



Service Manual

Washer extractor

W555H

Type W.55.H



Thinking of you
Electrolux

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

1 Safety Precautions



The machine is only intended for water-wash use.

Do not allow minors to use the machine.

Do not hose down the machine with water.

The machine's door lock must under no circumstances be bypassed.

If the machine develops a fault, this must be reported to the person in charge as soon as possible. This is important both for your safety and that of others.

The machine is not intended to be used by people (including minors) with reduced physical or mental capacity or lack of experience and knowledge. Such people must be instructed in the use of the machine by a person who has responsibility for their safety. Minors must be supervised to ensure that they do not play with the machine.

DO NOT MODIFY THIS APPLIANCE.



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



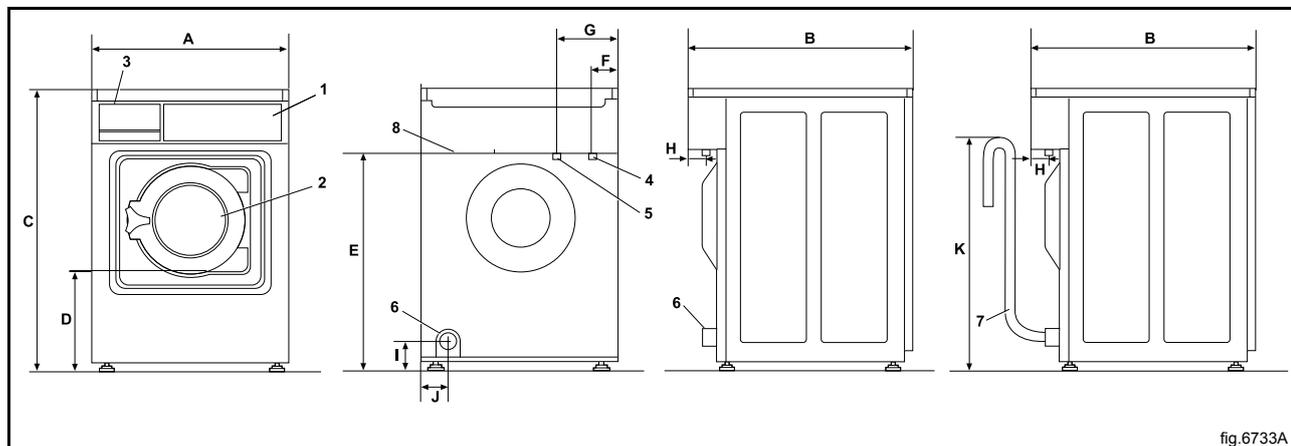
In order to prevent damage to the electronics (and other parts) that may occur as the result of condensation, the machine should be placed in room temperature for 24 hours before being used for the first time.



Servicing shall be carried out only by authorized personnel.

2 Technical data

2.1 Drawing



1	Operating panel
2	Door opening, \varnothing 255 mm
3	Detergent container
4	Cold water
5	Hot water
6	Drain valve
7	Drain pump
8	Electrical connection

	A	B	C	D	E	F	G	H
mm	595	680	850/875*	305	660	80	195	60

	I	J	K
mm	90	80	650

* C = Adjustable height, 25 mm.

2.2 Technical data

Weight, net	kg	102
Drum volume	litres	53
Drum diameter	mm	452
Drum depth	mm	332
Drum speed during wash	rpm	35/54
Drum speed during extraction	rpm	1450
Drum speed during extraction, Marine model	rpm	1300
G-factor, max.		530
G-factor, max. Marine model		425
Heating: Electricity	kW	4.4
Heating: Hot water		x
Frequency of the dynamic force	Hz	24.2
Floor load at max extraction	kN	1.2±0.3

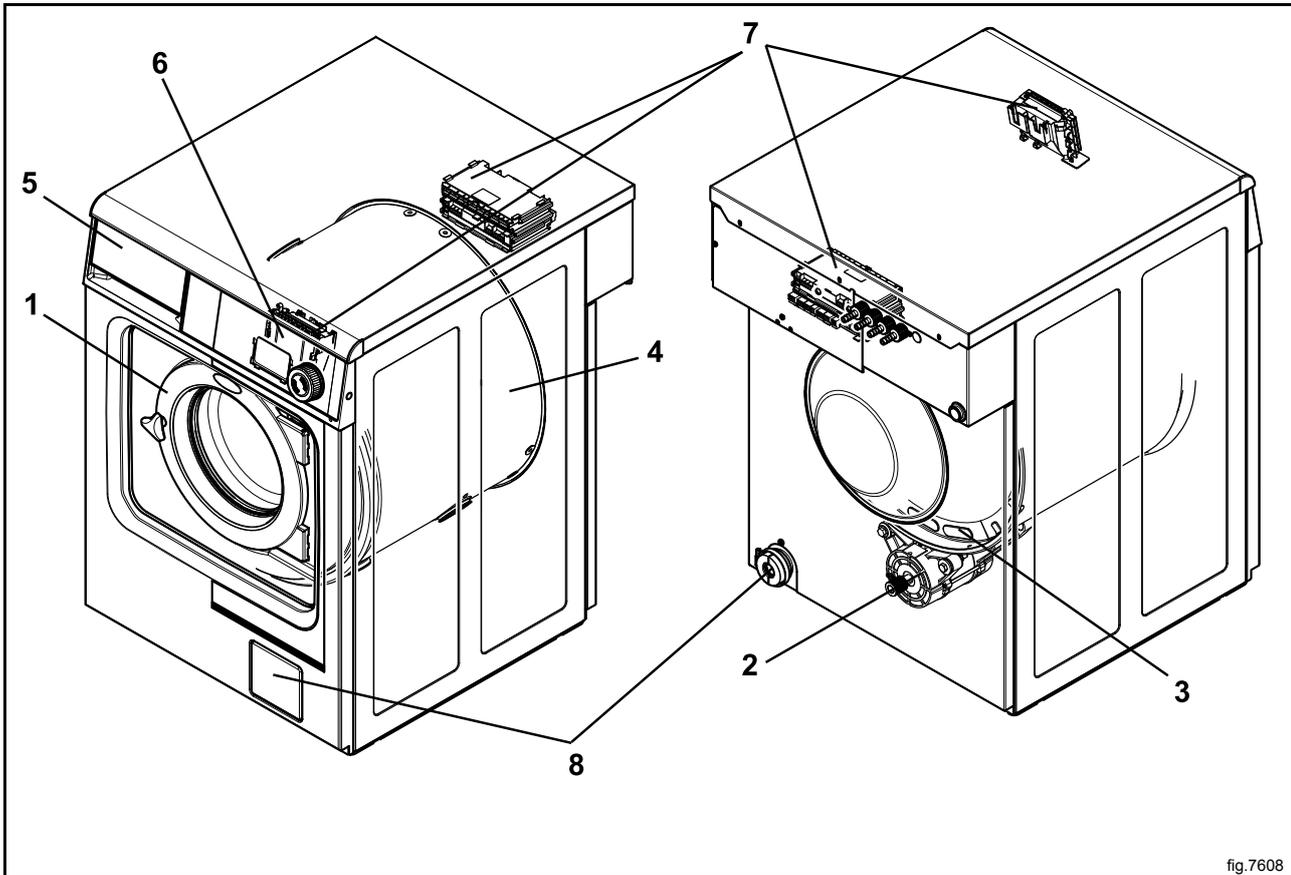
2.3 Connections

Water valves	DN BSP	20 3/4"
Capacity at 300 kPa	l/min	17
Drain valve	∅ outer mm	50
Draining capacity	l/min	160

2.4 Sound levels

Sound power level (IEC 60704-2-4)		
Wash	dB(A)	59
Extraction	dB(A)	72

3 Machine presentation



1	Door
2	Motor
3	Heating unit
4	Drum
5	Detergent container
6	Control panel with program unit
7	I/O modules
8	Drain / Drain pump

After a repair has been made

Whenever a repair has been made, a function check must be performed before the machine can be used again.

4 Function check



May only be carried out by qualified personnel.



A function check must be made when the installation is finished and before the machine can be ready to be used.

Open the manual water valves.

Add detergent in the compartment for main wash and start a program.

- Check that the drum rotates normally and that there are no unusual noises.
- Check that there are no leaks in water supply/drain connections.
- Check that water passes through the detergent container.
- Check that the door cannot be opened during a program.

Ready to use

If all tests are OK the machine is now ready to be used.

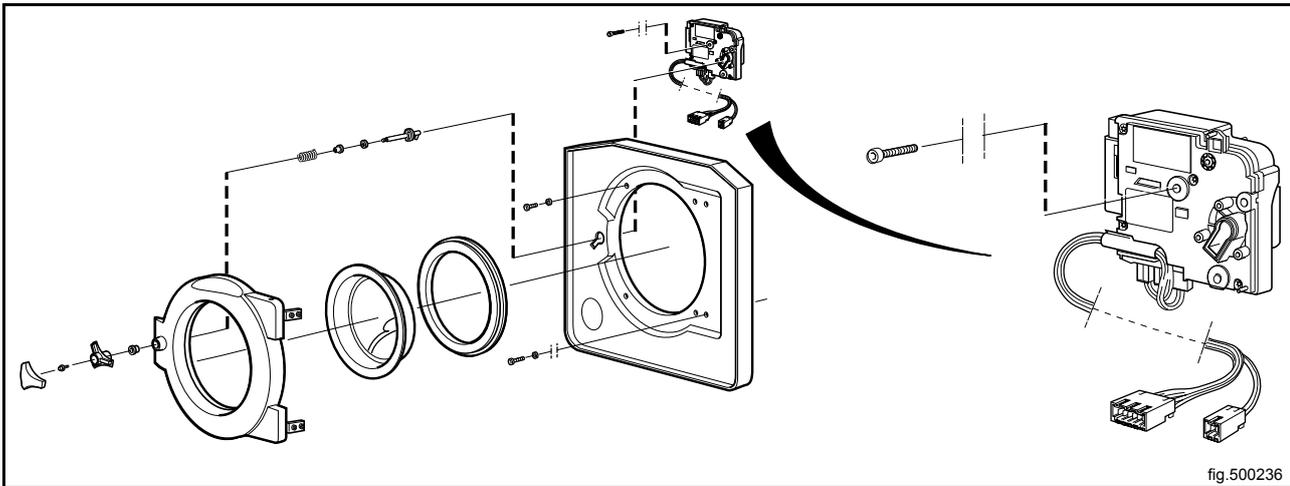
If some of the tests failed, or deficiencies or errors are detected, please contact your local service organisation or dealer.

5 Door and door lock

5.1 Door lock

The door lock consists of:

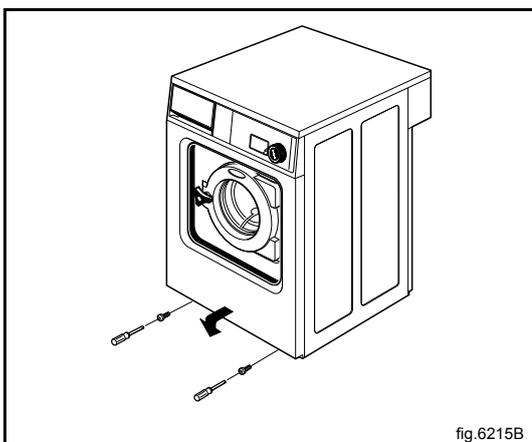
- An actuator that locks the door lock and also has one built-in micro switch. The actuator is bi-stable, i.e., it has two stable positions: locked door and unlocked door. The actuator must receive a pulse to lock and unlock the door lock.
- A micro switch that is closed when the door is closed.
- An emergency opening button that can be used to open the door lock in an emergency .



Replacement of door lock

Disconnect the power to the machine.

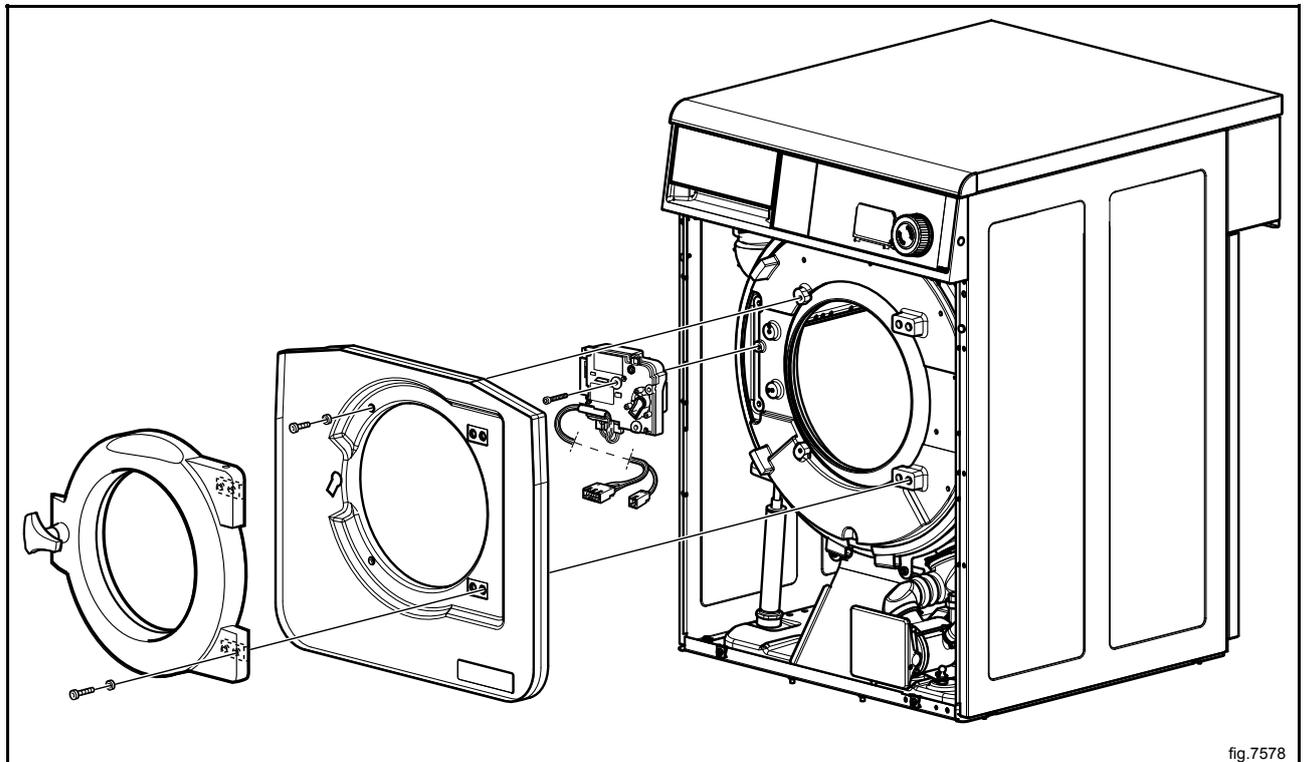
Demount the front panel.



Demount the door.

Demount the trim panel.

Disconnect the door lock cables and demount the door lock.



Mount the new door lock and connect the cables.

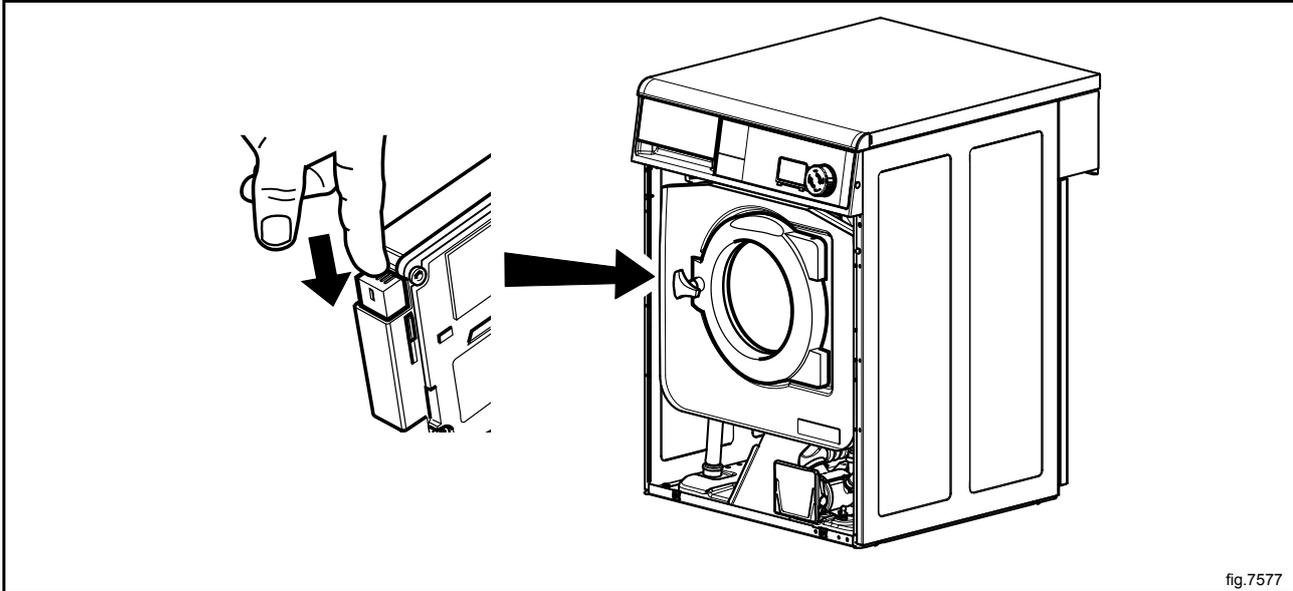
Mount the trim panel.

Mount the door and the front panel.

Emergency opening of door lock

The door can be opened by pressing the emergency opening button.

To access the emergency opening button, remove the front panel. The emergency opening button can be reached between the left side panel and the trim panel. If not accessible, remove also the trim panel.



6 Motor and motor control



Take care when measuring the motor control system since all components have a potential difference of approximately 300V in relation to protective earth and neutral. The components will contain dangerous voltages when the green LED on the motor control board is on. The motor control system will remain live for 30-60 seconds after cutting the power to the machine and the motor has stopped running.

6.1 Motor control unit

The motor control unit communicates with the program control unit board via a serial (input/output) interface. With the aid of the motor control unit the program control unit can control not only the speed of the motor at any given point, but also the acceleration or deceleration rate at which the motor is to achieve the speed required. The motor control unit constantly feeds information on current status (both normal status and on any abnormalities arising) back to the program control unit board.

The motor control unit can also supply data on the different torque and effect of the motor at constant speed when accelerating and deceleration. These data are used both for calculating the weight of the load and for detecting any unbalance.



The voltage on the motor control circuit has a potential difference of approx. 300 V in relation to incoming neutral and earth. Because of this, be careful when measuring. Use unearthed oscilloscopes. If the motor control unit has a green LED, this will remain lit for as long as there are hazardous voltages present in components.

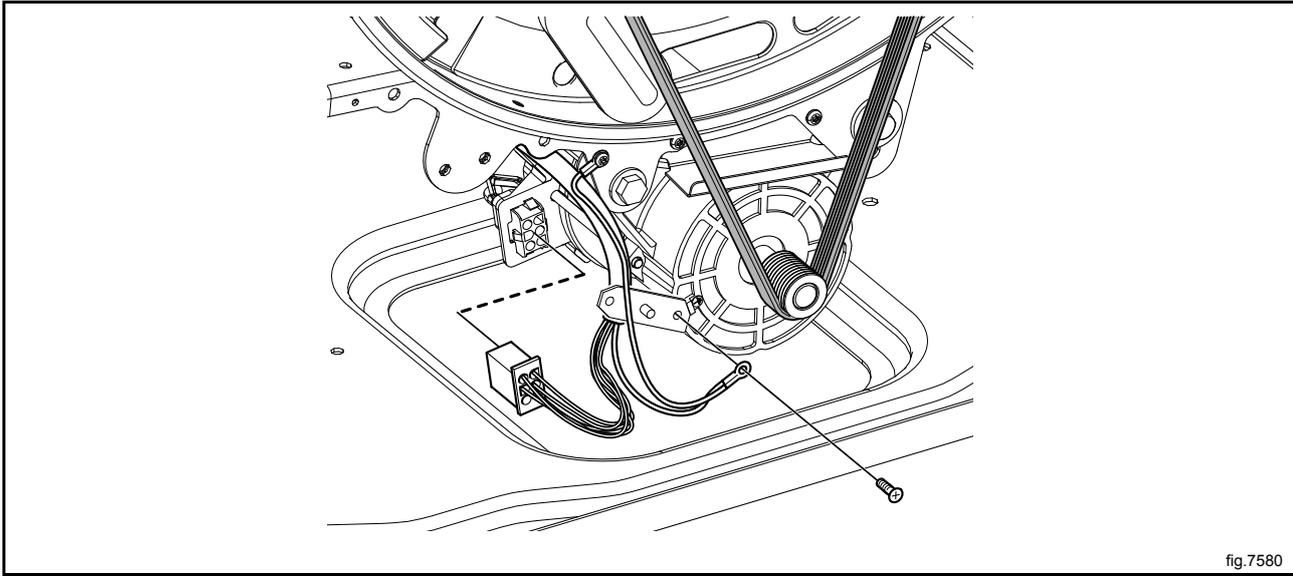
6.2 Replacement of motor

Disconnect the power to the machine.

