what's new

STARTLE RESPONSE/PPI
a new device in the BEEHIVE family

beehive cage-manager system. A single touch-screen conditioning controller, to manage all UB conditioning cages. Ask for details!

NEW GENERATION INSTRUMENTS: NEW LOOK, NEW SOFTWARE, NEW DEVICES... SAME RELIABILITY

NEW Forced Swim Test

your trusted partner...
roadmapping the future of behavioral research!
# PAIN AND INFLAMMATION

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>37140</td>
<td>Plethysmometer</td>
<td>1</td>
</tr>
<tr>
<td>37215</td>
<td>Analgesy-Meter</td>
<td>3</td>
</tr>
<tr>
<td>35150</td>
<td>Hot/Cold Plate NG</td>
<td>5</td>
</tr>
<tr>
<td>37370</td>
<td>Plantar Test (Hargreaves’s Apparatus)</td>
<td>7</td>
</tr>
<tr>
<td>37360</td>
<td>Tail-Flick Unit</td>
<td>9</td>
</tr>
<tr>
<td>37300</td>
<td>I.R. Heat-Flux Radiometer</td>
<td>11</td>
</tr>
<tr>
<td>37450</td>
<td>Dynamic Plantar Aesthesiometer</td>
<td>13</td>
</tr>
<tr>
<td>38500</td>
<td>P.A.M. Pressure Application Measurement</td>
<td>15</td>
</tr>
<tr>
<td>38450</td>
<td>e-VF Electronic Von Frey</td>
<td>17</td>
</tr>
<tr>
<td>37450-275</td>
<td>Von Frey Hairs</td>
<td>19</td>
</tr>
<tr>
<td>31300</td>
<td>Orofacial Stimulation Test (Hargreaves Method)</td>
<td>21</td>
</tr>
<tr>
<td>37100</td>
<td>Durham Animal Holders (for trigeminal stimulation)</td>
<td>23</td>
</tr>
</tbody>
</table>

# MOTORY COORDINATION, GRIP STRENGTH, ACTIVITY

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>47200</td>
<td>Grip Strength Meter</td>
<td>25</td>
</tr>
<tr>
<td>47420</td>
<td>Activity Cage</td>
<td>27</td>
</tr>
<tr>
<td>47650</td>
<td>Mouse Rota-Rod NG</td>
<td>29</td>
</tr>
<tr>
<td>47750</td>
<td>Rat Rota-Rod NG</td>
<td>31</td>
</tr>
<tr>
<td>47300</td>
<td>Rodent Treadmill</td>
<td>33</td>
</tr>
<tr>
<td>43000</td>
<td>Rotometer</td>
<td>35</td>
</tr>
<tr>
<td>6650</td>
<td>Hole Board</td>
<td>37</td>
</tr>
<tr>
<td>1800/50</td>
<td>Activity Wheels for Rats/Mice</td>
<td>39</td>
</tr>
</tbody>
</table>
Plethysmometer
Cat. No. 37140

General
In research on rheumatoid arthritis, the central development of oedema, and its modifications by pharmacological processes, it has proved of great value to measure inflammatory processes in the rat paw.

Our Plethysmometer 37140 displays the exact paw volume on the graphic LCD read-out. Small differences are detected by a transducer of original design.

The 37140 is provided with a pedal holding-command which freezes the reading, enabling the operator to concentrate its attention to the paw dipping.

The paw volume is shown on the multifunction graphic display in four digits, with 0.01 ml resolution. A zero key is provided to zero the meter before each measurement.

MICROPROCESSOR Controlled Instrument. Main Features:
- Computer compatibility: direct connection to PC (via the 52050 Software included)
- Read-out: multifunction graphic display
- Print-out: by optional thermal MiniPrinters 57145

FOR ACCURATE MEASUREMENT OF:
- RAT paw oedema
- MOUSE paw oedema

Including measuring cell for both RAT & MOUSE paw!!
Volume Measuring Water Cell

The measuring cell consists of two vertical interconnected Perspex tubes; the animal paw is dipped in the larger tube (1.8cm diam) to measure water displacement. A tube of smaller diameter (1.3cm) is also included for measuring the mouse paw.

The smaller diameter side tube contains the transducer which measures the conductance between two vertical wire electrodes. Conductance is linearly proportional to the water level, hence to the displaced volume.

Data Acquisition

The 37140 Plethysmometer is microprocessor controlled, featuring direct PC output. Internally stored data can be routed to the PC serial (RS232) or USB port (via adaptor).

Communication is managed by the dedicated Software Cat. 52050-02, a Windows® based Data Acquisition Software Package, which enables data storage into individual files (in .csv format) to be easily managed Excel or other statistical analysis packages.

Also Available

37140-25 Plethysmometer, complete with water cell diam. 2.5cm & standard accessories
37140-35 Plethysmometer, complete with water cell diam. 3.5cm & standard accessories

Other Available Water Cells

7157 Special Water Cell, diam. 2.5cm, complete with Transducer 7153-L
7159 Special Water Cell, diam. 3.5 cm, complete with Transducer 7153-L

Optional

57145 Thermal Mini-Printer
37400-305 Thermal Paper Roll for 57145

Specifications

- Power Requirement: Universal input 85-264 VAC, 50-60Hz, 40 W max.
- Data Read-out: multifunction graphic display
- Data Format: 4 digits (2 integers, 2 decimals)
- Resolution: 0.01 ml
- Commands: via soft-buttons
- Connection to PC: direct connection to PC USB port, via serial to USB adaptor
- Data Print-Out: via the optional MiniPrinter 57145

Physical

- Weight: 4.8 Kg
- Shipping Weight: 8.1 Kg approx.
- Shipping Dimension: 67x42x53cm

Bibliography

Analgesy-Meter
Randall-Selitto Paw Pressure Test
Cat. No. 37215

General

The 37215 is the up to date version of the classical 7200 paw pressure test which, since 1965, is helping to perform a rapid precise screening of analgesic drugs in a number of academic and industrial laboratories.

The force is applied to the animal’s paw, which is placed on a small plinth under a cone-shaped pusher with a rounded tip.

The operator depresses a pedal switch to start the mechanism which exerts the force.

When the rat struggles, the operator releases the pedal and reads off the scale the force at which the animal felt pain.

NEW: we are now introducing a specific pressure sensor and the related controller, available as optional, to transform the Analgesy-Meter in a fully digital device.

As the basic design is unchanged, results with the digital model are consistent with published data.

The upgrade kit has been designed to be fitted on existing Ugo Basile Analgesy-Meters as well. Ask for details!

Main Features

- Same instrument, three force ranges (from 0 to 250, 500, 750 g)
- Simple and reliable: no calibration needed!
- NEW model with digital reading
- Specific version for Mouse available, with lower (50% pressure range)
- Classic method since the 1960s: hundreds of papers published!
- Upgrade kit for old Analgesy-Meters available

Ugo Basile: more than 10,000 citations
Instrument Description

The force applied to the paw by the plinth increases at a constant rate, thus enabling perfect reproducible measurements to be made. The motor stops immediately the pedal is released.

The force is measured on the scale calibrated in 10-gram steps, by a pointer riveted to the slide. The scale can be multiplied by 2 or 3, by placing on the slide one or two discs provided with the standard package.

After each test the slide should be returned to its starting point by lifting it and pushing it to the left.

The 37215 features a low voltage synchronous motor and conforms the CE rules.

The standard 37215 can be conveniently used with mice. However, a dedicated model is also available, when lower pressure (50%) is desirable, model 37216, which includes a special chisel-shaped pusher (also available separately).

Data Acquisition

The classic Analgesy-Meter can now be integrated with a specific pressure sensor and the related controller, available as optional, which upgrades the Analgesy-Meter to a fully digital device.

As the basic design is unchanged, results with the digital model are consistent with published data.

The design of the upgrade kit makes it easy to retrofit existing UB Analgesy-Meters as well.

Ask for details!

37215 Specifications

Power Requirements: 115 or 230V, 50/60Hz, 15W max.
Start / Stop: by pedal switch
Force Range:
37215: 0 to 250, 500, 750 grams
37216: 0 to 125, 250, 375 grams

Physical:

Dimensions: cm 40 x 16 x 14
Packing: cm 55 x 45 x 36
Weight: 2.1Kg
Shipping Weight: 5.0Kg approx

Ordering Information

37215 ANALGESY-METER, complete with following standard accessories:
37215-302 Instruction Manual (on USB key)
37215-303 Pedal Switch, complete with cable
37215-323 Set of discs for additional weight
37215-321 Plinth
37215-322 Standard Pusher *
E-WP008 Mains Cord

* Pushers in special material/shapes, available on request

37216 ANALGESY-METER, low-pressure model, suitable for mice, with pusher 37215-326

Optional Upgrade to Digital

37215-100 ANALGESY DAQ upgrade kit
37215-BUNDLE Analgesy-Meter & Upgrade Kit

Bibliography

METHOD PAPER


REFERENCE TO UB ANALGESY-METER (RAT)


L. Ferrari et alia: “Role of Nociceptor αCaMII in Transition from Acute to Chronic Pain (Hypersialgic Priming) in Male and Female Rats” J. Neuro-science 33 (27): 11002-11011, 2013

D.A. Andersson et alia: “TRPA1 Has a Key Role in the Somatic Pro-Nociceptive Actions of Hydrogen Sulfide” PLoS ONE 7(10): e46917, 2012


REFERENCE TO UB ANALGESY-METER (MOUSE)


Hot / Cold Plate

Cat. No. 35150

General

This new Hot/Cold Plate NG offers a wide temperature range, presettable in the range -5°C to 65°C, can be used as:

- A conventional HOT PLATE, to carry out a rapid precise screening of narcotic type analgesic drugs according to the well known Hot Plate Test devised by N.B. Eddy and D. Leinbach.

- As a COLD PLATE, the Cold Plate Test is useful in studying cold receptors and cold allodynia, a phenomenon very frequently observed in chronic pain on humans.

The lid reduces humidity condensation on the plate at low temperatures.

Two working modes allow for testing at fixed temperature or at increasing/decreasing temperature (RAMP).

An optional auxiliary Plate (heat only) can be connected to the main unit and will be useful in the habituation phase.

