



Bioquell | ProteQ

Hydrogen Peroxide Vapour Decontamination Suite

USER MANUAL

Bioquell designs, manufactures and supplies as a service a broad range of bio-decontamination solutions for:

- rooms
- systems and processes
- laboratory equipment
- biomedical equipment

***For further information and contact details refer to website
www.bioquell.com***

Hydrogen peroxide vapour is potentially dangerous if used incorrectly. It is essential that the safety and operating instructions described in this manual are observed.

These are the Original Instructions

The Bioquell ProteQ is only to be used by personnel who have been trained by Bioquell or their agents on its safe use. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

United States of America only:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

REV	Description	Date	C.R.No	Orig	Chkd	Apprd
1	Initial Release	1 Nov 2018		ORC	REP	JR
2	Update of CE Declaration and specification	20 Dec 2018	CR3778	ORC	REP	JR
3	Update to spec, US distance measurer & user access	8 th May 2019	CR3852	ORC	PM	REP

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1 SAFETY

Safety instructions that must be observed when operating the Bioquell ProteQ hydrogen peroxide system or handling the hydrogen peroxide bottles are listed below.

Danger and Warning signs  are used where there is potential hazard to personnel.

The mandatory symbol  is used to describe other safety precautions that must be followed before operating the equipment.

SAFETY OBSERVANCE IS ESSENTIAL WHEN USING THIS EQUIPMENT. READ THIS SECTION CAREFULLY BEFORE USING THE EQUIPMENT.

Only personnel who have been trained by Bioquell or their agents on the safe use of the ProteQ should operate it.

	HANDLING HYDROGEN PEROXIDE Always wear gloves, long sleeves and eye protection when handling Hydrogen Peroxide.
	Exposure to HYDROGEN PEROXIDE LIQUID can cause burns and blistering to the skin and tissue damage to the eyes. HYDROGEN PEROXIDE VAPOUR can cause irritation to eyes, nose, throat, lungs and skin, breathing difficulties and coughing. IN ALL CASES SEEK MEDICAL ADVICE.
<u>ACTION TO BE TAKEN ON EXPOSURE TO HYDROGEN PEROXIDE</u>	
EYES	Irrigate with sterile water for at least 10 minutes.
LUNGS	Remove casualty immediately to fresh air, rest and keep warm.
SKIN	Drench with water, remove clothing.
MOUTH	Rinse thoroughly with water and give plenty to drink.

	HYDROGEN PEROXIDE VAPOUR IS HAZARDOUS - Ensure that the enclosure to be gassed is sealed to prevent hydrogen peroxide vapour escaping. - Ensure that any possible points of entry are sealed, locked where possible and warning signs displayed if appropriate. - Ensure area to be gassed is free of any humans, animals and plants.
	SPILLAGES Mop up with plenty of water and run to waste, diluting at least 20:1.
	POWER CONNECTION OF THE EQUIPMENT Ensure the Bioquell ProteQ system modules are connected to appropriately rated circuits which have an earth.
	COMMUNICATION CONNECTIONS If more than one system is in operation on a site, ensure each system is on a separate network. This can be identified by the colour of the wireless indicator, otherwise operational interference may occur
	DURING A CYCLE - Do not enter the area being bio-decontaminated - A suitable portable H₂O₂ detector should be used throughout the cycle to monitor concentrations outside the area. - If leak is detected, leak sealing and evacuation procedures should be followed.
	AT THE END OF AERATION Before re-entering the area check that the vapour concentration is at, or below, the countries Occupational Exposure Limit (OEL) (Long-term exposure limit is 1ppm and short-term is 2ppm in the UK). In USA: the Permitted Exposure Limit (PEL) has a Threshold Limit Value (TLV) of 1ppm for eight hours exposure a day.
	IF THE CYCLE ABORTS DURING GASSING OR AERATION - Check that the vapour concentration is at, or below, the OEL before entering the enclosure - If above the OEL, run further aeration cycles in accordance with these instructions until the safe concentration level is reached.
	EXTERNAL DISCHARGE OF VAPOUR If a fixed ventilation system is used to exhaust, it must not allow leakage of hydrogen peroxide vapours within the building. When the HVAC is started, check that the room does not become heavily pressurised, as this could cause the room sealing to become compromised.

WARNING – EQUIPMENT DAMAGE

	Operate only when located on a flat surface, and engage the brakes on the ProteQ unit. Always remove Aeration units from the ProteQ base unit, if present, before running a cycle.
	Place the aeration units onto the floor in the correct position, do not drop or throw to the ground. Carry units, do not move by kicking or dragging along the floor
	Do not use the aeration units as a step this will damage the equipment
	BEFORE MOVING EQUIPMENT after cycle is complete always disconnect power cables. Put away all equipment in the ProteQ base unit.
	Repairs, maintenance or adjustments to the Bioquell ProteQ generator must only be made by trained Bioquell personnel or their agents.
	The equipment must be serviced in accordance with the Maintenance Schedule to maintain safe performance.

DANGER – PERSONAL INJURY HAZARD

	The ProteQ can weigh up to 86Kg (190 lbs), the lectern alone 9Kg (20 lbs) and the aeration units weigh 10Kg (22 lbs). Appropriate lifting procedures should be followed. Do not lift multiple aeration units.
	When moving the ProteQ use the handles on either side of the bottle module. Two aeration units can be transported in the ProteQ, any further units should be transported using a suitable trolley and securing method.
	The user should not open access panels. This should only be for Bioquell trained service engineers.
	When moving the ProteQ with bottles containing liquid ensure the bottle engagement plunger is locked in its down position.

1.1 Warning Labels

ProteQ warning labels and their meaning



ELECTRICAL INJURY HAZARD

Only trained personnel should be accessing the internal PCB area.



WEAR PROTECTIVE GLOVES

Wear protective clothing when handling hydrogen peroxide bottles.



WEAR EYE PROTECTION

Wear protective eye protection when handling hydrogen peroxide bottles.



READ MANUAL

Read manual prior to operation of the equipment

Consumable H₂O₂ warning label and its meaning



CHEMICAL INJURY HAZARD

Contents harmful.



CHEMICAL INJURY HAZARD

Hydrogen peroxide liquid is harmful and is an oxidizing agent

Aeration unit warning label and its meanings



DO NOT STAND HERE

Do not stand on the aeration unit



**ELECTRICAL INJURY
HAZARD**

Only trained personnel should be accessing the internal PCB/power supply area.

2 UNPACKING INSTRUCTIONS

This ProteQ is supplied in one large box on a pallet:



WARNING: Two people are required to safely remove the system from the pallet.

1. Cut the retaining straps and remove the lid from the box.
2. Remove the small boxes containing the hand held instruments.
3. Remove the large outer sleeve by lifting it up and over the unit.
4. Lower the ramp.
5. Carefully cut open the silver bag.
6. Carefully, with two people, wheel out the ProteQ down the ramp.



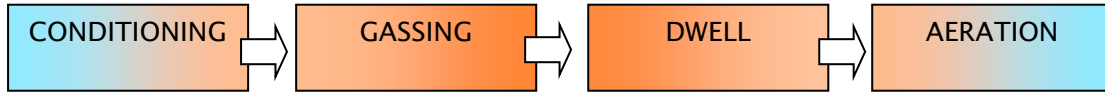
WARNING: The ProteQ module weighs 87kg (192lbs). Appropriate lifting procedures should be followed.

Charge the hand held low level H₂O₂ sensor as soon as it is unpacked, if supplied. The sensor, charger and information booklet are contained in separate small white boxes; see Section 17 of the manual on sensor charging.

3 VAPOUR BIO-DECONTAMINATION PROCESS

3.1 Process Sequence

The room bio-decontamination process consists of the following stages:



The ProteQ is designed to carry out the conditioning, gassing and dwell phases of the bio-decontamination cycle. The aeration phase is performed by the lower aeration part of the Base unit and optional aeration unit(s). Control and monitoring of the process is performed outside the area using the lectern. The Base unit, optional aeration units and lectern communicate with each other wirelessly.

3.1.1 Conditioning Phase

When the system starts conditioning, the air and vaporizer heaters warm-up and control to their set points ready for the next stage of the cycle.

During conditioning both the vaporizer and distribution fans operate, ensuring that the hydrogen peroxide outlets reach a stable operating temperature.

Immediately after conditioning, the dosing pump is primed with hydrogen peroxide liquid.

3.1.2 Gassing Phase

Liquid from a bottle is pumped onto the vaporizer heaters. Air then passes around the heaters where it picks up the H₂O₂ vapour for distribution.

The air circulation system has been designed to distribute the hot vapour evenly throughout the room being bio-decontaminated. This system consists of fans, which draw air from the top of the unit and blow it out of the four vents at high velocity. An additional, internal flow path, from the distribution head down to the base of the unit, ensures the inside of the unit is also bio-decontaminated.

There are two types of cycle parameters that can be programmed by the operator. The first is a parametric cycle where the amount of H₂O₂ to be used is automatically calculated from the room volume and by the unit's internal instrumentation and control algorithm. The alternative is a fixed pre-validated timed cycle.

3.1.3 Dwell Phase

The dwell phase allows the vapour to evenly distribute within the room and for the condensation contact time to be prolonged.

3.1.4 Aeration Phase

The Base unit has an aerator on the lower half. In addition up to 6 optional aeration units can be used, two of which can be transported in the ProteQ. The building's HVAC system can also be used to aerate. The aerators contain a catalyst, which converts the hydrogen peroxide (H_2O_2) vapour to water vapour and oxygen. This phase continues until the hydrogen peroxide concentration reaches 1ppm, when it should be checked with the hand held low level sensor.

Note: It is against US federal law to use a biocide in a manner inconsistent with its labelling. Refer to and comply with Bioquell Hydrogen Peroxide sterilant labelling.

