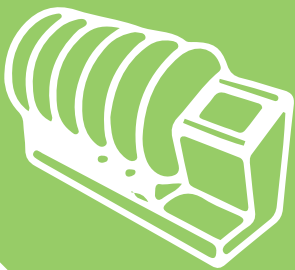


Instruction manual

ROTOMETER



ugobasile.com

Cat. No 43000

Motory Coordination, Grip Strength, Activity



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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.

43000

Instruction Manual

dated March 2010

Revision 2

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ROTOMETER

Cat. 43100

1 GENERAL

1.1 Purpose of the Instrument

The Rotometer is widely used in research on motor assessment tests. Rotometer is also used 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 have rotational sequelae.
- Physical lesions also can cause rotational behavior in an animal.

1.2 Principle of Operation: Freely Animals

To quantify rotational behavior in a freely moving animal is a significant development. This new Rotometer accomplishes precisely this task, using new and clever technology to count clockwise (CW) and counterclockwise (CCW) rotations in a circular open field. The animal carries just a small magnet (not much larger than a grain of rice) on its nape or on its tail.

The magnet can be fixed on the animal tail or in a jacket, surgically implanted or injected subcutaneously.

A convenient method is to attach a 2x15mm **magnet to the base of the tail** by using standard laboratory tape (as shown in Figure 1).

This method is easy and efficient, with minimal stress for the animal, and has the advantage of not requiring any anesthesia procedure.



Figure 1 “15 mm magnet, attached to the tail”

The **injectable magnets**, encapsulated within a proven bio-compatible material, fit within syringes normally used for the injection of identification transponders.

These small magnets are easy to inject in the animal’s nape and do not interfere with the animal behavior.

The optional Syringe kit 43000-321 includes a syringe, replacement needle and injectable magnets: 2x12 & 2x15 mm, 10 each.



Figure 2 “Syringe & injectable magnet ”

2 INSTRUMENT DESCRIPTION

The Instrument features:

- 1) a **Cabinet** or original design, incorporating the **detecting system** proper, see paragraph 2.2
- 2) a **Command/Display Module**, see paragraph 2.3
- 3) an **animal restrainer**, see paragraph 2.1.

2.1 Animal Restrainer

The animals are confined by a clear removable cylinder made of clear Plexiglas, which dimensions have been found to be convenient for either mice or rats.

2.2 Detecting System

The rodent is placed in the open field (20cm diameter round field, bound by the acrylic cylinder.) When the animal circles within this field, or rotates in place, the magnet (carried by

the rodent,) also rotates. Sensors below the open field pick up these rotations, and the electronics record the rotations over time.

The design of this detecting system is very advanced, to enable the arena to be quite large whilst the aboard magnet is very small. **The technically minded reader has already grasped that the above are conflicting requirements!**

2.3 Command/Display Module

This module of original design is located on the instrument front panel, and comprises both a graphic display and a command keyboard.

The graphic display presents all available commands: the operator sets the experiment configuration via the command keyboard located on the right of the display.

The multifunction liquid-crystal graphic-display shows the CW and CCW rotations on the LCD display and processes this datum via a microcontroller, beside enabling the researcher to add date, time, experimental number and further information.

The researcher can export the data directly to the PC, via serial or USB or through the Memory Stick, see also paragraph 3.

Via the memory stick all the experimental data of one or more sessions can be recorded.

2.3.1 Graphic Display

It is basically divided into 4 areas.

The two lines of the **top area** show:-

- 1) date
- 2) time

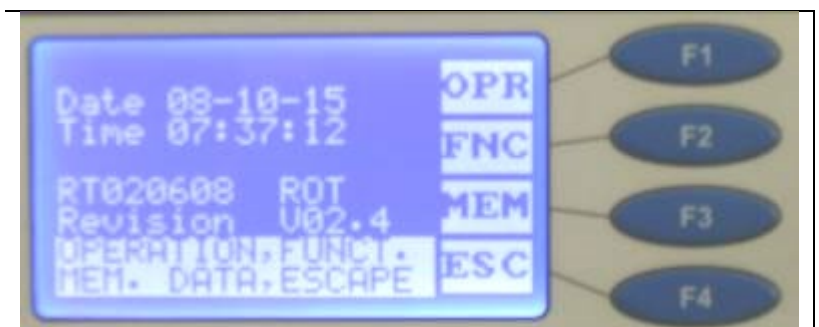


Figura 3 “Command/Display Module”

The two lines in the **middle** show:

- 1) the serial number and the name of the instrument
- 2) the firmware version/revision code (V02.4, in our example)

The **last** two lines are dedicated to notes and explanations about the function keys

The “**box**” at the right of the display window shows the key function abbreviation,

- **OPR** Operation
- **FNC** Function

meaning:-

- **MEM** Memory
- **ESC** Escape

2.3.2 Keyboard

The keyboard, consisting of 4 soft-membrane switches **F1**, **F2**, **F3** and **F4**, sets the experiment parameters, see paragraph 2.3.3 for reference.

If a key is held down more than one second, the command is repeated at a higher speed.

