CATALOGUE 2017

your science, our devices

PAIN, INFLAMMATION / MOTOR COORDINATION


PAIN AND INFIAMMATION


MOTORY COORDINATION, GRIP, STRENGTH, ACTIVITY


VENTILATORS AND GAS ANESTHESIA


BEHAVIOUR, CONDITIONING, REWARD


BEHAVIOUR, MAZES, TRACKING


TISSUE BATHS, TRANSDUCERS, RECORDERS


MISCELLANEOUS, ECT, LMD


BLOOD PRESSURE, VITAL FUNCTIONS


METABOLISM, FEEDING BEHAVIOUR


MUROMACHI MICROWAVE FIXATION

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what's new

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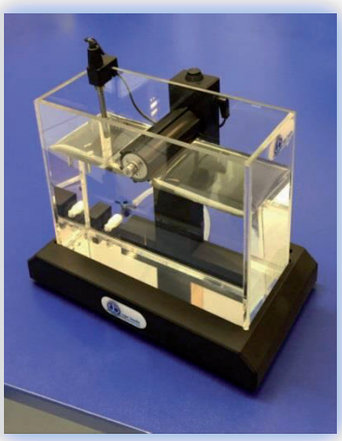
STARTLE RESPONSE/PPI

a new device in the BEEHIVE family

beehive
cage-manager system.
A single touch-screen 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



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roadmapping the future of behavioral research!

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PAIN AND INFLAMMATION

MOTORY COORDINATION, GRIP STRENGTH, ACTIVITY

Ugo Basile: more than 10,000 citations

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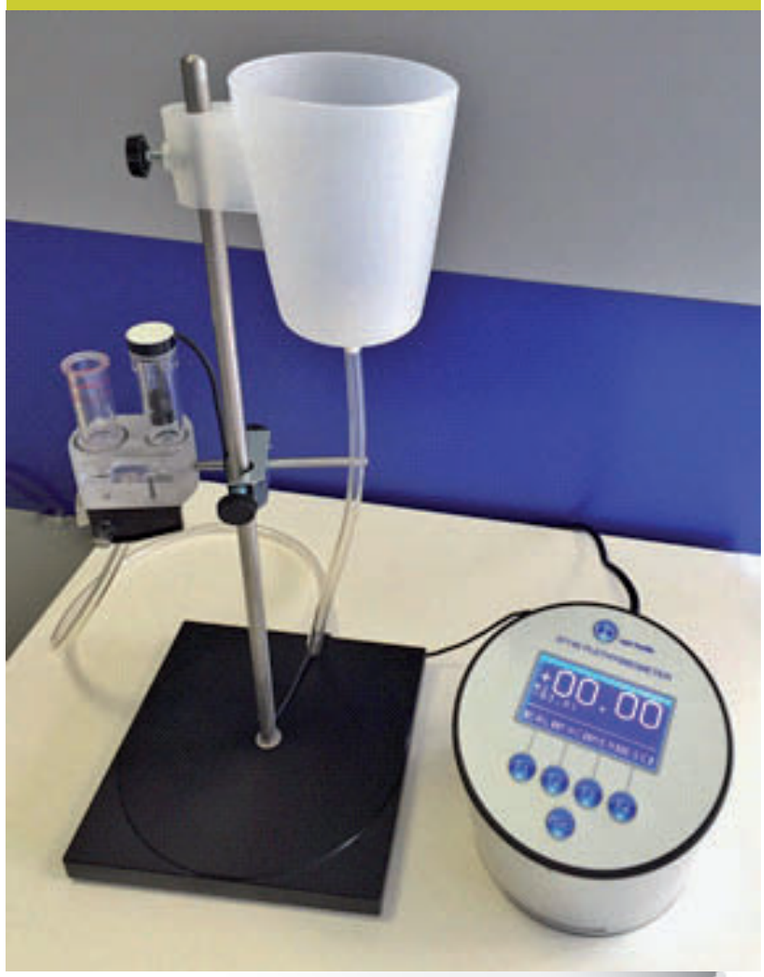
PAIN and INFLAMMATION

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.

Including measuring cell for both RAT & MOUSE paw!!

FOR ACCURATE MEASUREMENT OF:

- RAT paw oedema
- MOUSE paw oedema

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

Ugo Basile: more than 10,000 citations

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.

Ordering Information

37140	**PLETHYSMOMETER**, standard package including:-
7141	Electronic Block
7152-S	Standard Water Cell, diam. 1.8cm, including mouse paw tube **7186**, diam. 1.3cm
7153-L	Conductance Transducer
7140-154	Water Reservoir
7155	Calibration Probes (0.1, 0.2 , 0.5, 1, 2, 4ml)
7160	Wetting Compound, 100ml bottle
7165	Connection tube (cell-reservoir & drain vessel)
37215-303	"Hold" Pedal Switch
52050-02	CUB Dedicated Software (on USB drive)
37140-302	Instruction Manual (on USB drive)
52010-320	USB to serial port converter
52010-322	Connecting cable 9 to 9 pin
4210	Three Claw Stand, 10mm diam. upright
4003	Open Side Boss-Head
E-WP 008	Mains Cord

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

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- T. Keränen et alia: "Anti-Inflammatory Effects of β2-Receptor Agonists Salbutamol and Terbutaline Are Mediated by MKP-1" PLoS ONE, February 5, 2016
- A. Horváth et alia: "Transient Receptor Potential Ankyrin 1 (TRPA1) Re-ceptor is Involved in Chronic Arthritis: in Vivo Study Using TRPA1-Deficient Mice" Arthritis research & therapy 18(6), 2016
- F. Bonezzi et alia: "An Important role for N-Acylethanolamine Acid Ami-dase in the Complete Freund's Adjuvant Rat Model of Arthritis" J Phar-macol. Exp. Ther. jpet.115.230516, 2016
- T. Iannitti et alia: "Adiponectin-Mediated Analgesia and Anti-Inflammatory Effects in Rat" PLoS ONE , Sept. 9th, 2015
- D.B. Vendramini-Costa et alia: "Anti-inflammatory and antinociceptive ef-fects of racemic goniothalamin, a styryl lactone" Life Sciences 139: 83-90, 2015
- F. Vincenzi et alia: "A**2A Adenosine Receptors Are Differentially Modulated by Pharmacological Treatments in Rheumatoid Arthritis Patients and Their Stimulation Ameliorates Adjuvant-Induced Arthritis in Rats**" PLoS ONE 8(1): e54195, **2013**
- T. Bertaim et alia: "**Dose and Administration Schedule Effect of Tiludro-nate on Joint Damage in the Model of Complete Freund Adjuvant Induced Monoarthritis in Rats**" Open Journal of Rheumatology and Autoimmune Diseases 3: 18-25, **2013**

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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!

now available with
optional upgrade to
digital reading

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

- L.O. Randall and J.J. Selitto: "**A Method for Meas-urement of Analgesic Activity on Inflamed Tissue**" Arch. Int. Pharmacodyn. CXI, No. 4: 409-419, **1957**.

REFERENCE TO UB ANALGESY-METER (RAT)

- E.K. Joseph et alia: "**Vascular Endothelial Cells Mediate Mechanical Stimu-lation-Induced Enhancement of Endothelin Hyperalgesia via Activation of P2X2/3 Receptors on Nociceptors**" J. Neuroscience 33 (7): 2849-2859, **2013**
- L. Ferrari et alia: "**Role of Nociceptor αCaMKII in Transition from Acute to Chronic Pain (Hyperalgesic Priming) in Male and Female Rats**" J. Neuro-science 33 (27): 11002-11011, **2013**
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- Zs. Helyes et alia: "**Involvement of Transient Receptor Potential Vanilloid 1 Receptors in Protease-Activated Receptor-2-induced Joint Inflammation and Nociception**" Eur. J. of Pain 14 (4): 351-358, **2010**

REFERENCE TO UB ANALGESY-METER (MOUSE)

- K. Sugimoto et alia: "**The Impact of Low-Dose Insulin on Peripheral Nerve Insulin Receptor Signaling in Streptozotocin-Induced Diabetic Rats**" PLoS ONE: 8(8): e74247, **2013**
- M.J. Hussey et alia: "**Deletion of the Adenosine A2A Receptor in Mice en-hAnces Spinal Cord Neurochemical Responses to an Inflammatory Noci-ceptive Stimulus**" Neuroscience Letters 506(2): 198-202, **2012**
- M.S. Nash et alia: "**7-tert-Butyl-6-(4-Chloro-Phenyl)-2-Thioxo-2,3-Dihydro-1H-Pyrido[2,3-d]Pyrimidin-4-One, a Classic Polymodal Inhibitor of ...**" J. Pharmaco. Exper. Therap. 342 (2): 389-398, **2012**

