Instruction manual

Tail Flick

Revision 1.7 July 2024

Pain
Inflammation

LAN

SKU: 37560

ugo basile®
TRANSFORMING IDEAS
INTO INSTRUMENTS

SAFETY CONSIDERATIONS

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

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

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

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

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CE CONFORMITY STATEMENT

Manufacturer	**UGO BASILE srl**
Address	Via G. di Vittorio, 2 – 21036 Gemonio, VA, ITALY
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We hereby declare that

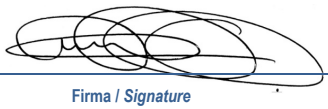
Instrument.	**TAIL-FLICK UNIT**
Catalog number	**37560**

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

- ***2006/42/CE on machinery***
- ***2014/35/UE relating to electrical equipment designed for use* within certain voltage limits**
- ***2014/30/UE relating to electromagnetic compatibility***
- ***2011/65/UE and 2015/863/UE on the restriction of the use of certain hazardous substances in electrical and electronic equipment***

C.E.O Mauro Uboldi

Nome / *Name*



January 2023

Date

Firma / *Signature*

MOD. 13 Rev. 1

Product features and general information

The 37560 innovates the Ugo Basile classic tail flick unit; this innovative version introduces some new features and a large touch display helping the user to set-up the experiment in a more efficient way.

New features:
- 4.3" touch screen display for calibration,- set-up and results
- TTL input/output signals for synchronisation with other devices
- Firmware update via USB key
- Selectable automatic or manual detection mode
- LAN (Ethernet support) for PC connection

Main features:
- Automatic detection of the animal response
- Data export via USB pen-drive
- Excellent reproducibility
- Adjustable I.R. Intensity

What's in the box

SKU: 37560
The Tail Flick unit
1 Pedal switch
1 Power cord according to your country
1 USB storage containing:
This instruction manual
The quality control and warranty certificate

OPTIONAL ITEMS ORDERING INFORMATIONS:
SKU: 37360-325
Mouse Holder (25mm I.D.)

SKU: 37360-330
Mouse Holder (30mm I.D.)

SKU:37300
Heat-Flux I.R. Radiometer

AVAILABLE SPARE PARTS
SKU: 37370-365
I.R. Bulb (Halogen "Bellaphot", Mod. 64607 OSRAM, 8V-50W)

SKU: E-BT 008
Battery type CR2032

SKU: E-FT 010-1
2 X fuse T1.25A - 6X32 mm

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1 General

The device has been designed to perform rapid and accurate screening of analgesic drugs and transgenic animals via heat stimulation of the rat/mouse tail, according to D'Amour & Smith method. It basically consists of an I.R. source, whose radiant energy of adjustable intensity is focused on the rat/mouse tail by an embodied parabolic mirror.

The instrument measures the time latency of the avoidance response (Tail Flick) when pain is induced by radiant heat applied to the animal's tail.

1.1 Principle of operation

The rat/mouse is held by the operator on the instrument upper panel or held in a restrainer (optional in two sizes for mice), in such way the tail, placed over a flush mounted window, receives the I.R. energy emitted by the device.

The inclined mouse restrainers are supplied as optional, to be used with mice to compensate for their tendency to hold the tail at 45 degrees up and therefore away from the heat source.

The operator starts the I.R. stimulus and the time counter starts.
When the animal feels pain and flicks its tail, a sensor detects it, stops the counter and switches off the I.R radiation.
The reaction time of the animal tail is automatically recorded.

2 Instrument Description

The Tail Flick Unit basically consists of an I.R. source, whose radiant energy of adjustable intensity is focused by a parabolic mirror on the animal tail.

The instrument components are:
The I.R. source, the sensor, the micro controller and the electronic circuit (all in the same unit).

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

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

2.1 Animal Welfare

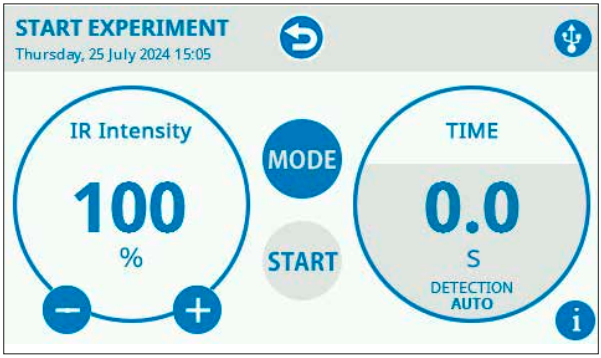
In any analgesia test, great care must be taken to prevent the animal from inadvertent harm. When an investigator initially begins using the tail flick unit, and when first assessing a new strain of animal, care must be taken to identify the appropriate amount of stimulus that will produce the desired response.
An adjustable cut-off time (maximum stimulus time) can be set from 5" to 30" to prevent animal injury.