Brand new, user friendly software, to set up the experiment and manage the results.

Main Features

- **OPERATING TEMPERATURE:** -5.0°C to 65.0°C in steps of 0.1°C (0.5°C precision)
- **DETECTION:** by pedal switch
- **OPERATING MODES:** fixed or ramping temperature, for dynamic experiments
- **X-PAD SOFTWARE:** brand new, user friendly software included as standard, to set up the experiment and manage the results
- **CONTROLS:** 4”3 touch-screen to set and monitor the test
- **DATA PORTABILITY:** via the USB Memory-Key, included as standard

IT CAN BE USED AS HOT PLATE OR COLD PLATE

NEXT GENERATION INSTRUMENT: SAME RELIABILITY, INNOVATIVE TECHNOLOGY!

for Rats

for Mice

PAIN and INFLAMMATION

Ugo Basile: more than 10,000 citations
**Instrument Description**

The Ugo Basile Hot/Cold Plate NG features:

- A cabinet incorporating the Heating/Cooling Plate (20cm diam.) and the 4”3 touch-screen
- A convenient restrainer (25cm tall, suitable to restrain either mice or rats), with anti-dew lid.

The plate temperature can be set in the range -5.0 to 65.0°C, with 0.1°C increments (0.5°C precision). The extremes of this ample range can be reached, provided the room temperature remains in the interval 18-24°C.

Operating modes will allow to work with constant temperature or ramp, defining the initial and final temperature to set an upward or a downward ramp.

**What’s new**

Physically similar to the previous versions, the new model features much quicker temperature changes and greater stability and uniformity.

Totally new is the X-PAD software included as standard, see below. Remote diagnosis and internet access are provided for.

**Experimental Configuration**

Via the X-PAD software, the operator can easily organize the experiment on her/his PC, and upload it to the Hot/Cold Plate via the USB key.

Treatments, protocols, stages, animals, and various test features (temperature, mode, etc.) can be quickly defined and saved for future use.

**Data Collection and Management**

A basic version of the collected data can be viewed on the touch-screen

When transferred to PC via USB drive, test results appear in full version.

The software automatically classifies the data, combining configuration settings with test results; the user can add information, before or after the test. Results appear in a tree-like structure, where columns can be dragged and dropped to customize the layout.

Configurations and data are exported as Text, Excel or Pdf reports and can be saved to cloud via Dropbox, OneDrive, GoogleDrive.

**Ordering Information**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>35150</td>
<td>HOT / COLD PLATE, standard package:</td>
</tr>
<tr>
<td>35150-001</td>
<td>Cabinet (controller/display and Plate assembly)</td>
</tr>
<tr>
<td>35100-286</td>
<td>Perspex Animal Restrainer, for Mice and Rats), 25cm height</td>
</tr>
<tr>
<td>35150-320</td>
<td>Restrainer Lid</td>
</tr>
<tr>
<td>35150-302</td>
<td>Instruction Manual (on USB key)</td>
</tr>
<tr>
<td>37215-303</td>
<td>Pedal Switch</td>
</tr>
<tr>
<td>X-PAD</td>
<td>Dedicated Software Package (on USB)</td>
</tr>
<tr>
<td>Mains Cord</td>
<td></td>
</tr>
</tbody>
</table>

**Optional**

An “auxiliary” conventional Hot Plate 35150-002 is available as optional; this self-standing unit may be used for the habituation phase before the test, thus reducing the use of the main unit to the test proper.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>35150-002</td>
<td>Auxiliary Hot Plate</td>
</tr>
<tr>
<td>35150-002</td>
<td>Combo Package 35150 &amp; 35150-002</td>
</tr>
</tbody>
</table>

**Physical**

Universal input 85-264 VAC, 50-60Hz
Dimensions 25x37x47(h)cm with restrainer
Weight 8.0Kg
Shipping Weight 12Kg approx.
Packing 68x34x28cm

**Bibliography**

- C.V. Möser: “TANK-Binding Kinase 1 (TBK1) Modulates Inflammatory Hyperalgesia by Regulating MAP Kinases and NF-κB Dependent Genes” J. Neuroinflammation 12:100, 2015
- D. Piomelli et alia: “Anandamide suppresses pain initiation through a peripheral endocannabinoid mechanism” Nature NSC, 2010
Plantar Test
(Hargreaves Apparatus)

Cat. No. 37370

General

Determination of acute nociceptive thermal threshold in laboratory animals has primarily relied upon the tail flick and hot plate methods. Although both methods are used frequently in pharmacological studies, they are not without limitation. In addition, neither method has been extended to investigating behavioural responses to hyperalgesia.

The Plantar Test represents a remarkable advance in methodology, as it combines the best features of all other methods of measuring pain sensitivity. Unique to the Plantar Test, the animal is unrestrained and unhandled during experiments.

Main Features

- Automatic detection of paw withdrawal (no visual score needed!)
- I.R. intensity adjustable in the interval 01-99 (in one digit steps)
- Software included
- Modular animal enclosure, from 3 to 12 spaces, conveniently designed to restrain mice or rats
- Optional 37300 Radiometer for calibration
- Data portability via the included memory key
- NEW: orofacial stimulation by optional holders

For Rats

For Mice

AUTOMATIC MEASUREMENT OF THE ANIMAL RESPONSE

www.ugobasile.com
Instrument Description

The Instrument basically consists of:

• a Movable I.R. (infra-red) Source
• a Controller (the picture shows the optional printer 37000-145 mounted on the top panel)
• a framed Glass Pane (86x35cm) supported by columns on a base platform onto which the movable source glides
• a modular enclosure of new design, in which the 3 spaces can be further divided into 2 or 4 by removable partitions, obtaining up to 12 spaces

After the acclimation period, the I.R. source placed under the glass floor (see the picture) is positioned by the operator directly beneath the hind paw. A trial is started by depressing a key on the I.R. source.

When the animal feels pain and withdraws its paw, the I.R. source switches off and the reaction time counter stops. The withdrawal latency to the nearest 0.1s is automatically determined and recorded.

Data Acquisition

The 37370 is a microprocessor controlled unit. The experimental data, stored in its internal memory can be directly exported to the PC USB or serial ports.

Communication is managed by the dedicated CUB Data Acquisition Windows®-based Software Package 52050-10, included as standard, which enables the user to route the experimental data to the PC and store them into individual files, to be managed by most statistical analysis packages available on the market.

The 37370 is provided with a memory key, to record all the experimental data of one or more sessions and to program the experiment parameters from a remote PC.

Calibration Radiometer

Each Plantar Test Unit is accurately calibrated via an Heat-Flux I.R. Radiometer Cat. 37300.

The end user should consider this extremely useful optional accessory, which enables the experimenter to:

i) Make sure that two or more units deliver thermal nociceptive stimuli (expressed in mW per square cm) of exactly the same intensity.
ii) Measure the I.R. energy (1mW for the duration of 1s corresponds to 1mJ) in absolute terms.

Ordering Information

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>37370</td>
<td>Plantar Test (Hargreaves’ test), complete with following standard accessories:</td>
</tr>
<tr>
<td>37370-001</td>
<td>Plantar Test Controller</td>
</tr>
<tr>
<td>37370-002</td>
<td>Emitter/Detector Vessel, with cable</td>
</tr>
<tr>
<td>37000-003</td>
<td>Platform</td>
</tr>
<tr>
<td>37370-327</td>
<td>Supporting columns</td>
</tr>
<tr>
<td>37000-006</td>
<td>Modular Animal Enclosure</td>
</tr>
<tr>
<td>37370-005</td>
<td>Framed Glass Pane</td>
</tr>
<tr>
<td>37370-302</td>
<td>Instruction manual (on the USB key)</td>
</tr>
<tr>
<td>52050-10</td>
<td>CUB Software (USB key) with USB cable</td>
</tr>
<tr>
<td>E-WP 008</td>
<td>Mains Cord</td>
</tr>
</tbody>
</table>

Optional Spares & Accessories

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>37000-145</td>
<td>Panel-Mount Printer</td>
</tr>
<tr>
<td>37300</td>
<td>Heat-Flux I.R. Radiometer</td>
</tr>
<tr>
<td>E-HR 002</td>
<td>Replacement Bulb</td>
</tr>
<tr>
<td>37370-278</td>
<td>Additional stimulation base, complete with glass pane and animal enclosure</td>
</tr>
<tr>
<td>37100</td>
<td>Set of two Durham Holders for orofacial stimula-</td>
</tr>
<tr>
<td></td>
<td>tion (see separate datasheet)</td>
</tr>
</tbody>
</table>

Physical

Universal Mains 85-264 VAC - 50-60Hz - 20 W max.
Dimensions 86 x 40 x 35 cm (assembled)
Weight 13.00 Kg
Packing 98 x 49 x 47 cm
Shipping Weight approx 27.50 Kg

Bibliography

Method Paper:


Papers mentioning UB model:

2. L. Mannelli et alia: “Effects of the Neutrophil Elastase Inhibitor EL-17 in Rat Adjuvant-Induced Arthritis” Rheumatology 10.1093, 2016
Tail-Flick Unit
Cat. No. 37360

General
This new style Tail Flick Unit has been designed to perform rapid precise screening of analgesic drugs via heat stimulation on the rat tail, according to D’Amour & Smith, see bibliography. It basically consists of an I.R. source, whose radiant energy of adjustable intensity is focused on the rat tail by an embodied parabolic mirror.

The rat is held by the operator on the instrument unobstructed upper panel (see picture) in such a way that its tail, placed over a flush mounted window, receives the I.R. energy.

The operator starts the stimulus and the related solid state second counter. When the rat feels pain and flicks its tail, a sensor detects it, stops the second counter and switches off the bulb. The reaction time of the animal is thus determined and automatically recorded.

Main Features
- Automatic detection of the animal response
- Data portable to USB pen-drive stick or to PC (USB)
- Comfortable, unobstructed working surface (no protruding elements)
- Excellent reproducibility thanks to optics lodged in a rigid structure & electronically controlled I.R. flux

Ugo Basile: more than 10,000 citations
**Instrument Description**

The instrument components are neatly arranged in a box of new design, which contains the I.R. source, the sensor, the microcontroller and the electronic circuit.

