Plethysmometer

User Guide

SKU 37240 - Rev. 1.0 - Nov. 2023

ugobasile.com

ugo basile®

YOUR COMPANION IN DISCOVERY SINCE **1963**

SAFETY CONSIDERATIONS

Although this instrument has been designed with international safety standards, it contains information, cautions and warnings which must be followed to ensure safe operation and to retain the instrument in safe conditions.

Service and adjustments should be carried out by qualified personnel, authorized by Ugo Basile organization.

Any adjustment, maintenance and repair of the powered instrument should be avoided as much as possible and, when inevitable, should be carried out by a skilled person who is aware of the hazard involved.

Capacitors inside the instrument may still be charged even if the instrument has been disconnected from its source of supply.

CE CONFORMITY STATEMENT

Manufacturer	**UGO BASILE srl società unipersonale**
Address	Via G. di Vittorio, 2 – 21036 Gemonio, VA, ITALY
Phone n.	+39 0332 744574
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We hereby declare that

Instrument.	**PLETHYSMOMETER**
Catalog number	**37240, 37240-25 and 37240-35**

is manufactured in compliance with the following European Union Directives and relevant harmonized standards

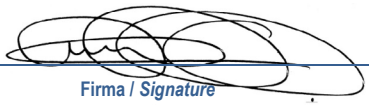
- ***2014/35/UE relating to electrical equipment designed for use*** **within certain voltage limits**
- ***2014/30/UE relating to electromagnetic compatibility***
- ***2011/65/UE and 2015/863/UE on the restriction of the use of certain hazardous substances in electrical and electronic equipment***

Account *Manager* **Mauro Uboldi**

Nome / *Name*

November 2023

Date



Firma / *Signature*

Table of Contents

1. Product features and general information

This original device by Ugo Basile was designed to measure paw volume changes (swelling) in rodents.

With almost 4,000 peer-reviewed citations, Ugo Basile Plethysmometer is the gold standard for paw swelling tests.

Main features include:

Touch screen display, friendly interface, USB data retrieval and experiment data loading capabilities, LAN connection, auto-measure function and Ugo Basile family feeling design.

Displays the exact paw volume on the touch screen display, read-out with resolution of 0.01ml. Small differences are detected by an high precision self-made level transducer.

Foot pedal that allows hands-free operation, to save measured value and to enable auto-measure function.

Easy zeroing before making new measurements.

Measuring paw tubes available in different sizes for different animals paws.

Web-based LAN connection for data retrieving and experiment data loading (password protected).

USB pen drive for data retrieving and experiment data loading.

2. What's in the box

Plethysmometer standard kit -SKU: 37240		
SKU	**Q.ty**	**Description**
37240-001	1	Plethysmometer electronic unit
37240-210	1	Plethysmometer cell stand
37252	1	Standard water cell with Mouse paw tube (diam.13 mm) and Rat paw tube (diam. 18 mm) with water level transducer
37240-154	1	Water tank
7155	1	Set of 6 calibration probes (0.1, 0.2, 0.5, 1, 2, 4 ml)
7160	1	Wetting Compound, 100 ml bottle
M-TF 050-F	1	2 mt. of Polyurethane tube for connection: cell to water tank & cell to drain
E-AU 101	1	USB Pen Drive including instruction manual (with CE certification) and X-Pad software
37215-303	1	Pedal Switch

Plethysmometer kit with 25mm Rat paw tube cell -SKU: 37240-25		
SKU	**Q.ty**	**Description**
37240-001	1	Plethysmometer electronic unit
37240-210	1	Plethysmometer cell stand
37257	1	Special water cell with Rat paw tube (diam. 25 mm) with water level transducer
37240-154	1	Water tank
7155	1	Set of 6 calibration probes (0.1, 0.2, 0.5, 1, 2, 4 ml)
7160	1	Wetting Compound, 100 ml bottle
M-TF 050-F	1	2 mt. of Polyurethane tube for connection: cell to water tank & cell to drain
E-AU 101	1	USB Pen Drive including instruction manual (with CE certification) and X-Pad software
37215-303	1	Pedal Switch

Plethysmometer kit with 35mm Rat paw tube cell -SKU: 37240-35		
SKU	Q.ty	Description
37240-001	1	Plethysmometer electronic unit
37240-210	1	Plethysmometer cell stand
37259	1	Special water cell with Rat paw tube (diam. 35 mm) with water level transducer
37240-154	1	Water tank
7155	1	Set of 6 calibration probes (0.1, 0.2, 0.5, 1, 2, 4 ml)
7160	1	Wetting Compound, 100 ml bottle
M-TF 050-F	1	2 mt. of Polyurethane tube for connection: cell to water tank & cell to drain
E-AU 101	1	USB Pen Drive including instruction manual (with CE certification) and X-Pad software
37215-303	1	Pedal Switch

