camSonix

Ultrasonic Baths

Operating Instructions

● Cleaning ● Degassing ● Mixing

C-Series Baths with Mix, Degas & Sweep	C-Series Baths with Mix, Degas, Sweep and Heating	D-Series Baths with Mix, Degas, Heating and Variable Power Control
C080 C175 C275 C425 C575 C690 C940 C950 C1275 C1800 C3000	C080T C175T C275T C425T C575T C690T C940T C950T C1275T C1800T C3000T C4500T C9000T	D275T D690T D950T D1275T D1800T D2800T

CE

Camlab ultrasonic cleaning baths are shielded and tested for electromagnetic compatibility and comply with the CE criteria concerning the low voltage directive and EMV

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Contents

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1 General

These Operating Instructions are part of the delivered equipment. They must be ready for use at any time and remain with the unit in case of resale. These operating instructions are not automatically revised .For then latest revised issue please contact Camlab.

Carefully read the Operating Instructions before using the unit and operate the electrical appliance according to the instructions.

We reserve the right to carry out technical modifications on the unit due to advanced development.

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The copy right remains with the editor.

2 Important safety warnings

Read before initial operation!

Intended use The present camSonix ultrasonic cleaning unit has been designed for the treatment of **items** and **liquids** only.

No cleaning of living beings or plants!

User The unit must be operated by instructed staff. Do not let children operate the unit.

Mains connection For safety reasons, the unit must be connected to a correctly grounded socket only. The technical details indicated on the nameplate must correspond with the available mains connection details, in particular those of the mains voltage and current connected value.

Prevention of electrical accidents The unit must be opened by authorised specialised personnel only.

For purposes of maintenance and care of the unit, in case of suspected humidity inside the unit or in case of malfunctions and after operation pull the mains plug.

Cleaning liquid Fill the unit with a sufficient quantity of cleaning liquid before switch-on. Flammable liquids must not be treated by ultrasound directly in the cleaning tank: risk of fire and explosion!

Hot surfaces and liquids Risk of burning and scalding! Depending on the operational period of the unit, unit surfaces, cleaning liquid, basket and cleaning items can heat up considerably.

Noise emission Ultrasonic units can produce annoying sounds.
Wear personal ear protection devices when working close to an ultrasonic unit which is operated without cover.

Sound transmission at physical contact	Do not reach inside the cleaning liquid or touch sound-carrying parts (tank, basket, cleaning items, etc.) during operation.
Exclusion of liability	Camlab Ltd. cannot be held liable for damages to persons, equipment or cleaning items caused by improper use. The operator is responsible for the instruction of the operating staff.

3   Function

Cleaning by ultrasound is the most modern fine cleaning method.

The electric high-frequency energy created by an ultrasonic generator is transformed into mechanical energy by piezo-electrical transducer systems and is then transmitted into the bath.
This process creates millions of tiny vacuum bubbles which implode due to the variations of pressure caused by the ultrasonic activity. Highly energetic liquid jets are created. These jets remove dirt particles from surfaces and even from the smallest grooves and bores.

3.1 Ultrasonic cleaning factors x 4

The cleaning result depends on four factors:

Mechanical energy	**Cleaning media**
Ultrasonic energy is probably the most important mechanical factor in the cleaning process. This energy must be transmitted through a liquid medium to the surfaces which are to be cleaned. camSonix units are fitted with the innovative sweep function device: electronic oscillation of the sound field (sweep function) prevents the formation of zones of low performance in the ultrasonic bath.	For saponification and removal of the dirt particles a suitable cleaning agent is required. See page 23 for the range of cleaners available. Cleaning chemicals are also necessary to reduce the surface tension. This increases considerably the efficiency of the ultrasonic activity.
Temperature	**Cleaning Time**
The effect of the cleaning medium is improved by the optimised temperature of the cleaning liquid. For all cleaning products please observe the instructions given on the label or the product information leaflets.	The cleaning period depends on the degree and the kind of contamination and on the correct selection of ultrasonic energy, cleaning agent and temperature.

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3.2 CE conformity

All camSonix ultrasonic units are in compliance with the CE marking criteria according to the EMC directive 89/336/EEC, and the low voltage directive 73/23/EEC.
A declaration of conformity is available from Camlab.

3.3 Delivered equipment

- Ultrasonic cleaning unit

- Mains cable

- Tube socket with tube clamp (on larger units)

- Operating Instructions

3.4 Unit front view / side view

Front view / side view of camSonix C275T

A **Filling line** (not present on camSonix C080 / C080T) indicates the recommended maximum filling level. This level should not be exceeded even with cleaning items inside.

B **Plastic carrying handles** (from camSonix C275)
for the safe transportation of the unit when the casing is hot.

C **Drain Valve for the draining of the tank** (On C-series only from camSonix C275) functional description *see section 4.1.*

D **Operating panel** for the control of the bath.
description see *section 6.6.*

4   Initial operation

Packing   Please keep the original packing or dispose of it according to the relevant waste disposal regulations.

Check for transport damages   Check your camSonix bath for possible transport damages before initial operation. In case of visible damage do not connect the unit to the mains. Contact your supplier or forwarding agent.

Placement   For operation, place the unit on a dry and solid surface. Ensure that the workplace is sufficiently ventilated!

Do not use a soft surface (e.g. a carpet) as this may impede the ventilation of the unit.

⚠ **CAUTION**

Risk of electrocution due to humidity inside the unit!
Protect the unit from entering humidity.

The unit inside is splash-proof. Keep workplace and casing dry in order to prevent electrical accidents and damages on the unit.