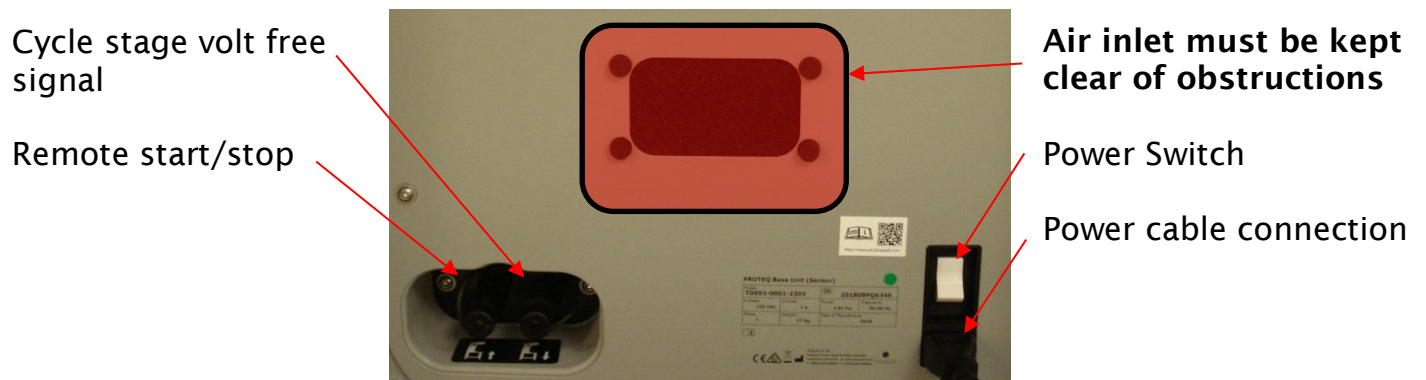
4 PROTEQ DESCRIPTION

4.1 Main Module Features & Connections

4.1.1 Base Unit

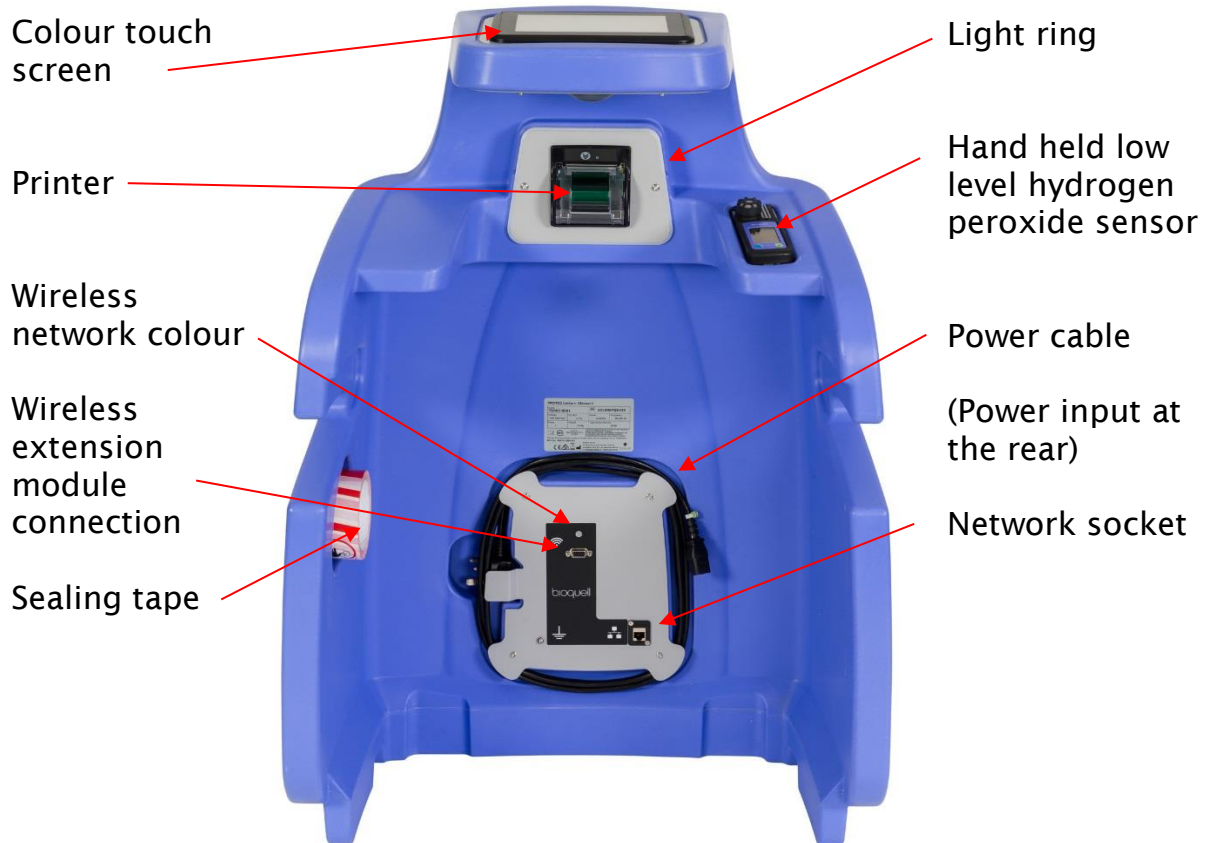


BACK PANEL



NOTE: The power cables supplied with the equipment must not be replaced with inadequately rated cables

4.1.2 Lectern



NOTE: The power cables supplied with the equipment must not be replaced with inadequately rated cables

4.1.3 Aeration Unit (Optional)



4.2 Hydrogen Peroxide Supply

The ProteQ HPV generator uses only Bioquell branded 35% wt/wt hydrogen peroxide in either 2 litre or 950ml bottles. Each bottle label contains a Radio Frequency Identification (RFID) tag which enables the amount of liquid in the bottle to be read along with the expiry date.



Unpacked bottle



Screw cap removed



Yellow inner cap removed – ready for use



WARNING – Personal Protective Equipment must be used when handling the bottles, which contain hydrogen peroxide. As a minimum Bioquell recommend wearing suitable gloves and eye protection.

5 MOVING THE PROTEQ



Hold the moulded handles on either side with both hands when moving the ProteQ, as shown.

The optional aeration units and the lectern along with the cables and accessories are all stored in the Base unit.

6 EQUIPMENT SET-UP

The ProteQ system can decontaminate a maximum total room(s) volume of 250m³ (8,800ft³), for larger rooms contact Bioquell.



Do not tread on aeration units, or use them as a step. Always place on the floor

6.1 Setting-up the ProteQ



Outside the room to be decontaminated, remove the lectern by holding the handles of the lectern and leaning the top back.

Place the lectern by the door.



Wheel the Base unit into the room, to its validated position.

If there are aeration units they must be placed in to their validated positions in the room. NOTE the arrows on the top of the aeration units must be pointing in their validated direction, usually away from the main unit. If the aeration units are not to be used place them outside the room.



The cables for the Base unit and the aeration units are in the bottom of the unit, under where the aeration units are stored.

DO NOT USE ANY DAMAGED CABLES, replace with adequately rated alternatives



Plug the longer power cable into the base unit, and the other end into an earthed socket, and turn the power on. Turn on the white switch on the Base unit above the power connection. The light ring will illuminate. *Ensure the white switch is not obstructed, as it is the main disconnect device.*

If the ProteQ is to communicate with the building's systems then it may be necessary to connect the interface cables to the voltfree / remote start stop connectors, see Section 4.1.1.



Ensure no objects (including paper) that might cause blockage of the air inlet to the left and above the power switch are in the cable storage area. See section 4.1.1.



Plug the shorter cables into the side of the aeration units, and plug the other end into an earthed electrical socket. Note - up to three aeration units can be plugged into the same socket. Do not plug them into the same socket as the Base unit if supply is 100V or 120V.

Turn on the power at the back of the aeration unit using the white switch and after a short time the fan will start, and the wireless indicator will illuminate. *Ensure the white switch is not obstructed, as it is the main disconnect device.*



Remove the wound power cable from the lectern, and plug the cable into the socket at the lower rear of the lectern. Plug into an earthed electrical socket, and turn the power on. The screen will illuminate.

6.2 Measuring the room

If a 'Parametric' cycle is to be run then the room volume must be known. If this is not already known it is recommended to use the optional device available which will accurately measure the volume of a room, see section 18. For rooms or suites which are more complicated than a rectangular room it may be necessary to measure several volumes and add them together.

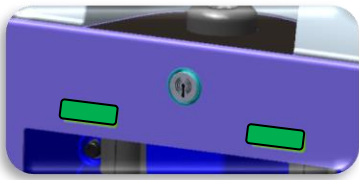
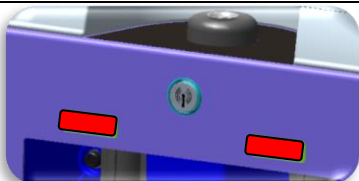
7 LOADING HYDROGEN PEROXIDE BOTTLES

7.1 Bottle Indicators

The ProteQ calculates the amount of peroxide required for the cycle. If it is loaded with an insufficient amount it will not allow the cycle to start.

The unit will always take hydrogen peroxide from a part full bottle first, until it is empty. Either 2 litre or 950ml bottles can be used.

The table below explains the actions required for the different combinations of bottle indicators; note - these lights only operate when the bottle holder is closed and the plunger is down. If the lights are reversed to those shown, the action is the same as that stated, but for the other side.

Light colour above bottle	Bottle Status	Action
	<u>Left Hand Bottle:</u> Enough for a cycle <u>Right Hand Bottle:</u> Enough for a cycle	There is sufficient liquid to run the cycle, no action required.
	<u>Left Hand Bottle:</u> Empty, expired or no bottle present <u>Right Hand Bottle:</u> Empty, expired or no bottle present	Both bottles are empty, expired or no bottle in place. Replace the bottles with new ones
	<u>Left Hand Bottle:</u> Full <u>Right Hand Bottle:</u> No bottle present, or empty or expired	There is one full bottle with sufficient liquid to run the cycle.
	<u>Left Hand Bottle:</u> Part used <u>Right Hand Bottle:</u> Part used	Both bottles have liquid but the total is insufficient to run the cycle. One of the bottles requires replacing with a full bottle or one which has a sufficient amount of liquid.
	<u>Left Hand Bottle:</u> Empty, expired or no bottle <u>Right Hand Bottle:</u> Part used	Place a new bottle in the left hand side (a part used bottle may also be tried). If sufficient liquid both lights will go green.

If the indicator light is red, the bottle could be empty or expired and should be disposed of according to local regulations. If empty, it could still contain up to 80ml of hydrogen peroxide.

7.2 Installing Hydrogen Peroxide Bottles

The following instructions explaining how to install bottles must be followed; in addition, there is an illustration of the procedure on the vaporizer module above the bottle enclosure. Before loading a 950ml bottle ensure the insert is present, see section 7.3.



WARNING: Use Personal Protective Equipment when handling hydrogen peroxide bottles. As a minimum, wear suitable gloves and goggles.



Press the bottom right hand side of the flap under the bottle storage compartment.

The flap will spring-up.

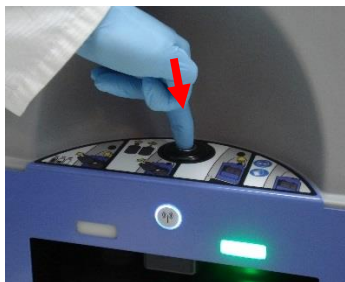


Remove a pair of gloves and goggles. Put them on before handling the bottle of hydrogen peroxide.

Loading new bottles:

STEP 1:

To access the bottles push the silver button at the centre of the black plunger. The plunger will be released and will move up.



STEP 2:

Obtain a new bottle and check the outer bag for any signs of liquid. If liquid is present, do not use the bottle. Treat the liquid as hydrogen peroxide and take the necessary precautions. If no liquid is present, remove the bottle from the bag, and remove the lid carefully by turning counter clockwise. Retain the lid.

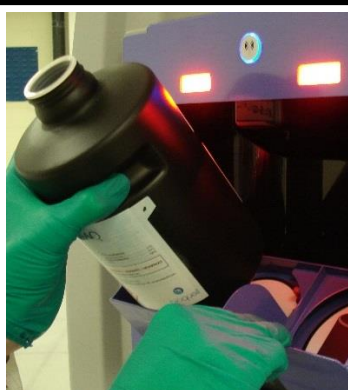




STEP 3:
Carefully remove the internal rubber yellow cap by pulling it off. Retain the cap.



WARNING: Use the finger grips in the 2 litre bottle to hold the bottles securely and safely. If using a 950ml bottle the insert must be fitted.

