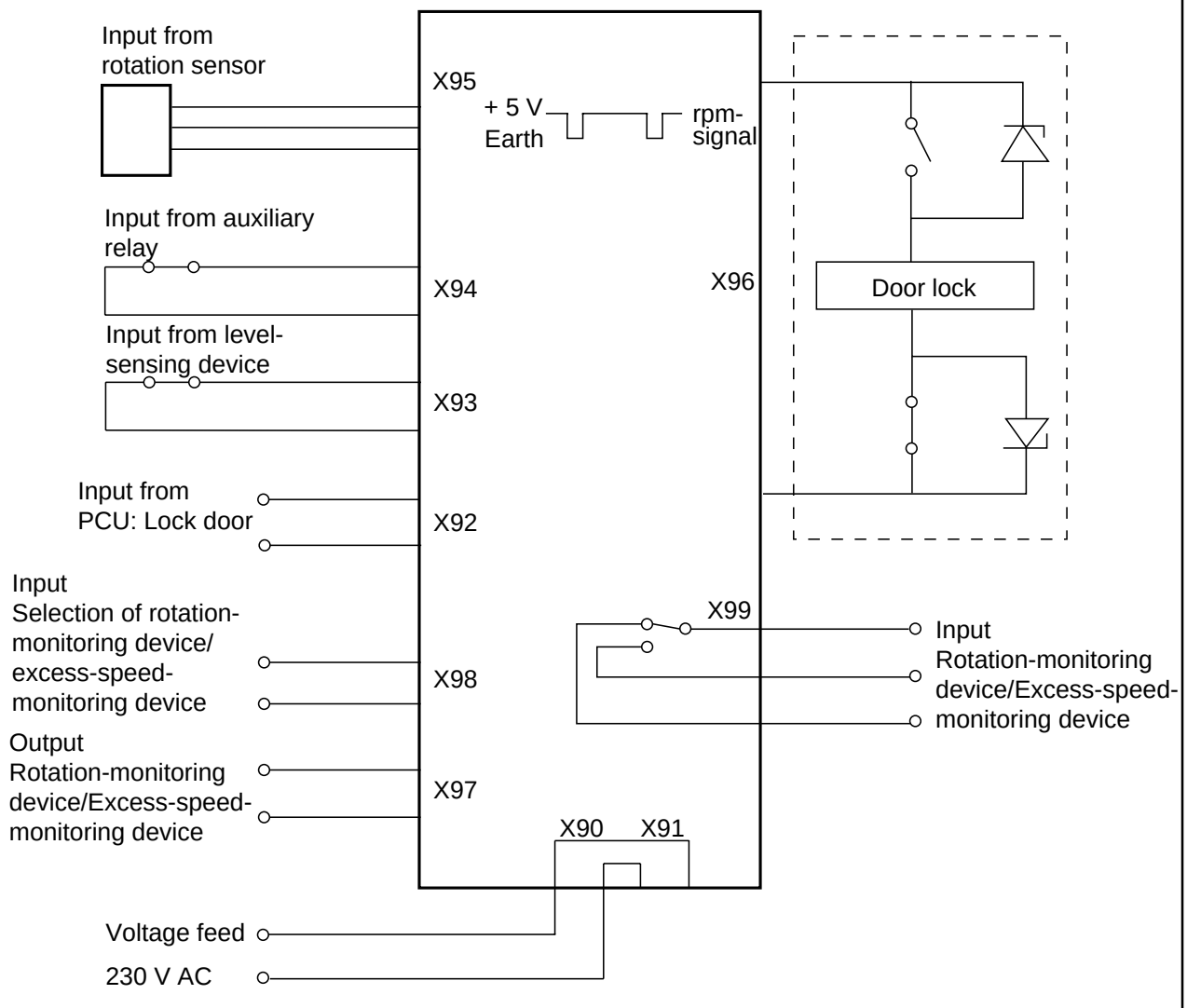
X99 = 1 X98 = 1

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

X99 = 1 X98 = 0

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

13

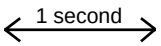


Error indication patterns

Fig. 14 If the door lock is working correctly, this is indicated by the red LED, by a pattern of flashes which indicates ”OK”. The error indication patterns revealed by the LED flash at various frequencies for the various errors or faults. All error indication patterns have a frequency cycle of 50%, i.e. the LED will be on half the time, off half the time.

14

LED pattern of flashes during normal functioning



Pattern of flashes indicating ”OK”, drum at standstill

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

Error indication pattern	Meaning/Cause
	Level-sensing device indicates water in drum when door lock is open. 2,19 Hz
	Auxiliary relay for motor indicates that the motor contactor is activated when the door lock is open (this error indication pattern does not occur when the excess-speed-monitoring device is selected). 1,88 Hz
	Signals from rotation sensor and auxiliary relay do not correspond. 1,56 Hz
	The control unit sensor circuits indicate fault/error in drive circuits for door lock including its wiring. 0,85 Hz
	Armament circuits for RE1/RE2 activated (capacitor C8 charged when it should be discharged). 0,37 Hz

4686

RDC circuit board

PCB connectors/functions:

Fig. 15

X278 Circuit board power supply, 200-240 V
X378 Power supply, onward feed, 200-240 V
X294 Output to motor relays/electromagnetic coupling, 200-240 V
X271 Power supply for relays, 200-240 V
X265 Input, imbalance switch, 5 V
X295 Input, rotation guard, 5 V
X275 Communication with CPU board

LED indication patterns

Green LED

The green LED flashes to acknowledge message communicated.
Frequency approx. 2 Hz.

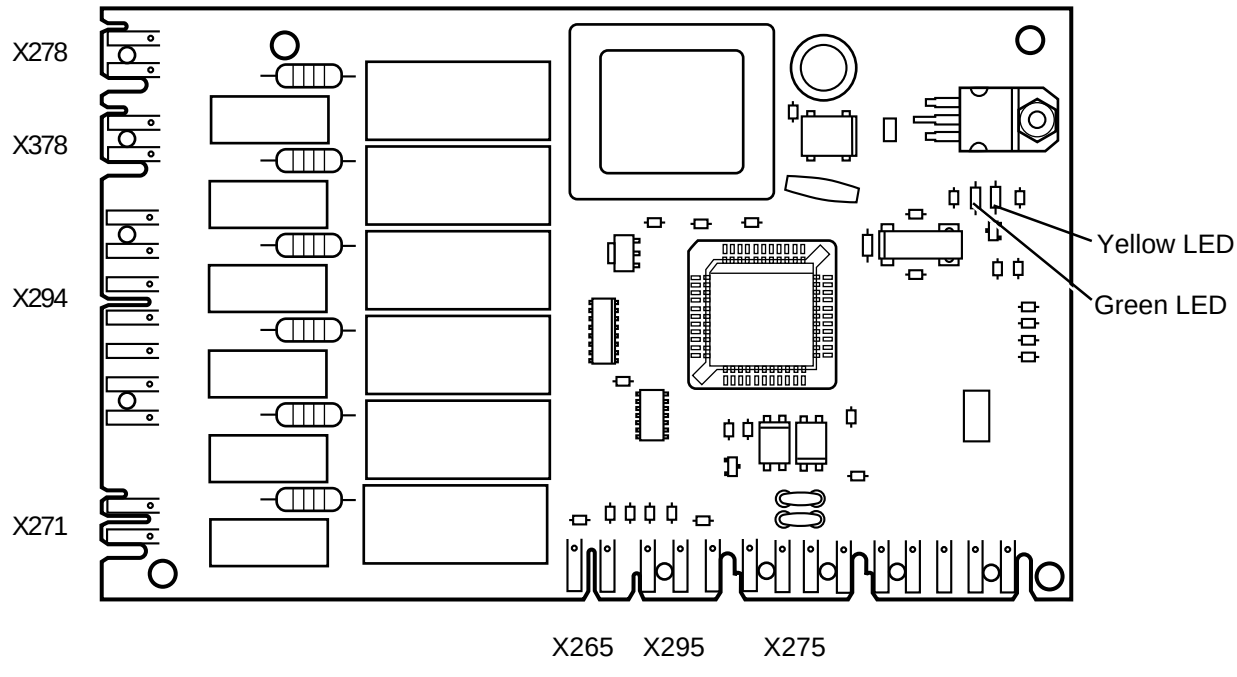
Yellow LED

Drum at standstill: LED not lit.

Drum rotating: LED lit, no flashing.

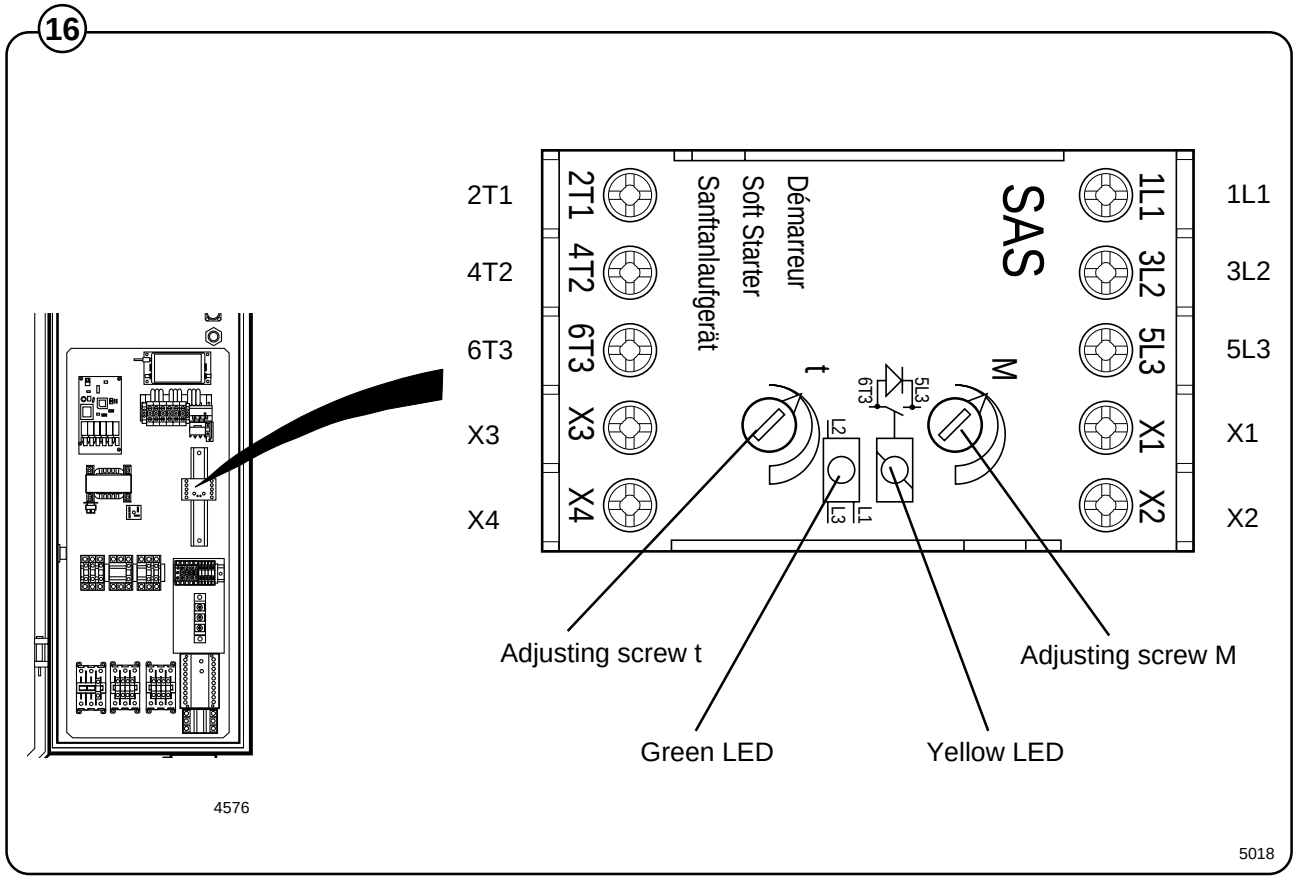
When the RDC board is energised, the LED will flash at the frequency of 30 Hz for one second.

15



Wash motor "Soft Starter"

Fig. 16 The Soft Starter (U4) is used to ensure a smooth transition when the wash motor is starting up to begin wash speed.



PCB connectors/functions:

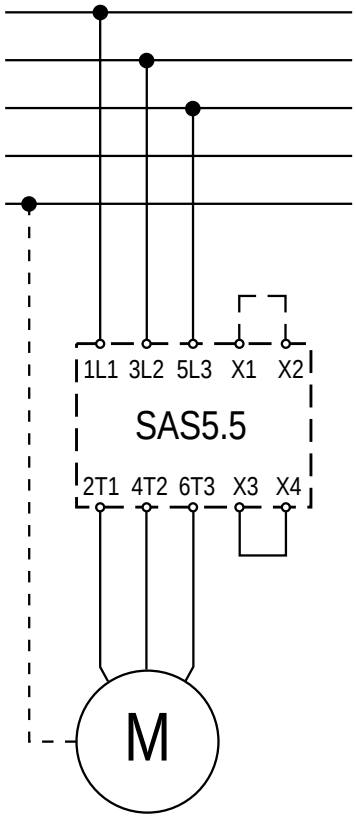
Fig. 16	1L1, 3L2, 5L3	Inward three-phase connectors from motor relay
	2T1, 4T2, 6T3	Outward three-phase connectors to motor
Fig. 17	X1-X2	Strap fitted: Power supply 160-240 VAC Strap <u>not</u> fitted: Power supply 380-480 VAC
	X3-X4	Strap for activating unit. The strap is permanently fitted so that activation of the Soft Starter will always take place from the motor relay.
	M	Adjusting screw (M) for adjusting motor starting torque. Default setting: 50% of max. value.
	t	Adjusting screw (t) for Soft Starter activation time (ramp time). Default setting: 30% of max. value.
	Green LED	Lit when power supply connected.
	Yellow LED	Lights when ramp time has ended and the Soft Starter thyristors are bypassed.

Adjustment of the Soft Starter function

- Adjust the Soft Starter function when the machine contains a full load. (If adjustment has to be done when the drum is empty, use the "default setting" values given on the page before this.)
- Use adjusting screw (t) to set the ramp time to 1– 1.5 seconds.
- First adjust the starting torque for the starting torque of the load, i.e. to the level when the motor starts rotating. Then adjust the starting torque to about 10% above this level to give the motor enough time to gain speed before the ramp time ends and 20the yellow LED lights.

17

Wiring schematic diagram



5019

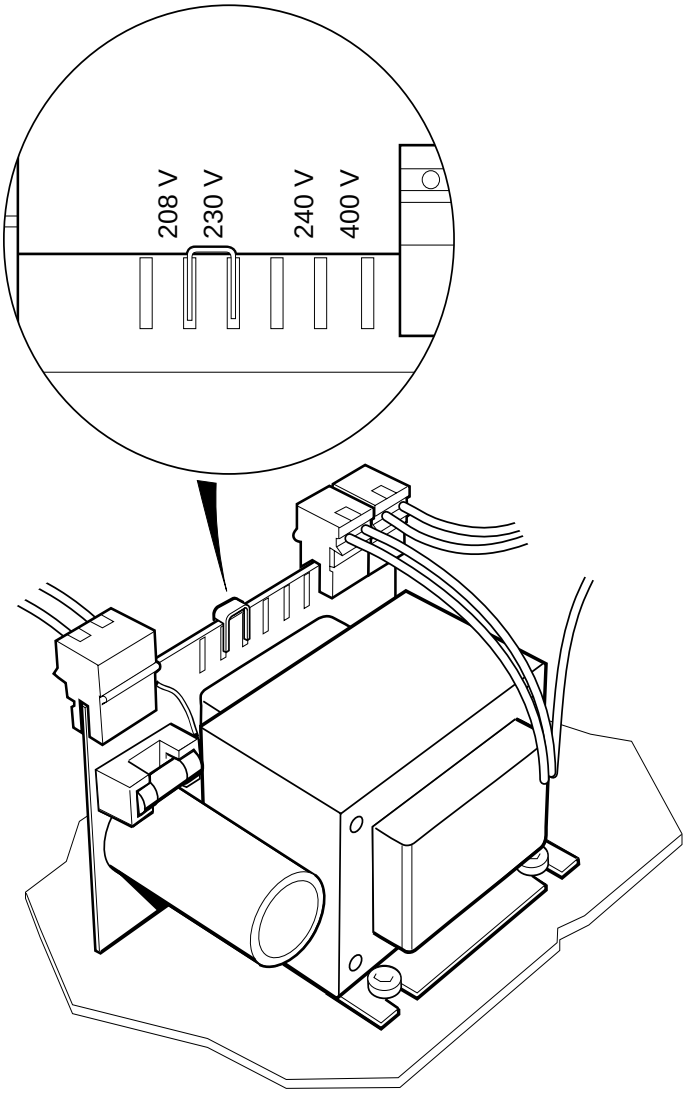
Control system transformer T10

Fig. 18 The control system transformer is used to provide the voltage feed for the CPU board, I/O boards and display board.

The transformer supplies 12 V on its secondary side, and can be adapted to suit any of four different primary voltages by moving a bridge.

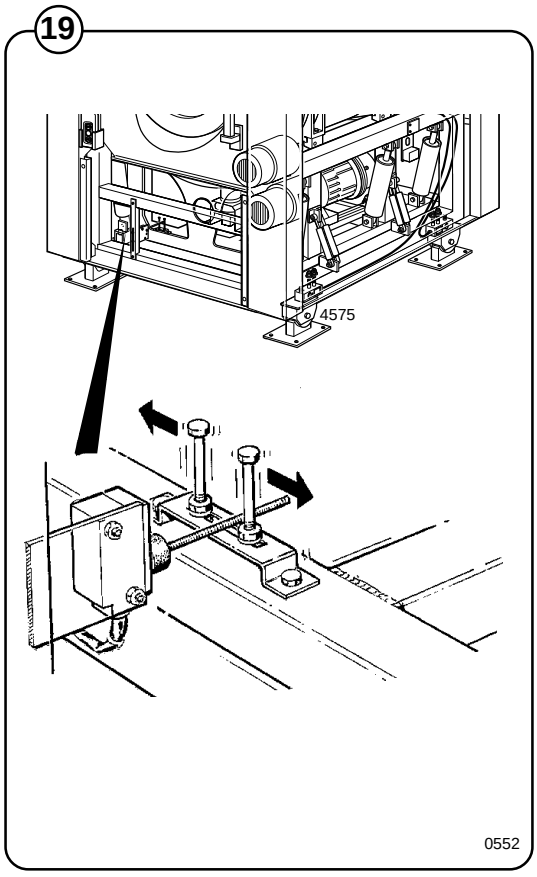
The transformer should normally be connected for a primary voltage of 230 V. Adaptation for different power supply voltages takes place at transformer T1.

18



3970

Unbalance cutout



Description

Fig. (19) The unbalance cutout is a safety device preventing machine damage during extraction due to uneven distribution of a wash load.

The unbalance cutout consists of a microswitch and a control arm, mounted on the outer frame, and a sensor mounted on the inner frame. The sensor consists of two adjustable screws on a sheet metal tab.

If the inner frame, and hence the sensor, moves beyond a certain point, the sensor will trip the microswitch via the control arm. The distribution- or extraction contact will then be disconnected. The program unit switches to wash cycle speed. Next, the program unit switches over to distribution cycle speed and a new extraction attempt will be made.

Repair instructions

Checking unbalance cutout adjustment

- With the machine empty, check that the unbalance cutout control arm is 10 mm away from the sensor adjustment screws and that the control arm touches the attachment clamp for the sensor.

  If necessary, adjustment can be done by:

  – moving the adjustment screws into the slots of the attachment tabs

  – moving the microswitch mounting plate up or down.

The unbalance cutout trips repeatedly

- Unsuitable wash load composition
- The unbalance cutout is incorrectly adjusted. Please refer to checking above.
- The shock absorbers are poor, see section ”Frame”.
- High water level not programmed in conjunction with extraction. High water level helps achieve better distribution.

Motor

Description

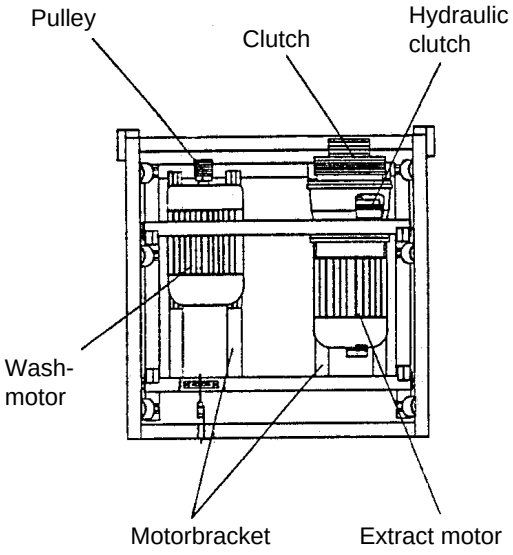
Fig. 20 Both motors, one for washing and distribution, and one for low- and high extraction, are mounted on the inner frame, each in a motor mount.

The washer motor is mechanically connected to the incoming pulley of a belt transmission. The incoming pulley of the transmission is connected with the outgoing pulley by an electro-mechanical clutch. The outgoing pulley of the belt transmission is connected to the drum via V-belts.

The extraction motor is mechanically connected to the previously mentioned belt transmission's outgoing wheel via a flexible rubber-lined coupling and a hydrostatic clutch.

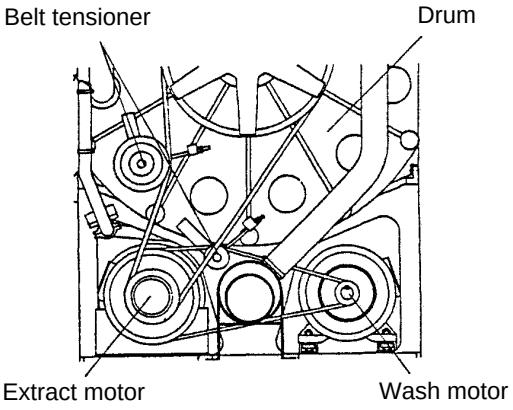
Fig. 21 At the rear of the outer drum there are two belt-tensioning devices: one for the belt drive between the wash-speed/distribution-speed motor and the input pulley on the belt transmission unit, the other for the belt drive between the output pulley of the belt transmission unit and the drum. The belt tensioner consists of a wheel mounted on the outer end of a movable arm which pivots on its mount on the rear end of the outer drum. The outer end of this arm is also anchored to the rear end of the outer drum, with a turnbuckle for adjusting the position of the belt tensioner.

20



4157

21



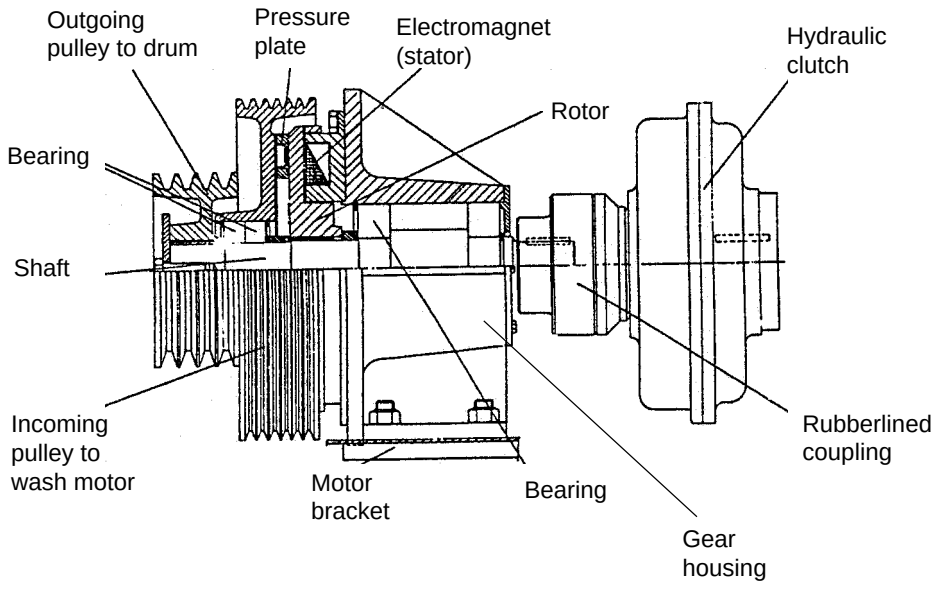
4158

Fig. 22

The belt transmission consists of a gear housing, an electro-mechanical clutch, and an incoming and an outgoing belt pulley. The gear housing is attached to the inner frame. The transmission's outgoing belt pulley is fixed to a shaft that goes through the gear housing. The electromagnetic rotor is also fixed to the shaft. The incoming belt pulley runs on the shaft on a ball bearing, between the clutch rotor and the outgoing belt pulley. The pressure plate of the clutch is attached to the incoming belt pulley. An electromagnet is located on the gear housing flange. When the electromagnet is activated, the incoming belt pulley pressure plate will be pressed by the magnetic force against the rotor attached to the shaft. Both belt pulleys are thereby connected to each other and the power from the washing motor is transferred to the drum.