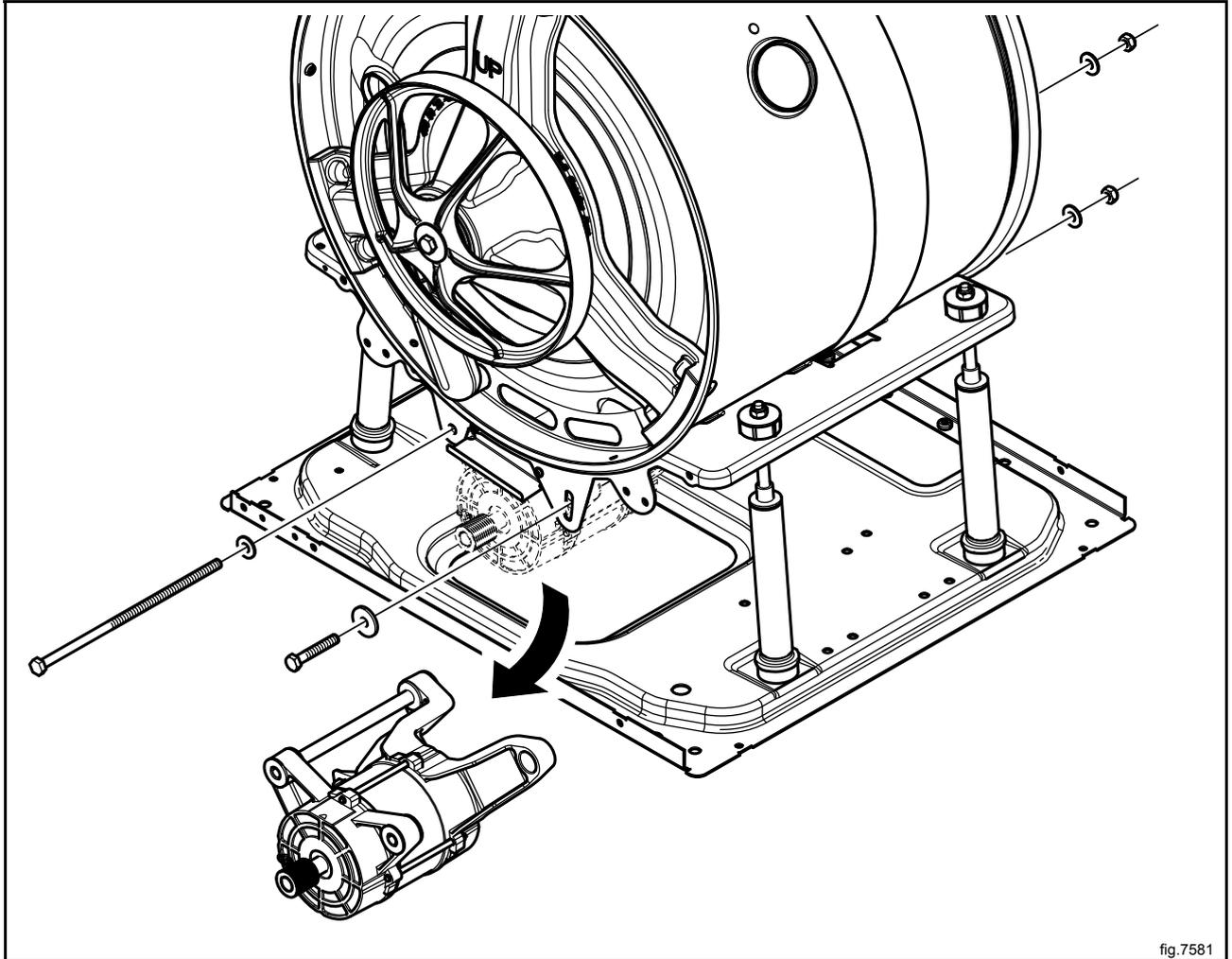
Demount the rear panel.

Disconnect the motor cable and unscrew the earth screw.

Remove the belt.



Demount the motor. Start with the bolt to the right and then the bolt to the left.



Mount the new motor. Start with the bolt to left and then the bolt to the right.

Fasten the belt. Make sure the belt is in position.

Check the belt tension with a frequency meter or similar. The frequency shall be $70 \text{ Hz} \pm 5$. Adjust if necessary with the right screw in the slotted hole.

Connect the motor cable and refit the earth screw.

Mount the rear panel.

7 Heating

7.1 Replacement of heating element

Disconnect the power to the machine.

Demount the rear panel.

Remove the belt (A).

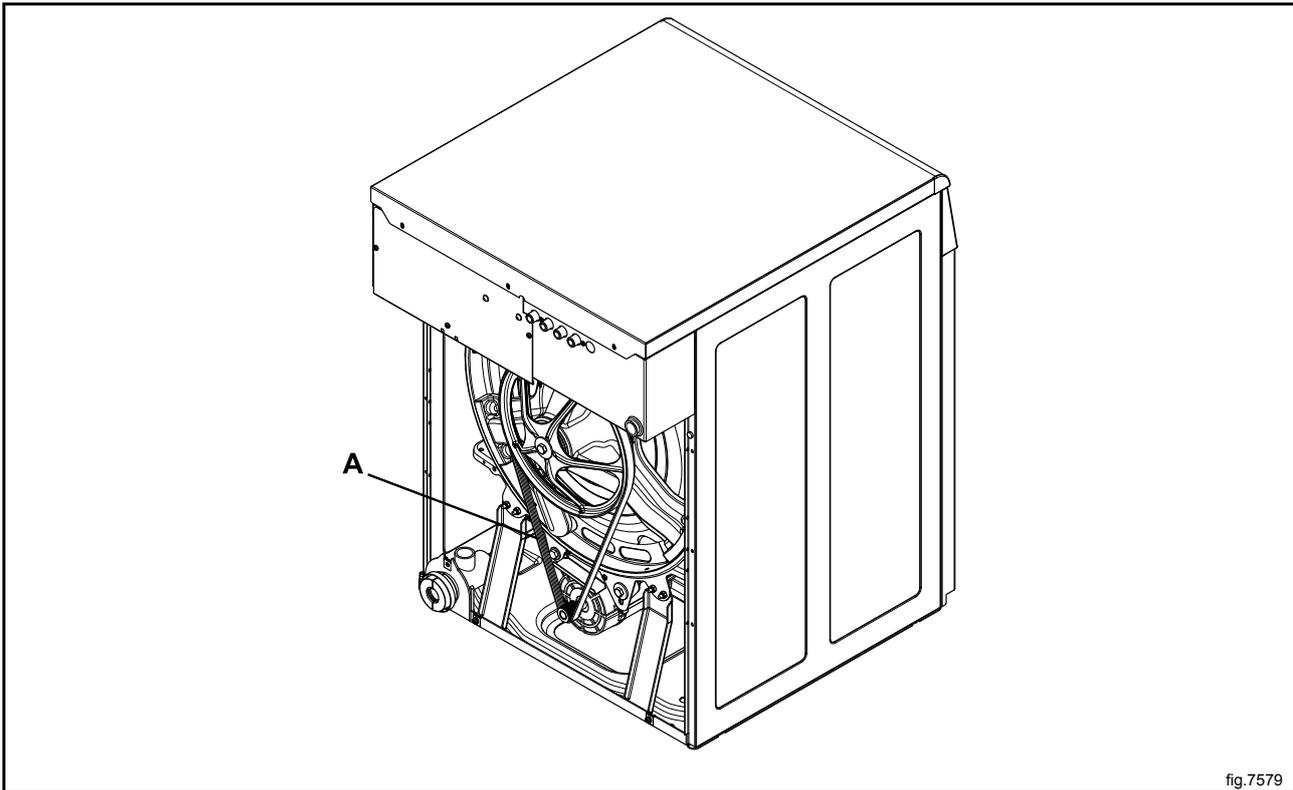


fig.7579

Disconnect the connectors to the heating element.

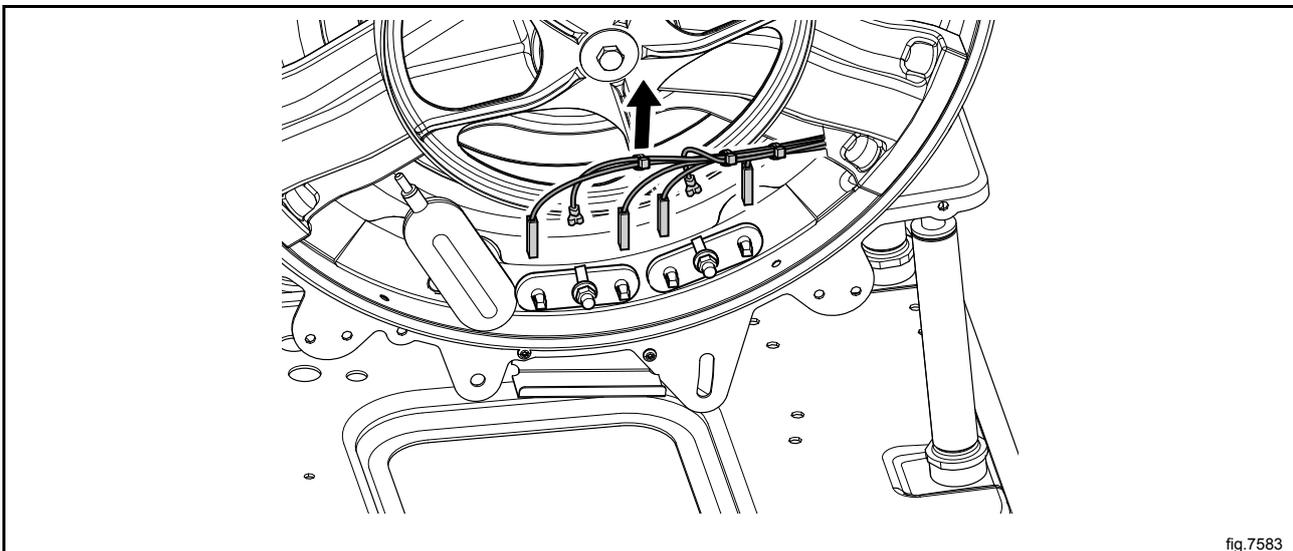
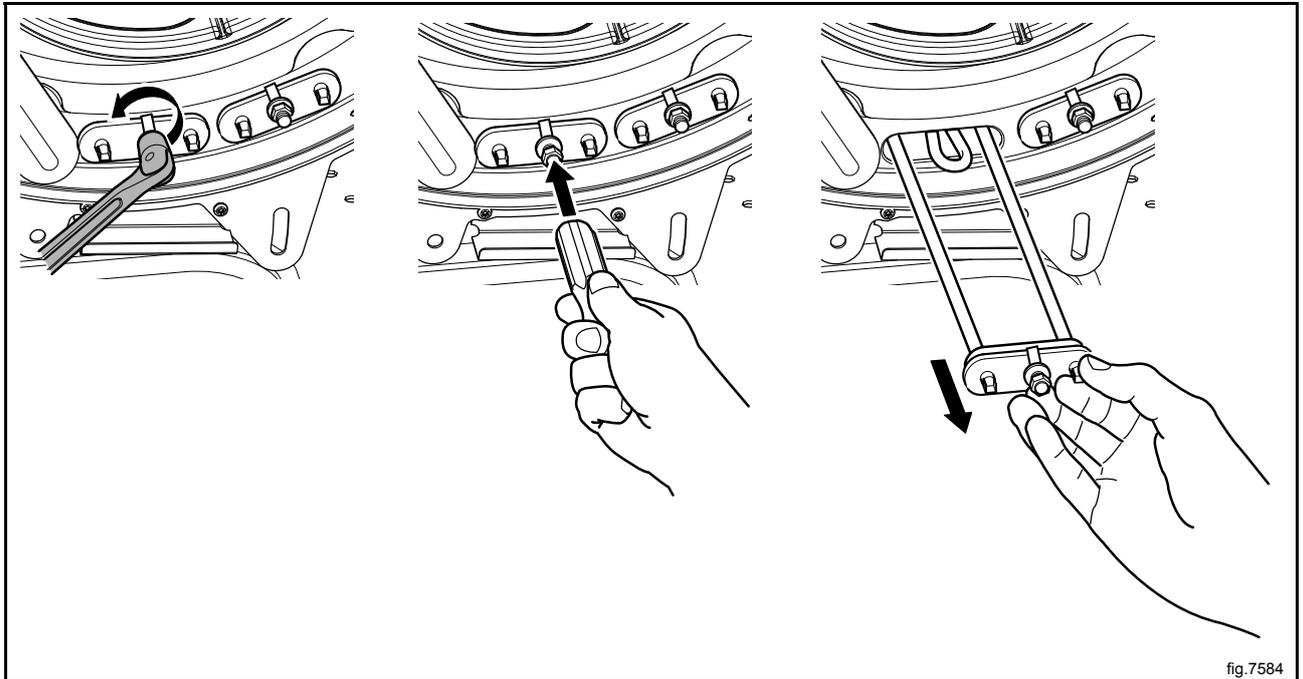


fig.7583

Loosen the bolt to the heating element and gently push on the middle of the heating element to release the flange.

Remove the heating element and insert the new heating element.



Push on the middle of the heating element to get the flange in position.

Fasten the bolt. Use tightening torque 6 Nm.

Reconnect the connectors to the heating element, use the electric schematic supplied with the machine.

8 Drum

8.1 Replacement of drum

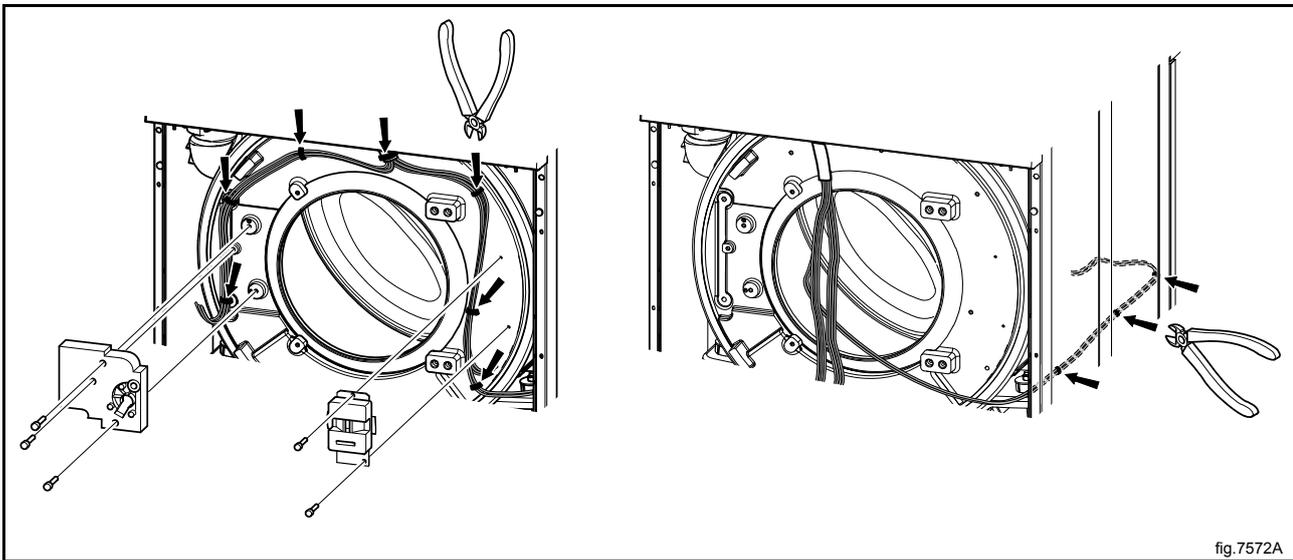
Disconnect the power to the machine.

Demount the top panel, the front— and back panels.

Demount the door.

Demount the trim panel.

Demount the door lock and the rotation guard. Cut the cable ties and disconnect the level sensor, motor cable and earth cable at the back of the machine.



Demount the drain and hoses to the drum. Drain and type of hoses are depending on machine model, for more information refer to the spare parts list).

Demount the air hose and the hose from the detergent compartment on top of the drum.

Remove the belt.

Disconnect the connectors to the heating elements. Loosen the bolt to the heating element and gently push on the middle of the heating element to release the flange. Remove all heating elements.

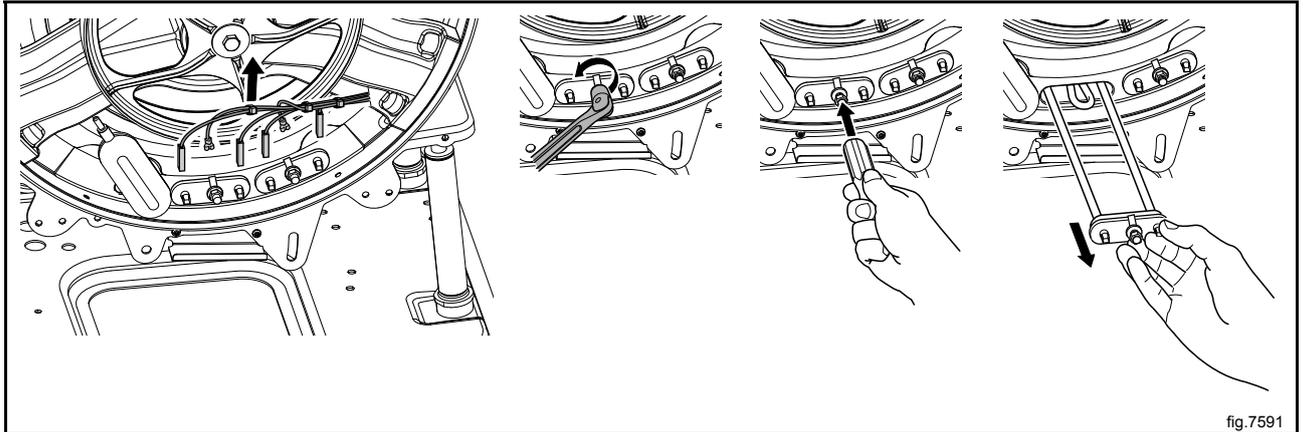


fig.7591

Disconnect the inlet hose and the vent hose from the drum.

Unscrew the screws to the side panels and lift of the cabinet to release the drum package.

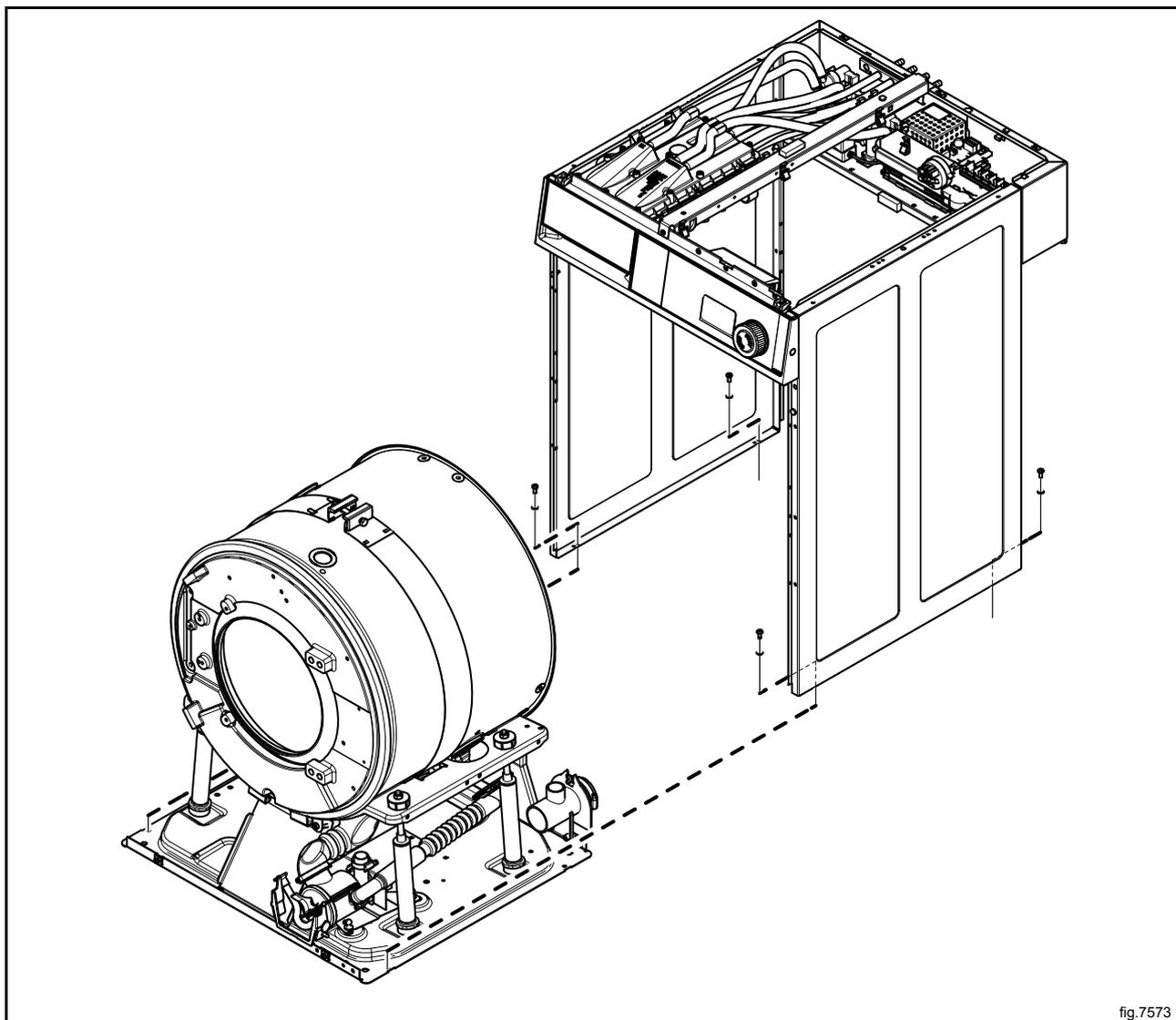
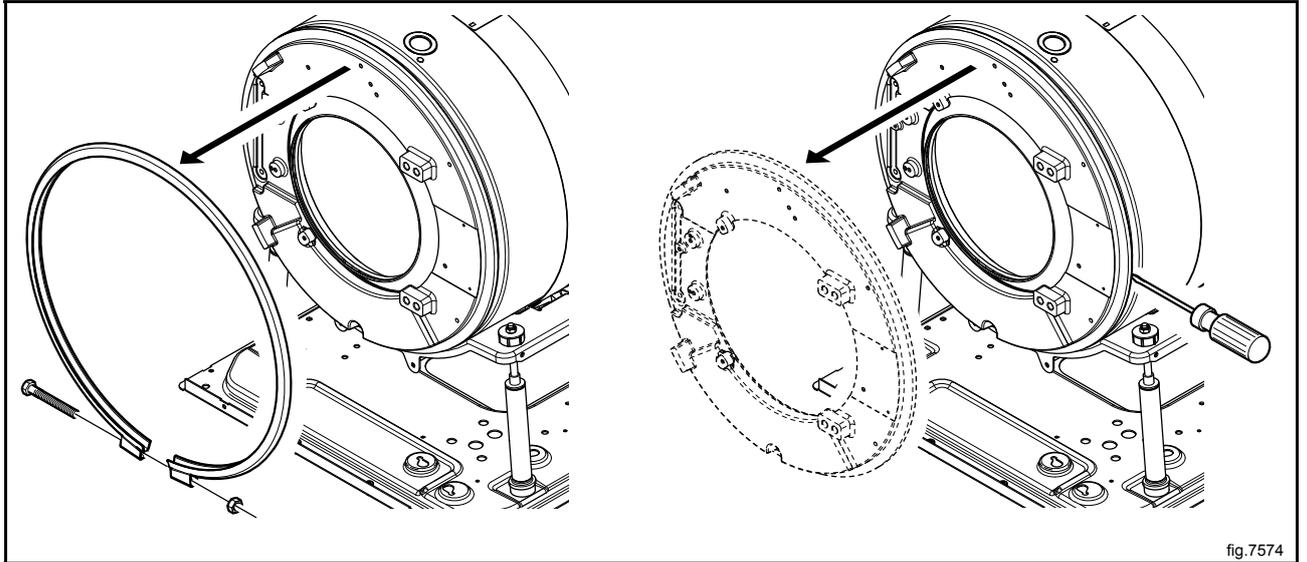
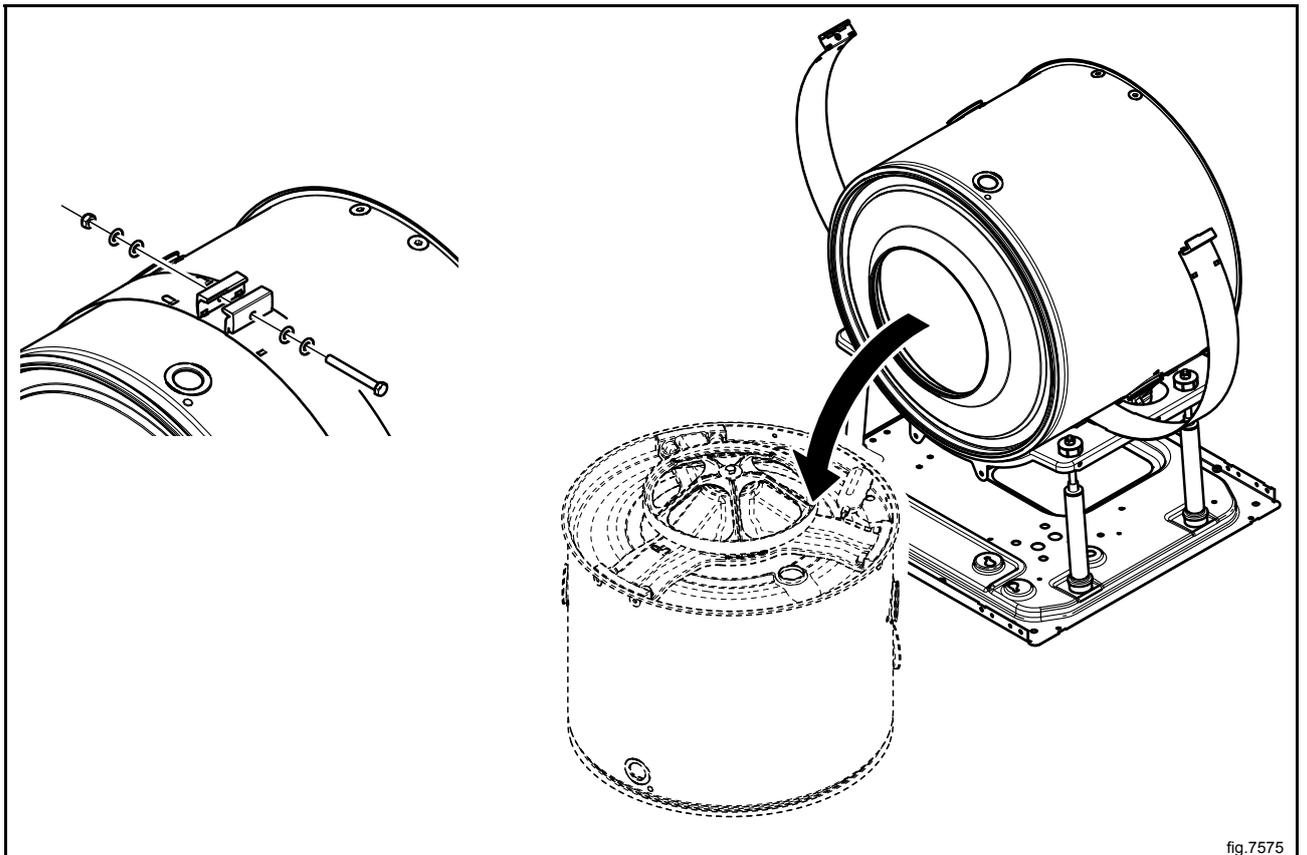


fig.7573

Demount the counter weight by loosening the tension strap.