Ambient conditions
- Allowed ambient temperature during operation: +5°C to +40°C

- Allowed relative humidity of air during operation: max. 80%

Indoor operation only

4.1 Set up of the liquid drain (C and D-Series)

Note: Models C080,C080T,C175,C175T and D275T do NOT have a drain and can be emptied by unplugging from the power and then tipping out the contents.
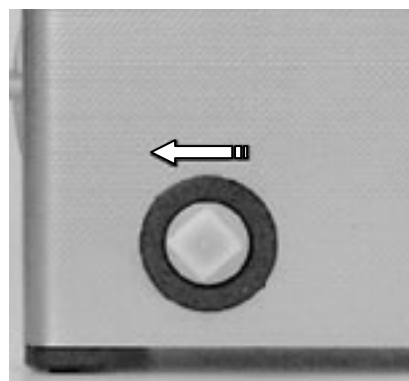

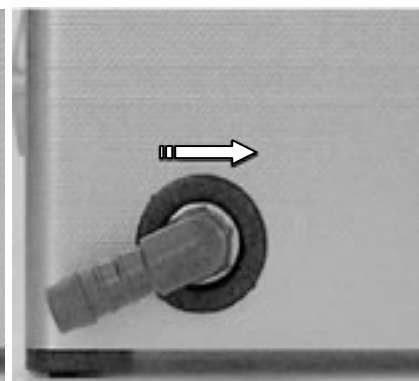Illustration 4.1
Drain with plastic screw cap

Illustration 4.2
Drain fitted with standard tube

On the delivered unit, the drain duct for the cleaning liquid is closed off with a plastic screw cap.

Fix the delivered tube socket to the drain duct.

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Proceed as follows

1. Unscrew (clockwise) the plastic screw cap *(see illustration 4.1)*

2. Screw the tube socket (included in delivery) onto the inside thread of the drain duct (anti-clockwise).

3. Turn the tube socket into the required drain position *(see illustration 4.2)*.
   The plastic thread is self-sealing when the socket has been screwed in by hand as far as possible.
   Note: Unscrewing the tube socket (anti-clockwise) can cause a leak of the thread.

The drain duct is now ready for connection to a customer-provided discharge system. Use a standard tube (dia 1/2"). Push the tube onto the socket and fix it with the clamp included in the delivery.

The bath can now be drained using the drain valve. Please ensure you have fitted tubing to the drain and that it is draining to an appropriate point.
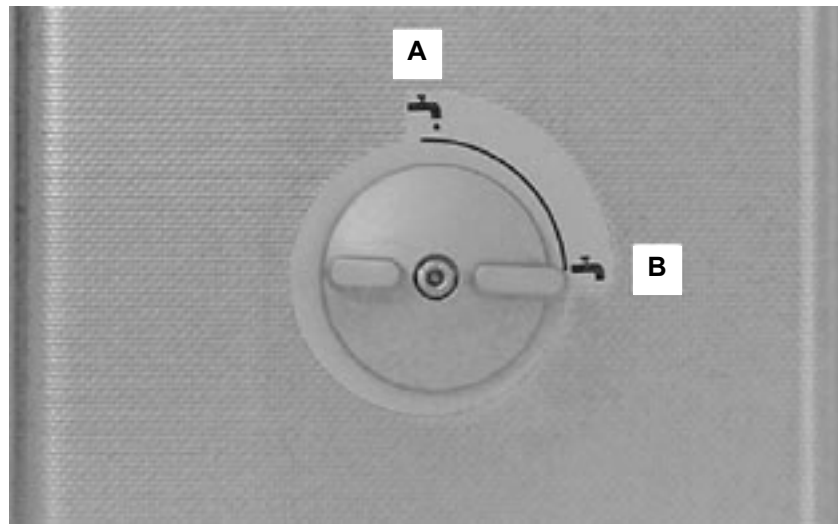
View of Drain Valve for draining the tank

A **Vertical position**: drain open

B **Horizontal position**: drain shut

4.2   Connecting the unit to the mains

Required mains conditions

Earth grounded socket:
1 phase (220-240 V); 1 N; 1 PE protective earth.

camSonix C4500T / C9000T in countries with 120 V mains:
2 phases (120 V); 1 N; 1 PE protective earth.

Diagram: required mains conditions for C4500T / C9000T in 120 V mains.

Connect mains cable Use the plug-in mains cable delivered with the unit. Connect the unit to a grounded shockproof socket only. Ensure that the values indicated on the nameplate of the unit correspond with the available connecting conditions.

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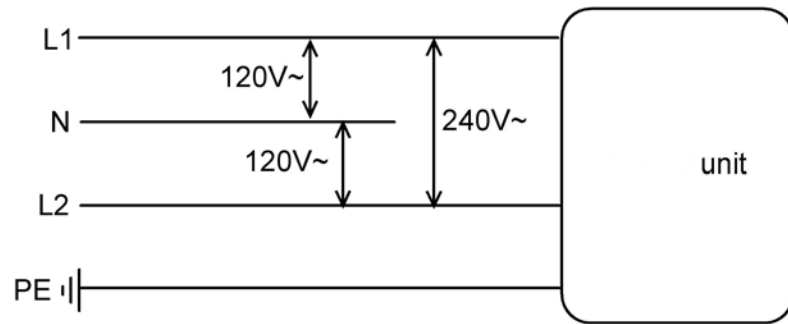# 5   Putting unit into operation

5.1   Filling of the unit

Shut the drain
Shut the drain duct before filling the tank. (Turning knob for draining of the tank into horizontal position) (*see section4.1*).

Observe filling level
Fill the cleaning tank with a sufficient quantity of a suitable cleaning liquid before switch-on.

[i] The optimum filling level is approx. 2/3 of the tank volume.

The marked maximum filling level of the tank (not available on C080 / C080T) indicates the recommended filling level with cleaning items in the bath (*see also section 3 Illustration 3.4*).

Suitable cleaning agents
Ensure that the chosen cleaning agent is suitable for treatment in an ultrasonic bath and observe the instructions on dosage and the compatibility of the material.
We recommend the use of the cleaning agents listed in *section 7.5.*

Prohibited cleaning agents
Flammable products are generally not allowed for use in an ultrasonic bath. Observe the safety warnings given in *section 7.3.*

CAUTION
Risk of fire and explosion!
Never use flammable liquids or solvents directly in an ultrasonic cleaning bath.
Use the cleaning chemicals listed in *section 7.5.*

[i] Ultrasonic activity increases the vaporisation of liquids and creates a very fine mist which can catch fire on any ignition source.
Observe the instructions on limitations of use given in *section 7.3.*

NOTE
Risk of damage to the transducer tank!
Do not use any acid cleaning agents (pH value < 7) directly in the stainless steel tank if the cleaning items or the contamination of the cleaning items contain halogenides (fluorides, chlorides or bromides). The same applies to NaCl solutions.
Use the cleaning chemicals listed in *section 7.5.*

[i] The stainless steel tank can be destroyed by crevice corrosion in a very short time. Substances that cause crevice corrosion can be contained in household cleaners.