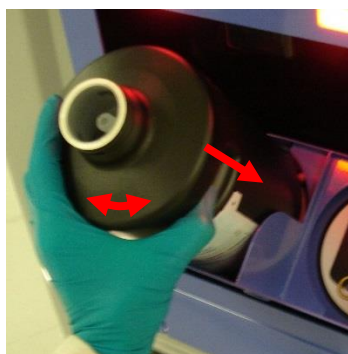


STEP 4:
For 2 litre bottle:

Pull the bottle tray open with one hand while holding the bottle with the other using the finger grips. These should be facing forward for correct alignment. Then slide the bottle in.

For 950ml bottles:

Pull the bottle tray open with one hand while placing the bottle in the insert in the bottle carrier with the other. An insert must be present, see section 7.3



Ensure that the stud at the bottom of the holder lines-up with the indent on the bottom of the bottle. It may be necessary to rotate the bottle until it drops down into its correct position.

The label in the bottom of the bottle holder also illustrates this.



STEP 5:
Push the black plunger down until it clicks and stays down.

Note – avoid pressing the silver button during this step, as the silver button releases the mechanism.

Bottles may be left in the vaporizer between decontamination cycles. Discard part used bottles if left for more than a week.

To remove bottles: Release the plunger as shown in STEP 1 and remove the bottle. Ensure that both the yellow cap and the bottle's screw cap are put back on, even if the bottle is empty.



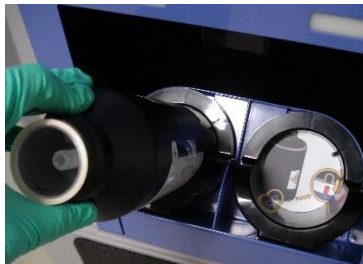
WARNING: Always replace the yellow cap, otherwise hydrogen peroxide liquid may build up in the top of the bottle.

7.3 Fitting Insert for 950ml Bottle

When a 950ml bottle is required an insert must be placed in the bottle holder.



Place the insert into the bottle holder, ensuring it is all the way down. It is possible to have a mix of size of bottles if required.



8 OPERATION

8.1 Running a Cycle



Check that the low level hydrogen peroxide sensor is working. To start remove the cap over the sensor if present and then hold down the green button. The display will count down from 3 and then start. Place the sensor in the recess on the lectern. If the sensor is not working, do not run a cycle. The sensor may be stored on the lectern, see section 4.1.2



Ensure the door is sealed, this is likely to require taping. A roll of tape is supplied on the lectern.



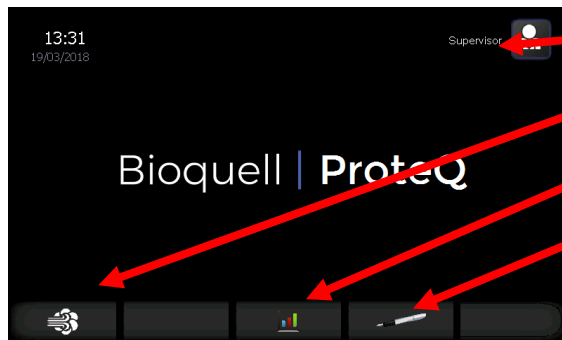
WARNING – Ensure all possible openings and conduits into the enclosure are properly sealed. If large leaks occur and high concentration Hydrogen Peroxide escapes into areas where people are present it can cause serious harm. Use tape provided to seal door.



First log on to the system. Press the icon in the top right of the screen then select user name and enter password. Click OK. When logged ON the User Name will be displayed in the top right of the screen. The Log on period will expire after 5 minutes of inactivity if not in cycle, after which it will be necessary to log on again.

If the system is installed in an enclosure or chamber which is used to decontaminate items using a validated cycle, ensure the load or equipment are arranged and placed within the area in accordance with the validation.

Note: Full screen navigation is given in Section 20.



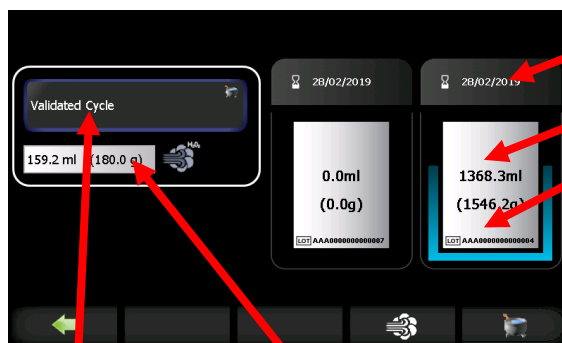
Name of person logged on

To open decontamination cycle page

Parameter display

Administration menu

Start decontamination page:



Expiry date of hydrogen peroxide

Volume of hydrogen peroxide in the bottle

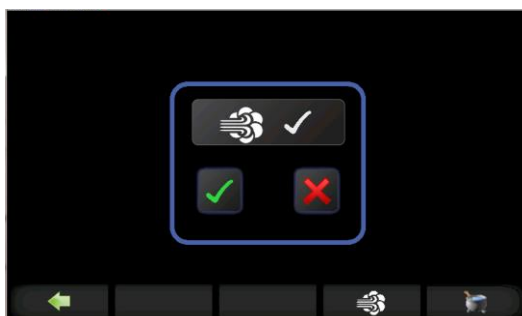
Hydrogen peroxide lot number

Cycle name

Quantity of peroxide required

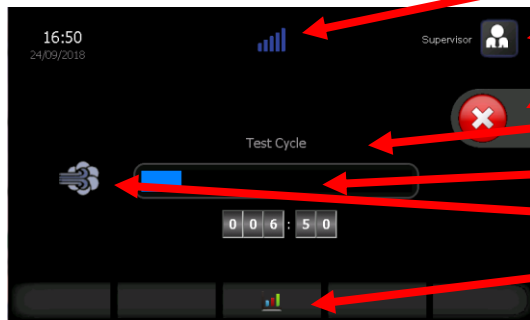
Refer to section 9 to change the cycle.

To start a cycle press  this icon is not visible and the ProteQ's lights are white if the unit is prevented from starting. Refer to the Troubleshooting Section (Section 15) for explanation of warning screens that prevent the cycle from starting. When the light ring is green the cycle can be started. The light ring colour is replicated above the printer on the lectern.



Confirm that the cycle is to be started by pressing 

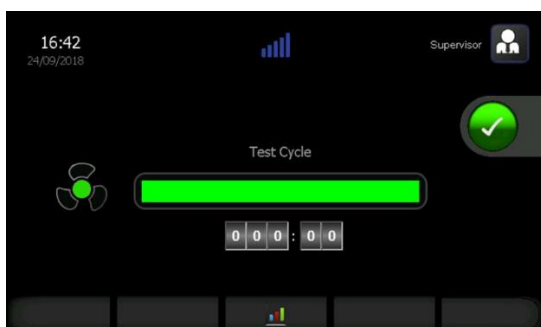
Cycle stage screens



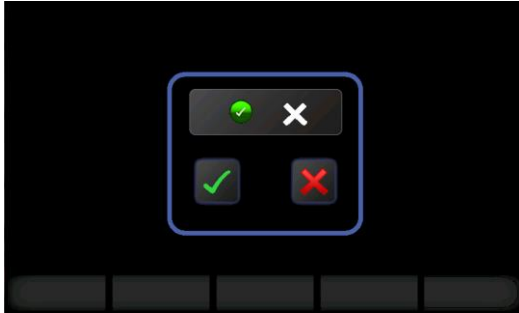
- Wireless signal strength indicator
- Person logged in. Press icon to log off
- Abort button
- Cycle name
- Stage progress bar and countdown timer
- Stage icon – see following page
- View cycle variables

The stage icons which will be displayed are given below along with the light colour of the ring around the vaporiser module, any installed aeration modules, and which may also be repeated on the bottle module.

Icon	Cycle stage	Light colour of ring
	Conditioning stage	Light blue
	Priming stage	Light blue
	Gassing stage	Light blue
	Dwell stage	Light blue
	Aeration stage	Magenta (after H ₂ O ₂ concentration is less than 70ppm)
	Aeration stage completed	Flashing green



Check that the enclosure is at 1ppm or below using an independent low level hydrogen peroxide sensor, before confirming that the cycle is to be stopped by pressing the  button, then confirm by pressing 

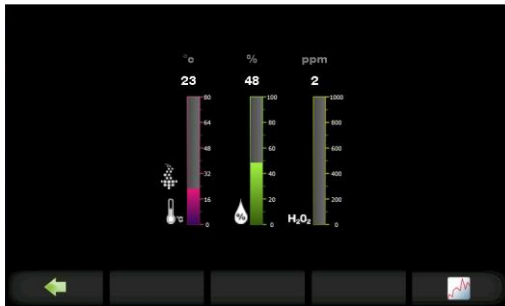


If no one is logged on, this screen will not appear. See 8.1 on how to log on. The name of the person logged on will appear on the printed record.



WARNING – Do not enter an enclosure until the hydrogen peroxide level has been checked with a low level sensor and is at a safe level

8.2 Viewing Cycle Variables (Sensor units only)

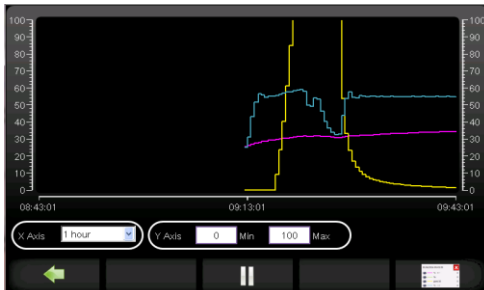


The parameter details can be viewed by pressing the  button. These give:

- Enclosure temperature
- Enclosure relative humidity
- Hydrogen peroxide concentration

Press  to return to the cycle stage screen

Press  to view graphical trend



The graphical view is in real time. The axes can be altered using the input fields at the bottom.

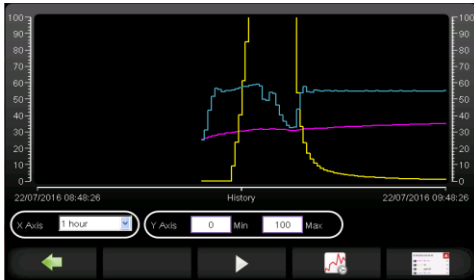
When pressing the  icon, a gold line and a data window appear.

The gold line can be dragged from the top along horizontally and the data at that point on the graphs will be displayed in the window.

Press the  button to move to a history/archive view of the cycle.

The history/archive view is similar to the real-time view except it is possible to go back further in time. The gold line and data window is also available.





By pressing the  icon, an input screen appears allowing the start and end time over which the data to be viewed is required.

Press the  button to return to the real time graph.



8.3 Aeration Only Cycle

If there is an alarm the ProteQ will automatically go into emergency aeration if the cycle has progressed beyond conditioning, this will keep aerating until stopped by the user.

Aeration Only cycle can also be selected as described in Section 9 from the drop down list of stored cycles if required.