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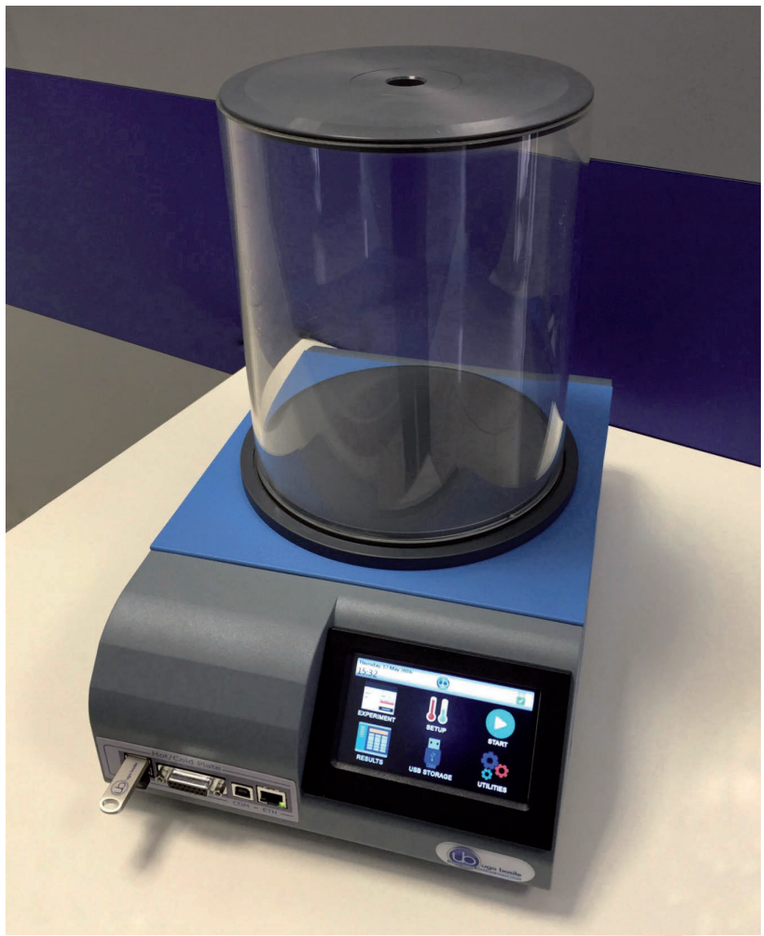
Hot / Cold Plate

ng

Cat. No. 35150



General

This new **Hot/Cold Plate NG** offers a wide temperature range, presetable 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).

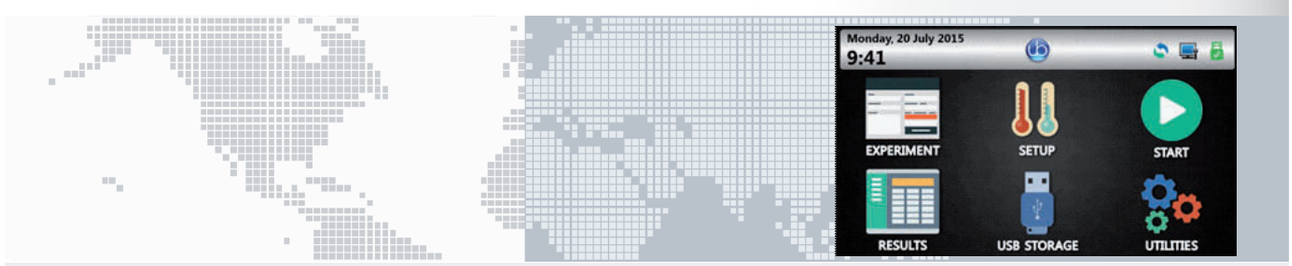
An optional **auxiliary Plate** (heat only) can be connected to the main unit and will be useful in the habituation phase.

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

for Rats

for Mice

- **IT CAN BE USED AS HOT PLATE OR COLD PLATE**
- **NEXT GENERATION INSTRUMENT: SAME RELIABILITY, INNOVATIVE TECHNOLOGY!**



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

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.

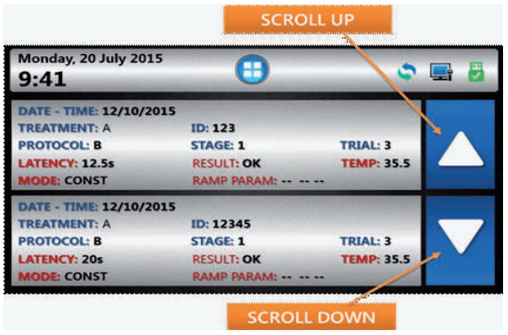
Experimental Configuration

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.

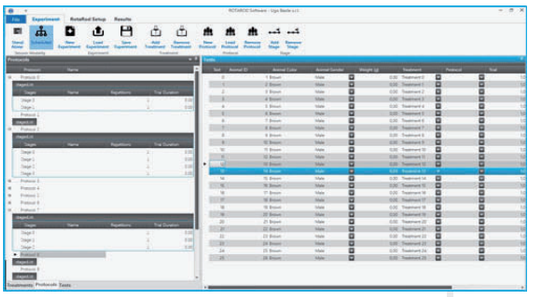
Data Collection and Management

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

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

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.

35150-002	Auxiliary Hot Plate
35150-002	Combo Package 35150 & 35150-002

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***
- W. Kallenborn-Gerhardt et alia: "**Nox2-dependent signaling between macrophages and sensory neurons contributes to neuropathic pain hypersensitivity**" Pain 55(19): 2161-2160, ***2014***
- D. Piomelli et alia: "**Anandamide suppresses pain initiation through a peripheral endocannabinoid mechanism**" Nature NSC, ***2010***

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Plantar Test
(Hargreaves Apparatus)

Cat. No. 37370

For Rats

For Mice

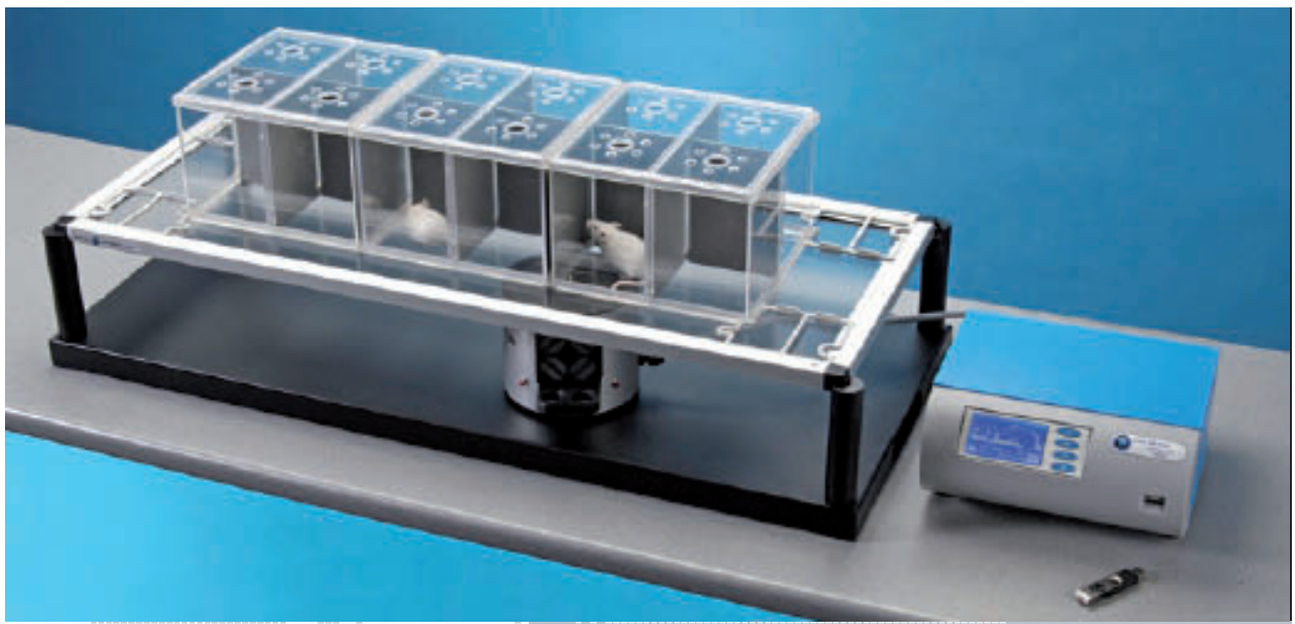
AUTOMATIC MEASUREMENT OF THE ANIMAL RESPONSE

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

Ugo Basile: more than 10,000 citations

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 latform 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

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

Optional Spares & Accessories

37000-145	Panel-Mount Printer
37300	Heat-Flux I.R. Radiometer
E-HR 002	Replacement Bulb
37370-278	Additional stimulation base, complete with glass pane and animal enclosure
37100	Set of two **Durham Holders** for **orofacial** stimulation (see separate datasheet)

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	27.50 Kg approx

Bibliography

Method Paper:

- K.M.Hargreaves, R.Dubner, F.Brown, C.Flores & J.Joris: "**A New and Sensitive Method for Measuring Thermal Nociception in Cutaneous Hyperalgesia**" Pain 32: 77-88, **1988**.
- D.C. Yeomans & H.K. Proudfit: "**Characterization of the Foot Withdrawal Response to Noxious Radiant Heat in the Rat**" Pain 59: 85-97, **1994**.