2.2 Touch-screen command/display

The Tail flick unit incorporates a 4.3" touch-screen display, for settings, testing and results via an intuitive main menu. (Figure below)

Main Menu

During the test (Figure below), the touch-screen display, shows the numeric values of the set IR intensity (in %) and the elapsed time (in seconds).
In addition, at the bottom of the time counter, the function mode is indicated (auto or manual detection).



Experiment page

2.3 Notes on Resistive Touch-Screens

The Ugo Basile Tail Flick touch screen uses resistive technology and can be used with fingers, gloves or (recommended) a display pencil.
Resistive touch-screens (differently from commercial capacitive screens) are a better choice for laboratory applications because of:
- High resistance to dust and water
- Better use with gloved hand or stylus

3 Installation

3.1 Unpacking & preliminary check

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

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

Once unboxed, if the instrument is damaged, notify Ugo Basile SRL company, writing an email to support@ugobasile.com

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

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

3.2 Notes on the Instruction Manual

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

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

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

3.3 Safety Instruction

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

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

3.4 Assembling the instrument

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

3.5 Before Applying Power

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

Power unit

The fuse compartment holds two fuses. Use (T1,25A 6X32mm) fuses for operation from 100 to 240V, for fuse replacement, please refer to paragraph 7.1 Electrical at page 23 of this manual.
The power cord inlet fits a standard C13 cable.
Make sure your power out-take is provided with a reliable ground connection.

3.6 Intended Use

The Tail Flick is intended for **investigation use on laboratory animal only.**

3.7 Additional Safety Consideration

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

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

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

3.8 Connections

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

Connect the pedal switch to the Tail Flick device (blue connector figure below). Note that the connector of the pedal switch is provided with a polarization key; align it with the blue bushing, and gently push in.
To remove the connector, gently pull it out.

DO NOT ROTATE THE CONNECTOR: PERMANENT DAMAGE CAN OCCUR

Device rear view

The connection module on the front panel encompasses the following connectors, from let to right:

1. USB port: enable data import/export to a PC (via a USB pen drive), and allow firmware upgrade.
   Moreover, experiment created with the X-Pad software (see specific manual for details) can be uploaded into the device by using a simple USB pen drive.
   This port also connect the provided USB external numeric key-pad
   The lower USB connector is covered and has not to be used.
   DO NOT REMOVE THE USB CONNECTOR COVER
2. TTL I/O: 15pins D-SUB connector, provides TTL input and output for start/stop command
3. COM: reserved for maintenance and service purpose
4. Ethernet connector (RJ45):for LAN connection, provide communication with a PC to load experiment from the Ugo Basile X-Pad software and for experimental data retrieving, with out the need of a USB pen use.

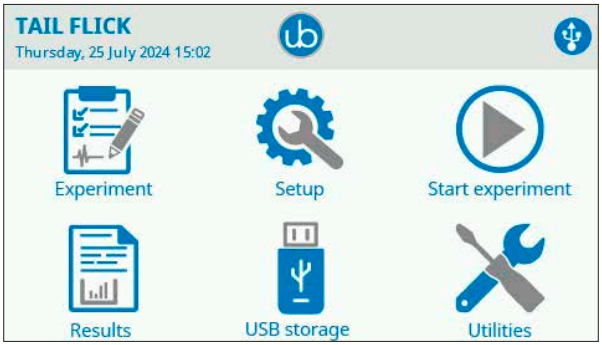
4 Operation

Position the Tail Flick on a stable and flat bench or table surface.
Fit the top panel extension, as shown in the picture below, and secure it by tightening the two screws.

Avoid direct illumination, e.g., from a table lamp.
This will definitely upset the animals, as rodents dislike bright light, not to speak of the risk to raise their body temperature.
Moreover, intense light may cause the sensor to miss the tail withdrawal, as a light source from above tends to mask the I.R. energy reflected back by the tail.

4.1 Main Menu

Getting familiar with the Tail Flick home page menu is very easy (see figure below).



