



Qi Series



Operator Instruction Manual

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**Ultrawave baths are manufactured in the United Kingdom
and conform to exacting international standards.**

Safety instructions

The following products are covered by this operating manual:

- Qi-100, Qi-200, Qi-300 & Qi-400

The products listed above are a series of general purpose ultrasonic cleaning baths designed for indoor use by a professional user.



Electrical

Connect to a 230VAC fully earthed supply.

It can be dangerous to operate an ultrasonic bath without an earth connected.

The mains IEC socket is fitted with two fuses.

Qi100, Qi200, Qi300	T5A
Qi400	T10A

NEVER FIT A FUSE OF A HIGHER RATING THAN THOSE SPECIFIED.

Ensure that excess mains cable is stored neatly.



General use

Ensure that the bath contains liquid before you switch it on.

Always use a basket to support items to be cleaned.

Not doing so may damage the bath and invalidate your warranty.

Do not place hands or fingers in the bath.

Care should be taken when operating the bath at higher temperatures as external surfaces may become hot.

Never use toxic, flammable, acidic, caustic or corrosive solutions in the bath.

Do not move the bath when it is full of water.

Read the whole of these instructions. Safety may be impaired if they are not followed.

Ultrawave will not be responsible for damage or injury caused by incorrect use of the equipment.

WEEE Compliance: Ultrawave are complying with the WEEE regulations by contracting our obligations to Producer Compliance Scheme. Once it is deemed that the **Qi-Series** model is no longer effective, please contact Ultrawave to arrange collection by our compliance scheme provider, who will pick up the machine from your premises.

Installation

The following parts and accessories are included with the **Qi-Series** ultrasonic cleaner:

- 1 x **Qi-Series** ultrasonic cleaner
- 1 x basket
- 1 x lid
- 1 x 2m length of drain hose
- 1 x hose tail
- 1 x mains lead
- 1 x Ultraclean detergent sample

How to install?

Screw the hose connector into the drain valve at the rear of the unit.



Locate the unit close to a drain or sink.

Connect one end of the drain hose to the hose connector, and locate the other end over a drain or sink.

Connect the mains lead into a suitable mains socket.

Ensure that the mains plug and the switch are easily accessible.

Your **Qi-Series** ultrasonic cleaner is now ready to use.

Quick guide

Pour water into the bath so that it submerges the level sensor (Do not overfill).

Add the required dose of detergent (see page 19).

Switch on the machine via the switch at the rear of the unit, just above the electrical mains lead.

Press the "START" key to accept the programmed cleaning cycle settings and start the cleaning cycle.

At the end of the cycle, remove the basket from the bath and rinse the items under clean running water.



REMEMBER

- Always ensure the liquid is above the level sensor when in operation.
- Do not put hot water above 50°C into the bath.
- Always use the basket.
- Never expose hands to cleaning solutions.
- Never use toxic, flammable, acidic, caustic or corrosive solutions.
- Never breathe the fumes from strong solutions.
- Rinse the items in clean water once the cycle is complete.

Subjecting the bath to improper treatment or misuse will invalidate the warranty.

Controls

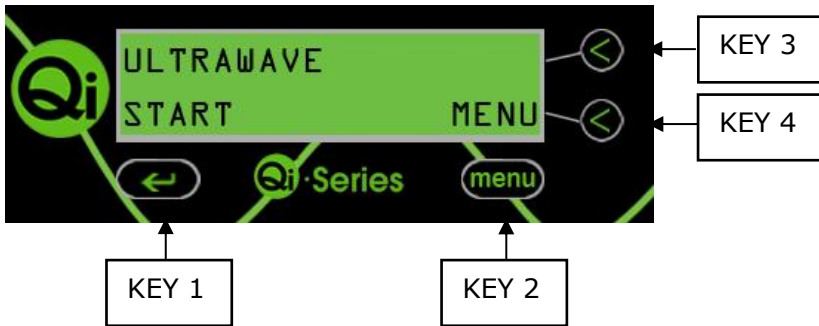
Ensure your **Qi-Series** ultrasonic cleaner is plugged into a 220-240 VAC fully earthed supply.