The shaft which passes through the gear housing is joined at its other end to a hydraulic coupling via a flexible rubber-lined coupling. The rubber-lined coupling makes up for any misalignment between the hydraulic coupling and the belt transmission.

22



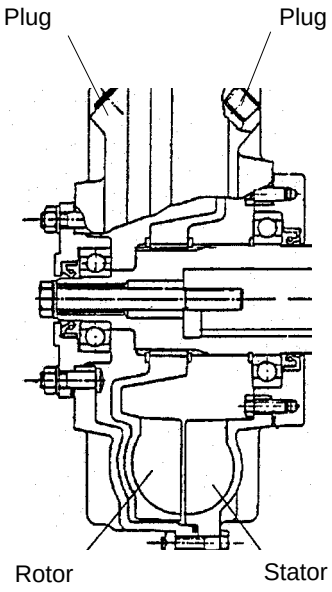
4159

Fig. 23

The hydrostatic clutch has two blade wheels, a stator and a rotor. One blade wheel is the clutch housing and is connected to the clutch's outgoing shaft. The other blade wheel is connected with the incoming shaft of the clutch. The fluid in the clutch acts as the conduit of power transfer between the blade wheels. This arrangement is the reason why the clutche's outgoing shaft, and thereby the laundry drum, do not immediately rotate at the same speed as the centrifugation motor. Instead, they only gradually reach the same speed as the centrifugation motor. This difference in the speed between the motor and the drum means that the motor will start without a load, and the motor's starting power consumption is minimized.

The hydrostatic clutch is equipped against overheating with two safety plugs. One plug contains a pin that is held in place by a fuse. This fuse melts at 145°C and disengages the pin which by centrifugal force then activates a microswitch which in turn shuts down the power to the centrifugation contactor. The other plug, equipped with a fuse in its center, melts at 175°C causing oil to drain from the clutch and power transmission to cease.

23



4160

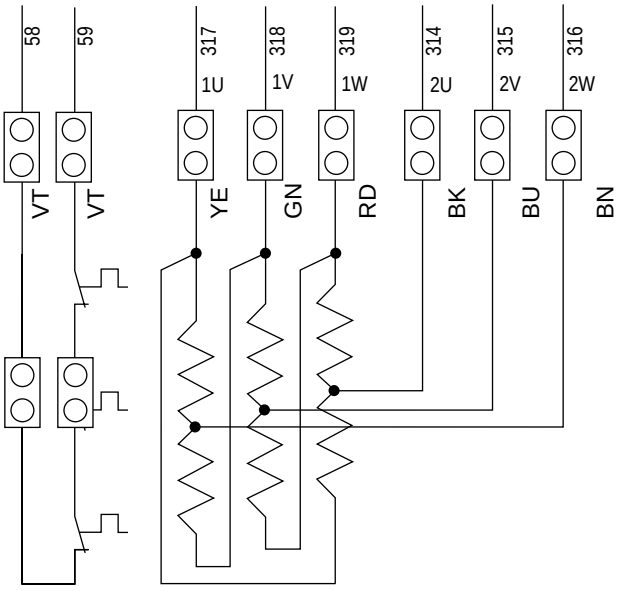
The speed governor is located on the belt tensioner.

The motors are equipped with thermal protectors in the motor windings. The thermal protectors shut off power to the motor contacts in the event of motor overheating, that is, if the temperature exceeds 130 °C.

Fig. 24 The adjacent figures show the engagement of both motors.

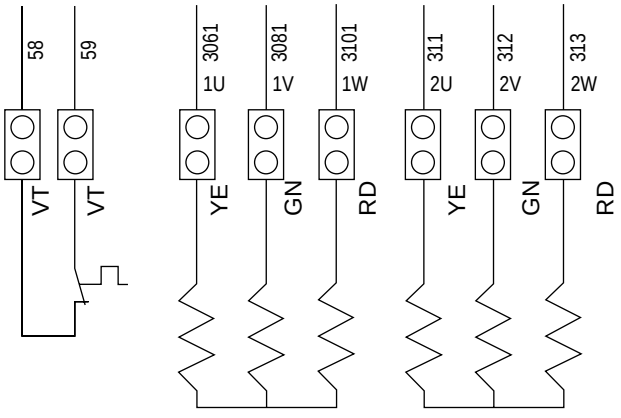
24

Extract motor



Low/high extration

Wash motor



Wash

Distribution

VT= Violet
GN = Green
RD = Red
YE = Yellow
BK = Black
BU = Blue
BN = Brown

4580

Repair instructions

Possible faults

Overheated motor, the motor does not run

- Wait until the motor has cooled off. The motor protectors are reset automatically after approximately 30 minutes. Start the motor again.
- If the motor protector trips several times, this may be due to a short circuit. Faulty bearings in the motor or drum may also be the cause. Replace the motor.
- The motor probably runs on two phases; measure the windings on the connection block.

The motor makes loud noises

- Bearing break down; replace the motor or bearings

The motor only runs at one of the speeds

- Check for proper connections
- Measure the connections, the error could be due to interruption in a winding.

The motor locks up

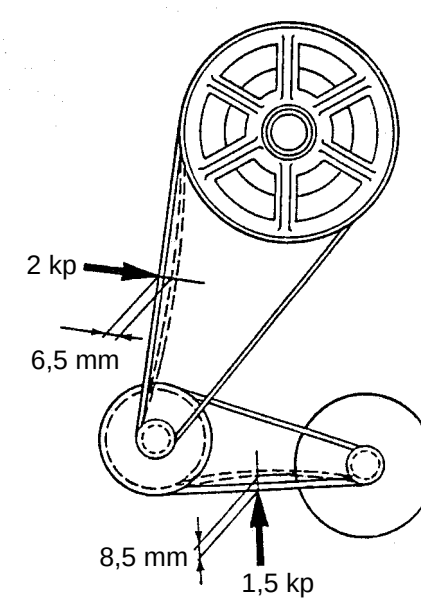
- Replace the motor or the bearings.

Tensioning of V-belts

Fig. 25

- Loosen the turnbuckle screw of the tensioner and turn the turnbuckle screw until correct belt tension has been obtained.

25



Replacement of the washer motor

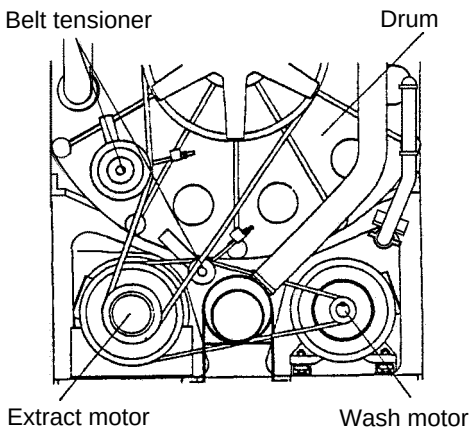
Fig. 26

1. Dismount the automatic unit.
2. Loosen the turnbuckle screw for the belt tensioner on the belt connection between the laundry motor and the belt transmission.
3. Remove the belts.
4. Remove the four motor mount nuts.
5. Pull the motor off the motor mount to the rear and away from the machine.

Fig. 27

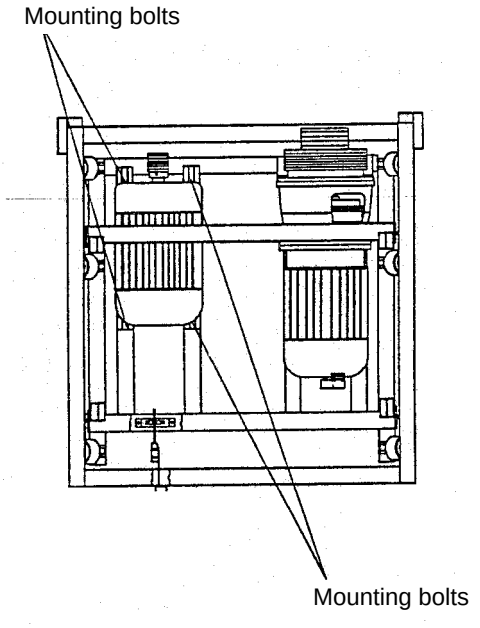
6. Loosen the motor's electrical connections on the motor.
7. Attach the electrical components to the new motor. Be sure that the cables are attached correctly on the motor connector block, see schematic under "Description" in this section.
8. Push the new motor onto the motor mount.

26



5036

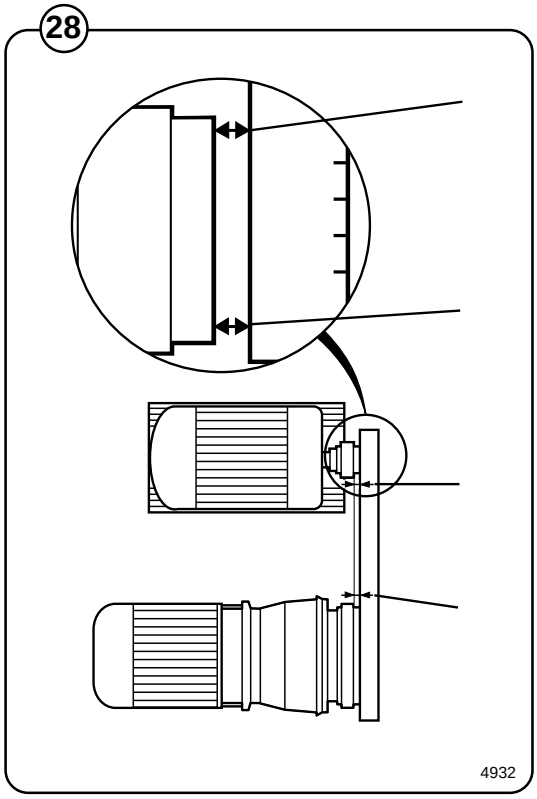
27



4163

9. Align the motor as follows:
   - place straightedge against the incoming pulley of the belt transmission
   - adjust the position of the motor so the straightedge is aligned with the wash motor pulley
10. Tighten down the motor on the motor mount.
11. Check (measure) the motor alignment. If necessary adjust again according to Step 9.
12. Place the belts on the belt pulleys.
13. Tighten the belts with the belt tensioner, according to ”Tightening of V-belts” in this section.

Fig. 28



Replacement of extract motor

1. Loosen the turnbuckle screw of the belt tensioner for the belt connection between the wash motor and the belt transmission.

Fig. 29

2. Remove the belts.
3. Loosen the turnbuckle screw of the belt tensioner on the belt connection between the belt transmission and the drum.
4. Remove the belts.
5. Loosen the motor's electrical connections on the motor.
6. Disconnect the electrical connectors for the electromechanical coupling and the switch for the hydraulic coupling.
7. Unscrew the gear housing nuts from the motor mount.
8. Pull the gear housing out of the motor mount, to the rear and away from the machine.

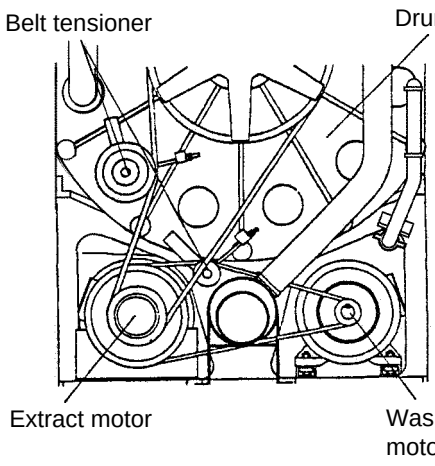
Fig. 30

9. Remove the switch for the hydraulic coupling.
10. Unscrew the motor nuts from the motor mount.
11. Pull the motor to the rear and away from the machine.

Fig. 31

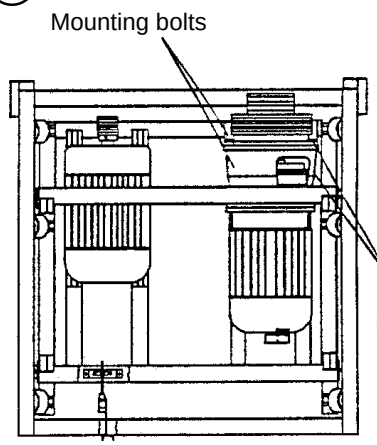
12. Transfer the hydraulic coupling to the new motor, see the section headed "Hydrostatic clutch" (Disassembly and Installation) in this chapter. If necessary replace the rubber element(s), see the section "Rubber element, flexible coupling" in the Maintenance chapter.

29



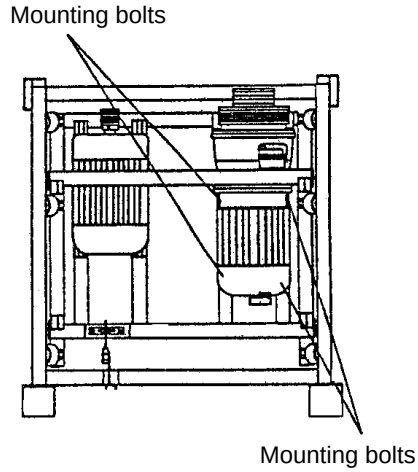
5036

30



4165

31



4166

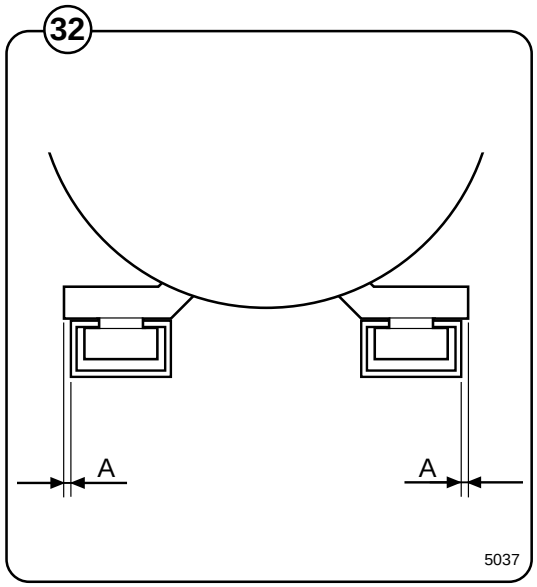
13. Push the new motor into the motor mount.
14. Refit the switch for the hydraulic coupling.

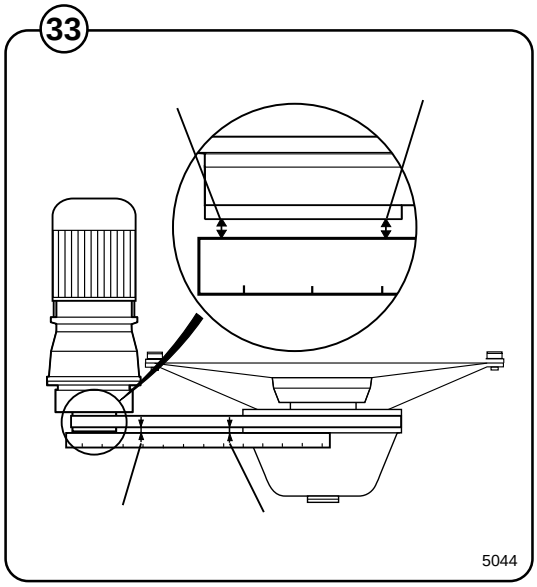
Fig. 32

15. Slide the gear housing into the motor mount. Make sure that the distances marked "A" are as similar as possible.

Fig. 33

16. Check the alignment of the gear housing relative to the inner side of the large pulley and adjust if required.
    * The zero mark is the drum pulley's inner, flat side.
17. Fasten the gear housing onto the motor mount.
18. Check the installation relative to the wash motor (as described from Step 9 under the heading "Replacement of the wash motor" in this chapter), and adjust if necessary.
19. Push the extract motor forward against the gear housing so that the flexible rubber-lined coupling is engaged. Be certain not to damage the rubber liner.





20. To check the alignment of gear housing and motor you can use *either* straightedge and feeler gauge *or* a dial gauge.

Fig. 34 Fig. 35

Using straightedge and feeler gauge:

- The straightedge is used to check for any possible radial runout between the shafts. The straightedge should be placed on the periphery of the coupling halves, after which four checks should be made in the same way through one revolution. Tighten the motor mounting bolts alternately through the adjustment process. Keep checking that the radial runout does not exceed 0.35 mm.

Fig. 34 Fig. 36

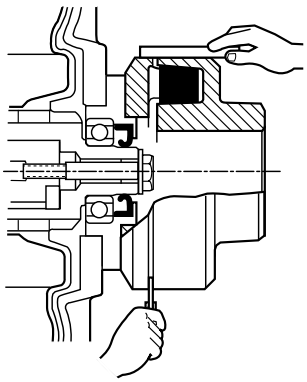
- The feeler gauge is used to check for any possible axial runout, by checking the clearance between the coupling halves. Perform four checks like this while turning the coupling through one revolution. Check in the same way as above that the axial runout does not exceed 1.0 mm.

Using a dial gauge:

Fig. 37

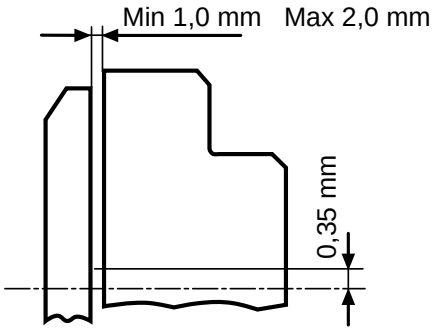
- Set up a dial gauge to measure relative to the rubber-lined coupling.
- Zero the dial gauge, rotate the coupling and read off the radial runout. Reposition the motor in the motor mount to achieve zero or max. 0.35 mm radial runout. (It may be necessary to insert shims at the motor mounts.) Tighten the motor mounting bolts alternately through the adjustment process.

34



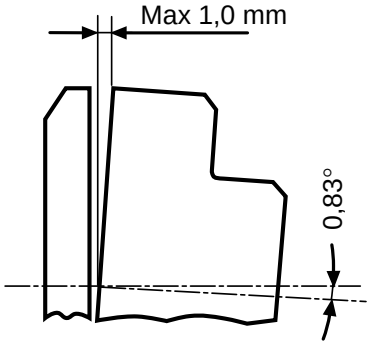
5038

35



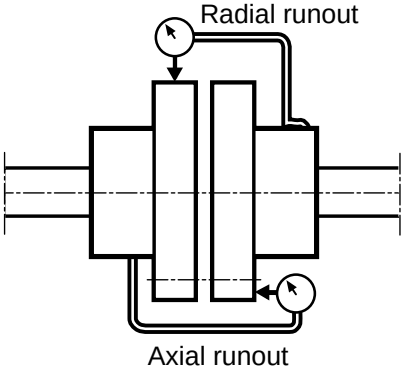
5040

36



5041

37

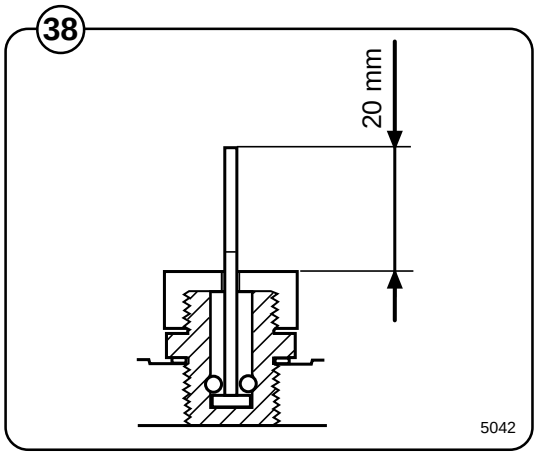


5039

21. Place the belts on the belt pulleys.
22. Tighten the belts with the belt tensioner, according to ”Tightening of V-belts” in this section.
23. Pull and attach the motor’s connections to the motor.

Fig. 38

24. Adjust the switch on the hydraulic coupling to ensure that the metal rod reaches the microswitch arm.
25. Connect the electromechanical coupling and the switch to the hydraulic coupling.



Hydrostatic clutch

Disassembly of hydrostatic clutch

Fig. (39) Necessary condition: loose motor

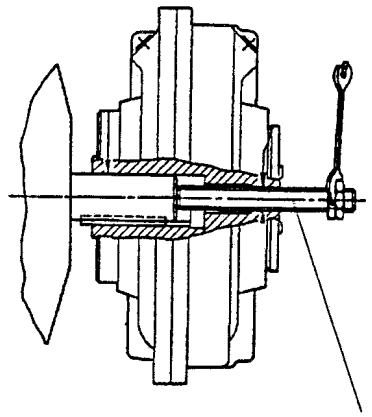
1. Remove the male part of the flexible coupling, located on the hydrostatic clutch outgoing shaft, by removing the locking screw at the shaft's center.
2. Pull the hydrostatic clutch off the motor shaft by threading a puller bolt into the hole for the clutch fastening nut.

Installation of hydrostatic clutch

Fig. (40) Necessary Condition: loose motor

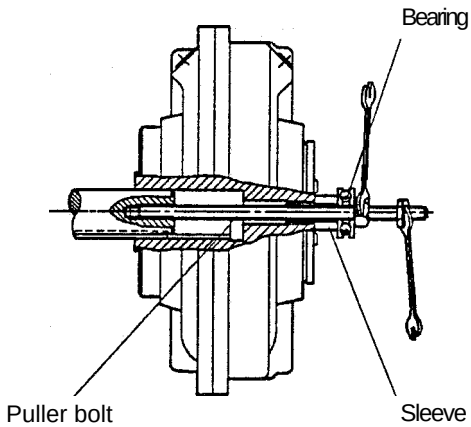
1. Place the hydrostatic clutch on the motor shaft and screw a long assembly bolt (with sleeve, bearing and nut) into the motor shaft.
2. Push the clutch in by turning the nut on the bolt.
3. Mount the flexible coupling's male part and lock the parts with the locking screw at the shaft's center.