Observe the instructions on limitations of use given in *section 7.4.*

For queries please contact the manufacturer or your supplier.

5.2   Placement of cleaning items

Caution! The ultrasonic bath has been designed for the ultrasonic treatment of items and liquids only.
Do not clean living beings or plants!

NOTE

Do not reach inside the tank during ultrasonic operation!

Cell walls can be damaged by prolonged exposure to ultrasonic activity.

For placing and taking out the cleaning items always switch off the unit.

No cleaning items on the bottom of the tank Do not place the cleaning items directly onto the bottom of the cleaning tank, as this might lead to damages to the unit.

Use cleaning basket Place the cleaning items into the stainless steel cleaning basket (accessory equipment see page 30).

Acid tank When using cleaning chemicals which might destroy or damage the stainless steel tank, use a separate container.

5.3   Degassing of liquid

Freshly mixed cleaning liquids are saturated with air which lessens the cleaning effect of the ultrasonic activity. By sonification of the liquid over a period of several minutes before the cleaning process the tiny air bubbles in the liquid are eliminated.

Degas key Degas the fresh cleaning liquid for approx. 5 - 10 minutes. For switch-on and switch-off press the degas key.

Auto degas The camSonix units are equipped with an auto degas option. When the programmed period has finished, the degas function is automatically switched off (10 min).

Note Degas and sweep functions cannot be operated at the same time.

6   Ultrasonic cleaning process

Please observe the following instructions before starting the ultrasonic cleaning process.

It is the user's responsibility to check the cleaning results.

CAUTION

Risk of scalding by hot surfaces and cleaning liquid!

Ultrasonic energy is physically transformed into heat.

The unit and the cleaning liquid in the tank heat up during ultrasonic operation even with the heating switched off.
During permanent operation with cover temperatures exceeding 60°C can be reached.

During permanent operation with cover and heating temperatures exceeding 80°C can be reached.

Do not reach inside the bath.
If necessary touch unit and basket with protecting gloves!

⚠ **NOTE**

Ultrasonic units can produce annoying sounds.

Wear personal ear protection devices when working close to an ultrasonic unit which is operated without cover.

⚠ **NOTE**

Sensitive surfaces can be damaged when exposed to ultrasound over prolonged periods, particularly at low cleaning frequencies.

Ensure that sensitive surfaces are exposed to ultrasonic acitivity for a suitable period only.

If in doubt check the cleaning progress regularly and observe the state of the surface material.

⚠ **NOTE**

Ultrasonic energy is physically transformed into heat.

The unit and the cleaning liquid in the tank heat up during ultrasonic operation even with the heating switched off.
During permanent operation with cover temperatures exceeding 60°C can be reached.

For the cleaning of temperature-sensitive items please take into consideration the heating-up of the cleaning liquid.

Please observe that the temperature of the cleaning media remains below 42°C when cleaning parts contaminated with fresh protein or blood.

6.1 Heating up of the cleaning liquid (units with heating)

Depending of the degree and kind of contamination and on the cleaning medium used it might be required to heat up the cleaning liquid. For a quick heating-up process and in order to prevent unnecessary energy losses we recommend using a lid.

ℹ The ultrasonic energy is transformed physically into heat. Low set temperatures can be exceeded during ultrasonic operation.

The cleaning effect through ultrasonic cavitation is reduced when cleaning with high temperatures. We recommend not exceeding a temperature of 80°C inside the tank.

For the recommended cleaning temperature please observe the product information of the cleaning agent used.

⚠ **CAUTION**

High temperatures! Risk of burning and scalding!

Cleaning liquid, cleaning tank, casing, lid, basket and cleaning items can heat up considerably.

Do not reach inside the bath.
If necessary wear protective gloves when touching unit and basket!

⚠ **NOTE**

Cleaning temperature recommendations in the medical sector:

Please observe that the temperature of the cleaning media remains below 42°C when cleaning parts contaminated with fresh protein or blood.

Please observe the temperature even when using low or no heating.

6.2 Temperature-controlled cleaning (units with heating)

Functions camSonix units are equipped with an additional temperature-controlled cleaning function. The cleaning process is automatically started as soon as the required bath temperature is reached.

How to proceed
1. press the on/off key to start the unit.

2. select the required temperature.

3. set the required ultrasonic cleaning period.

4. keep the start/stop key pressed > 2 sec:
   The unit starts heating up.
   During the heating-up process the ultrasound is regularly activated to mix the liquid.
   When the set temperature is reached the ultrasound is switched on for the duration of the set cleaning period.

ⓘ When the set cleaning period has run down, the ultrasonic activity switches off automatically. The heating continues operating at the set temperature.

6.3 Automatic mixing of the liquid during heating up (units with heating)

Without mixing of the liquid the generated heat will rise to the surface of the bath. This will cause a strong gradient of temperature inside the cleaning tank.

camSonix units are equipped with an additional mixing device which guarantees the optimum mixing of the cleaning liquid during the heating up process.

Functions The ultrasound is activated for periods of approximately 5s each with one-minute breaks in between.

How to proceed
1. press the on/off key to start the unit.

2. select the required cleaning period (set period)

3. set the required temperature

4. to start keep the ▶■ key pressed for > 2 sec

(*see chart 6.7*)

ⓘ Operation only when set temperature > actual temperature

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6.4 Starting the cleaning process manually

Press the on/off key to start the unit.

Select the cleaning period Set the required cleaning period with the turning knob.

Short period operation For short period operation set the required cleaning period at the turning knob.

Press the ►■ key to start the ultrasonic operation.

The unit starts the ultrasonic cleaning process.
The ultrasound is automatically switched off when the set period has run down.

Permanent operation For permanent operation turn the turning knob clockwise into ∞ position. In this operating mode there is no automatic switch-off. The ultrasonic activity must be switched off by hand after the cleaning process has been finished; press the ►■ key to switch of. Alternatively, turn the turning knob back into "0" position.

Caution: Turn the turning knob only anti-clockwise into "0" position!