Optional items ordering information	
SKU	Description
37252	Standard water cell with Mouse paw tube (diam. 13 mm) and Rat paw tube (diam. 18 mm) **with water level transducer**
37252-S	Standard water cell with Mouse paw tube (diam. 13 mm) and Rat paw tube (diam. 18 mm) **without water level transducer**
37257	Special water cell with Rat paw tube (diam. 25 mm) **with water level transducer**
37257-S	Special water cell with Rat paw tube (diam. 25 mm) **without water level transducer**
37259	Special water cell with Rat paw tube (diam. 35 mm) **with water level transducer**
37259-S	Special water cell with Rat paw tube (diam. 35 mm) **without water level transducer**

Available spare parts	
SKU	**Description**
7182	18 mm tube for the rat paw
7186	13 mm tube for the rat paw
7187	25 mm tube for the rat paw
7189	35 mm tube for the rat paw
7153-L	Water level transducer
E-BT 008	Battery type CR2032
E-FT010-1	2 X fuse T1.25A - 6X32 mm

Consumables	
SKU	**Description**
7160	Wetting Compound, 100 ml bottle

LAN connection default password is:

UgoBasile (CASE SENSITIVE)

3. General

In research on rheumatoid arthritis, central development of oedema and its modifications by pharmacological processes, the measurement of the inflammatory processes in the paws of mice and rats has proven to be of great value.

The Ugo Basile Plethysmometer is a volume meter, designed for accurate measurements of the rodent paw swelling.

It consists of a liquid-filled cell into which the rodent paw is dipped. A transducer of original design, which measures small differences in liquid level caused by volume displacement, is connected to an electronic unit used to show, save and recall the values.

3.1. Principle of operation

The measuring cell consists of two vertical interconnected Perspex tubes, the larger of which is used to measure displacement. The water level in the smaller tube, which contains the transducer, follows that of the large one and is therefore proportional to the volume dipped in the large tube.

We have developed an original transducer which measures the conductance between two vertical wire electrodes.

4. Intrument description

4.1. The Electronic Unit 37240-001

The Plethysmometer Electronic Unit is a microprocessor-controlled unit with touch screen and user-friendly graphical interface which has the capability to store a great number of measurements; load and recall experiments and can communicate to a PC through a LAN connection via web browser or via the provided USB stick. (FAT formatted).

The experimental data are shown on the multifunction graphic display, in four digits, with 0.01 ml resolution.

4.2. The water cell

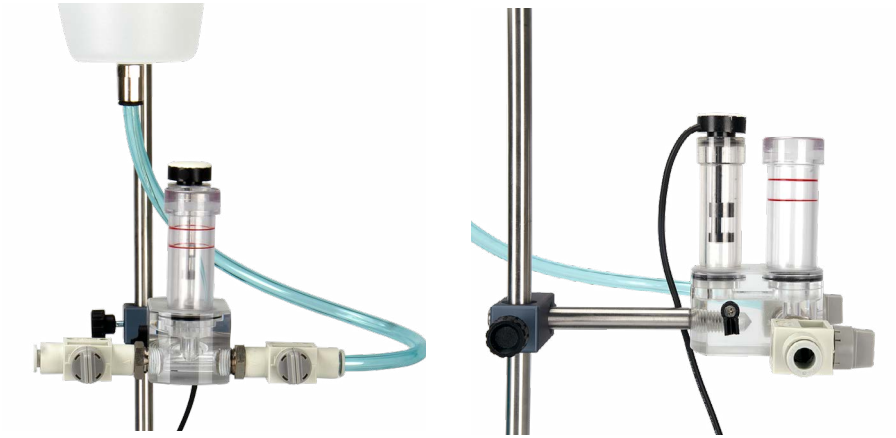
The standard kit SKU: 37240 includes a standard water cell for Rat, diam. 18 mm, provided with an extra paw tube diam. 13 mm for measuring the mouse paw volume.

The Plethysmometer can be ordered with a different water cell configurations:

- SKU: 37240-25, including a 25mm diam. Water Cell
- SKU: 37240-35, including a 35mm diam. Water Cell

37240-25 & 37240-35 kit, includes all the Plethysmometer standard accessories and only differs from the standard kit for the water cell capacity.

Other water cells are available as a separate part, see ugobasile.com web site for more informations.



Water Cell with transducer, Frontal and lateral view

5. Installation

5.1. Unpacking & preliminary check

Check the contents of the shipment for completeness, check list to hand, and visually inspect the instrument as soon you take it out the packaging.

If the instrument is damaged, immediately inform the shipping agent or carrier and notifying us by email at support@ugobasile.com.

Inspect the instrument for damages such as scratches, broken or loose parts. If after having tested it, the instrument fails to meet rated performances, contact our company immediately via email service@ugobasile.com.

Notes on the User Guide

This User Guide can be found on the provided USB Key.
We recommend thoroughly to read this manual, as it contains essential informations for the correct installation and operation of the instrument.

Please save the manual in a safe place, ready to be consulted by qualified personnel who use the instrument. Print it only if necessary.

Our User Guide are available as free download on our web site. For any additional information and/or assistance, you are welcome to contact our Service Department service@ugobasile.com, specifying the serial number of the instrument.

5.2. Before Applying Power

The Power Module (see figure below) is positioned on the left of the back panel and incorporates, from left to right, the fuse holder, the ON/OFF switch, the power inlet connection.

