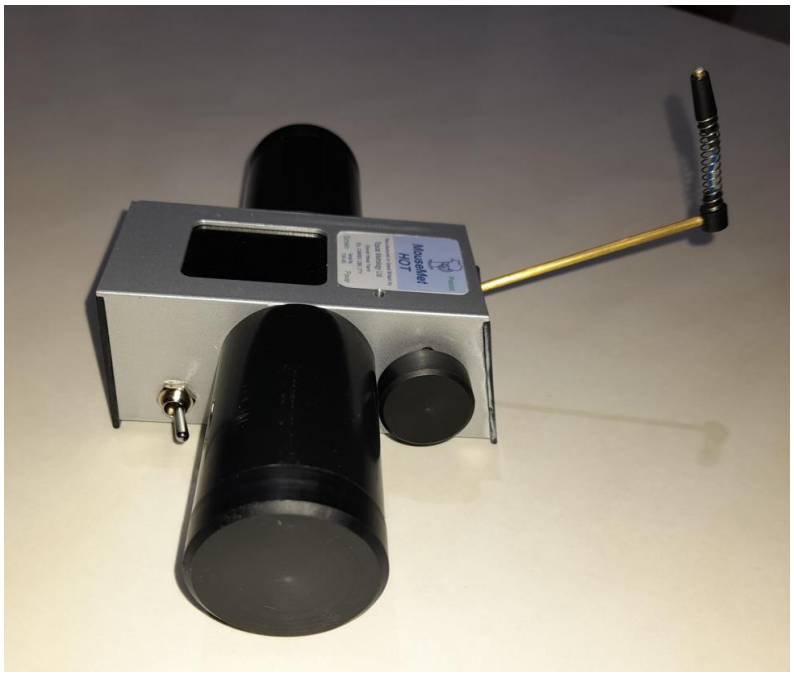
November 2024

# MouseMet HOT Testing System

## Introduction

MouseMet HOT is a novel, fully integrated electronic testing system for the efficient measurement of hot thresholds on the plantar surface of a mouse's paw. The transducer has been specifically designed to be insensitive to the hand tremor of the operator at the very low application force required for this species (0.5-1g). The hot probe is activated simply by rotating the handles of the transducer with the probe in contact with the plantar surface. The temperature of the probe rises, at 2.5°C/sec or 1.7°C/sec, and at threshold the probe is withdrawn and the "Screen" button pressed to freeze the graph of probe temperature against time, along with the peak temperature. The system is very similar in use to MouseMet mechanical; once an operator is familiar with one system, the other is simple to learn.

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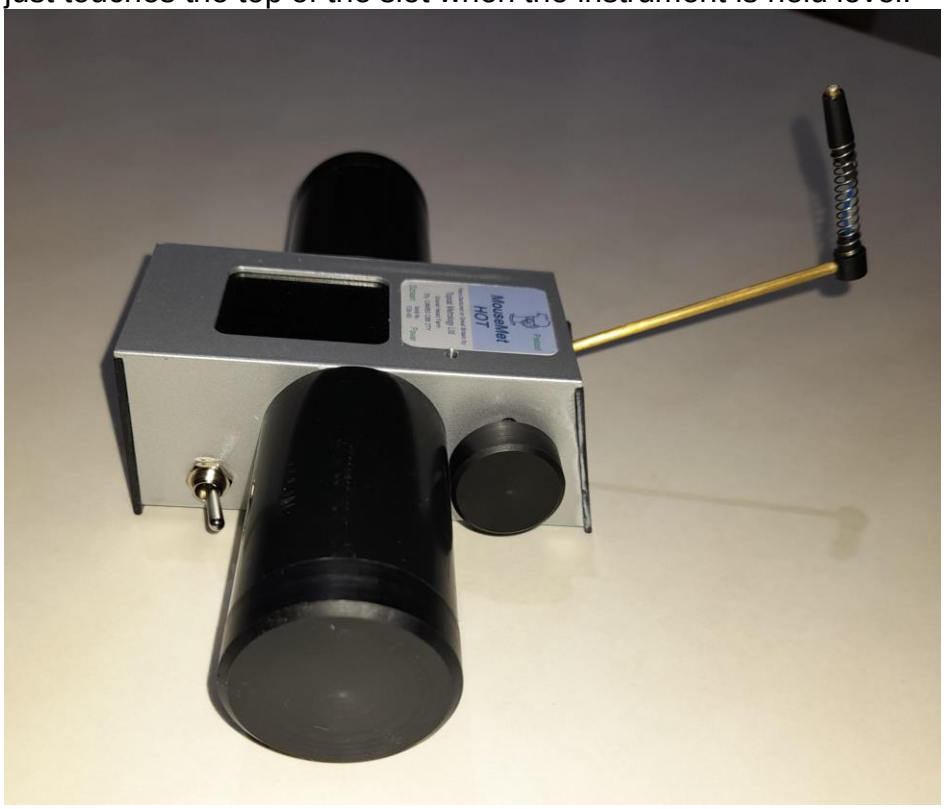
## Assembly

