Service Manual

Washer extractor

WH6–7, WH6–8, WH6–11, WH6–14, WH6–20, WH6–27, WH6–33
Compass Pro

Type W3....





Electrolux PROFESSIONAL

438916951/GB, IE
2022.11.29

Original instructions

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

1 Symbols

	Caution
	Caution, high voltage
	Read the instructions before using the machine

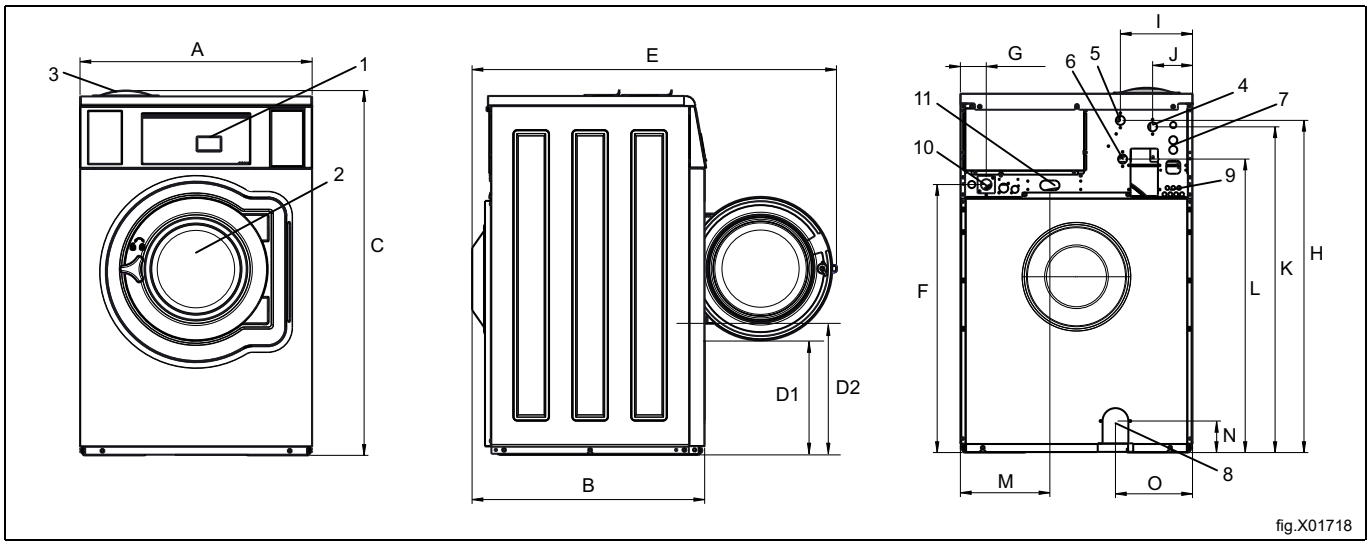
2 Abbreviations

Abbreviation	Explanation
MCU	Motor Control Unit
DLCU	Door Lock Control Unit
COM	Communication
CW	Clock-Wise
CCW	Counter Clock-Wise
OH	Over Heat
RTC	Real Time Clock
CBT	Central Booking Terminal
VGB	Voice Guidance Board
DST	Daylight Saving Time
IPS	Internal Payment System
CPU	Control Program Unit

3 Technical data

3.1 Drawing

3.1.1 WH6–7, WH6–8, WH6–11



1	Operating panel
2	Door opening, WH6–7, WH6–8: ⌀ 310 mm, WH6–11: ⌀ 365 mm
3	Detergent container
4	Cold water
5	Hot water
6	Cold/Hot water or Re-used water with network pressure (option)
7	Re-used water from tank/pump or Liquid detergent supply
8	Drain
9	Liquid detergent supply
10	Electrical connection
11	Steam connection

mm	A	B	C	D1	D2	E	F	G
WH6–7	720	720	1135	360	425	1135	835	80
WH6–8	720	720	1135	360	425	1135	835	80
WH6–11	830	770	1215	365	435	1240	920	80

mm	H	I	J	K	L	M	N	O
WH6–7	1035	215	125	1015	915	280	100	240
WH6–8	1035	215	125	1015	915	280	100	240
WH6–11	1120	215	125	1100	1000	280	105	295

3.1.2 WH6–14

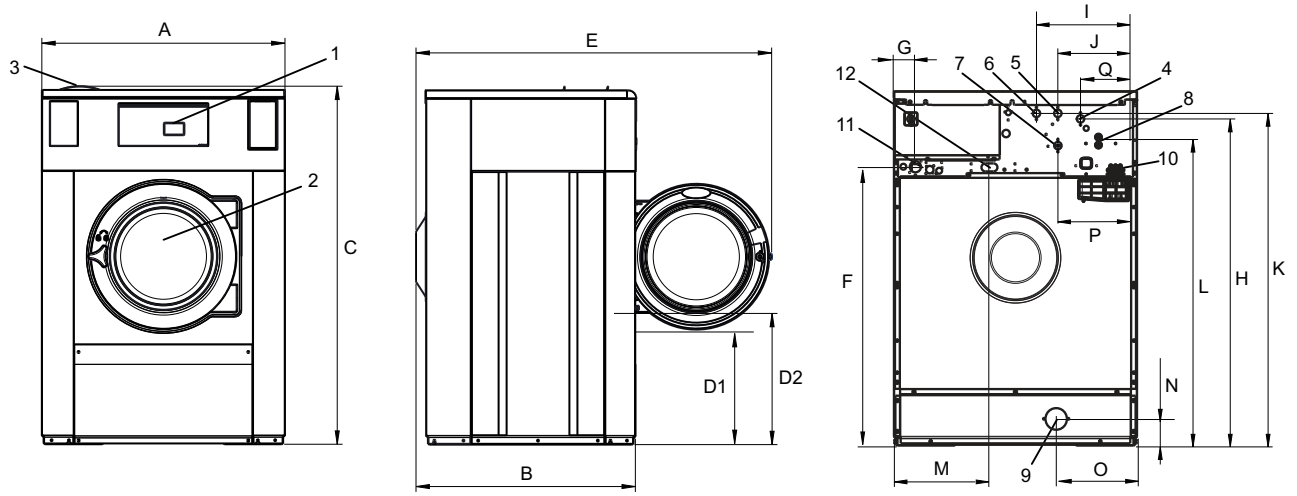


fig.X01751

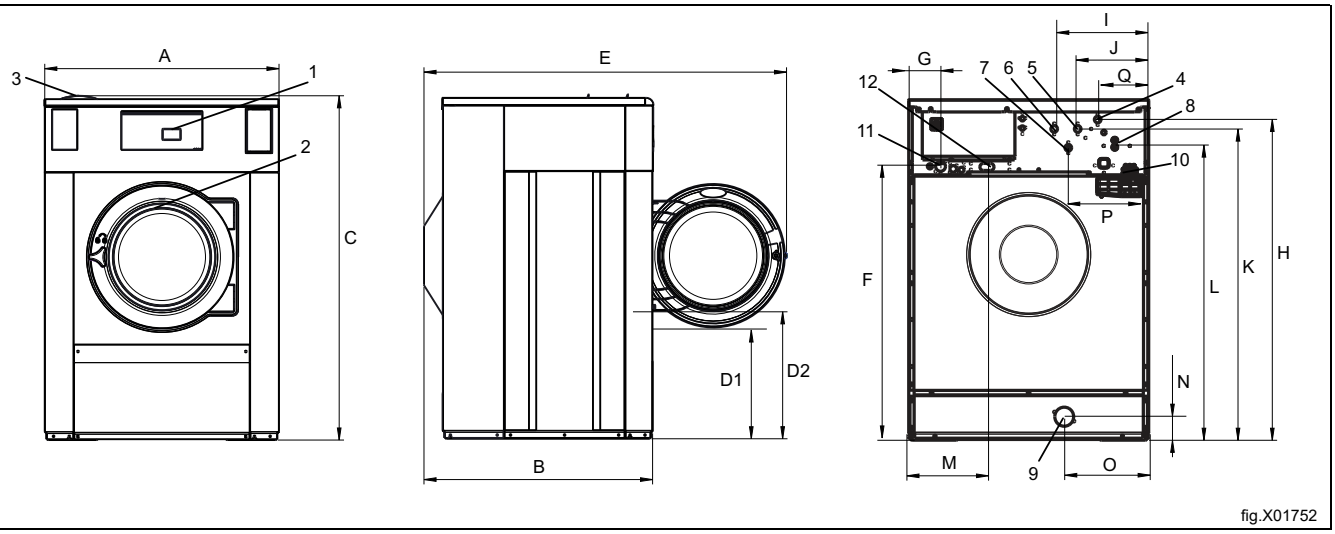
1	Operating panel
2	Door opening, WH6–14: ⌀ 395 mm
3	Detergent container
4	Cold/Hot water (Detergent container)
5	Cold water
6	Hot water
7	Cold/Hot water or Re-used water with network pressure (option)
8	Re-used water from tank/pump or Liquid detergent supply
9	Drain
10	Liquid detergent supply
11	Electrical connection
12	Steam connection

mm	A	B	C	D1	D2	E	F	G
WH6–14	910	820	1345	440	515	1310	1050	80

mm	H	I	J	K	L	M	N	O
WH6–14	1245	375	295	1225	1125	360	105	305

mm	P	Q
WH6–14	295	210

3.1.3 WH6–20, WH6–27, WH6–33



1	Operating panel
2	Door opening, WH6–20, WH6–27, WH6–33: ⌀ 435 mm
3	Detergent container
4	Cold/Hot water (Detergent container)
5	Cold water
6	Hot water
7	Cold/Hot water or Re-used water with network pressure (option)
8	Re-used water from tank/pump or Liquid detergent supply
9	Drain
10	Liquid detergent supply
11	Electrical connection
12	Steam connection

mm	A	B	C	D1	D2	E	F	G
WH6–20	970	945	1430	470	555	1480	1135	150
WH6–27	1020	990	1465	500	580	1525	1170	135
WH6–33	1020	1135	1465	500	580	1665	1170	135

mm	H	I	J	K	L	M	N	O
WH6–20	1330	400	300	1290	1210	350	105	335
WH6–27	1365	400	300	1325	1245	335	105	360
WH6–33	1365	400	300	1325	1245	335	105	360

mm	P	Q
WH6–20	330	215
WH6–27	340	215
WH6–33	340	215

3.2 Technical data

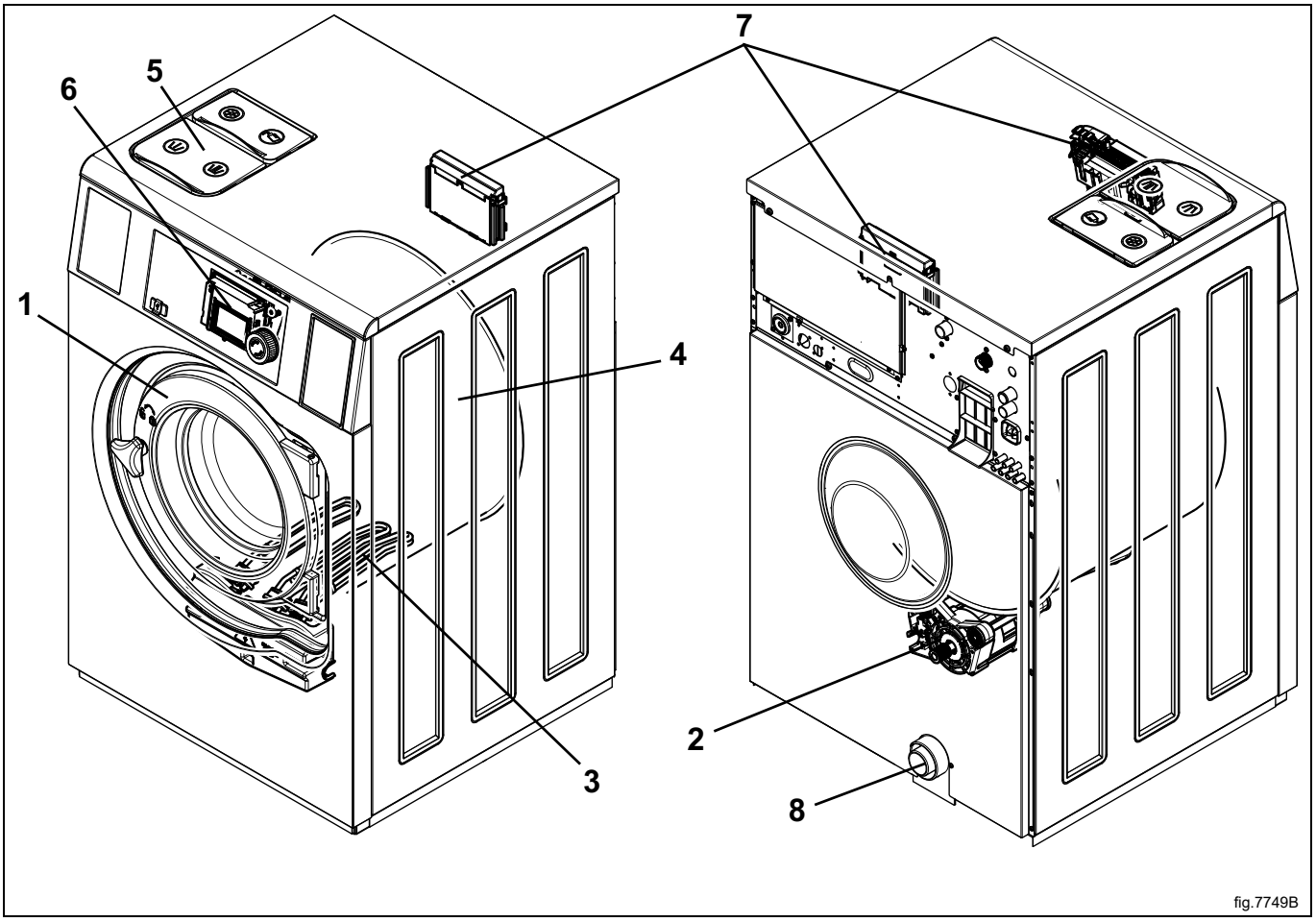
		WH6–7	WH6–8	WH6–11	WH6–14	WH6–20	WH6–27	WH6–33
Weight, net	kg	145	158	202	263	354	425	560
Drum volume	litres	65	75	105	130	180	240	300
Drum diameter	mm	520	520	595	650	725	795	795
Drum speed during wash	rpm	49	49	46	44	42	40	40
Drum speed during extraction	rpm	1245	1245	1165	1113	1054	1007	1007
G-factor, max.		450	450	450	450	450	450	450
Heating: Electricity	kW	3.0	3.0	5.2	13	18	23	23
	kW	5.2	5.2	7.5				
	kW	5.4	5.4	10				
	kW	7.5	7.5					
Heating: Steam		x	x	x	x	x	x	x
Heating: Hot water		x	x	x	x	x	x	x
Frequency of the dynamic force	Hz	20.8	20.8	19.4	18.6	17.6	16.8	15.8
Floor load at max extraction	kN	1.8 ± 0.5	1.9 ± 0.5	2.5 ± 0.5	3.1± 0.5	4.2 ± 1.0	5.2 ± 1.0	6.2 ± 1.3
Sound power/pressure level at extraction*	dB(A)	73/58	73/59	76/62	78/62	84/68	83/68	82/66
Sound power/pressure level at wash*	dB(A)	57/43	61/47	61/46	63/48	66/50	64/48	66/50
Heat emission of installed power, max	%	5	5	5	5	5	5	5

* Sound power levels measured according to ISO 60704.

3.3 Connections

		WH6–7	WH6–8	WH6–11	WH6–14	WH6–20	WH6–27	WH6–33
Water valves	DN BSP	20 3/4”	20 3/4”	20 3/4”	20 3/4”	20 3/4”	20 3/4”	20 3/4”
Recommended water pressure	kPa	200–600	200–600	200–600	200–600	200–600	200–600	200–600
Continuous operating pressure	kPa	50–800	50–800	50–800	50–800	50–800	50–800	50–800
Capacity at 300 kPa	l/min	20	20	20	20	30	60	60
Drain valve ⌀ outer	mm	50/75	50/75	50/75	75	75	75	75
Draining capacity	l/min	170	170	170	170	170	170	170
Steam valve connection	DN BSP	15 1/2”	15 1/2”	15 1/2”	15 1/2”	15 1/2”	15 1/2”	15 1/2”
Recommended steam pressure	kPa	300–600	300–600	300–600	300–600	300–600	300–600	300–600
Functioning limits for steam valve	kPa	50–800	50–800	50–800	50–800	50–800	50–800	50–800

4 Machine presentation



1	Door and door lock
2	Motor
3	Heating unit
4	Drum
5	Detergent container
6	Control panel with Control system
7	I/O modules
8	Drain
9	I/O module type 6

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.

5 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.

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.

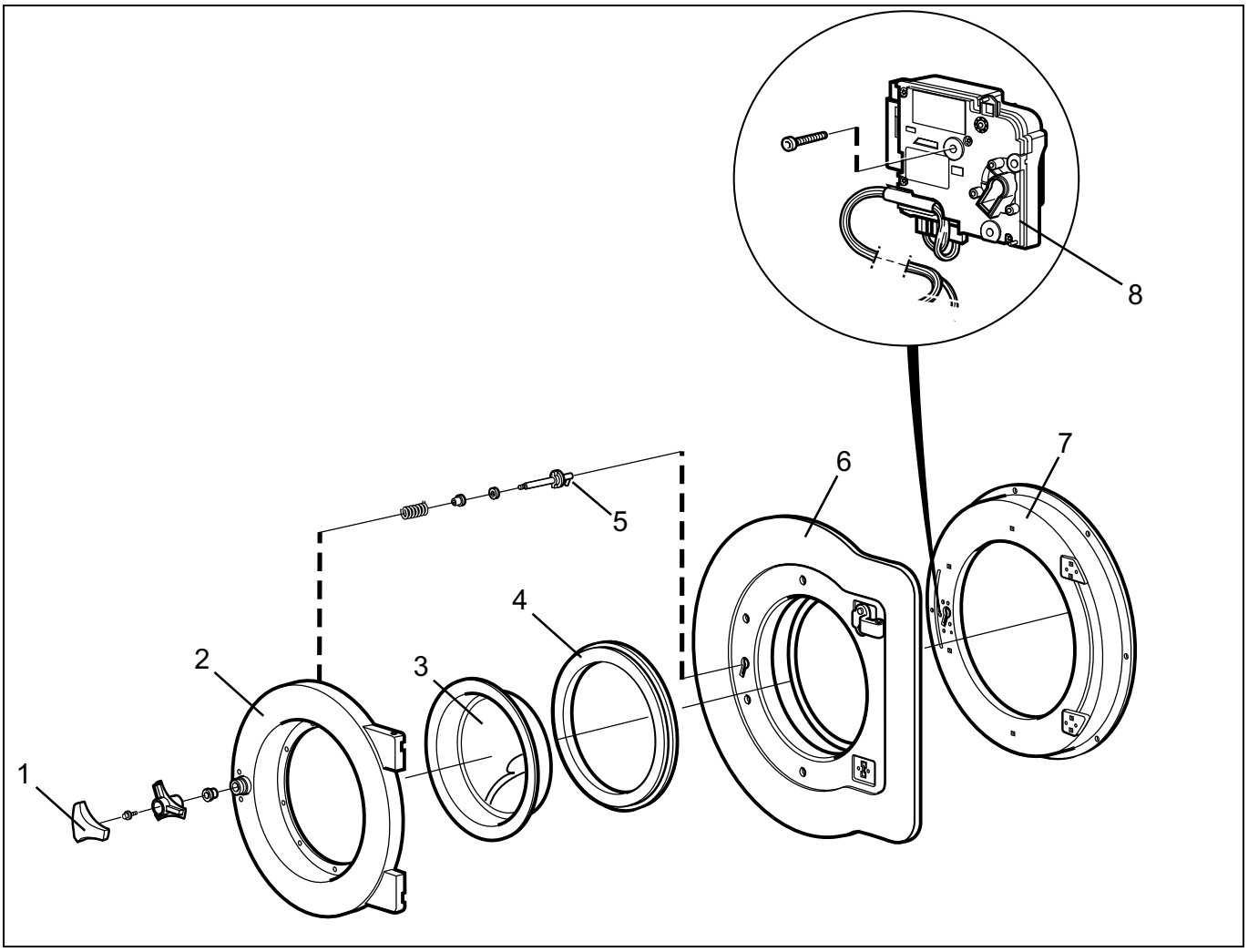
Ready to use

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.

6 Door and door lock

The door and door lock consists of the following parts:



1	Slip lock door handle
2	Door
3	Door glass
4	Door gasket
5	Locking shaft
6	Trim panel
7	Support frame
8	Door lock unit

6.1 Description

The door glass is attached in the door rim by the door gasket. The door seals the opening by the door gasket that prevent the door from leakage. The door is closed by the slip lock handle and locking shaft and locked by the door lock unit.

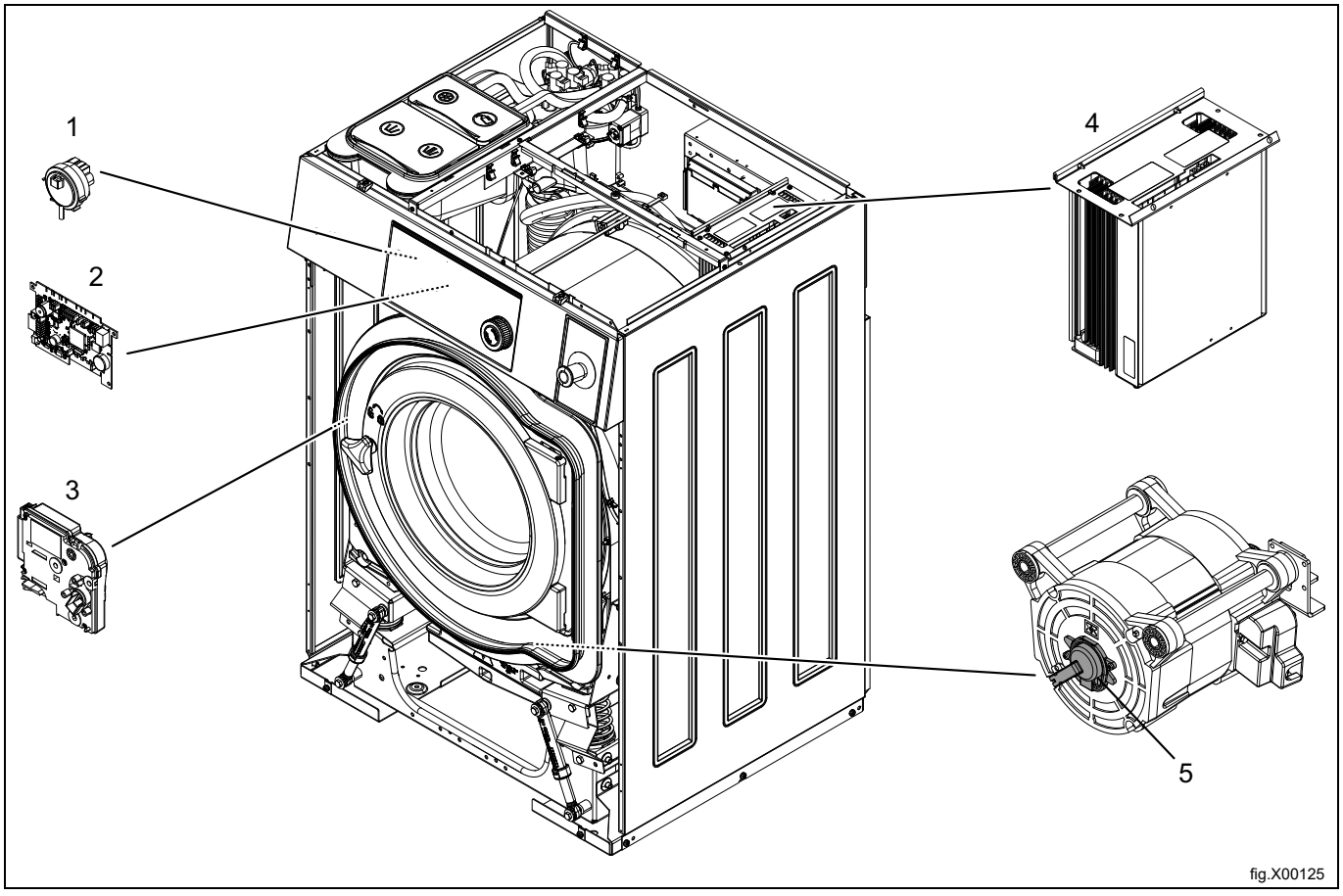
Slip lock door handle

The handle has a slip lock function to prevent damage on the locking mechanism if the door is tried to be opened when locked. If the torque is too high on the slip lock the handle just slips over (4–5 Nm).

Door lock unit

The door lock actuator is a bi-stable which means it has two stable positions; locked or unlocked. The door lock unit locks the door when the wash program has started, water level switch B2 confirm no water, the motor control unit confirm stand still and rotation sensor B3 confirm no drum rotations. The actuator is locked by a 5 VDC pulse signal and keeps locked by a permanent magnet.

The door is unlocked and possible to open when water level switch B2 confirm no water, the motor control unit confirm stand still and rotation sensor B3 confirm no drum rotations.



1	Water level switch B2
2	Door lock control unit
3	Door lock unit
4	Motor control unit
5	Rotation sensor B3 (Tacho)

Emergency opening button

An emergency opening button (A) is located on the side of the door lock unit and can be used to open the door in case of emergency.

On soft mounted machines the emergency opening button can be reached by pushing the drum assembly backwards.
On solid mounted machines the front panel need to be removed to reach the emergency opening button.

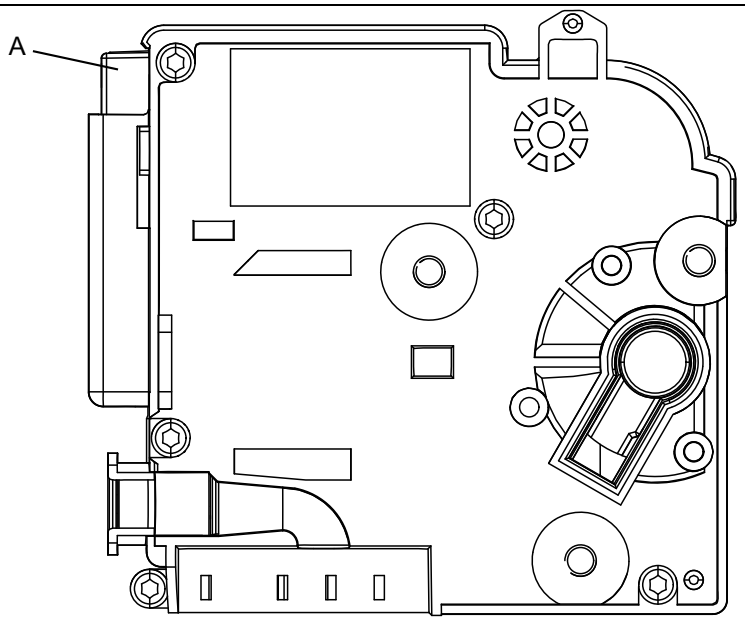


fig.X00017A

6.2 Replacements and adjustments

6.2.1 Replacement of the door

6.2.1.1 WH6–7, WH6–8, WH6–11

Disconnect the power to the machine.

Demount the door hinges from the trim panel and remove the door.

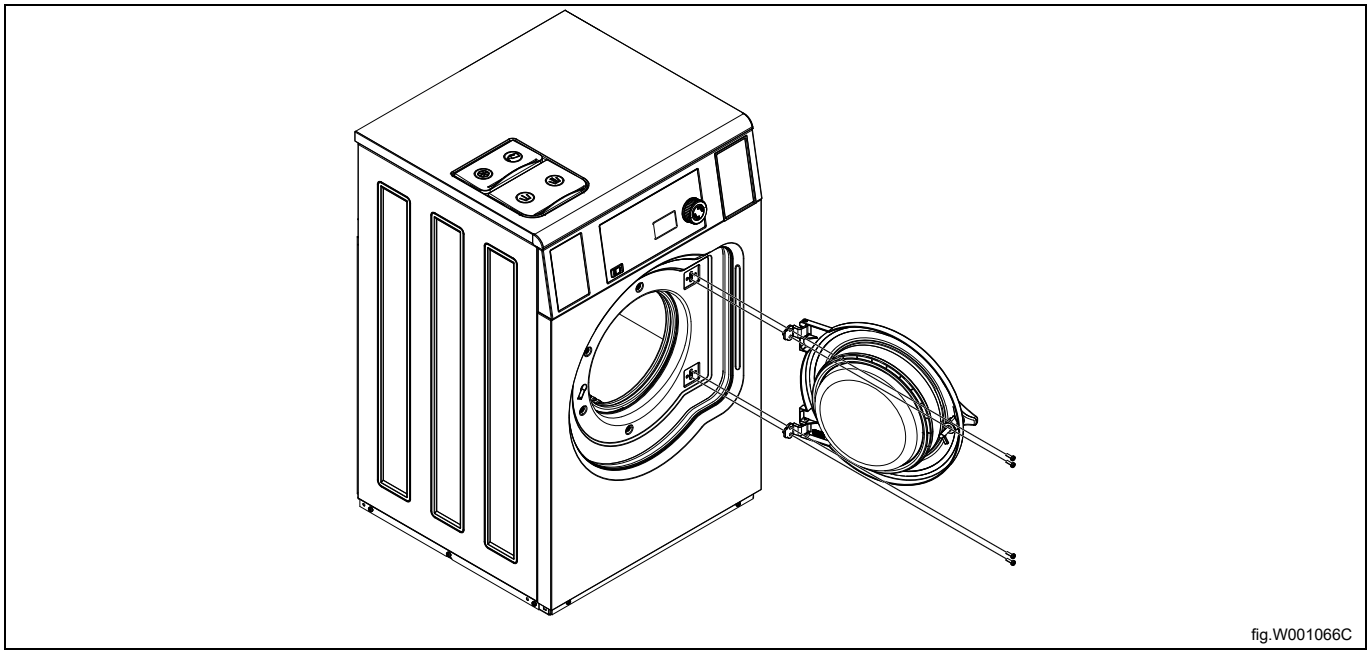


fig.W001066C

Mount the new door by the door hinges on the trim panel. Tighten the screw M6 (B) to 9–10 Nm / 6.6–7.4 lbf-ft.

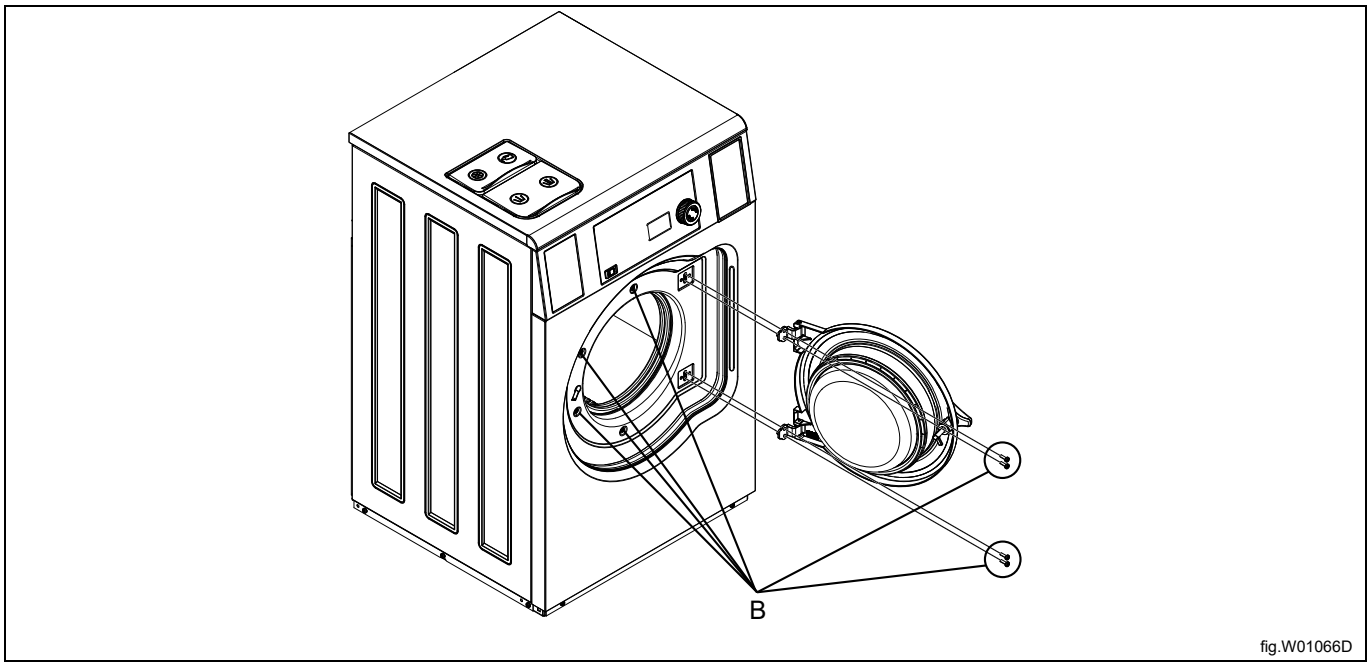


fig.W01066D

Function check

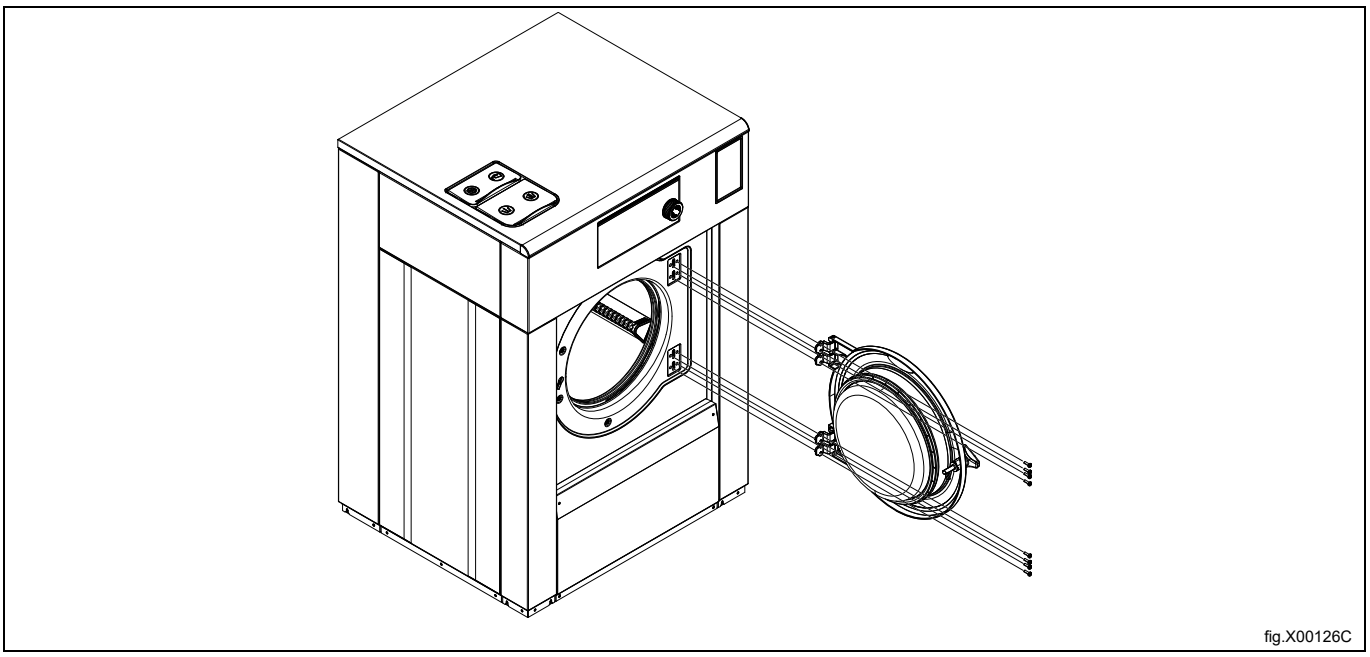
Check the function by closing and opening the door several times.

Power up the machine, select a wash program and start the machine. Verify that the door is locked.

Check that there are no leak, abnormal movement or noise from the door module.

6.2.1.2 WH6–14, WH6–20, WH6–27, WH6–33

Disconnect the power to the machine.
Demount the door hinges from the trim panel and remove the door.


fig.X00126C

Mount the new door by the door hinges on the trim panel. Tighten the screw M6 (B) to 9–10 Nm / 6.6–7.4 lbf-ft.

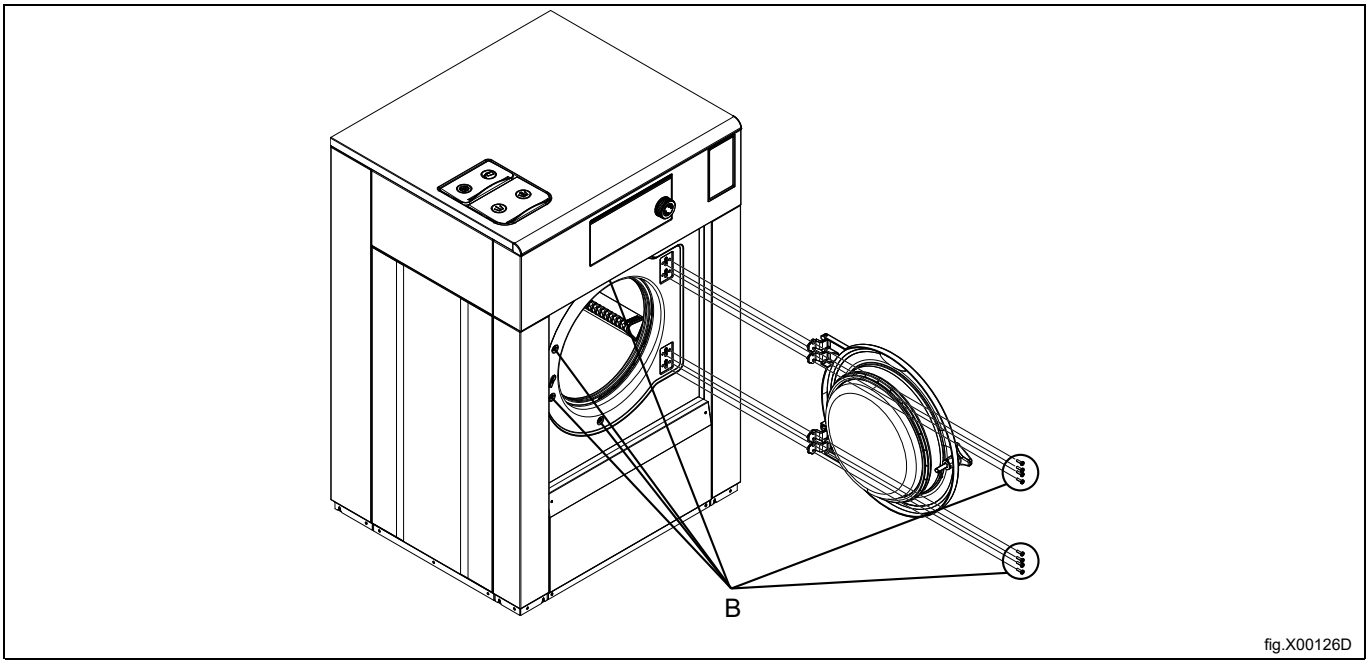


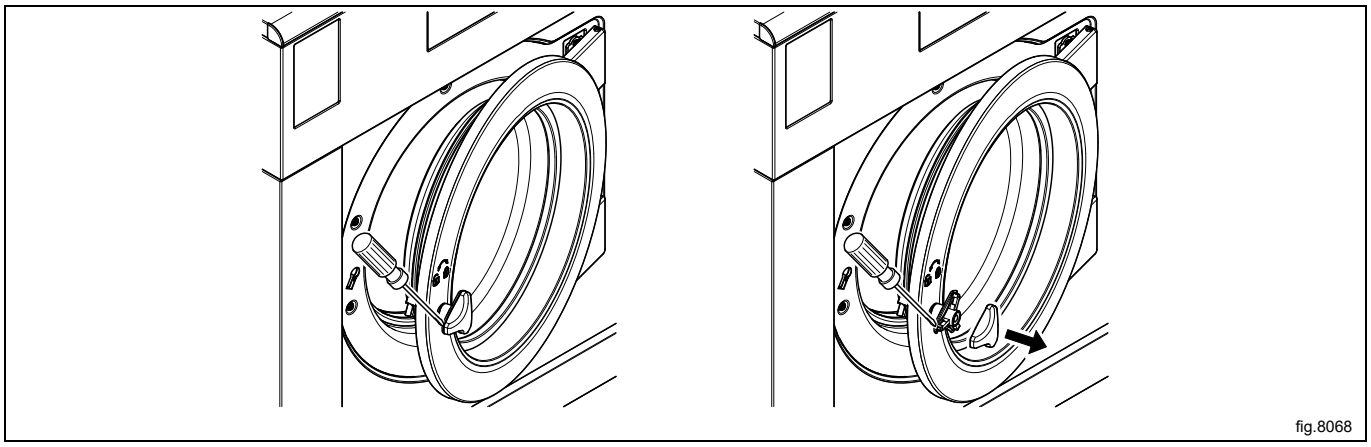
fig.X00126D

Function check

Check the function by closing and opening the door several times.
Power up the machine, select a wash program and start the machine. Verify that the door is locked.
Check that there are no leak, abnormal movement or noise from the door module.

6.2.2 Replacement of the door handle

Disconnect the power to the machine.
Open the door.
Remove the plastic cover on the door handle. Be careful not to damage the door handle.


fig.8068

Remove the center screw (A) and demount the door handle.

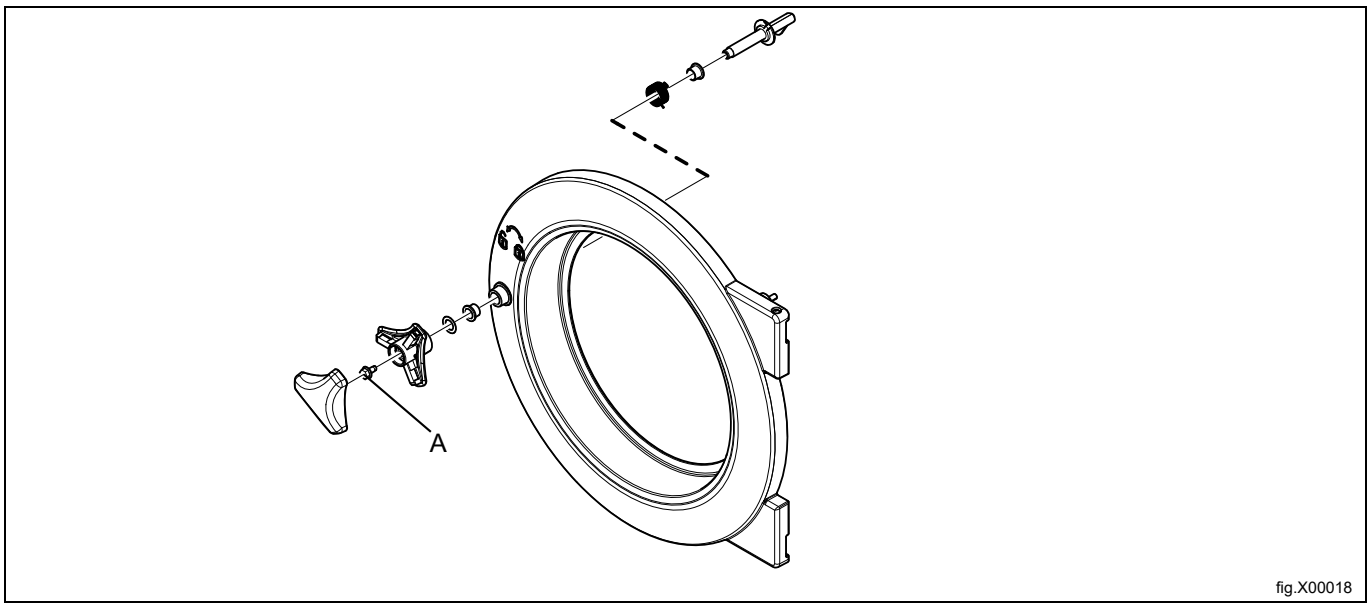
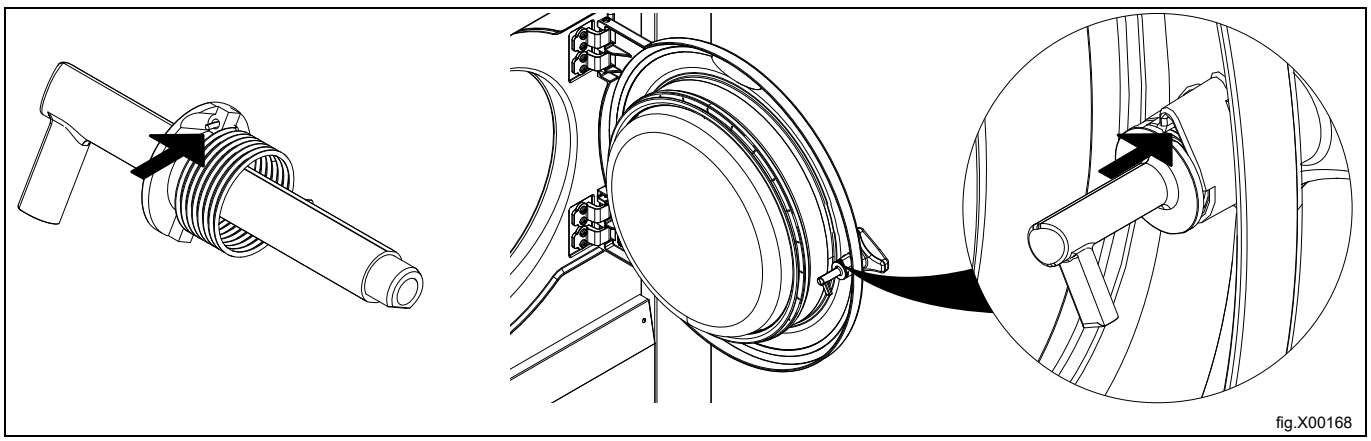


fig.X00018

Mount the new door handle. Make sure to mount the spring in the right way.


fig.X00168

Tighten the center screw to 15 Nm / 11 lbf-ft.

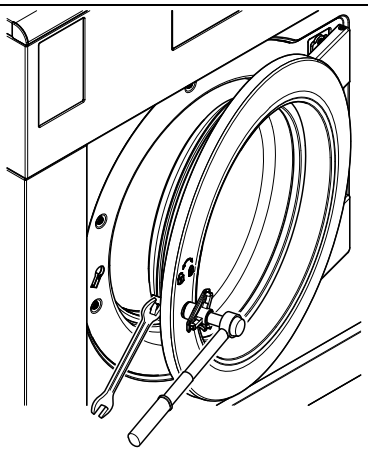


fig.8069

Tighten the screw M6 (B) to 9–10 Nm / 6.6–7.4 lbf-ft.

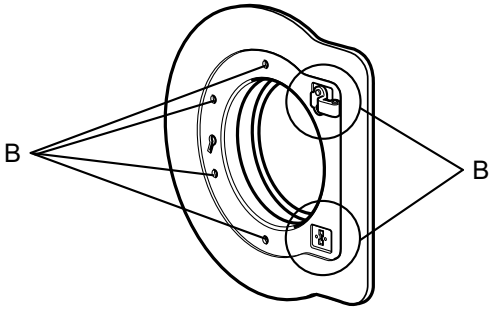


fig.X00002D

Close the door and check that the closing torque is according to the table:

Note!

A used door gasket can result in lower door gasket pressure.

Model	Closing torque (on machines with a new door gasket)
WH6–7, WH6–8, WH6–11	> 2.5 Nm / 1.84 lbf-ft
WH6–14, WH6–20, WH6–27, WH6–33	> 3 Nm / 2.21 lbf-ft

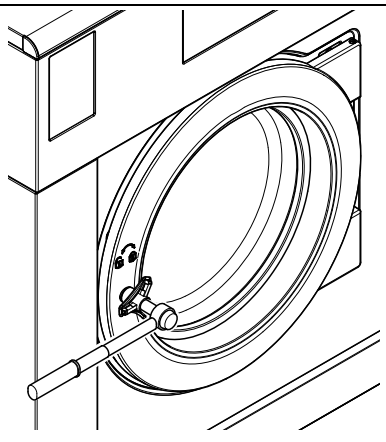


fig.8070

6.2.3 Replacement of the door lock unit

6.2.3.1 WH6–7, WH6–8, WH6–11

Disconnect the power to the machine.
Demount the front panel.

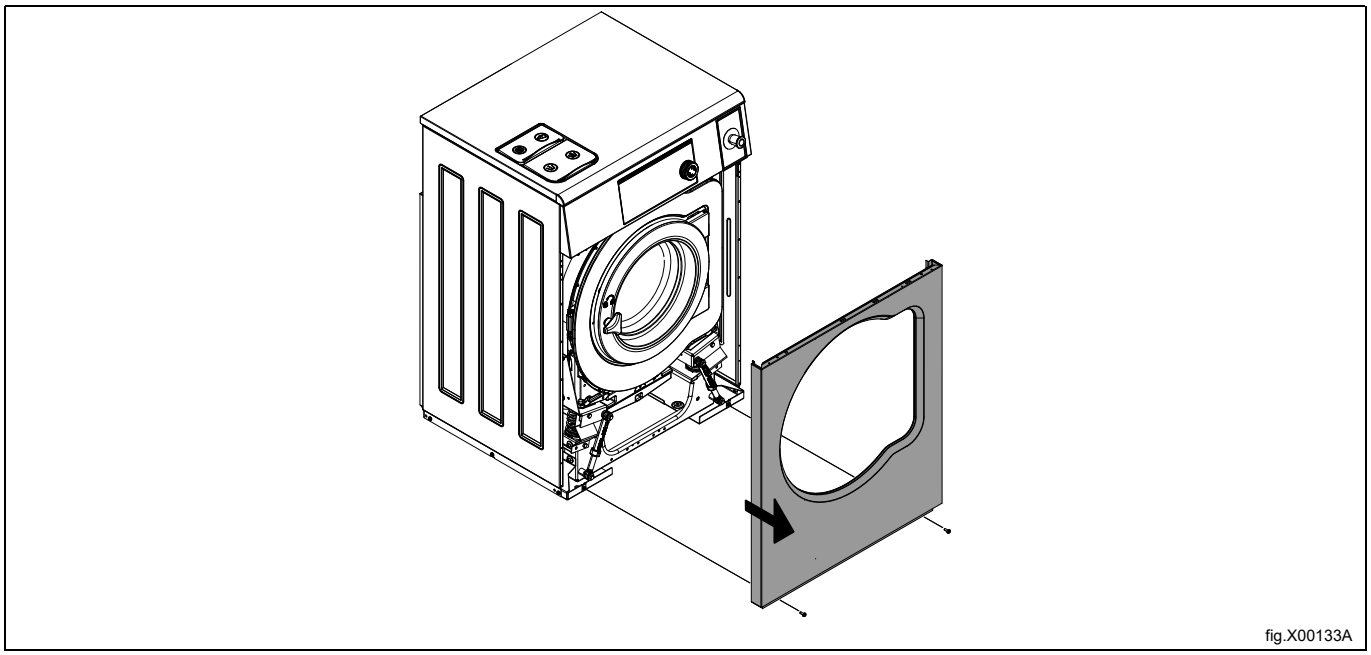


fig.X00133A

Demount the door.