Power Module

The fuse compartment holds two protection fuses.
Use (T1.25A) timed fuses for operation at both 115 or 230V, for fuse replacement.
The power cord inlet fits a standard C13 socket, Cat. # E-WP008.
Make sure your power outlet is provided with a reliable ground connection.

This device is provided by an universal input power system which accept 85-264 VAC, 50-60Hz and absorb a maximum of 15 Watt.

5.3. Intended Use

The Plethysmometer is intended for
Investigation use on laboratory animal only.
DO NOT USE ON HUMANS.

5.4. Additional Safety Consideration

1. Use original accessories and spare parts only.
2. Immediately disconnect and replace damaged main cord.
3. Do not obstruct access to the power module.
4. Do not operate in hazardous environment or outside prescribed environmental limitation.
5. Do not spray any liquid on the connectors, display, or on the electronic unit.

Ugo Basile cannot in any way and form be held responsible for damage caused to things and people and warranty will be void, due to:

- Incorrect electrical supply.
- Incorrect installation procedure.
- Incorrect or improper use or, in any case, not in accordance with the purpose for which the instrument has been designed and the warnings stated in the instruction manual supplied with the instrument.
- Replacement of original component, accessories or parts with others not made by Ugo Basile.
- Servicing carried out by unauthorized personnel.

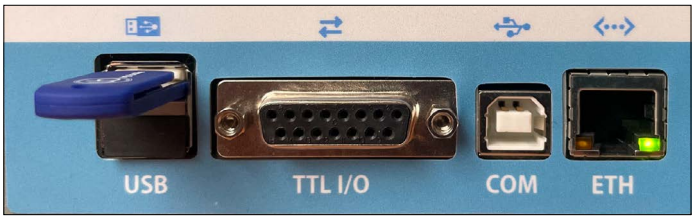
5.5. Connections

Connect the transducer cable connector to the electronic unit at the *sensor* connector, connect the pedal foot switch at the *pedal* connector.
Connect the mains cord between the power socket of the Plethysmometer and the power outlet with a reliable earth connection, then turn ON the device.

Rear view of the Plethysmometer control unit

The connection module on the front panel (Figure “Connection Panel”) encompasses the following connectors, from left to right:

- Upper and lower USB ports: enable data export to a PC (via a USB pen drive), and allow for firmware upgrades. Moreover, experiment data created with the X-Pad software (see specific manual for details) can be uploaded into the device by using a USB pen. (see paragraph 4.2). DO NOT PLUG 2 DEVICES AT THE SAME TIME. The lower USB port is not available, please DO NOT REMOVE THE CAP.
- TTL I/O: 15pins D-SUB connector, provides TTL input and output for start/stop command.
- COM: for maintenance and service purpose.
- Ethernet connector can be used for loading experiment data coming from a X-PAD software file, or to retrieve experiment result data from the device to a PC via web browser.



Connection Panel

6. Operation

6.1. Setting-Up the Plethysmometer

Place the Electronic Unit and the Stand on a stable and reasonably flat bench/ table (stand, clamp and reservoir may differ from what featured in the picture).

Fasten the water cell to the laboratory stand by means of the enclosed clamp.

Insert the water tank on the same stand, and fix it by the black plastic screw.

The cell is fitted with two valves, one for cell loading and one for cell unloading. Use the 8mm polyurethane tube to connect the water tank to the loading tap and another piece of polyurethane tube from the unloading tap to a sink.

Keep both valves wings **vertical (SHUT)** and fill the reservoir with a solution prepared in a separate vessel, (see paragraph "6.1.1. Preparing the Dipping Solution").

Combine a gentle push and rotation of the transducer head to make sure it is properly fitted to the smaller tube.

Fill the cell by opening the loading valve by turning its wing horizontally. Keep the unloading tap closed while filling.

Close the loading valve to stop the flow and open the unloading valve to drain; fill and drain a couple of times to practice and to purge the system from air bubbles. Adjust the liquid level in the marked range, close to the lower red line.

6.1.1. Preparing the dipping solution

While the Plethysmometer can work with a simple tap water solution, to ensure correct measurement we strongly recommend to prepare and use 1 litre of a dipping solution as follow:

Add to a 1 litre of distilled water the following components:

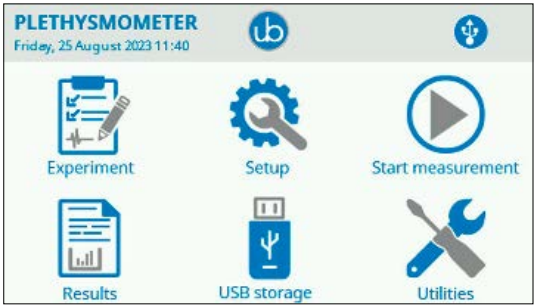
- 3 ml of wetting compound (provided with standard package) which minimizes drop and meniscus build-up, leading to more accurate measures.
- 0.8-0.9 g of NaCl (salt). Conductivity attained by this concentration provides optimum transducer performances.

Mix the solution.

The solution must always be fresh.