39



4169

40



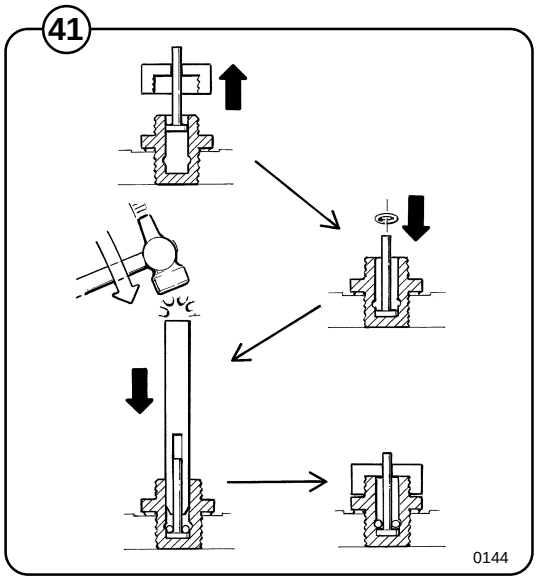
4170

Replacement of fuse in a hydrostatic clutch

- First find out what caused the overheating. (Oil level too low in the coupling? Insufficient cooling? Has the motor been started often? Long starting periods?) Make certain that the drum rotates freely and without resistance.
- The machine comes with a repair kit consisting of a ring of fuse material (tin alloy) and a mandrel. Replace the fuse as follows:

Fig. 41

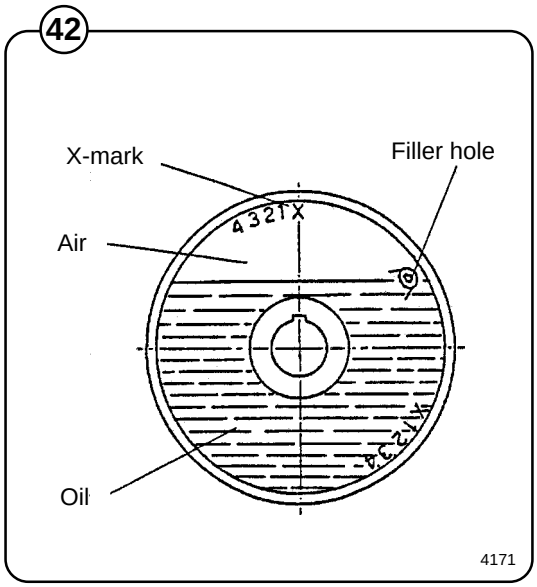
1. Remove the white cover screw above the fuse.
2. Remove the metal rod along with any residual tin.
3. Push the metal rod into the fuse socket as far as it will go.
4. Insert the new tin ring over the rod.
5. Push the ring down with the mandrel and tap lightly with a hammer so that the ring is pressed into the grooves of the socket side walls preventing the rod from protruding.
6. Tighten the white cover screw



Topping up the hydrostatic clutch with oil

Fig. 42

1. Rotate the clutch so that the x-mark on its side points directly upwards.
2. Unscrew the filler plug and clean it.
3. Top up with a few decilitres of oil through the oil filler hole.
4. Rock the clutch to and fro a few times to remove any trapped air.
5. Repeat points 3 and 4 until the oil overflows from the filler hole when the x-mark on the housing faces directly upwards.
6. Place sealing compound on the plug threads and screw the plug into the clutch.



Replacing the electromagnetic clutch

Fig. 43

1. Remove the locating screw and washer from the centre of the shaft.
2. Use a suitable puller to remove the output pulley from the shaft. Save the key for refitting.
3. Use a suitable puller to remove the input pulley from the shaft. Save the spacer sleeve and spacer washer for refitting.
4. Screw puller bolts into the holes for this purpose on the rotor and pull the rotor off the shaft. Save the key and spacer washer for refitting.
5. Undo the retaining bolts on the magnet and remove the magnet.
6. Fit the new magnet, ensuring it is flush with the gear housing.
7. Apply Loctite to the retaining bolts and fit these to secure the magnet.

43

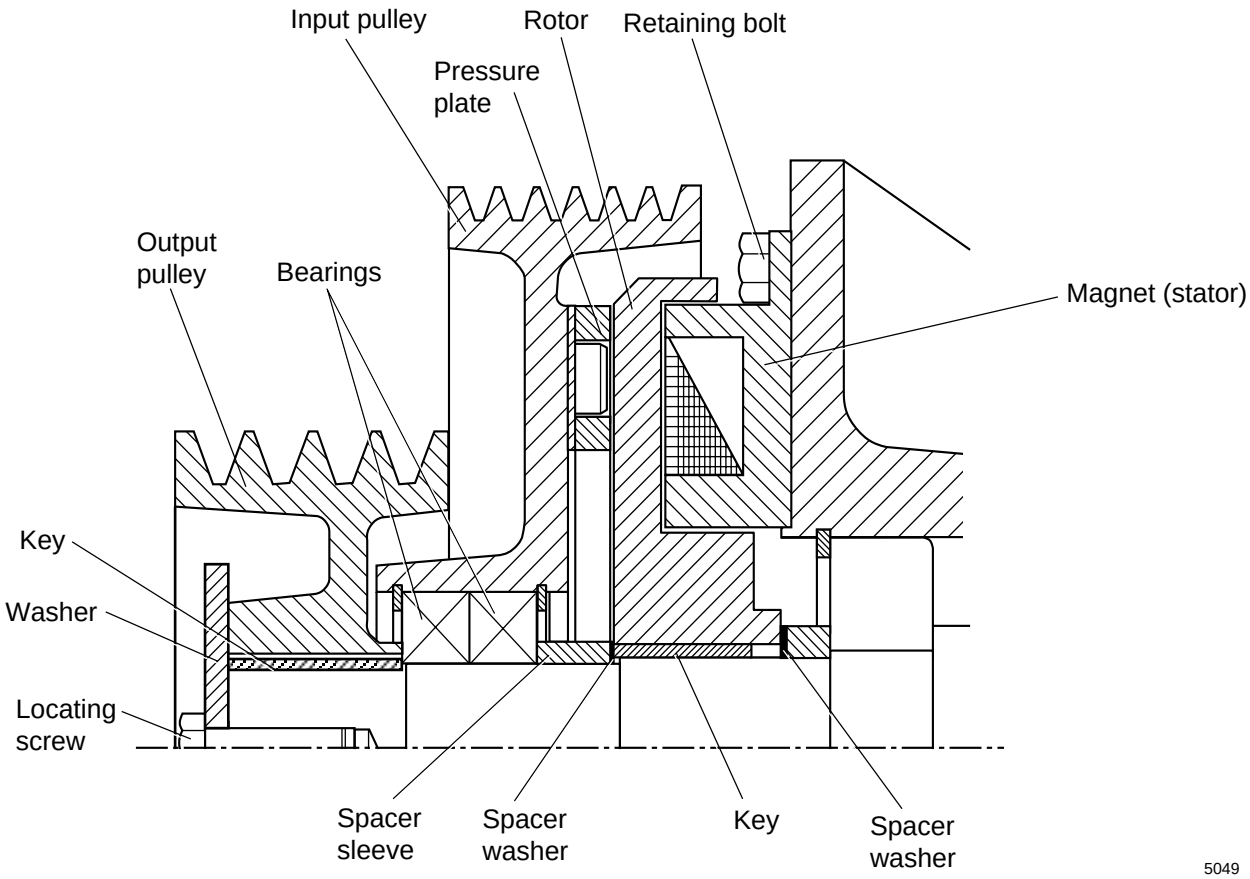
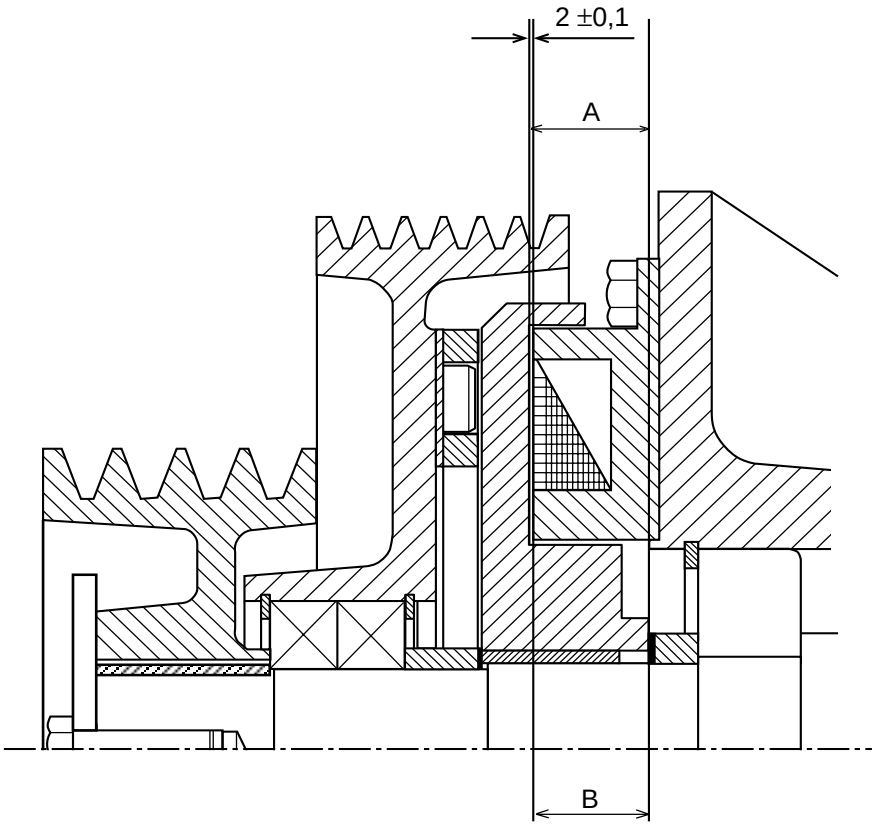


Fig. 44

8. Carry out the required measurements and fit a spacer washer to ensure a clearance of 2 ±0.1 mm between magnet and rotor, as follows:
   - measure and note the distance (A) from the rotor's centre flange to the bottom of the rotor's recess for the magnet.
   - measure and note the distance (B) from the surface of the magnet to the spacer ring by the front bearing of the gear housing.
   - Fit spacer washers as required to achieve the correct clearance. (The spacer washers are available into two types: 0.1 mm and 0.2 mm thick.)
9. Fit the key. Lubricate the shaft and press the rotor onto it until the rotor goes all the way home against the inner spacer ring.
10. Undo the screws holding the pressure plate and remove the plate.
11. Fit the new pressure plate and secure it with the screws.
12. Remove the inner locking ring in the input pulley.
13. Tap the two ball-bearings out of the pulley.
14. Lubricate the internal surfaces of the pulley and tap into place two new bearings with a tubular drift of the correct size to ensure it presses against the outer bearing race. Note: install one ball-bearing at a time to ensure they will both seat properly.

44



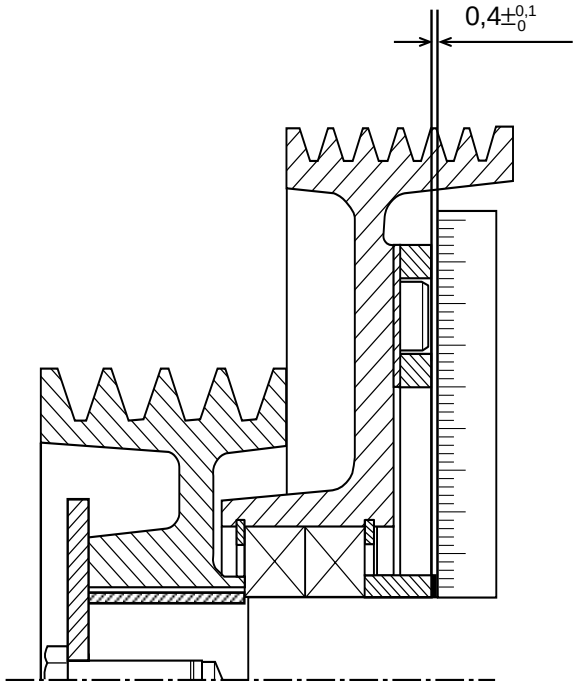
5047

15. Fit a shim between the rear bearing and the locking ring to ensure there is no axial play between the outer bearing race and the locking ring.

Fig. 45

16. The clearance between rotor and pressure plate should be 0.4 mm with a tolerance of +0.1/-0 mm.
    - Gauge the clearance using a straightedge. The straightedge should extend across the entire pressure plate (the illustration shows only half of the pressure plate). Gauge the clearance on both sides. Turn the straightedge through 90° and check that the clearance is still correct. Use a feeler gauge for accuracy.
    - Fit spacer washers as required (available into two gauges: 0.1 mm and 0.2 mm thick) to achieve the correct clearance.
17. Lubricate the shaft and install the spacer sleeve on it.
18. Lubricate the shaft and tap into place the input pulley using a tubular drift which presses against the pulley's inner ball-bearing race.
19. Fit the key. Lubricate the shaft and tap into place the output pulley until it goes all the way home.
20. Apply Loctite to the shaft locating screw, fit the washer, install the screw and tighten it.

45



5048

Motor brake

Description

Fig. 46 The motor brake consists of a control unit, thyristor, relay and connection terminal set.

The length of braking time and braking current level are adjusted at two separate potentiometers on the control unit, see the section headed "Motor brake adjustment".

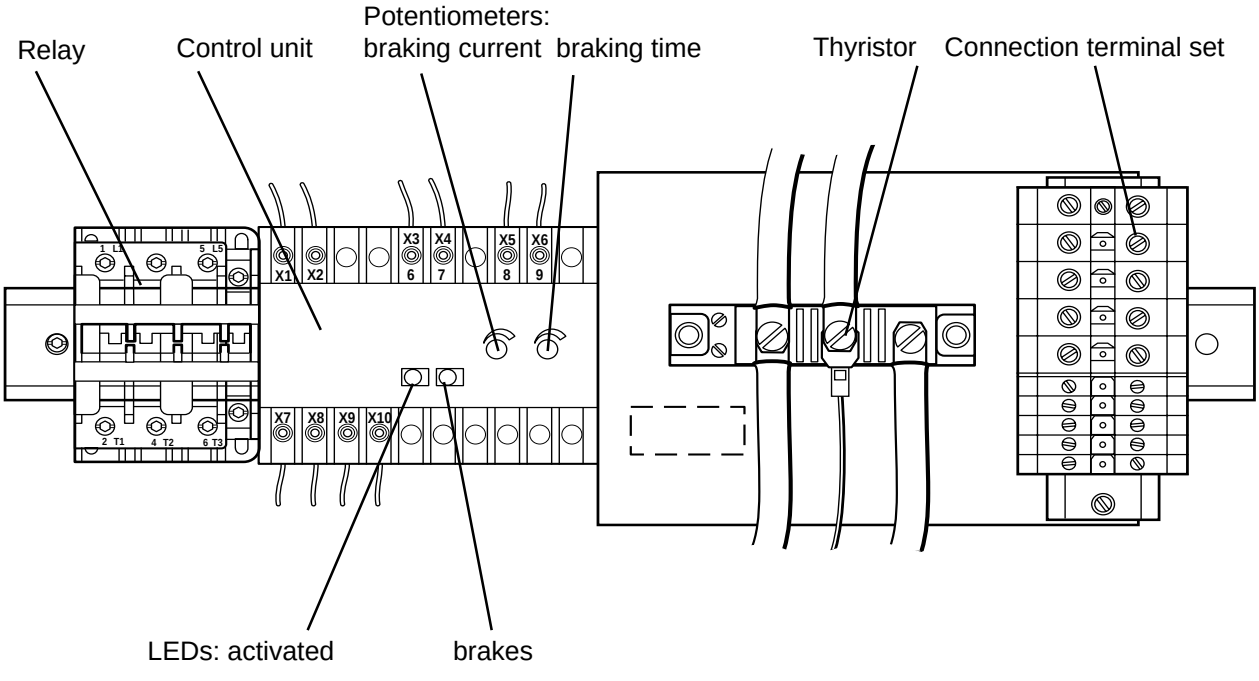
The green LED indicates that the control unit is activated (energised) and the red LED indicates when the motor brake is braking.

Fig. 47 The connection terminal set has the following terminals:

L1, L2, 2	Power supply for the control unit
6, 7	Start function
8, 9	Safety function (interlock circuit)
V, U	Braking current, which is connected to two of the motor's phases

The control unit is activated when the high-speed extraction relay operates, and closes terminals 6 and 7. The braking sequence does not start, however, until there is an open circuit at inputs 6 and 7. This occurs when the high-speed extraction relay breaks and ends extraction. Then the control unit will operate the relay, which supplies DC to the two motor phases so the motor brakes. The interlock circuit, terminals 8 - 9, prevents the motor from being restarted during the braking sequence.

46



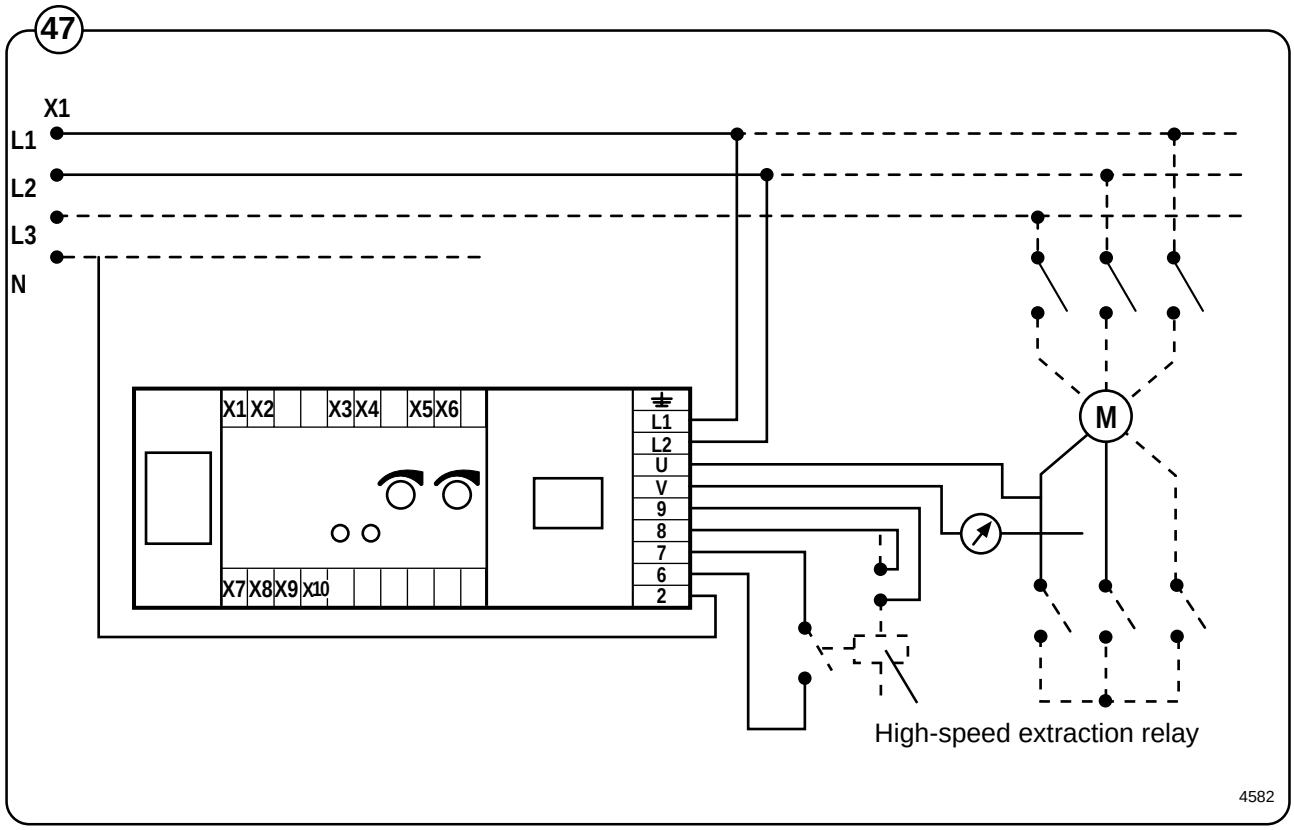
Motor brake adjustment

Fig. 47

- Connect up a moving-iron meter in the circuit between motor and motor brake.
- Turn the potentiometer for braking time clockwise to its max. position.
- Turn the potentiometer for braking current anticlockwise to its min. position.
- Activate high-speed extraction. When the high-speed extraction relay breaks, the braking sequence will start.
- Adjust the braking current. The braking current will depend on the rated voltage of the machine, see table below.

Rated voltage (V)	Frequency (Hz)	Braking current (A)
380-480 V	50/60	approx. 50
220-240 V	60	approx. 90
230 V	50	approx. 80

- Adjust the braking time to approx. 15-30 seconds. The aim should be to keep the braking current low and the braking time short. High braking current and long braking times cause high temperatures in the braking unit, wiring and motor windings.



Motor brake installation

If a motor brake is to be installed on a machine which previously had none, check the following:

- The wiring between the machine terminals X1: L1, L2 and the motor brake terminal set terminals L1 and L2 should be of 10 mm^2 gauge.
- The wiring between motor brake terminals U and V and the extraction motor terminals should be of 10 mm^2 gauge.

If it is not, replace existing wiring with 10 mm^2 gauge.

Replacing the motor brake

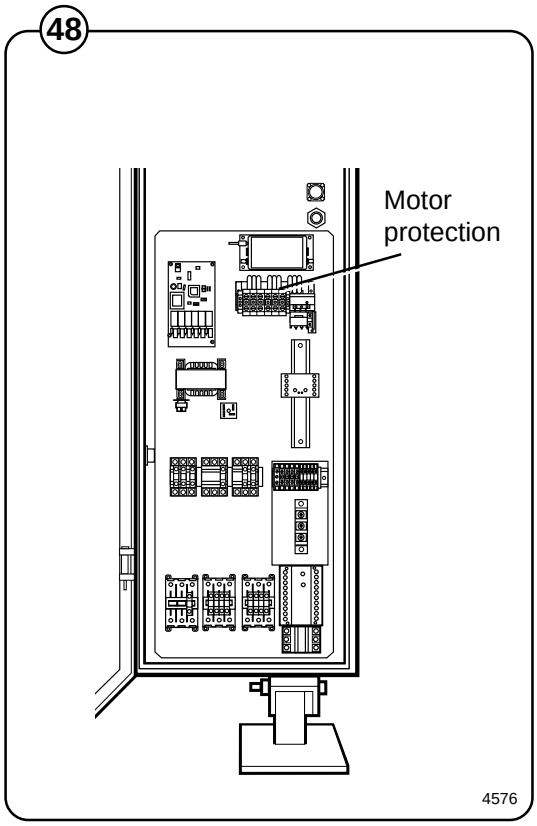
- Switch off the power supply at the machine's main switch.
- Put clear identifiers on the various electrical conductors for the motor brake.
- Remove the old motor brake equipment and fit its replacement.
- Connect up the wiring.
- Adjust the motor brake correctly, see under heading "Motor brake adjustment".
- Restore the machine to its normal working state.

Motor protection

Description

Fig. (48) To protect the motors from overloading, current is supplied to them through a motor protector. On the motor protector's front side, there is a reset button with an adjustment arm on one side used for setting the power level at which the protector should trip.

The following setting values apply to the motor protector.



Setting values

Voltage	A
230 V	55 A
400 V	37 A

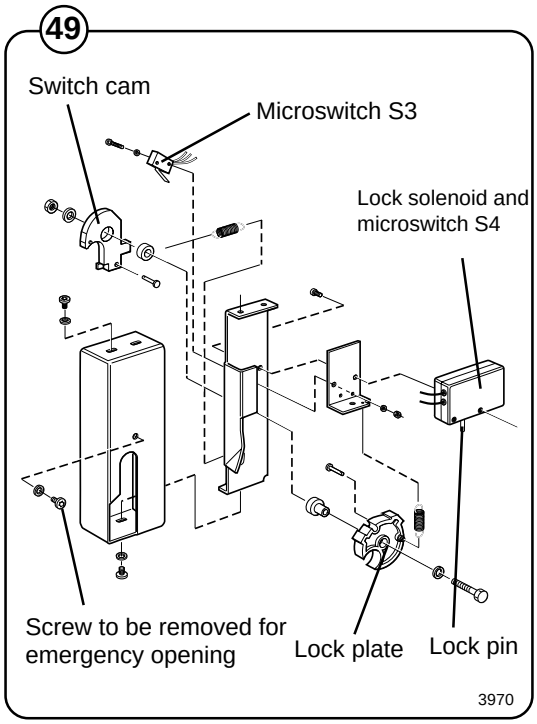
Repair instructions

Repairs are not recommended. The faulty motor protector should be replaced.

Door lock

Fig. (49) The machine door lock, working in conjunction with the CPU board and the door lock control unit, is a safety system designed to prevent injury by ensuring:

- that it is not possible to start the machine until the door has been closed
- that the door will be locked automatically when the machine starts
- that will not be possible to open the door until the program has ended, the water has been discharged and the drum is at a standstill



Instructions for opening machine door if door lock is faulty

This emergency procedure for opening the door lock may only be carried out by authorised personnel, and only if the door lock has failed.

Fig. (50) The cover on the door lock cannot be removed if the door is locked. If the door lock should fail when the door is locked, for example because of a fault in the door lock solenoid or because the lock pin is binding, the emergency procedure for opening the door will have to be followed before the lock can be replaced.

