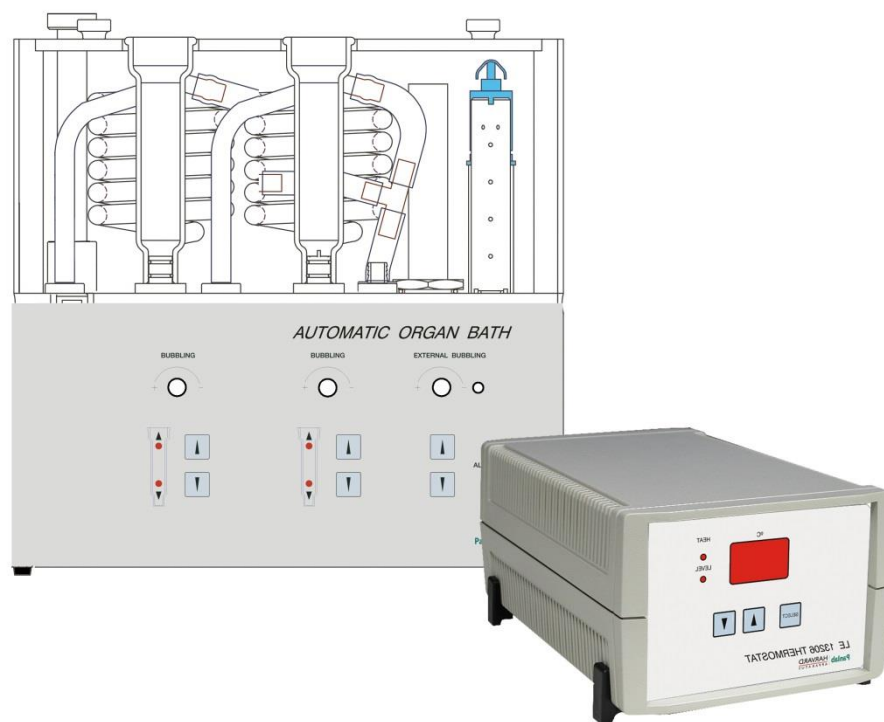


# Hardware User's Manual

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## Organ Bath

### Compact Baths



### References:

LE01002	(76-0030)	LE01026	(76-0031)
LE01004	(76-0032)	LE01046	(76-0033)
LE01006	(76-0034)	LE01066	(76-0035)
LE01008	(76-0036)	LE01086	(76-0037)

### Version:

V02/07/2015

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### Limitation of Liability

PANLAB does not accept responsibility, under any circumstances, for any harm or damage caused directly or indirectly by the incorrect interpretation of what is expressed in the pages of this manual.

Some symbols may have more than one interpretation by professionals unaccustomed to their usage.








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## 1. SYMBOLS TABLE

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Recognising the symbols used in the manual will help to understand their meaning:

DESCRIPTION	SYMBOL
Warning about operations that must not be done because they can damage the equipment	
Warning about operations that must be done, otherwise the user can be exposed to a hazard.	
Protection terminal ground connection.	
Warning about a hot surface which temperature may exceed 65°C	
Warning about a metal surface that can supply electrical shock when it's touched.	
Decontamination of equipments prior to disposal at the end of their operative life	
Waste Electrical and Electronic Equipment Directive (WEEE)	

## 2. GOOD LABORATORY PRACTICE

---

Check all units periodically and after periods of storage to ensure they are still fit for purpose. Investigate all failures which may indicate a need for service or repair.

Good laboratory practice recommends that the unit be periodically serviced to ensure the unit is suitable for purpose. You must follow preventive maintenance instructions. In case equipment has to be serviced you can arrange this through your distributor. Prior to Inspection, Servicing, Repair or Return of Laboratory Equipment the unit must be cleaned and decontaminated.



### Decontamination prior to equipment disposal

In use this product may have been in contact with bio hazardous materials and might therefore carry infectious material. Before disposal the unit and accessories should all be thoroughly decontaminated according to your local environmental safety laws.

### 3. UNPACKING AND EQUIPMENT INSTALATION

---



**WARNING:** Failure to follow the instructions in this section may cause equipment faults or injury to the user.


- A. No special equipment is required for lifting but you should consult your local regulations for safe handling and lifting of the equipment.
- B. Inspect the instrument for any signs of damage caused during transit. If any damage is discovered, do not use the instrument and report the problem to your supplier.
- C. Ensure all transport locks are removed before use. The original packing has been especially designed to protect the instrument during transportation. It is therefore recommended to keep the original carton with its foam parts and accessories box for re-use in case of future shipments. Warranty claims are void if improper packing results in damage during transport.
- D. Place the equipment on a flat surface and leave at least 10 cm of free space between the rear panel of the device and the wall. Never place the equipment in zones with vibration or direct sunlight.
- E. Once the equipment is installed in the final place, the main power switch must be easily accessible.
- F. Only use power cords that have been supplied with the equipment. In case that you have to replace them, the spare ones must have the same specs that the original ones.



- G. Make sure that the AC voltage in the electrical network is the same as the voltage selected in the equipment. **Never connect the equipment to a power outlet with voltage outside these limits.**



**WARNING**

For electrical safety reasons you only can connect equipment to power outlets provided with earth connections .

This equipment can be used in installations with category II over-voltage according to the General Safety Rules.



**WARNING**

Before connecting LE13206 Thermostat to the organ bath, be sure that it is turned off.



Do not touch the resistance while the organ bath is running, is a hot element that can harm you.

The manufacturer accepts no responsibility for improper use of the equipment or the consequences of use other than that for which it has been designed.

### PC Control

Some of these instruments are designed to be controlled from a PC. To preserve the integrity of the equipment it is essential that the attached PC itself conforms to basic safety and EMC standards and is set up in accordance with the manufacturers' instructions. If in doubt consult the information that came with your PC. In common with all computer operation the following safety precautions are advised.



- WARNING**
- To reduce the chance of eye strain, set up the PC display with the correct viewing position, free from glare and with appropriate brightness and contrast settings
  - To reduce the chance of physical strain, set up the PC display, keyboard and mouse with correct ergonomic positioning, according to your local safety guidelines.

## 4. MAINTENANCE

---



**WARNING:** Failure to follow the instructions in this section may cause equipment fault.

- **PRESS KEYS SOFTLY** – Lightly pressing the keys is sufficient to activate them.
- Equipments do not require being disinfected, but cleaned for removing urine, faeces and odour. To do so, we recommend using a wet cloth or paper with soap (which has no strong odour). **NEVER USE ABRASIVE PRODUCTS OR DISSOLVENTS.**
- **NEVER** pour water or liquids on the equipment.
- Once you have finished using the equipment turn it off with the main switch. Clean and check the equipment so that it is in optimal condition for its next use.
- The user is only authorised to replace fuses with the specified type when necessary.

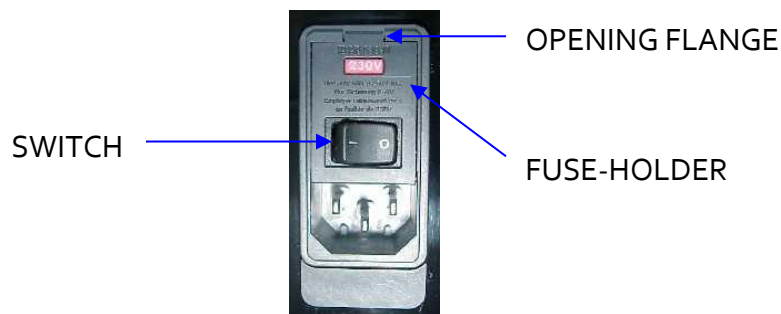


Figure 1. Power inlet, main switch and fuse holder.

### FUSE REPLACEMENT OR VOLTAGE SETTING CHANGE

In case of an over-voltage or other incident in the AC net making it impossible to turn on the equipment, or if the equipment voltage setting is incorrect, check fuses according to the following procedure.

- 1 Remove power cord from the power inlet.

- Open fuse-holder by pulling the flange with a regular screwdriver.



Figure 2. Open fuse-holder door.

- Extract fuse holder using the screwdriver.

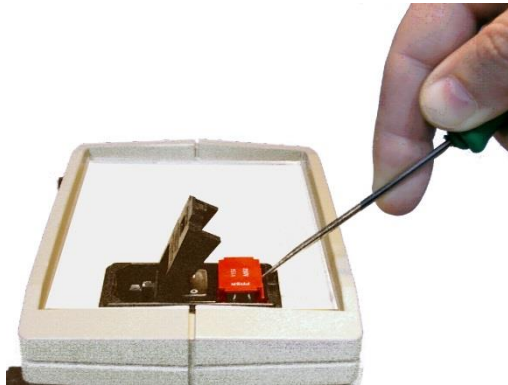


Figure 3. Extract fuse-holder.