Once plugged in, switch on your **Qi-Series** bath via the power on/off switch at the rear of the unit.

The switch will then illuminate.



The **Qi-Series** is operated through a menu driven control system:



The different keys perform the following functions:

KEY 1: Enter – Starts and ends the ultrasonic cycle

KEY 2: Menu – Scroll through the menu

KEY 3: Up/On – Adjust the settings in the options menu

KEY 4: Down/Off – Adjust the settings in the options menu

Operating instructions


When the **Qi-Series** power is turned on and the bath is full of liquid, the following screens will display alternately.



When the water temperature is at or above the temperature set, the message "Temp OK" will display.



The actual temperature in the bath may vary and may be different to the value shown in the screen above.

To immediately start the cycle using the already set cleaning parameters, press the  key.

When the **Qi-Series** power is turned on and the liquid level is too low, the following screen will display.



When the bath is filled with liquid to the correct level, you will be given the option to degas. (The need for de-gassing is explained on page 20).



You will need to de-gas the liquid to ensure good cleaning efficacy.

By choosing YES, your **Qi-Series** ultrasonic cleaner will run an automatic de-gas cycle. The following screen will display.



When you are happy that the liquid is degassed, press the ←key.

Note: If the machine detects low liquid level for more than 5 seconds, it is assumed that the bath has been filled with fresh water, and you will be given the option of running a degas cycle.

Operator menu

A number of the **Qi-Series** cleaning parameters can be altered.

To access the options menu and scroll through the various changeable parameters, press the MENU key, when the following screen is displayed.



To scroll through the menu, press the MENU key. To exit the MENU at any time, press the ←key.

Screen 1: Setting the temperature

Your **Qi-Series** is fitted with a thermostat and heaters to ensure the temperature of the cleaning fluid is maintained at the set temperature.



Use the UP and DOWN keys to accurately set the desired temperature of the cleaning fluid between ambient and 80°C.

During normal use, the water heaters in your **Qi-Series ultrasonic cleaner** will switch on if the cleaning fluid temperature is lower than the set temperature.

[As a safety feature, the heaters and ultrasonics in your **Qi-Series** ultrasonic cleaner will only operate when the bath is full of fluid.]

Please note that during normal operation, ultrasonic energy will heat the cleaning fluid by up to 15°C per hour.

Your **Qi-Series** ultrasonic cleaner cannot cool the cleaning fluid. If the fluid temperature becomes too hot, you must either let it cool down, or refill the bath with cooler water.



SAFETY NOTICE: When the temperature is set to temperatures above 50°C, the case of the **Qi-Series** will become hot and care should be taken when touching the case (see page 27 for details).

When the correct temperature is selected, use the MENU key to move to the next screen.

Screen 2: Setting the cycle time

Your **Qi-Series** ultrasonic cleaner is factory pre-set with a cycle time of 15 minutes. Use this screen to amend the cycle time. Use the UP and DOWN keys to scroll through the numbers in order to increase or decrease the time.



When the desired cycle time has been selected, use the MENU key to move to the next screen. The new time setting will be saved when you start the next cycle.

To run the ultrasonic continuously or in infinity mode, use the UP and DOWN keys to set the cycle time to 0.

NOTE: If the fluid level falls below the level sensor, this will cause the cycle to stop.

Screen 3: Setting the power level

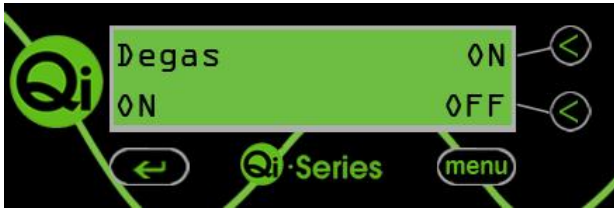
Your **Qi-Series** ultrasonic cleaner allows the power level of the ultrasonic activity to be adjusted. This allows the cleaning cycle to be accurately tailored to the specific cleaning application.



Use the UP and DOWN keys to scroll through the numbers between 50 and 100%. When the desired power level has been selected, use the MENU key to move to the next screen. The new time setting will be saved when you start the next cycle

Screen 4: Degas

As well as the automatic degas function that you are offered when the machine is first turned on, this menu function allows you to run a degas cycle whenever a cleaning cycle is initiated.



