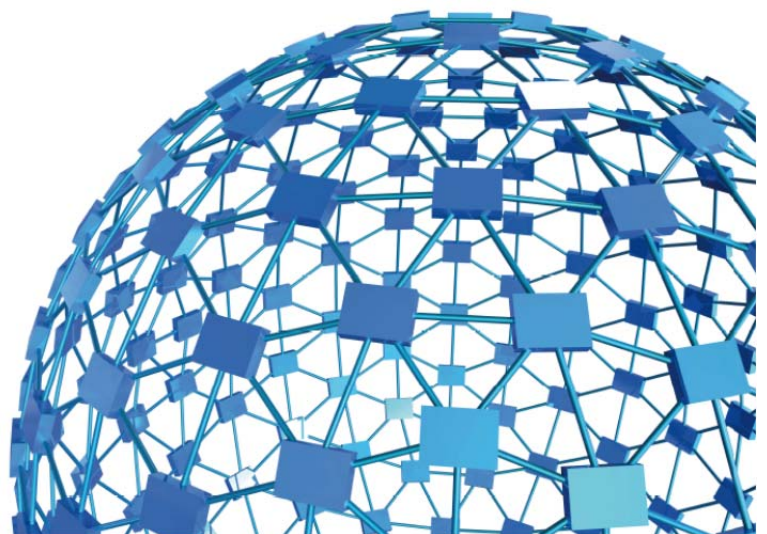




# instruction manual

**Mouse RotaRod NG**  
**Cat. No. 47650**



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**instruction manual**

**Mouse RotaRod NG  
Cat. No. 47650**

**Serial No.**

## SAFETY CONSIDERATIONS

ALTHOUGH THIS INSTRUMENT HAS BEEN DESIGNED WITH INTERNATIONAL SAFETY STANDARD, THIS MANUAL CONTAINS INFORMATION, CAUTIONS AND WARNINGS WHICH MUST BE FOLLOWED TO ENSURE SAFE OPERATION AND TO RETAIN THE INSTRUMENT IN SAFE CONDITIONS.

SERVICE AND ADJUSTMENTS SHOULD BE CARRIED OUT BY QUALIFIED PERSONNEL, AUTHORIZED BY UGO BASILE ORGANIZATION.

ANY ADJUSTMENT, MAINTENANCE AND REPAIR OF THE OPENED INSTRUMENT UNDER VOLTAGE 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.

# Mouse Rota-Rod



Cat. No. 47650

## General

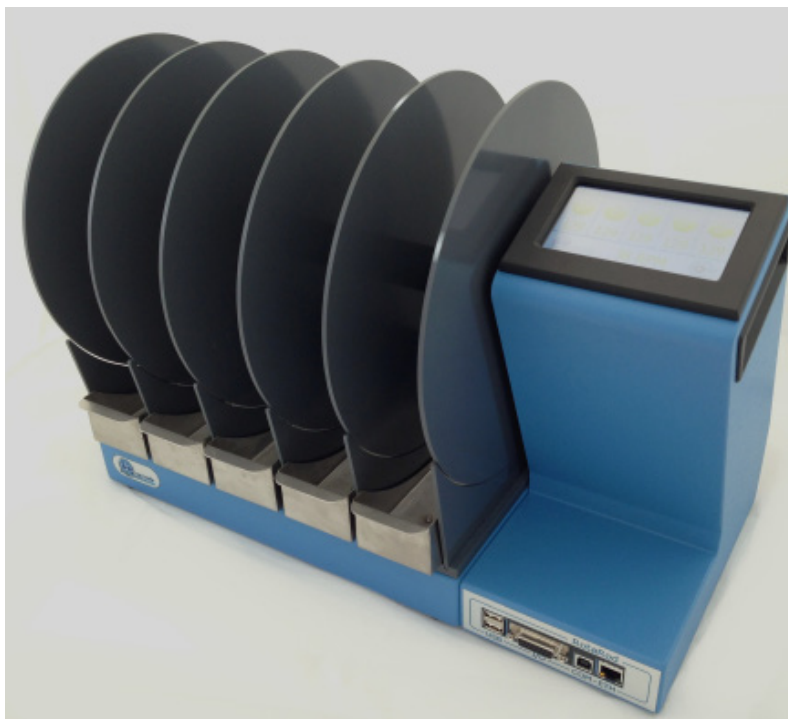
Ugo Basile designed the first industrial Rota-Rod in the 1960s, based on the 1957 paper by N.W Dunham and T.S Miya.

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

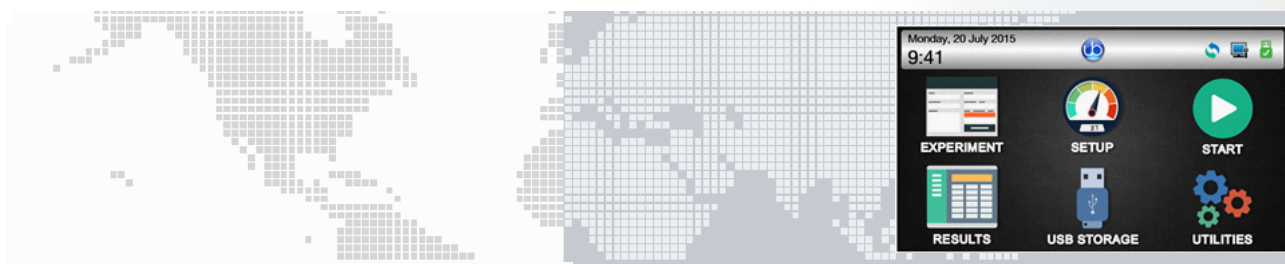
The Rota-Rod is the reference test to screen drugs potentially active, or having side effects, on motor coordination.

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



# CHECK-LIST

## 47650 Mouse Rota-Rod

CLIENTE / CUSTOMER \_\_\_\_\_

Ordine No. / Order No. \_\_\_\_\_ Data / Date \_\_\_\_/\_\_\_\_/\_\_\_\_

| UB code                   | CAT.No.   | Q.ty | ✓ | DESCRIPTION        | DESCRIZIONE           |
|---------------------------|-----------|------|---|--------------------|-----------------------|
| E-WP 008                  |           |      |   | MAINS CABLE        | EUROPE                |
| E-WP 008-1                |           |      |   |                    | U.S.A.                |
|                           | 47650-320 | 5    |   | TRIP BOX           | VASCHETTA             |
| E-FT 013                  |           | 2    |   | FUSE (T2A)         | FUSIBILE (T2A)        |
| E-AU 041 USB<br>pen-drive | 47650-302 | 1    |   | INSTRUCTION MANUAL | MANUALE DI ISTRUZIONE |
|                           | X-PAD     |      |   | SOFTWARE           | SOFTWARE              |

|                                     |                                     |                                     |                                     |
|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| DATE / /                            | Serial No.                          | IMBALLATO DA / PACKED BY            |                                     |
| Set for                             |                                     |                                     |                                     |
| <input type="checkbox"/> 115V 50 Hz | <input type="checkbox"/> 230V 50 Hz | <input type="checkbox"/> 115V 60 Hz | <input type="checkbox"/> 230V 60 Hz |

### IMPORTANT/IMPORTANTE:

Check the shipment for completeness immediately after receipt: should you find any discrepancy, please fill in the following part and transmit it to our fax no. +39 0332 745488

Al ricevimento della merce controllate che la spedizione sia completa: in caso di discrepanza, completate il formulario di seguito riportato ed inviatelo al nostro fax no. 0332 745488

|            |                     |
|------------|---------------------|
| FROM: Name | Company/Institution |
| DATE       | REF.                |

### NOTE

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# Mouse Rota-Rod NG

Cat. 4 7 6 5 0

## 1 GENERAL

The “Rota-Rod” technique has been originated by a 1957 paper of N.W. Dunham and T.S. Miya (see paragraph 9.1-Method Papers) and has proved to be of great value in research involving screening of drugs which are potentially active on motor co-ordination.