Loosen the tensioner holding the drum and remove the drum.



Mount the new drum.

Fasten the tensioner and mount the counter weight with the tension strap.

Mount the heating elements, hoses and drain in the same position as before.

Fasten the belt. Make sure the belt is in position. Check the belt tension with a frequency meter or similar. The frequency shall be $70 \text{ Hz} \pm 5$. Adjust if necessary.

Remount the cabinet.

Connect the inlet hose and the vent hose to the drum.

Remount the level sensor, motor cable and earth cable at the back of the machine.

Remount the door lock and the rotation guard.

Fasten the cables with cable ties in the same position as before.

Remount the trim panel and the door.

Remount the top panel, the front— and back panels.

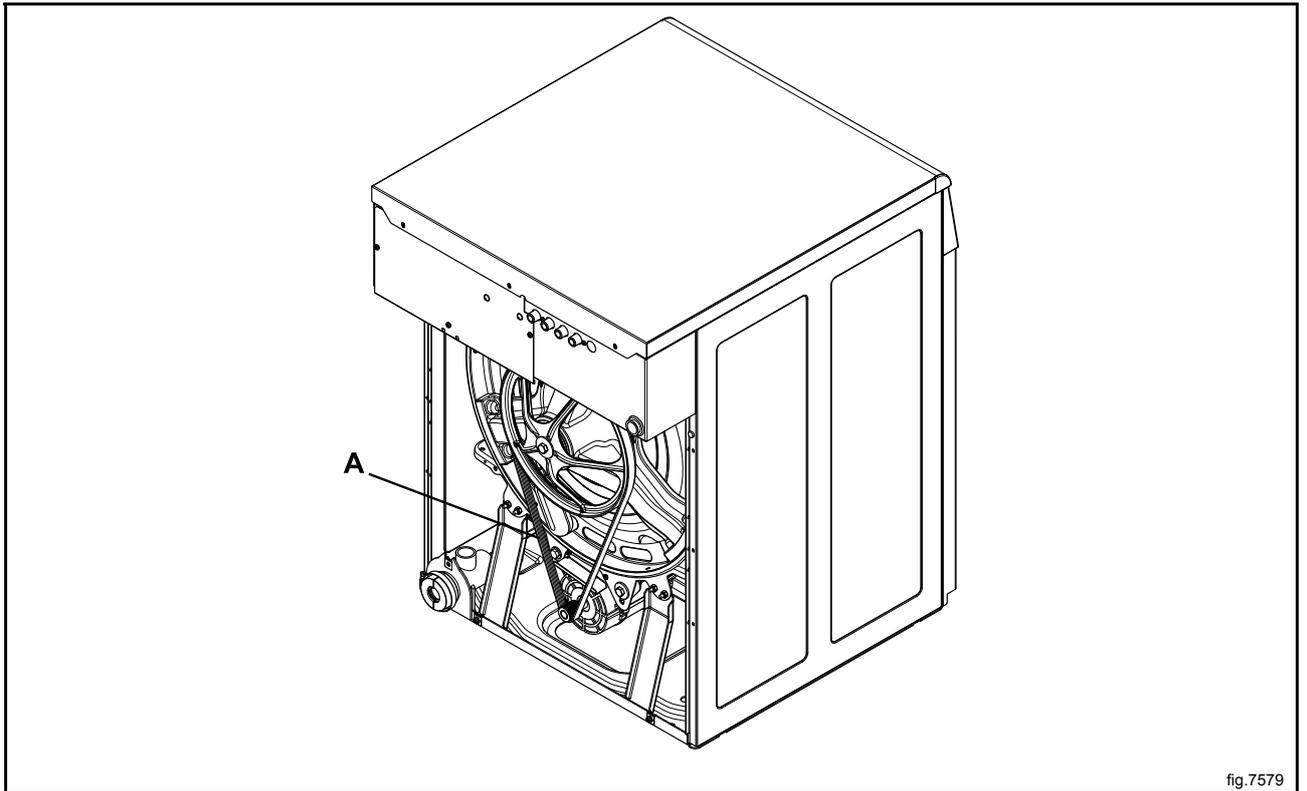
Connect the power to the machine.

8.2 Replacement of the belt

Disconnect the power to the machine.

Demount the back panel.

Remove the belt (A) and put the new belt in position. Check the belt tension with a frequency meter or similar. The frequency shall be $70 \text{ Hz} \pm 5$. Adjust if necessary with the right screw in the slotted hole.



Remount the back panel.

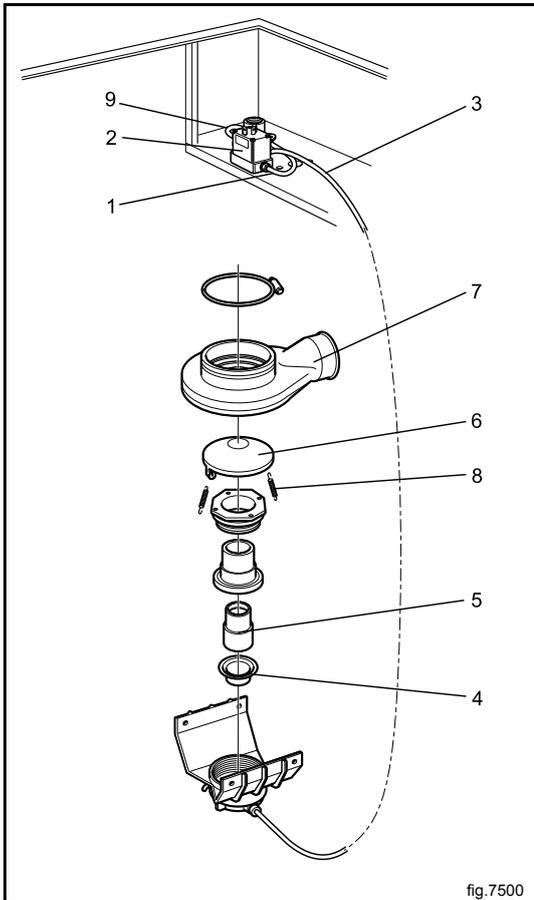
Connect the power to the machine.

9 Drain

9.1 Drain valve

The water pressure in the cold water intake is used for closing the drain valve. There is a hose (1) connected between the water intake and the control valve (2). When the control valve is activated it opens and lets water into the supply line (3) which is connected to the drain valve. The water presses up a rubber membrane (4) and a plunger (5) with a pressure plate (6) which closes the valve's rubber membrane (7).

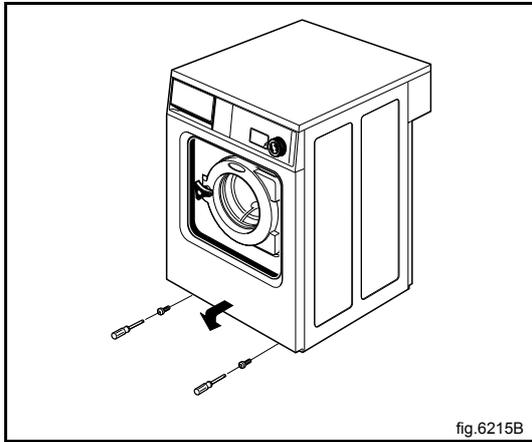
When the control valve shuts off water pressure to the drain valve the springs (8) pull back the plunger. The return water passes the control valve and runs out into the drain via the return hose (9).



Replacement of drain valve

Disconnect the power to the machine.

Demount the front panel.

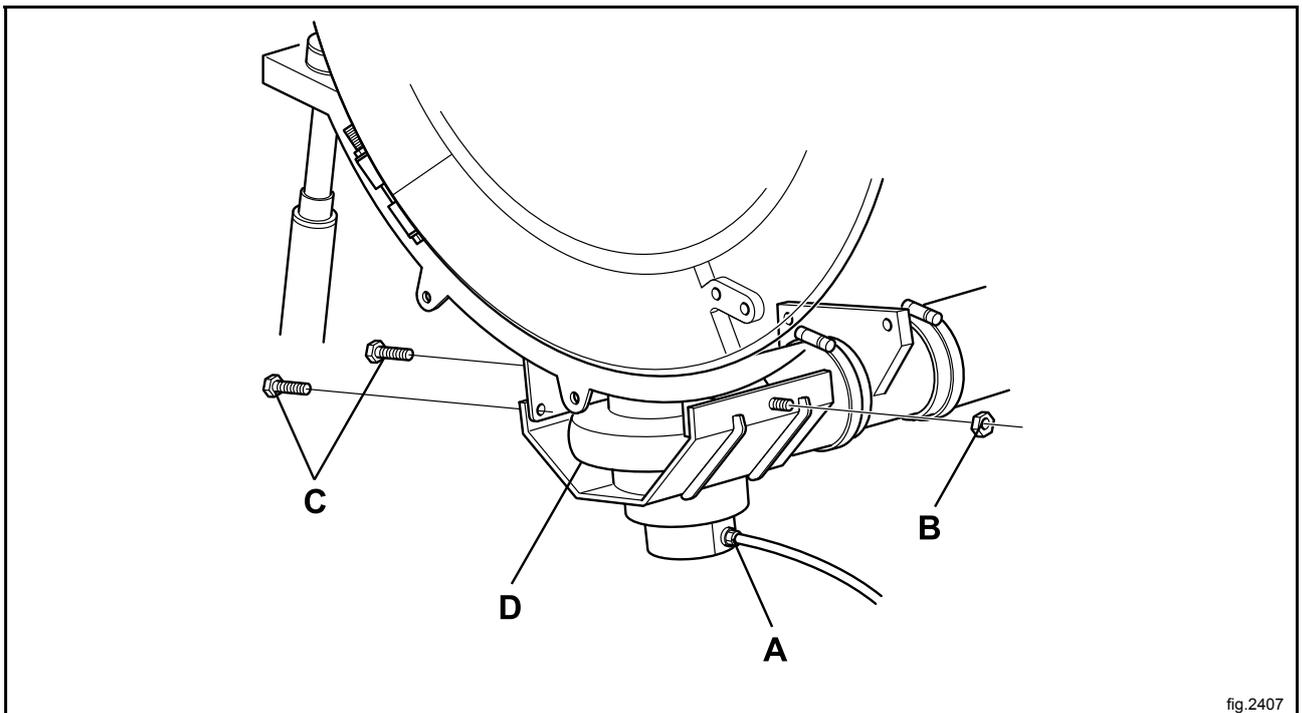


Demount the door.

Demount the trim panel.

Remove the hose from the valve's nipple for water supply (A).

Remove the nut but leave the bolt (B) in place, securing the drain valve to the right-hand side of the saddle. Remove the bolts (C) securing the drain valve on the left-hand side of the saddle. Pull down the left side of the drain valve a little and then lift the drain valve off from the right-hand bolt. Demount the drain valve from the hose (D).



Mount the new drain valve.

Mount the drain valve onto the right-hand bolt (B) on the saddle. Mount the bolts (C) on the left-hand side of the saddle. Tighten the bolt (B).

Mount the hose for water supply (A).

Mount the hose from the drum (D) on the drain valve. The rubber edge on the hose shall be pulled down over the valve cover. Check that the hose edge snaps into place over the lower edge of the cover.

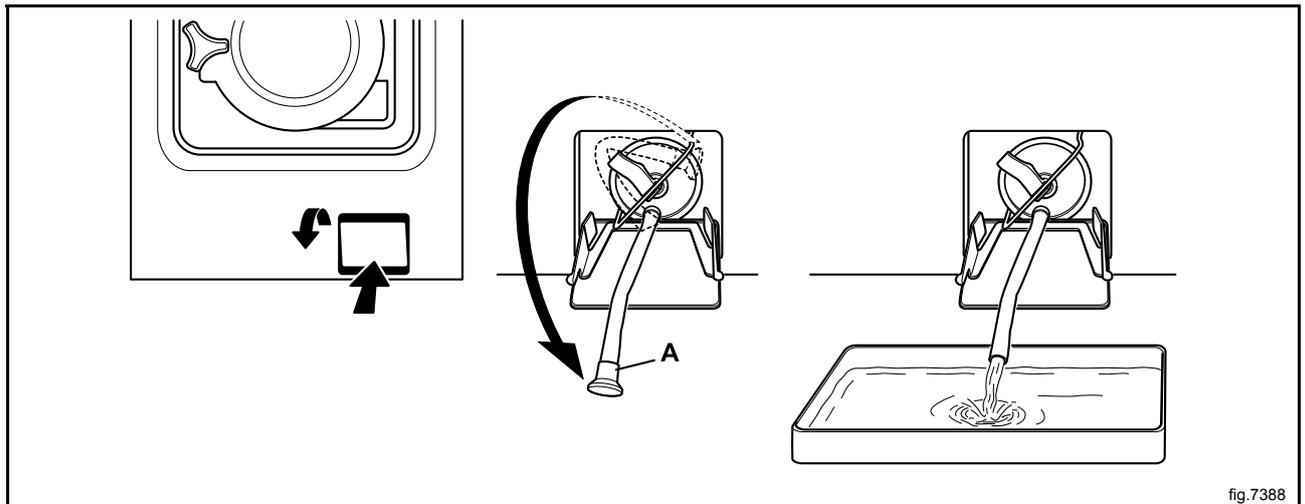
Mount the trim panel, the door and the front panel.

9.2 Drain pump

The drain pump is located under the drum. Access the drain pump through a door on the front of the machine. The motor which drives the pump is activated from the timer.

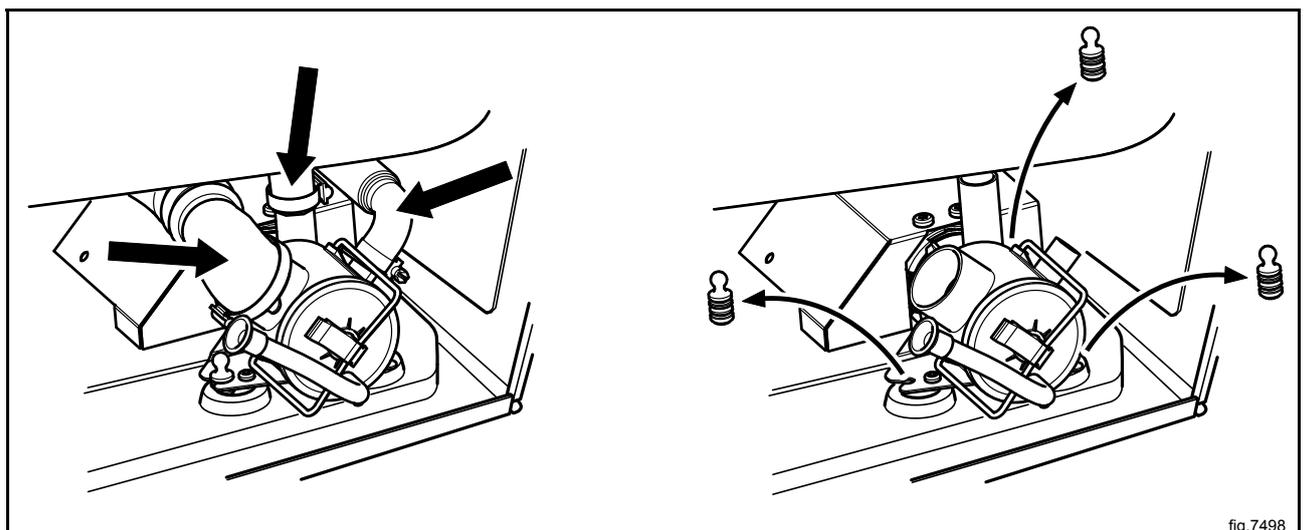
Replacement of drain pump

Open the door to the drain pump and pull out the hose. Remove the plug (A) to empty the drain into for example a baking plate or similar.



Demount the hoses to the drain pump.

Demount the plastic plugs holding the pump in position and remove the drain pump.



Mount the new drain pump and fasten the plastic plugs.

Remount the hoses and make sure the connections are tight.

Refit the plug (A) and close the door.

10 Detergent container

Water connections into the detergent container are fitted with dispersers which mix the detergent thoroughly with water and flush the compartments clean. From the bottom of the detergent container the water is flushed down into the drum.

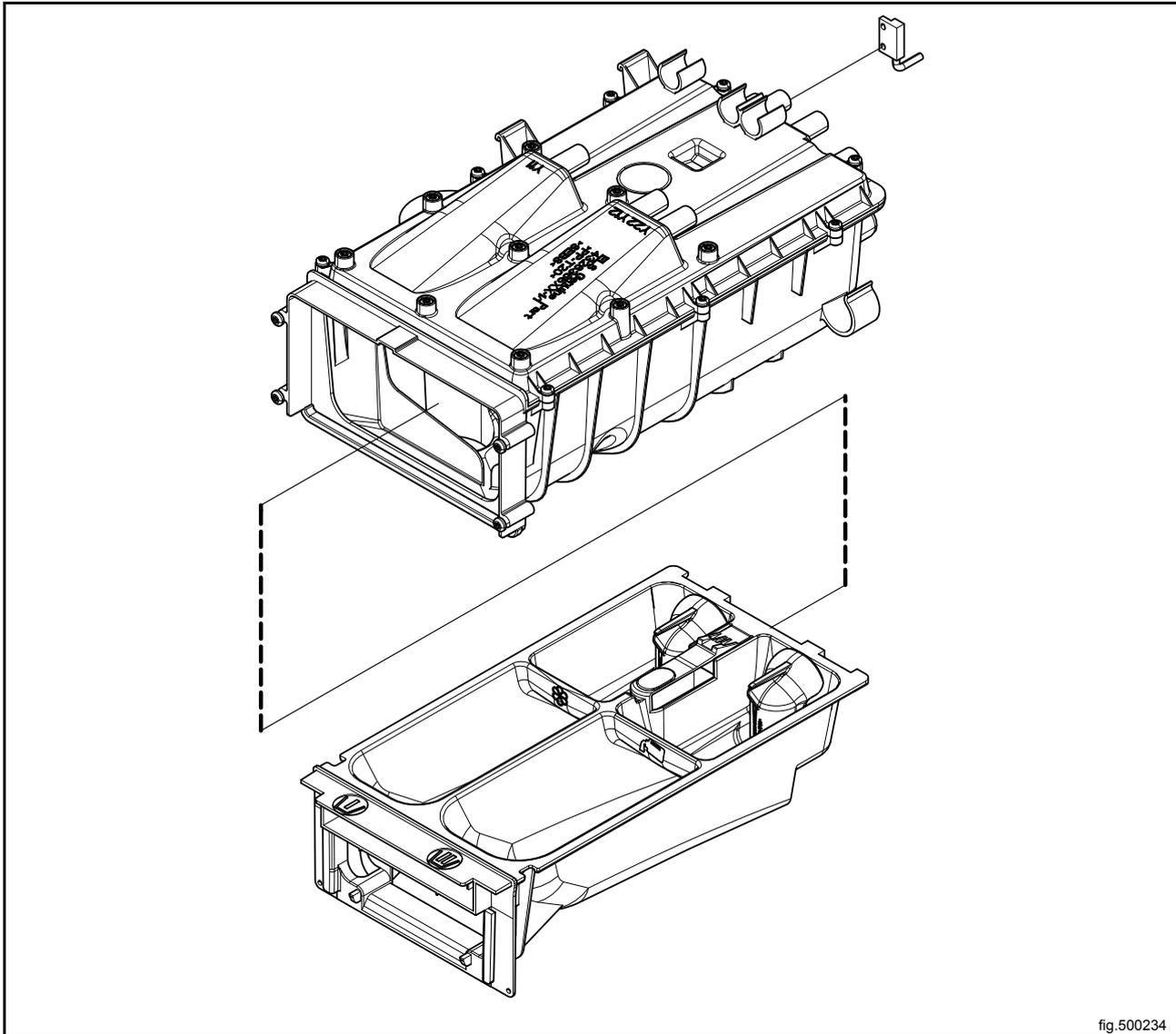
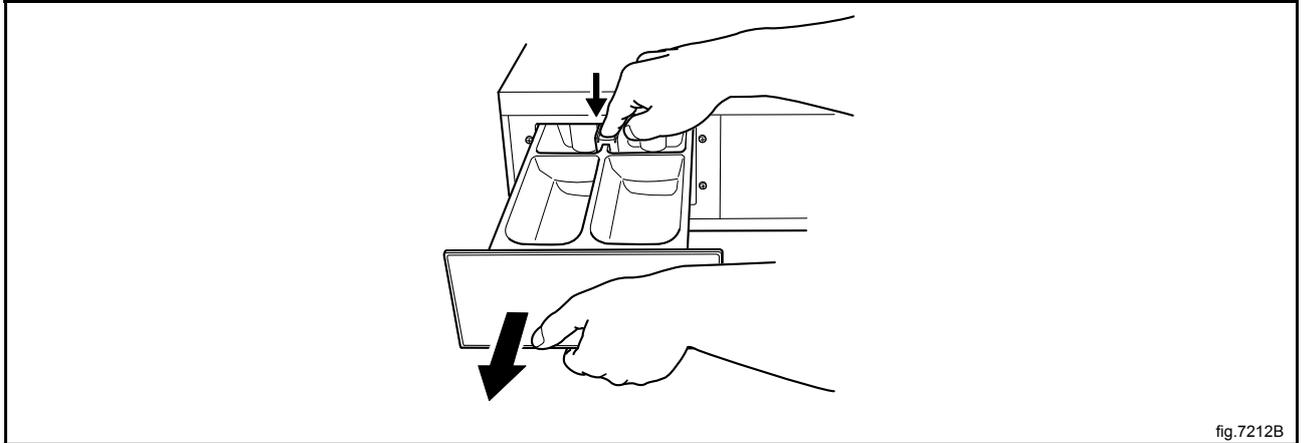


