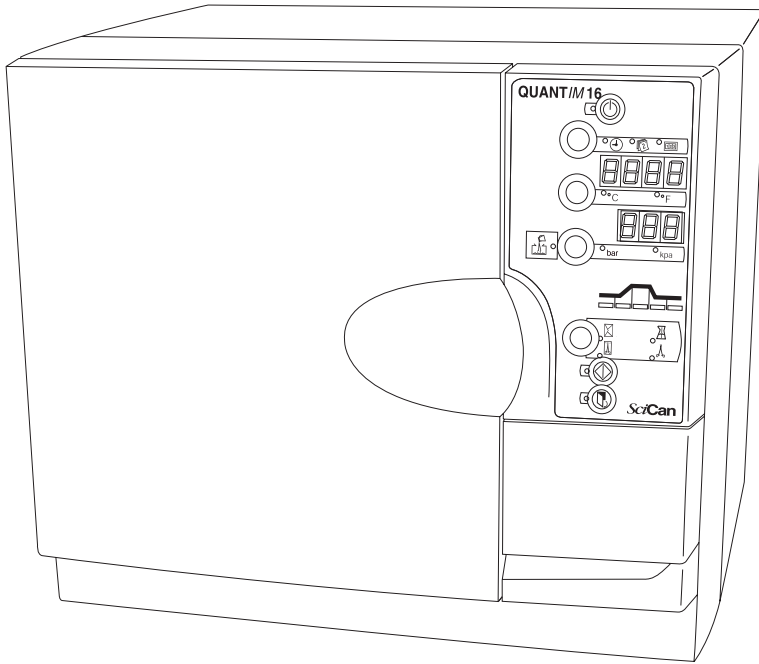


QUANTIM 16



- **Service Guide**



SciCan QUANTIM 16

Service Manual

Revision 2.0

SciCan

1440 Don Mills Road,
Toronto, ON M3B 3P9
CANADA

Phone: (416) 445-1600
Fax: (416) 445-2727
Toll free: 1-800-667-7733

SciCan Inc.

500 Business Center Drive,
Pittsburgh, PA 15205
USA

Phone: (412) 494-0181
Fax: (412) 494-4794
Toll Free: 1-800-572-1211

For all service and repair inquiries:

Canada / United States: 1-800-870-7777
Email (Service and Repair): techservice.ca@scican.com

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November 29, 2002

Amendment List

Issue	Issue Date	Change	Incorporated by	Date
1	29/11/02	Change fuse specification to slow blow fuse.	Albert Ohanian	29/11/02
2				
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Forward

The product has been designed to allow full testing of all functions, including calibration, from the front panel. Full use should therefore be made of these facilities before removing any cover plates or the rear case.

Before starting any repair, obtain a full history and description of the reported fault. Start by ensuring that all general maintenance procedures have been carried out successfully as per the operating instructions.

Spare parts kits are stand alone items and do not include components such as decals, grease, RTV silicone etc. these should be ordered separately.

The pressure vessel is a high integrity component, the lid and associated brackets, extrusions etc. should not be removed, if required, the whole vessel should be replaced. Due to the nature of the design, the boiler, chamber probe housing and air bleed fitting may be changed and then subject to a single pressure test using engineering mode Eng 01 (Pressure release valve lift test.)

Use only genuine spare parts as provided by SciCan. Use of other parts may cause product failure and invalidate the warranty.

If in doubt, call SciCan direct for assistance.

NOTE:

- (1) This document is the copyright of SciCan and may not be copied to any other parties without the written authority of SciCan.
- (2) This document was first issued with all pages at initial issue on the 01/10/01.
Any revisions will be indicated on the amendment list (page 1) together with the date of the up issue and an attachment showing the affected pages.
- (3) Insulation resistance and earth continuity should be checked before placing unit back in service after a repair.

Technical Specifications

	SC2803571 *	SC2804521				
Height in mm	410	410				
Length in mm	440	440				
Width in mm	480	480				
Weight in kg	42	42				
Chamber diameter in mm	250	250				
Chamber length in mm	330	330				
Capacity in litres	16	16				
Number of cycles	4	4				
Sterilizing temperature °C	121/132	121/132				
Sterilizing time in minutes	3, 15, 30	3, 15, 30				
Operating pressure in bar	1.05/2.05	1.05/2.05				
Voltage	230	120				
Wattage	2200	1500				
Frequency Hz	60	60				

* Not all models are available in all countries

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Chapter 1

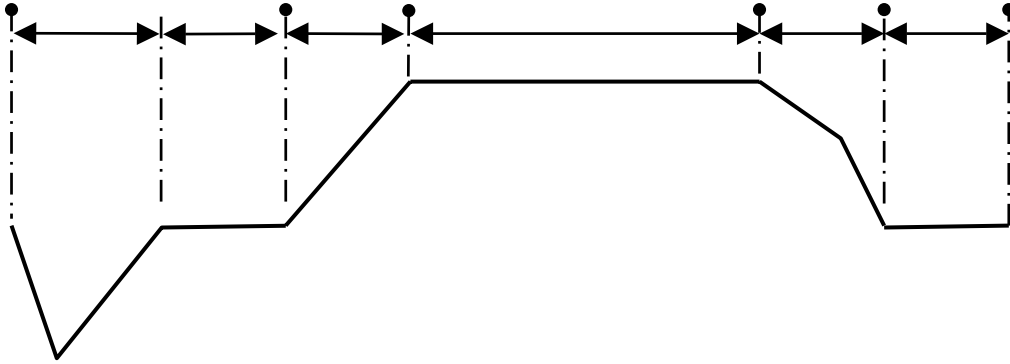
Cycle Options

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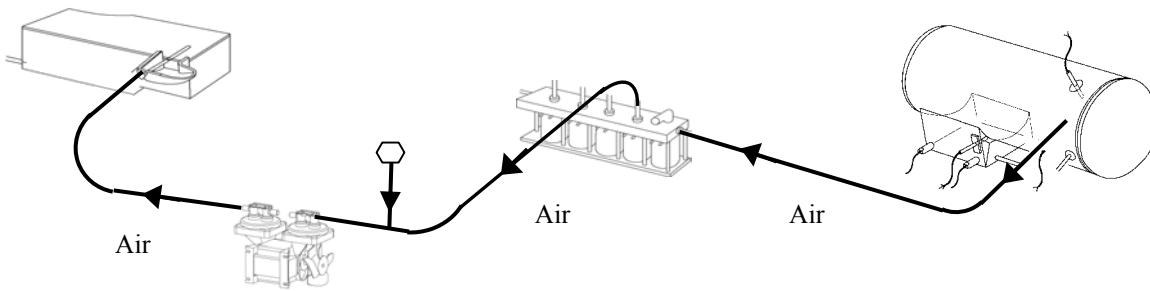
Cycle stages:

Start Cycle

1. Pre Vacuum/
Water Fill
2. Heating
3. Sterilizing
4. De-Pressurise
5. Complete

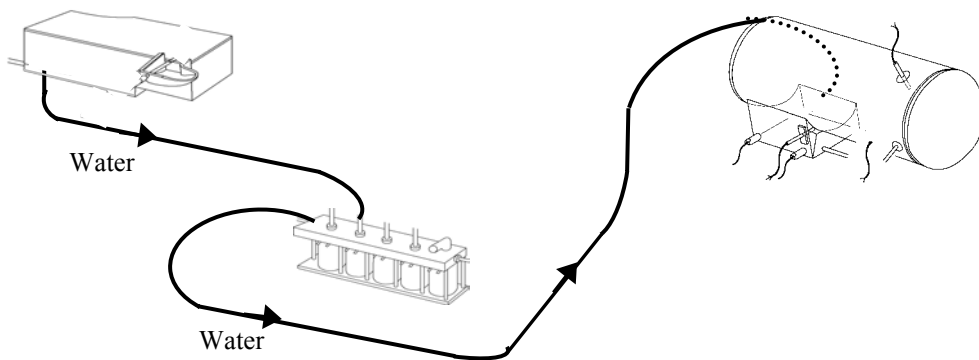


Stage 1. Pre-vacuum



Short pre-vacuum pulse to assist in water fill.

Stage 1. Water fill



Before the start button is pressed, the air bleed valve & heater are energised.

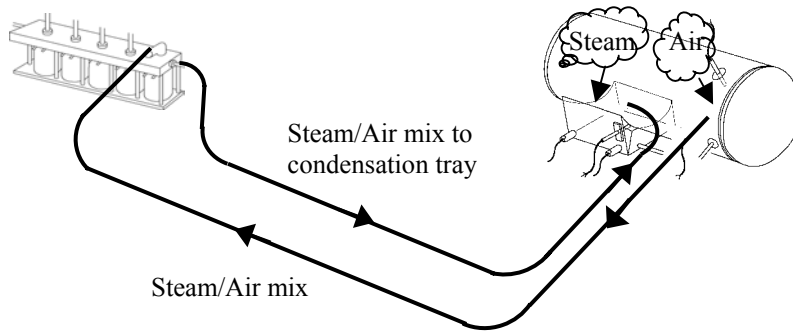
NB. Dependent on software version. If the temperature inside the chamber is above 80°C or the boiler temperature is above 90°C pressing the start button will initiate the cycle but nothing will happen until the temperatures are below these limits.

When the vacuum level has been achieved, the water fill solenoid energises & water travels from the tank, through the water fill valve to the boiler via the filter.

The boiler probe also acts as a water level sensor. When the water reaches the boiler probe a circuit is completed and the valve closes.

NB Two attempts are made to fill the boiler with water. If the sensor does not detect water in a given time frame E13 will be indicated.

Stage 2. Heating



Once the boiler has filled the heater element is powered, the air bleed solenoid is energised (valve open)

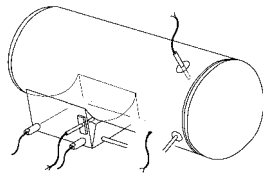
Steam rises into the rear of the chamber and pushes the air forward and out through the hole at the front of the chamber and then to the condensate tray via the air bleed valve.

At around boiling temperature, the rate of change in the differential between the boiler and chamber probes begins to be monitored.

When no differential is evident the air bleed valve closes at approximately 106°C and the temperature continues to rise up to the sterilizing temperature.

NB Failure to achieve zero differential results in E03 being displayed.

Stage 3. Sterilizing



As the temperature approaches the Sterilizing timer start temperature as set in Cal 01, the energy input is reduced avoiding the possibility of temperature overshoot.

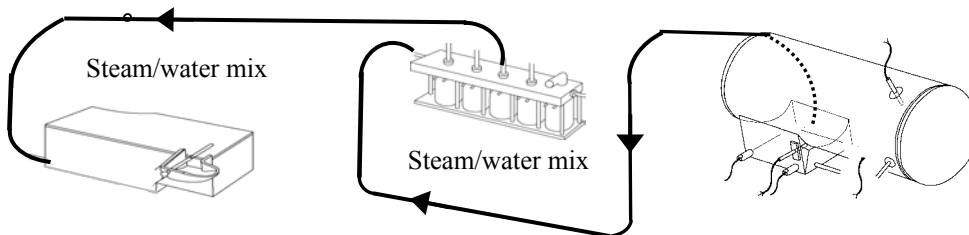
On reaching Cal 01 the sterilizing timer value found in Cal 07 begins.

The temperature continues to rise to the target temperature. This is the temperature at which sterilization will be controlled selected in Cal 02.

During the sterilization period the temperature in the boiler is compared with the temperature in the chamber and this should be in the range of 132, - 0, + 3 degrees for 132 sterilising cycles.

NB Possible faults displayed in this stage: b02, d02, t02 an explanation of these is provided later in this manual.

Stage 4. Depressurisation



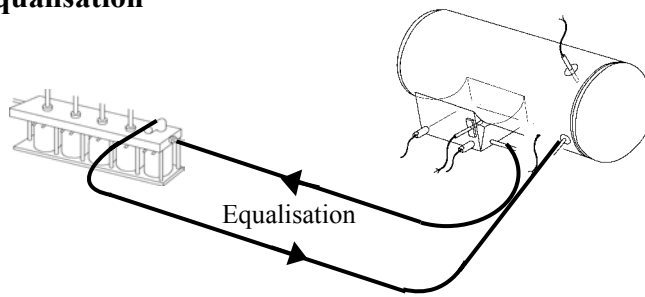
At the end of the sterilising period the heater is turned off & the flush valve opens immediately (except on liquid cycles).

With the flush valve open the remaining pressure in the chamber forces residual water out of the boiler and back to the water tank.

Once all the water has been returned to the tank, the pressure in the chamber falls rapidly.

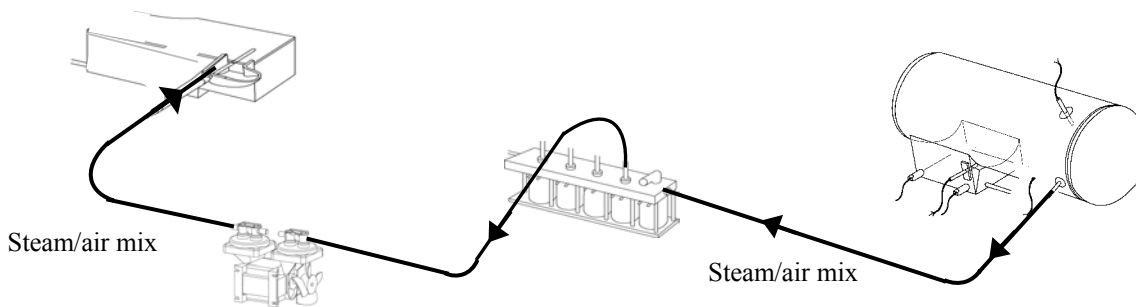
Once the pressure has returned to atmospheric, the cycle proceeds to vacuum drying.

Stage 4. Air equalisation



Once atmospheric pressure is achieved, the air valve, boiler and heater pad are de-energised, and power is applied to the air bleed solenoid. The air bleed valve opens and atmospheric pressure is maintained in the chamber through this route.