Remove the screw on the lock cover. Use a tool such as a piece of bent wire (max. diameter 3 mm) to move the lock pin up out of the slot in the lock plate, while turning the door handle.

Door lock

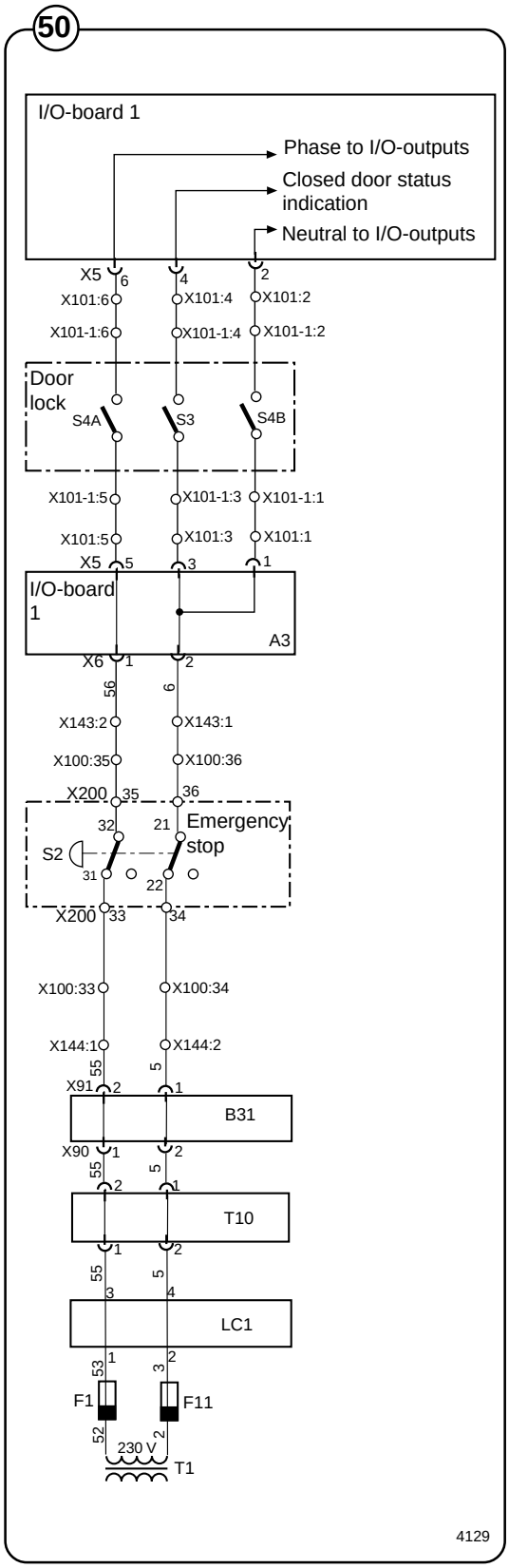
Fig. (50)

The lock has two stable states; one when the lock pin which locks the door handle is **extended** (the door lock is locked), the other when the lock pin is **retracted** (the lock is unlocked). This means that, in the event of a loss of power to the machine, the lock will remain in the same state as before the loss of power.

When the locking arm has closed the door, the switch cam is actuated and it closes microswitch S3. The program control unit monitors the status of S3, and when S3 closes, the program control unit can give the command for door closing.

The door lock control unit checks that there is no water in the drum and that the drum is at a standstill. After that the door lock control unit locks the door lock by activating the solenoid, to make the lock pin enter a slot in the lock plate. When the lock pin is fully home in this slot, switches S4A and S4B both close. Only now, when S3, S4A and S4B are all closed, will the outputs on the I/O boards which control the machine's functions be energised, and the wash program can begin.

When the program control unit requests that the door be unlocked, the door lock control unit checks that there is no water in the drum and that the drum is not rotating. After that the solenoid is activated, now with polarity reversed, to make the lock pin disengage and to allow the door to be opened.



Drain valve

Description

Fig. 51 The drain valve uses compressed air to close. A control valve opens and supplies pressure to a piston located beneath the rubber diaphragm of the drain valve.

Fault-finding

May only be carried out by authorized personnel.

The drain valve will not close

Check that:

- The control valve is energised.
- Hoses and the control valve are not blocked. Check by undoing the supply line at the drain valve and then activating the control valve.
- The rubber diaphragm is in good condition.
- The piston is operating correctly.

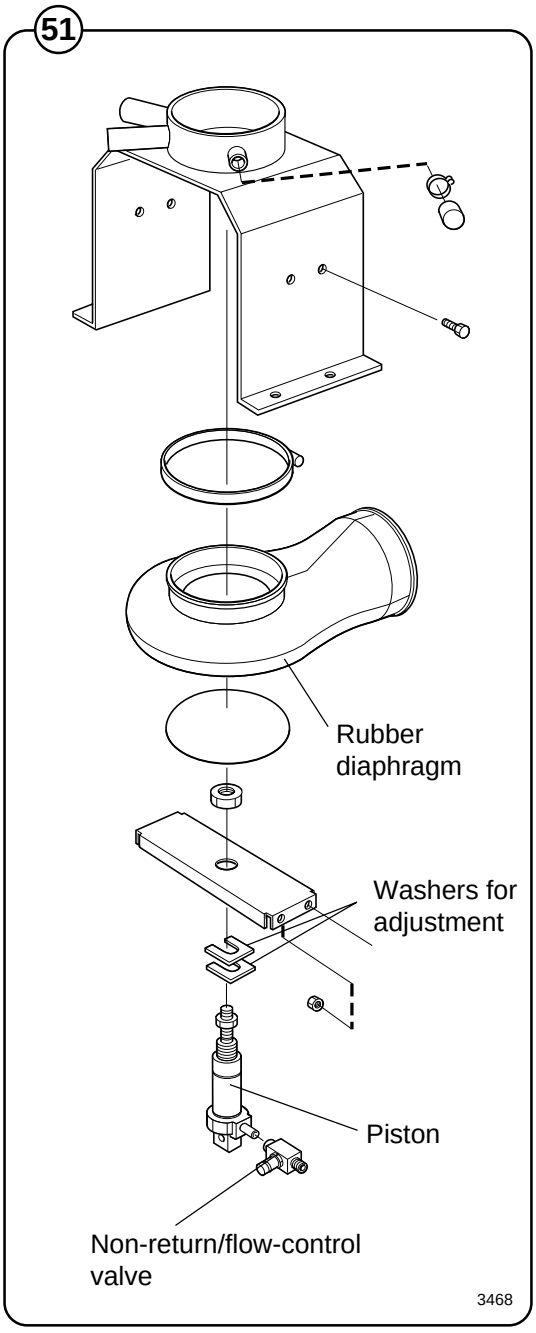
The drain valve will not open

Check that:

- The piston is operating correctly.
- The non-return/flow-control valve is open. At low air pressures the flow-control valve opens more.

The drain valve is leaking (water).

- Remove one of the washers for adjustment.



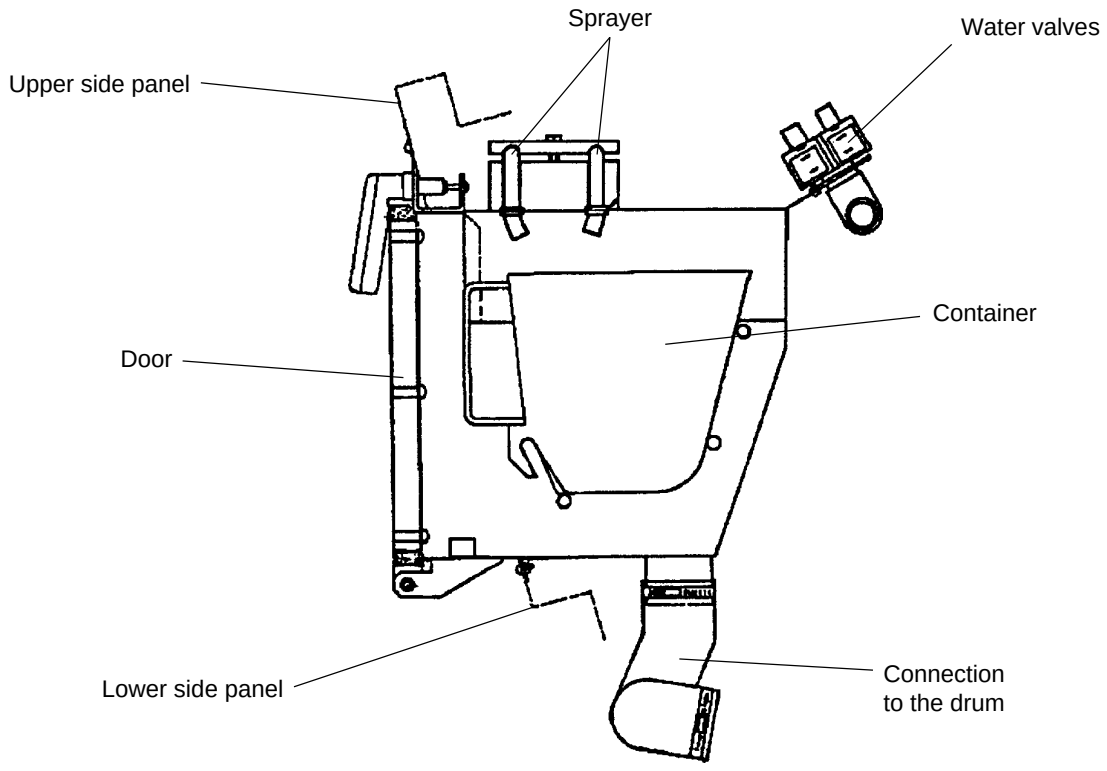
Detergent dispenser

Description

Fig. (52) The detergent dispenser consists of a sheet metal container with five compartments and a common bottom for all compartments. In each compartment there is a detergent container. On the long side of the detergent container there is a door for easy access to the detergent containers. At the bottom of the container there is a tube connecting the dispenser with the side of the washer drum.

For each compartment there are two water valves, each with a sprayer, for flushing the detergent from the containers down into the machine via the bottom of the detergent container. In the right compartment container however, only one sprayer is used for this purpose, and the other sprayer is used to flush the bottom of the detergent container clean. This arrangement ensures that no residual detergent remains in the bottom of the detergent container.

52



Repair instructions

Replacement of detergent container

1. Check that the machine is disconnected from the mains.
2. Turn off the machine’s water supply.
3. Remove the two bottom side plates as well as the three top plates.
4. Disconnect the water hose from the detergent compartment sprayers.
5. Open the lid to the detergent compartment, checking that the dispenser containers are empty. Remove the containers from the compartments. Close the container lid.
6. Disconnect the detergent container hose connection to the drum.
7. Disconnect the detergent container from the upper side plate.
8. Push the detergent container inward and lift it out through the top of the machine.
9. Install a new detergent container through the top of the machine.
10. Attach the container to the upper side plate.
11. Connect the container to the drum and the water valve.
12. Open the container lid and insert the containers.
13. Replace the top plates and the lower side plates.
14. Reset and test-run the machine.

Frame

Description

Fig. 53 The frame comprises two parts, an outer and an inner frame. The inner frame is suspended in the outer frame by six spring struts, three on each side. In order to minimise the transmission of vibration between the frames, their lower sections are connected by eight shock absorbers, two at each corner.

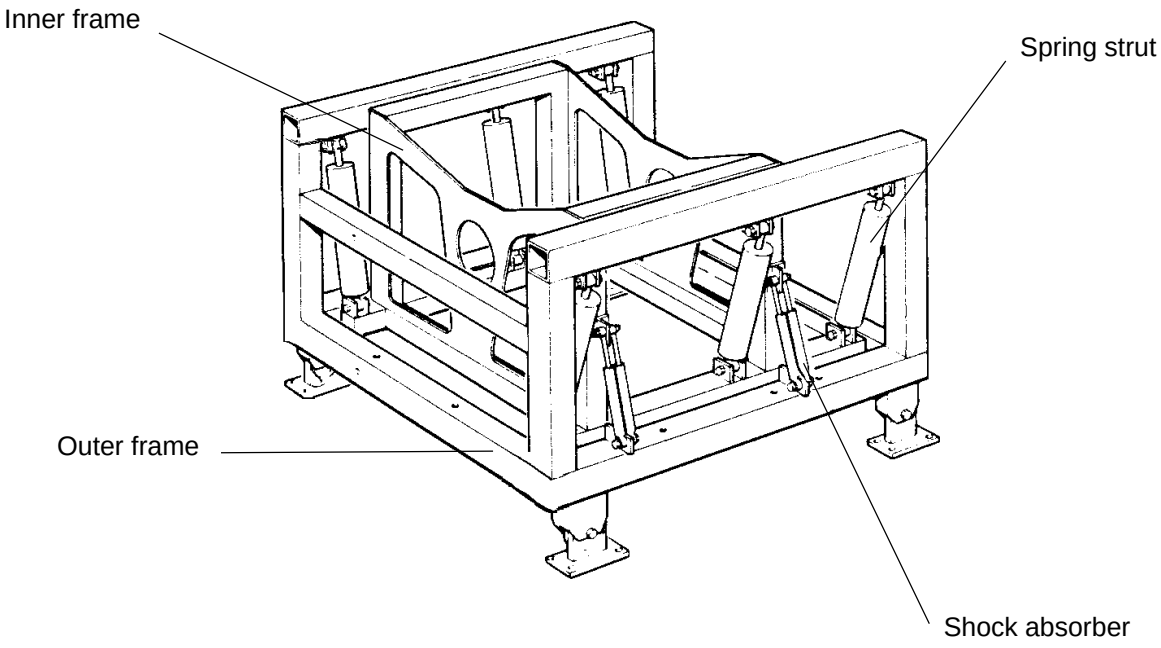
The outer frame is fitted with feet that can be anchored in the floor. The machine cladding panels are attached to the outer frame.

The inner frame supports the drum and the motor arrangement. The drum is bolted to the upper section of the inner frame by bolts. The motors are bolted to the lower section of the inner frame by screws.

Repair instructions

- Check the shock absorbers; replace them if required. Note that the shock absorbers should be fitted with the plunger rod upwards.
- Check the springs and their attachment.

53



4557

Drum with bearings

Description

Fig. 54

The inner drum is mounted to the outer drum with two heavy-duty bearings at the rear of the drum. The bearings are pre-lubricated with grease and sealed from the inner drum using v-rings.

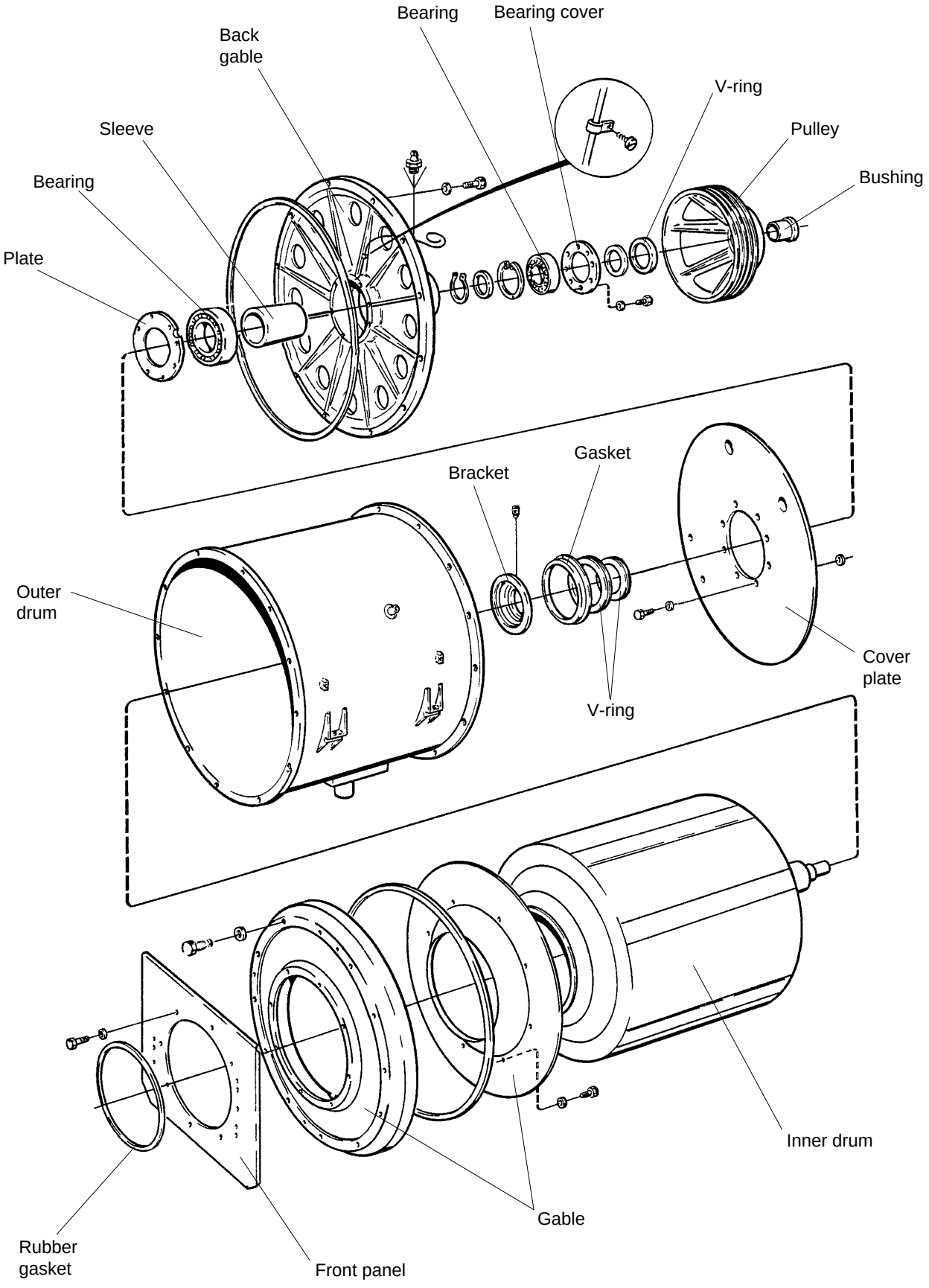
The inner drum shaft is through-going. The belt pulley has been attached to the projecting shaft stub using a clamp bushing.

The outer drum consists of a drum sweep, two front gables, a rear gable, and a cover plate. The two front gables and the machine’s front plate are attached to the front edge of the drum sweep. The rear gable, together with the cover plate, is attached to the rear edge of the drum sweep.

The outer drum rests in a cradle consisting of the inner frame. The inner frame is flexibly attached with springs to the outer frame.

Drum with bearings

54



Technical data

Innerdrum, volume	litres	843
diameter	mm	1120
depth	mm	856
Dry load capacity 1:10	kg	84.3
Drum speed,		
wash	rpm	36
distribution	rpm	70
extraction, low	rpm	440
extraction, high	rpm	880
Heating,		
steam		x
hot water		x
G-factor		485
Weight, net	kg	2500*

* Precise weight depends on accessories fitted.

Connections

Water valves	connection	DN50
	BSP	2"
recommended water pressure, valve open	kPa	300-600
Functioning limits for water valve	kPa	40-1000
Capacity at 300 kPa	l/min	800
Drain valve	outer Ø mm	160
Draining capacity	l/min	600
Steam valve	connection	DN32
	BSP	1 1/4"
recommended steam pressure	kPa	300-600
operating range (limits) of steam valve	kPa	50-800
Compressed air	connection	DN6
	BSP	1/8"
recommended air pressure	kPa	400-600
consumption	l/h	20

Frequency of the dynamic force	Hz	7,5/15
Max floor load at extraction	kN	27±2.5

Sound levels

Solid sound level in re 10^{-9} mm/sec	dB (A)	57
Airborne sound level dB (A) re $2x10^{-5}$ Pa		85*
Vibration level	mm/sec^2	0,93
Vibration speed	µm/sec	13

* With insulation

Power consumption - Washer motor

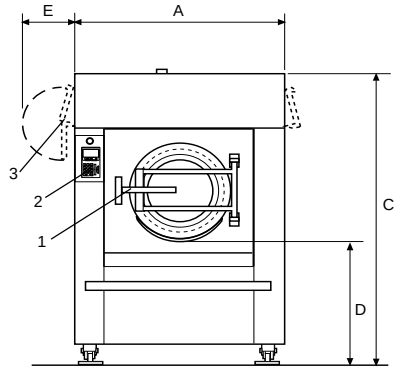
Wash	kW	2,5
Distribution	kW	4,0

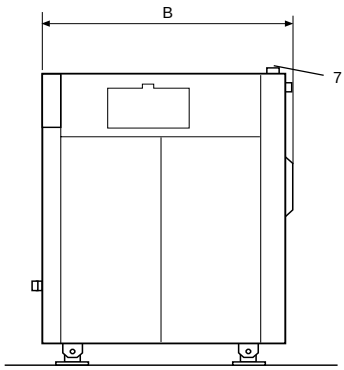
Power consumption - Extract motor

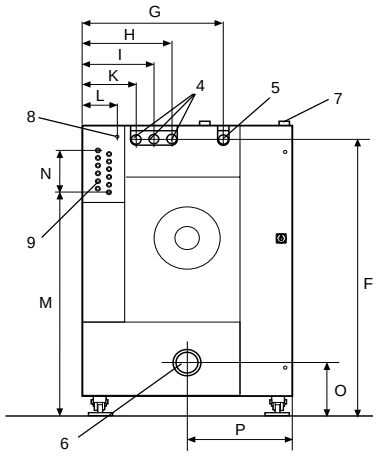
Low extraction	kW	7,5
High extraction	kW	11,0

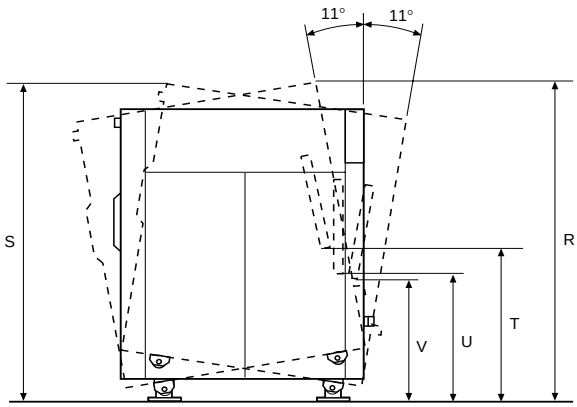
1	Door opening ø 535
2	Control panel
3	Soap box
4	Water connections
5	Steam connection
6	Drain
7	Electrical connection
8	Compressed air
9	External liquid supply (10 connections)

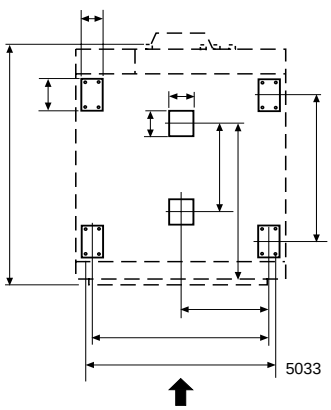
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**K**	**L**	**M**	**N**
1390	1755	2085	990	380	2015	915	620	500	380	230	1565	300
O	**P**	**R**	**S**	**T**	**U**	**V**						
430	695	2305	2325	1270	1050	1005						











Installation

For the installation of machines with optional equipment (such as the tilt function), see also the section ”Optional equipment” at the end of this manual.

The washer extractor is supplied bolted in place on a pallet and packaged in a delivery crate. In some cases the machine may be supplied in waterproof/dustproof packaging. The direction from which the machine must be lifted and the machine centre of gravity are shown on the packaging.

Location and surface

The machine must not be sited over an open floor drain. Check that the floor has an even surface and is level. The floor must be capable of withstanding the following:

- max. floor loading during extraction: 27±2,5 kN
- frequency, dynamic load: 7.5/15 Hz

The following clearances are recommended:

Fig. (55)

- at least 1 metre between the machine and any wall behind it.
- at least 0.5 metres at each side, between the side of the machine and a wall, or between machines where these are side by side.
- if the machine has a detergent dispenser: at least 1,2 metres between the side of the machine and a wall, or between machines where these are side by side.

