Instruction manual

Multiple Activity Cage

Revision 3.0 - Dec. Y24

MOUSE RAT

Motory Coordination

SKU: 47420 / 47420-NC

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TRANSFORMING IDEAS INTO INSTRUMENTS

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 powered instrument should be avoided.
If inevitable, it should be carried out by a skilled person who is aware of the hazard involved.

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

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CE CONFORMITY STATEMENT

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

Instrument.	**MULTIPLE ACTIVITY CAGE**
Catalog number	**47420**

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*

Product features and general information

An animal level of general activity or locomotion is an indicator of drug action, toxic substances, neurological damage, or daily rhythms in activity.

Activity data may be automatically and unobtrusively collected by many methods.

The Ugo Basile Activity Cage has proved to be of great value to record spontaneous co-ordinate activity in rats and mice (individual or groups) and variation of this activity in time.

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

The lower IR array monitors horizontal movement while the upper IR array monitors vertical or rearing activity.

The number of beam breaks is correlated with the amount of movement about the cage.

The Ugo Basile Multiple Activity Cage has been proved of great value to record spontaneous coordinate activity in rats and mice (individual or groups) and variations of this activity in time, e.g., in the following types of investigations:

- General toxicology, in ascertaining the action of a drug on the animal's activity, especially if it is subjected to chronic treatment.
- Psycopharmacology, in screening drugs which are potentially active on the central nervous system.
- Behavioral Sciences, in evaluating the variations of spontaneous activity af- ter changes in environmental conditions.

The Basile 47420 Multiple Activity Cage is a reliable research instrument for recording spontaneous coordinate activity in rats and mice, either in individual or in groups.

The records are printed in digital form at pre-set intervals. In group studies, social behavior can be assessed, and changes in this behavior induced by drugs can be evaluated.

The initial period (environmental exploration) may also be clearly evidenced as the Apparatus can be preset to supply a digital read out at 1 minut intervals.

What's in the box and options

SKU: 47420 Multiple Activity Cage:
1 x Microprocessor controlled Electronic Unit, for single cage operation
1 x Cage, including transparent cage, lid, base with supporting rods, catch pan and connection cable
1 x Set of Horizontal Sensors (emitter/receiver), complete with connection cable
1 x Set of Vertical Sensors, (emitter/receiver), complete with connection cable

SKU: 47420-NC Multiple Activity Cage No Cage:
1 x Microprocessor controlled Electronic Unit, for single cage operation
1 x Set of Horizontal Sensors (emitter/receiver), complete with connection cable
1 x Set of Vertical Sensors, (emitter/receiver), complete with connection cable

Optional items ordering informations:

SKU	*Item description*
7433	1 Animal Cage, including transparent cage, lid, base with supporting rods, catch pan and connection cable
7435	1 Set of Horizontal Sensors (emitter/receiver), complete with connection cable
7436	1 Set of Vertical Sensors, (emitter/receiver), complete with connection cable

Contents

1 Principle of Operation

The activity detection of our Multiple Activity Cage basically relies on horizontal and/or vertical sensors, see "*2.2 Horizontal & Vertical Sensors*".

The movements the anim l makes inside the cage interrupt one or more I.R. beam/s.

The beam interruptions, counted and recorded by the electronic unit, enable the user o assess and analyse the animal activity.

1.1 Notes on the instruction manual

This instruction manual included in the box is necessary for a correct installation of the instrument. Please save this manual, keep it ready to be consulted by the qualified personnel using the instrument.

Our manuals are available as free download on our web site https://ugobasile.com/.
For any additional information and/or assistance, you are welcome to contact our service department, first of all by specifying the serial number of your instrument at service@ugobasile.com.

Treadmill support QR code:

1.2 Safety instruction

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

DO NOT attempt to open or perform any service work before having contacted Ugo Basile support team.

Use original accessories and spare parts only. Immediately disconnect and replace damaged main cord. Do not operate in hazardous environment or outside prescribed environmental limitation. Do not spray any liquid on the connectors, or other parts.

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

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

1.3 Intended use

The device is intended for investigation use on laboratory animal only.
DO NOT USE THIS DEVICE ON HUMANS

2 Instrument Description

Our activity cages are available as multi-channel (47420) system.
The (47420) systems comprises:

- an electronic unit 7441 (for up to 6 cages), see "*2.3 Electronic Units*"
- a I.R. Beam Cage

2.1 Animal Cage

The I.R. Beam Cage consists of:

- an animal cage of clear Perspex (SKU 7433)
- a set of emitter/sensor arrays for horizontal activity (**11** & **12**), (SKU 7435), See *"2.2 Horizontal & Vertical Sensors"*
- a set of emitter/sensor arrays for vertical activity **13** & **14**), (SKU 7436), See *"2.2 Horizontal & Vertical Sensors"*

The 7433 Cage consists of a cubicle, dimensioned 41 x 41 x 33 (h) cm, entirely made of clear Perspex, upper lid (**5**) and bottom catch pan (**3**), detachable for cleaning.

The cubicle rests on a sturdy base made of black Perspex (**1**), provided with four vertical notched bars of stainless steel (**2**) to which the horizontal/vertical detecting systems 7435 and/or 7436 can be fastened. See *"Figure 4 - Animal Cage*".

The animal cage, is designed for one rat or up to 3-4 mice.