fig.500234

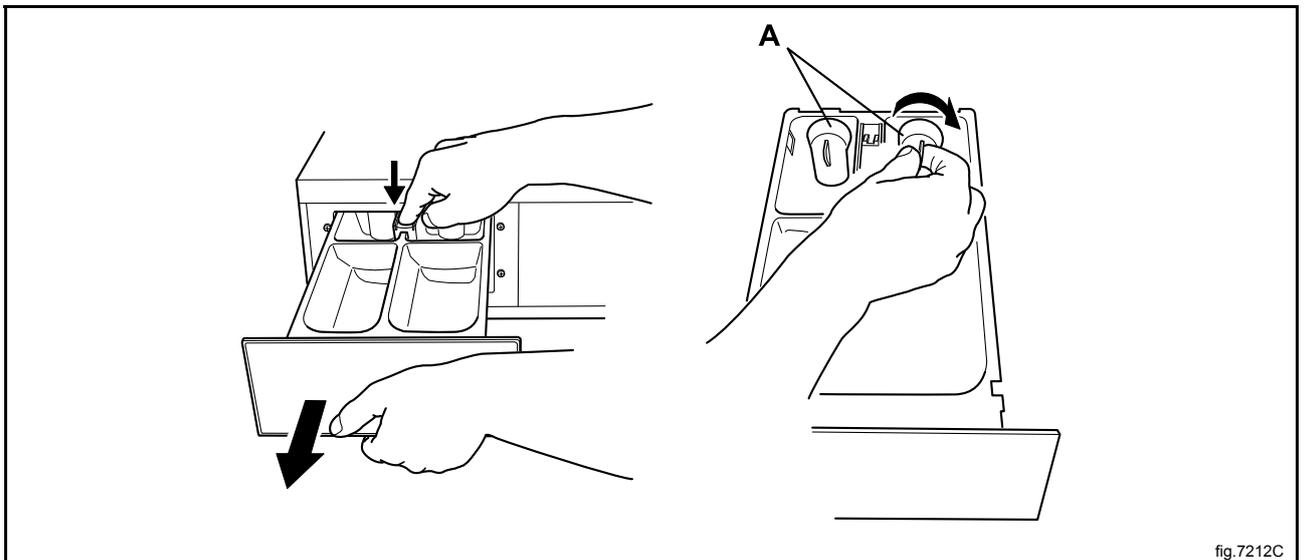
10.1 Replacement of detergent container

Remove the detergent container from the machine and replace with the new one.



10.2 Replacement of siphon

Remove the detergent container from the machine and remove the siphon to be replaced. Mount the new siphon.



10.3 Replacement of reed switch

Disconnect the power to the machine.

Demount the top panel.

Disconnect the cable from the program unit.

Remove the reed switch by pulling it out a bit and down from its position.

Mount the new reed switch and make sure it is in position. Connect the cable in the same position as before.

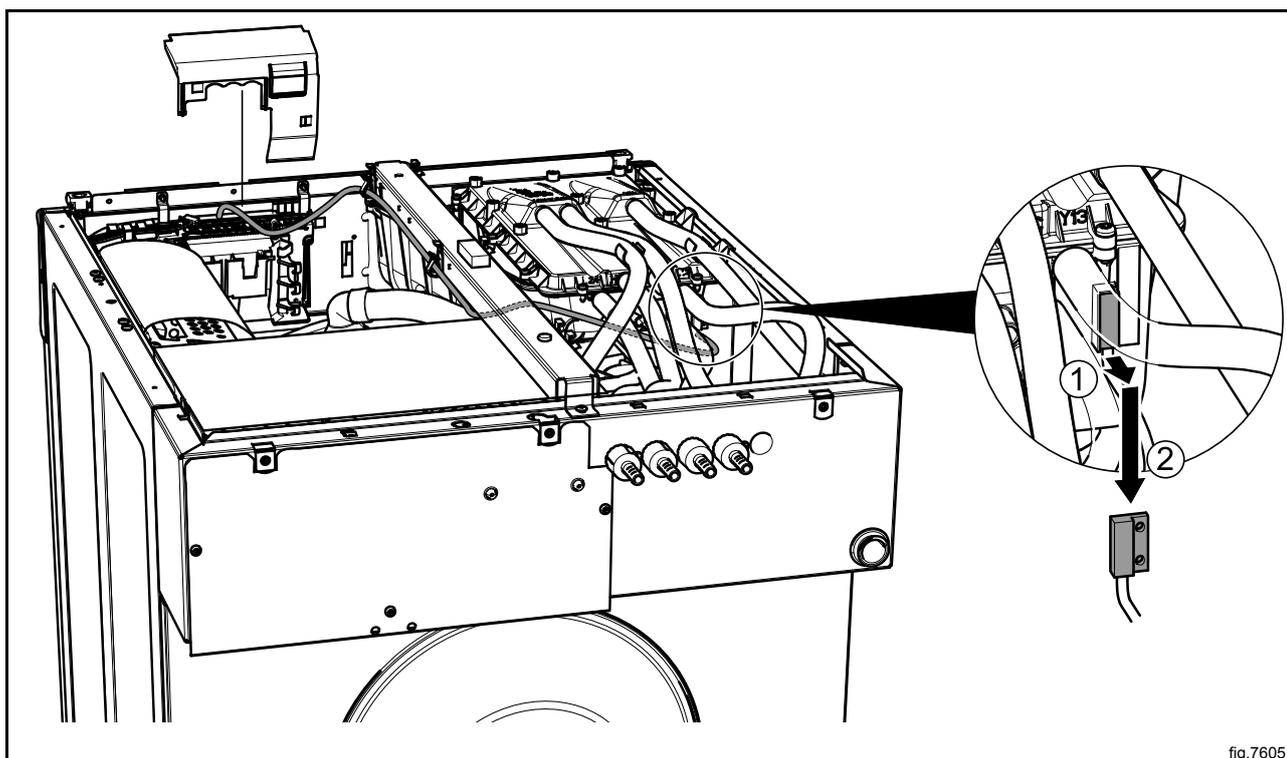


fig.7605

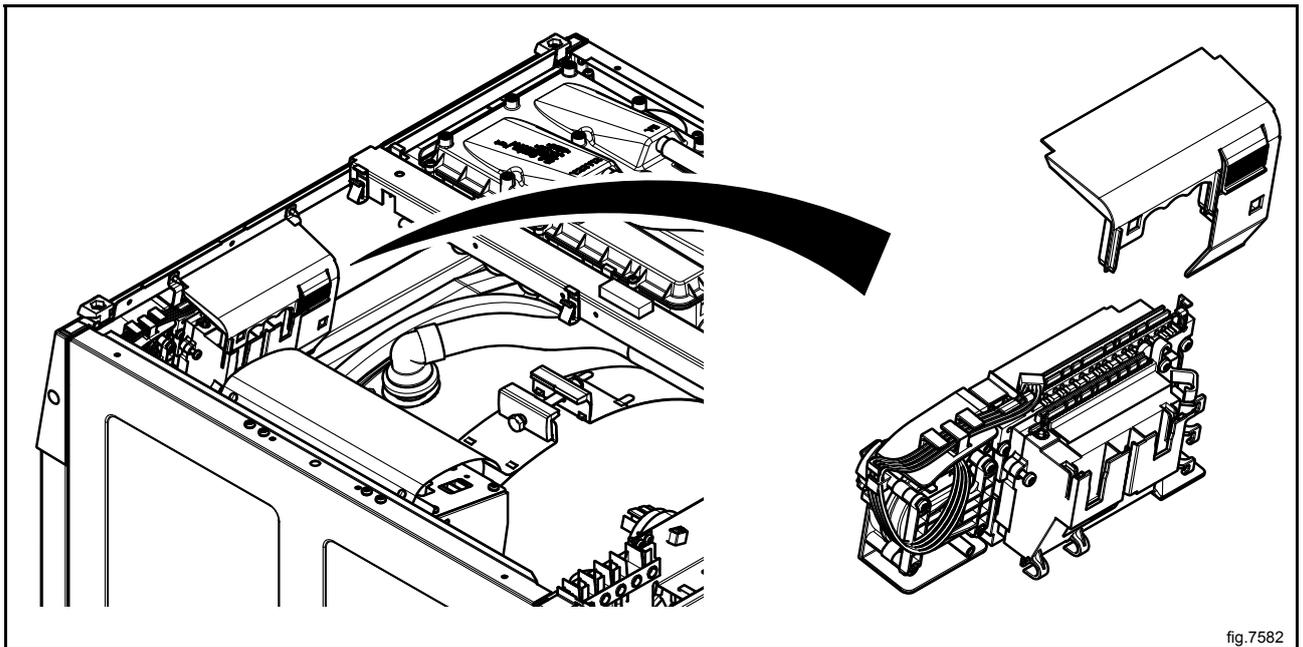
11 Control panel

11.1 Program unit

11.1.1 Description

The program unit is electronic and comprises a circuit board containing microprocessor, program memory, serial interface to the motor control, I/O-boards etc.

The program unit receives its power from a separate power supply unit.



The program unit receives information from the I/O boards about inputs like temperature sensor, level sensor, door status and outputs like drum, water valves, drain and heat control.

Control panel

11.1.2 Connections

The program unit board has the following connections:

Board connector	Function
M-COM	Communication, motor control
D-BUS	Databus
D-BUS	Databus
TACHO	Tachometer
COIN	Coin meter (coin 1, coin 2, blocking)
EMERG / INP 1	Input, reed switch detergent box
FREE / INP 2	Free program (key switch) / Input
RS 232	Serial communication
ENC	Control knob (pulses)
USB TYPE B	Connection for software / service download
PIN CONNECTOR	Panel sign connector
LEVEL	Level control
DO	Digital output
OUTP	Output
DOOR IN	Door lock
P-BUS	Power bus
TEMP	Temp sensor

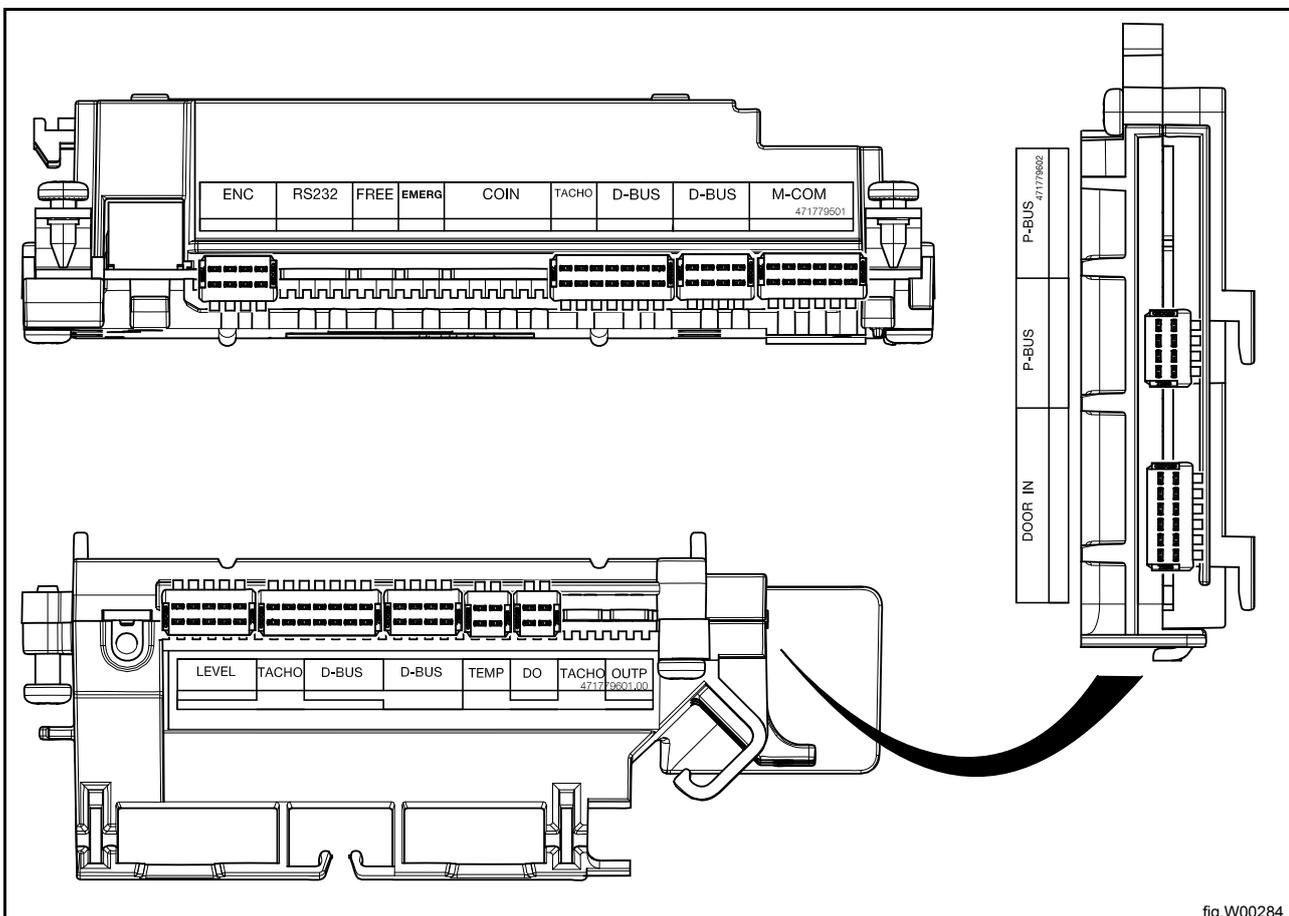


fig.W00284

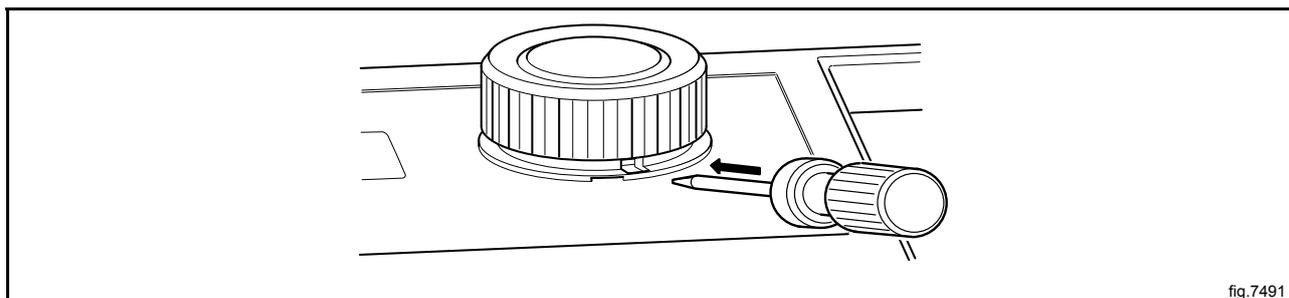
11.1.3 Replacement of program unit

Disconnect the power to the machine.

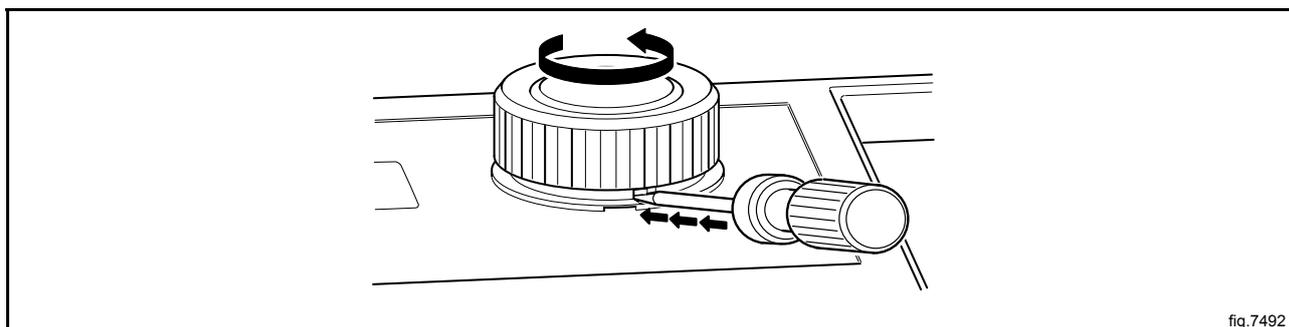
Demount the top panel.

Demount the control knob

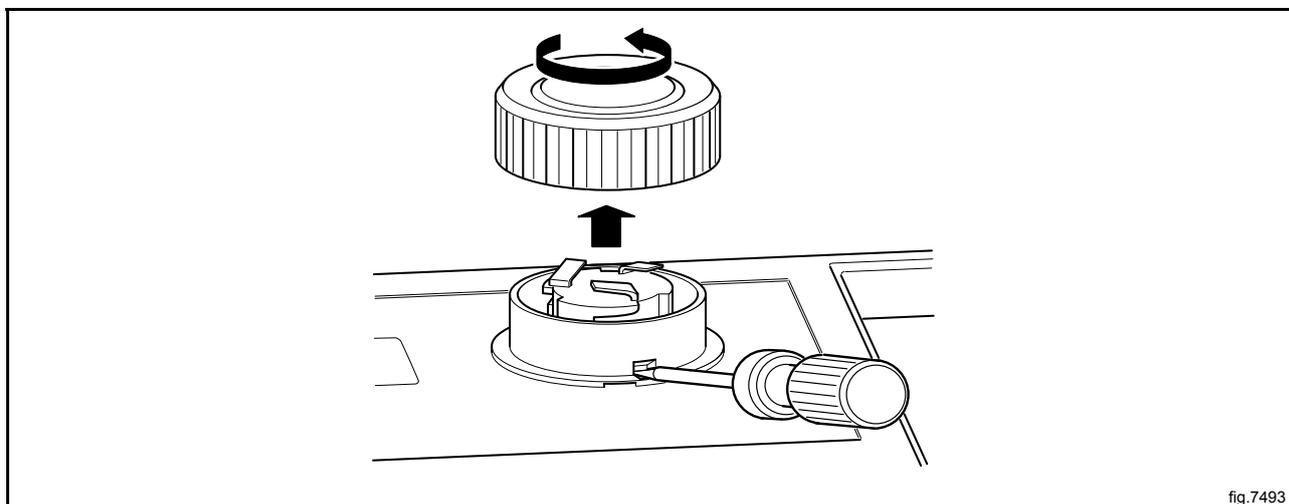
Insert a screwdriver in the upper hole.



Gently push the screwdriver inwards and turn the control knob counter-clockwise until the screwdriver goes further in.



Continue turning a quarter of a turn until it is possible to remove the control knob.



Demount the cover ring

When the control knob is removed, insert the screwdriver in the lower hole and press gently. Turn the cover ring counter-clockwise until it is possible to remove the cover ring.

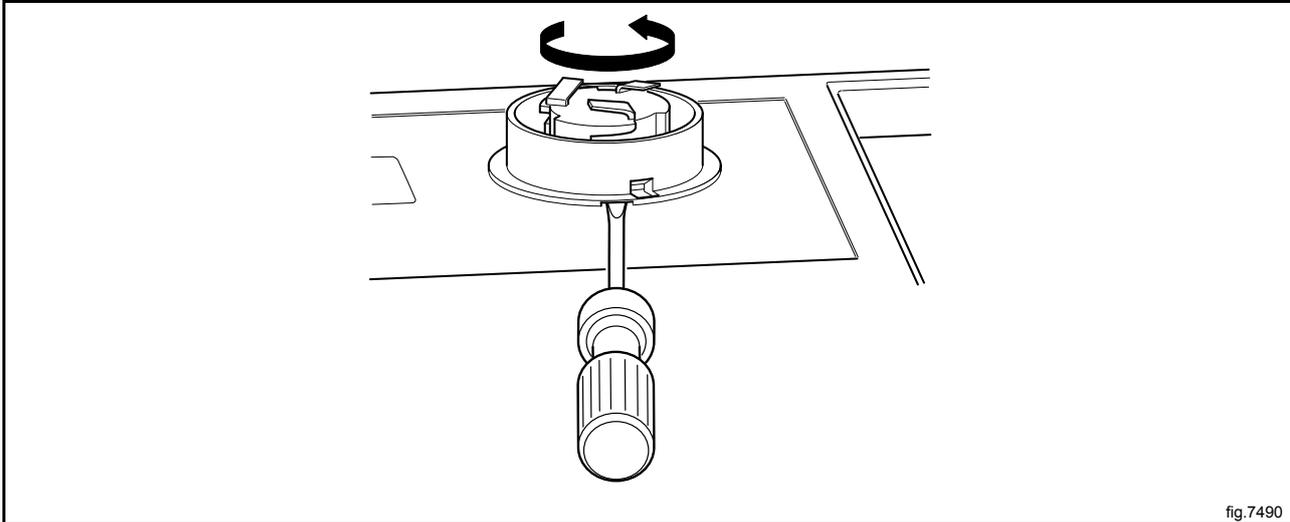


fig.7490

Demount the program unit

Demount the cover to the CPU and disconnect the cables.

Loosen the screws holding the program unit onto the panel and demount the program unit.