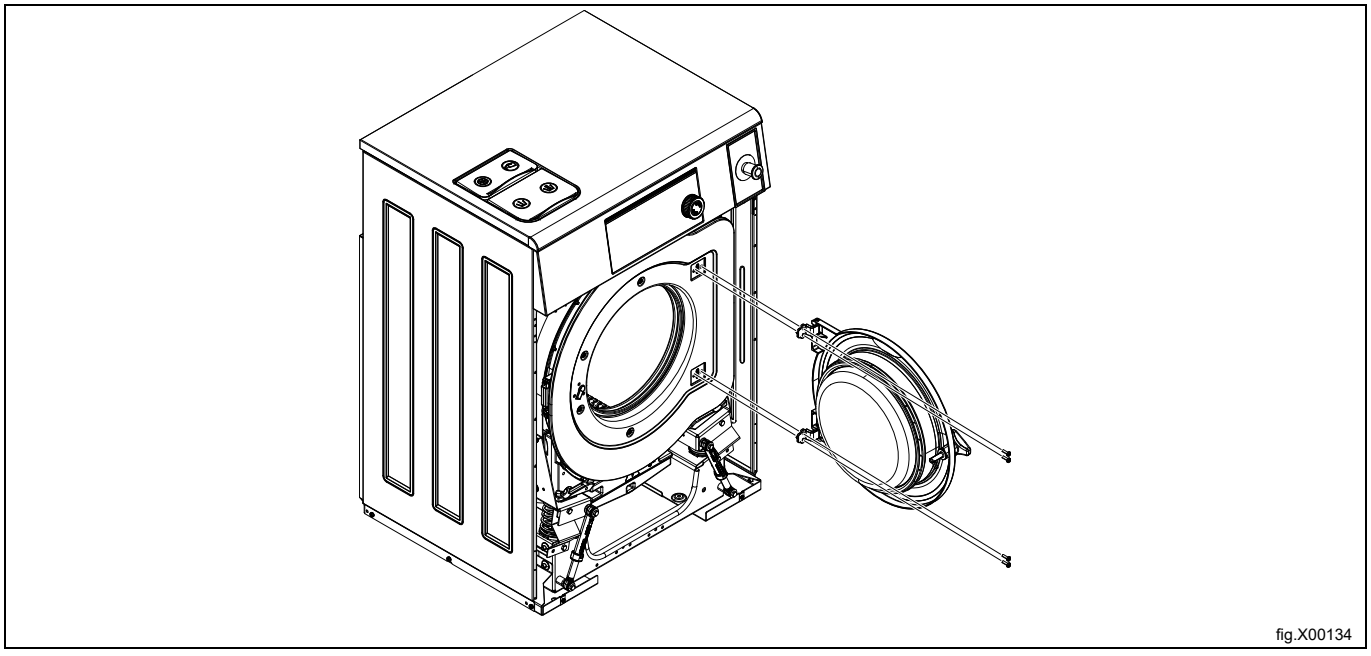


fig.X00134

Demount the trim panel.

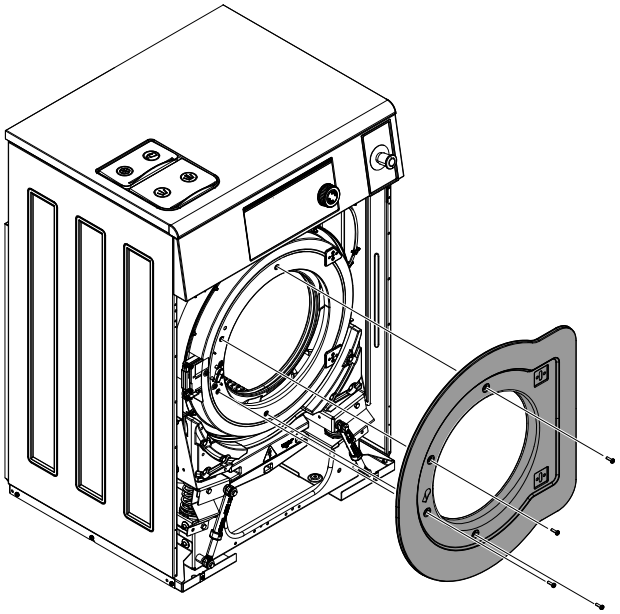


fig.X00135

Disconnect the door lock cables and demount the door lock unit.

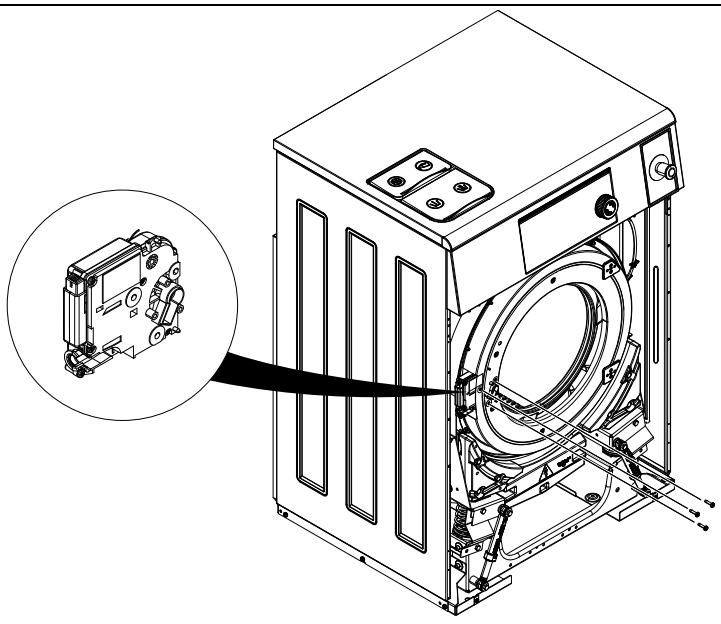


fig.X00136

Mount the new door lock. Use tightening torque 5 Nm / 3.7 lbf.ft.

Connect the cables.

Make sure all the cable ties are mounted and that the cable ties are hanging free from the moving parts.

Remount the trim panel.

Remount the door. Use tightening torque 9–10 Nm / 6.6–7.4 lbf.ft.

Before remounting the front panel, lock the door and verify that the emergency opening button is working by pressing it to open the door.

Remount the front panel.

Function check

Power up the machine.

Check the function by closing and opening the door several times.

Select a wash program and start the machine. Verify that the door is locked.

Check that there are no leak, abnormal movement or noise from the door module.

6.2.3.2 WH6–14, WH6–20, WH6–27, WH6–33

Disconnect the power to the machine.
Demount the top panel and the front panel.

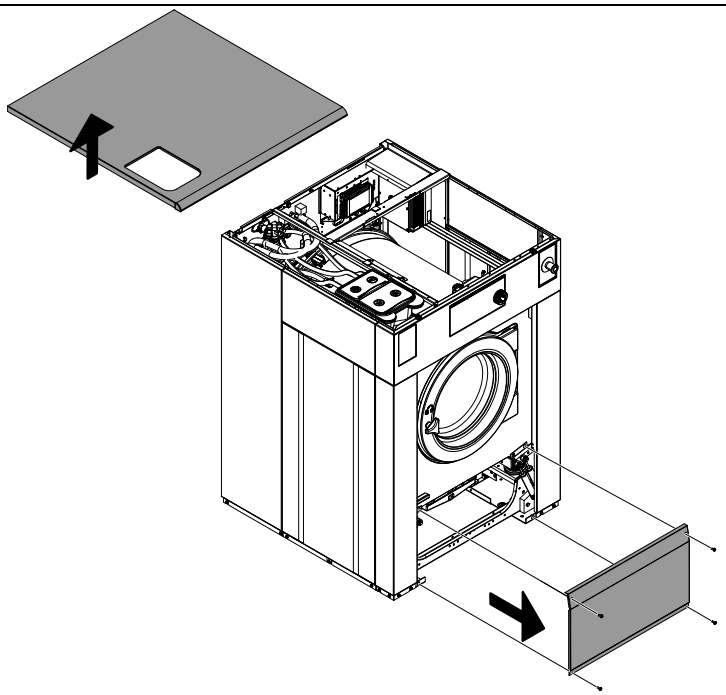


fig.X00127A

Demount the door.

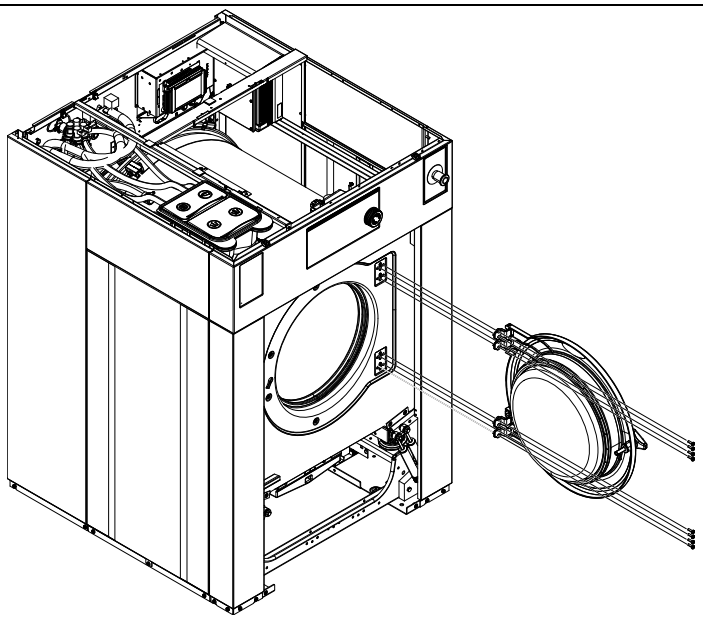


fig.X00128

Demount the brace.

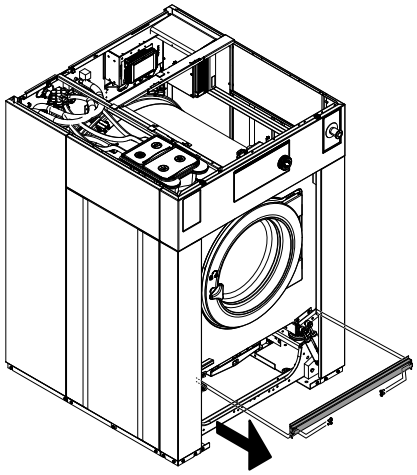


fig.X00127B

Remove the three rubber strips around the trim panel.

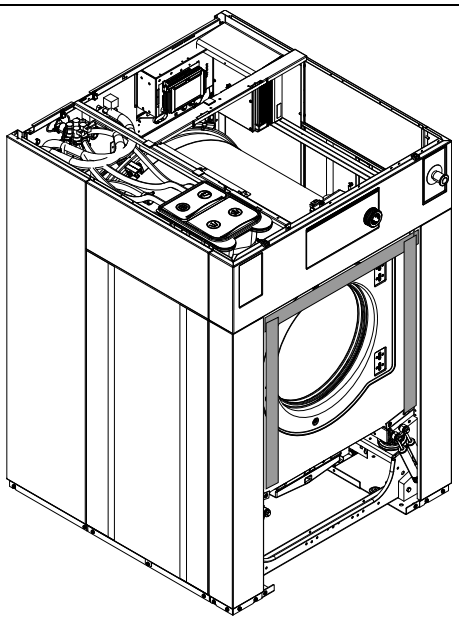


fig.X00129

Press the drum assembly backwards to reach the clips holding the door lock cable on the left side.
Loosen the level hose on the right side.

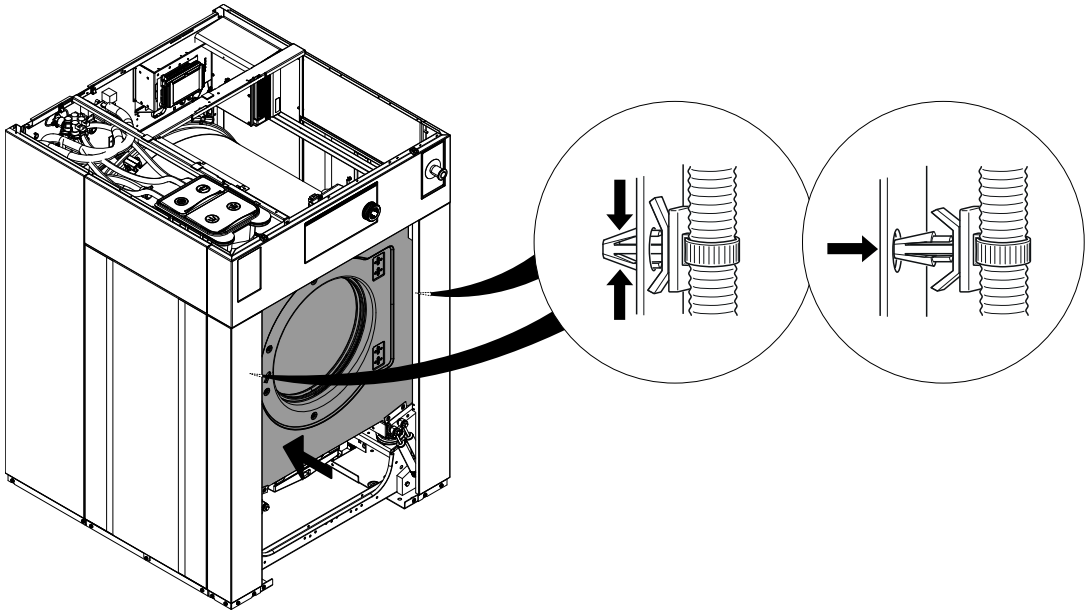


fig.X00130

Demount the trim panel.

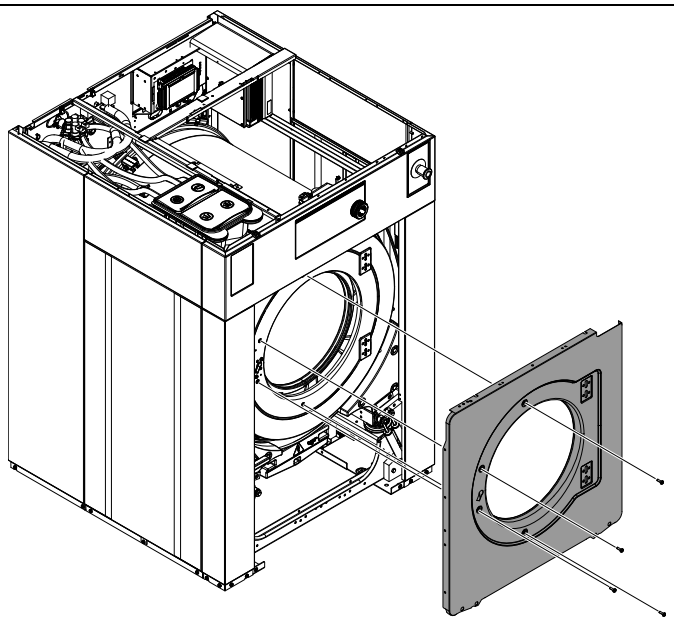


fig.X00131

Disconnect the door lock cables and demount the door lock unit.

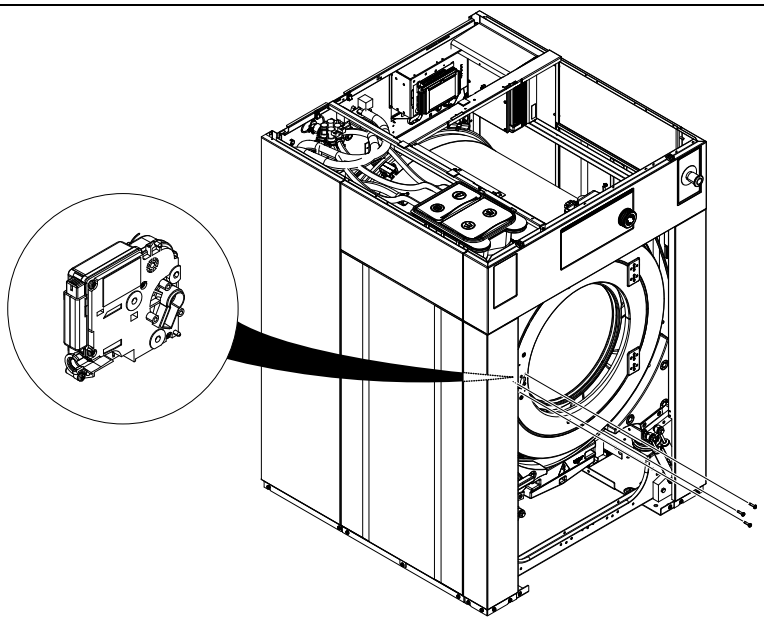


fig.X00132

Mount the new door lock unit and connect the cables.

Remount the trim panel.

Press the drum assembly backwards to remount the clips for the door lock unit and the level hose.

Note!

It is important to retrofit all the clips for the door lock unit cables and the level hose. Make sure they are not in contact with any moving parts.

Remount the brace and the three rubber strips.

Before remounting the lower front panel, lock the door and verify that the emergency opening button is working by pressing it to open the door.

Remount the lower front panel, the door and the top panel.

Function check

Power up the machine.

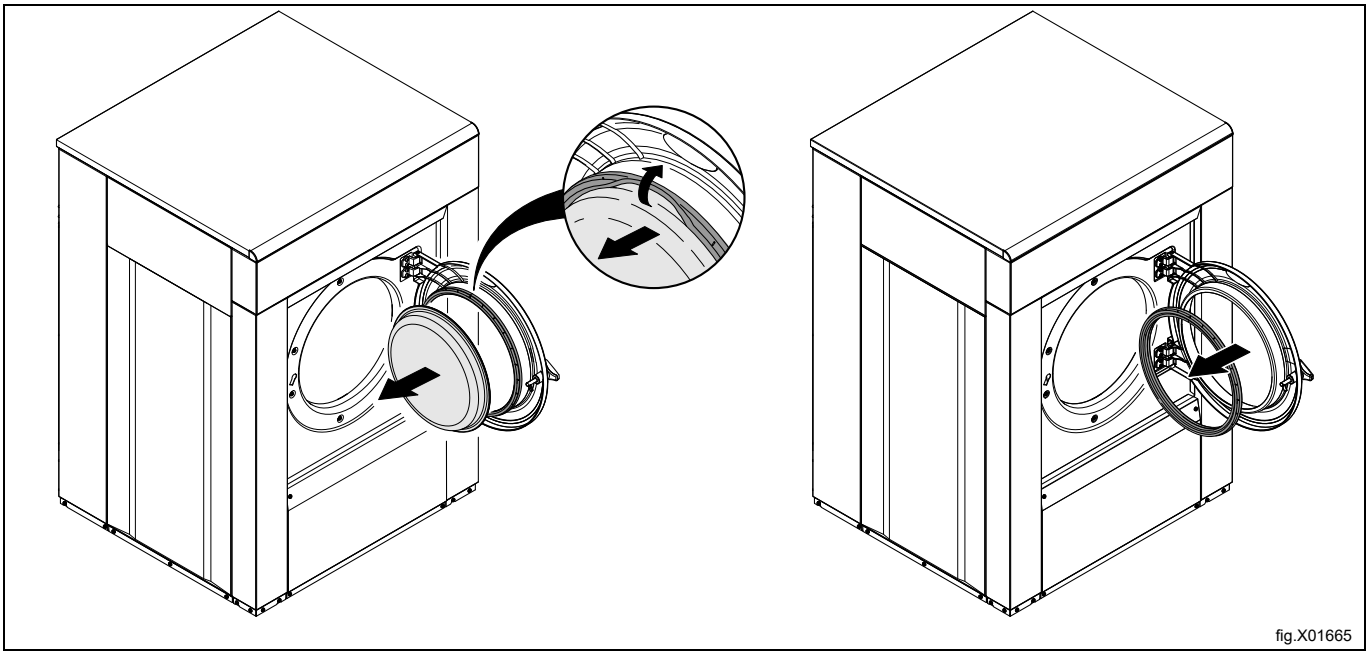
Check the function by closing and opening the door several times.

Select a wash program and start the machine. Verify that the door is locked.

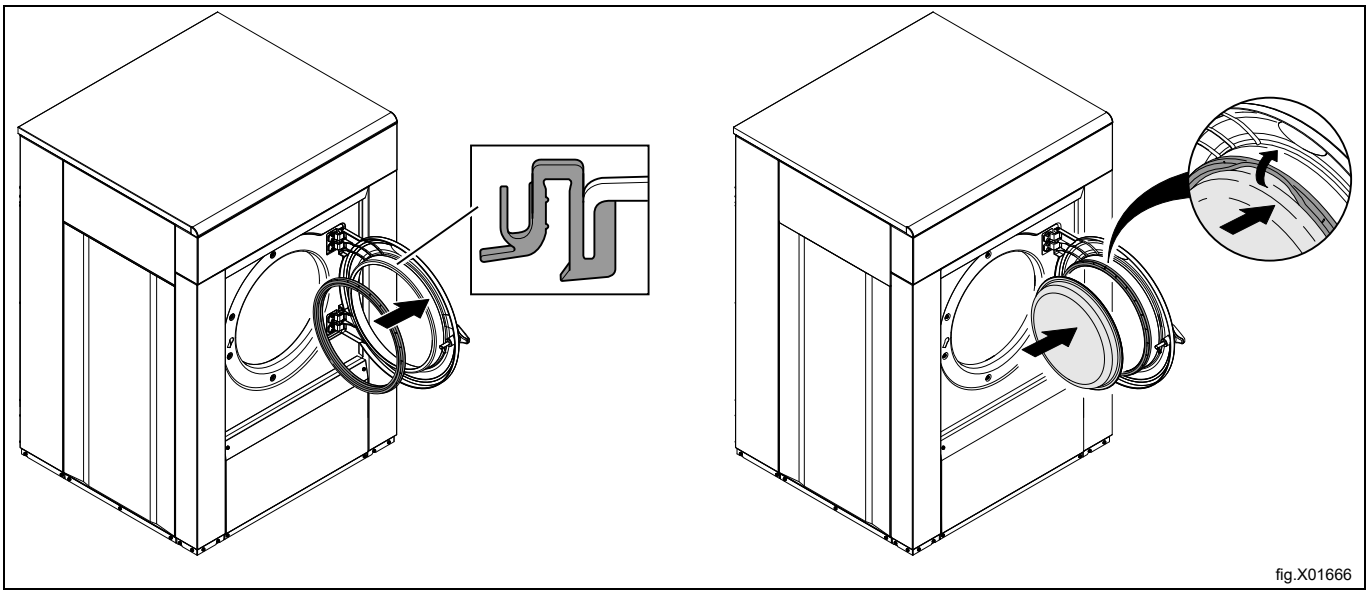
Check that there are no leak, abnormal movement or noise from the door module.

6.2.4 Replacement of the door gasket

Disconnect the power to the machine.
Open the door 90°
Demount the door glass; lift the gasket to be able to pull out the glass.
Demount the door gasket from the door frame.


fig.X01665

Mount the new door gasket to the door frame.
Remount the door glass into the slot of the door gasket.


fig.X01666

Check that the door glass and door gasket are fit tight (A-A) and concentric together.

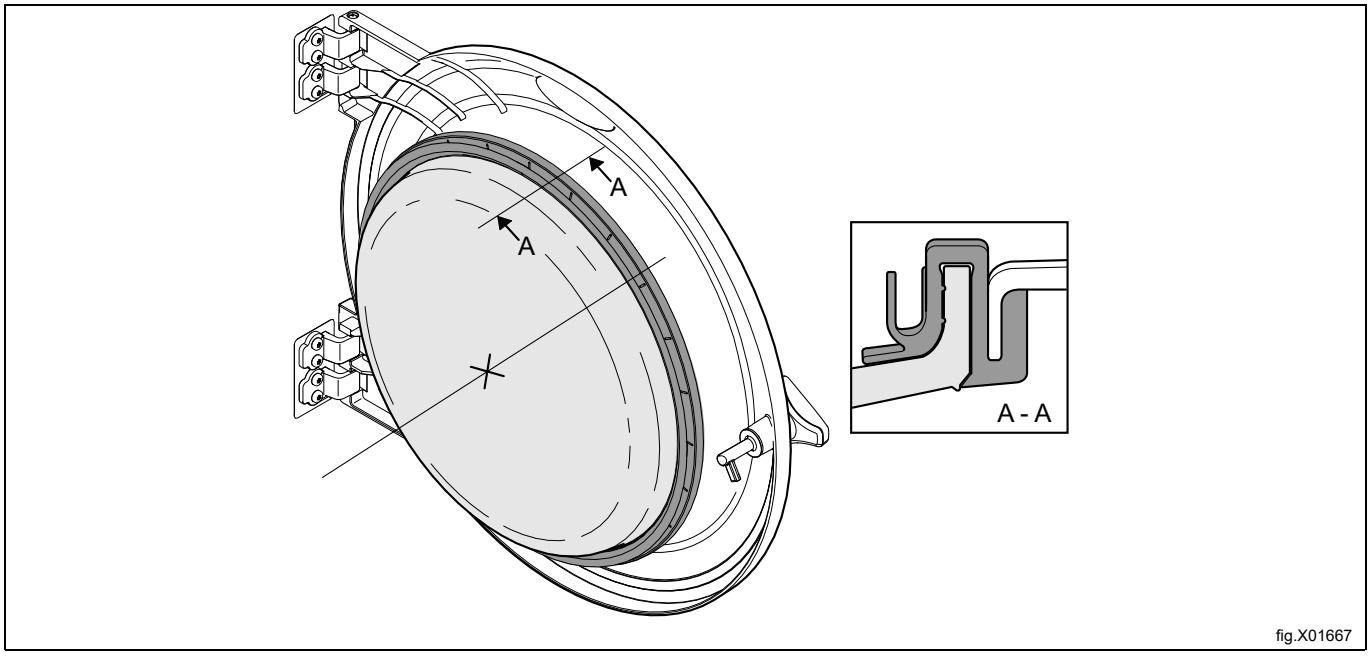


fig.X01667

6.3 Problems and solutions

6.3.1 Door knob creating noise or feeling loose

Problem

The center screw inside the door knob is loose or is not tightened enough. This is causing the door handle to feel loose and/or creating noise.

Solution

Hold the L-pin on the axis still against one side on the door and turn the knob in each direction. If there is any play while turning the center screw must be tightened.

- Disconnect the power to the machine.
- Remove the plastic cover on the door handle. Be careful not to damage the door handle.
- Tighten the center screw to 15 Nm / 11 lbf-ft.
- Remount the plastic cover.
- When the center screw has been tightened there shall not be any play while turning the door handle.

6.3.2 Door and door hinges are feeling loose

Problem

The door and door hinges are feeling loose.

Solution

Tighten the M6 screw a the door’s hinge to 9–10 Nm / 6.6–7.4 lbf.ft.

Note!

If not tightening the screws, the door glass can be crashed to the drum and glass will fall into the drum and damage the load in the machine.

7 Motor and motor control

7.1 Motor control unit

The motor control unit communicates with the control system via a serial (input/output) interface. With the aid of the motor control unit the control system 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 control system.

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.

7.2 Replacement of motor

Disconnect the power to the machine.

Demount the rear panel/panels.

Remove the belt.

Loosen the two bolts (A).

Demount the cover panel to the motor cable.

Disconnect the motor cable and unscrew the earth screw.

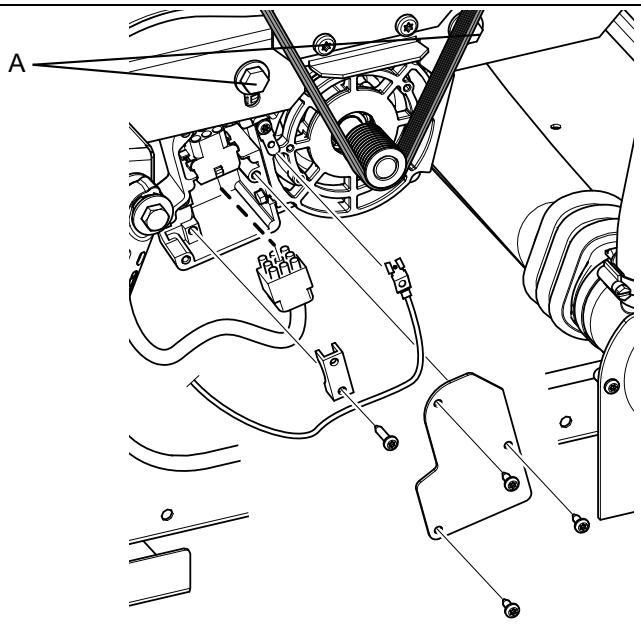


fig.7759B

Demount the motor by removing the two nuts, washers and bolts.

Note!

The motor is heavy.

Disconnect the cable to the rotation sensor.

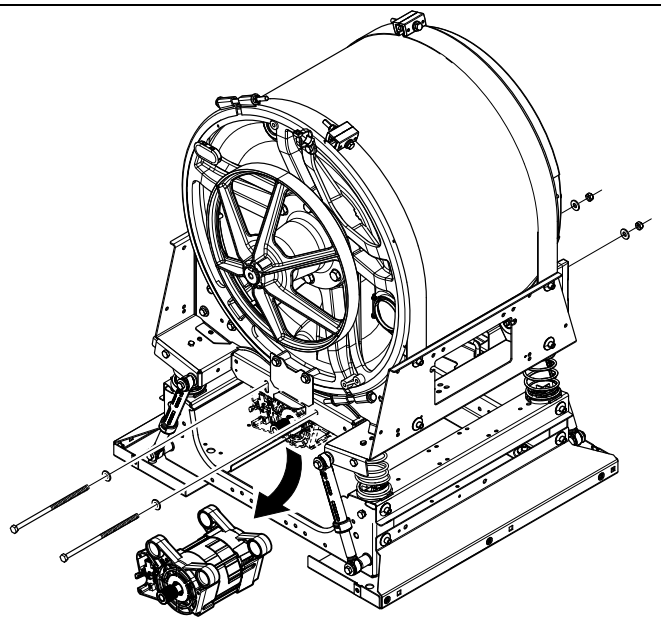


fig.7760

Mount the new motor.

Connect the cable to the rotation sensor.

Connect the motor cable and refit the earth screw.

Mount the cover panel to the motor cable.

Mount the belt. Make sure the belt is in position. For belt tension please refer to “Belt tension”.

Mount the rear panel/panels.

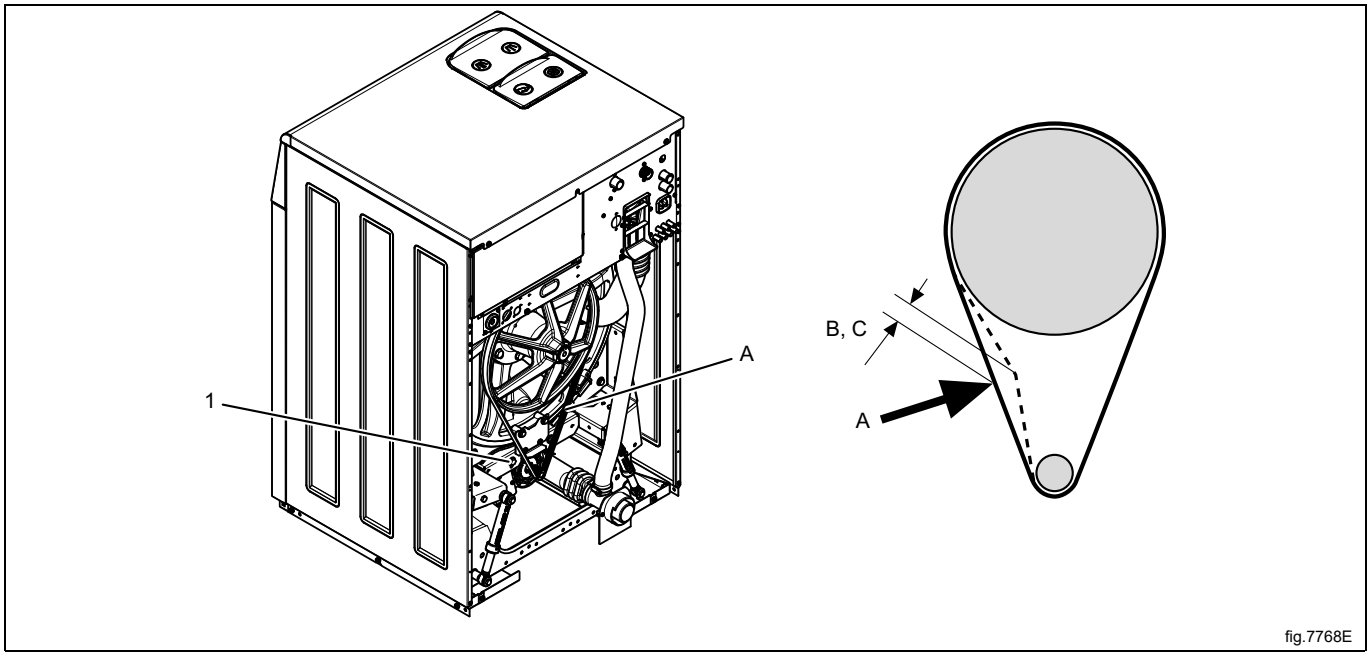
7.3 Replacement of the belt

Disconnect the power to the machine.

Demount the rear panel/panels.

Loosen the bolt (1), remove the belt (A) and put the new belt in position.

The belt tension should be according to the table, adjust if necessary. Please refer to “Belt tension” for more information



Remount the rear panel/panels.

Connect the power to the machine.

7.4 Belt tension

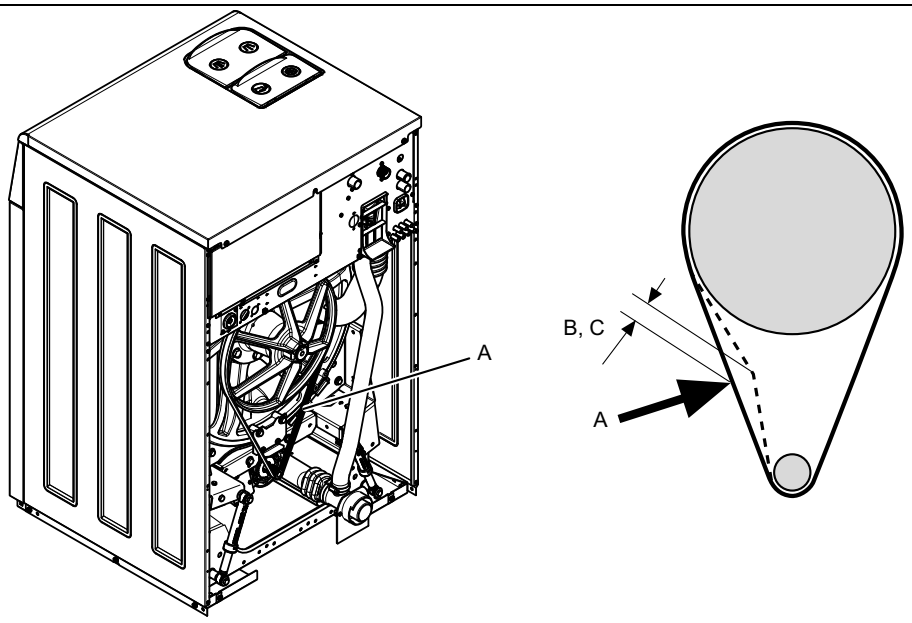


fig.7768A

Adjust the belt by using a specified force

The belt is adjusted by pressing the belt (A) with a specified force and measuring the movement (B) (mm) of the belt. See table.

Note!
A new belt should move less than a used belt.

Model	A = Force (N)	B = Movement with a used belt (mm) (> 50 running hours)	C = Movement with a new belt (mm)
WH6–7	30	8	7
WH6–8	30	8	7
WH6–11	40	9	8
WH6–14	53	10	8
WH6–20	68	10	8
WH6–27	75	10	8
WH6–33	78	10	8

Adjust the belt by frequency

Make the belt vibrate and measure the frequency, adjust the belt to the specified frequency according to machine type, new or old belt. See table.

Note!
A new belt should have frequency higher than a used belt.

Model	Frequency with a new belt (Hz)	Frequency with a used belt (Hz) (> 50 running hours)
WH6–7	100	89
WH6–8	100	89
WH6–11	96	74
WH6–14	88	78
WH6–20	78	70
WH6–27	78	68
WH6–33	78	68

7.5 Adjusting the belt tension

7.5.1 WH6–7, WH6–8, WH6–11

To adjust the belt tension, loosen the motor retaining screw (1) a couple of turns, then press down on the motor to achieve proper tensioning.

Lock the motor retaining screw (1). Tighten the bolts (1) and (2) to 30 Nm / 22 lbf.ft.

Check the belt tension. Please refer to “Belt tension” for more information.

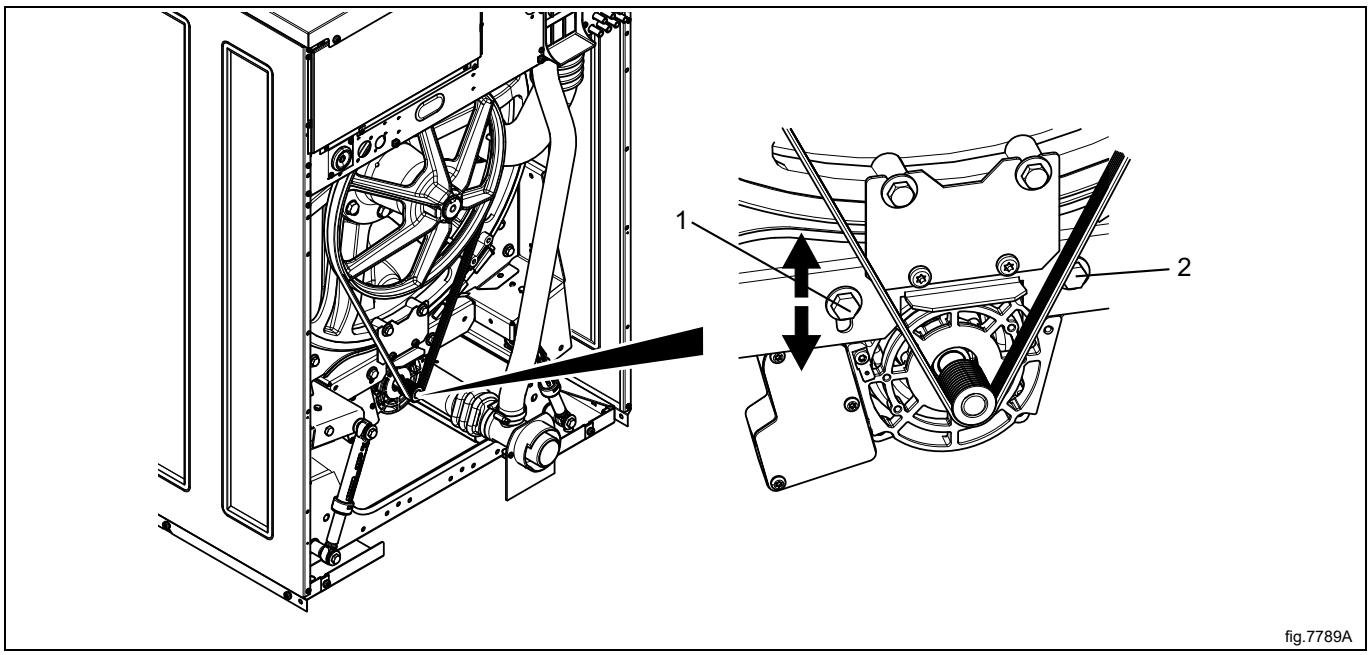


fig.7789A

7.5.2 WH6–14, WH6–20, WH6–27, WH6–33

To adjust the belt tension, first loosen the motor retaining screw (1) a couple of turns to increase or decrease the belt tension.

- Increase the belt tension by turning the screw (2) clockwise.
- Decrease the belt tension by turning the screw (2) counter clockwise.

Lock the locking nut (2) when the tension is correct, then lock the motor retaining screw (1). Tighten the bolts (1) and (3) to 50 Nm / 37 lbf.ft.

Check the belt tension. (If the old belt is used there is no need to check and adjust the belt tension). Please refer to “Belt tension” for more information.

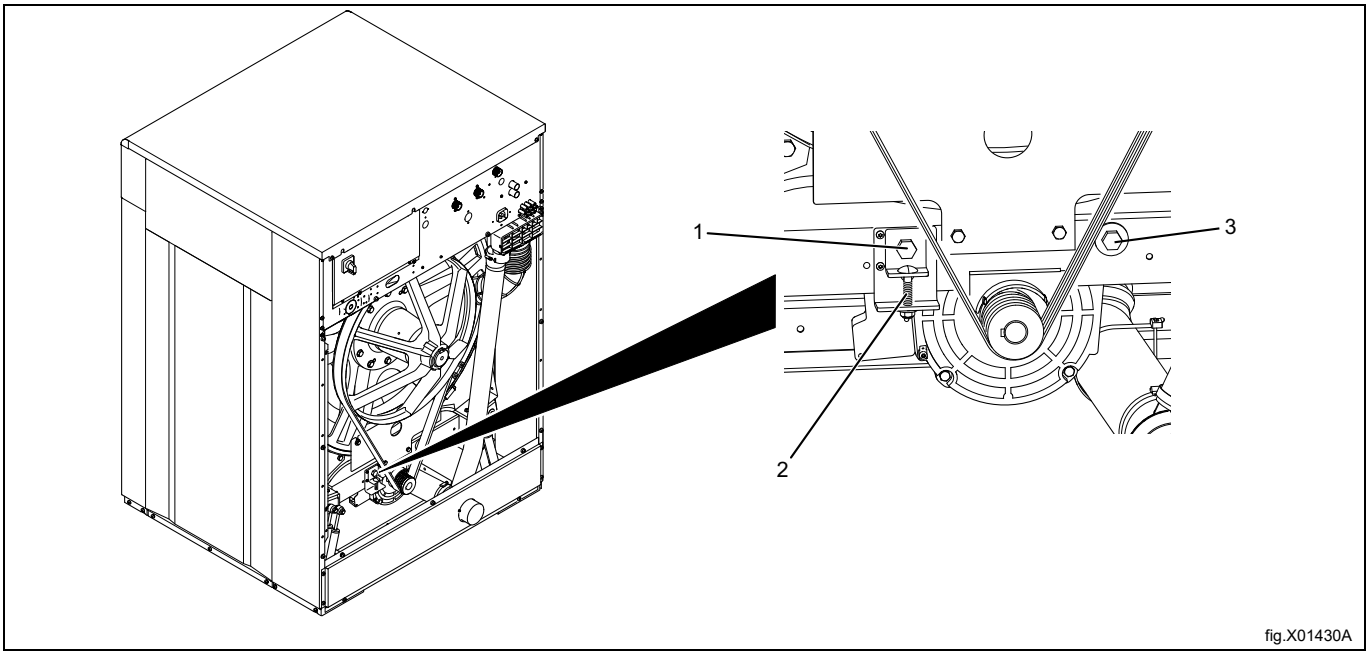


fig.X01430A

8 Heating

8.1 Electrical heated machine

An electrical heated machine normally has three heating elements. Depending on voltage and machine configuration there are different voltage and effect on the heating elements.

When replacing heating elements always replace with the original element with the same rating. The contactor/contactors for the heating elements are located in the back electrical module. The heating starts when the machine control systems calls for heat and the water level sensor indicates water in the machine. The heating stops when the temperature sensor indicate reached set temperature.

8.1.1 Replacement of heating element

Disconnect the power to the machine.

Demount the front panel.

Remove the cover to the heating elements.

Disconnect the connectors to the heating elements.

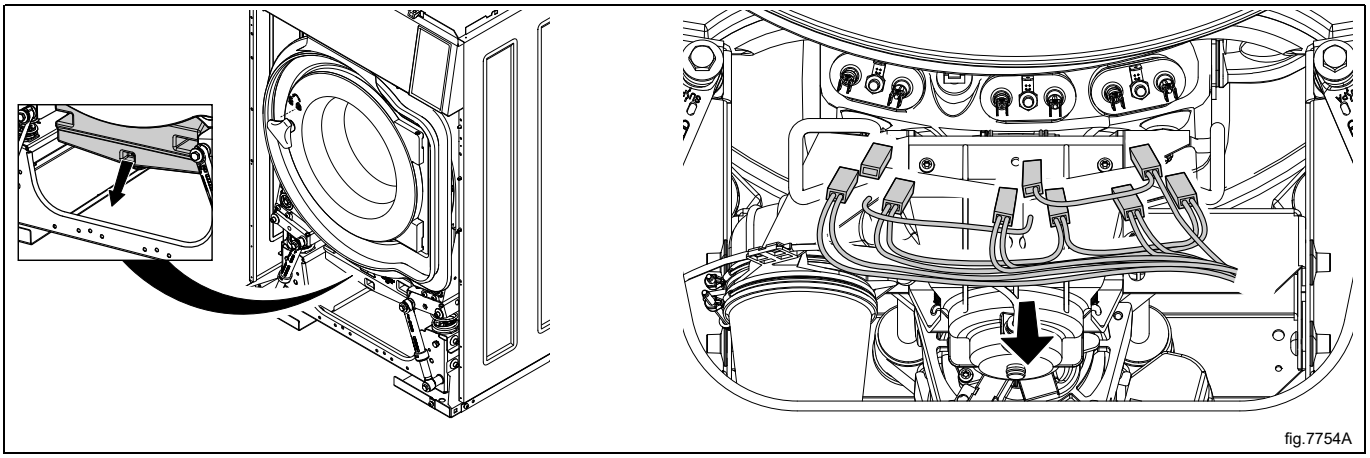


fig.7754A

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.

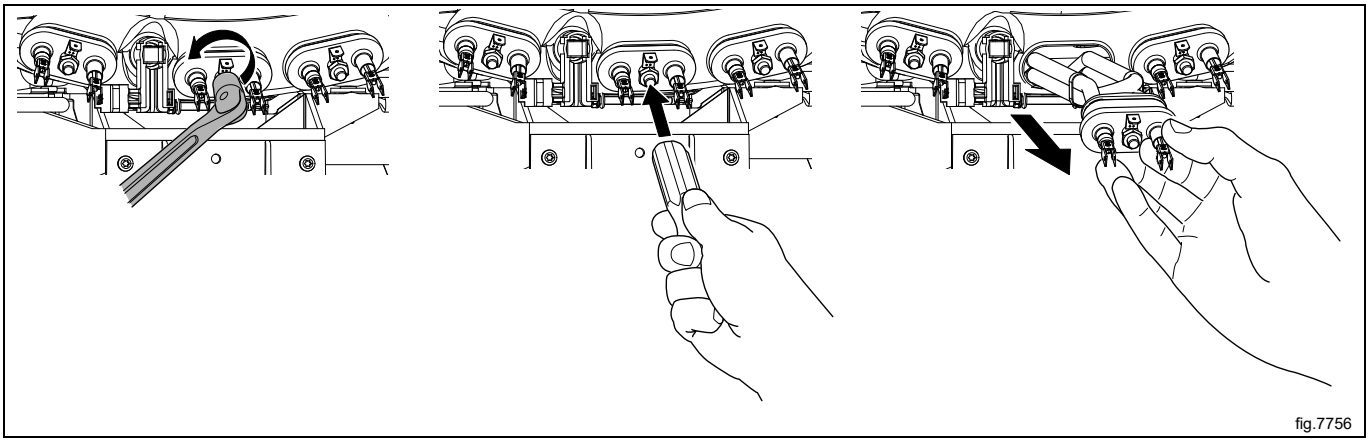


fig.7756

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

Fasten the bolt.

- For models WH6–7, WH6–8, WH6–11: Use tightening torque 5 Nm.
- For models WH6–14, WH6–20, WH6–27, WH6–33: Use tightening torque 9 Nm.

Reconnect the connectors to the heating element. Ensure good connections between the cables and the connector, use the electric schematic supplied with the machine.

Note!

Bad heating element connections will cause heat and melts the cables, plastic parts and connections. This results risk of fire!

Remount the cover and the front panel.

8.2 Steam heated machine

Steam heated machines has a steam injector mounted in the drum and inject steam (direct steam DS) direct in the water bath. Amount of steam are controlled by the steam valve located at the back of the machine.

The heating starts when the machine control systems calls for heat and water level switch indicates water in the machine. The heating stops when the temperature sensor indicate reached set temperature.

8.3 Non heated machine

Non heated machines has no internal heating system. The machine control system mix hot and cold water to reach right water temperature. If the temperature exceeds set temp only cold water is used.

When the water level is reached the temp will not be higher than the set temperature. As the machine has no internal heating system the machine will not call for heat and will not wait for the machine to heat.

8.4 Machine with dual heating

A dual heated machine heats the water either with two electrical heating elements or with direct steam from a steam injector. With an external switch or from the machine control system the different heating methods are selected.

Depending on the voltage and machine configuration there are different voltage and effect on the heating elements. When replacing heating elements always replace with the original element with the same rating. The contactor/contactors for the heating elements are located at the rear electrical module.

The steam injector are mounted between the two heating elements and inject steam (direct steam DS) direct in the water bath. The amount of steam are controlled by the steam valve located at the back of the machine.

The heating starts either with the electrical heating elements or via the steam valve when the machine control systems calls for heat and water level switch indicates water in the machine. The heating stops when the temperature sensor indicate reached temperature.

9 Drum

9.1 Replacement of drum

9.1.1 WH6–7, WH6–8, WH6–11

- Disconnect the power to the machine.
- Demount the rear panel and the top panel.

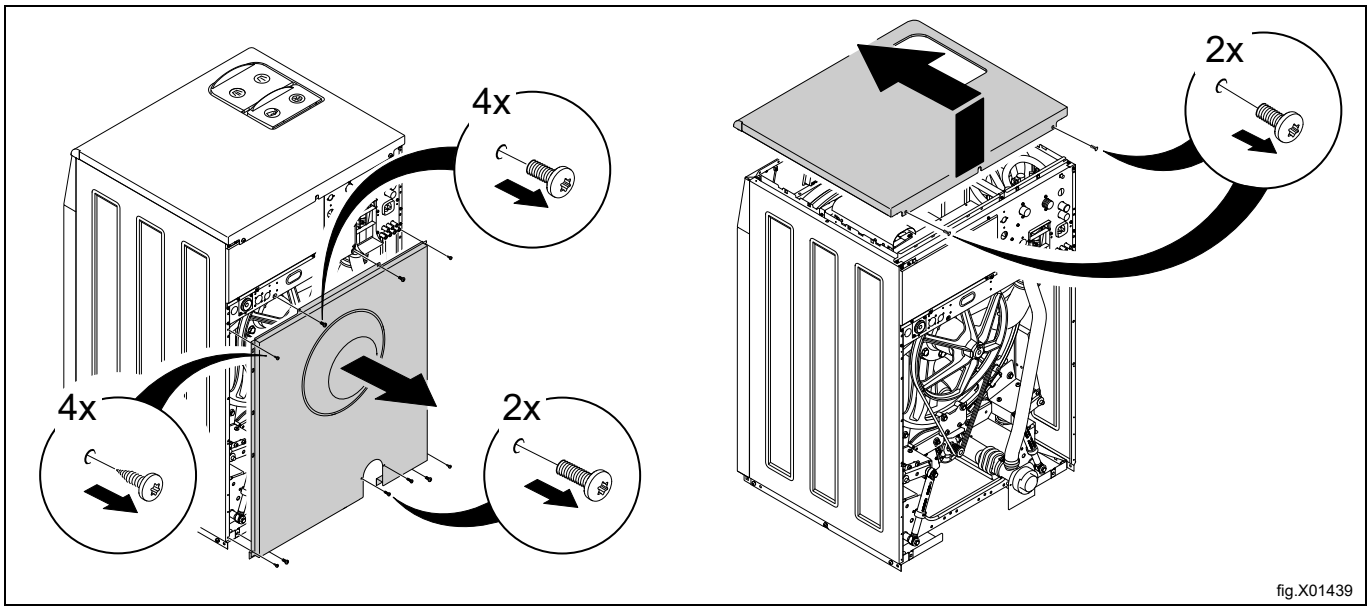


fig.X01439

- Demount the front panel.
- Disconnect the hoses connected to the drum.