In order to avoid unintended permanent operation, the camSonix units are equipped with a safety switch-off automatically. The unit switches off completely after 12 h permanent operation. If you wish to continue operation start the unit again.

6.5 Sweep function

camSonix units are equipped with an optional sweep function.

Functions A more homogeneous sounding of the cleaning bath is achieved by the continued displacement of the sound pressure maxima in the cleaning liquid.

Particularly for large cleaning items it may be useful to switch on the sweep function.
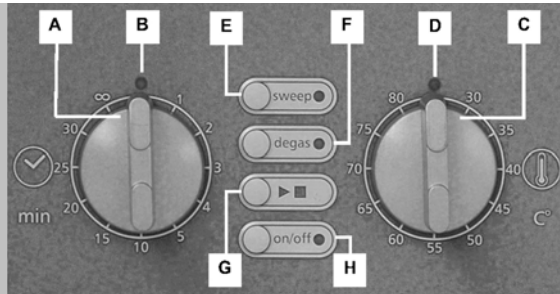
How to proceed Press the sweep key to switch on or off.

Sweep and degas functions cannot be operated at the same time.

6.6 C-Series Description of Control Panels

Models C080 and C080T only	Models C175 – C9000T

View of operating panel (unit with heating Model C080T)

View of operating panel (unit with heating)

A - Timer Knob *

Setting options for short-period operation: 1; 2; 3; 4; 5; 10; 15; 20; 25; 30 min (with automatic switch-off). Permanent position ∞ for continued operation. Here the unit must be switched off by hand.
For safety reasons the unit is automatically switched off after 12 hours permanent operation.

A - Timer Knob *

Setting options for short-period operation: 1; 2; 3; 4; 5; 10; 15; 20; 25; 30 min (with automatic switch-off). Permanent position ∞ for continued operation. Here the unit must be switched off by hand.
For safety reasons the unit is automatically switched off after 12 hours permanent operation.

B - Ultrasound LED

Indicates ultrasonic operation when lit

B - Cleaning Time LED

Indication of set time period and remaining time.

C - Temperature knob*

Select the temperature range in 5°C steps from 30° up to 80°C. (applies only for units with heating)

C - Temperature knob*

Select the temperature range in 5°C steps from 30° up to 80°C. (applies only for units with heating)

D - Temperature LED

Indicates heating is on but does not indicate values (applies only for units with heating)

D - Temperature LED

Indication of set value and actual value of liquid temperature. (applies only for units with heating)

E - Sweep Function Key

Press for an optimised sound field distribution which ideal for cleaning. Operation is indicated by an LED on the button

E - Sweep Function Key

Press for an optimised sound field distribution which ideal for cleaning. Operation is indicated by an LED on the button.

F - Degas Function Key

Press for the efficient degassing of fresh cleaning liquid and for special applications in the laboratory Operation is indicated by an LED on the button. (manual and auto degas – *see chart 6.7*)

F - Degas Function Key

Press for the efficient degassing of fresh cleaning liquid and for special applications in the laboratory Operation is indicated by an LED on the button. (manual and auto degas – *see chart 6.7*)

G - Ultrasound Key

Press to activate ultrasound. Ultrasonic activity is indicated by the Ultrasound LED (B) only.

G - Ultrasound Key +LED

Press. to activate ultrasound Ultrasonic activity is indicated by an LED on the button.

H - On/Off Key

Press to start operation

H - On/Off Key

Press to start operation

*Turn clockwise to set and turn anticlockwise to reset.

* Turn clockwise to set and turn anticlockwise to reset.

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6.7   C-Series Operating and display functions

Please note: specific displays of unit types C080 / C080T and C175 – C9000T are marked separately.

All Models			
Action	**Setting**	**C080 and C080T**	**All Other C Series**
Switch on unit	Press On/off key	On/off LED (H) is on.	On/off LED (H) is on.
Switch off the unit	Press On/off key	All displays are off	All displays are off
Start ultrasound	Press ►■ Key (G) or Select time period by turning timer knob. (A)	Ultrasound LED (B) is on.	Ultrasound LED (G) is on and a cleaning time LED (B) is on. Remaining time is indicated by second blinking LED (B) (only in timer operation)
Stop ultrasound before end of set period	Turn timer knob (A) to 0 or Press ►■ Key (G)	Ultrasound LED (B) is off	Ultrasound LED (G) is off and cleaning time LED (B) is on.
Switch on Sweep function* * sweep and degas cannot be operated at the same time	Select time period by turning timer knob (A). Press ►■ Key (G) Press Sweep key (E)	Sweep LED (E) is on and Ultrasound LED (B) is on	Sweep LED (E) is on and Ultrasound LED (G) is on and a cleaning time LED (B) is on. Remaining time is indicated by second blinking LED (B)
Switch off sweep function	Press Sweep key (E)	Sweep LED (E) is off and Ultrasound LED (B) is on	Sweep LED (E) is off and Ultrasound LED (G) is on Remaining time is indicated by second blinking LED (B)
Switch on Degas function* * sweep and degas cannot be operated at the same time	Select time period by turning timer knob. (A) Press ►■ Key (G) Press Degas Key (F)	Degas LED (F) is on and Ultrasound LED (B) is on	Degas LED (F) is on and Ultrasound LED (G) is on Remaining time is indicated by second blinking timer LED (B)
Switch off Degas function	Press Degas Key (F)	Degas LED (F) is off and Ultrasound LED (B) is on	Degas LED (F) is off and Ultrasound LED (G) is on Remaining time is indicated by second blinking timer LED (B)
Switch on Auto Degas function* * sweep and degas cannot be operated at the same time	Press ►■ Key (G) Keep Degas Key (F) pressed > 2 sec	Degas LED (F) blinks Ultrasound LED (B) blinks	Degas LED (F) blinks Ultrasound LED (G) blinks

