

Instruction manual

Dynamic Plantar Aesthesiometer

Revision 1.4



Pain
Inflammation



SKU: 37550



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INTO INSTRUMENTS

SAFETY CONSIDERATIONS

Although this instrument has been designed with international safety standard, this manual 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. If inevitable, it 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.



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We hereby declare that

Instrument. **DYNAMIC PLANTAR AESTHESIOMETER**
Catalog number **37550**

***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

October 2020

Date


Firma / Signature

Product features and general information

The 37550 NEW Dynamic Plantar Aesthesiometer brings together tradition and innovation. The highly cited and world-wide recognized mechanical stimulation for allodynia and hypersensitivity studies is fully automated and carries a number of new features and benefits.

The experiment can now be performed in an even more efficient flexible and accurate way!

New features:

- Maximum force 100g (formerly, 50 g)
- User selectable automatic or manual detection of the animal response (paw withdrawal)
- Multiple paw approaching mode (adjustable touch force and pause)
- 4.3" Touch screen for all setting and results
- Embedded USB pen drive port for seamless data export and acquisition

Other features:

- TTL input and output signals for synchronization with other devices
- Firmware update via USB key
- Modular animal enclosures (6 rats, 12 mice)
- Full system including laser cut grid base



What's in the box

SKU: 37550

- 1 Control unit
- 1 Touch Stimulator
- 2 Umbrella probes
- 1 Allen key for the umbrella probe
- 5g, 50g, 100g calibration weights
- 1 Metal base with 4 columns
- 1 Framed perforated metal sheet
- 3 Sets of animal modular enclosures (up to 12 mice or 6 rats)
- 1 Power cord according to your country
- 1 USB pen drive containing:
 - This instruction manual
 - The quality control and warranty certificate

Optional items ordering informations:**SKU: 37450-278**

Additional Stimulation Base, complete with perforated metal sheet and animal enclosure

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1 General

The device has been designed to apply reproducible light touch (low forces) to the rodent paw plantar surface, while the animal is walking freely on a metal grid.

Loss of light touch detection or a dramatic increase of it (allodynia) are related to various diseases and malfunctioning of the peripheral and central nervous systems.

Knock-out, transgenic mice and other rodents, which have been given specific drugs, do respond differently to this type of stimuli and hence represent very useful animal models for basic and preclinical/applied research in many fields, from pain and analgesia, to somatosensitivity, diabetes, anesthesia, cancer and much more.

1.1 Principle of Operation

The rat/mouse is normally put in the apparatus for habituation several minutes (sometimes up to 1-2 hours) before the test starts (mice normally require longer habituation than rats) and the operator waits for the end of any sign of exploration or discomfort before starting the test itself.

At this point, using the tiltable mirror, the touch stimulator probe is positioned underneath the animal paw and the force is applied by pressing one of the 2 buttons on the stimulator or the "start" icon on the touch screen.

Notice that, with the Dynamic Plantar Aesthesiometer, not only the maximum force can be set (from 1 to 100g), but also the force application rate is adjustable, in order to modulate from a very soft to a very fast force delivery, depending on the experiment and neural fibres to be studied.

The reaction time of the animal (paw withdrawal latency time) and the force at which it occurred, is scored and automatically recorded.

2 Instrument Description

The Dynamic Plantar consists of a touch stimulator unit, embedding a needle stimulator and a pointing mirror.

The other instrument components are:

- The electronic unit with the 4.3" touch screen
- The metal base with laser-cut grid surface
- The modular animal enclosures (for up to 6 rats and 12 mice)

On the instrument front panel are located a touch screen display and several connection ports. On the back of the device are located the power socket, the power fuse and switch, the touch stimulator cable connector and the serial number label.

At the bottom of the unit is located a sticker with the factory force calibration data.