2.3.3 Function Key Abbreviations

The function of each key depends on the software sub-routine and is clearly indicated on the box at the right side of the display, by abbreviations, meaning respectively:-

CFG	Configuration file
CLK	Clock setting
DEG	Degauss
DIS	Display contrast
DWN	Decrement
ENT	Enter
EPR	External Printer
ESC	Escape
FNC	Function menu
FTR	Feature menu
MEM	Memory menu
MPR	MiniPrinter
MSK	Memory Stick
NO	No
NUL	Annulment
OK	Confirm
OPR	Operation menu
OUT	Out data
RES	Data memory reset
SET	Set temperature
STA	Start
STP	Stop
UP	Increment
VW	Data view
YES	Yes
>	Shift to right

2.3.4 Memory Loss!

If the caption "MEMORY LOSS!! SET CONFIGURATION" appears on the display, then it means that the data saved in the memory are lost.

The operator has to reset date, time and the experiment configuration including sequence number, etc., (see paragraph 7.2.)

NOTE : to avoid the loss of relevant data, we suggest to save them on the PC or to print them before exiting any experimental session.

2.3.5 Battery Low!

When the caption “**BATTERY LOW!! CHANGE SNAPHAT!!**” appears on the display, it means the internal batteries which maintain the memory are down and have to be replaced.

To replace the batteries, see paragraph 8.5-Battery Replacement.

3 DATA ACQUISITION & DATA PRINT-OUT

The Rotometer is a microprocessor controlled unit. Experimental data, stored in the 43000 internal memory (and shown on its graphic display) can be directly exported to the PC.

As Clockwise and Counterclockwise rotations accrue, they are displayed on the front panel. Experiments may be qualified with animal data, date, time, and other diagnostic data. Data may be exported directly to a flash drive (included) or to a PC via USB or serial port.

The USB connector type B enables the operator to connect the instrument directly to PC via its USB port. This connector is located on the back panel (see paragraph 4.5-Connections and **Errore. L'origine riferimento non è stata trovata.**).

The connection to PC is also possible via the serial port RS 232 C via the Delta 9-pin female connector (COM 1).

Communication is managed by the dedicated **CUB Package** Cat. **52050-13**, which is included as standard, or by the 52010 Win-DAS Software.

The **CUB 52050** is a Windows® based **Data Acquisition Software Package**, which enables the researcher to route to the PC the data originated by all Ugo Basile instruments and to store them into individual files, ready to be easily managed by any common statistical analysis packages available on the market.

3.1 57145 MiniPrinter

The **MiniPrinter** 57145 is a compact thermal printer device, supplied as an optional part, suitable to print experimental data on 58mm wide paper.

The MiniPrinter does not require any mains cord: it draws the power it needs from the instrument to which it is linked, via the data transmission cable.

See paragraph 4.5 for connection to the Rotometer via the 20-pin cable provided with the Mini-Printer, and paragraph 6.2 to enable the data print-out on the Mini-Printer.

For further details, please ask for a free copy of the Mini-Printer Instruction Manual.

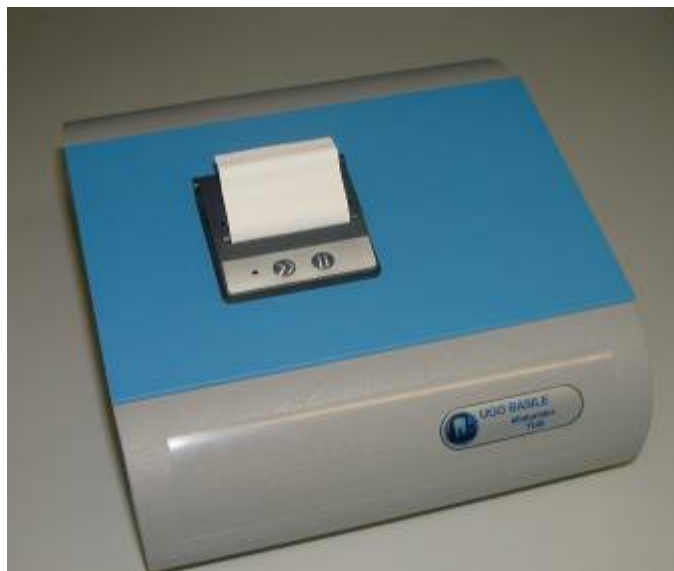


Figura 4 "Mini Printer 57145"

4 INSTALLATION

4.1 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 **Check List** supplied.

If the instrument is damaged or, after having tested it, fails to meet rated performances, notify the carrier and our company immediately.



Protect the environment!

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

4.2 Notes on the Instruction Manual

The 43000 Instruction Manual included in the Basic Unit package is necessary for the correct installation and operation of the instrument.

We recommend to keep the manual in good condition, ready to be consulted by the qualified personnel who use the instrument.

Copies of the instruction manual are available free of charge upon request: please contact our service department (see paragraph 8.7-Customer Support) specifying the series number of your instrument.

4.3 Setting up the Instrument

Position the instrument on a stable and flat bench or table surface, avoiding magnetically charged metallic material. A wooden table is the best surface, but if this is not available, make sure the Rotometer is at about 30 cm of distance from large metal objects.