Ugo Basile designed the first industrial Rota-Rod in the 1960s. 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.

### 1.1 Principle of Operation

When a mouse falls off its cylinder section onto the trip-box below, the plate boxes and the corresponding magnetic switch is activated, thereby recording the animal endurance time in seconds.

The display shows the actual angular speed (RPM). At the end of a run, the display shows for each animal the running time, the rotation mode and the rotation speed at the time the animal fell off, combined with information preset by the user.

The record related to each lane can be zeroed during the operation by resetting the related trip plate. This allows the operator to place a fresh mouse on a particular rotor lane while the mice on the other lanes are running.

## 2 INSTRUMENT DESCRIPTION

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.

The Mouse Rota-Rod consists of **five 3cm diam. cylinders**, which are suitably machined to provide grip. Six **25cm diam. dividers** make for **five lanes**, each **5.7cm wide**, enabling five mice to be on the rotor simultaneously. The **height to fall is 16cm**.

The rotor, whose angular speed can be preset by the operator, turns on ball bearings. It is driven by a silent D.C. geared motor. Drive speed is unaffected by voltage variations, friction, or wear. This ensures that all trials can be repeated in constant operating conditions. The standard rod rotation is CCW.

The 47650 incorporates a 4"3 touch-screen, for basic setting and monitoring, via an intuitive panel.

The picture shows the Rota-Rod main menu.

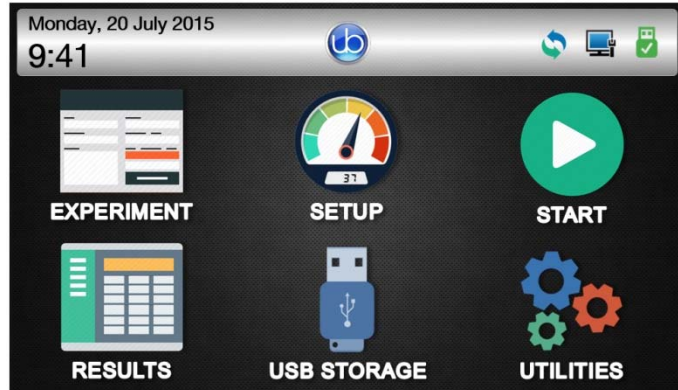
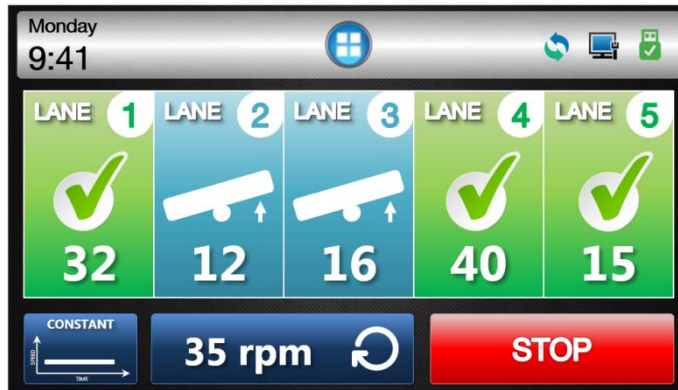
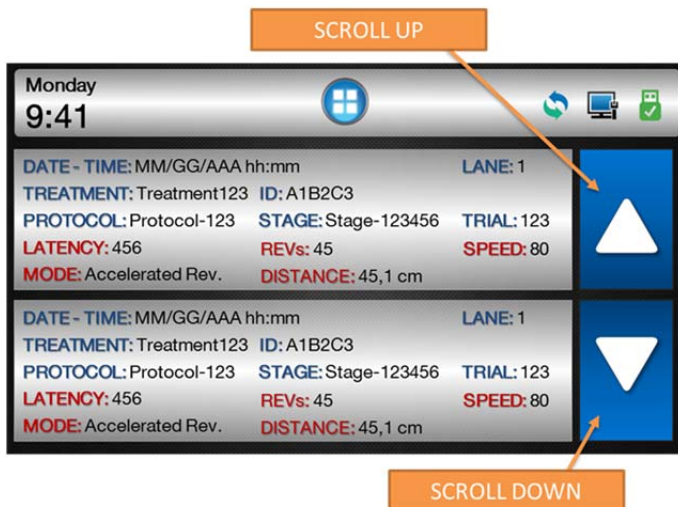


Figure 1 "Main Menu"

During the test, the touch-screen indicates the actual speed (RPM) and the status of the rotor section.



The test results for each section, can be browsed in a condensed view.



The brand new **X-PAD** software, included as standard, provides a user-friendly interface to set the experiment and a powerful tool to manage the results easily on one's PC. Data exchange from the instrument to the PC is done via the USB flash drive provided.



See also paragraphs 2.3-Experimental Configuration and 2.4-Data Collection and Management.

### 2.1.1 Notes on Resistive Touch-Screens

If you have in mind the sensitivity to touch of your tablet or smart-phone, you might think the Rota-Rod touch screen does not react promptly, and you have to press down harder.

This is because we employ a resistive touch-screen (while most smart phones use a capacitive screen); the resistive screens are better for our application because of

- High resistance to dust and water
- Better use with gloved hand or stylus (because the conductive technology is dependent on the conductive nature of human body, it doesn't work if the user is wearing gloves).

## 2.2 Rota-Rod Features

The main features of the new model are:

- **SPEED:** adjustable in the range 5-80 RPM, in steps of 1 RPM
- **MODE:** constant, ramp (accelerating), reverse, 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
- **SOFTWARE:** **X-PAD** brand new, user-friendly version, to set the experiment and manage the results
- **DETECTION:**

while maintaining the reliable magnet-contact detection system, the new model introduces new trip-boxes replacing the old trip-plates.

The boxes confine the animals when they fall off the rod and are made of stainless steel to guarantee sturdiness and easy cleaning (they can be autoclaved).

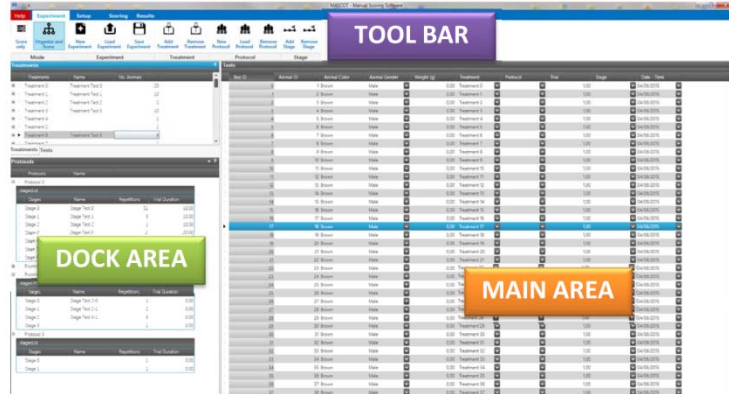


Figure 2 "Trip-Box"


## 2.3 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 flash drive provided.

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



Configurations are easily:

- exported to **Text**, **Excel** or **Pdf** reports 
- saved to cloud to **DropBox**, **OneDrive**, **GoogleDrive** 



## 2.4 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.

Data are quickly:

- exported to **Text**, **Excel** or **Pdf** reports 
- saved to cloud to **DropBox**, **OneDrive**, **GoogleDrive** 

# 3 INSTALLATION

## 3.1 Unpacking & Preliminary Check

Check the contents of the shipment for completeness, packing list to hand, and visually inspect the instrument as soon you take it out of the packaging. Use the supplied **Check List**.