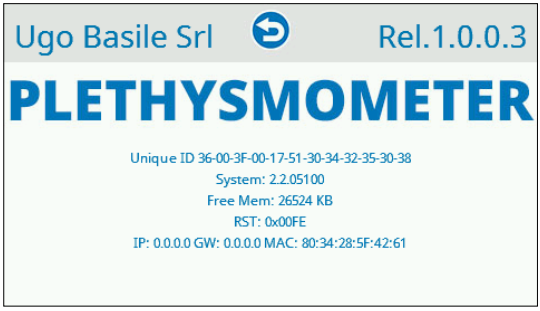
6.1.2. Main Menu

Getting familiar with the Plethysmometer home screen is very easy (see figure "Main Menu").



Main Menu

From the home page, press the **"Ugo Basile logo" button** on the top bar for software and memory information. Press the back button to roll back into "Main Menu" page.



Software and Memory information Screen

6.1.3. Utilities Menu

The **Utilities menu** is accessible from the Main Menu, giving access to:

- Update, for the internal software (firmware) updates.
- Calibration, for instrument output characteristic calculation (See paragraph "6.2. Calibration").
- Erase DB, to delete the internal database (all data will be lost).
- Date-time, to control the internal clock.
- Factory Reset, to restore the device as it was at the factory. **WARNING**: all data will be lost.

Utilities Menu

The **Update Menu** requires to insert the USB pen drive and is necessary to update the device firmware.

Ugo Basile is continuously improving the devices with new features and bug corrections, so an update for your instrument may be available.

To evaluate if an update is available send us an email message to service@ugobasile.com indicating your actual firmware revision and the serial number of your device asking for an update.

In order check out your actual device firmware revision press the Ugo Basile logo icon at the home page windows and note the revision number at the right top of the screen (e.g. REL 1.0.0.3).

If an update is available we will send you the update file answering your email request; download the email attached update file to be copied into the provided USB stick.

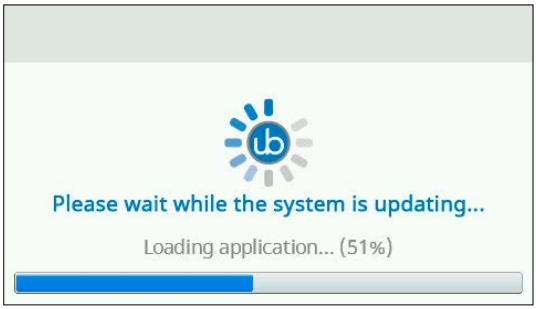
If the provided USB stick is lost you can use another general purpose USB stick with a minimum capacity of 4 or 8 gb which needs to be FAT32 formatted.

Copy the update file we sent you into the USB stick you choose then remove it from your PC and plug it into the USB port of the device (one of the two port is the same, but never use booth port at the same time).

Press the Update button in the Utilities menu and follow the indication on screen.

NEVER SWITCH THE DEVICE OFF DURING UPDATE PROCEDURE

When the update procedure ends the device will automatically reboot.



Updating Screen

The **Date-Time Menu** allows you to adjust the date and time of the device, as shown in the below picture.

Date and time setting are essential for experiment result data correct population, please set the correct date and time of Your location.

Date-Time Menu

ERASE DB function:

The device memory can be fully erased, by tapping onto the **Erase DB Icon**, this can be useful for support needs and for freeing the internal device memory.

While internal memory device is not unlimited we advice you to perform this function after You saved Your experimental data on your PC at the end of a experiment session.

WARNING: all the Experiment and result data will be lost, with no way to recover them.
Be sure to export Your experimental data before performing Erase DB function.

Factory reset function:

This function is the unique way to reset the LAN connection password.
If the LAN connection password is lost, you can reset the password to the factory default (which is UgoBasile) with this button.
For data security reason when the password is reset also the experiment data are deleted. Please make a backup of your data before resetting the LAN connection password.

Calibration button is explained in the chapter 6.2

6.1.4. Device setup menu

The **Setup Icon**, accessible from the Main Menu, gives access to:

- Network, for device LAN connection setup.
- Auto-reading, to set-up the automatic measurement saving functions. See par. 6.3.2 for details.

Device Set-Up Menu

Network: The Plethysmometer can be connected to a PC via Ethernet cable which uses IP protocol to communicate, this menu page is for setting up the network parameter to use a web browser from a PC/mobile device to load experiment data to the device and retrieve result data from the device.
You may want to connect the Plethysmometer directly to Your PC or to the Lab LAN (Local Area Network).

Refer to your IT technician for this set-up.

IP assignment: use auto (DHCP) (Dynamic Host Configuration Protocol) to let the device IP address being automatically assigned.

When connecting the device to a facility LAN, make sure with IT department a DHCP server exist and it is enabled.

When connecting the device directly to the PC through the Ethernet cable, make sure PC Ethernet (LAN) card is set to use DHCP (Automatic IP assignment).
An Ethernet cross cable may be necessary in case of old hardware PCs.

If you need to manually assign the device IP address, select Manual and use the following instruction to set an IP address.

IP Address: in DHCP mode shows the assigned IP Address, in Manual mode, pressing the number makes possible to insert the desired IP address.

This number needs to be defined by your IT department, an arbitrary value can damage the functionality of other LAN connected devices.