The transducer is supplied with the probe arm lowered. To raise the arm to the operating position, rotate the preload know on the RHS anti-clockwise, until the probe just touches the top of the slot when the instrument is held level.




## Installation

In order to make very sensitive measurements on a very small target, the Mousemet transducer incorporates novel thermode technology, proprietary to Topcat Metrology. In common with many other transducers, there is a possibility that “noise” from other electrical equipment in close proximity will distort the measurement. Topcat Metrology are not aware of any such instance but recommend that Mousemet should always be installed as far away from other electrical equipment as possible and that other nearby equipment should be turned off. Information on how to recognise and deal with noise is given in the testing section of this manual.

## Batteries

Two 9V PP3 batteries are recommended (not supplied with the system). Note that the system will also operate with just one battery (in either handle) but with reduced operating time. Topcat recommends the use of LiPo rechargeable batteries of 600 -

800mAh capacity. NiMh or disposable batteries can also be used (but do NOT attempt to recharge them). To install the batteries, first make sure the power switch is in the OFF position (up). Pull the caps off the handles, insert the batteries and plug in the connectors. Then replace the caps.

With NiMH batteries of 800 mAh capacity, battery life is approx 20 hours before the battery low legend appears. When the batteries are low, the words "Battery Low" will appear on the screen. At this point the system contains sufficient charge for 1-2 more tests.

WARNING: Never allow PP3 batteries to come into contact with metal objects such as keys or coins (in a pocket) or metal surfaces such as laboratory workbenches. Always attach the protective clips supplied to charged batteries to prevent the possibility of fire.

Do not leave the instrument switched on when not in use. This will discharge the batteries completely, shortening their life and may, in extreme circumstances, lead to corruption of the software. Always switch off at the end of testing.

**Principle of operation**

The thermal probe heats when the arm is pushed down to the trigger point. The legend “Heating” will then appear on the display and the red LED on the back panel will glow. The arm is preloaded so that a force of 0.8-1 gram is required to push it down. This preload may be adjusted by turning the preload knob and may be checked with the weight provided.

Tests are conducted by bringing the probe into contact with the plantar surface, and then twisting the transducer by the black handles until the trigger point is reached and heating starts. At threshold, the transducer is withdrawn, allowing the measurement arm to move back to its neutral position. This switches off the heater.

The green “Screen” button on the left hand side may then pressed to freeze the graph of probe temperature against time and the threshold temperature (at the top of the screen).

## Heating Rate

There is a small black switch on the rear panel. With this switch in the LEFT position, heating will occur at an average rate (over the range of 20-55°C) of 1.7°C/sec. With the switch RIGHT, the rate is 2.5°C/sec.

## Sleep Mode

To conserve battery power, the display will sleep after about 20 seconds. To restore the last graph to the screen, press the Screen button.