- Replace fuses if necessary. Insert fuses in the fuse-holder in the correct position.



CORRECT



INCORRECT

Figure 4. Fuses position.

- Insert the fuse-holder again, positioning it according to the voltage in the AC net.



115V POSITON



230V POSITION

Figure 5 Fuse holder position.

- If the fuses blow again, unplug the equipment and contact technical service.



For electrical safety reasons, never open the equipment. The power supply has dangerous voltage levels.

**BATH POWER SELECTOR**

Figure 6. Bath power selector.

Before connecting the bath to the thermostat, you must check under the pump the voltage selector is correctly set (115V or 230V) and change it in case it was necessary. In this way the heating element will have a power of 500W.



**WARNING**

- If selector is set to 115V and LE13206 is feed to 230V, the heating element will receive 2000W of power.
- If selector is set to 230V and LE13206 is feed to 115V, the heating element will receive 125W of power.



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## 6. INTRODUCTION

---

The Panlab o1 series Organ Baths are highly compact units designed for easy maintenance of isolated tissues in physiological conditions for extended periods of time, facilitating the recording of tissue tension response to drug challenges.



Figure 7. LE01.o86 8-channel Automatic Organ Bath.

This Manual covers the handling instructions for all o1-series organ baths. The differences between the different models are fully explained where relevant.

MODEL	NUMBER OF VESSELS	VESSEL FILLING & EMPTYING	CONTAINER VOLUME (L)
LE01.002	2	STOPCOCK	5
LE01.026	2	ELECTROVALVES	5
LE01.004	4	STOPCOCK	8
LE01.046	4	ELECTROVALVES	8
LE01.006	6	STOPCOCK	11
LE01.066	6	ELECTROVALVES	11
LE01.008	8	STOPCOCK	14
LE01.086	8	ELECTROVALVES	14

TABLE 1. o1 SERIES ORGAN BATHS.

All models of the o1 Series are composed of a container receptacle for the vessels and the electronic water-heating and stirring control unit: the LE13206 Thermostat Unit. This is mounted externally to guarantee maximum safety of operation.

The containers are made of transparent Perspex, thick enough to support the entire volume of water, which, once heated, thermostates the tissue vessels and the physiological saline solution (PSS) reservoir coils.

Coils and vessels can be easily removed by sliding them up from their fixing base on the container's floor. These elements are made of glass, so the dismantling operation must be undertaken with care. All baths are shipped with 25 ml vessels; 50, 10 and 5 ml vessels are also available.

The dimensions of the vessels are indicated in TABLE 2, (see also Figure 8).

VOLUME (ml)	TOTAL HEIGHT	INTERNAL DIAMETER	PPS OVERFLOW OUTLET HEIGHT	REFERENCE
50	126	28	100	LE0150 (76-0047)
25	126	20	100	LE0125 (76-0046)
10	126	14	85	LE0110 (76-0045)
5	126	11	70	LE0105 (76-0044)

TABLE 2. DIMENSIONS OF THE VESSELS.

Vessels only need to be removed when another size is needed, or when the original is broken. Washing of vessels and coils should be adequately undertaken without dismantling them, following the instructions outlined in the relevant chapter of this Manual.

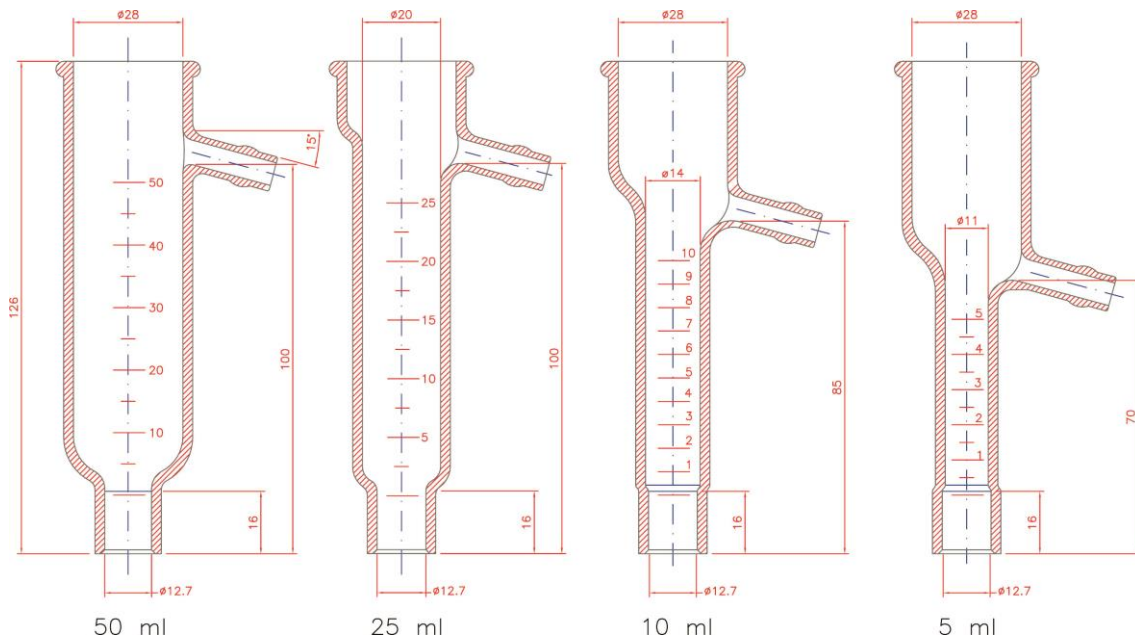


Figure 8. Vessel dimensions.

## 7. EQUIPMENT DESCRIPTION

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### 7.1. LE13206 FRONT PANEL

---

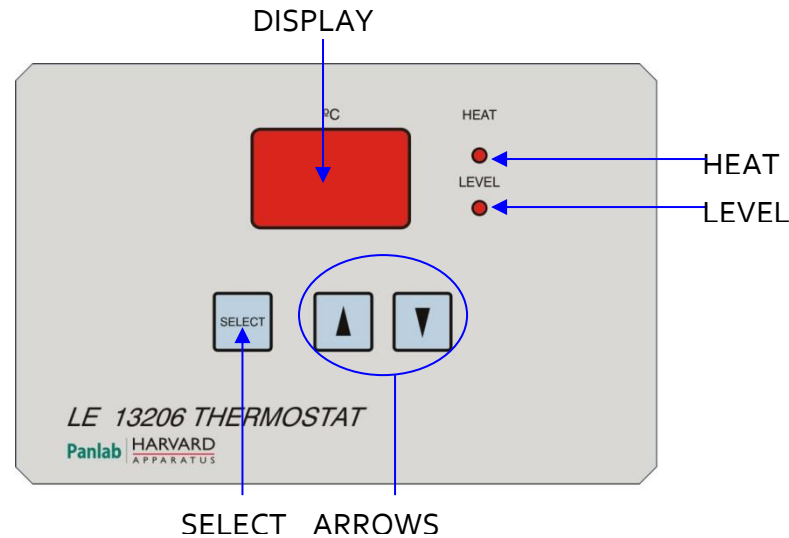


Figure 9. LE13206 Front Panel.

- **SELECT:** This button is used to set the organ bath temperature between 25.0°C and 45.0°C. The display will show a flashing decimal dot, and the temperature setting can be modified with the ARROWS. If SELECT is pressed, or if 15 seconds pass without any button being pressed, the display will show the organ bath temperature again.
- **DISPLAY:** The display shows the organ bath temperature with a resolution of 0.1°C. The display will show "---" if the temperature probe is not connected or the temperature is lower than 20°C or higher than 62°C. The decimal dot flashes when the device is in temperature selection mode.
- **HEAT:** This LED remains on while the thermostat controller is heating. Three conditions must be met for the thermostat controller to heat:
  - Water level is correct (level led is on).
  - Target temperature is higher than current bath temperature.
  - The thermal security switch in series with the heating element is not open.
- **LEVEL:** This led comes on when the heating element is completely covered by water.

- **ARROWS:** The selected temperature can be modified with the arrows after pressing the SELECT button. The temperature range is between 25.0°C and 45.0°C.