Use the ON and OFF keys to select the required option. (See page 20 for the importance of degassing.)

If you turn the degas function ON, your **Qi-Series ultrasonic cleaner** will run a degas cycle every time the cycle start key is depressed.



Once the correct option is selected, press the MENU key to move to the next screen.

Screen 5: Frequency Leap

Your **Qi-Series** ultrasonic cleaner is equipped with Frequency LEAP technology to provide a more homogeneous ultrasonic cleaning activity throughout the whole tank.

Using advanced software and generators, the **Qi-Series** uses Frequency LEAP to create a pseudo-random leaping action between a wider frequency range, reducing standing waves and improving the cleaning action.

For different cleaning applications the operator can choose between Frequency LEAP and traditional ultrasonic activity.



Use the ON and OFF keys to select the required option.

Once the correct option is selected, press the MENU key to move to the next screen. The new setting will be saved when you start the new cycle.

When you exit the Operator Menu, DO NOT SWITCH THE MACHINE OFF; you must start a cycle for the new settings to be saved. Once saved, the new settings will be used each time the machine is switched on.

Starting the cycle

Once all the Operator Menu options have been selected, the following screen will display.



The **Qi-Series** is now ready for use.

Press the \leftarrow key to begin the cleaning cycle.

When the **Qi-Series** is in operation, the following screen will display.



(The actual time and temperature may show different values.)

The operator can abort the cycle at any time by pressing the \leftarrow key.

On successful completion of the cycle, the following message will be displayed for three seconds.

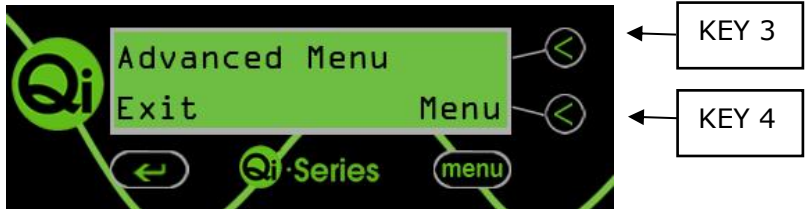


Advanced menu

The Advanced Menu allows different settings to be specified which may not require regular changes and also allows the usage history of the individual **Qi-Series** ultrasonic cleaner to be seen.

To access the advanced menu, press and hold Keys 3 and 4 together.

The following screen will then appear:

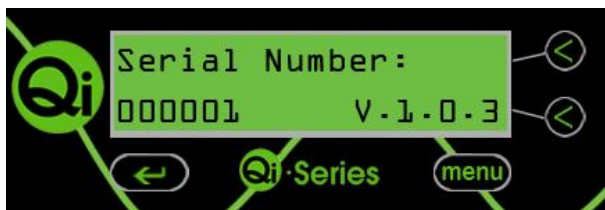


In order to scroll through the settings available in the Advanced Menu, press the MENU key.

You may exit the Advanced Menu at any time by pressing the ↶ key.

Screen 1: Serial Number

The first screen shows the unique serial number of your **Qi-Series** ultrasonic cleaner and the version of software. The software version implemented on your bath may be different to that shown.



Press the MENU key to move to the next screen.

Screen 2: Time used

This screen shows the total time your **Qi-Series ultrasonic cleaner** has been in use in days, hours and minutes; i.e. the sum of all the cleaning cycle times since new.



For example, the screen above shows that the bath has been in use for a total of 2 days, 5 hours and 27 minutes.

Screen 3: Clock

The **Qi-Series** is fitted with a real time clock. This is factory set to the correct time and date, but can be changed by the operator.



To change the time and date, scroll through the settings by pressing the MENU key and amend by pressing the UP and DOWN keys. When all the settings are correct, press the MENU key to move to the next screen.

Screen 4: Cycle Count

The second screen shows the number of cycles which the **Qi-Series** ultrasonic cleaner has run since new.



The cycle count shows all cycles which the bath has begun and includes those cycles which are not completed; i.e. those cycles aborted by the operator or because the fluid level was low.