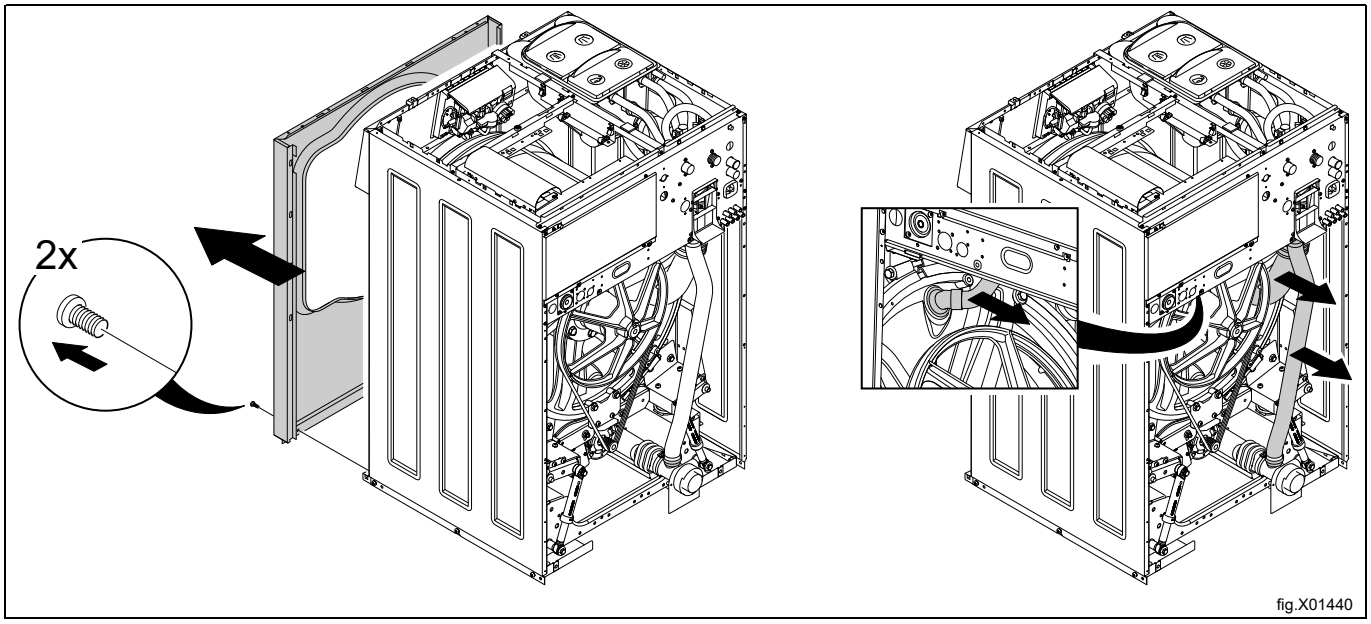
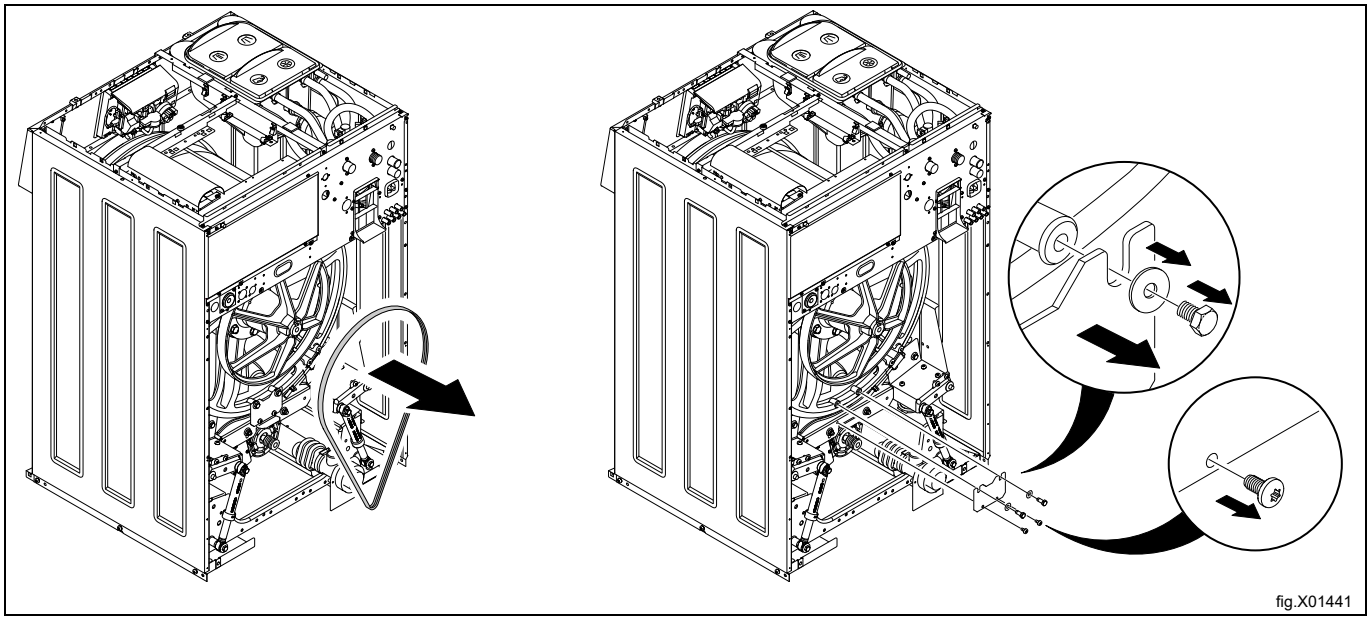
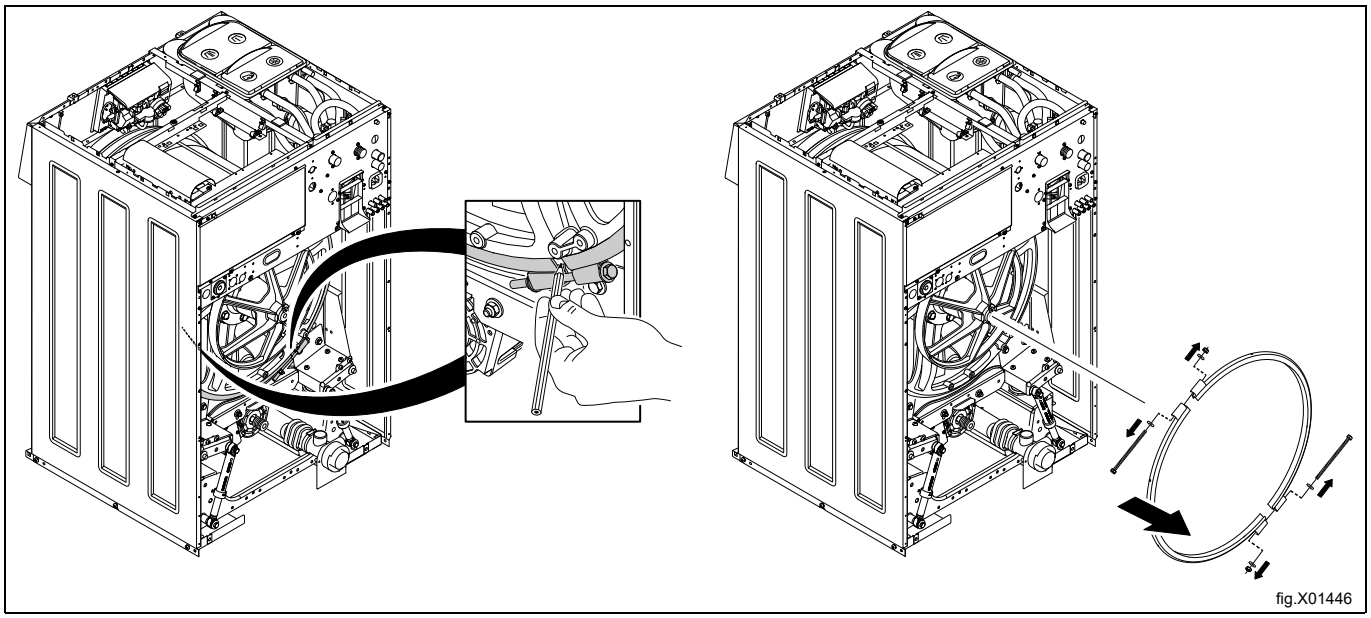


fig.X01440

- Remove the belt.
- Demount the anti-rotation bracket.



- Mark the position of the tension strap. When remounting, it is important to fasten the tension strap at the same position.
- Demount the tension strap.



- Remove the screws on both side panels. This is to be able to tilt the machine when removing the drum.
- Being two persons, lift and tilt the machine forward from the front of the machine as much as necessary to be able to pull out the drum from the rear of the machine.
- Insert the new drum.

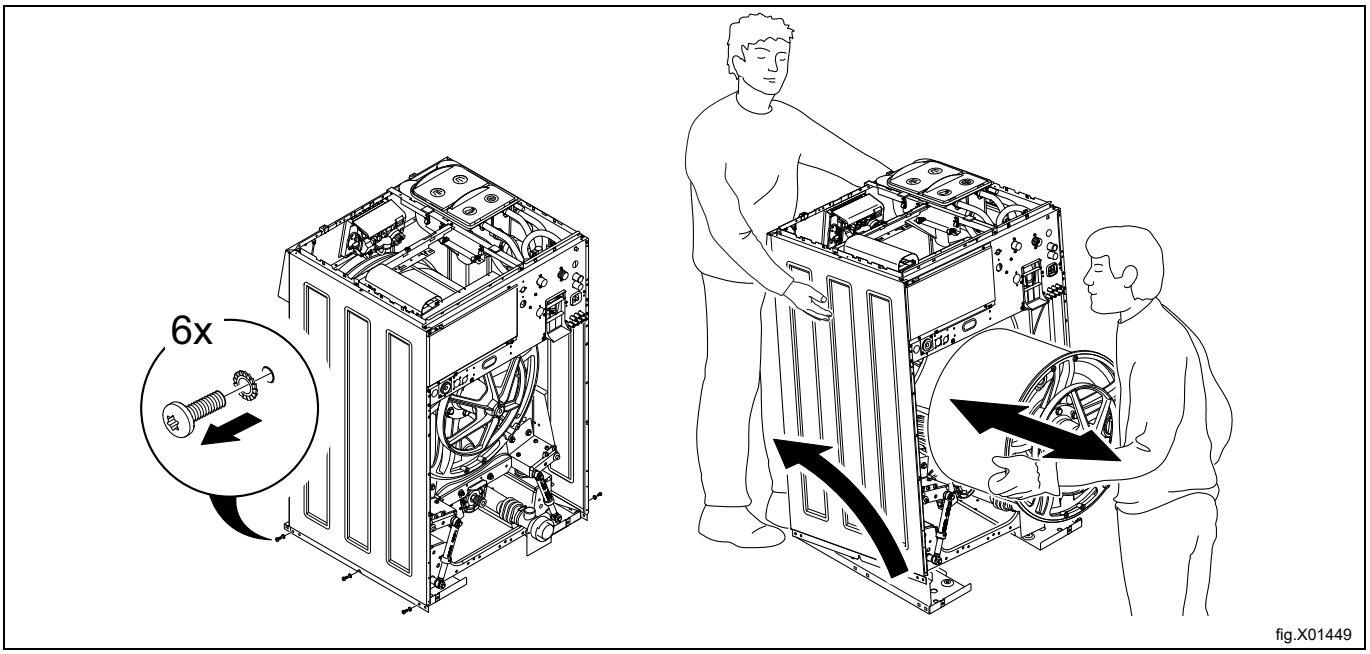


fig.X01449

- When the new drum is in position, carefully put the machine down again.
- Fasten the screws to both side panels. Tightening torque 6.5 Nm.
- Remount the tension strap at the same position as before. Tighten the screws.
- Use a hammer to hit on the outside of the tension strap all the way around to really make it tight. Do this a couple of times.
- Finally, tighten the screws again. Tightening torque 26 Nm.

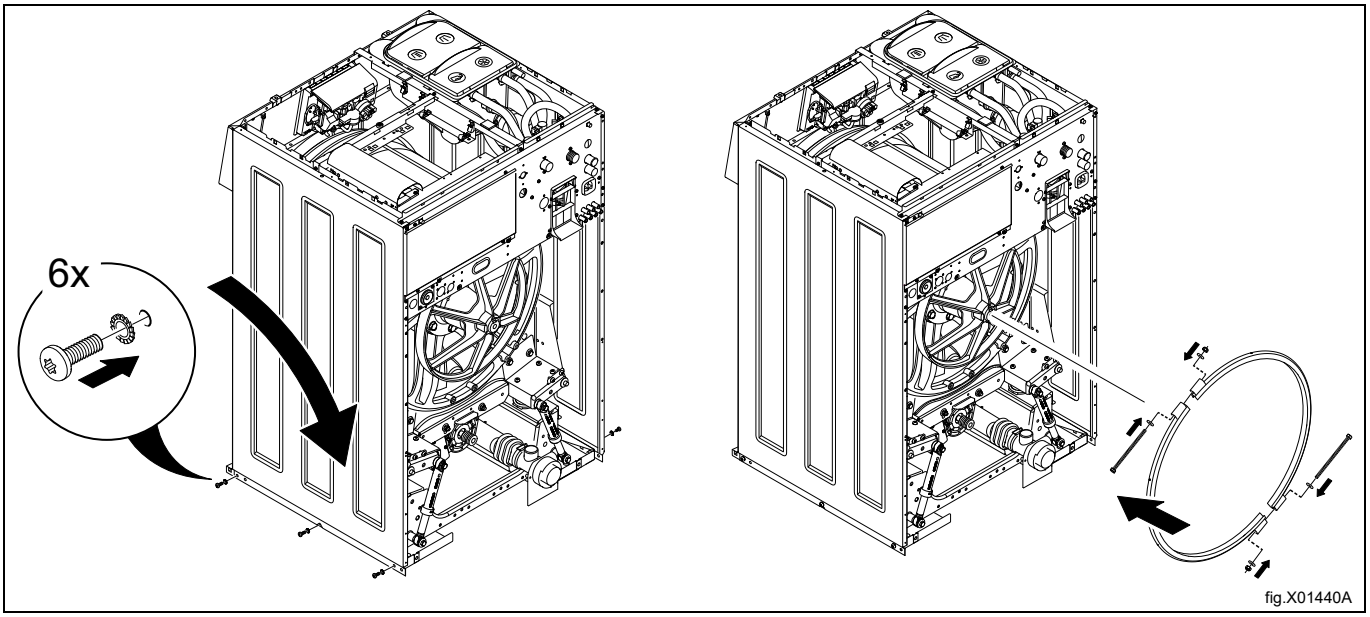


fig.X01440A

- Remount the anti-rotation bracket.
- Fasten the belt. Make sure the belt is in position. (Check the belt tension).

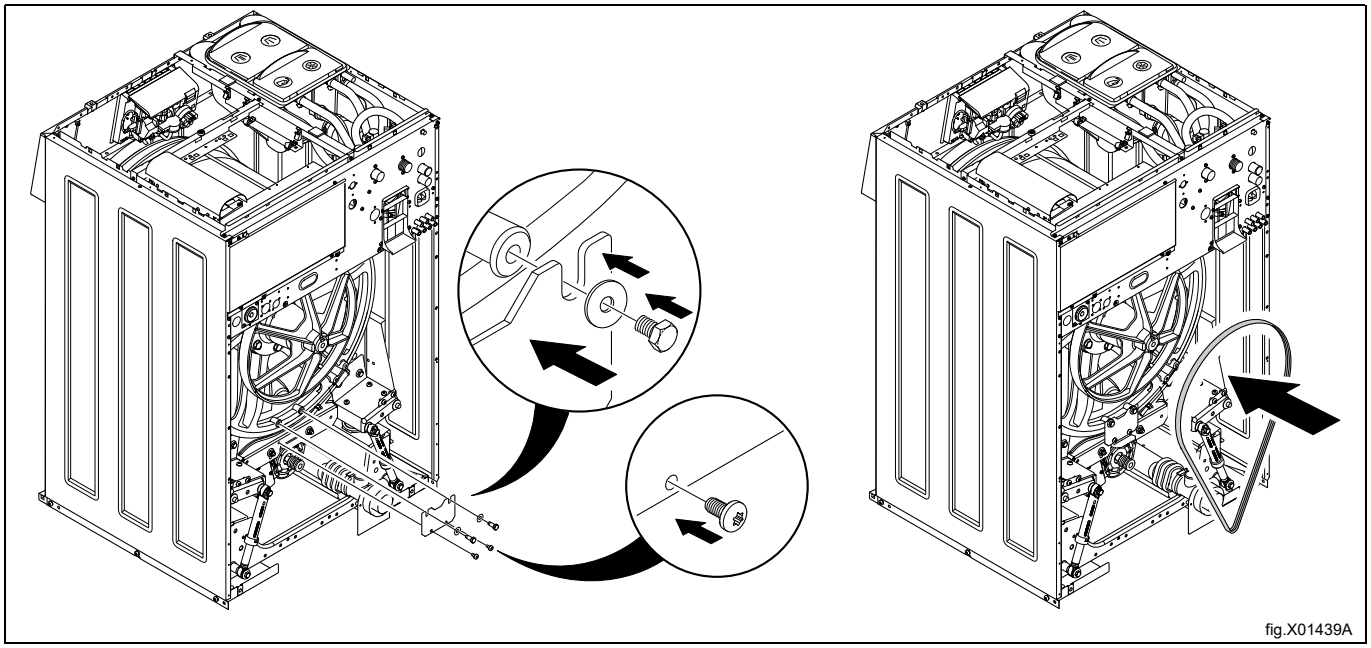


fig.X01439A

- Reconnect the hoses that was disconnected.
- Remount the front panel.

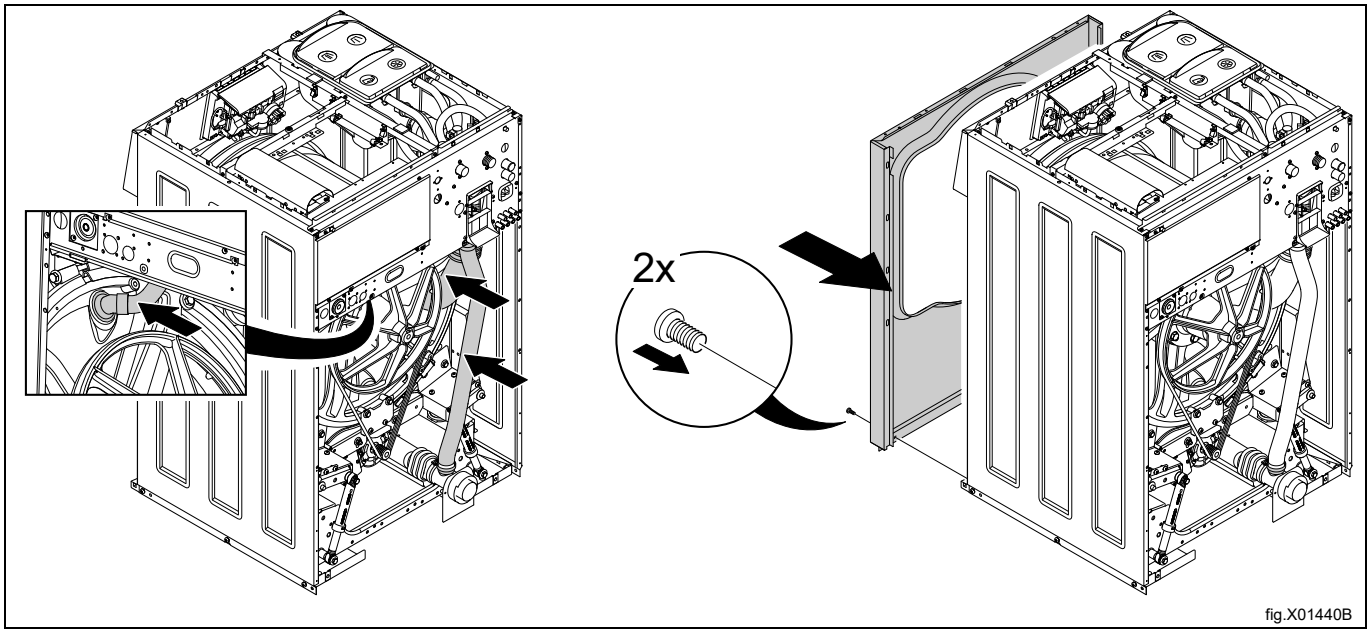
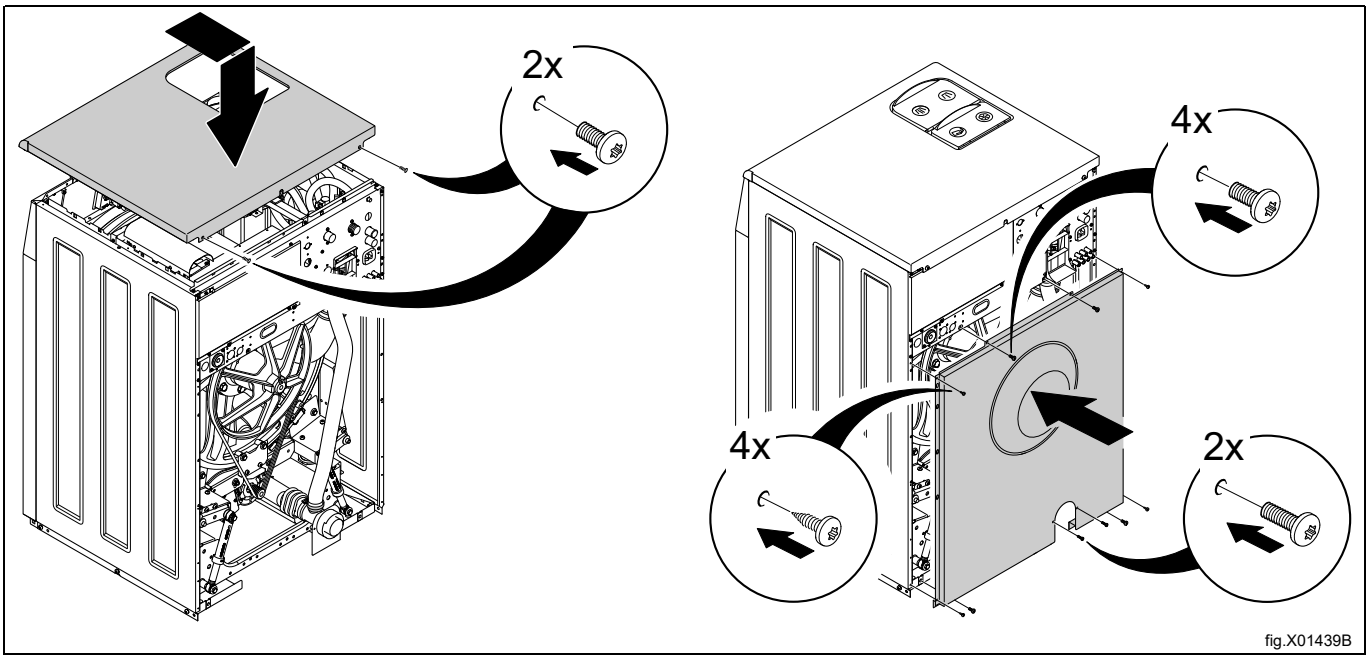


fig.X01440B

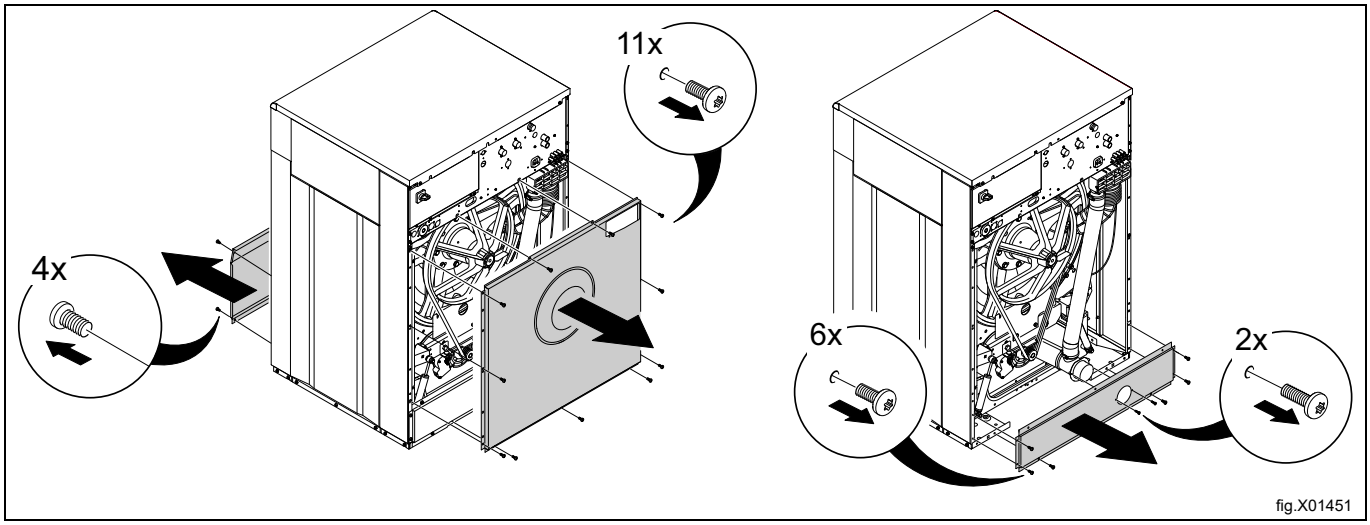
- Remount the top panel and the rear panel.



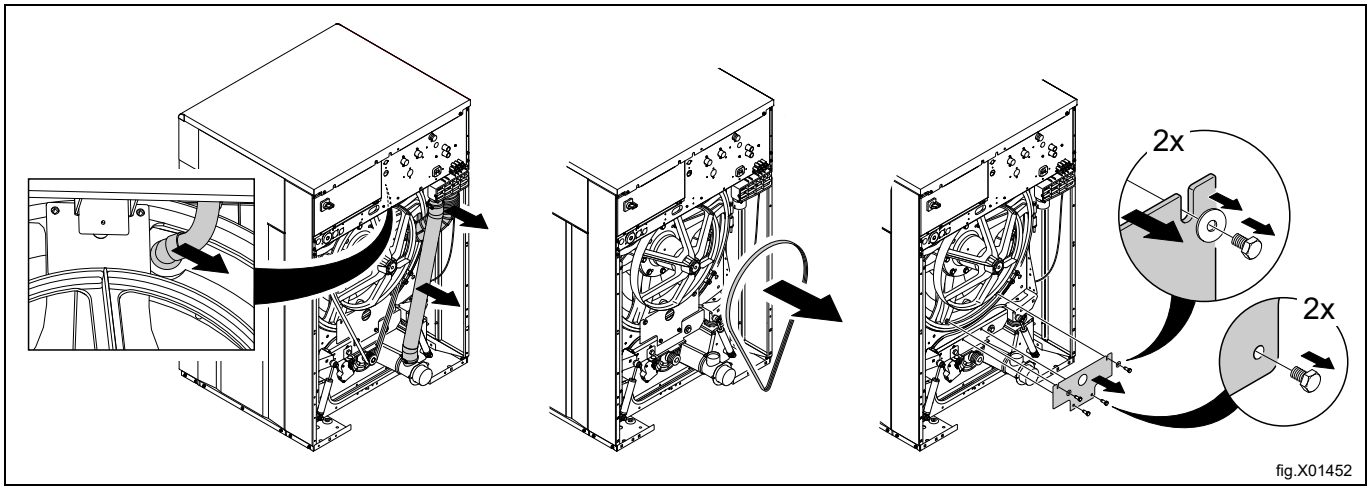
- Connect the power to the machine.

9.1.2 WH6–14, WH6–20, WH6–27, WH6–33

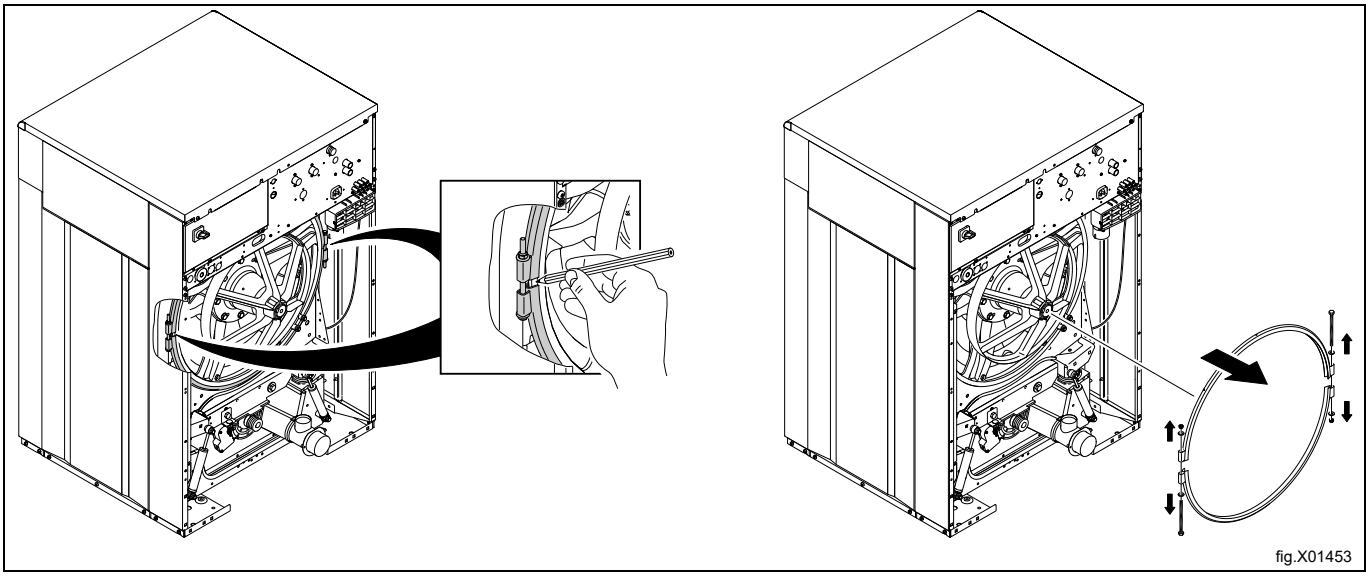
- Disconnect the power to the machine.
- Demount the front panel and the rear panels.



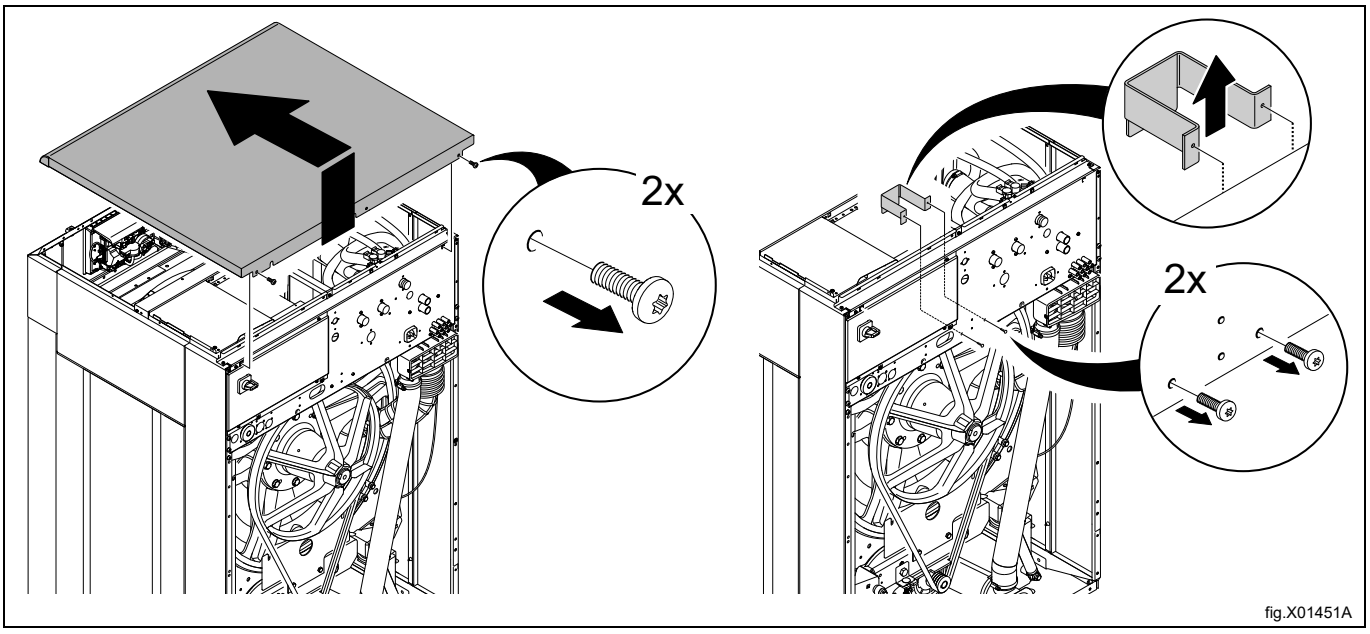
- Disconnect the hoses connected to the drum.
- Remove the belt.
- Demount the anti-rotation bracket.



- Mark the position of the tension strap. When remounting, it is important to fasten the tension strap at the same position.
- Demount the tension strap.



- Demount the top panel.
- Demount the bracket.



- Loosen and remove the screws on both side panels. Remove the left side panel. This is to be able to tilt the machine when removing the drum.

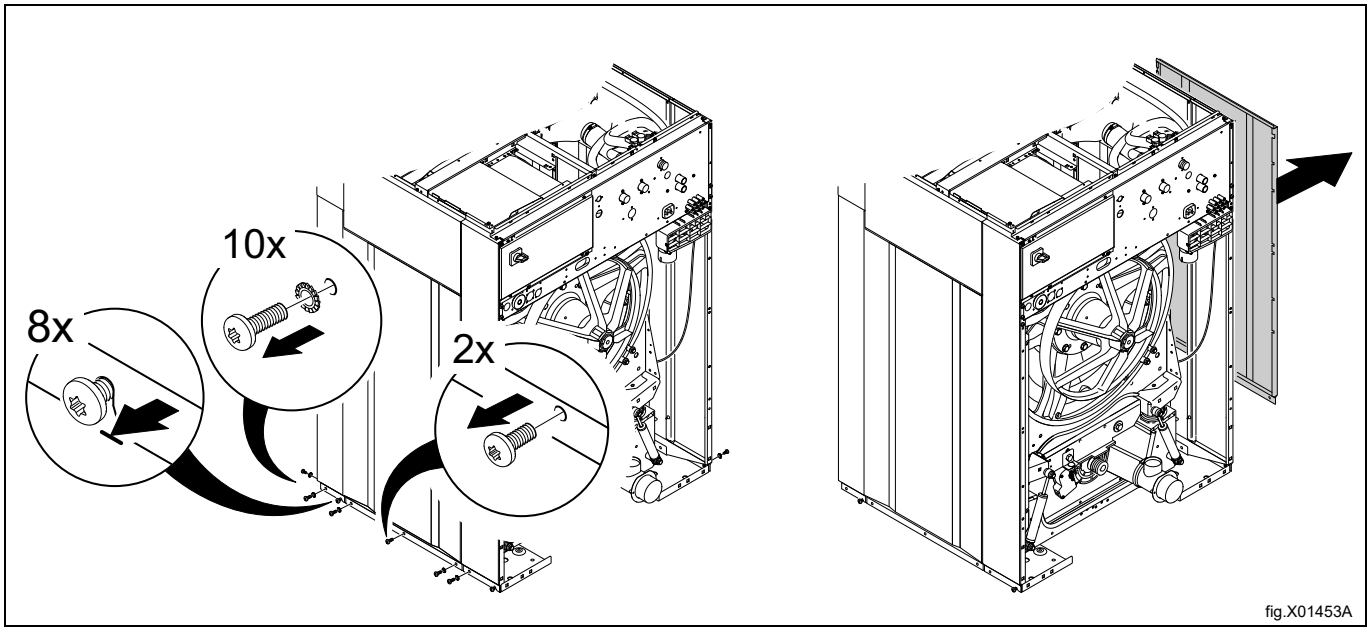
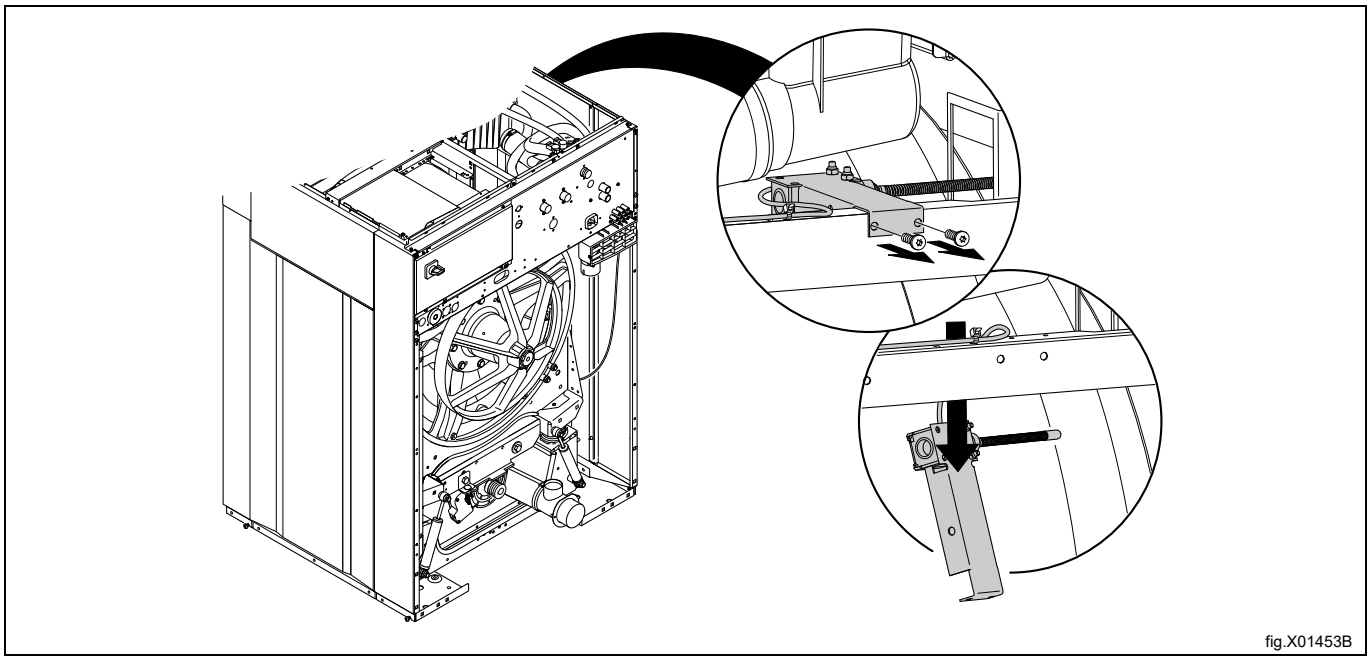


fig.X01453A

- Demount the out of balance switch and carefully let it hang by the cable in a suitable position so it will not get damaged when tilting the machine to remove the drum.


fig.X01453B

- Loosen and/or cut any straps to the cables to prevent them from getting damaged when tilting the machine to remove the drum.
- Being two persons, lift and tilt the machine forward from the front of the machine as much as necessary to be able to pull out the drum from the rear of the machine.
- Insert the new drum.

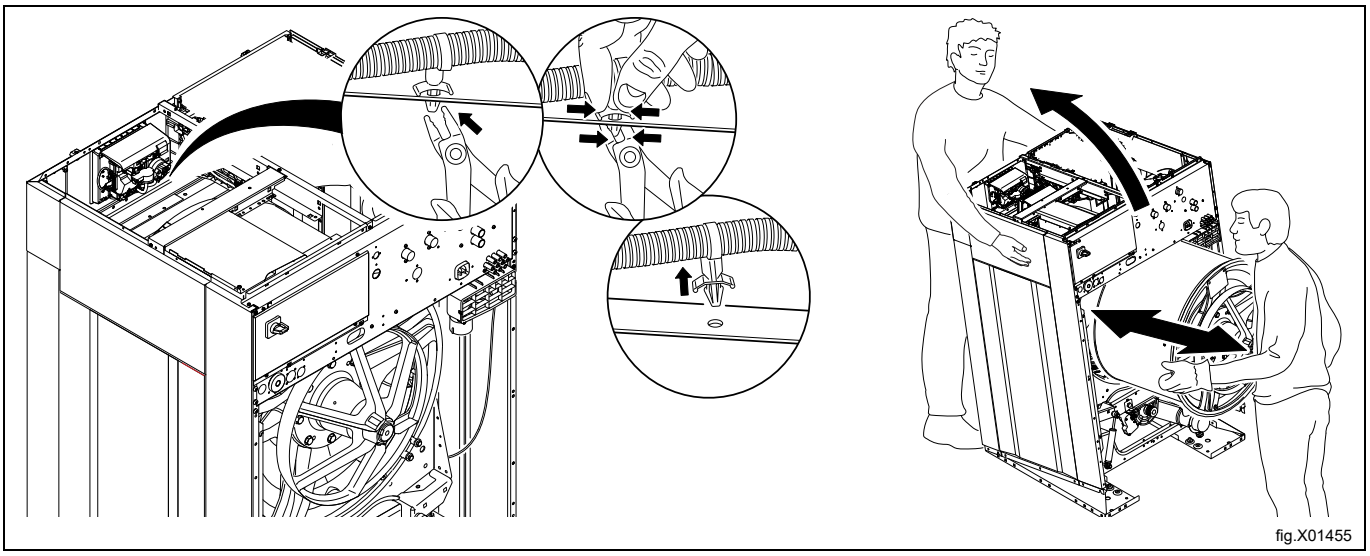


fig.X01455

- When the new drum is in position, carefully put the machine down again.
- Strap and/or re-strap all the cables.

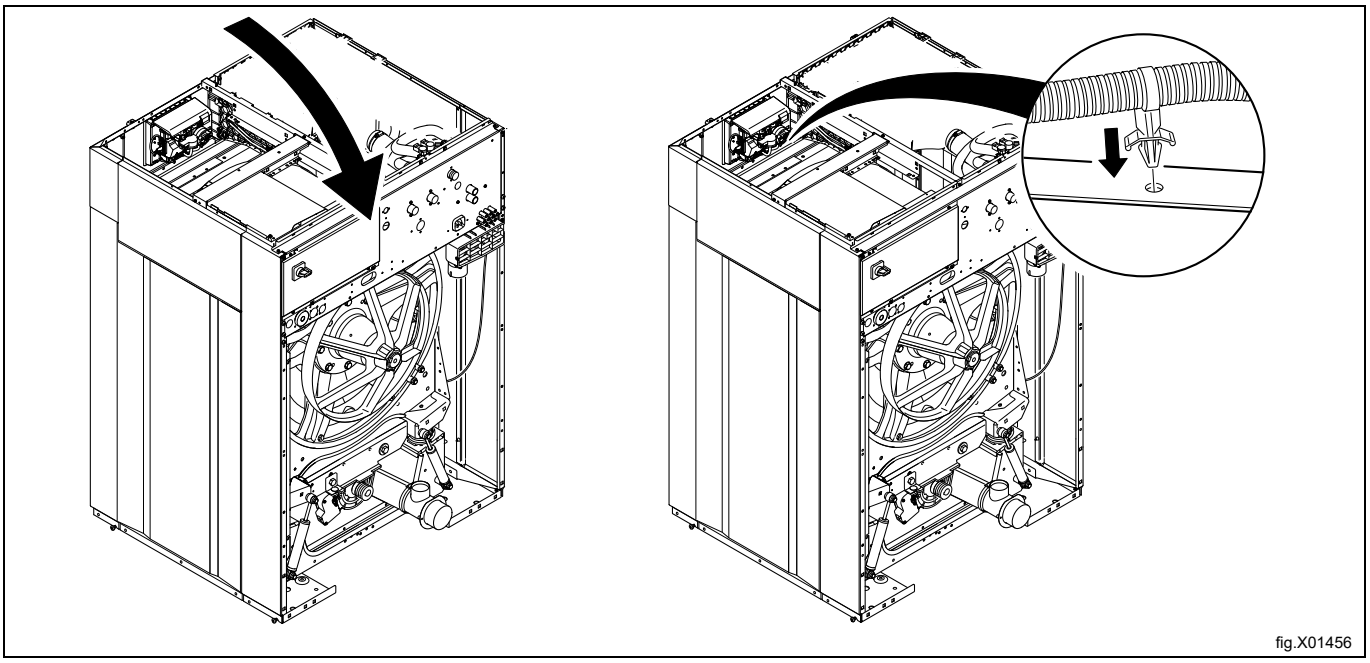


fig.X01456

- Remount the bracket and the out of balance switch.

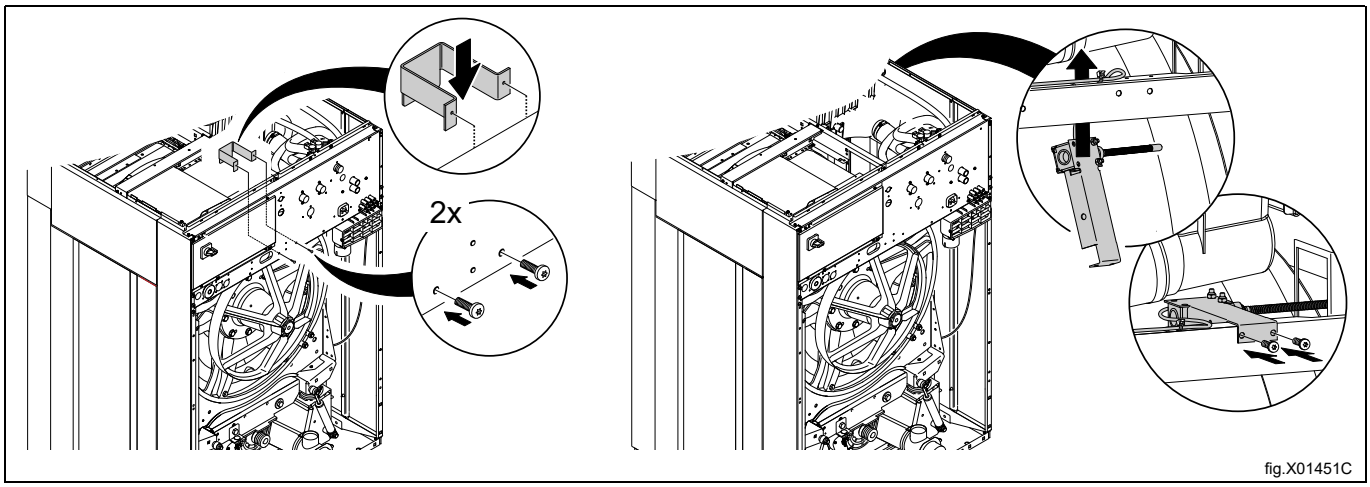


fig.X01451C

- Remount the left side panel.
- Insert and fasten the screws to both side panels. Tightening torque 6.5 Nm.

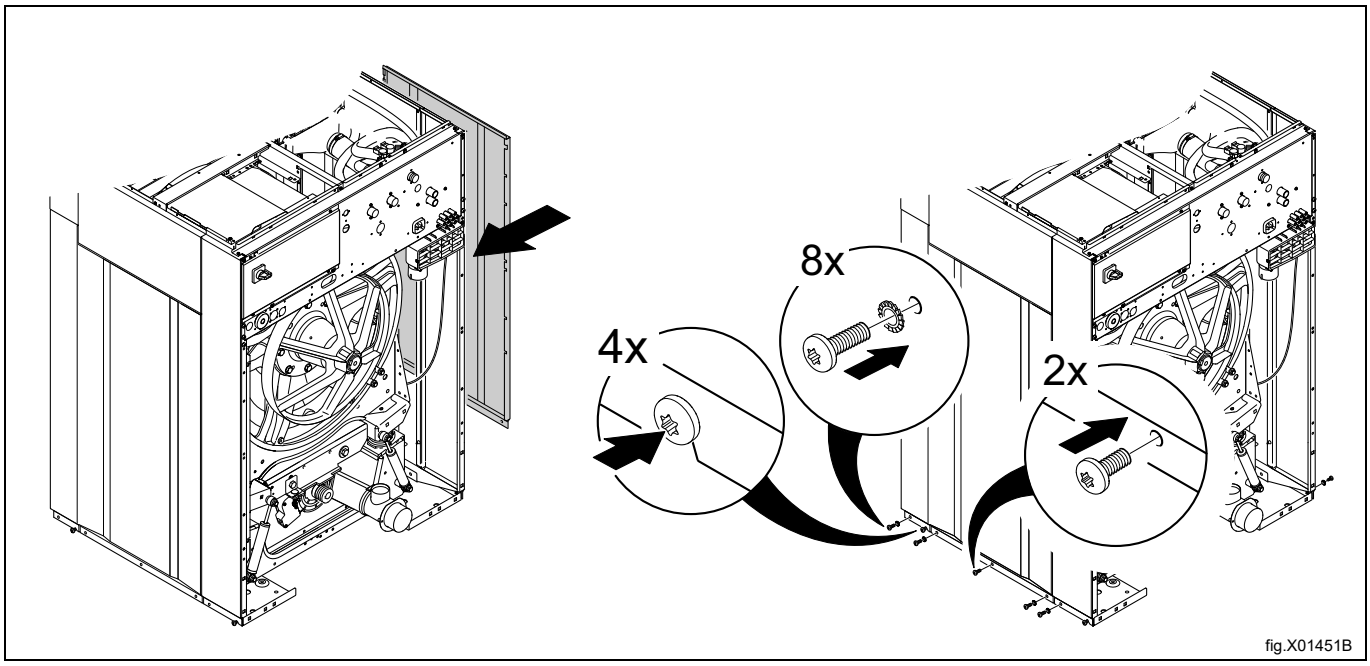


fig.X01451B

- Remount the tension strap at the same position as before. Tighten the screws.
- Use a hammer to hit on the outside of the tension strap all the way around to really make it tight. Do this a couple of times.
- Finally, tighten the screws again. Tightening torque 26 Nm.
- Remount the top panel.