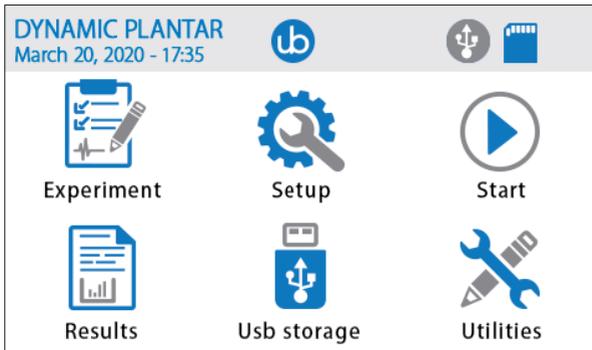
2.1 Animal Welfare

In any analgesia test, great care must be taken to prevent the animal from harm. When an investigator initially begins using the Dynamic Plantar, and when first assessing a new strain of animal, care must be taken to identify the appropriate amount of stimulus that will produce the desired response and no/minimum harm.

Although the forces that are applied through the Dynamic Plantar are small (1-100g), care must always be taken to prevent animal injury.

2.2 Touch-screen command/display

The Dynamic Plantar unit incorporates a 4.3" touch-screen display, for basic settings and result monitoring, via an intuitive menu on the touch screen.



Home menu

During the test (figure below), the touch-screen display shows the numeric values of the force being applied at that moment in time (7g over 1.8s, in the example figure below).

In the middle of the screen, the “MODE” and “START” icons allow easy switching between manual and automatic detection of the paw withdrawal and starting of the test. Alternatively, the test can be started by pressing one of the buttons on the touch stimulator and the animal response can be scored manually, by pressing again.

The “i” icon on the bottom left corner, gives access to the current test information, including; session, treatment, animal ID, etc...



Test page

2.3 Notes on Resistive Touch-Screens

The Ugo Basile Dynamic Plantar touch screen uses resistive technology and can be used with fingers, gloves or (recommended) a display pencil.

Resistive touch-screens (differently from commercial *capacitive* screens) are a better choice for laboratory applications because of:

- High resistance to dust and water
- Better use with gloved hand or stylus

3 Installation

3.1 Unpacking & preliminary check

Check the content of the shipment for completeness and visually inspect the instrument as soon as you take it out of the packaging.

If the box looks damaged, inform the carrier and provide a conditional signature (not a full signature).

Once unpacking, if the instrument is damaged, notify our company, by writing an email to support@ugobasile.com

If after a test, the instrument fails to meet the expected behaviour and performance, please contact our after sales service at sales@ugobasile.com.

Protect the environment: Dispose of packaging properly, according to existing and applicable waste management rules and regulation.

3.2 Notes on the Instruction Manual

This instruction manual included in the box (in the USB pen drive in PDF format) is necessary for a correct installation and operation of the instrument.

Please save the manual, keep it ready to be consulted by the qualified personnel using the instrument, and print it only if necessary.

Our Instruction Manuals are available as free download on our web site, www.ugobasile.com. For any additional information and/or assistance, you are welcome to contact our Service Department, first of all by specifying the serial number of your instrument (service@ugobasile.com)

3.3 Safety Instruction

The following guide lines must be followed to ensure safe operation.

- DO NOT attempt to open or perform any service work before having contacted Ugo Basile support team
- DO NOT use the device on human subjects