If you want to know quickly if your surface is magnetic, you place a magnet above the table: if the magnet does not stick, the surface is NOT magnetic!

Do not put electromagnetic sources near the instrument (this includes the Rotometer magnets and the animal with his magnet attached!)

Do not move the instrument during the experiment (or after calibration has been run), as this would have an influence on the results of the test.

4.4 Before Applying Power

Take a look at the Power Module, on the right of the Rotometer back-panel, which encompasses – from left to right - the connection of the mains cord, the mains switch and the fuse holder.

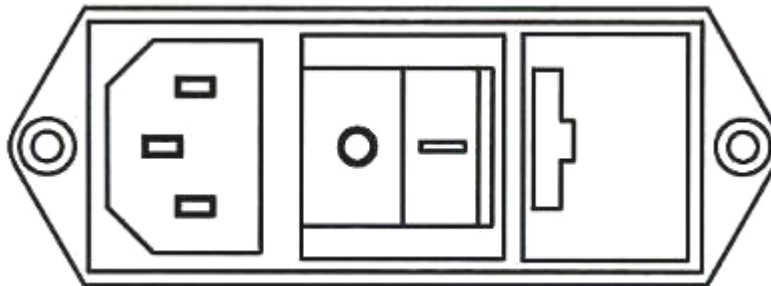


Figura 5 "Power Module"

4.4.1 Mains Switch

This two-pole toggle switch, which complies with international safety standards, provides a visual cue, meaning:-

- **OFF** when pressed to the right ("O" side)
- **ON** when pressed to the left ("I" side)

4.4.2 Fuse Holder

The fuse holder comprises two fuses, one on the live, the other on the neutral. We recommend 5 Amp fast-blow fuses (type F5A). To replace the fuses, see paragraph 8.1-General

The instrument requires a minimum of maintenance. As mentioned in the OPERATION and APPENDIX subheadings. Don't store it too close to a massive steel-iron structures and/or high power electrical/electronic devices.

4.4.3 Electrical Mains Cord

The mains cord is a standard cable, Cat. No. **E-WP 008**. Make sure your power outtake is provided with a reliable ground connection, see also paragraph 4.5 & 4.6.

4.4.4 Input of Power Supply

A switching power supply provides current to the Rotometer. This is a compact, highly reliable product providing excellent electric specifications and full compliance to the EMC and Safety standards, which will ensure a long trouble-free service.

Its mains input is universal: in plain words, it accepts **any voltage from 85 to 264 Volt AC**. Forget the voltage selector and any associated doubt or problem, for instance in case you have to move your instrument from USA or Japan to Europe, or vice versa.

4.5 Connections

Connect the mains cord to a power outlet, **provided with a reliable earth connection**, protected by a differential earth-leakage switch (CGFI) that breaks at the threshold of 0.03A, within a max. acceptable delay of 1s. The maximum breaking compliance required by the CGFI is 10kA at rated current of 6A.

4.5.1 Back Panel

Beside the mains module, positioned on the right side of the panel, the back panel embodies a connection module, see Figure 6 "Back Panel", where you can see, from left to right:-

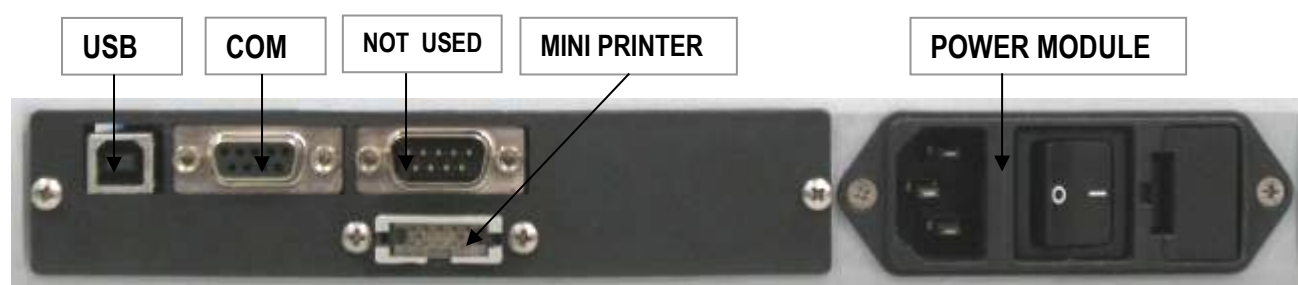


Figura 6 "Back Panel"

USB: this USB type B connector for linking the Instrument to the USB port of the PC

COM: this delta 9-pin female connector for connection to the serial port RS232C of the PC

* a second delta 9-pin connector is present on the back panel, but it is not in use.

MINI

PRINTER: a 20-pin connector to the Mini Printer Cat. 7145, see also (see paragraph 3.1).

Mismatching the connection is prevented by the individual pin arrangement of every connector.

4.6 Additional Safety Consideration



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.