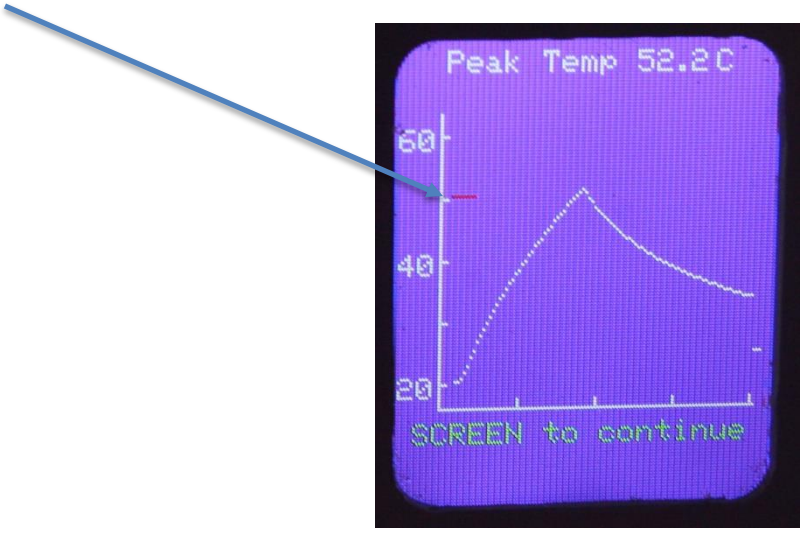
## Measurement of Probe Temperature after a Test

After a test, the thermal probe must be allowed to cool before the next test. If the green button is pressed while the display is active, it will then plot the cooling of the probe. Note though that the previous peak reading will then be lost, so make sure it is recorded first.

Probe cooling takes 1-3 minutes after a test. Some users prefer to start the next test before the probe has cooled fully as the residual heat, bringing the probe closer to skin temperature, can help prevent touch-on responses from the mouse.

Alternatively, the probe can be preheated manually before a test by pushing the arm down to activate the heater for a couple of seconds. Probe cooling after a test can also be speeded up, if required, by the use of a USB fan placed 5cm away from the probe. Be sure to allow the temperature to stabilise for a few seconds after using a fan, before starting the next test.

Cutout set to 52°C



**Thermal Cut-out**

The system includes a thermal cut-out which switches off power to the probe at a preset temperature (factory set to 60°C but adjustable by the user). If the cut-out operates during a test, heating will stop and the legend “Cutout” will appear on the screen. This legend will disappear after approximately 10 seconds when the probe has cooled down and is usable again.