Screen 5: Low power

In its factory pre-set mode, the **Qi-Series** ultrasonic cleaner will maintain the set fluid temperature. This means that it is consuming power when sitting idle (i.e. when the sonics are not running).

The **Qi-Series** can be set to save power when not in use.



Setting Low Power to ON means that after five minutes of inactivity, the **Qi-Series ultrasonic cleaner** will enter its SLEEP mode – the screen illumination will power down, and the internal water heater will not operate.

The **Qi-Series** ultrasonic cleaner uses less than 10Watts of power whilst in SLEEP mode.

By setting Low Power to OFF, the **Qi-Series** screen will maintain the set fluid temperature; i.e. when the fluid temperature falls below the specified setting, the heaters will automatically switch on, meaning the bath is immediately ready for use when required.

When the desired option is selected, use the MENU key to move to the next screen.

Screen 6: Fluid level sensor

The **Qi-Series** ultrasonic cleaner is fitted with a fluid level sensor to ensure it is not under-filled prior to or during the cycle. This ensures that the optimum cleaning process can occur and potential damage to the tank is minimised.



The level sensor is a resistive device, so will not detect fluids with very low conductivity such as pure deionised (DI) water.

The level sensor can be disabled for specialist cleaning applications where deionised (DI) water is used. There is a considerable risk of causing damage to the tank if a minimum amount of water is not always retained in the bath. Use with extreme caution.

Use the ON and OFF keys to set the Low Power function. When the desired option is selected, use the MENU key to move to the next screen. The fluid level setting will return to ON each time the unit is switched on.



WARNING

Setting the fluid level sensor to OFF means that the **Qi-Series** ultrasonic cleaner will operate as if the bath were full of fluid.

It is therefore the operator's responsibility to ensure that the tank is filled with sufficient water when the fluid level sensor is disabled.

Screen 7: Portable appliance testing

The **Qi-Series** ultrasonic cleaner is provided with this screen to make portable appliance testing easier.



When the ON button is pressed, both the heater and the ultrasonic generator will turn on, irrespective of any other programmed settings.

You will then be sure that the **Qi-Series** ultrasonic cleaner is operating in the mode required for accurate portable appliance testing.

Portable appliance testing must be conducted with water in the bath. Only a trained, qualified electrical engineer must perform a PAT test.

Once you have completed your tests, press the OFF button.

Ultrasonic cleaning detergents

Detergents are a vital component in the ultrasonic cleaning process, aiding in the removal and loosening of debris from the surfaces of items placed in the tank while also intensifying the power of the ultrasonic activity.

Ultrawave offer a range of specially formulated ultrasonic detergents for use in applications including medical and heavier industrial cleaning requirements.

Ultraclean M2: A general purpose detergent for all plastics, glass and metals (except aluminium and other soft metals). Also suitable for use on medical instruments.

Ultraclean SA: A general purpose cleaning detergent for aluminium and other soft metals.

Ultraclean CBX: A heavy oil and carbon remover for non-ferrous metals, not for use on aluminium and other soft metals.

Ultraclean CS: A carbon and heavy contaminant remover, not for use on aluminium and other soft metals.

Ultraclean PH: A rust removal detergent and brightening agent for non-ferrous metals, not for use on aluminium and other soft metals.

Ultraclean RI: Rust inhibitor for corrosion prevention of ferrous metals.

Sonozyme: A poly-enzymatic detergent for cleaning surgical instruments. Packaged in single shot dose sachets - 1 sachet per 5-10 litres.

Dosing Matrix (ml of detergent per tank)

	Detergent dose (ml)	
	2%	5%
Qi-100	100	250
Qi-200	240	600
Qi-300	340	850
Qi-400	600	1500

Each of these detergents is available from Ultrawave. The required detergent dose may vary depending on the component being cleaned and the level of contamination. Ultrawave recommend a dosage of between 2 and 5% for all detergents other than Sonozyme.

Technical information

The need to degas

In order to allow optimum ultrasonic activity, the gases present in ordinary tap water need to be driven out of the cleaning solution.

The time needed to degas the liquid varies depending on the amount of gas present in the liquid and the quantity of water in the tank. Ultrawave recommends a degas period of at least 10 minutes.