The animal cages are supplied disassembled, in order to reduce the possibility of breakages, see "*4.1 Unpacking & preliminary check*" & "*4.4 Assembling the instrument*".

The transparent cubicle can be easily removed for cleaning purposes, see paragraph 8.4.

2.2 Horizontal & Vertical Sensors

The Horizontal Sensors (SKU 7435) consist of two facing blocks containing an I.R. arrya of 16 emitters and, respectively, receivers, designed for the assessment of the ambulatory activity, see "*Figure 5 - Assembling the Sensors*"
A similar system (SKU 7436), whose height can be adjusted, assesses the vertical activity (rearing).

2.3 Electronic Units

The 7441 Multiple Electronic Unit is designed to accept up to six cages. It is lodged into an attractive cylindrical case of original design. The unit can be tilted to obtain the ideal glare-free reading angle.

7441 is provided with an internal memory capable of storing the data from several experiments, for scrolling screen review and optional output to PC, see *"3 Data Aquisition"*

Figure 1 - Upper Panel

Its upper panel, see "*Figure 1 - Upper Panel*" incorporates:
- the graphic LCD Display
- The control keyboard

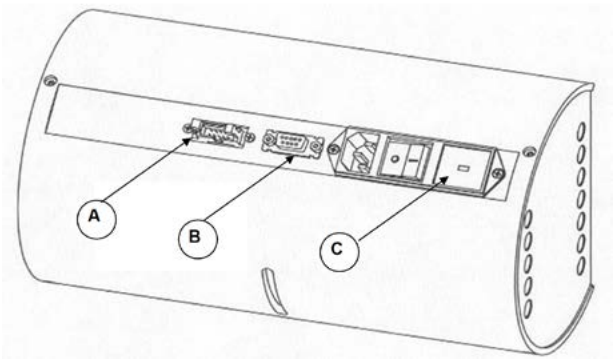


Figure 2 - Back Panel

The back panel embodies, from left to right:
- the 10-pin socket-connector to the Animal Cage (**A**)
- the Delta 9-pin connector (**B**) (serial port RS232) for branching the 7431 or 7441 to the PC
- the POWER MODUL (**C**), see *"4.5 Before Applying Power"*

The 7441 multiple electronic unit is similar to the 7431, but it's designed to accept up to six cages. Its back panel incorporates six 10-pin soc et-connector to the Animal Cages.

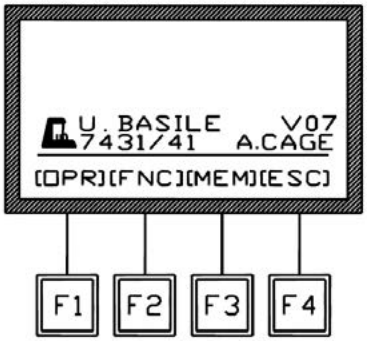
7441 are provided with an internal memory capable of storing the data from several ex-periments, for scrollin screen review and optional output to PC, see *"3 Data Aquisition"*

2.4 Graphic Display

The graphic display presents all available commands. The operator sets the experiment configuration via the keyboard located below the display, see "*Figure 1 - Upper Panel*"

The activity data are displayed at pre-set intervals and routed to the PC according to the selected configuration.

The data can be customized if required, namely completed with animal & experiment numbers, sex indication, etc.



It is basically divided into three levels of characters:

The **upper level** shows the select output path and the channel status and mode.

The **intermediate level**, in small characters on two lines, generates "information strings" which monitor the instrument status and supplies date, time, etc.

The **lower level**, divided by a horizontal line, indicates in square brackets the function of the keys F1, F2, F3 and F4.

2.5 Keyboard

The keyboard consists of 4 soft push-button keys F1, F2, F3 and F4, the function of which depends on the software sub-routine and is clearly indicated on the lower level of the display, see *"2.7 Function Key Abbreviations"*

Each function menu has in fact a different sub-routine software, which is entered when the corresponding function key is depressed. If a key is kept depressed more than one second, the command is repeated at a higher speed.

2.6 F4 Key

The F4 key, which has the function of ESCAPE key, enables the operator to leave a menu and go back to a previously selected one.

If depressed more times from the main menu, F4 shows in sequence, in the intermediate level of the display:

- name of the electronic unit software release number
- selected output path
- date and time
- real time data in progress of each channel
- the UGO BASILE mice

The F4 loop then comes back to the main menu, showing the Ugo Basile logo.

2.7 Function Key Abbreviations

All function eys are indicated on the graphic display by abbreviations, meaning:

(ALL) "All (Serial)"
(B-R) "Baud Rate"
(CAG) "Cage Selection"
(CLK) "Clock Setting"
(DAT) "Date Setting"
(DIS) "Display Contrast"
(ESC) "Escape (see paragraph 1.4.4)"
(FNC) "Function Menu"
(MEM) "Memory Menu"
(NO) "No"
(NUL) "Annulmen"
(OFF) "Channel Inactivation"
(ON) "Channel Activation"
(OK) "Enter"
(OPR) "Operation Channel Menu"
(OUT) "Output Menu"
(PHO) "Cage with the Sensor"
(REP) "Automatically Repeat the Previous Channel Mode"
(RES) "Data Memory Reset"
(SER) "Serial (PC) Path"
(TIM) "Time Setting"
(TES) "Test"
(VW) "Data View"
(YES) "Yes"

3 Data Aquisition

The electronic unit (either for single or multiple cage) is microprocessor controlled and features direct PC output. Internally-stored data can be routed via a 9-pin D-type connector to the PC serial port (RS232), see *"4.6 Connections"*.