Papers mentioning UB model:

- D. Piomelli et alia: "**Anandamide suppresses pain initiation through a peripheral endocannabinoid mechanism**" Nature NSC, **2010**
- L. Mannelli et alia: "**Effects of the Neutrophil Elastase Inhibitor EL-17 in Rat Adjuvant-Induced Arthritis**" Rheumatology 10.1093, **2016**
- S. Castany et alia: "**The Antinociceptive Effects of a δ-Opioid Receptor Agonist In mice with Painful Diabetic Neuropathy: Involvement of Heme Oxygenase 1**" Neurosc.Letters 614: 49-54, **2016**
- Z.Z. Huang et alia "**Mir-500-Mediated GAD67 Downregulation Contributes to Neuropathic Pain**" J. Neurosci 36(23): 6321-6331, **2016**
- T.A. Nees et alia: "**Early-Onset Treadmill Training Reduces Mechanical Allodynia and Modulates Calcitonin Gene-Related Peptide Fiber Density in Lamina III/IV in a Mouse Model of Spinal Cord Contusion injury**" Pain 157(3): 687-697, **2016**
- V. Carozzi et alia: "**Chemotherapy-Induced Peripheral Neurotoxicity in Immune-Deficient Mice: New Useful Ready-to-Use Animal Models**" Exp. Neurology 264: 92-102, 2015

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Tail-Flick Unit

Cat. No. 37360

Dedicated Software

Memory Key included

RAPID and PRECISE SCREENING OF ANALGESIC DRUGS ON THE RAT TAIL

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 determinedand 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

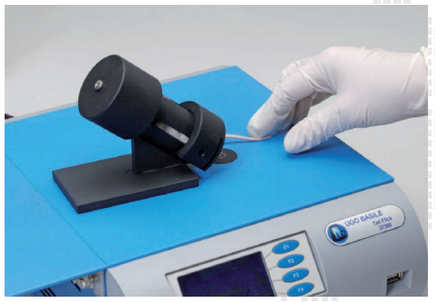
Instrument Description

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 recorderd.

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**

Ordering Information

37360	**TAIL-FLICK UNIT,** complete with following standard accessories:-
37215-303	Pedal Switch, complete with cable
37360-302	Instruction Manual (on USB key)
52050-09	CUB Software (on USB key)
52010-323	USB cable
E-WP008	Mains Cord

Accessories and Optionals

57145	MiniPrinter
37300	Heat-Flux I.R. Radiometer
E-HR 002	Replacement Bulb
37360-325	Mouse Holder, 25mm diam.
37360-330	Mouse Holder, 30mm diam.

Basic Specifications

I.R. Intensity	adjustable in the interval 01-99 (in one digit steps)
Reaction Time	three digits, 0.1s steps
Calibration	via appropriate I.R. Radiometer

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:

- F.E. D'Amour & D.L. Smith: "**A Method for Determining Loss of Pain Sensation**" J. Pharmacol. Exp. Therap. 72: 74-79, **1941**

Papers mentioning UB model:

- T.O. Lilius et alia: "**The Mineralocorticoid Receptor Antagonist Spironolactone Enhances Morphine Antinociception**" Eur. J. of Pain online view, **2013**
- J.W. Little et alia: "**Spinal Mitochondrial-Derived Peroxynitrite Enhances Neuroimmune Activation During Morphine Hyperalgesia and Antinociceptive Tolerance**" Pain 154 (7): 978-986, **2013**
- P.J. McLaughlin et alia: "**The Mineralocorticoid Receptor Antagonist Spironolactone Enhances Morphine Antinociception**" Eur. J. of Pain online, **2013**
- T.A. Kosten et alia: "**A Morphine Conjugate Vaccine Attenuates the Behav-ioral Effects of Morphine in Rats**" Progr. in Neuro-Psychopharmacol. and Biol. Psychiatry 45: 223–229, **2013**
- 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**

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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.

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

Main Features

- Provides a measure of stimulus intensity in mW/cm^2
- Assures that all infrared instruments are emitting the same level of stimulus intensity

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.

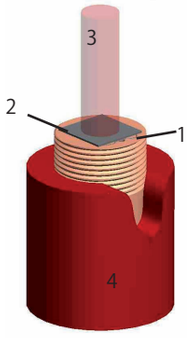
Moreover, if the bulb is replaced or the electronics serviced, output alteration of more significant magnitude, say, 8-10%, may take place.

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.



1 Heat-Sink
2 Temperature Gradient Sensor
3 I.R. Beam
4 Plastic Guard

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:

$$p = \Delta T / \rho d$$

Where ΔT is the temperature difference between top and bottom surfaces of the sensor, ρ is its thermal resistivity and d its thickness.

It is notable that the determination of p is not affected by the heat-sink temperature. ΔT only comes into play. The time constant of the system ζ (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.

ρ 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

37300	**I.R. HEAT-FLUX RADIOMETER**, standard package, including:-
37300-001	Heat-Flux Meter (complete with cable/connector & 9V battery)
37300-002	Heat-Flux Probe
37300-302	Instruction Manual (on CD)
37300-320	Probe Front Cover
37300-321	Adaptor for Tail-Flick
37300-322	Adaptor for Plantar Test
I-A 073	Instrument case

Physical

37300 complete standard package, lodged in its case:

Dimensions	37x32x11cm
Weight	1.5Kg
Packing	46x38x27cm
Shipping Weight	3.6Kg

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Dynamic Plantar Aesthesiometer

Cat. No. 37450

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

ASSESSMENT OF ANIMAL SENSITIVITY TO LIGHT TOUCH OF THE PAW

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
- Data Portability via the Memory-Key provided with the standard package
- Print-out: by optional panel mount or independent thermal MiniPrinter
- NEW: orofacial stimulation by optional holders

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
37450-005	Framed testing surface (perforated plat-form)
37000-006	Modular animal enclosure (3 to 12 spaces)
37450-302	Instruction manual (on USB key)
37400-321	Set of two 0.5mm diam. NiTi alloy filaments, two calibration weights (5 & 50 g) and accessories, in a plastic case
E-WP 008	Mains Cord
52050-12	CUB Data Acquisition Software Package, with USB Connection Cable

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

- R. Lu, A. Schmidtko: "**Direct Intrathecal Drug Delivery in Mice for Detect-ing In Vivo Effects of cGMP on Pain Processing**" Methods in Molecular Biology 1020: 215-221, **2013**
- I.Q. Russe et alia: "**Activation of the AMP-Activated Protein Kinase Reduces Inflammatory Nociception**" Journal of Pain 2, **2013**
- J. Btesh et alia: "**Mapping the Binding Site of TRPV1 on AKAP79: Implications for Inflammatory Hyperalgesia**" J. Neuroscience 33 (21): 9184-9193, **2013**
- 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**
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- P.J. Austin et alia: "G. Chronic Constriction of the Sciatic Nerve and Pain Hypersensitivity Testing in Rats" JoVE 61, e3393, doi:10.3791/3393, 2012 http://www.jove.com/video/3393/chronic-constriction-sciatic-nerve-pain-hypersensitivity-testing

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PAM

PRESSURE APPLICATION MEASUREMENT

Cat. No. 38500

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.

Fig. 1: "Joint Transducer"

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

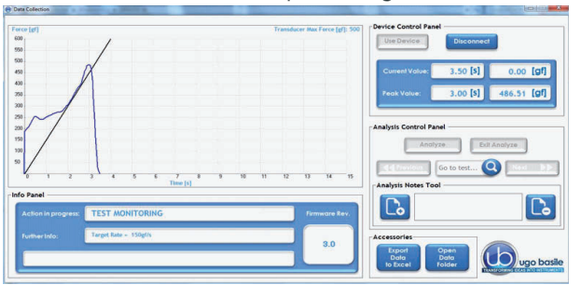
Fig. 2: "Paw Transducer"

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.

Fig. 3: "PAM device standard package (38500), shown with pedal switch, small and large joint transducer and Usb cable".

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 trasferred 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

- **Method Paper:** N. J. Barton et al.: "**A novel behavioural technique for measuring hypersensitivity in a rat model of joint pain**". *J. Neurosc. Methods,163, 67–75, **2007**.*
- B.Y. Cooper et alia: "Exposure to Gulf War Illness Chemicals Induces Functional M**uscarinic Receptor Maladaptations in Muscle Nociceptors"** NeuroToxicology 54: 99-110, ***2016***
- T.J. Nutter et alia: "**A Delayed Chronic Pain Like Condition with Decreased KV Channel Activity in a Rat Model of Gulf War Illness Pain Syndrome**" NeuroToxicology 51: 67-69, ***2015***
- D. Amorim et alia: "**Amitriptyline reverses hyperalgesia and improves associated mood-like disorders in a model of experimental monoarthritis**" *Behav. Brain Res 265: 12-21, **2014***
- T. Schwagarus et alia: "**A New Method for Measuring CFA-induced Mechanical Hyperalgesia in the Rat**" *Evotec 2012*
- J. Leuchtweis et al.: "**Validation of the Digital Pressure Application Measurement (PAM) Device for Detection of Primary Mechanical Hyperalgesia in Rat and Mouse Antigen-Induced Knee Joint Arthritis**..." *Methods & Findings in Exp. & Clinical Pharmacol., 32(8): 581-589, **2010***
- **38550 (*)**: P. Di Giminiani et alia: "**Capsaicin-induced Neurogenic Inflammation in Pig Skin: A Behavioural Study**" *Res. In Vet Science 96(3): 447-453, **2014***

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e-VF

ELECTRONIC VON FREY

Cat. No. 38450

General

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 them 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.