## 7.2. LE13206 REAR PANEL

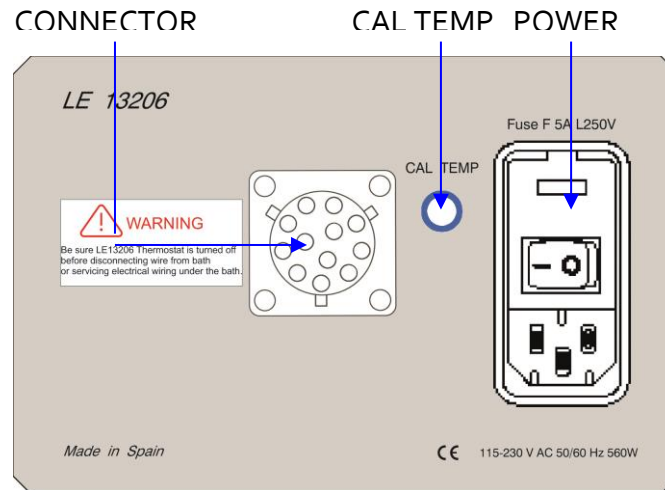


Figure 10. LE13206 Rear Panel.

- **CAL TEMP:** Potentiometer used to calibrate the LE13206 thermostat temperature measurement. The LE13206 thermostat is factory-set with its own organ bath, thus, this potentiometer should only be readjusted if the user is to work with another organ bath.
- **CONNECTOR:** Twelve-pin connector used to connect LE13206 thermostat to the organ bath.

PINS	FUNCTION
A, B	Heating element
C, D	Pump
E, F	Level
G	GND of 24V
H	+24V DC
K, M	Temperature probe
L	GND

- **POWER:** Power inlet, fuse holder and main switch.

### 7.3. AUTOMATIC ORGAN BATH

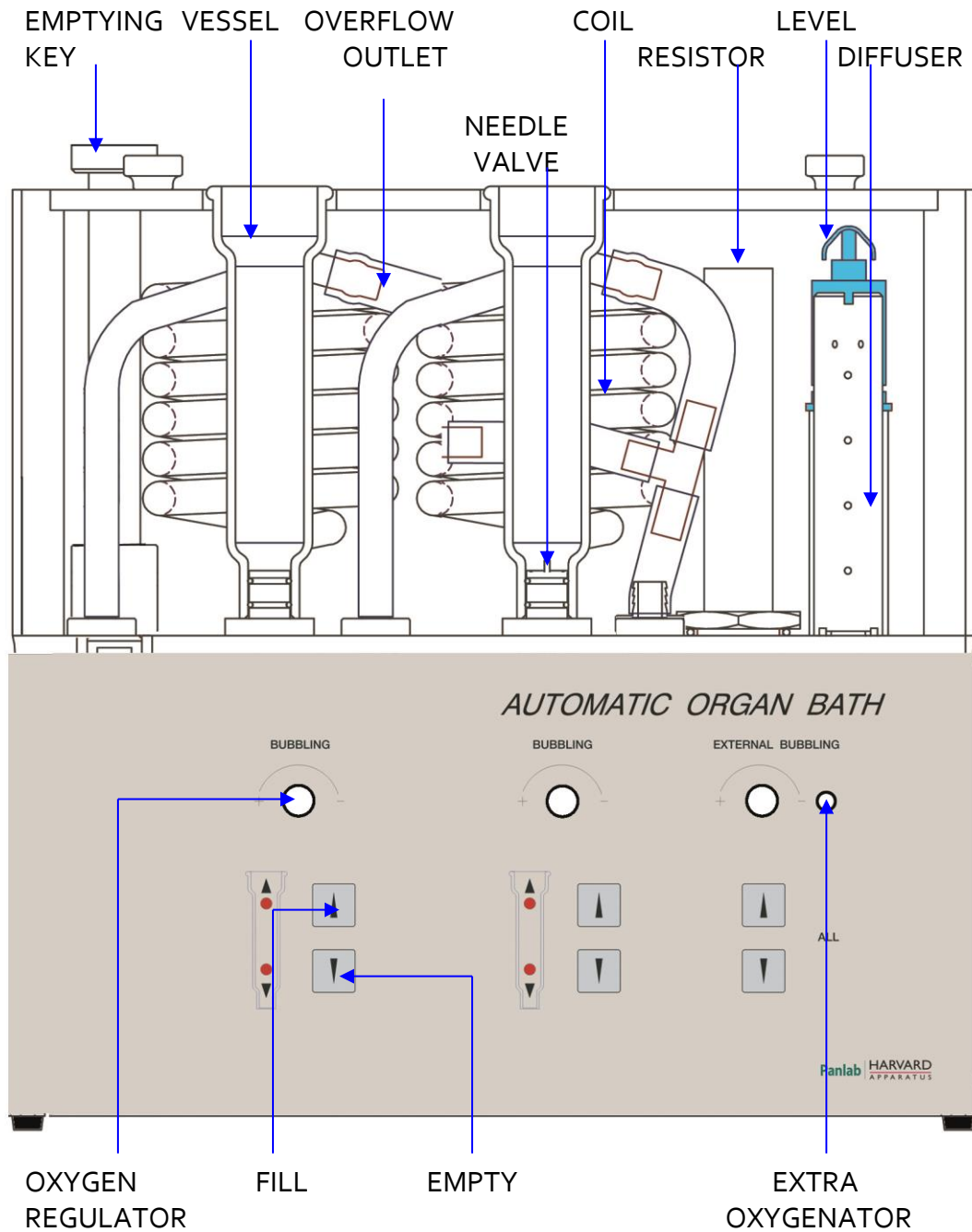


Figure 11. LE01.026 Front view.

- **EMPTYING KEY:** The organ bath reservoir can be emptied by unscrewing the reservoir cap with this key.
- **VESSEL:** The organ bath has 2, 4, 6 or 8 vessels where the tissue is immersed in the Krebs solution and oxygen is added through the needle valve.

- **OVERFLOW OUTLET:** If vessel is overfilled, an overflow outlet drains the excess liquid and avoids the contamination of the distilled water in the reservoir.
- **COIL:** A saline solution flows through the coil before entering the vessel to exchange heat with water in the reservoir.
- **LEVEL:** Switch with a floating buoy that detects when the water level in the organ bath is right (resistance completely covered) and prevents the LE13206 from heating if water level is insufficient. When the switch opens the contact the led labelled **LEVEL** in the LE13206 thermostat turns on.
- **RESISTOR:** Heating element, it has 500W power and the coating is grounded to protect the user against electric leakage.
- **DIFFUSER:** In the recirculation water pump outlet there is a diffuser that drives water flow towards the resistor.
- **OXYGEN REGULATOR:** For each vessel there is an oxygen regulator that regulates the flow of carbogen through the needle valve. There is an additional oxygen regulator for the extra oxygenator, making it possible to provide oxygen to a Petri dish while the tissue is handled and prepared.
- **FILL:** The vessel filling valve opens while pressing this button, so that the fluid in the coil enters in the vessel. The Krebs tank must be positioned above the bath, as the vessels are filled by gravity.
- **EMPTY:** The vessel-emptying valve opens while this button is pressed, so that liquid is fed into the drain.
- **FILL ALL:** Pressing this button will simultaneously open the valves for filling all the vessels, and will remain open until the button is pressed again.
- **EMPTY ALL:** Pressing this button will simultaneously open the valves to empty all the vessels, and will remain open until the button is pressed again.
- **EXTRA OXYGENATOR:** Oxygen outlet that can be used to deliver oxygen to a Petri dish, while tissue is being prepared to enter the vessel.
- **EXTRA OXYGENATOR ACCESORY:** Nylon tube that can be used to deliver oxygen to a Petri dish.
- **CONNECTOR:** 12-pin male connector, used to connect the organ bath to the LE13206 thermostat.
- **PUMP WATER INLET:** Water inlet of the pump, which expels the water through the diffuser towards the resistance.