Data output is managed by the Data Acquisition Software (SKU 52050-04) to interface an Activity Cage and PC.

The 52050 is a Windows® based Data Acquisition Software Package, which enables the research worker to store the data into individual files, ready to be easily managed by most statistical analysis packages available on the market.

Ask for details!

4 Installation

4.1 Unpacking & preliminary check

The animal cages are supplied disassembled, in order to reduce their bulk and hence the transport cost. Moreover, all the components, individually packed with extreme care in solid cardboard boxes, form a practically unbreakable set.

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

The Activity Cage is packed into three individual carton boxes: the first contains the elec- tronic unit, the second the cage panels, the black base and its catch pan. The sensors and their supporting bars are packed in the third box.

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 regulation.

Open the packaging box and take the instrument out the box; make sure to remove all the packaging material form the apparatus before placing it on the experiment Lab room.

4.2 Notes on the Instruction Manual

The 47420 Instruction Manual included in the Electronic Unit package is necessary for the correct installation and operation of the instrument.

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

Free of charge copies of the instruction manual are available upon request: please contact our service department (see *"9.5 Customer Support"*) specifying the series number of your instrument.

4.3 Environment

Select for the Activity Cage test a room which is acoustically isolated or at least free from intense or sudden noise.

The room should not be too brightly illuminated. Avoid direct light on the cage, e.g., from a table lamp.

An intense light definitely upsets the animals, which dislike full light.

Moreover, intense light may be scattered by the clear Perspex walls and channel to the I.R. receivers a strong background radiation which may cause, in the extreme case, some spurious activity detection.

4.4 Assembling the instrument

Assemble the instrument on a stable and flat bench or table surface.

First of all consider the cage base (**1**) of black Perspex; insert the four vertical notched supporting-bars (**2**) of stainless steel in the four holes at the corners of the base platform, and push them down until they reach the bench surface. Tighten them via the Allen wrench provided.

Position the catch pan (**3**) inside the four pins (4) fastened on the black base.

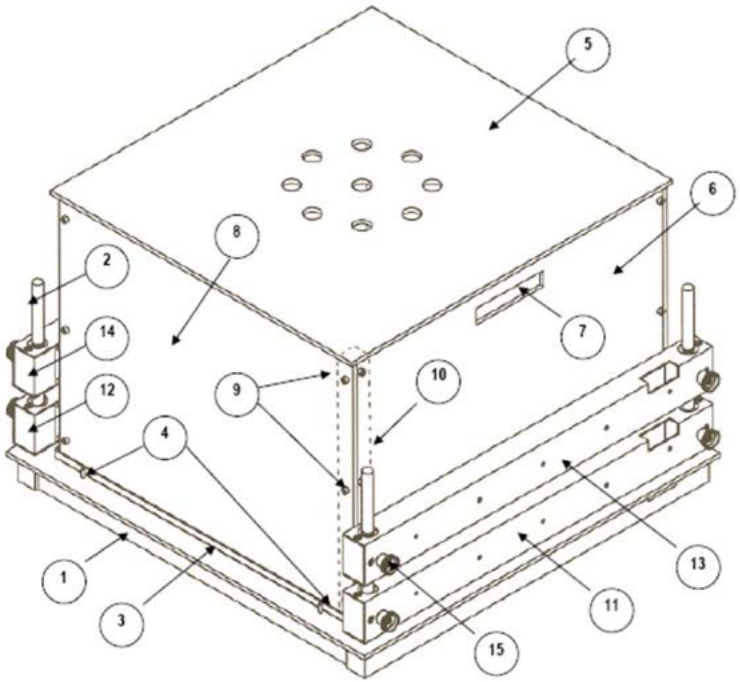


Figure 4 - Animal Cage

The four walls of the Animal Cage are individually packed in a flat box, together with the upper lid (**5**), the base box and the catch pan.

The two walls (**6**) on which a port (**7**) is cut which acts as a handle to lift the assembled cage, are provided with two fastened lateral Perspex beams (**10**,

indicated by broken lines).

Take the two plain walls (**8**) and fasten them to the previously described Perspex beams (**2**) via the 12 screws (**9**) provided (a suitable Allen wrench is provided).

The lid (**5**) is provided with four Perspex side positioners; it fits the cage in a unique orientation.

Insert the transparent cage inside its catch-pan rims. The cage is held in position by its own weight.

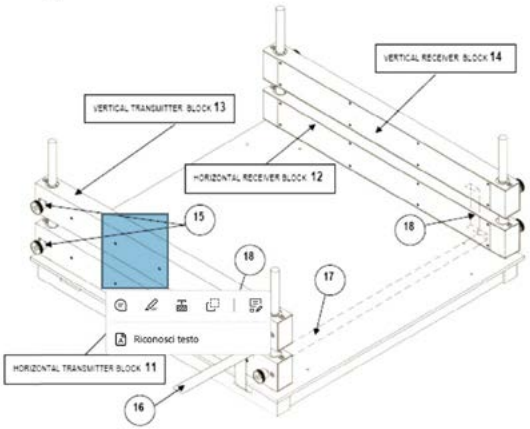


Figure 5 - Assembling the Sensors

Insert the transmitter and receiver blocks on the notched stainless-steel bars (**2**); position the two horizontal blocks (**11** & **12**) first, then the vertical blocks (**13** & **14**), in case the activity cage you are assembling is complete with this set.