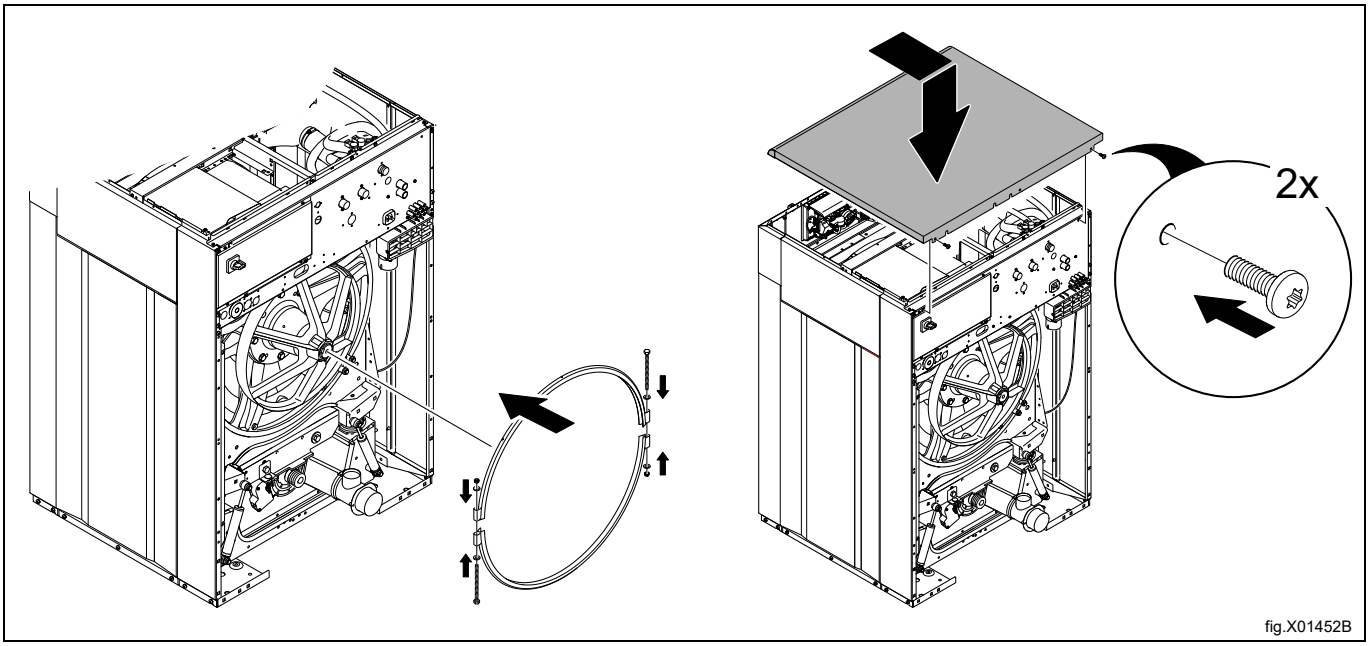


fig.X01452B

- Remount the anti-rotation bracket.
- Fasten the belt. Make sure the belt is in position. (Check the belt tension).
- Reconnect the hoses that was disconnected.

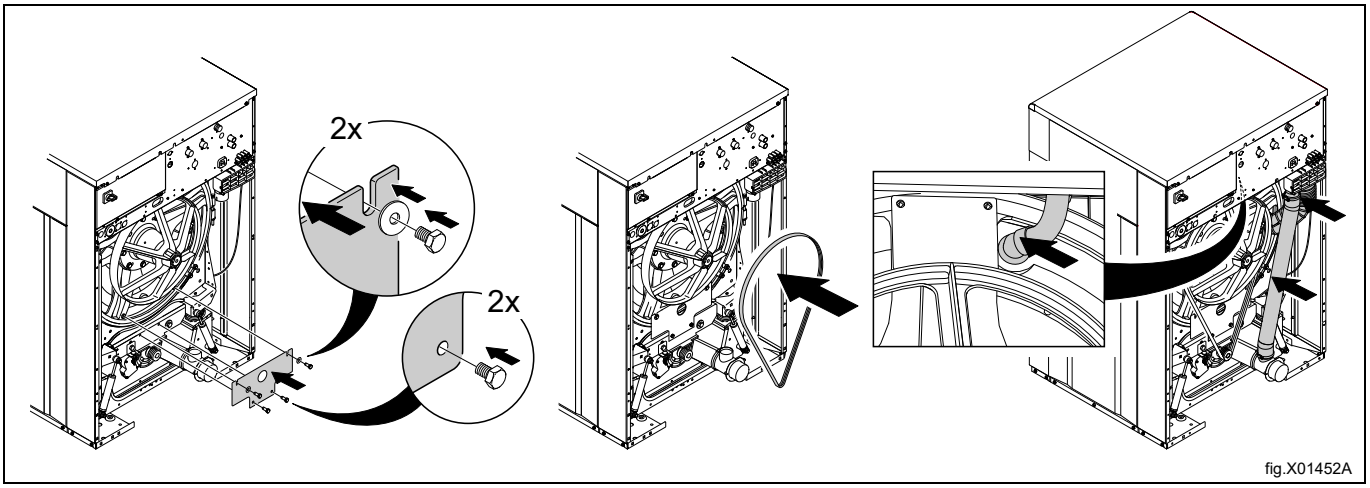
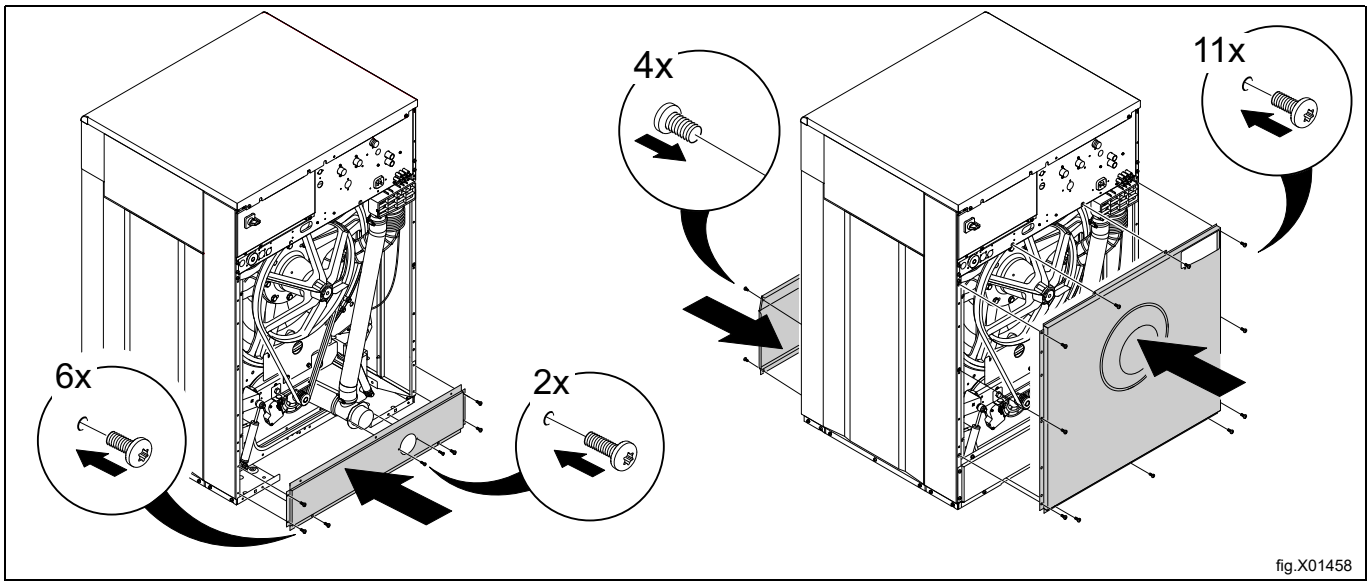


fig.X01452A

- Remount the rear panels and the front panel.



- Connect the power to the machine.

9.2 Replacement of bearings

Complete tool kit, part No: 472 9913-60

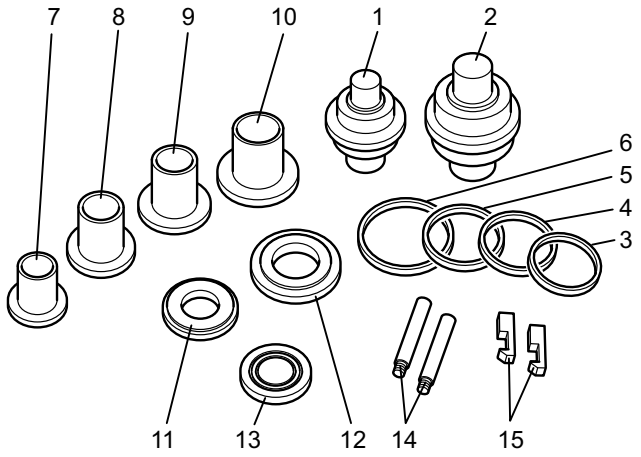


fig.7038

1. 432 1723-01: Drift for gaskets (WH6–7-WH6–11, WN6–8-WN6–11, WS6–8-WS6–11, WN6–14, WS6–14)
2. 432 1723-02: Drift for gaskets (WH6–14-WH6–33, WN6–20-WN6–35, WS6–20-WS6–35)
3. 432 1716-01: Spacer (WH6–7-WH6–8, WN6–8–WN6–9, WS6–8–WS6–9)
4. 432 1716-02: Spacer (WH6–11, WN6–11–WN6–14, WS6–11–WS6–14)
5. 432 1716-03: Spacer (WH6–14, WN6–20, WS6–20)
6. 432 1716-04: Spacer (WH6–20-WH6–33, WN6–28–WN6–35, WS6–28–WS6–35)
7. 432 1719-01: Drift, large bearing (WH6–7-WH6–8, WN6–8-WN6–9, WS6–8-WS6–9)
8. 432 1719-02: Drift, large bearing (WH6–11, WN6–11–WN6–14, WS6–11–WS6–14)
9. 432 1719-03: Drift, large bearing (WH6–14, WN6–20, WS6–20)
10. 432 1719-04: Drift, large bearing (WH6–27-WH6–33, WN6–28-WN6–35, WS6–28-WS6–35)
11. 432 1730-01: Presser (WH6–7-WH6–11, WN6–8-WN6–11, WS6–8-WS6–11)
12. 432 1730-02: Presser (WH6–14-WH6–33, WN6–20–WN6–35, WS6–20–WS6–35)
13. 432 1722-01: Washer
14. 432 1727-01: Extender
15. 432 1729-01: Puller block, large bearing

Start by removing the pulley:

Removing the pulley

Remove the C-clamp from the drum shaft.

Mount the puller with puller drags on shaft and pulley.

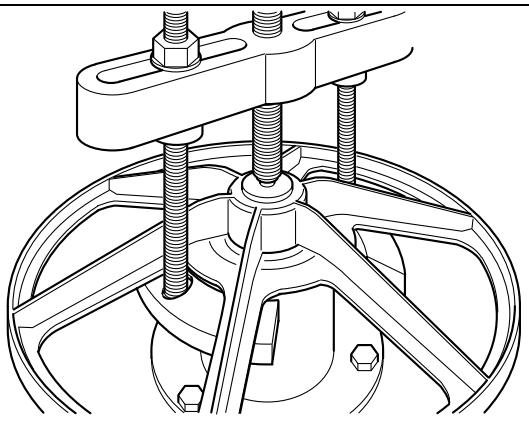


fig.7033

Heat up the pulley around the shaft so that the aluminium expands slightly. Then it is easier to pull off the pulley.

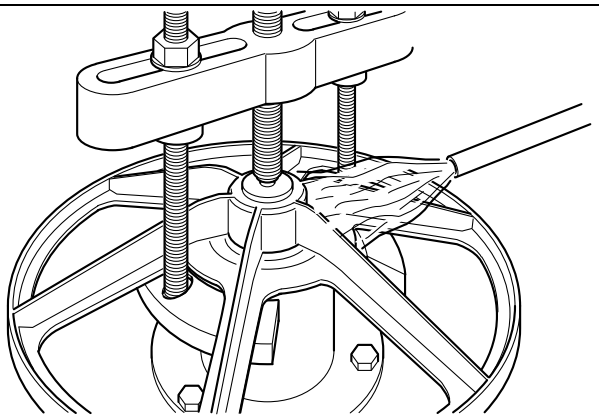


fig.7034

Pull off the pulley.

Demounting the bearing

Remove the wedge from the shaft.
Measure the distance (A) between the bearing and the end of the shaft.
B = Shaft
C = Bearing

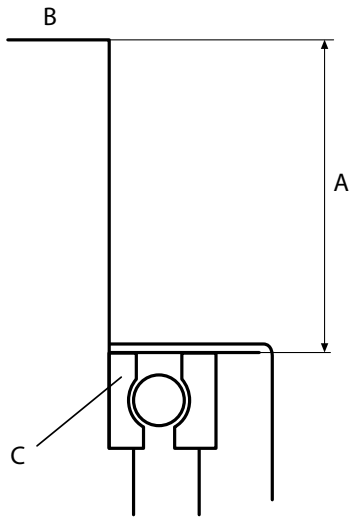


fig.6999

Loosen the bolts in the bearing house.

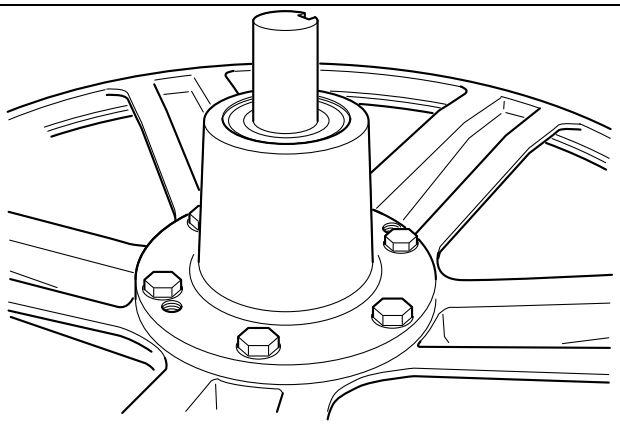


fig.7039

Mount two bolts in the threaded holes and press until the bearing house is loose.

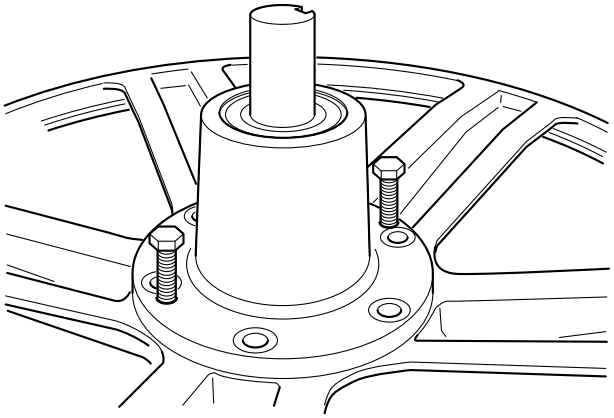


fig.7040

If the front bearing is still on the shaft, use the puller to remove it. In order to be able to put the puller blocks under the bearing, push the rear gable a little. Do not attempt to remove the rear gable when the bearing is still on the shaft. It will result in a damaged lining.

Remove the sealings and then the rear gable.

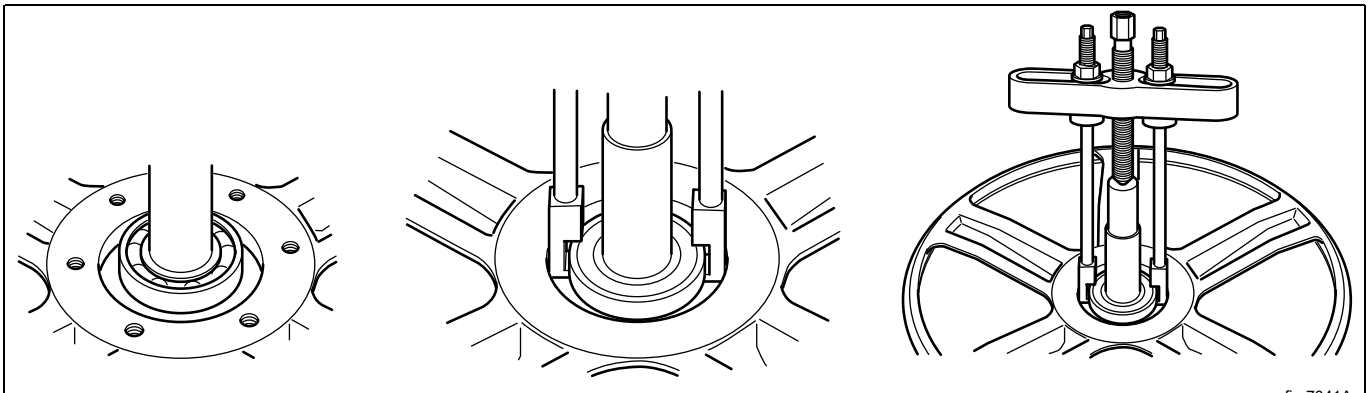


fig.7041A

Alt. 1. Tap the bushing in three places (with about 120° in between). Sometimes it is sufficient to loosen it from the shaft.

Alt. 2. Chisel or grind the bushing off the shaft.

Remove the bushing from the shaft.

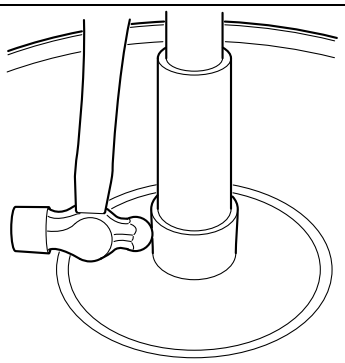


fig.7044

Tap the bearings from the bearing house. Be careful not to damage the bearing surfaces.

Clean the bearing house thoroughly.

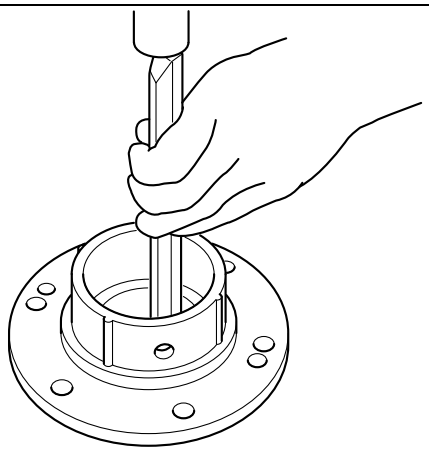


fig.7045

Mount the new bushing and bearing

472 9913-12: WH6–7-WH6–8, WN6–8–WN6–9, WS6–8–WS6–9

472 9913-13: WH6–11, WN6–11, WN6–14, WS6–11, WS6–14

472 9913-14: WH6–14, WN6–20, WS6–20

472 9913-15: WH6–20, WN6–28, WS6–28

472 9913-16: WH6–27, WH6–33, WN6–35, WS6–35

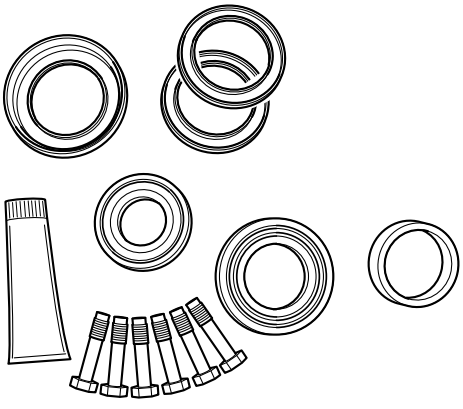


fig.7046A

Heat up the new bushing and put it in position in the shaft.
Put some grease on the surfaces (A).

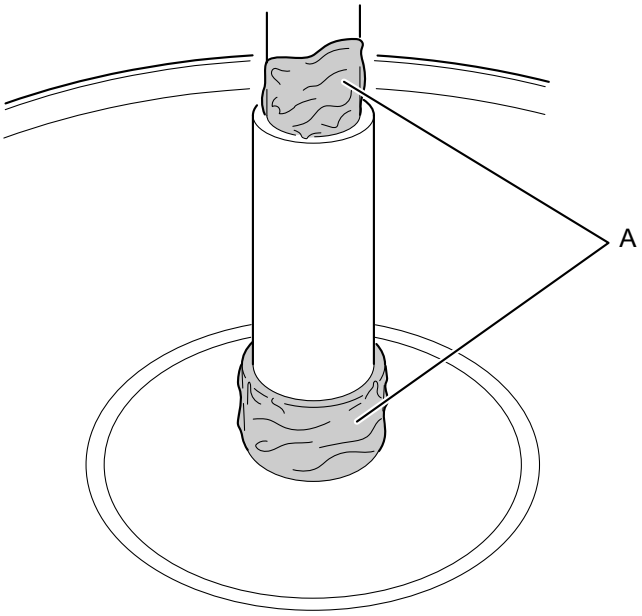


fig.7044A

Tap the bearing gently into the housing with drift and washer.

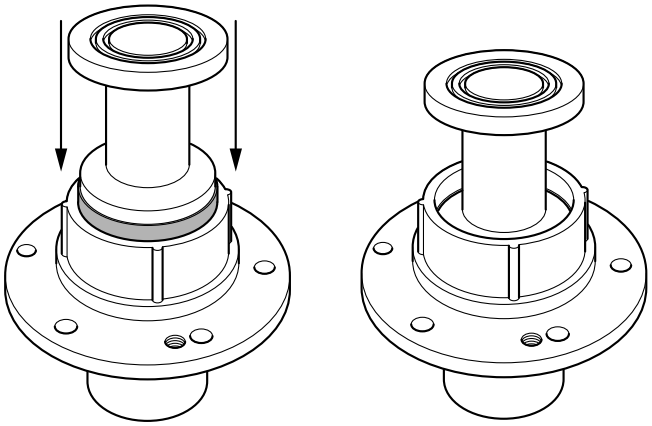


fig.7047A

Turn the housing around and gently tap the rear bearing into the housing using the presser.

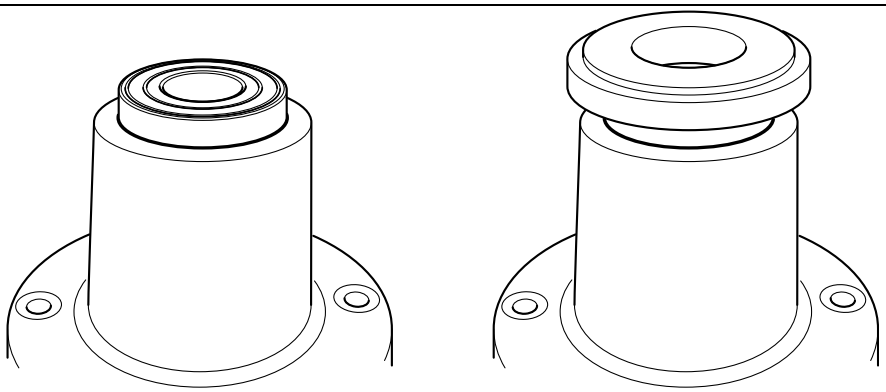


fig.7049A

Put some grease on the inside of the bearing housing. Then it is easier to mount the sealing rings.

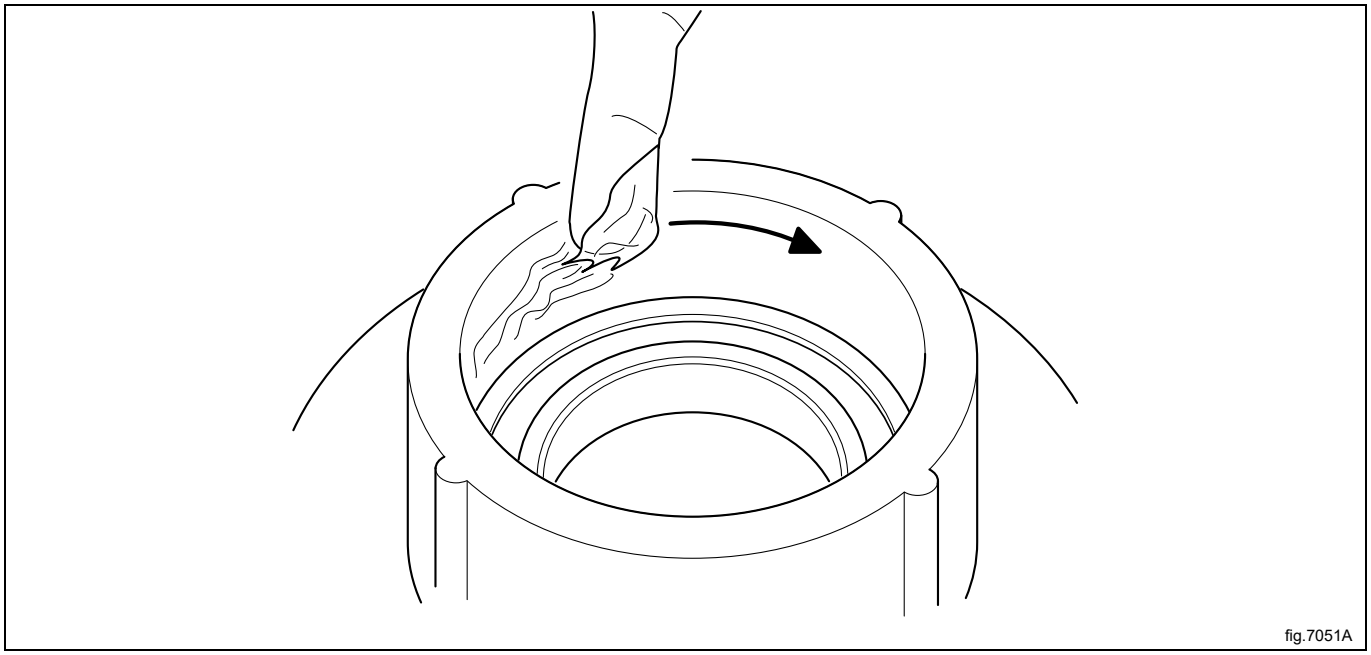


fig.7051A

Place the first sealing on the drift with the opening up. Tap it carefully down in the bearing housing. Push it down until it stops.

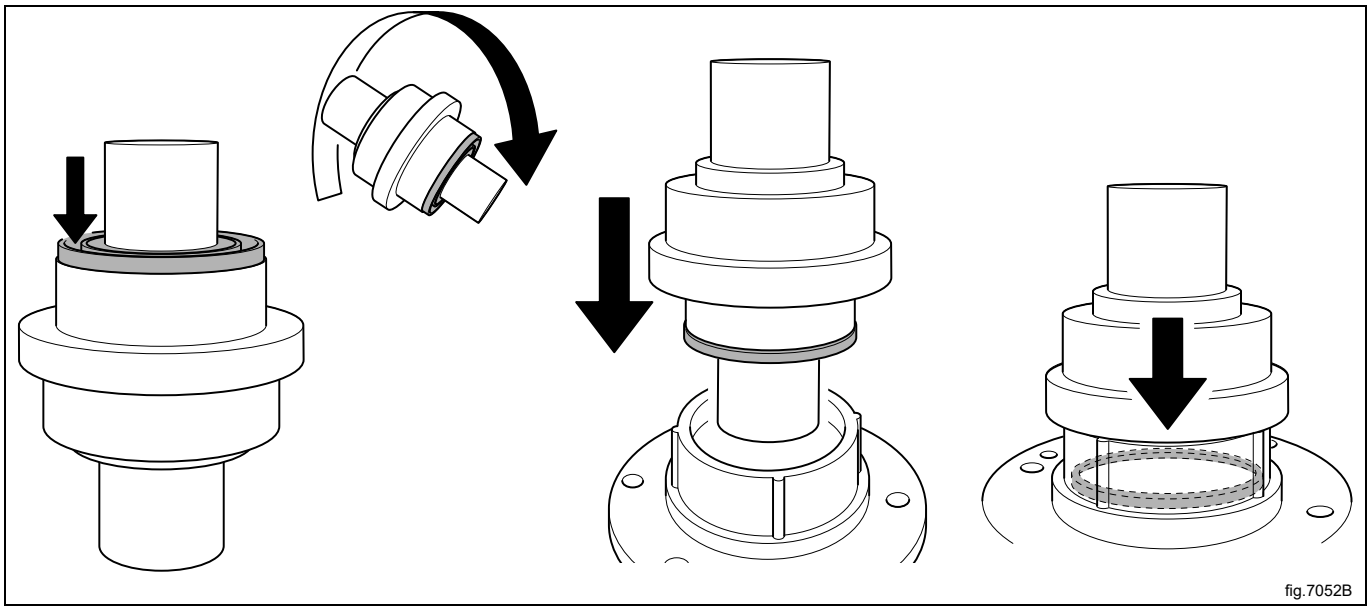
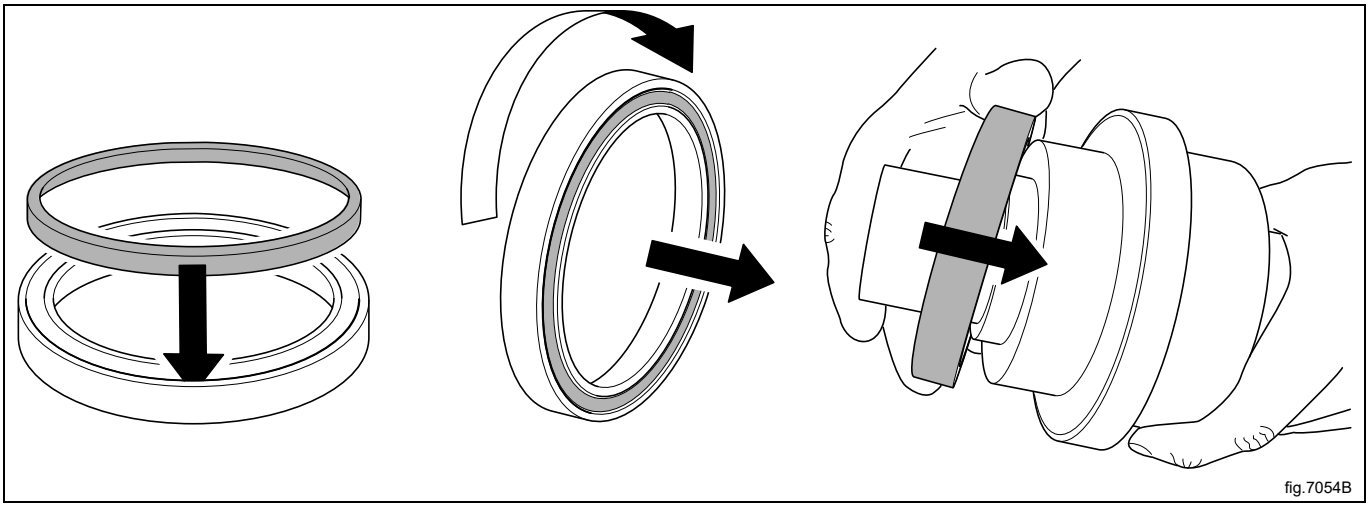
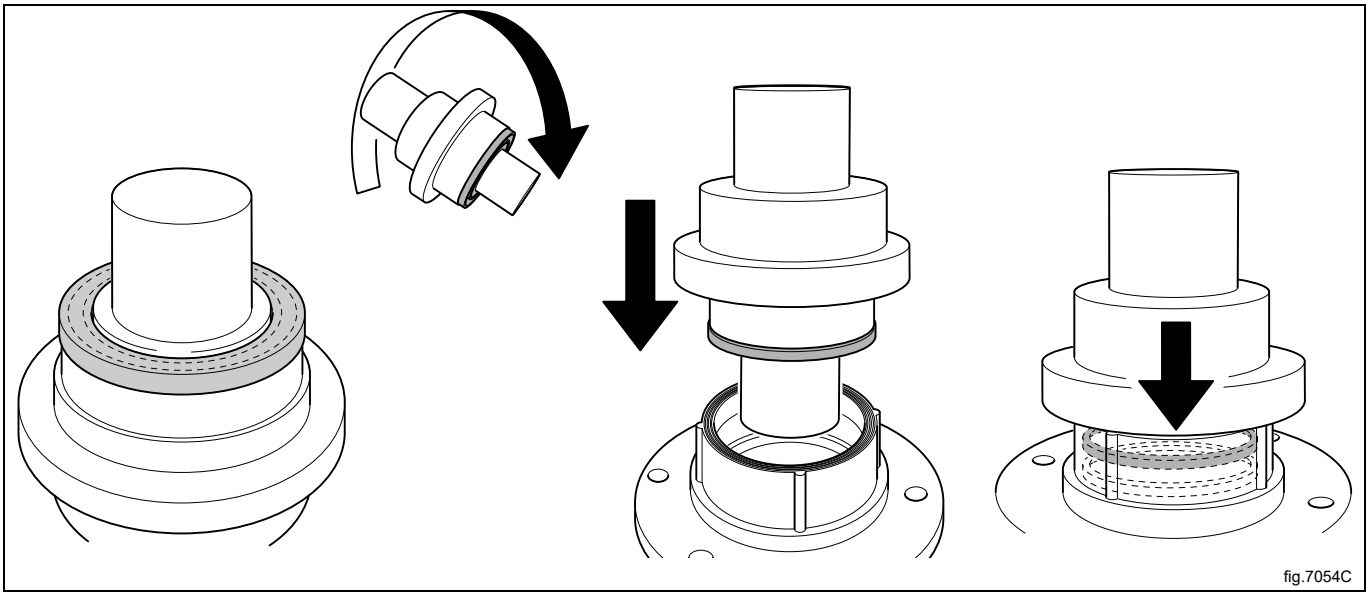


fig.7052B

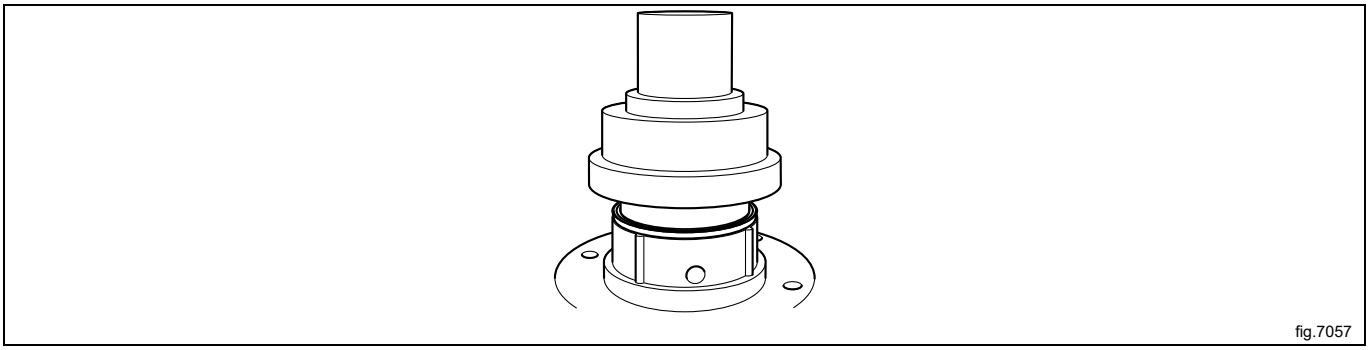
Assemble the sealing. Place the spacer and sealing on the drift.


fig.7054B

Press down the drift to the bottom and then take out the drift and the spacer.


fig.7054C

Mount the third sealing. The lip shall lay against the housing. Don't push too far as the lip can break.


fig.7057

Put some grease (C) on the sealings.
Position the sealing rings.
A = Bearing housing
B = Sealing rings

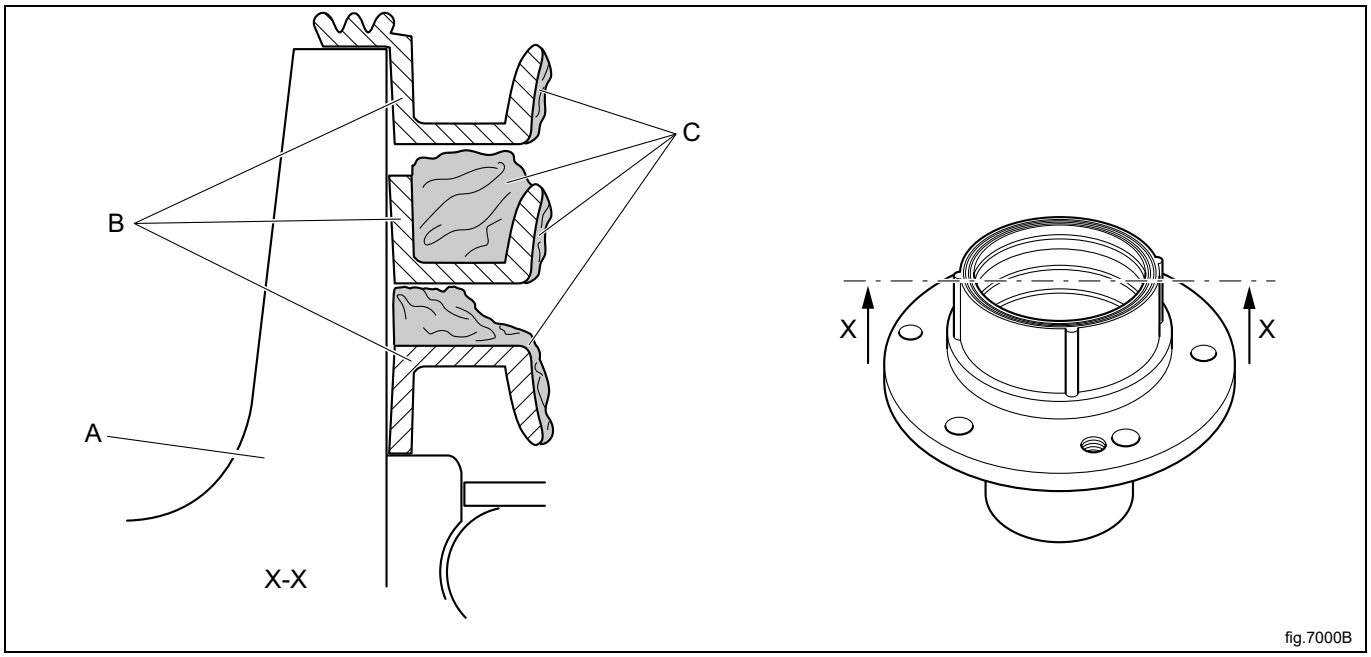
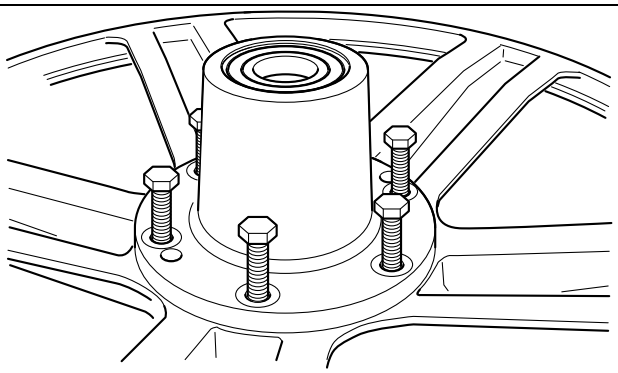


fig.7000B

Mount the bearing housing to the rear gable and tighten the bolt crosswise (85 ± 5 Nm / 62.7 ± 3.7 lbf.ft).

Note!
The marking (up) shall be pointing upwards when rear gable is in place on the machine.


fig.7058

Thread the shaft end with M10 and min 20 mm deep (A).

Mount the rear gable over the drum shaft. Be sure to put it on horizontally so that the sealings don't get damaged on the shaft.

Mount the adaptor on the shaft end and thread it down to the bottom.

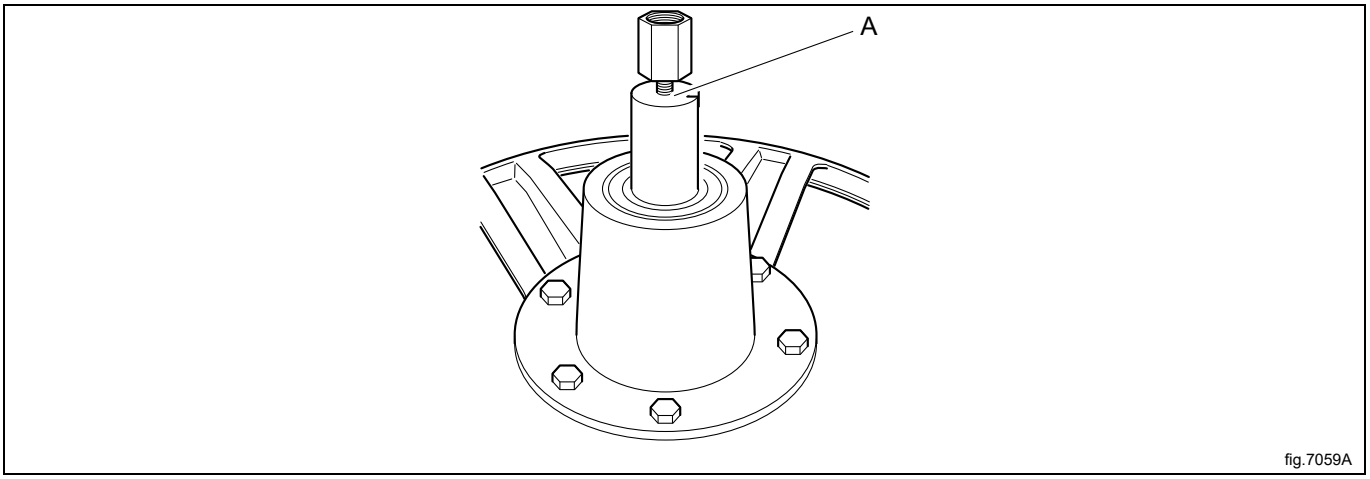


fig.7059A

Mount the presser, the washer, the nut and the puller bolt. Press down the rear gable until it stops. Check the measure between the shaft end and the bearing race. This measure (A) was taken before removing the rear gable from the shaft.

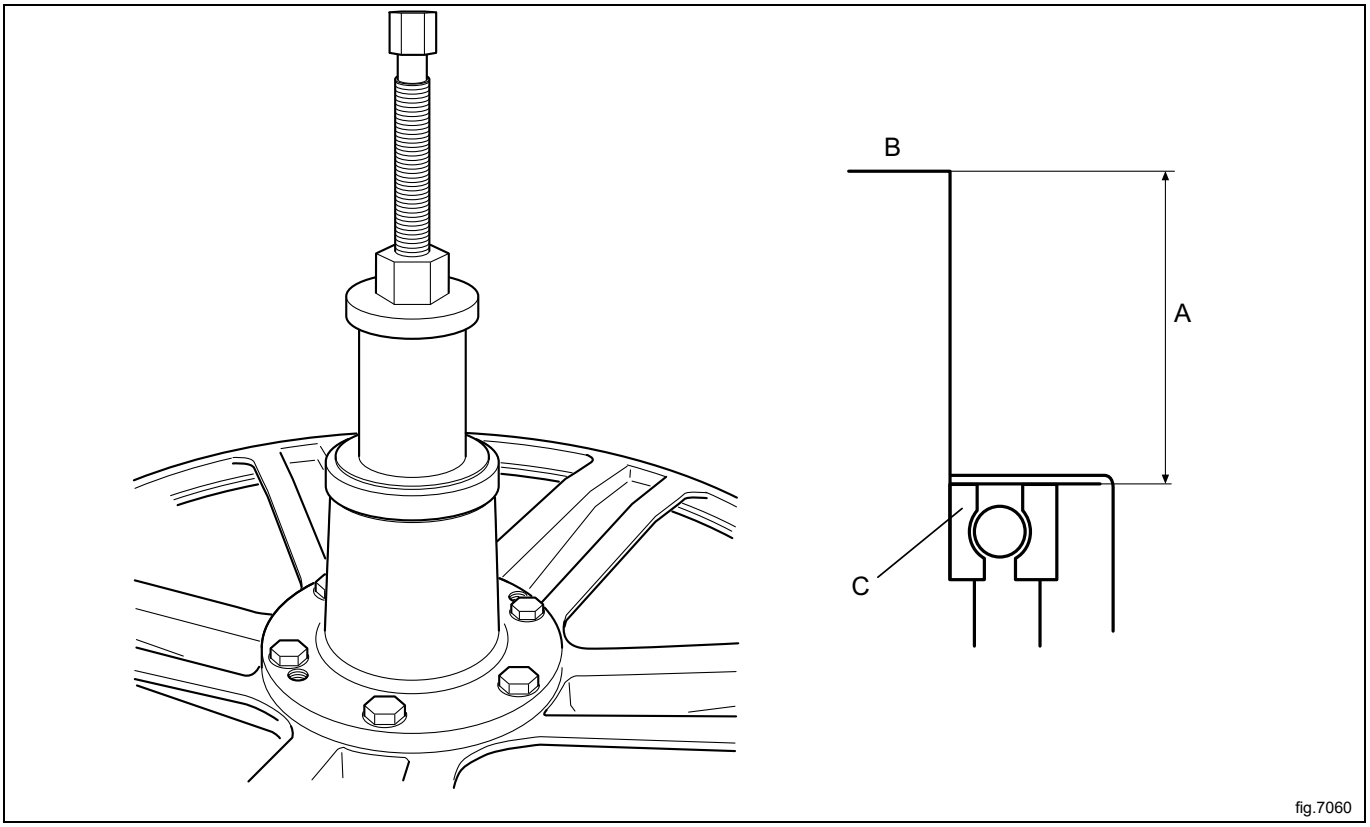


fig.7060

Mount the wedge on the shaft.

Mount the pulley, the sleeve, the washer, the nut and the puller bolt onto the shaft. Thread the bolt to the adaptor on the shaft. Press the pulley onto the shaft. It is easier if the pulley is heated.

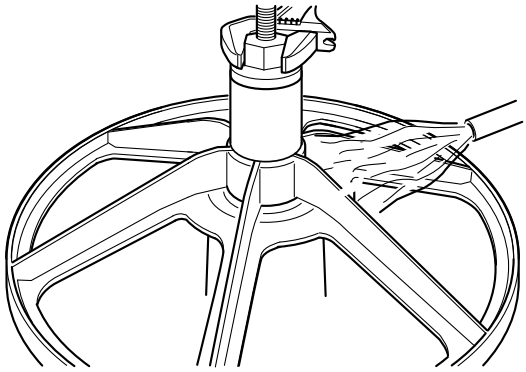


fig.7061

Lock the pulley with the C-clamp.

Replace the gasket around the circumference of the rear gable.

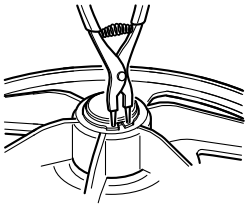


fig.7062

10 Drain

10.1 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 (closing the drain valve) 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). Drain valve is closed.

When the control valve is inactive (opens the drain valve) the water from the drain valve is released through the supply line (3) via the control valve (2) and out into the drain via the return hose (9). The springs (8) pulls back the plunger to help open the valve.

If the machine lose power the drain valve will open.

Machines can have an inverted drain function. In this case, when the control valve is active; the drain valve is open. When the control valve is inactive; the drain valve is closed.

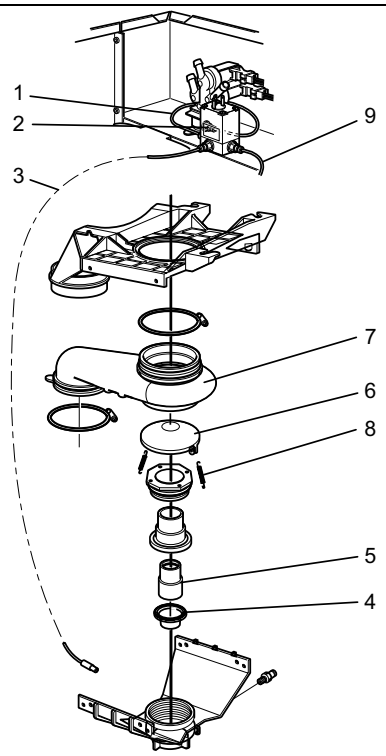


fig.7757

Replacement of drain valve

Disconnect the power to the machine.

Switch off the water supply.

Demount the front panel.

For electrical heated machines; remove the cover to the heating elements.

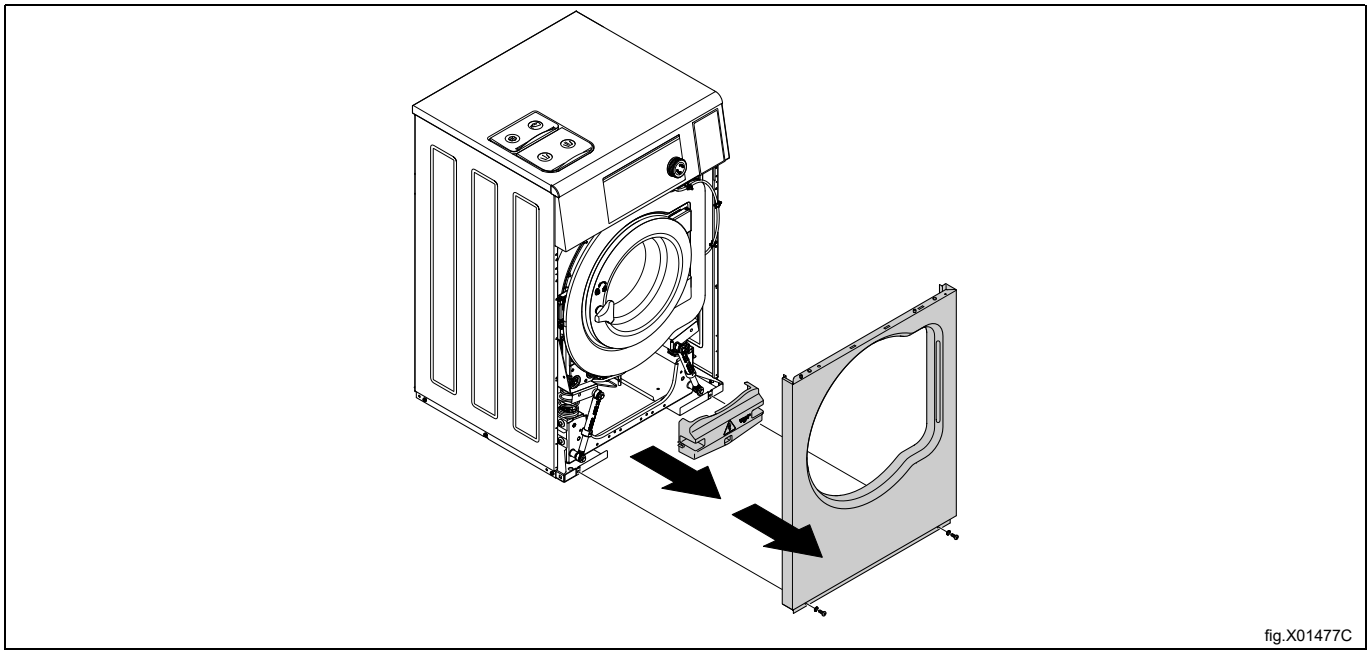


fig.X01477C

Loosen the hose clamps (A) and demount the hose from the drain valve.