When the counter stops, the display remains frozen on the indicated time. Latency time is thus automatically recorded.

An inclined Mouse Restrainer is supplied as optional, to be used with the mouse to compensate for its tendency to hold its tail at 45 degrees up and therefore away from the heat source.

In fact, the availability of mice with specific gene(s) knock-outs is driving a substantial shift from rats to mice as a research animal of first choice.

**Data Acquisition**

The 37360 is a microprocessor controlled unit. The experimental data, stored in its internal memory can be directly exported to the PC USB or serial ports.

Communication is managed by the dedicated CUB Data Acquisition Software Package, Cat. 52050-09, included as standard.

The CUB Windows®-based Software Package enables the user to route the experimental data to the PC and store them into individual files, to be managed by most statistical analysis packages available on the market.

The 37360 is provided with a memory key, to record all the experimental data of one or more sessions and to program the experiment layouts from a remote PC.

**Calibration Radiometer**

Each Tail Flick Unit is accurately calibrated via an Heat-Flow I.R. Radiometer Cat. 37300.

The end user should consider this extremely useful accessory, which enables the experimenter to:

i) Make sure that two or more units deliver thermal nociceptive stimuli (expressed in mW per square cm) of exactly the same intensity.

ii) Know the I.R. energy (1mW for the duration of 1s corresponds to 1mJ) in absolute terms

**Basic Specifications**

<table>
<thead>
<tr>
<th>Spec</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.R. Intensity</td>
<td>adjustable in the interval 01-99 (in one digit steps)</td>
</tr>
<tr>
<td>Reaction Time</td>
<td>three digits, 0.1s steps</td>
</tr>
<tr>
<td>Calibration</td>
<td>via appropriate I.R. Radiometer</td>
</tr>
</tbody>
</table>

Universal Mains 85-264 VAC - 50-60Hz - 20 W max.

**Physical**

Dimensions: 43x22x10cm
Weight: 4.0 Kg
Packing: 45x34x26cm
Shipping Weight: 5.8 Kg approx.

**Bibliography**

**Method Paper:**

**Papers mentioning UB model:**
J. Walsh et alia: “Disruption of Thermal Nociceptive Behaviour in Mice Mutant for the Schizophrenia-Associated Genes NRG1, COMT and DISC1” Brain Res. 1348: 114-119, 2012
I.R. Heat-Flux Radiometer
Cat. No. 37300

General

The Heat-Flux I.R. Radiometer Cat. 37300 has been designed to calibrate I.R. sources, in particular the classic Tail-Flick 37360 and Plantar Test 37370 of our make.

The purpose of this extremely useful accessory is to make sure different I.R. sources deliver the same power flux (expressed in mW per square cm), hence a nociceptive stimulus of the same intensity.

The standard package of this portable self-sufficient instrument includes an I.R. Probe, a Digital Meter, and Adaptors for Tail-Flick and Plantar Test (see picture), all parts of neatly lodged in a sturdy plastic case with punched foam lining.

Main Features

- Provides a measure of stimulus intensity in mW/cm²
- Assures that all infrared instruments are emitting the same level of stimulus intensity

For Precise Calibration of Infrared Analgesia Meters  
To calibrate the I.R. emission of Ugo Basile Plantar Test & Tail Flick
I.R. HEAT-FLUX RADIOMETER

The I.R. output of a I.R. Tail-Flick or Plantar Test may, over the course of one-two years, undergo to 2-3% reduction, due to dust gathered on the optics, darkening of the I.R. bulb, accidental knocks, aging of components due to thermal cycles, etc.

Moreover, if the bulb is replaced or the electronics serviced, output alteration of more significant magnitude, say, 8-10%, may take place.

The 37300 Radiometer enables the experimenter to:

- Check (and adjust if necessary) the actual emission of an I.R. source
- Ensure that two or more Tail-Flick/Plantar Test Units deliver thermal nociceptive stimuli of exactly the same intensity. Balance them, if necessary.
- Know the I.R. energy in absolute terms: 1mW for the duration of 1s corresponds to 1 mJ. A useful datum to compare with any equal or different method/instrument described in the literature.

Principle of Operation

This simple and reliable I.R. Radiometer uses miniature flat "temperature gradient sensors", whose output signal is proportional to the temperature difference between their top and bottom surface.

In fact, the temperature reached by the top surface of the sensor attains few degrees Celsius over the heat-sink temperature and hence involves negligible convection and radiation losses.

At the equilibrium, the I.R. power flux \( p \) (mW per square cm) is given by the formula:

\[
p = \frac{\Delta T}{\rho d}
\]

Where \( \Delta T \) is the temperature difference between top and bottom surfaces of the sensor, \( \rho \) is its thermal resistivity and \( d \) its thickness.

It is notable that the determination of \( p \) is not affected by the heat-sink temperature. \( \Delta T \) only comes into play. The time constant of the system \( \zeta \) (zeta), i.e., the time to reach the equilibrium is given by the formula:

\[
\zeta = \rho d C
\]

where \( C \) is the thermal capacity * of the sensor.

\( \rho d \) and \( C \) are very small, which leads to the equilibrium and hence to the exact determination of the I.R. power flux in a matter of 3-4 seconds.

Note:  
* thermal capacity = mass by specific heat  
** the heat propagates by radiation - conduction - convection

Practical Clues

The measure, as previously mentioned, requires only a few seconds. The I.R. probe is positioned on the Tail-Flick/Plantar Test, after the suitable adaptor is fitted on the threaded head of its heat sink.

The reading on the digital display gives the I.R. power output in mW per square centimetre.

The calibration (if necessary) of the I.R. radiation source is carried out by adjusting the supply current of the I.R. bulb, see the instruction manuals of the Tail Flick and, respectively, the Plantar Test.

### Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>37300</td>
<td>I.R. HEAT-FLUX RADIOMETER, standard package, including:</td>
</tr>
<tr>
<td>37300-001</td>
<td>Heat-Flux Meter (complete with cable/connector &amp; 9V battery)</td>
</tr>
<tr>
<td>37300-002</td>
<td>Heat-Flux Probe</td>
</tr>
<tr>
<td>37300-302</td>
<td>Instruction Manual (on CD)</td>
</tr>
<tr>
<td>37300-320</td>
<td>Probe Front Cover</td>
</tr>
<tr>
<td>37300-321</td>
<td>Adaptor for Tail-Flick</td>
</tr>
<tr>
<td>37300-322</td>
<td>Adaptor for Plantar Test</td>
</tr>
<tr>
<td>I-A 073</td>
<td>Instrument case</td>
</tr>
</tbody>
</table>

### Physical

37300 complete standard package, lodged in its case:

- Dimensions: 37x32x11cm
- Weight: 1.5Kg
- Packing: 46x38x27cm
- Shipping Weight: 3.6Kg
Dynamic Plantar Aesthesiometer
Cat. No. 37450

General
The Dynamic Plantar Aesthesiometer has been designed to assess “touch sensitivity” on the plantar surface of the rodents.

Somaesthetic (mechanical) stimulation has a long history of effective clinical use to diagnose pathologies of hyper- or hypo-aesthesia, brought about by drugs, neural pathology or experimental lesions, etc., in model and experimental systems using laboratory animals.

Main Features
- Automatic detection of animal response (no visual score needed)
- Consistent application of force at an adjustable rate (force ramp)
- Software included as standard

- Mechanical Stimulation
- With large platform
- Modular animal cage for Mice & Rats

ASSESSMENT OF ANIMAL SENSITIVITY TO LIGHT TOUCH OF THE PAW

PAIN and INFLAMMATION

Ugo Basile: more than 10,000 citations
The **37450** encompasses:
- a movable **touch-stimulator unit**, complete with filament actuator and adjustable angle mirror
- a microprocessor controlled **electronic unit**, of new design provided with graphic display, internal memory for data storage, memory stick and optional printer.
- a large **testing surface**
- a modular **animal enclosure**, in which the 3 spaces can be further divided into 2 or 4 by removable partition, thus obtaining up to 12 spaces.

**Operation**

The animal moves freely in one of the enclosure compartments, positioned on the testing surface.

After cessation of exploratory behaviour, the operator places the touch-stimulator below the target area of the animal paw, using the adjustable angled mirror to position the filament.

The **START** key provided at both sides of the touch-stimulator handle, invokes the following automatic sequence:

a. an electrodynamic actuator of proprietary design lifts a straight metal (NiTi alloy) filament
b. the small diameter rod touches the plantar surface and begins to exert an upward force below the threshold of feeling
c. the force increases at the preset application rate, until a stop signal is attained, either when the animal removes its paw or when the preset force is reached.

The filament (0.5mm diameter) transmits force over the entire range of typical aesthesiometers. Paw withdrawal reflex is automatically recorded using two metrics: the latency until withdrawal, in seconds, and the force at which paw was withdrawn, in grams.

**Basic Specifications**

| **Starting** | via keys on the touch-stimulator vessel |
| **Force range** | 0 to 50.0 grams, in 0.5g steps |
| **Force increasing rate** | adjustable in the interval 1 to 20 seconds, in 1 s steps |
| **Filament travel** | 12 mm |
| **Latency time** | on graphic display, in 0.1s steps |
| **Connection to PC** | through DELTA 9-pin connector |

**Data Acquisition**

The 37450 is a microprocessor controlled unit. The experimental data, stored in its internal memory can be directly exported to the PC USB or serial ports.

Communication is managed by the dedicated CUB Data Acquisition Software Package, **Cat. 52050-12**, included as standard. The CUB Windows®-based Software Package enables the user to route the experimental data to the PC and store them into individual files, to be managed by most statistical analysis packages available on the market.

The 37450 is provided with a **memory key**, to record all the experimental data of one or more sessions and to program the experiment layouts from a remote PC.