Once the blocks are positioned at a convenient height, see *"Figure 4 - Animal Cage"* block them via the side knurled-knobs (**15**) with which each block is provided.

The cable branch, originating at this bifurcation is 65 cm long, complete with a connector at its end. It has been found convenient to route the cable inside the pedestal of the cage via two suitable slots (**13**), to avoid having cables dangling around.

Connect the cable branch to the other horizontal block, passing it on the described slot. At this point the horizontal combination transmitter/receiver is operational.

In case even the vertical set has to be assembled as well, two identical short

stretches of flat-cable (jumpers) are provided (18), each complete with connectors at both ends.

4.5 Before Applying Power

Consider the Power Module, positioned on the right of the Electronic Unit back panel, which encompasses – from left to right - the inlet connection of the mains cord, and the fuse holder/voltage selector.

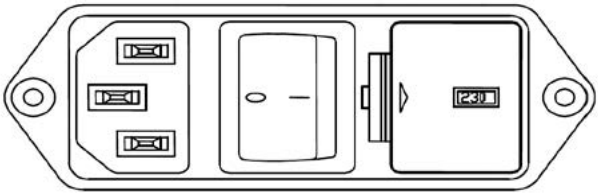


Figure 6 - Power Module

Mains Switch:
This two-pole toggle switch, which complies with int rnational safety standards, provides a visual cue, meaning:

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

Fuse Holder:
The fuse holder comprises two fuses, one on the live, and the other on the neutral. For operation at 220-230 Volts, we recommend 315 mA timed fuses (type T315). Use 630 mA fuses (type T630) for operation at 115 Volts.

For fuse replacement see *"9.1 Electrical".*

The fuse holder also embodies the Voltage Selector. Make sure that the flag indicates the correct voltage (i.e., the voltage of your mains). To change the selected voltage, see *"9.1 Electrical".*

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

4.6 Connections

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

The back panel (*see "2.3 Electronic Units"*) also embodies two connectors:

TO ANIMAL CAGE: the socket 10-pin connector enables the connection of the Animal Cage to the ele tronic unit.

TO PC RS232C: this delta 9-pin connector enables the operator to connect the instrument to the serial port RS232C of the PC.

Mismatching the connection is prevented by a different pin arrangement.

For 7435 and/or 7436 connection, see *"4.4 Assembling the instrument"* and *"Figure 5 - Assembling the Sensors"*

4.7 How to handle the Instrument

The Activity Cage is a relatively bulky instrument. Once the Activity Cage set-up is assembled, lift or move the combined unit with care, paying particular attention to the inter-connecting cables.

4.8 Additional Safety Consideration

- Place your Activity Cage on a steady flat surface (e.g. your table).
- Do not obstruct free and comfortable access to the power module.
- Use original accessories and spare parts only, see *"What's in the box and options"*
- Immediately disconnect and replace a damaged mains cable.
- Do not use in hazardous environments or outside prescribed environmental limitations (i.e. 10C° / +40C°, 95% relative humidity, non-condensing), see *"10 Specification"*
- Do not spray any liquid on the connectors; see *"9 Maintenance"*

5 Operation

5.1 Switch On

Switch on the Activity Cage by acting on the Mains Switch placed on the back side of the in- strument; see *"Figure 2 - Back Panel"*.

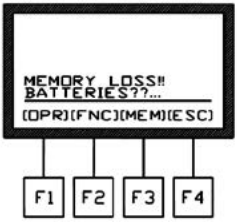
The software takes some seconds to perform a complete checking of the electronic circuit. During the checking, the display shows the software version which is actually installed, e.g., "V07", which appears on the right side of the screen, at the intermediate level.

It is important to let us know the software version, in case of any operational or servicing problem.

NOTE: the drawings illustrating the displays, featured a examples in this manual, may vary from what you see on your electronic-unit display; in fact some of the features the experimenter is asked to set (date, output selection, etc., not to speak of the number of cages) slightly modify the display appearance.

Memory Loss!

The internal memory is fed by two watch-type batteries.



In case the caption “MEMORY LOSS!! BATTERIES ??” appears on the display, it means that the internal watch- type batteries which maintain the memory, are down and consequently have to be replaced see “*9.2 Battery Replacement*”

The data saved in the memory are lost.

Once the batteries have been replaced, the operator has to set again date, time (see “”) and the experiment configuration including sequence number, calibration, etc., see *“5.2 Starting the experiment”*

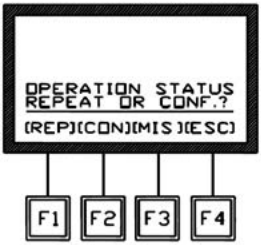
NOTE : When the caption “MEMORY LOSS!! BATTERIES??” appears, the 7431 internal memory is lost. To avoid the loss of relevant data, we suggest to save them on the PC before exiting any experimental session.

5.2 Starting the experiment

Drop the animal/s into the cage.

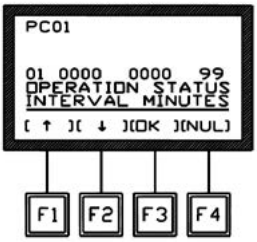
Before starting an experimental trial, it is necessary to configure each cage connected to the electronic unit. In particular, the operator will be asked to:-”
• confirm whether the cage is active
• set the experiment duration
• set the trial number”

From the main menu, depress the F1 (OPR) key, followed by the F2 (CON) key.