8.4 Printed Report

A printed report is created for every cycle and contains the following data:

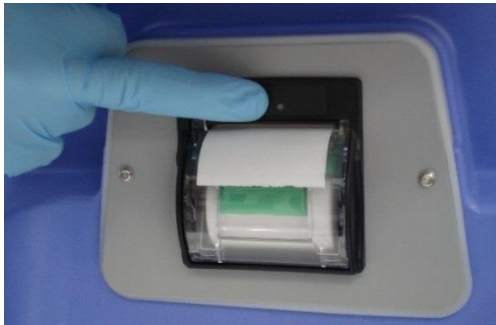
1. Header
2. Date & Time
3. PLC software version
4. HMI software version
5. ProteQ serial number
6. Cycle count
7. Calibration due date
8. H₂O₂ lot number
9. The active programme name and parameters
10. User name
11. Signature (manual input required)

At each transition between cycle phases the following data is printed:

- Time
- Cycle phase
- Process variables
- If sensor unit: Total hydrogen peroxide used and peak gas concentration as measured by the H₂O₂ sensor during gassing, dwell and aeration process phases

All alarms and warnings are printed with the time the alarm occurred.

All print outs are also stored on the unit's hard disk, and can be retrieved using FTP, refer to TD092-SP-001 for full details.



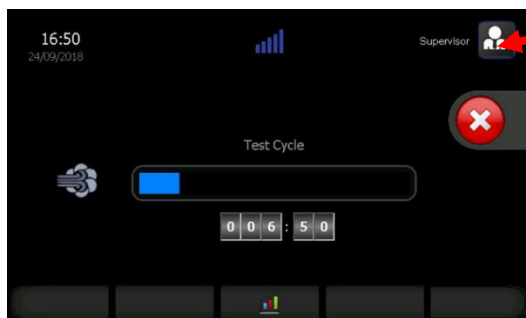
The paper feed button can be pressed as indicated on the left.

To remove the printed report pull the paper up to rip off.

To change the paper in the printer, refer to section 14.1.1.

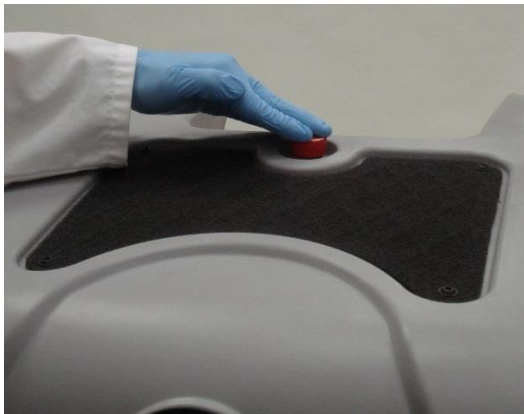
If the paper runs out the printer will print at least the last 2 cycles which have not been printed.

8.5 Log OFF



Press the icon in the top right of the screen to log off. It is important that the user logs off as soon as they have started the cycle or stops the cycle as their name will be the one printed

8.6 Process Stop

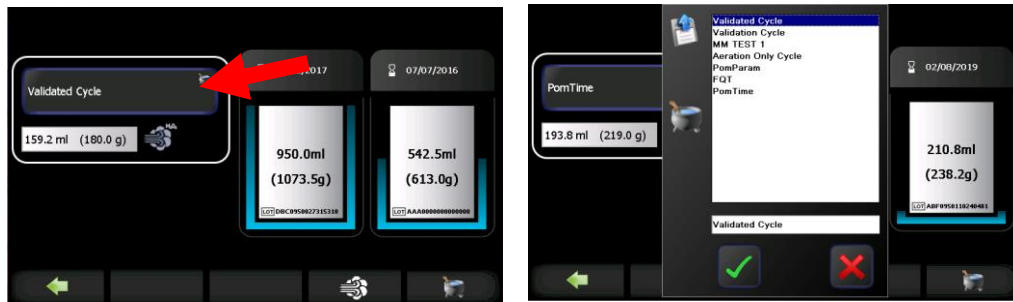


If the process stop button is pressed the ProteQ will stop working and an alarm will activate.

To release the button twist carefully clockwise, the button will then spring back up.

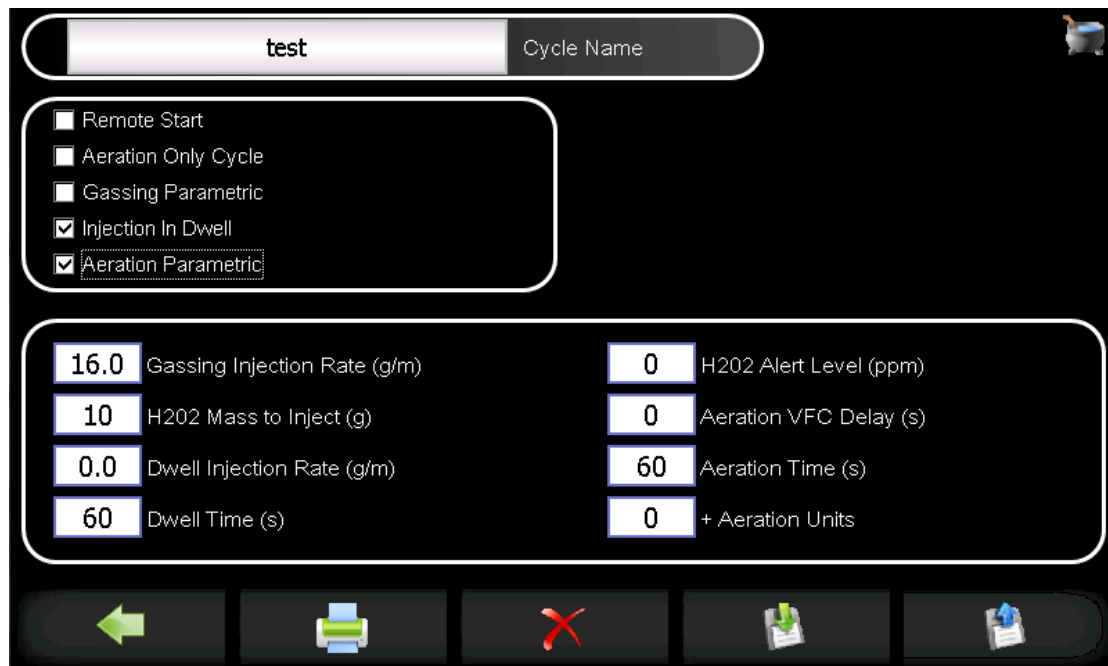
9 LOADING AN EXISTING PRE-PROGRAMMED CYCLE

When in the start cycle page, press the cycle name to change it.



Choose the cycle (recipe) required by selecting it from the list and pressing .

To view the parameters of the cycle selected press  in the bottom right of the screen. The following screen will appear.



Parameters which are not applicable to the cycle will not be visible. The icons along the bottom will vary depending on the access level of the person logged in (refer to Section 20, screen navigation).

10 CREATING A NEW CYCLE



WARNING – Do not alter any of the Cycle Parameters unless instructed by BIOQUELL or you have been fully trained as safety of the unit and efficacy may be compromised.

Note: It is against US federal law to use a biocide in a manner inconsistent with its labelling. Refer to and comply with Bioquell Hydrogen Peroxide sterilant labelling.

To edit or create a new cycle Administration level access is required. There are two ways to create new cycles:

- (i) Create a new cycle; or,
- (ii) Edit an existing cycle and save it as a new cycle.

At the recipe screen edit the cycle parameters to those required. Then save by pressing

Enter a new Recipe name in the bottom box, or if an existing recipe is to be edited then choose the recipe from the list. Then press . If a recipe is being edited a confirmation is required.

The following table details the cycle parameters that can be altered:

Description	Units	Limits	Explanation
Cycle Name		24 Characters	Name of the cycle. Note more than 24 characters can be entered but only 24 will appear on the print out. Only use letters and numbers, not punctuation or symbols.
CYCLE FEATURES			
Remote Start		Check or Uncheck	Check to enable the cycle to be started/stopped remotely, by the building or enclosure control system.
Aeration Only Cycle		Check or Uncheck	Check to select Aeration Only cycle.
Gassing Parametric		Check or Uncheck	Check to allow the gassing time to be automatically optimised for the environmental conditions using the room volume. This will alter the gassing time.

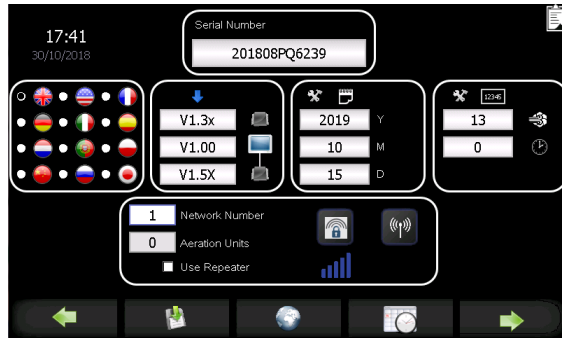
Description	Units	Limits	Explanation
Injection in Dwell		Check or Uncheck	Check to allow the injection of H ₂ O ₂ during dwell phase. Timed cycle only.
Aeration Parametric		Check or Uncheck	Check allows the aeration phase to finish after the aeration time has been completed and will continue, if required, until concentration is below 1ppm. If unchecked the aeration will run for the set time only.
CYCLE PARAMETERS			
Gassing Injection Rate*	g/min	4 to 16	H ₂ O ₂ injection rate during gassing phase.
H2O2 Mass to inject	g	10 to 4520	Mass of liquid H ₂ O ₂ solution vaporised in gassing phase. (timed cycle only, gassing parametric disabled)
Room Volume	m ³	5 to 400	Room volume to be decontaminated (gassing parametric enabled)
Dwell Injection Rate*	g/min	4 to 16	H ₂ O ₂ injection rate during dwell phase.
Dwell Time	Sec	60 to 21600	Length of time in dwell phase
H2O2 Alert Level	ppm	0 to 1000	At the end of gassing dwell the system checks that the peak PPM reached thus far is greater than the alert level. If not a warning alarm message will be displayed and printed.
Aeration VFC Delay	Sec	0 to 64800	Delay time before the volt free cycle phase indicator switches from gassing to aeration. Delay time must be shorter than aeration time
Aeration Time	Sec	60 to 59940	Length of aeration phase if Aeration Parametric is unchecked, and minimum aeration time if checked.
+ Aeration Units		0 to 6	Number of additional wireless aeration units which are required.

* These values must be set with care to ensure hydrogen peroxide does not condense in the vaporiser. Seek advice from Bioquell.

11 SYSTEM ADMINISTRATION

The System Administration menu can be viewed from the Home Page by pressing . Full screen navigation and access levels are given in Section 20.

11.1 System Information



The unit's serial number is at the top. From left to right:

- Screen and print language
- Screen and PLC software version
- Service due date (will flash if service is overdue)
- Number of cycles and hours run

The language can be changed by selecting the flag of the language required and then pressing .

11.2 Time Zone, Daylight Saving and Region

Press  to set the time zone, daylight saving and region. Choose from the pull down menus and press 'OK' when done. Can be edited by supervisor level and above.

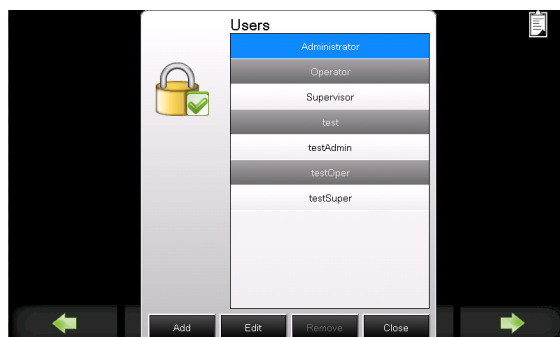
11.3 Date and Time

Press  to set the time and date. The hour, minute, second and year, month, day can be edited when touched using a keypad which will appear. When correct accept by pressing the green tick. Can be edited by supervisor level and above.