**Ordering Information**

| **37450** | DYNAMIC PLANTAR AESTHESIOMETER, complete with following standard accessories: |
| **37450-001** | Microprocessor controlled electronic unit, with USB key |
| **37400-002** | Touch stimulator |
| **37000-003** | Large platform |
| **37400-327** | Supporting Columns |
| **37400-005** | Framed testing surface (perforated platform) |
| **37400-278** | Modular animal enclosure (3 to 12 spaces) |
| **37450-321** | Instruction manual (on USB key) |

**Optional**

| **37000-145** | Panel-Mount Thermal Printer |
| **57145** | Thermal MiniPrinter |
| **37450-278** | Additional stimulation base, with perforated platform and animal enclosure |
| **37100** | Set of two Durham Holders for orofacial stimulation (see separate leaflet) |

**Physical**

- **Universal Mains**: 85-264 VAC - 50-60Hz - 20 W max.
- **Total Weight**: Kg 12.5
- **Packing**: 98x49x47cm
- **Shipping Weight**: Kg 21 approx.

**Bibliography**

- V. Brázda et alia: “Dynamic Response to Peripheral Nerve Injury Detected by In Situ Hybridization of IL-6 and its Receptor mRNAs in the Dorsal Root Ganglia is not Strictly Correlated With Signs of Neuropathic Pain” Molecular Pain 9(42), 2013
General

The new P.A.M. (Pressure Application Measurement) from Ugo Basile is a novel, easy-to-use tool for measuring mechanical pain threshold in experimental joint hypersensitivity models in rodents.

The PAM device has been designed and validated specifically for the mechanical stimulation and assessment of joint pain, and therefore is especially useful in studying arthritis.

The PAM applies a quantifiable force for direct stimulation of the joint and automatic readout of the animal response.

The operator simply wears on his/her thumb a special force sensor, specially designed to apply force to rat and mouse joints, and measures the force which elicits the animal response (normally, limb withdrawal).

Each PAM device comes standard with two force sensors, a large one useful for stimulating rat joints, a smaller sensor recommended to test mice; an optional paw transducer/applicator is also available, to stimulate the animal paw.

Joint Pain

Arthritis

MECHANICAL PAIN THRESHOLD IN:

- Joint Hypersensitivity
- Chronic Joint Inflammation

Main Features

- Rat and Mouse Transducers included
- Maximum Applicable Force: 1500g
- Resolution: 0.1g
- Automatic recording of Limb Withdrawal
- User-controlled application of pressure directly to the joint
- DCA Software included - NEW 2014 release

Ugo Basile: more than 10,000 citations
Rationale of the Technique
Arthritis is associated with chronic, debilitating pain in the joints. Current metrics of arthritic pain in animal models are indirect, by scoring the level of motor activity or the animal weight distribution (Barton et al. 2007); while correlating well with the level of joint pain, their metric is a composite picture of complex pain responses, and provides little direct information about local stimulation and locally-evoked responses.

The quantification of localized joint hypersensitivity is not common in animal experiments; in this sense the PAM device represents a step forward toward multifactorial measurement of pain-related behavior in animal research; the PAM is the first instrument designed specifically to apply force to the joint and automatically detect the animal response.

Instrument Configuration
Pressure transducers: the PAM device comes with 2 transducers, each tested and validated. Both flat and round, the large transducer is suitable for rat, the small one is ideal for mouse.

An optional paw transducer/applicator is also available, rapidly transforming the PAM into a Digital Randall-Selitto for pressure application on paws, muscles, tail.

Electronic Unit: the compact PAM controller connects to the mains or can be battery-operated. A foot pedal switch is provided for manual score of the peak force.

Data Monitoring and Storage
The device includes as standard both a control unit with internal memory and a software for signal monitoring, data transfer and analysis. Saved data can be browsed on the control unit and/or transferred to a PC in proprietary, .xls or .txt format, for further processing.

Acknowledgements
The PAM was invented and validated in the University of Edinburgh by the team of Prof. Daniel McQueen, Susan Bond and colleagues and Dr. Harry Brash, who built the first prototypes.

Ordering Information
| 38500 | PAM, standard package, including:
| 38500-001 | Electronic Unit
| 38500-002 | Large Joint Transducer
| 38500-003 | Small Joint Transducer
| 38500-011 | DCA Software (on USB Key)
| 38500-302 | Instruction Manual (on USB Key)
| 38500-303 | Pedal Switch

All components lodged in a dedicated plastic case

Options
38500-006: Paw Transducer
38550: PAM, high-pressure model for large animals

Physical
Weight: 1.4 Kg (in the plastic case)
Shipping weight: 2.7 Kg
Packing: 46x38x27cm
Shipping Weight: 27.50 Kg approx

Bibliography
Ugo Basile introduces an electronic apparatus for applying light touch to the rodent foot, the e-VF, **Electronic Von Frey**.

A touch stimulator transducer is mounted on a Perspex bar so that routine procedures may be employed to examine and test the animal skin sensitivity. A **prism** of proprietary design is a useful tool to locate and aim the stimulation area.

The completion of each test may be indicated either by the sudden release of the paw or by pressing the external foot-pedal. The display then gives the operator a summary of the results of the test (i.e. force and time corresponding to the animal response).

The operator may choose to reject the results or to accept them, in which case they are recorded in the e-VF internal memory. The results of several hundred tests may be stored in the e-VF for transfer to a PC when convenient.

The rate of application of the force is set by the operator and the **NEW** e-VF includes software tools that help in consistently applying the force at the desired rate.

**Main Features**

- DCA Software included - NEW 2014 release
- Maximum Applicable Force: 1000g
- Resolution: 0.1g

- Automatic recording of animal response
- User-controlled application of force rate
- Location of the target via the original prism-design

**Sensitivity**

**Allodynia**

**ASSESSMENT OF HYPERSENSITIVITY IN RATS & MICE**
Rationale of the technique

Impaired cutaneous sensation is usually first made evident as a loss of light-touch detection. The Electronic Von Frey was developed to quantify the sensitivity to light touch in the laboratory animal.

The classic instrument for test of touch sensitivity is the Semmes-Weinstein set of Von Frey Hairs, i.e., 20 monofilaments in a linear scale of physical force. The Semmes-Weinstein set can be used on rodents, which respond to light touch of the paw, when they feel it, by a paw withdrawal reflex. However, the involved procedure is tedious and time-consuming because several stimulations must be performed for a single test (a different filament for each force level).

Compared to the classic Von Frey Hairs, the Electronic Von Frey (e-VF) has the advantage of ensuring a continuous force application along the whole force range of the sensor, by using a single rigid metal tip.

Speaking about force, although the sensor can detect forces from 0 to 1000g, it is reasonable to set the device lower limit to 5g, given by difficulty, even for the most skilled user, to apply forces below this threshold.

The metal tip used in the e-VF is the same as the one used in the classic Ugo Basile Dynamic Plantar Aesthesiometer 37450, allowing consistent comparison of results among the two instruments.

Ease of use

The e-VF device has been designed to make sensitivity experiments easy and consistent, thanks to its:

- Effective peak detector, for a reliable and automated detection of the animal response
- Ratemeter and Slope feature, ensuring the desired force is applied at a consistent rate

- NEW Software, acting as a quality control tool, by showing the applied pulling force (red line), the desired target force rate (blue line), and the peak detection in real time, see picture above

Instrument configuration

The e-VF comes as a complete package including touch stimulator transducer with prism, electronic unit with power supply, foot pedal, software & USB cable. The mesh grid with platform, and animal enclosure are optional.

Data Monitoring and Storage

The device comes standard with both a control unit with internal memory and the new DCA software for signal monitoring, data transfer and analysis.

Once saved, data can be browsed on the control unit and/or transferred to a PC in proprietary, Excel (xls) or text (.txt) format, to be managed by most statistical analysis packages available on the market.

Ordering Information

38450 e-VF, Electronic Von Frey, complete with following standard parts
38450-001 Electronic Unit, with power supply
38450-004 Touch-Stimulator Transducer with Prism
38500-011 DCA Software (on USB Key)
38450-302 Instruction Manual (on USB key)

All components lodged in a dedicated plastic case

Options

37450-005 Perforated Metal Sheet for plantar stimulation
37450-278 Base assembly for plantar stimulation, with perforated metal sheet & animal enclosure

Physical

Weight 1.4Kg
Shipping Weight 2.7Kg
Packing 46x38x27cm
Von Frey Hairs
Cat. No. 37450-275

General
Von Frey hairs (named after the German physiologist Max von Frey, 1852–1932) were originally produced from animal and human hairs of different diameter; nowadays they are nylon monofilaments; the diameter determines the resistance of the monofilament to bending. A filament is placed perpendicularly to the skin with slowly increasing force until it bends, thereby determining the amount of force applied.

The Aesthesio® set of 20 monofilaments is based on the Semmes Weinstein monofilament set, but now features retractable filaments to protect the filament and allow the evaluator to carry a few around in a pocket.

The set of monofilaments provides an approximately logarithmic scale of actual force, and a linear scale of perceived intensity.

They have a long history of effective use in clinical settings, and can be used to diagnose pathologies of hyper- or hypo-aesthesia.

Subsets within the set of 20 probes distinguish pathologies on different parts of the body (foot, hand, lip, cheek, etc.).

Individual filaments are also sold separately individually.

Main Features
- 20 Filament Kit
- Graded Series of Nylon Monofilament, color-coded
- Rotating sleeve protects precision filament while in closed position

Ugo Basile: more than 10,000 citations
Von Frey Filaments have a long history of effective use in clinical settings, and can be used to diagnose pathologies of hyper- or hypo-aesthesia.

The operating principle remains the same: when the tip of a fiber of given length and diameter is pressed against the skin at right angles, the force of application increases as long as the researcher continues to advance the probe, until the fiber bends. After the fiber bends, continued advance creates more bend, but not more force of application.

This principle makes it possible for the researcher using a hand held probe to apply a reproducible force, within a wide tolerance, to the skin surface.

Rodents exhibit a paw withdrawal reflex when the paw is unexpectedly touched. The Touch Test™ Sensory Evauator can be used on the Plantar surfaces of the foot of a rat or mouse, and the animal will indicate sensation by pulling back its paw.

Replacement filaments available. Subsets within the set of 20 probes distinguish pathologies on different parts of the body (foot, hand, lip, cheek, etc.). Rotating sleeve protects precision filament while in closed position.

Accessories
For easy and quick stimulation of the plantar surface with Von Frey filaments, we offer a 90x38cm perforated metal platform, cat. 37450-005. Laser-cut perforations form a mesh-like open grid of square holes ~5x5 mm; interweaving metal grid is ~1mm wide, comfortable to the animal and easy to view the target area of the paw.

