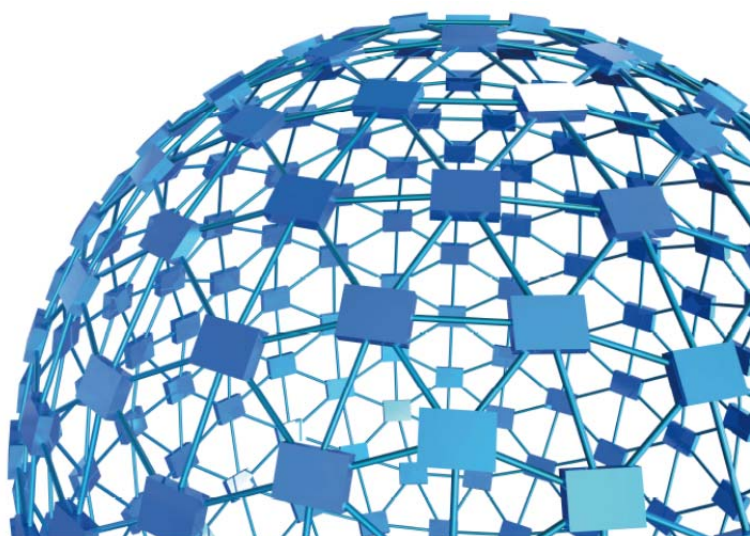




instruction manual

Multiple Activity Cage
Cat. No. 47420



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instruction manual

Multiple Activity Cage
Cat. No. 47420

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.

Multiple Activity Cage

Cat. No. 47420

General

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

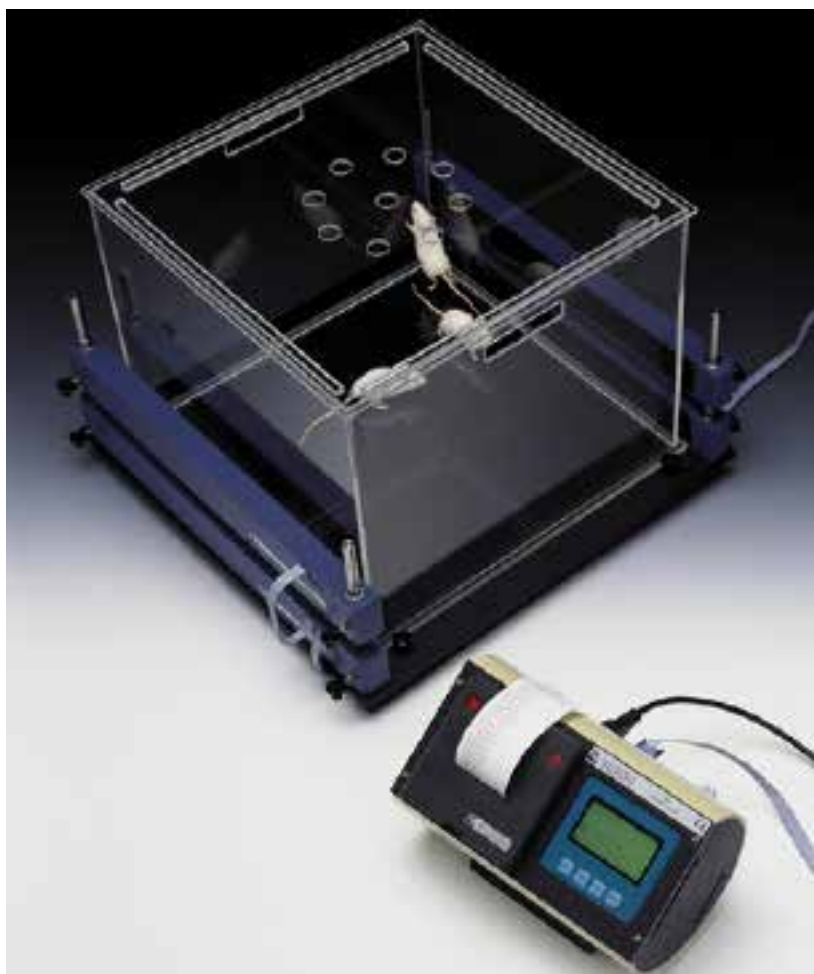
Activity data may be automatically and unobtrusively collected by many methods.

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.