11.4 Manage Users and Passwords

Administrator access only. (Default passwords are given in Section 22)

Press the  arrow at the bottom right of the Administration page and then on the next page press  button to access the functions.



The list of users is displayed.

At any time the user can return to the Password Page by selecting 'Close'.

11.4.1 Adding New Users

In the displayed boxes enter the user's name and password.

The 'Description' box may be left blank or a reference may be added.

The password chosen must be unique to each individual, and contain a minimum of 3 and a maximum of 24 alphanumeric characters. *Note: More characters may be entered but only the first 24 characters will be displayed.*

Select 'Next' to proceed to the next screen or 'Cancel' to return to the Administration Page.

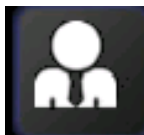
Select the access level the new user is to be given. (Select only one).

There are three user groups that a person can be put in; these are listed below:



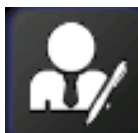
OPERATOR

Someone in this group can operate, start and stop a pre-programmed cycle, transfer a cycle, change language; otherwise have only viewing rights.



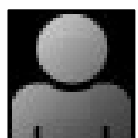
SUPERVISOR

Someone in this group can operate, start and stop a pre-programmed cycle, transfer a cycle, change language, change the date and time; otherwise have only viewing rights.



ADMINISTRATOR

Someone in this group can do as the SUPERVISOR and also, has access to manage the passwords; this includes setting-up new users, re-setting passwords, and assigning user groups to the user. In addition they can edit, create and delete recipes (cycles).

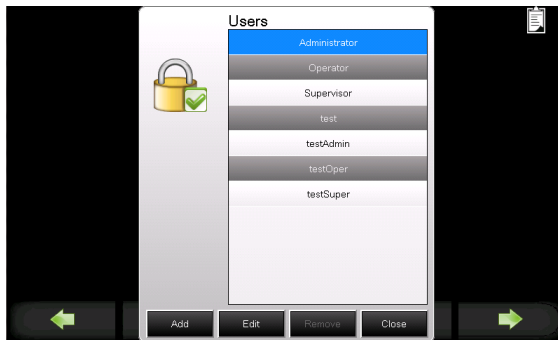


NO USER

No user is logged in. Access to the Home Page is permitted, but all navigation keys are disabled

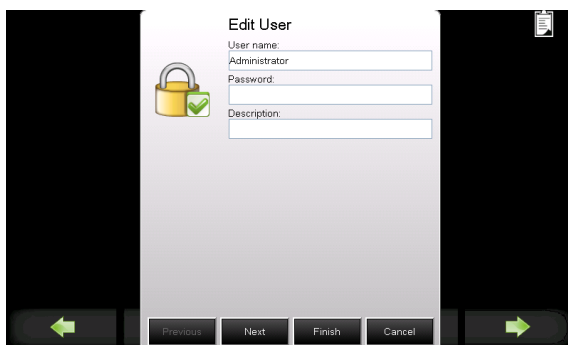
Note: 'NO USER' is not selectable.

11.4.2 Changing Access Level



Select the person's name for which access level is to be changed.

Select 'Edit'.



Enter the user's details.

Select 'Next'.

Select access level to which the user is to be assigned.

Then select 'Finish'.

11.4.3 Deleting Users

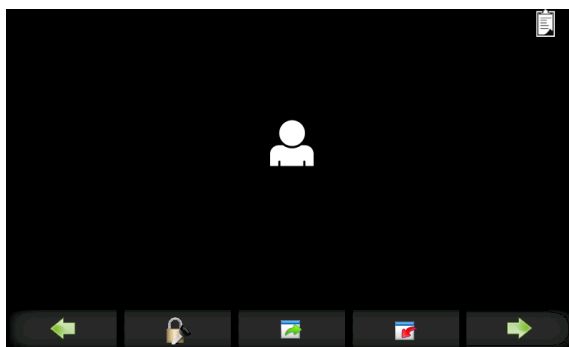


Select the name of the user to be removed.

Select 'Remove'.

A prompt box appears. Select 'YES' to remove the user or 'NO' to return to the previous screen.

11.5 Audit Trail (Option)



Select  to move to the next page from password page.

Audit Trail					
Message	Description	Value Before	Value After	Time Stamp	User
Show Users Dialog Security when ButtonNav				25/07/2018 17:36:46	Admin
Show Users Dialog Security when ButtonNav				25/07/2018 17:36:32	Admin
Current User	Login	<no user>	Administrator	25/07/2018 16:06:33	Admin
Current User	Logout	Engineer	<no user>	25/07/2018 15:06:11	<no user>
DisableDoorInterlocks	Disabled	False	True	25/07/2018 15:17:37	Engl
Process Mode	Stopped			25/07/2018 15:17:36	Engl
Process Mode	Running			25/07/2018 15:17:34	Engl
LightsHMI	Admin. Para.	20	10	25/07/2018 15:17:20	Engl
HPIV Recipes Report Saved				25/07/2018 14:32:17	Engl
QHPV Only Recipe Saved	SAB test cycle			25/07/2018 14:32:17	Engl
HMI_Command	Eng.parameters saved	0	33	25/07/2018 14:04:14	Engl
HMI_Command	Eng.parameters saved	0	33	25/07/2018 14:02:57	Engl
QHPV_vaporiser_temperature_raw_max	Calib Para.	3866	3865	25/07/2018 14:02:56	Engl
HMI_Command	Eng.parameters saved	0	33	25/07/2018 14:02:32	Engl
QHPV_vaporiser_temperature_raw_max	Calib Para.	3878	3866	25/07/2018 14:02:31	Engl
HMI_Command	Eng.parameters saved	0	33	25/07/2018 14:01:37	Engl
QHPV_vaporiser_temperature_raw_min	Calib Para.	201	178	25/07/2018 14:01:35	Engl
QHPV_air_heater_temperature_raw_max	Calib Para.	3960	3934	25/07/2018 14:00:24	Engl
QHPV_air_heater_temperature_raw_min	Calib Para.	1157	1092	25/07/2018 13:59:37	Engl
HMI_Command	Eng.parameters saved	0	33	25/07/2018 12:07:25	Engl

This page displays all recorded actions, newest at the top.

Select  to create a PDF report of the database and store on the hard disk.

Select  to export the database to the hard disk and create a PDF report of it.

Refer to Bioquell for details on how to import the audit trail, cycle parameters and other information into external data acquisition systems.

12 PACKING-UP



WARNING – Do not enter an enclosure until the hydrogen peroxide level has been checked with a low level sensor and is at a safe level

The unit should be packed away neatly to avoid damage.



1. Turn the power off to the Base unit and aeration units if used. Coil-up the power cables and place in the storage area by the power switch of the Base unit.

The bottles do not need to be removed from the ProteQ as long as they remain engaged with the plunger down. If removing bottles, always fit BOTH yellow and screw caps.



2. Return the aeration units, if present, onto the back of the Base unit.
3. Wheel the Base unit out of the room to the lectern's location.
4. Place the hand held low level sensor on the lectern, or return it to its charging unit.
5. Unplug the lectern's power cable. DO NOT TAKE THE LECTERN INTO THE ROOM, this may re-introduce contamination.
6. Place the power cable's plug behind the grey metal as shown and then wind the cable around the groove being held by the grey metal.
7. Place the lectern onto the Base unit by leaning it backwards and first engaging the bottom and then pushing the top forward.



13 OPERATING THE WIRELESS NETWORK (PAIRING)

The lectern, base unit, and aeration units must be on the same wireless network to enable them to communicate with each other. Supervisor or administrator access is required for the following.

13.1 Changing the Wireless Network Colour

Where multiple suites are being run on the same site, it is important that every suite has a different network colour, as this will prevent confusion if modules are mixed-up or changed between suites, or two suites are run in nearby rooms.

To change the colour, go to the administration screen and change the network number. A total of 10 network numbers are available and each number has a different colour associated with it.

13.2 Pairing a Lectern to a ProteQ Base Unit

If a ProteQ base unit requires pairing with a lectern then use the following procedure.

Power down and power-up the lectern and log on



Go to the Admin screen (pen), and press the wireless icon 

acknowledge with the green tick, this starts a new network.

Return to the admin screen and open the network by pressing the 'open network' icon  the icon and the wireless indicator on the lectern panel will flash. If a repeater is being used the light on the repeater will also flash.



Press the wireless button above the bottle module on the base unit. This will start to fast flash.

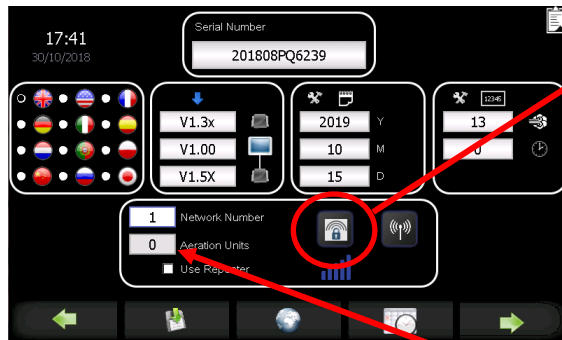
The lectern should pair with the base unit, this is seen by the light halo around the wireless button on the base unit going steady state blue. This may take a minute, if unsuccessful power cycle the base unit.

Once paired, push the 'open network' icon  again to close the network, if this is not done within 5 minutes it will automatically close. The icon will stop flashing.

13.3 Joining Aeration units to the network

If an aeration unit and Base unit are not displaying the same wireless network colour around their wireless buttons then the aeration unit is not on the same wireless network. The colour around the wireless button on the Base unit will be the same colour as the light on the lectern's grey panel. The number of aeration units on the network can be read from the screen.

The following explains how to join an aeration unit to the wireless network. The base unit and lectern have to already be paired.



Press the 'Open Network' button. The button will start to flash.

Then press the wireless button on the portable aerator and its light will start to fast flash.

After a short time the button on the aerator will stop flashing and become the same colour as the Base unit.

The number of aerators displayed on the screen will increase accordingly.

Several aerators can be paired at the same time. A maximum of 6 aerators is allowed. The network can then be closed by pressing the 'open network' button again, if this is not done it will close automatically after 5 minutes.



13.4 Using the Wireless Repeater



If there are issues with getting a reliable signal between the lectern and the main unit a wireless repeater can be used. This is a repeater box containing the wireless transmitter/receiver which is on the end of a 20m cable.

The cable is plugged into the lectern and the box can then be located nearer to the ProteQ base unit allowing a better signal.



After plugging the repeater box in, go to the administration screen and check the 'Use

Repeater' box. Press the save icon . Then turn the lectern power off and on.

Then pair the lectern to the ProteQ base unit as described in Section 13.2.

If cycles without the repeater are required it is necessary to uncheck the 'Use repeater' box, save, power cycle and pair the lectern to the ProteQ base unit again as Section 13.2.