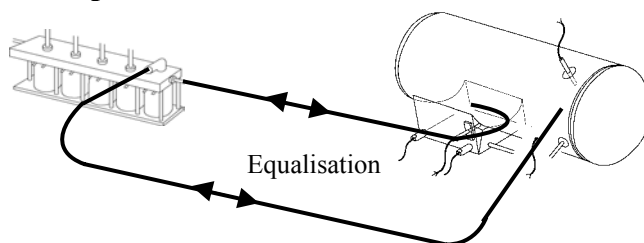
Stage 4 Vacuum drying



During the drying stage, the door LED flashes, this is an indication that drying has started. Drying can be terminated at any time by pressing the door button, after a short time 15 is shown on the temperature display and the buzzer sounds, this can be muted by pressing the standby button. Pressing the standby button again returns the unit to recovery mode.

While vacuum drying the door remains closed and power is applied alternately to the boiler and heater pad, at the same time the vacuum solenoid is energised opening the vacuum valve and starting the vacuum pump. A vacuum is then pulled for approximately 1 minute (2 minutes for the final vacuum). At the end of the minute the vacuum pump and valve are turned off.

Stage 5. Cycle complete



After a few moments delay, the cycle will complete. Indicated by 3 beeps from the buzzer.

The air bleed valve remains open to avoid a pressure increase or vacuum forming within the chamber, before the door is opened.

NB. A positive or negative pressure in the chamber can stop the door from opening.

Once the door open button is pressed, a reduced power is applied to the boiler heater and this will remain on until the start of the next cycle in order to ensure that the unit is 'warm' ready for the next cycle.

User Message Modes and Causes

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User Message Mode Diagnosis

Introduction:

Simple mechanical faults are not covered, the operators manual should be consulted for gasket replacement and cleaning etc.

Fault recovery sequences may be found in the operating instructions.

Total power loss

In the event that power cannot be restored, it is possible to open the door by pressing on the end of the door lever, located behind bezel moulding, mimicking the action of the solenoid. Access is via the printer door with right-hand in “thumbs up” format or via the right-hand side bottom of the product.

NB: a significant number of faults are due to a failure to maintain the equipment resulting in leaks, either of steam or water. Always check for leaks first.

Unit flashes ‘Door’ continuously.

The solenoid has been triggered but the door micro switch has not opened.

What to look for:

- Door is held closed due to some mechanical condition
- Door is held closed by a pressure caused during cool down as a consequence of the air bleed valve not operating
- Door micro switch or harness is short circuited
- Power control module fault

Unit flashes door intermittently or door open light is not illuminated when door is shut

Occurs when pressing cycle start button with door “open”

What to look for:

- Door is open/latch is not fully engaged
- Door micro switch/harness fault, open circuit
- Check micro switch set position
- Check latch lock parts are functioning correctly
- Power control module fault

01 Power failure

Power failure at any time during sterilizing cycle.

Often an indication that mains power loss to the unit or another fault has occurred.

What to look for:

- Adequate mains supply.
- Mains fuses.
- Transformer not overheated and cut out.
- Excess current being drawn, check solenoid coil resistance and insulation resistance.

02 Sterilizing parameter fault

The autoclave is fitted with an electronic comparator that checks the following conditions during the sterilizing cycle:-

tØ2 = Sterilizing time fault (No. 1)

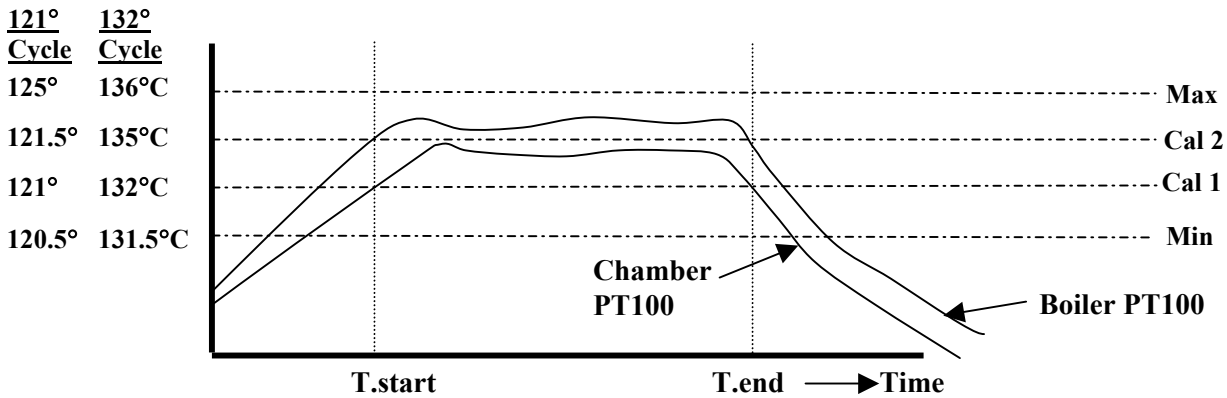
dØ2 = PT100 boiler and chamber probes do not agree (No. 2)

bØ2 = Temperatures outside of control band (No. 3)

Autoclave has failed to sterilize.

In determining whether or not a cycle has failed, several comparisons are made;

No.1 Sterilizing hold period



When the start temperature is reached, the on board computer sets to zero the cycle timer, it also reads the time clock. When the cycle timer has timed out, the on board computer reads the time clock. The cycle time and timer clock values must agree to better than 10 seconds.

No.2. Compare boiler and chamber PT100 probe values.

During the sterilizing period they must agree, with an error of $<2^{\circ}\text{C}$.

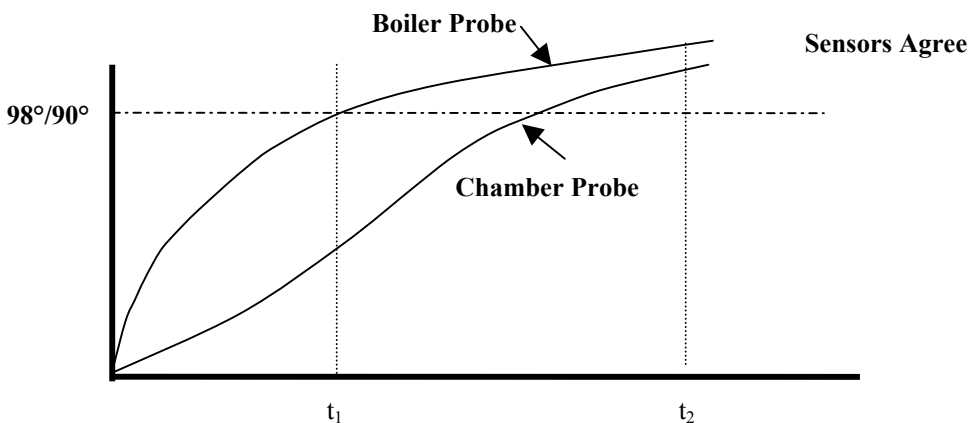
No.3. Both boiler and chamber PT100 must be within the min/max cycle limits.

What to look for:

- Check that the values used in calibration modes CAL01 and CAL02 are as per specification. If CAL02 is more than 3°C higher than CAL01 or similar to CAL01 then a fault may be generated. CAL02 should lie in the range; $\text{CAL01}+0.5^{\circ}\text{C}$ to $\text{CAL01}+1.5^{\circ}\text{C}$.
- Check chamber probe insertion depth.
- Check that both PT100 probes have a similar resistance.
- Dirty probes
- Check all pipe work for leaks, water loss from boiler giving rise to a boil dry condition during sterilizing will trigger this error code.
- Power control module fault.
- Timing difference, check real time clock for operation, reset if necessary.
- Power surges. ie. X-ray equipment or lift machinery in close proximity.

03 Air bleed was not successful.

Autoclave has failed to obtain a balance between boiler and chamber PT100 probes within the time limit.



- $t_2 - t_1$ must be < 10 minutes from Boiler probe reaching 90°C .

What to look for:

- Very low applied voltage
- Gross steam leak

- Boiler not filling with water or adequate water.
- Air bleed tubes blocked
- Air bleed solenoid valve failed to operate correctly
- Air bleed solenoid blocked
- Check free flow of air through air bleed fitting in the vessel when the valve is open.
- Check chamber probe position in chamber.
- Check that both PT100 probes have a similar resistance at ambient temperature
- Check air bleed copper pipe is not up to the boiler face inside the drip tray.
- Power control module

07 Boiler thermistor failure

What to look for:

- Boiler thermistor open circuit or short circuit to ground
- Power control module

10 Water in boiler

Water in boiler at end of cycle when door open is enabled

What to look for:

- Was a user message previously displayed ie: 01, 09 etc.
- Fill solenoid fault (open or leaking)
- Check boiler probe
- Ensure flush is successful at end of cycle
- Check boiler filter for blockage
- Power control module

11 Air filter blocked

What to look for:

- Air filter blocked
- Check pipe work for kinks, restrictions and collapses
- Check valve operation
- Check for wet filter
- Air solenoid fault
- Air bleed tube blocked
- Power control module fault

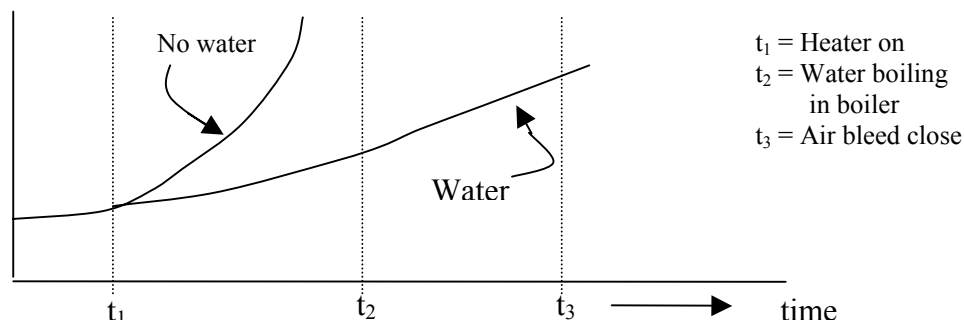
12 Boil dry indication.

Autoclave detects that the boiler has run out of water.

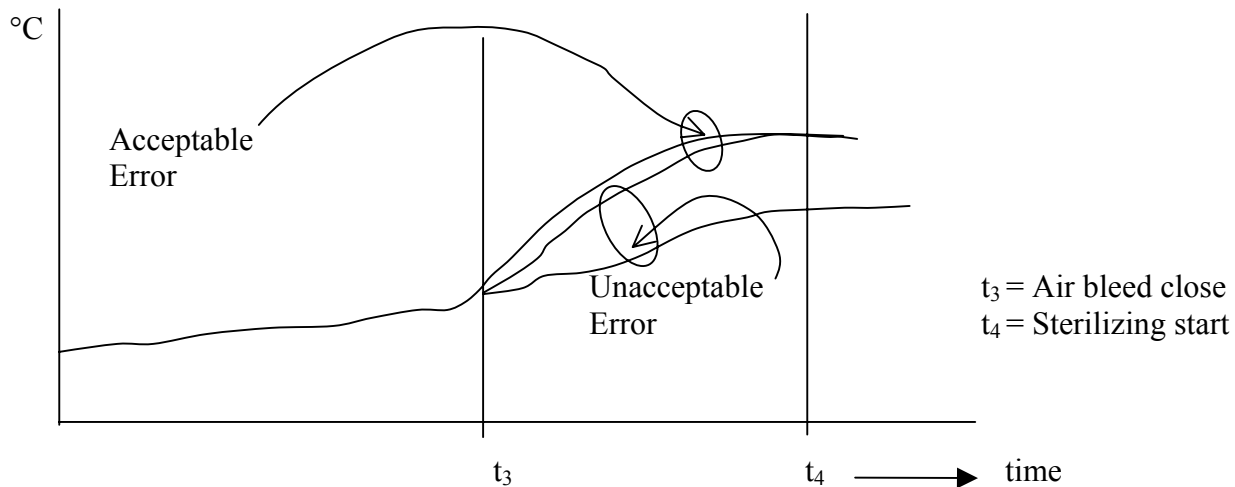
NB: if an user message 12 occurs before the air bleed valve has closed then the rate of rise of boiler wall temperature can cause the thermal cut-out to operate.

There are two key detection phases:

Phase 1. During the heating phase from end of water fill to air bleed valve close the boiler thermistor is checked for a rapid rise in boiler temperature signifying that there is no water in the boiler.



Phase 2. During the heating phase from air bleed to start of sterilizing the control system is checking to make sure that both boiler and chamber PT100s are tracking. Any significant deviation is reported as an error.



During phase 1, the most likely causes of water loss are gross steam leak, or large linen load.

During phase 2, the most likely causes are:

- Small steam leak, increasing with pressure
- Linen load
- Chamber probe fault

What to look for:

- Boiler did not fill
- Gross water/steam leak in pipes/ASME valve etc. Load mass or surface area too great or receptacles open end up retaining water
- Check vessel is angled down at the back a minimum of 2° ensuring water runs to rear of vessel.
- Load is too absorbent, eg. Linen materials
- PT100 probe fault boiler or chamber (tracking error, diagnose by substitution.)
- Power control module fault
- Chamber probe insertion depth incorrect.

Note: Thermal cut-out operation is often preceded by a user message 12.

13 Boiler failed to fill

Boiler did not fill with water

What to look for:

- Fresh water tank empty due to level sensor fault.
- Fill tubes blocked
- Fill solenoid failed to operate
- Fill solenoid blocked
- Water filter blocked
- Boiler probe not connected (water level sensor function)
- Power control module fault
- Ensure air bleed valve is open during fill

14 PT100 failure (chamber)

What to look for:

- Chamber PT100 probe either open circuit or short circuit or short circuit to ground.
- Power control module fault

Flashing red LED

Insufficient water in fresh water tank to run a cycle.