With dedicated
software included

STAND-ALONE CON-
TROLLER WITH EMBED-
DED PRINTER FOR GLP
AND DATA SAFETY

MAIN FEATURES

- Measures **horizontal and vertical activity in rats and mice**, useful in the following types of investigation:-
- **General Toxicology**, ascertaining the action of a drug on the animal's activity
- **Psychopharmacology**, screening drugs which are potentially active on the CNS
- **Behavioural Sciences**, in evaluating the variations of spontaneous activity after changes in environmental conditions

Ugo Basile: more than 10,000 citations



No. Ordine / Order No. _____ Data / Date _____ / _____ / _____

Serial numbers	Cages 7433	1	2	3	4	5		6
UNIT 7441	Sensors 7435	1	2	3	4	5		6
S.N.	Sensors 7436	1	2	3	4	5		6

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.

NOTES



CONTENTS

1	GENERAL	1
1.1	PRINCIPLE OF OPERATION.....	1
1.2	INSTRUMENT CONFIGURATION	1
1.3	ANIMAL CAGE	2
1.3.1	<i>HORIZONTAL & VERTICAL SENSORS</i>	2
1.4	ELECTRONIC UNITS.....	2
1.4.1	<i>THERMAL PRINTER</i>	4
1.4.2	<i>GRAPHIC DISPLAY</i>	4
1.4.3	<i>KEYBOARD</i>	5
1.4.4	<i>F4 KEY</i>	5
1.4.5	<i>FUNCTION KEY ABBREVIATIONS</i>	6
2	DATA ACQUISITION	6
3	INSTALLATION	7
3.1	UNPACKING & PRELIMINARY CHECK	7
3.2	NOTES ON THE INSTRUCTION MANUAL.....	7
3.3	ENVIRONMENT	7
3.4	ASSEMBLING THE INSTRUMENT	8
3.5	BEFORE APPLYING POWER.....	10
3.5.1	<i>MAINS SWITCH</i>	10
3.5.2	<i>FUSE HOLDER & VOLTAGE SELECTOR</i>	10
3.5.3	<i>MAINS CORD</i>	11
3.6	CONNECTIONS	11
3.7	HOW TO HANDLE THE INSTRUMENT	11
3.8	ADDITIONAL SAFETY CONSIDERATION.....	11
4	OPERATION	12
4.1	SWITCHING ON	12
4.1.1	<i>MEMORY LOSS!</i>	12
4.2	STARTING THE EXPERIMENT	13
4.2.1	<i>EXPERIMENT DURATION</i>	14
4.2.2	<i>TRIAL NUMBER</i>	14
4.2.3	<i>HOW TO RECALL A PREVIOUSLY SET CONFIGURATION</i>	15
4.2.4	<i>SELECTING CAGE TYPE</i>	15
5	DATA PRINT-OUT AND PC OUTPUT	15



5.1	HOW TO SET THE DATA OUTPUT PATH.....	15
5.1.1	<i>INSTRUMENT ADDRESS AND BAUD-RATE</i>	16
5.2	DATUM FORMAT.....	17
5.3	INTERMEDIATE PRINT-OUT.....	18
5.4	QUICK SETTING OF THE 47420 MULTIPLE ACTIVITY CAGE	18
6	MEMORY MANAGEMENT	19
6.1	MEMORY RESET.....	20
6.1.1	<i>"MEMORY FULL " MESSAGE</i>	21
6.2	SETTING TIME & DATE	21
6.3	DISPLAY CONTRAST	22
7	SELF-DIAGNOSIS.....	22
8	MAINTENANCE	23
8.1	ELECTRICAL	24
8.2	BATTERY REPLACEMENT	24
8.3	PAPER LOADING.....	25
8.3.1	<i>PAPER ROLL</i>	25
8.4	ANIMAL CAGE	26
8.5	LONG INACTIVITY	26
8.6	CUSTOMER SUPPORT	26
9	ORDERING INFORMATION	27
9.1	MULTIPLE CAGE SET-UP	27
9.2	SPECIFICATIONS	27
10	BIBLIOGRAPHY.....	28

FIGURE INDEX

Figure 1 "Upper Panel "	3
Figure 2 "Back Panel "	3
Figure 3 "Printer Panel"	4
Figure 4 "Animal Cage"	8
Figure 5 "Assembling the Sensors"	9
Figure 6 "Power Module"	10
Figure 7 "Paper Loading"	25



MULTIPLE ACTIVITY CAGE

Cat. 4 7 4 2 0

1 GENERAL

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.
- **Psychopharmacology**, in screening drugs which are potentially active on the central nervous system.
- **Behavioral Sciences**, in evaluating the variations of spontaneous activity after 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 minute intervals.