During the degas cycle, you will see bubbles of gas forming on the inside of the bath, and slowly rising to the surface. Degassing is complete when you can no longer see these bubbles.

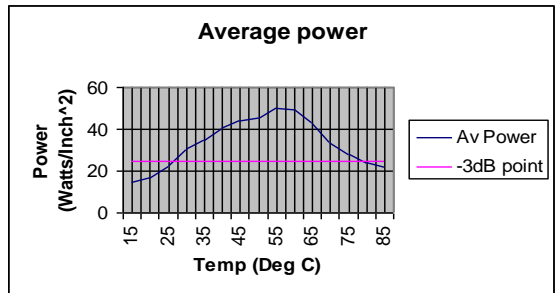
Another indication of increased “cold-boiling” at the liquid surface indicates that the liquid is degassed.

Once the liquid is degassed, the bath is immediately useable and will run the cleaning cycle.

The effect of heat

Heating the liquid in the bath will aid the cleaning process.

Normally a temperature of between 30 to 60°C is sufficient to accelerate the process. You will see from the graph below that optimum cleaning will be obtained at 60°C



If you are using your bath to clean medical equipment, it is recommended to limit the fluid temperature to 40°C. This will avoid “baking” proteins

Ultrasonic activity itself will heat up the liquid at a rate of approximately 10-15°C per hour if in continuous use.

Cleaning time

The **Qi-Series** ultrasonic cleaner is factory preset with a cleaning time of 15 minutes. Some components may take longer or shorter to clean effectively depending on the contaminants and the level of contamination.

Specifications

Ambient Temperature	5 to 40°C
Maximum relative humidity	80% R.H. in room temperatures up to 31°C decreasing linearly to 50 % R.H. at 40°C
Altitude above sea level	Up to 2,000 m (6,500 ft)
Operating Environment	Indoor use only

	Qi-100	Qi-200	Qi-300	Qi-400
Capacity (litres)	5.0	12.0	17.0	30.0
Operating Freq. (KHz)	32 to 38	32 to 38	32 to 38	32 to 38
Heater range (°C)	Ambient to 80	Ambient to 80	Ambient to 80	Ambient to 80
Ultrasonic power (W)	100	200	300	400
Heating power (W)	300	600	750	1350
Mains Voltage (Vac)	220-240	220-240	220-240	220-240
IEC Fuse	T5A	T5A	T5A	T10A
UK Mains plug	5A	5A	5A	13A

Troubleshooting

Ultrawave have a dedicated service team who are able to resolve any problems that occur with your **Qi-Series**. However, on many occasions it is possible that the problem can be rectified by the operator.

The unit fails to turn on (no display is shown)	Check that the unit is plugged in and that mains electricity is present.
The screen displays: "Liquid Level Low"	<p>Fill the Qi-Series with water so that it is above the fill line indicated inside the tank.</p> <p>If you are using "normal" water ensure that the detergent has been added.</p> <p>If the water in your area is "hard", slightly more detergent may be required.</p> <p>If "pure" water (eg. De-I or RO) is being used, the level sensor can be disabled in the advanced menu (see page 17).</p>
The screen displays: "Sonics Low"	<p>The Qi-Series is fitted with an ultrasonic power detector, which monitors the ultrasonic activity in the bath during a cleaning cycle.</p> <p>If the ultrasonic power drops below a certain point, the cycle will be incomplete and this message will display. This is not necessarily caused by a problem with the machine.</p> <p>Excessive amounts of parts to be cleaned can cause the power level in the bath to drop</p> <p>If this message displays, run another cycle to see if the problem persists.</p>

If any of these problems persist, the Ultrawave Service Department can be contacted on +44 (0) 845 330 4238 or service@ultrawave.co.uk.

Cycle abort modes

If the cycle is aborted, the reason for the failure will be displayed.

If the operator aborts the cycle, the following screen will be displayed.



If the Level sensor is set to ON, and the fluid drops below the required level during operation, the cleaning cycle will stop and the following screen will be displayed.



The **Qi-Series** will not operate again until the tank is filled to the correct level.

If the power to the ultrasonic generator should fall below a certain level during operation, the cleaning cycle will stop and the following screen will be displayed.