- a. Place your Rotometer on a flat, non metallic surface.
- b. Put the instrument far from PC monitors, mobile phones, PC loudspeakers, and other electro-magnetic sources.
- c. Put the instrument far from and magnetic card (i.e. credit card, magnetic badge..).
- d. Do not obstruct free and comfortable access to the power module;
- e. Use original accessories and spare parts only, see also paragraph 9;
- f. Immediately disconnect and replace a damaged mains cable;
- g. Do not operate the instrument in hazardous environments or outside prescribed environmental limitations (i.e. +18C°/+24C°, 60% relative humidity, non-condensing);
- h. Do not spray any liquid on the connectors.

5 OPERATION

5.1 Switching On

Switch on the 43000 by acting on the switch on the back of the instrument (see paragraph 4.5.1).

The software device takes a few seconds to perform a complete check of the electronic circuit. During checking, the display shows the installed firmware version.

Then the instrument automatically performs a self calibration procedure. **DO NOT MOVE the instrument during self calibration.** Any displacement from the original position needs to be compensated by the instrument, by repeating the calibration procedure.

The automatic calibration procedure, including degaussing, takes from one to three minutes and begins immediately after switching on the instrument. The time require by the calibration depends on the magnetic charge previously accumulated by the sensors. See also paragraph 5.3.

NOTE: In normal conditions, two or three minutes are more than sufficient to calibrate the instrument. If the Rotometer has been stocked near strong electromagnetic sources, as magnets, loudspeakers, mobiles, etc, a longer time or the manual degauss by pressing the “DEG” button could be necessary.

Make sure the animals is not near or in the instrument during calibration.

5.2 Performing a Test

The instrument shows the last data collected from the previous experiment.

- Time: duration of the TEST(seconds).
- CW: clockwise rotations.
- CCW: counter-clockwise rotations.

The last line shows the number of the internal memory record used for the test.

To perform a test, press OPR button and then STR button.

At this point the animal can be positioned within the Perspex cylinders and the rotations are counted.

The instruments performs the self calibration, showing “**waiting**” on the display. When ready, “EXP RUNNING” appears on the display and time in seconds starts to increase.

NOTE: DO NOT MOVE THE INSTRUMENT!! It is very important not move the Rotometer while an experiment is running. If this happens, stop the experiment, move the animal away from the instrument, repeat the calibration procedure and start with a new test, see also paragraph 5.3-CALIBRATION.

When the test if over, press the STP button.

5.3 CALIBRATION

The Rotometer is a self-calibrating instrument. When the instrument is on, an automatic degaussing procedure demagnetizes the instrument sensors. This procedure takes place every 30 seconds, except when the animal is being tested. It is also possible to manually start the degauss procedure, by pressing the DEG button.

For this reason it is very important to follow these instructions:

- Put the instrument on a flat surface, avoiding metallic material. A wooden table is the best surface, but if this is not available, make sure the Rotometer is at about 30 cm of distance from large metal objects.
- **DO NOT PLACE ANY ELECTROMAGNETIC SOURCE NEAR THE INSTRUMENT. When the animal carries the magnet necessary for the test, the animal itself is a magnetic source. Keep the animals (at least 50 cm) far from the instrument until has started the test.**
- Do not move the instrument during the test.
- To enable the automatic degaussing procedure to take place, wait one minute after switching on the instrument, before starting operation.

5.4 Configuration File

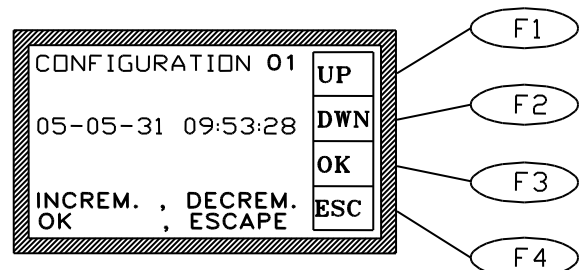
Refer to the Cub Manual for setting tests configurations (paragraph 2.2.)

The user can configure up to 6 different configuration files, which can be saved in the memory key, from which they may be recalled to the PC and/or to the instrument.

5.4.1 From the Memory Key to the Instrument

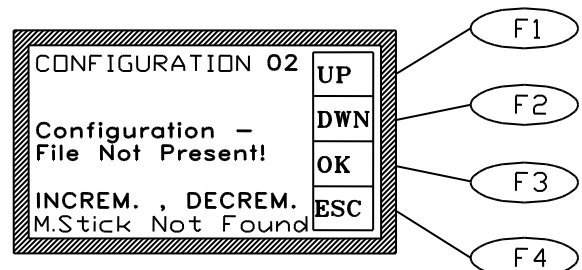
With the memory key inserted in its slot on the front panel, press **F1 (OPR)** and **F2 (CFG)**.

The configuration indicated on the first line is read and after some seconds the related save date appears.