3.4 Assembling the instrument

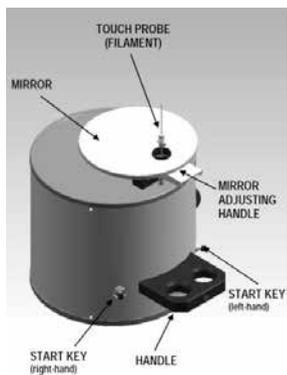
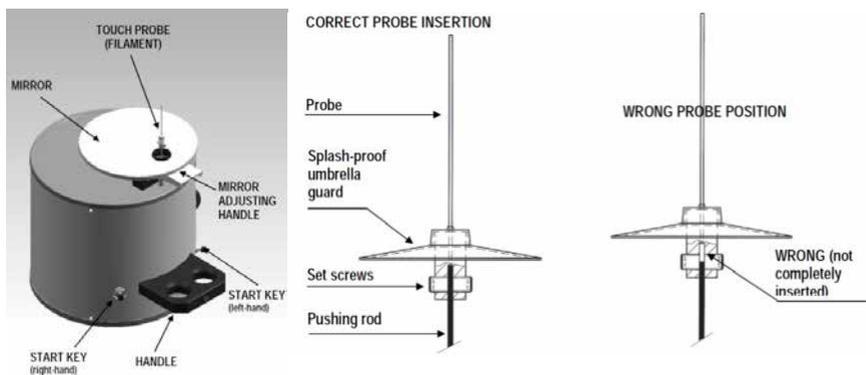
Place the electronic unit on a stable and flat surface and do not block the lateral ventilation grids. To guarantee the rated performance, a free area should be left around the instrument of at least 20 cm left, right and rear.

Then, mount the 4 columns onto the metal base and position the grid frame pane onto the column themselves.

If using particular heavy animals it could be necessary to lift up the grid; please refer to the addendum manual at page 31 of this manual.

At this point you are ready to assemble the modular animal enclosures (see specific manual)

Connect the Touch Stimulator to the electronic unit and pay attention to insert the touch probe (filament) correctly. See figures below.



The Dynamic Plantar device

3.5 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 inlet connection of the power cord.



Power module

The fuse compartment holds two fuses. Use (T2.0A) timed fuses for operation at both 115 or 230V, for fuse replacement, please refer to paragraph 5.1-Electrical.

The power cord inlet fits a standard C13 cable, Cat. # E-WP008.

Make sure your power out-take is provided with a reliable ground connection.

3.6 Intended Use

The Dynamic Plantar Test is intended for **investigation use on laboratory animal only**.

3.7 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 obstruct the ventilation grids on booth sides of the cabinet
5. Do not operate in hazardous environment or outside prescribed environmental limitation
6. Do not spray any liquid on the connectors, display, or other parts

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 approved by the manufacturer
- Servicing carried out by unauthorized personnel

3.8 Connections

Connect the mains cord between the power socket of the Dynamic Plantar and the power outlet with a reliable earth connection.

Connect the emitter cable to the electronic unit and then the power cord.
At this point you can turn the Dynamic Plantar on.



Rear view of the Dynamic Plantar control unit

The connection module on the front panel (Figure below) encompasses the following connectors, from left to right:

1. 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 simple USB pen. (see paragraph 4.2)
2. TTL I/O: 15pins D-SUB connector, provides TTL input and output for start/stop command and mode settings
3. COM: Reserved for maintenance and service purpose
4. Ethernet connector: only for support reason at the factory, not to be used



Connection panel

4 Operation

For best experiment results, position the Dynamic Plantar electronic unit and the base with the grid frame pane and the animal enclosures in a quiet and flat environment.

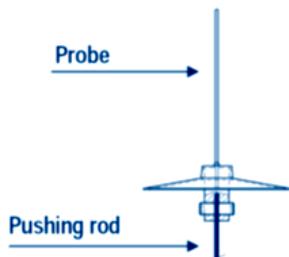


The Dynamic Plantar test device

While the animals are getting through their habituation phase within the animal enclosures, it is time to perform a device calibration in preparation for the testing.

The **CALIBRATION**, menu is accessible from the touch screen main menu, by touching on the "Utilities" icon.

First make sure that the probe is mounted on its pushing rod. Then, without any weight on the probe, perform the zeroing.



Now remove the probe and put the 5g , 50g and 100g weights on the needle (pushing rod) according to the instructions prompted on the screen. The wizard will take you step by step until the process is completed (see figure below).



The calibration page

Now that the system is calibrated; once the animals are quiet, the test can be performed.

With the aid of the adjustable angled mirror, place the touch stimulator beneath the animal paw to position the probe directly below the plantar target area.