The shelf is coated with a polymer resin that is easy to clean and which will not be spoiled by fluids or waste materials. Mount the shelf on the wall.

In alternative we offer a shelf with 40 or 80cm legs, 37450-045 & 37450-085 respectively, which can be completed with our standard animal enclosure 37000-006; the latter is the modular enclosure, used with out Plantar Test & Dynamic Plantar Aesthesiometer, in which the 3 spaces can be further divided by partitions into 2 or 4, thus lodging up to 12 rats or mice.

You might also consider the complete stimulation base 37450-278, including supporting columns, shelf, and animal enclosure.

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>37450-005</td>
<td>Large perforated metal platform in a carrying case</td>
</tr>
<tr>
<td>37450-045</td>
<td>Platform 37450-005, with 40cm legs</td>
</tr>
<tr>
<td>37450-085</td>
<td>Platform 37450-005, with 80cm legs</td>
</tr>
<tr>
<td>37000-006</td>
<td>Multiple-configuration animal enclosure, from 3 to 12 spaces</td>
</tr>
<tr>
<td>37450-277</td>
<td>Set of 20 VonFrey Filaments 37450-275 &amp; complete base assembly 37450-278</td>
</tr>
<tr>
<td>37450-278</td>
<td>Base assembly for plantar stimulation, incl. supporting columns, perforated metal sheet and multiple-configuration animal enclosure, from 3 to 12 spaces</td>
</tr>
</tbody>
</table>
Orofacial Stimulation Test
*Fehrenbacher, Henry and Hargreaves Method*

Cat. No. 31300

**General**
The Orofacial Stimulation Test by Ugo Basile measures hypersensitivity to thermal or mechanical stimulation of the trigeminal area.

Rats voluntarily contact a thermal or a mechanical stimulator with their *unshaved vibrissal pad* in order to access a food reward. Metrics obtained are the **duration** of feeding and the **number of feeding attempts**, measured by interruption of an infrared barrier traversing the opening to the reward.

Feeding duration and number of attempts are strongly dependent on changes in the applied thermal or mechanical stimulus.

**Main Features**
- Mechanical and thermal nociception assays within the same experiment
- High throughput: up to 16 animals can be tested simultaneously
- Intact vibrissal pad, as the test does not require any shaving
- The ORO-Software, included as standard, manages up to 16 cages

Ugo Basile: more than 10,000 citations
**Orofacial Software: testing window**

The "System and Method for Assessing Hypersensitivity to Orofacial, Thermal and Mechanical Stimulation" (U.S. Provisional Patent Application 61/235,590) was invented by J. Fehrenbacher, M. Henry and K. Hargreaves, in the Laboratory of Dr. Hargreaves at UT San Antonio and developed commercially by Ugo Basile R&D. Dr. Fehrenbacher is now at IUPUI, Indianapolis.

A kit of Mouse adaptors for both thermal and mechanical stimulation is available, see ordering information.

**Instrumentation and Methodology**

Orofacial pain problems are common and involve structures and mechanisms unique to the trigeminal nerve. Few methods are currently available for orofacial preclinical research, and none incorporates parallel measurement of mechanical or thermal stimulation within the same experiment.

Moreover, while most of the current assays measure unlearned behaviors, such as flinching or withdrawal reflexes, the new Orofacial Stimulation Test, developed by Fehrenbacher, Henry and Hargreaves, integrates higher-order brain functions into measurements of orofacial nociception.

This innovative approach permits highly integrated nociceptive responses to thermal or mechanical stimulation.

Animals are trained & tested in standard home cages. The snout is inserted through an opening to lick the reward bottle. Tests are performed in the presence of thermal or mechanical stimuli contacting the vibrissal pad.

Following treatment to induce hypersensitivity, (e.g., trigeminal ligation or injection) trials are repeated to determine the effect of treatment on feeding behavior/reward. Assay sensitivity (inflammation-induced decreases in feeding behavior and reversal of hypersensitivity by local and systemic administration of analgesics) has been proven (Hargreaves et alia, ms in prep.); the feeding behavior is strongly correlated to mechanical or thermal orofacial nociception, as the animal must contact the stimulator in order to access the food reward.

The Ugo Basile Orofacial Stimulation Test quantifies feeding behavior by measuring and recording the beam-break number and duration (including min, max and mean), via the ORO-Software included; the software acquires data from up to 16 cages simultaneously.

**Ordering Information**

- 31300  Complete system for one animal
- 31320  Complete system for two animals
- 31340  Complete system for four animals
- 31300-001  Electronic unit (four channels)
- 31300-002  Additional cage assembly (includes thermal and mechanical stimulators and feeding detector)
- 31300-003  Circulating water bath
- 31300-010  ORO-Software, for data acquisition and analysis from up to 16 cages
- 31300-323  Optional Kit of Mouse adaptors for thermal and mechanical stimulation (for 1 cage)

**Bibliography**

Durham Animal Holders
New animal holders for trigeminal stimulation
Cat. No. 37100

General

The Durham Animal Holders are the newest accessory for use with the Plantar Test/Hargreaves Test, and Dynamic Plantar Aesthesiometer, manufactured by Ugo Basile.

These animal holders complete the scope of the infrared (IR) thermal stimulus of the Plantar Test, or the mechanical stimulus of the Dynamic Plantar Aesthesiometer, used for assessing hind paw withdrawal. This new invention allows the application of the same stimulus to the region innervated by the trigeminal nerve.

The 37100 includes two holders, form molded for testing specific size ranges of animals; the two sizes have been optimized for young adult rats as well as for bigger rats.

Main Features

- Correlation thresholds in submandibular (trigeminal) region and hindpaw plantar surface
- Test orofacial nociception using a standard Plantar Test (Hargreaves) device, a Dynamic Plantar Aesthesiometer, or an eVF Electronic Von Frey

“Very nicely done - easy to use and it greatly facilitates consistent handling of animals”
Dr. Ken Hargreaves, UT Texas
Innovative design and material
The Durham Holders are designed to hold an animal comfortably and effectively. They are made of a proprietary polymer with a deep-red color which appears dark to the animal.

The holders conformation is optimized to two specific animal size ranges; the smaller holder will accommodate rats from 175 grams to 250 grams, and the larger holder will accommodate animals from 225 grams to over 400 grams.

In practice, the rat crawls in happily and becomes snugly nestled within the holder. Normally the rats don’t back out, but inserting the vertical back plate ensures that the animal stays in place.

The position of the removable back panel insert can be adjusted from slot to slot, which allows the animal to be securely held in place, without being crowded.

The rat crawling towards the front helps quite a lot and the subject is almost self-positioning for applying the IR stimulus to the submandibular region of the rat face.

Access Panels
There are two different windows through which the stimulus may be presented:

- **Submandibular access panel:**
The opening under the chin is a perfectly sized rectangular aperture just below the animal’s chin. It allows the IR or mechanical stimulus to be aimed precisely and to stimulate the area innervated by the mandibular branch of the trigeminal nerve.

The aperture is large enough that both right and/or left side may be individually stimulated!

- **Plantar access panel:**
The holder allows the animal to be positioned in such a way to use the classic Plantar Test instruments for stimulating the hindpaw, as well as the areas innervated by the trigeminal nerve.

Rationale of the technique
The Durham Holders have distinct advantages which make them ideal as accessories to the classical Hargreaves test and they represent a step forward toward a multifactorial measurement of pain-related sensitivity in animal research.

Quantification of localized hypersensitivity is common in the clinic, but not in animal experiments.

The holders may appear similar to the classic Broome style animal holder; however, those restrainers are clunky, made of clear acrylic, and do not have stimulus apertures, so they could never be used for this stimulation.

Acknowledgements
The Durham Holders were invented and validated at the Center of Biomedical and Life Sciences at Missouri State University; specifically, in the laboratory of Dr. Paul Durham, director of Biomedical & Life Sciences and Professor of Cell Biology at Missouri State University. Filip Garrett and Allison Overmyer performed the validations. Prototypes were put together by Larry Vause.

Ordering Information
- **37100**
  - Set of two Durham Holders for rats:
    - 37102 medium size
    - 37103 large size

  - **Physical**
    - Weight: 0.4 Kg (two holders)
    - Gross weight: 1.0 Kg
    - Packing: 39x27x21cm

Bibliography - Method Papers

Papers mentioning 37100 Orofacial Holders
Grip Strength Meter

Cat. No. 47200

General

The Ugo Basile Grip Strength Meter automatically measures grip-strength (i.e. peak force and time resistance) of forelimb or hindlimb (via the optional grid) in rats and mice.

The Grip Strength test is a perfect complement to the gold standard Ugo Basile Rota-Rod device for motor coordination and motor function experiments. The effects of drugs, toxins, muscle relaxants, disease, ageing or neural damage on muscle strength may be assessed.

The animal is placed over a base plate, in front of a grasping tool (either T-shaped, trapeze-shaped or grid), whose height is adjustable.

The bar is fitted to a force sensor connected to the control unit, which can be used as a standalone or connected to a PC via the USB port, for monitoring and data recording, via the NEW software provided as standard.

Features and Benefits

- Software included - NEW 2014 Release
- Grasping tools and grasping-grids included for rats and mice
- No calibration needed
- Force-rate monitoring (via software or LCD display)
- Grasping bar / grasping trapeze positioned at adjustable height
- Maximum applicable force 1500g; resolution 0.1g

Ugo Basile: more than 10,000 citations
Rationale of the Grip Strength test
When pulled by the tail, the animal grasps at the bar. Rodents instinctively grab anything they can, to try to stop this involuntary backward movement, until the pulling force overcomes their grip strength. After the animal loses its grip on the grasping bar, the peak amplifier automatically stores the peak pull-force achieved by the limbs and shows it on the display.

The instrument basically consists of a base plate of black sand-blasted Perspex, complete with a force transducer and a grasping device (bar, trapeze or the optional grid), which can be positioned at an adjustable height.

The force transducer has a maximum applicable force of 1500g, with a resolution 0.1g.