What to look for if tank is full:

- Check sensor wiring and connectors
- Power control module fault

Door does not open correctly

This fault may take many forms from not opening to opening with a loud “popping” noise.

What to look for:

- Check calibration of pressure display as this has a profound effect on the opening point of the flush and air bleed valves at the end of the cycle.
- Failure of hinge lubrication, any increase in stiffness will cause door open spring to be ineffective requiring the door to be pulled open
- Setting of the interlock lever, if incorrectly set it may catch on the lid strike plate preventing the door from opening. Alternatively it may rub on the inside of the door moulding rendering the door open spring ineffective.
- Check that vessel is central to bezel hole. Alignment has been shown to be adversely affected when the unit experiences a significant drop when out of the packaging. The only remedy is to rebuild the chassis plate to vessel sub-assembly, paying particular attention to condition of the chassis plates and boiler to vessel bracket.
- Check that the door moulding is correctly fitted.
- Door sealing gasket is sticking to vessel or gasket plate, clean gasket plate and vessel sealing surface.
- Unit being operated at above 1500 metres. (a 42 psi release valve may be fitted for use of up to 2000 meters).
- Vacuum or pressure inside the vessel through valves not operating correctly

Running temperature is incorrect

Due to the nature of the control system any hardware failure will render the unit inoperative, calibration drift is very rare. Chamber and boiler probes are of the platinum resistance type, of proven reliability.

Front end hardware on the power control module that measures the temperature is of a dynamic comparative nature and relies on a balance between the two input circuits, a single failure will therefore show up as a user message, usually 14 or 08.

Before making an adjustment using CAL03, CAL04, CAL05, CAL06 check the following: -

- Are the calibration settings for CAL01 and CAL02 correct (CAL08 may be used to reset machine to factory default settings).
- Is your measuring equipment working correctly, do you have a calibration certificate for it.

Thermal cut-out operates

What to look for:

- See user message 12.
- Boiler thermistor out of range
- Boiler thermistor not located correctly on boiler
- Power control module fault.

No display

Loss of Power

What to look for:

- No mains power.
- Fuses blown.
- Thermal cut-out on boiler.
- Check mains connections on power control module.
- Check transformer output. No output could be caused by a faulty transformer or an overloaded output. (If unit recovers, most likely it is a S/C on one of the transformer loads.)
- Power control module fault.
- Display module fault/not connected.

Chapter 3

Calibration Modes

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Calibration Modes

Introduction:

Before attempting to make calibration adjustment ensure that:-

- The correct settings for CAL 01 and CAL 02 are used
- The test equipment is calibrated and carries a current certificate.

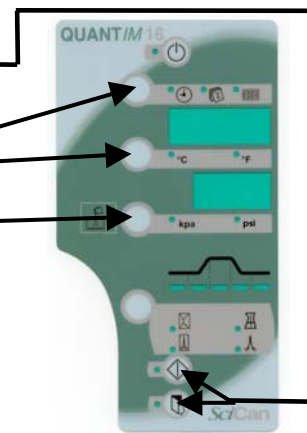
Failure to observe the above two key points will prevent you from obtaining a satisfactory result.

Note that the process controller uses the displayed temperature value to determine the sterilizing start point. It is therefore essential that the steps are followed in sequence as set out below when calibrating the temperature display; it is not possible to “jump” in and out. CAL 01 and CAL 02 may be adjusted independently, however, it must be ensured that the temperature display is accurate.

Entering the mode

Calibration modes are entered by using an access code complete with up/down and accept buttons, door must be open with unit in ready mode:-

- To enter CAL modes, press and hold door open and cycle start buttons for 10 seconds. The letters “CAL” will appear in the date/time display, “001” will appear in the pressure display window.
- Up button, was date/time/cycle count button.
- Down button, was Deg C button.
- Accept button, was Kpa button.

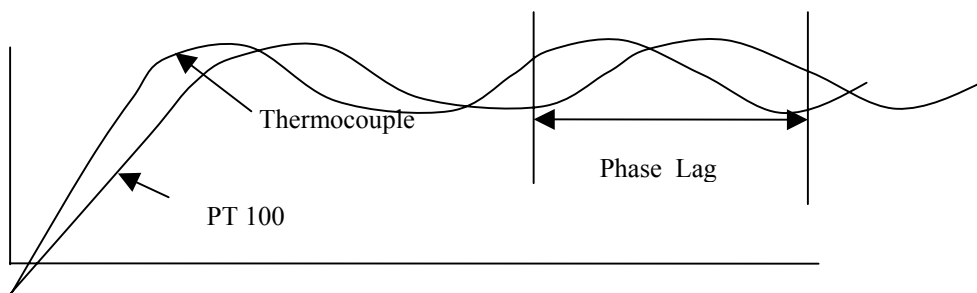


When using CAL modes 01 to 04 inclusive, ignore the small indicator LED's and also ignore 'door' flashing on the display when entering Calibration mode.

Temperature display

Sensor (chamber probe) data is used to provide a correct indication of the chamber temperature on the temperature display. Calibration mode Cal 03 is used to ensure that the displayed value is the same as actual steam temperature.

It should be noted that PT100s do not respond as quickly as thermocouples. Therefore, if an external measuring system is attached using thermocouples, then the external system temperature will always “lead” product displayed value.



Under these conditions of test, a judgement will have to be made as to the required calibration adjustment and when to “accept” as the two systems will never completely agree.

Calibration modes CAL 01 and CAL 02 always operate using the displayed temperature values, this ensures that only one adjustment is required.

Pressure display

Derived from the pressure transducer + or -.

CAL 01 Sterilizing start temperature

This mode is used to set the temperature at which the timed sterilizing cycle starts.

CAL 01 can be set on both 121 and 132 temperature ranges by following the sequence described below:-

SEQUENCE:

- Open door.
- Enter CAL mode.
- Press accept (001 flashes on the pressure display).
- The up/down buttons are used to adjust to the required temperature value display in °C.
- Press accept to update with the new setting (001 stops flashing and the accepted value is shown on the temperature display).
- Press 121 temperature selection button (001 is still on the pressure display but new CAL 01 temperature shown on the temperature display) eg. 121.5.
- The up/down buttons are used to adjust to the required temperature value. Display in °C.

NB: 001 on pressure display does not flash.

- Press accept to update with the new setting (001 is still on the pressure display and the accepted value on the temperature display).
- Press Standby button to exit CAL 01.

CAL 02 Target temperature

This mode is used to set cycle target running temperature.

CAL 02 can be set on both 121 and 132 temperature ranges by following the sequence described below:-

SEQUENCE

- Open door.
- Enter CAL mode.
- The up/down buttons are used to obtain a displayed mode “002.”
- Press accept (002 is now flashing on the pressure display).
- The up/down buttons are used to adjust to the required temperature value. Display in °C.
- Press accept to update with the new setting (002 stops flashing and the accepted value is shown on the temperature display).
- Press the cycle selection button (002 is still on the pressure display but new CAL 02 temperature shown on the temperature display).
- The up/down buttons are used to adjust to the required temperature value. Display in °C.

NB: The pressure display is showing 002 but does not flash.

- Press accept to update with the new setting (002 is still on pressure display and the accepted value on the temperature display).
- Press Standby button to exit CAL 02.

CAL 03 Temperature calibration

This mode is used to calibrate the displayed temperature value (derived from the chamber probe).

Before starting a cycle ensure that the measuring equipment is correctly connected to the vessel using one of the two 1/4 BSP entry ports provided in the door.

Place thermocouple adjacent to the chamber probe. Other thermocouples may be placed in the centre of the chamber or load if preferred and at the rear of the chamber near the drain (10mm above centre of large hole in rear of chamber floor).

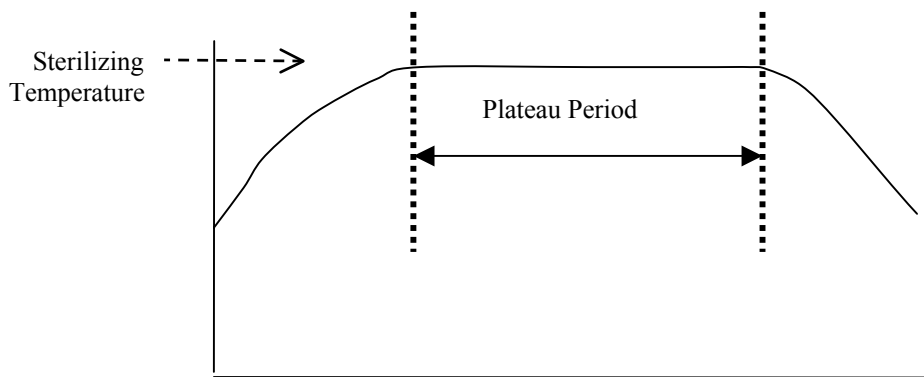
SEQUENCE

- Open door.
- Enter CAL mode.
- The up/down buttons are used to obtain a displayed mode “003.”
- Press accept (003 is flashing on the pressure display.)
- Select 132°C. Unwrapped instrument cycle (132 x 3 minutes).
- Close door and start the cycle.
- Wait 3 minutes after the sterilizing LED comes on for the temperature to stabilise.
- The up/down buttons are used to adjust temperature value displayed in Deg C.
- Press accept to update with the new setting (003 is no longer flashing on the pressure display.)
- Press the standby button after a 3 minute wait period then wait for unit to complete the sterilizing cycle.
- After pressing the door release button the display returns to the ready mode.

CAL 07 Sterilization hold time

This mode is used to set sterilizing cycle timer (plateau period at temperature).

The temperature selection button can be used to select the range to be adjusted whilst in CAL 07 mode.



SEQUENCE

- Open door.
- Enter CAL mode.
- The up/down buttons are used to obtain a displayed mode “007.”
- Press accept (007 is now flashing on the pressure display).
- The up/down buttons are used to adjust to the required time value (displayed in seconds), for the selected temperature.
- Press accept to update with the new time setting (007 stops flashing and the accepted value is shown on the temperature display).
To set the sterilizing timer for any other temperature cycle.
- Select the required cycle. (007 is still on pressure display, the new time setting will be shown on the temperature display.)
- The up/down buttons are used to adjust to the required time value (displayed in seconds), for the selected temperature.

NB: 007 on pressure display does not flash.

- Press accept to update with the new setting (007 is still on the pressure display and the accepted value on the temperature display.)
- Press Standby button to exit CAL 07.

CAL 08 Factory default

This mode is used to return unit to the factory de-fault settings i.e. Temperature and Time.

SEQUENCE

- Open door.
- Enter CAL mode.
- The up/down buttons are used to obtain a displayed mode “008.”
- Press Accept and the unit should return to ready mode.

NB: If the original default settings are required it is now essential that these are re-booted into the software. This is done by switching off, then back on again at the mains plug.

CAL 09 Residual air content

This mode is used to set the residual air content of the vessel.

Do not use this mode unless the means are available to determine residual air content and it is known why it is required to change the default setting.

SEQUENCE

- Open door.
- Enter CAL mode.

- The up/down buttons are used to obtain a displayed mode “009.”
- Press accept.
- The up/down buttons are used to adjust displayed arbitrary value
- Press accept to end sequence.

CAL 10 Pre-vacuum time limit (seconds) (1st pulse only)

This mode is used to set the time limit for achieving the required vacuum pressure. This is a time flag. If the required vacuum pressure has not been reached by the set time error code E 04 will occur.

SEQUENCE

- Open door.
- Enter CAL mode
- The up/down buttons are used to obtain a displayed mode “010.”
- Press accept (010 is now flashing on the pressure display).
- The up/down buttons are used to adjust to the required value. Display in seconds.
- Press accept to update with the new setting (010 stops flashing and the accepted value is shown on the temperature display).
- Exit by pressing the standby button.

CAL 11 Pre-vacuum pressure limit (1st pulse)

This mode is used to set the Vacuum pressure limit.

SEQUENCE

- Open door.
- Enter CAL mode.
- The up/down buttons are used to obtain a displayed mode “011.”
- Press accept (011 is now flashing on the pressure display.)
- The up/down buttons are used to adjust to the required value. Display in kPa.
- Press accept to update with the new setting (011 stops flashing and the accepted value is shown on the temperature display.)
- Exit by pressing the standby button.
- Unit returns to ready mode.

CAL 12 Post vacuum heater temperature

Allows the band heater temperature to be adjusted.

SEQUENCE

- Open door.
- Enter CAL mode.
- The up/down buttons are used to obtain a displayed mode “012.”
- Press accept (012 is now flashing on the pressure display.)
- The up/down buttons are used to adjust to the required value. Display in seconds.
- Press accept to update with the new setting (012 stops flashing and the accepted value is shown on the temperature display.)
- Exit by pressing the standby button

NB: Heater band is not activated. Use Engineering Mode 10 to test CALIBRATION.

CAL 14 Set cycle availability

This facility allows the Engineer to select which cycles can be used. For example only 132°C cycles could be selected. No other 121 cycles could then be used. The sequence of events is as follows:-

SEQUENCE

- Open door.
- Enter CAL mode.
- The up/down buttons are used to obtain a displayed mode “014.”
- Press accept (014 is now flashing on the pressure display.)
- The Temperature display is now showing “On.”

- The LED's indicate a 132°C Vacuum cycle. The "On" on the temperature display is showing that the 134°C vacuum cycle has been selected.
 - If this was not required the down button would have to be pressed, which would change the display to "OFF" i.e. not selected.
 - If this is what is required proceed to the next cycle option i.e. 121°C Vacuum cycle by pressing the Up button.
 - This is then selected or not selected as required using the same method described above.
 - When set as required press the Up button to go to the next cycle i.e. 132°C Non-Vacuum drying cycle and proceed in the same manner.
 - Carry on with this procedure until all cycles have been selected or not selected.
 - Once all the settings have been accessed and they have been checked as correct, press accept (014 stops flashing on the pressure display.)
- If the standby button is pressed, the unit should now automatically be in CAL 15 (Default setting) i.e. 015 flashing on the pressure display and "On" flashing on the temperature display.
- Scroll through all selected cycles by pressing the Up button.
- When the cycle required is reached accept is pressed, 015 is still showing on the pressure display but has stopped flashing and On is still showing on the temperature display.
- The standby button is pressed and the unit returns to ready mode.
- Pressing the standby button or switching off and on at the mains whilst in this ready mode results in an E01 error mode being indicated on the temperature display. This can be cleared using the normal recovery sequence.