Remove the hose from the valve's nipple for water supply (B). (Press the orange ring and pull out the hose at the same time).

Note!

If the drain valve has a heat protection plate, this must be moved to the new drain valve.

Demount the heat protection plate by unscrewing the two screws about one turn. Carefully remove the heat protection plate.

Loosen and unscrew the four retaining nuts of the valve a couple of turns (use a socket, extender and ratchet wrench). Turn the valve and unlock it from the bolts.

Loosen the hose clamps (C) and demount the drain valve.

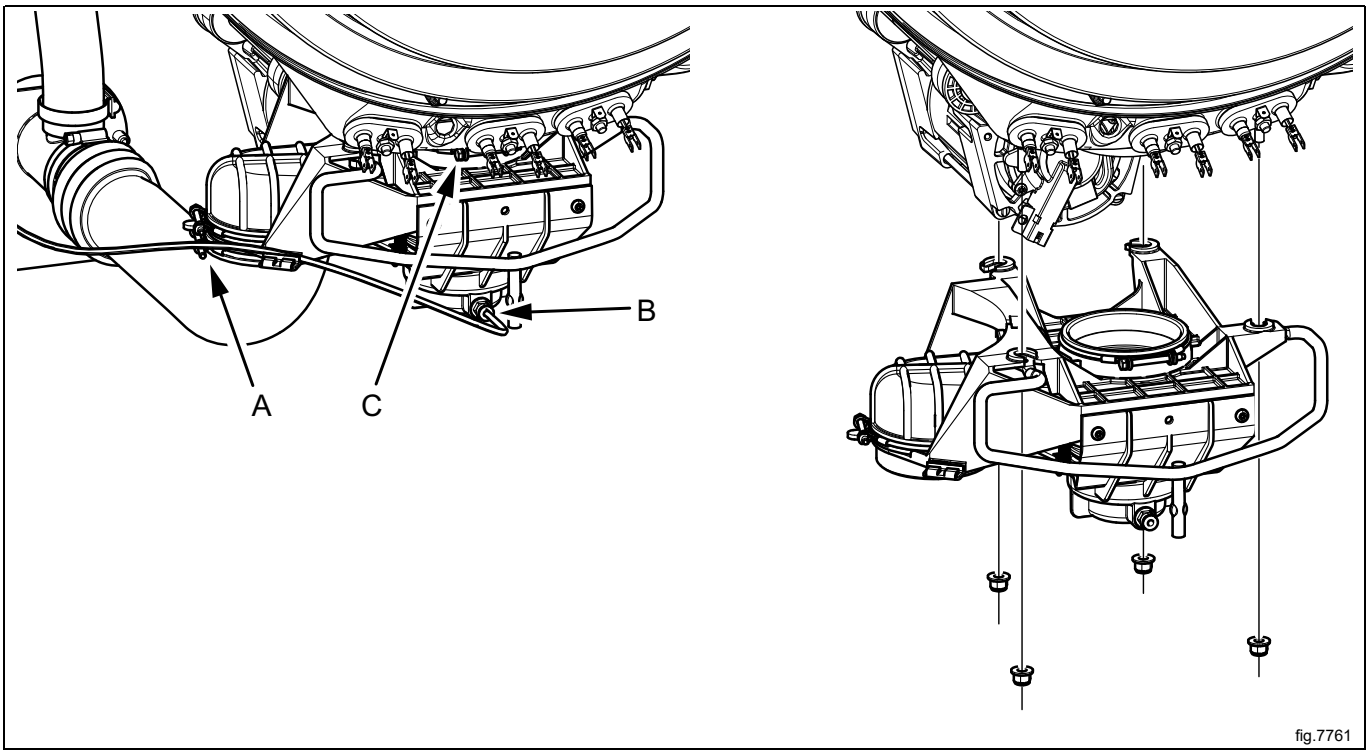


fig.7761

Mount the new drain valve in the machine.

Unscrew the screws on the new drain valve about one turn to prepare for the heat protection plate. Do not use an electric screw driver due to the risk of damaging the threads.

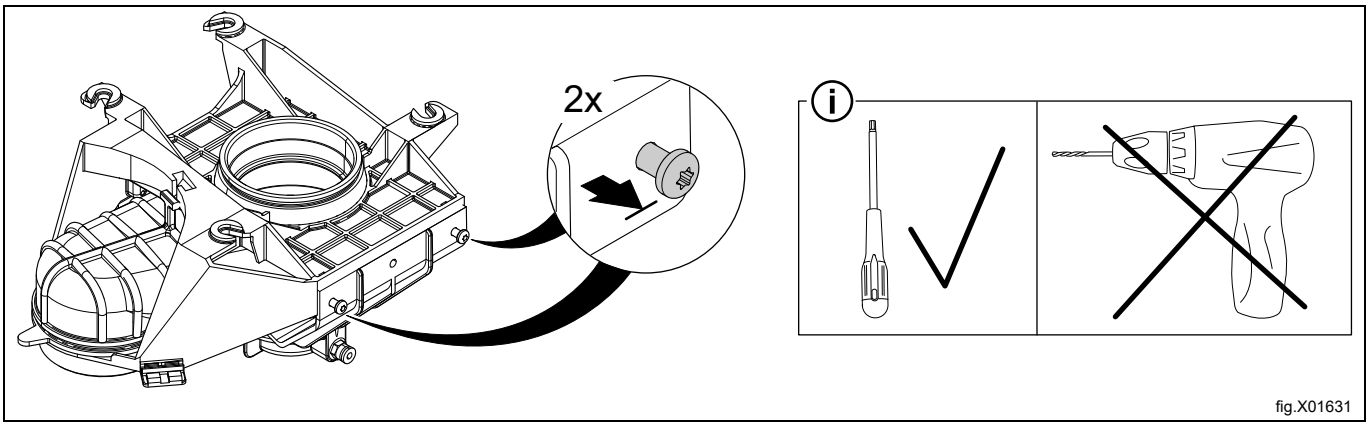


fig.X01631

Carefully insert the heat protection plate between the element cables and the new drain valve and put in position by sliding it in. Be careful not to damage any cables.

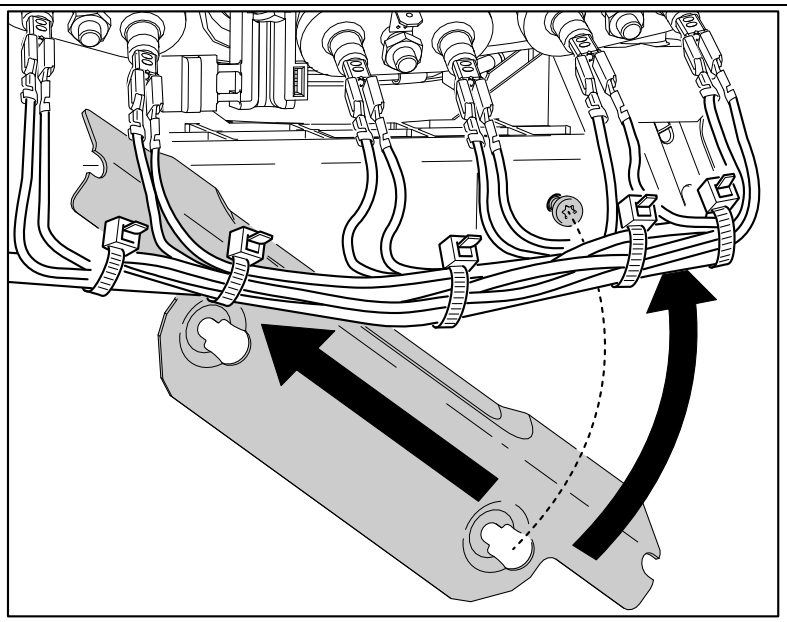


fig.X01487A

Push the heat protection plate to the right most position before tightening the screws.

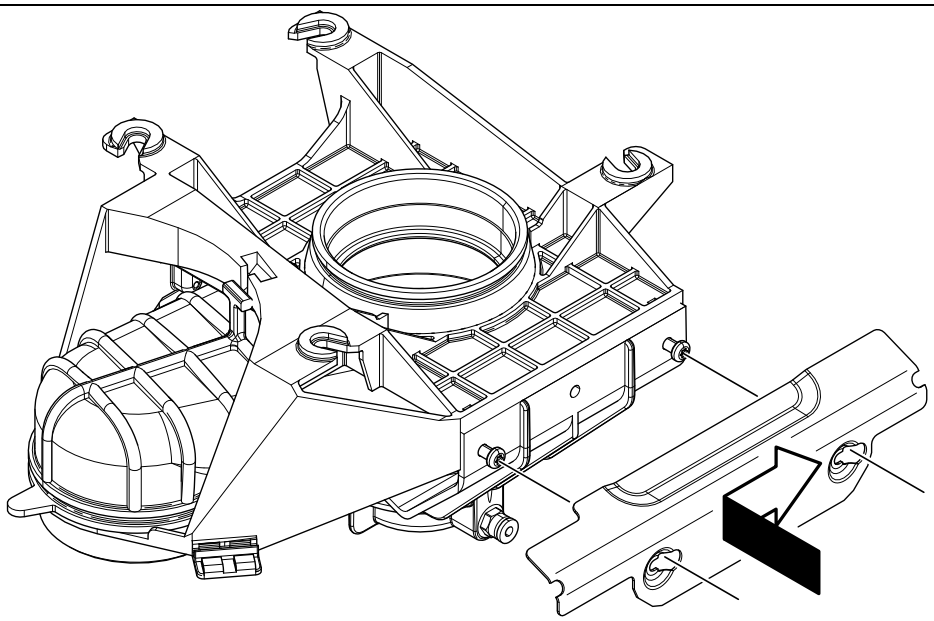


fig.X01633

Tighten the screws with tightening torque 1 Nm.

Note!
Be very careful when tightening the screws.

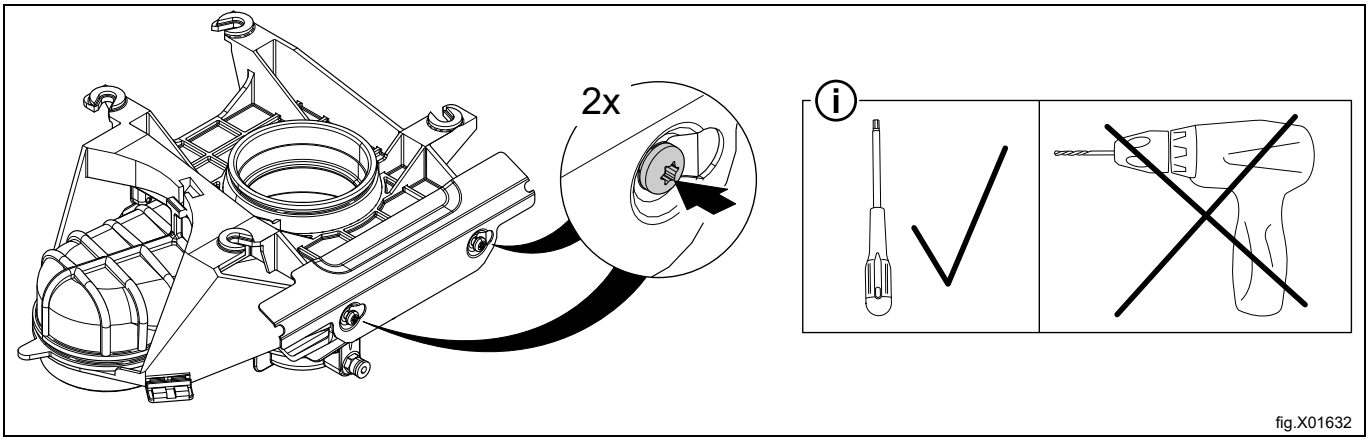


fig.X01632

Mount the hoses and tighten the hose clamps.
For electrical heated machines; mount the cover to the heating elements.
Mount the front panel.

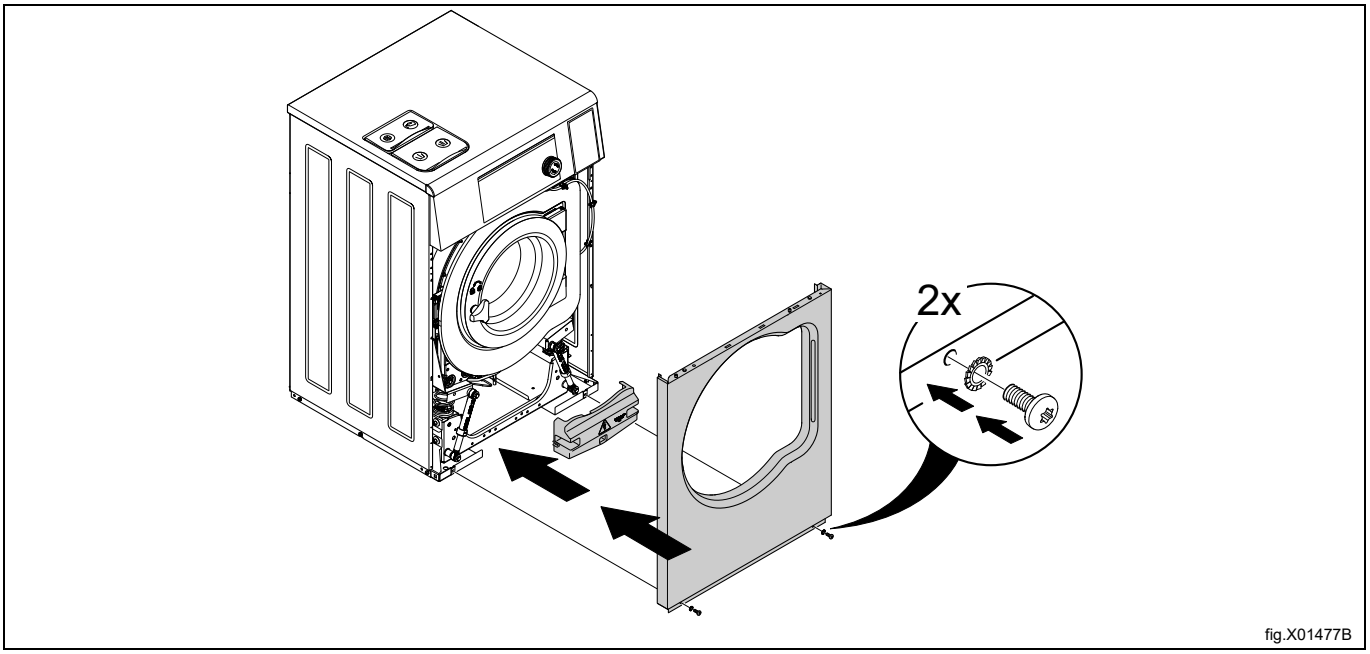


fig.X01477B

10.2 Electrical drain valve

An electrical drain valve is a normally open (NO) valve and stays open by the return spring. The valve closes by a motor that operates the built-in flap that closes the drain and keeps it closed as long as there is power to the motor.

The drain opens by a return spring when the motor is powered off. The motor is available in 120 Volt AC or 230 Volt AC. Both variants in 50/60 Hz. When replacing, always use original parts and with the same rating.

Machines can have an inverted electrical drain valve that is normally closed (NC). In this the drain stays closed by the return spring and is opened by the motor.

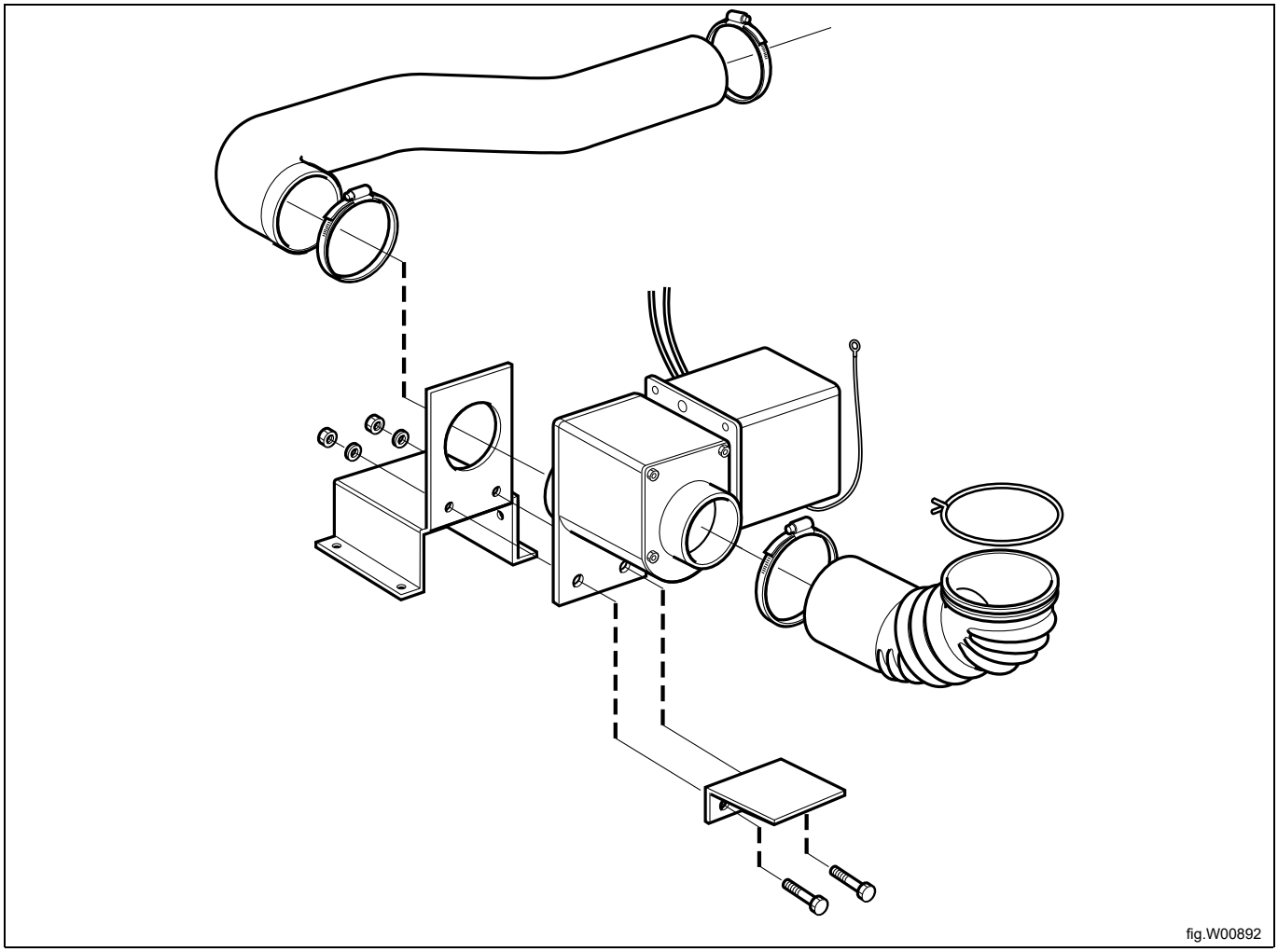


fig.W00892

Replacement of electrical drain valve

Disconnect the power to the machine.

Switch off the water supply.

Demount the front panel.

For electrical heated machines; remove the cover to the heating elements.

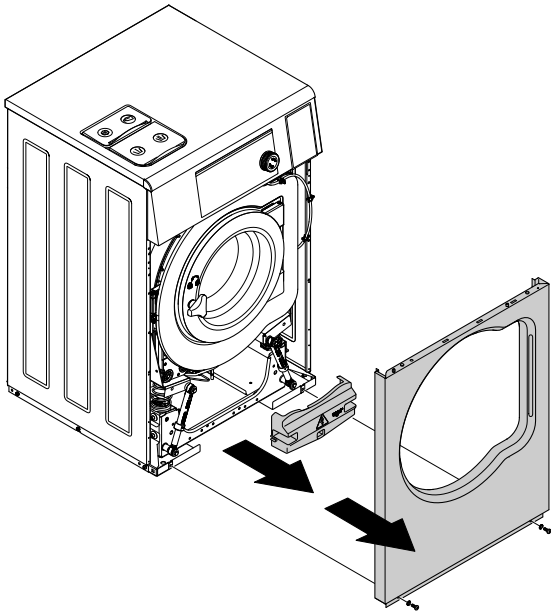
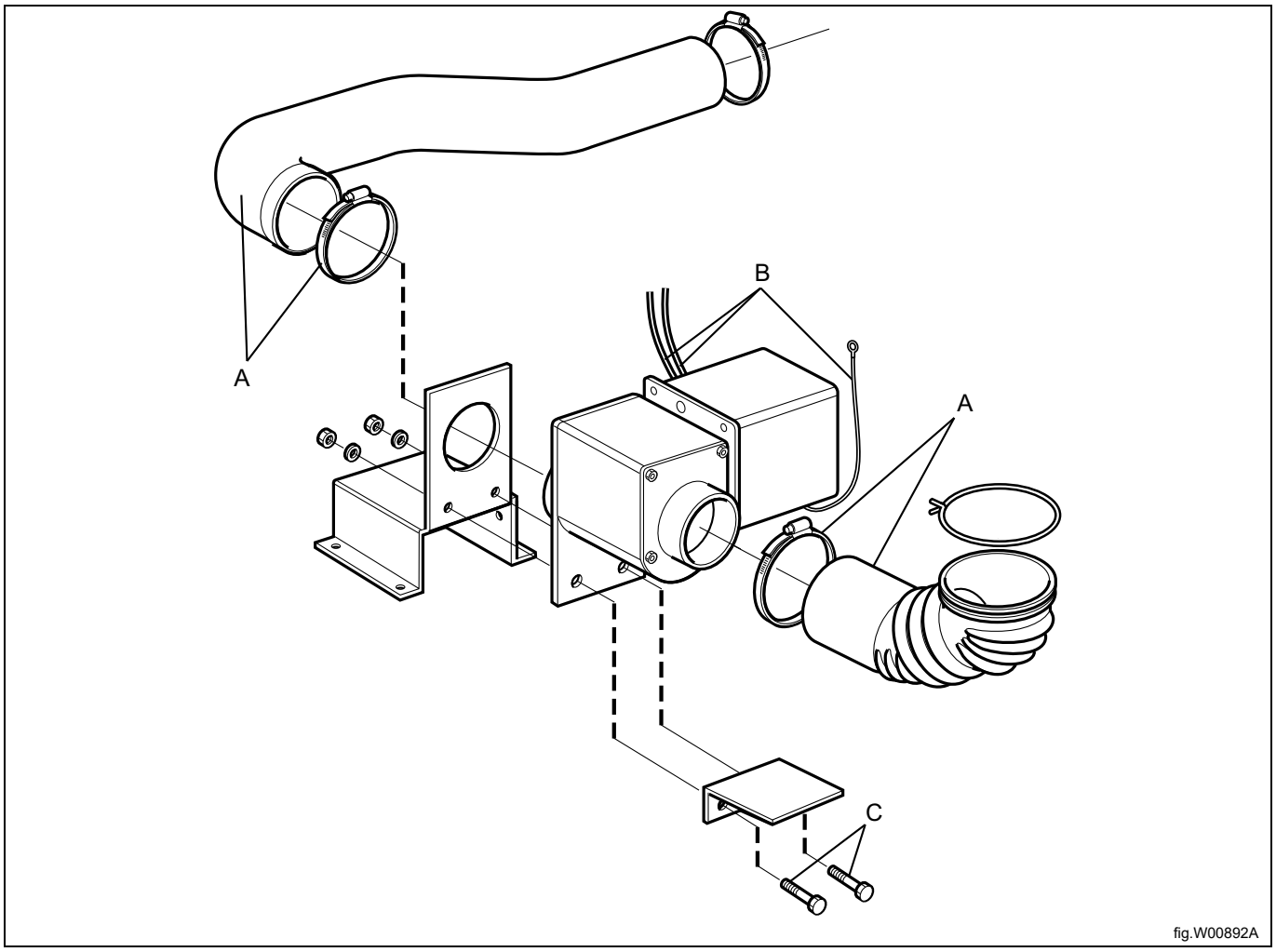


fig.X01477C

Loosen the hose clamps and demount the hoses (A) from the drain valve.
Disconnect the cables (B) from the drain valve.
Loosen the bolts (C) and demount the electrical drain valve from the mounting plate.
Check and clean the drain hoses if necessary before remounting the drain valve.



Mount the new electrical drain valve on the mounting plate and tighten the bolts.
Mount the hoses (A). Tighten the hose clamps.
Connect the wires (B).
For electrical heated machines; mount the cover to the heating elements.
Mount the front panel.

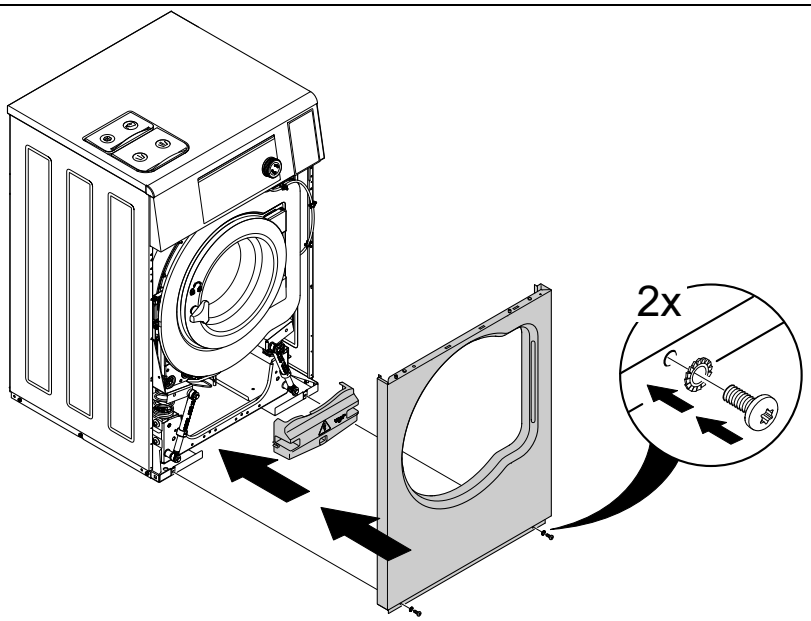


fig.X01477B

10.3 Drain pump (for models WH6–7, WH6–8, WH6–11)

10.3.1 General

The drain pump is located to the left under the drum in the front of the machine.

To keep the water in the drum the drain hose (A) must be mounted by the same height of the drum unit (approximately height is 650 ± 50 mm / 25 9/16 ± 1 15/16 inch from the bottom of the machine).

The motor which drives the pump is activated by the I/O module that it is controlled by the CPU.

To access the drain pump, remove the front panel.

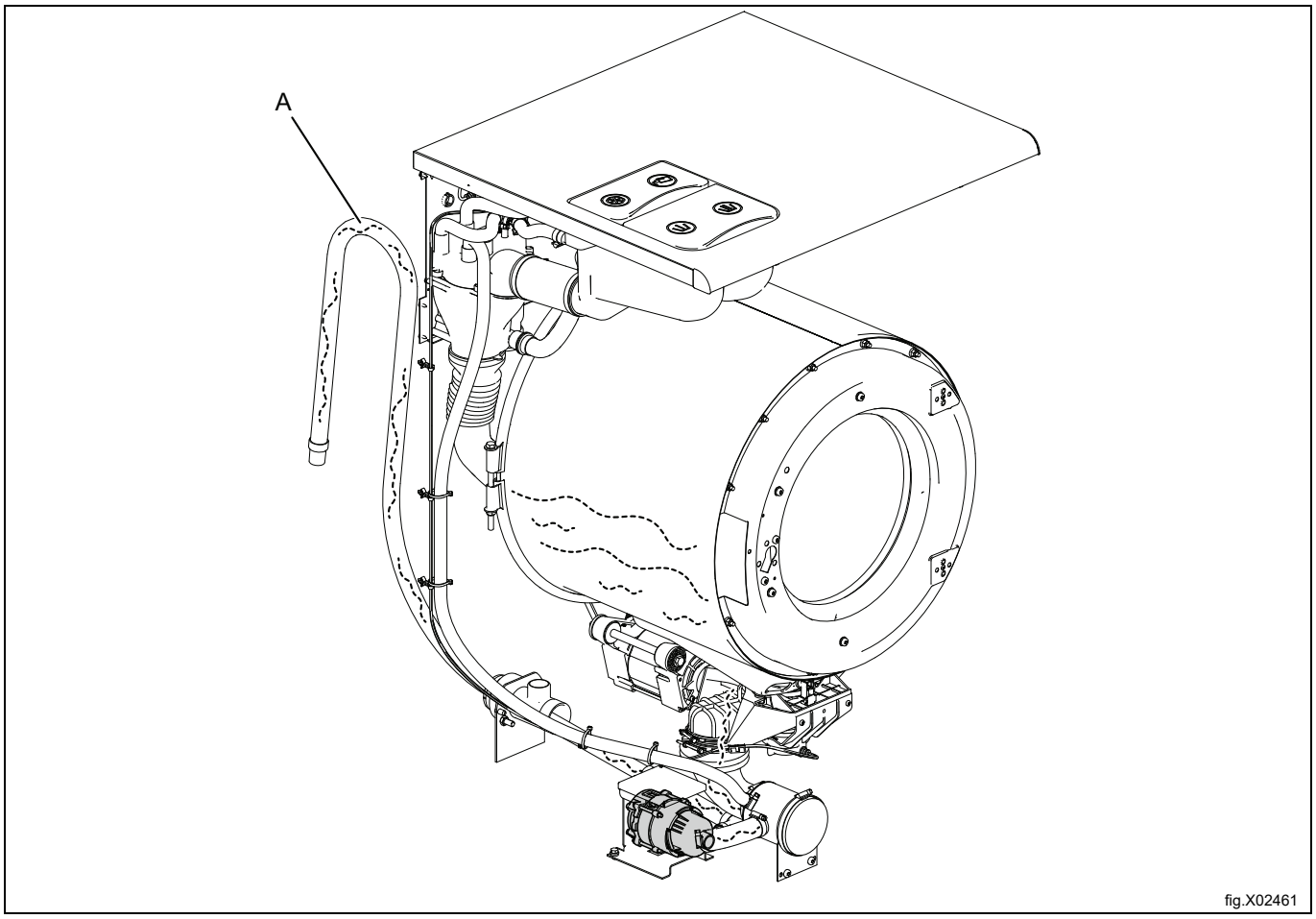


fig.X02461

10.3.2 Replacement of the drain pump

Disconnect the power to the machine.
Demount the front panel.

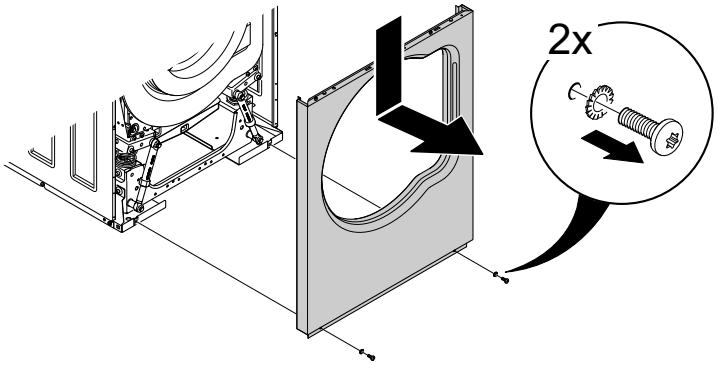


fig.X02466

Loosen the hose clamps (A) and demount the hoses from the container.
Romove screws (B) and remove the container (C).

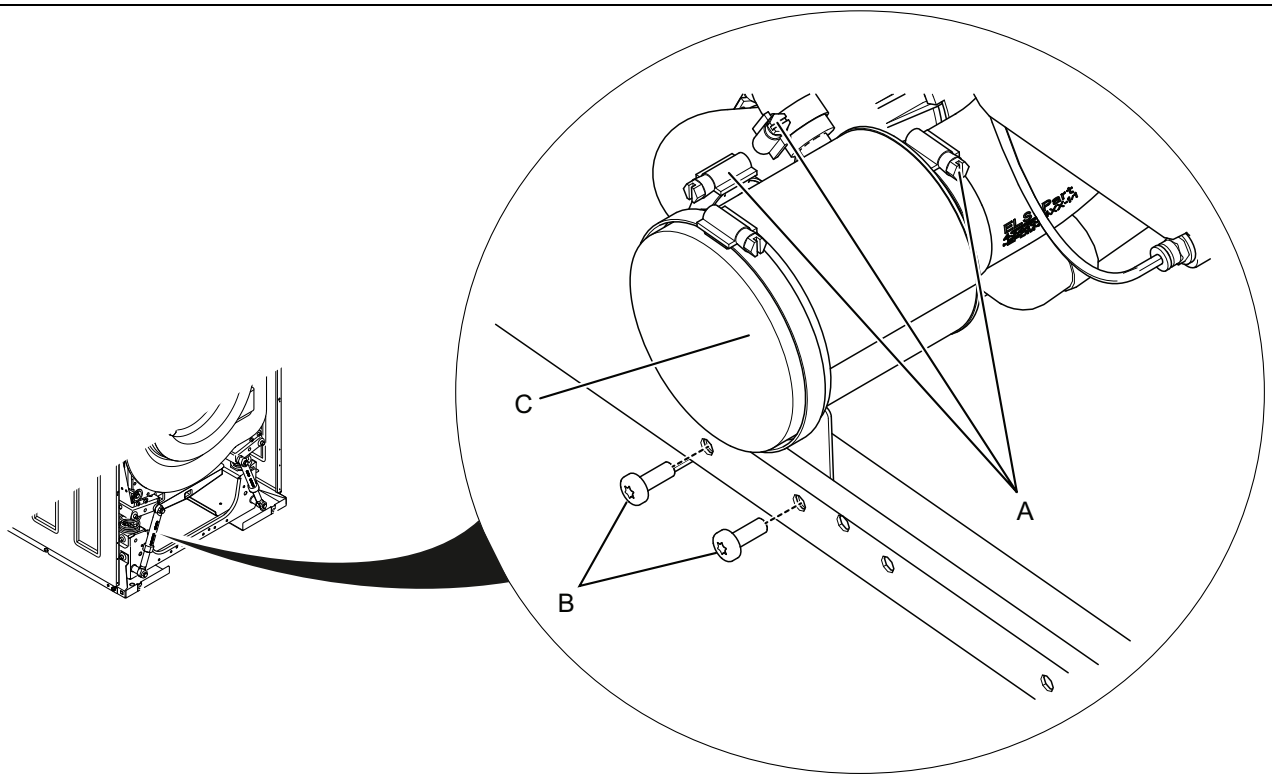


fig.X02463A

Loosen the hose clamps (D) and demount the hoses (E) from the drain pump.
Remove the cables from the drain pump.
Remove the 3 screws (F) and demount the drain pump unit from the machine.

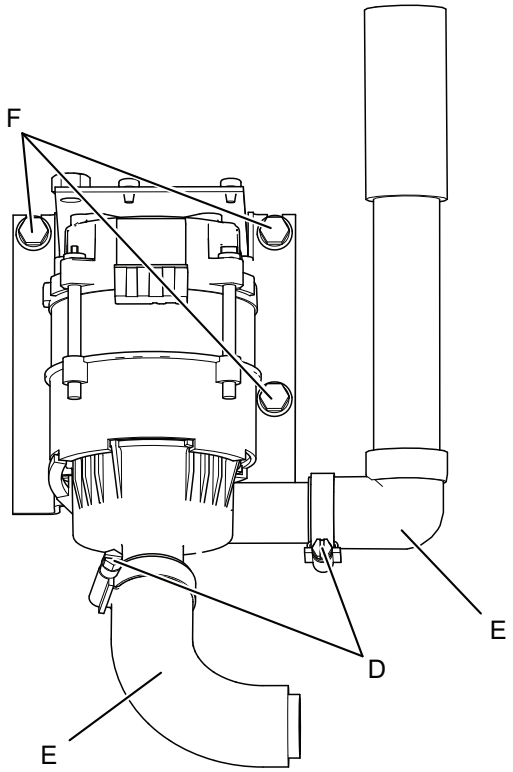


fig.X02464

Remove the 2 screws (G) and replace the drain pump with the new one.

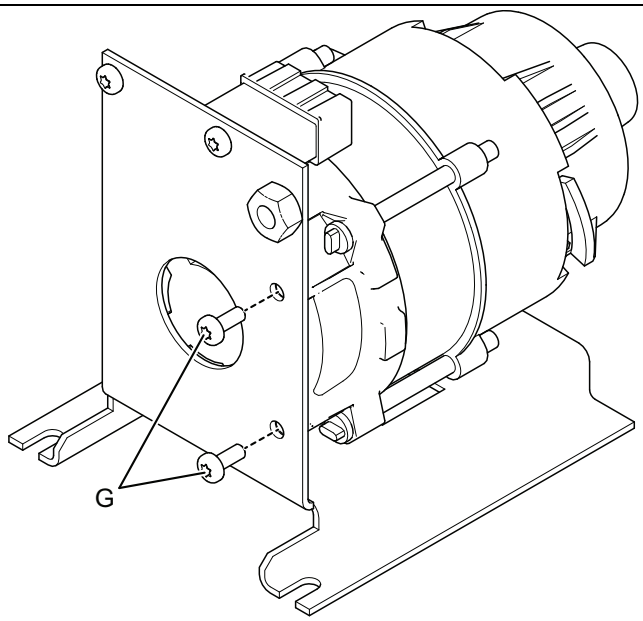


fig.X02465

Check and clean the drain hoses if necessary before remounting the drain pump unit.
Remount everything in reverse order.

11 Detergent container

Water connections into the detergent container are fitted with dispensers 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.

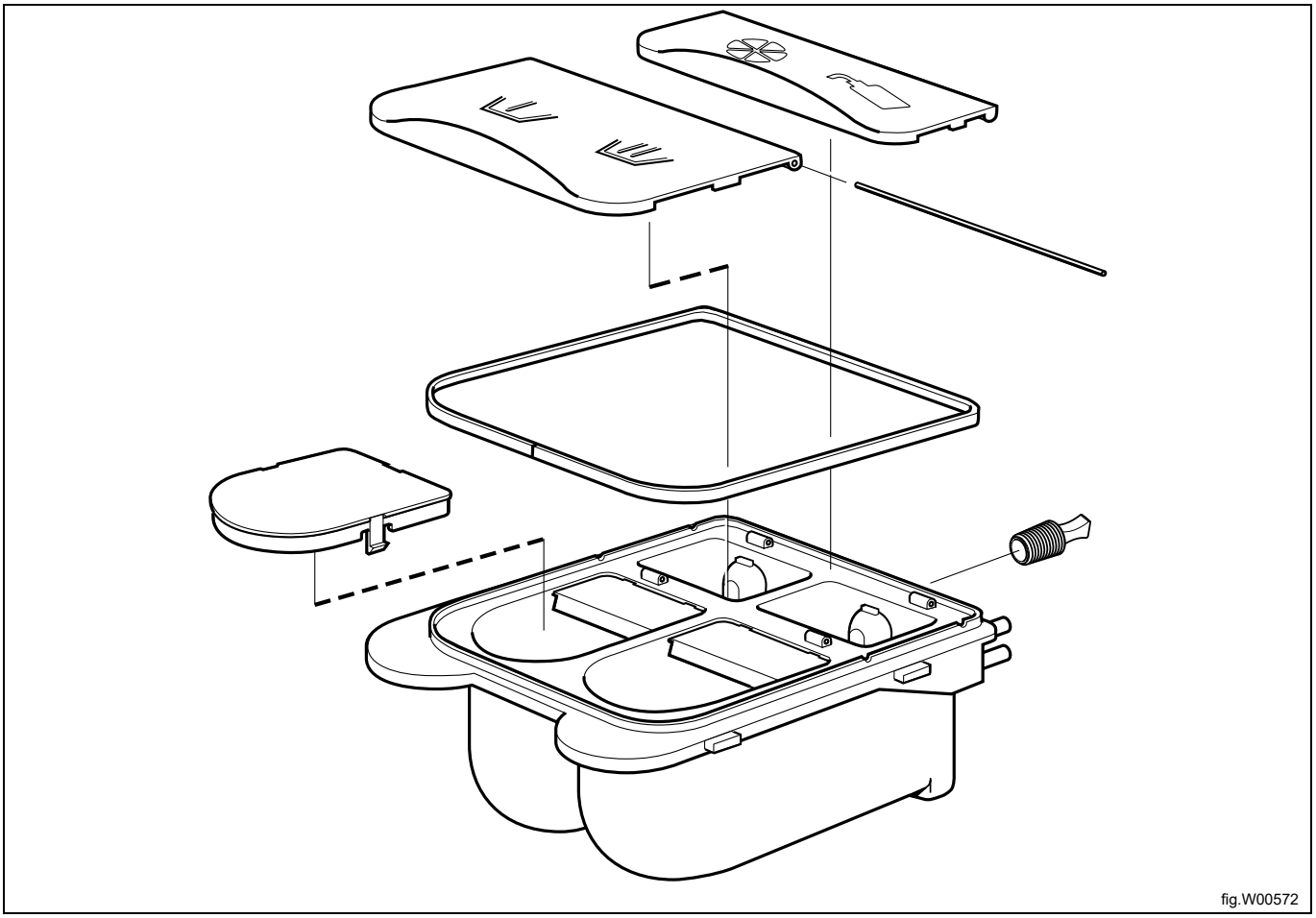


fig.W00572

11.1 Replacement of detergent container

Disconnect the power to the machine.
Demount the top panel.

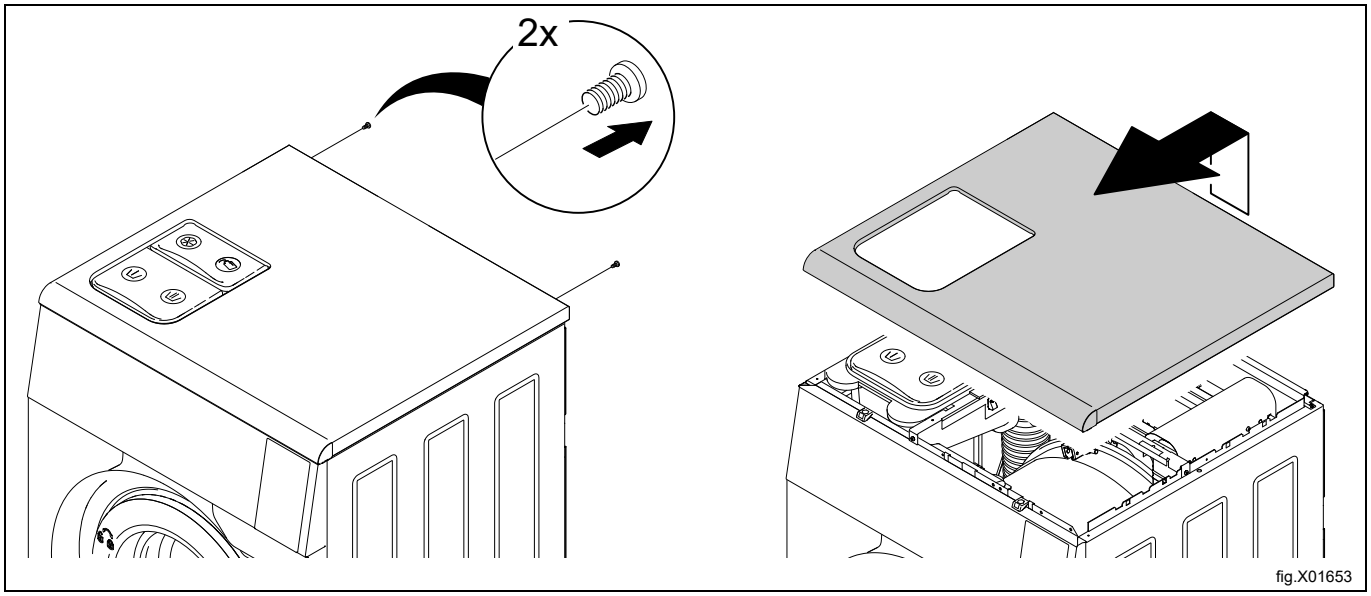
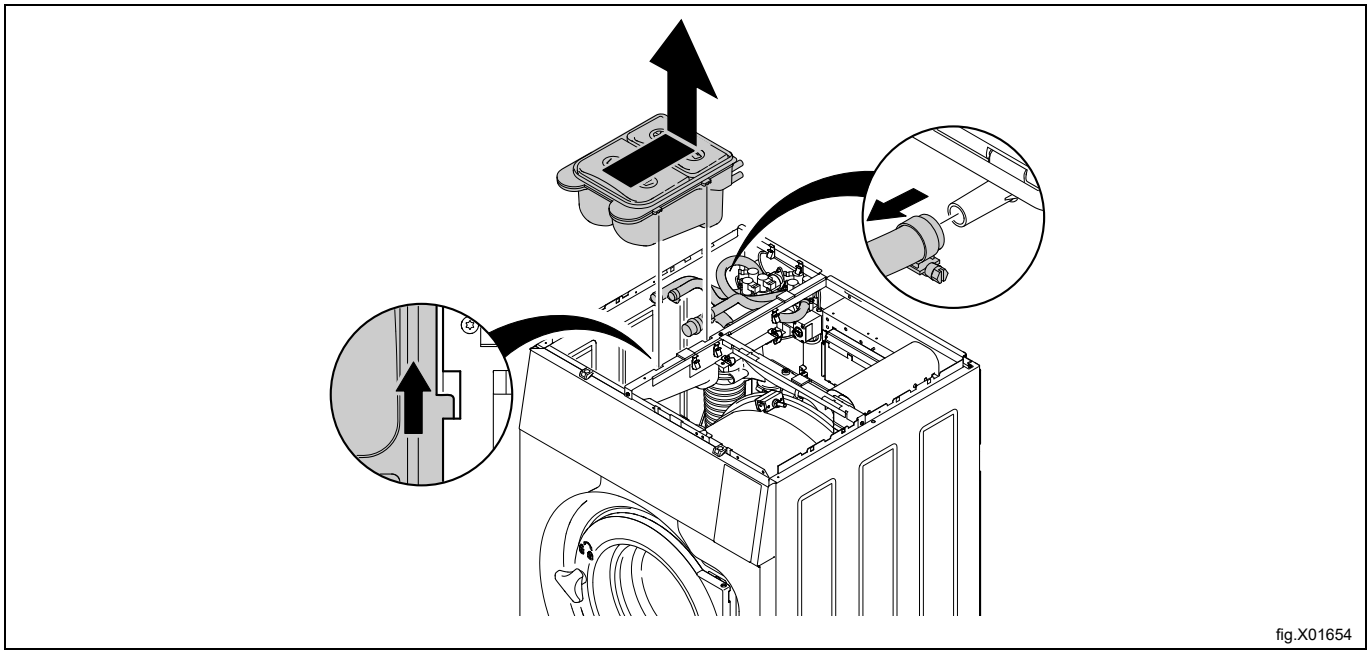
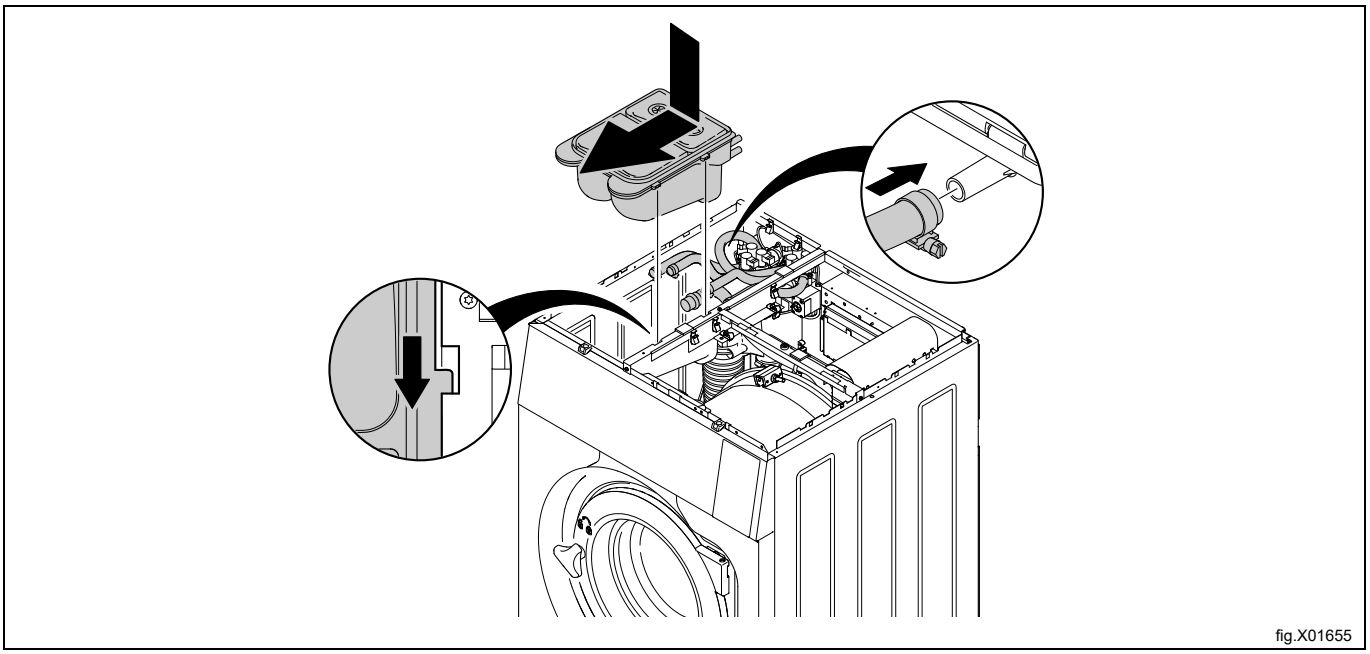


fig.X01653

Loosen the hose clamps and demount the hoses connected to the detergent container.
Remove the detergent container by sliding it into the hole and lifting it upwards.


fig.X01654

Insert the new detergent container by sliding it into position into the hole.
Remount the hoses and tighten the hose clamps. Use tightening torque 2.2 Nm / 1.6 lbf.ft.


fig.X01655

Remount the top panel.
Make sure the rubber bushing on the detergent container is in position and does not get squeezed.