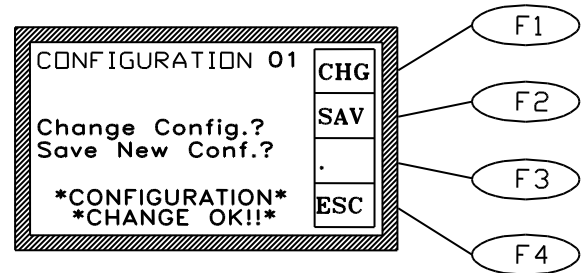
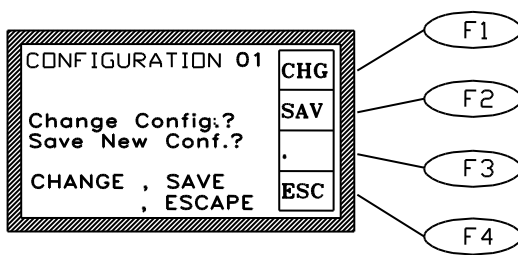
If the configuration is not present, the caption “**CONFIGURATION-FILE NOT PRESENT!**” appears instead of the date.

Select the desired configuration by the **F1 (UP)** or **F2 (DWN)** key, then confirm the selection by the **F3 (OK)** key.



5.4.1.1 Uploading

If the configuration is present, the user can upload it and change the instrument parameters by pressing **F1 (CHG)**.



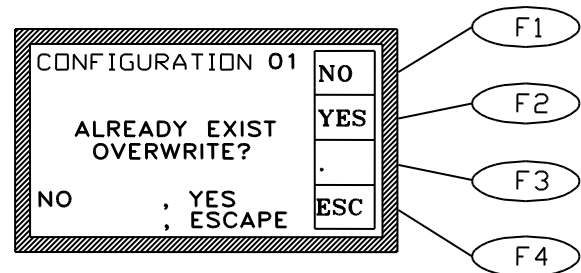
The caption “CONFIGURATION CHANGE OK” confirms the change.

5.4.1.2 Downloading

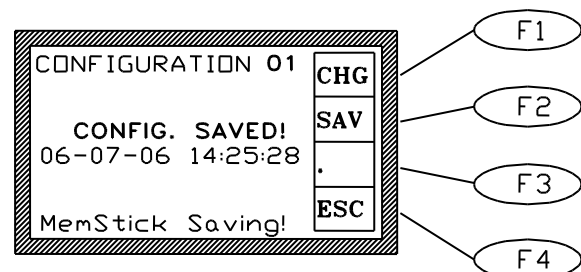
This feature enables downloading configuration parameters from the instrument to the memory key.

If the configuration is present, the user can overwrite it with the current instrument parameters by depressing **F2 (SAV)** and **F2 (YES)**.

If the configuration is not present, it will be created automatically: save it by the **F2 (SAV)** key only.



The caption “CONFIG. SAVED!”, complete with the new date and time, confirms the overwriting.



5.4.2 From Device to PC

It is possible to import or export a configuration from the device to PC.

From the CUB software, select “**CONFIGURATION**” then “**DOWNLOAD FROM DEVICE**”.

5.4.3 From PC to the Instrument

It is possible to send or to read the current configuration directly from/to the instrument.

From the CUB software, select **CONFIGURATION**, send **CONFIGURATION**. (Refer to the CUBs Manual for details).

6 WORKING WITH MINI PRINTER AND PC

6.1 How to Set the Data Output to PC

Experimental data are saved in the instrument's internal memory. During the experimental trial, the data also may be routed to the PC for real-time or remote communication.

To do this, connect the cables as outlined in paragraph 4.5-Connections.

Open the CUB Program and choose the type of connection, serial or USB. If multiple units are connected to the same PC, also choose which Rotometer is to be connected.

It is not necessary to take any further action: the data are automatically routed to the PC (even when the PC is not connected).

Serial and USB communication between the Rotometer and the PC is controlled by the Ugo Basile CUB software, see paragraph 3 and software instruction manual.

6.2 How to send Output Data to the MiniPrinter

Experimental data are saved in the internal memory. During the experimental trial, the data also may be printed-out in real time via the optional **57145 Thermal MiniPrinter**, see paragraph 3.1-57145 MiniPrinter.

When used in conjunction with the Mini-Printer, the operator has to set the data output path.

From the main menu, depress **F2 (FNC)** key, followed by the **F1 (OUT)** key.

The display shows:

Depress now the **F1 (MPR)** key, the display shows:

Mini - Printer
ENABLED (or DISABLED)

Each time the **F1 (MPR)** is depressed, the printer status changes (from ENABLED to DISABLED or from DISABLED to ENABLED).

If no printer is connected, then the caption "NOT FOUND!" will appear.

6.3 Data Format

When routed to the PC via the CUB Data Acquisition Software (Refer to the Cub Manual), the data can be monitored on the test manager window:

Serial n°	Date [YY-MM-DD]	Time [HH:MM:SS]	Test time [s]	CW reel	CCW reel	Exp. n°	M/F	Seq. n°	Group
RT999999	07-11-09	11:03:37	00002	00000	00000	5	M	51	1
RT999999	07-11-09	11:10:10	00005	00000	00001	5	M	52	2
RT999999	07-11-09	11:12:32	00012	00000	00000	5	M	53	2
RT999999	07-11-09	11:41:37	00002	00000	00000	5	M	54	1
RT999999	07-11-09	12:06:44	00032	00005	00023	5	M	55	1
RT999999	07-11-09	12:15:41	00002	00000	00000	5	M	—	1

Buttons: OPEN, SAVE, DELETE, TOTAL TESTS INTO DEVICE

Figura 7 "Acquired Data Window"

The first column shows the **Serial N°**, beginning with the abbreviation RT which stays for Rotometer.