CAL 15 Set machine default

This allows the Engineer to set the required cycle default i.e.


The cycle to which the unit returns to on completion of a cycle etc.


SEQUENCE


- Open door.
- Enter CAL mode.
- The up/down buttons are used to obtain a displayed mode "015."
- Press accept (015 is now flashing on the pressure display.)
- Scroll through all selected cycles by pressing the Up button.
- When the cycle required is reached press accept, 015 is still showing on the pressure display but has stopped flashing and On is still showing on the temperature display.
- Press the standby button and the unit returns to ready mode.
- Pressing the standby button or switching off and on at the mains whilst in this ready mode results in an E01 error mode being indicated on the temperature display. This can be cleared using the normal recovery sequence.


Factory default settings

	Unwrapped	Pouch	Pack	Liquid
Cal01	132.0	132.0	121.0	121.0
Cal02	132.5	132.5	121.5	121.5
Cal03				
Cal06				
Cal07	180	900	1800	1800
Cal08	Default	Default	Default	Default
Cal09	2	2	2	2
Cal10				
Cal11				
Cal12	195	195	195	195
Cal13				
Cal14	On	On	On	On
Cal15	On			
Cal16				
Cal17				
Cal18				

 121°C/30minutes cycle for textiles and wrapped surgical packs plus other items except liquids, plus item recommended for exposure at this temperature and time.

 121°C/30minutes cycle with special vent and dry functions for liquids or gels that could boil over with rapid depressurisation, not suitable for liquids intended for direct patient contact.

 132°C/3minute cycle for instruments loose on a tray, glass or metal canisters or tubing not used in surgical procedures.

 132°C/15minutes cycle for instruments and dental hand-pieces, loosely wrapped individual instruments, multiple layers of instruments separated by fabric, wrapped trays of loose instruments or tubing not used in surgical procedures, plus item recommended for exposure at this temperature and time.

Chapter 4

Engineering Modes

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Engineering Modes

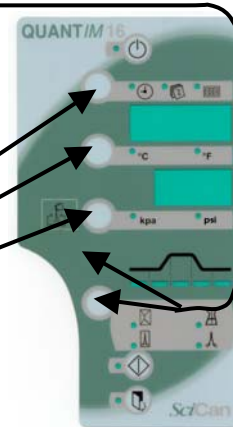
Introduction

Engineering modes are provided to ensure that the diagnostic process can proceed smoothly. Each output device can be operated individually, this allows easy pin pointing of parts that are not operational.

Entering engineering mode

Engineering modes are entered by using an access code complete with Up/Down and accept buttons:-

- To enter Engineering (ENG) modes, press and hold both drying cycle selection button and the button immediately above (this may be concealed) for 10 seconds.
- The letters "Eng" will appear in the
- Temperature display, "001" will appear in the pressure display window.
- Up button, was date/ time/cycle count button.
- Down button, was Deg C button
- Accept button, was Kpa button



ENG 01 ASME valve test

This mode is used to over pressure the vessel in order to test the pressure release valve.

The pressure relief valve (PRV) is not fitted with a pull ring. Do not attempt to manually lift valve.

SEQUENCE

- Open door.
- Enter ENG mode.
- Press accept -(001 is flashing on pressure display & actual vessel temperature on the temperature display).
- Close door.
- **Select 132Unwrapped.**
 - Press cycle start button, unit will then proceed as for a normal cycle, eventually the ASME valve will vent.
 - Record pressure / temperature.
 - Switch off and on at mains to recover.
 - Recovery should then be as per Interruption to a cycle User message 01

ENG 02 Printer test

This mode is used to test that the printer is working

SEQUENCE

- With printer installed
- Enter ENG mode
- Use Up/Down button to obtain a displayed mode "002"
- Press accept – this will produce a test print.
- Press accept again to make test
- Press standby button to exit – unit returns to ready mode.

Printer should then print out (typically):

Prestige Medical Century 2100

Serial No: 98010800 (For example)

Date: 08/01/98 (For example)

Time: 10:52 (For example)

Version: SCI-1-0

Printer Test: OK.

NB: Actual printed text may vary with customer specific models.

ENG 03 Valve test

This mode is used to test that the valve block is working.

Air bleed valve may be tested in this mode (also “standby” followed by Ready - only after power On/Off.) Open door, use a tube and blow air through hole in brass fitting in the chamber whilst cycling valve On/Off.

Both fill and flush valves can be checked for flow rate. Remove tube from boiler filter, place a container under tube. Fill water tank. Cycle valves On/Off and check flow rate.

Fill circuit has a higher flow rate than flush valve.

SEQUENCE

- Enter ENG mode
- The up/down buttons are used to obtain a displayed mode “003”
- Press accept - 003 is flashing on the pressure display and the first cycle status LED is illuminated.
- Press the accept button - 003 still flashing but first cycle status LED goes out.
- Press accept - 003 is flashing on the pressure display and the second cycle status LED is illuminated.
- Press the accept button - 003 still flashing but second cycle status LED goes out.
- Repeat the above procedure until all valves have been tested. Each cycle status LED represents a valve and when illuminated indicates that the valve is open.
- Once each valve has been tested it is possible to exit by pressing the standby button.

The following is a key for identification purposes: -

Key for identifying valves

- 1st. Cycle Status LED “On” = Air Bleed Valve Open.
- 2nd. Cycle Status LED “On” = Vacuum Valve Open.
- 3rd. Cycle Status LED “On” = Flush Valve Open.
- 4th. Cycle Status LED “On” = Water Fill Valve Open.
- 5th. Cycle Status LED “On” = Air Inlet Valve Open.
- During this mode it is possible to check valve function by disconnecting pipes and checking for flow, it is possible to check the air bleed function by blowing into the air bleed fitting using a piece of tube (fitting located bottom front left of chamber with door open.)
- It is possible to use a Multimeter to check the applied voltage at the power control module connector block, also check coil resistance (when valve harness is disconnected from module).

NB: If there is any water in the water tank then the boiler will tend to fill when either the water fill or flush valve are opened this may lead to an Error E10.

ENG 04 Vacuum pump test

This mode is used to determine if the vacuum pump is working.

Note: Vacuum pump will not start if a vacuum exists in the inlet pipe.

SEQUENCE

- Enter ENG mode
- The up/down buttons are used to obtain a displayed mode “004”
- Press Accept button - 004 is flashing on the pressure display and Eng on the temperature display. The vacuum pump also starts running.
- Press Accept button again - 004 is flashing on the pressure display and Eng on the temperature display. The vacuum pump is no longer running.
- The pump can be switched on and off by pressing the accept button.
- When finished Exit by pressing the standby button - unit returns to ready mode.

ENG 05 Fan test

This mode is for testing the fan.

SEQUENCE

- Enter ENG mode
- The up/down buttons are used to obtain a displayed mode “005”
- Press Accept button - 005 is flashing on the pressure display and Eng on the temperature display. The fan is now running at varying speeds.

- When finished Exit by pressing the standby button - unit returns to ready mode.

ENG 06 Door solenoid test

This mode is used to test that the door solenoid is working.

Shut door, operate mode, check that door pops open but held in drying position, release mode and check door opens fully.

SEQUENCE

- Enter ENG mode
- The up/down buttons are used to obtain a displayed mode "006"
- Press accept - 06 is flashing on Pressure Display, with Eng on the temperature display. The solenoid also energises, and the door opens to the drying position.
- Press accept again - 006 is flashing on Pressure Display, with Eng on the temperature display. The solenoid is now de-energised.
- Press standby button to exit - unit returns to ready mode. It is possible to use a Multimeter to check the applied voltage at the power control module connector block, also check coil resistance (with solenoid disconnected from the module).

ENG 07 Boiler heater element test

This mode is used to test that the Triac drive circuit and the boiler heating element are working.

If left 'on' in this mode it is possible to the test thermal cut-out located on the boiler.

It may show E12 error before cut-out operates.

SEQUENCE

- Enter ENG mode
- The up/down buttons are used to obtain a displayed mode "007"
- Press accept - 007 is flashing on the pressure display. "OFF" on the temperature display. This indicates Triac drive inactive.
- Press accept - 007 is flashing on the pressure display. "On" on the temperature display. This indicates Triac drive is active.
- Press standby button to exit – unit returns to ready mode

NB: When using this mode, place 100ml of water in boiler and wait for steam to be generated, then de-energise to check that correct function is obtained.

- It is possible to use a Multimeter to check the applied voltage to the heating element, also check element resistance with mains power off and element disconnected from module.

ENG 08 LED & Buzzer test

This mode is used to test that all the display LED's and buzzers are working.

SEQUENCE

- Enter ENG mode
- The up/down buttons are used to obtain a displayed mode "008"
- Press accept - All LED's begin to flash on and off accompanied by a buzzer.
- Press standby button to exit - unit returns to ready mode.

ENG 10 Drying cycle heater test

To check that the drying cycle heater warms up.

SEQUENCE

- Enter Eng mode
- The up/down buttons are used to obtain a displayed mode "010"
- Press accept - 010 is flashing on the pressure display. "OFF" on the temperature display. This indicates that the band heater is switched off.
- Press accept - 010 is flashing on the pressure display. "On" on the temperature display. This indicates that the band heater is switched on.
- Check using thermocouple attached to vessel base.
- Exit by pressing standby - unit returns to ready mode.

Chapter 5

Maintenance

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Tools and Test Equipment

Special tools

Part No	Description	Quantity
279400	Spacers for vessel to chassis alignment.	1
279401	Spacer rear chassis plate.	1
279402	Remover hinge pin.	1

Standard hand tools

Socket 26mm
Socket 13mm extended
Socket 19mm
Extension 3/8 x 125mm
Spinner, nut M5
Spinner, nut M4
Screwdriver Pozi 1
Screwdriver Pozi 2
Screwdriver Pozi 4
Spanner, 10mm A/F
Spanner, combination 13mm A/F
Pliers, circlip
Screwdriver, 6mm flat blade
Screwdriver, 3mm flat blade
Pliers
Side cutters, small
Allen Key, 4mm A/F
Gauge, feeler 0,5mm
Adaptor, entry port-1/4 BSP, (quantity 2)
Spanner 30mm

Electrical equipment

Multimeter, 3.5 digit
Megger 500vdc

Temperature measuring equipment

Thermocouple, single point, type T or K.
Accuracy +/- 0.2 deg at 134 deg C (calibrated).
Resolution 0.01 bar

Pressure measuring equipment

Range absolute. Accuracy +/- 0.02 bar at 3 bar absolute (calibrated).
Resolution 0.01 bar

Consumables

Part No	Description	Quantity
279142	Glass tape	4 x 40mm rolls
279218	RTV	1 tube
	Tape heat resistant	1 roll
279118	Tie wrap	10
	Vaseline	1
279421	Grease	1

Torque settings

Nut M30 chamber housing	1.5 Nm
Nut, ASME valve	65 Nm
Nut M8, boiler strap	10 Nm
Nut dome, door plate	10 Nm
Nut M8, vessel to chassis plate	24 Nm
Bolt M8, chassis plate to bezel	20 Nm
Fixing M6	6 Nm
Fixing M5	2.5 Nm
Port door entry	2 Nm
Door fixing screws	2.2 Nm
Screw strike plate	0.5 Nm
Plate door micro switch	1.7 Nm
Boiler probe fixing nuts	1.0 Nm

Electrical values

	Typical values	
Solenoid, valve Coil	13.7 Ω	
Solenoid, door	12.8 Ω	
Heater, boiler 230v	24.7 Ω	
Heater, boiler 110v	8.0 Ω	
Sensor, PT100, chamber and boiler (at ambient)	109.1 Ω	
Thermistor, boiler sensor (at ambient)	80.5 Ω	
Coil, vacuum pump 230v	20.2 Ω	
Coil, vacuum pump 110v	5.2 Ω	
Thermistor, drying cycle	130.0 Ω	
Solenoid, drive voltages, door and valve block	5.1v	
Fan, drive (using Eng 09)	23.0v	
Transformer, output (orange)	36.0v	
	(white)	10.4v
	(Yellow)	12.6v
Printer, drive	12-18vdc	

Parts Removal and Re-fitting

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Before working on the product ensure that it is unplugged from the mains supply and that the fresh water tank is empty.

1. Gasket replacement

The gasket is located on the inside of the door and is accessed by:

Opening the door.

Removing the two M6 nuts securing the gasket plate.

Taking a firm hold of the sealing gasket lip and pull hard to remove the gasket and plate from the vessel lid.

Peel the gasket from the plate.

On reassembly ensure that plate is clean, seat gasket onto plate such that gasket lip is on the same side of the plate as the entry port plug heads (NOT NUT SIDE.) Always use new seals under dome nuts. Tighten to 10Nm.

NB: (a) Any dirt on the sealing rib of the gasket or on the vessel sealing surface will cause a steam leak.

(b) Spray cast lid in gasket seat area with dry PTFE lubricant to prevent gasket from bonding to cast lid.

Spares refer to chapter 6 figure 1

2. Front door moulding removal

Open the door.

Disconnect the flexible pipe from the drain tap.

Unclip the pipe from the door moulding.

Remove 4 off M6 x 16mm securing screws.

On reassembly, check that the rubber bushings and metal spacers are in place and in good condition.

2.1 Drain tap removal

Open the door.

Undo 2 off M3 plasti grip screws.

2.2 Use of entry ports

Remove front door moulding.

Remove either one or two entry port plugs as required.

NB: It is now possible to insert the required test equipment.