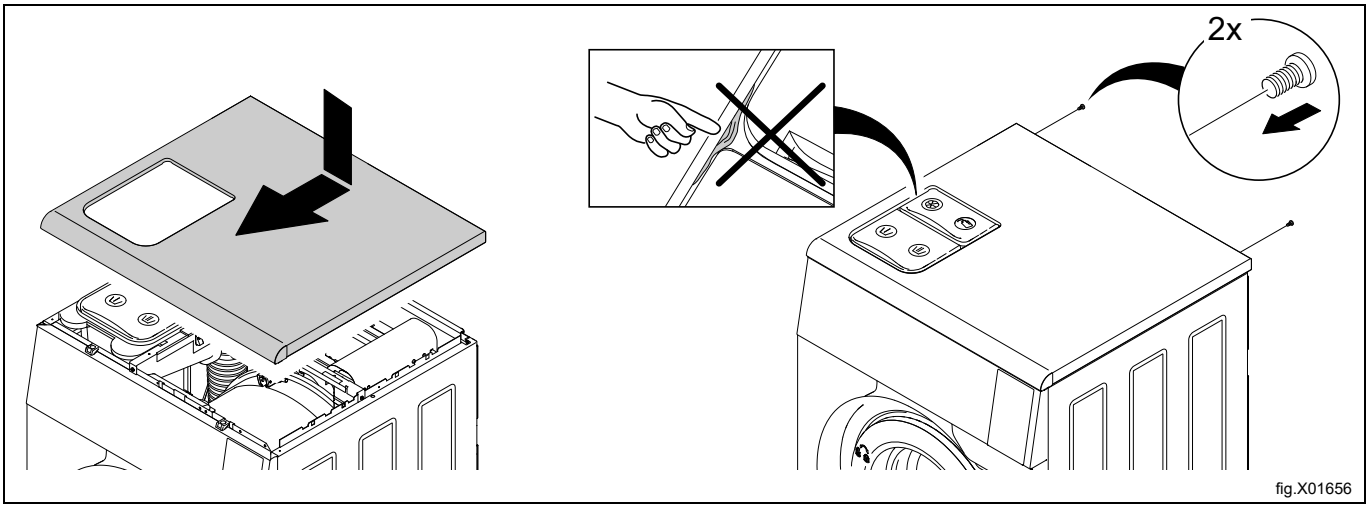


fig.X01656

12 Control panel

12.1 Control system

12.1.1 Description

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

The control system CPU receives its power from a separate power supply unit.

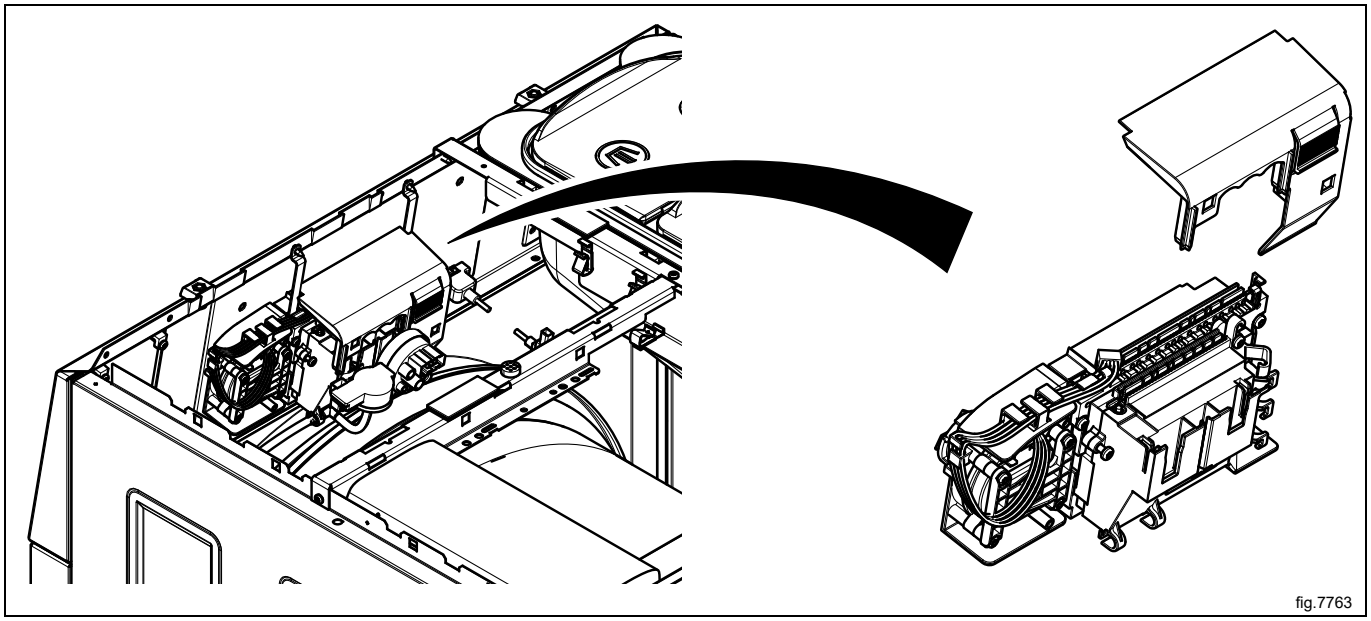


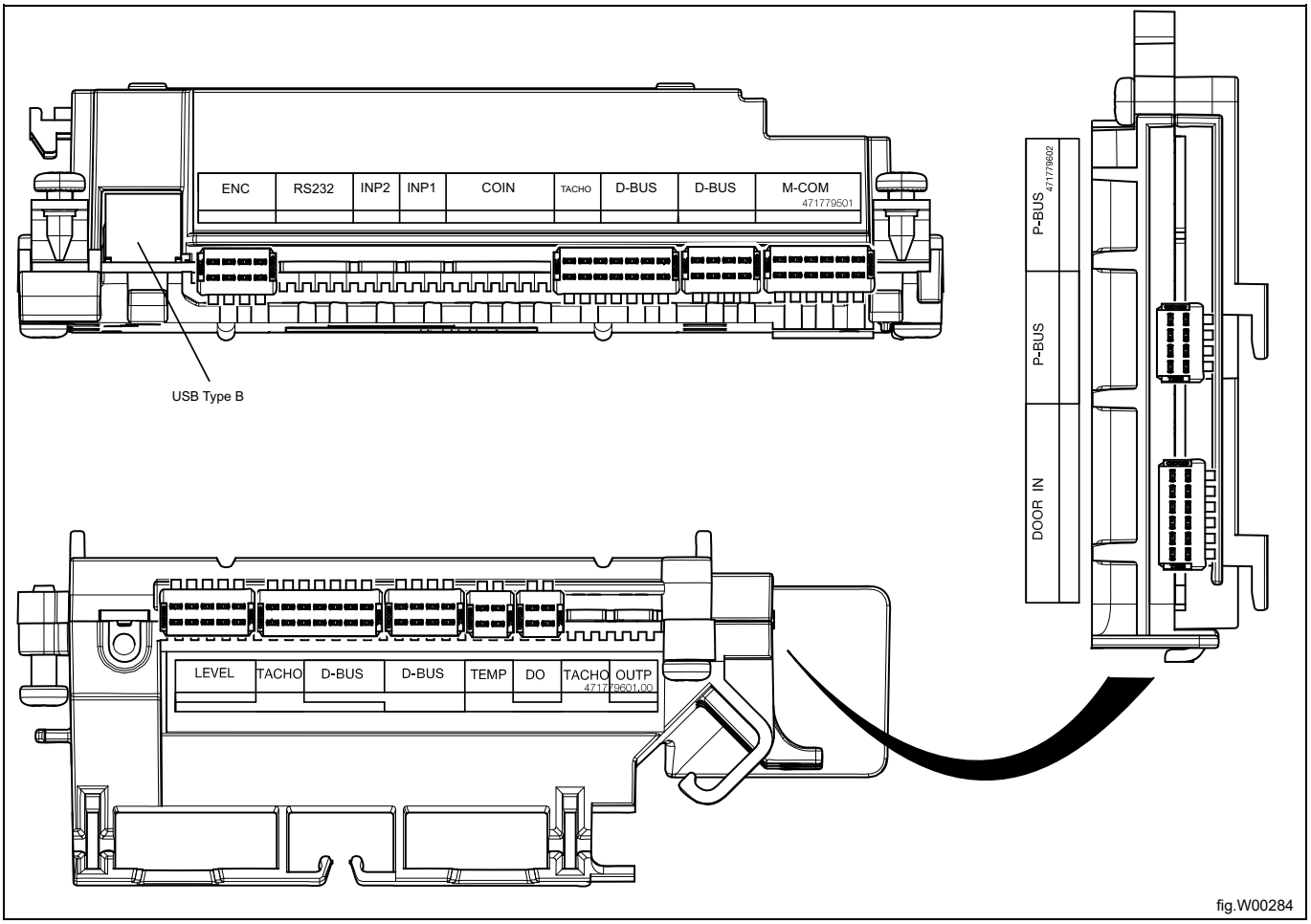
fig.7763

The control system receives information about inputs like temperature sensor, level sensor, door status and activates outputs like water valves, drain and heat control.

12.1.2 Connections

The control system CPU and I/O module type 10 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) price programming
INP 1	Input 1, stop button
INP 2	Free program (key switch) / Input 2
RS 232	Serial communication
ENC	Control knob (pulses)
USB TYPE B	Connection for software / service download
PIN CONNECTOR	Panel sign connector
LEVEL	Level controls
DO	Door out, door lock solenoid
OUTP	Output
DOOR IN	Door lock micro switches
P-BUS	Power bus
TEMP	Temp sensor



12.1.3 Replacement of control system CPU

Disconnect the power to the machine.
Demount the top panel.

12.1.3.1 Demount the control knob

Insert a screwdriver in the upper hole.

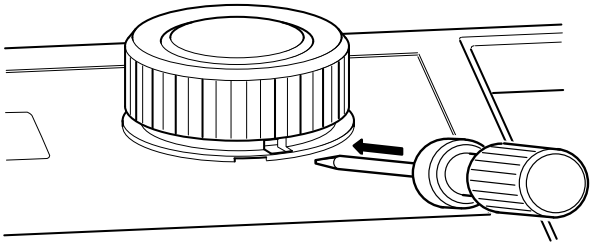


fig.7491

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

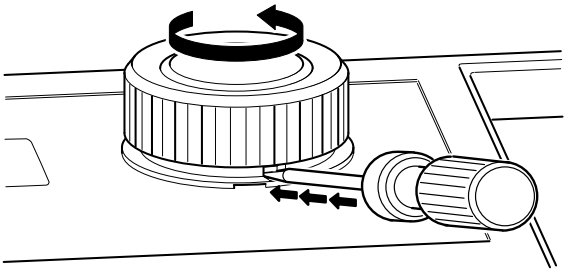


fig.7492

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

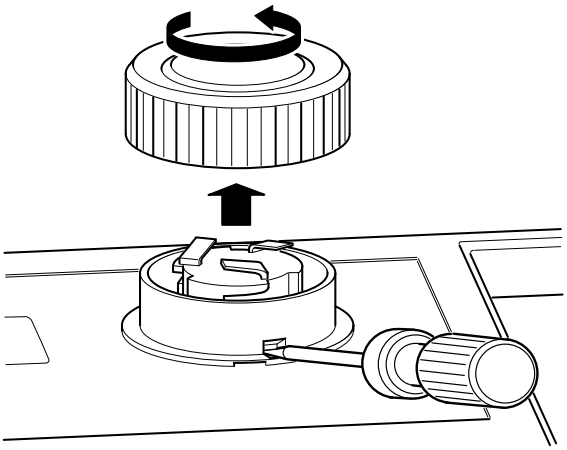


fig.7493

12.1.3.2 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.

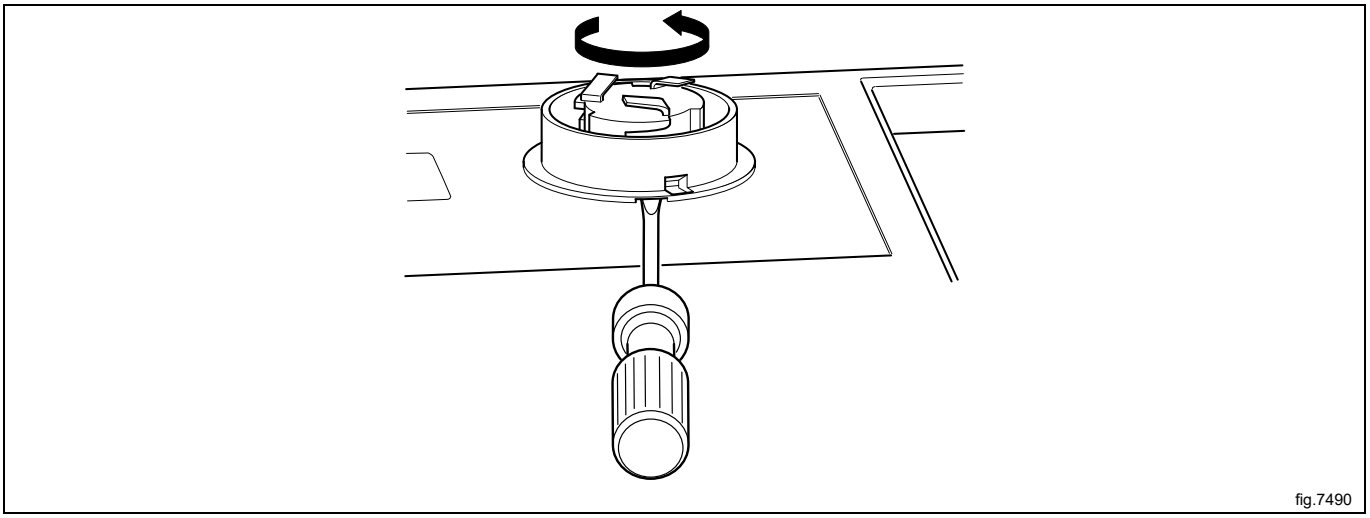


fig.7490

12.1.3.3 Demount the control system CPU

Demount the cover and disconnect the cables.

Loosen the screws holding the control system CPU onto the panel and demount the control system CPU.

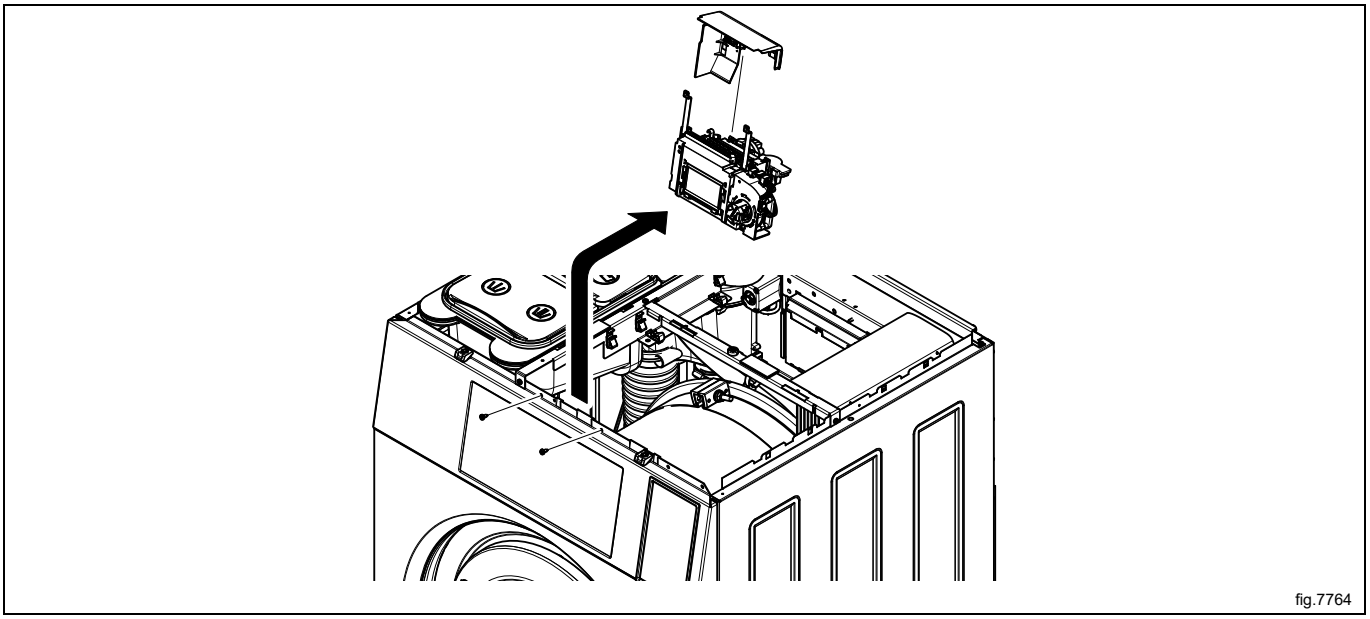


fig.7764

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

Demount the two grounding brackets (B).

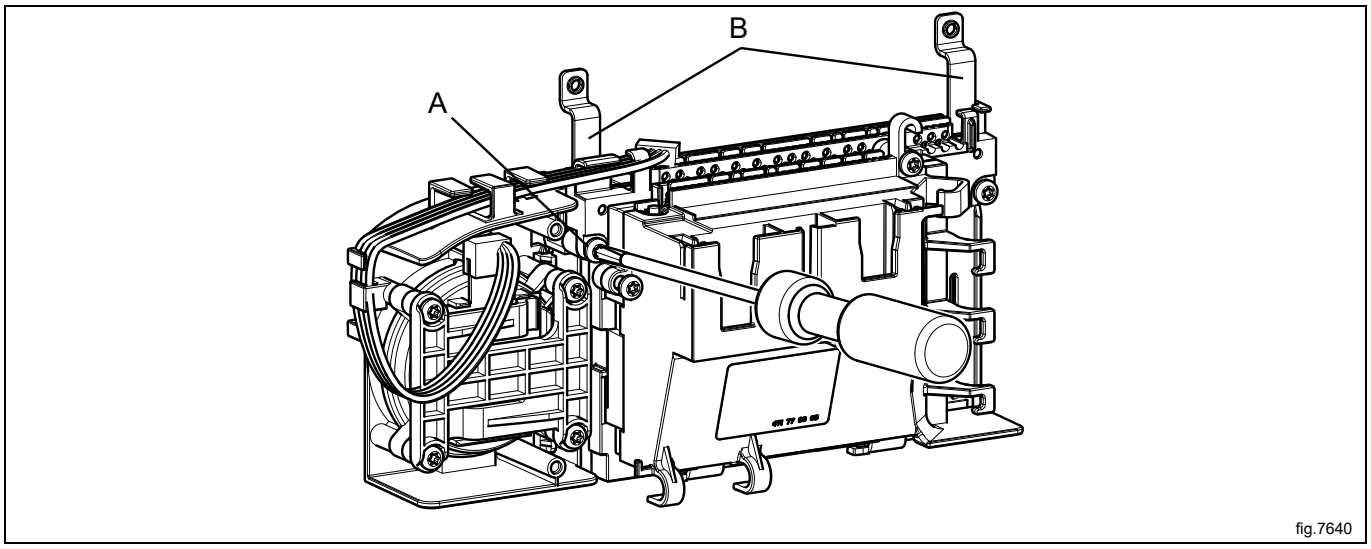


fig.7640

Demount the I/O module type 10 from the control system CPU by unscrewing the screw (C) a bit (4–5 mm). Remove the I/O module type 10 by lifting it upwards.

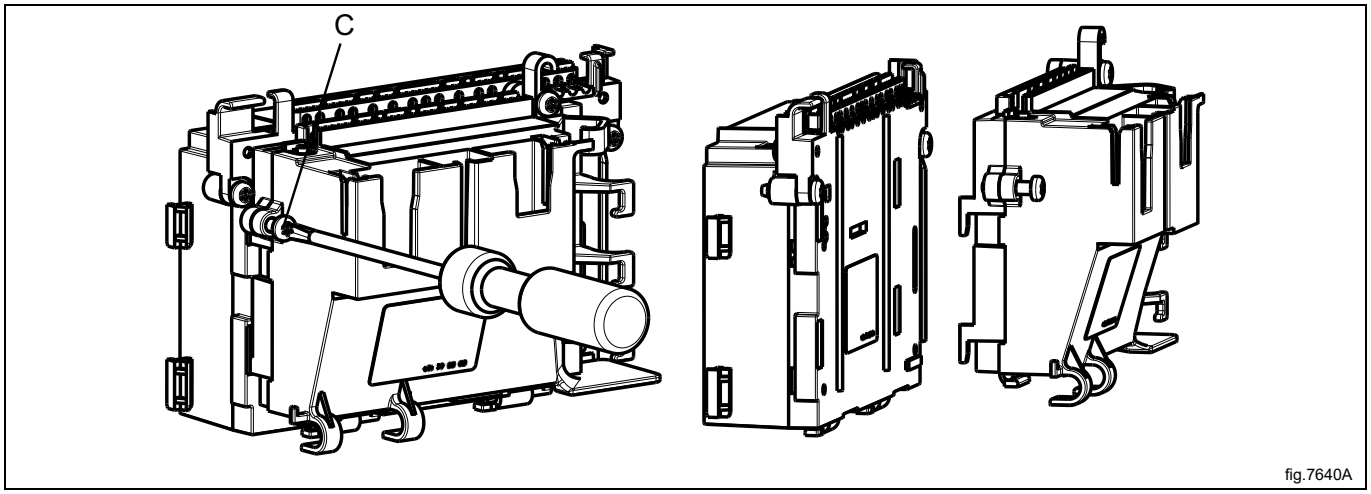


fig.7640A

12.1.3.4 Mount the new control system CPU

Start by mounting the control knob unit on the control system CPU. Fasten the screw (A).

Mount the I/O module type 10 and fasten the screw (C).

Mount the two grounding brackets (B) on the new control system CPU.

Mount the control system CPU on the control panel and make sure that the guide pins (D) are in position. Fasten the screws to the panel.

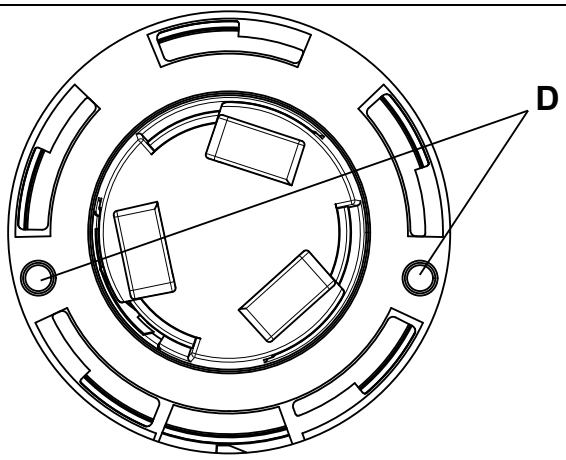


fig.7511

Connect the cables and remount the cover.

12.1.3.5 Mount the cover ring and the control knob

Mount the 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.

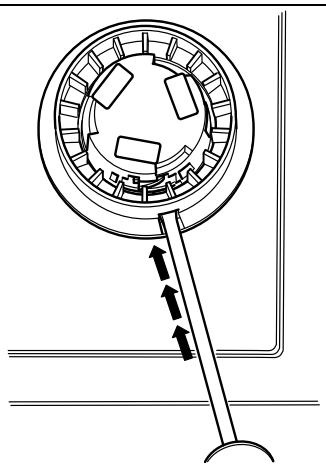
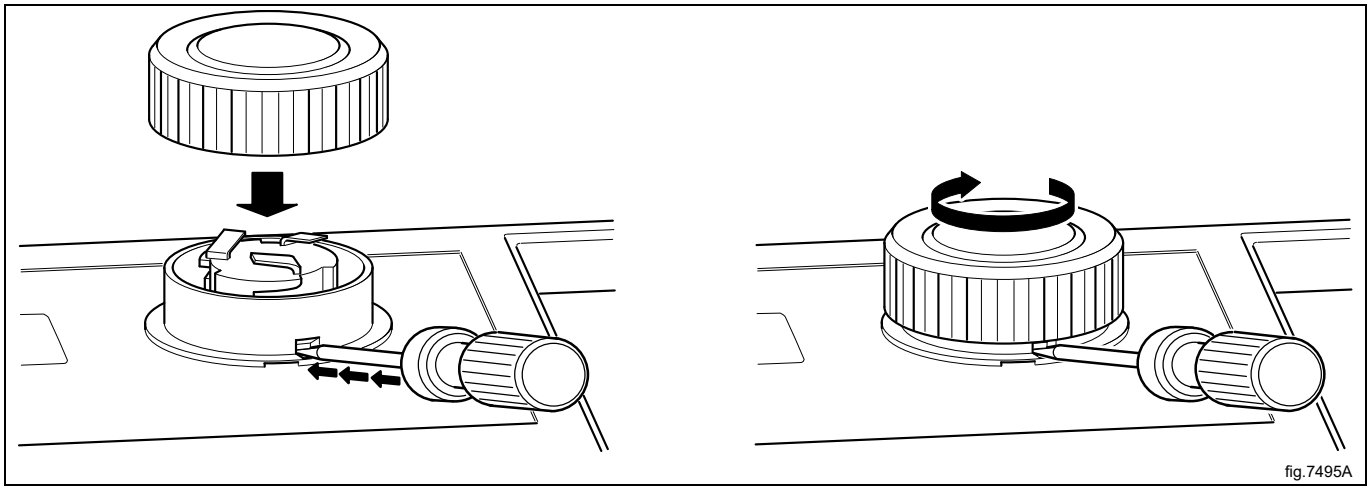


fig.7494

Mount the 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.



See the parameter software installed in the machine’s control system on delivery. This is specified at the front and back on the machine.

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

Download the latest software from the web.

Connect the power to the machine.

Use the CST to install the software to the machine.

Re-address the I/O board for function options.

Correct the machine address if it is necessary e.g. the machine is connecting to LMIS system.

Test run the machine.

12.2 Control knob

12.2.1 Replacement of control knob

Disconnect the power to the machine.
Insert a screwdriver in the upper hole.

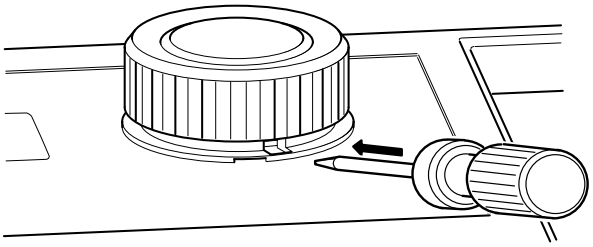


fig.7491

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

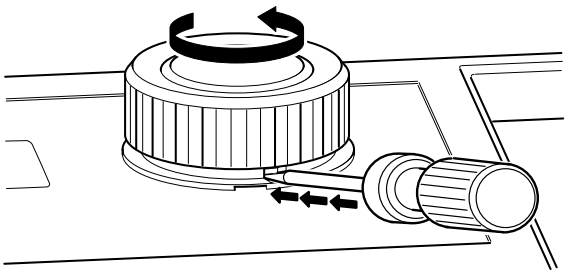


fig.7492

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

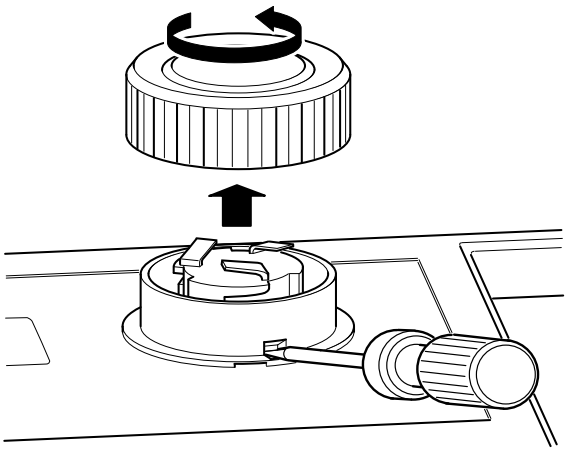


fig.7493

12.2.1.1 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.

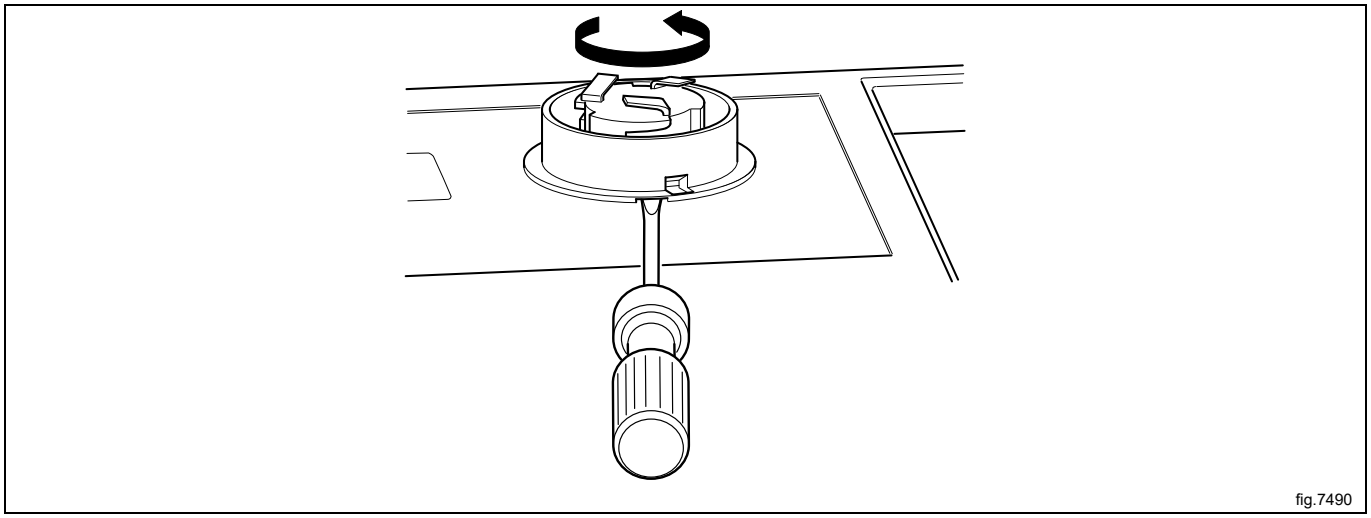


fig.7490

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.

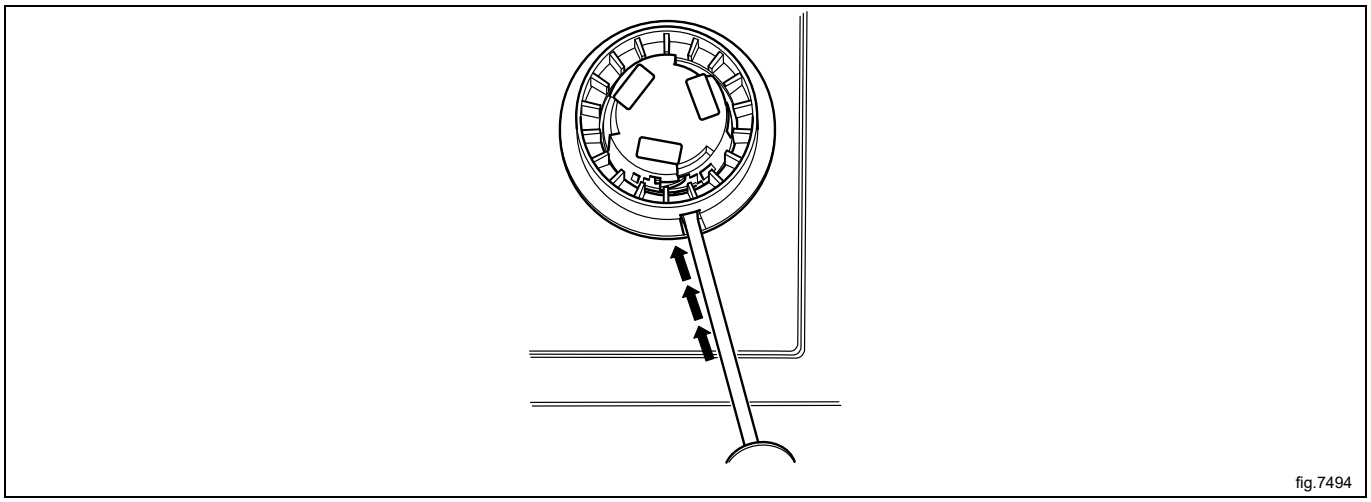
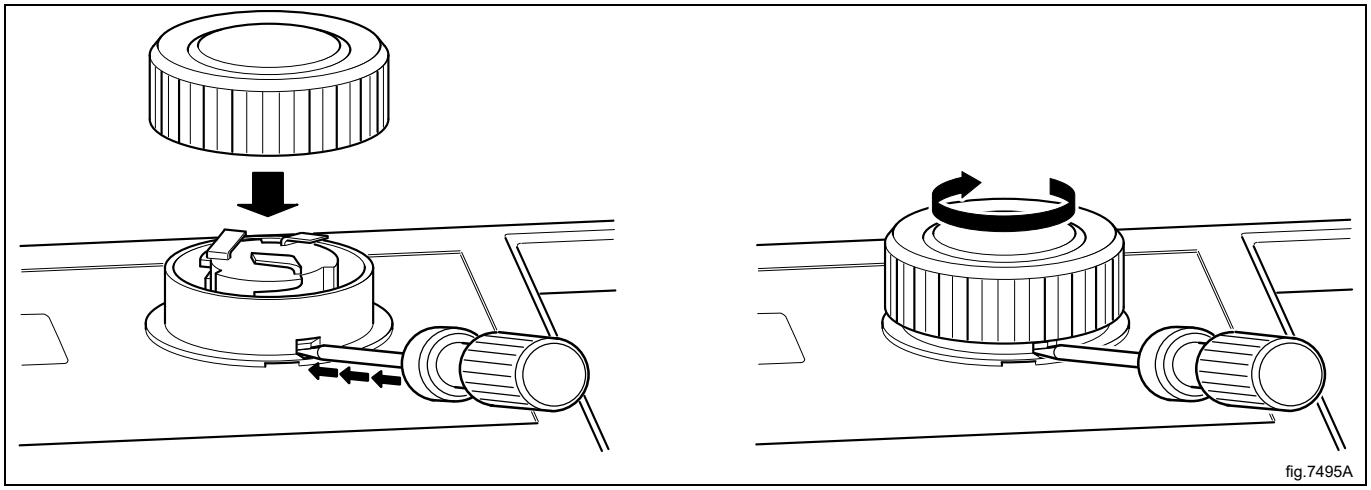


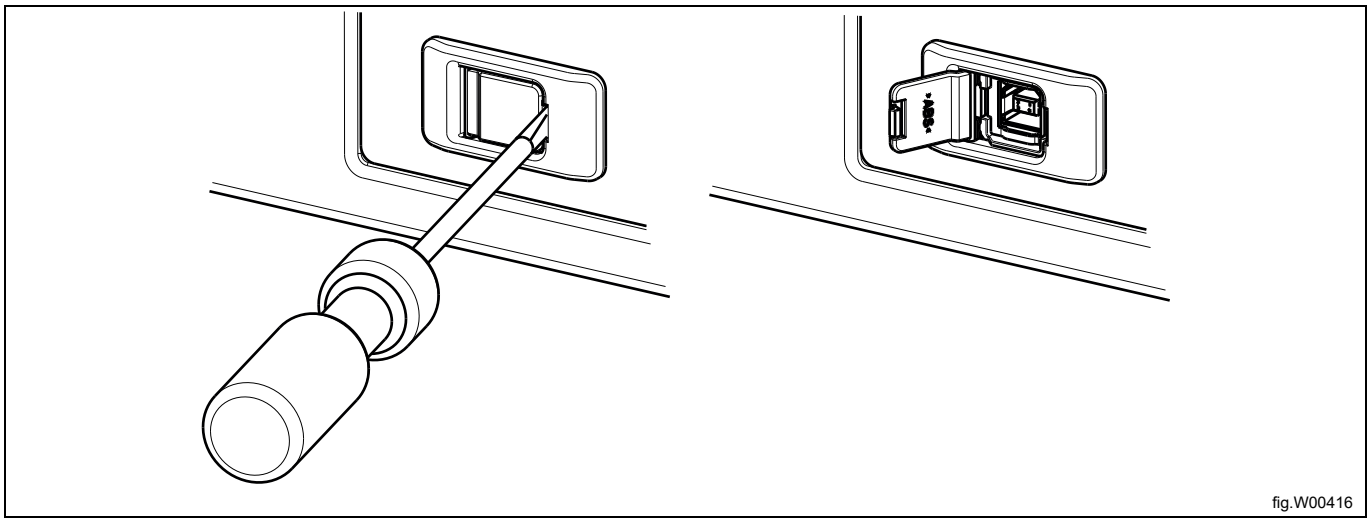
fig.7494

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.


fig.7495A

12.3 USB connection

To open the USB connection; use a screwdriver to carefully press and open the lid.


fig.W00416

13 I/O modules

13.1 General

The machine can be equipped with either two or more 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, water valves, drain 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.
- 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 control system. 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 control system 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.

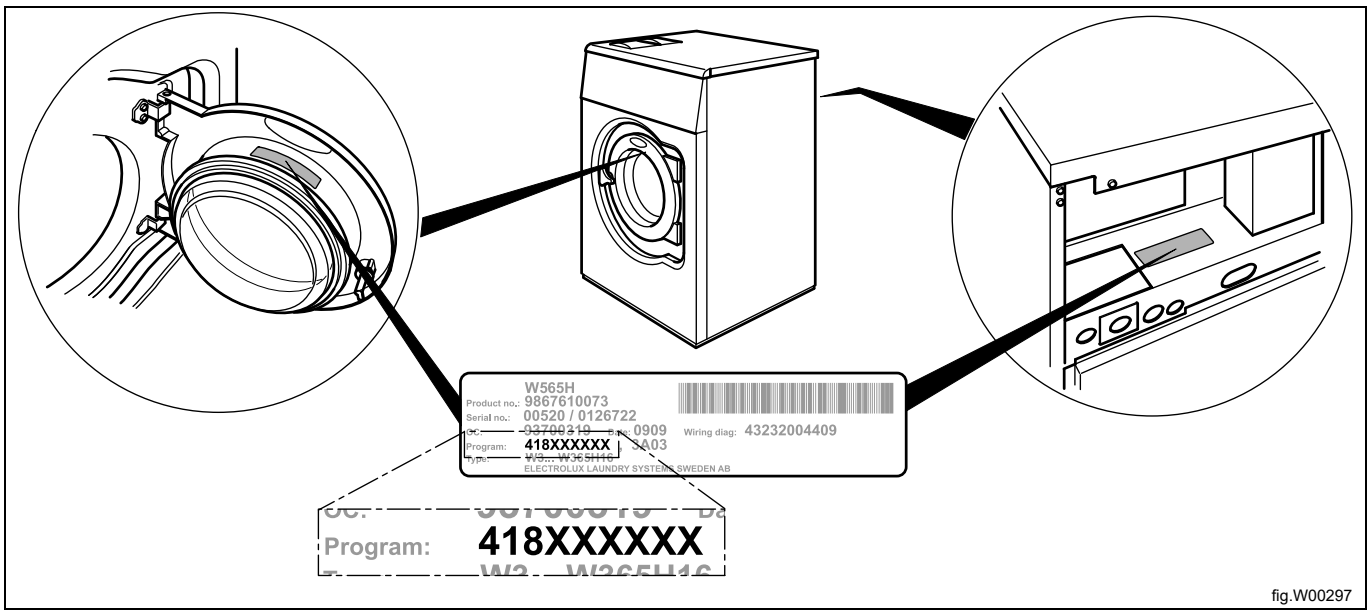


fig.W00297

Addressing I/O boards

After replacing an I/O board or in instances where an I/O board has been added to the machine, the new I/O board must be addressed in order to activate the function options.

Activate the CONFIGURATION menu (a long press on the start button/or control knob, a password is needed to continue).

Activate the I/O CONFIGURATION menu. Activate the SETUP ALL I/O BOARDS or ADD/REMOVE I/O BOARDS menu.

Set up the I/O boards one by one by pressing the service button on the board. Follow the instructions on the display.

13.2 Replacement of I/O module

I/O module type 1, 11 or 3

I/O module type 1, 11 or 3 are installed in the same way.
Disconnect the power to the machine.
Demount the top panel.
Remove the cover on the module.

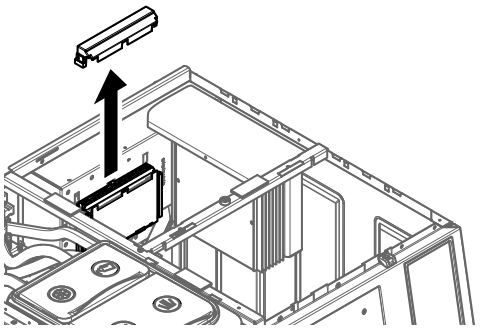


fig.7798

Remove the electrical connections on the module. (Note the position of the connections).
Remove the module by pulling it upwards.

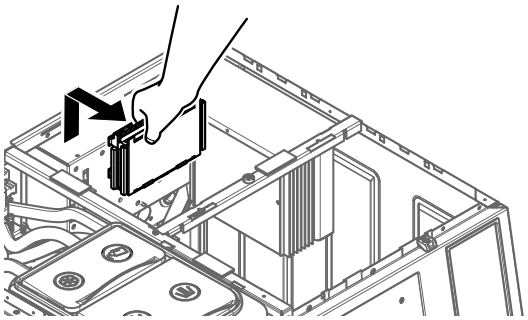


fig.7799

Insert the new module and make sure it is in position.
Connect the electrical connections in the same way as before.
Mount the cover.
Remount the top panel.
Connect the power to the machine.
Address the new I/O module to the CPU. (Please refer to "Addressing I/O boards" section).
Test run the machine.

I/O module type 2

Disconnect the power to the machine.

Demount the cover panel at the back of the machine.

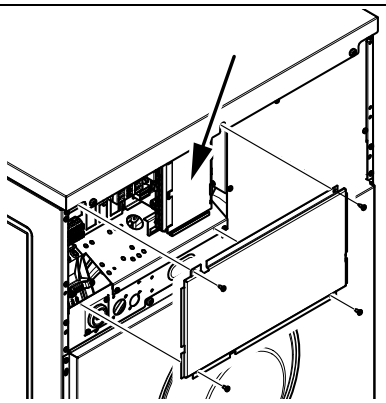


fig.7797

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

Remove the module by lifting it towards you and up a bit and then pushing it to the left.

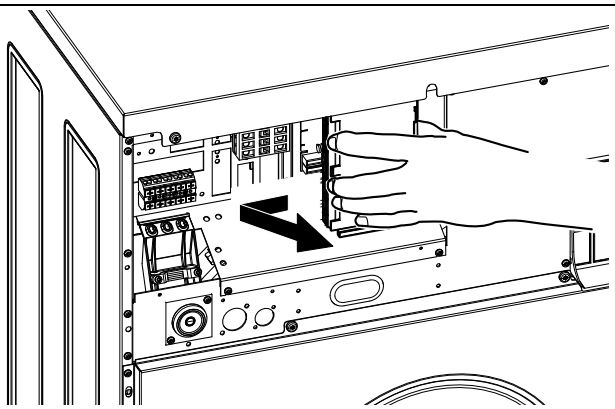


fig.7800

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

Connect the electrical connections in the same way as before.

Remount the cover panel.

Connect the power to the machine.

Address the new I/O module to the CPU. (Please refer to "Addressing I/O boards" section).

Test run the machine.

I/O module type 10

Disconnect the power to the machine.

Demount the top panel.

Remove the cover to the control system and I/O module type 10.

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

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

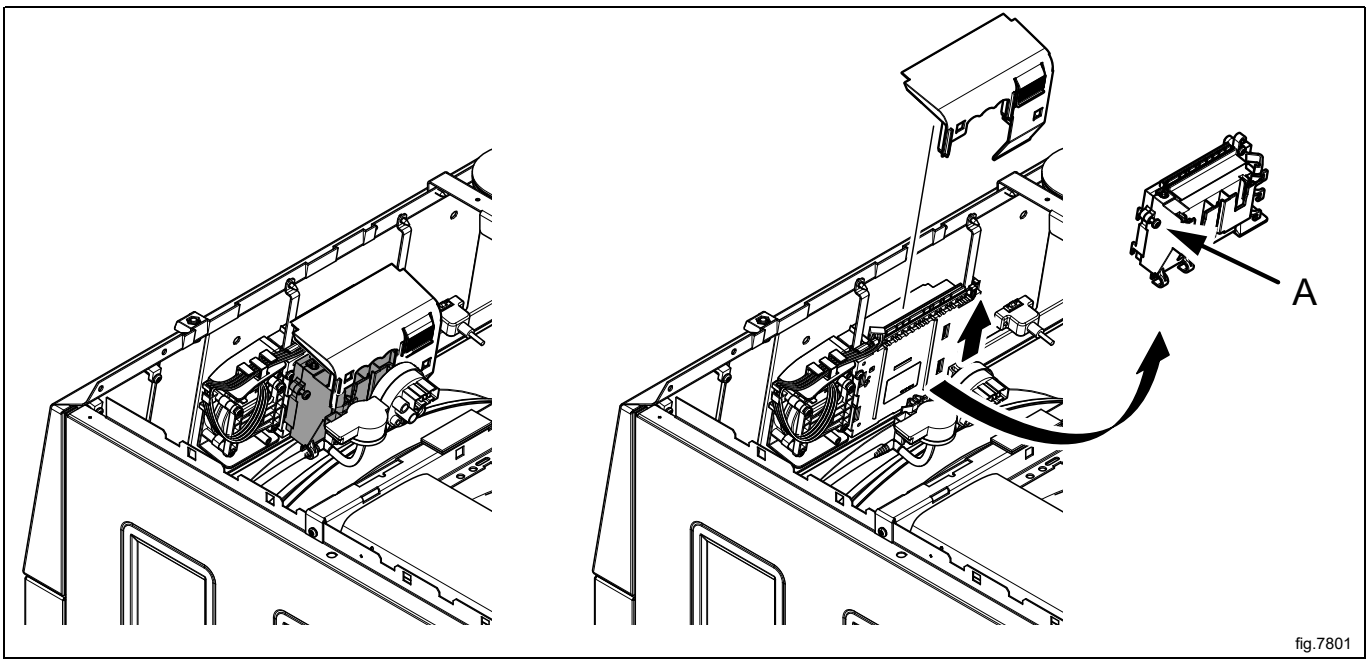


fig.7801

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

Connect the electrical connections in the same way as before.

Fasten the screw (A) and remount the cover.

Remount the top panel.

Connect the power to the machine.

Address the new I/O module to the CPU. (Please refer to "Addressing I/O boards" section).

Test run the machine.

I/O module type 6

Disconnect the power to the machine.

For WH6-7, WH6-8 and WH6-11: Demount the front panel.

For WH6-14, WH6-20, WH6-27 and WH6-33: Demount the side panel.

Disconnect the cable and demount I/O module type 6 by lifting the plastic cover outwards and pulling the I/O module to the right.

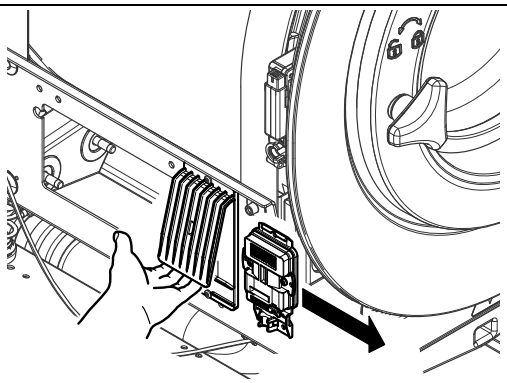


fig.7802

Mount the new module and make sure it is in position.
Connect the cable.
Remount the panel.
Connect the power to the machine.
Address the new I/O module to the CPU. (Please refer to "Addressing I/O boards" section).
Test run the machine.

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

13.3.1 External coin meter/Central payment (2A)

The signal received from external coin meters must be a pulse between 300–3000 ms (500 ms is recommended) with a minimum pause of 300 ms (500 ms is recommended) between two pulses.

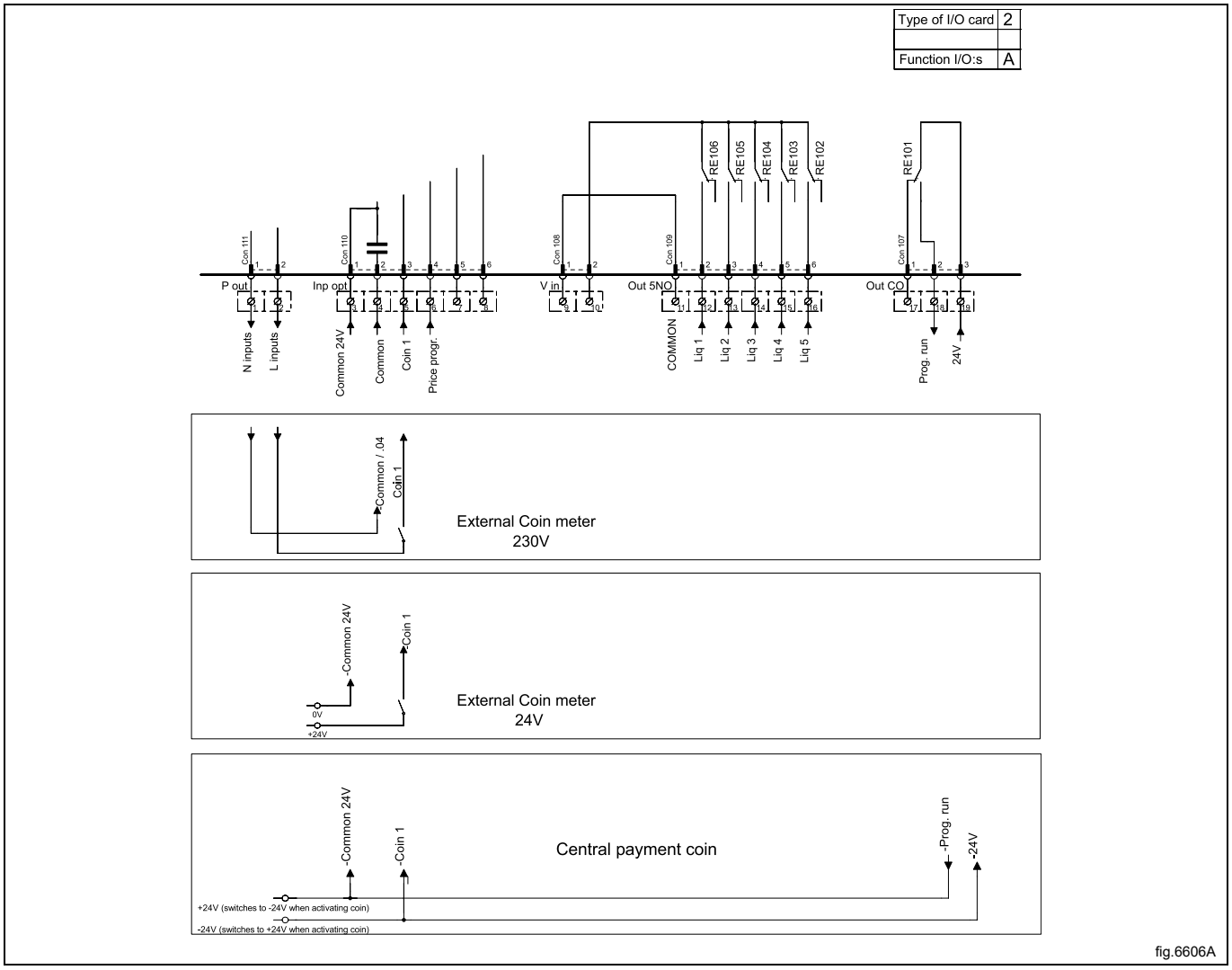


fig.6606A

13.3.2 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.