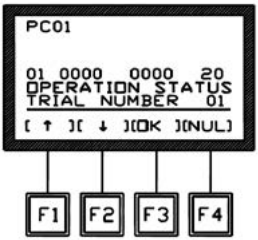


Now it is possible to set the cage ON or OFF by depressing the corresponding key

The caption “PC01” appears when (ON) is depressed, confirming that cage 1 is now active, although the activity counting will not begin until the experiment duration and trial number have been set.



Experiment duration



Now set the experiment duration in minutes, from 01 to 99, via the F1 (↑) or F2 (↓) keys.
Depress the F3 (OK) key to confirm the selection.”
In this phase the user can fill manually the experiment tags lane by lane (Treatment, Protocol, Stage, Inclination, Trial, ID).

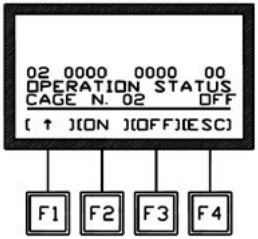
Trial Number

At this point, it is possible to set the trial number, from 01 to 99, F1 (↑) or F2 (↓) keys.

Confirm the selected figure b depressing the F3 (OK) key.

Now the setting is complete, the following display will appear, and the activity counting begins.

A multiple activity cage (SKU. 47420, see *"2 Instrument Description"*) is involved, before leaving the configuration stage, it is necessary to configure all the other cages.



As for cage number one, first of all the operator will be asked to select the cage number, by depressing the F1 (↑).

The following display will appear:

For each cage, follow the same steps described for cage No. 1.

At this point, you may leave the configuration stage by depressing the F4 (ESC) key.

Only in the case all six cages are in use at the same time, the operator may depress F1 (↑) key 6 times until the caption “CAGE N. ALL” appears instead of the cage number.

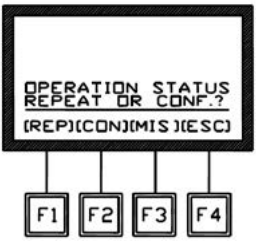
This option will set all the six cages “ON”.

The experiment duration and trial number selected after this setting, will apply to all 6 cages.

How to recall a previously set configuration

In the case the configuration set for the previous experimental session is still valid, the researcher may maintain it.

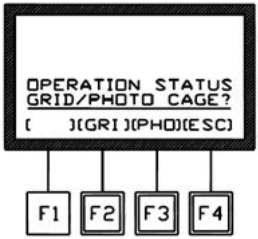
From the MAIN menu, depress the F1 (OPR) key, followed by F1 (REP). The last cage configuration will be applied.



Selecting Cage Type

Although in this manual we consider the I.R. beam cages only, the activity cage electronic units are designed to accept also signals fro the grid-floor cages manufactured until 2002.

During the testing in our laboratory, the electronics is set for the I.R. cages. However, in case it is necessary to set it again, for example after replacing the batteries, etc., proceed as follows: from the main menu, depress the F1 (OPR) key (see previous display), followed by F3 (MIS) key.



Depress the F3 (CAG) again. Now select the I.R. beam cage, by the F3 (PHO) key.

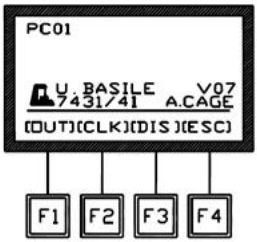
The datum shown on the display can routed to the PC, see *"6.1 How to set the data ouput path"*.

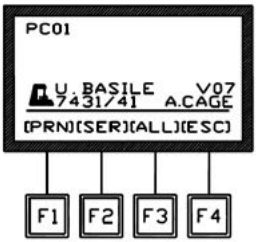
6 Data PC Output

6.1 How to set the data ouput path

If no path is set, the acquired data are saved in the 47420 internal memory only.

During the experimental trial, the data can also be routed to the PC for remote communication.





Serial communication between the 47420 Activity Cage and an IBM (or compatible) PC is owned by the Ugo Basile Win-DAS Windows®-based software supplied as optional.

In case the operator wants to cancel one of the previously activated choices (PRN, SER or ALL), it is necessary to enter the OUT menu and depress the F4 (ESC) key (once or twice), selecting no option."

Instrument Adress and Baud-Rate

When the SER or ALL functions are activated, and the 7420 is correctly connected to the PC, the message “CONNECTED TO PC” appears on the display.

From this menu, via the F1 (ADD) key, the operator can set the address of the Instrument which is routing data to the PC and the communication speed (baud-rate).

The default address is 01 and the default baud-rate is 300. The factory set parameters are suitable in most cases; in this case the operator can leave this menu by depressing the F4 (ESC) key.

To modify the address, if necessary, press the F1 (ADD) key; select by the up or down arrows the desired address (from 01 to 99) and then depress the F4 (ESC) key.