Subnet mask: this number, having the same syntax of the IP address, it will

be automatically populated when in DHCP mode; in manual mode need to be manually populate and the range for the group number need to be 0 or 255. Usual value is 255.255.255.0.

This number needs to be defined by your IT department, an arbitrary value can damage the functionality of other LAN connected devices.

Gateway: this data is not actually in use since the device does not access the Internet. Leave it 0.0.0.0

Primary DNS: in DHCP mode this data is automatically populated but it is not needed since the device does not access the Internet.
Leave it 0.0.0.0

Secondary DNS: in DHCP mode this data is automatically populated but it is not needed since the device does not access the Internet
Leave it 0.0.0.0

Again we recommend You to refer to Your IT department to set-up this values.

6.2. Calibration

Calibration is essential for precise measurements.
Calibration is necessary in the following cases:

Every time the device is powered on.

- If the instrument has been not used for a long time.
- After having changed the dipping solution.
- After replacing the cell.
- After replacing the transducer.

Each kit is complete with a 7155 calibration volume set, including the following calibration volumes:

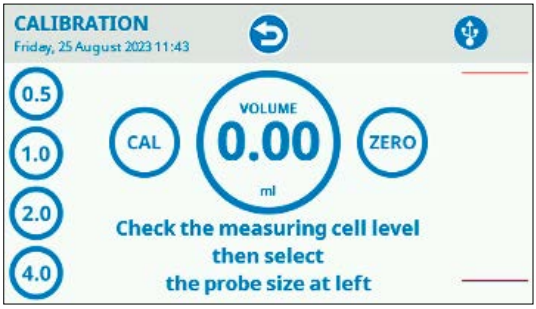
- 0.1 ml (yellow) (for reference only)
- 0.2 ml (orange) (for reference only)
- 0.5 ml (pink)
- 1 ml (grey)
- 2 ml (blue)
- 4 ml (green)

Calibration is a linearisation of the relationship between the transducer measure and the actual volume displacement around the chosen reference volume.

You MUST calibrate the instrument having in mind the estimated value of interest (i.e., calibrate with 1ml, using the gray volume, if the paw volume displacement will be around 1ml).

6.2.1. How to calibrate

From the main menu press the **Utilities Icon**. By pressing the **Calibration button**, the corresponding menu is shown.



Calibration Menu

The calibration procedure goes through the following steps:

1. Select the calibration volume from the list on the left you decide to use (similar to the paw volume you wish to measure).
2. Wait for the instrument to zeroing . Do not touch the water cell.
3. Dip the desired calibration value into the cell and leave it to the cell bottom.
4. Press the CAL button and wait for successful calibration.

In case of no volume dipped an error message appears and the user can go through the procedure again.

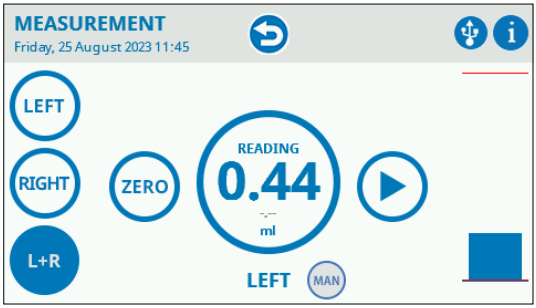
Notes:

- Before making a second calibration, do not forget to zero the instrument first and to dry the calibration volume with a cloth. Despite the wetting agent use, while taking the calibration volomes out the cell you will also takes out some water drops. If not dried, the second measure will show the volume of this calibration volumes plus the volume of these drops.
- Also space the calibration by at least 10 second intervals, either when calibrating or evaluating the oedema. This will let the liquid film formed on the tube wall by the liquid column oscillations, to settle down and will give time to the electrodes/solution interface to recover into steady conditions.
- Before each working session, it is advisable to check the calibration: simply zero the display and dip the calibration volume you used for the calibration into the cell, then read the value shown by the instrument.
  If readed value is +- 0.5ml of the target value calibration is still valid; if out og this range You need to re-calibrate the device.
- Never use a solution older than 2-3 days.

6.3. Measurement

Once calibrated, the Plethysmometer is ready to carry out accurate measurements.

From the Main Menu press the "**Start Measurement**" button and the following menu will show:



Measurement Menu

6.3.1. Manual measurement

The manual measurement mode is shown in the "**MAN**" icon on the right of the selected paw, highlighted in grey.

Press the **"ZERO" button** on the screen and then dip the animal paw into the cell, paying attention to the position of the paw in the cell.

Dipping the paw at different levels for repeated measurement may result in different readings.

We advise You to mark with a soft marker the animal paw to have a reference in order dipping the animal paw at the same level during repeated readings.

There are two modes to save the measured value:

- Press the pedal switch and the value is automatically stored in the internal memory of the device.
- Press the **"Play" button** on the screen.

6.3.2. Automatic measurement

To make the measurement easier and let the operator concentrate on dipping the paw in a most precise way, there is a semi-automatic measurement function that needs to be setup.