In each instance of a cycle abort, the cycle count in the Advanced Menu will still log the cycle as complete.

Maintenance

It is important to keep your bath clean. Not only will contaminated liquid reduce the performance of the bath, it may also damage it. Change the cleaning liquid regularly. Your cleaning process will determine how often to change the liquid – the more soiled your items, the more often you will need to change the liquid. Change the cleaning liquid at least daily.

Before cleaning the equipment always switch off and disconnect it from the power supply and allow it to cool down to less than 40°C. Clean by wiping with a damp soapy cloth.

The base of the bath generates the ultrasonic activity by vibrating at very high speeds. If any contaminants are in contact with the bath, they act as an abrasive, causing wear on the metal surface. In extreme cases, the bath will develop holes and start to leak.

Portable Appliance Testing should be conducted with water in the bath.

Service

Ultrawave recommend that your **Qi-Series** ultrasonic cleaner is serviced and tested by an Ultrawave approved engineer on an annual basis.

More regular periodic testing can be done by the operator to ensure that your ultrasonic bath is operating at optimum efficiency.

There are no user serviceable parts inside the unit. All service and repair must be conducted by suitably trained and qualified engineers approved by Ultrawave.

Service contracts for your **Qi-Series** ultrasonic cleaner are available from Ultrawave.

For more information on Ultrawave Service Contracts, Annual Validation Testing and any maintenance, contact the Ultrawave Service Department on:

Tel: +44 (0) 845 330 4238

Email: service@ultrawave.co.uk

Returning equipment to Ultrawave

Ultrawave are committed to supplying products of the highest quality. However, on rare occasions, it is possible that products may not meet the expectations of our customers. Should this occur, we aim to address and rectify any problems you may have with Ultrawave products quickly and effectively.

Troubleshooting and Problem Solving

Sometimes it is possible to rectify any issues over the telephone. Our dedicated service and product support personnel may be able to troubleshoot your problem remotely, thus causing minimal disruption.

Contact our Service department on: +44 (0) 845 330 4238

service@ultrawave.co.uk

Please have to hand your model and serial number together with information on the problem prior to contacting us.

If we are unable to solve your problem over the phone, we may suggest returning your product to the distributor where purchased or directly to Ultrawave. Where appropriate, we operate a Return To Base (RTB) warranty and repairs policy.

Decontamination

A decontamination certificate is compulsory for the return of products which have been used in hazardous or medical environments or have been contaminated with potentially harmful substances. It remains the user's liability to ensure Ultrawave (and/or its distributors) are made aware of any potential contamination issues relating to medical chemical, biological or radioactive contamination.

If a decontamination certificate is not supplied, the product may be returned to the customer without inspection.

More information on decontamination guidelines, as well as copies of decontamination certificates can be found at www.ultrawave.co.uk or <http://www.ultrawave.co.uk/product-returns-policy.html>

If you require further information, please call the Ultrawave Service Department on +44 (0) 845 330 4238.

Warranty

The warranty on Ultrawave ultrasonic products applies to defects appearing within **24 months** of the date of sale because of faulty material or manufacture. Genuine defective items returned to Ultrawave or its agent's premises will be replaced or repaired free of charge at their discretion.

The warranty is two years on transducer assemblies and 5 years on the bonding process. If the transducers or bonding material are exposed to liquid or cleaning chemicals, the warranty will be invalidated.

The warranty does not apply to:

- normal wear and tear.
- damage caused by misuse.
- non-observance of maintenance, service or connection instructions.
- damage caused by the use of toxic, flammable, acidic, caustic or corrosive chemicals or fluids not recommended by Ultrawave.

The user should familiarise themselves with this instruction booklet before operating the equipment and should apply to Ultrawave or its agent for advice on cleaning techniques or chemicals.

Ultrawave will not be responsible for damage or injury caused by incorrect use.

Statutory rights are not affected.

Temperatures of touchable hot surfaces

BS EN 13202:2000 gives the recommended maximum surface temperatures for different materials at various exposure times (see below). Your Ultrawave ultrasonic bath can be set so that the cleaning fluid is up to 80°C. This means that parts of ultrasonic bath will be above the recommended maximum temperature.