Sensitivity

Allodynia

ASSESSMENT OF HYPERSENSITIVITY IN RATS & MICE

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

Rationale of the technique

Impaired cutaneous sensation is usually first make 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.

Fig. 1: "touch stimulator" with prism. Optional grid mesh not included

Data Monitoring and Storage

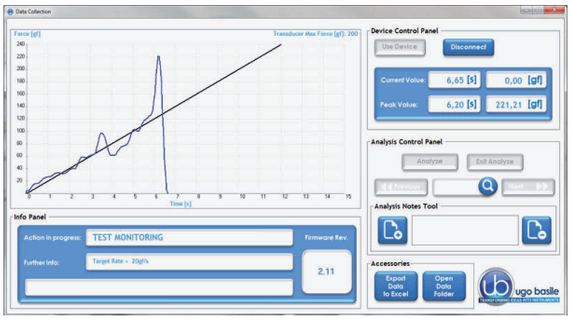
The device comes standard with both a control unit with internal memory and the **new DCA software** for signal monitoring, data transfer and analysis.

Once saved, data can be browsed on the control unit and/or trasferred 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 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.

Fig. 2: electronic unit, usb cable and foot pedal

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
38450-310	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

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Von Frey Hairs

Cat. No. 37450-275

Hypersensitivity

Touch Threshold

Semmes Weinstein Von Frey Filaments for Touch Assessment

General

Von Frey hairs (named after the German physiologist Max von Frey, 1852–1932) were been 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

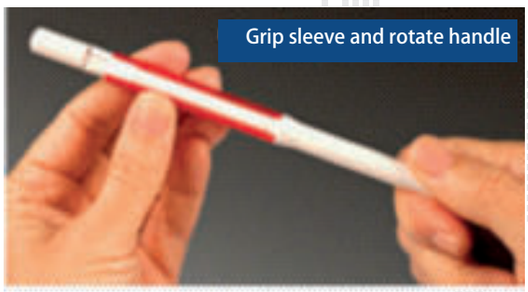
Von Frey Filaments have a long history of effective use in clinical settings, and can be used to diagnose pathologies of hyper- or hypo-aesthesia.

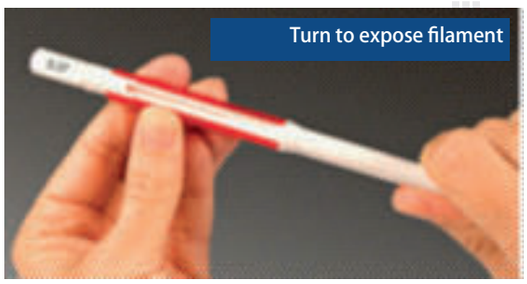
The operating principle remains the same: when the tip of a fiber of given length and diameter is pressed against the skin at right angles, the force of application increases as long as the researcher continues to advance the probe, until the fiber bends. After the fiber bends, continued advance creates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

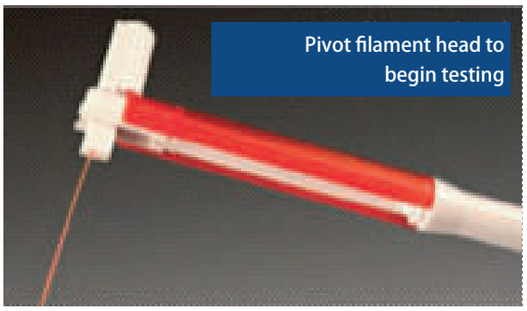
This principle makes it possible for the researcher using a hand held probe to apply a reproducible force, within a wide tolerance, to the skin surface.

Rodents exhibit a paw withdrawal reflex when the paw is unexpectedly touched. The Touch Test™ Sensory Evaluator 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; intervening 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

37450-275	**Aesthesio®** Sensory Evaluator, Kit of 20 Von Frey filaments in a carrying case

Physical

Weight	0.4 Kg
Shipping Weight	0.9 Kg
Packing	24x22x5cm

Options

37450-005	Large Perforated Metal Platform (testing shelf) for plantar stimulation
37450-045	Platform 37450-005, with 40cm legs
37450-085	Platform 37450-005, with 80cm legs
37000-006	Multiple-configuration animal-enclosure, from 3 to 12 spaces
37450-277	Set of 20 VonFrey Filaments 37450-275 & complete base assembly 37450-278
37450-278	Base Assembly for plantar stimulation, incl. supporting columns, perforated metal sheet and multiple-configuration animal-enclosure, from 3 to 12 spaces

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Orofacial Stimulation Test

Fehrenbacher, Henry and Hargreaves Method

Cat. No. 31300

Mechanical Nociception

Thermal Nociception

Trigeminal hyperalgesia

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 ac-cess 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

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.

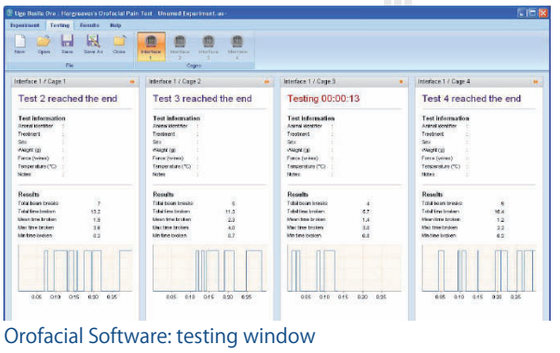
This innovative approach permits highly integrated nociceptive responses to thermal or mechanical stimulation.

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.



Orofacial Software: testing window

The, Data are shown in real-time both as numeric summary results and in a graphic format. Data are automatically analyzed across time according to an adjustable time window, independently viewable for each of the 16 cages. The results of all the tests are available in a spreadsheet format which can easily be copied to other programs for further analysis.

Either the thermal or the mechanical stimulator is mounted onto a **stimulation/detection "wall"**, which also incorporates a drinking bottle and fits inside standard rat home cages (e.g. Tecniplast or Allentown).

Stimulus/detection "walls" mounted into standard home cages

The **thermal stimulator** relies on a copper tubing loop and a circulating water bath, whose temperature can be adjusted from ambient to 70°C, to reach hot nociceptive thresholds. Chin inserts are included to test animals of different size.

The **mechanical stimulator** relies on thin wires attached to a mounting plate. The system comes with several plates, each with a different number of wires in order to apply different force levels to the animal vibrissal pad.

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

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.*

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)

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- M. Cha et alia: "**Assessment of chronic trigeminal neuropathic pain by the orofacial operant test in rats**" Behav. Brain Research 234: 82-90, 2012
- Fehrenbacher, J.C. *et al.* 2010. "**Characterization of a novel orofacial behavioral assay to assess hyperalgesia to thermal and mechanical stimulation**". (submitted).

www.ugobasile.com

Durham Animal Holders

New animal holders for trigeminal stimulation

Cat. No. 37100

- Orofacial Pain assessment
- Mechanical and Thermal Nociception

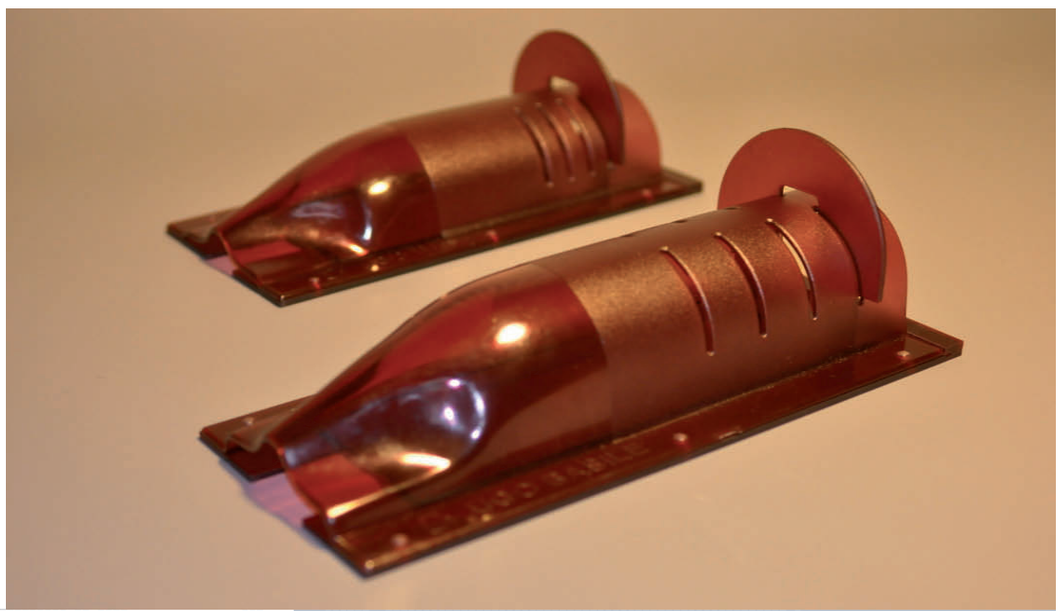
Trigeminal hyperalgesia

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 yourg adult rats as well as for bigger rats.