Mechanical installation

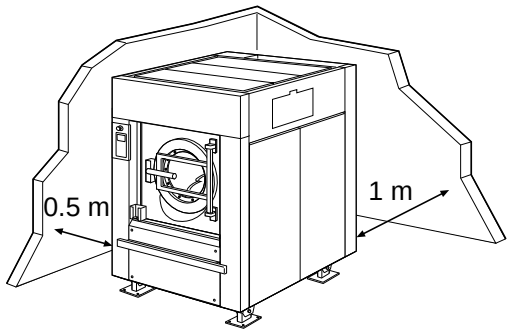
Fig. (56)

- Remove the packaging material. Remove the machine’s rear cover, side panels and lower front panel.

Fig. (57)

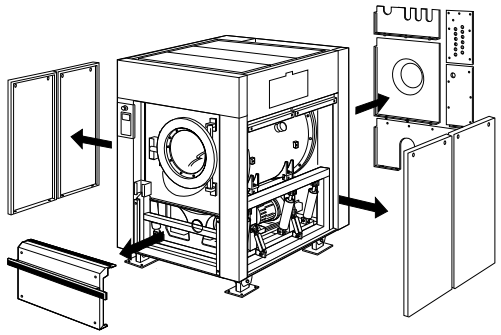
- Remove the four bolts securing the machine’s outer frame onto the pallet.

55



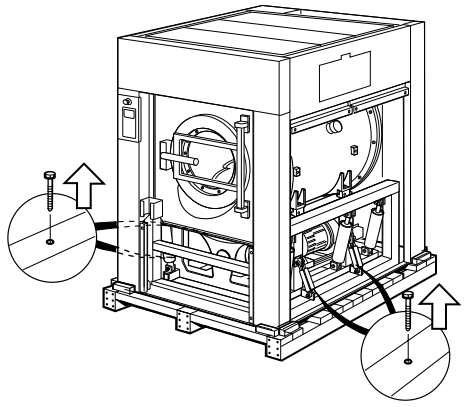
4588

56



4589

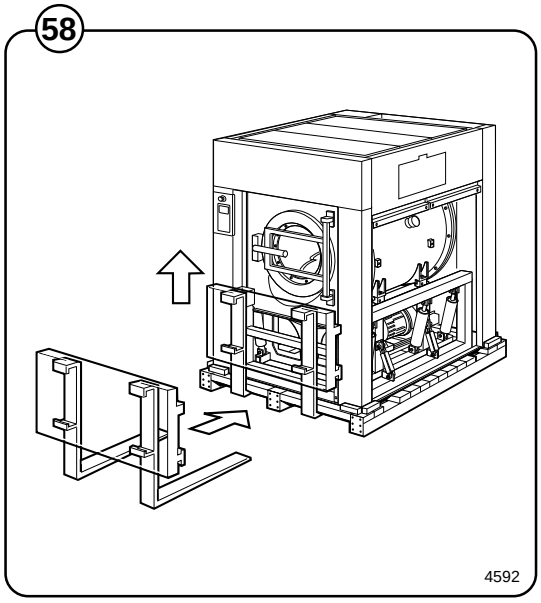
57



4590

Fig. 58
- Use a fork-lift truck to lift the machine. The machine weighs approximately 2500 kg.

Fig. 59
- Position the four blocks of wood supplied, one beneath each machine foot (on the outer frame), within the recesses in the pallet.



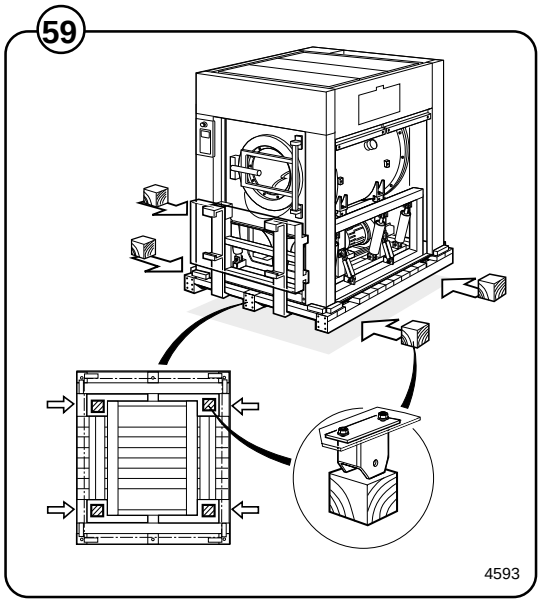


Fig. 60

- Lower the machine (A) and withdraw the truck forks (B). The machine should now be standing on the four blocks, and the pallet will be on the floor, clear of the machine. The next step is to insert the truck forks very carefully between machine and pallet (C).

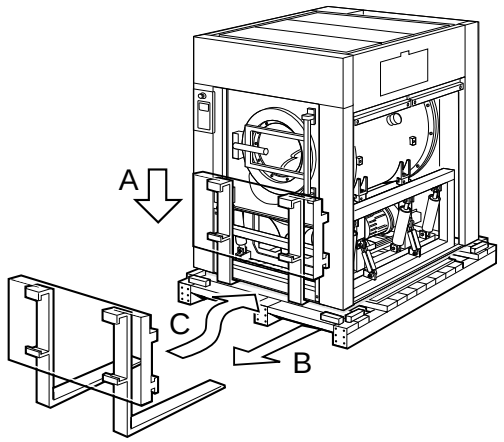
Fig. 61

- Lift the machine and remove pallet and blocks.
- <u>For machines without tilt function:</u>
  Install the machine´s four feet, using bolts and nuts.

Fig. 62

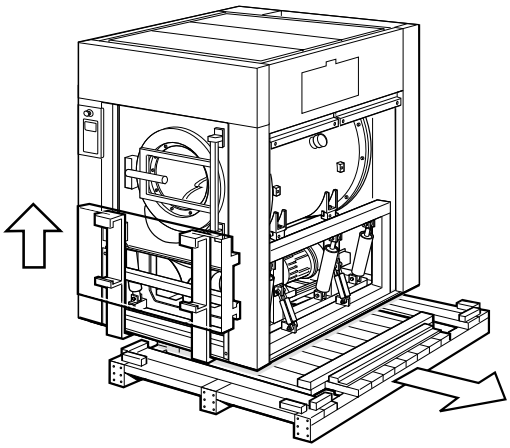
- <u>For machines with tilt function:</u>
  Install the four wheels, using bolts and nuts.
- If the machine is to have the tilt function, this is a suitable time to install the corner posts which hold the protective plates, and also, where applicable, the position sensors (see the section ”Tilt function (optional equipment)”).

60



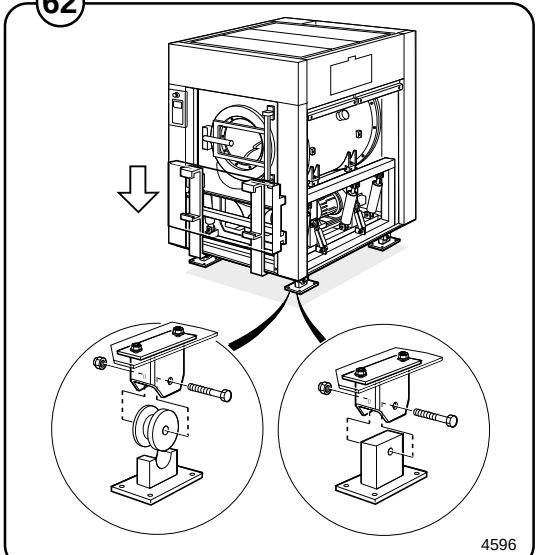
4594

61



4595

62



4596

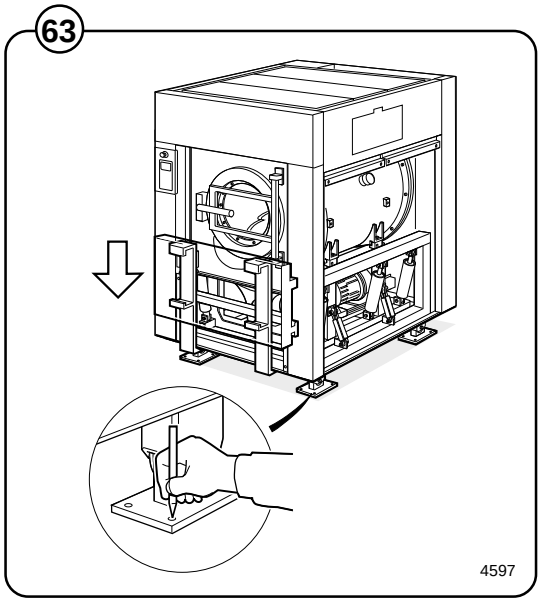
Fig. 63

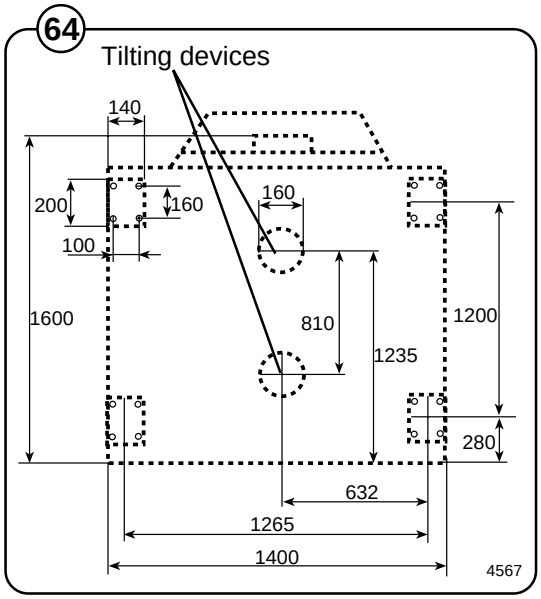
- Put the machine in place. Mark out and drill the holes for fixing the feet. Hole diameter: 15 mm.

Fig. 64

Fig. 65

Use a spirit level and, where necessary, the ”washers” (or rectangular metal plates) supplied, to ensure that the floor mountings are level.





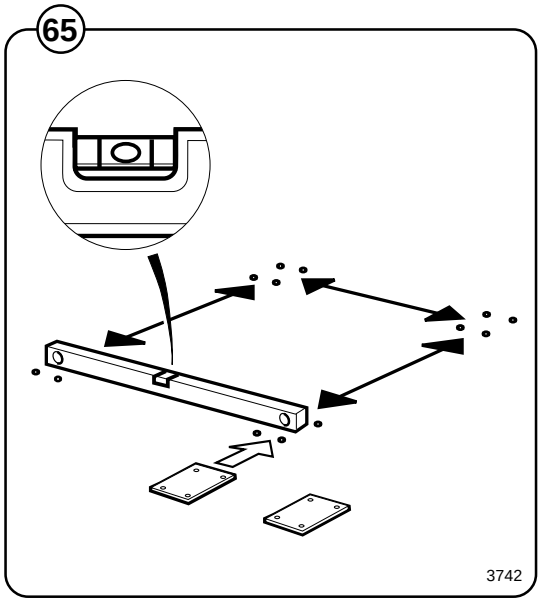
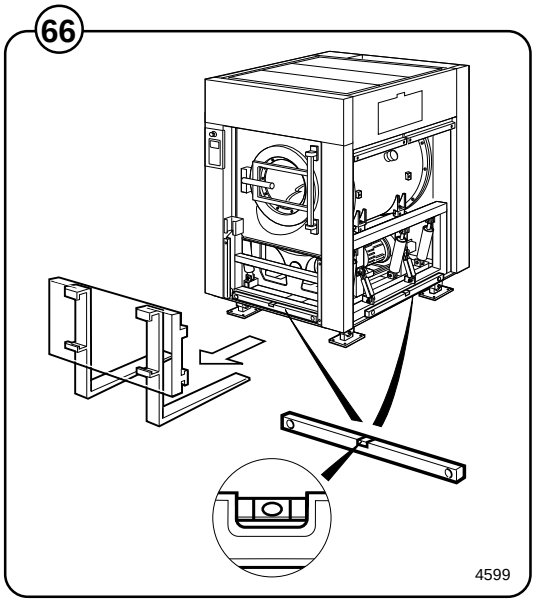


Fig. 66
- Put the machine in place. Use a spirit level on suitable surfaces of the outer frame to check that the machine is level. Check too that the machine is resting firmly on all four feet.

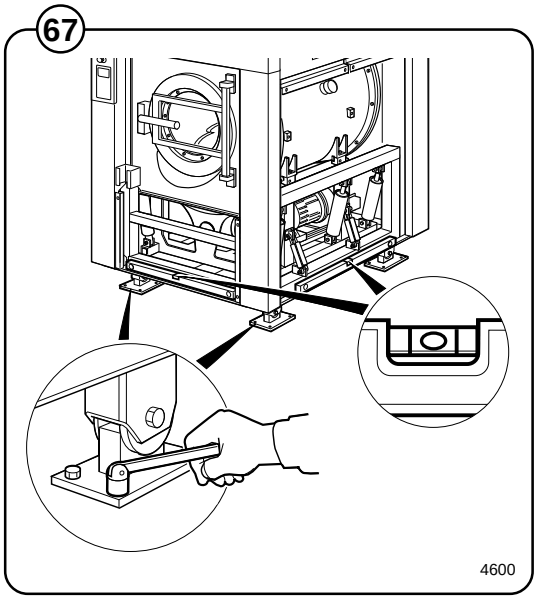
Fig. 67
- Bolt the machine feet to the floor. Then check again that the machine is resting firmly (without movement) and is level.

Fig. 68
- Remove the four transport locking devices.

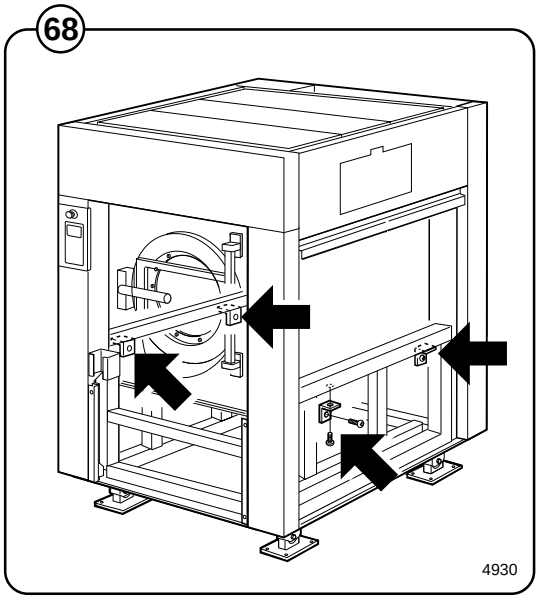
66



67



68



Connecting the water supply

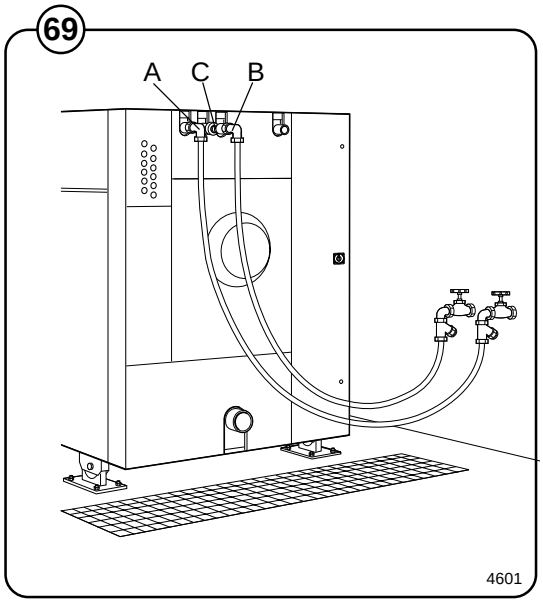


Fig. (69) The supply pipes to the machine should be fitted with manual shut-off valves to facilitate installation and service. Fit the filters supplied to the manual shut-off valves. Refer to local utilities regulations when fitting non-return valves.

The hoses should be rated for high pressure and for 2.5 MPa (25 kp/cm^2).

The following values apply to water pressure:

- recommended: (valve fully open) 300-600 kPa (3-6 kp/cm^2)
- limiting values, min: 40 kPa (0,4 kp/cm^2)
  max: 1 MPa (10 kp/cm^2)

The hoses should be flushed through before being connected to the machine.

The hoses should hang in gradual arcs. This is particularly important if the machine is fitted with a tilting function.

Connect the hoses as follows:

- cold water to (A)
- hot water to (B)
- (if using a third water supply:) the third water hose to (C).

  Sizes of A, B and C: DN 50 (2" BSP).

Steam supply

Fig. 70

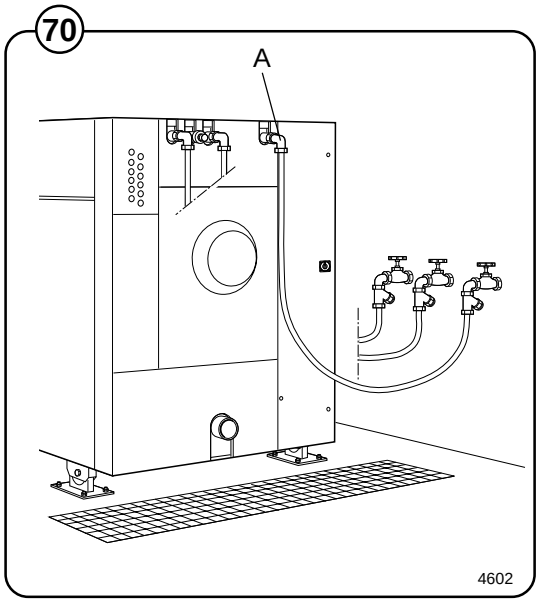
The supply hose (A) must have a manual shut-off valve to make installation and servicing easier. Fit the filters supplied to the manual shut-off valve.

Connect an approved hose between filter and machine. The following values apply to steam pressure:

- recommended: 300-600 kPa (3-6 kp/cm^2)
- limiting values, min: 50 kPa (0,5 cm^2)
  max: 800 kPa (8 kp/cm^2)

The hose should hang in a gradual arc. This is particularly important if the machine is fitted with a tilting function.

Connection size: DN 32 (1 1/4" BSP).



Compressed air connection

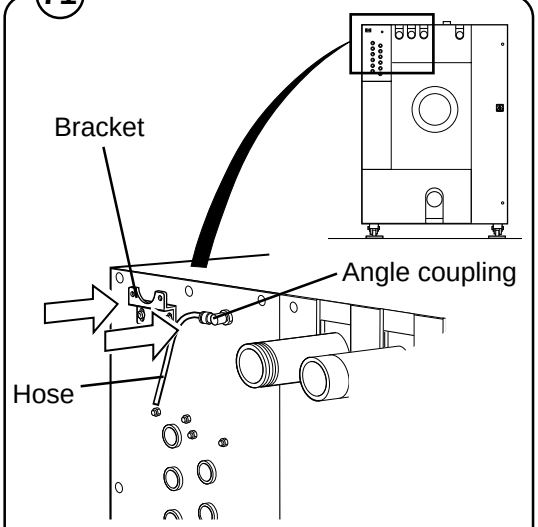
Applies only to machines with the tilt function

Fig. 71 A pressure regulator complete with water separation device is to be installed on the machine. When the machine is supplied, the angled coupling, hose and bracket for the pressure regulator will already be installed.

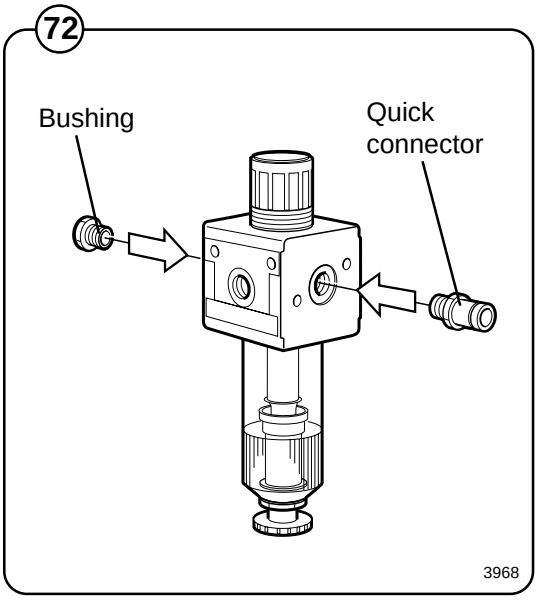
Fig. 72 Install the quick-connector for the hose and a bushing (for the hose from the compressed air supply) on the pressure regulator.

Fig. 73 Install the regulator on the bracket using two screws. Connect the compressed air hose using the quick-connector. Screw on the pressure gauge.

71



72



73

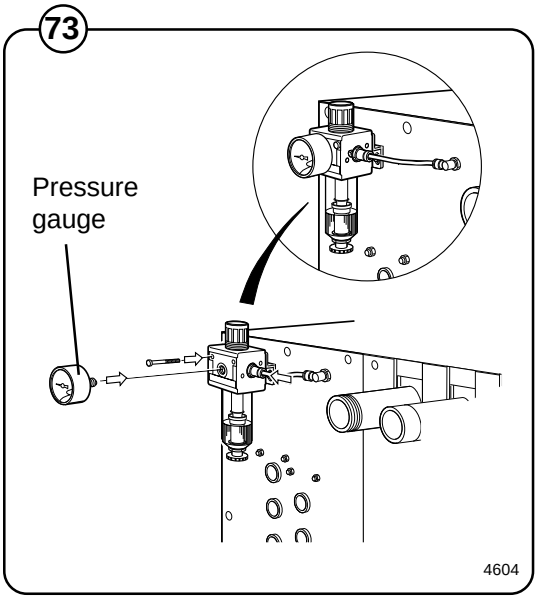
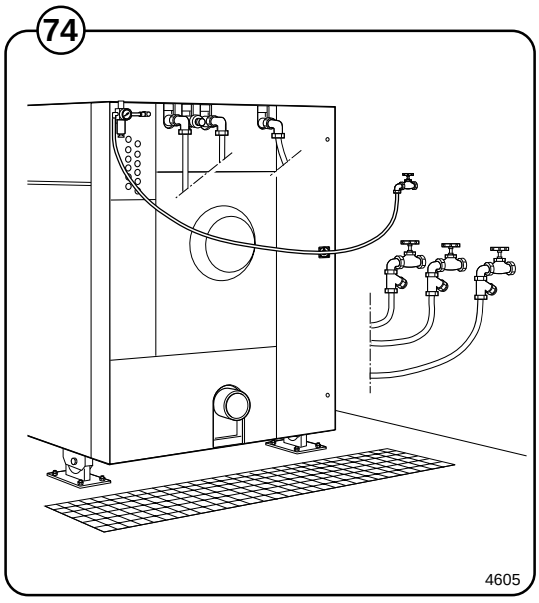


Fig. 74 Connect the hose from the compressed air supply to the bushing on the pressure regulator. Connect the hose so it hangs in a gentle arc. This is particularly important if the machine has the tilt function.

The connecting hose must be rated for a pressure of at least 1 MPa (10 kp/cm^2).

The following values apply to the compressed air supply:

- Recommended pressure: 400-800 kPa (4-8 kp/cm^2)

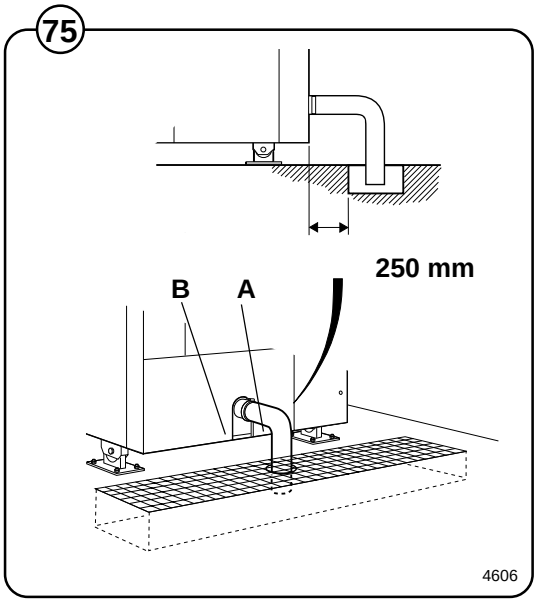


Drain

Fig. 75 The connector for the machine discharge (A) has an external diameter of 160 mm. The distance between the machine and the floor gully or drainage channel should be at least 250 mm.