If the instrument is damaged, inform the carrier immediately, notifying our company. If after having tested it, the instrument fails to meet rated performances, please contact our after sales service, see paragraph 6.4-Customer Support.



### ***Protect the environment!***

Dispose of packaging properly, according to existing and applicable waste management rules and regulations.

## **3.2 Notes on the Instruction Manual**

The 47650 Instruction Manual included in the package (on the USB pen drive) is necessary for the correct installation and operation of the instrument.

We recommend reading the manual with attention, as it is essential for the correct installation and operation of the instrument.

Please save the manual, ready to be consulted by the qualified personnel who use the instrument. Print it, only if necessary.

Our Instruction Manuals are available as free download on our web. For any additional information and/or assistance, you are welcome to contact our Service Department (see paragraph 6.4-Customer Support), specifying the serial number of your instrument.

## **3.3 General Safety Instructions**

The following guidelines must be followed to ensure safe operation.

- ! DO NOT** attempt to open or perform any service work
- ! DO NOT** connect up human subjects



## **3.4 Assembling the Instrument**

The Rota-Rod is shipped assembled: position it on a stable and reasonably flat bench or table surface.

Check that the five trip-boxes, under each cylinder section, are correctly positioned.

## **3.5 Before Applying Power**

Consider the Power Module (see figure 3), positioned left on the back panel, which encompasses – from left to right - the mains switch, the inlet connection of the mains cord, and the fuse holder/voltage selector.



*Figure 3, "Power Module"*

### 3.5.1 Mains Switch

This two-pole toggle switch, which complies with international safety standards, is lighted when the instrument is **ON**.

### 3.5.2 Fuse Holder

The fuse holder comprises two fuses, one on the live, and the other on the neutral. Use (T2A) timed fuses for operation at both 115 or 230 Volts.

For fuse replacement, please refer to paragraph 6.1-Electrical.

### 3.5.3 Mains Cord

It is a standard cable, Cat. # E-WP008. Make sure your power outtake is provided with a reliable ground connection.

## 3.6 Intended Use

The Rota-Rod is intended for investigation use on **laboratory animals only**.

## 3.7 Additional Safety Consideration

- 1) Use original accessories and spare parts only, see also paragraph 8-ORDERING INFORMATION.
- 2) immediately disconnect and replace damaged mains cord.
- 3) do not obstruct a comfortable access to the power module.
- 4) do not operate in hazardous environments or outside prescribed environmental limitations (i.e. +10c° / +40c°, 95% max. relative humidity, non-condensing), see also paragraph 7-47650 SPECIFICATIONS.
- 5) do not spray any liquid on the connectors and on the geared motor.

UGO BASILE DOES NOT ACCEPT ANY RESPONSIBILITY FOR PROBLEMS OR HARM CAUSED TO THINGS OR PERSONS, ARISING FROM:

- 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 components, accessories or parts with others not approved by the manufacturer;
- servicing carried out by unauthorized personnel.

### 3.8 Connections

Connect the mains cord to a power outlet, **provided with a reliable earth connection.**

Now consider the connection module: for easy and quick access, it is positioned on the front panel.

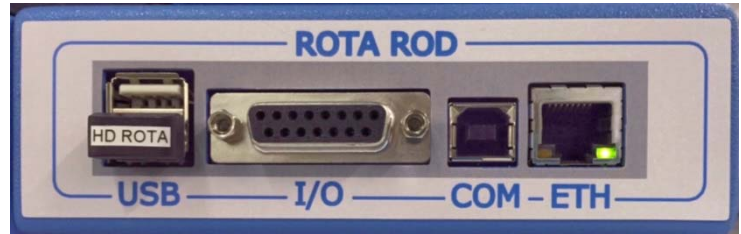


Figure 4, "Connection Module"

It encompasses the following connectors, from left to right:

- the **upper USB** enables data exchange (configurations & results) with the PC, and allows firmware upgrades, via the USB flash drive provided, or to connect a keyboard (see paragraph 3.8.2)
- the **lower USB** accommodates the USB storage key labelled "HD ROTA". **WARNING: DO NOT REMOVE IT! See paragraph 3.8.1**
- **I/O** this D-SUB 15 connector provides TTL outputs for lane status, rotation and speed see paragraph 5.7.4-Reset HD



This button resets the HD, which contains ALL THE EXPERIMENTAL DATA.

A message box will ask to confirm the action.



#### **ATTENTION:**

After confirming the procedure, it will be impossible to recover the data.

- **Signal Output.**
- **COM** this USB-B 2.0 allows communication to the PC (for Ugo Basile use, programming and debug)
- **ETH** the Ethernet connector will be used for remote diagnosis and Internet access used for standard operation.

#### 3.8.1 USB Hard Disk



The USB storage key must be ALWAYS connected to the bottom port (see picture below). This USB key works as the inner memory of the system. It contains the collected data and the protocols.

If the Rota-rod does not detect the USB HARD DISK, a message box asks to disconnect and to reconnect the USB Key and restart the device.



If during a normal operation, the user disconnects the USB HARD DISK, the device automatically switch off and restarts.

**WARNING:** this operation could damage the experiment data and Impair the internal Rota-Rod memory.

### 3.8.2 Keyboard

When setting up the experiment, it is often requested (although not compulsory) to enter data via the touch-screen. For example information about the test, stage, animal, treatment, etc.

To ease the data input, it is possible to connect a standard QWERTY keyboard to the upper USB port. The keyboard will be automatically recognized and **alphanumeric** data typed on the keyboard will appear on the touch-screen.

Beside all the alphanumeric keys, the PC will accept:

- The **backspace**, to cancel the entered data
- The **ESC** key, to leave the menu
- The **ENTER** key, to confirm the input and move to the following field

## 3.9 Installation of X-PAD Software

The **X-PAD** software is saved on the USB Flash Drive provided with the instrument: download it on the Hard Disk of your PC.

# 4 PRELIMINARY

## 4.1 Placing the Mice on the Rotor

We recommend that **the rotor is set in motion before placing the mice in position**; or else, by the time the last mouse is in place, the first may well be facing the wrong direction and is therefore likely to fall immediately when the drum starts rotating.

Start the rotor at the selected speed and then place the mice, one by one, in their respective lanes, at the same time **resetting the related counter to zero, by lifting the corresponding trip plate**.

Flip them up by the tail, right-side up but dorsal side in first, and then drop them between the rotating discs onto the rotor.