When disconnecting pipe from drain tap, fold pipe back on itself and clip in this position.

On reassembly, ensure that new silicon washers are fitted under the bolt head and the bolt heads are inside the vessel and the nuts are visible when door is shut, torque tighten to 2Nm.

Spares refer to chapter 6 figure 1

3. Printer door moulding and Hinge replacement

Using slight force, simply pull hinges out of bezel moulding.

On reassembly, “Superglue” hinges into door moulding. Hinges are a push fit into bezel, do not glue.

Spares refer to chapter 6 figure 1

4. Electrical cord and Fuse replacement

Remove 4 off fixing screws holding the cable clamping plate from the rear moulding.

Disconnect the electrical cord from the power/control module.

The two fuses can now be accessed through the gap left by the removal of the clamping plate.

Spares refer to chapter 6 figure 1

5. Rear case removal

Place a 30mm spacer under the chassis to support the unit during removal.

Remove 4 off M4 screws and disconnect the mains cable.

Remove the rear access panel and disconnect fan connector from the power/control module.

Remove 3 off M4 fixing screws from rear cover plate / extension moulding.

On reassembly, reverse above actions but ensure that rear case does not pick up on any wires and replace the olive on single use units.

Spares refer to chapter 6 figure 1

Note: Once the rear case has been removed the following items can be accessed

6. Fan and Finger guard removal

Located on the side of the rear moulding the fan and guard is removed by:

Removing 4 securing screws from side of the rear moulding.

Fan and finger guard may now be removed.

On reassembly, ensure that the airflow direction is out from the rear moulding and that the wires exit from fan at its bottom front corner.

Spares refer to chapter 6 figure 2

7. Water tank removal

Located on the side of the chassis, unplug the electrical wires (blue and yellow) from the power/control module.

Remove silicone tube from bottom of tank and collect any residual water.

Remove silicone tube from end of silencer.

Remove the self-tapping screw from the locating pip on rear of tank.

Slide tank rearward off the chassis and carefully remove.

Spares refer to chapter 6 figure 3

8. Vacuum pump removal

Located on the side of the chassis, disconnect the hoses from pump to the valve block and silencer.

Remove the valve block (para 19).

Unplug from PCB and ease the harness through the chassis.

Undo the 4 off nuts securing the pump to the vessel side of the chassis.

8.1 Silencer removal

The silencer is secured to the bracket by a N°6 self tapping screw,

To remove the silencer first undo the locating screw holding the water tank and gently ease the tank slightly away from the chassis, the silencer screw can now be accessed. Alternatively remove the screw using a right-angled screwdriver.

8.2 Pump bracket removal

The brackets are secured to the chassis by 4 M6 nuts.

On reassembly, it is important that the spigots on the vacuum pump lid and silencer are facing away from the chassis. Also that the hose connecting the pump and the silencer is clear of the rotating part of the pump (note that the silencer spigot is slightly off set towards the pump by approximately 10°.

Ensure that the tubes on the pump and the silencer are pushed fully over the spigots; it is advisable to change all tubes.

Spares refer to chapter 6 figure 3

9. Air filter replacement

Located on the chassis above the vacuum pump, unclip filter.
Remove adapter from filter

On reassembly, change adapter and clips as required.

Spares refer to chapter 6 figure 3

10. Display module removal

Located at the back of the bezel moulding remove the fresh water tank (para 7).
Unplug the display module supply and the printer cables.
Remove 6 off M3 x 5mm fixing screws.
Remove the display PCB module.

On reassembly, ensure that all the small 3mm LED's line up with the holes in the bezel and that the switches are flush with the outside face of the moulding.

Spares refer to chapter 6 figure3

11. Door solenoid removal

Located on the chassis under the bezel moulding, remove the water tank (para 7).
Remove two securing screws and springs.
Unplug the solenoid (two red wires) from the power/control module.

See chapter 6 figure 1 for spring arrangement

Spares refer to chapter 6 figure 1

12. Chamber temperature probe replacement

Located on the topside of the vessel, undo the large black nut from the brown sensor housing until the keeper piece is loose.
Pull out the PT100 sensor.
Remove sensor wires from the terminal block on power/control module.

On reassembly, it is recommended to change the small black sealing grommet within the brown sensor housing. The PT100 probe tip should be flush with the inside rim of the brown moulding, open door to check. Ensure that the large washer is in place and hand tighten only the black nut.

Spares refer to chapter 6 figure 3

13. Chamber sensor moulding removal

Located on the topside of the vessel, remove the probe (para 13).
Remove first the black nut, washer and the keeper piece.
Remove second black nut.
Moulding may now be removed by pushing into the chamber.

On reassembly, it is recommended to change both moulding to vessel seal and sensor grommet. Always ensure that the moulding to vessel seal is correctly seated before applying black nut, this may be done by viewing seal from the outside of the chamber. When viewing seal from the inside front of the chamber, the small black tab should be clearly visible at the point nearest the front of the chamber. Black nut holding moulding to vessel should be hand tightened plus ½ turn with a spanner.

Spares refer to chapter 6 figure 3

14. Power control module removal

Located at the rear of the unit at the back of the vessel, unplug all connectors, noting position of connectors (ref to circuit diagram).

Remove 4 off M5 x 10mm fixing screws.

Slide the entire bracket out of the chassis plate cut out.

Unplug flying leads to the boiler heating element.

Spares refer to chapter 6 figure 3

15. Transformer replacement

Located on side of the chassis on the hinge side of the unit, unplug the transformer from the power/control module.

Remove 1 off M5 x 10mm fixing screw and 1 off M5 fixing nut.

Swing transformer free of the top bracket location.

Remove transformer.

Spares refer to chapter 6 figure 3

16. Door micro switch replacement

Located between the front door moulding and attached to the vessel lid, remove door moulding (para 2).

Remove rear case (para 5).

Cut tie wrap holding micro switch wire to chassis plate.

Remove glass fibre tape.

Remove 2 off M4 x 5mm fixing screws.

On reassembly, ensure that the washers are in place, set micro switch such that with the door shut and the lever fully engaged on the strike plate the micro switch contacts have changed state to close the circuit, the micro switch body should be almost touching the lever angled face.

Spares refer to chapter 6 figure 4

17. Door open spring removal

Located behind the hinge, remove rear case (para 5).

Unclip spring.

Spares refer to chapter 6 figure 3

18. Vessel lid removal

Located in the door, remove door moulding (para 2).

Remove rear case (para 5).

Cut tie wraps holding door micro switch to chassis plate and bezel.

Unplug door micro switch from power/control module.

Feed door micro switch wire through hinge area to outside of bezel moulding.

Remove the door spring and the anchor post.

Remove hinge pin top circlip.

Place unit on its side (tank side to worktop).

Align lower hinge pin circlip "ears" with free space so as to avoid chassis plate.

Insert the pin extractor tool through the aperture in the base of the bezel and screw into the hinge pin.

With the right hand supporting the vessel lid in the closed position draw out the pin.

Place the pin and tool on a clean surface.

Release the door catch and remove the vessel lid.

NB: Failure to fit circlips **WILL** result in vessel failure.

Always apply ample grease to pin and outer mating surfaces of the vessel extrusions.

The pressure vessel and lid are treated as a single spares item due to the safety implications of in field repairs being made without a full hydrostatic test being available.

Always apply grease to pin and outer mating surfaces of the vessel extrusions.

The vacuum vessel lid differs in that the hinge holes are slotted, a lid from a non-vacuum machine will **NOT WORK**.

Spares refer to chapter 6 figure 4

19. Valve block removal

Located in between the vessel and the chassis, rotate the unit and place face down on a protected work surface.

Unplug valve block from power control module.

Free up harness back to valve block.

Disconnect both pipes from fresh water tank.

Disconnect air bleed tube at vessel end.

Disconnect boiler tube at boiler end.

Pull silicone tube back through bezel hole.

Remove 2 off M6 x 8mm fixing nuts.

Pull 8mm copper tube away from boiler, cut RTV joint.

On reassembly, always fit a new tube between valve block and water tank. Never reuse the metal clip used to grip black tube to water tank copper tube. Apply RTV to the joint between the 8mm copper tube and boiler back plate.

Spares refer to chapter 6 figure 4

20. Boiler /Vessel seal replacement

Located under the unit attached to the vessel by a strap, remove power/control module.

Remove 4 attaching screws to release the rear support bracket by removing Invert unit.

Remove 2 screws, block and pillar nuts to release the thermal cut out on rear of boiler.

Remove earth wire from boiler.

Undo the 2 off M8 fixing nuts.

Pull boiler off vessel breaking the boiler to vessel seal and cut the 8mm tube RTV to tray joint.

On reassembly, ensure that the correct size of boiler is used and always use a new boiler to vessel seal.

Set boiler at the correct dimension from the front lip of the vessel.

Ensure that the boiler is installed flat with respect to the chassis plates.

Apply RTV to the 8mm tube to tray joint.

Spares refer to chapter 6 figure 4

21. Boiler temperature and Water level sensor replacement

Attached to the side of the boiler, remove 2 off M3 long nuts on side of boiler.

Pull out probe,

Pull out seal.

Remove clamp plate.

On reassembly, always fit a new seal. Insert probe until only 15mm remains outside of the boiler from cast face of boiler.

NB: The outer sheath of the probe is the water level sensor.

Spares refer to chapter 6 figure 4

22. Boiler thermistor replacement

Attached to the side of the boiler, cut cable tie securing the yellow twisted wires.

Pull sensor out of boiler casting.

On reassembly, ensure that all the old RTV is removed from the boiler hole.

Before inserting new probe ensure that the boiler hole is well packed with RTV, use fast cure RTV, leave until set before running autoclave.

Spares refer to chapter 6 figure 4

23. Condensate tray removal

Attached to the front of the boiler, rotate unit and place onto a protected worktop, under side upper most.

Remove 2 off M4 x 5mm fixing screws.

Remove 8mm copper tube, undo at valve block and pull out of tray hole.

Pull tray away from boiler.

On reassembly, apply RTV to new tray so as to seal all areas to boiler except cut out in top from which the steam escapes.

Spares refer to chapter 6 figure 4

24. ASME valve replacement

Attached to the side of the boiler, remove boiler (para 20).

Remove ASME valve.

Remove vent tube.

On reassembly, always use a new valve to boiler seal.

Tighten to 65 Nm.

Set to valve decline.

Spares refer to chapter 6 figure 4

25. Water filter replacement

Remove rear cover plate.

Fitted to the side of the boiler, undo plastic pipe back nut.

Remove plastic pipe.

Remove filter.

On reassembly, flush out boiler with water

Use PTFE tape on filter thread

Spares refer to chapter 6 figure 4

26. Drying cycle heater element replacement

Attached to the underside of the vessel secured by three straps, rotate unit and place top down on work surface.

Remove heater element wire for terminal block on the power/control module.

Undo straps holding band in place.

Remove band.

On reassembly, check location of temperature sensor

Spares refer to chapter 6 figure 4

27. Drying cycle temperature sensor replacement

Attached to the side of the vessel by the drying cycle heater element securing strap, rotate unit and place top down on work surface.

Slacken the strap holding sensor in place

Unplug the sensor (single white wire) from the power/control module.

Remove sensor.

On re-assembly, ensure that sensors are correctly positioned against the folded over edge on the heater element.

Spares refer to chapter 6 figure 4

28. Vessel Removal

Disconnect the door spring.

Remove the chamber temperature probe and chamber sensor moulding.

Undo the drying cycle heating element and the temperature sensor. (para 26 and 27)

Remove the 4 screws holding the rear chassis panel.

Disconnect the boiler. (para 20)

Remove the vacuum pipe at the base of the vessel.

Remove the 4 nuts attaching the vessel to the chassis.

Lift the vessel from the chassis.

On reassembly check that the 4 spacers are firmly attached under the rim.

NB: The pressure vessel and lid are treated as a single spares item due to the safety implications of in field repairs being made without a full hydrostatic test being available.

Always apply grease to pin and outer mating surfaces of the vessel extrusions.

The vacuum vessel lid differs in that the hinge holes are slotted, a lid from a non-vacuum machine will **NOT WORK**.

Spares refer to chapter 6 figure 4

29. Bezel moulding removal

Located between the door and the chassis

Empty the water tank.

Remove furniture.

Remove rear case (para 5).

Remove door moulding.

Cut ties securing door micro switch harness, unplug micro switch.

Remove circlip from top of door hinge pin.

Remove hinge pin and ease the door out.

Push water drainpipe through hole in bezel.

Place unit face down.

Unplug the display harness from the display module.

Release the water drainpipe, the display, valve, and door solenoid harness from the clips on the bezel.

Remove the three nuts, one bolt and four washers that secure the chassis to the bezel. Lift the chassis and vessel assembly clear of the bezel.

Set the chassis down in an upright position on a firm surface, when lifting the chassis hold the door interlock in the open position.

On reassembly, place the new bezel on a protected surface (preferably packed up on the low side so as to be level).

Fit the display board into the bezel.

Lift the chassis assembly face down and lower onto the three locating studs in the bezel, ensuring that no harness or tubing is in a position to get caught between chassis and bezel.

Place one washer and nut on each of the three studs. Tighten a little more than hand tight so as to hold the chassis in place for the next operation.

Turn the unit onto its side and replace the door, when the hinge pin is in the correct position, refit circlip.

Replace the chassis to bezel washer and bolt.

Turn the unit upright and check the door alignment, if not correct then loosen the nuts slightly.

Set the unit in a position that the widest gap around the door is on the bench tighten any nuts or bolt that is accessible.

Turn unit upright. Check door alignment when correct tighten the three nuts and one bolt to 8Nm.

Refit all other parts.

NB: A new front decal will need to be fitted.

Spares refer to chapter 6 figure 1

30. Chassis plates removal

Remove door moulding (para 2).