Home page

From the home page, press the “UB logo” button for software and general information.
Press the “back” button to roll back into main menu page, see figure below:

4.2 Quick setup for first test

Holding the animal:
- It is advisable to gather some experience in holding the rat/mouse on the top panel also to habituate the animal to the specific type of pre-handling that the test requires.

The animal must be kept firmly but not to the point of causing discomfort; it should in fact flick its tail when the heat reaches the threshold of pain and not as a consequence of its struggling to slip out from the operator's hands.

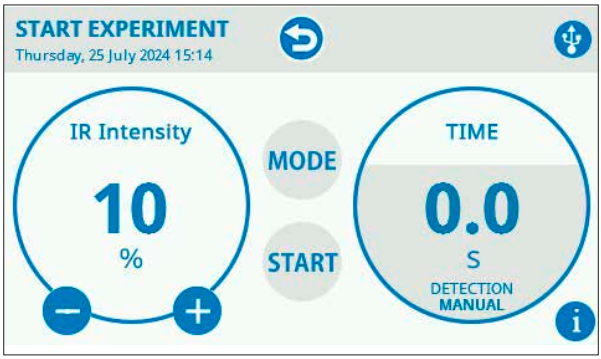
Some researchers roll up a cloth around the rat, leaving the tail protruding, a procedure that is in most cases satisfactory.
You are now ready to configure and run your first experiment. The following steps will guide you to quickly configure the Tail Flick device and get the first result:

Mouse restrainer
Inclined Mouse Restrainers are available as options, to be used with mice to compensate for their tendency to hold the tail at 45 degrees up and therefore away from the heat source.
Two restrainers are available:
- 37360-325, I.D. 25 mm
- 37360-330, I.D. 30 mm

Setting up the test
Initiating a test is very simple:
1. Press SETUP to adjust the IR intensity and the cut-off time

Carrying out the test
Position the animal so that its tail is over the I.R. window.
To start a trial you have two choices:
A - Press the start button from the home screen and press the start button again on the start screen
or
B - From the home screen press the pedal switch once to go into the start screen and once again to start the test

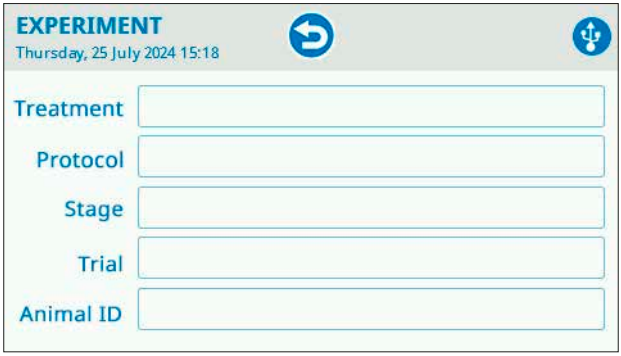
When the animal feels pain and flicks its tail, the I.R. source switches off and the reaction time stops. The withdrawal latency to the nearest 0.1 s is automatically detected and stored.



Looking at the results

The Tail Flick will save the intensity and time latency results, in addition to the descriptive data, if they have been input in the Experiment field (Treatment, Protocol, ID, Stage, Trial).

Result screen

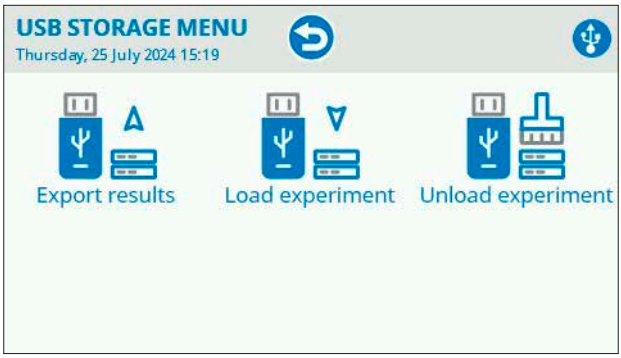


Experiment screen, where the descriptive data shown in the result screen are input

Exporting the results

Once data have been saved into the Tail Flick internal memory, they can be transferred into a USB pen drive by simply plugging it into one of the two front USB ports and pressing,