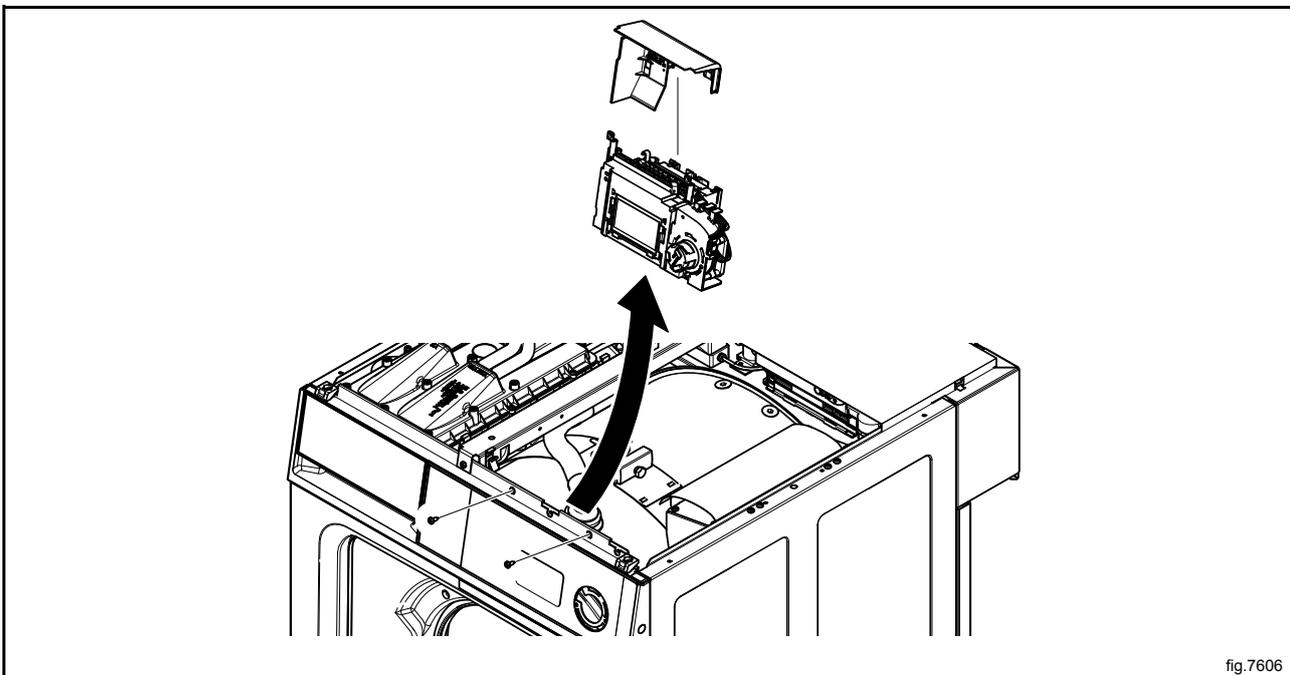
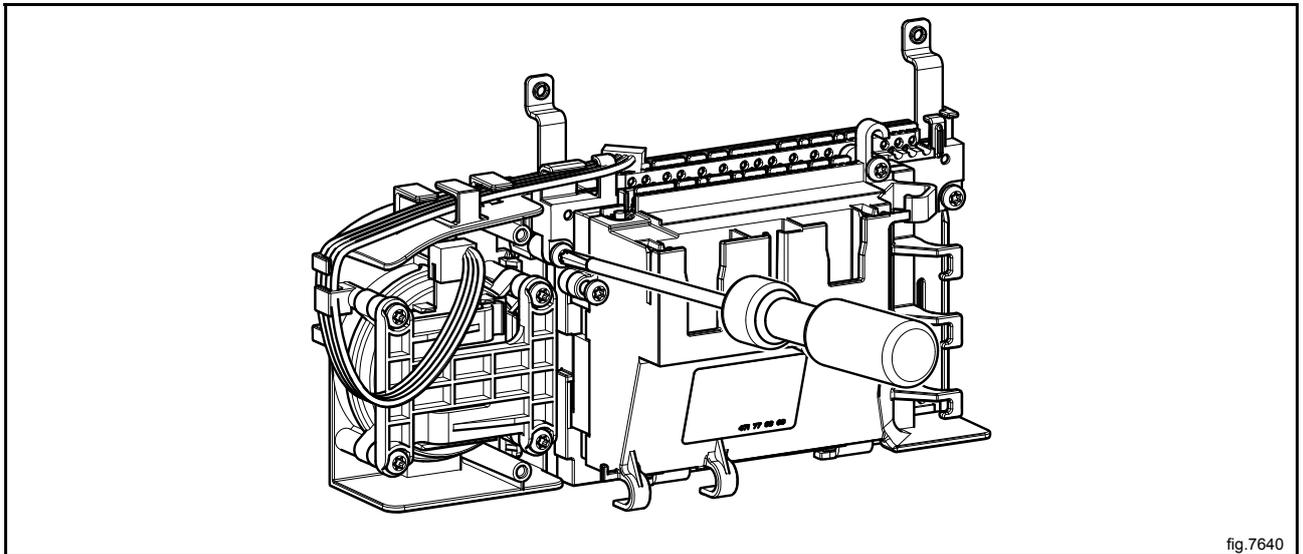


fig.7606

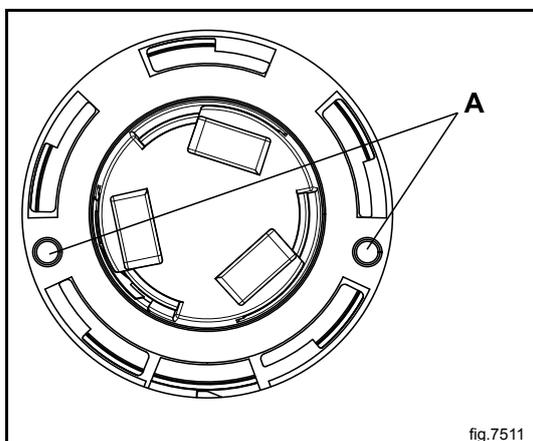
Demount the control knob unit from the program unit by unscrewing the screw a bit (4–5 mm) until the control knob unit loosens.



Mount the new program unit

Start by mounting the control knob unit on the program unit. Fasten the screw.

Mount the program unit with the CPU part. Mount the program unit on the control panel and make sure that the guide pins are in position. Fasten the screws to the panel.



Connect the cables and remount the cover to the CPU.

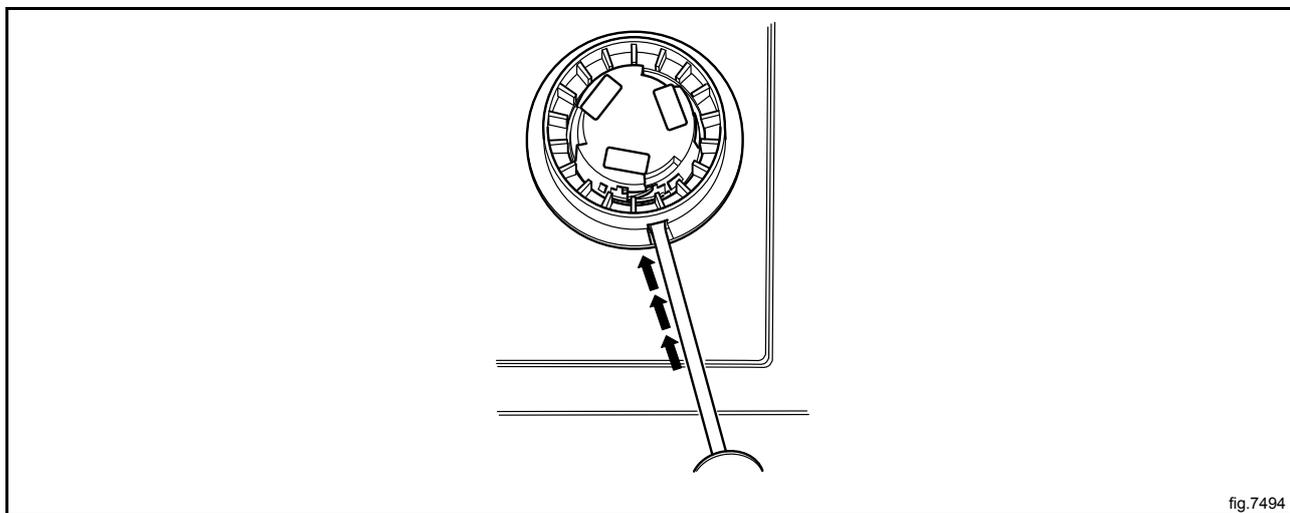
Mount the cover ring and the control knob

Mount the cover ring and rotate it clockwise until it is in position.

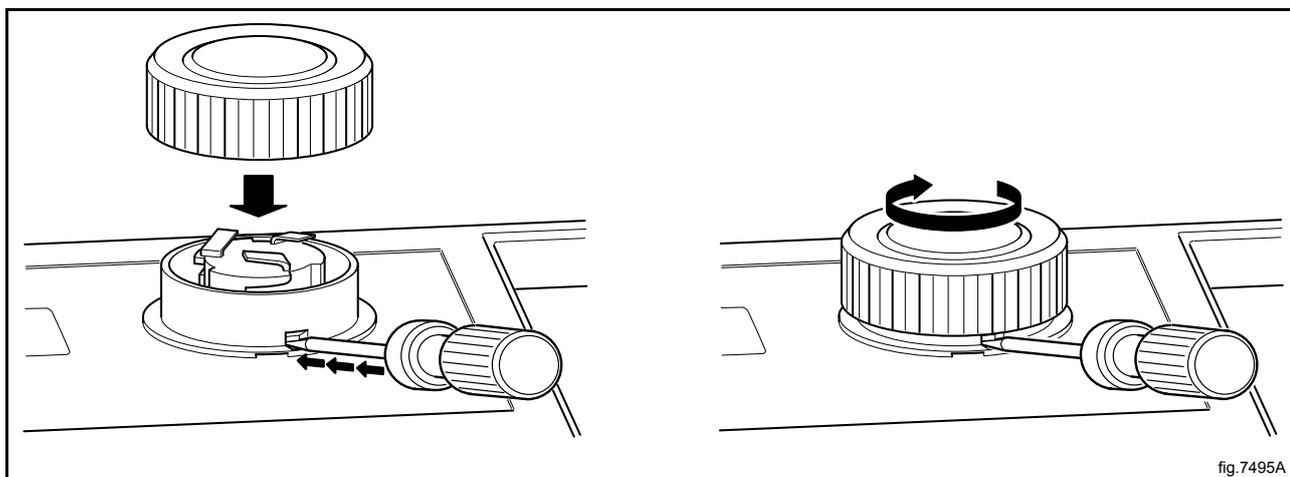
Control panel

Rotate the inner knob until the locking device is pointing downwards.

Insert the screwdriver and press the locking device.



Mount the control knob on the inner knob. Continue to press with the screwdriver and turn the control knob clockwise until it stops when it is in position.

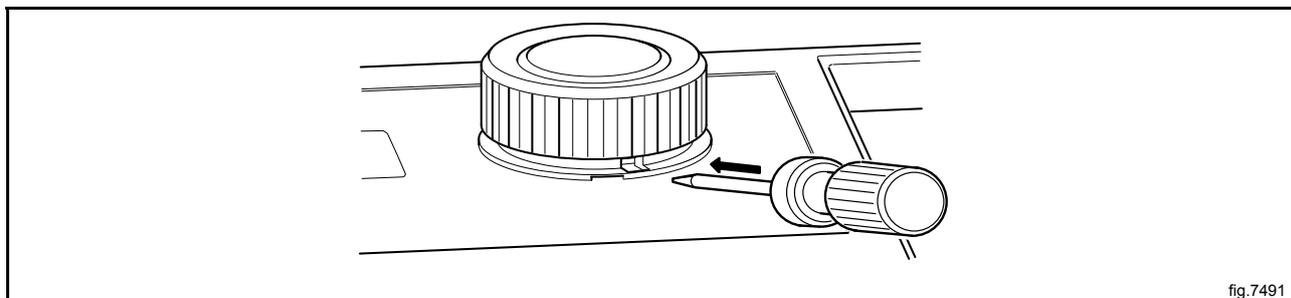


11.2 Control knob

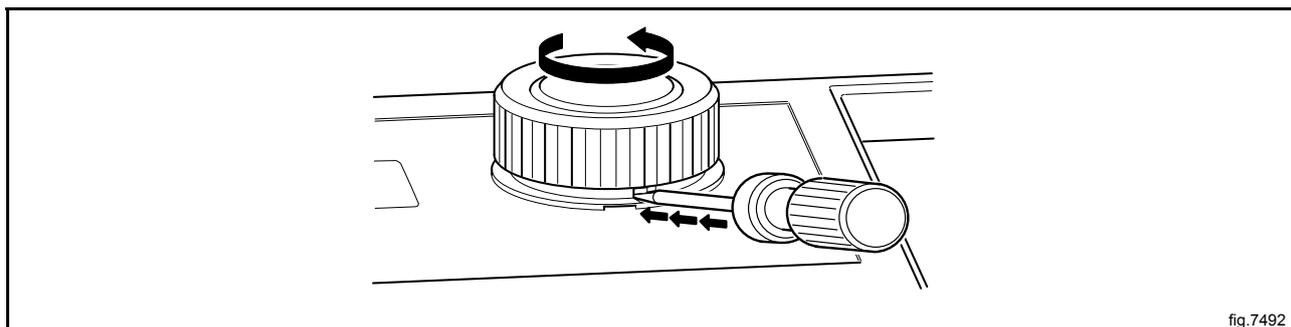
11.2.1 Replacement of control knob

Disconnect the power to the machine.

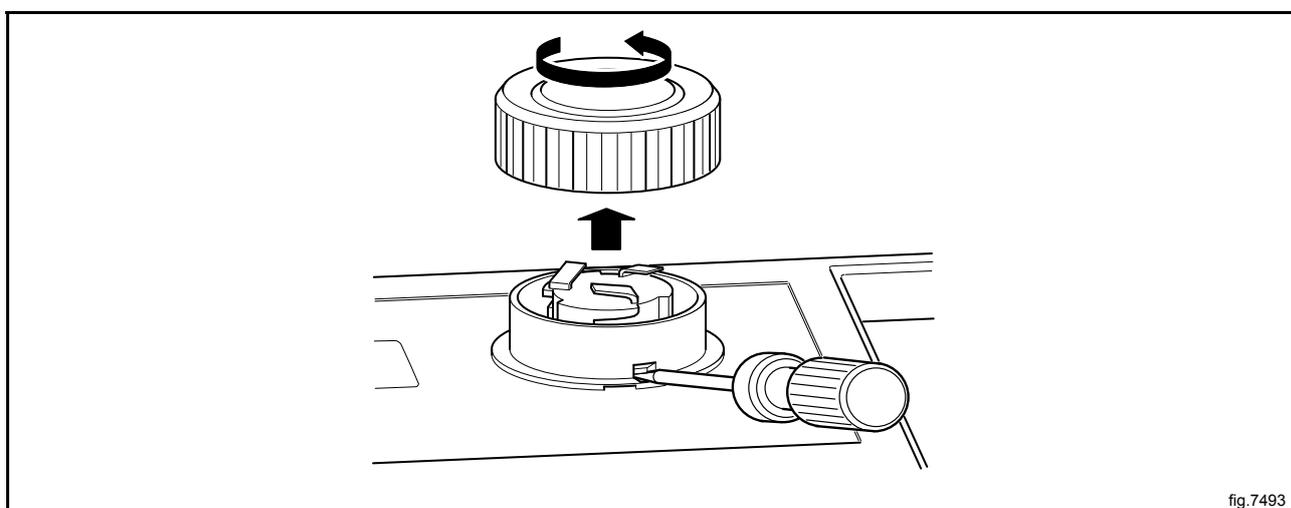
Insert a screwdriver in the upper hole.



Gently push the screwdriver inwards and turn the control knob counter-clockwise until the screwdriver goes further in.



Continue turning a quarter of a turn until it is possible to remove the control knob.



Cover ring

When the control knob is removed, insert the screwdriver in the lower hole and press gently. Turn the cover ring counter-clockwise until it is possible to remove the cover ring.

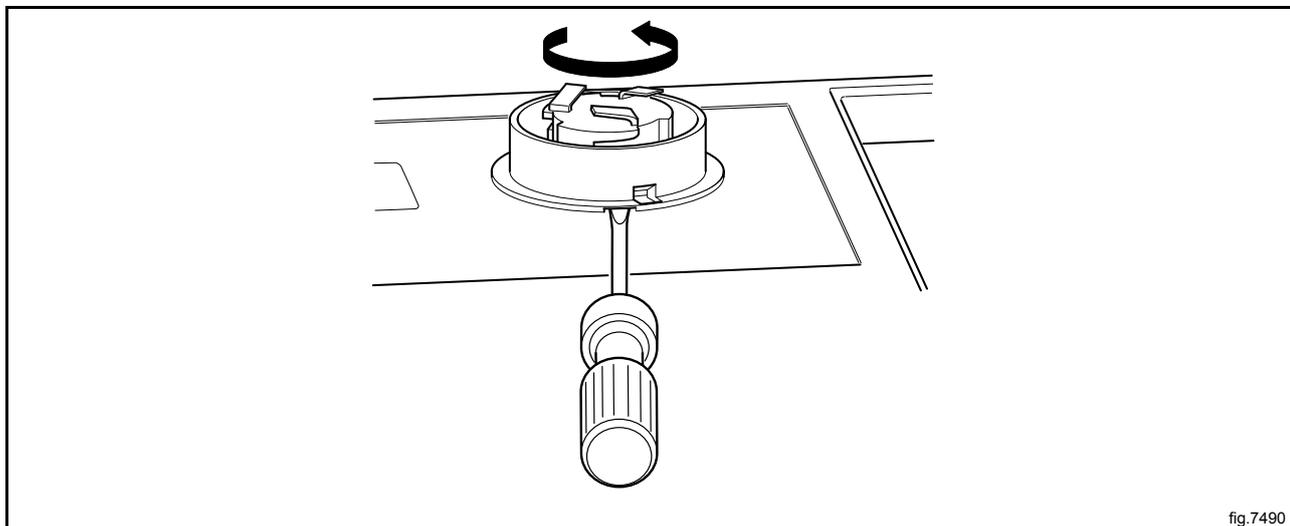


fig.7490

Mount the new cover ring and rotate it clockwise until it is in position.

Rotate the inner knob until the locking device is pointing downwards.

Insert the screwdriver and press the locking device.

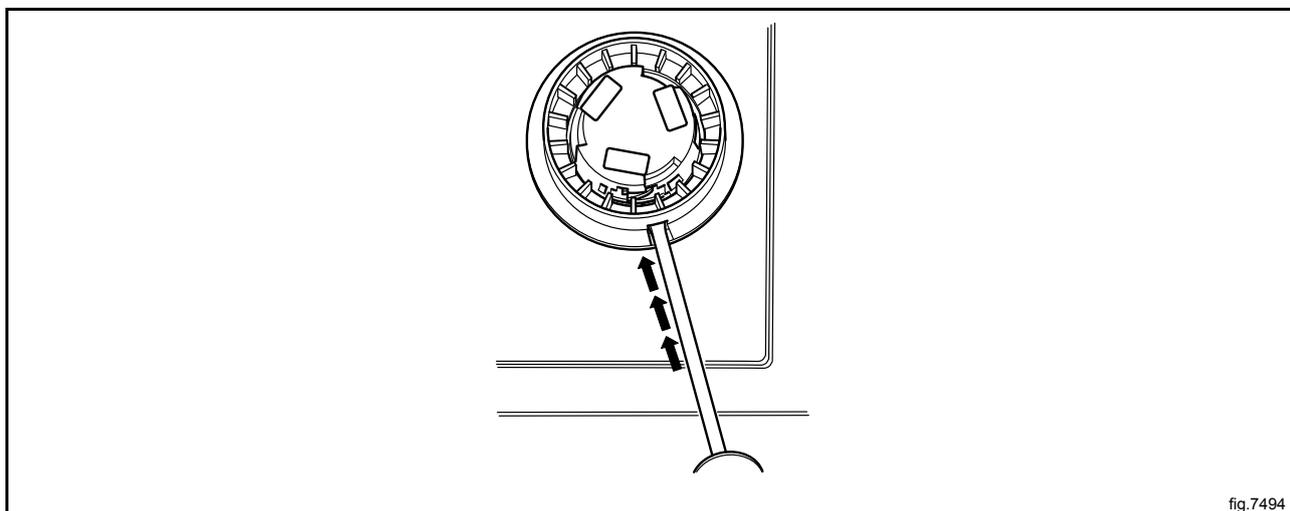
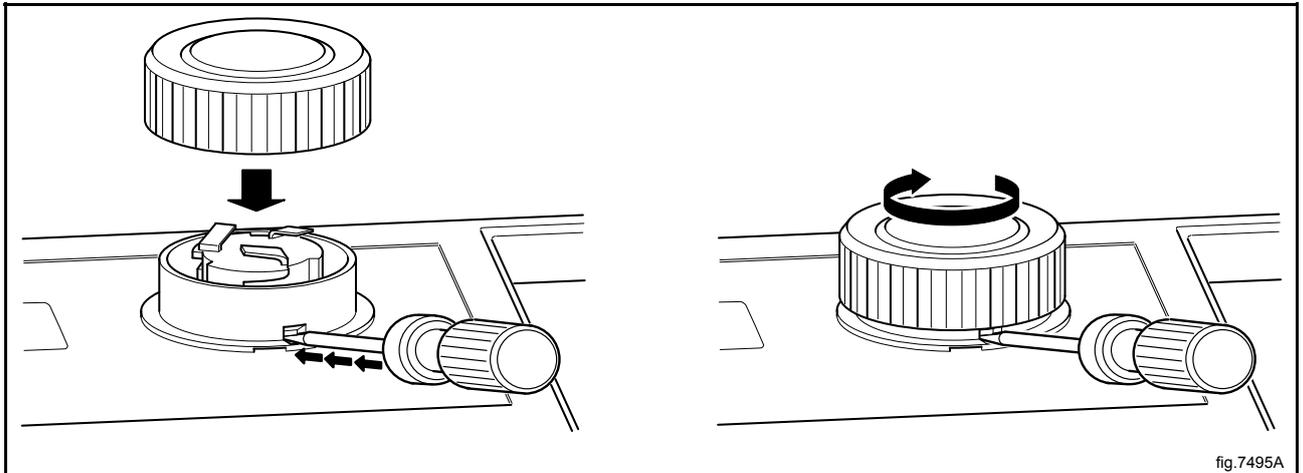


fig.7494

Mount the new control knob on the inner knob. Continue to press with the screwdriver and turn the control knob clockwise until it stops when it is in position.