The transducer incorporates a proprietary memory chip to store all calibration parameters, so that no further calibration is required for normal use; moreover, the controller will prompt to auto-zeroing routine at every measurement to automatically adjust any offset.

Data Monitoring and Storage
The device comes standard with both a control unit with internal memory and the new DCA software for signal monitoring, data transfer and analysis.

Once saved, data can be browsed on the control unit and/or transferred to a PC in proprietary, Excel (.xls) or text (.txt) format, to be managed by most statistical analysis packages available on the market.

Ease of use
The GSM device has been designed to make sensitivity experiments easy and consistent, thanks to its:

- Effective peak detector, for a reliable and automated detection of the animal response
- Ratemeter and Slope features, ensuring the desired force is applied at a consistent rate
- NEW Software, acting as a quality control tool, by showing the applied pulling force (red line), the desired target force rate (blue line), and the peak detection in real time.

The experimenter can consistently apply the force (i.e. pull the animal) at the desired rate, by simply making sure that the red trace lays on the blue line, see figure 1.

Grasping-Grids
Grasping-grids are also included, for integrated measurement of the four limbs (left) or hindlimbs (right).

Ordering Information
47200 Grip-Strength Meter, new model for rats & mice, complete with following standard accessories
47200-001 Control Unit, with Power Supply
47200-002 Force Sensor
47200-004 Baseplate and upright
38500-011 DCA Software (on USB Key)
M-LM 589 T-shaped Grip-Bar
M-LM 590 Grip-Trapeze for Rat
M-LM 588 Grip-Trapeze for Mouse
47200-325 Mouse Grasping Grid
47200-326 Mouse Grasping Grid ("blind" top)
38500-303 Pedal Switch
52010-325 USB Cable
All components lodged in a dedicated plastic case

Physical
Weight 4.8kg
Shipping weight 6.5Kg
Packing 46x38x27cm

Bibliography
- J.D. Lee et alia: “Pharmacological inhibition of complement C5a-C5aR1 signalling ameliorates disease pathology in the hSOD1G93A mouse model of amyotrophic lateral sclerosis” Br. J. Pharmacol. DOI: 10.1111/bph.13730, 2017
Multiple Activity Cage

Cat. No. 47420

General

An animal level of general activity or locomotion is an indicator of drug action, toxic substances, neurological damage, or daily rhythms in activity.

Activity data may be automatically and unobtrusively collected by many methods.

The Ugo Basile Activity Cage has proved to be of great value to record spontaneous co-ordinate activity in rats and mice (individual or groups) and variation of this activity in time.

As the animal moves about a clear acrylic cage, it interrupts one or more infrared beams. The beams are arranged in an array of emitters on one side of the cage, detectors on another.

The lower IR array monitors horizontal movement while the upper IR array monitors vertical or rearing activity.

The number of beam breaks is correlated with the amount of movement about the cage.

With dedicated software included

STAND-ALONE CONTROLLER WITH EMBEDDED PRINTER FOR GLP AND DATA SAFETY

MAIN FEATURES

- Measures horizontal and vertical activity in rats and mice, useful in the following types of investigation:
- General Toxicology, ascertaining the action of a drug on the animal’s activity
- Psychopharmacology, screening drugs which are potentially active on the CNS
- Behavioural Sciences, in evaluating the variations of spontaneous activity after changes in environmental conditions

Ugo Basile: more than 10,000 citations
**Instrument Description**

The **47420 MULTIPLE ACTIVITY CAGE** package comprises:

- an **Electronic Unit**, Cat. 7441
- an **I.R. Beam Cage**

This set-up can accept up to 5 additional cages, for a total of 6.

**Electronic Unit**

The **7441**, designed to process the data originated by **up to 6 Cages**, incorporates a graphic display, a thermal printer and a serial port RS232 for direct connection to the PC via the software Cat. 52050 included. A serial to USB adaptor is also included.

The graphic display presents all available commands. The operator sets the experiment configuration via the keyboard located below the display.

The activity data are displayed at preset intervals and printed/routed to the computer according to the selected configuration. The data can be customized by adding animal & experiment numbers, gender, etc.

Its internal memory is capable to store the data of several experiments, to be unloaded to the PC later.

**Cage**

The **7433** Cage consists of a cubicle, entirely made of clear Perspex, dimensioned 41x41x33(h)cm. Upper lid and bottom catch pan detachable for cleaning.

The cubicle rests on a sturdy base, provided with four vertical notched bars of stainless steel to which the horizontal/vertical detecting systems 7435 and/or 7436 can be fastened.

The **7435** consists of two facing blocks containing an I.R. array of emitters and, respectively, sensors, to record the horizontal activity. A similar system, Cat. 7436, whose height can be adjusted, assesses the vertical activity (rearing).

Open-field cages are also available, in different dimensions and colors: ask for additional details.

**Data Acquisition**

The electronic unit is microprocessor controlled and features direct PC output. Internally-stored data can be routed via a 9-pin D-type connector to the PC serial port (RS232).

Data output is managed by **52050-04 Data Acquisition Software Package (Windows® based)**, which enables the research worker to store the data into individual files, ready to be easily managed by most statistical analysis packages available on the market.

Combination with ANY-maze videotracking software is also possible, to integrate the quantitative measure of general locomotor activity, collected by our Activity cage, with more detailed information about the animal activity.

Moreover, the 47420 will add vertical activity (rearing) to videotracking data. **Ask for additional information!**

**Ordering Information**

- **47420 MULTIPLE ACTIVITY CAGE**, standard package, including following parts:
  - **7441** Electronic Unit
  - **7433** Animal Cage
  - **7435** Set of emitter/receiver sensor arrays for horizontal activity
  - **7436** Set of emitter/receiver sensor arrays for vertical activity

- **47420-302** Instruction manual (on USB flash drive)
- **37400-305** Package of 10 Heat Sensitive Paper Rolls
- **E-WP008** Mains Cord
- **52050-04** Dedicated Software Package CUB
- **52010-320** USB to serial port converter
- **52010-322** Serial cable 9 to 9 pin

**Physical**

- Weight **7441**: 2.7Kg
- Weight **7433**: 11.8Kg (including 7435/7436)
- Dimensions **7441**: 27x16x19cm
- Dimensions **7433**: 54x50x37cm
- Shipping weight 26Kg (whole set-up)
- Packing 80x60x44cm

**Bibliography**

- C. Bohotin et alia: “The effect of one month riboflavin administration on thermo-nociceptive behavior and locomotion in mice” European Neuropsychopharmacology 26: S293, 2016
- V. Labrie et alia: “Genetic loss of D-amino acid oxidase activity reverses schizophrenia-like phenotypes in mice” Genes, Brain and Behavior, 9: 11–25, 2010
- J. Vlainic, et alia: “Zolpidem is a potent anticonvulsant in adult and aged mice” Brain Res.,1310 181–188, 2010
- A. Betourne et alia: “Central locomotor and cognitive effects of a NPF receptor agonist in mouse” Peptides 31, 221–226, 2010
Mouse Rota-Rod
Cat. No. 47650

General

Ugo Basile designed the first industrial Rota-Rod in the 1960s, based on the 1957 paper by N.W Dunham and T.S Miya.

The name we coined soon became so popular, now everybody knows this instrument as Rota-Rod!

The Rota-Rod is the reference test to screen drugs potentially active, or having side effects, on motor coordination.

The 47650 Rota-Rod NG (Next Generation), is an evolution of the original model and the result of many years of research in cooperation with the latest development in behavioral and pharmacological research.

The 47650 combines the same functionality of the previous version, now considered the standard, with additional new features: surprisingly silent operation, much easier experimental organization and data management.

Main Features

- **SPEED**: adjustable in the range 5-80 RPM, in steps of 1 RPM
- **MODE**: constant, ramp (accelerating), multi-step ramp *(NEW!)*
- **ROTATION**: forward, reverse and rocking
- **DRIVE**: totally silent motor. Zero noise!
- **CONTROLS**: 4”3 touch-screen to set and monitor the test
- **X-PAD SOFTWARE**: brand new, user-friendly version, to set the experiment and manage the results
- **DETECTION**: new design: trip-boxes to enclose the animals, stainless-steel to ease sterilization
General
The Ugo Basile Rota-Rod NG consists of a 3cm diam. rod, suitably machined to provide grip. Five flanges divide the five 5.7cm lanes, enabling five mice to be simultaneously on test. When a mouse falls off its rod section into the trip-box below, its endurance in RPMs is recorded. Height to fall is 16cm. A 4”3 touch-screen shows the information for each section, and indicates the actual speed, (RPM):

What's new
Physically similar to the previous versions, the new model features stainless-steel trip-boxes to facilitate cleaning and confine the animals when they fall off the rod.
Totally new is the X-PAD isoftware included as standard, see paragraphs below. Remote diagnosis and internet access are provided.

Experimental Configuration
Via the X-PAD software, the operator can easily organize the experiment on her/his PC, and upload it to the Rota-Rod via the USB key.
Treatments, protocols, stages, animals, and various test features (speed, mode, revolution, etc.) can be quickly defined and saved for future use.

Data Collection and Management
A basic version of the collected data can be viewed on the touch-screen; when transferred to PC via USB drive, test results appear in full version.
The software automatically classifies the data, combining configuration settings with test results. The user can add information, before or after the test. Results appear in a tree-like structure, where columns can be dragged and dropped to customize the layout.
Configurations and data are exported as Text, Excel or Pdf reports and can be saved to cloud via Dropbox, OneDrive, GoogleDrive.

47850 Combo-Package for Mouse & Rat
You work with both rats and mice? You should consider the Combination Package 47850, including both Mouse and Rat Rota-Rods.