By pressing the button on either sides of the stimulator, or by touching “start” on the touch screen main menu, the Dynamic Plantar device starts operating according to the amount of force and force rate previously set (from “setup” in the main menu, assuming the system is set to automatic mode; modes will be described in later paragraphs)

When the animal withdraws its paw, the touch stimulator stops exerting the upward force, the filament goes back to the original position, and the reaction time counter stops, automatically recording the withdrawal latency to the nearest 0.1s, as well as the actual force at which the animal reacted.

This automatic scoring can be overridden by pressing one of the buttons on the touch stimulator during force delivery (manual mode).



The start page

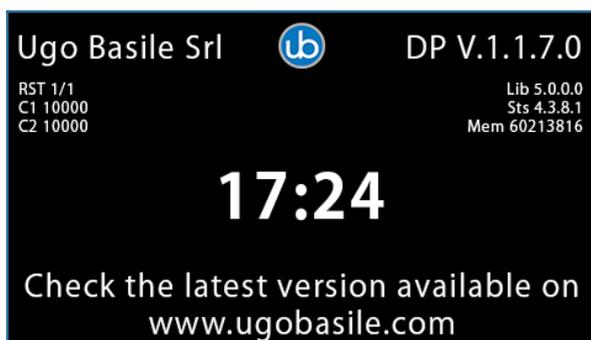
4.1 Main Menu

Getting familiar with the Dynamic Plantar home screen is very easy (see figure below).



Main Menu

From the home page, press the “Ugo Basile logo” button for software and memory information. Press again the “Ugo Basile logo” to roll back into main menu page.



4.2 Quick setup for first test

Carrying out the test

Position the animal(s) in the cages and wait until they are quiet, with little or no exploration, but not sleeping.

From the “Setup” menu, adjust the force level and the ramp time (time to reach the maximum force).



From the “Start” menu, select the operating mode (manual or automatic paw withdrawal scoring) and press the start button to start the force (alternatively, press the button on the touch stimulator unit).



The start page

Looking at the results

The Dynamic Plantar will save both the force and time latency values, in addition to the descriptive data, if they have been input in the Experiment field (Treatment, Protocol, ID, Stage, Trial). See image below.



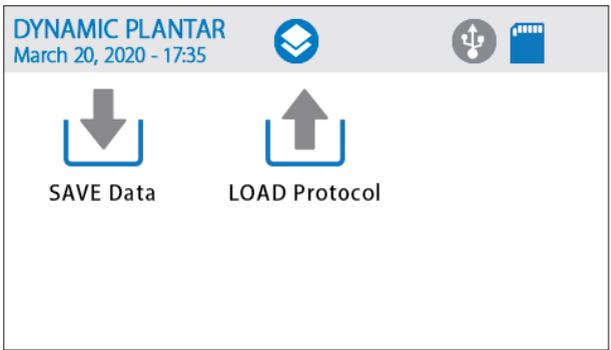
Result page



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

Exporting the results

Once data have been saved into the Dynamic Plantar internal memory, they can be transferred into a USB pen drive by simply plugging it into any of the two front USB ports and pressing, USB STORAGE, followed by SAVE DATA



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 being used, make sure it is formatted as FAT32. Data will be automatically saved as .CSV files, which can be opened in Microsoft Excel, with semicolon separated format.

4.3 Set up and Utilities Icons

The “set up” icon from the home screen is intended to define the experiment parameters, i.e.:

- The force to be applied (1-100 g)
- The ramp time rate (the time to apply the force; 0-50 seconds)



The set-up page

By touching on the force circle (the one on the left in the above image), the numeric keyboard appears and the value in grams can be entered. The same applies to the time in seconds, for the ramp time circle.

Notice that if the ramp time is set to zero, this will result in a constant force (i.e. no ramp).