Remove rear case (para 5).
Remove power/control module (para 14).
Remove transformer (para 15).
Remove the vacuum pump and brackets (para 8).
Remove the air filter (para 9).
Rotate vessel and place face down on a protected work surface.
Remove valve block (para 19).
Remove water tank (para 7).
Remove vessel lid (para 18).
Undo and remove 3 off M8 nuts and 1 off M8 bolt.
Free wire from bezel clips (do not disturb the display harness).
Free silicone tube from bezel.
Lift chassis assembly out of moulding and place on a work surface correct way up.
Remove 2 off M4 x 10mm solenoid fixing screws.
Remove solenoid (para 11).
Remove solenoid armature from interlock lever.
Remove interlock pin top circlip.
Slide pin out.
Remove interlock lever.
Place assembly face down on a protected work surface.
Remove 4 off M8 vessel to chassis plate fixing nuts.
Slide out chassis plate on hinge side of vessel.
Slide out chassis plate on interlock side of vessel, at same time remove solenoid bracket.

Chassis plates reassembly

Place solenoid bracket on hinge side bolts before spacer.
2 off spacers (flat rectangular sheet with two holes for stainless steel vessel);
2 off small M8 washers to be fitted under the M8 nuts hinge side (washer fits between nut and chassis plate)
2 off large washer to be fitted under the M8 nuts interlock side (washer fits between nut and chassis plate)
4 off large washer to be fitted under 3 off M8 bolts and 1 off M8 nut fixings chassis plates to bezel moulding
Tighten 4 off vessel to chassis plate M8 nuts to 24 Nm
Tighten 3 off bolts M8 and 1 off nut M8 to 8 Nm.
NB: Failure to fit circlips **WILL** result in vessel failure.

1. Setting the pressure vessel into the chassis plates

Reassemble vessel and chassis plates to the point where final tightening of the vessel to chassis plate fixing nuts is required before fitting interlock lever and solenoid.

Place assembly face down on a protected work surface

Fit spacer blocks to the 4 off chassis plate front holes, this will leave the vessel sealing face flat on the surface whilst lifting up the chassis plates, when all is settled without gaps, tighten vessel to chassis plate fixing nuts. **Place assembly in bezel and check that the vessel is central to the bezel, if not, repeat previous step but making an adjustment to ensure centralisation. Failure to centralise vessel to bezel will cause cast lid to bezel alignment problems and possible damage to the bezel paint finish.**

2. Setting of the solenoid.

Reassemble chassis plates and vessel such that the solenoid and interlock lever are reinstalled, ensure that the solenoid 2 off M4 fixing screws in place but not tightened.

Fit lid to vessel

Adjust M4 stop screw on solenoid bracket such that with lever fully engaged on cast lid strike plate a gap of 0,5mm exists between lever and end of stop screw.

Tighten locking nut and check clearance.

Vessel door should, on closing, first touch the interlock lever on its angled face.

By hand squeeze interlock lever and solenoid so as to mimic the solenoid when energised, the solenoid **MUST** be bottomed.

Slide solenoid back until the outer edge of the interlock lever is fully engaged on the metal plate closing the recess in the casting in which the lever operates.

Tighten solenoid fixing screws.

Check operation of door by pushing vessel lid into the closed position, then manually operate the solenoid to its full extent and check that the door opens freely and is caught on the outer face of the interlock lever.

3. Safety. Failure to correctly fix and locate pressure vessel will cause problems with cast lid and door alignment.

Failure to correctly set the solenoid may invalidate essential safety features

4. Always apply grease to pin and outer mating surfaces of the vessel extrusions.

Spares refer to chapter 6 figure 3

IF IN DOUBT CALL SciCan FOR ASSISTANCE.

Chapter 6

Spares Breakdown

To obtain the correct item when ordering spares it is essential to quote the model number and serial number.

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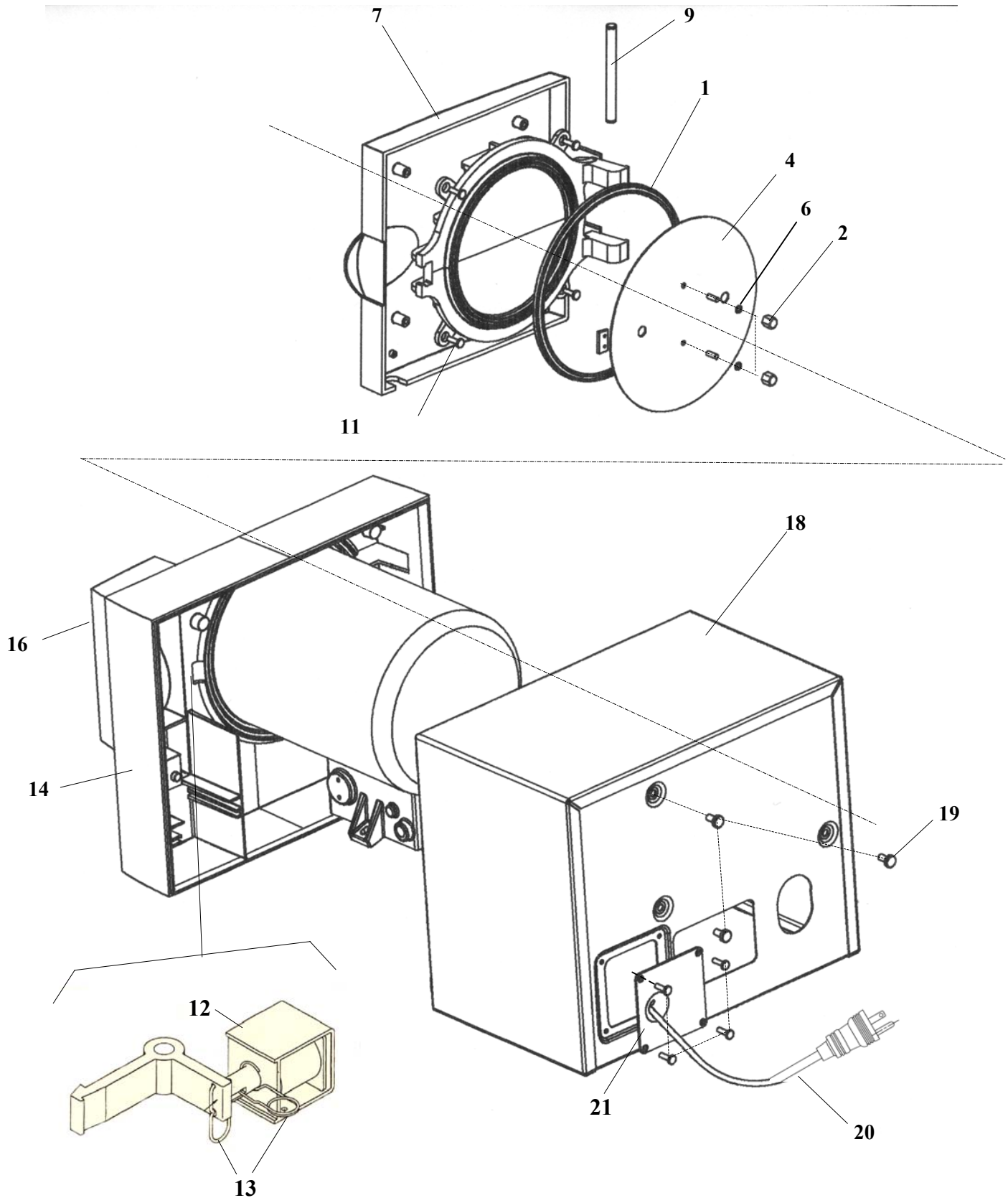


Figure 1

Figure	Indent	Part no.	Description	Quantity
1	1	279011	Kit, door gasket 250 Gasket, moulding 250 Washer rubber 6mm I/D	1 2
1	2	279100	Kit, dome nut M6 Nut domed M6 O Ring Screw socket grub M6 x 20	2 2 2
1	3	279104	Kit, entry plug Lock nut 1/4 BSP Plug entry port O Ring	(NI) 2 2 2
1	4	289001	Kit, plate 250 vacuum Plate 250 Nut domed M6 O Ring Screw socket grub M6 x 20	1 2 2 2
1	5	279107	Entry port O-ring	2 (NI)
1	6	279215	Washer sealing 6mm plate	1
1	7	289124	Kit, door moulding Moulding door Screw M3 Cable clip 13mm Valve drain	1 2 1 1
1	8	279102	Kit, drain tap and pipe clip Valve drain Screw M3 x 8 Cable Clip 13mm self adhesive	(NI) 1 2 1
1	9	279143	Kit, pin set Pin hinge Pin interlock Circlip pin	1 1 4
1	10	279141	Circlip pin	4 (NI)
1	11	279103	Kit, door screws, grommets and spacers Screw M6 x 20 Spacer door moulding Grommet door mounting	4 4 4

Figure Indent		Part no.	Description	Quantity
1	12	279170	Solenoid door interlock	1
1	13	279171	Kit spring, door solenoid	
			Spring bias	1
			Spring break link	1
1	14	289126	Kit, bezel 250 (with printer door and feet)	
			Bezel 250	1
			Cable clip 6mm self adhesive	1
			Cable clip 13mm self adhesive	4
			Foot bezel	2
			Screw self tapping	2
			Door printer sub-assembly	1
			Plate catch self adhesive	1
			Catch magnetic self adhesive	1
1	15	279189	Kit, feet (bezel)	(NI)
			Foot bezel	2
			Screw self tapping	2
1	16	289128	Decal front panel	1
1	17	279192	Decal no tap water	1 (NI)
1	18	279111	Kit, rear case (with feet)	
			Case rear	1
			Screw M4 x 10	6
			Screw M8 x 10	5
			Foot	2
1	19	279114	Kit fixing, rear case	
			Screw M4 x 10	6
			Screw M8 x 10	5
1	20	289123	Cord set UL	1
1	21	279260	Moulding rear plate	1
1	22	279000	Kit, printer accessory	(NI)
1	23	289083	Kit, printer	(NI)
			Printer unit	1
			Roll printer	1
			Handbook printer	1
1	24	279001	Roll printer	1 (NI)

1	25	289102	Ribbon printer	1 (NI)
Figure	Indent	Part no.	Description	Quantity
1	26	289125	Kit, printer door moulding with hinges	(NI)
			Moulding door printer	1
			Hinge printer door	2
			Plate catch self adhesive	1
1	27	279200	Printer door catch	(NI)
			Plate catch self adhesive	1
			Catch magnetic self adhesive	1
1	28	279202	Harness printer	1 (NI)
1	29	279216	Hinge printer door	2 (NI)

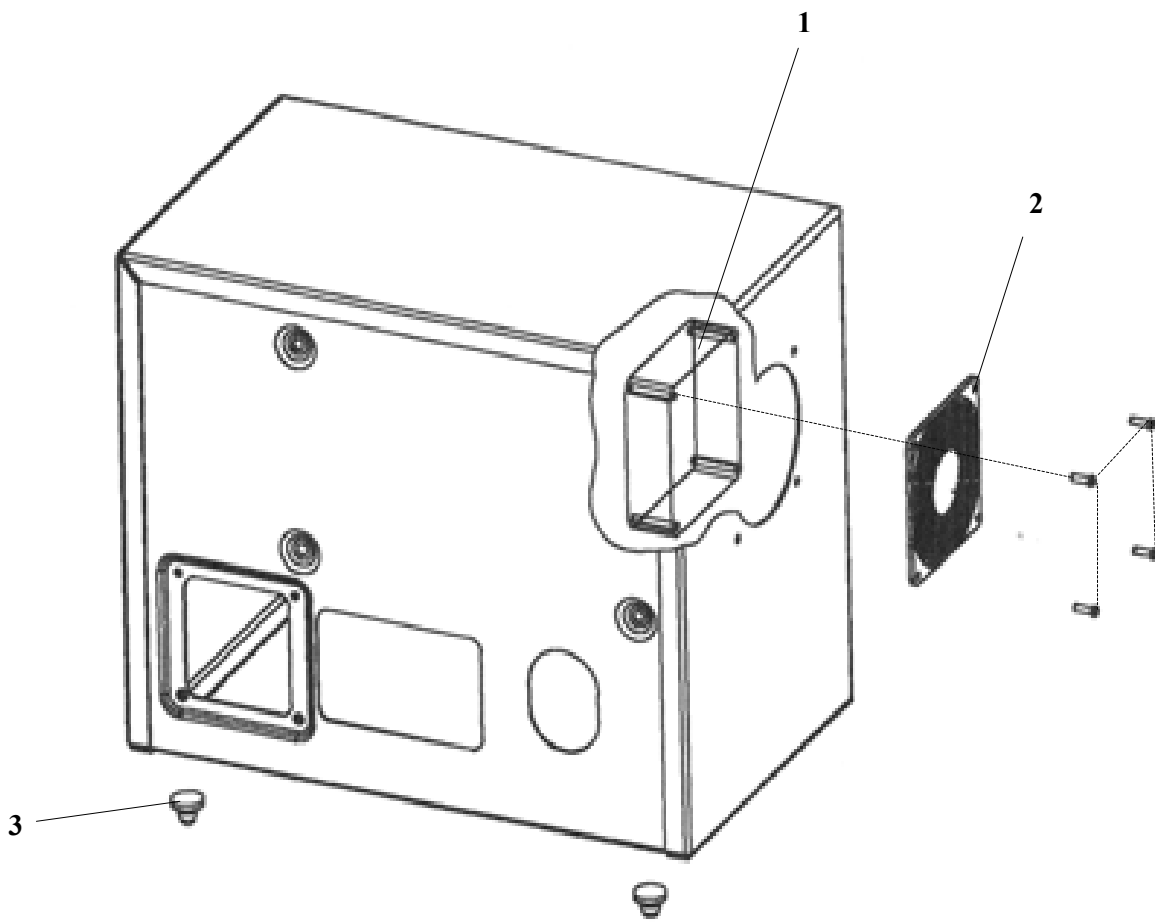


Figure 2

Figure	Indent	Part no.	Description	Quantity
2	1	279424	Kit, fan extraction Fan Screw self tapping	1 4
2	2	279116	Kit, finger guard Guard finger Screw self tapping	1 4
2	3	279190	Foot (rear case)	2
2	4	219257	Decal caution hot	1 (NI)