If you operate your ultrasonic bath at temperatures above the recommended maximum, the Ultrawave advise that you conduct a risk assessment, and if appropriate fix a "Caution – Hot" warning label to your machine.

The following limit values are based on the harmonised standards –

- BS EN 13202:2000 Ergonomics of the thermal environment – Temperatures of touchable hot surfaces – Guidance for establishing surface temperature limit values in production standards with the aid of
- EN 563: 1994 Safety of machinery – Temperature of touchable surfaces
- Ergonomics data to establish temperature limit values for hot surfaces

Material/time-temp*	1 sec	4 sec	10 sec	10 min	8 hr
Uncoated metals	65°C	58°C	55°C	48°C	43°C
Painted metals	83°C	64°C	55°C	48°C	43°C
Enamelled metals	74°C	60°C	56°C	48°C	43°C
Ceramics, glass, stone	80°C	70°C	66°C	48°C	43°C
Plastics	85°C	74°C	70°C	48°C	43°C
Wood	110°C	93°C	89°C	48°C	43°C

Time	Contact	Part
1 sec	Accidental contact	Outer case, tank flange
4 sec	Parts held for short periods	Knobs, switches
10 sec	Parts continuously held in normal use	Handles
10 min	Prolonged use	Handles
8 hr	Continuous	Handles

Compliance with the Control of Noise at Work Regulations

The Control of Noise at Work Regulations 2005 (the [Noise Regulations](#)^[1]) came into force for all industry sectors in Great Britain on 6 April 2006. The Control of Noise at Work Regulations 2005 replaces the Noise at Work Regulations 1989.

The aim of the Noise Regulations is to ensure that workers' hearing is protected from excessive noise at their place of work, which could cause them to lose their hearing and/or to suffer from tinnitus (permanent ringing in the ears)

The level at which employers must provide hearing protection and hearing protection zones is now 85 decibels (daily or weekly average exposure) and the level at which employers must assess the risk to workers' health and provide them with information and training is now 80 decibels. There is also an exposure limit value of 87 decibels, taking account of any reduction in exposure provided by hearing protection, above which workers must not be exposed.

To help you calculate your workers' exposure, Ultrawave publish the noise generated by your ultrasonic cleaner on the Certificate of Test. The figure is that experienced by a worker standing in the operating position.

The full text of the [Control of Noise at Work Regulations 2005](#)^[2] and the full text of the [Noise at Work Regulations](#) 1989^[2] can be viewed online.

Guidance on the 2005 Regulations can be found in the free HSE leaflet '[Noise at Work](#)' (INDG362 (rev 1))^[4] and in HSE's priced book 'Controlling Noise at Work' (L108) (ISBN 0 7176 6164 4) available from [HSE Books](#)^[5] or from bookshops.

[1] <http://www.hse.gov.uk/noise/regulations.htm>

[2] <http://www.opsi.gov.uk/si/si2005/20051643.htm>

[3] http://www.opsi.gov.uk/si/si1989/Uksi_19891790_en_1.htm

[4] <http://www.hse.gov.uk/pubns/indg362.pdf>

[5] <http://www.hsebookds.co.uk>

Service record

Ultrawave recommend that your **Qi-Series ultrasonic cleaner** is serviced at least once every 12 months. This record must be maintained by the engineer conducting the service.

There are no user serviceable parts inside. All service and repair should be referred to qualified Ultrawave engineers only.

Date		Cycle count	
Engineer			
Details			
Next service due			

Date		Cycle count	
Engineer			
Details			
Next service due			

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Date		Cycle count	
Engineer			
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Next service due			



Notes

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Notes

[illegible]



Ultrawave

Precision ultrasonic cleaning equipment

Ultrawave Ltd
Eastgate Business Park
Wentloog Avenue
Cardiff
CF3 2EY
United Kingdom

Tel: +44 (0) 845 330 4236
Service: +44 (0) 845 330 4238
Fax: +44 (0) 845 330 4231

www.ultrawave.co.uk
admin@ultrawave.co.uk



Ultrawave baths are manufactured in the United Kingdom and conform to exacting, international standards