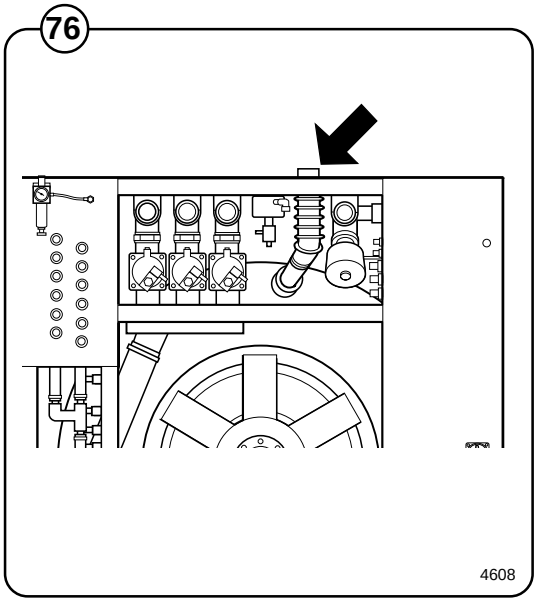
Connect a hose or a pipe to the drain connection. Avoid acute angles or kinks which could impede the flow. The hose or pipe should open into a floor gully, drainage channel or similar waste outlet. Make sure that the hose's function is unaffected by the tilting function if the machine has this feature.

If the machine has a second discharge, (B) must also be connected to the floor drain.



Ventilation

Fig. 76 The vent from the washing machine drum is at the back of the machine. If bleach or other additives are used, the pipe should be extended and connected to a ventilation system.



Detergent dispenser, non-liquid detergents

If only non-liquid detergents are to be used in the detergent dispenser, the following adaptation is recommended:

Fig. (77) Drill two 5 mm holes in the bottom of each scoop to allow any water left to drain off.

Installation of equipment for external liquid supply

Electrical installation may only be carried out by competent, authorised personnel.

All external equipment which is connected to the machine must be CE/EMC-approved.

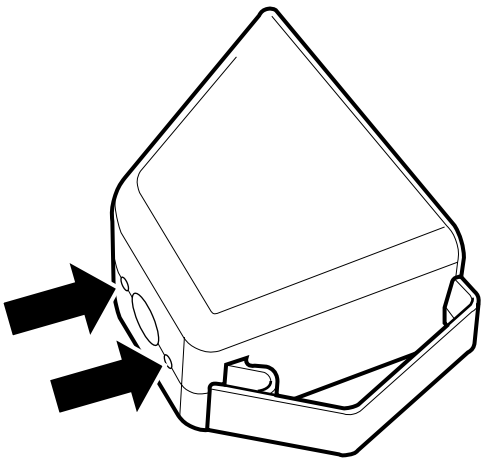
Fig. (78) As standard equipment the machine has 10 pipe connectors of 1/2" diameter, for connecting an external liquid supply system .

Fig. (79) External supply equipment is connected to X146 on the top row of terminals in the automatic control unit. There is a total of 13 outputs for detergent dosage.

The terminal numbering corresponds to the numbering used in the liquid detergent function in programming.

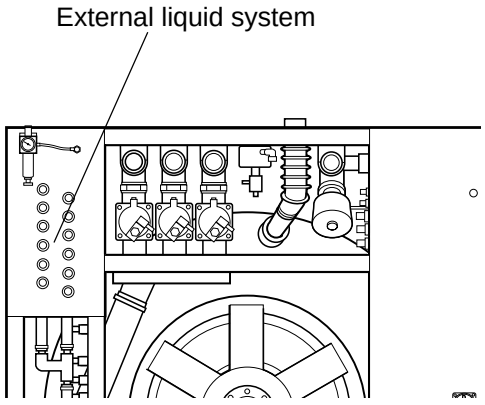
Common neutral for all outputs is on terminal X146:14.

77



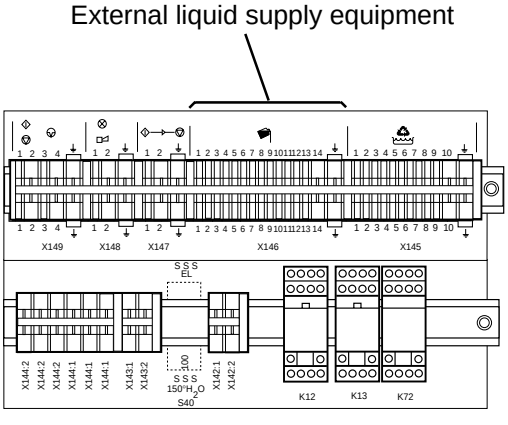
0355

78



4608

79



4578

Electrical installation

Electrical installation may only be carried out by competent, authorised personnel. Check that the earth conductor is correctly connected.

The electrical cable for the machine's power supply should hang in a gentle arc. This is particularly important if the machine is equipped with the tilt function or weighing equipment.

Fig. 80 Connect the machine to a separate mains circuit with its own circuit breaker(s). The various ratings required for circuit breakers are shown in the table.

Fig. 81 Connect the cable to the main switch inside the compartment on the machine rear, see illustration.

The electrical cable used must be of a suitable size/rating. For the correct size/rating for this cable, check the relevant local or national regulations.

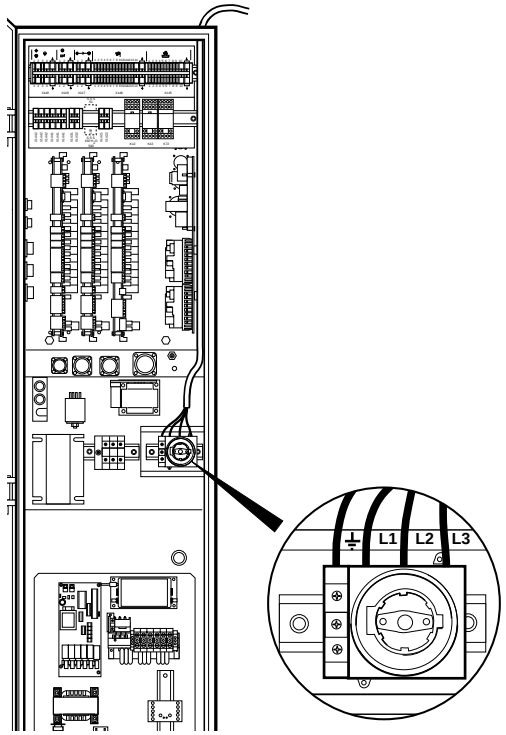
If an earth leakage circuit breaker (or RCD - residual current device) is used, it must be installed to protect the washer extractor only.

80

Total wattage: 13.9 kW

Voltage alternative	Fuse A
230 V 3 AC 50 Hz	100
400-415 V 3N AC 50 Hz	63

81



4609

Function checks

Manual operation

- Switch on the machine's main switch.
- Open the manual valves for water and compressed air, also for steam if the machine has steam heating.

The procedure for operating the various machine functions manually is described in the chapter "Machine Operation" under the heading "Manual Functions".

- Check that the imbalance switch is correctly adjusted. See section headed "Imbalance switch".
- Check that the drum is empty and close the door.
- Close the drain valve.
- Operate the machine manually to fill with cold water, then hot water. Check that these water supplies are connected as they should be.
- Start the motor on wash action, and check that the motor is revolving clockwise and anticlockwise alternately, as normal for wash action.
- Start heating by entering a final temperature and then pressing **START**. Check that the steam valve opens as appropriate.
- Check that all sources of detergent supply are working as they should, including the built-in detergent supply compartments, where present.
- Check the water and steam connections and the drain valve for signs of any leakages.
- Empty the water from the machine and open its door.
- To adjust the Soft Starter, follow procedure under "Adjustment of the Soft Starter function" in the "Program control unit" chapter.

For machines with tilt function

- Operate the tilt control unit to tilt the machine forwards and backwards. Please note that if you switch the direction of tilt from one direction straight to the other, the cylinder will not start to fill until the pressure in the active cylinder has reduced to below 20 kPa.
- Check that the machine will **not** move from tilt position to normal position when the emergency stop is pressed in, but that it remains in the position it was in already.

For machines with weighing equipment

- Follow the "Zero calibration" procedure (described under heading "Zero calibration" in the "Machine operation" chapter).

Automatic operation

- Check that the external switch or switches are switched on and that the manual valves for water, compressed air and steam (if the machine has steam heating) are open.
- Run one of the machine's built-in (standard) programs with heating to 60 C.
- Check that the program proceeds normally, and that water filling, detergent filling, heating and motor action are all working in accordance with the program display on the display screen.

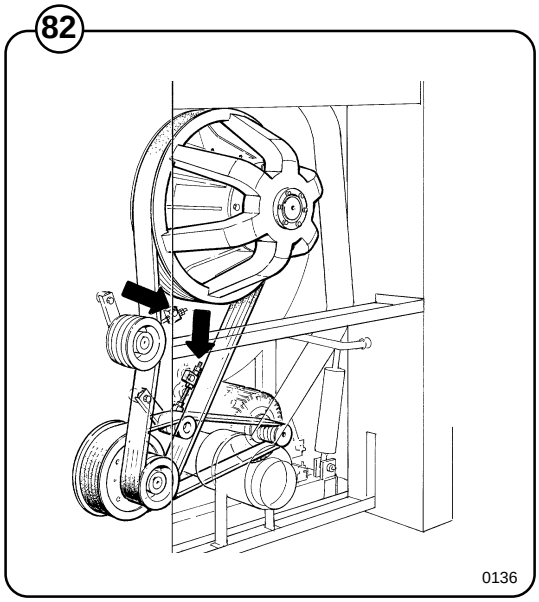
To conclude this set of function checks

If all function checks have been satisfactory, refit the side panels, rear and front covers and any other panels which were taken off during installation.

Checking and adjusting drive belt tension

- Make sure that the external switch or switches are all off before you remove any covers from the machine.
- After a few hours' operation, re-tension the belts using the appropriate tensioning devices.

Fig. 82



Maintenance

Daily

- Check that the door lock operates properly and that the door does not leak. Clean any detergent residues from the door seal.
- If dispensing equipment for powder detergent is used, clean this equipment (including the scoops) to remove detergent residues.
- Check that the drain valve does not leak and that it opens and closes normally.

Every month

Make sure that the external power switch is ”OFF” before removing the machine’s protective panels.

- Then undo the machine’s rear and side panels.
- Check that valves, hoses and connections do not leak.

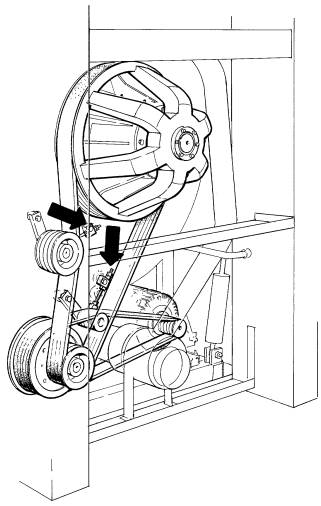
Fig. 83

- Check that the drive belts are undamaged and are properly tensioned. Adjust the belt tension as required with the two belt tensioners.

Fig. 84

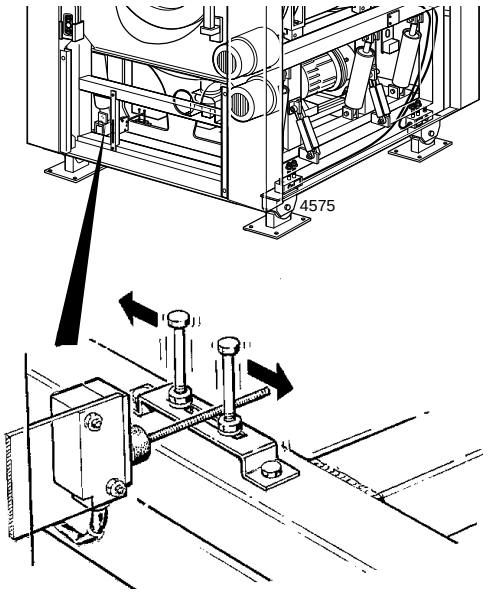
- Check that the operating lever for the imbalance switch is not bent, damaged and that it is correctly adjusted. The operating lever should be about 10 mm from the two adjustment screws and shall just be above the mounting plate for the screws (when the machine is empty).

83



0136

84



0552

- Clean filters at the the steam and water connections. Drain water from the compressed air connection water separator.

Fig. (85)
- The machine has equipment for lubricating shaft seals: check the oil level in the tank. If its level falls too low, the machine will stop and an error message will be displayed. When necessary, top up with Binol Hydrap hydraulic oil or equivalent.
- Refit the panels when the check is completed.

Every six months

- Make sure that the external switch is ”OFF” before removing the machine’s protective panels.

Fig. (86)
- Then remove the rear panel. Lubricate the drum shaft with a grease gun (two greasing points), 10-15 pump strokes in each place.

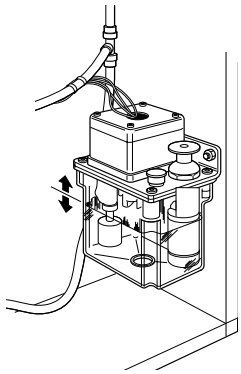
The steam valve’s opening and closing is operated by compressed air combined with oil to ensure that the opening movement is slow and smooth.

Fig. (87)
- Check that the opening time for the steam valve is 5 - 10 seconds. The time can be adjusted by turning the adjustment screw below the oil reservoir.
- Check that hoses and connections do not leak. It may be necessary to replenish the oil in the oil reservoir. Access can be gained by unscrewing the air hose connection.

Annually

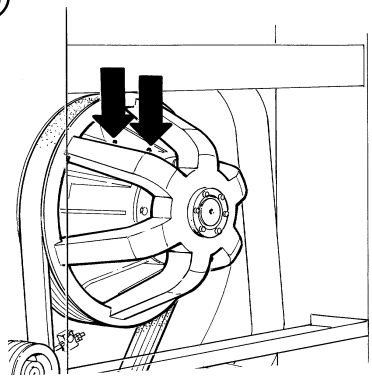
Fig. (88) Lubricate the motors’ shaft seals with a grease gun (two lubrication points on each motor), 1 pump stroke in each position.

85



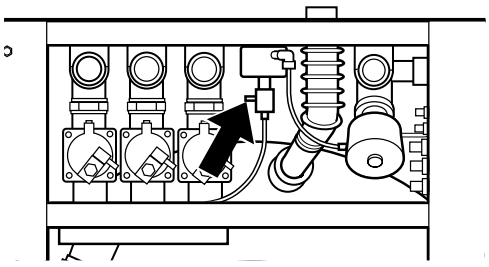
0138

85



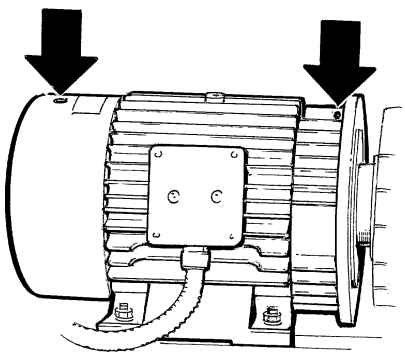
0139

87



5007

88



0141

Overheated coupling oil

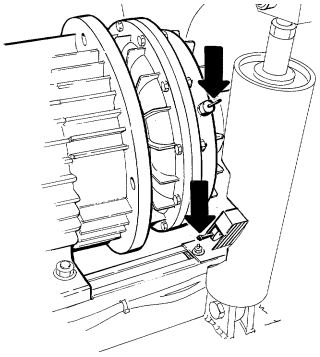
Fig. (89) The machine is fitted with a hydraulic coupling to reduce starting current and to provide a gradual start to the spin cycle. If drum rotation is prevented or if the washing is bunched up in the drum during the spin cycle, the oil in the hydraulic coupling may become too hot.

When the oil temperature reaches 145 deg C, a melt fuse operates and actuates a switch. An error-message will be seen on the display.

Fig. (90) As an extra safety measure, there is a further melt fuse that operates at 175 deg C. Hydraulic oil runs out of the coupling when this fuse operates.

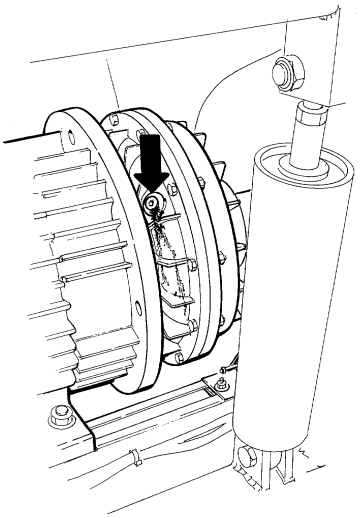
The coupling contains 2.7 litres of Shell Tegula 32 or equivalent quality.

89



0142

90



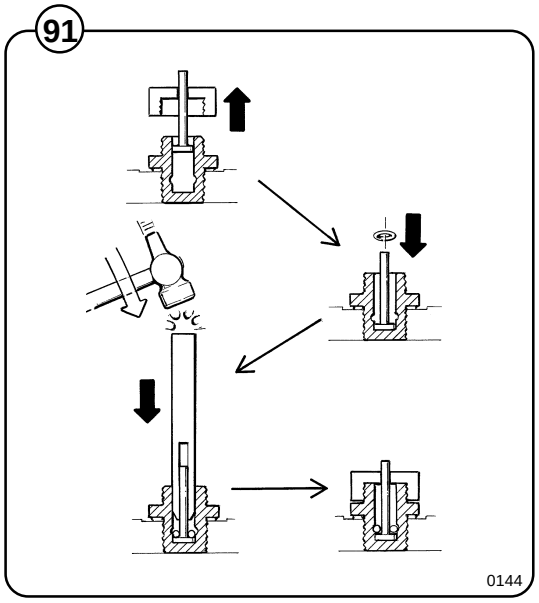
0143

Repairing the melt fuse

- First of all find out what caused the overheating. Make sure that the drum can rotate easily without meeting resistance.
- A repair kit is supplied with the machine and this includes a ring of fusible material (a tin alloy) and a drift. Repair the fuse as follows:

Fig. (91)

- Unscrew with white nut which conceals the melt fuse. Remove the metal rod and clear any tin residues. Press down the metal rod in the fuse enclosure as far as it will go. Thread the new tin ring over the rod.
- Push the ring down with the drift and tap it lightly with a hammer so that the ring is pressed into the groove in the side wall of the enclosure and blocks the rod.
- Screw the white cover nut back into position.



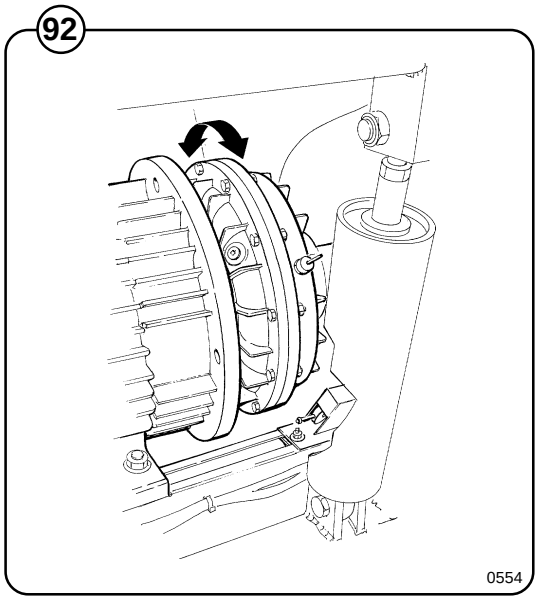
Rubber elements, flexible coupling

Between the extraction-speed motor and the electromagnetic clutch there is a flexible coupling with rubber elements. The rubber elements will have to be replaced if play arises between the motor and the electromagnetic clutch. Procedure for checking condition of the rubber elements:

- lock the drum, i.e. by asking somebody to hold the front of the drum so that it is locked against the outer drum.

Fig. (92)

- Turn the hydraulic coupling manually and check for any signs of play between the two halves of this coupling. If there is any play in the flexible coupling, the rubber elements should be replaced. A replacement set is supplied with the machine.

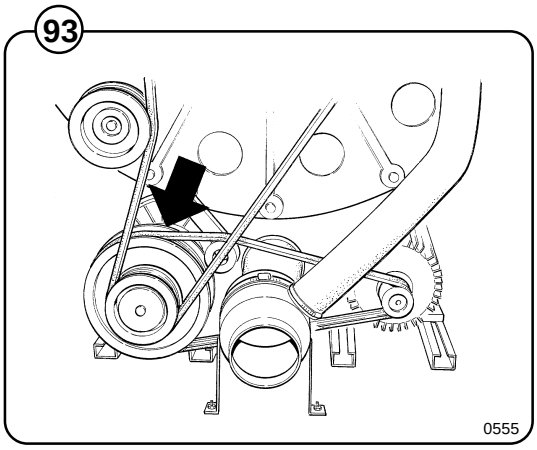


To replace the rubber elements:

- Release the motor and move it about 5 cm to access the rubber elements.
- Replace the rubber elements (12 of them).
- To adjust, see Step 20 under the heading "Replacement of extraction motor".

Magnetic coupling

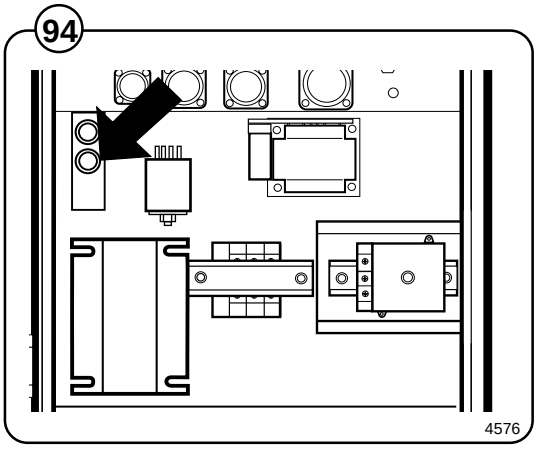
Fig. 93 The motor for washing and distribution speeds is connected via an electrically-controlled magnetic coupling which is built into the large belt pulley to the left (seen from the rear). If the drum appears to slip or takes a long time to reach the correct speed, it may be necessary to adjust the magnetic coupling. Adjustment is carried out by removing shims in the coupling's attachment. Refer to section headed "Replacing the electromagnetic clutch".



Operating fuses

Fig. 94 The CPU-, display and I/O-units are supported via two fuses in the control unit.

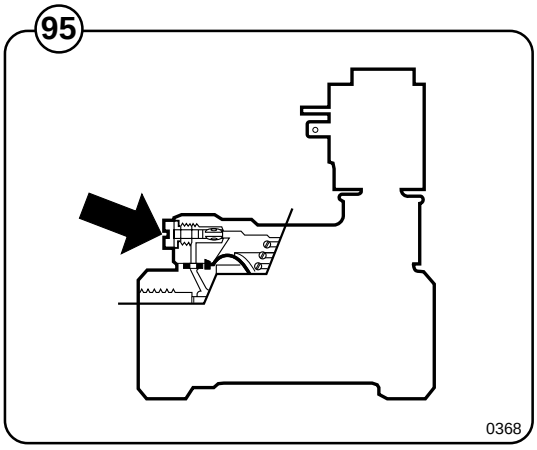
Fuse rating: 1.6 A T

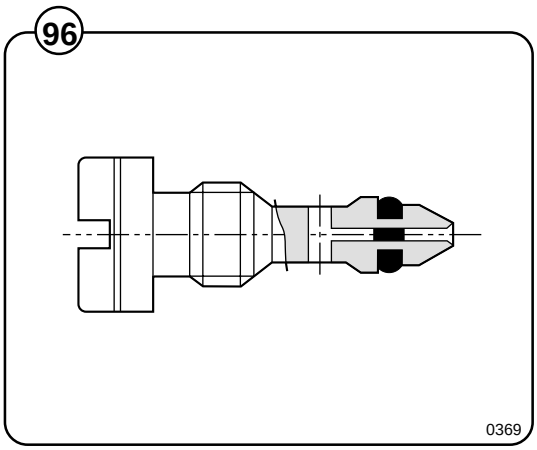


Cleaning nozzles in the water valve

Hot water with a high chalk content can cause lime scale to accumulate in the valve. If the efficiency of the valve gradually deteriorates, its balancing nozzles may need to be cleaned:

- close the manually operated tap
- Fig. 95 unscrew the nozzle
- clean the hole in the nozzle carefully with a needle or similar device
- Fig. 96 screw the nozzle back into position. Make sure that the seal is positioned correctly and seals properly.
- open the manually-operated tap again
- check that there are no leakages





Tilt function

Installation

Fig. 97 Remove the machine's side panels, lower front panel and rear covers.