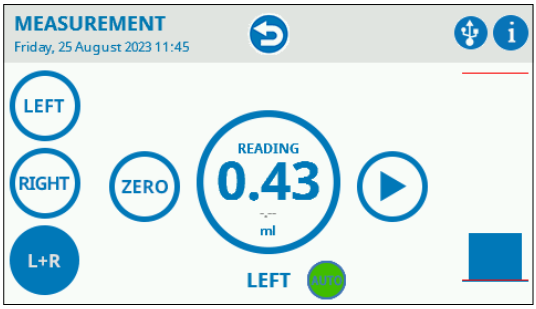
From the Main Menu select the "**Device Setup**" then press the **"Auto Reading" button**. The following menu is shown:

Automatic Measurement Menu

Enable the automatic measurement by pressing the **"Auto Reading" button**. The button turn to "YES". The following parameters are described in details:

- MAXIMUM FLUCTUATION: it is the measuring delta within which a certain value is considered valid during the acquisition phase. Insert the desired value then press OK.
- STABILIZATION TIME: it is the time that must pass before saving the measured value when maximum fluctuation and minimum volume parameters are met. Insert the proper value then press OK.
- MINIMUM VOLUME: it's the minimum volume displacement that triggers a valid measuring value. Insert the proper value and press OK.

When enabled, the measurement menu will show as follows:



Measurement Menu

The **"AUTO" icon** will show as orange, meaning that the device is ready to measure. Press the **"ZERO" button** on the screen.

To enable the measuring phase, press the PLAY button or press the switch pedal. The **"AUTO" icon** will turn green.

Dip the animal paw into the cell, paying attention to the position of the paw in the cell.

When the MINIMUM VOLUME and MAXIMUM FLUCTUATION are met, after the STABILIZATION TIME the measure is automatically stored in the memory.

6.4. Restoring Liquid Level

The water tank has been provided for easing the task of liquid level restoring, which may be necessary after having processed 20-30 animals.

Consider that each paw takes away some drops of liquid when withdrawn from the cell.

It is also recommended to empty and clean and refill the cell in case of droppings from the animal.

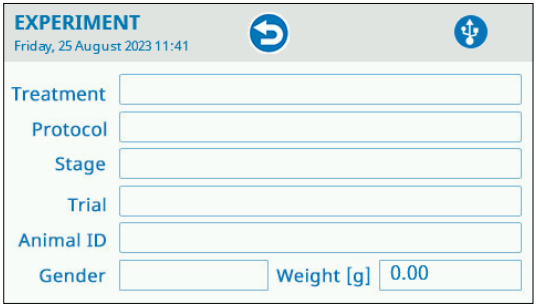
6.5. Results

6.5.1. Results and Experiment menus

The Plethysmometer will save measurement values (volume [ml], calibration value [mV/ml] and zero value [mV]), in addition to the descriptive data, if they have been input in the Experiment field (Treatment, Protocol, ID, Stage, Trial).

See image below.

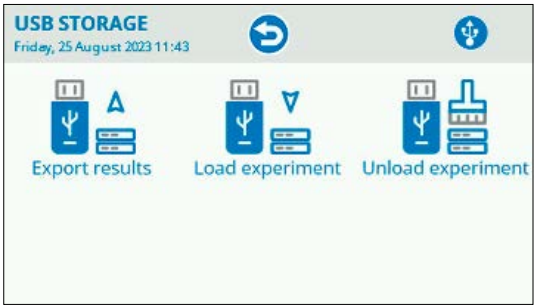
Result Menu



Experiment screen, where the descriptive data shown in the Results screen are input

6.5.2. USB results export

Once data have been saved into the Plethysmometer internal memory, they can be transferred into a USB pen drive by simply plugging it into the upper USB port and tapping USB STORAGE followed by Export results.



The USB Storage Window

Important: data can be saved into the provided USB pen or into any other USB pen. However, if a non-Ugo Basile USB pen drive is used, make sure it is formatted as FAT32 and equal or smaller than 16GB.

Data will be automatically saved as .CSV files, which can be opened in Microsoft Excel®, with comma separated format.

6.5.3. Ethernet (LAN) data load and retrieve

Using the provided Ethernet cable, it is possible to load experiment data to the Plethysmometer as well as sending the experimental data results directly to a PC, without the need to use the USB drive as a transfer data unit. This feature can be useful for example when lab rules does not permit the use of a USB pen-drive for security reasons.

Requirements:

To use this feature, it must be ensured that:

- The device must be plugged from the front RJ45 connector to any LAN socket or directly to the LAN computer connector (automatic cross connection);
- A Windows PC or Mac computer with a running web browser.
- The Network set-up into the device is correctly set.

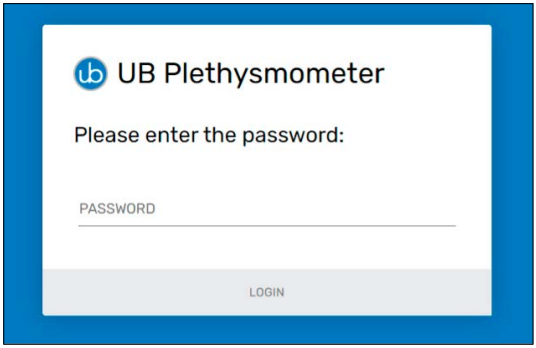
Note: If the Plethysmometer is plugged into laboratory LAN and the facility provides a WiFi connection at the same LAN, the user can also use a mobile device such a tablet or smart phone to browse Plethysmometer data.