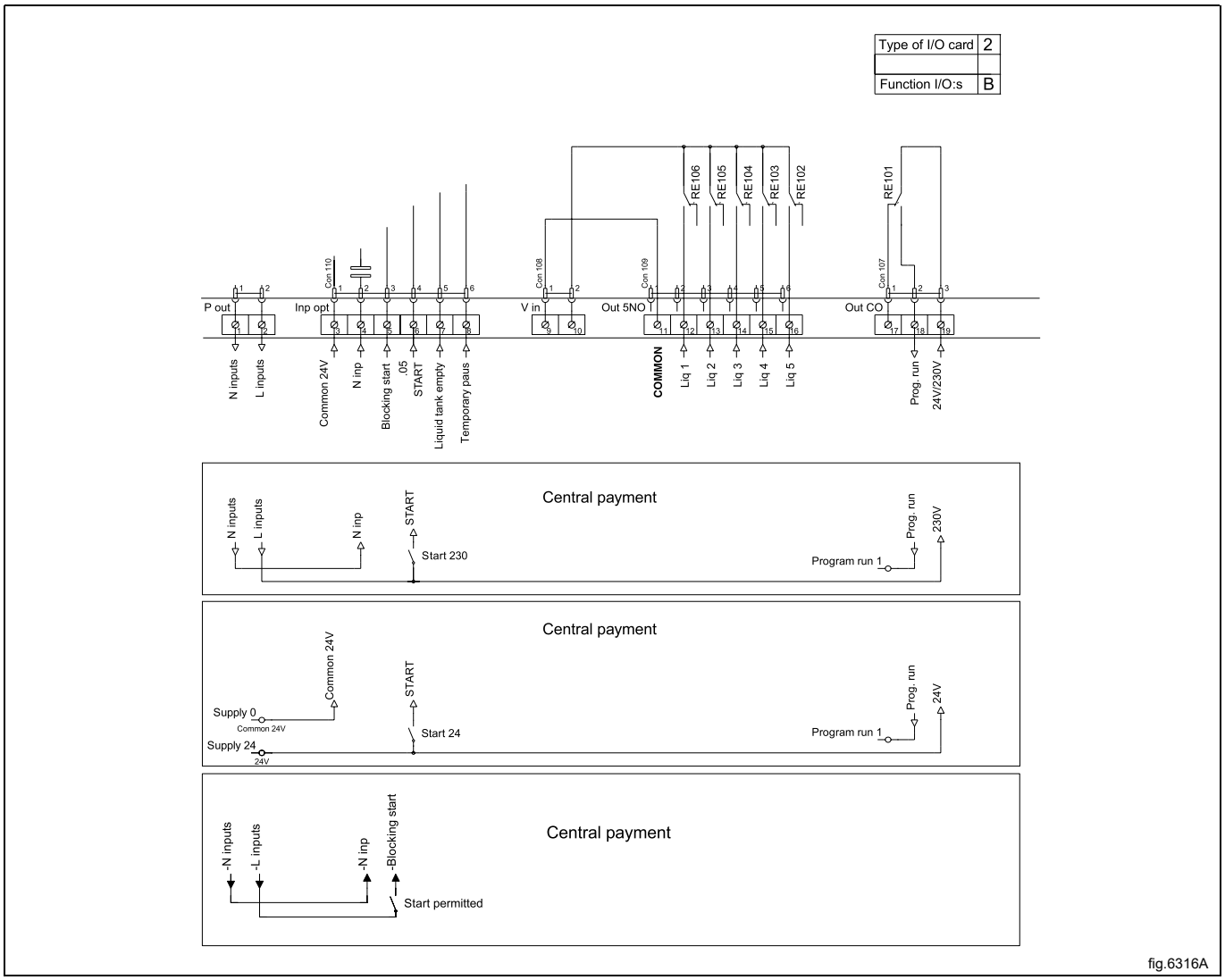


fig.6316A

13.3.3 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.

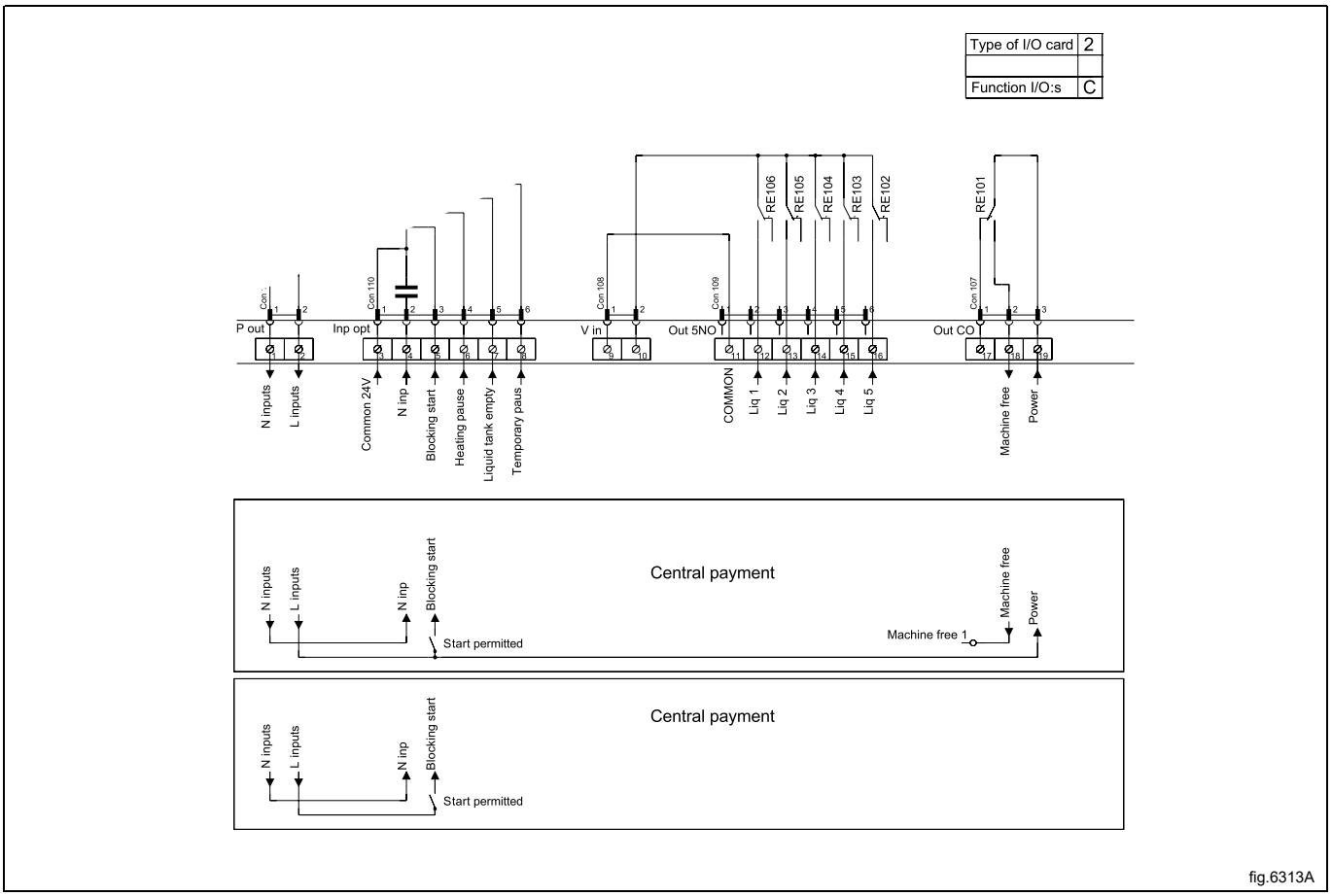


fig.6313A

13.3.4 Outputs for detergent signals and inputs for pause signals, "empty" signal (2D)

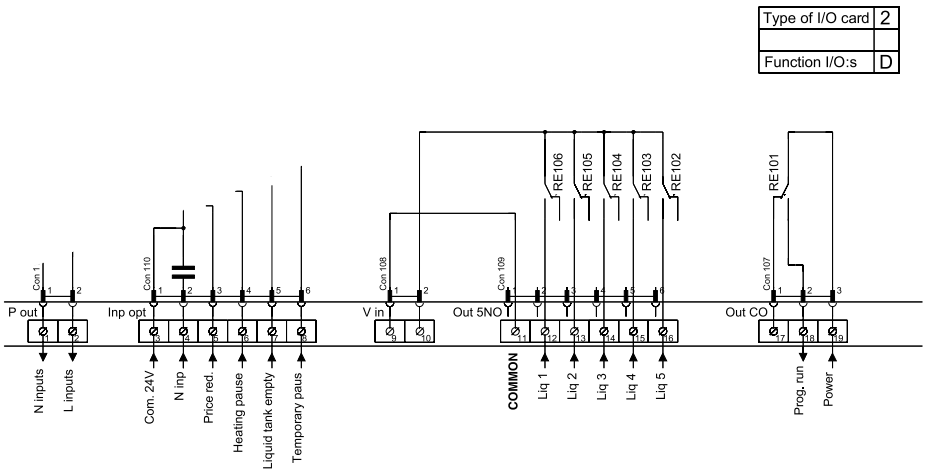


fig.6314B

13.3.5 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).

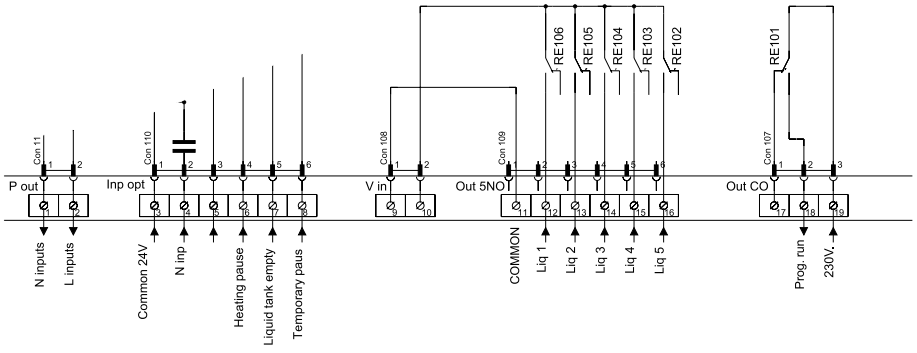


fig.6315A

13.3.6 Central booking/payment (2F)

The central payment or booking system shall provide 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.

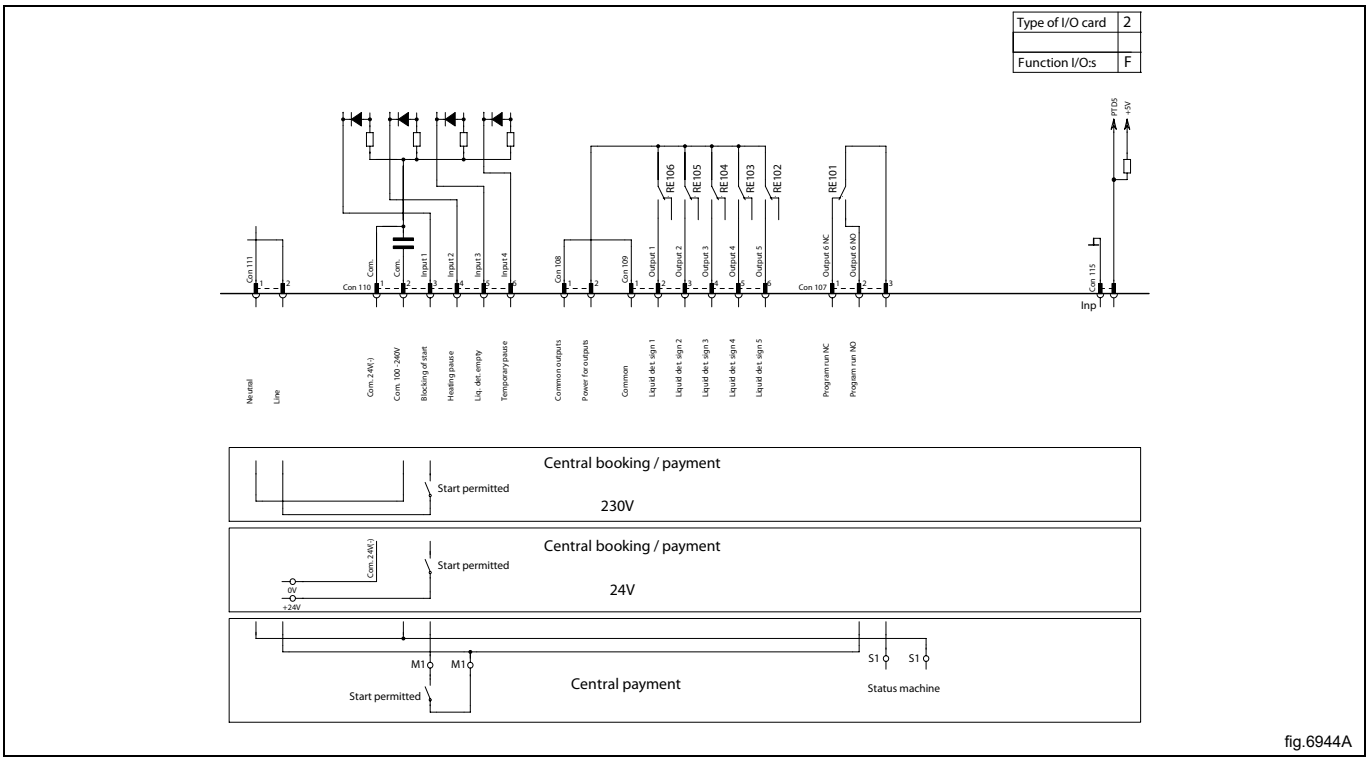
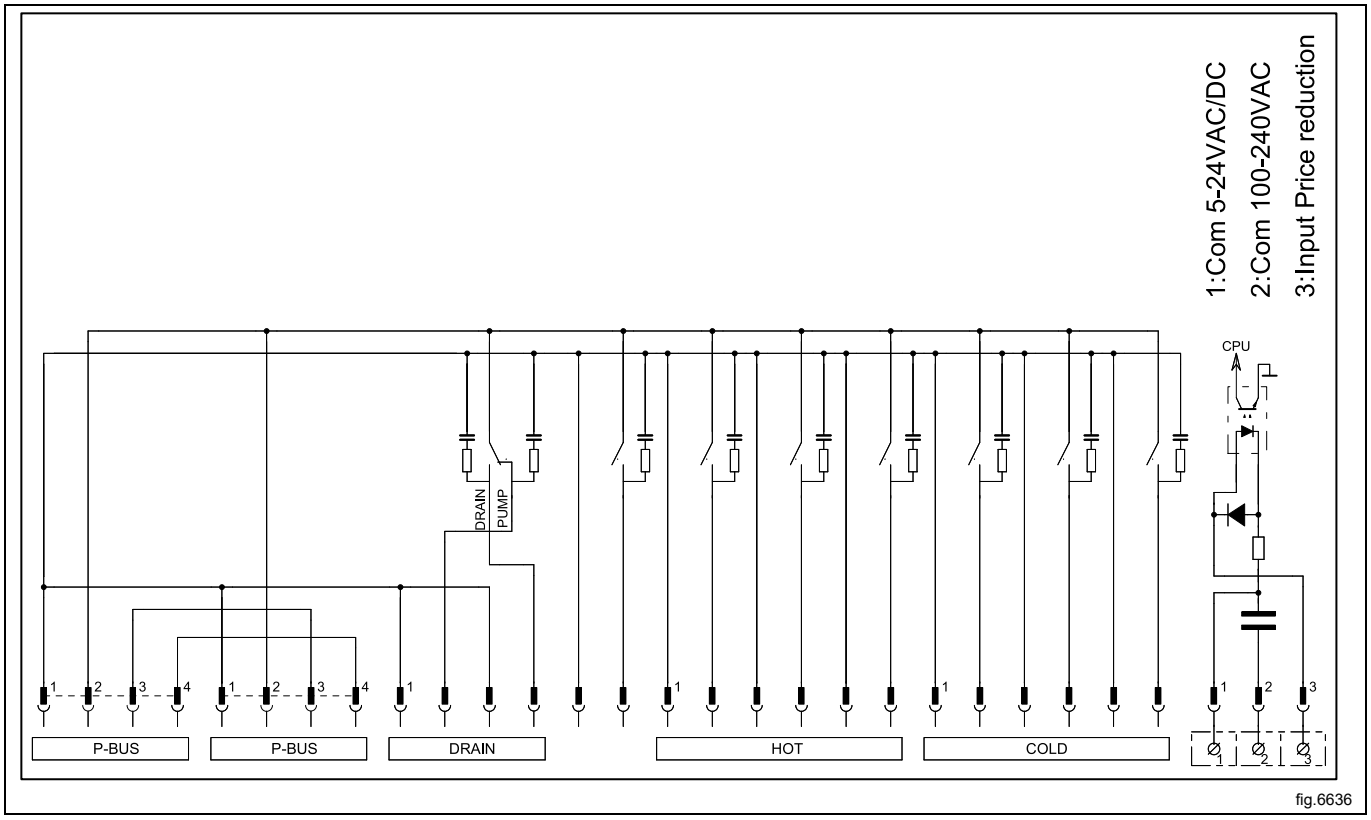


fig.6944A

13.3.7 Machines with I/O module type 3

By maintaining an active (high) signal on connection 3 "Price reduction”, 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.



14 Troubleshooting

14.1 General

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

There is a memory in the control system 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.




Before resetting any error code, always verify and correct the root cause why the error is trigged.

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.

14.2 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**	
10 MAIN COMMON	1	INTERNAL ERROR CPU TACHO
	11	REAL TIME CLOCK OUT OF ORDER
	13	INITIALIZING FAILED
	15	MACHINE STOP
	16	EMERGENCY STOP

Error code		Text
Major	**Minor**	
11 MAIN WASHER	1	NO WATER
	2	DOOR OPEN / LOADING DOOR OPEN
	3	DOOR LOCK FAIL / LOADING DOOR NOT LOCKED
	4	WATER LOW TEMP
	5	WATER HIGH TEMP
	6	WATER IN MACHINE AT PROGRAM END
	8	NO HEATING
	9	DRUM OVERFILLED
	10	MAX TIME DRAIN
	12	NO LEVEL SENSOR
	16	TIMEOUT HEATING
	17	DOOR LOCK
	27	LEVEL OFFSET
	28	WATER LEVEL HIGH DLCU LEVEL LOW
	29	WATER LEVEL LOW DLCU LEVEL HIGH
	30	HEATER CONTACTOR STUCK
	126	CO2 BOTTLE EMPTY
	127	DRAWER OUT CLOSE TO START

Error code		Text
Major	Minor	
12 MAIN DRYER	1	O.H. THERMOSTAT – INLET AIR
	2	O.H. THERMOSTAT – OUTLET AIR
	3	INLET AIR SENSOR – OPEN
	4	INLET AIR SENSOR – SHORT CIRCUITED
	5	OUTLET AIR SENSOR – OPEN
	6	OUTLET AIR SENSOR – SHORT CIRCUITED
	8	CONDENSE WATER CONTAINER IS FULL
	9	HEAT PUMP LOW PRESSURE
	10	HP HIGH PRESSURE CHECK COOLING SYSTEM AND FILTERS
	11	DRYING ERROR WITH RMC PROGRAM
	12	DRYING ERROR WITH AUTOSTOP PROGRAM
	13	DRYING ERROR WITH TIME PROGRAM
	14	GAS ERROR PRESS GAS REST BUTTON
	15	NO VACUUM
	16	VACUUM SWITCH SHORTED
	17	AIRFLOW OBSTRUCTED MAINTENANCE NEEDED
	18	REDISTRIBUTION OF LOAD NEEDED
	19	ERROR CLOGGED FILTER CLEAN THE FILTER / CONTACT THE TECH. IF ERROR REMAINS
	20	ANALOGUE AIRFLOW SENSOR IS SHORTED OR NOT CONNECTED
	21	THE VACUUM SWITCH TURN ON/OFF FREQUENTLY
	253	JUMPER 1
	254	JUMPER 2
	255	JUMPER 3

Error code		Text
Major	Minor	
13 MAIN BARRIER	1	DRUM POSITIONING TIMED OUT
	2	DRUM LOCKING / UNLOCKING
	3	INNER DOOR OPENING
	4	INNER DOOR JACK POSITION
	5	DOOR UNLOCKING
	6	DRUM LOCK POSITION SWITCH
	7	DRUM NOT ROTATING
	8	UNBALANCE SWITCH ON AT PROG START
	9	WATER IN DRUM – CALL SERVICE
	10	WATER IN DRUM – CALL SERVICE
	11	UNLOADING DOOR NOT LOCKED
	12	LOADING DOOR NOT LOCKED
	13	UNLOADING DOOR NOT LOCKED
	14	INNER DRUM DOOR NOT CLOSED
	15	COMPRESSED AIR IS MISSING
	16	DRUM LOCK POSITION SWITCH

Error code		Text
Major	Minor	
14 MAIN W&D	1	EXTRACTION FAILED DRYING ABORTED

Error code		Text
Major	Minor	
15 MAIN POCKET	2	UNLOADING DOOR OPEN
	3	UNLOADING DOOR NOT LOCKED
	17	DOOR LOCK

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

Error code		Text
Major	Minor	
21 DRUM MOTOR EWD	1	HEATSINK TOO HOT
	2	MOTOR TOO HOT
	3	NO INTERLOCK
	4	NO COMMUNICATION
	5	MOTOR SHORT CIRCUIT
	6	INTERLOCK HARDWARE
	7	LOW DC VOLTAGE
	8	HIGH DC VOLTAGE
	12	NO PARAMET. SET IN MCU
	13	UNBALANCE
	15	MOTOR NOT FOLLOW
	255	UNDEFINED ERROR

Error code		Text
Major	Minor	
22 DRUM MOTOR KEB	0	SECURITY INPUT
	1	OVERVOLTAGE
	2	UNDERVOLTAGE
	3	PHASE FAILURE
	4	OVERCURRENT
	6	OVERHEAT INTERNAL
	7	NO OVERHEAT INTERNAL
	8	OVERHEAT POWER MODULE
	9	DRIVE OVERHEAT
	11	NO DRIVE OVERHEAT
	12	POWER UNIT
	13	POWER UNIT NOT READY
	14	POWER UNIT INVALID
	15	LOAD SHUNT FAULT
	16	OVERLOAD
	17	NO OVERLOAD
	18	BUS
	19	OVERLOAD 2
	20	NO OVERLOAD 2
	21	EEPROM DEFECTIVE
	22	POWER UNIT COMMUNICATION
	23	BUS SYNCHRON.
	30	MOTOR PROTECTION
	31	EXTERNAL FAULT
	32	ENCODER 1
	33	POWER FACTOR CONTROL
	36	NO OVERHEAT POWER MODULE
	39	SET
	46	PROTECT. ROT. FORWARD
	47	PROTECT. ROT. REVERSE
	49	POWER UNIT CODE INVALID

Error code		Text
Major	Minor	
23 DRUM MOTOR OBIWAN/ SKYWALKER	1	HEATSINK TOO HOT
	2	MOTOR TOO HOT
	3	NO INTERLOCK
	4	NO COMMUNICATION
	5	MOTOR SHORT CIRCUIT
	6	INTERLOCK HARDWARE
	7	LOW DC VOLTAGE
	8	HIGH DC VOLTAGE
	12	NO PARAMET. SET IN MCU
	13	UNBALANCE
	15	MOTOR NOT FOLLOW
	255	UNDEFINED ERROR

Error code		Text
Major	Minor	
30 FAN MOTOR COMMON	1	O.H. FAN MOTOR

Error code		Text
Major	Minor	
40 INTERNAL COM.	1–10	I/O INTERLOCK Axxx
	11–20	I/O COMMUNICATION Axxx
	21	I/O COMMUNICATION
	22	I/O BOARD MISMATCH

Error code		Text
Major	Minor	
41 INTERNAL COM. I/O TYPE 10	1	CHARGE CIRCUIT
	2	SET SIGNAL, NO TACHO. WAIT 5 MINUTES
	3	ACTUATOR CIRCUIT
	21	CHARGE CIRCUIT
	22	SET SIGNAL, NO TACHO. WAIT 5 MINUTES
	23	ACTUATOR CIRCUIT

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

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

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

Error code		Text
Major	**Minor**	
60 INTERNAL	5	FATAL ERROR INVALID RUNNING MODE
	11	FATAL ERROR EXTERNAL FLASH WRITE
	17	FATAL ERROR INVALID OPTION
	18	FATAL ERROR INVALID MODULE
	28	FATAL ERROR INVALID COIN INPUT
	29	FATAL ERROR INVALID FONT

14.3 Description of error codes and causes

MAIN COMMON

10:1 INTERNAL ERROR CPU TACHO

Tacho input on CPU delivers values that is out of range.

Recommended actions:

1. Run motor on highest possible speed in service mode. Check input value for RPM speed.
2. Replace defective component.

10:11 REAL TIME CLOCK OUT OF ORDER

The real time clock is used by the control system for delayed start, measuring time, power failure, error codes, etc.

Upon power on, the communication with the internal real time clock in the control system is established. In case this fails, this error occurs

Recommended actions:

1. Power off the machine for 1 minute and try again.

10:13 INITIALIZATION FAILED

The error code is shown if the hardware initialization has failed to initialize within 15 seconds after power on.

Recommended actions:

1. Press the control knob/start button to retry.
2. Upload a new software that matches the machine configuration and try again.

10:15 MACHINE STOP

This message is shown if input for `MACHINE STOP` is activated.

This is not an error code but is handled in the same way.

Recommended actions:

1. Reset the Machine Stop Button.
2. Press the control knob to confirm machine stop. Machine will revert to Idle mode.

10:16 EMERGENCY STOP

This message is shown if input for `EMERGENCY STOP` is activated. This is not an error code but is handled in the same way.

Recommended actions:

1. Reset the Emergency Stop Button.
2. Press the control knob to confirm emergency stop. Machine will revert to Idle mode.

MAIN WASHER

11:1 NO WATER

This error is shown if the programmed water level is not reached within a certain time, typically 10 minutes.

Max. filling time is defined in Config. 1 parameter MAX FILL TIME.

This error message can be turned off in Configuration - Error code.

Possible causes:

Long filling times can be caused by a leaking drain valve, blocked filler valve, defective filler valve, defective valve control board, clogged level sensor hose, leaking level system, etc.

Recommended actions:

1. Check for leaking drain valve by filling water to high level in service program.
2. Check for leaking or clogged level sensor system by filling water to high level in service program and then actual level in inputs.
3. Check for malfunction or block filler valve by activating input by input in service program.
4. Monitor a program by using Process viewer in ELS Common Service Tool.

11:2 DOOR OPEN / LOADING DOOR OPEN

This error code will be shown if the control system detect that the input DOOR CLOSED has been deactivated during an on-going program. This error code can only occur during an on-going program.

Possible causes:

This can be caused by for example a bad or defective door lock, loose cable to door lock, problem with door lock edge connection, defective input on I/O unit type 10 etc.

Recommended actions:

1. Check door lock functionality in service program, but activating door lock and then by checking inputs.
2. Check electrical connections by reading inputs at the same time as cables carefully moved/pulled.
3. Carefully knock on the door lock to locate intermittent errors.

11:3 DOOR LOCK FAIL / LOADING DOOR NOT LOCKED

This error code will be shown if the control system have not detected the input DOOR LOCKED to be active within a certain time after program start, typically 3 seconds.

Possible causes:

This can be caused by a mechanical problem preventing door lock to lock, defective door lock, loose cable connection to door lock, broken cables to door lock or mechanical problem with emergency opening of the door.

Recommended actions:

1. Check door lock functionality in service program, but activating door lock and then by checking check inputs.
2. Check electrical connections by reading inputs at the same time as cables carefully moved/pulled.
3. Carefully knock on the door lock unit to locate intermittent errors.
4. Check DLCU status in service mode for more information on possible causes.

11:4 WATER LOW TEMP

This error code is shown if the temperature sensor indicates temperature below approx. -9°C/15°F. Minimum allowed temperature is defined in Config. 2 parameter MIN PROG TEMP.

Possible causes:

This low temperature means that the resistance in the sensor is too high (>23.5kΩ on all machines except Barrier Washers) or too low (<97Ω on Barrier washers). This can be caused by, for example, the machine has been stored outdoors, or an open circuit in the sensor or its wiring (all machines except Barrier Washers) or short circuit in the sensor or its wiring (Barrier Washers).

Recommended actions:

1. Measure resistance in temperature sensor and check for open circuit or short circuit in its wiring. The resistance should be as shown in the table below:
   Temp - Resistance
   15°C / 59°F - 7.6 kΩ (105,9Ω on Barrier)
   20°C / 68°F - 6.0 kΩ (107,8Ω on Barrier)
   25°C / 77°F - 4.8 kΩ (109,7Ω on Barrier)
2. Monitor a program by using Process viewer in ELS Common Service Tool to detect intermittent errors.

11:5 WATER HIGH TEMP

This error code is shown if the temperature sensor indicates temperature above + 98°C/208°F. Maximum allowed temperature is defined in Config. 2 parameter MAX PROG TEMP.

Possible causes:

This high temperature means that the resistance in the sensor is too low (< 350Ω on all machines except Barrier Washers) or too high (>137Ω on Barrier washers). This can be caused by, for example, short circuit in the sensor or its wiring (all machines except Barrier Washers) or an open circuit in the sensor or its wiring (Barrier Washers).

Recommended actions:

1. Measure resistance in temperature sensor and check for open circuit or short circuit in its wiring. The resistance should be as shown in the table below:
   Temp - Resistance
   15°C / 59°F - 7.6 kΩ (105,9Ω on Barrier)
   20°C / 68°F - 6.0 kΩ (107,8Ω on Barrier)
   25°C / 77°F - 4.8 kΩ (109,7Ω on Barrier)
   Monitor a program by using Process viewer in ELS Common Service Tool to detect intermittent errors.

11:6 WATER IN MACHINE AT PROGRAM END

This error code will only appear at program end.

Error is activated if the level system has not indicated “empty drum” within a certain time, typically 3 minutes.

This error code can also arise if the program is rapid advanced to the end, or if program is aborted.

Maximum allowed drain time can be changed in Config. 2 parameter MAX DRAIN TIME.

Level for empty drum is defined in Config. 2 parameter LEVEL EMPTY.

This error message can be turned off in Configuration - Error code.

Possible causes:

- Clogged drain
- Foam/ clogged drain pipe
- Incorrect installation of drain pipe/drain system
- Defect drain valve
- Open water valve, filling water

Recommended actions:

1. Check drain for dirt.
2. Blow through the level hose and check that it is not blocked and does not contain any water.
3. Check in the service program that the level control is working correctly.
4. Check for detergent overdosing/remains of foam.
5. Make sure the installation of the drain system follows the installation manual for the machine.
6. Monitor a program by using Process viewer in ELS Common Service Tool.

11:8 NO HEATING

This error code is shown if the temperature is increasing 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.

Minimum temperature increase is defined in Config. 2 parameter MIN TEMP INCREASE.

Maximum heating time is defined in Config. 2 parameter MAX HEATING TIME.

This error message can be turned off in Configuration - Error code.

Possible causes:

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, leaking drain/refill of water, to low water level in program etc.

It can also occur in installations using power control, where number of machines that can heat at the same time is limited.

Recommended actions:

1. Check heating elements and electrical power to heaters.
2. Fill up water in service program, activate heat and monitor level and temperature increase.
3. Check for a leaking drain.
4. Monitor a program by using Process viewer in ELS Common Service Tool.

11:9 DRUM OVERFILLED

This error code is shown if the mechanical level sensor connected to input DRUM OVERFILLED detects a high level (used primary in W&D machines)

Possible causes:

This error code can be caused by for example water inlets not closing correctly, faulty level switch, blocked level hose, drops of water in the level hose, foam in drum or level hose, etc.

Recommended actions:

1. Check in the service program that all the water valves are working correctly.
2. Check that the level switch is working correctly. Switch is normally closed.
3. Blow through the level hose and check that it is not blocked and does not contain any water or foam.

11:10 MAX TIME DRAIN

This error code will only occur in drain or extraction modules.

Error is activated 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.

Maximum allowed drain time is defined in Config. 2 parameter MAX DRAIN TIME.

Level for empty drum is defined in Config. 2 parameter LEVEL EMPTY, (may not be changed unless agreed with factory since it affects other functionality as well).

Recommended actions:

1. Check drain for dirt.
2. Blow through the level hose and check that it is not blocked and does not contain any water.
3. Check in the service program that the level control is working correctly.
4. Check for detergent overdosing/remains of foam.
5. Make sure the installation of the drain system follows the installation manual for the machine.
6. Monitor a program by using Process viewer in ELS Common Service Tool.

11:12 NO LEVEL SENSOR

This error code is activated if the CPU detects that there is no electronic level sensor connected.

It can also be caused by a broken cable to the sensor or a broken sensor.

11:16 TIMEOUT HEATING

This error code will be shown if total heating time in a program is longer than a Maximum allowed heating time, typically 2h 30 min.

Maximum allowed heating time is defined in Config. 2 parameter HEATING TIMEOUT.

Compared to Error code 11:8 - NO HEATING, this error code measures the maximum allowed heating time.

Possible causes:

Could occur if machine heats properly (min. temperature increase during heating is OK), but there is a drain leakage causing repeated fillings.

11:17 DOOR LOCK

This error code is shown if the input for DOOR LOCKED is active at program start, i.e. the door is locked although the control system has not requested locking.

Recommended actions:

1. Check door lock functionality in service program, by activating door lock and then by checking inputs.
2. Check DLCU status in service mode for more information on possible causes.
3. If DLCU is in error mode, wait five minuts for automatic reset or manually reset the DLCU in service mode.

11:27 LEVEL OFFSET

This error code is shown at program start if the level sensor indicates a level above what the control system CPU can compensate for. If high level is indicated a attempt is made to first drain the machine.

Maximum allowed level offset is defined in Config. 2 parameter MAX LEV. ZERO OFFS.

The drain time before error code is triggered is defined in Config. 2 parameter MAX DRAIN TIME START.

Possible causes:

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

Recommended actions:

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

11:28 WATER LEVEL HIGH DLCU LEVEL LOW

The DLCU on I/O type 10 contains a mechanical DLCU level switch which ensures that there is no water in the machine when the door unlocks. To ensure that the DLCU level switch functions correctly, the DLCU level switch status is compared with a predefined value from the electronic level sensor. During first fill, this check is made to ensure that the mechanical level switch is activated when the water level exceeds the predefined value. If not, this error code is shown.

Predefined level value is defined in Config. 2 parameter LEVEL DLCU.

Possible causes:

- The mechanical level control can be damaged.
- Leakage or clogged level controls air hoses.

Recommended actions:

1. Check function of mechanical level switch by reading DLCU status in service mode.
2. Check the analog level control function by checking value in inputs.
3. Blow through the level hoses and check that they are not blocked and does not contain any water.
4. Check the cables and their connections.

11:29 WATER LEVEL LOW DLCU LEVEL HIGH

The DLCU on I/O type 10 contains a mechanical DLCU level switch which ensures that there is no water in the machine when the door unlocks opens. To ensure that the DLCU level switch functions correctly, the DLCU level switch status is compared with the value from the electronic level sensor. At program start and program end, when the water level is below LEVEL EMPTY value, a check is made to ensure that the mechanical level switch is not activated If it is activated, this error code is shown.

The level empty value is defined in Config. 2 parameter LEVEL EMPTY.

Possible causes:

- The mechanical level control can be damaged.
- Mechanical level control is not connected or bad there is bad contact in the connector.
- Leakage or clogged level controls air hoses.
- Incorrect nominal value, possibly caused by a error in the electronic level control.

Recommended actions:

1. Check function of mechanical level switch by reading DLCU status in service mode.
2. Check the analog level control function by checking value in inputs.
3. Blow through the level hoses and check that they are not blocked and does not contain any water.
4. Check the cables and their connections.

11:30 HEATER CONTACTOR STUCK

The machine detect there is problem in one or both contactors which drive the heaters.

Possible causes:

- One or both contactors which drive the heaters is/are stuck.
- Cable between the electronic board and the error sensor is lose.
- The sensor has lost connection with the contactors.

Recommended actions:

1. Check the heater contactor.
2. Check the cables.
3. Check the micro switch over the contactors.

11:126 CO2 BOTTLE EMPTY

This is only a warning message.

Shown when CO2 bottle is about to be empty and input CO2 BOTTLE EMPTY is actvated.

Program will continue when message has dissappeared.

11:127 DRAWER OUT CLOSE TO START

This is only a warning message.

Shown if input DETERGENT BOX SENSOR is active at program start or during program run if water is supposed to flush in detergent compartment.

The program will pause until input DETERGENT BOX SENSOR is deactivated.

The function to check for open detergent box can be turned off in Config 1 DETERGENT BOX SENSOR.

MAIN DRYER

12:1 O.H. THERMOSTAT - INLET AIR

This error code is shown if the input O.H. INLET AIR is deactivated.

Normally this is due to that protection thermostat for inlet air has trigged due to overheating.

The overheating thermostat for inlet air needs to be mechanically restored.

Cut power and turn off gas supply (if gas heated) and check contactors/heat relays before restoring the thermostat.

When the overheating thermostat for inlet air has been restored and the machine is powered up again, the error code is cleared automatically.

The error code can be trigged if:

- The inlet air sensor has stopped operating correctly.
- The fan has stopped operating.
- The airflow is obstructed, by lint, overload, etc.
- The contactor or heat relay has got welded.

If the overheating thermostat for inlet air is not trigged, but there still is 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.

12:2 O.H. THERMOSTAT - OUTLET AIR

This error code is shown if the input O.H. OUTLET AIR is deactivated.

Normally this is due to that protection thermostat for outlet air has trigged due to overheating.

The overheating thermostat for outlet air needs to be mechanically restored.

Cut power and turn off gas supply (if gas heated) and check contactors/heat relays before restoring the thermostat.

When the overheating thermostat for outlet air has been restored and the machine is powered up again, the error code is cleared automatically.

The error code can be trigged if:

- The outlet air sensor has stopped operating correctly.
- The contactor or heat relay has got welded.

If the overheating thermostat for outlet air is not trigged, 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.

12:3 INLET AIR SENSOR - OPEN

The error code is shown if the analog input INLET AIR TEMP. (PT100) is reading a resistance of more than approximately 185 Ω. Probably caused by broken PT100 sensor or wiring.

If the inlet air temperature in the `SHOW INPUTS` menu show a temperature of 222 °C the inlet air sensor is considered open.

When the inlet air sensor 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 control system reset and ongoing program will be ended.

The error code can be trigged if:

- The sensor, harness or connector is broken. The sensor shall measure around 110 Ohm in room temperature, see table. (Measure direct over the sensor connectors).

If the measure of inlet air sensor is OK, 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.

Temp - Sensor resistance
0°C / 32°F - 100 Ω
20°C / 68°F - 107 Ω
30°C / 86°F - 112 Ω
200°C / 392°F - 176 Ω

12:4 INLET AIR SENSOR - SHORT-CIRCUITED

The error code is shown if the analog input INLET AIR TEMP (PT100) is reading a resistance of less than 100 Ω. Probably caused by broken PT100 sensor or damaged wiring.

If the inlet air temperature in the SHOW INPUTS menu show a temperature of 0 °C the inlet air sensor is shorted.

When the inlet air sensor 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 control system reset and ongoing program will be ended.

The error can be trigged if:

- The sensor, harness or connector is shorted. The sensor shall measure around 110 Ohm in room temperature, see table. (Measure direct over the sensor connectors).

If the measure of inlet air sensor is OK, 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.

Temp - Sensor resistance
0°C / 32°F - 100 Ω
20°C / 68°F - 107 Ω
30°C / 86°F - 112 Ω
200°C / 392°F - 176 Ω

12:5 OUTLET AIR SENSOR - OPEN

The error code is shown if the analog input OUTLET AIR TEMP (NTC) is reading a resistance of more than approximately 26.7 kΩ. Probably caused by broken NTC sensor or wiring.

If the outlet air temperature in the SHOW INPUTS menu shows a temperature of -10 °C the outlet air sensor is open.

When the outlet air sensor 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 control system reset and ongoing program will be ended.

The error code can be trigged if:

- The sensor, harness or connector is broken. The sensor shall measure around 5 K Ohm in room temperature, see table. (Measure direct over the sensor).

If the measure of outlet air is OK, 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.

Temp - Sensor resistance
-10 °C - 26.7 kΩ
15 °C - 7.6 kΩ
20 °C - 6.0 kΩ
25 °C - 4.8 kΩ
30 °C - 3.9 kΩ
100 °C - 0.33 kΩ

12:6 OUTLET AIR SENSOR - SHORT-CIRCUITED

The error code is shown if the analog input OULET AIR TEMP (NTC) is reading a resistance of less than 330 Ω. Probably caused by broken NTC sensor or damaged wiring.

If the outlet air temperature in the SHOW INPUTS menu shows a temperature of 100 °C the outlet air sensor is shorted.

When the outlet air sensor 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 control system reset and ongoing program will be ended.

The error code can be trigged if:

- The sensor, harness or connector is broken. The sensor shall measure around 5 K Ohm in room temperature, see table. (Measure direct over the sensor).

If the measure of outlet air sensor is OK, 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.

Temp - Sensor resistance
-10 °C - 26.7 kΩ
15 °C - 7.6 kΩ
20 °C - 6.0 kΩ
25 °C - 4.8 kΩ
30 °C - 3.9 kΩ
100 °C - 0.33 kΩ

12:8 CONDENSE WATER CONTAINER IS FULL

The pump will run when a program starts for normally 15 seconds. Then it will run again after normally 3 minutes.

The pump will also run if the input for the float is trigged.

The error code is activated if the input CONDENSER TANK is still activated after 15 seconds.

This means that the pump has tried to empty the condense water container without the signal from the float in the condense water container has been deactivated.

When the float in the condense water container is restored it is possible to reset the error code from the control system.

The error code is reset from the control system by a short press on the control knob/start button. A long press on the control knob/start button will make the control system reset and ongoing program will be ended.

The error code can be trigged if:

- The condense water container is full and the pump is not operating. Check the pump by activating the CONDENSER PUMP menu in the ACTIVATE OUTPUTS menu when the machine is in service mode.
- If the pump is running and no water is coming out, the drain is blocked or the float is out of order.
- If water coming out of the hose, it might be partly blocked.

If the pump does not run or if there is no level in the condense water container 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.

12:9 HEAT PUMP LOW PRESSURE

The error code is shown if the input HP LOW PRESSURE (low pressure switch, P2) has tripped.

The error code can be trigged if there is too little refrigerant in the heat pump or by damaged wiring or connectors.

It can can also be trigged if machine is started in a cold environment, or started with clogged lint filters.

The error can be restored with the knob when the pressure is restored and the ongoing program will continue.

Recommended actions:

1. 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.
2. Check airflow and clean filters.
3. Try to run again, if error still present, check the heat pump for gas leakage.

12:10 HP HIGH PRESSURE CHECK COOLING SYSTEM AND FILTERS

The error is activated if the input HP HIGH PRESSURE (high pressure switch, P1) has tripped.

The errror can be trigged if there is no cooling water to machine or if the airflow is obstructed, by lint, overload, etc.

The error can be restored with the knob when the pressure is restored and the ongoing program will continue.

Recommended actions:

1. 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.
2. Check cooling water supply.
3. Check airflow and clean filters.

12:11 DRYING ERROR WITH RMC PROGRAM

The error code is shown if the analog input RMC does not register the STOP VALUE FOR RMC PROGRAM reached within the maximum drying time (normally 90 minutes). When the error is trigged the machine will automatically go to the cooling module before the program ends.

The program is ended and the error code is reset by opening the door.

If the clothes are still wet after maximum drying time and the dryer is not overloaded, check that the heating system is working correct by using the ACTIVATE OUTPUTS menu when the machine is in service mode.

Note!

Make sure that the fan is active before turning on the heat.

If the clothes are dry, check the RMC system and harness, connectors and functions by reading the electrical schematic and by using the SHOW INPUTS menu when the machine is in service mode.

- RMC value no load = 0%
- RMC value 100K Ohm between lifter and drum = ~24% (Putting your hand over the lifter onto the drum will result in approximately 20% RMC value)
- RMC value system short circuit = 50%

12:12 DRYING ERROR WITH AUTOSTOP PROGRAM

The error code is shown if the analog input OULET AIR TEMP (NTC) does not register the STOP VALUE FOR AUTOSTOP PROGRAM reached within the maximum drying time (normally 90 minutes).

When the error is trigged the machine will automatically go to the cooling module before the program ends.

The program is ended and the error code is reset by opening the door.

If the clothes are still wet after maximum drying time and the dryer is not overloaded, check that the heating system is working correct by using the ACTIVATE OUTPUTS menu when the machine is in service mode.

Note!

Make sure that the fan is active before turning on the heat.

If the clothes are dry, check the outlet air sensor and harness, connectors and functions by reading the electrical schematic and by using the SHOW INPUTS menu when the machine is in service mode.

12:13 DRYING ERROR WITH TIME PROGRAM

The error code is shown if a time program has continued longer than the maximum drying time (normally 90 minutes) without the door has been opened.

When the error is trigged the machine will automatically go to the cooling module before the program ends.

The program is ended and the error code is reset by opening the door.

12:14 GAS ERROR PRESS GAS RESET BUTTON

The error code is shown if input GAS ERROR is activated. This means that no flame has been detected by the gas control box.

The metal probe of the flame sensor generates an electrical current when exposed to the burner's flame. This signal is detected by the ignition control module which, in turn, cuts off the gas valve immediately if the sensor does not indicate flame within 3 attempts at each 10 seconds. The integrity of the sensor's electrical connection is, therefore, critical to proper operation of this system. When the gas control box is in error mode, a red LED is active on the gas control box. The gas control box also trigs input GAS ERROR on the control system , which generates the error code.

The control system sends a reset signal to the gas control box via output GAS ERROR RESET by a short press on the start button or service button (depending on market and segment). When the gas control box receive a reset command it removes the error. The control system will automatically restart the program when the error is removed from the gas control box and when heat is allowed (vacuum needed) the gas control box will try to ignite the gas again.

A long press on the control knob/start button will make the control system reset and ongoing program will be ended.

The gas error can also be reset at the gas control box. The machine will automatically restart when the error is restored.

The error code can be trigged if:

- The gas control box fails to ignite. Check the gas supply and nozzle pressure.

If the gas control box do not have a gas error but the control system does, 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.

12:15 NO VACUUM

The error code is shown if the input VACUUM is not activated within set time in parameter TIMEOUT VACUUM.

The error code is reset from the control system by a short press on the control knob/start button. A long press on the control knob/start button will make the control system reset and ongoing program will be ended.

The time is defined in Config. 1 parameter TIMEOUT VACUUM.

The error code can be trigged if:

- The fan is not operating or blows in the wrong direction.
- The airflow is obstructed. (Cleaning of evacuation channel/chimney and air flaps).
- The vacuum switch sensor or hose is disconnected.
- The lint drawer is open, etc.

Check the harness, connectors and functions by reading the electrical schematic and by using the SHOW INPUTS and ACTIVATE OUTPUTS menus when the machine is in service mode.

12:16 VACUUM SWITCH SHORTED

The error code is shown if the input VACUUM was already activated when a program was started.

The error code is reset from the control system by a short press on the control knob/start button. A long press on the control knob/start button will make the control system reset and ongoing program will be ended.

Recommended actions:

1. Check the vacuum switch/pressure sensor, harness, connectors and functions by reading the electrical schematic and by using the SHOW INPUTS menu when the machine is in service mode.

12:17 AIRFLOW OBSTRUCTED MAINTENANCE NEEDED

The error is shown if input INTERNAL FILTER is activated.

Error can be triggered by clogged internal filter, damaged vacuum switch or harness.

Recommended actions:

1. Check and clean internal filters, see maintenance manual.
2. 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.
3. If permanent clean heat pump box.

12:18 REDISTRIBUTION OF LOAD NEEDED

The error code is shown if the input VACUUM has deactive several times during program run and the function to handle vacuum error during program run has failed to recreate vacuum in the machine. The error code is reset from the control system by a short press on the control knob/start button. A long press on the control knob/start button will make the control system reset and ongoing program will be ended.

The error code can be trigged if:

- The load is blocking the airflow.

Check the load and redistribute it in the drum.

12:19 ERROR CLOGGED FILTER CLEAN THE FILTER / CONTACT THE TECH.IF ERROR REMAINS

This error is triggered if the airflow inside the machine doesn't enough to complete drying cycle.

Error can be triggered by mostly by clogged filter, or air blockage in the heat pump unit.

Recommended action:

1. Check and clean internal filters, see maintenance manual, replace if necessary.
2. If permanent, clean the heat pump unit.

12:20 ANALOGUE AIRFLOW SENSOR IS SHORTED OR NOT CONNECTED

The error code is shown if the analog airflow sensor reading value more than the maximum range "500 pascal".

Probably caused by broken sensor or damaged wiring.

1. Check or replace the harnesses.
2. Check or replace the sensor.

12:21 THE VACUUM SWITCH TURN ON/OFF FREQUENTLY

This error code is shown because the vacuum switch toggles between ON & OFF many times during a certain time.

1. Check the installation of the exhaust pipe, that there is proper air flow and right installation, check the air flow according to the installation manual.
2. Check the harness and connectors between the I/O board and the vacuum switch.
3. Check the position of the vacuum switch and air pipes.

12:253 JUMPER 1

The error code is shown if input JUMPER 1 is not activated.

Jumpers are a by-pass of inputs not used in the machine. How many jumpers used is depending on configuration.

When the jumper 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 control system reset and ongoing program will be ended.

Recommended actions:

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.

12:254 JUMPER 2

The error code is shown if input JUMPER 2 is not activated.

Jumpers are a by-pass of input not used in the machine. How many jumpers used is depending on configuration.

When the jumper 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 control system reset and ongoing program will be ended.

Recommended actions:

1. 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.

12:255 JUMPER 3

The error code is shown if input JUMPER 3 is not activated.

Jumpers are a by-pass of input not used in the machine. How many jumpers used is depending on configuration.

When the jumper 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 control system reset and ongoing program will be ended.

Recommended actions:

1. 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.

MAIN BARRIER

13:1 DRUM POSITIONING TIMED OUT

The error code is shown if input POSITION DRUM 1 and POSITION DRUM 2 is not activated within set time in Config parameter DRUM POS TIMEOUT.

Recommended actions:

1. Check inputs from positioning sensors DP1 and DP2.

13:2 DRUM LOCKING / UNLOCKING

The error code is shown if drum is not able to unlock/lock when expected.

This is detected by the input sensors DRUM UNLOCKED (FC1) and DRUM LOCKED (FC2).

Recommended actions:

1. Check functionality of drum lock position sensors FC1 and FC2.
2. Check functionality of drum locking piston, i.e that it operates normall and could activate/inactivate. This could be done by running a positioning sequence in service program or by running a program.

13:3 INNER DOOR OPENING

Machine indicates that the automatic inner door JACK (Piston) has not left the home position within a reasonable time.

The error code is shown if the sensor for JACK AT HOME (backwards position) is still active when JACK is expected to be in forward position.

Recommended actions:

1. Check functionality JACK_AT_HOME sensor DP8, i.e active when jack is in backward position, inactive when JACK is in forward position.
2. Check functionality for JACK, I.e that it could move forward when expected.

13:4 INNER DOOR JACK POSITION

Machine indicates that the inner door opening jack is not in home position when the drum is rotating.

The error code is shown if input JACK AT HOME is not active when the reported motor speed is not zero.

Recommended actions:

1. Check functionality for JACK, i.e that it is in backwards position when expected.
2. Check functionality JACK_AT_HOME sensor DP8, i.e active when jack is in backward position, inactive when JACK is in forward position.
3. Check wiring to JACK_AT_HOME sensor DP8, bad contact in the sensor could cause this problem.