The keyboard page to input the force in grams



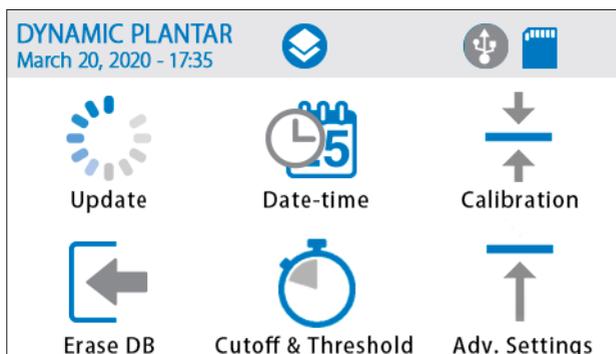
The keyboard page to input the force rate in seconds

The scoring **MODE**, instead, is accessed from the START icon in the home screen and it is changed from automatic to manual by simply touching on the MODE icon (see image below).



Also, the **UTILITIES** icon is accessible from the main menu and it includes several sub-menus:

- Update
- Date-Time
- Calibration
- Erase DB
- Cut off and threshold
- Advanced settings



The UPDATE menu requires to insert the USB pen drive and it is necessary to update the device firmware.

Contact the Ugo Basile Support team before updating the firmware.

To get the latest version of your device firmware, go to the Ugo Basile website in the support/download section. Download the appropriate firmware (from the Ugo Basile firmware folder) and upload it into the device using a USB pen drive. Insert the USB pen drive (FAT32 formatted), wait for the circle-shaped arrows on the top of the screen to appear and then touch the update icon.

The system will show the update progress icon and then reboot.

The update is now completed. You can check which version is now running on your machine by touching the Ugo Basile icon at the centre top of the screen.

If needed, the same procedure can be used to downgrade to a previous firmware version.



The update page

The DATE-TIME menu gives access to the adjustment of the date and time of the device, as shown in the screenshot below



The date & time page

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The **CALIBRATION** menu gives access to the procedure that ensures the system delivers accurate amount of force.

Its operation has been described before (see paragraph 4, “Operation”)



The calibration page

From the UTILITIES screen also the full memory can be erased, by tapping the ERASE DB button

The icon **“Cut-off and Threshold”** takes to the “Cut-off time” and “Time Threshold menus”

The **“Cut-off time menu”** sets the maximum experiment (test) time, i.e. the maximum time over which the force will be applied. Once this time is exceeded, the probe will be lowered and the test stopped.

Notice that if a ramp time is being used, the cut-off time will be the sum of the cut-off time plus the ramp time.

In other terms, the cut-off counter will start once the ramp is completed (i.e. the force has reached its peak).

For example if a 7 second ramp and a cut-off time of 6 second are used, the total test duration will be 13 seconds (7 + 6), given no animal response occurred before.

Notice that the cut-off feature can be used both when the scoring mode is automatic and manual.

The **“Time Threshold”** menu, sets the minimum acceptable response time, below which the record will be marked as “missing” in the results (see table below).

Column1	Column2	Column3	Column4	Column5	Column6	Column7	Column8	Column9	Column10	Column11
Session	Date	Treatment	Protocol	Stage	Trial	ID	Latency	Reason	Mode	Scoring
1	10/21/2020 11:44:06						1.7	Detection	Constant	Auto
2	10/21/2020 11:44:08						0.2	Manual Stop	Constant	Auto
Session	Date	Treatment	Protocol	Stage	Trial	ID	Latency	Reason	Mode	Scoring
1	10/21/2020 11:44:06						1.7	Detection	Constant	Auto
2	10/21/2020 11:44:08						0.2	Manual Stop	Constant	Auto
3	10/21/2020 11:46:43						1.4	Detection	Constant	Auto
4	10/21/2020 11:46:53						0.2	Missing	Constant	Auto
Session	Date	Treatment	Protocol	Stage	Trial	ID	Latency	Reason	Mode	Scoring
1	10/21/2020 11:44:06						1.7	Detection	Constant	Auto
2	10/21/2020 11:44:08						0.2	Manual Stop	Constant	Auto
3	10/21/2020 11:46:43						1.4	Detection	Constant	Auto
4	10/21/2020 11:46:53						0.2	Missing	Constant	Auto

From the icon **“Advanced settings”**, the “Touch Force” and the “Touch Pause” can be set to different values to make the instrument behave in different ways.