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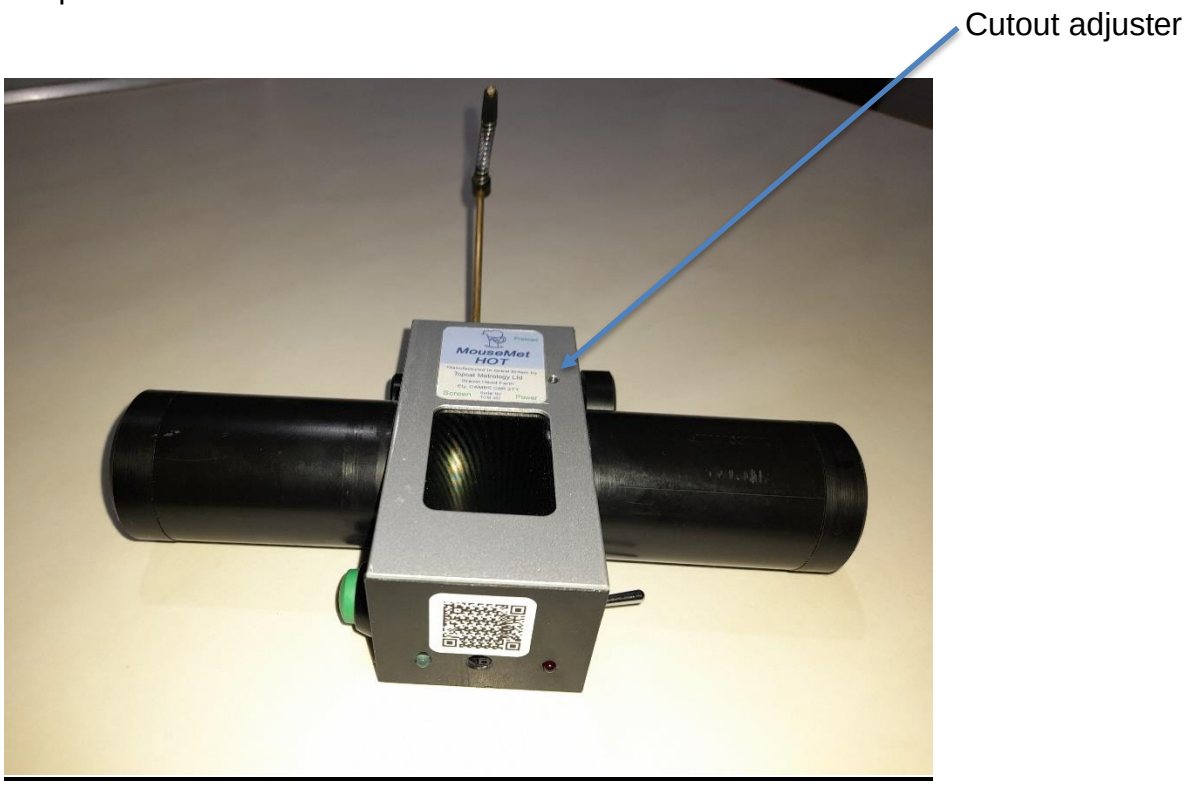
The preset cutout temperature is shown as a small red line on the display, next to the Y axis of the graph. To change the cutout temperature remove the top panel by undoing the 4 plastic screws on the sides. The cutout adjuster is then visible on the right hand side, immediately behind the display. Be very careful not to touch or damage the thermocouple attachment wires close by.

Switch the unit on and turn the adjuster with a small plastic screwdriver until the required level is reached. The range is 40°C to 62°C. Clockwise reduces the temperature.



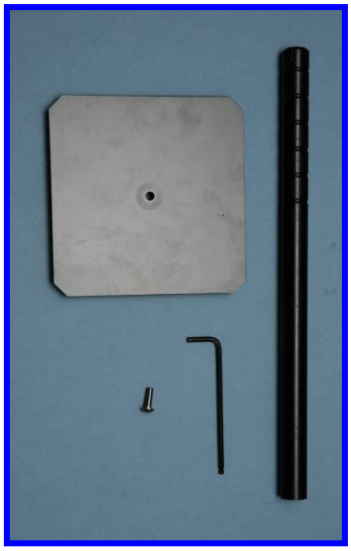
**Battery Low Indicator**

When the batteries are low, the words "Battery Low" will appear on the screen. At this point the system contains sufficient charge for 1-2 more tests.

**MouseMet Runs**

The MouseMet system is supplied with two mouse runs. The stand requires assembly before use;

1. Bolt the long vertical support, with notches at the upper end, to the baseplate using the screw and hexagon key provided.
2. Thread the crosspiece onto the vertical rod and set to the correct height. The ballscrew in the crosspiece will click into the grooves (it can be tightened or loosened if necessary).
3. Thread the support bars through the holes in the top of the runs and push an O ring on either side to secure them.
4. Place the runs onto the horizontal bars.
5. Test for height and adjust if needed. It is important to be comfortable with your elbows on the bench so that you can rotate the handles of the transducer easily.



Cleaning

The runs are suitable for cleaning and sterilisation by standard washing and normal laboratory disinfectants (eg Trigene).

## Testing

To use, advance the probe into contact with the foot, and then rotate the handles to the trigger point. At threshold withdraw the probe and press the green “Screen” button to freeze the display.