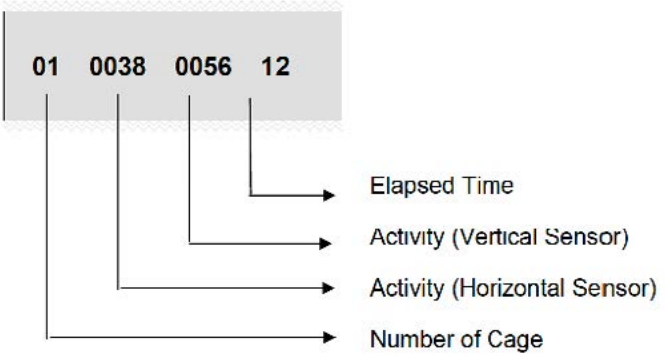
To change the factory set baud-rate, depress the F2 (B-R) key. Select by the arrows the desired value in the loop which includes 300 - 600 - 1200 - 2400 - 4800 BPS.

Then depress the F4 (ESC) key.

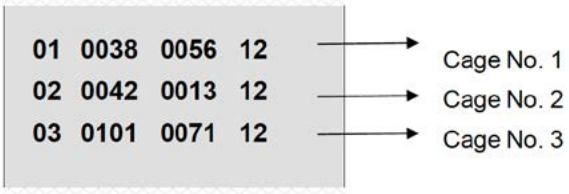
The baud-rate must be identical to the value set on the Win-DAS software (see 52010” manual).”

6.2 Datum Format

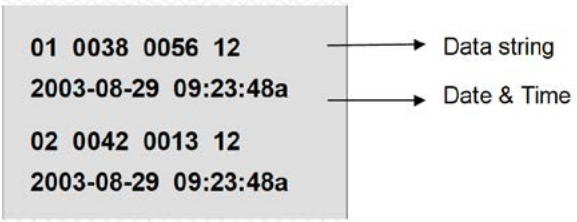
The datum form appears as follows:



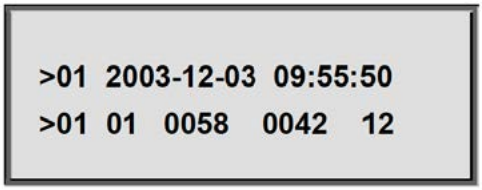
If we consider a multiple activity cage, the data will look as follows:



If the operator has selected the combination of the experimental datum with date and time (see ""), this information appears on a second line.



When the data are routed to th PC via the Win-DAS Data Acquisition Software (see its instruction manual), they can be monitored on the "UB Server" window, each string beginning with the address of the instrument to which the data refers. The address may be 01 (default) or other (preset by he operator).



6.3 Quick setting of the 47420 Multiple Activity Cage

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 recommend you to browse the com- plete manual to go deep into details.

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

Command Description	Command Sequence	See also paragraph
Set display to show DATA in progress	Repeat (ESC) (F4) key until the configuration is reached	
Repeat Previous Experiment	(OPR) - (REP)	
Send MEMORY DATA to PC	(MEM) - (OUT) - (YES)/(NO) to combine or not Time & Date - (SER).	
Set TIME	(FNC) - (CLK) - (TIM) - (↑)/(↓) to set the correct Time - (ENT)	
Set DATE	(FNC) - (CLK) - (DAT) - (↑)/(↓) to set the correct Date - (ENT)	
Set DISPLAY CONTRAST	(FNC) - (DIS) - (↑)/(↓) depressed un- til the desired cont ast is reached - (ESC) - (ESC)	

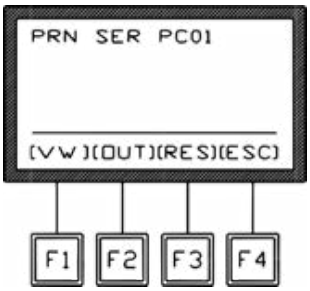
While the experiment is in progress, if properly set by depressing the F4 key from the Main Menu, the display shows the incoming data in real time.

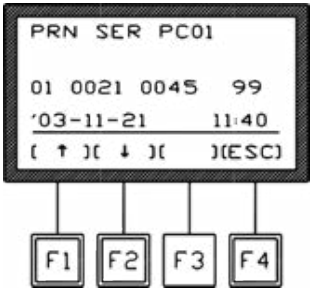
7 Memory Management

Each datum is saved in the memory which can store about 350 strings, including the datum proper and the date/time indication.

By depressing the F3 (MEM) key from the main menu, the MEMORY Menu can be reached, from which the F1 (VW) key enables the operator to visualize on the display the data stored in the memory, each complete with aquisition Date & Time.

Use the vertical-arrow keys F1 (↑) or F2 (↓) to scan the data; by momentarily depress- ing the key, the displayed datum will increase (or decrease) of one measurement. Keep- ing these keys depressed longer will scan the data at higher speed.





As usual the F4 (ESC) recalls the previous menu software or abandons a wrong selection.

From the MEMORY Menu, the F2 (OUT) key enables the researcher to export data stored in the memory to the PC.

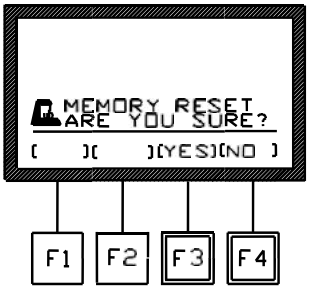
Before selecting the output, the operator will be asked if he/she is interested to combine each datum with the related Date & time, by an wering (YES) (F3 key) or (NO) (F4) to the question “WITH DATE & TIME?”

Before starting a new experimental session, we suggest to check the memory,

which may contain some data of the previous trial. If it is the case, enter the level and RESET the memory.