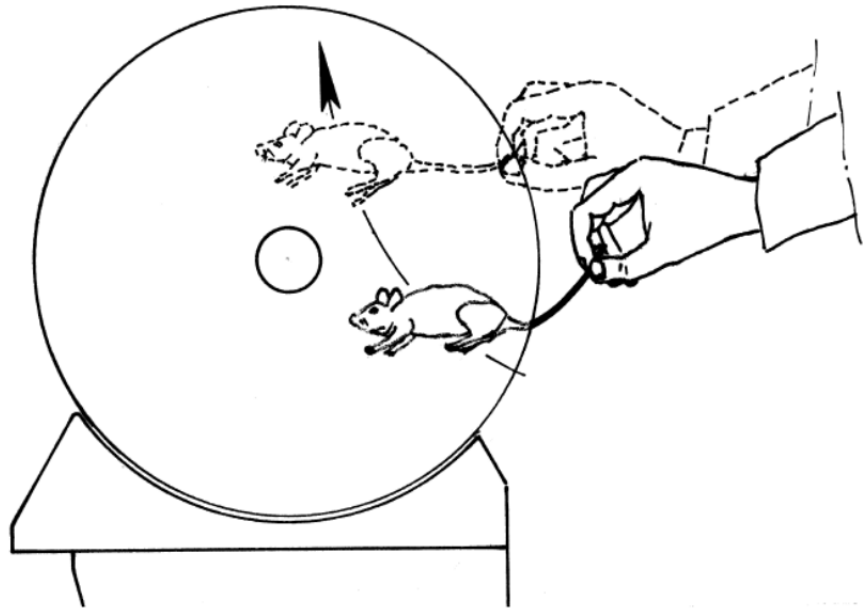


Figure 5 "Placing the Mice on the Rotor"



**IMPORTANT:**

The mice should not be lowered from above; if an attempt is made to place the animal directly on the rotor, it will spread its legs and block entry between the discs.

Experience and patience will teach the ideal technique: as in most behavioural devices, the man/ animal interface is not less important than the animal/ machine one, and requires some patience and gentle handling to be perfected.

Speaking about animal/machine interface, the surface finishing of the drums is a sensitive point. The rotor drums are knurled to provide adequate grip. Soft substances are not suitable, as the mice would cling to the drums without trying to keep pace with the revolving rotor as the experiment dictates; knurled Perspex provides, according to our experience, the ideal compromise, and remains spotless after years of use.

If you have the feeling that the rotor surface is too glossy and smooth, brush its knurled surface with a metallic brush; this action will not make the surface texture coarser, but it creates thousands of micro scratches which eventually improve the grip.

## 4.2 Adjusting the Detection Sensitivity

A small stainless steel screw allows the gap magnet/keeper to be adjusted thereby enabling the **plate release-sensitivity** to be regulated.

For juvenile (lighter) animals, it might be necessary to increase sensitivity a little.

Turn the screw CW to increase, CCW to decrease sensitivity.

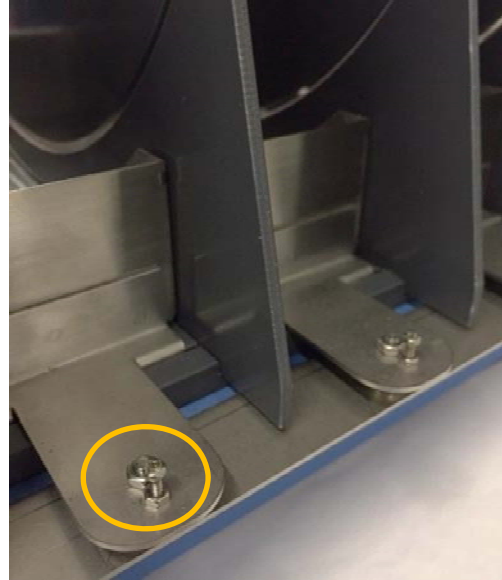


Figure 6 "Detection Sensitivity"

## 4.3 Conditioning

It is advisable to carry out an acclimation and conditioning session, before starting the motor co-ordination test.

With the rotor at low speed, say 4-5 R.P.M., each naïve mouse is placed upon its section in order to familiarize it with the revolving rotor. After 2-3 training runs of 1-2 minutes at intervals of 2-3 hours, the mice should be accustomed to the rota-rod, and ready for the test proper.

## 5 OPERATION

Switch on the Rota-Rod: the instrument performs a CPU check, which might take up to 60 seconds, during which the display will show:



After switching on the instrument, first of all, get familiar with its controls.



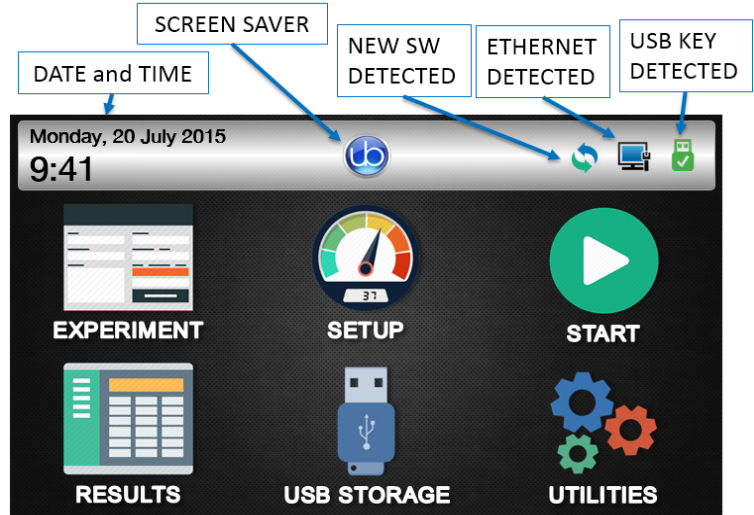
## 5.1 Home Page

The test is managed by the 4”3 touch-screen.

This is how the Home Page looks like.



From the Home Page, the logo button on the tool-bar, opens the “screen-saver” window



This window displays current date and time, and the version of the software on-board.



From any other menu, the logo button always brings back to the Home page.

### 5.1.1 System Icons



**NEW SOFTWARE DETECTED:** if this icon is present, a new version of SW has been detected on the USB Key.

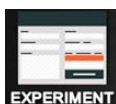


**ETHERNET DETECTED:** an Ethernet connection has been detected



**USB KEY DETECTED:** if this icon is present, a USB has been detected on the USB port.

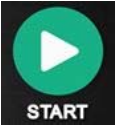
### 5.1.2 Home Page Icons



In the **EXPERIMENT** page, it is possible to enter information about the test, including treatment, protocol, stage, trial, see paragraph 5.2.



Speed and Mode are defined from the **SET-UP** page, see paragraph 5.3



goes to **START** Page, see paragraph 5.4



goes to **RESULTS** Page, see paragraph 5.5



goes to **USB STORAGE** Page, see paragraph 5.6



goes to **UTILITIES** Page, see paragraph 5.7


## 5.2 Experiment

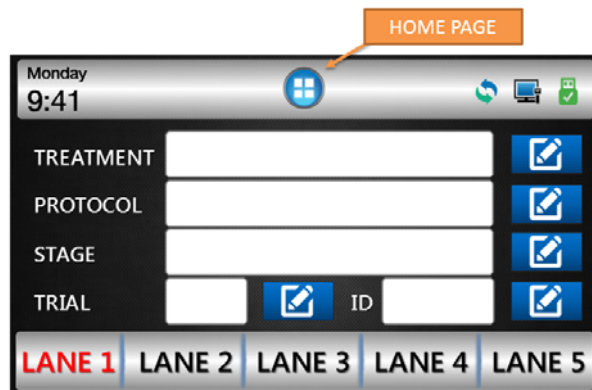
In the **EXPERIMENT** page, it is possible to enter information about the test.

First of all, select the lane number:



The selected lane appear in **red color**.

Depress the keyboard icon  to activate the virtual keyboard



Enter a maximum of 12 characters in each field. TREATMENT, PROTOCOL, STAGE and TRIAL are text boxes, where it possible to specify the related information.

All the information boxes are independent for each lane: select another lane and enter the related data. Repeat the same process for each lane.