Connections
USB1 this USB 2.0 enables data exchange (protocols & results) with the PC, and allows firmware upgrades
USB2 backup to USB1 with the same functions
I/O this D-SUB 15 connector provides TTL outputs for lane status, rotation and speed
COM this USB-B 2.0 allows communication to the PC
ETH the Ethernet connector is used for remote diagnosis and Internet access

Ordering Information
47650 MOUSE ROTA-ROD, standard package, including:
47650-320 Stainless-Steel Trip-Box
47650-302 Instruction Manual (on USB key)
X-PAD Dedicated Software Package (on USB)
USB Cable & Mains Cord
Optional
47850 Combination Package 47650 Mouse Rota-Rod and 47750 Rat Rota-Rod

Physical
Universal input 85-264 VAC, 50/60 Hz
Dimensions 46(w)x28(d)x33(h)cm
Weight Kg 11
Shipping Weight Kg 16 (approx.)
Packing 70x36x46cm

Method Papers

Bibliography
Papers Dealing With Rota-Rod Technique
• M. Milanese et alia: “Knocking Down Metabotropic Glutamate Receptor 1 Improves Survival And Disease Progression in the SOD1G93A Mouse Model of Amyotrophic Lateral Sclerosis” Neurobiol. of Disease 64: 48-59, 2014
• J.E. Lorenz: “Oxidant-Induced Activation of cGMP-Dependent protein Ki-nase Iα Mediates Neuropathic Pain After Peripheral Nerve Injury” Antioxidants & Redox Signaling Jan. 2014
• C.D. Heldermon et alia: “Development of Sensory, Motor & Behavioral Deficits in the Murine Model of Sanfilippo Syndrome Type B”: PloS ONE; 8 (e772): 2007 (rocking)
Rat Rota-Rod

Cat. No. 47750

General

Ugo Basile designed the first industrial Rota-Rod in the 1960s, based on the 1957 paper by N.W Dunham and T.S Miya.

The name we coined soon became so popular, now everybody knows this instrument as RotaRod!

The Rota-Rod is the reference test to screen drugs potentially active, or having side effects, on motor coordination.

The 47750 Rota-Rod NG (Next Generation), is an evolution of the original model and the result of many years of research in cooperation with the latest development in behavioral and pharmacological research.

The 47750 combines the same functionality of the previous version, now considered the standard, with additional new features: surprisingly silent operation, much easier experimental organization and data management.

Main Features

- **SPEED**: adjustable in the range 5-80 RPM, in steps of 1 RPM
- **MODE**: constant, ramp (accelerating), multi-step ramp (**NEW!**) (\[\[\]
- **ROTATION**: forward, reverse and rocking
- **DRIVE**: totally silent motor. Zero noise!
- **CONTROLS**: 4”3 touch-screen to set and monitor the test
- **X-PAD SOFTWARE**: brand new, user-friendly version, to set the experiment and manage the results
- **DETECTION**: new design: trip-boxes to enclose the animals, stainless-steel to ease sterilization

Ugo Basile: more than 10,000 citations
General
The Ugo Basile Rota-Rod NG consists of a 6cm diam. rod, suitably machined to provide grip. Five flanges divide the four 8.7cm lanes, enabling four rats to be simultaneously on test. When a rat falls off its rod section into the trip-box below, its endurance in RPMs is recorded. Height to fall is 30cm.
A 4”3 touch-screen shows the information for each section, and indicates the actual speed, (RPM).

What’s new
Physically similar to the previous versions, the new model features stainless-steel trip-boxes to facilitate cleaning and confine the animals when they fall off the rod.
Totally new is the software included as standard, see paragraphs below. Remote diagnosis and internet access are provided.

Experimental Configuration
Via the new X-PAD software, the operator can easily organize the experiment on her/his PC, and upload it to the Rota-Rod via the USB key.
Treatments, protocols, stages, animals, and various test features (speed, mode, revolution, etc.) can be quickly defined and saved for future use.

Data Collection and Management
A basic version of the collected data can be viewed on the touch-screen; when transferred to PC via USB drive, test results appear in full version.
The X-PAD software automatically classifies the data, combining configuration settings with test results. The user can add information, before or after the test. Results appear in a tree-like structure, where columns can be dragged and dropped to customize the layout.
Configurations and data are exported as Text, Excel or Pdf reports and can be saved to cloud via Dropbox, OneDrive, GoogleDrive.

47850 Combo-Package for Mouse & Rat
You work with both rats and mice? You should consider the Combination Package 47850, including both Mouse and Rat Rota-Rods.

Connections
USB1 this USB 2.0 enables data exchange (protocols & results) with the PC, and allows firmware upgrades
USB2 backup to USB1 with the same functions
I/O this D-SUB 15 connector provides TTL outputs for lane status, rotation and speed
COM this USB-B 2.0 allows communication to the PC
ETH the Ethernet connector is used for remote diagnosis and Internet access

Ordering Information
47750 RAT ROTA-ROD, standard package, including:
47750-320 Stainless-Steel Trip-Box
47750-302 Instruction Manual (on USB key)
X-PAD Dedicated Software Package (on USB)
USB Cable & Mains Cord
Optional
47850 Combination Package 47650 Mouse Rota-Rod and 47750 Rat Rota-Rod

Physical
Universal input 85-264 VAC, 50/60 Hz
Dimensions 55(w)x46(d)x57(h)cm
Weight Kg 15
Shipping Weight Kg 21 (approx.)
Packing 76x60x80cm

Bibliography
Method Papers

Papers Dealing With Rota-Rod Technique
- L. A. Griffiths et alia: “Knocking Down Metabotropic Glutamate Receptor 1 Improves Survival And Disease Progression in the SOD1G93A Mouse Model of Amyotrophic Lateral Sclerosis” J. of Pain, accepted manuscript, 2015
- CD. Helderman et alia: “Therapeutic Efficacy of Bone Marrow Transplant, Intracranial AAV-mediated Gene Therapy, or Both in the Mouse Model of MPS IIIIB” Molecular Therapy 15(5): 873-880, 2010 (rocking, mouse)
General

“Exercise is a multifactorial activity that affects virtually every organ and tissue in the body. Not only does exercise contribute many health benefits, but lack of exercise is implicated in many chronic health problems.

As evidence continues to accumulate concerning the impressive range of health benefits that exercise confers, biomedical researchers have increasingly become interested in conducting systematic studies of exercise to further define those benefits”


Ugo Basile introduces an original TREADMILL for rats and mice. The same device is suitable for tests on either rats or mice, by simply replacing the lane assembly.

Our model incorporates a shock grid at the back of the treadmill to deliver a mild electric shock, when an aversive stimulus is required.

The running-lane assembly can be manually tilted from -25° to +25°, in steps of 5°.

Main Features

- **SPEED:** from 3 to 100m/min, in steps of 1m/min
- **MODES:** constant, accelerating, custom ramps
- **SLOPE:** positive (uphill) or negative (downhill), from -25° to +25°
- **SHOCK:** from 0 to 2mA (in 0.1mA steps), included
- **CONTROLS:** 4”3 touch-screen to set and monitor the test
- **X-PAD SOFTWARE:** brand new, user-friendly version, to set the experiment and manage the results
- **DETECTION:** via incorporated electronic circuit automatically detects speed & absolute and relative distances
**Instrument Description**

Our Treadmill consists of a main unit, incorporating drive, shoker, running belt and shock grid, and a control unit with 4"3 touch-screen.

Two different lane assemblies are available, to provide the ideal running tracks for either rats or mice. The running surface consists of an easy-to-clean alimentary-grade white belt, providing suitable grip. The device features an autocleaning tool and a pan to collect droppings.

**Mouse Lane-Assembly**

The mouse assembly, a structure which is quickly and easily fitted to the main unit, consists of 7cm high external walls and inside partitions, to divide the running belt into 6 lanes, each 45x5.5cm. Each lane is provided with a transparent lid.

**Rat Lane-Assembly**

The rat assembly has different dimensions: walls and partitions are 15cm high, and the running belt is divided into 3 lanes, each 45x11cm.

**Shock & Detection Circuit**

The grid (3mm bars, placed 8mm apart.) attached to either mouse or rat assembly, delivers the light foot-shock. Shock intensity and frequency can be preset via the controller module, as well as the cut-off number of shocks. The setting is common to all lanes.

The same grid also functions as detection system: distance, both absolute and relative, and speed are detected and recorded.

**Experimental Configuration**

Via the X-PAD software, the operator can easily organize the experiment on her/his PC, and upload it to the Treadmill via the USB key.

**Data Collection and Management**

A basic version of the collected data can be viewed on the touch-screen; when transferred to PC via USB drive, test results appear in full version. The software automatically classifies the data, combining configuration settings with test results. The user can add information, before or after the test. Results appear in a tree-like structure, where columns can be dragged and dropped to customize the layout.

**Configurations and data are exported as Text, Excel or Pdf reports.**

**Connections**

USB connectors are provided for data exchange and firmware upgrades; the lower USB port accommodates the USB storage key. The D-SUB 15 connector provides TTL outputs for shock status for each lane, and speed. Additional ports are provided for factory use and remote diagnosis.

**Ordering Information**

47302 Rat Treadmill NG: tapis-roulant with touch-screen controller & shoker, 3-lane partition assembly 47300-002 (each lane 45x11x15(h)cm), manual tilting (-25°/+25°), transparent cover. Complete with X-PAD software, USB output, USB flash drive.

47303 Mouse Treadmill NG: as above, with 3-lane partition assembly 47300-002 (each lane 45x5.5x7(h)cm).

X-PAD Dedicated SW Package (on USB)

47300 Combo-Package for Mouse & Rat

Working with both rats and mice? Consider the Combination Package 47300, including the main unit and both Mouse & Rat interchangeable lane-assemblies!

**Special model for tethered mice:**

47300-013 Mouse 6-lane assembly (each lane 45x5.5x15(h)cm, without lid, for tethered mice)

**Specs:**

- Speed: 3 to 100m/min, in steps of 1m/min
- Shock: 0 to 2mA, 1, 2 or 3Hz
- Slope: from -25° to +25°, in steps of 5°

**Physical**

- Universal input: 85-264 VAC, 50/60Hz
- Dimensions: 56(w) x 67(d) x 35(h) cm
- Weight: Kg 22-27 (with 1 or 2 lane assy)
- Shipping Weight: Kg 35-40 (approx.)
- Packing: wooden crate, 77x65x63 / 82x71x57 cm

**Bibliography, Method Papers**

Rotometer

Cat. No. 43000

General

The Rotometer is widely used in research on motor assessment tests, in traumatic and acquired brain injury research and spinal cord injury research.