13:5 DOOR UNLOCKING

Machine indicates that either loading or unloading door is not able to unlock.

The error code is shown if inputs LOADING DOOR LOCKED or UNLOADING DOOR LOCKED does not get inactive within a resonable time after door unlock command is sent.

Recommended actions:

1. Check door lock functionality in service program, by activating door lock and then by monitoring input and output status under Check inputs and outputs.
2. Check electrical connections by reading inputs at the same time as cables carefully moved/pulled.

13:6 DRUM LOCK POSITION SWITCH

The error code is shown if inputs DRUM UNLOCKED and DRUM LOCKED are both active or inactive at the same time during program run. Since it occurs during program run it is required to turn power off to the machine to clear the error message.

Possible causes:

Heavy unbalance in drum that prevents the motor to position the drum. Worst case scenario is wet load in one compartment.
Could also depend on problems with indexing sensors, washer I/O board or malfunction in mechanical drum lock function.

Recommended actions:

1. Check inputs from indexing sensors FC1 and FC2.
2. Run a positioning sequence with wet load in one compartment to test functionality.

13:7 DRUM NOT ROTATING

The error code is shown if positioning sensor on input on J201 is not indicating rotation when rotation is expected during program run.

Recommended actions:

1. Check that drive belt is not broken.
2. Check positioning sensor on input J201.

13:8 UNBALANCE SWITCH ON AT PROG START

The error code is shown if unbalance switch is active at program start.

Recommended actions:

1. Check unbalance switch for proper alignment.
2. Check unbalance switch for electrical fault.

13:9 WATER IN DRUM - CALL SERVICE

This error code will be shown if the control system detects water above safety level when program is finished.

Possibly caused by broken inlet valve and / or drain valve.

Recommended actions:

1. Turn off water inlet to machine.
2. Manually open the drain valve.
3. Check reason for valve malfunction.

13:10 WATER IN DRUM - CALL SERVICE

This error code will be shown if the control system detects water above safety level in idle mode. Possibly caused by broken inlet valve and / or drain valve.

Recommended actions:

1. Turn off water inlet to machine.
2. Manually open the drain valve.
3. Check reason for valve malfunction.

13:11 UNLOADING DOOR NOT LOCKED

This error code will be shown if the control system has not detected the input UNLOADING DOOR LOCKED to be active within a certain time after closing the unloading door.

Possible causes:

This can be caused by a mechanical problem preventing door lock to lock, defective door lock, loose cable connection to door lock, broken cables to door lock or mechanical problem with emergency opening of the door.

Recommended actions:

1. Check door lock functionality in service program, by activating door lock and then by monitoring input status under Check inputs and outputs.
2. Check electrical connections by reading inputs at the same time as cables carefully moved/pulled.
3. Carefully knock on the door lock unit to locate intermittent errors.

13:12 LOADING DOOR NOT LOCKED

This error code will be shown if the control system detects that the input LOADING DOOR LOCKED has been deactivated during an on-going program.

Possible causes:

This can be caused by a mechanical problem preventing door lock to lock, defective door lock, loose cable connection to door lock, broken cables to door lock or mechanical problem with emergency opening of the door.

Recommended actions:

1. Check door lock functionality in service program, by activating door lock and then by monitoring input status under Check inputs and outputs.
2. Check electrical connections by reading inputs at the same time as cables carefully moved/pulled.
3. Carefully knock on the door lock unit to locate intermittent errors.

13:13 UNLOADING DOOR NOT LOCKED

This error code will be shown if the control system detects that the input UNLOADING DOOR LOCKED has been deactivated during an on-going program.

Possible causes:

This can be caused by a mechanical problem preventing door lock to lock, defective door lock, loose cable connection to door lock, broken cables to door lock or mechanical problem with emergency opening of the door.

Recommended actions:

1. Check door lock functionality in service program, by activating door lock and then by monitoring input status under Check inputs and outputs.
2. Check electrical connections by reading inputs at the same time as cables carefully moved/pulled.
3. Carefully knock on the door lock unit to locate intermittent errors.

13:14 INNER DRUM DOOR NOT CLOSED

This error code will be shown if the control system detects that the input INNER DOOR OPEN is activated during program start or becomes activate when drum is ordered to drive/drum is rotating.

Recommended actions:

1. Check functionality of INNER DOOR OPEN SENSOR (DP7), i.e inactive when door is closed and active when door is open.
2. Check door lock functionality in service program, by activating door lock and then by monitoring input status under Check inputs and outputs.

13:15 COMPRESSED AIR IS MISSING

Machine indicates that compressed air is missing.

This error code will be shown if the control system detects that the input COMPRESSED AIR PRESENT is not activated.

Recommended actions:

1. Check compressed air pressure to machine, valves is open, compressor on etc.
2. Check that input COMPRESSED AIR PRESENT activates when compressed air is present.

13:16 DRUM LOCK POSITION SWITCH

The error code is shown if inputs DRUM UNLOCKED and DRUM LOCKED are both active or inactive at the same time during positioning sequence. By pressing the start button it is possible to have another trial.

Possible causes:

Heavy unbalance in drum that prevents the motor to position the drum. Worst case scenario is wet load in one compartment. Could also depend on problems with indexing sensors, washer I/O board or malfunction in mechanical drum lock function.

Recommended actions:

1. Check inputs from indexing sensors FC1 and FC2.
2. Run a positioning sequence with wet load in one compartment to test functionality.

MAIN W&D

14:1 EXTRACTION FAILED DRYING ABORTED

Only on Wash & Dryer. If extraction is omitted, the drying sequence will also be omitted.

MAIN DRYER

15:2 UNLOADING DOOR OPEN

Only on Pocket washer:

This error code will be shown if the control system detects that the input DOOR CLOSED 2 (unloading side) has been deactivated during an on-going program.

The error can only occur during an on-going program.

Possible causes:

This can be caused by for example a bad or defective door lock, loose cable to door lock, problem with door lock edge connection, defective input on I/O unit type 10 etc.

Recommended action:

1. Check door lock functionality in service program, but activating door lock and then by checking inputs.
2. Check electrical connections by reading inputs at the same time as cables carefully moved/pulled.
3. Carefully knock on the door lock to locate intermittent errors.

15:3 UNLOADING DOOR NOT LOCKED

Only on Pocket washer:

This error code will be shown if the control system detects that the input DOOR LOCKED 2 has not been activated within a certain time after unloading door is closed.

It will also be activated if the input DOOR LOCKED 2 has been deactivated during an on-going program.

Possible causes:

This can be caused by a mechanical problem preventing door lock to lock, defective door lock, loose cable connection to door lock, broken cables to door lock or mechanical problem with emergency opening of the door.

Recommended actions:

1. Check door lock functionality in service program, but activating door lock and then by checking check inputs.
2. Check electrical connections by reading inputs at the same time as cables carefully moved/pulled.
3. Carefully knock on the door lock unit to locate intermittent errors.
4. Check DLCU 2 status in service mode for more information on possible causes.

15:17 DOOR LOCK

Only on Pocket washer running with one door setup.

This error code is activated if the input for DOOR LOCKED 2 is active at program start, i.e. the door is locked although the control system has not requested locking.

Possible causes:

- DLCU 2 is in error mode after previous program run.
- Door lock solenoid broken.

Recommended actions:

1. Check door lock functionality in service program, by activating door lock and then by checking check inputs.
2. Check DLCU 2 status in service mode for more information on possible causes.
3. If DLCU 2 is in error mode, wait five minuts for automatic reset or manually reset the DLCU 2 in service mode.

DRUM MOTOR COMMON

20:1 O.H. DRUM MOTOR

This error code will be shown if the control system detects that the input OH DRUM MOTOR is deactivated during program run.

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 control system reset and ongoing program will be ended.

The error code can be trigged if:

1. The motor is very warm. Check that the vent holes in the motor are not covered.
   If the overheating protection is not trigged, but there is still an error code:
2. 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 occurs if the first message sent from the CPU to the MCU was not replied to during start up.

Recommended actions:

1. 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.
2. Check that the green power indication LED on the MCU is on. The LED can be seen by looking down by the MCU edge connections.
3. 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 occurs if the communication between the CPU and the MCU has stopped working.

Recommended actions:

1. 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.
2. Check that the indicator LED on the MCU is on. The LED can be seen by looking down by the MCU edge connections.
3. 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 EWD

21:1 HEATSINK TOO HOT

This error code is generated by the MCU for drum motor.

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°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).

Recommended actions:

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

21:2 MOTOR TOO HOT

This error code is generated by the MCU for the drum motor.

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 shown.

Possible causes:

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.

Recommended actions:

- 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 for drum motor.

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 shown.

Possible causes:

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 / 50 Hz to the interlock signal. An error in the interlock circuits of the MCU can also set this error code.

Recommended actions:

1. Use a multimeter to check that the interlock signal is present on X302:1-2 when the door lock is activated. Read also bit 1 in the second byte under MCU 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.
2. Replace the defective part.

21:4 NO COMMUNICATION

This error code is generated by the MCU for drum motor.

MCU detects there is there is a problem in communication with CPU.

Possible causes:

Bad contact in harness or connectors between CPU and MCU.

Recommended actions:

1. Check wiring, connections between CPU and MCU.

21:5 MOTOR SHORT CIRCIUT

This error code is generated by the MCU for drum motor.

The MCU reads the power consumption of the motor continuously. If the current for some reason exceeds a predetermined 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, the error code will not be shown.

Possible causes:

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

- Short circuit in motor. Measure motor windings with a Motor Tester.
- 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.

Recommended actions:

1. 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. Measure motor windings with a Motor Tester.
2. Further information can be obtained by studying the contents of MCU ERROR LOG 1 and MCU ERROR LOG 2. Review 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 ERR. LOW SPEED (can give a clue in case of intermittent errors).
   TACHO ERR. HIGH SPEED (can give a clue in case of intermittent errors).

21:6 INTERLOCK HARDWARE

This error code is generated by the MCU for drum motor.

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 shown.

Possible cause:

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

Recommended actions:

1. Replace MCU.

21:7 LOW DC VOLTAGE

This error code is generated by the MCU for drum motor.

The MCU constantly measures the voltage over the mains input. If the voltage is below a predefined 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 low. If it is, this error code is shown. 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 ERROR LOG 1` and `MCU ERROR LOG 2`:

- `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.

Recommended actions:

1. Check that the supply voltage is stable and never drops below nominal voltage - 10%.
2. Check the fuses and cables.
3. 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 for drum motor.

The MCU constantly measures the voltage over the mains input. If the voltage exceeds a predefined 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 shown.

Recommended actions:

1. Check incoming AC voltage.

21:12 NO PARAMET. SET IN MCU

This error code is generated by the MCU for drum motor.

The MCU contains several different parameter sets for different motors. During power up the control system checks that the correct parameter set digit is written into the MCU. If not, the control system will write down the parameter set digit defined in fixed configuration.

If the MCU discovers that no parameter set value is written down into the MCU, the error code will be shown.

Possible causes:

This can be caused by wrong software in CPU or wrong MCU for the current machine.

Recommended actions:

1. Make sure correct machine software and correct MCU are used.

21:13 UNBALANCE

This error code is generated by the MCU for drum motor.

The MCU monitors the unbalance switch status. If the status is active already at program start, this error code is shown.

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.

Possible causes:

- 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 `MCU ERROR LOG 1` and `MCU ERROR LOG 2`. 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 ERR. LOW SPEED` (can give a clue in case of intermittent errors).
- `TACHO ERR. HIGH SPEED` (can give a clue in case of intermittent errors).

Recommended actions:

1. Replace the defective part.

21:255 UNDEFINED ERROR

This error code is generated by the MCU. The MCU reports an error that is not defined.

DRUM MOTOR KEB

22:0 SECURITY INPUT

Machine indicates that Interlock signal is missing to MCU.
Internal MCU error code STO.
The interlock signal is missing to MCU STO1+ or STO2+ inputs when expected to be active.
Recommended actions:

1. Verify STO 1+ signal from Loading Door or Unloading door locked sensors.
2. Verify STO 2+ signal from Emergency switch on loading or unloading side.

22:1 OVERVOLTAGE

The Motor Control Unit indicates error E.OP.
Voltage in DC-link too high.
Internal message 1.
Recommended actions:

1. Verify input voltage supply to machine (all phases).
2. Check that input choke is connected.
3. Check if braking resistor is defective.
4. Switch off the mainpower for 2 minutes.
5. Restart the machine.

22:2 UNDERVOLTAGE

The Motor Control Unit indicates error E.UP.
Voltage in DC-link too low.
Internal message 2.
Recommended actions:

1. Verify input voltage supply to machine (all phases).
2. Switch off the mainpower for 2 minutes.
3. Restart the machine.

22:3 PHASE FAILURE

The Motor Control Unit indicates error E.UPh.
One phase of input voltage missing. (Ripple detected).
Internal message 3.
Recommended actions:

1. Check power supply.
2. Check for blown fuses.

22:4 OVERCURRENT

The Motor Control Unit indicates error E.OC.
Peak current too high.
Internal message 4.
Recommended actions:

1. Verify that the load in the machine does not exceed maximum load.
2. Verify that the load in the machine have distributed correctly before spin.
3. Check FC for short-circuit at output transistors.
4. Check motor including cable for short-circuit.
5. Switch off the main power to machine for 5 minutes.
6. Restart the machine.

22:6 OVERHEAT INTERNAL

The Motor Control Unit indicates error E.OHI.

Internal overheating in frequency controller. Can only be reset when internal temperature has dropped by 3 °C.

This is indicated by message E.nOHI. See also error code 22:7.

Internal message 6.

Recommended actions:

1. Switch off the main power to machine for 30 minutes.
2. Restart the machine.

22:7 NO OVERHEAT INTERNAL

The Motor Control Unit indicates error E.nOHI.

Error `OVERHEAT INTERNAL` is reset. See also error code 22:6.

Internal message 7.

Recommended actions:

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:8 OVERHEAT POWER MODULE

The Motor Control Unit indicates error E.OH.

Too high temperature on power module heat sink.

Error can only be reset when temperature is normal again. This is indicated by message E.nOH. See also error code 22:36.

Internal message 8.

Recommended actions:

1. Check that cooling fan is working and that fan grid is not clogged..
2. Check that heat sink is not soiled.
3. Very high ambient temperature.
4. Switch off the main power to machine for 30 minutes.
5. Restart the machine.

22:9 DRIVE OVERHEAT

The Motor Control Unit indicates error E.dOH.

Motor temperature too high. Can only be reset when motor temperature has dropped (E.ndOH, Resistance at terminals T1/T2 > 1650 Ω) This is indicated by message E.ndOH. See also error code 22:11)

Internal message 9.

Recommended actions:

1. Switch off the mainpower for 30 minutes until motor has cooled down.
2. Restart the machine. If problem persists, check motor windings etc.

22:11 NO DRIVE OVERHEAT

The Motor Control Unit indicates error E.ndOH.

Error `MOTOR OVERHEAT` is reset. See also error code 22:9.

Internal message 11.

Recommended actions:

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:12 POWER UNIT

The Motor Control Unit indicates error E.Pu.
General power circuit fault.
Internal message 12.
Recommended actions:

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:13 POWER UNIT NOT READY

The Motor Control Unit indicates message nO_PU.
Power circuit not ready or identified by controller.
Internal message 13.
Recommended actions:

1. Wait 2 minutes and try to start again.
2. Switch off the main power to machine for 5 minutes.
3. Restart the machine.

22:14 POWER UNIT INVALID

The Motor Control Unit indicates error E.PUIN.
Power unit invalid. Software version in power module and control board does not match.
Internal message 14.

22:15 LOAD SHUNT FAULT

The Motor Control Unit indicates error E.LSF.
Load-shunt relay is not ready. Appears for a short time during switch-on.
Internal message 15.
If message remains, check following:

1. Wrong input voltage or too low.
2. Braking resistor defective or wrongly connected.
3. Hardware fault in controller.
4. Switch off the main power to machine for 5 minutes.
5. Restart the machine.

22:16 OVERLOAD

The Motor Control Unit indicates error E.OL.
Overload counter has reached 100%.
The error can only be reset after overload counter has reached 0% again. This is indicated by the message E.nOL. See also error 22:17.
Internal message 16.
Leave machine powered up without running any program for 30 minutes.

1. Check machine is not loaded more than intended.
2. Check motor and drum for mechanical fault. (jamming).
3. Check motor for electrical fault.
4. Switch off the main power to machine for 5 minutes.
5. Restart the machine.

22:17 NO OVERLOAD

The Motor Control Unit indicates error E.nOL.

Overload counter is reset to 0%. See also error 22:16.

Internal message 17.

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:18 BUS

The Motor Control Unit indicates error E.buS.

Timeout of monitoring time of communication between operator unit and inverter (Watchdog).

Internal message 18.

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:19 OVERLOAD 2

The Motor Control Unit indicates error E.OL2.

Standstill constant current exceeded.

The error can only be reset after cooling time has elapsed. This is indicated by the message E.nOL2. See also error code 22:20.

Internal message 19.

1. Wait until message 22:20, No ERROR over load 2 is shown.
2. Switch off the main power to machine for 5 minutes.
3. Restart the machine.

22:20 NO OVERLOAD 2

The Motor Control Unit indicates error E.nOL2.

Cooling time has elapsed, error over load 2 is reset. See also error code 22:19

Internal message 20.

1. Restart the machine.

22:21 EEPROM DEFECTIVE

The Motor Control Unit indicates error E.EEP.

EEPROM defective.

Internal message 21.

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

Note!

The EEPROM can not be written to, meaning parameter changes are not possible.

22:22 POWER UNIT COMMUNICATION

The Motor Control Unit indicates error E.PUCO.

Parameter value could not be written to power circuit.

Internal message 22.

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:23 BUS SYNCHRON.

The Motor Control Unit indicates error E.SbuS.

Problem with Bus synchronization.

Internal message 23.

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:30 MOTOR PROTECTION

The Motor Control Unit indicates error E.OH2.

Electronic motor protection relay has tripped.

Internal message 30.

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:31 EXTERNAL FAULT

The Motor Control Unit indicates error E.EF.

External fault. This error can be triggered if a digital input is programmed as external error input, and trips. Not used in this application.

Internal message 31.

22:32 ENCODER 1

The Motor Control Unit indicates error E.EnC.

Cable breakage in the encoder. Not used in this application.

Internal message 32.

22:33 POWER FACTOR CONTROL

The Motor Control Unit indicates error E.PFC.

Error in the power factor control.

Internal message 33.

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:36 NO OVERHEAT POWER MODULE

The Motor Control Unit indicates error E.nOH.

Temperature on heat sink is within permissible range again. See also error 22:8.

Internal message 36.

1. Restart the machine.

22:39 SET

The Motor Control Unit indicates error E.SEt.

It has been attempted to access a locked parameter set.

Internal message 39.

Recommended actions:

1. Upgrade machine software to latest version. Restart machine.

22:46 PROTECT. ROT. FORWARD

The Motor Control Unit indicates error E.PrF.

Forward (right) limit switch is activated. Not used in this application.

Internal message 46.

22:47 PROTECT. ROT. REVERSE

The Motor Control Unit indicates error E.Prr.
Reverse (left) limit switch is activated. Not used in this application.
Internal message 47.

22:49 POWER UNIT CODE INVALID

The Motor Control Unit indicates error E.Puci.
Power unit code invalid. During initialization the power unit was not recognized or identified as invalid.
Internal message 49.
Recommended actions:

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:50 POWER UNIT CHANGED

The Motor Control Unit indicates error E.Puch. Power unit changed.
Power module ID was changed. With a valid power unit the error can be reset by writing to SY.3, see inverter manual.
Mismatch between CPU module and Power module internally in Frequency controlled due to bad contact.
Internal message 50.
Recommended actions:

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:51 DRIVER RELAY

The Motor Control Unit indicates error E.dri.
Error in Driver relay.
Internal message 51.
Recommended actions:

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:52 HYBRID

The Motor Control Unit indicates error E.Hyb.
Error hybrid. Invalid encoder interface identifier. Not used in this application.
Internal message 52.

22:54 COUNTER OVERRUN 1

The Motor Control Unit indicates error E.co1.
Counter overflow encoder channel 1. Not used in this application
Internal message 54.

22:55 COUNTER OVERRUN 2

The Motor Control Unit indicates error E.co2.
Counter overflow encoder channel 2. Not used in this application
Internal message 55.

22:56 BRAKE

The Motor Control Unit indicates error E.br.
Error brake. Not used in this application.
Internal message 56.

22:57 INITIALISATION MFC

The Motor Control Unit indicates error E.InI.
MFC not booted.
Internal message 57.

22:58 OVER SPEED

ERROR over speed in KEB Motor Control Unit.
Internal message 105.
Recommended actions:

1. Restart the machine.

22:87 OVERHEAT INT.

Warning: The Motor Control Unit indicates A.OHI.
Internal overheating in frequency controller. Can only be reset when internal temperature has dropped by 3 °C.
This is indicated by message A.nOHI. See also error code 22:92.
Internal message 87.
Recommended actions:

1. Switch off the main power to machine for 30 minutes.
2. Restart the machine.

22:88 NO OVERHEAT POWER MODULE

Warning: The Motor Control Unit indicates A.nOH.
Warning Overtemperature of power module heat sink is reset. See also error code 22:89.
Internal message 88.
Recommended actions:

1. Restart the machine.

22:89 OVERHEAT POWER MODULE

Warning: The Motor Control Unit indicates A.OH.
Overtemperature of power module heatsink. See also error code 22:88.
Internal message 89.
Recommended actions:

1. Switch off the main power to machine for 30 minutes.
2. Restart the machine.

22:90 EXTERNAL FAULT

Warning: The Motor Control Unit indicates A.EF.
External fault. This warning can be triggered if a digital input is programmed as external error input, and trips. Not used in this application.
Internal message 90.

22:91 NO DRIVE OVERHEAT

Warning: The Motor Control Unit indicates A.ndOH.
Warning Drive motor overheat is reset. See also error code 22:96.
Internal message 91.
Recommended actions:

1. Restart the machine.

22:92 NO OVERHEAT INT.

Warning: The Motor Control Unit indicates A.nOHI.
Overheat internal is reset. See also error code 22:87.
Internal message 92.
Recommended actions:

1. Restart the machine.

22:93 BUS

Warning: The Motor Control Unit indicates A.buS.
Timeout of monitoring time of communication between bus operator and inverter (Watchdog).
Internal message 93.
Recommended actions:

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:94 PROTECT. ROT. FORWARD

The Motor Control Unit indicates error A.PrF.
Forward (right) limit switch is activated. Not used in this application.
Internal message 94.

22:95 PROTECT. ROT. REVERSE

The Motor Control Unit indicates error A.Prr.
Reverse (left) limit switch is activated. Not used in this application.
Internal message 95.

22:96 DRIVE OVERHEAT

Warning: The Motor Control Unit indicates A.dOH.
Motor temperature too high. Can only be reset when motor temperature has dropped (Resistance at terminals T1/T2 > 1650 Ω) This is indicated by message A.ndOH. See also error code 22:91.
Internal message 96.
Recommended actions:

1. Switch off the mainpower for 30 minutes until motor has cooled down.
2. Restart the machine. If problem persists, check motor windings etc.

22:97 MOTOR PROTECTION

Warning: The Motor Control Unit indicates A.OH2.
Electronic motor protection relay has tripped.
Internal message 97.
Recommended actions:

1. Switch off the main power to machine for 5 minutes.
2. Restart the machine.

22:98 NO OVERLOAD

Warning: The Motor Control Unit indicates A.nOL.
Overload counter is reset to 0%. See also message 22:99.
Internal message 98.
Recommended actions:

1. Restart the machine.

22:99 OVERLOAD 1

Warning: The Motor Control Unit indicates A.OL.

Overload counter has reached 100%.

The warning can only be reset after overload counter has reached 0% again. This is indicated by the message A. nOL. See also message 22:98.

Internal message 99.

Leave machine powered up without running any program for 30 minutes.

Recommended actions:

1. Check machine is not loaded more than intended.
2. Check motor and drum for mechanical fault. (jamming).
3. Check motor for electrical fault.
4. Restart the machine.

22:100 OVERLOAD 2

Warning: The Motor Control Unit indicates A.OL2.

Standstill constant current exceeded.

The message can only be reset after cooling time has elapsed. This is indicated by the message A.nOL2. See also message 22:101.

Internal message 100.

Recommended actions:

1. Wait until message 22:101, `NO OVERLOAD 2` is shown.
2. Restart the machine.

22:101 NO OVERLOAD 2

Warning: The Motor Control Unit indicates A.nOL2.

Cooling time has elapsed, error over load 2 is reset. See also message 22:100.

Internal message 101.

Recommended actions:

1. Restart the machine.

22:102 SET

Warning: The Motor Control Unit indicates error A.SEt.

It has been attempted to access a locked parameter set.

Internal message 102.

Recommended actions:

1. Upgrade machine software to latest version.
2. Restart the machine.

DRUM MOTOR OBIWAN/SKYWALKER

23:1 HEATSINK TOO HOT

This error code is generated by the MCU for drum motor.

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 (> 100°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). When temperature has decreased below 85°C , the error can be reset on the selector button.

Recommended actions:

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

23:2 MOTOR TOO HOT

This error code is generated by the MCU for the drum motor.

The MCU monitors the motor temperature in two ways.

1. The MCU calculates the motor winding resistance by measuring current and voltage. The winding 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. 130°C), the error code will be shown. When temperature has decreased below 130°C, the error can be reset on the selector button.
2. The MCU monitors the input from motor over heat protection. If this input is open circuit, the error will be shown. When input is closed again, the error can be reset on the selector button.

Possible causes:

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.

Recommended actions:

- Make sure the drum turns easily.
- Check the status of motor over heat protection.
- 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.

23:3 NO INTERLOCK

This error code is generated by the MCU for drum motor.

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 shown.

Possible causes:

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 / 50 Hz to the interlock signal. An error in the interlock circuits of the MCU can also set this error code.

Recommended actions:

1. Use a multimeter to check that there is 230V present on the MCU Interlock input when the door lock is activated. Read also bit 1 in the second byte under MCU 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.
2. Replace the defective part.

23:4 NO COMMUNICATION

This error code is generated by the MCU for drum motor.

MCU detects there is there is a problem in communication with CPU.

Possible causes:

Bad contact in harness or connectors between CPU and MCU.

Recommended actions:

1. Check wiring, connections between CPU and MCU.

23:5 MOTOR SHORT CIRCIUT

This error code is generated by the MCU for drum motor.

The MCU reads the power consumption of the motor continuously. If the current for some reason exceeds a predetermined limit, the MCU will cut the current to the motor, and the error code will be shown.

Possible causes:

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

- Short circuit in motor. Measure motor windings with a Motor Tester.
- 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 interlock signal.

Recommended actions:

1. 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. Measure motor windings with a Motor Tester.
2. Further information can be obtained by studying the contents of MCU ERROR LOG 1 and MCU ERROR LOG 2.
3. Review following:
4. SHORT CIRCUIT 1 (specifies how many times the current limit has been exceeded.

23:6 INTERLOCK HARDWARE

This error code is generated by the MCU for drum motor.

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 shown.

Possible cause:

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

Recommended actions:

1. Replace MCU.

23:7 LOW DC VOLTAGE

This error code is generated by the MCU for drum motor.

The MCU constantly measures the voltage over the mains input. If the voltage drops below a predefined limit, the MCU will shut off the current to the motor and the error code will be shown.

The error can be reset by pressing selector button when voltage is within range again.

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 ERROR LOG 1` and `MCU ERROR LOG 2`:

- `UNDERVOLTAGE 1` (specifies how many times the voltage has dropped below the limit).
- `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.

Recommended action:

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

23:8 HIGH DC VOLTAGE

This error code is generated by the MCU for drum motor.

The MCU constantly measures the voltage over the mains input. If the voltage exceeds a predefined limit, the MCU will shut off the current to the motor, and the error code will be shown.

The error can be reset by pressing selector button when voltage is within range again.

Possible causes:

Fluctuating mains voltage.

Recommended action::

1. Check that the supply voltage is stable and never exceeds nominal voltage + 6%.

23:12 NO PARAMET. SET IN MCU

This error code is generated by the MCU for drum motor.

The MCU contains several different parameter sets for different motors. During power up the control system checks that the correct parameter set digit is written into the MCU. If not, the control system will write down the parameter set digit defined in fixed configuration.

If the MCU discovers that no parameter set value is written down into the MCU, the error code will be shown.

Possible causes:

This can be caused by wrong software in CPU or wrong MCU for the current machine.

Recommended actions:

1. Make sure correct machine software and correct MCU are used.

23:13 UNBALANCE

This error code is generated by the MCU for drum motor.

The MCU monitors the unbalance switch status. If the status is active already at program start, this error code is shown.

23:15 MOTOR NOT FOLLOW

This error code is generated by the MCU. The MCU continuously estimates the motor speed. If the estimated speed is less than 180 rpm 10 seconds after drive command, or higher than 180 rpm 60 seconds after stop command, the error will be shown.

Possible causes:

- 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).
- Check that the drum can be rotated easily.
- Check motor windings for open circuit using a Motor tester.

Further information can be obtained by studying the contents of MCU ERROR LOG 1 and MCU ERROR LOG 2. 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).

Recommended action:

1. Replace the defective part.

23:255 UNDEFINED ERROR

This error code is generated by the MCU. The MCU reports an error that is not defined.

FAN MOTOR COMMON

30:1 O.H. FAN MOTOR

This error code will be shown if the control system detects that the input OH FAN MOTOR is deactivated during program run.

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 control system reset and the ongoing program will be ended.

The error code can be trigged if:

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

If the overheating protection is not trigged, 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.

INTERNAL COM.

40:1–40:10 I/O INTERLOCK Axxx

This error code will be shown if the control system detects that the input IO INTERLOCK is not active. I/O unit designation, Axxx, that is shown in the error description is according to electric schematics and electrical component list.

Recommended actions:

1. Check that door is actually locked.
2. Check DLCU status in service mode for more information on possible causes.
3. Check P-bus connectors on I/O board for present interlock signal.
4. Check that D-bus connector is fitted correctly with regards to the rib on the connector and the slot in the plastic cover of the I/O board.

40:11–40:20 I/O COMMUNICATION Axxx

The error code is shown if the control system can not communicate with one or several I/O units on D-bus. I/O unit designation, Axxx, that is shown in the error description is according to electric schematics and electrical component list. Errors are related to the D-Bus communication port between CPU and the different I/O units in the machine. The error code is shown if the control system has lost communication with one or more I/O units for a certain time.

If there is communication between the I/O unit and control system the LED next to the service button will flash.

If there is no communication to the I/O unit but power, the LED will light when the button is pressed on the I/O board (all I/O boards except for I/O unit type 6).

Possible causes:

- Mistake when configurating I/O unit adress at set up. Button on wrong I/O unit pressed during config.
- Two or more I/O units have the same I/O adressing.
- Bad or intermittent contact in D-Bus wiring between I/O units and CPU or between I/O units.
- Squeezed or shorted D-bus cables (shorted to ground).
- An old version of an I/O unit is fitted in the machine that do not support Compass Pro. Check part number compared to original I/O board or spare parts list.

Recommended actions:

1. Check that all I/O units are configured in `I/O CONFIGURATION` menu when the machine is in service mode. Alternatively use Common Service Tool to get a overview of the I/O unit configuration. Use the electric schematic to find correct I/O board to address.
2. If all I/O units are present in the list, check the LED as above, harness, connectors and functions by reading the electrical schematic.
3. Check that the I/O units fitted in the machine supports Compass Pro. Check part number compared to original I/O board or spare parts list.
4. Update the machine software to latest available version.

40:21 I/O COMMUNICATION

Only on Barrier washer.

The error code is activated if the control system no longer can communicate with Barrier I/O unit or if the communication is intermittent. I/O unit designation that is shown in the error description is according to electric schematics and electrical component list.

Barrier I/O board is connected to M-COM port on CPU in paralell with the MCU for drum. Electrical interface is RS-485. The error code is shown if the control system has lost or only have intermittent communication with the I/O unit.

Possible causes:

- Bad contact in harness or connectors between CPU/MCU and I/O unit.
- The I/O board is incorrectly configured on DIP switches (SW210 and SW202)

Recommended actions:

1. Check wiring, connections configuration of I/O unit according to service manual.

40:22 I/O BOARD MISHMASH

The error code is shown if wrong Type of I/O unit is fitted.

Could also occur if adressessing of the I/O units is made in a incorrect way.

After addressing of I/O units the CPU reads the Type of each unit.

If there is a mismatch between what the Type of I/O unit the CPU finds, and what the I/O unit type the software configuration expects, the error will be shown.

Machine will not run until problem is solved. There are two exceptions: I/O type 1 can be used when I/O type 11 is expected, but not oposite. I/O type 8 can be used when I/O type 81 is expected, but not oposite.

Possible causes:

- When adressing the I/O units the operator has pressed a the button on the wrong I/O unit.
- Wrong type of I/O unit if fitted in the machine.
- Two I/O units have got the same adress.

Recommended actions:

1. Readdress all I/O units.

Use `I/O CONFIGURATION` function in service mode.
Alternatively use Common Service Tool, I/O addressing function.

2. Use the electric schematic to find correct I/O board to address.
3. Use Common Service Tool, I/O addressing function to get best overview/visualization of the problem.

INTERNAL COM. I/O TYPE 10

41:1 CHARGE CIRCUIT

The DLCU on I/O board type 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.

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

Possible causes:

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

For pocket machine, this error relates to I/O board type 10 on "Loading side".

See also corresponding error 41:21 for I/O type 10 on "Unloading side".

41:2 SET SIGNAL NO TACHO. WAIT 5 MINUTES

The DLCU on I/O board type 10 counts the tacho pulses from the motor in order to guarantee that the drum is standing still before the door is opened. To ensure that the signal from the tacho generator is working correctly, DLCU compares the tacho signal with a digital bit value from the CPU, which is due to the CPU having activated the motor (See DLCU status indication).

Error will reset automatically after 5 minutes and door will then unlock. The error message is filtered in such a way that: - the digital bit value should have been active for more than 2 seconds - when the digital bit value goes low, tacho signal must be present - test is only performed when door is about to unlock.

Possible causes:

- Open or shorted circuit to the tacho sensor.
- Damaged tacho sensor or magnet.
- Secondary fault due to a error in the motor system.

Recommended actions:

1. Check that motor is actually running.
2. Check there is voltage from tachometer output when motor is running.
3. Check that rotation is detected in DLCU status for the I/O type 10 board.

For pocket machine, this error relates to I/O board type 10 on "Loading side".

See also corresponding error 41:22 for I/O type 10 on "Unloading side".

41:3 ACTUATOR CIRCUIT

The DLCU on I/O board type 10 continuously controls the circuit to the door lock solenoid. DLCU can detect an open circuit (>50 kΩ) but not a short circuit.

If case of an open circuit, CPU will show the error.

The error will disappear if the error is removed.

Possible causes:

- Open circuit to the door lock solenoid.
- Open circuit in the door lock solenoid.
- Error or open circuit in the I/O board 10 circuits.

Recommended actions:

1. Check resistance in door lock solenoid circuit. Correct reading is approx. 6 Ω.
2. Check if error "AC" still remains in DLCU status.

For pocket machine, this error relates to I/O board type 10 on "Loading side".

See also corresponding error 41:23 for I/O type 10 on "Unloading side".

41:21 CHARGE CIRCUIT

Only on Pocket washer.

Pocket washer uses two I/O boards type 10, one for the "Loading side" and one for the "Unloading side".

This error relates to I/O board type 10 on "Unloading side".

See also corresponding error 41:1 for I/O type 10 on "Loading side".

The DLCU on I/O board type 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.

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

Possible causes:

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

41:22 SET SIGNAL NO TACHO. WAIT 5 MINUTES

Only on Pocket washer.

Pocket washer uses two I/O boards type 10, one for the "Loading side" and one for the "Unloading side".

This error relates to I/O board type 10 on "Unloading side".

See also corresponding error 41:2 for I/O type 10 on "Loading side".

The DLCU on I/O board type 10 counts the tacho pulses from the motor in order to guarantee that the drum is standing still before the door is opened. To ensure that the signal from the tacho generator is working correctly, DLCU compares the tacho signal with a digital bit value from the CPU, which is due to the CPU having activated the motor (See DLCU status indication).

Error will reset automatically after 5 minutes and door will then unlock.

The error message is filtered in such a way that:

- The digital bit value should have been active for more than 2 seconds.
- When the digital bit value goes low, tacho signal must be present.
- Test is only performed when door is about to unlock.

Possible causes:

- Open or shorted circuit to the tacho sensor.
- Damaged tacho sensor or magnet.
- Secondary fault due to a error in the motor system.

Recommended actions:

1. Check that motor is actually running.
2. Check there is voltage from tachometer output when motor is running.
3. Check that rotation is detected in DLCU status for the I/O type 10 board.

41:23 ACTUATOR CIRCUIT

Only on Pocket washer.

Pocket washer uses two I/O boards type 10, one for the "Loading side" and one for the "Unloading side".

This error relates to I/O board type 10 on "Unloading side".

See also corresponding error 41:3 for I/O type 10 on "Loading side".

The DLCU on I/O board type 10 continuously controls the circuit to the door lock solenoid. DLCU can detect an open circuit (>50 kΩ) but not a short circuit. If case of an open circuit, CPU will show the error. The error will disappear if the error is removed.

Possible causes:

- Open circuit to the door lock solenoid.
- Open circuit in the door lock solenoid.
- Error or open circuit in the I/O board 10 circuits.

Recommended actions:

1. Check resistance in door lock solenoid circuit. Correct reading is approx. 6 Ω.
2. Check if error "AC" still remains in DLCU status.

INTERNAL COM. I/O TYPE 6

42:1 I/O TYPE 6 INTERNAL ERROR

I/O unit type 6, reading of internal analog values out of range.

Possible causes:

- Intermittent error in wiring to I/O type 6 unit.
- Internal error in I/O type 6.

Recommended actions:

1. Switch power off for 1 minute and try again.
2. If problem remains, replace defective part.

42:2 I/O TYPE 6 POSITION TEST

Position test is used to verify that I/O type 6 unit is correctly assembled and fixed in the expected position.

Recommended actions:

1. Check that I/O type 6 unit is assembled and fixed in correct position.

42:3 I/O TYPE 6 EXTRACT TEST

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

Recommended actions:

1. Check that I/O unit type 6 unit is assembled and fixed in correct position.
2. Put some unbalance in drum and run motor to extraction speed in service program.

Check analog input readings for I/O 6.

EXTERNAL COM. PAYMENT

51:22 NO CBT COMMUNICATION PRESS TO RETRY

Machine connected to payment system using serial communication to machine.

Cause:

- Communication has been established once and then interupted.

Recommended actions:

1. Check electrical connections between CPU and payment system.
2. If running in a network, check network cables between machine and payment system.
3. Check that payment system is operational.
4. Check that payment system and machine is configured to the same Machine adress (Config 1).
5. 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 CMIS computer has been interrupted.

The warning will be shown at program start for 5 seconds, the next 5 programs. It is then removed automatically.

After the warning message has disapeared the machine will start, but no CMIS data statistics/data will be logged.

Possible causes:

- If using ELS Common Service Tool process viewer and cable has been unplugged before process viewer has been stopped, this warning will occur.
- If running with ELS CMIS and communication is interrupted to PC, warning will occur.

Recommended actions:

1. If using ELS CST, reconnect, enter Process viewer and select function "Reset MIS communication".
2. If using ELS Network and CMIS:

Check ELS network cable between machine and PC.
Check that CMIS application is active and running normally.
For CMIS:The machine can operate but statistics will be affected and data will be lost.

52:2 DMIS COMMUNICATION ERROR

This is a warning message that will be shown for 5 seconds if there is a problem in DMIS communication, i.e. the communication between the machine and a external detergent dosing system.

Warning is shown if system has been up running once and then is interrupted or working intermittent.

The warning will be shown at program start for 5 seconds, the next 5 programs. It is then removed automatically.

After the warning message has dissapeared the machine will start, but there is a risk the wash will run without any external detergent dosing.

Possible causes:

- The external dosing system has been disconnected, switched off or broken.
- Machine adress in machine has been changed and this is also used by external dosing system.

Recommended actions:

1. Check connections, cables or network between machine and detergent dosing system.
2. Consult the supplier for external dosing system.

INTERNAL

60:5 FATAL ERROR INVALID RUNNING MODE

The control system has an internal error during memory read.
Recommended actions:

1. Press the control knob/start button to retry.
2. If problem persists, upload new software.

60:11 FATAL ERROR EXTERNAL FLASH WRITE

The control system has an internal error during memory read.
Recommended actions:

1. Press the control knob/start button to retry.
2. If problem persists, upload new software.

60:17 FATAL ERROR INVALID OPTION

The control system has an internal error during memory read.
Recommended actions:

1. Press the control knob/start button to retry.
2. If problem persists, upload new software.

60:18 FATAL ERROR INVALID MODULE

The control system has an internal error during memory read.
Recommended actions:

1. Press the control knob/start button to retry.
2. If problem persists, upload new software.

60:28 FATAL ERROR INVALID COIN INPUT

The control system has an internal error during memory read.
Recommended actions:

1. Press the control knob/start button to retry.
2. If problem persists, upload new software.

60:29 FATAL ERROR INVALID FONT

The control system has an internal error during memory read.
Recommended actions:

1. Press the control knob/start button to retry.
2. If problem persists, upload new software.

15 Maintenance

15.1 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 thermal fuse to trigger.
- Inspect the shock absorbers and coil springs.

15.2 Clean the internal drain and hoses

Drain valve

Disconnect the power to the machine.

Switch off the water supply.

Demount the front panel.

For electrical heated machines; remove the cover to the heating elements.

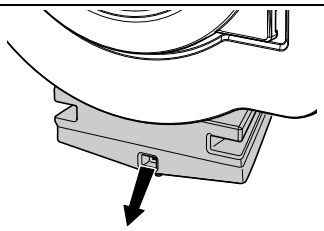


fig.7751B

Demount and clean the internal drain (A) and the hose (B).

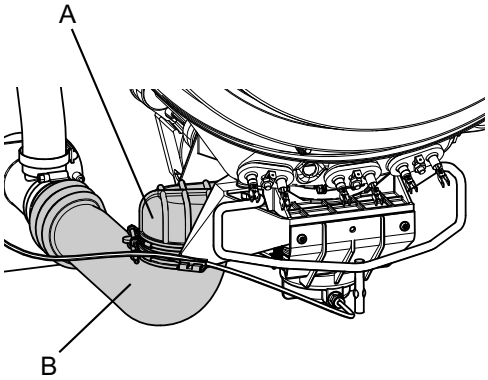


fig.7761A

Remount the hose and tighten the hose clamps. For the different hose clamps, use tightening torque 1 = 2.2 Nm / 1.6 lbf.ft and 2 = 1.2 Nm / 0.9 lbf.ft.

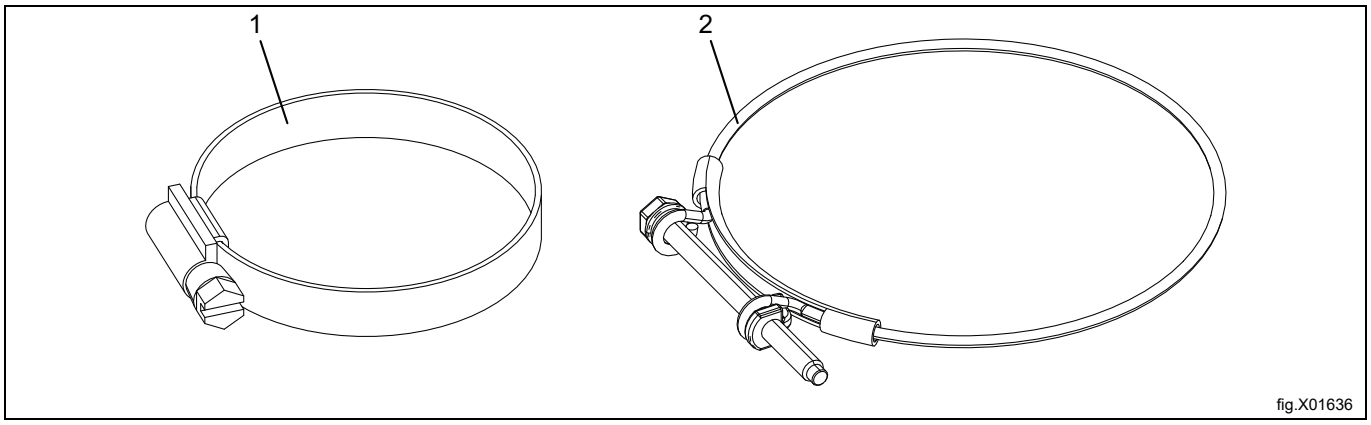
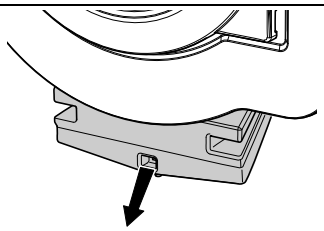


fig.X01636

For electrical heated machines; mount the cover to the heating elements.
Run a program and check that water does not leak onto the floor.
Mount the front panel.

Electrical drain valve

Disconnect the power to the machine.
Switch off the water supply.
Demount the front panel.
For electrical heated machines; remove the cover to the heating elements.


fig.7751B

Demount and clean the internal drain (A) and the hoses (B).

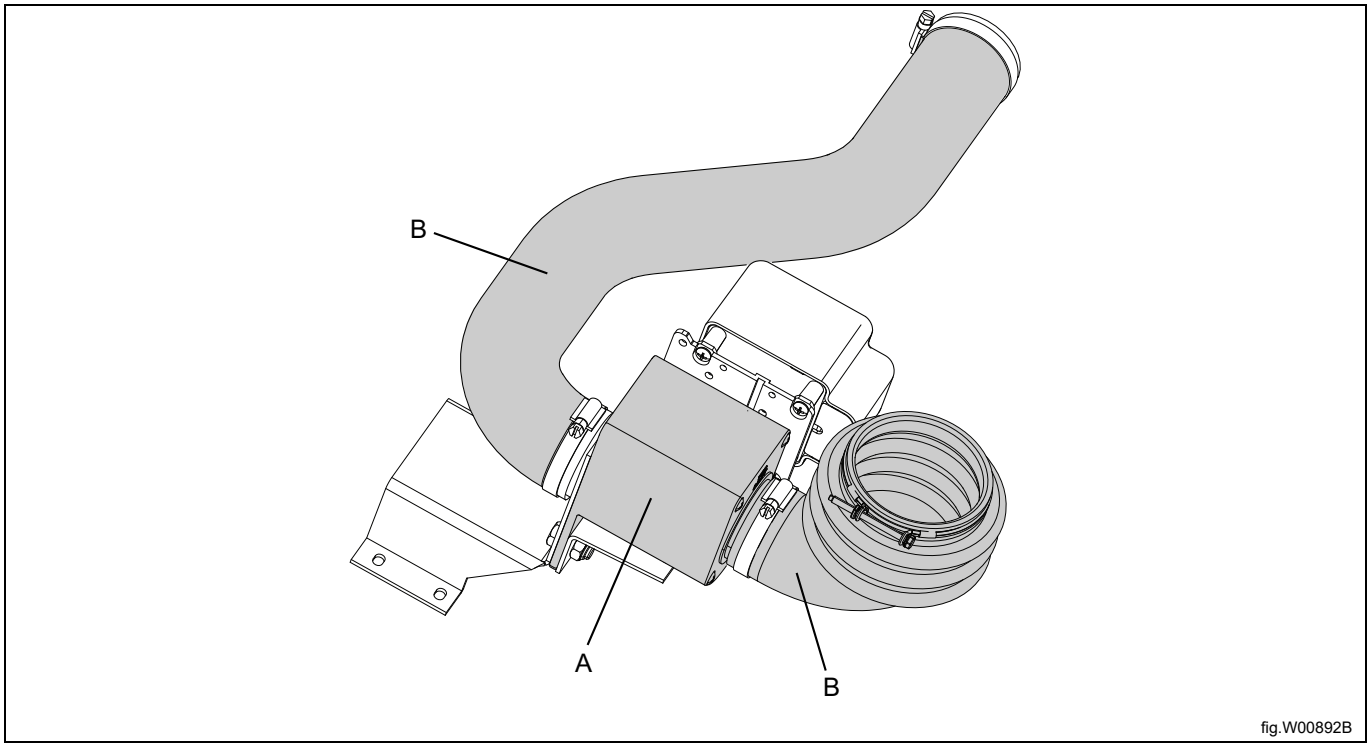


fig.W00892B

Remount the hose and tighten the hose clamps. For the different hose clamps, use tightening torque 1 = 2.2 Nm / 1.6 lbf.ft and 2 = 1.2 Nm / 0.9 lbf.ft.

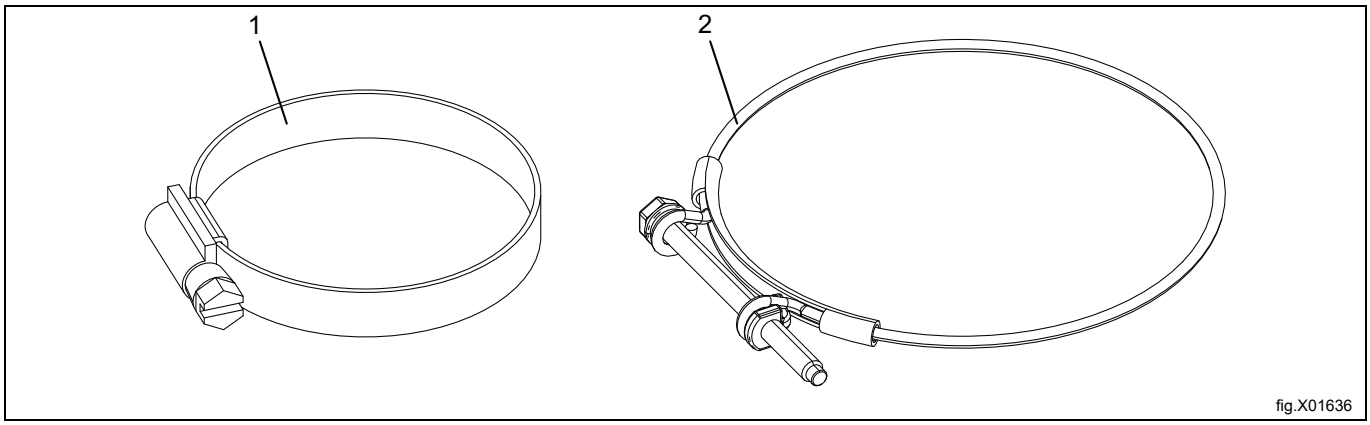


fig.X01636

For electrical heated machines; mount the cover to the heating elements.

Run a program and check that water does not leak onto the floor.

Mount the front panel.

15.3 Check the door and door hinges

Check that the door and door hinges are not feeling loose. If so, tighten the M6 screw a the door's hinge to 9–10 Nm / 6.6–7.4 lbf.ft.

Note!

If not tightening the screws, the door glass can be crashed to the drum and glass will fall into the drum and damage the load in the machine.



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