14 ROUTINE MAINTENANCE

14.1 User Routine Maintenance

14.1.1 Changing the Printer Paper

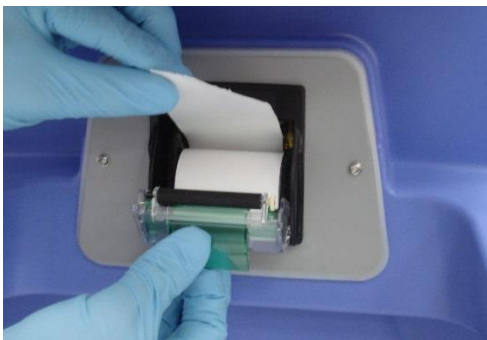
The paper required for the printer is available from Bioquell (Part No. 7050-00003). The following pictures show how to change the printer paper:



Open the printer cover by gently lifting the "green" part.



Allow the cover to drop down and remove the old roll of paper.



Replace with new roll of paper ensuring correct orientation (as shown). Push cover closed. The printer is now ready to use.



Depressing the button will allow paper to be fed through the printer.

14.1.2 Cleaning

The system exterior surfaces are manufactured from polypropylene (PP), acrylonitrile butadiene styrene (ABS), and polyester powder coated aluminium and stainless steel panels.

To keep the unit clean the following procedure is recommended:

- Switch off power.
- Using a mild detergent solution (non-abrasive) wipe the external surfaces with a damp cloth taking care not to wet the printer or the external pre-

- filter panels or fan grilles. Take care around the power switch(es) not to use excessive cleaning solution.
- Rinse cloth and wipe thoroughly.
 - Dry surfaces with a lint-free clean cloth.



Do not expose the ProteQ base unit to Isopropyl Alcohol (IPA) or other hydrocarbon cleaning agents as this will adversely affect the hydrogen peroxide sensor

14.1.3 Hydrogen Peroxide Liquid

Bioquell Hydrogen Peroxide must be used as it ensures that the national regulations on hydrogen peroxide liquid and decontamination processes are complied with as well as ensuring that the liquid is of a compatible quality for the system. The bottle has been designed to reduce the risk of liquid coming in contact with the operator.

The ProteQ base unit will take two sizes of bottles:

950ml Bottle

Part Number: BQ783-XX-0950

This part number is for four 950ml bottles of 35% hydrogen peroxide.

2Litre Bottle

Part Number: BQ783-XX-2000

This part number is for four 2litre bottles of 35% hydrogen peroxide.

(where XX refers to the country/region codes, refer to your local Bioquell office or distributor for applicable code.)

Contact your local Distributor to order the Bioquell Hydrogen Peroxide.

14.2 Scheduled Maintenance

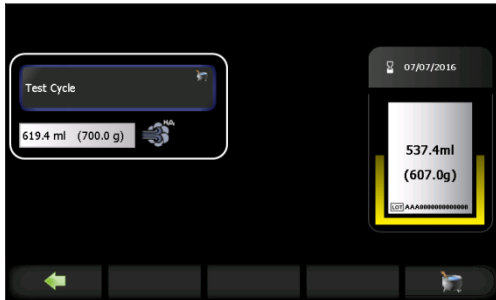
Planned and preventative maintenance and calibration must be carried out by fully trained and Bioquell authorised service personnel on a minimum of a twelve monthly cycle to maintain the safety and efficiency of the system operation. Only genuine replacement parts supplied by a Bioquell Service Provider must be used to ensure safe operation.

15 TROUBLE SHOOTING

15.1 Software Cycle Interlocks

The following conditions prevent the cycle from starting:

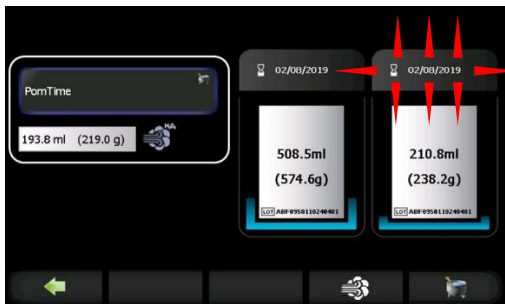
NOTE the ProteQ's lights will be white, when the issue is resolved it will go green.



Insufficient H₂O₂ Volume

If the bottle icons are yellow there is insufficient volume of Hydrogen Peroxide within the bottle to complete the chosen cycle.

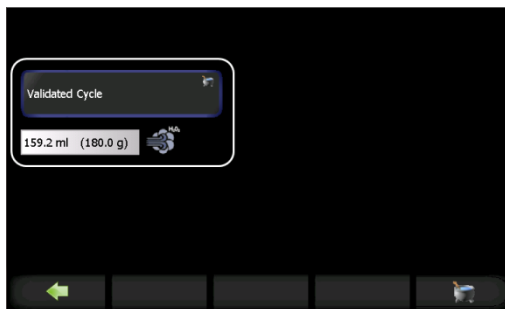
Replace a bottle or both bottles with sufficient liquid for the cycle and repeat Cycle Run procedure.



Invalid Hydrogen Peroxide

If the expiry date box is yellow and flashing the hydrogen peroxide in the bottle is beyond its expiry date and cannot be used.

Replace bottle and repeat Cycle Run procedure.



Bottle RFID tag not read or plunger not down

If the bottle cannot be seen the cycle will not run as the bottle RFID has not been read. There is either no bottle in place, the black plunger is not down or the bottle is in place (with plunger down) but the RFID tag is not in the correct position.

If the tag is in the wrong place then the bottle is misaligned with the red stud. Remove the bottle carefully and check that the bottom of the bottle has not been punctured, and replace ensuring that the bottle is correctly aligned, see Section 7.2.

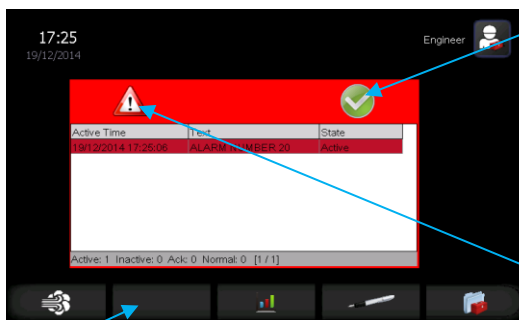


No Aeration Unit Connected

If the loaded cycle requires additional aeration units to those present on the network, the gassing icon on the bottom menu row will not be displayed and there will be an alarm 44 after a few minutes.

15.2 Warnings & Alarms

When an alarm is activated it will display on the screen and the vaporiser's lights will illuminate red. If the audible alarm is enabled this will sound, but only in cycle.



Alarm Acknowledge button. All alarms have to be acknowledged to be removed from the alarm list. To acknowledge first touch the alarm warning in the panel

then press the acknowledge button . Acknowledging will stop the audible alarm, if enabled.

To minimise or close an empty alarm list touch the hazard symbol.

The hazard symbol will be visible in the second box if there are any active alarms, and will flash if there are unacknowledged alarms.

Touch box to view the alarm list. All alarms are printed if a printer is fitted.

The following is a table of all the alarms and what action can be taken:

Alarm No.	Alarm Name	Alarm Description	Action	User Action
1	Emergency Stop	The emergency stop has been pressed down	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Turn the Emergency Stop button to reset when safe to enter room. See Section 4 for location
2	RFID reader 1 error	Left hand RFID reader alarm (reads bottle labels)	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm and contact service provider
3	RFID reader 2 error	Right hand RFID reader alarm (reads bottle labels)	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm and contact service provider
4	Vaporiser 1 temperature low	Vaporizer not reaching temperature	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider

Alarm No.	Alarm Name	Alarm Description	Action	User Action
5	Vaporiser 1 temperature high	Vaporizer temperature too high	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
6	Vaporiser 2 temperature low	Vaporizer not reaching temperature	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
7	Vaporiser 2 temperature high	Vaporizer temperature too high	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
8	Delivery temperature low	Heaters are not able to achieve the required air temperature	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
10	Sterilant injection 1 fault	Vaporizer not receiving Hydrogen Peroxide	Unit will go into emergency aeration	Aerate until room reaches 1ppm and contact service provider
11	Sterilant injection 2 fault	Vaporizer not receiving Hydrogen Peroxide	Unit will go into emergency aeration	Aerate until room reaches 1ppm and contact service provider
12	Pump rotation fault	Hydrogen peroxide dosing pump is not rotating	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm. Remove bottle and contact service provider.
13	Distribution fan 1.1 fault	Distribution fan 1 has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
14	Distribution fan 1.2 fault	Distribution fan 1 has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
15	Distribution fan 2.1 fault	Distribution fan 2 has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
16	Distribution fan 2.2 fault	Distribution fan 2 has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
17	Distribution fan 3.1 fault	Distribution fan 3 has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
18	Distribution fan 3.2 fault	Distribution fan 3 has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
19	Distribution fan 4.1 fault	Distribution fan 4 has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider
20	Distribution fan 4.2 fault	Distribution fan 4 has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm and contact service provider

Alarm No.	Alarm Name	Alarm Description	Action	User Action
21	Air heater fan 1 fault	Air heater fan 1 has stopped working	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm and contact service provider
22	Air heater fan 2 fault	Air heater fan 2 has stopped working	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm and contact service provider
23	Cycle abort by user	The cycle has been aborted by means of the stop button on the HMI	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration. If in emergency aeration will stop cycle.	Aerate until room reaches 1ppm and contact service provider
24	Power failure	Power has been lost during a cycle and resumed	Will go to off mode when power restored.	Start aeration cycle and aerate until room reaches 1ppm, then re-run cycle
25	Emergency aeration	Unit has gone into emergency aeration due to another fault	Unit is in emergency aeration	Aerate until room reaches 1ppm
26	Aeration unit 1 main fan failure (if present)	Main aeration fan has stopped working	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm, and contact service provider
27	Aeration unit 1 distribution fan 1 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
28	Aeration unit 1 distribution fan 2 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
29	Aeration unit 2 main fan failure (if present)	Main aeration fan has stopped working	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm, and contact service provider
30	Aeration unit 2 distribution fan 1 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
31	Aeration unit 2 distribution fan 2 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider

Alarm No.	Alarm Name	Alarm Description	Action	User Action
32	Aeration unit 3 main fan failure (if present)	Main aeration fan has stopped working	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm, and contact service provider
33	Aeration unit 3 distribution fan 1 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
34	Aeration unit 3 distribution fan 2 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
35	Aeration unit 4 main fan failure (if present)	Main aeration fan has stopped working	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm, and contact service provider
36	Aeration unit 4 distribution fan 1 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
37	Aeration unit 4 distribution fan 2 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
38	Aeration unit 5 main fan failure (if present)	Main aeration fan has stopped working	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm, and contact service provider
39	Aeration unit 5 distribution fan 1 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
40	Aeration unit 5 distribution fan 2 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
41	Aeration unit 6 main fan failure (if present)	Main aeration fan has stopped working	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm, and contact service provider
42	Aeration unit 6 distribution fan 1 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider

Alarm No.	Alarm Name	Alarm Description	Action	User Action
43	Aeration unit 6 distribution fan 2 failure (if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
44	Aeration unit communications lost In cycle (if present)	One of the aeration units as defined in the cycle setup, is no longer communicating	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-pair the aeration unit, if does not work replace unit.
45	HMI communication error	The communication between the HMI and the vaporizer module has been lost	Unit will go into emergency aeration	Aerate until room reaches 1ppm, then re-pair the vaporizer module. If does not work contact service provider.
46	RH sensor fault - RH	The RH sensor is reading a low RH value due to a fault	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm and contact service provider
47	RH sensor fault - temperature	The temperature sensor is reading a low temperature value due to a fault	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Aerate until room reaches 1ppm and contact service provider
48	Insufficient Liquid	Parametric cycle only.	Will stop cycle at the end of conditioning stage.	More H2O2 required. Restart the cycle.
49	Starting temperature Low	The room temperature is below 15°C	Will prevent a cycle from starting	Increase the temperature in the room to above 15°C
50	Starting temperature High	The room temperature is above 35°C	Will prevent a cycle from starting	Reduce the temperature in the room to below 35°C
52	Starting RH High	The RH sensor is reading 100% RH or higher	Will prevent a cycle from starting	Faulty sensor - Contact service provider
53	EMM Fan Fault	The fan on the environmental monitoring module is not rotating	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Faulty EMM - Contact service provider
54	Internal Aeration Fan1 Fault	Fan has stopped working	Will go into emergency aeration.	Contact service provider
55	Internal Aeration Fan2 Fault	Fan has stopped working	Will go into emergency aeration.	Contact service provider
56	Remote Stop	External input is not present when required, usually from Building Management System or other controller.	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Investigate the external system. Check Remote Start/Stop leads and connections to unit.