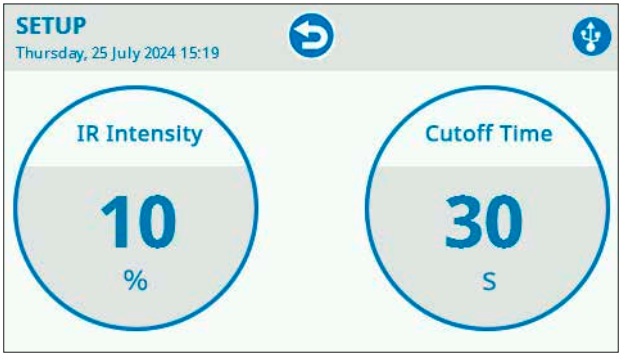
- USB STORAGE button followed by
- Export Result button



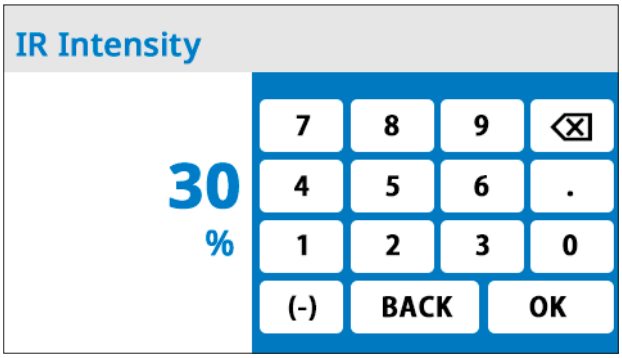
USB storage page

4.3 Set up and Utilities Icons

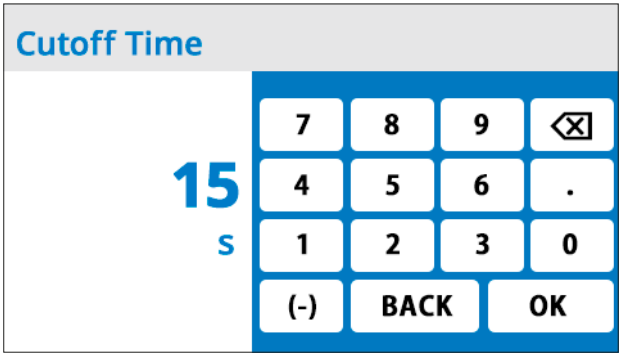
The “set up” icon from the home screen is intended to define the experiment parameters, i.e. IR intensity (level of energy delivered to the tail) and “cut off time”, e.g. the time after which the energy source will turn off even if there is no tail flick (intended to avoid tissue damage).



Setup screen



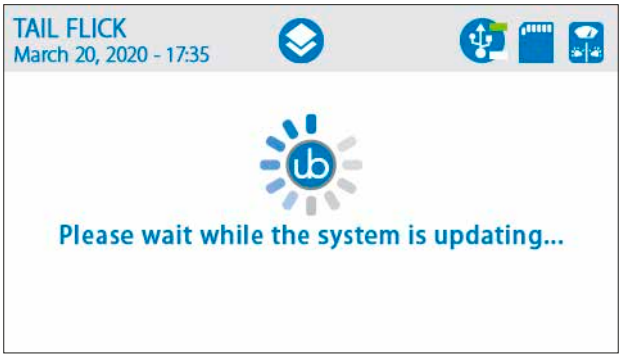
IR intensity window



Cut-off time set-up screen

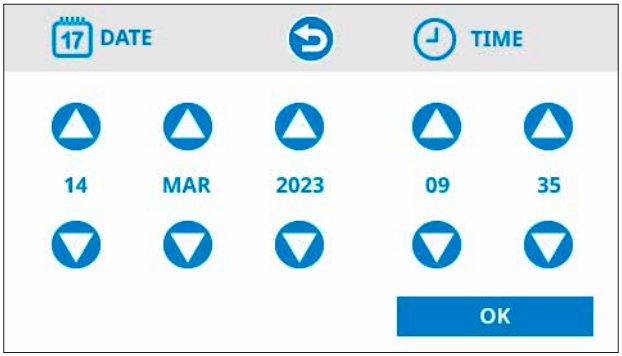
The UTILITIES icon, reachable from the main menu, give access to:
- Update
- Date-Time
- Erase DB
- Sensitivity

The UPDATE menu requires to insert the USB pen drive and is necessary to updated the device firmware. Contact the Ugo Basile Support team before updating the firmware.