7.1 Memory Reset

From the Memory menu, the F3 key (RES) enables the operator to reset the data stored in the memory.



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

The operator is now required to answer (YES) (F3 key) or (NO) (F4 key) to the question: “are you sure?”. This further question has been added to avoid the accidental loss of all stored data.

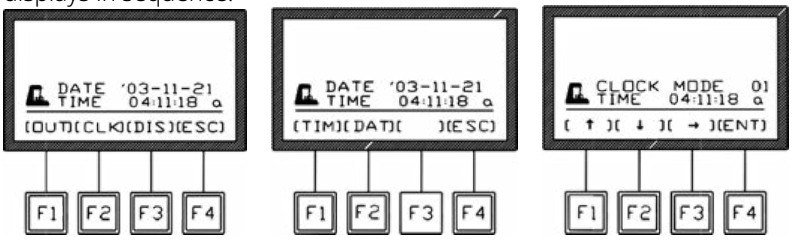
The Memory menu automatically appears also when the memory is fully loaded, which means it has reached its maximum capability of about 500 line.

Memory Full Message
If the “MEMORY FULL” message appears during acquisition, the operator has three options:

1. the researcher who is not interested in considering the data saved in the memory, may simply depress the F3 (RES) key and confirm the reset by answering F3 (YES) to the question “ARE YOU SURE?”, see *“7.1 Memory Reset”.*
2. in the case the data previously saved in the memory are necessary, proceed in order to send them to PC as previously explained (see *“7 Memory Management”*)
3. there is also the possibility to ignore the indication of “MEMORY FULL” and go on with the experiment by depressing the F4 (ESC) key. The data acquired onwards will not be saved. Consider that, in this case, the memory remains fully loaded and the display reminds it by showing the message “MEMORY FULL” each time the 37400 is switched ON.

7.2 Setting Time & Date

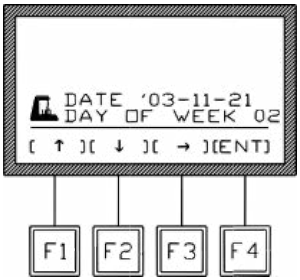
To set time and date, from the Main menu depress the F2 (FNC) key, followed again by the F2 (CLK) key. Now select F1 (TIM) to set TIME. See the following displays in sequence:



Use the F3 horizontal arrow key to highlight, on the intermediate level of the display, the time section (hours, minutes, seconds, and mode) which has to be modified.

Now use the vertical-arrow keys F1 (↑) or F2 (↓) to set the correct time; a momentarily action on the keys will increase or decrease the numerical value of one step: depress the keys longer for higher speed selection.
Also remember to set the clock mode, selecting among the following possibilit es:
00 = 24-hour mode
01 = anti-meridian (a.m.) time
02 = post-meridian (p.m.) time

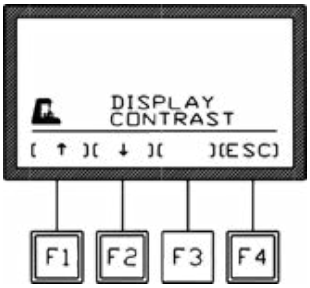
Once the TIME setting is complete, depress the F4 (ENT) key to save the setting and go back to the Main Menu.



Follow the same procedure to set the DATE, selecting now the F3 (DAT) key. Enter also the DAY OF THE WEEK, referring to the following table:
01 = Monday
02 = Tuesday
03 = Wednesday
04 = Thursday
05 = Friday
06 = Saturday
07 = Sunday
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 (↑) or F2 (↓) depressed until you reach the desired display contrast.

The readability of the liquid crystal display depends on the angle of view: select the ideal contrast according to the height of the table, the operator's distance and so on.

Find the ideal readability combining display contrast and tilting of the electronic unit.

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

Leave this software level, saving the selected display contrast, by depressing the F4 (ESC) key.

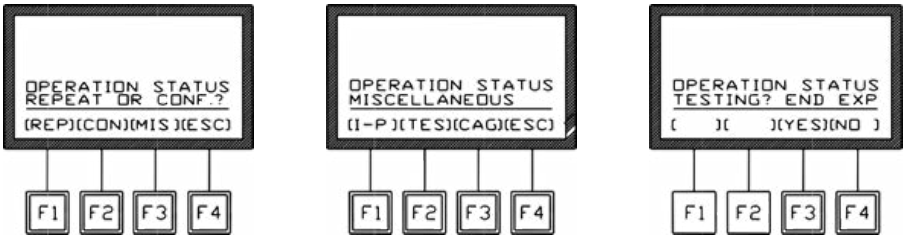
8 Self-Diagnosis

Before any session, it is recommended to test the status of the instrument.

One or more emitter/receiver couples not operating is an unlikely event, indeed! But it would be frustrating to realize, after a working day, that some of the couples emitter/receiver was not operating and thus the results have to be discarded. To prevent such a misfortune the 47420 provides a self-diagnosis procedure.

First of all connect the cage/s to the electronic unit.

From the MAIN menu, depress the F1 (OPR) key, followed by the F3 (MIS) key. Now select F2 (TES). See the following displays in sequence:



Depress the F3 (YES) key to start the self-diagnosis of all the connected cages.

The following display shows the result of the self diagnosis for each cage; in our example, 3 cages are connected to the electronic unit.