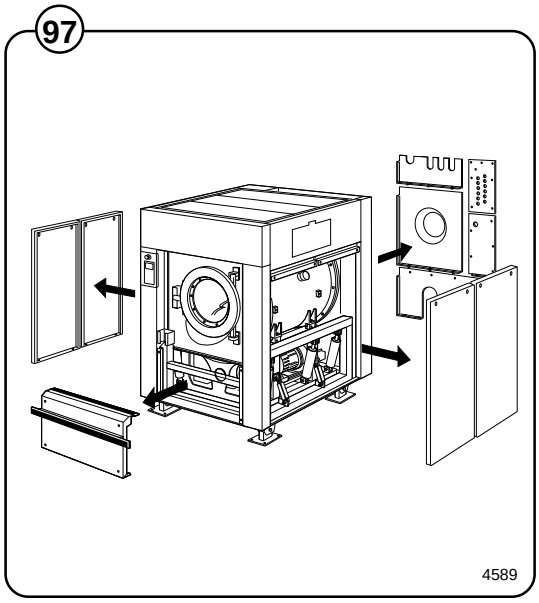


Fig. 98 <u>For machines with tilt both forwards and backwards</u>:

Insert the two cylinder units from the side of the machine underneath the machine frame.

If there is vinyl floor-covering on the floor:
To protect the floor from wear, a sheet of stainless steel should be laid beneath each cylinder unit.

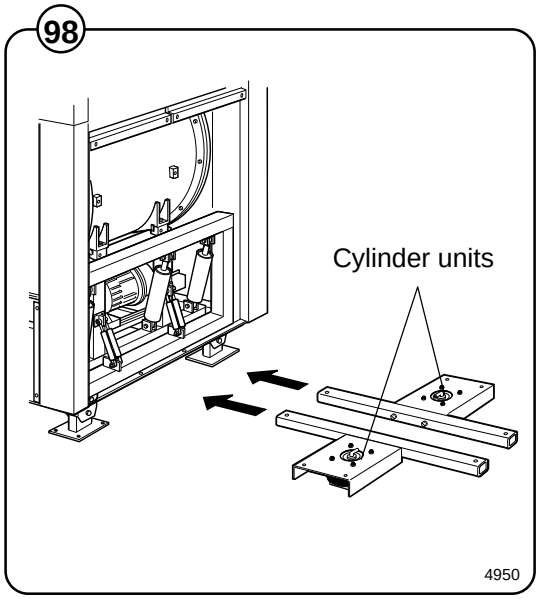


Fig. 99 <u>For machines with forward tilt only</u>:

Insert the cylinder unit from the side of the machine underneath the rear section of the machine frame.

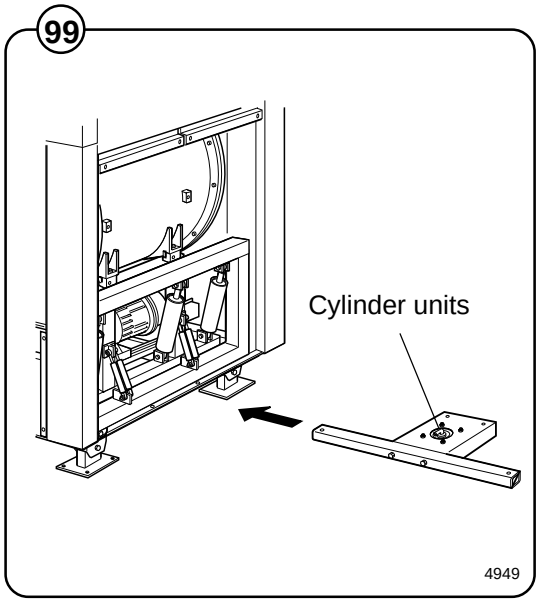


Fig. 100 Secure the cylinder units using four bolts and nuts.

It is important to fit four washers (each 5 mm thick) between each cylinder unit and the machine frame (see illustration).

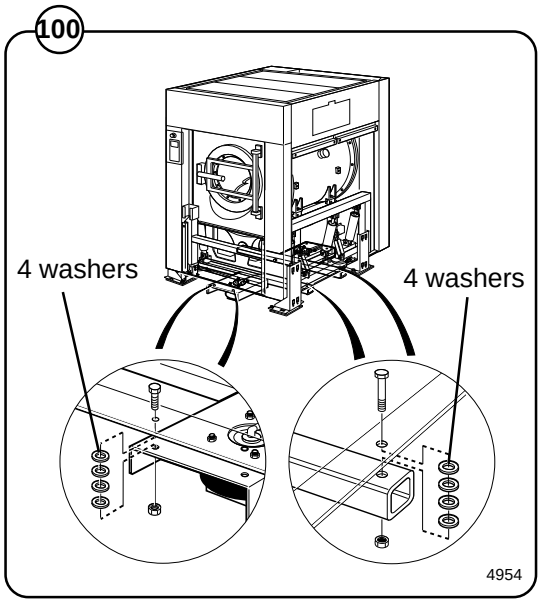


Fig. 101 Fit the four corner posts, one for each corner of the machine, using the bolts which secure the machine feet to the floor. Adjust the clearance between the upper part of each corner post and the machine so it is 14 mm.

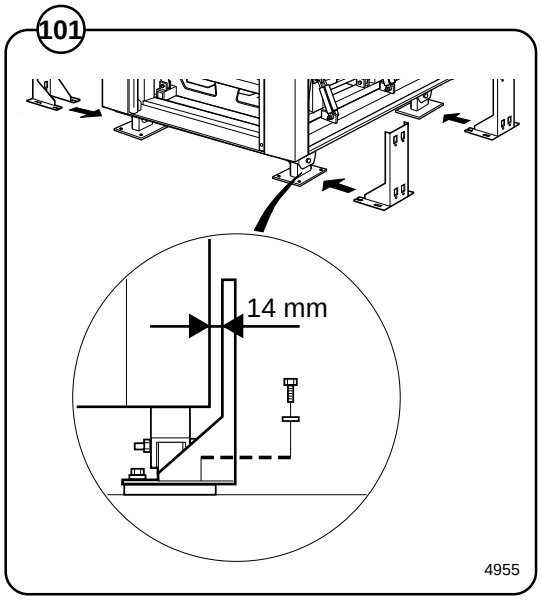
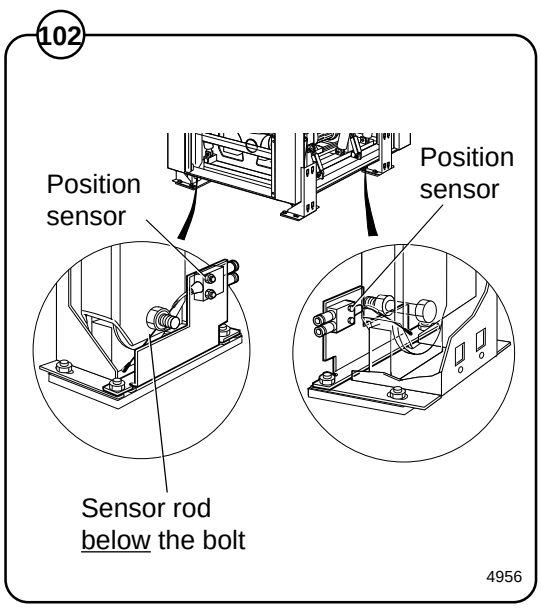


Fig. 102 <u>For machines with tilt both forwards and backwards</u>:

Fit two pneumatic position sensors on two of the machine feet: at left-hand front and right-hand rear, diagonally opposed. The position sensors are to be fitted using the inner two fastening bolts of the feet, mounted on the corner posts just installed.

Please note that the sensor rod must be placed <u>below</u> the bolt for the wheel.



Tilt function (optional equipment)

For machines with tilt both forwards and backwards:

The compressed air lines which are to be connected to the air bellows and position sensors are supplied bundled on the machine rear.

Fig. 103 Connect the lines to the air bellows and pressure sensors according to the table below. These lines do not need to be fastened to the frame, but can be laid on the floor underneath the machine.

The air lines are marked as follows:

Fig. 104

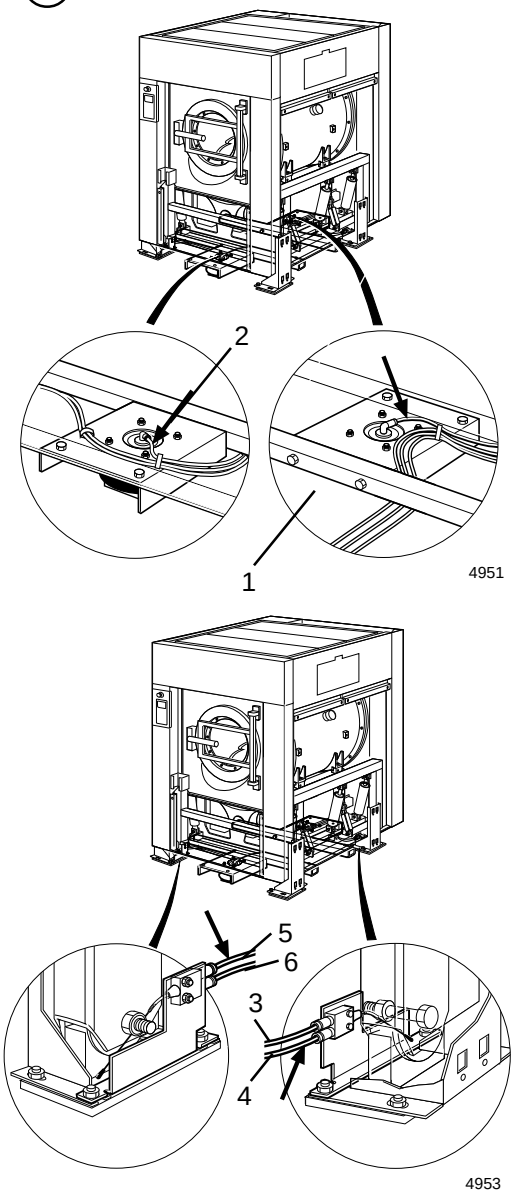
ID marking	Connect to
1	Rear air bellows
2	Front air bellows
3	Rear pressure sensor, connection 1
4	Rear pressure sensor, connection 2
5	Front pressure sensor, connection 1
6	Front pressure sensor, connection 2

Fig. 105 Note that the tubes for the pressure sensors must be connected correctly.

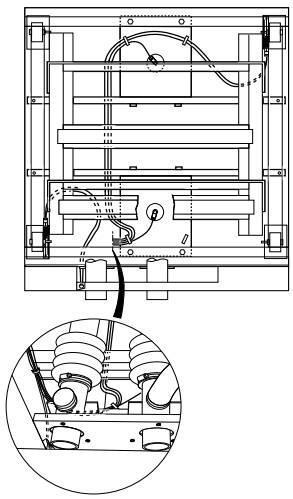
– Connection 1

– Connection 2

103



105



104

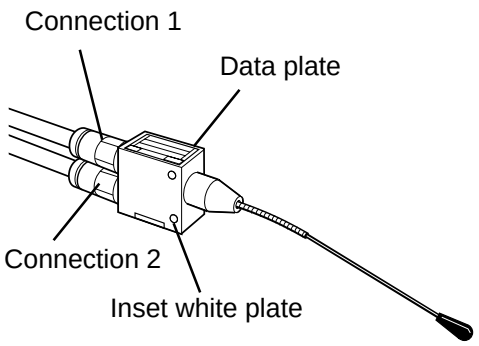
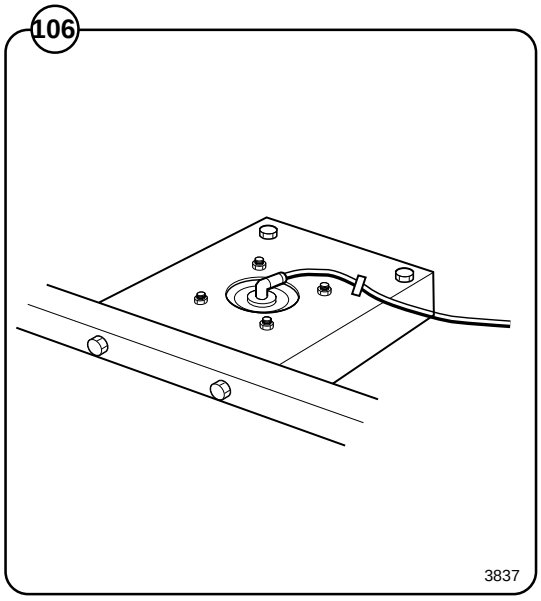


Fig. 106

For machines with forward tilt only:

The compressed air line to be connected to the air bellows is supplied bundled on the machine rear. Connect this line to the connection nipple on the top of the bellows.



Tilt function (optional equipment)

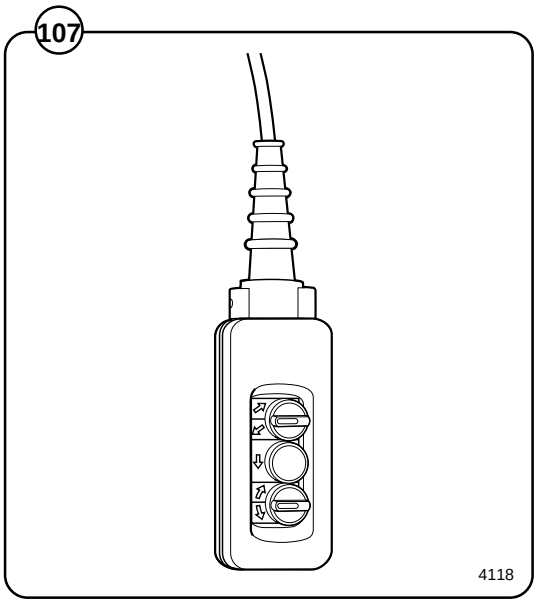
Fig. 107 Test the tilt function:

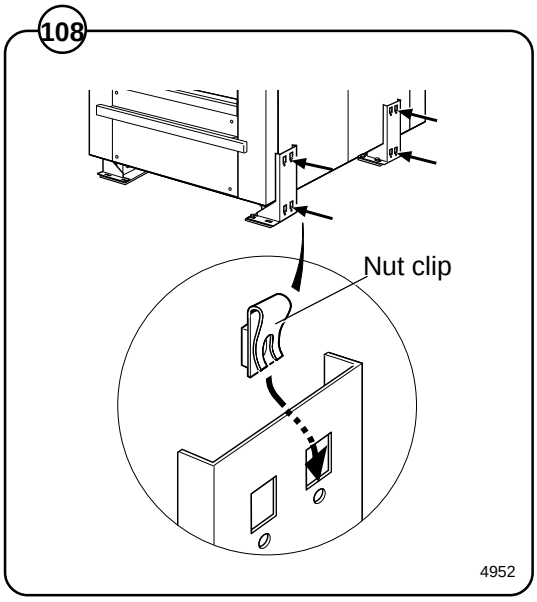
- Switch on the machine electrical switch(es) and turn on the compressed air supply.
- Open the door and lock it open.
- The uppermost switch on the tilt control unit tilts the machine either backwards (turn switch anticlockwise) or forwards (turn switch clockwise). The middle switch returns the machine to its normal (upright) position. These switches must be kept actuated throughout the entire tilt movement. If the switch is released, the tilt movement will halt and the machine will stop in its position.
- The bottom switch on the control unit rotates the drum either clockwise or anticlockwise.
- Check that the machine cannot tilt in the opposite direction until it has returned to its normal position after an earlier tilt.
- Check for any possible leaks from compressed air lines or from bellows and sensors.

Refit the machine panels/covers.

Fig. 108 Fit two nut clips to each corner post. The nut clips slot into the rear grooves on the posts.

Fig. 109 Fit the rubber dampers and sleeves to the front end of each side panel strip.





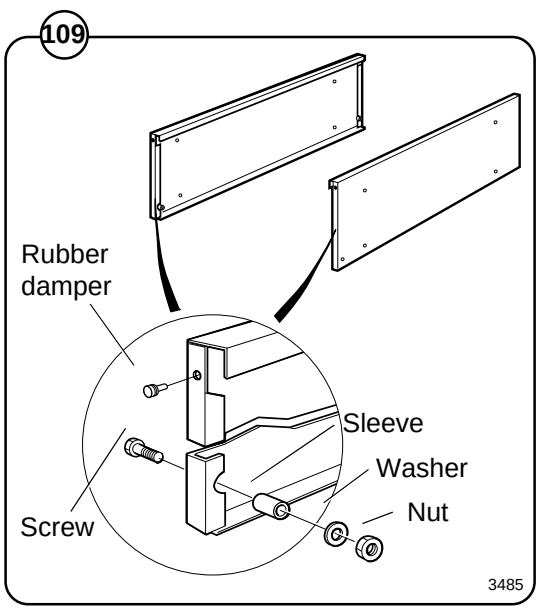


Fig. 110 Position and fasten the side panel strips.

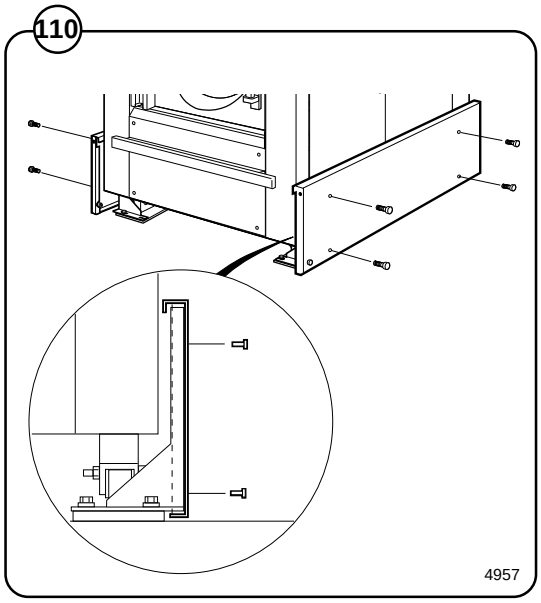


Fig. 111 Fit the two counterweights to the front panel strip. The bolt heads should be at the bottom.

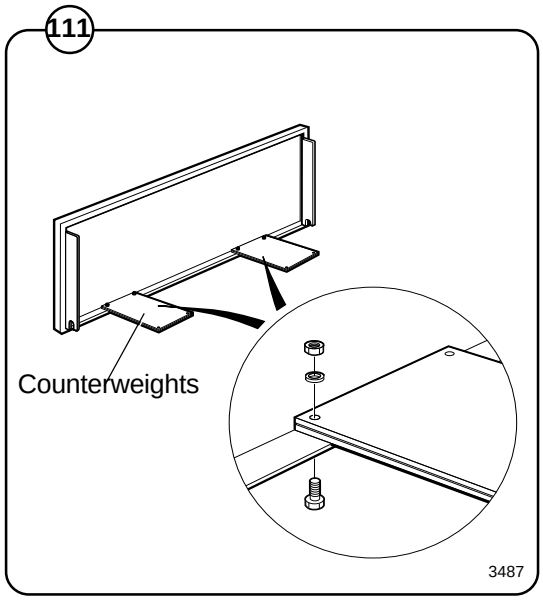
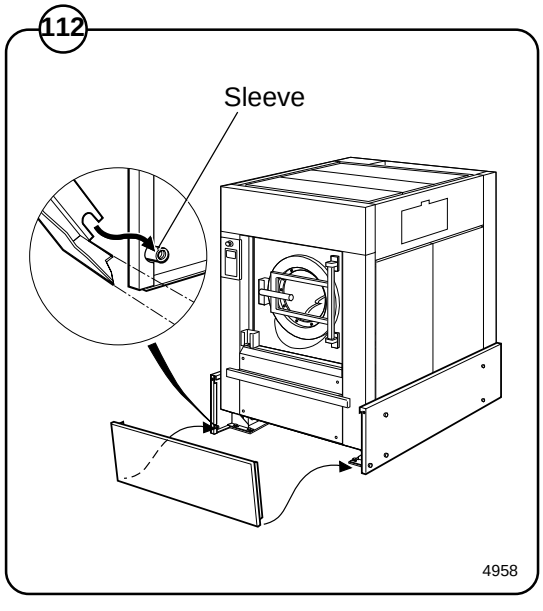


Fig. 112 Hang the front panel strip on the two sleeves you fitted to the side strips.



Weighing equipment

Description

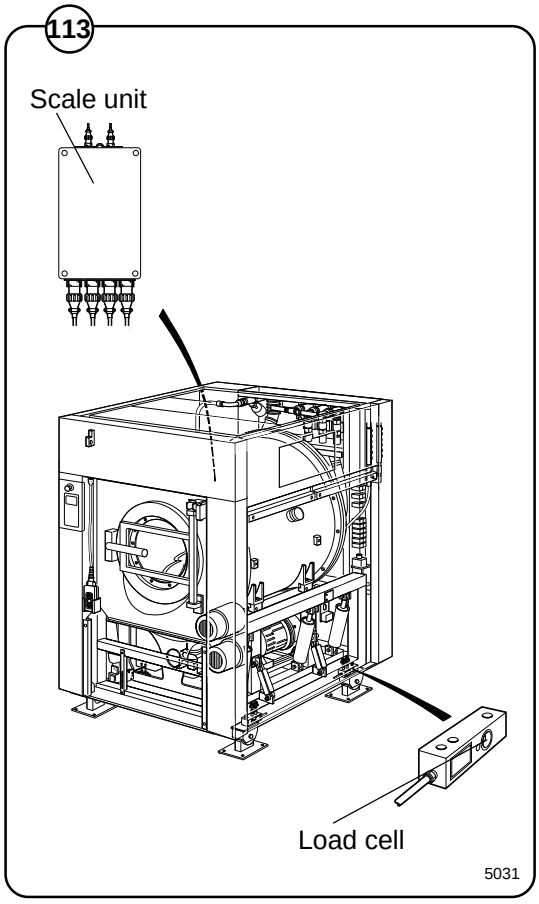
Fig. 113

The weighing equipment comprises the following units:

- A scale unit located inside the machine's left-hand rear side panel
- Four load cells, one in each corner of the frame
- Wiring

The weight of the wash load is registered by the four load cells, which send analogue signals to the scale unit. In the scale unit the signals are processed and converted to a weight value in an analogue-digital converter. The weight value is transmitted via a serial interface to the CPU board. The weight is then shown on the display.

Weighing the load allows the water level to be adjusted automatically according to the actual weight of the load, i.e. the water level is reduced during washing if the machine does not have a full load. The consumption of water and energy can thus be reduced.



Safety rules

The weighing equipment is a precision measuring device and must be treated as such.

- Never spray water directly onto the load cells and scale unit.
- The load cells are vulnerable to impact.
- The load cells are potentially vulnerable if welding is carried out. If welding has to be done on the washer extractor, attach the earth cable clamp as close as possible to the welding site.

After a power-cut

When the supply is restored after a power-cut, the weight display will show "0" if the load inside the drum is less than 6.25 kg. If the load weighs more than 6.25 kg, the true weight of the load will be shown.

Water level reduction

To achieve optimum load volumes, the weight of the load can be seen on the display while the machine is being loaded. If the machine does not have a full load, the water level will 20be reduced according to a water-level reduction table. However the water level can never be lower than the safety level plus the hysteresis.