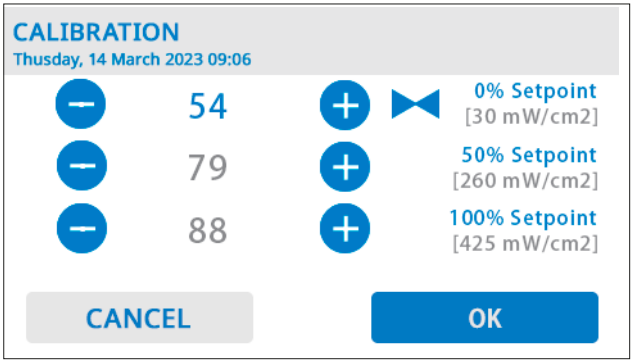
Update screen

The DATE-TIME menu allows to adjust the date and time of the device, as shown in the screen shot below



Date and time screen

The CALIBRATION, menu is dedicated to the conversion of the arbitrary % units of the tail flick into absolute energy value.
In addition to this, when a radiometer (optional which can be purchased from Ugo Basile, SKU 37300) is available, the emission power of the heat source can be measured and adjusted.
Factory values can be input in the menu below, by simply reading the values from the sticker attached to the bottom of the unit.
IN CASE YOU DO NOT HAVE A RADIOMETER AVAILABLE IN YOUR LAB
DO NOT ALTER THE DEFAULT FACTORY VALUE



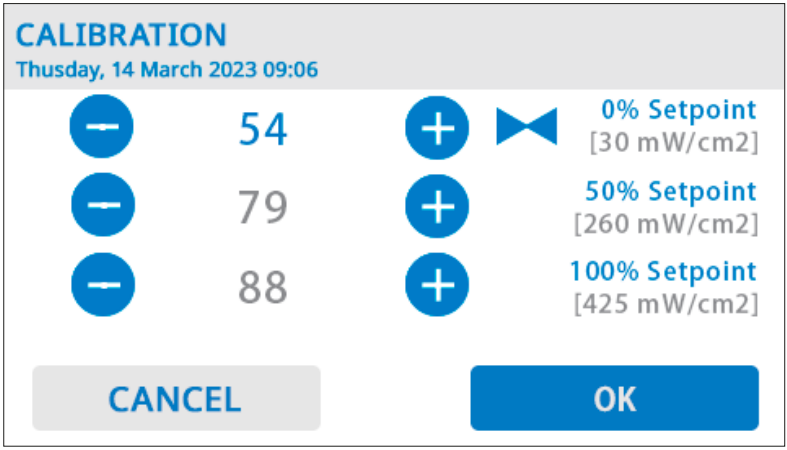
Calibration window

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

4.4 Radiometer Calibration

The calibration consists in the measurement of the I.R. output power of the Tail Flick with the Ugo Basile I.R. Radiometer (SKU:37300).

It is highly recommended to calibrate the Tail Flick at every animal test session to ensure the correct device functionality.
No other calibration method are available
To start the calibration from the main page press the Utility button and then the Device Setup and finally the Calibration button.



The Radiometer consist in a probe (the red one) protected by an aluminium disk on one side and of one electronic unit (the one with the display) that use a standard 6LR61 9v battery that in case of out of power need to be changed. (Battery holder is placed on the device back)

1. Take the Radiometer probe out of the box, unscrew the aluminium probe protection and screw up the Tail Flick aluminium adapter (the small one) to fit the Tail Flick emission area.
2. Connect the Radiometer probe to the Radiometer electronic unit, by the blue connector.
3. Switch the Radiometer electronic unit ON, using the side OFF/ON button. (the Radiometer display shows 000.)
4. Place the Radiometer probe on the Tail Flick emission area (if placed the tail holder need to be removed first)
5. You will read on the Radiometer display a value; using the Tail Flick display + and minus button on the first calibration line at the to,p You need to read on the Radiometer display the same value the Tail Flick indicates at that line under 0% Set point
   please wait 10 second for every Radiometer value reading
   E.g. on the above picture the 0% set point shows 30, using the + and - button you need to reach 30 on the Radiometer display
6. Press on the number between the second line of the + and minus buttons to switch to the second calibration point, and repeat the procedure reaching 260
7. Do the same for the third calibration point to reach 425
8. At the calibration procedure end press OK
9. Unscrew the aluminium adapter from the Radiometer probe and replace it with the aluminium protection, switch the Radiometer OFF and place it in the black plastic box.