Second and third column show the date and time respectively.

The following columns show the datum proper, in the following format, see the fifth line, in the example above:-

- 00032** = Test time (in seconds)
- 00005** = CW revolutions
- 00023** = CCW revolutions
- 5** = Experiment number
- M** = Animal gender
- 55** = Sequence number
- 1** = Group Number

6.3.1 Print-Out on the MiniPrinter

Here is a sample of data print-out from a MiniPrinter

```

RT020608 08-10-15 11:18:22
0001 00000 00000 1 F 19

RT020608 08-10-15 11:18:54
0017 00003 00002 1 F 20

RT020608 08-10-15 11:18:54
0017 00003 00002 1 F 20

```

Listing in the **first line**:-

- the instrument serial number
- the date
- the time

And in the **second line**:-

- the test time
- CW revolutions
- CCW revolutions
- the experiment number, gender, sequence and group numbers

6.4 Quick Setting of the 43000 Rotometer

This Instruction Manual extensively explains how to take advantage of all the features offered by this microprocessor controlled unit.

The following table summarizes them; however, we strongly recommend that you to read the complete manual to familiarize yourself with all operational details.

Each sequence of commands is described starting from the MAIN MENU.

Command Description	Command Sequence	Paragraph reference
Set display to show DATA in progress	Repeat (ESC) (F4) key until the configuration is reached	2.3.1
Set Printer ON	(FNC) - (OUT) - (PRN)	6.2
Print DATA previously saved in the 43000 memory	(MEM) - (OUT) - (MPR)	7
Send DATA previously saved in the 43000 memory to PC & to Memory Key via USB ports	(MEM) - (OUT) - (MSK)	7
Send DATA previously saved in the 43000 memory to PC	from CUB program: TEST > Download Test	7
Set animal number		5.4
Set gender		5.4
Set experiment number		
Set DATE & TIME	(FNC) - (CLK) - (UP)/(DWN) - (>)	7.2

	to set the correct value - (ESC)	
Set DISPLAY Contrast	(FNC) - (DIS) - (UP)/(DWN) depressed until the desired contrast is reached - (ESC) - (ESC)	7.3

7 MEMORY MANAGEMENT

Each data point, no matter whether printed or sent to the PC, is saved in the memory (which can store about 300 measures, including the datum proper and the date/time indication).

By pressing the **F3 (MEM)** key from the main menu, the **MEMORY** menu can be reached.

F1 (VW) key enables the operator to visualize the Data stored in the memory, each datum complete with acquisition Date & Time.

The top datum is the last datum which has been sent to internal memory.

Use the vertical-arrow keys **F1 (UP)** or **F2 (DWN)** to scan the data; by momentarily depressing the key, the displayed datum will increase (or decrease) by one measurement. Keeping these keys depressed longer will scroll through the data.

As usual the **F4 (ESC)** recalls the previous menu software.

From the **MEMORY** Menu, the **F2 (OUT)** key enables the researcher to export the data stored in the memory to the Memory Key, by **F3 (MSK)** or to print them by **F1 (MPR)** or **F2 (EPR)** respectively on the Mini-Printer or on an external printer (*), via COM2, located on the back panel, see paragraph 4.5.1.

(*) customer printer connected in serial on COM2 at 9600 baud-rate

If the MiniPrinter is not connected, or the Memory Key is not inserted on its slot, the caption "**NOT FOUND!**" will appear.

To interrupt the print-out response of the stored Data, depress the **F4 (ESC)** key for one second at least.

Before starting a new experimental session, we suggest checking the memory which may contain data from a previous trial. If it is the case, enter the proper software level and **RESET** the memory.

7.1 Memory Reset

From the Memory menu, the **F3** key (**RES**) enables the operator to clear all the data stored in the internal memory.

This command can be useful (for instance, before starting a new experimental session) if the operator prefers to cancel the data saved from previous experiments.

After pressing RF3 key, one must answer **(YES)** (F3 key) or **(NO)** (F4 key) to the question: “are you sure?”.

The Memory menu automatically appears when the memory is full; that is, maximum capability of about 300 measures are stored.

7.1.1 “Memory Full” Message

If the “**MEMORY FULL**” message appears during acquisition, the operator has three options:-

- **if not interested in the data** stored in the memory, the researcher may simply depress the **F4 (ESC)** key, followed by the **F3 (RES)** and confirm the reset by answering **F3 (YES)** to the question “ARE YOU SURE?”, see paragraph 7.1.
- When **data** previously saved in the memory are **not to be cancelled**, the researcher must print and/or send them to the memory key or PC as previously explained (see paragraph 7-MEMORY **MANAGEMENT**).
- There is also the possibility to **ignore the indication of “MEMORY FULL”** and go on with the experiment. However, we caution against this, as all data acquired subsequently will not be saved.

As a safeguard, when the memory remains fully loaded, the display will continue to show the message “MEMORY FULL” at every measure.

7.2 Setting Time & Date

To set time and date, from the Main menu press the **F2 (FNC)** key, followed again by the **F2 (CLK)** key.