In the **RESULT** table the entered information will be matched with the test results. Of course, the user may choose not to enter any information and leave the fields empty.



The Home Page icon brings back to the home page.




**NOTE:**

Whenever a virtual keyboard is involved to enter data, it is possible to use an external QWERTY keyboard, connected to the RotaRod upper USP port, see also paragraph 3.8.2.

### 5.3 Set-Up

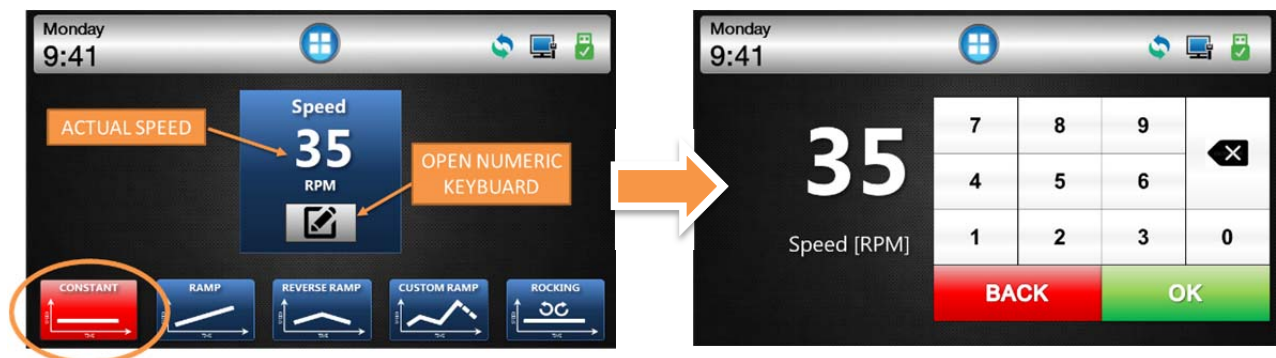
In this page it is possible to set-up **Speed** and **Mode**.


The user may choose among the **CONSTANT**, **RAMP**, **REVERSE RAMP**, **CUSTOM RAMP**, **ROCKING** modes, by depressing the related button at the page bottom.

Having selected the Speed and mode, press  to go back to the Home page.

#### 5.3.1 Constant Speed

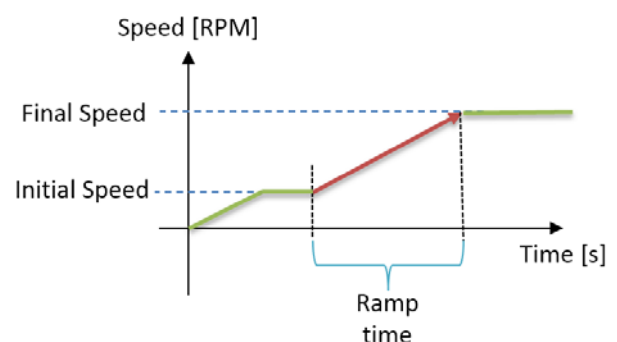
With **Constant Speed** mode, the rod rotates CCW at a speed which remains constant, for the duration of the test.




Depress the icon  to activate the numeric keyboard, and enter a speed between **5** and **80 RPM**. Confirm by **“OK”**.

#### 5.3.2 Accelerated/Decelerated Speed

This mode allows testing the subjects with an **increasing/decreasing** speed. It is necessary to set the initial and final speed, and the ramp (the time the rotor takes to go from the initial to the final speed). Revolutions are CCW.

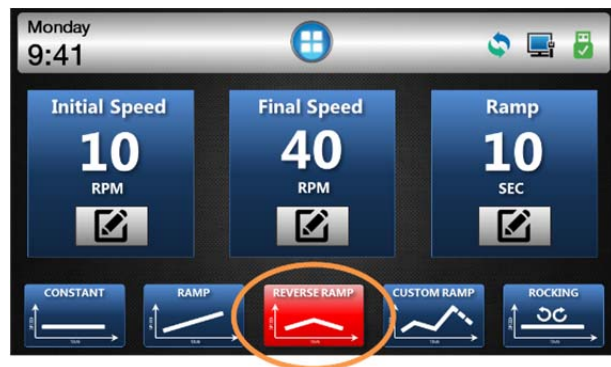


Depress the icon  to activate the numeric keyboard to enter:

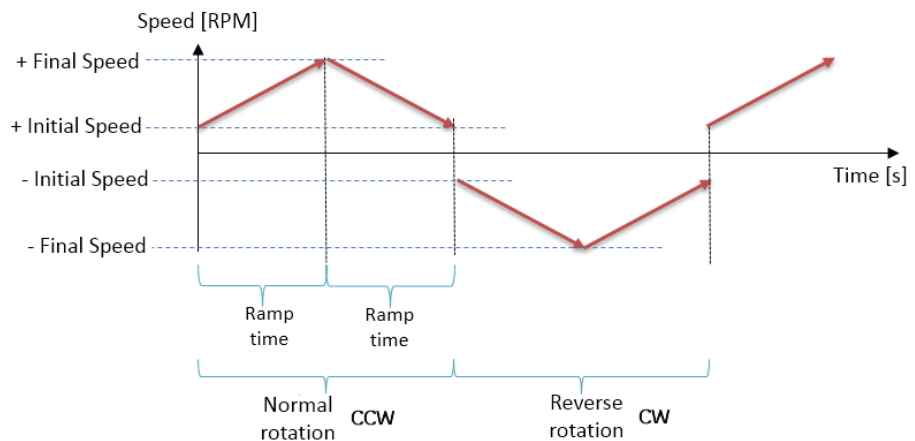
- **Initial speed:** between **5** and **80 RPM**
- **final speed:** between **5** and **80 RPM**
- *if the initial speed is lower than the final speed, the speed will be accelerating: on the contrary a decelerated speed is obtained by setting an initial speed higher than the final one)*
- **ramp:** from 1s to 999s (**acceleration limits: maximum 2RPM/s**)

### 5.3.3 Reverse Rotation

This mode allows testing the subjects with reversing rotation, which means a 4-stage cycle consisting of a CCW-rotation phase at increasing speed, followed by a phase at decreasing speed, a change of rotation, hence a CW-rotation phase at increasing speed, followed by a phase at decreasing speed.



The scheme on the right simplifies the reverse cycle.



Depress the icon  to activate the numeric keyboard to enter:

- **initial speed:** between **5** and **80 RPM**
- **final speed:** between **5** and **80 RPM**
- *if the initial speed is lower than the final speed, the speed will be accelerating: on the contrary a decelerated speed is obtained by setting an initial speed higher than the final one)*
- **ramp:** from 1s to 999s (**acceleration limits: maximum 2RPM/s**)

### 5.3.4 Custom Ramp


This feature is not controlled on the touch-screen, and is to be set on the PC. The related button is not active.

### 5.3.5 Rocking

When this mode is selected, the rotor will complete the number of preset revolutions CCW, then reverse rotation and complete the same number of revolutions CW, then repeating the cycle until stopped. number.

In the example: the rotor will revolve repeatedly 5 times forward, then 5 times backward.