Note: Try to perform the calibration procedure in a short period of time, do not leave the Tail Flick in Calibration mode for long.

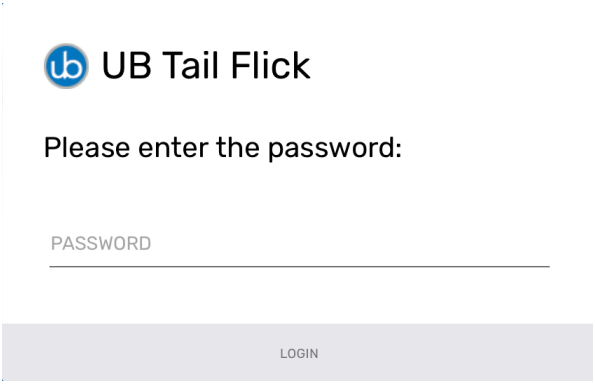
4.5 Using LAN connection

If Your Hot/Cold plate is LAN connected, You can load experiment parameters file generated by the Ugo Basile X-Pad app into the Hot/Cold plate and retrieve experimental data result without the need to use the USB pen as a data bridge.

LAN Connection is done by a standard web browser, while we do prefer to use Google Chrome, You can try to use Your preferred web browser.

To start a connection session make sure the LAN connection installation has been properly done (see paragraph 3.8 connection) and then open Your web browser.

LAN connection to the Tail Flick, for data security, is password protected; the factory password is UgoBasile, and You may want to change it.



To change the LAN connection password:

1. Log in to your Tail Flick with the factory password (UgoBasile)
2. Go to the main menu (the 3 lines at the top left and select the command "Change Password"
3. You will asked to input the current password and input two times the new password. Password need to be 8 or 15 characters, should contain at least a lower case letter, an upper-case letter, a number and a symbol.

It is advisable to secure store the password set for feature use, while if You loose it You do not have any chance to retrieve Your experiment data.

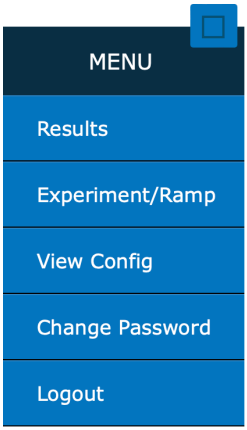
If You lost the password You can reset the password from the device touch panel, but be aware that the password reset will delete all the stored experiment result data.

To reset the password (and the stored result data):
On the device touch screen panel from the main page press the Utility button and then the Factory reset and You will be asked for a reset confirmation.
Result data were deleted and the password has been set as UgoBasile.

LAN Connection menu:

Clicking on the three white line at the top left on the browser windows You can open the main

connection menu:



On the Result page You will find the experiment data result and the possibility to download the .csv file with the data on Your computer by pressing the Download CSV File button.

The Experiment page will give You the ability to load into the device:
Experiment data created by the Ugo Basile Windows app X-Pad which is included in Your Tail Flick device.
Create the Experiment file in X-Pad and save it on Your PC.
By the web browser connect to the Tail Flick as described, select from the menu the command Experiment

Use the button Select File (is in Italian in the pics while this Windows is an Italian edition) to select on Your drive the saved Experiment file and then press the relative button Send to device. You will receive a confirmation message.
The Experiment data and/or Ramp data will be loaded into the Tail Flick.

The View Configuration page is intended for show the system data and can be required by our support team to have Your device information for service purpose.

The Logout command is to disconnect Your browser from the Hot/Cold plate and ending the working session.

5 Bibliography

METHOD PAPER

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

SOME OF THE PAPERS MENTIONING THE UGO BASILE TAIL FLICK

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 Antino-ciceptive Tolerance" Pain 154 (7): 978-986, 2013

T.C. Chen et alia: "Spontaneous inflammatory Pain Model From a Mouse Line With N-ethyl-N-nitrosourea Mutagenesis" J. Biomed. Science 19 (55): 2–15, 2012

Walsh et alia: "Disruption of Thermal Nociceptive Behaviour in Mice Mu-tant for the Schizophrenia-Associated Genes NRG1, COMT and DISC1" Brain Res. 1348: 114-119, 2012

K. Guillemyn et alia: "In vivo Antinociception of Potent mu Opioid Agonist Tetrapeptide Analogues and Comparison with a Compact Opioid Ago-nist-neurokin 1 Receptor Antagonist Chimera" Molecular Brain 5 (4): 2-11, 2012