There are several well-characterized causes for animals to exhibit rotational behavior:

- Uneven/unilateral higher expression of levels of neurotransmitters (such as GABA or dopamine). Some brain tumors can cause aberrant expression levels to occur. Injury may also interfere with proper neurotransmitter expression and/or cause some localized change in neurotransmitter expression.

- Developmental anomalies can also cause rotational behavior.

- Anxiety/stress may cause this aberrant behavior.

- Exposure to some drugs, or drug abuse, or withdrawal from some drugs; all may cause rotational sequences.

- Physical lesions also can cause rotational behavior in an animal.

Main Features

- No jacket or tether is necessary: the animal is completely free

- Stand-alone, with internal memory

- Quick and simple to use: no training, turn-key system with software included

Ugo Basile: more than 10,000 citations
Freely Moving Animals

To quantify rotational behavior in a freely moving mouse is a significant development.

This new Rotometer accomplishes this task precisely, using new and clever technology to count clockwise (CW) and counterclockwise (CCW) rotations in an open field.

The animal just carries a small magnet (not much larger than a grain of rice) on its nape or on its tail.

The magnet can be surgically implanted or injected subcutaneously; however, a convenient method is to attach it to the base of the mouse tail by using standard laboratory tape. This easy and efficient method, involves minimal stress for the animal, and has the advantage of requiring no anesthesia procedure.

Data Acquisition

The 43000 is a microprocessor controlled unit. The experimental data, stored in its internal memory can be directly exported to the PC USB port, or to a flash drive (included).

Communication is managed by the dedicated CUB Data Acquisition Software Package, Cat. 52050-13, included as standard. The CUB Windows®-based Software Package enables the user to route the experimental data to the PC and store them into individual files, to be managed by most statistical analysis packages available on the market.

Principle of Operation

The animal is placed in the open field (20cm diam., circular arena, enclosed in a 25cm tall acrylic cylinder. Our Rotometer is dimensioned for mice, but small rats can also be tested conveniently.

The design of this detecting system is very advanced, to enable the arena to be quite large whilst the magnet aboard is very small.

When the mouse circles within the open field, or rotates in place, the magnet (carried by the mouse) also rotates.

Sensors below the open field pick up these rotations, and the electronics record their number over time, discriminating Clockwise from Counterclockwise rotation.

As CW and CCW rotations accrue, they are displayed on the front panel and stored in the instrument internal memory; experiments may be qualified with animal data, date, time, and other diagnostic data.
Hole Board
Cat. No. 6650
Cat. No. 46653 for Videotracking

General

The Hole-Board 6650 has been conceived to study the innate exploratory behavior of the mouse confronted with a new environment (head plunging stereotype), according to the classic method devised by Böissier-Simon.

The normal mouse of either gender, when confronted with a new environment, will explore holes in the substrate of its environment by poking its nose in and out of the hole a few times, then moving on to the next hole.

The initial exploration activity of the animal and its variations brought about by psychotropic drugs are unmistakably assessed. The nose poke frequency provides an indicator of exploratory behavior.

The test lasts few minutes and does not require any previous training/conditioning of the animal.

A model with no recording unit is also available; the non-reflecting surface makes it particularly suitable for Videotracking. Ask for Cat. No. 46653.

Main Features
- The recording of the “nose poking” stereotype takes place automatically
- A few minute test is sufficient for most screenings
- No previous training/conditioning required
- A specific model for Videotracking is available

Quick Test for Exploratory Behavior in Mice

The classical “Planche à Trous” Test by Boissier & Simon

Ugo Basile: more than 10,000 citations
**Instrument Descriptions**

The “Méthode de la Planche à Trous” devised by Boissier & Simon (see bibliography) can be performed under optimum conditions: the recording of the “head plunging” or “nose poking” stereotype takes place automatically, via miniature I.R. emitters/receivers embodied in the “holes”.

The instrument consists of a “Board” and a Control Unit.

**Control Unit 6651**

The control unit is lodged into a resilient cabinet whose front panel features the ACTIVITY display, the RESET and TEST keys, the LED visual indicators.

At every head plunging, the ACT (activity) LED blinks and the read-out increases by one digit.

A time-constant has been provided to inhibit the circuit to record a rapid up & down nose poking as it were a multiple event.

The figure remains frozen until the operator depresses the reset key again, when placing a fresh mouse on the board.

**Board 6652**

The 40x40 cm board, 2.2cm thick, is made of grey Perspex. The matt finishing avoids reflections which may alter the behaviour of the animal.

The board embodies 16 “head-plunging detectors”, each comprising an I.R. emitter and a diametrically opposed receiver, flush mounted 1cm below the upper panel.

The dimensioning of the board and holes has been optimized for mice in the 15-30g range, to provide negligible false recordings.

**Special Model for Videotracking**

A special model of Mouse Hole-Board is also available, with no electronics, ideal for Videotracking.

The 46653 is a simple open field, dimensioned 40x40cm, with 16 holes diam 3cm, spaced 10cm apart (from center to center), enclosed in transparent (or opaque) walls. The non-reflecting surface makes it particularly suitable for Videotracking.

A similar model, the 46652, is also available, dimensioned 1mx1m, 35cm high, 16 holes diameter 3.8cm, to test rat exploratory behavior.

---

**Ordering Information**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6650</td>
<td>HOLE BOARD, standard package including:</td>
</tr>
<tr>
<td>6651</td>
<td>Control Unit</td>
</tr>
<tr>
<td>6652</td>
<td>Board</td>
</tr>
<tr>
<td>6655</td>
<td>Instruction Manual (on USB key)</td>
</tr>
<tr>
<td>E-WP08</td>
<td>Mains Cable</td>
</tr>
</tbody>
</table>

**Basic Specs.**

- **Power**: 15 or 230V, 50/60Hz, 15W max.
- **Dimensions**: 40x40x2.2(h)cm (board), 26x15x25(h)cm (controller)
- **Weight**: 5.5Kg
- **Shipping Weight**: 10Kg approx.
- **Packing**: 67x42x53cm

**Bibliography**

- J.R. Boissier et P. Simon: “Dissociation de deux composantes dans le comportement d’investigation de la souris” Arch Int. Pharmacodyn 147, No. 3-4, 1964
- J.R. Boissier et P. Simon: “L’utilisation d’une réaction particulière de la souris (Méthode de la planche à trous) pour l’étude des médicaments psychotropes” Thérapie XIX, 571-589, 1964

**Method Paper**

- M. A. Yrbas et alia: “Pharmacological Mechanism Underlying the Antinociceptive Activity of Vanillic Acid” Pharmacol Biochem. And Behav. 132: 8-95, 2015
Rotating Wheels for Rodent Activity

Cat. No. 1800 / 1850

General
The Activity Wheels are designed to provide an easy and convenient method for measuring motor activity over long periods of time in laboratory rodents.

Especially useful for research on circadian rhythms or motor function, when connected to the 2600 Multifunction Printer or to any other data acquisition systems.

Main Features
- Flexibility: version for rats or mice
- Easy monitoring (compatible with any Data Acquisition System)
- All stainless-steel wheel construction
- Clear polycarbonate cage for total visibility

Data Acquisition available as optional (2600 Multifunction Printer)
1850 Mouse Cage

The 11850 is the classic 25 cm diameter running-wheel made of stainless steel, provided with low friction Teflon bushing, for quite smooth action. The mouse runs on 2mm bars, placed 7 mm apart.

The wheel is housed in a clear polycarbonate cage. A stainless steel wire lid with exclusive lid locks incorporates a U-shaped food hopper for pellets; water bottle is not included.

The Mouse cage is dimensioned 37(h)x26(w)x358(d) cm.

1800 Rat Cage

The Rat Cage is similar to the mouse model; the running wheel has 35 cm diameter. The 2 mm bars are placed 8.8 mm apart.

Dimensions of the Rat Cage are 48(h)x32(w)x47(d) cm.

Revolution Counter

Each cage is complete with magnetic switch and LCD counter. The switch counts whole revolutions of the activity wheel and operates on an extended-life battery (included).

Cages without counter, models 1800-S and 1850-S, are also available, for data collection via PC, see paragraph below.

Data Acquisition

For data acquisition a Multifunction Printer is required.

This is a microprocessor controlled device, designed to acquire data from 6 Cat. 2600) independent channels (each Activity Wheel requires 1 channel).

The data, stored in the 2600 internal memory and shown on its graphic display, can be printed out in real time and/or routed to the PC, via the CUB software provided as standard.

When working with the Multifunction Printer, the counter is not required, so you may consider models 1800-S or 1850-S.

The picture above features a Multifunction Printer, with the necessary multi-connection cable 2610-F to connect up to 6 activity wheels.

Ordering Information

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800</td>
<td>Rat Activity Wheel, complete with polycarbonate cage, magnetic switch and LCD revolution counter</td>
</tr>
<tr>
<td>1850</td>
<td>Mouse Activity Wheel, complete with polycarbonate cage, magnetic switch and LCD revolution counter</td>
</tr>
<tr>
<td>1800-S</td>
<td>Rat Activity Wheel, complete with polycarbonate cage &amp; magnetic switch, without counter</td>
</tr>
<tr>
<td>1850-S</td>
<td>Mouse Activity Wheel, complete with polycarbonate cage &amp; magnetic switch, without counter</td>
</tr>
</tbody>
</table>

Multifunction Printers

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2600</td>
<td>Multifunction Printer, 6 input channels, with microprocessor for direct connection to the PC. Complete with dedicated software 52050-01, serial cable &amp; USB adaptor</td>
</tr>
<tr>
<td>2610-F</td>
<td>Multi-Connection Cable</td>
</tr>
</tbody>
</table>

Physical

<table>
<thead>
<tr>
<th>Size</th>
<th>Dimensions</th>
<th>Weight</th>
<th>Shipping weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1800</td>
<td>48(h)x32(w)x47(d) cm</td>
<td>7Kg</td>
<td>11Kg</td>
</tr>
<tr>
<td>1850</td>
<td>37(h)x26(w)x358(d) cm</td>
<td>5Kg</td>
<td>7Kg</td>
</tr>
</tbody>
</table>
For the past 5 decades we have provided scientists with the unmatched tools necessary to transform their ideas into meaningful research and results.

We look forward to working with you and to another 50 years.