How to connect the PC to the Plethysmometer device.

Open a web browser on the PC, prompt the Plethysmometer device IP address and press ENTER (IP address can be seen on the device screen pressing the UB logo on the top of the main page, which takes to the info page, find the number after the text IP: on the screen and take note of it: e.g. 10.0.2.163).

Note: if you find this number with all zero values, review the network configuration of the Plethysmometer.

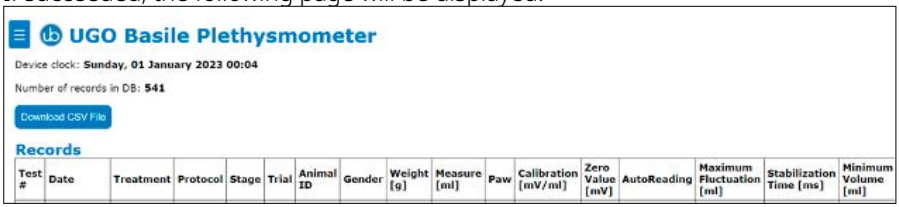
The login page should appear:



Login Page

Default password is **UgoBasile (CASE SENSITIVE)**. Prompt the default password and press LOGIN.

If succeeded, the following page will be displayed:



Result Page

- As a first operation please set a new password, using the icon at the top left corner and select the “Change Password” menu item.
- Fill the “Current password” field with the default password then fill the next field “New Password” and confirm it filling the “Repeat new password” field.
  Note that Password length must be between 8 and 15 characters and should contain at least a lower-case letter, an upper-case letter, a digit and a symbol.
- Press Change Password: you should see for 3 seconds a page confirming the password has been changed.

If password has been lost and there is no way to find it:

On the Plethysmometer main page, go to the Utility button and press **Factory Reset**, this operation will erase all the Plethysmometer data including the experiment result data.

WARNING ALL PLETHYSMOMETER DATA WILL BE LOST

Provide a USB data export from the USB storage menu (Export result) before

executing this Factory Reset function. Plethysmometer is now having the default password and a new password can be now set as previously described.

Loading X-Pad Experiment data from a PC web browser:

It is possible to populate the Experiment data of the Plethysmometer via a Windows PC, using the provided Ugo Basile **X-Pad** Windows application which is included into the Plethysmometer provided USB pen-drive.

Please refer to the instruction manual for installing and using of X-Pad application software.

Once You have the Experiment file on the PC, open a Web browser and connect to the Plethysmometer device, then log-in.

From the menu go to “Experiment” and press “Choose File” (this text is depending the operative system language), point to the X-PAD file and press “Send to device” button.

Experiment data are now available into the Plethysmometer and cannot be modified. They can be delated from the USB Storage menu with the button unload Experiment.

Retrieve Experiment result data from the Plethysmometer to a PC web browser:

When the experiment is completed, the user can export all the experiment result data from the Plethysmometer to a PC using the Web browser communication.

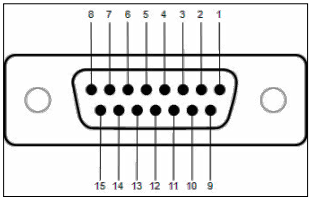
Log in into the Plethysmometer and go to the Result page from the menu.

Press the button “Download CSV File” and the .csv (comma separated value) file will be saved into the chosen directory for further use.

6.6. TTL Connections

The Plethysmometer is provided with a D-sub (DA-15 Female) TTL I/O port. This port could be used to synchronize some events with external instruments or acquisition systems. TTL Output signals are electrical isolated to guarantee galvanic isolation between the device and any other external device.

TTL signals are refereed to Power Ground (pin 14 and pin 15).



D-sub connector pins

DB-15 Pin#	Signal Name	Signal Type	Description
1	Reserved	TTL OUT	Reserved
2	Reserved	TTL OUT	Reserved
3	Reserved	TTL OUT	Reserved
4	Reserved	TTL OUT	Reserved
5	Reserved	TTL OUT	Reserved
6	Reserved	TTL OUT	Reserved
7	Reserved	TTL OUT	Reserved
8	Reserved	ANALOG OUT	Reserved
9	Save measurement	TTL IN	Save measurement -> TTL High level
10	Reserved	TTL IN	Reserved
11	Reserved	TTL IN	Reserved
12	Reserved	TTL OUT	Reserved
13	Reserved	TTL OUT	Reserved
14	GND	POWER	Power Ground
15	GND	POWER	Power Ground

D-sub connector pin-out table

NOTE: TTL OUT is designed for connection with scientific instruments! DO NOT CONNECT ANY POWER DEVICE!

NOTE: DO NOT SINK a current more then 10mA from each TTL pin! DAMAGE WILL OCCURS.

7. Maintenance

While any service of the instrument ought to be carried out by Ugo Basile personnel or by qualified personnel authorized by UGO BASILE organization, this manual section describes normal maintenance procedures which can be carried out at your facility.