J. Morrison et alia: "Design, Synthesis, and Structure–Activity Relation-ships of indole-3-heterocycles as Agonists of the CB1 Receptor" Bioor-ganic & Medicinal Chemistry Letters 21: 506-509, 2011

M. Spetea et alia: "In vitro and in vivo Pharmacological Profile of the 5-benzyl Analogue of 14-methoxymetopon, a Novel μ Opioid Analgesic with Reduced Propensity to Alter Motor Function" Eur. J. Pharmac. Sciences 41: 125-135, 2010
C.A. Boehm et alia: "Midazolam Enhances the Analgesic Properties of Dexme-detomidine in the Rat" Vet. Anaesthesia and Analgesia 37 (6): 550-556, 2010

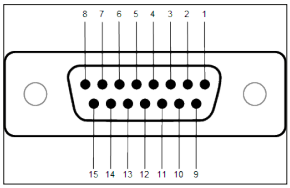
M.A. Philips et alia: "Myg1-Deficient Mice Display Alterations in Stress-Induced Responses and Reduction of Sex-Dependent Behavioural Dif-ferences" Behav. Brain Res. 207: 182-195, 2010

6 Connections

6.1 Communication port connection

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

TTL signals are referred to power ground (pin 14 and pin 15)



TTL D-sub pin out

DB-15 Pin#	Signal Name	Signal Type	Description
1	Start/Stop	TTL OUT	Start -> TTL High Level Stop -> TTL Low Level
2	Detection Manual/Automatic	TTL OUT	Manual -> TTL High Level Automatic -> TTL Low Level
3	Reserved	TTL OUT	Reserved
4	Reserved	TTL OUT	Reserved
5	Reserved	TTL OUT	Reserved
6	Reserved	TTL OUT	Reserved
7	Reserved	TTL OUT	Reserved
8	IR value	ANALOG OUT	Analog IR value
9	External start	TTL IN	Start -> TTL High Level Stop -> TTL Low Level
10	Reserved	TTL IN	Reserved
11	Reserved	TTL IN	Reserved
12	Reserved	TTL OUT	Reserved
13	Detection	TTL OUT	Detection -> TTL High Level No detection -> TTL Low Level
14	GND	POWER	Power Ground
15	GND	POWER	Power Ground

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

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

7 Maintenance

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

UNPLUG THE MAIN CORD BEFORE CARRYING OUT ANY MAINTENANCE JOB

7.1 Electrical

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

7.2 Cleaning/disinfection

The Tail Flick does not require any maintenance apart from normal cleaning.
Do not use organic solutions. Cotton wool and water can be used for cleaning purposes.
For disinfection, use a non-alcoholic disinfectant, or H_2O_2.

7.3 Long Inactivity

The instrument does not require any particular maintenance after long inactivity, except cleaning and internal date and time battery change that need to be carried out by a Ugo Basile professional.

7.4 Customer Support

For any further information concerning the use and/or maintenance of this device, please do not hesitate to contact our service department (or our local distributor) either directly of via our support page http://www.ugobasile.com/support.html.
Make sure to include the device serial number into any service communication.

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

8 Specification

General	
Command Input	4.3” TFT touch-screen
Read-out	4.3” TFT touch-screen
Power Requirements	Universal input 100-240 VAC, 50-60Hz, 50W
Sound Level	< 54dB
Operating environment	10°C to 40°C; 5% to 95% RH (non-condensing)
Operation	
I.R. Intensity	Adjustable from 1 to 100 (in one digit steps)
Latency time	0.1s steps
Cut-off function	From 5 to 30 sec
Measurement Mode	Manual and automatic
Start Experiment	By Start button, pedal switch or TTL input
Stop Experiment	By Stop button, pedal switch, cut-off or TTL input
Data export	.csv format, from USB key (provided)
TTL I/O	Input and output TTL signal
Physical weights	
Total Weight	2.8kg
Shipping Weight	3.0kg
Physical dimensions	
Dimensions with out extension table mounted	27cm(w) x 38.5cm(d) x 13cm(h)
Dimensions with extension table mounted	37,5cm(w) x 38.5cm(d) x 13cm(h)
Packaging dimensions	46cm(w) x 35cm(d) x 28cm(h)
Warranty This device is covered by 12-month on-factory manufacturer warranty. An additional 12 month on-factory warranty period (total 2 years) is available for free after device registration.	