12 I/O modules

12.1 General

The machine can be equipped with either one or two I/O modules:

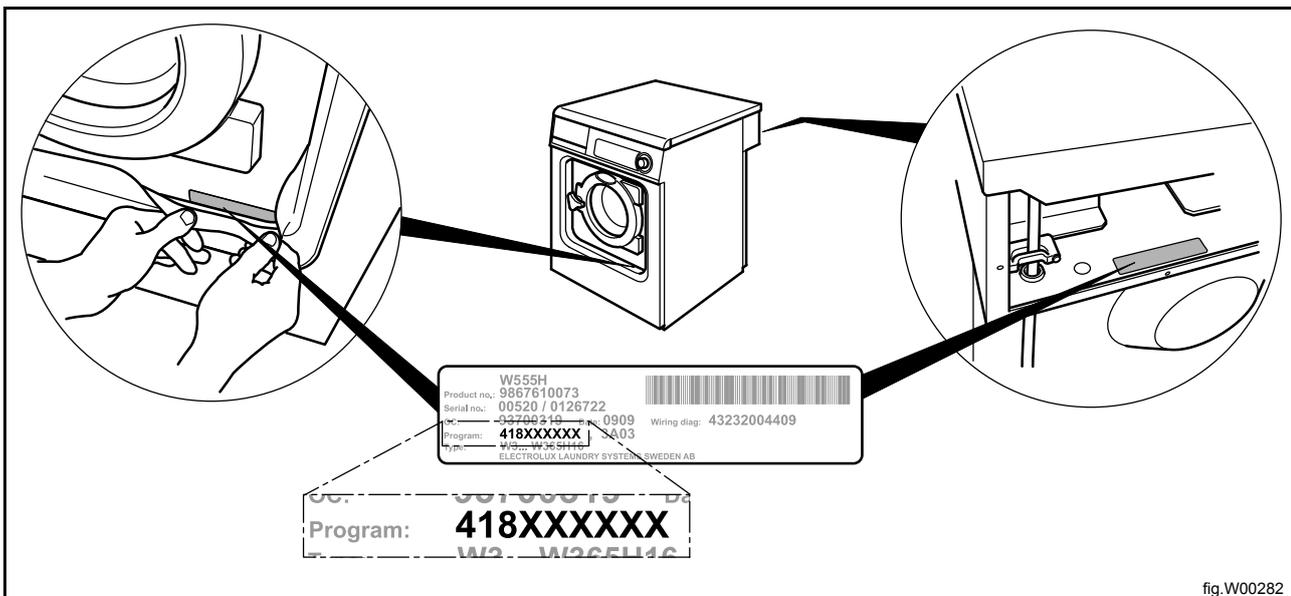
- I/O module type 1, 11 or 3 is always installed in the machine at delivery. It controls internal machine functions and outputs to heating, motors etc.
- I/O module type 10 is always installed in the machine at delivery. It controls the door lock functions.
- I/O module type 6 is always installed in the machine at delivery (except marine models). I/O module type 6, Power Balance, controls and handles the out-of-balance of the drum package during the entire extraction cycle. Before start the I/O module type 6 run a self test to make sure it is working properly. In case of a fault and on marine models the machine will use the previous system with tachometer signal from motor to detect out-of-balance.
- I/O module type 2 is installed as an option. It controls the external functions like detergent dosing systems and inputs from payment and booking systems etc.

The functionality of I/O module inputs and outputs is depending on the parameter software downloaded to the machine's program device. The function options for the I/O modules are indicated by a letter in the program designation for each module.

Location

The parameter software installed in the machine's program device on delivery is specified at the front and back of the machine.

Using this article number, you can find the program designation and thereby identify I/O module function options on the web.



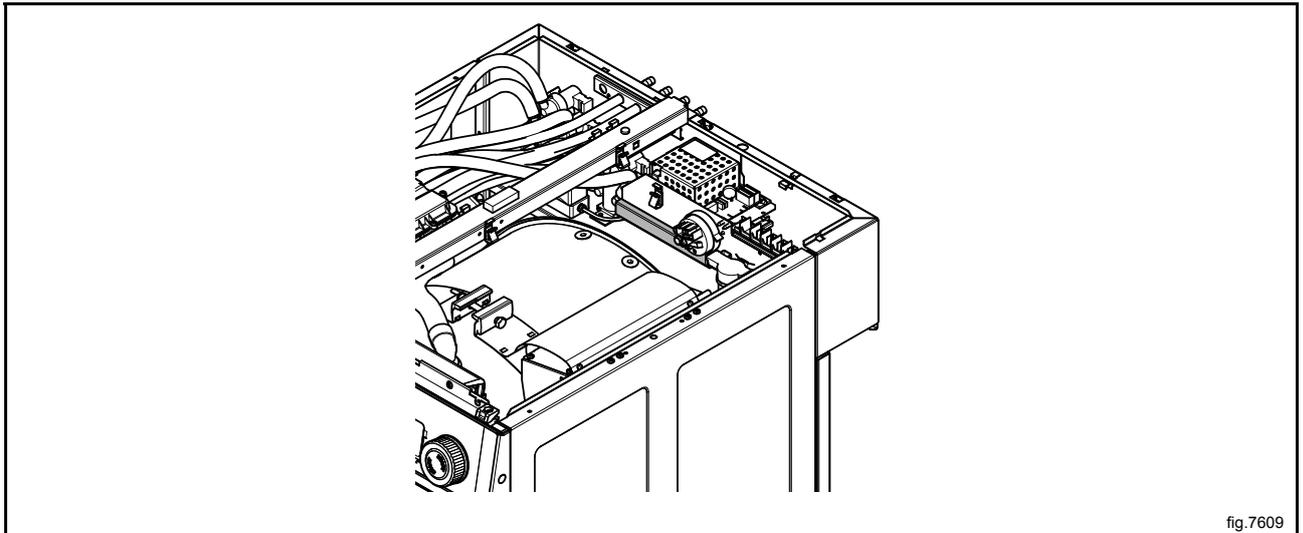
12.2 Replacement of I/O module

I/O module type 1, 11 or 3 and I/O module type 2

I/O module type 1, 11 or 3 and I/O module type 2 are installed in the same way. If the machine has I/O module type 2, it is located on I/O module type 1, 11 or 3. The illustration shows replacement of I/O module type 1.

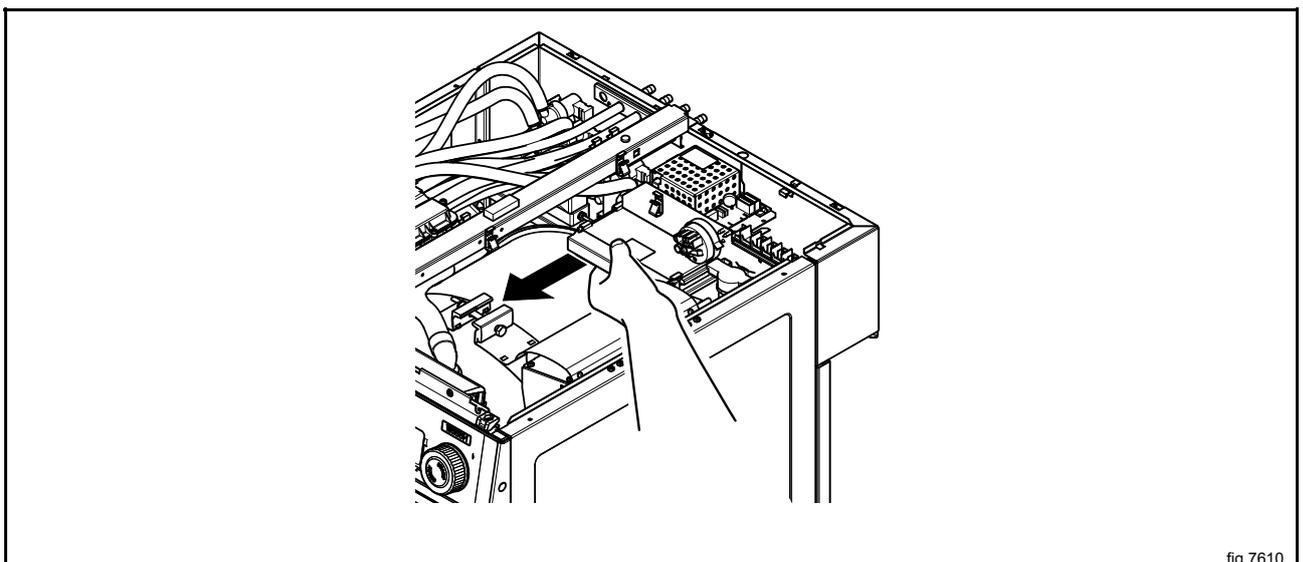
Disconnect the power to the machine.

Demount the top panel.



Remove the electrical connections on the module. (Note the position of the connections).

Remove the module by pulling it out towards the front of the machine.



Insert the new module and make sure it is in position.

Connect the electrical connections in the same way as before.

If both I/O module type 1, 11 or 3 and I/O module type 2 is to be replaced it is recommended to fit the modules together before mounting in the machine.

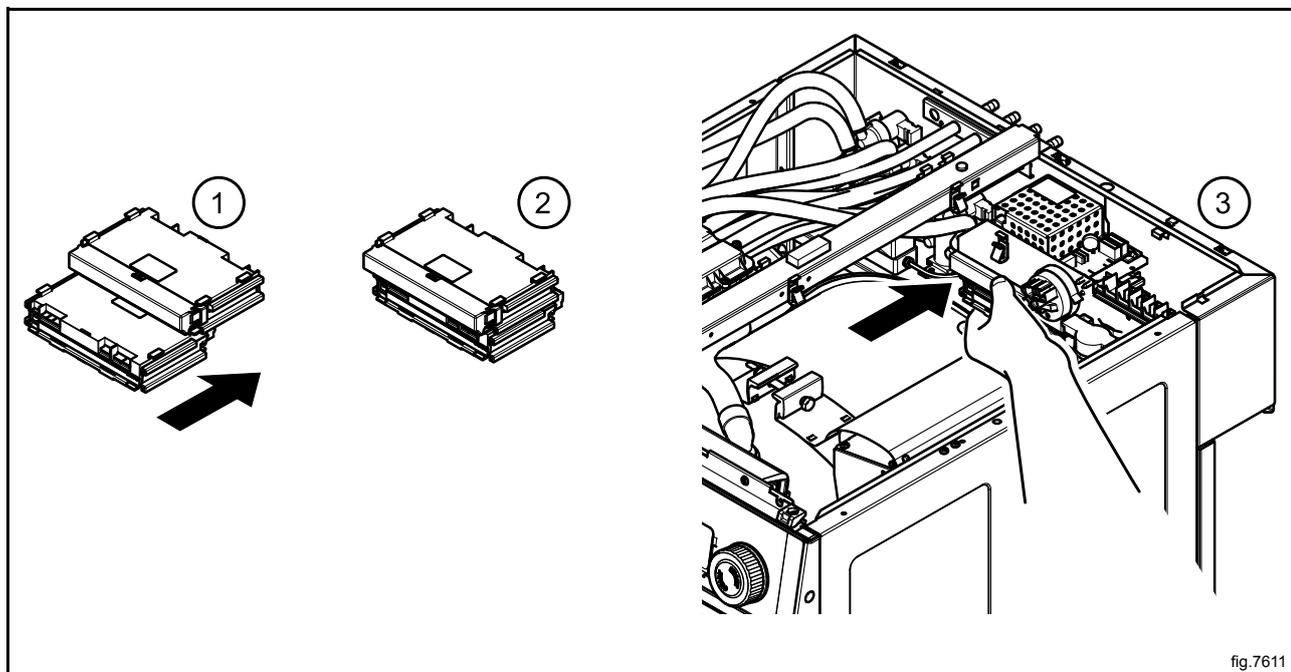


fig.7611

Remount the top panel.

Connect the power to the machine.

I/O module type 10

Disconnect the power to the machine.

Demount the top panel.

Remove the cover to the program unit and I/O module type 10.

Remove the electrical connections on the module. (Note the position of the connections).

Loosen the screw a bit and remove the I/O module by lifting it upwards.

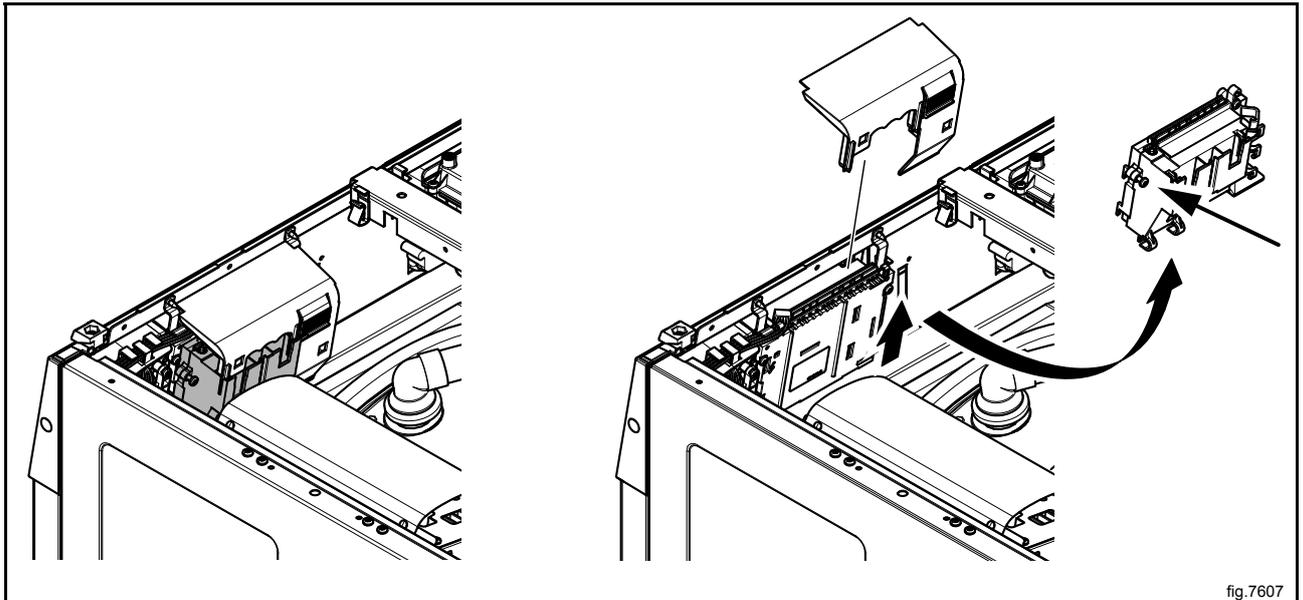


fig.7607

Insert the new module and make sure it is in position.

Connect the electrical connections in the same way as before.

Fasten the screw and remount the cover.

Remount the top panel.

Connect the power to the machine.

I/O module type 6

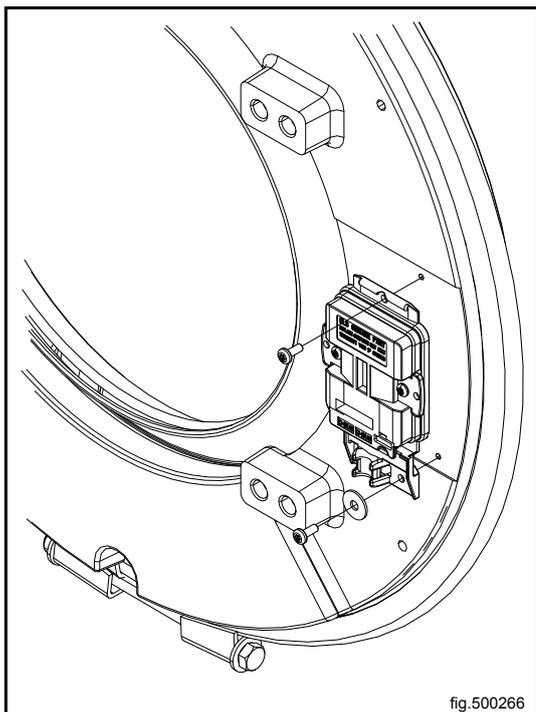
Disconnect the power to the machine.

Demount the front panel.

Demount the door.

Demount the trim panel.

Disconnect the cable and demount I/O module type 6.



Mount the new module and make sure it is in position.

Connect the cable.

Mount the trim panel, the door and the front panel..

Connect the power to the machine.

12.3 External connections to I/O module type 2

Inputs

The signal level may be 5 - 24V DC/AC or 100 - 240V AC. At 5 - 24V, the signal reference must be connected to 3 and at 100 - 240V to 4.

Note!

Do not mix potentials on the inputs.

Connecting excessive voltage (> 24V) to connection 3 may damage the I/O modules.

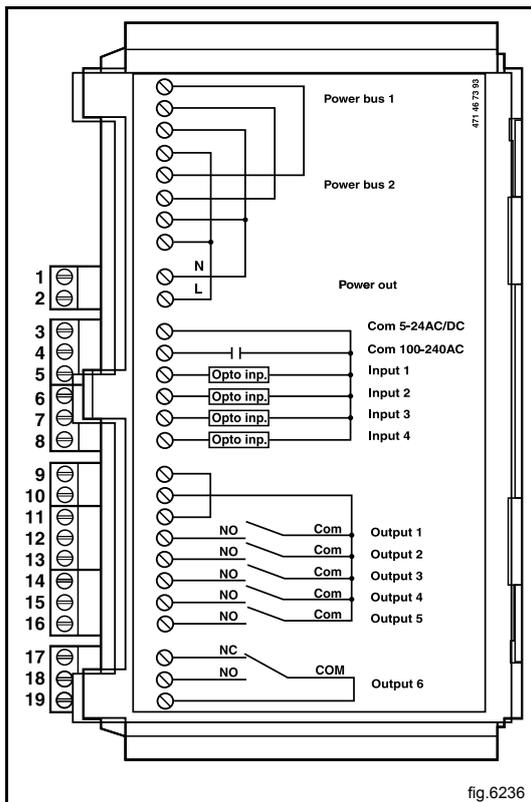


fig.6236

12.4 Circuit diagram of function options for I/O module type 2

12.4.1 External coin meter/Central payment (2A)

The signal received from external coin meters must be a pulse.

In order to program/set prices, the signal initiating the price programming procedure must be active (high).

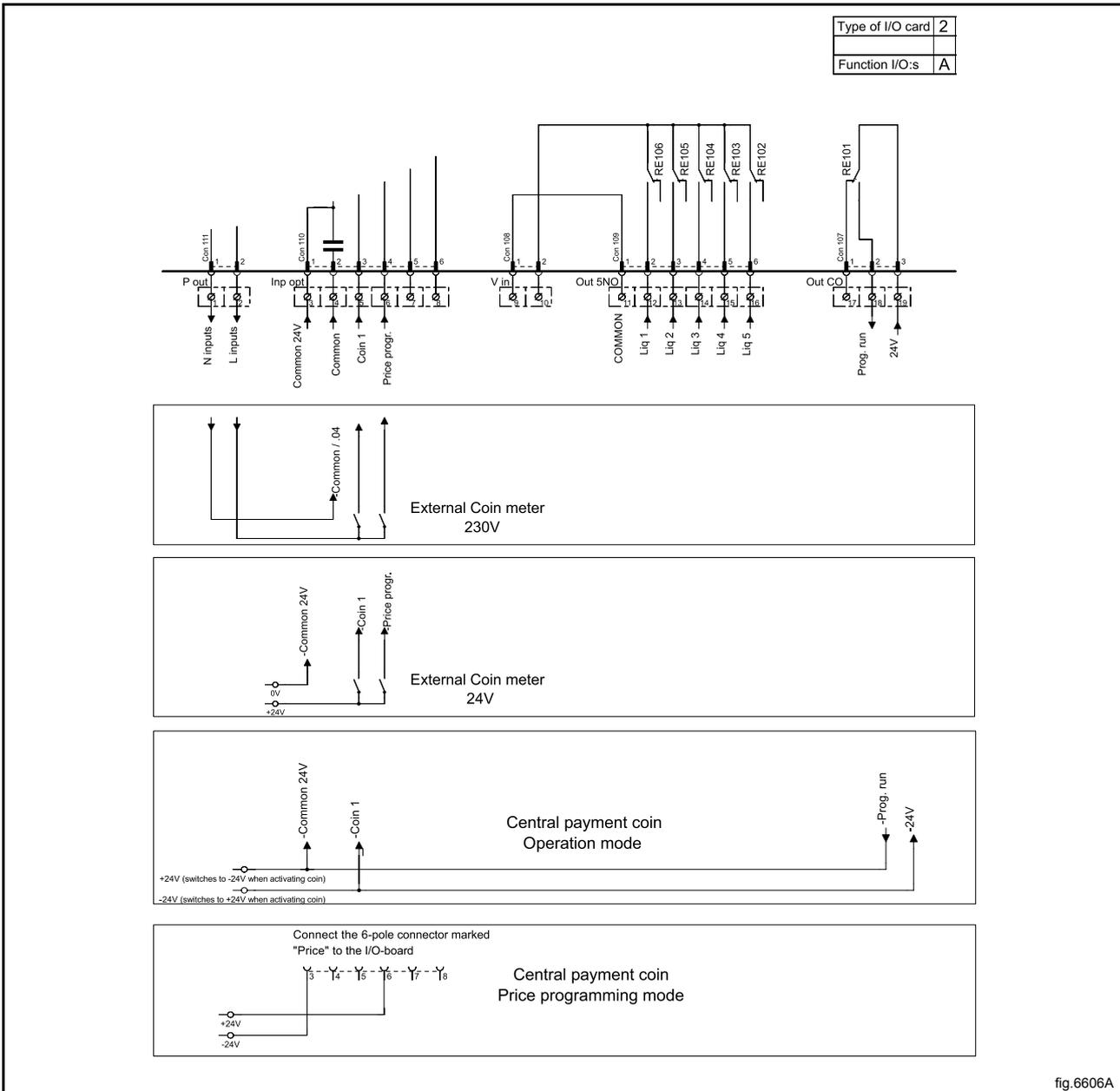


fig.6606A

12.4.2 Central payment (2B)

To start the machine from a central payment system, the payment system must transmit a start pulse to the machine. The start pulse can be either 230V or 24V. In order to receive a feedback signal once the machine has started, 230V or 24V must be connected to connection 19. The feedback signal on connection 18 remains active (high) during the entire program.