For each cage two lines appear:
- an upper line referring to the emitters
- a lower line referring to the receivers.

Each line comprise:
- 16 fragments in case only the horizontal sensors are used

or
- 32 fragments in case both horizontal & vertical sensors are used

When all the couples emitter/receiver are correctly aligne, all 16+16 (or 32+32 respectively) fragments appear on the display.

If a fragment is missing from the upper line (referring to the emitters), it means the couple is not aligned.

In case of misalignment, it is necessary to fix the sensors. This job must be carried at our factory, please see *"9.5 Customer Support"*.

9 Maintenance

Although any service of the instrument must be carried out by Ugo Basile personnel or by qualified personnel authorized by the UGO BASILE organization, this section of the instruction manual describes normal maintenance procedures that can be performed at the customer's facilities.

9.1 Electrical

To inspect and/or replace the fuses, disconnect the mains cable first! Insert a minia- ture screwdriver in the slot indentation, see paragraph 3.5, and snap out the slide which houses the fuses.

For operation at 220-230 Volts, we recommend 315 mA timed fuses (type T315). Use 630 mA fuses (type T630) for operation at 115 Volts.

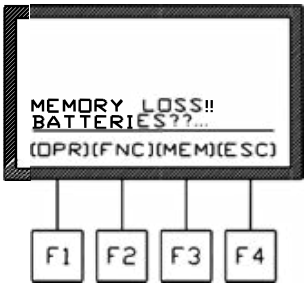
Once the fuse holder is removed, the voltage selector becomes accessible. The same precision screwdriver can be used to remove the jumper on which the operating voltage is engraved. Place the jumper upside down if you have to shift from 115 to 230V or viceversa.

Snap in the fuse slide: the mechanical "click" ensures that it is locked. Check the voltage flag before applying electrical power.

9.2 Battery Replacement

The 7441 memory is supported by two watch-type batteries Silver 1.55V SR43W. Always use the same type of batteries for replacement.

When the batteries are down, the display shows:



NOTE: When the caption “MEMORY LOSS!! BATTERIES??” appears, the internal memory is lost. To avoid the loss of relevant data, we suggest saving them before exiting any experimental session.

Switch off the unit and disconnect the mains cable, see note below.

Remove the 4 screws which fasten the right panel (front view, display side). The Circuit Block is fastened on the panel. Detach the panel/circuit block.

Extract the panel/circuit block carefully. The batteries are located on the electronic board; replace the batteries. At this point, set again DATE and TIME and carry out the CALIBRATION procedure.

9.3 Animal Cage

The animal cages do not require any maintenance; protect them from dust with the plastic lid (4) provided.

Dust has in fact an abrasive action on the board Perspex panels when these are subsequently cleaned. Organic solvents should not be used for cleaning purposes as they can impair the Perspex surface.

Loose dust may be removed with soft cloth or a dry brush. Water and a mild detergent or – ideally – ICI Perspex polish can be used.

9.4 Long Inactivity

The instrument does not require any particular maintenance after long inactivity, except cleaning, see *“9.3 Animal Cage”*.

We suggest to check the instrument performances, see *“8 Self-Diagnosis”.*

9.5 Customer Support

For any further information you may desire, concerning the use and/or the maintenance of the device, please do not hesitate to contact our service department (or our local distributor) either directly of via our support page at the following link:
ugobasile.com/support/support-request

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

10 Specification

General	
Commands	via “soft keys”
Read-out	multifunction graphic display
Starting	via keyboard on the electronic unit
Connection to PC	through DELTA 9-pin connector. See *“3 Data Aquisition”*
Power Requirement	115 or 230 V, 50/ 0 Hz, 20 W max.
Operating Temperature	15° to 30° C
Sound Levels	Negligible
Dimensions	
Electronic Unit	cm 27 (w) x 16 (d) x 19 (h)
Assembled cage	cm 54 (w) x 50 (d) x 37 (h)
Packing Dimensions	cm 66 x 50 x 63 (for each cage)
Weight	
Electronic Unit	Kg 2,70
Assembled cage	Kg 11,80 (with sensors 7435/7436)
Shipping Weight	26.00 Kg approx.

11 Warranty

Your device is covered by 12 months on factory warranty period.
Registering the device on our registering web site page will give you a 12 months free warranty period.

To make the product registration.
1. Take a picture or a note of the device serial number which is written in a metallic label at the of the instrument case.
2. Browse the internet page: register.ugobasile.com
3. Fill out the form and you will receive the new warranty certificate

UB Care warranty extension
It is possible to buy a warranty period extension called UB Care 12 or UB CARE 24 respectively of additional 12 or 24 months.

UB CARE is available only in the first 12 months after the delivery date, not later.
Your device is covered by 12 months on factory warranty period.

12 Bibliography

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13 Related Products

Measurement of motor coordination and balance can be used not only to assess the effect of drugs or other experimental manipulations on mice and rats, but also to characterize the motor phenotype of transgenic or knock-out animals.

The tests can be used equally well for rats and mice, and have been used both for the phenotypic characterization of transgenic mice and for evaluating the effects of lesions and aging in rats.

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Activity Cage - Spontaneous Activity
for Mice and Rats

Grip Strength Meter (GSM) for Mice and Rats

Treadmill - Interchangeable Lane Assembly for Mice and Rats

Hole Board Device - Boissier-Simon method

Running Wheels - Rodents Motor Activity Measurement

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