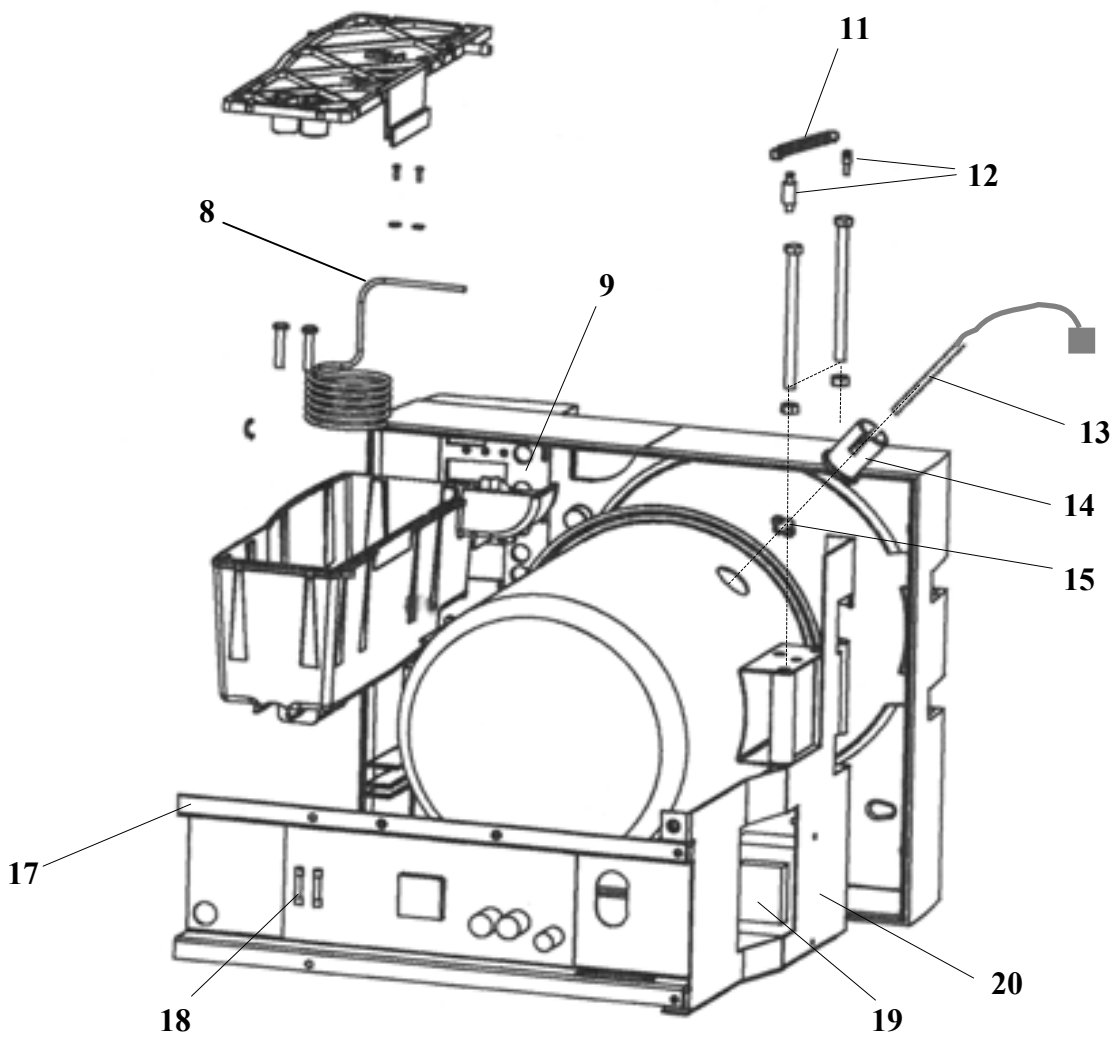
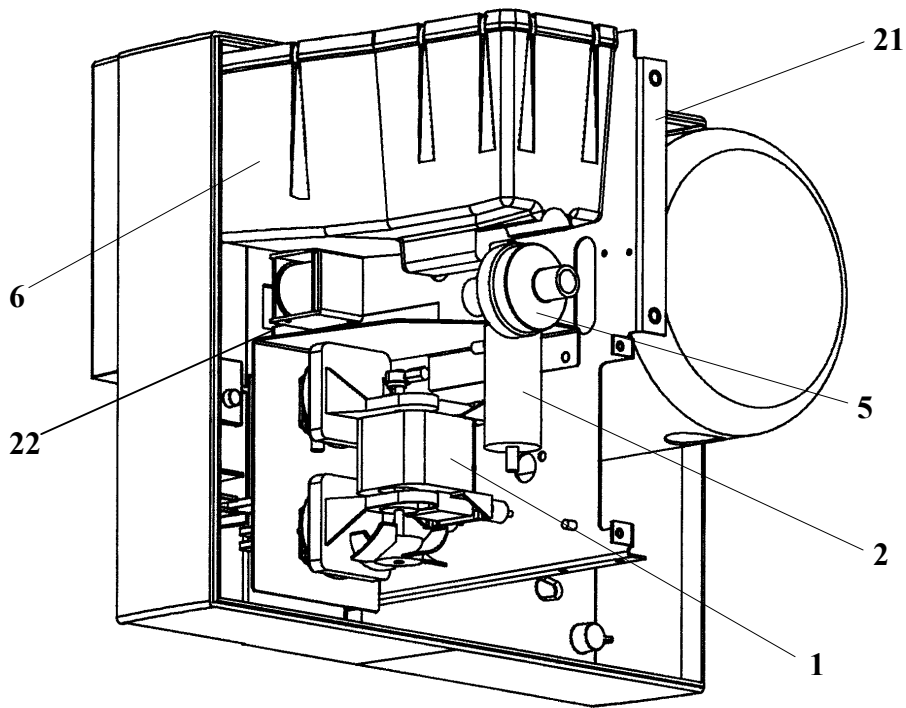


Figure 3

Figure	Indent	Part no.	Description	Quantity
3	1	289118	Kit, pump vacuum sub assembly 110v 60Hz	1
		289122	Kit, pump vacuum sub assembly 230v 50Hz	1
			Stud M4	4
			Nut M4	4
3	2	289134	Kit, Silencer, vacuum pump	
			Silencer, vacuum pump	1
			Screw No 6	1
3	3	289133	Kit, bracket vacuum pump	(NI)
			Bracket side	1
			Bracket lower	1
			Nut, M6	4
			Screw M4	2
			Nut M4	2
			Foot	1
			Grommet	1
3	4	289135	Kit, tube, pump to silencer	(NI)
			Tube silicon	1
3	5	289023	Kit, filter air	
			Air filter	1
			Adapter	1
3	6	309014	Kit, water tank multi use	
			Moulding tank	1
			Moulding lid	1
			Seal	1
			Clip	12
			Coil dump	1
			Coil condensing	1
			Washer	2
			Screw M3	2
			Nut tubing 4mm	1
			Olive 4mm	1
			Connector	1
			Reducer	1
			Harness sensor	1
			Screw M6	2
			Nut M6	2
			Washer M6 flat	4
			Washer M6	2
			Clip cable	1
Foot	2			
3	7	279417	Kit, seal and clip, water tank	1 (NI)

Figure	Indent	Part no.	Description	Quantity
3	8	309004	Coil condensing multi use	1
3	9	279225	Kit, display module	
			Module display	1
			Screw pan head M3	6
			Tie wrap	4
3	10	289021	Harness display	1 (NI)
3	11	289015	Spring door open	1
3	12	289028	Kit, door open spring pillars	
			Anchor pillar No1	1
			Anchor pillar No2	1
3	13	289006	Kit, chamber PT100 probe (2 wires)	
			Sensor PT100	1
			Grommet sensor	2
			Tie wrap	2
3	14	279133	Kit, chamber sensor mouldings with M30 nuts	
			Moulding sensor inner	1
			Moulding sensor outer	1
			Nut M30	2
3	15	279130	Grommet sensor	2
3	16	279132	Seal sensor to vessel 250	1 (NI)
3	17	289116	Kit, module power control & mounting bracket	
			Bracket PSU mounting	1
			Module power control 230v/110v	1
3	18	279123	Fuses MDA 15A Slow Blow 250V	2
			Fuses M12A 230v	2
3	19	279259	Transformer 230v	1
		289136	Transformer 110v	1
			Screw	2
			Nut plate	2
3	20	279253	Chassis plate No 1(hinge side)	1
3	21	279254	Chassis plate No 2(central plate)	1
3	22	279163	Kit, solenoid bracket	
			Bracket solenoid	1
			Screw M4	1
			Nut hex M4	1

Figure	Indent	Part no.	Description	Quantity
3	23	289024	Grommet chassis plate	1 (NI)
3	24	279166	Kit fixing, chassis plates to vessel	(NI)
			Packer chassis plate	2
			Washer plain M8	2
			Nut hex M8	4
			Washer M8	2

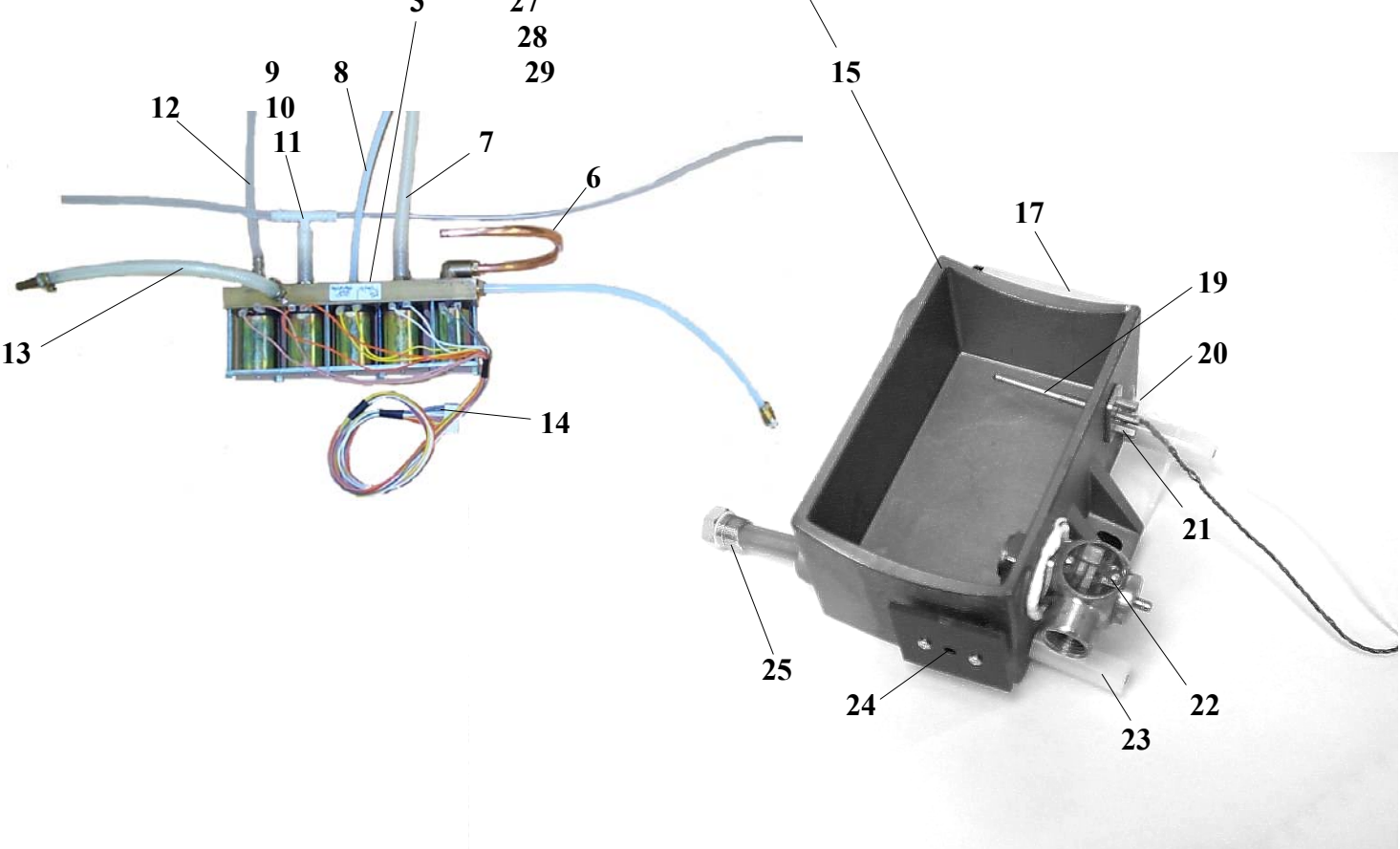
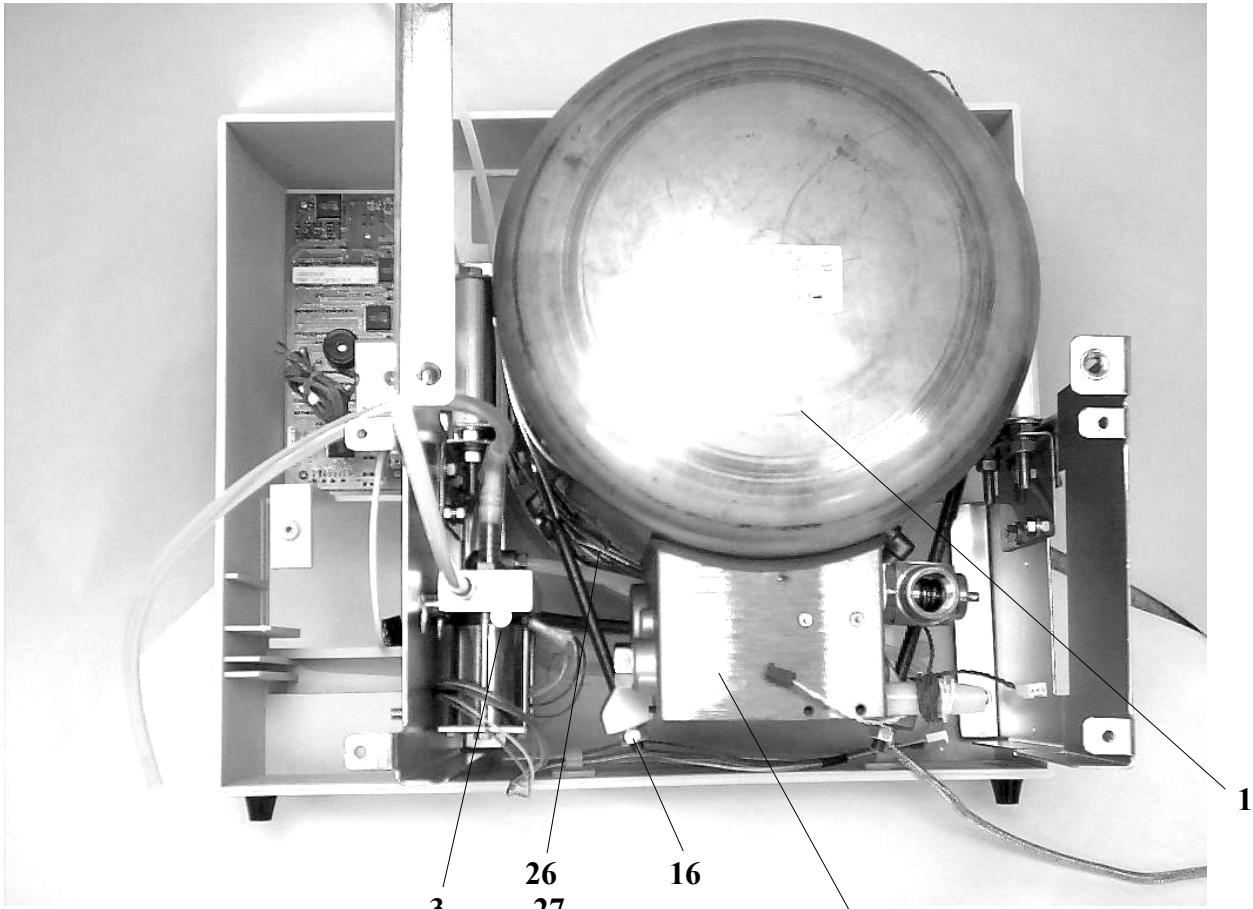