The probe can also be pre-heated by holding the arm down manually to activate the heating before applying to the foot.

## Environment and Electromagnetic Interference

As noted above, the intrinsic design of the MouseMet transducer means that it is theoretically possible for it to be affected by local electromagnetic interference (“noise”). Topcat Metrology are not aware of any such instance, and have incorporated all possible refinements into the system to mitigate against this possibility but the user should still be alert.

There are two possible types of interference:

1. A continuous level (from, for example, an unsuppressed electric motor running nearby) might produce a change in the calibration which is constant while the noise source is present.
2. Transients (from, for example, a mobile phone ringing or from heavy electrical plant switching on or off) might produce one or more spikes in the temperature trace.

To guard against this, the user is strongly advised to follow these procedures:

1. To check for continuous interference, check that the measurement of room temperature is correct at the beginning and end of each test session.
2. Inspect the temperature ramp for each test and check that it shows a smooth increase and decrease in temperature with no distortion from “glitches”.
3. Do not use a mobile phone or other wireless transmitting device within 1m radius of the equipment.
4. If the equipment is always used in the same location, confidence will increase with time and the checks need not be performed so frequently. Conversely, if the equipment is moved to a new test site, more regular checks should be made at first.

**Compliance**

MouseMet has been tested and found to comply with the relevant EU and FCC standards for electromagnetic emissions. The relevant declaration is at the end of this manual. It should be stored safely. As the product incorporates novel technology, the EU standard test method for electromagnetic immunity is not fully relevant. The conventional parts of the system have been tested and optimised with respect to the standard and self-assessment has been used to determine and minimise the immunity risks posed by the novel aspects of the system. Full details of this compliance process are available from the manufacturer on request.

**Packing list:**

1. MouseMet Thermal Transducer
2. Calibration weight (1g)
3. Protective PP3 clips
4. Run system for two mice with hexagon keys for assembly

**EU Authorised Representative**:

As required by EU legislation, the following company is empowered to represent Topcat Metrology in any matter concerning compliance with EU Directives:

24hour-AR,
Storgatan 51,
903 26 Umeå,
Sweden

## EU Declaration of Conformity

This declaration of conformity is issued under the sole responsibility of the manufacturer:

Topcat Metrology Ltd
Gravel Head Farm
Downham Common
Little Downham
Ely CAMBS
CB6 2TY

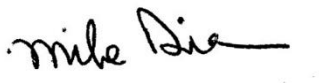
Object of the declaration: MouseMet Thermal Transducer, Serial No: TCMXXX

The object of the declaration is in conformity with the relevant Union harmonisation legislation:

– Electromagnetic Compatibility Directive (2014/30/EU)

Using standards: – EN 55011:2009_A1

EN61326-1:2013



Dr Michael Dixon, Director:

Little Downham: 22nd March 2021

# Topcat Metrology Ltd

"*Looking behind the measurement*"

www.topcatmetrology.com

**Supplier's Declaration of Conformity**

This Declaration of Conformity is hereby issued according to Chapter 1, Subpart A, Part 2 of Title 47 of the Code of Federal Regulations by:

Topcat Metrology Ltd
Gravel Head Farm
Downham Common
Little Downham
Ely, CAMBS
CB6 2TY
United Kingdom

MouseMet Thermal Transducer
complies with the applicable requirements of FCC Rule Part 15

RESPONSIBLE PARTY located in the United States:

Violette Engineering Corporation
6731 Whittier Avenue
McLean, VA 22101
info@violettecorp.com

The responsible party warrants that each unit of equipment marketed under this Declaration of Conformity will be functionally identical to the unit tested and found acceptable with the standards and that the records maintained by the responsible party continue to reflect the equipment being produced under such Supplier's Declaration of Conformity and continue to comply within the variation that can be expected due to quantity production and testing on a statistical basis.

Dr Michael Dixon

22nd March 2021