"Very nicely done - easy to use and it greatly facilitates consistent handling of animals"

Dr. Ken Hargreaves, UT Texas

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

Ugo Basile: more than 10,000 citations

Innovative design and material

The Durham Holders are designed to hold an animal comfortably and effectievely. 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:

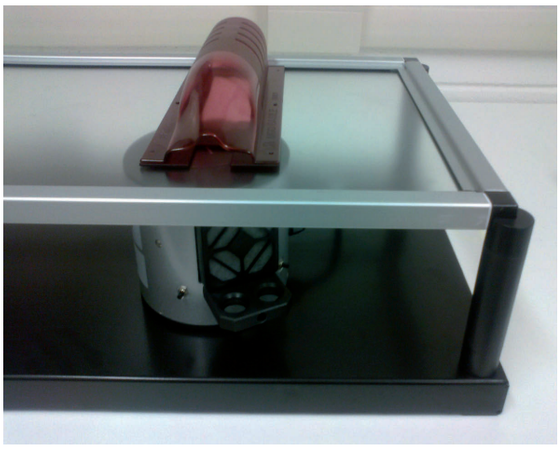
- **Submandibular access panel:**

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.



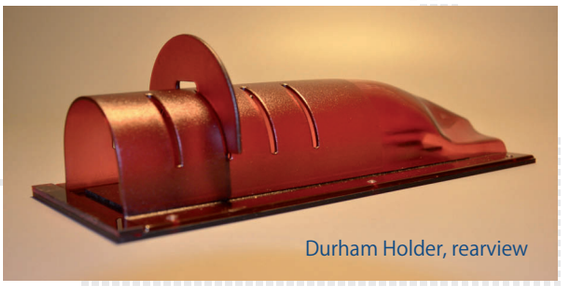
The picture above shows a Durham Holder positioned on a classic Ugo Basile Plantar Test (Hargreaves) device.

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.



Durham Holder, rearview

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

- F.G. Garrett et alia: "**Validation of a Novel Rat-Holding Device for studying heat- and mechanical-Evoked Trigeminal Nocifensive Behavioral Responses**" *J. Orofacial Pain, 26 No. 4, 336- 344,* ***2012***
- F.G. Garrett, A.E. Overmyer, L.A. Vause, J.L. Hawkins, J.B. Hayden, and P.L. Durham "**Development of a novel device for measuring withdrawal latency by thermal stimulation in rodent facial pain models using the Hargreaves Plantar Apparatus**" *Poster presented at SFN 2010*

Papers mentioning 37100 Orofacial Holders

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- J.L. Hawkins et alia: "**Nicotine Stimulates Expression of Proteins Implicated in Peripheral and Central Sensitization**" *Neuroscience 290: 115-125,* ***2015***

MOTORY COORDINATION, GRIP STRENGTH, ACTIVITY

PAIN AND INFIAMMATION

MOTORY COORDINATION, GRIP, STRENGTH, ACTIVITY

VENTILATORS AND GAS ANESTHESIA

BEHAVIOUR, CONDITIONING, REWARD

BEHAVIOUR, MAZES, TRACKING

TISSUE BATHS, TRANSDUCERS, RECORDERS

MISCELLANEOUS, ECT, LMD

BLOOD PRESSURE, VITAL FUNCTIONS

METABOLISM, FEEDING BEHAVIOUR

MUROMACHI MICROWAVE FIXATION

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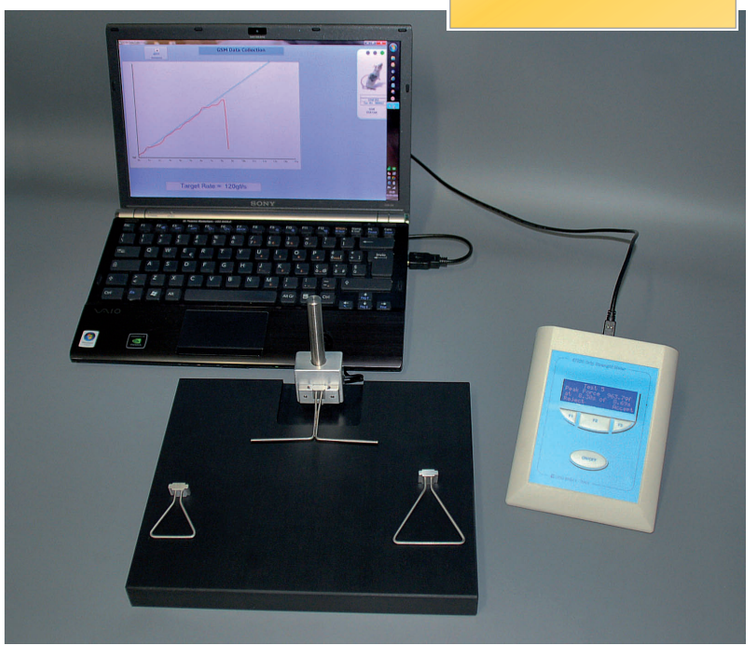
NOW full optional: including software, 3 grasping tools and 2 grasping grids

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.

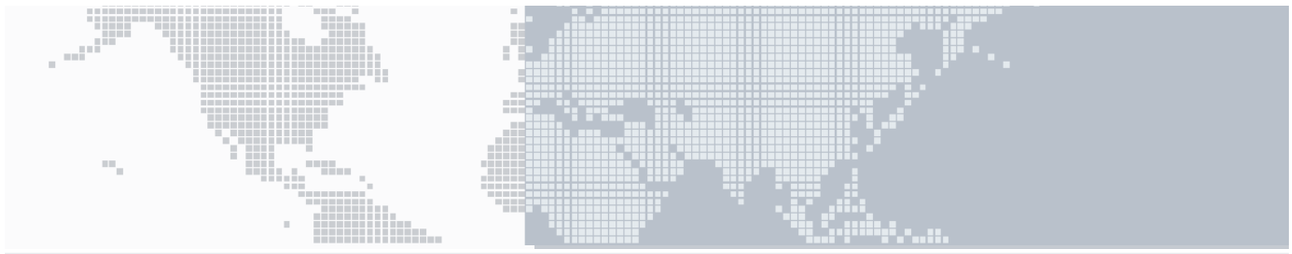
The Grip Strength test is a perfect complement to the gold standard Ugo Basile Rota-Rod device for motor coordination and motor function experiments. The effects of drugs, toxins, muscle relaxants, disease, ageing or neural damage on muscle strength may be assessed.

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 stand-alone or connected to a PC via the USB port, for monitoring and data recording, via the **NEW** software provided as standard

High Consistency with force-rate monitoring tool

for Rats
for Mice



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 trasferred to a PC in proprietary, Excel (.xls) or text (.txt) format, to be managed by most statistical analysis packages available on the market.

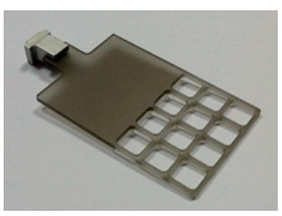
Ease of use

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.er. 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).

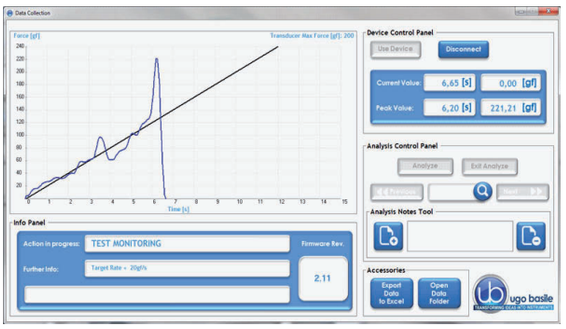


Figure 1: Screenshot of the GSM software *showing the force trace (in red) and the desired target force rate (in blue) - slope function*

Ordering Information

47200	**Grip-Strength Meter,** new model forrats & 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

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- M. Wiesmann et alia: "**A specific dietary intervention to restore brain structure and function after ischemic stroke**" Theranotics 7 (2): 493-512, **2017**
- A. Lenihan et alia: "**Decreased Anxiety-Related Behaviour but Apparently Unperturbed NUMB Function in Ligand of NUMB Protein-X (LNX) 1/2 Double Knockout Mice**" Molecular Neurobiology: 1-20, **2016**
- G.J. Huang et alia: "**Ectopic Cerebellar Cell Migration Causes Maldevel-opment of Purkinje Cells and Abnormal Motor Behaviour in Cxcr4 Null Mice**". PLoS ONE 9 (2): e86471, **2014** (Mouse)
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- N. Lange et alia: "**Behavioural and Pharmacological Examinations in a Transgenic Mouse Model of 2 early-onset torsion dystonia**" Pharmacology, Biochemistry and Behavior 97 (4): 647–655, **2011** (Mouse)
- M. Savic et alia: "**Behavioural Characterization of Four Endemic Stachys Taxa**" Phytother. Res., **2010** (Rat)