Use the **F3** horizontal arrow key to highlight the parameter to be modified (day, year, etc.).

Now use the **F1 (UP)** or **F2 (DWN)** keys to set the correct value; as usual, a quick press will increase or decrease the numerical value by one step: holding the keys longer scrolls through more rapidly.

Depress the **F4 (ENT)** key to confirm the selection.

7.3 Display Contrast

To modify the display contrast, depress the **F2 (FNC)** key from the Main Menu, then the **F3 (DIS)** key. The display shows:

Keep the arrow keys **F1 (UP)** or **F2 (DWN)** depressed until you reach the desired display contrast.

The readability of the liquid crystal display depends on the angle of view: select the ideal con-

trast according to the height of the table, the operator's distance and so on.

Use these steps to optimize display contrast and module orientation.

Please note that the display brightness can vary slightly with use, due to the instrument temperature; if necessary adjust it again.

To exit this software level, saving the selected display contrast, press the **F4 (ENT)** key.

8 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 section of the instruction manuals describes normal maintenance procedures which can be carried out at your facility.



UNPLUG THE MAINS CORD BEFORE CARRYING OUT ANY MAINTENANCE JOB!

8.1 General

The instrument requires a minimum of maintenance. As mentioned in the OPERATION and APPENDIX subheadings. Don't store it too close to a massive steel-iron structures and/or high power electrical/electronic devices.

8.2 Electrical

To inspect and/or replace the fuses, **disconnect the mains cable first!** Insert a miniature screwdriver in the slot indentation, see paragraph 4.4.2, and snap out the slide which houses the fuses.

The fuses must be 5A fast-blow fuses (type F5A/250V 6x30mm). Snap in the fuse slide: the mechanical "click" ensures that the fuse carrier is locked.

8.3 Basic Unit

The arena on which the animal walks, turned from a PVC disk, is impervious to aqueous solution splashes, and will not be corroded by rodent urine. However we recommend that you keep the instrument clean. It can be cleaned with any watery solution.

Never use organic solvents for cleaning: they may spoil the chassis. A moistened cloth is adequate for dusting and removing the animals' droppings; mild, dilute detergent in water may be used to remove stubborn stains.

8.4 Perspex Restrainer

Organic solvents should never be used for cleaning the Perspex restraining cylinder as they may “craze” the acrylic material.

This means that a network of tiny superficial cracks, due to the release of internal stress in the acrylic crazing will not degrade the mechanical sturdiness of the cylinders, but will definitely spoil the look of the tubes and decrease their transparency, hence impairing the animal observation.

8.5 Battery Replacement

The internal memory of the Rotometer is supported by a battery snap type **M4T32-BR12SH1** of **ST**. The rated battery endurance is 10 years, therefore replacing the batteries is not a frequent task.

To replace batteries, first of all switch off the unit and disconnect the mains cable.

When the caption “**BATTERY LOW!! CHANGE SNAPHAT!!**” appears on the display, it means that internal batteries which maintain the memory are sufficiently low and should be replaced (see also paragraphs 2.3.5).

When the batteries are low, the display shows the caption “**MEMORY LOSS!!**”, see paragraph 2.3.4.

NOTE : when the caption “**MEMORY LOSS!!**” appears, internal memory may be lost. The loss of relevant data can be avoided by saving data before exiting every experimental session.

Always use the same type of batteries for replacement, our part number **E-US 063-1**, see also paragraph 9-ORDERING INFORMATION.

The batteries are located on the PCB of the instrument (see electronic component list, in the section Wiring Diagrams). Take off the bottom panel by removing four Phillips head screws.

You will notice a mini PCB, assembled on a larger one. On the mini-board there is a small box, marked **U3**. This 4-pin box contains the batteries and the clock quartz.

Extract it with care, by lifting its longer sides, a miniature screwdriver or a tip of a pen is useful to gently pry off this small box.

Insert the fresh snaphat paying attention to the orientation of its white dot which should match the dot on the PCB. A “click” assures proper insertion. Reassemble the bottom panel.

At this point, set again date and time (see paragraph 7.2) and set the configuration (see paragraph 5.4).

8.6 Long Inactivity

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

8.7 Customer Support

For any further information you may desire concerning the use and/or maintenance of the instrument, please do not hesitate to get in touch with our local distributor or with our **service department** at:-



UGO BASILE S.r.l.

Viale G. Borghi 43
21025 COMERIO – Varese, ITALY



Phone : +39 0332 744574



Fax : +39 0332 745488



e-mail : service@ugobasile.com

Before sending any instrument to our factory for repair, we recommend you to contact our service department to obtain a return authorization number (R.A.N.) 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.