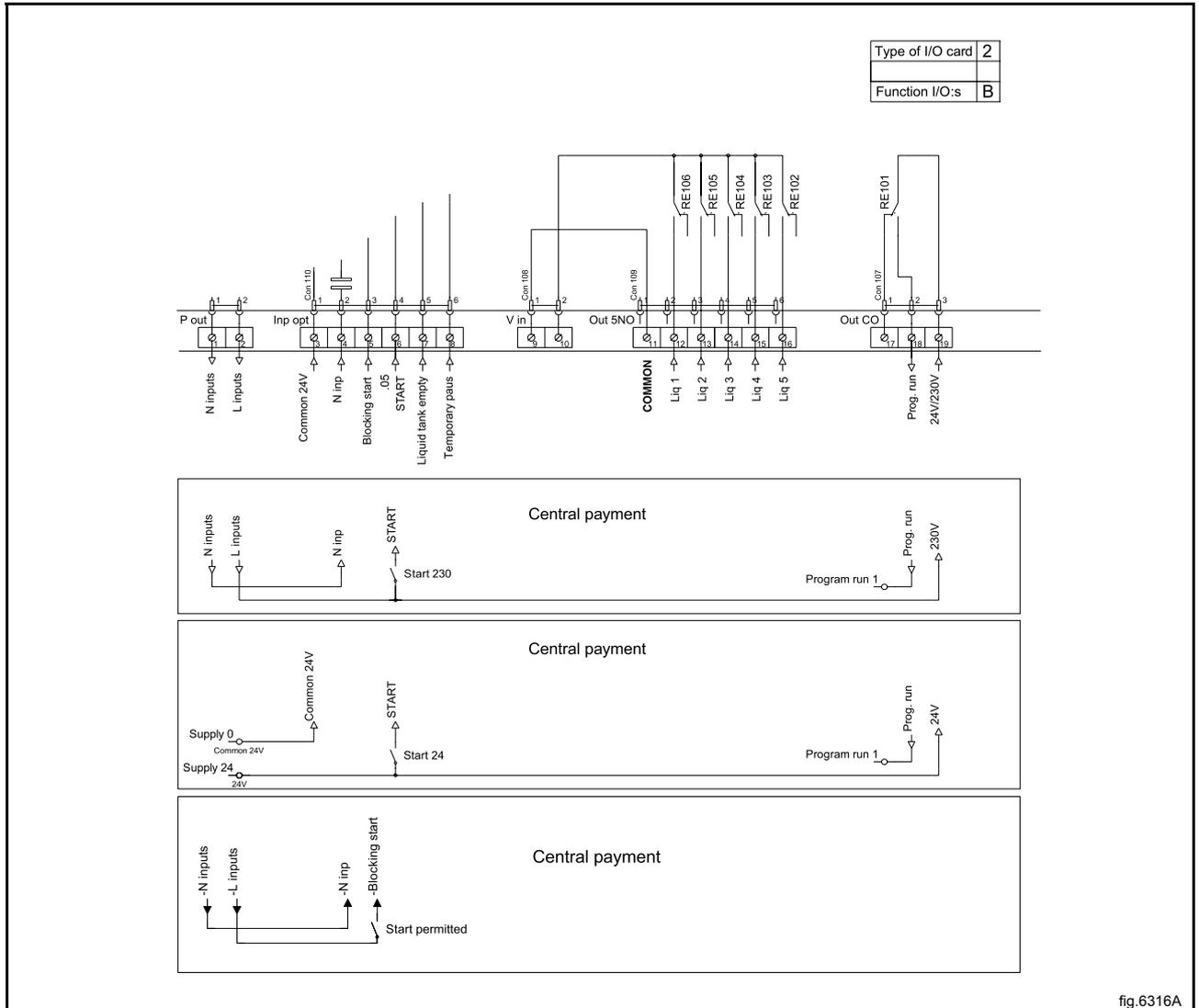


fig.6316A

12.4.3 Central payment (2C)

The central payment or booking system shall transmit an active (high) signal to the machine once permission has been granted to start the machine. The signal must remain active (high) until the machine starts. A feedback signal will be present on connection 18 and remain active (high) whilst the machine door is closed but the program has not started. The feedback signal is powered by 230V or 24V from connection 19.

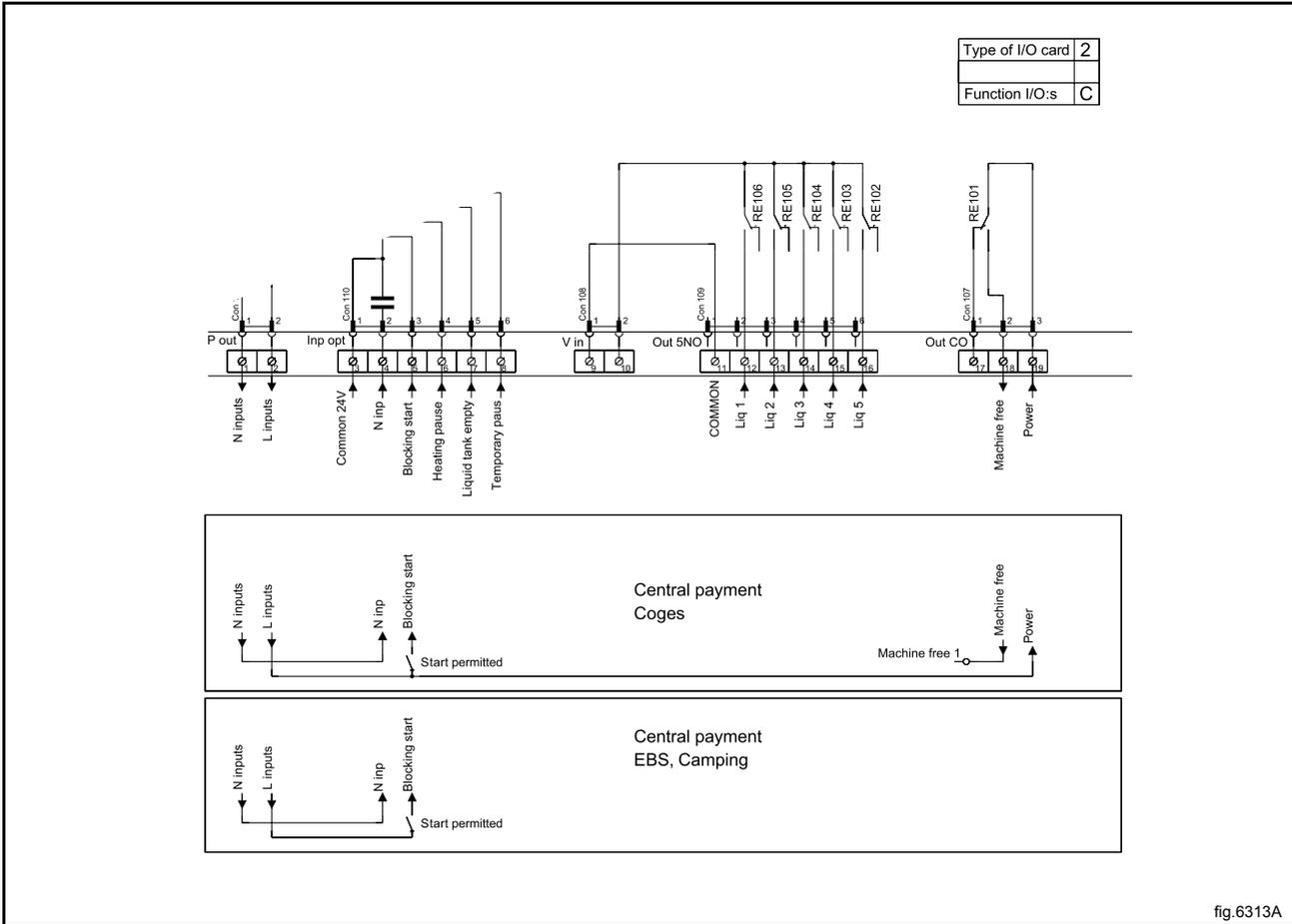
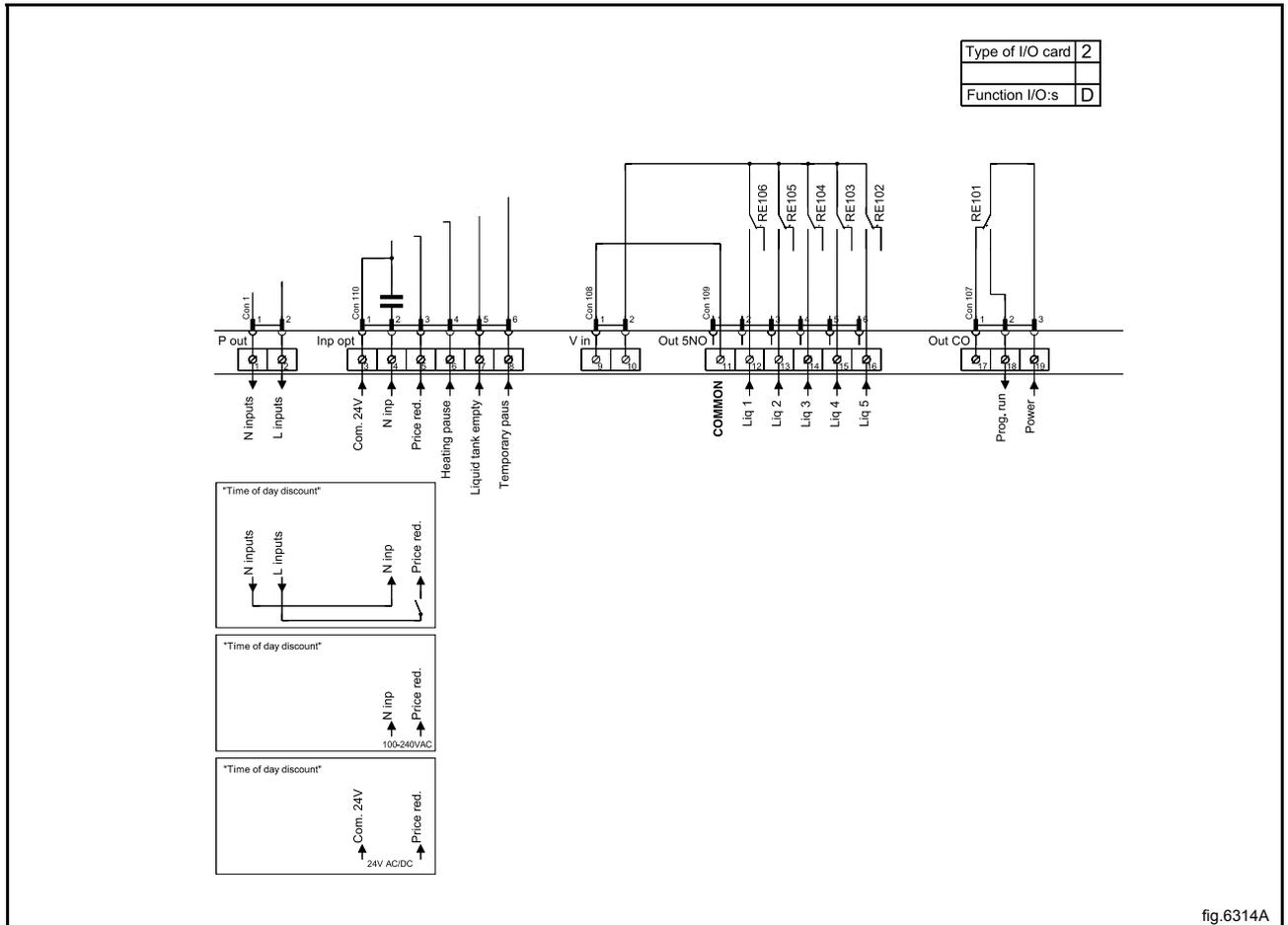


fig.6313A

12.4.4 Outputs for detergent signals and inputs for pause signals and "empty" signal, price reduction (2D)

The figure shows standard function addressing for machines with the coin program package.

By maintaining an active (high) signal on connection 5 ("Price red"), the price of the program can be reduced. This function has a number of uses, including providing reductions during a specific period of the day. Whilst the signal remains active (high), the price of the program is reduced by the percentage entered in the price programming menu.



12.4.5 Outputs for detergent signals and inputs for pause signals and "empty" signal (2E)

Heating pause: By connecting a signal to connection 6, you can pause operation of the machine whilst it heats up. The machine will pause for as long as the pause signal remains active (high).

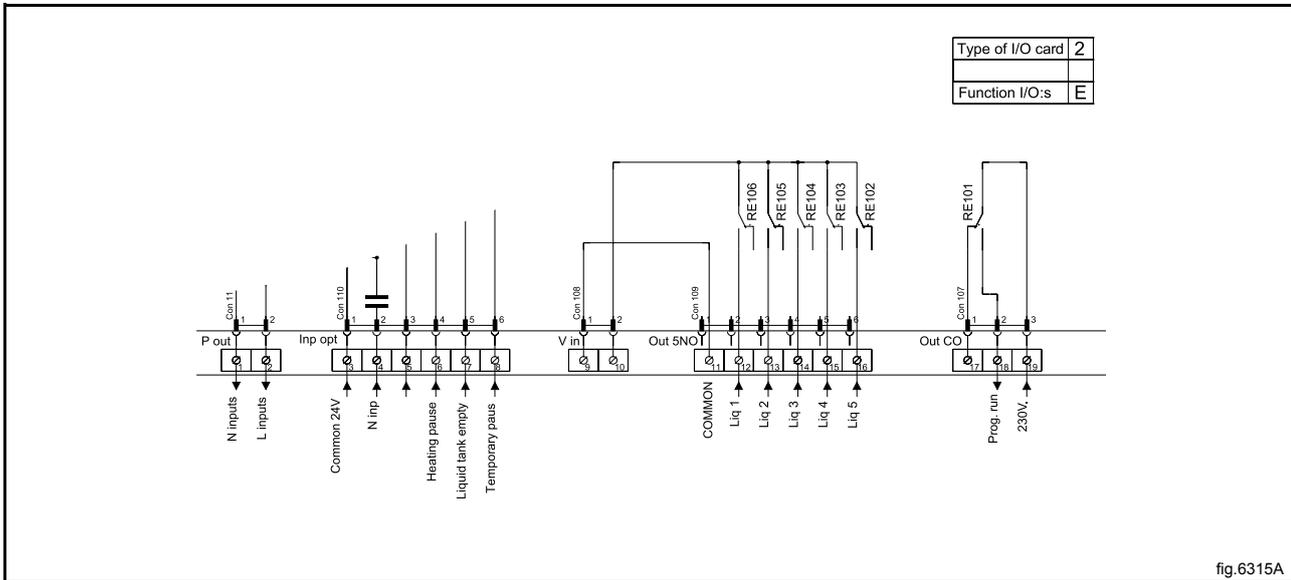


fig.6315A

12.4.6 Central booking/payment (2F)

The central payment or booking system shall transmit an active (high) signal to the machine once permission has been granted to start the machine. The signal must remain active (high) until the machine starts. A feedback signal will be present on connection 18 and remain active (high) whilst the program is running. The feedback signal is powered by 230V from connection 19 or external 24V.

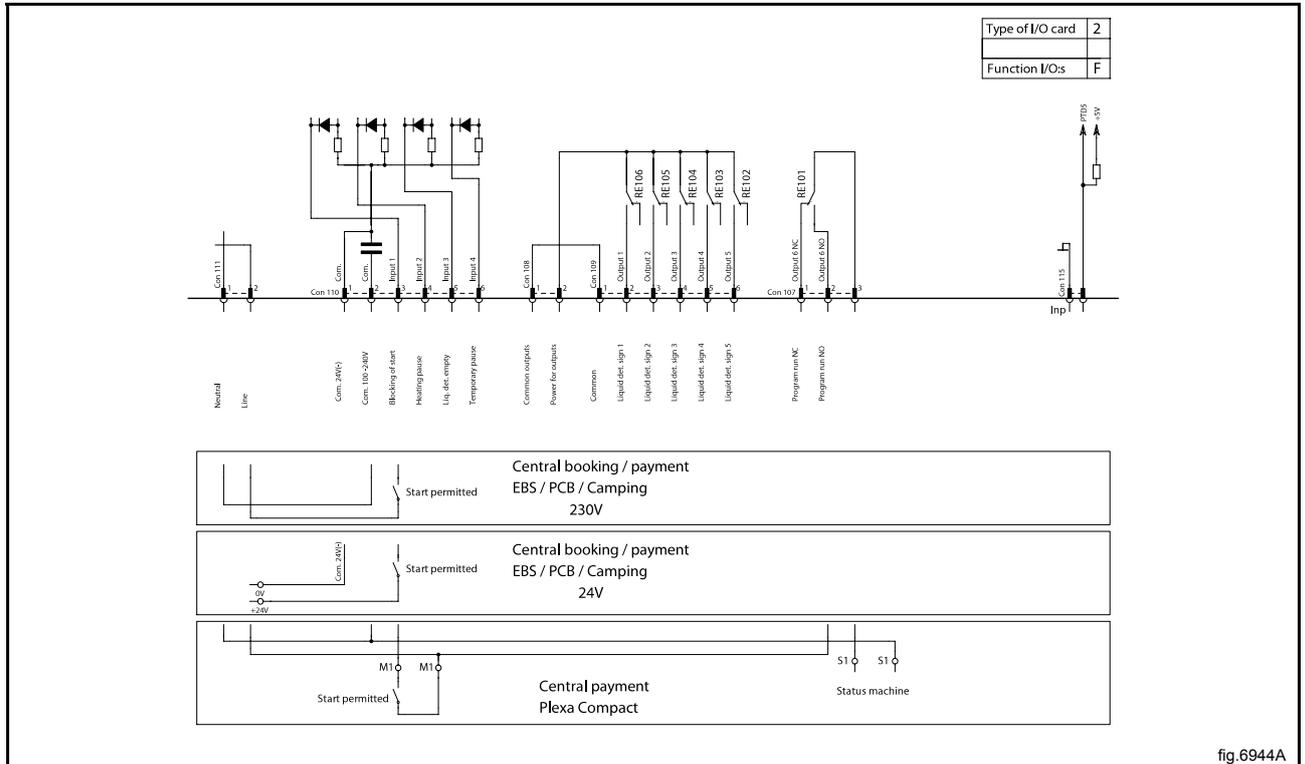
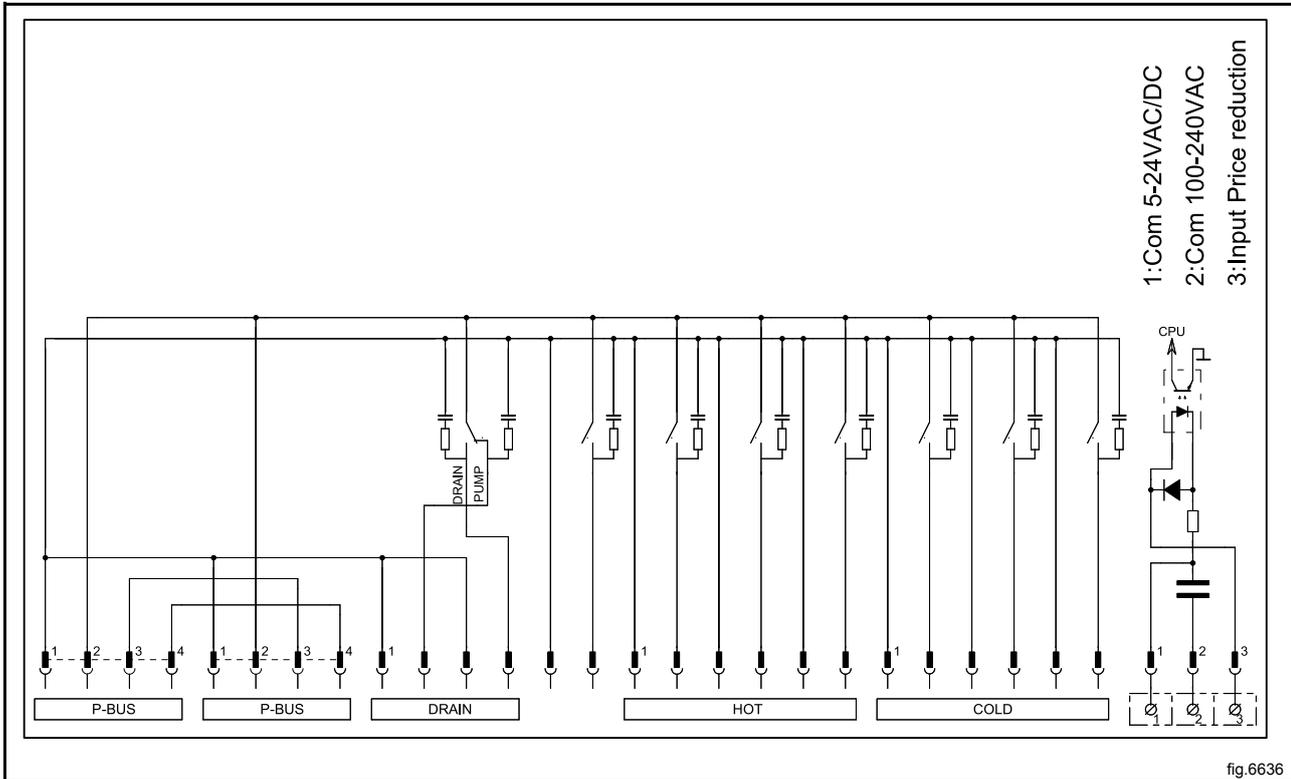


fig.6944A

12.4.7 Machines with I/O module type 3

By maintaining an active (high) signal on connection 3 "Price reduction", the price of the wash program can be reduced. This function has a number of uses, including providing reductions during a specific period of the day. Whilst the signal remains active (high), the price of the wash program is reduced by the percentage entered in the price programming menu.



13 Troubleshooting

13.1 General

The troubleshooting section is used to trace errors in the machine to a defective component or unit.

There is a memory in the CPU that will save the selected program for 10 minutes in the case of power failure.

The machine will restart in pause mode if the power is turned on again within this time. For very short power failure (less than 10 seconds) the machine will restart automatically.

Safety regulations

Troubleshooting may only be carried out by authorised personnel.

Take care during all work on the machine while the power is on.



Take care when measuring the motor control system since all components have a potential difference of approximately 300V in relation to protective earth and neutral. The components will contain dangerous voltages when the green LED on the motor control board is on. The motor control system will remain live for 30-60 seconds after cutting the power to the machine and the motor has stopped running.

Measurements

For information on measuring points, components and voltages, please refer to the electric schematic supplied with the machine.

Troubleshooting

13.2 Error code

An error in the program or in the machine is indicated on the display by an error code and a descriptive text.

The error codes are divided into different groups called “Major” comprising different error codes called “Minor”.

The errors will be displayed as for example **11 : 2 DOOR OPEN**.

The following is a description of all Major groups followed by a description of each error code.

Error code		Text
Major	Minor	
MAIN COMMON 10	11	REAL TIME CLOCK OUT OF ORDER
	13	INITIALIZING FAILED

Error code		Text
Major	Minor	
MAIN WASHER 11	1	NO WATER
	2	DOOR OPEN
	3	DOOR LOCK FAIL
	4	WATER LOW TEMP
	5	WATER HIGH TEMP
	6	WATER IN MACHINE
	8	NO HEATING
	9	DRUM OVERFILLED
	10	DRUM NOT DRAINED
	16	TIMEOUT HEATING
	17	DOOR LOCK
	27	LEVEL OFFSET
	28	WATER LEVEL HIGH DLCU LEVEL LOW
29	WATER LEVEL LOW DLCU LEVEL HIGH	

Error code		Text
Major	Minor	
DRUM MOTOR COMMON 20	1	O.H. DRUM MOTOR
	2	NO MOTOR COMMUNINCATION
	3	LOST MOTOR COMMUNICATION

Error code		Text
Major	Minor	
DRUM MOTOR MCU 21	1	HEATSINK TOO HOT
	2	MOTOR TOO HOT
	3	NO INTERLOCK
	5	MOTOR SHORT CIRCUIT
	6	INTERLOCK HARDWARE
	7	LOW DC VOLTAGE
	8	HIGH DC VOLTAGE
	15	MOTOR NOT FOLLOW
	20	NO PARAMET. SET IN MCU

Error code		Text
Major	Minor	
INTERNAL COM. 40	1	I/O BOARD MISHMASH
	20	I/O INTERLOCK
	21	I/O COMMUNICATION

Error code		Text
Major	Minor	
INTERNAL COM. I/O 41	1	CHARGE CIRCUIT
	2	SET SIGNAL NO TACHO
	3	ACTUATOR CIRCUIT

Error code		Text
Major	Minor	
INTERNAL COM. I/O TYPE 6 42	1	INTERNAL ERROR
	2	POSITION TEST
	3	EXTRACT TEST

Error code		Text
Major	Minor	
EXTERNAL COM. PAYMENT 51	22	NO CBT COMMUNICATION

Error code		Text
Major	Minor	
EXTERNAL COM. CMIS 52	1	CMIS COMMUNICATION ERROR

13.3 Description of error codes and causes

MAIN COMMON

10:11 REAL TIME CLOCK OUT OF ORDER

The real time clock is used by the CPU, measuring time, power failure, error codes, etc.