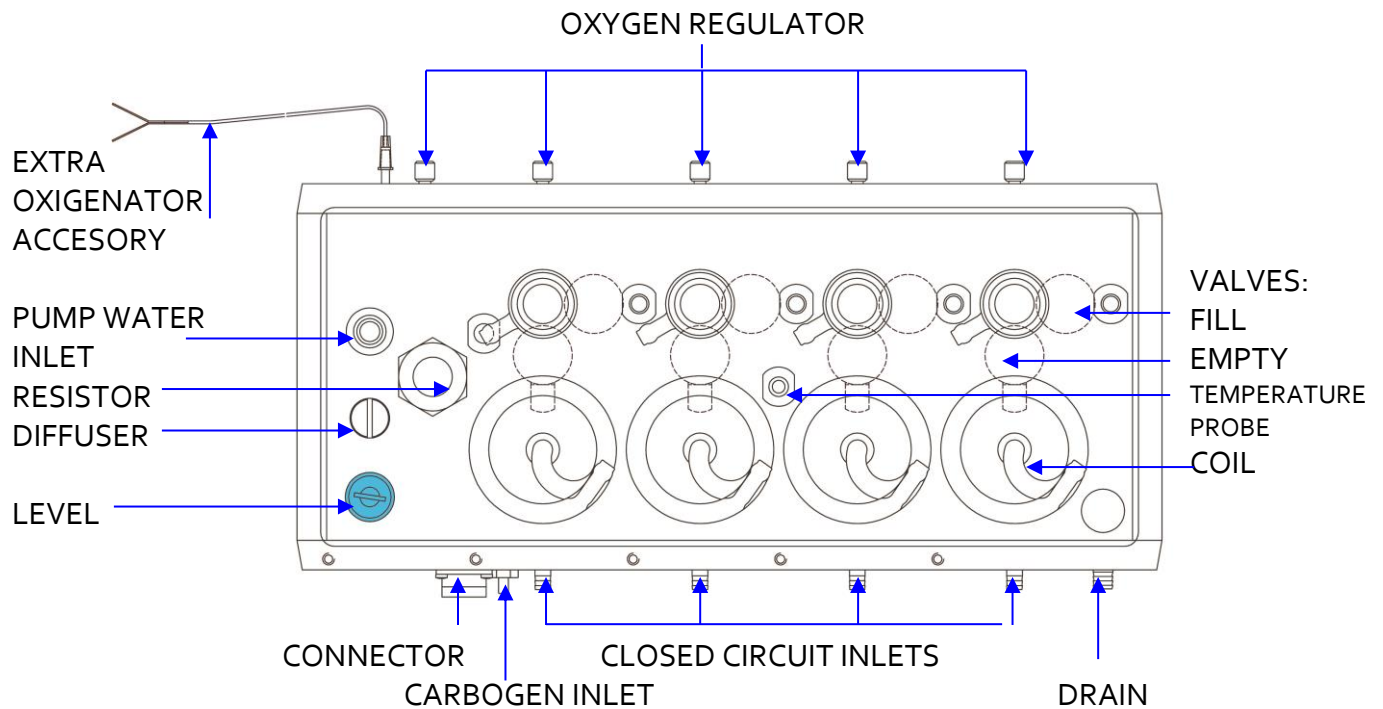
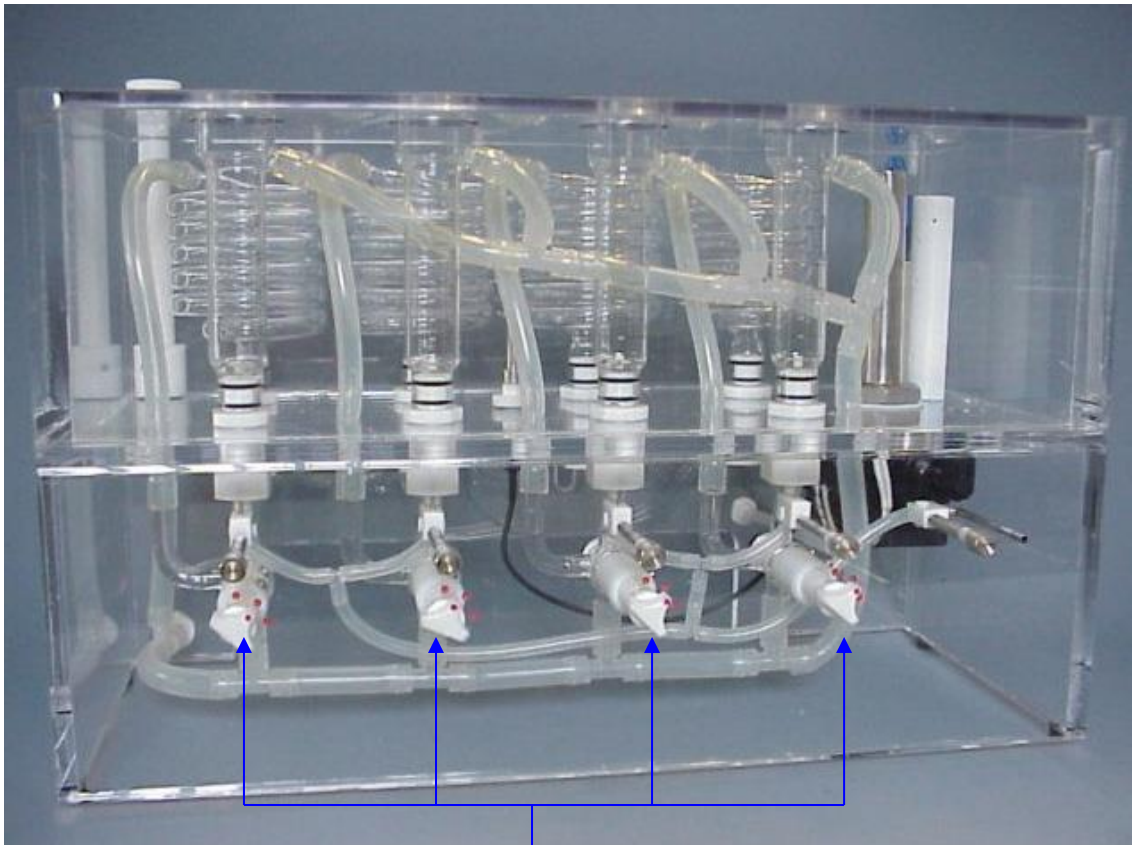


Figure 12. LE01.046 top view.

- **CLOSED CIRCUIT INLETS:** Each coil has an inlet for connection to the Krebs reservoir.
- **FILL VALVE:** Pressing the fill button opens this valve to allow water to pass through the coil to the vessel.
- **EMPTY VALVE:** Pressing the empty button opens the drain valve to empty the vessel in the drainage circuit.
- **CARBOGEN INLET:** The pressured gas bottle must be connected to this inlet. Gas pressure must never exceed 0.5 bar.
- **TEMPERATURE PROBE:** Measures the water temperature that is shown on the display.
- **NEEDLE VALVE:** Needle valve that supplies small bubbles of gas to the saline solution.

## 7.4. MANUAL ORGAN BATH

The difference between manual and automatic organ baths is that the former uses a 3-way key instead of electrovalves to fill and empty the vessels. Except for this, all other elements explained in chapter 7.3 are common to both kinds of organ baths.



3-WAY KEYS

Figure 13. LE01.004 Manual organ bath.

Stopcock key positions are shown in the following figure:

### STOPCOCK POSITIONS

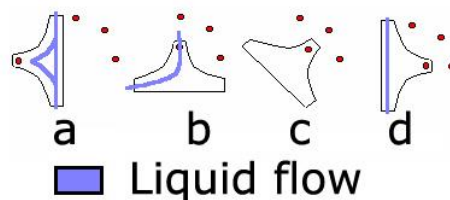


Figure 14. Stopcock key positions.

- a) Liquid recirculation, used to purge the circuit.
- b) Fill vessel.
- c) Keep liquid in the vessel.
- d) Empty vessel.

## 8. EQUIPMENT CONNECTION

The necessary connections are shown in the following figure:

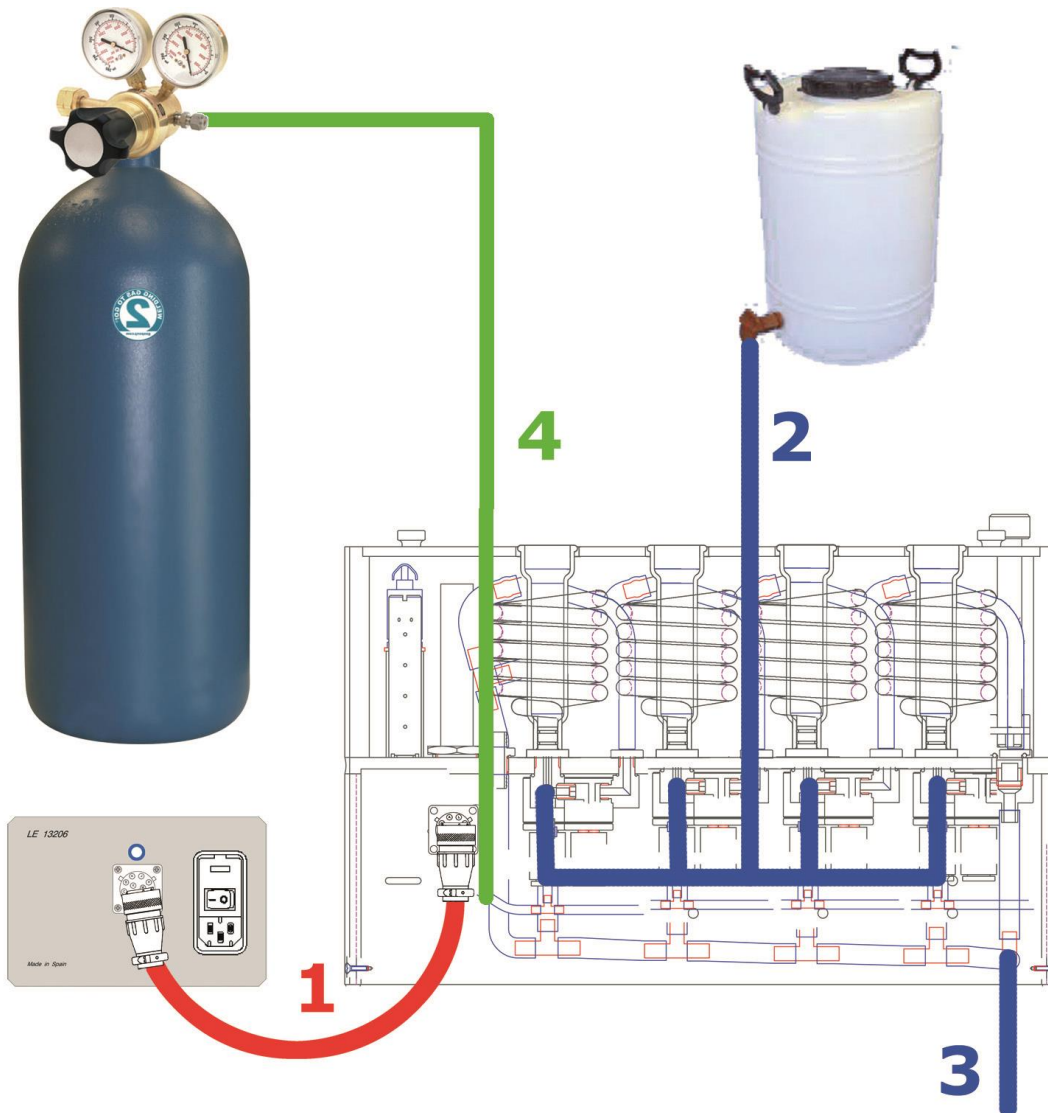


Figure 15. Equipment connection.

The necessary connections are listed in the next table:

	FROM	TO	CONNECTION
1	LE13206 connector	Organ bath connector	12-pin cable
2 <sup>1</sup>	Krebs reservoir	Organ bath liquid inlets	Silicone tube
3 <sup>1</sup>	Organ bath drain	Laboratory drain	Silicone tube
4 <sup>2</sup>	Pressured gas	Carbogen inlet	Silicone tube

<sup>1</sup> Hydraulic connections.

<sup>2</sup> Pneumatic connections.

## 9. WORKING WITH THE EQUIPMENT

---

The following instructions summarize the steps necessary to prepare the organ bath to work.

### 9.1. INSTALLING MICROPOSITIONER / TISSUE HOLDERS

---

- 1) Screw the micropositioner stand into its purpose-designed holes in the rear wall of the organ bath. It will be apparent that there are more holes than micropositioner stands (one more). This is to facilitate the correct and comfortable installation of the transducers (as there are different sizes depending on the model). On occasion, there is not enough space to work easily with them, so the fifth hole has been conceived to facilitate and aid installation.
- 2) Take the micropositioner and place it on the steel bar by the hole, fixing the selected position with the metal screw (it must face the organ bath).



Figure 16. Micropositioner.

- 3) Take the steel bar with pliers, and insert it in the slit of the small steel bar. Then, insert the small steel bar in the corresponding hole of the micropositioner, ensuring that the metal screw on the steel bar remains in the external part of the entire set.
- 4) The last step is to install the transducer (not included). Insert it through the remaining hole on the micropositioner (facing the organ bath), and fix it with the proper metal screw. Connect it to the amplifier input connector.



Figure 17. Transducer and Micropositioner set.

The micropositioner can be moved up and down when a gross adjustment of the transducer position is needed.

### 9.2. ASSEMBLING THE KREBS CIRCUIT

---

- 1) Using a silicone tube, connect the Organ Bath rear panel physiological solution inlet for each coil to the fresh solution container. Each coil can be fed with a different physiological solution, or several coils can be fed with the same solution.
- 2) Using a silicone tube, connect the Organ Bath drain to the drain in your laboratory, or sewage reservoir depending on your waste treatment protocols.

The silicone tubes are numbered as 2 and 3. See Figure 15.

**Note:** the tubes required for this step are not supplied with the bath.

### 9.3. ASSEMBLING THE CARBOGEN CIRCUIT

---

- 1) Connect the gas inflow connector on the rear panel of the organ bath to a gas source (the silicone tube is labelled as 4, see Figure 15). A minimum pressure source of 0.1 bars must be used.



**WARNING:** Pressure must never exceed 0.5 bar in order not to damage the carbogen circuit.

The advisable carbogen composition is:

GAS	CONCENTRATION
O <sub>2</sub>	95%
CO <sub>2</sub>	5%

### 9.4. ELECTRICAL CONNECTIONS

---

Connect the LE13206 Thermostat Unit output cable to the organ bath using the special cable with two round connectors.

- 1) The holes in the sockets must match the holes in the aerial connectors.
- 2) Insert the cable connector into the socket.
- 3) Then turn the metal ring to fix it.

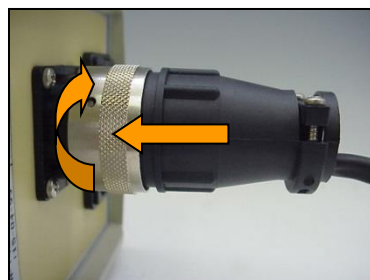


Figure 18. Connecting the cable to the socket.

## 9.5. PREPARING THE TISSUE

---

- 1) Take the organ holder and place it in the notched end of the steel bar, so that the selected organ can be comfortably prepared.

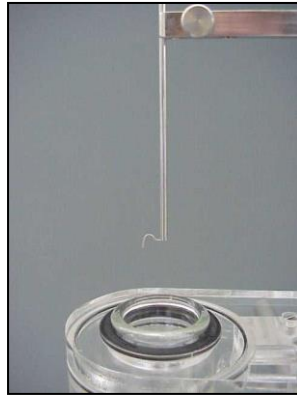


Figure 19. Tissue holder.

- 2) Take the organ selected for experimentation. Fasten one side to the organ holder, and the other to a hook (not included) tied to a thread.



Figure 20. Tissue preparation example.

- 3) Gently slide the holder with the organ through the slit of the bar with a notch, until the organ is completely covered by the solution.
- 4) Take the thread tied to the organ, and tie it to the transducer, as shown.



Figure 21. Thread tied to the transducer.

5) Use the MICROPOSITIONER to choose the desired tension.

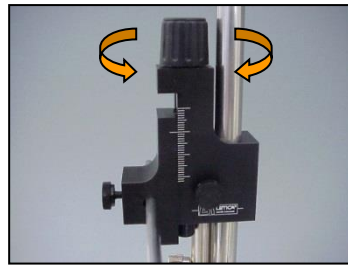


Figure 22. Micropositioner knob.

The MICROPOSITIONER / TISSUE HOLDER / TRANSDUCER set can be used separately from the rest of the organ bath.

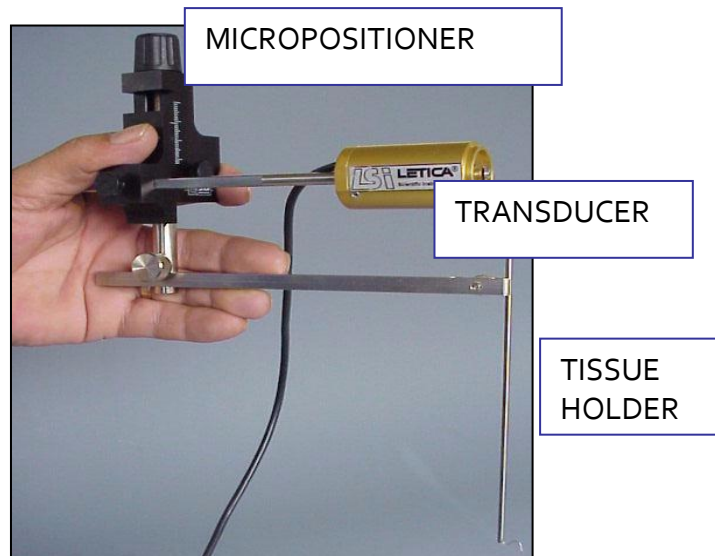


Figure 23. Micropositioner, Transducer and Tissue holder set.