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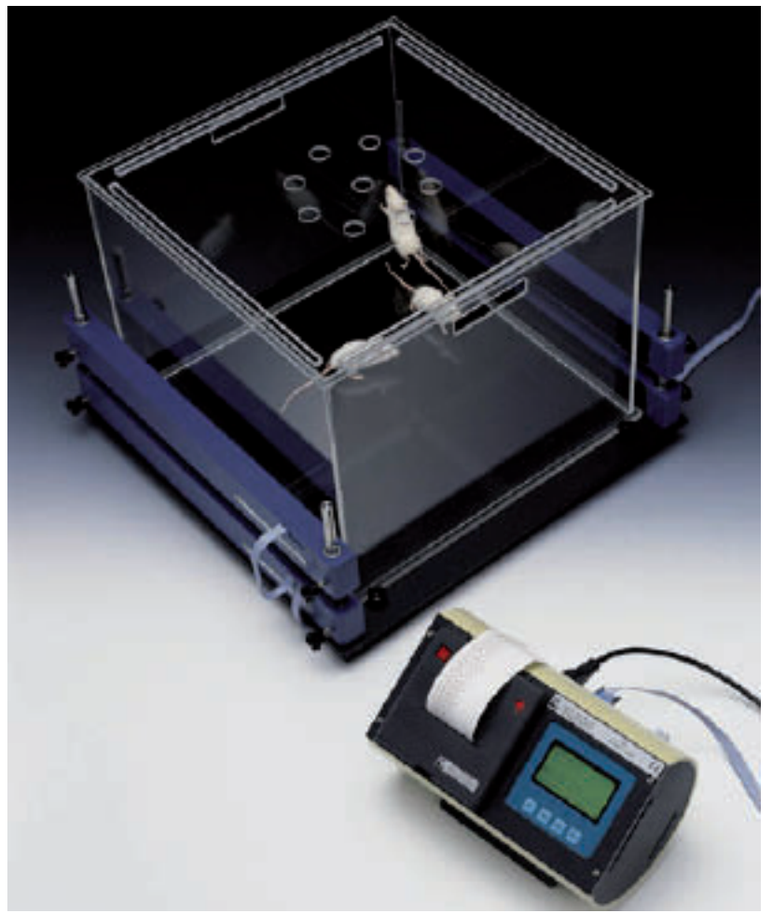
Multiple Activity Cage

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.

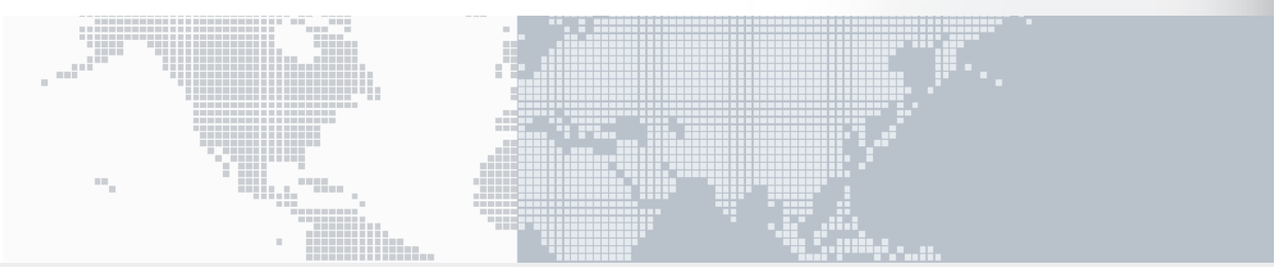
As the animal moves about a clear acrylic cage, it interrupts one or more infrared beams. The beams are arranged in an array of emitters on one side of the cage, detectors on another.

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

Bibliography

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- B. H. Ali et alia: "**The Antidepressant-like Action of Human and Caprine Amniotic Fluid in Rats: Effect of Gender**" Am. J. Pharmacological Sc. 3 (4): 98-102, 2015
- 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
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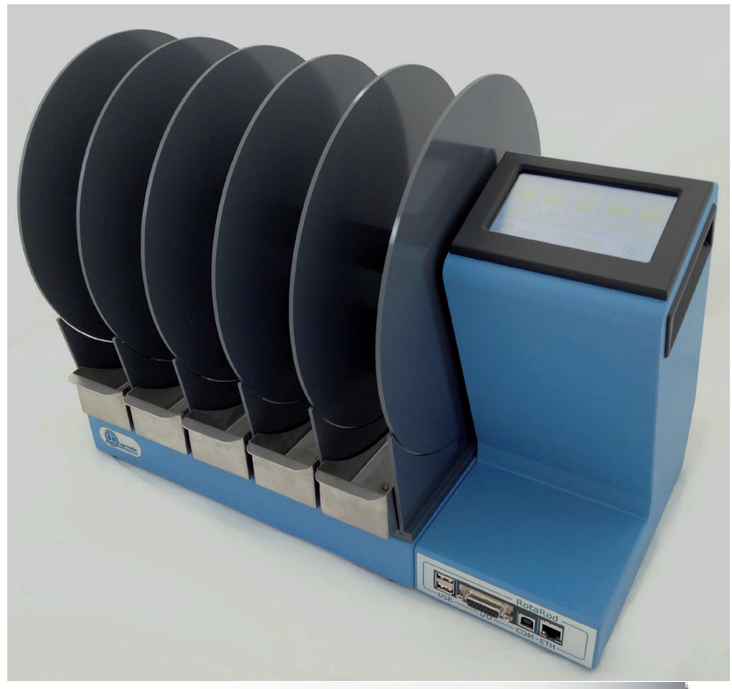
Mouse Rota-Rod

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 RotaRod!

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.**

- UGO BASILE DESIGNED THE ORIGINAL ROTA-ROD IN THE 1960S; SINCE THEN, OUR ROTA-RODS HAVE BEEN CITED IN THOUSANDS OF SCIENTIFIC PAPERS
- NEXT GENERATION ROTA-ROD:
  SAME RELIABILITY, INNOVATIVE TECHNOLOGY!

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

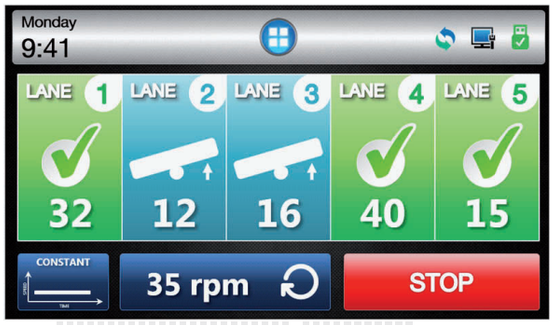
Ugo Basile: more than 10,000 citations

General

The Ugo Basile Rota-Rod NG consists of a 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

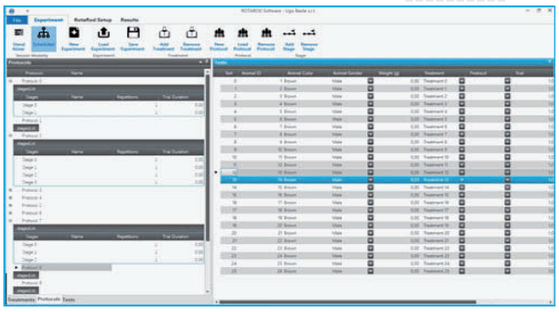
Physically similar to the previous versions, the new model features stainless-steel trip-boxes to facilitate cleaning and confine the animals when they fall off the rod.

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.

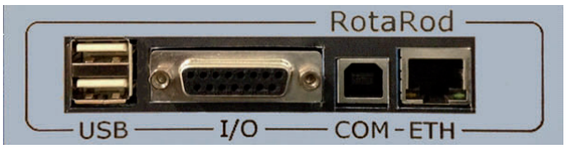
The software automatically classifies the data, combining configuration settings with test results. The user can add information, before or after the test. Results appear in a tree-like structure, where columns can be dragged and dropped to customize the layout.