The **“Touch Force”** is the amount of grams that the device will apply to the paw as a baseline, before starting the application of the target force (through a ramp or without a ramp, according to what previously set in the force setting menu).

The Touch Force baseline value can be set with values ranging from 0.1 to 1g.

The **“Touch Pause”**, determines the duration of the application of the Touch Force. It follows that this feature is effective when its value is greater than zero. In such case, it will deliver the baseline force to the animal paw, before applying the target force (directly or through a ramp, according to what has been previously set in the force setting menu).

Notice that the previous generation (from 2007 to end 2020) of Dynamic Plantar devices had a touch force and a touch pause set of values programmed in the device by default. Those values were 0.3 g for the Touch force and 1.2 seconds for the touch pause. It follows that if these values are applied, the instrument will behave as the previous generation, in terms of amount and duration of initial baseline force.



The advanced settings page

Another operating mode, is the **“Legacy mode”**, that reproduces the behaviour of those Dynamic Plantar devices from the very first generation (before 2007).

To do so, just touch the **“L”** blue icon on the upper right corner on the screen above. This will determine every sudden application of the force, without any preliminary attenuation (differently from the other modes).

5 Bibliography

SOME OF THE PAPERS CITING THE UGO BASILE DYNAMIC PLANTAR AESTHESIOMETER

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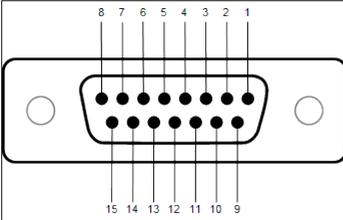
6 Connections

6.1 Communication port connection

The Dynamic Plantar device 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 signal are electrical isolated in order to guarantee an electrical barrier

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

Refers to Figure and Table below for connector pin out



D-sub connector pins

DB-15 Pin#	Signal Name	Signal Type	Description
1	Start/Stop	TTL OUT	Start -> TTL High Level Stop -> TTL Low Level
2	Detection Manual/Automatic	TTL OUT	Manual -> TTL High Level Automatic -> TTL Low Level
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	Force level	ANALOG OUT	Force level
9	External start	TTL IN	Start -> TTL High Level Stop -> TTL Low 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

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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

The device does not require any particular maintenance.

Although the stimulation unit is provided with a protective plastic umbrella, the upward pushing mechanism might get stuck, due to urine penetrating the mechanism itself, and crystallizing, in particular when the Dynamic Plantar Aesthesiometer is used intensely.

When this is the case, the stimulation unit should be serviced at our facility for a thorough cleaning.

This can be avoided or at least delayed, by immediately wiping away any urine trace gliding from the protective umbrella onto the stimulation unit, before it leaks in the mechanism.

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 Cleaning/disinfection

The Plantar Test does not require any maintenance apart from normal cleaning.

Do not use organic solutions. Cotton wool and water can be used for cleaning purposes. For disinfection, use a non-alcoholic disinfectant, or H₂O₂.

7.3 Long Inactivity

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

7.4 Customer Support

For any further information you may desire concerning the use and/or maintenance of the Plantar Test, please do not hesitate to contact our service department (or our local distributor) either directly or via our support page <http://www.ugobasile.com/support.html>:

Before sending any 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.