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Heated Models Only			
Action	Setting	C080 and C080T	All Other C Series
Switch on heating	Set temperature by turning temperature knob (C)	Temperature LED (D) is on; it goes out when the set temperature is reached	Set temperature LED is on. Actual temperature LED blinks and goes towards set temp. Once the set temperature is reached only the Set Temp. LED is on If actual temperature > set temperature, the temperature LED starts blinking again
Switch off heating by hand	Turn set temperature knob (C) to position "0"	Temperature LED (D) is off	Set temperature LED blinks
Start ultrasound with temperature-controlled* and mixing of cleaning liquid * if set temperature > actual temperature	Select time period by turning timer knob. (A) Set temperature by turning temperature knob (C) Keep Degas Key (F) pressed > 2 sec	Ultrasound LED (B) blinks until the set temperature is reached; the ultrasound LED (B) is now on as soon as the ultrasound is activated	Temperature LED (D) blinks until the set temperature is reached. The LED is now on and the Cleaning time LED (B) is on. Remaining time is indicated by a second blinking LED (B)

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7   D-Series Ultrasonic Baths
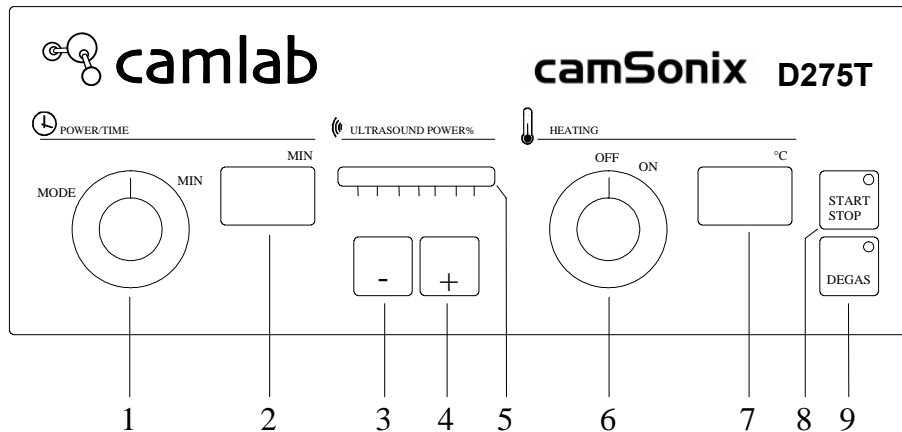
A.   Switch On/Off

Switch on the unit by turning the knob (1) clockwise. Switch it off by turning the knob anti-clockwise to the 0 position.

B. Setting of the Timer for Ultrasound

Set the required time by turning the knob (1). When the unit is switched on it works in long-term mode. You can choose periods between 2 and 95 minutes or set the unit to infinity operation (position mode).

When the unit is switched to infinity operation mode, the indicator (2) shows "00" or "0.0". After turning the knob (1) clockwise until it stops at the "mode" position, the unit switches automatically to the short-term mode. By turning back the knob you can now set a period between 0.2 and 9.5 minutes.

Turning the knob again to the "mode" position puts the unit back into the long-term mode.

C. Ultrasonic Power Regulation

The buttons "-" (3) and "+" (4) regulate the required cleaning power.When the unit is switched on the power is set and indicated (5) at 100 %.

D. Temperature regulation

The knob (6) switches on heating regulation and temperature indicator(7).
The indicator (7) always shows the actual temperature in the cleaning bath.
Turn the knob clockwise and set the required temperature (scale).

If the required temperature (scale) is higher than the actual temperature (indicator 7) the cleaning liquid will be heated up. During the heating up period the right decimal point of the indicator (7) flashes. As soon as the required temperature is reached the decimal point stops flashing and the heating switches off.

ATTENTION: The temperature indication may deviate from the actual temperature by up to +/- 2¡C. Note that the ultrasonic activity creates heat which may cause the temperature to rise above the set value. Low temperatures cannot be kept with permanent ultrasonic activity.

E. Degas

The Degas device is activated by the button (9).
When the Degas function is switched on the green indicator illuminates and the cleaning liquid is degassed very quickly. This process increases the cleaning effect of the medium and shortens the overall cleaning period. The
Degas device is particularly useful when the bath has been newly filled. In addition, the Degas function allows various applications in the sono-chemical sector, e.g. degassing of high-polymer solvents.

F. Start/Stop

The ultrasound is switched on by the button Start/Stop (8); the indicator flashes. When the ultrasound is switched on the set cleaning period starts and the remaining cleaning period is constantly indicated. Pressing the button again stops the ultrasound. The remaining cleaning period is still indicated and continues to run down when the Start/Stop button (8) is pressed again.

When the set cleaning period is over the ultrasound is automatically switched off and the indicator (2) shows the originally set period.
If you want to set the cleaning period back to its original value during operation you do not need to turn the knob (1) again. Just press the On/Off button (8) and keep it pressed for 3 seconds.

G. Special Features

All settings can be changed during ultrasonic operation.

Period: Set the new required period by means of knob (1). Ultrasound and temperature indicator stop for 2 seconds. Then the unit starts operating again for the newly set period.
Power: Set the new power by pressing the buttons "-" (3) or "+"(4).
Heating: The set temperature can be changed during ultrasonic operation.

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Degas: The Degas function can be switched on and off during ultrasonic operation (9).

7.1   After cleaning

Follow-up treatment of cleaning items   When the cleaning process is finished rinse the cleaning items, e.g. under the tap.

Drain the unit   Drain the liquid as soon as it is dirty or when the unit is not operated over a prolonged period of time. Certain residues and types of contamination may destroy or damage the stainless steel tank.

Use the quick-drain duct to drain the cleaning tank (*see section 4.1*).

7.2 Cleaning media

The cleaning chemical to be used must be suitable for the use in an ultrasonic bath to prevent damage to the tank or injuries to the user. Use the recommended cleaners mentioned in *section 8.3.* Observe the restrictions to cleaners containing solvents and aqueous cleaners mentioned *in sections 7.33 and 7.44.*

For queries please contact Camlab or the supplier of your cleaner.

Exclusion of liability   Damages caused by non-compliance with the instructions given in *sections 7.33 and 7.44* will not be covered by the manufacturer's warranty.

7.3   Limitations of use of cleaners containing solvents

Caution! Never use flammable liquids or solvents directly in an ultrasonic cleaning tank. Risk of fire and explosion!

Ultrasound increases the volume of vaporisation of liquids and creates a very fine mist that can catch fire on any ignition source at any time.