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

Bibliography

Method Papers

- N.W. Dunham & T.S. Miya: "**A Note on a Simple Apparatus for Detecting Neurological Deficit in Rats & Mice**" J. Am. Pharmaceut. Assoc., Scientific Edit., XLVI: No. 3, 1957
- B.J. Jones & D.J. Roberts: "**The Quantitative Measurement of Motor Incoordination in Naive Mice Using an Accelerating Rotarod**" J. Pharm. Pharmac.: 20: 302-304, 1968

Papers Dealing With Rota-Rod Technique

- R.K. Sheean et alia: "**Effect of Thymic Stimulation of CD4+ T Cell Expansion on Disease Onset and Progression in Mutant SOD1 Mice**" J. Neuroinflammation 12:40, ***2015***
- B.J. Turner et alia: "**Overexpression of Survival Motor Neuron Improves Neuromuscular Function and Motor Neuron Survival in mutant SOD1 Mice**" Neurobiol. Of Aging 35 (4): 906-915, ***2014***
- 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 I α Mediates Neuropathic Pain After Peripheral Nerve Injury**" Antioxi-dants & Redox Signaling Jan. ***2014***
- C.D. Heldermon et alia: "**Therapeutic Efficacy of Bone Marrow Transplant, Intracranial AAV-mediated Gene Therapy, or Both in the Mouse Model of MPS IIIB**" Molecular Therapy 15(5): 873-880, ***2010*** (*rocking*)
- 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*)

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Rat Rota-Rod

ng

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.**

- UGO BASILE DESIGNED THE ORIGINAL ROTA-ROD IN THE 1960S; SINCE THEN, OUR ROTA-RODS HAVE BEEN CITED IN THOUSANDS OF SCIENTIFIC PAPERS
- NEXT GENERATION ROTA-ROD:
  SAME RELIABILITY, INNOVATIVE TECHNOLOGY!

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

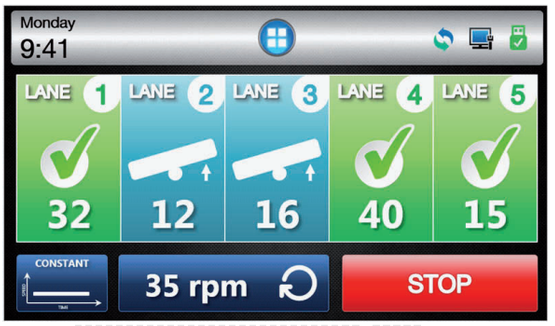
Ugo Basile: more than 10,000 citations

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

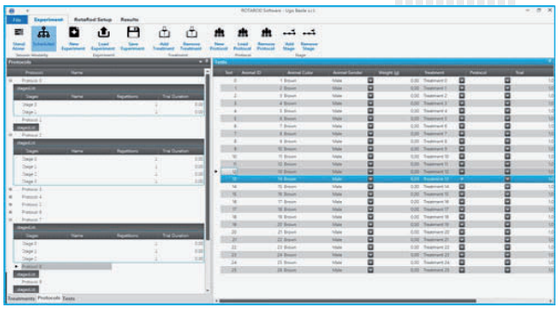
Physically similar to the previous versions, the new model features stainless-steel trip-boxes to facilitate cleaning and confine the animals when they fall off the rod.

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.

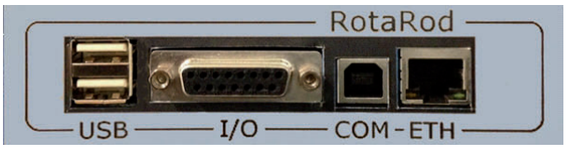
The ***X-PAD*** software automatically classifies the data, combining configuration settings with test results. The user can add information, before or after the test. Results appear in a tree-like structure, where columns can be dragged and dropped to customize the layout.

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

- N.W. Dunham & T.S. Miya: "**A Note on a Simple Apparatus for Detecting Neurological Deficit in Rats & Mice**" J. Am. Pharmaceut. Assoc., Scientific Edit., XLVI: No. 3, 1957
- B.J. Jones & D.J. Roberts: "**The Quantitative Measurement of Motor Incoordination in Naive Mice Using an Accelerating Rotarod**" J. Pharm. Pharmac.: 20: 302-304, 1968

Papers Dealing With Rota-Rod Technique

- L. Micheli et alia: "Acu**te and subchronic antinociceptive effects of nociceptin/orphanin FQ receptor agonists infused by intrathecal route in rats**" Eur. J. Pharmacol. 754 : 73-81, ***2015***
- 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***
- JV. Jokinen et alia: "**Pregabalin enhances the antinociceptive effect of oxycodone and morphine in thermal models of nociception in the rat without any pharmacokinetic interactions**" Eur. J. Pain DOI: 10.1002/ejp.728, ***2015***
- JF. Barthel et alia: "Lo**ng-term Application of Glycine Transporter Inhibitors Acts Antineuropathic and Modulates Spinal N-methyl-D-aspartate Receptor Subunit NR-1 Expression in Rats**" Anesthesiology 121.1: 160-169, ***2014***
- C.D. Heldermon et alia: "**Therapeutic Efficacy of Bone Marrow Transplant, Intracranial AAV-mediated Gene Therapy, or Both in the Mouse Model of MPS IIIB**" Molecular Therapy 15(5): 873-880, ***2010*** (*rocking, mouse*)

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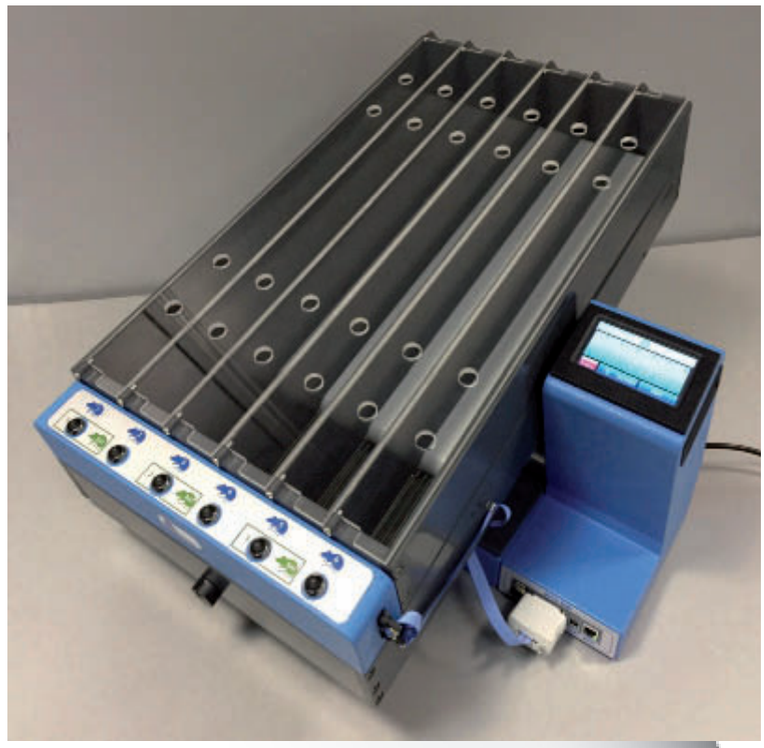
Rodent Treadmill

Cat. No. 47302 for Rats
Cat. No. 47303 for Mice



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"

(from Resource Book for the Design of Animal Exercise Protocols, APS, Feb 2006)

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°.

- MEASURES ENDURANCE , DISTANCE, SPEED
- SAME DEVICE TO TEST RATS & MICE
- COMPACT AND USER-FRIENDLY:
  test settings & monitoring controlled by the attached electronics and managed on the touch-screen.

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

Ugo Basile: more than 10,000 citations

Instrument Description

Our Treadmill consists of a main unit, incorporating drive, shocker, 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.

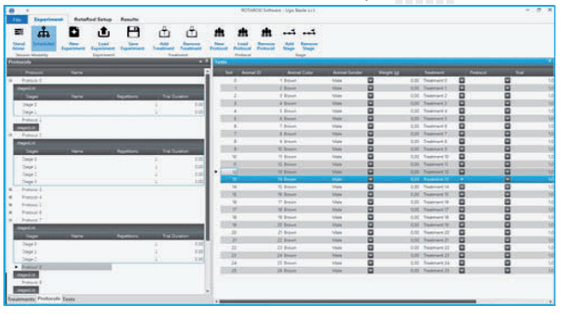
Shock & Detection Circuit

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.



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

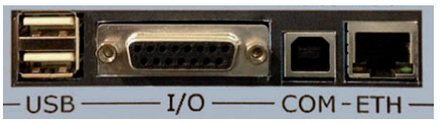
Data Collection and Management

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.

Connections



USB connectors are provided for data exchange and firmare 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 & shocker. 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 45x5.5 x**15**(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)x67(d)x35(h)cm
Weight	Kg 22-27 (with 1 or 2 lane assy)
Shipping Weight	Kg 35-40 (approx.)
Packing:	wooden crate, 77x65x63 / 82x71x57cm

Bibliography, Method Papers

- American Physiological Society: "Resource Book for the Design of Animal Exercise Protocols" Feb. 2006
- O.J. Kemi et alia: "Intensity-Controlled Treadmill Running in Mice: Cardiacand Skeletal Muscle Hypertrophy" J. Appl. Physiol. 93: 1301-1309, 2002
- X.Q. Wang & G.W. Wang: "Effects of Treadmill Exercise Intensity on Spatial Working Memory and Long-Term Memory in Rats" Life Sc. 149: 96-103, 2016
- M. Shinozaki et alia: "Combined Treatment With Chondroitinase ABC and Treadmillrehabilitation for Chronic Severe Spinal Cord Injury in Adult Rats" Neuroscience Res 113: 37-47, 2016

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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

No Tether !