9 ORDERING INFORMATION

43000 ROTOMETER, standard package, including following standard accessories:

- 43000-001** Rotometer Main Unit
- 35100-286** Perspex Animal Restrainer
- 43000-302** Instruction Manual
- M-LM 345** Dust Cover for the Plate
- E-AU 041** Memory Key
- E-WP 008** Mains Cable
- 52050-13** CUB Data Acquisition Software Package
- 52010-322** Connecting Cable (9 to 9 pin)

Set of fuses

9.1 Optional

- 57145** Thermal Mini Printer (see also paragraph 3.1), including 20-pin connection cable Cat. No. 7178
- 37400-305** Package of 10 Heat Sensitive Paper Rolls
- 43000-321** Syringe kit, including 1 syringe and 2 injectable magnets
- 43000-012** Magnets kit (including 10 magnets) 2x12 mm
- 43000-052** Magnets kit (including 50 magnets) 2x12 mm
- 43000-015** Magnets kit (including 10 magnets) 2x15 mm
- 43000-055** Magnets kit (including 50 magnets) 2x15 mm

9.2 Specifications

General

Commands	via "soft keys"
Starting	via command key
Read-out	multifunction graphic display
Print-Out	By optional thermal MiniPrinter 57145
Power Requirement	Universal input 85-264 VAC, 50-60Hz, 40W max.
Sound Level	< 60 dB (A)
Operating Temperature	18° to 40° C
Connection to PC	via USB connector type B

Data Portability via USB flash drive, provided

Physical

Total Weight 3.5Kg

Shipping Weight 7Kg approx.

Dimensions 25(w)x37(d)x16(h)cm (without restrainer)

Dimensions (restrainer) 20cm diam. x 25(h)cm

Packing Dimensions 68x34x28

Warranty 43000 is covered by a 24-month warranty

10 BIBLIOGRAPHY

- M. Duckert: “Quantifizierung und motorisch-funktionelle Analyse von post-lesional beobachtbaren Tyrosinhydroxylaseimmunreaktiven Neuronen im 6-OHDA-Parkinson-Modell der Maus” Dissertation, Rostock, 2012



11 APPENDIX

11.1 Principle of Operation

The magnetic field lines generated by the magnet aboard the mouse are picked up by a detection circuits which embodies sensors and electronics ad hoc, to reckon the animal rotations, discriminating the CW from the CCW ones and displaying the resulting figures on the LCD display.

At this point we cannot forget the existence of the Earth magnetic field which, albeit stronger than the field generated by the aboard magnet, can be easily counterbalanced, provided some simple instructions are followed during the initial calibration phase and some care is taken during the operation run.

The technically minded user can understand why he/she has to comply with the dos and don'ts list, via a glance to the subheading 11.2-The Earth Magnetic Field.

11.2 The Earth Magnetic Field

The magnetic field of our Planet is practically constant on what concerns direction and intensity, when we limit the space to our county and the time to, say, 10 years.

Its intensity is relevant. It acts on a hardly sensitive element, the needle of a toy compass, which requires a not negligible torque to get oriented.

The Earth magnetic field lines permeate our space and pass through most substances and metals (the royal family, silver, gold, platinum included) without the slightest attenuation and deviation.

Until they confront a peculiar trio of metals, iron, cobalt, nickel (Atomic numbers 26-27-28 on the Periodic Table of the Elements). Fe, Co, Ni, pure and in their alloy combinations react to the magnetic field, altering its intensity and direction and becoming magnets themselves!

Incidentally, even the sensors designed to pick up the aboard magnet rotation signals, are ferromagnetic and, in a certain way, disturb the field they are supposed to measure. Seems paradoxical?

Think of a common thermometer which, when put on a spot to measure the local temperature, it thermally modifies the environment and introduces an error which should be taken into account and counterbalanced.

This, per se, doesn't represent an inconvenience. The mentioning counterbalancing circuit can take care of any field alteration which can occur in normal laboratory conditions and correct the errors.

To complete the picture, electricity joins the play; when flowing through a winding, it also generates a magnetic field.

At this point we understand why any instrument or mechanism we use in our laboratory and factory, containing steel (which is a ferrous alloy, possibly even containing a pinch of Nickel and Cobalt) and which definitely embodies electrical-electronic circuitry, locally alters the Earth magnetic field.

Seems tangled? It is tangled.

However an initial procedure which is called degaussing (a neologism, middle XX Century, in honour of the German mathematician K.F. Gauss) is carried by the instrument as initial smoothing of the magnetization status of everything.

Degaussing procedure may take some minutes, see CALIBRATION

What the circuit cannot do is to reconfigure itself when a substantial alteration of the local field is carried out during the operation.

This is the same as accidentally altering the light direction and intensity in a photo studio when the photographer has finalized the ideal light conditions for that particular subject.

Beside the irate reaction of the photographer, you have to reposition lamps, mirrors, screens.

Coming down to practice, as stressed in the CALIBRATION once the instrument is calibrated, don't move it. Now it is clear why!

Manoeuvring and/or positioning errors do not damage the circuits. They may only lead to the nuisance of a second attempt.

The only really dangerous thing (dangerous for the integrity of the instrument, not for the operator!) is to play with a big magnet very close to the Rotometer. The actual test will definitely be impaired and a permanent damage to the circuit sensors is possible.



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CE CONFORMITY STATEMENT

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We hereby declare that

Instrument. **ROTOMETER**
Catalog number **43000**

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

- *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*

Account Manager

Mauro Uboldi

Nome / Name

October 2018

Date

Firma / Signature