Depress the icon  to activate the numeric keyboard to enter:

- **Speed:** between **5** and **80 RPM** (In the Rocking mode, the speed is constant!)
- **Revolution number**

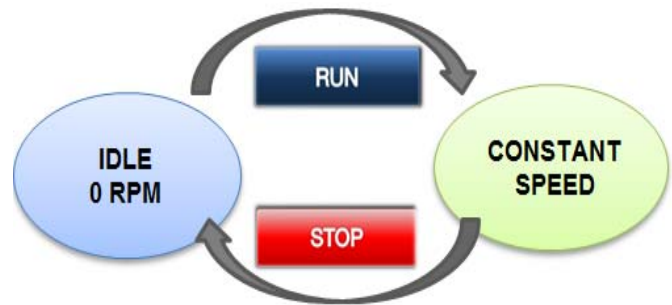
## 5.4 Start Button

### 5.4.1 Starting Constant Speed

In the constant speed mode, during **IDLE** state, the motor and the counters are disabled.

Pressing the **RUN** button, starts the motor and enables the counters.

The motor stops and the counters are disabled by pressing the **STOP** button.



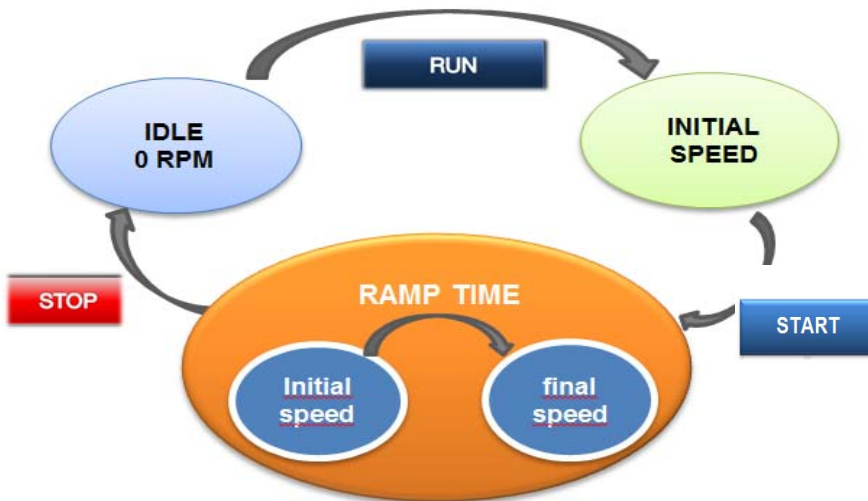
During RUN state, each counter is started by lifting the related trip box (UP position).

When an animal falls off its rotor section, tilting the trip box to DOWN position, the related counter stops and the display shows the lane as green; the data are saved and will appear in the RESULT table.



### 5.4.2 Starting a Ramp

In the accelerating mode, when the **RUN** button is depressed, the Rota-Rod will pass from the IDLE state (motor and counters disabled), to the initial speed.



ALL Trip Boxes must be in the UP position in order to start the experiment.

The experiment and the counters are started by the **START** button: the motor will accelerate from the INITIAL SPEED to the FINAL SPEED.




When an animal falls off its rotor section, tilting the trip box to DOWN position, the related counter stops and the display shows the lane as green, indicating the completed revolutions; the data are saved and will appear in the RESULT table.



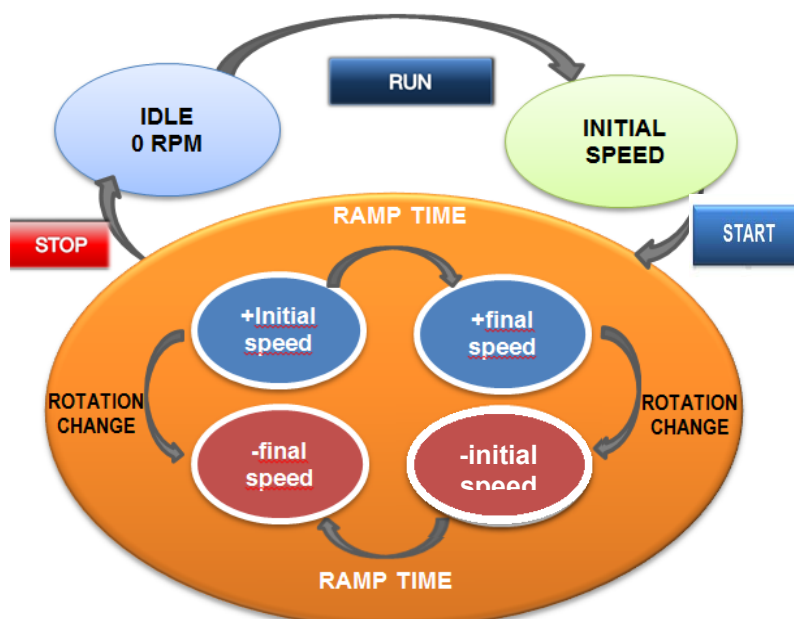
As soon as the FINAL SPEED is reached, the rod will keep rotating at constant speed and the timers will continue counting.

The motor and the counters will stop by pressing the STOP button at any time during the experiment.

Press  to return to the Home page.

### 5.4.3 Starting a Reverse Rotation

In the accelerating mode, when the **RUN** button is depressed, the Rota-Rod will pass from the IDLE state (motor and counters disabled), to the **initial speed**.



All Trip Boxes must be in the UP position in order to start the experiment.

The experiment and the counters are started by the **START** button: the motor will accelerate from the INITIAL SPEED to the FINAL SPEED.

As soon as the FINAL SPEED is reached, the rotor will change the rotation sense and restart accelerating from “-INITIAL SPEED” to “- FINAL SPEED”.

The cycle is repeated until the STOP button is depressed at any time during the experiment.

When an animal falls off its rotor section, tilting the trip box to DOWN position, the related counter stops and the display shows the lane as green, indicating the revolution number; the data are saved and will appear in the RESULT table.

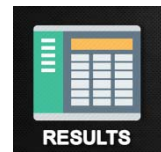
Press HOME PAGE button to return to the FIRST PAGE.

*See in this example how to read and use the various sections of the display*

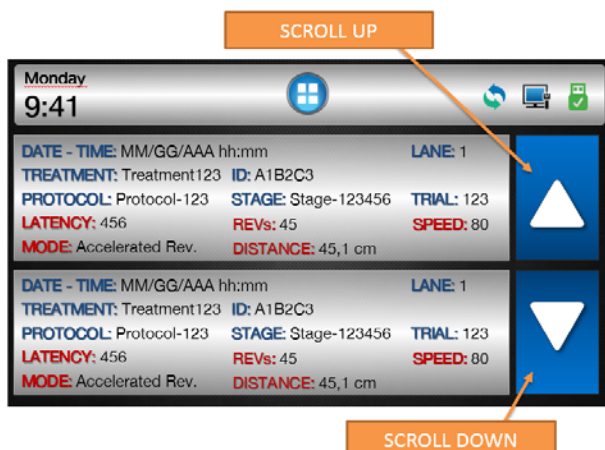


## 5.5 Results

Data are saved in the internal memory and they can be scrolled on the touch-screen. Reach the results section by depressing the “RESULTS” icon from the home page.



The home page is reached from any menu, but depressing the button



As you see from the example, all the Experiment-related information entered by the user appear under the blue headings

- DATE-TIME
- LANE
- TREATMENT
- ID
- PROTOCOL
- STAGE
- TRIAL



The test results appear under the red headings:

- LATENCY
- REVOLUTIONS
- SPEED
- MODE
- DISTANCE

Scroll through the results by the UP ▲ and DOWN ▼ arrows.

Results can then be saved on the USB flash drive, and uploaded on the PC for further processing, see paragraph 5.6.1. When transferred to PC via USB drive, test results appear in extended version.