UNPLUG THE MAIN CORD BEFORE CARRYING OUT ANY MAINTENANCE JOB

7.1. Electrical

To inspect and/or replace the fuses, disconnect the mains cable first! Insert a miniature screwdriver in the slot indentation and snap out the slide which houses the fuses. Snap in the fuse slide: the mechanical "click" ensures that it is locked.

7.2. Cell

To clean the cell, remove the transducer first, by lifting its plastic head, after having freed the connection cable from its clamp.

Avoid the use of organic solvents as they are liable to damage the Perspex surface. Use tap water, a test tube brush and a soapy solution or a mild detergent.

The large and small tubes of all cell models are detachable. Close tolerances, dimensionally stable Perspex and a carefully designed O-ring seal provide mechanical stiffness and perfect water tightness without any clamping or fastening device.

To detach the tubes, in case replacement becomes necessary, exert pull and rotation as when uncorking a bottle.

To insert new tube/s, some drops of a soapy solution or silicone oil on the O-Ring may ease insertion.

7.3. Transducer

The **Water Level Transducer** (SKU 7153-L) provides years or trouble-free operation if not mechanically damaged by accidental knocks.

Handle it with care and never poke with the nail or some improvised "tool" (pencil, lab. spatula, etc.) to "feel" the wires, this may just lead to spoil their parallelism which is pivotal for the linearity of the instrument.

Grease spots caused by finger contact when handling the transducer and/or traces of organic wastes dropped by paws and diffused through the water in the long run may form a film over the wires, which may decrease the transducer efficiency.

To clean the transducer, keep its plastic head between forefinger and thumb and shake it in a Becker vessel, filled with alcohol. Keep the transducer head and cable dry. To remove particles, use a small soft water-colour type brush. Make a final quick rinsing, using acetone and let the transducer dry in air before repositioning it in the cell.

7.4. Long Inactivity

The instrument does not require any particular maintenance after long inactivity, except cleaning.

7.5. Customer Support

For any further information you may desire concerning the use and/or maintenance of the Plethysmometer, please do not hesitate to contact our service department (or our local distributor) either directly or via our support web form.

Customer Support Contacts

Phone: +39 0332 744574
E-mail: service@ugobasile.com
Web form: https://ugobasile.com/support/support-request

Before sending the instrument to our factory for repair, please contact our logistics department to obtain a return authorization number (RMA) and shipping/packing instructions. We may not be held responsible for damages during transport due to poor packing; whenever possible, please use the original packing.

8. Specification

Operation	
Power Requirement	Universal input 85-264 VAC, 50-60Hz, 15 W max
Display	4.3” multifunction color touch-screen display
Measured data Format	4 digits, 2 integers, 2 decimals (e.g.: 23.89 ml)
Instrument measure resolution	0.01 ml
Connection to PC	Fast Ethernet LAN connection
Physical	
Weight	3.5 kg
Shipping Weight	6.5 kg
Shipping Dimension	36x55x45 cm
Warranty	
Warranty	Plethysmometer is covered by a 12-month warranty + 12 after product registration

Optional Warranty	
37240-UBC12	UB Care 12 Additional hardware warranty extension 12 months for Plethysmometer (Valid for SKU 37240)
37240-UBC24	UB Care 24 Additional hardware warranty extension 24 months for Plethysmometer (Valid for SKU 37240)
37240-25-UBC12	UB Care 12 Additional hardware warranty extension 12 months for Plethysmometer (Valid for SKU 37240-25)
37240-25-UBC24	UB Care 24 Additional hardware warranty extension 24 months for Plethysmometer (Valid for SKU 37240-25)
37240-35-UBC12	UB Care 12 Additional hardware warranty extension 12 months for Plethysmometer (Valid for SKU 37240-35)
37240-35-UBC24	UB Care 24 Additional hardware warranty extension 24 months for Plethysmometer (Valid for SKU 37240-35)

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10. Related products

Estimates suggest that 20% of adults suffer from pain globally. Chronic pain is the most common cause of long-term disabilities.

Since 1963, Ugo Basile's devices have increasingly acquired a leading role in the field of pain and inflammation preclinical research, becoming precious tools for researchers to achieve their experimental objectives.

35550 - Thermal Gradient Ring (Zimmermann's method)

37550 - Dynamic Plantar Aesthesiometer - For Automated Mechanical Stimulation and Allodynia

38450 - Electronic Von Frey - e-VF Handheld

37450-275 - Von Frey Filaments manual touch sensitivity kit

37570 - Plantar Test for thermal stimulation - (Hargreaves Apparatus)

37560 - Tail Flick Unit - Thermal stimulation, D'Amour & Smith method

37300 - I.R. Heat-Flux Radiometer for Tail Flick and Plantar Test

37215 - Analgesy-Meter Randall-Selitto paw-pressure test

38500 - PAM Pressure Application Measurement (for joint pain)

31300 - Orofacial Stimulation Test (Fehrenbacher, Henry, Hargreaves method)

35300 - Hot/Cold Plate NG for screening of thermal hyperalgesia/ allodynia

35350 - Thermal Place Preference (TPP Test) for Mice & Rats

47885 - Librae Incapacitance Tester (Weight Bearing)

36103 - Climbing Test - Measures Vertical Activity in Rodents

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