Removing the set from the steel bar affixed to the wall of the organ bath, it is possible to work with the tissue outside the organ bath, using an extra box with physiological solution in it, and using the EXTRA-OXYGENATOR (see Figure 12) to keep the tissue oxygenated, and therefore alive, until the experiment starts.

To control the level of oxygenation of the external recipient, use the key on the control panel where EXTERNAL BUBBLING is written.

It is possible to take the set, work with it and install or uninstall it again on the organ bath stand.

## **9.6. FILLING & EMPTYING THE CONTAINER**

---

Distilled water is suggested for use as thermostatzation liquid. This will prevent contamination or lime deposits on the container walls and pipes. The addition of an anti-algae product is also recommended.



The container can be filled directly through its upper opening. Ensure that the closing valve is fully closed, turning its extension arm clockwise. Note that the container's valve outlet is the same pipe used by the vessels for emptying.

In order to avoid condensation or bubbles which could hinder vessel visibility, it is advisable to fill the container completely, up to the lid. This water can be used for several days without renewal.

To empty the container, open the container's closing valve, using the knob situated in the top left corner.

A vacuum pump, connected to the waste solution outlet (on the rear panel of the bath), can be used if a quicker emptying is sought.

As an additional security measure, the resistor cannot start heating the water until the water reaches the desired level, that is, to cover completely all the instruments, including the resistor. The water level controller is the instrument that allows the thermostat to start working. If this measure were not taken, the resistor would probably burn out in a short period of time.

## **9.7. FILLING & EMPTYING THE TISSUE VESSELS**

---

The emptying of the tissue vessels is carried out by gravity through its bottom inlets, taking about six seconds (in 25 ml vessels). If higher emptying or filling velocities are required, a vacuum pump can be added on the emptying pipe and a rotary pump can be used in the filling circuit (ensuring that the glass pipes do not break due to excessive pressure).

It is also possible to control the emptying and filling electrovalves with a remote device (timer) or computer and not only the front panel controls (see Chapter 11).

There are two different ways to empty the vessel of the old solution and fill it with the new one, depending on the needs of the experiment

### **9.7.1. BY OVERFLOWING**

Allow the new solution into the vessel by pressing the UP arrow. This "pushes" the old solution until it overflows out of the vessel.

The new solution will probably be "contaminated" by the old one, so it would be advisable to continue the "pushing action" for a certain time (perhaps 7 - 8 seconds, depending on the size of the vessel). This technique is used when it is desired to keep the organ in solution.



### 9.7.2. BY TOTAL EMPTYING

By pressing the DOWN arrow, let the electrovalve empty the vessel, or place the stopcock in a total emptying position.

When the vessel is completely empty, press the UP arrow or place the stopcock in the correct position until the new solution has completely filled the vessel. This method leaves the tissue exposed to air for a short period. Note that the coils store enough volume (220 ml) to allow several washing cycles.

### AUTOMATIC ORGAN BATHS

In the electrovalve-controlled organ bath models, the emptying and filling processes are carried out by opening the relevant electrovalve. The electrovalve remains open while the respective button is pressed. On the right end of the bath, two keys make it possible to carry out the operation in all vessels simultaneously.

### MANUAL ORGAN BATHS

In the stopcock-controlled organ baths, each vessel is emptied or filled separately, by turning the 3-way stopcock on the container's front panel until it reaches the end position.

## 9.8. CONTROL OF THE GAS FLOW

---

The gas bubbling of the preparation is achieved by means of a crystalline diffuser filter (or needle-valve) situated at the base of the vessel; bubbling gas inflow is regulated independently for each vessel by turning its corresponding buttons at the front of the container (see Figure 11) counter-clockwise (opening) or clockwise (closing).



**WARNING:** Once the experiment has finished and the organ bath has been cleaned, never leave the oxygen regulator screws closed, the silicone tubes can become stuck with pressure and damp.

## 9.9. REMOVING AND CHANGING PIECES

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There are four pieces designed to be changed: the NEEDLE-VALVE, the VESSEL, the TEMPERATURE PROBE and the COILS.

### 9.9.1. Needle-valve

Take the NEEDLE-VALVE CHANGER, and place it inside the vessel. Using the part with a notch on it, secure the needle-valve and take it out, pulling softly (to install another, perform the process in reverse order).

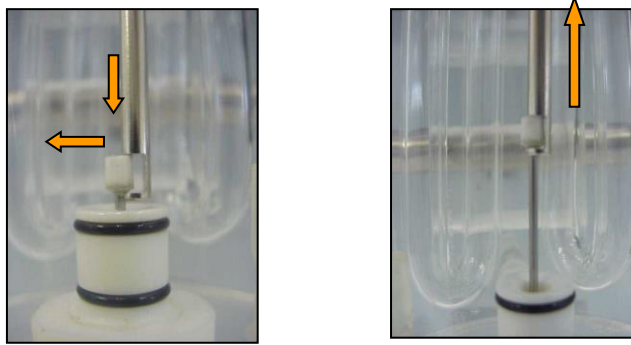


Figure 24. Extracting the needle valve.

### 9.9.2. Vessel

To remove the vessel, take the cover and move gently in a single movement, as shown.

To remove the tube fixed to the vessel, first try pulling from the plastic side.

It is not always possible to easily remove the tube, as it becomes affixed to the vessel (since it is made of glass). In that case, CUT the tube and replace it with another on next installation.



Figure 25. Removing the vessel.



**WARNING:** The vessel is made of glass, be careful when handling it as there is a possibility of breaking it and causing damage.

### 9.9.3. Temperature probe

To replace the probe, disconnect its feed cable, placed on the outer lower part of the container, directly below the probe. Use pliers to unscrew the probe by the white plastic piece on its base.

#### 9.9.4. Coils

Pull up the coil until it is separated from the bottom, and disconnect the tube from the coil (\*).

To install a new one, perform the procedure in reverse order. It is easier to connect the tubes if they are slightly moistened.



(\* ) If it is not possible, cut the silicon tube and replace it

Figure 26. Extracting the coil.



**WARNING:** The coil is made of glass, be careful when handling it as there is a possibility of breaking it and causing damage.

### 9.10. CLEANING THE BATH

In order to extend the bath life, it is convenient to fully clean the solution circuit on a regular basis. It is also advisable to clean the container when necessary, as indicated.

The liquid in the Main container, which is heated to thermo-regulate the whole organ bath, should consist of distilled water. A bit of anti-algae additive can be added to the distilled water to prevent algae from appearing in the water if it is to be kept for an extended period, or it can be changed every week, without any need for adding any toxic products.

#### 9.10.1. Cleaning the Organ Bath glass components

Prior to starting work with the Bath, flush 5 litres of distilled water through the coil and vessel circuit (liquid feed circuit). Use a brush to clean the vessels while the distilled water is circulating.

Once the experimental session is finished, flush out the circuit using another 5 litres of distilled water, repeating the vessel brushing operation.

If the Organ bath is not going to be used for an extended period of time, the preventive steps detailed below should be carried out:

- 1) The needle valves of the vessels should be covered with distilled water to prevent them from clogging.
- 2) Thoroughly clean out the feed circuit (coils and vessels), given that there may be residues that can form saline deposits, which will subsequently impede circulation of the liquids. Either of two methods can be used to clean coils and vessels:
  - a) Remove the vessels and coils and submerge them in a 0.2M solution of hydrochloric acid (HCl) for a period of time no longer than 2 minutes. Proceed with caution with the vessels as the acid can attack the paint of the graduated scale and remove it. Rinse well using distilled water to eliminate all traces of the acid. If difficulty is encountered when disconnecting the tubes from the glass components, it is better to cut the silicone tubing off at the joint.
  - b) Without dismantling the coils and vessels, flush the internal circuit with a 0.1M hydrochloric acid (HCl) solution for a maximum of 2 minutes. Then circulate 5 litres of distilled water through the vessels and coils to remove any traces of acid. It is important to take maximum care with the acid solution to ensure it does not come into contact with the plastic parts of the bath (Perspex or Methacrylate).

Obviously, other cleaning methods are available and it is possible to use other acid solutions such as chromic, dichromic or lactic. The choice as to which method is best is left up to the user.



**WARNING:** The coil and vessel are made of glass, be careful when handling them as there is a possibility of breaking them and causing damage.

#### **9.10.2. Cleaning the Organ Bath Plastic components**

To clean the plastic parts of the bath (walls, etc.), use a cloth moistened with a soapy solution and then rinse off with distilled water.