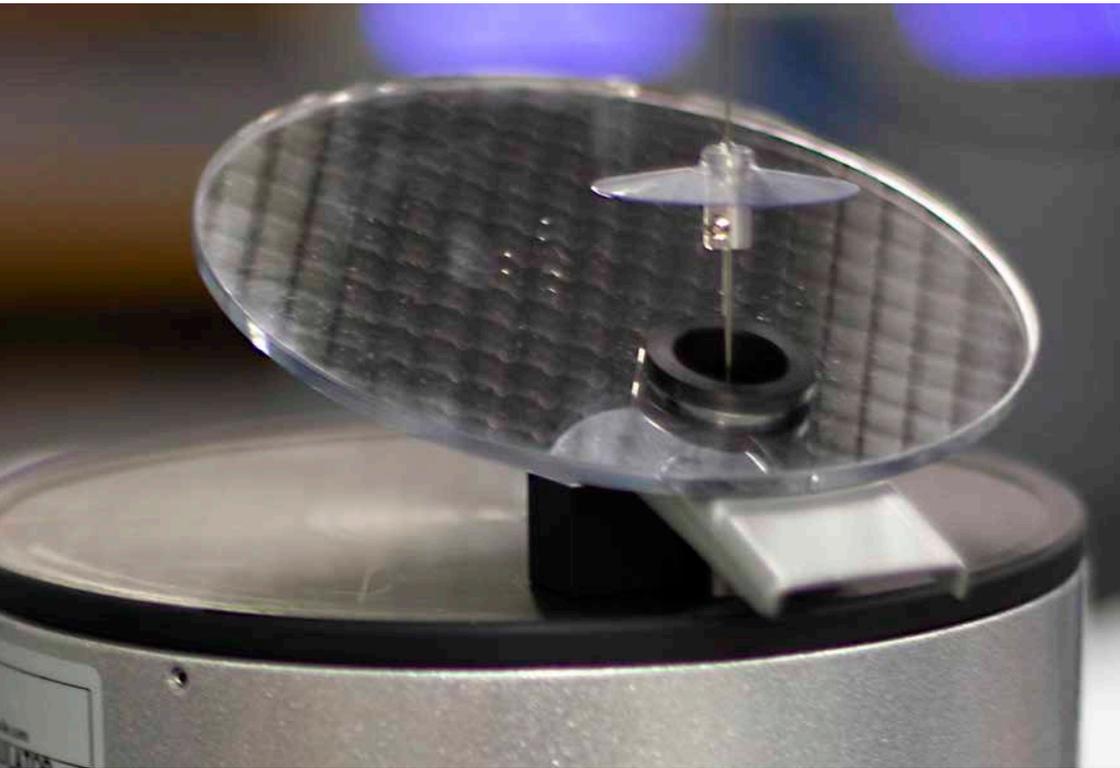
8 Specification

General	
Command Input	4.3" touch-screen (resistive)
Read-out	4.3" TFT touch-screen
Power Requirements	Universal input 100-240 VAC, 50-60Hz, 30W
Sound Level	< 45dB(A)
Operating environment	10°C to 40°C; 5% to 95% RH (non-condensing)
Operation	
Force Range	From 0.3 to 100 grams in 0.1g steps
Force Increasing Rate (ramp)	Adjustable in the interval from 0 to 50 seconds, in 1 s steps
Latency Time	Displayed on the graphic display, in 0.1s steps
Measurement Mode	Manual and Automatic
Start Experiment	By Start button, push buttons or TTL input
Stop Experiment	By Stop button, push buttons, cut-off or TTL input
Data export	.csv format, from USB key (provided)
TTL I/O	Input and output TTL signal
Physical weights	
Total weight	10.0kg
Shipping Weight	13.0kg
Physical dimensions	
Platform-base dimension (with cages)	90cm(w) x 38.5cm(d) x 37cm(h)
Electronic unit dimension	25cm(w) x 29cm(d) x 12cm(h)
Required space on table (all parts)	135cm(w) x 40cm(d) x 50cm(h)
Packaging dimensions	98cm(w) x 49cm(d) x 47cm(h)
Warranty	
<p>This device is covered by 12-month on-factory manufacturer warranty. An additional 12 month on-factory warranty period (total 2 years) is available for free after device registration.</p>	

Instruction manual addendum

Dynamic Plantar Aesthesiometer

Optional thickness installation



This guide is valid for the following SKU: 37550

Optional thickness for heavy animals

While the Ugo Basile dynamic plantar device is designed to be used for mice and for rats, when using the device with particular heavy animals, such as adult male rats, the upper grid, where the animal stays, can flex a little, mainly in the centre of the upper grid surface.