Figure 4

Figure Indent	Part no.	Description	Quantity
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Note: The pressure vessel and lid are treated as a single spares item due to the safety implications

4	1	289052	Kit vessel 250 x 330 vacuum 16 litre Vessel SS 16 litre Plate rating vessel Seal boiler Lid sub assembly 250 vacuum Extrusion hinge Extrusion interlock Screw set M8 x 120 Nut M8 Washer M8 Lever Pin hinge Pin interlock Circlip Washer M8 Moulding sensor inner Moulding sensor outer Seal sensor Grommet sensor Nut M30 Washer M30 Spring door open Nut air bleed Seal air bleed Elbow equal 8mm O/D Screw taptite M3 x 5	1 1 1 1 1 1 4 6 8 1 1 1 4 2 1 1 1 2 2 1 1 1 1 1 1 2
4	2	279159	Kit, door micro switch Harness micro switch Plate micro switch door shut Nut micro switch M2 Screw pan head M2 Screw M4	(NI) 1 1 2 2 2
4	3	289008	Kit, valve block assembly, multi use Valve and pipes sub-assembly Nut tubing 8mm Olive 8mm Ferrule 6mm I/D Screw M/C M6 x 8 Olive 6mm Nut tubing 6mm Ferrule 4mm I/D Clip tube	1 5 5 5 2 1 1 1 1

Figure	Indent	Part no.	Description	Quantity
4	3	289084	Kit, valve block	(NI)
			Valve block vacuum sub assembly	1
			Screw grub M6 x 20	2
			Spacer valve	2
			Nut chassis plate M6	2
4	4	289079	Kit, valve repair	(NI)
			Pin valve sub assembly	1
			O Ring bobbin valve solenoid	1
			O Ring bush valve	2
4	5	289129	Kit, tube	(NI)
			Tube airbleed	1
			Tube tank to valve	1
			Tube valve to tank vent	1
			Tube valve to vessel	1
			Tube valve to boiler	1
			Tube drain tap	1
			Tube valve to tee	1
			Tube valve to air filter	1
			Tube valve to vacuum pump	1
			Nut tubing 8mm	4
			Olive 8mm	4
			Ferrule tube 6 I/D	6
			Ferrule tube 4 I/D	3
			Olive 6mm	3
			Nut tubing 6mm	3
			Fitting equal tee 8mm	1
4	6	289047	Kit, valve to boiler drip tray	
			Tube short ABD	1
			Nut tubing 8mm	1
			Olive 8mm	1
4	7	289090	Kit, tube, valve to vacuum pump inlet	
			Tube valve to pump	1
			Nut tubing 8mm	2
			Olive 8mm	2
			Ferrule Tube 6mm I/D	1
4	8	279193	Kit, tube, valve to water tank (multi use)	
			Tube valve to tank vent	1
			Ferrule tube 4mm I/D	2
			Olive 6mm	2
			Nut tubing 6mm	2
4	9	279196	Kit, valve to tee (water feed/drain tap)	
			Tube valve to tee	1
			Fitting equal tee 8mm	1

Figure	Indent	Part no.	Description	Quantity
4	10	279195	Tube, tee to water tank Tube silicone 8mm x 6mm	1
4	11	279194	Kit, tube tee drain tap c/w fittings (multi use) Tube 8mm Connector	1 1
4	12	289091	Kit, tube, valve to air filter Tube valve to air filter Nut tubing 8mm Olive 8mm Ferrule Tube 6mm I/D	1 1 1 1
4	13	289089	Tube, valve to boiler Tube silicone Clip tube Fitting 8mm Nut 8mm Olive 8mm	1 1 1 1 1
4	14	289086	Harness water valve vacuum	1
4	15	289045 289130	Kit, boiler, 250 mm O/D vessel, 230V (16 litre) Kit, boiler, 250 mm O/D vessel, 110V (16 litre) Boiler vessel Seal boiler 250 Thermistor Element insulator Washer ASME valve Grommet sensor Stud self-clinch M3 Tray air bleed Screw M4 x 8 RTV	1 1 1 2 1 1 4 1 2 A/R
4	16	279242	Kit, boiler strap Strap Washer plain M8 Nut hex M8	1 1 2 2
4	17	309023	Kit, condensate tray Tray air bleed Screw M4 x 8	1 2
4	18	279154	Seal, boiler 250mm	1 (NI)
4	19	289011	Kit, boiler probe PT100 Sensor PT100 water level Grommet sensor	1 1

Figure	Indent	Part no.	Description	Quantity
4	20	279152	Kit, boiler thermistor Thermistor Strap boiler to vessel	1 1
4	21	279151	Kit, clamp plate and nuts Plate sensor fixing Nut extended M3	1 2
4	22	279157	Kit, ASME valve Valve ASME Nut ASME valve Washer ASME valve	1 1 1
4	23	279155	Element terminal insulator	2
4	24	279203	Kit, thermal cut out backing board Board thermal cut out Screw pan head M3 Washer single coil M3	1 2 2
4	25	279176	Filter water	1
4	26	289131 289055	Heater element 110v 350w Heater element 230v 350w	1 1
4	27	279183	Strap heater support SS	2
4	28	279188	Sensor drying cycle element Thermistor drying cycle	1
4	29	279255	Thermistor drying	1

Figure	Indent	Part no.	Description	Quantity
5	1	289132	Carrier furniture 16 litre 6 tray	1 (NI)
5	2	279006	Tray 284	1 (NI)
5	3	279009	Furniture pouch rack 282	1 (NI)
5	4	279007	Handle furniture carrier	1 (NI)
5	5		Manual Operators	1 (NI)
5	6		Manual vacuum pump	1 (NI)
5	7	309031	Test pack (TST)	1 (NI)
5	8	279208	Kit, fixing M3	(NI)
			Screw taptite M3 x 5L	2
			Screw pozi M3 x 10	2
			Screw pan head M3	10
			Nut extended M3	4
			Screw M3 x 8 plastech	2
5	9	279209	Kit, fixing M4	(NI)
			Screw M4 x 8	4
			Screw M4 x 16	1
			Nut hex M4	5
			Screw M4 x 10	6
			Screw M4 x 20 pozi csk	4
5	10	279210	Kit, fixing M5	(NI)
			Screw M5 x 10	13
			Washer M5	6
5	11	279214	Kit, fixing M6	(NI)
			Screw socket grub M6 x 20	1
			Washer copper M6	1
			Nut domed M6	1
			Screw M6 x 20	4
			Screw M/C M6 x 8	2
			Nut chassis plate M6	2
5	12	279211	Kit, fixing M8	(NI)
			Bolt hex M8 x 120	4
			Nut hex M8	13
			Washer M8	14
			Bolt M8 x 120 hex head	2
			Washer plain M8	6
			Nut extrusion fixing M8	2
			Screw M8 x 10 hex head	1
			Screw M8 x 20	5
			Locknut M8	2

Part Number Index

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279001	Roll printer	1	24
279006	Tray 284	5	2
279007	Handle furniture carrier	5	4
279009	Furniture pouch rack 282	5	3
279011	Kit, door gasket 250	1	1
279100	Kit, dome nut M6	1	2
279102	Kit, drain tap and pipe clip	1	8
279103	Kit, door screws, grommets and spacers	1	11
279104	Kit, entry plug	1	3
279107	Entry port O-ring	1	5
279111	Kit, rear case (with feet)	1	18
279114	Kit fixing, rear case	1	19
279116	Kit, finger guard	2	2
279123	Fuses MDA 15A Slow Blow (250V)	3	18
279130	Grommet sensor	3	15
279132	Seal sensor to vessel 250	3	16
279133	Kit, chamber sensor mouldings with M30 nuts	3	14
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279143	Kit, pin set	1	9
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279159	Kit, door micro switch	4	2
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279171	Kit spring, door solenoid	1	13
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279183	Strap heater support SS	4	27
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279193	Kit, tube, valve to water tank (multi use)	4	8
279194	Kit, tube tee drain tap c/w fittings (multi use)	4	11

Part Number	Description	Figure	Indent
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279196	Kit, valve to tee (water feed/drain tap)	4	9
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279216	Hinge printer door	1	29
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279255	Thermistor drying	4	29
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279417	Kit, seal and clip, water tank	3	7
279424	Kit, fan extraction	2	1
289001	Kit, plate 250 vacuum	1	4
289006	Kit, chamber PT100 probe (2 wires)	3	13
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289011	Kit, boiler probe PT100	4	19
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289023	Kit, filter air	3	5
289024	Grommet chassis plate	3	23
289028	Kit, door open spring pillars	3	12
289045	Kit, boiler, 250 mm O/D vessel, 230V (16 litre)	4	15
289047	Kit, valve to boiler drip tray	4	6
289052	Kit vessel 250 x 330 vacuum 16 litre	4	1
289055	Heater element 230v 350w	4	26
289079	Kit, valve repair	4	4
289083	Kit, printer	1	23
289084	Kit, valve block	4	3
289086	Harness water valve vacuum	4	14
289089	Tube, valve to boiler	4	13
289090	Kit, tube, valve to vacuum pump inlet	4	7
289091	Kit, tube, valve to air filter	4	12
289102	Ribbon printer	1	25

289116	Kit, module power control & mounting bracket	3	17
289118	Kit, pump vacuum 110v 60Hz	3	1
Part			
Number	Description	Figure	Indent
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289123	Cord set UL	1	20
289124	Kit, door moulding	1	7
289125	Kit, printer door moulding with hinges	1	26
289126	Kit, bezel (with printer door and feet)	1	14
289128	Decal front panel	1	16
289129	Kit, tube	4	5
289130	Kit, boiler, 250 mm O/D vessel, 110V (16 litre)	4	15
289131	Heater element 110v 350w	4	26
289132	Carrier furniture 16 litre 6 tray	5	1
289133	Kit, bracket vacuum pump	3	3
289134	Kit, Silencer, vacuum pump	3	2
289135	Kit, tube, pump to silencer	3	4
309004	Coil condensing multi use	3	8
309014	Kit, water tank multi use	3	6
309023	Kit, condensate tray	4	17
309031	Test pack (TST)	5	7
	Manual Operators	5	5
	Manual vacuum pump	5	6

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Description	Part Number	Figure	Indent
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Boiler, 250 mm O/D vessel, 110V (16 litre)	289130	4	15
Boiler, 250 mm O/D vessel, 230V (16 litre)	289045	4	15
Bracket solenoid	279163	3	22
Bracket vacuum pump	289133	3	3
Carrier furniture 16 litre 6 tray	289132	5	1
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Catch printer door	279200	1	27
Chassis plate No 1(hinge side)	279253	3	20
Chassis plate No 2(central plate)	279254	3	21
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Coil condensing multi use	309004	3	8
Cord set UL	289123	1	20
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Decal front panel	289128	1	16
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Door moulding	289124	1	7
Door moulding with hinges	289125	1	26
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Filter water	279176	4	25
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Grommet chassis plate	289024	3	23
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Harness water valve vacuum	289086	4	14
Heater element 110v 350w	289131	4	26

Heater element 230v 350w	289055	4	26
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Description	Part Number	Figure	Indent
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Kit, valve to boiler drip tray	289047	4	6
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Manual vacuum pump		5	6
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Pillar door open spring	289028	3	12
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Pump vacuum 230v 50Hz	289122	3	1
Ribbon printer	289102	1	25

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Strap heater support SS	279183	4	27
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