Do **not** fill potentially explosive substances and flammable solvents

- marked in compliance with the EEC directives by symbols and safety warnings R 1 to R 9

- or E, F+, F, O or R 10, R 11 or R 12 for flammable substances

into the stainless steel tank for ultrasonic treatment.

Exception In compliance with the general regulations on the protection of labour, certain limited volumes of flammable liquids (max. 1 litre) can be used in an ultrasonic cleaning unit under the following conditions: these liquids must be filled into a suitable separate vessel (e.g. beaker) with sufficient ventilation; this vessel (beaker) can then be put into the stainless steel tank which is filled with non-flammable liquid (water with a few drops of interlacing agent).

7.4 Limitations on aqueous cleaners

Do not use aqueous cleaning media with pH values in the acid range (pH < 7) directly in the ultrasonic tank if fluoride (F^-), chloride (Cl^-) or bromide (Br^-) ions can be taken in by the removed dirt or through the cleaning chemical. These can destroy the stainless-steel tank by crevice corrosion within a very short period of ultrasonic operation.

Acids and alkaline solutions Other media which can destroy the stainless-steel tanks when used in high concentrations or with high temperatures during ultrasonic operation are: nitric acid, sulphuric acid, formic acid, hydrofluoric acid (even diluted). This is not an exhaustive list.

Risk of damage to the unit: do not use cleaning solutions containing more than 0.5%w/w alkali (KOH and/or NaOH) in an ultrasonic cleaning tank.

Entrainment of chemical substances The above limitations for the use of chemicals in an ultrasonic bath also apply for the aforementioned chemicals when these are brought into an aqueous (particularly distilled water) bath through entrainment or from the removed dirt.

Acid-resistant tank For the ultrasonic treatment with the above mentioned media use an acid-resistant tank (available as an accessory).

Disinfectants The limitations of use also apply to the standard cleaners and disinfectants if these contain the above mentioned compounds.

Safety regulations Observe the safety warnings indicated by the manufacturer of the chemicals (e.g. goggles, gloves, R and S phrases).

For queries please contact Camlab.

7.5 List of recommended cleaning media

Camlab has a large range of suitable cleaning products on offer developed by chemical and acoustic engineers. Please contact Camlab to find the most suitable cleaning chemical for your application.

Environment – friendly products The organic detergents contained in the cleaning concentrates are biodegradable. Product information and safety data sheets are available from Camlab.

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7.5.1   Dental

clean 10   Universal cleaning concentrate for the cleaning of instruments and laboratory equipment made of plastic, ceramic, stainless steel, rubber and glass.

clean 25   Ready-to-use cleaner for impression spoons: removes dental plaster and alginates.

clean 35   Cleaning concentrate for prostheses with activated oxygen for the cleaning of dental prostheses made of metal, ceramics and plastic. The released oxygen cleans the prosthesis hygienically.

clean 40   Chemical cleaning concentrate for the removal of cement and carbonate (lime). For the cleaning of precious metals, ceramics, plastics, glass and rubber. Removes metal oxide, cement, fluxing media, etc.

clean 50d   Aldehyde-free, ready-to-use drill cleaner for instruments made of stainless steel. For the hygienic removal of amalgam remains, blood, tissue, etc.; with anti-corrosion effect.

clean 60   Acid cleaning concentrate for instruments made of stainless steel, glass and plastic. Removes corrosion, rust films and mineral deposits.

7.5.2   Medical

clean 10   Universal cleaning concentrate for the cleaning of instruments and laboratory equipment made of plastic, ceramic, stainless steel, rubber and glass.

clean 60   Acid cleaning concentrate for instruments made of stainless steel, glass and plastic. Removes corrosion, rust films and mineral deposits.

7.5.3   Optics

opto clean   Cleaning concentrate for glasses, frames, optical lenses and components. Also suitable for plastics.

7.5.4   Laboratory

clean 60   Acid cleaning concentrate for instruments made of stainless steel, glass and plastic. Removes corrosion, rust films and mineral deposits.

clean 65   Neutral laboratory and universal cleaning concentrate for glass, plastic, metals and rubber.

clean 70   Alkaline laboratory cleaning concentrate for equipment made of glass, metal, alkali-proof plastics, rubber and ceramics. Removes dust, grease, oil, soot, etc.

clean 75   Ammoniac cleaning concentrate with brightening effect for precious and non-ferrous heavy metals; for the removal of abrasive and polishing pastes.

7.5.5   Jewellery

clean 75   Ammoniac cleaning concentrate with brightening effect for precious and non-ferrous heavy metals; for the removal of abrasive and polishing pastes. Not suitable for soft stones, pearls or corals.

clean 85   Gentle, neutral cleaning concentrate for the jewellery workshop. Suitable for soft stones and fancy jewellery.

noble clean   Cleaning and brightening of gold, silver and platinum jewellery within seconds. Not suitable for soft stones, pearls or corals.

ultra clean   Extra gentle, mild alkaline cleaning concentrate for precious metal jewellery, in particular gold and gold-alloys will be given a new shine, with stones. Clean soft stones without ultrasound.

super clean   Ammoniac cleaning concentrate for jewellery made of precious metals, with brightening effect. Clean soft stones without ultrasound.

7.5.6   Watches

chrono clean 1:20   Neutral concentrate for the aqueous cleaning of disassembled watches and clocks; removes resin residues and rust.

cleaning-concentrate 1:9   Ammoniac aqueous cleaning concentrate for disassembled watches and clocks with brightening effect on non-ferrous parts.

7.5.7   Industry and workshop

tec clean A1   Alkaline cleaning concentrate for electronics and fine optics: removes light oils, grease, fluxing agents, dust, finger prints, etc.

tec clean A2   Ammoniac Intensive cleaner with brightening effect for non-ferrous and precious metals: removes grinding, polishing and lapping media, grease, oil, etc.

tec clean A3   Alkaline cleaning concentrate for iron, steel, stainless steel and precious metals: removes punching oil, drawing grease, soot, forge, grinding and polishing media, high-performance cooling lubricants, etc.

tec clean A4   Alkaline universal cleaning concentrate: removes oil, grease, soot, coking, forge, dust, finger prints, etc.