Alarm No.	Alarm Name	Alarm Description	Action	User Action
57	Hydrogen Peroxide Sensor Fault	The H2O2 sensor is reading a low value to do a fault	Will prevent a cycle from starting. If in cycle prior to gassing will stop the cycle, otherwise will go to emergency aeration	Faulty EMM – contact service provider
58	Aeration unit 1 distribution fan 3 failure (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
59	Aeration unit 1 distribution fan 4 failure (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
60	Aeration unit 2 distribution fan 3 failure (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
61	Aeration unit 2 distribution fan 4 failure (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
62	Invalid Cycle Recipe	Cycle requires the Sensor pack option.	Will prevent a cycle from starting.	Delete cycle or edit cycle parameters.
63	Decon Fan1 Fault	Fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Contact service provider
64	Decon Fan2 Fault	Fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Contact service provider
65	Aeration unit 3 distribution fan 3 failure (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
66	Aeration unit 3 distribution fan 4 (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
67	Aeration unit 4 distribution fan 3 failure (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
68	Aeration unit 4 distribution fan 4 failure (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider

Alarm No.	Alarm Name	Alarm Description	Action	User Action
69	Aeration unit 5 distribution fan 3 (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
70	Aeration unit 5 distribution fan 4 failure (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
71	Aeration unit 6 distribution fan 3 failure (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
72	Aeration unit 6 distribution fan 4 failure (flat cat only option, if present)	Aeration distribution fan has stopped working	Will stop cycle prior to gassing stage, otherwise will go into emergency aeration.	Aerate until room reaches 1ppm, then re-run cycle with other aeration units and contact service provider
73	Insufficient Aeration Units for Loaded Cycle	Cycle requires more aeration units than are on the wireless network	Will prevent a cycle from starting.	Ensure the correct quantity of aeration units are available, they are all powered up and paired on the wireless network. Try re-pairing the network

Warnings

Message	Mode / Phase	Action	User Action
H2O2 Level Not Achieved	End of gassing phase and programmed minimum H ₂ O ₂ ppm level not achieved.	Warning only, printed only at end of Dwell, also at end of cycle (deviation in cycle).	Possible invalid cycle. Inform supervisor. Check concentration of H ₂ O ₂ and conditions in which it has been stored.

Indication	Cause	Action	User Action
The Administration screen icon (pen) flashes, and the service date field in the administration screen flashes	Service / calibration is overdue	No Action	Arrange a service visit by the Bioquell Service provider

15.3 Fault Finding

Fault	User Checks	Further Action
No power to the screen or base unit	- Check power is switched on at the lectern/base unit - Check the building's power supply to the lectern/base unit	If power to the lectern/base unit is OK Contact Bioquell Service Provider
Printer does not Operate	- Check printer has correct paper - Check paper feed - Check green light on printer is lit	Replace paper roll if necessary. The green light will flash. Press paper advance key on printer. Check paper has the correct side up. Contact Bioquell service provider.
Incorrect Password	- Re-enter password in accordance with User Manual - Re-set password by administrator	Contact person with Administrator rights Contact Bioquell Service Provider
H ₂ O ₂ concentration level reads high and will not reduce	Check if IPA or other hydrocarbon based cleaning agents have been used on the ProteQ base unit or items in the enclosure	Contact Bioquell Service Provider.
Cannot start a cycle	See Section 15.1 - Check H₂O₂ is not expired - Ensure enough H₂O₂ in bottle for cycle chosen - Check no alarms active	If checks OK Contact Bioquell Service Provider

16 SPECIFICATION

Materials of Construction: (external surfaces)		• Polypropylene (PP) • Acrylonitrile Butadiene Styrene (ABS) • Aluminium Alloy (Epoxy coated) • Polyester/Polycarbonate Labels
Cycle Starting Environmental Limiting Conditions:	Temperature Limits:	15°C to 30°C (59°F to 86°F) ¹
	Relative Humidity Limits:	10% to 80% RH ²
Storage Environmental Limiting Conditions:	Temperature Limits:	0°C to 35°C (32°F to 95°F)
	Relative Humidity Limits:	80% RH (Max non-condensing)
Pollution Degree Environment:		2
Power Requirements:	230V AC	Single phase, 50/60 Hz, (7.5A Base Unit, 1A lectern)
	120V AC	Single phase, 50/60Hz, (15A Base Unit, 2A lectern)
	100V AC	Single phase, 50/60Hz, (15A Base Unit, 2A lectern)
Power Supply:		Installation category II
Power Consumption: Base Unit / lectern	230V AC	1.8 kW max / 0.2kW max
	120V AC	1.8 kW max / 0.2kW max
	100V AC	1.8 kW max / 0.2kW max
Cable lengths (Mains Power):	Base Unit	5m (16.4ft)
	Lectern	3m (10 ft)
Operating Position:		Upright Only
Unit Dimensions (WxHxD)	Base Unit & lectern	672 x 1430 x 710 mm (26.5 x 56.3 x 28.0in) (Height=1421mm (56in) if no lectern)
	Lectern	630 x 880x 349 mm (24.8 x 34.6 x 13.7in)
Unit Weight:		67 kg (148lbs), including Lectern, not including bottles or Aeration units
Lectern Weight:		9 kg (20lbs)
Packaged Dimensions:	(WxHxD)	900 x 1560 x 820mm (35.4 x 61.4 x 32.2in)
Packaged Gross Weight:		115kg (254lbs)
Locking Brake:		(2x) Castor Lock
Data Printer		Thermal print record
Human interface		Colour touch screen

¹ The ProteQ will allow a cycle to start up to a maximum of 35°C (95°F) starting temperature. However when operating above 30°C please contact Bioquell to ensure the correct cycle set-up

² If requiring to operate outside this range refer to Bioquell or its agents

External Connections:	Base Unit Lectern	• Mains Power Supply • Cycle status signal digital (volt free) outputs (requires voltage from external equipment) • Start/stop (run) signal 24VDC input (requires volt free connection at external equipment) • Mains Power Supply • RJ-45 connector on lectern for Ethernet communications (Protocol: Modbus TCP/IP and OPC UA) • Wireless range extender
Wireless Interface:		2.4 GHz ISM Band, 16 channels (IEEE802.15.4 Channels 13,15,19,20,25), Zigbee, Maximum power 3dBm
Optional additional Aeration Capability		2 off onboard stored, free standing wirelessly controlled units. Independently powered 100-240V (3.1A). Upto 6 can be operated
Maximum H ₂ O ₂ liquid injection rate	230V/120V	4 to 16 g/min
	100V	4 to 10 g/min
Enclosure decontamination capacity		Nominally 400 m ³ (14,130ft ³) for rooms (subject to configuration, loading and environmental conditions, lower limit 250m ³ (8,830ft ³) at 30°C (86°F) and 10% RH)
Maximum H ₂ O ₂ liquid volume	Capacity	4 litres (135 fl oz)
Injection Pump Accuracy		±1.5%
H ₂ O ₂ Liquid concentration		35% w/w. Bioquell approved supply only
Radio Frequency Identification of H ₂ O ₂ bottles		ISO1443 Type A (13.56 MHz), Maximum power <1 linear mW
Noise: Outside room over a cycle L _{Aeq}		64.2 dB (A)

17 HAND HELD LOW LEVEL HYDROGEN PEROXIDE SENSOR



This instrument is fitted with the hydrogen peroxide vapour sensor head. The two alarm set points are programmed at 1ppm and 2ppm. The date is set in European format, and the language is English. The calibration certificate is contained in the box with the instructions.

Refer to the separate manufacturer's manual for full details including changing language; the following is intended to be a quick reference guide.

Switching ON: Press the green 'OK' button on the right. The unit will perform a self-test of the audible and visual alarm, then the display will show the following:

Software version
Days to next calibration
Alarms (set to A1=1, and A2=2)

It will then display the level detected. If you press any key the display will be illuminated for 10 seconds.

If the level detected exceeds 1ppm, the visual and audible alarm will operate in single bursts. When 2ppm or greater is detected, the alarm will operate in double bursts. To acknowledge the alarm press 'OK' button, this may not mute the alarm if the level is above the high alarm limit.

When the instrument is turned off it is still providing power to the sensor to keep it in a warmed state, ready for the next use. Once fully charged, the battery should last for 150 hours in the off state, therefore the instrument should be stored in its charger base unit.

If the unit is to be left off for longer periods without being charged, the battery should be removed by unscrewing the allen bolt at the bottom rear of the unit. The battery pack should then slide out.

Charging the power supply unit

The unit is supplied with the instrument holder and mains adaptor. Place the instrument into the holder and plug in the mains adaptor. The red light on the holder will be flashing when the unit is charging and will stay illuminated once charged. It takes about 4 hours to fully charge.

It is strongly recommended that the instrument is stored in its charging unit.

Calibration

This instrument requires re-calibration every six months. It is recommended that the re-calibration is conducted by Bioquell as it can then be accurately re-calibrated at 1ppm.

18 DISTANCE MEASUREMENT DEVICE (OPTIONAL)



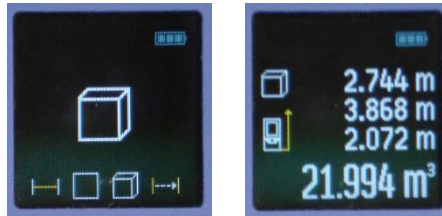
The Distance measurer can be used to measure the volume of the room.

Press button 3 to turn the instrument ON and OFF.

Once ON, to measure room volume press the central button 2 until the cube appears, as shown below.

Place the instrument against the wall and Press button 1 several times to measure the first distance, this will fill in the first distance, continue to measure the other two dimensions pressing button 2 when aligned. Any distance can be repeated by pressing button 3.

Refer to the separate manufacturer's manual for full details; the above is intended to be a quick reference guide.



UNIT FOR US/CANADA



Press button 3 to turn the instrument ON and OFF.