No Jacket !

TRULY **UNRESTRAINED** MICE

Main Features

- No jacket or tether is necessary: the animal is completely free
- Stand-alone, with internal memory
- **Quick and si**mple 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.

Fig. 1: "2x15mm magnet, attached to the mouse tail"

Our **magnets** are encapsulated within a proven **biocompatible material** (Paryline), to be implanted or injected subcutaneously, and fit within syringes normally used for the injection of identification transponders.

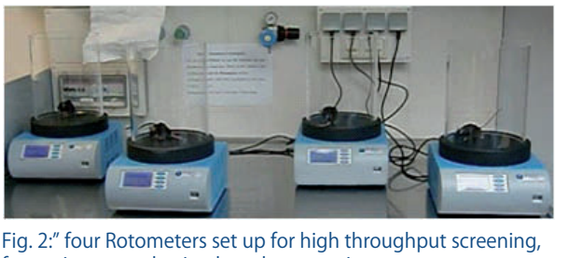

Fig. 2:" four Rotometers set up for high throughput screening, for testing several animals at the same time

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.

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.

Ordering Information

43000	**ROTOMETER**, standard package, including:
43000-001	**Main Unit with display**
35100-286	Perspex Animal Restrainer (25cm h)
43000-302	Instruction Manual (on USB key)
E-E 018	Paryline-coated Magnet, 2x12mm (2pcs)
E-E 019	Paryline-coated Magnet, 2x15mm (2pcs)
E-AU 041	Memory Key
52050-13	CUB Data Acquisition Software Package and USB cable

Optional:

57145	Thermal MiniPrinter
43000-321	Syringe Kit, incl. implanter, replacement needle & injectable magnets, 2x12 & 2x15 mm, 10 each
43000-012	Set of 10 Paryline-coated Magnets (2x12mm)
43000-015	Set of 10 Paryline-coated Magnets (2x15mm)
43000-052	Set of 50 Paryline-coated Magnets (2x12mm)
43000-055	Set of 50 Paryline-coated Magnets (2x15mm)

Specifications:

Read-out	multifunction graphic display
Print-out	by optional thermal MiniPrinter
Universal Mains	85-264 VAC - 50-60Hz - 30 W max.
Dimensions	25(w)x37(d)x16(h)cm, plus restrainer
Animal Restrainer	20 (diam.) x 25 (h) cm
Weight	3.5Kg
Shipping Weight	7.0Kg approx.
Packing	68x34x28cm

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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 Boissier-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 or Videotracking. Ask for Cat. No. 46653.

- Quick Test for Exploratory Behavior in Mice
- The classical "Planche à Trous" Test by Boissier & Simon

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

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

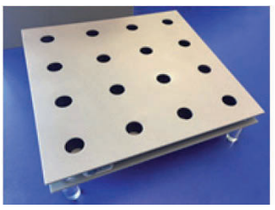
The 40x40 cm board, 2.2cm thick, is made of grey Perspex. The matt finishing avoids reflections which may alter the behaviour of the animal.

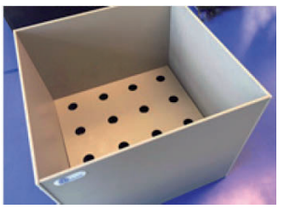
The board embodies 16 "head-plunging detectors", each comprising an I.R. emitter and a diametrically opposed receiver, flush mounted 1cm below the upper panel.

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

6650 **HOLE BOARD, standard package** including:
6651 Control Unit
6652 Board
6655 Instruction Manual (on USB key)
E-WP008 Mains Cable

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

Method Paper

- 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

Papers mentioning 6650

- E.D. de Oliveira et alia: "**Mechanisms Involved in the Antinociception Induced by Spinal Administration of Inosine or Guanine in Mice**" Eur. J. Pharmacol. 775: 71-82, 2016
- M. A. Yrbas et alia: "**Pharmacological Mechanism Underlying the Antinociceptive Activity of Vanillic Acid**" Pharmacol Biochem. And Behav. 132: 8-95, ***2015***
- P. Santos et alia: "**Anxiolytic Properties of N-acetylcysteine in Mice**" Behav. Brain 317: 461-469, ***2016***
- O.D. Can et alia: "**Anti-depressant-like Effect of Vitexin in BALB/c Mice and Evidence for the Involvement of Monoaminergic Mechanisms**" Eur. J. Pharmacol 699 (1-3): 250-257, ***2013***

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Rotating Wheels
for Rodent Activity

Cat. No. 1800 / 1850

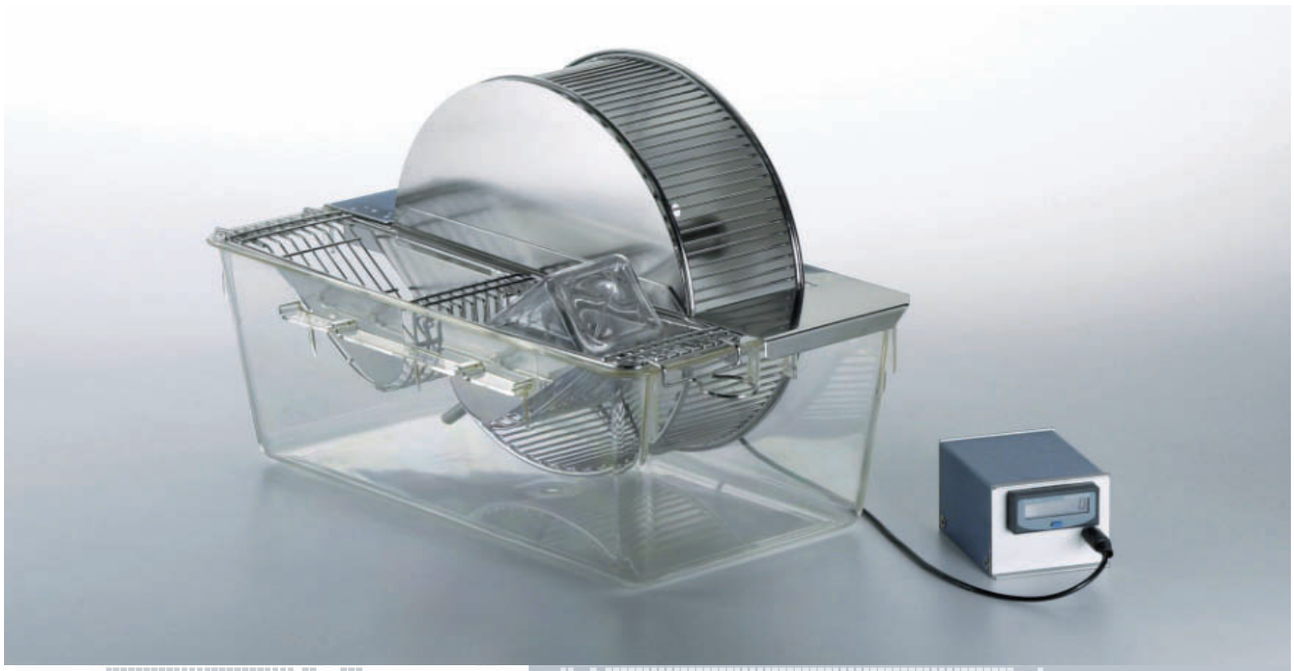
EASY MONITORING OF RODENT MOTOR ACTIVITY

Data Acquisition available as optional (2600 Multifunction Printer)

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

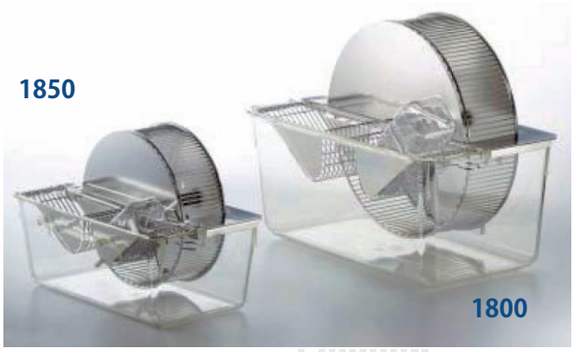
Ugo Basile: more than 10,000 citations

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)x358d) 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

1800	**Rat Activity Wheel**, complete with polycarbonate cage, magnetic switch and LCD revolution counter
1850	**Mouse Activity Wheel**, complete with polycarbonate cage, magnetic switch and LCD revolution counter
1800-S	**Rat Activity Wheel**, complete with polycarbonate cage & magnetic switch, without counter
1850-S	**Mouse Activity Wheel**, complete with polycarbonate cage & magnetic switch, without counter

Multifunction Printers

2600	**Multifunction Printer, 6 input channels**, with microprocessor for direct connection to the PC. Complete with dedicated software 52050-01, serial cable & USB adaptor
2610-F	**Multi-Connection Cable**

Physical

Dimensions	**1800**	48(h)x32(w)x47(d) cm
	1850	37(h)x26(w)x358d) cm
Weight	**1800**	7Kg
	1850	5Kg
Shipping weight	**1800**	11Kg
	1850	7Kg

latest revision
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