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tec clean A5   Powerful alkaline cleaner in powder form for iron and light metals: removes forged and gummed oil and grease, grinding and polishing media, lacquer and paint remnants, wax, etc.

tec clean N1   Neutral cleaning concentrate: removes oil, grease, grinding, lapping and polishing media, dust, sweat, finger prints, etc.

tec clean S1   Mild acid cleaning concentrate: removes rust, lime, oxide films (e.g. verdigris), grease, oil, etc.

tec clean S2   Strong acid cleaning concentrate: removes mineral contamination such as lime, rust and other oxides, films that can be removed with corrosives, etc.

8 Maintenance

8.1 Maintenance / Care

Pull the mains plug before carrying out any maintenance works!

Electrical security

camSonix units are maintenance-free.
Check the casing and the mains cable for damage regularly in order to prevent electrical accidents.

Care of transducer tank

Lime deposits on the stainless-steel tank can be cleaned gently e.g. with clean 40 or clean 115C (operate the unit with concentrate + water).

Grid of air fan

Check the air fan grid at the bottom of the unit regularly. (not available in all units).

Remove dirt if necessary to allow sufficient ventilation inside the unit.

Care of casing

Residues of cleaning media can be wiped away with a household cleaner or de-calcifier depending on the kind of contamination. **Do not put the unit in or under water!**

Disinfection

If the unit is used for medical and sanitary purposes it is necessary to disinfect the transducer tank and the surfaces regularly (standard surface disinfectants).

8.2 Service life of the transducer tank

The transducer tank and particularly the ultrasound transmitting surfaces are wear parts. The changes on the surfaces that occur after a certain operating period are visible first as grey areas and later on as material abrasions, the so-called cavitation erosion.

camSonix baths use a highly cavitation-resistant special steel. To prolong the service life of your ultrasonic unit we recommend observing the following instructions:

- Regularly remove any cleaning residues, in particular metal particles and rust films.

- Use suitable cleaning chemicals, with particular caution concerning the kind of removed contamination (see instructions *section 7.4*).

- Exchange the cleaning medium before it is too heavily contaminated.

- Do not operate the ultrasound unnecessarily; switch off after the cleaning process.

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8.3 Repair

Opening by authorised specialised personnel only

Repair and maintenance works which require the unit to be connected and opened must be carried out by authorised and specialised Camlab personnel only.

CAUTION

Risk of electrocution due to live parts inside the unit!

Pull the mains plug before opening the unit!

Camlab cannot be held responsible for any damage caused by unauthorised maintenance or repair works on the unit.

In case of a break-down of the unit please contact the supplier.

9 Technical details

C-Series

	Mains voltage unit variants (Vac)	Ultrasound frequency (kHz)	Power consumption total (W)	Ultrasonic power RMS (W)	Ultrasonic maximum peak power* (W)	Heating power (W)
C080	100-120	37	30	30	240	0
C080T	220-240		90			60
C175	100-120	37	35	35	280	0
C175T	220-240		95			60
C275	100-120	37	80	80	320	0
C275T	220-240		280			200
C425	100-120	37	140	140	560	0
C425T	220-240		340			200
C575	100-120	37	150	150	600	0
C575T	220-240		550			400
C690	100-120	37	150	150	600	0
C690T	220-240		750			600
C940	100-120	37	150	150	600	0
C940T	220-240		750			600
C950T	220-240	37	550	150	600	400
C1275	100-120	37	200	200	800	0
C1275T	220-240		1000			800
C1800	100-120	37	200	200	800	0
C1800T	220-240		1000			800
C3000	100-120	37	300	300	1200	0
C3000T	220-240		1500			1200
C4500T	200-240	37	2000	400	1600	1600
C9000T	200-240	37	2800	800	3200	2000

C080 – C175T: impulse wave form; C275 – C9000T: standard sine-wave modulation
The choice of the waveform has been matched to the relevant tank size. The signal form of the wave results in a factor 4 or 8 for the ultrasonic peak max., depending on the modulation of the wave.

	Tank max. volume (approx. litre)	Tank effective volume (approx. litre)	Tank internal dimensions W x D x H (approx. mm)	Unit external dimensions W x D x H (approx. mm)	Basket internal dimensions W x D x H (approx. mm)	Weight (approx. kg)
C080, C080T	0,8	0.7	190x85 x 60	206x116x178	177x73x30	2,0
C175, C175T	1,75	1,20	151x137x100	175x180x212	112x103x50	2,1
C275, C275T	2,75	1,90	240x137x100	300x179x214	198x106x50	3,3
C425, C425T	4,25	3,20	240x137x150	300x179x264	190x105x75	4,0
C575, C575T	5,75	4,3	300x151x150	365x186x264	255x115x75	5,1
C690, C690T	6,90	5,2	505x137x100	568x179x214	465x106x50	5,6
C940, C940T	9,4	7,3	505x137x150	568x179x264	455x106x75	6,4
C950, C950T	9,50	7,50	300x240x150	365x278x264	255x200x80	5,9
C1275, C1275T	12,75	9,00	300x240x200	365x278x321	250x190x115	7,5
C1800, C1800T	18,0	12,90	327x300x200	390x340x321	280x250x115	8,5
C3000, C3000T	28,0	20,60	505x300x200	568x340x321	455x250x115	11,0
C4500T	45,0	35,00	500x300x300	615x370x467	455x270x194	25,0
C9000T	90,0	75,00	600x500x300	715x570x467	545x450x250	42,0

D-Series

Model	Internal tank dimesions	Power Consumpt. Watts	Max. volume liter	Ultrasonic Frequency kHz	CE 73/23/EWG 89/336/EWG	CE 93/42/EWG
D275T	240x137x100	350	2,75	40	√	√
D690T	505x137x100	600	6,9	40	√	√
D950T	300x240x150	600	9,5	40	√	√
D1275T	300x240x200	700	12,75	40	√	√
D1800T	327x300x200	1100	18	40	√	√
D 2800T	505x300x200	1200	28	40	√	√