If this is the case the nitinol probe (needle or filament) can touch the bottom part of the grid preventing the test execution.

In this case we advise You to install an additional spacer between the black pole and the base of the metal floor increasing of 1.5 mm the distance between the floor and the bottom surface part.

This Manual show You how to install and remove the four spacer provided with Your Dynamic Plantar device.

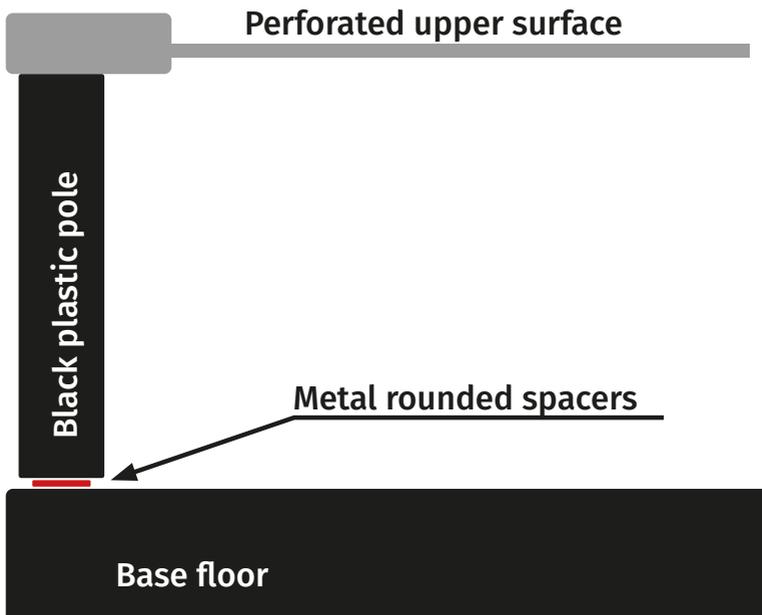
Check-list

In Your Dynamic Plantar package You will find 12 rounded metal spacer:

- 4 of these rounded metal spacers are provided to be used for the pole fixation as showed in the Dynamic plantar instruction manual (plus 2 as spare).
- 4 of these rounded metal spacers are provided to be used to increase the distance between the floor and the bottom grid surface, when using heavy animals (plus 2 as spare). These parts are located into the small black plastic bag where You find the Dynamic plantar umbrella.

Install the additional 4 spacers:

1. If the 4 poles are all-ready installed, please remove them, if not, skip this point.
2. While mounting the poles, be sure to place one metal rounded spacers for any of the four pole; see picture below.
3. Pay attention to not tighten the screw too much.

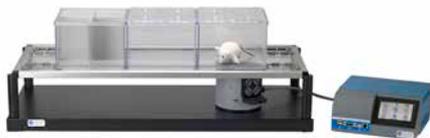




For other Ugo Basile products related to this device visit **ugobasile.com** web site for details



TGR - Thermal Gradient Ring (Zimmermann's method)



The original Plantar Test for thermal stimulation (Hargreaves Apparatus)



Dynamic Plantar Aesthesiometer (DPA) for mechanical stimulation



Thermal Place Preference (TPP Test) for Mice & Rats



Plethysmometer, the 1st and original device for measuring paw volume & oedema



Analgesy-Meter the 1st and original Randall-Selitto paw-pressure test

Ugo Basile SRL

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For other Ugo Basile products related to this device visit **ugobasile.com** web site for details



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



e-VF Handheld Electronic Von Frey of original design



PAM Pressure Application Measurement (for joint pain)



Orofacial Stimulation Test (Fehrenbacher, Henry, Hargreaves method)



Tail-Flick Unit, thermal stimulation of the tail, according to D'Amour & Smith method



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

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Optional thickness for heavy animals



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The 1st, original Mouse RotaRod for motory coordination studies



OPERON (Papaleo-Scheggia's method) for Attentional Set-Shifting Task



Fear Conditioning System - ANYmaze



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The Rota-Rod Family

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