**WARNING:** Never use alcohol or products containing derivatives of alcohol as they will harm the plastic surfaces. Regularly clean the top and fixing bolts using distilled water to avoid the formation of saline deposits.

## 10. THERMOSTAT CALIBRATION

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The LE13206 Thermostat has been calibrated with its own Organ Bath, if you wish to work with it connected to another Organ Bath; the temperature must be calibrated with the CAL TEMP potentiometer on the LE13206 rear panel.

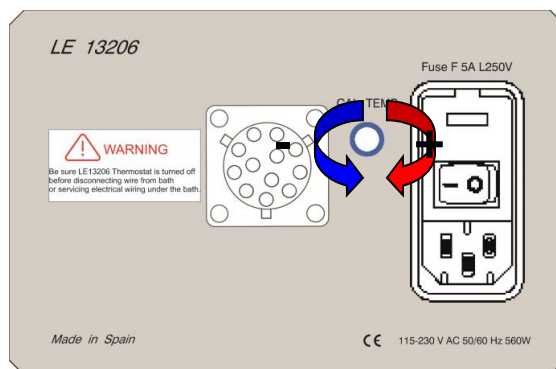


Figure 27. CAL TEMP potentiometer rotation directions.

Follow this process to calibrate the thermostat:

- 1) Fill the bath with distilled water.
- 2) Connect the LE13206 thermostat to the bath.
- 3) Measure the water temperature with a precision thermometer.
- 4) Turn on the thermostat and select 25°C pressing the SELECT button and the ARROWS, press select again to accept changes and to read temperature on the thermostat display.
- 5) When the temperature in the display of the LE13206 thermostat reaches 25°C, the HEAT LED will be turned off. Then, observe the precision thermometer and adjust the LE13206 thermostat with the CAL TEMP potentiometer in the hole of the rear panel using a small screwdriver. If you turn in the direction of the red arrow (see Figure 27) the temperature on the display increases, if you turn in the direction of the blue arrow (see Figure 27) the temperature on the display decreases. Adjust the potentiometer so that the temperature on the LE13206 display is the same as the temperature on your precision thermometer.
- 6) Now select 30°C by pressing the SELECT button and ARROW button. Press the SELECT button again to validate the selection.
- 7) Wait until the temperature on the display reaches 30°C (it may slightly exceed 30°C. This is normal, but in permanent state it will maintain 30°C). Then look at the LE13206 Thermostat display and the precision thermometer. If there is any difference, adjust the LE13206 Thermostat again with the rear potentiometer.

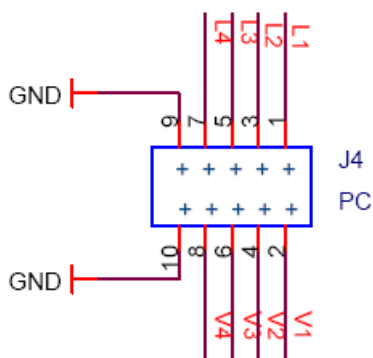


Remember that each Thermostat has to be adjusted with its own Bath; if you connect a Thermostat to another Bath the temperature displayed may have a small error.

## 11. ELECTROVALVE REMOTE CONTROL

In the automatic Organ Bath, electrovalves can be controlled remotely. On the lower side of the Organ Bath front panel there are one or two 10-pin Ansley connectors (depending of the number of vessels of the bath). The default state of the valves is closed; the corresponding valve will open when the correct pin is joined to ground.

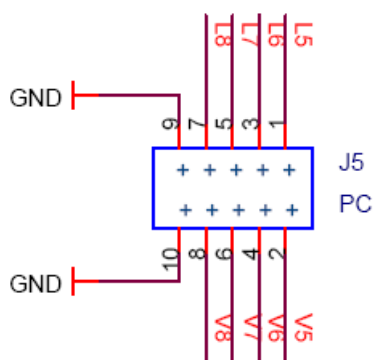
### 11.1. 2 AND 4 VESSEL ORGAN BATH



PIN	VALVE
1	Fill 1
2	Empty 1
3	Fill 2
4	Empty 2
5	Fill 3
6	Empty 3
7	Fill 4
8	Empty 4

Figure 28. Remote control of electrovalves 1 to 4.

### 11.2. 6 AND 8 VESSEL ORGAN BATH



PIN	VALVE
1	Fill 5
2	Empty 5
3	Fill 6
4	Empty 6
5	Fill 7
6	Empty 7
7	Fill 8
8	Empty 8

Figure 29. Remote control of electrovalves 5 to 8.

## 12. TROUBLESHOOTING

This table features instructions to solve the most frequent problems.

PROBLEM	SOLUTION
The equipment does not start up.	<ul style="list-style-type: none"> <li>• Ensure that the voltage of mains is the same as that selected in the fuse holder.</li> <li>• Check the condition of the fuses.</li> </ul>
The display of the LE13206 shows "---" instead of a numeric value.	<ul style="list-style-type: none"> <li>• Ensure that Organ Bath is connected to the Thermostat controller.</li> <li>• Ensure that the temperature probe in the Organ Bath is connected.</li> <li>• With the help of an auxiliary thermometer check that water temperature is not lower than 20°C or higher than 62°C (range of measuring of the Thermostat controller).</li> </ul>
Organ bath does not heat water.	<ul style="list-style-type: none"> <li>• Check that water level is correct (LEVEL led must be on). Add water to the reservoir if necessary.</li> <li>• Check that selected temperature is higher than current temperature.</li> <li>• If the first two points are correct and the Organ Bath still does not heat check the value of resistance between pins A and B in the Organ Bath with a resistance meter. It should be 100Ω or 25Ω. If it is open circuit this means that the resistor is broken or that the temperature protection switch is open.</li> </ul>
A vessel fills or empties alone.	<ul style="list-style-type: none"> <li>• If the vessel fills alone, this means that there is dirt in the filling electrovalve. Dismount the valve to clean the Viton membrane and inside the valve.</li> <li>• If the vessel empties alone, this means that there is dirt in the emptying electrovalve. Dismount the valve to clean the Viton membrane and inside the valve.</li> </ul>
It works when you fill or empty only one vessel. But the "fill all" or "empty all" buttons do not work.	<ul style="list-style-type: none"> <li>• The 24V in the Thermostat controller are failing.</li> <li>• The membrane keyboard is failing.</li> <li>• Contact technical service in either case.</li> </ul>
When you turn on the thermostat controller the leakage switch in your electrical installation opens.	<ul style="list-style-type: none"> <li>• The resistor coating has broken and water enters it.</li> <li>• Contact technical service.</li> </ul>

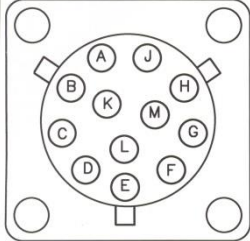
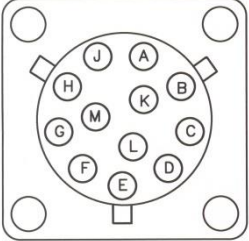
### 13. PREVENTIVE MAINTENANCE

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	EXPERIMENT	WHEN NECESSARY
CHANGE DISTILLED WATER FROM THE HEATING TANK		<input checked="" type="checkbox"/>
CLEAN ORGAN BATH GLASS COMPONENTS	<input checked="" type="checkbox"/>	
CLEAN ORGAN BATH PLASTIC COMPONENTS		<input checked="" type="checkbox"/>
CHANGE NEEDLE VALVES		<input checked="" type="checkbox"/>
CHANGE VESSELS		<input checked="" type="checkbox"/>
CHANGE COILS		<input checked="" type="checkbox"/>
CHANGE TEMPERATURE PROBE		<input checked="" type="checkbox"/>
CALIBRATE THERMOSTAT		<input checked="" type="checkbox"/>



## 14. TECHNICAL SPECIFICATIONS

<p><b>POWER SUPPLY</b>          Input voltage:          Frequency:          Fuse:          Maximum power:          Conducted noise:</p>	<p>115/230 V~          50/60 Hz          2 fuses 5mm*20mm 5A Fast          560W          EN55022 /CISPR22/CISPR16 class B</p>
<p><b>WARMING SPECIFICATIONS</b>          Temperature range:          Display resolution:          Accuracy:          Maximum output voltage in resistor:          Minimum voltage in resistor:</p>	<p>25-45 °C          0.1 °C          +/-0.3 °C          230V AC / 115V AC          0V AC</p>
<p><b>TEMPERATURE PROBE</b>          Technology:          Measurement range showed:          Linearity:          Accuracy:</p>	<p>Transistor          20-62 °C          +/-0.1 °C          +/-0.1 °C</p>
<p><b>ENVIRONMENTAL CONDITIONS</b>          Operating temperature:          Operating relative humidity:          Storage temperature:</p>	<p>10°C to +40°C          0% to 85% RH, non-condensing          0°C to +50°C, non-condensing</p>
<p><b>RESISTOR</b>          Value:          Power:</p>	<p>100Ω at 230V / 25Ω at 115V          500W</p>
<p><b>CONNECTOR:</b>  <u>Pin</u>          A, B:          C, D:          E, F:          G:          H:          K, M:          L:</p>	<p><u>Function</u>          Resistor          Pump          Level          GND of 24V          +24V DC          Temperature Probe          GND</p>
<p>a) </p>	<p>b) </p>
<p><b>Figure 30. Connector external view: a) Thermostat controller, b) Organ Bath.</b></p>	