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10   Trouble shooting

Fault	Possible cause	Remedy
Casing damaged	• damage by third party, transport damage	• return unit to supplier or manufacturer
Mains cable damaged	• damage by third party, transport damage	• obtain original spare mains cable from manufacturer or supplier
No operating functions; all LEDs dark	• mains cable not plugged in	• plug in mains cable
	• socket dead	• check socket/fuse
	• mains cable damaged/interrupted	• replace mains cable
	• fault of electronics	• return unit to supplier or manufacturer
No ultrasonic function; LED ultrasound dark	• turning timer knob for ultrasonic operation to "0" position	• switch on the timer knob for ultrasonic operation
	• unit is switched off	• switch on the unit at on/off key
	• key ►■ (ultrasound) not pressed	• press key ►■
	• fault of electronics	• return unit to supplier or manufacturer
No ultrasonic operation; LEDs of LED cleaning period blink alternately ("running light") = fault indication ultrasound	• adverse filling level	• change filling level, switch unit and off and on
	• fault of electronics	• switch unit off and on if fault is indicated again: return unit to supplier or manufacturer
Unsatisfactory cleaning results	• no or unsuitable cleaning medium used	• use suitable cleaning medium
	• cleaning temperature not sufficient	• heat up cleaning liquid
	• cleaning period too short	• repeat cleaning interval
Unit does not heat up; LED temperature dark	• temperature knob is set in "0" position	• switch on temperature knob
	• unit is switched off	• switch on unit with on/off key
	• fault of electronics	• return unit to supplier
No heating function; LEDs of LED temperature blink alternately ("running light") = fault indication heating	• fault of electronics	• switch unit off and on if fault is indicated again: return unit to supplier
Unsatisfactory heating-up period	• loss of heating energy	• use lid
	• no mixing of cleaning liquid	• e.g. switch on ultrasound (see section 7.2)
Unit produces boiling noise during heating-up	• no mixing of cleaning liquid	• e.g. switch on ultrasound (see section 7.2)
Set temperature is exceeded	• temperature sensor does not measure the average temperature (no revolution)	• mix liquid manually or by means of ultrasound
	• set temperature too low, ultrasonic energy heats up the liquid more than required (physical process)	• for low set temperatures do not switch on heating
		• switch on ultrasound for short periods only
No operational functions; LEDs of LED ultrasound and LED temperature blink alternately ("running light") = fault indication programme control	• fault of electronics	• switch unit off and on if fault is again indicated: return unit to supplier

11   Accessories for ultrasonic baths

Description	Part Number
Spare Plastic lid for C080/C080T	EA/1003278
Plastic lid for C175/C175T	EA/1003280
Plastic lid for C275/C275T,C425/C425T	EA/1003281
Plastic lid for C575/C575T	EA/1003282
Plastic lid for C690/C690T,C940/C940T	EA/1003283
Plastic lid for C950/C950T,C1275/C1275T	EA/1003285
Plastic lid for C1800/C1800T	EA/1003286
Plastic lid for C3000/C3000T	EA/1003287
Stainless steel basket for C080/C080T	EA/1004170
Stainless steel basket for C175/C175T	EA/2070390
Stainless steel basket for C275/C275T	EA/2070400
Stainless steel basket for C425/C425T	EA/2070600
Stainless steel basket for C575/C575T	EA/1004243
Stainless steel basket for C690/C690T	EA/1004247
Stainless steel basket for C940/C940T	EA/1004235
Stainless steel basket for C950/C950T	EA/1004178
Stainless steel basket for C1275/C1275T	EA/1004277
Stainless steel basket for C1800/1800T	EA/1004275
Stainless steel basket for C3000/C3000T	EA/1004271
Immersion basket polypropylene	EA/2070380
Immersion basket stainless steel 59mm diam	EA/2070540
Immersion basket stainless steel 85mm diam	EA/1007545
Immersion basket oblong for C080/C080T	EA/2070390
Immersion basket oblong for C175/C175T	EA/2070400

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Immersion basket oblong for C275/C275T	EA/2070600
Tool holder	EA/2070760
Test tube holder	EA/2070770
Hook racks with 10 hooks	EA/1007938
Clamp for Erlenmeyer flask 50ml	EA/1008553
Clamp for Erlenmeyer flask 250ml	EA/1007555
Clamp for Erlenmeyer flask 500ml	EA/1007575
Clamp for Erlenmeyer flask 1000ml	EA/1007558
SS Cover 2 holes for C080/C080T	EA/2070520
SS Cover 1 hole for C175/175T	EA/2070290
SS Cover 2 holes for C275/C275T, C425/C425T	EA/2070300
Beaker with lid 600ml for C080/C080TH	EA/2070360
Beaker with lid 600ml for all units	EA/2070340
Beaker with lid 100ml for all units	EA/2070350
Acid Resistant Plastic tub for C275/C275T,C425/C425T, C575/C575T	EA/2070890
Acid Resistant Plastic tub for C950/C950T,C1275/C1275T	EA/2070900
Acid Resistant Plastic tub for C1800/C1800T	EA/2070910
Acid Resistant Plastic tub for C3000/C3000T	EA/2000008
Stainless Steel Cooling coil	EA/1007754

12   Equipment disposal

The unit can be taken to metal and electronics recycling stations or returned to the manufacturer.

13 Manufacturer's contact address

Camlab Ltd

Norman Way, Over, Cambridge CB24 5WE
Phone +44 (0) 1954 233100
Fax   +44 (0) 1954 233101
e-mail: sales@camlab.co.uk

Please visit our homepage. You will find helpful information and descriptions on our large product range:

www.camlab.co.uk

Do you have any queries or suggestions concerning the present unit, its operation or the Operating Instructions?
Please contact us, we will be glad to assist:

Technical Support

Phone +44 (0) 1954 233120

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Service Department

Working together to provide an outstanding service

Camlab's Service Department is committed to providing the best possible after sales support to their customers, not only during the warranty period but for the entire working life of the equipment.

Our team of engineers are backed by a comprehensive range of spare parts and many years of experience maintaining and repairing scientific instrumentation.

Regular servicing has been long established as the most effective way to maximise the life of the equipment. It has the benefit of ensuring the continued electrical and operational safety as well as the accuracy and calibration (where applicable) of the instrument.

For these reasons we offer our customers a more cost effective after sales service by way of service contracts.

For further information please contact our Service Department on :

Phone : +44 (0) 1954 233130

e-mail : service@camlab.co.uk