## 5.6 USB Storage




By depressing the USB icon, you will reach the USB Storage menu.



### 5.6.1 Save Data



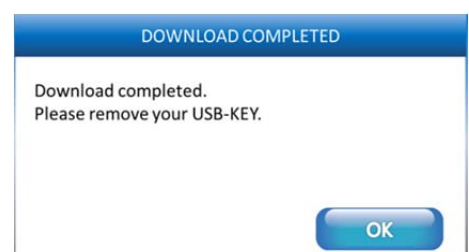
By pressing this icon, it is possible to export the results on a USB-KEY.

Insert in the upper USB port the USB flash drive provided with standard package. Correct insertion is confirmed by the  icon on the toolbar.

If you try to save the data without USB-KEY, the following dialog box will appear.



When the download procedure ends correctly, the following dialog box is displayed.



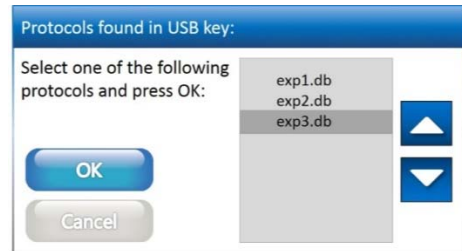
The file will be saved in .CSV format.

### 5.6.2 Load Protocol



When a USB flash drive, containing at least one protocol is connected to the device, the “LOAD PROTOCOL” button will open the following window, displaying all the loadable protocols found.

Use the arrows on the right of the screen to scroll the list up and down.



Having selected the desired protocol, if the protocol was properly loaded the confirmation box will show up, while an error box will appear if the file has been found corrupted.

After opening a protocol, the user will be able to test the animals following to the loaded protocol, combined with the information contained therein.

## 5.7 Utilities

The UTILITIES menu offers the following options:



### 5.7.1 Software Update





For software update you will receive the “RR\_Update.hex” file by E-Mail or download it from our web site.

The file is to be saved on a USB key (FAT32 file system formatted), for example the standard Ugo Basile USB key provided with the Rota-Rod.

Proceed as follows:

- A. **Switch OFF** the Rota-Rod
- B. Copy the “RR\_Update.hex” file on USB Key (file system FAT32);
- C. **Switch ON** the Rota Rod
- D. Insert the USB KEY containing “RR\_Update.hex” file into the UPPER USB port (see picture on the right)



- If the USB key is detected, the  icon on the system bar will appear on the tool-bar
- If the system recognizes a new SW version, the  icon will appear on the toolbar.

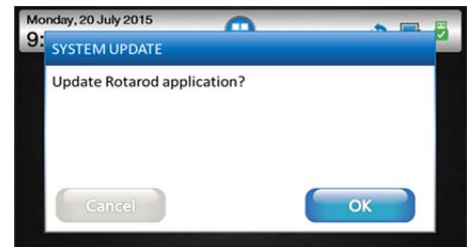


Only if the two icons are shown, it is possible to proceed with the update.

- E. Select in sequence:



- F. Confirm by answering **OK** to the question “Update Rotarod application?”



- G. Wait about 30 seconds for the Rota-Rod to reboot.



**IMPORTANT:**

do not remove the USB Key during the updating procedure!!!

- H. Wait about 30 seconds
- I. **Switch OFF** the Rota-Rod
- J. Remove the USB key from the upper USB port (NB: do NOT remove the USB Hard disk from the lower USB port!)
- K. **Switch ON** the Rota-Rod
- L. Select “**USB STORAGE**” and then “**ERASE MEMORY**”
- M. Answer “**OK**” to the confirmation window



**IMPORTANT:**

Erasing the memory will determine the loss of all the data stored in the hard disk. It's highly recommended to export all meaningful data and results before doing it.

N. Press the HOME button to check the new SW version.



### 5.7.2 Setting Date & Time

Select the "DATE-TIME" icon



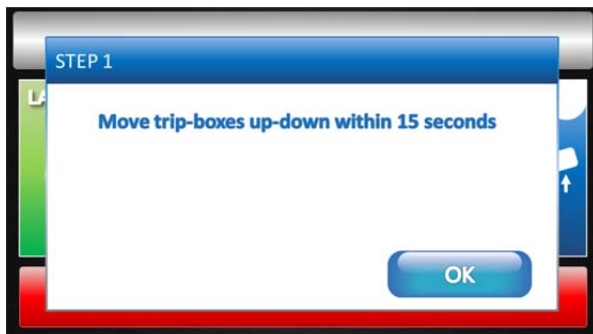
Set date and time by using the the UP ▲ and DOWN ▼ arrows, then confirm by pressing **OK**.



### 5.7.3 Diagnostics



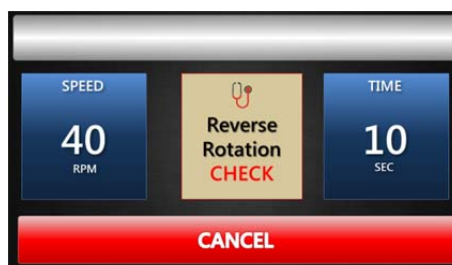
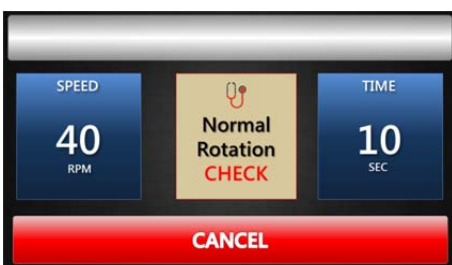
By selecting this function, the Rota-Rod will perform an self-diagnostics automatic test.



First of all, the machine tests the correct functioning of all trip-boxes.

Follow the instructions; press **OK** then move each trip-box up then down once, within 15 seconds.

Then the self-diagnostics checks the motor performances, in normal and accelerating modes:



The procedure can be stopped at any time, by pressing the **CANCEL** button.

When the diagnostic sequence is completed, a report can be saved to USB



### 5.7.4 Reset HD



This button resets the HD, which contains ALL THE EXPERIMENTAL DATA.

A message box will ask to confirm the action.



#### ATTENTION:

After confirming the procedure, it will be impossible to recover the data.

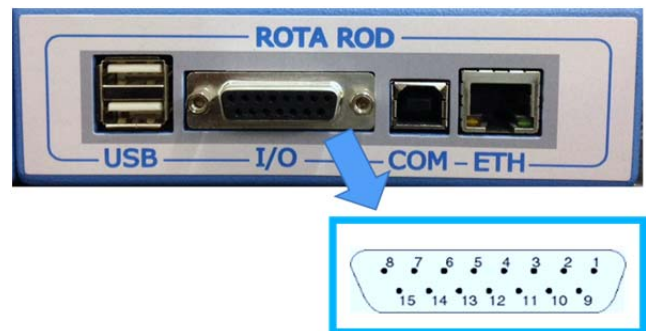
## 5.8 Signal Output

For some sophisticated application, and interface with other systems, it might be useful to obtain outputs for lane status, rotation and speed.

The 15-pin D-SUB connector (see picture and paragraph 3.8) provides different output trigger, in the form of TTL signals.

All pins, except pin 8, are TTL digital signals. Pin 8 is an analog output which provides the rotation speed.