Once ON, to measure room volume press the central 'FUNC' button 2 then the '+' button twice (4), when the cube is at the top, as shown below. Then press button 1 twice.

Place the instrument against the wall and Press button 1 to measure the first distance, this will fill in the first distance, continue to measure the other two dimensions pressing button 1 when aligned. Any distance can be repeated by pressing button 3.

Refer to the separate manufacturer's manual for full details; the above is intended to be a quick reference guide.



NOTE: Ensure that the instrument is set to measure in metres. To do this press and hold the 'FUNC' button 2 for a few seconds, 'ft/m' will be highlighted then, press button 1, rotate using '+' button 4, when '0.000 m' is highlighted press button 1.

19 PARTS LIST

19.1 Consumables

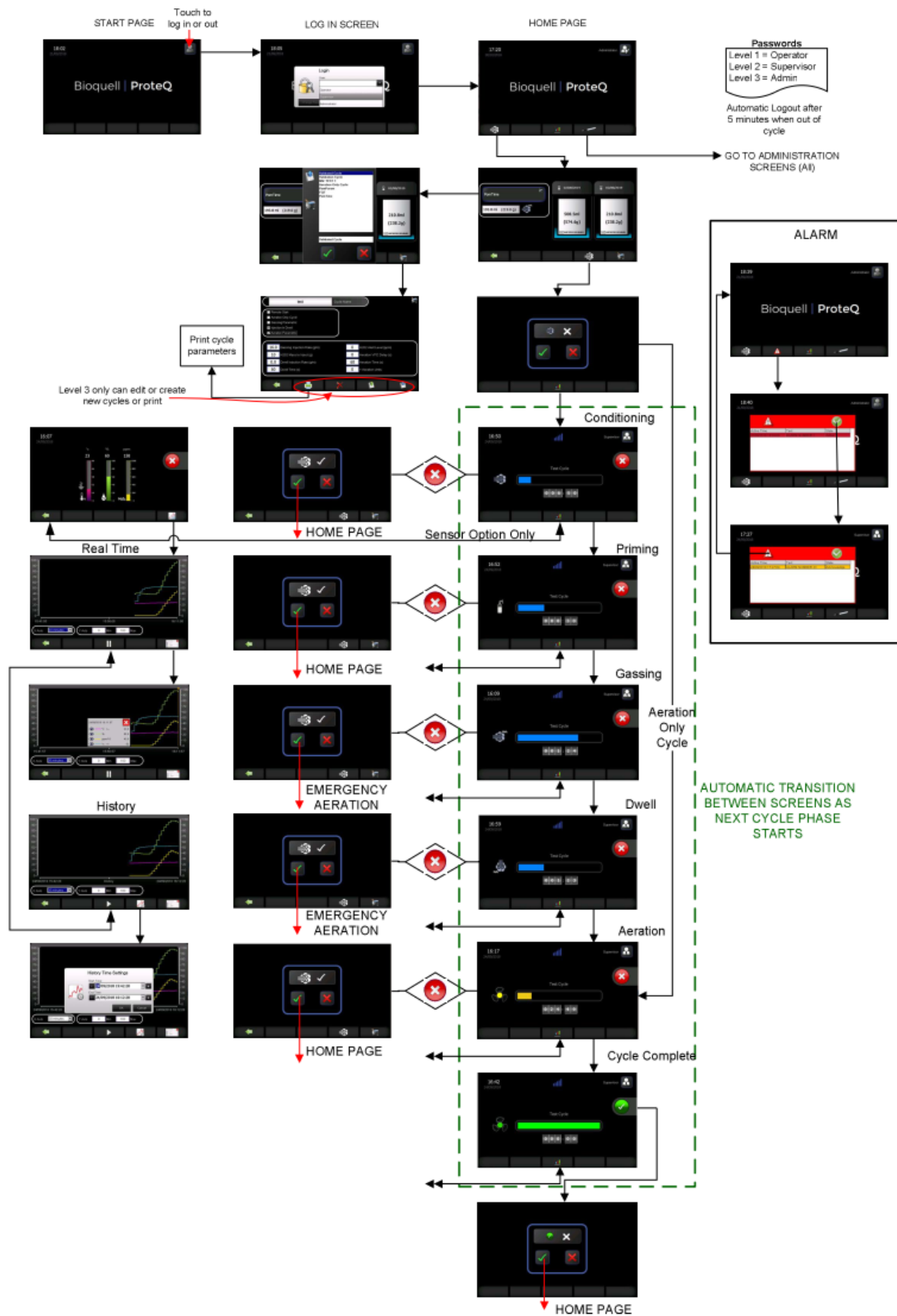
Part No	Part Description
BQ783-XX-0950	4 x 950ml bottles of 35% Hydrogen Peroxide
BQ783-XX-2000	4 x 2 Litre bottles of 35% Hydrogen Peroxide
TD078-5000-100	Chemical Indicators, box of 100.
TD078-1000-100	Biological Indicators, box of 100
H20990614	Bioquell Sealing Tape
H20040010	Gloves (order 100 for a box of 100)
H07990042	Goggles

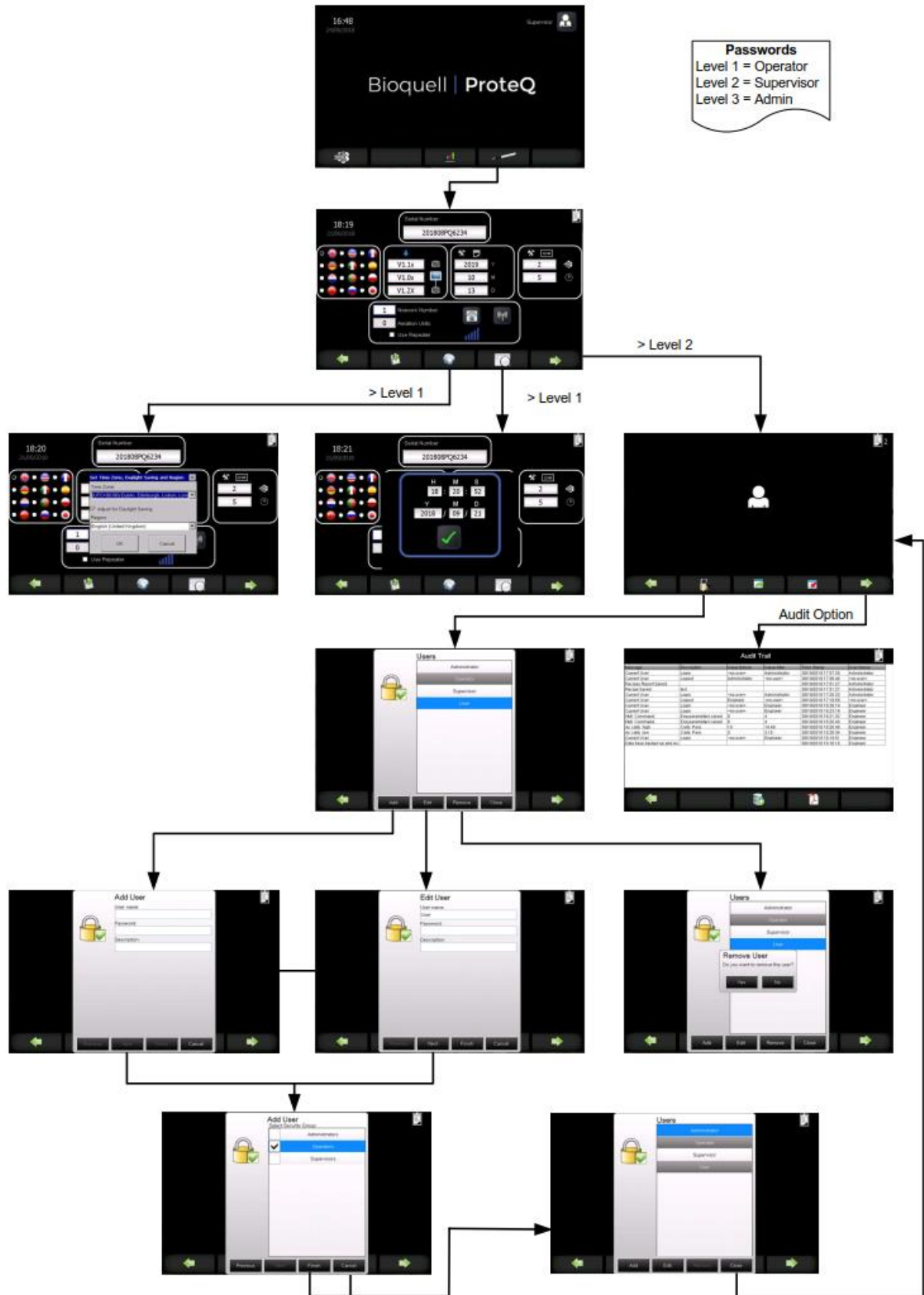
Where XX refers to the country/region codes, refer to your local Bioquell office or distributor for applicable code.

19.2 Replacement Parts

Part No	Part Description
TD091-4503	Hand held low level H2O2 Detector
TD091-4505	Room Distance measurer
TD091-4506	Room Distance measurer (US/Canada)
TD106-2050	Wireless Repeater with 20m cable
TD092-9509	Bottle Insert for 950ml bottle

20 SCREEN NAVIGATION





21 EC DECLARATION OF CONFORMITY

EC DECLARATION OF CONFORMITY FOR ATTACHMENT OF 'CE' MARK



We, the manufacturer: BIOQUELL UK Limited.
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West Portway
Andover, England
SP10 3TS
Tel: +44 (0) 1264 - 835835
Fax: +44 (0) 1264 - 835836

declare under our sole responsibility that the appliance:

ProteQ

Serial Number as stated on the unit's rating plate

complies with the Essential Requirements of the Machinery Directive 2006/42/EC, Radio Equipment Directive 2014/53/EU, and Restriction of Hazardous Substances in Electrical and Electronic Equipment 2011/65/EU by means of the following harmonised standards:

Machinery Directive 2006/42/EC: by means of EN 12100:2010

Radio Equipment Directive 2014/53/EU by means of:

Article 3.1a	RF Exposure: EN 62311
Article 3.1a	EN 61010-1: 2010
Article 3.1b	EN 61326-2-1:2013 using ETSI EN 301 489-3 V2.1.1, & ETSI EN 301 489-17 V3.1.1 (ETSI EN 301 489-1 V2.1.1)
Article 3.2	EN 300 328 v 2.1.1 EN 300 330 v 2.1.1

Restriction of Hazardous Substances in Electrical and Electronic Equipment 2011/65/EU by means of EN 50581:2012

A copy of the Technical File for this equipment is available from:

O.R.Cumberlege

At Bioquell UK Limited, 52 Royce Close, West Portway, Andover, England

Authorised signatory of manufacturer:

O.R.Cumberlege, Director

14th November 2018

22 DEFAULT PASSWORDS

Access to these passwords should be limited to the necessary personnel and at the appropriate level of seniority and training.

It is advised that this page is removed from the manual and stored in a safe place.

Name	Password
ADMINISTRATORS	admin
SUPERVISOR	super
OPERATOR	oper

These default passwords cannot be changed or deleted, however people's name and their own password can be added, and their access permission level set

It is strongly advised that users use their own login name and password.

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For further information on Bioquell's technology:

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