Actual weight display

Fig. 114 The Clarus control unit automatically detects if weighing equipment is connected, and the actual (current) weight is shown on the display, on one line of the menu (normal display mode).

Fig. 115 When the machine starts to be loaded, the display switches to showing the actual weight in large numerals (weight display mode).

Normal display mode is resumed:

- If a new program number is entered using the numeric keys.
- If ⮌ is pressed.
- Automatically after the time set via ”Settings 1” under ”Time for weight display”.

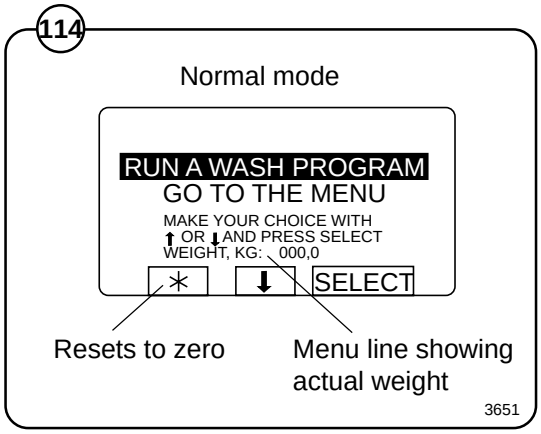
While a wash program is running, you can switch to weight display mode by selecting ”Show weight”, see the section ”Show weight” under ”Machine operation”.

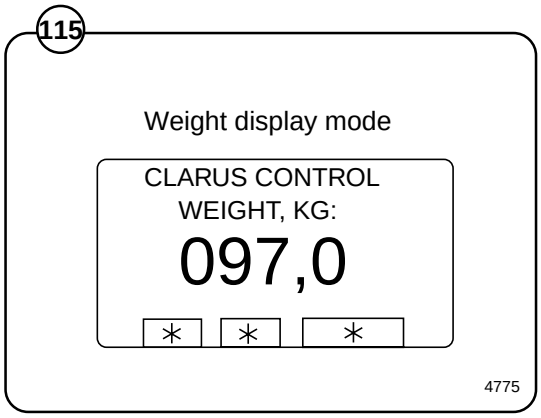
The weight shown on the display will always be the net weight (achieved because the weighing equipment has been ”tared”). A slight delay is built in to prevent the display from flickering.

Resetting the weighing equipment

Fig. 114 If the display does not show the weight (in an empty machine) as zero after a program, the weighing equipment can be reset to zero using the TAR key.

For a description of the functions used to set and check the tare value, see the section headed ”Scale adjustments” under ”Machine operation”.





Calibrating the weighing equipment

The “Zero calibration” function is used to increase the accuracy of the weighing equipment. This should be done once a month. See the section headed “Zero calibration” under “Machine operation”.

If a new scale unit is installed, it must be calibrated as described in the section ”Calibrate the scale” under ”Machine operation”.

Checking accuracy of weighing equipment display

Twice a year you need to check that the weighing equipment is displaying the accurate weight, with the aid of an object of known weight. If the weighing equipment does not show the real weight of this object, you will need to follow the “Zero calibration” procedure, a function in the Clarus software. Follow the instructions under “Zero calibration” in the “Machine operation” section of the manual. If this is unsuccessful, the weighing equipment will have to be recalibrated using the “Calibrate the scale” function, as described under “Machine operation”.

If the weighing equipment has a fault

Follow the troubleshooting procedure under the heading “Fault-finding, weighing equipment”.

If you cannot rectify the problem with the help of that section, make a note of the weighing equipment version number before you contact the service department.

To find the weighing equipment version number, access the service program, select “Scale adjustments”, then “Read version number”.

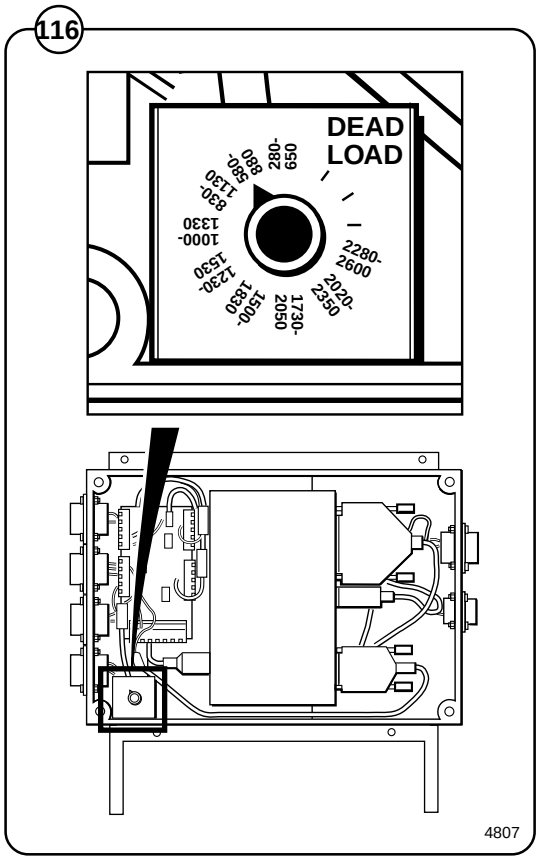
The dead load selector

Fig. 116 The dead load selector, located in the scale unit, is used for setting the machine’s “dead load”.

The dead load is the load (weight) to which the load cells are subjected before any load is placed in the wash drum. The dead load selector is set before the machine leaves the factory, and its setting should not normally be changed. For this machine the selector should be set to **2280-2600 kg.**

If calibration of the weighing equipment should fail, one possible cause can be that this selector is incorrectly set.

116



To replace a load cell

Fig. 117

- Machines without tilt function: Remove nut + bolt (A).
- Use a suitable jack to lift under the frame at the corner where the load cell is to be replaced.
- Insert a suitable object as a chock beneath the frame, to remove risk of injury and machine damage.
- Machines with tilt function: Remove nut + bolt (A) and remove the wheel.
- Remove bolt (B). Use a socket wrench to remove the bolt.
- Disconnect the load cell cable at the scale unit and remove the strap.
- Remove nuts and bolts (C).
- Remove the faulty load cell and fit the new, assembly is reverse of disassembly.

Install the new load cell as indicated by arrow on side of load cell, see figure!

117

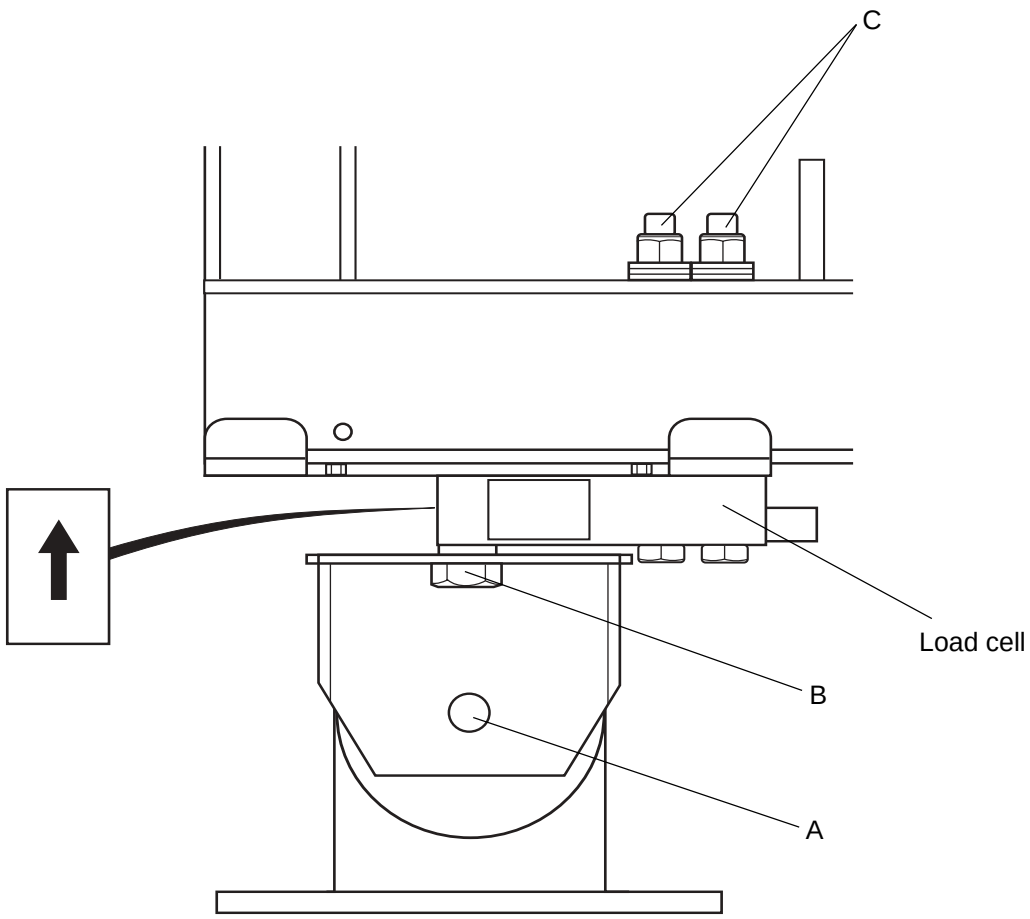


Illustration shows a machine with the tilt function.

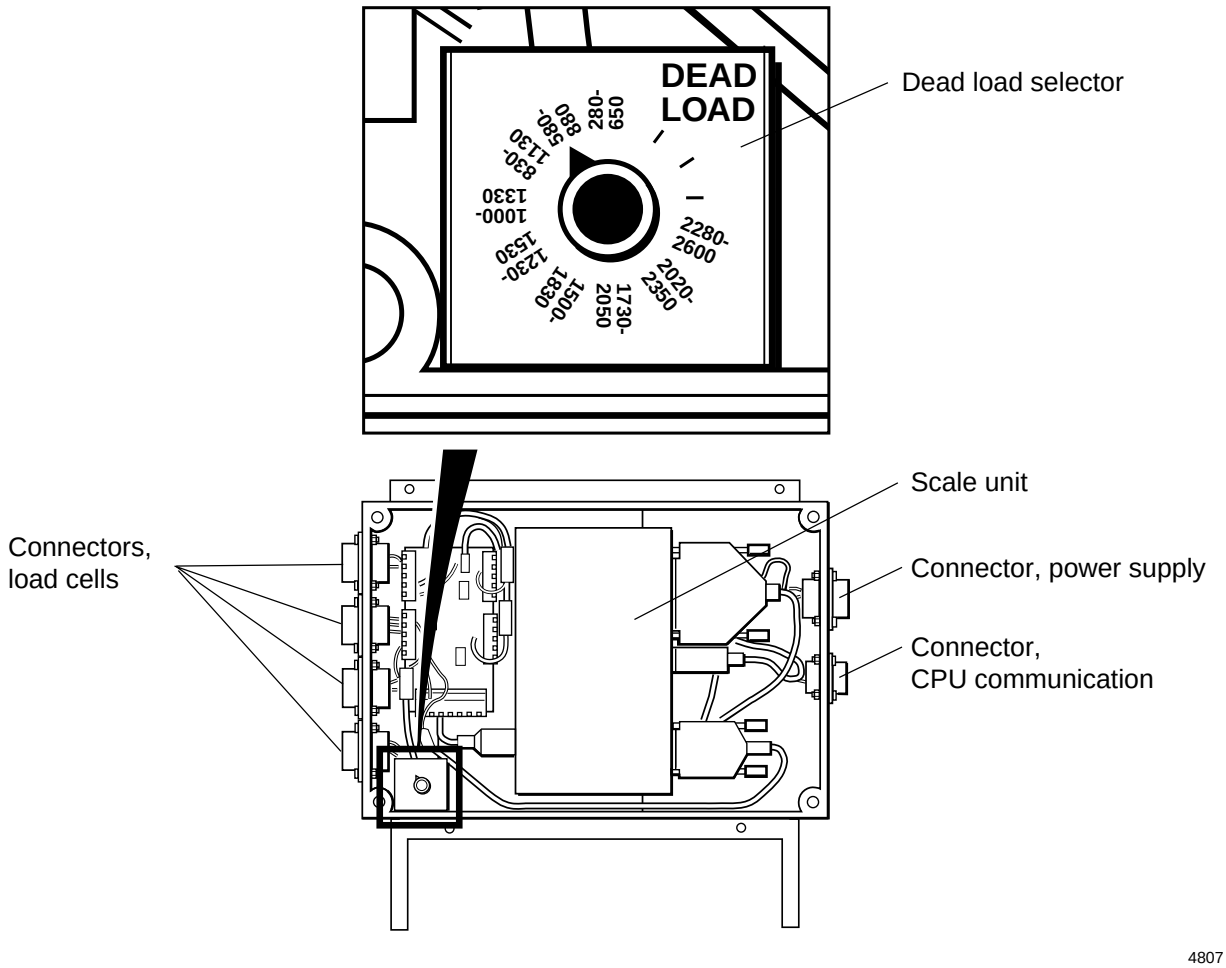
5032

To replace the scale unit

Fig. 118

- Remove the machine's left-hand rear side panel.
- Disconnect the six connectors to the scale unit.
- Take the scale unit off its mounting plate.
- Install the new scale unit, assembly in reverse order of disassembly.
- Check that the dead load selector is set to **2280-2600 kg.**
- Calibrate the weighing equipment, see "Calibrate the scale" under "Machine operation".

118



Component locations

119

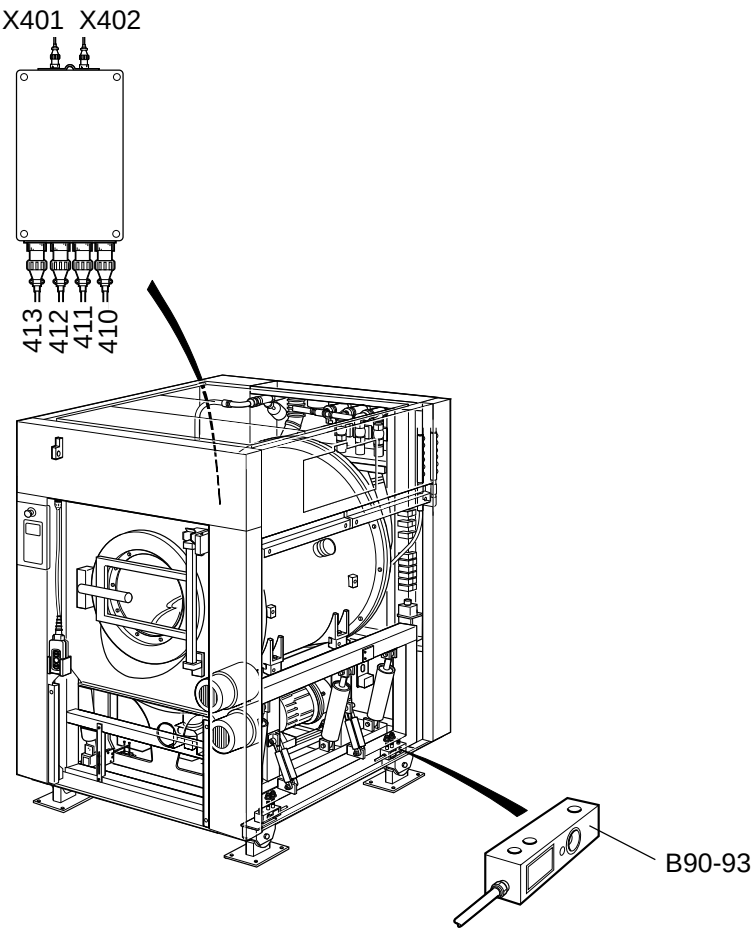


Fig. 119

A90	Scale unit
B90-93	Load cells
Connectors	
X401	Voltage feed
X402	Communication with CPU board
X410-413	Load cells

Fault-finding, weighing equipment

Error message on display:

Weight, kg:	**999,9 eller -999,9**

Probable cause:

The weighing equipment is overloaded/ ”underloaded”, i.e. the load cells are sending a signal which is too high/low to the scale unit. Probable cause is one or more load cells faulty. The dead load selector may be on the wrong setting. Alternatively, the machine may not have been installed correctly.

Fault-finding procedure:

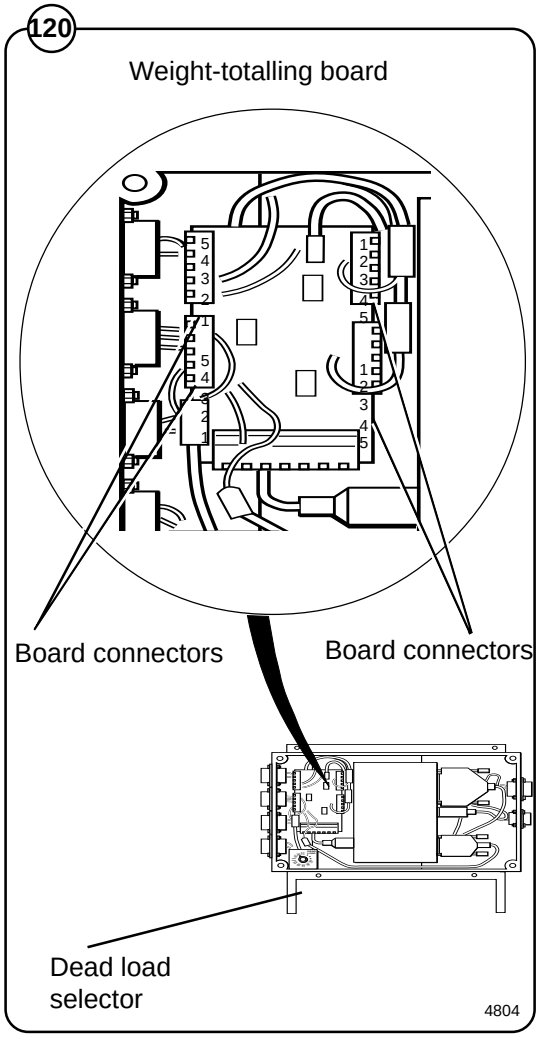
- Check that all service connections to the machine are flexible.

Fig. 120

- Remove the left-hand rear side panel. Check that the dead load selector is set to **2280-2600 kg**. If it is not, set it correctly and calibrate the weighing equipment according to “Calibrate the scale” under “Machine operation”.
- If the weight displayed is -999.9, try following the "Zero calibration" procedure (described under "Zero calibration" in the "Machine operation" chapter).
- Remove the side panels and check that the load cells are unobstructed. Remove any mechanical obstructions.
- Taking the load cell cables one at a time, disconnect the cable connecting each load cell to the scale unit. Continue one by one until a stable weight parameter is displayed (but not 999.9). When this stable parameter is displayed you will know which of the load cells must be faulty.

Fig. 120

- If more than one load cell is faulty, the faulty cells can be identified using a multimeter on the scale unit weight-totalling board to check each cell in turn, as follows:
  - Remove the four screws on the scale unit cover.
  - Check that the four load cell cables are connected to the scale unit.
  - Measure the voltage at the connectors on the weight-totalling board, between terminal 2 and 3 for each load cell. The normal value for an unladen machine is approx. 3-5 mV (DC). A value different from this indicates that the load cell is faulty.
  - Replace the faulty load cell(s) as described under “To replace a load cell”.



Menu line which should show actual weight not displayed.

Possible causes:

The option “DISPLAY WEIGHT ALLOWED” may be switched off (have the answer “No” alongside) in “Settings 1”. Possible fault in communication with CPU board or display. The fault can also be in the scale unit.

Fault-finding procedure:

- Check in “Settings 1” that the option “DISPLAY WEIGHT ALLOWED” has “Yes” alongside.
- Check that the cables/wiring for CPU communication and power supply are connected to the scale unit and in good condition.
- If the washer extractor appears to be working normally apart from the absence of weight parameter display, try replacing the scale unit as described under “To replace the scale unit”.

The weighing equipment is not displaying accurate weight values.

Probable cause:

Probably a faulty load cell.

Fault-finding procedure:

- Place an object of known weight at one corner on top of the washer extractor. Check the weight shown on the display. Move the weight to each of the other corners of the machine in turn, checking the display each time. If one corner is different from the others, this will reveal which load cell is faulty.
- Check that the load cell in question is mechanically unobstructed, free of anything which could affect its normal functioning.
- Replace the load cell as described under “To replace a load cell”.

Error message on display:

Failed. Press SELECT.

Possible causes:

Dead load selector or calibration switch incorrectly set. An incorrect calibration weight has been used for calibration.

Fault-finding procedure:

Fig. 121

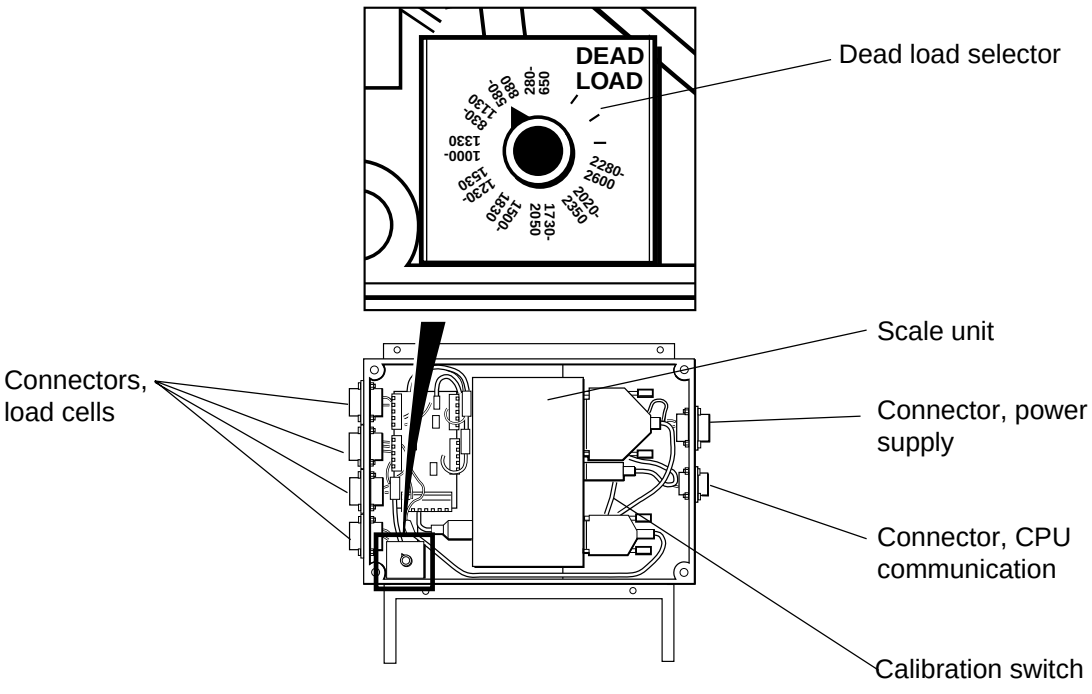
- Check that the dead load selector is set correctly. It should be set to 2280-2600 kg.
- If you are or have recently been calibrating the weighing equipment, the calibration switch may be incorrectly set, or an incorrect calibration weight may have been used for calibration.

  Check that the calibration switch is set correctly. It should normally be set to NORM. During calibration the switch should be set to CAL.

  The calibration weight should be between 40 and 400 kg.

  If relevant/necessary, calibrate the weighing equipment, or follow the “Calibrate the scale” procedure under “Machine operation”.
- Check that all cables/wiring to the scale unit are sound and correctly connected.

121



Message on display:

Function not allowed.

Probable cause:

A function has been selected in the program which cannot be carried out.

Fault-finding procedure:

- Check that the function in question is switched on under “Settings”.
- Check that the cables for CPU communication, power supply and load cells are connected.
- Check that these cables are all in good condition.
- If any cable is faulty, replace it.

Message on display in service program:

Weighing equipment not connected.

Probable cause:

CPU board not communicating with scale unit.

Fault-finding procedure:

- Check that the connectors for CPU communication, power supply and load cells are connected on the scale unit.
- Check that their cables are all in good condition.
- If any cable is faulty, replace it.

ELECTROLUX LAUNDRY SYSTEMS

SE- 341 80 Ljungby, Sweden. Telephone +46 372 661 00. Telefax +46 372 133 90.