DIMENSIONS (CONTROL UNIT) Width x Height x Depth: Weight:	161 x 115 x 250 mm 2.5 kg
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DIMENSIONS (CAGE)<sup>3</sup>

Model	Number of vessels	Type	Width	Depth	Height
LE01.002	2	MANUAL	280	225	295
LE01.004	4	MANUAL	440	225	295
LE01.006	6	MANUAL	600	225	295
LE01.008	8	MANUAL	760	225	295
LE01.026	2	AUTOMATIC	280	220	295
LE01.046	4	AUTOMATIC	440	220	295
LE01.066	6	AUTOMATIC	600	220	295
LE01.086	8	AUTOMATIC	760	220	295

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<sup>3</sup> Dimensions are expressed in millimeters

**DECLARACIÓN DE CONFORMIDAD**  
**DECLARATION OF CONFORMITY**  
**DECLARATION DE CONFORMITÉ**

Nombre del fabricante: **Panlab s.l.u.**  
 Manufacturer's name: [www.panlab.com](http://www.panlab.com)  
 Nom du fabricant: [info@panlab.com](mailto:info@panlab.com)

Dirección del fabricante: **Energía, 112**  
 Manufacturer's address: **08940 Cornellà de Llobregat**  
 Adresse du fabricant: **Barcelona SPAIN**

Declaro bajo su responsabilidad que el producto: **ORGAN BATH**  
 Declares under his responsibility that the product:  
 Déclare sous sa responsabilité que le produit:

Marca / Brand / Marque: **PANLAB**

Modelo / Model / Modèle: **LE13206**

Cumple los requisitos esenciales establecidos por la Unión Europea en las directivas siguientes:  
 Fulfils the essential requirements established by The European Union in the following directives:  
 Remplit les exigences essentielles établies pour l'Union Européenne selon les directives suivantes:

<b>2006/95/EC</b>	Directiva de baja tensión / Low Voltage / Basse tension
<b>2004/108/EC</b>	Directiva EMC / EMC Directive / Directive CEM
<b>2012/19/EU</b>	La Directiva de Residuos de Aparatos Eléctricos y Electrónicos (WEEE) / The Waste Electrical and Electronic Equipment Directive (WEEE) / Les déchets d'équipements électriques et électroniques (WEEE)
<b>2011/65/EU</b>	Restricción de ciertas Sustancias Peligrosas en aparatos eléctricos y electrónicos (ROHS) / Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (ROHS) / Restriction de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques (ROHS)
<b>2006/42/EC</b>	Directiva mecánica / Machinery directive / Directive mécanique

Para su evaluación se han aplicado las normas armonizadas siguientes:  
 For its evaluation, the following harmonized standards were applied:  
 Pour son évaluation, nous avons appliqué les normes harmonisées suivantes:

Seguridad / Safety / Sécurité:	<b>EN61010-1:2011</b>
EMC:	<b>EN61326-1:2012 Class B</b>
Safety of machinery:	<b>EN ISO 12100:2010</b>

En consecuencia, este producto puede incorporar el marcado CE y FCC:  
 Consequently, this product can incorporate the CE marking and FCC:  
 En conséquence, ce produit peut incorporer le marquage CE et FCC:



En representación del fabricante:  
 Manufacturer's representative:  
 En représentation du fabricant: **Carme Canalís**  
**General Manager**  
**Panlab s.l.u., a division of Harvard BioScience**

Cornellà de Llobregat, Spain  
 21/10/2014

**(GB) Note on environmental protection:**



After the implementation of the European Directive 2002/96/EU in the national legal system, the following applies:

Electrical and electronic devices may not be disposed of with domestic waste. Consumers are obliged by law to return electrical and electronic devices at the end of their service lives to the public collecting points set up for this purpose or point of sale. Details to this are defined by the national law of the respective country. This symbol on the product, the instruction manual or the package indicates that a product is subject to these regulations. By recycling, reusing the materials or other forms of utilising old devices, you are making an important contribution to protecting our environment.

**(E) Nota sobre la protección medioambiental:**



Después de la puesta en marcha de la directiva Europea 2002/96/EU en el sistema legislativo nacional, Se aplicara lo siguiente:

Los aparatos eléctricos y electrónicos, así como pilas y baterías, no se deben tirar a la basura doméstica. El usuario está legalmente obligado a llevar los aparatos eléctricos y electrónicos, así como pilas y baterías, al final de su vida útil a los puntos de recogida municipales o devolverlos al lugar donde los adquirió. Los detalles quedaran definidos por la ley de cada país. El símbolo en el producto, en las instrucciones de uso o en el embalaje hace referencia a ello. Gracias al reciclaje, a la reutilización de materiales i a otras formas de reciclaje de aparatos usados, usted contribuirá de forma importante a la protección de nuestro medio ambiente.

**(F) Remarques concernant la protection de l'environnement :**



Conformément à la directive européenne 2002/96/CE, et afin d'atteindre un certain nombre d'objectifs en matière de protection de l'environnement, les règles suivantes doivent être appliquées.

Elles concernent les déchets d'équipement électriques et électroniques. Le pictogramme "picto" présent sur le produit, son manuel d'utilisation ou son emballage indique que le produit est soumis à cette réglementation. Le consommateur doit retourner le produit usager aux points de collecte prévus à cet effet. Il peut aussi le remettre à un revendeur. En permettant enfin le recyclage des produits, le consommateur contribuera à la protection de notre environnement. C'est un acte écologique.

**(D) Hinweis zum Umweltschutz:**



Ab dem Zeitpunkt der Umsetzung der europäischen Richtlinie 2002/96/EU in nationales Recht gilt folgendes:

Elektrische und elektronische Geräte dürfen nicht mit dem Hausmüll entsorgt werden. Der Verbraucher ist gesetzlich verpflichtet, elektrische und elektronische Geräte am Ende ihrer Lebensdauer an den dafür eingerichteten, öffentlichen Sammelstellen oder an die Verkaufsstelle zurückzugeben. Einzelheiten dazu regelt das jeweilige Landesrecht. Das Symbol auf dem Produkt, der Gebrauchsanleitung oder der Verpackung weist auf diese Bestimmungen hin. Mit der Wiederverwertung, der stofflichen Verwertung oder anderer Formen der Verwertung von Altgeräten leisten Sie einen wichtigen Beitrag zum Schutz unserer Umwelt.

**(I) Informazioni per protezione ambientale:**



Dopo l'implementazione della Direttiva Europea 2002/96/EU nel sistema legale nazionale, ci sono le seguenti applicazioni:

I dispositivi elettrici ed elettronici non devono essere considerati rifiuti domestici. I consumatori sono obbligati dalla legge a restituire i dispositivi elettrici ed elettronici alla fine della loro vita utile ai punti di raccolta collerici preposti per questo scopo o nei punti vendita. Dettagli di quanto riportato sono definiti dalle leggi nazionali di ogni stato. Questo simbolo sul prodotto, sul manuale d'istruzioni o sull'imballo indicano che questo prodotto è soggetto a queste regole. Dal riciclo, e re-utilizzo del material o altre forme di utilizzo di dispositivi obsoleti, voi renderete un importante contributo alla protezione dell'ambiente.

**(P) Nota em Protecção Ambiental:**



Após a implementação da directiva comunitária 2002/96/EU no sistema legal nacional, o seguinte aplica-se:

Todos os aparelhos eléctricos e electrónicos não podem ser despejados juntamente com o lixo doméstico. Consumidores estão obrigados por lei a colocar os aparelhos eléctricos e electrónicos sem uso em locais públicos específicos para este efeito ou no ponto de venda. Os detalhes para este processo são definidos por lei pelos respectivos países. Este símbolo no produto, o manual de instruções ou a embalagem indicam que o produto está sujeito a estes regulamentos. Reciclando, reutilizando os materiais dos seus velhos aparelhos, esta a fazer uma enorme contribuição para a protecção do ambiente.