The error code is activated if there is a time out in the communication with the internal real time clock in the CPU or if the data sent to/from the real time clock is incorrect.

The error can only be removed by turning of the power to the machine for 30 seconds.

10:13 INITIALIZATION FAILED

The CPU has an internal time limit for initialization of the system.

The error code is activated if 15 seconds has expired during start up and the hardware still is not initialized.

Press the control knob/start button to retry.

MAIN WASHER

11:1 NO WATER

When filling with water, the level specified by the program must be attained within a certain time. This time is normally set to 10 minutes but can vary depending on the type of machine and the software. If the filling time exceeds the maximum allowed filling time, this error code will be displayed.

Long filling times can be caused by a blocked filler valve, defective filler valve, a break in the cable between the filler valve control board, defective valve control board, leaking level system, etc.

11:2 DOOR OPEN

This error code can only arise during an on-going program.

This error code will be displayed if the control system detect that the input for door closed has been deactivated during an on-going program.

This can be caused by for example a bad or defective door lock, loose cable to door lock, problem with door lock edge connection.

11:3 DOOR LOCK FAIL

This error code can arise at program start. If the door lock doesn't lock within a certain time after program start, this error code will be displayed.

This error code will also be displayed if the door switch for locked door signals that the door has been unlocked during an on-going program.

This can be caused by for example a bad or defective door lock, loose cable to door lock, problem with door lock edge connection.

11:4 WATER LOW TEMP

This error code is displayed if the temperature around the temperature sensor is below approx. -9°C .

A low temperature means that the resistance in the sensor is too high, above approximately $23.7\text{ k}\Omega$. This can be caused if the machine for example has been standing outdoors, an open circuit in the sensor, a break in the cable to the sensor.

The resistance should be as shown in the table below:

Approximate values of an error free temperature sensor	
T ($^{\circ}\text{C}$)	R (Ω)
15	7.6
20	6.0
25	4.8

11:5 WATER HIGH TEMP

This error code is displayed if the temperature around the temperature sensor exceeds $+98^{\circ}\text{C}$.

A high temperature means that the resistance in the sensor is too low, lower than approximately $350\ \Omega$. This can be caused by for example a short circuit in the sensor, break in the cable to the sensor, etc.

11:6 WATER IN MACHINE

This error code can only arise in the case of rapid advance to the end of the program or if program is aborted.

This error code will also appear if the level system has not indicated “empty drum” within a certain time (approximately 3 min). This time may vary depending on the size of the machine.

Action

- Check drain for dirt.
- Blow through the level hose and check that it is not blocked and does not contain any water.
- Check in the service program that the level control is working correctly.
- Check for detergent overdosing.

11:8 NO HEATING

This error code is displayed if the temperature is rising too slowly when heating is active. The limit for this error code is normally set to a water temperature increase of approximately 3°C per 10 minutes but can vary depending on the type of machine and software.

This error code can be caused by for example a defective heating element, a break in the power supply to the heating element, defective heating contactor, etc.

On machines built for washing mops, it can be caused by too low level in the program step. The lowest level for a mop program in the main wash with heating is 90 scale units.

11:9 DRUM OVERFILLED

This error code will be displayed if the drum has been filled with water above a pre-determined level during an on-going program.

This error code can be caused by for example a blocked level hose, drops of water in the level tube, defective filler valve, defective electronic filler control, etc.

Action

- Blow through the level hose and check that it is not blocked and does not contain any water.
- Check in the service program that the level control is working correctly.
- Check using the service program that all the water valves are working correctly.

11:10 DRUM NOT DRAINED

This error code is displayed if the water in the drum is not below a predetermined level when a drain period has been completed in the program.

This error code can be caused by for example a blocked drain, blocked level hose, a water drop in the level hose, defective level control, restricted drain lines to the machine, too many machines emptying simultaneously into drain pipes that are too narrow, etc.

Action

- Check the drain installation and that the waste water can flow freely out from the machine without any restrictions.
- Check the drain valve in the machine with regard to dirt.
- Blow through the level hose and check that it is not blocked and does not contain any water.
- Check in the service program that the level control is working correctly.

11:16 TIMEOUT HEATING

This error code is based on degrees/minutes. A check is made during water filling. If there is a drain leakage there will be repeated fillings and therefore no error code from gradient check.

This timeout is an overall timeout that is started when heating is started. If heating time is longer than set in **MAX HEATING TIME** (Config 2) this error code will be displayed.

11:17 DOOR LOCK

This error code is displayed if the door lock is locked at the start of the program, i.e. that the door is locked although the timer has not requested locking.

11:27 LEVEL OFFSET

This error code arises if the level system indicates a level at the start of the program (when the drum should be empty) that exceeds what the program unit can compensate for automatically.

This can be caused by for example blocked drain, blocked level hose, a drop of water in the level hose, leaking level system, defective level control, etc.

Action

- Check drain for dirt.
- Blow through the level hose and check that it is not blocked and does not contain any water.
- Check in the service program that the level control is working correctly.

11:28 WATER LEVEL HIGH DLCU LEVEL LOW

The DLCU on I/O type 10 contains a mechanical level guard which ensures that there is no water in the machine when the lock opens. To ensure that the level guard functions correctly, the mechanical level guard is compared with a nominal value generated by the level system, which is compared with the electronic level sensor.

When the water level exceeds the nominal value during first fill, a check is made to ensure that the mechanical level guard is switched on, and if not, this error code is displayed.

Cause

- The level control can be damaged.
- Cross talk in the level control electrical system.
- Leakage in the level controls' air hoses.
- Incorrect nominal value, possibly caused by a error in the electronic level control.

Action

- Check the level control function. (Switch-on level = 40 mm, switch-off level = 15 mm Wg).
- Check the cables and their connections. The voltage across the level controller should be 0 V when the water level is < 15 mm Wg and 5 V when water level is > 40 mm Wg.
- Blow through the level hoses and check that they are not blocked and does not contain any water.

11:29 WATER LEVEL LOW DLCU LEVEL HIGH

The DLCU on I/O type 10 contains a mechanical level guard which ensures that there is no water in the machine when the lock opens. To ensure that the level guard functions correctly, the mechanical level guard is compared with a nominal value generated by the level system, which is compared with the electronic level sensor.

When the mechanical level monitor is switched off during draining, the water level in the drum must be below the nominal value measured by the electronic level control.

Cause

- The level control can be damaged.
- Cross talk in the level control electrical system.
- Leakage in the level controls' air hoses.
- Incorrect nominal value, possibly caused by a error in the electronic level control.

Action

- Check the level control function. (Switch-on level = 40 mm, switch-off level = 15 mm Wg).
- Check the cables and their connections. The voltage across the level controller should be 0 V when the water level is < 15 mm Wg and 5 V when water level is > 40 mm Wg.
- Blow through the level hoses and check that they are not blocked and does not contain any water.

DRUM MOTOR COMMON

20:1 O.H. DRUM MOTOR

Not valid for washer extractors with MCU.

This error code is activated if the overheating protection for the drum motor has triggered.

The overheating protection is automatically restored. When the overheating protection is restored the error code is automatically reset and the ongoing program will continue. A long press on the control knob/start button will make the CPU reset and ongoing program will be ended.

The error code can be triggered if:

- The motor is very warm. Check that the vent holes in the motor are not covered.

If the overheating protection is not triggered, but there is still an error code:

- Check the harness, connectors and functions by reading the electrical schematic and by using the **SHOW INPUTS** menu when the machine is in service mode.

20:2 NO MOTOR COMMUNICATION

This error code arises if the first message sent from the CPU to the MCU was not replied to during start up.

Action

- Check that there is power reaching the MCU. Check the fuses in the Protection Cable. If one of the components in the Protection Cable is damaged, the cable must be replaced.
- Check that the indicator LED on the MCU is on. The LED can be seen by looking down by the MCU edge connections.
- Check that the communication cable between the CPU board and the MCU is intact and not damaged. Measure also with a reference instrument to see whether there is contact between all the leads in the communication cable.

20:3 LOST MOTOR COMMUNICATION

This error code arises if the communication between the CPU and the MCU has stopped working.

Action

- Check that there is power reaching the MCU. Check the fuses in the Protection Cable. If one of the components in the Protection Cable is damaged, the cable must be replaced.
- Check that the indicator LED on the MCU is on. The LED can be seen by looking down by the MCU edge connections.
- Check that the communication cable between the CPU board and the MCU is intact and not damaged. Measure also with a reference instrument to see whether there is contact between all the leads in the communication cable.

DRUM MOTOR MCU

21:1 HEATSINK TOO HOT

This error code is generated by the MCU. There is a temperature sensor (NTC) mounted on the MCU cooling flange next to the power transistors in the output stage. If the temperature of the cooling flange gets too high ($> 90^{\circ}\text{C}$) the error code will be set to protect the transistors.

The cause of high cooling flange temperature can be e.g. a stiff drum in combination with intensive use and high ambient temperature. There may also be an error in the motor (sticking bearings or short circuit in windings, which impairs the efficiency of the motor).

Action

- Make sure the drum turns easily.
- Check the value on the error code counter for the error code.
- Check the last 8 MCU error codes.
- Start a 90°C normal program with load on continuous operation and measure the temperature of the motor and MCU.
- Replace the defective part.

21:2 MOTOR TOO HOT

This error code is generated by the MCU. Each time the motor is started from stationary, the MCU will first measure the resistance between two phases in the motor. The MCU processor governs the output transistors so that a DC current flows between two phases in the motor winding. The actuation of the transistors is a measure of the voltage applied to the winding and the resistance can be calculated using the current and voltage values. The resistance can then be converted to a temperature since the winding resistance at 20°C and the temperature coefficient are known. If the average value of the four latest temperature readings is higher than the maximum motor temperature (e.g. 150°C), the error code will be activated.

The cause of high motor temperature can be a stiff drum, possibly in combination with intensive use and high ambient temperature. There may also be an error in the motor (sticking bearings or short circuit in windings, which impairs the efficiency of the motor). There could also be a contact error in the connectors between the MCU and the motor or an error in the motor cable. An error in MCU temperature measurement circuits can also occur.

Action

- Make sure the drum turns easily.
- Check the value on the error code counter for the error code.
- Check the last 8 MCU error codes.
- Measure the three phases to the phase resistors on the MCU motor connector (disconnect MCU and take the reading in the cable connector) to make sure they are the same.
- Start a 90°C normal program with load on continuous operation and measure the temperature of the motor and MCU.
- Replace the defective part.

21:3 NO INTERLOCK

This error code is generated by the MCU. The MCU must be powered with 230V / 50 or 60 Hz on the interlock input in order to drive the motor. This signal is a confirmation that the door is closed and locked.

MCU receives its commands to rotate the drum from the CPU via a serial communication link between the MCU and CPU. Since the CPU also has access to the interlock signal, the CPU must never send a run command to the MCU if the interlock signal is missing. If this does happen, this error code will be activated.

The cause of this error code being activated can be e.g. a break in the cable leading the interlock signal to the MCU. There may also be an error in the connector in the door lock, which connects 230V / 50Hz to the interlock signal. An error in the interlock circuits of the MCU can also set this error code.

Action

- Use a measuring instrument to check that the interlock signal comes on X302:1-2 when the door lock is activated. Read also bit 1 in the second byte under "Motor Status" in the service program (the bits are numbered from 0 to 7 where bit 0 is on the far right). If bit 1 in the second byte is 1 then the lock is open, while a 0 indicates that the lock is closed.
- Replace the defective part.

21:5 MOTOR SHORT CIRCUIT

This error code is generated by the MCU. The MCU reads the power consumption of the motor continuously. If the current for some reason gets too high (= exceeds a certain limit), the MCU will cut the current to the motor. After the motor has stopped (= tachometer indicates stationary motor), the MCU will attempt to restart it. If the MCU then detects high motor current again, this error code will be activated. If on restarting after a first short circuit, the MCU rotates normally, an error code will not be activated.

Cause

This error code can be activated for a number of reasons:

- Short circuit in motor.
- Short circuit internally in motor winding (impaired efficiency, higher current consumption).
- Short circuit in motor cables.
- Short circuit in connectors.
- Drops of water causing short circuits in the motor connector.
- Short circuit in the MCU output transistors.
- Bad contact in tacho signal.
- Bad contact in interlock signal.

Action

- If the error is a stable one, it is generally not difficult to locate the defective unit through resistance measurement and testing with the service program.
- Further information can be obtained by studying the contents of "MCU FAULT LOGGER". Study the following:
 - SHORT CIRCUIT 2 (specifies how many times the error code has been active).
 - SHORT CIRCUIT 1 (specifies how many times the current limit has been exceeded. The difference between short circuit 1 and short circuit 2 indicates how many times there has been a short circuit 1 that has not been confirmed when restarting the motor).
 - LAST FAULT CODE N/8 (shows the 8 latest error codes).
 - TACHO CUT-OUT LOW RPM (can give a clue in case of intermittent errors).
 - TACHO CUT-OUT HIGH RPM (can give a clue in case of intermittent errors).

21:6 INTERLOCK HARDWARE

This error code is generated by the MCU. The MCU must be powered with 230V / 50 or 60 Hz on the interlock input in order to drive the motor. The interlock circuits in the MCU have been split into two channels so that a component error in MCU cannot give a false confirmation that the door is locked. These two channels are checked against each other. If this check gives an incorrect result this error code will be activated.

The reason for this error code being activated can be attributed to an error in the interlock circuits in motor control.

Action

- Replace MCU.

21:7 LOW DC VOLTAGE

This error code is generated by the MCU. The MCU constantly measures the voltage over the mains input. If the voltage is too low (= falls below a certain limit), the MCU will shut off the current to the motor. Once the motor has stopped (= the tachometer sensor indicates that the motor is stationary), the MCU checks to see whether the input voltage is still low. If it is, this error code is activated.

The reason for this error code being activated can be low mains voltage or that the machine's on/off switch has been operated in an unsuitable manner.

Further information can be obtained by studying the contents of "MCU FAULT LOGGER":

- UNDERVOLTAGE 2 (specifies how many times this error code has been active).
- UNDERVOLTAGE 1 (specifies how many times the voltage has dropped below the limit. The difference between undervoltage 1 and undervoltage 2 indicates how many times there has been an undervoltage 1 without it being confirmed when the motor has stopped).
- LAST FAULT CODE N/8 (shows the 8 latest error codes) Undervoltages can be registered even during normal operation. Consequently, a small number of registrations need not mean that there is an error in the MCU.

Action

- Check that the supply voltage is stable and never drops below nominal voltage - 10%.
- Check the fuses and cables.
- Check the supply voltage in the network cabling and at the MCU in the machine.

21:8 HIGH DC VOLTAGE

This error code is generated by the MCU. The MCU constantly measures the voltage over the mains input. If the voltage is too high (= exceeds a certain limit), the MCU will shut off the current to the motor. Once the motor has stopped (= the tacho sensor indicates that the motor is stationary), the MCU checks to see whether the input voltage is still high. If it is, this error code is activated.

The reason for this error code being activated can be high mains voltage (e.g. power surge). Further information can be obtained by studying the contents of "FC FAULT LOGGER":

- OVERVOLTAGE 2 (specifies how many times this error code has been active)
- OVERVOLTAGE 1 (specifies how many times the voltage limit has been exceeded. The difference between overvoltage 1 and overvoltage 2 gives the number of times overvoltage 1 has occurred without it being confirmed when the motor has stopped).
- LAST FAULT CODE N/8 (shows the 8 latest error codes). Overvoltage registrations can also occur if there is a bad contact in the tacho signal. Check also the following registers:
TACHO CUT-OUT LOW RPM (number of short tacho interruptions during wash rpm).
TACHO CUT-OUT HIGH RPM (number of short tacho interruptions during extraction rpm).

Action

- Check the tacho cables if there are many registrations in the TACHO CUT-OUT registers.

21:15 MOTOR NOT FOLLOW

This error code is generated by the MCU. The MCU must always receive information on the rotation of the motor from the tacho sensor in order to rotate. If the tacho sensor is not working, the motor can rotate for max. 10 seconds during the starting process. After this period, this error code will be activated.

Cause

- Break in the cables between the tacho sensor and the MCU.
- Break in connectors in tacho cables.
- Break in one of the phases to the motor (cables or connectors). This error can be suspected if the motor does not rotate for 10 seconds (the motor will not start with only two phases).
- Error in tacho generator.
- Error in tacho circuits in the MCU.

Further information can be obtained by studying the contents of "FC ERROR LOGGER". Study the following:

- MOTOR NOT FOLLOW (specifies how many times this error code has occurred).
- LAST ERROR CODE N/8 (shows the 8 latest error codes).
- TACHO CUT-OUT LOW RPM (can give a clue in case of intermittent errors).
- TACHO CUT-OUT HIGH RPM (can give a clue in case of intermittent errors).

Action

- Replace the defective part.

21:20 NO PARAMET. SET IN MCU

The program unit has read from the MCU or I/O board that the interlock is not active.

The reason for interlock failure can be a problem with the hatch lock, damaged motor supply cables or the I/O board with interlock voltage etc. The most probable error source is the I/O board.

INTERNAL COM.

40:1 I/O BOARD MISHMASH

The error code is activated if wrong I/O board is addressed to wrong position in the machine.

After addressing of I/O boards the CPU reads the type of board in every position. If there is a mishmash between what the CPU reads and what the software expect on any address the error code will be displayed.

Readdress all I/O boards. Use the electric schematic to find correct I/O board to address.

40:2 I/O INTERLOCK

The program unit has read from the I/O board that the interlock is not active.

The reason for interlock failure can be a problem with the hatch lock, damaged motor supply cables or the I/O board with interlock voltage etc. The most probable error source is the I/O board.

40:21 I/O COMMUNICATION

The error code is activated if the CPU no longer communicate with one or more I/O boards.

There is an internal data bus between the different I/O boards in the machine with information about inputs, outputs, etc. that the CPU use to control the machine. The error code is activated if the CPU has lost communication with one or more I/O boards. The error will also be activated if the service button is pressed on the wrong I/O board during configuration of I/O boards. If there is communication between the I/O board and CPU the LED next to the service button will flash. If there is no communication to the I/O board but power, the LED will light when the button is pressed on the I/O board.

Check that all I/O boards are configured in **I/O CONFIGURATION** menu when the machine is in service mode.

If all I/O boards present in the list check the LED and harness, connectors and functions by reading the electrical schematic.

INTERNAL COM. I/O

41:1 CHARGE CIRCUIT

The DLCU on I/O board 10 contains an arming circuit that is charged when the door lock coil is to be activated. For safety reasons, this arming circuit must be discharged when the door lock coil is not to be activated. If the arming circuit for operating the door lock is charged when it is not supposed to be, an error message will be sent to the CPU. If the error ceases, the message will not be sent to the CPU.

CPU reads the error message when the door is locked and unlocked and generates an error. The error is ignored between these two occasions.

Cause

- The error can be caused by overloads and/or defective components in the DLCU on I/O board 10.

41:2 SET SIGNAL NO TACHO

The DLCU on I/O board 10 counts the tacho pulses from the motor in order to guarantee that the drum is stationary when the door is opened. To ensure that the signal from the tacho generator is working correctly, DLCU compares the tacho signal to a digital bit value from the CPU, which is due to the CPU having activated the motor. The tacho signal should always correspond to the digital bit value and if the tacho signal is not present when the digital bit value is present, an error message will be generated to CPU.

The error message is filtered in such a way that the digital bit value should have been on for 2 seconds; if this is the case, a check is made that the pulses from the tacho sensor are present when the digital bit value ceases.

Internally the DLCU will automatically clear an error if it disappears during program run.

CPU reads the error message when the program finishes and generates an error code, the error message is ignored between these two occasions.

Cause

- The error can be caused by breaks in the circuits for the tacho sensor, or caused by a error in the magnet in the tacho sensor.
- Collateral damage due to a error in the motor system.

41:3 ACTUATOR CIRCUIT

The DLCU controls the door lock actuator coil. The DLCU checks continuously that the coil is engaged. DLCU can detect a break in the circuit ($>50\text{ k}\Omega$) (DLCU cannot detect a short in the circuit).

If there is a break in the actuator circuit, CPU will be notified; the error code will disappear if the error ceases.

CPU reads the error message when the program starts and finishes and generates an error code, the error message is ignored between these two occasions.

Cause

- The error can be caused by a break in the cables between the hatch lock and the I/O board 10, or caused by a error in the hatch lock solenoid.
- Error or break in the I/O board 10 circuits.

Action

- If the error returns after a reset, and is not caused by a error in the hatch lock or the cables for the hatch lock, change the I/O board 10.

INTERNAL COM. I/O TYPE 6

42:1 INTERNAL ERROR

Reading of A/D values out of range.

42:2 POSITION TEST

Position value out of range. Check that I/O module type 6 is still in correct position.

42:3 EXTRACT TEST

I/O module type 6 is not able to read any or too low values during extraction.

EXTERNAL COM. PAYMENT

51:22 NO CBT COMMUNICATION

Machine with payment system using serial communication to machine. Serial communication with payment system interrupted.

Check network cable between machine and payment system.

Check that payment system is operational.

To reset machine to working state without repairing payment system, use Reset CBT communication in service mode. (Requires password).

EXTERNAL COM. CMIS

52:1 CMIS COMMUNICATION ERROR

Communication between machine and network computer has been interrupted.

Check network cable between machine and network.

Check that CMIS on network computer is operational.

The machine can be operated but statistics could be affected and data could be lost.

14 Maintenance

14.1 Inspect the interior of the machine

Inspect the interior of the machine to ensure that no leaks are noticed.

During an actual wash cycle; disconnect the power to the machine and proceed as follows:

- Remove the top panel, the front and rear panel.
- Verify that all internal hoses do not leak.
- Check that water does not leak onto the floor.
- Inspect the belt. Adjust the tension or replace if necessary.
- If the heating time is unusually long, check the heating elements. If the water is very hard, check whether there are lime deposits on the heating elements. Decalcify the elements if necessary. Adapt the amount of deliming agent to the manufacturer's guidelines.
- Never switch on the heating elements when there is no water in the machine. This will cause the slow-blow fuse to trigger.
- Inspect the shock absorbers and coil springs.



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