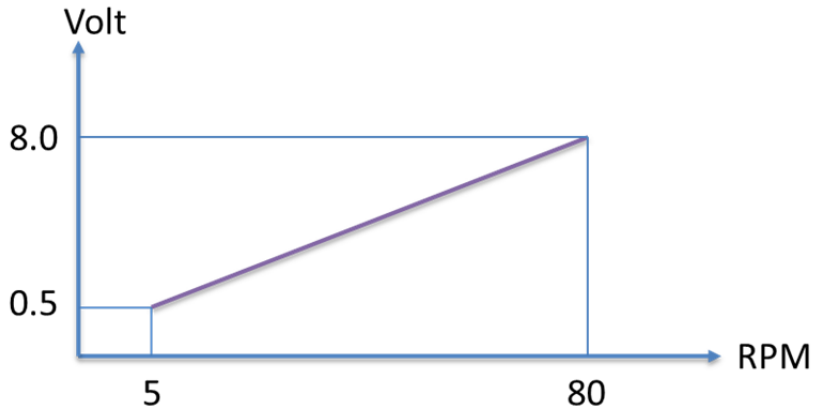
Pins 14 and 15 are ground.



### 5.8.1 Pin-Out

| Pin No.     | DESCRIPTION       | LEVEL LOW    | LEVEL HIGH  |
|-------------|-------------------|--------------|-------------|
| Pin 1       | PLATE 1 STATUS    | PLATE UP     | PLATE DOWN  |
| Pin 2       | PLATE 2 STATUS    | PLATE UP     | PLATE DOWN  |
| Pin 3       | PLATE 3 STATUS    | PLATE UP     | PLATE DOWN  |
| Pin 4       | PLATE 4 STATUS    | PLATE UP     | PLATE DOWN  |
| Pin 5       | PLATE 5 STATUS    | PLATE UP     | PLATE DOWN  |
| Pin 6       | ROTATION SENSE    | REVERSE      | NORMAL      |
| Pin 7       | EXPERIMENT STATUS | NOT RUNNING  | RUNNING     |
| Pin 8 (*)   | ANALOG SPEED OUT  | 5 RPM = 0.5V | 80 RPM = 8V |
| Pins 9 - 13 | NOT USED          |              |             |
| Pins 14-15  | GROUND            |              |             |

(\*) The following picture shows the correlation between RPM and Volt on Pin8:



## 6 MAINTENANCE

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



**UNPLUG THE MAINS CORD BEFORE CARRYING OUT ANY MAINTENANCE JOB!**

### 6.1 Electrical

To inspect and/or replace the fuses, **disconnect the mains cable first!** Insert a miniature screwdriver in the slot indentation, see paragraph 3.5.2, and snap out the slide which houses the fuses. Use T2A fuses for operation at both 230 or 115 Volts.

Snap in the fuse slide: the mechanical “click” ensures that it is locked.

### 6.2 Cleaning

Rota-Rod 47650 does not require any maintenance apart from normal cleaning.



**Do not use organic solutions**, liable to impair the discs and the acrylic components and touch-pad.

Cotton wool and water can be used for cleaning purposes. For disinfection, use a non-alcoholic disinfectant, or H<sub>2</sub>O<sub>2</sub>.

### 6.3 Long Inactivity

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

## 6.4 Customer Support

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



### UGO BASILE s.r.l.

Via G. Di Vittorio 2  
21036 GEMONIO – Varese, ITALY



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[service@ugobasile.com](mailto:service@ugobasile.com)  
[logistics@ugobasile.com](mailto:logistics@ugobasile.com)  
[sales@ugobasile.com](mailto:sales@ugobasile.com)

**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.

## 7 47650 SPECIFICATIONS

### General

|                       |   |
|-----------------------|---|
| Commands              | 4"3 touch-screen (resistive)                  |
| Read-out              | on the touch-screen                           |
| Power Requirement     | Universal input 85-264 VAC, 50-60Hz, 40W max. |
| Sound Level           | < 60 dB (A)                                   |
| Operating Temperature | 10° to 40° C                                  |

### Operation

|                      |   |
|----------------------|---|
| Speed                | adjustable in the range 5-80 RPM, in steps of 1 RPM   |
| Mode                 | constant, ramp (accelerating), multi-step ramp (NEW!) |
| Rotation             | forward, reverse, rocking                             |
| Rotor Start/Stop     | on the touch-screen                                   |
| Counting Start /Stop | each section via its trip box                         |
| Trip-Box             | stainless-steel to ease sterilization                 |
| Drive                | forward, reverse, rocking                             |
| Data Acquisition     | via dedicated <b>X-PAD</b> software, provided         |

|                  |  |
|------------------|--|
| Data Portability | by USB flash drive   |
| TTL Output       | for lane status, rotation and speed  |
| Data             | exported to Text, Excel or Pdf, or saved to cloud to Drop-Box, OneDrive, GoogleDrive |
| Configurations   | exported to Text, Excel or Pdf, or saved to cloud to Drop-Box, OneDrive, GoogleDrive |

### Physical

|                    |                     |
|--------------------|---------------------|
| Total Weight       | 11Kg                |
| Shipping Weight    | 16Kg approx.        |
| Dimensions         | 46(w)x28(d)x33(h)cm |
| Packing Dimensions | 70x36x46cm          |

|                 |   |
|-----------------|---|
| <b>Warranty</b> | 47650 is covered by a 24-month warranty |
|-----------------|---|

## 8 ORDERING INFORMATION

### 47650 **Mouse Rota-Rod NG**, complete with standard accessories

*47650-320* Stainless-Steel Trip-Box (5 are provided with standard package)

E-AU 041 USB pen drive, including:

*47650-302* Instruction Manual  
*X-PAD* Software Package

*E-WP008* Mains Cord – Europe (or E-WP008-1 U.S.A. / E-WP008-2 U.K.)

Set of 2 fuses

### 8.1 Optional

Working with both rats and mice? You should consider the Combination Package 47850, including both Mouse and Rat Rota-Rods

*47850* **Combination Package** 47650 Mouse Rota-Rod and 47750 Rat Rota-Rod



## 9 BIBLIOGRAPHY

### 9.1 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. Pharmacol.: 20: 302-304, **1968**

### 9.2 Papers Dealing With Ugo Basile Mouse Rota-Rod

- 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 Kinase  $\alpha$  Mediates Neuropathic Pain After Peripheral Nerve Injury”** Antioxidants & 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)

# *Notes*

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*Notes*

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*Notes*

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## CE CONFORMITY STATEMENT

Manufacturer **UGO BASILE srl**  
Address Via G. di Vittorio, 2 – 21036 Gemonio, VA, ITALY  
Phone n. +39 0332 744574  
Fax n. +39 0332 745488

*We hereby declare that*

Instrument. **ROTA ROD for Mice**  
Catalog number **47650**

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

- *2006/95/CE relating to electrical equipment designed for use within certain voltage limits*
- *2006/42/CE on machinery*
- *2004/108/CE relating to electromagnetic compatibility*
- *2011/65/UE on the restriction of the use of certain hazardous substances in electrical and electronic equipment*

Account Manager

Adriano Basile

Nome / Name

June 2015

Date

Firma / Signature

## Laboratory Test and Certification: 47650 Mouse Rota Rod NG

We hereby certify that the 47650 Mouse Rota Rod NG has been tested in our laboratory for 2 weeks, in order to identify any possible trouble with the use with animals.

Support has been given to Ugo Basile R&D Team to solve those issues and to incorporate improvements based on our experience.

Particular care has been taken in comparing the new NG features with the previous models by Ugo Basile.

Best regards

Guido Cavaletti



Head, Experimental Neurology Unit - Director, PhD Program in Neuroscience  
School of Medicine and Surgery - University of Milano-Bicocca  
via Cadore 48 - 20900 Monza (MB), Italy