1.1 Principle of Operation

The activity detection of our Multiple Activity Cage basically relies on horizontal and/or vertical sensors, see paragraphs 1.3.1.

The movements the animal 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 to assess and analyse the animal activity.

Data related to activity, either horizontal and/or vertical, are printed in a convenient format, see paragraph 1.4.1-Thermal Printer.

1.2 Instrument Configuration

Our activity cages are available as multi-channel (**47420**) systems.

The **47420** package comprises:-

- an **electronic unit 7441 (for up to 6 cages)**, see paragraph 1.4



and

- an I.R. Beam Cage, see paragraph 1.3

1.3 Animal Cage

The I.R. Beam Cage consists of:-

- an **animal cage** of clear Perspex, Cat. **7433**, see paragraph 1.3 and Figure 4 “Animal Cage”, page 8.
- a set of emitter/sensor arrays for **horizontal** activity (**11 & 12**), Cat. **7435**
- a set of emitter/sensor arrays for **vertical** activity (**13 & 14**), Cat. **7436**, see paragraph 1.3.1

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 leaflet picture and 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 break-ages, see paragraphs 3.1-Unpacking & Preliminary Check & 3.4-Assembling the Instrument.

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

1.3.1 Horizontal & Vertical Sensors

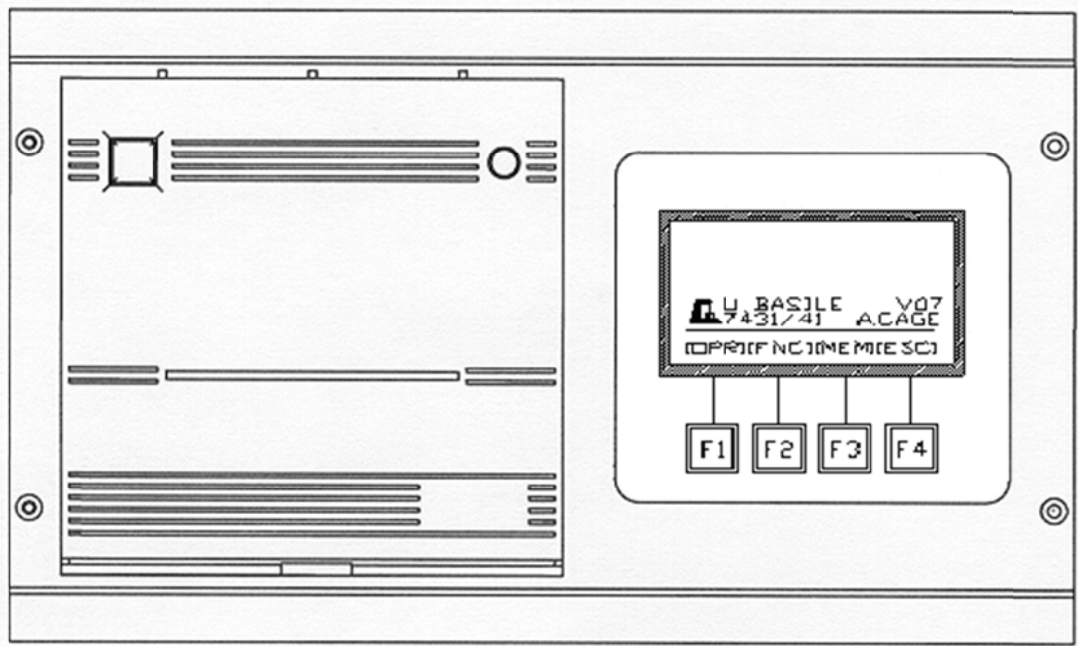
The **7435 Horizontal Sensors** consist of two facing blocks containing an I.R. array of 16 emitters and, respectively, receivers, designed for the assessment of the **ambulatory activity**, see Figure 5 “Assembling the Sensors”.

A similar system, Cat. **7436**, whose height can be adjusted, assesses the **vertical activity (rearing)**.

1.4 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 paragraph 2-DATA ACQUISITION.

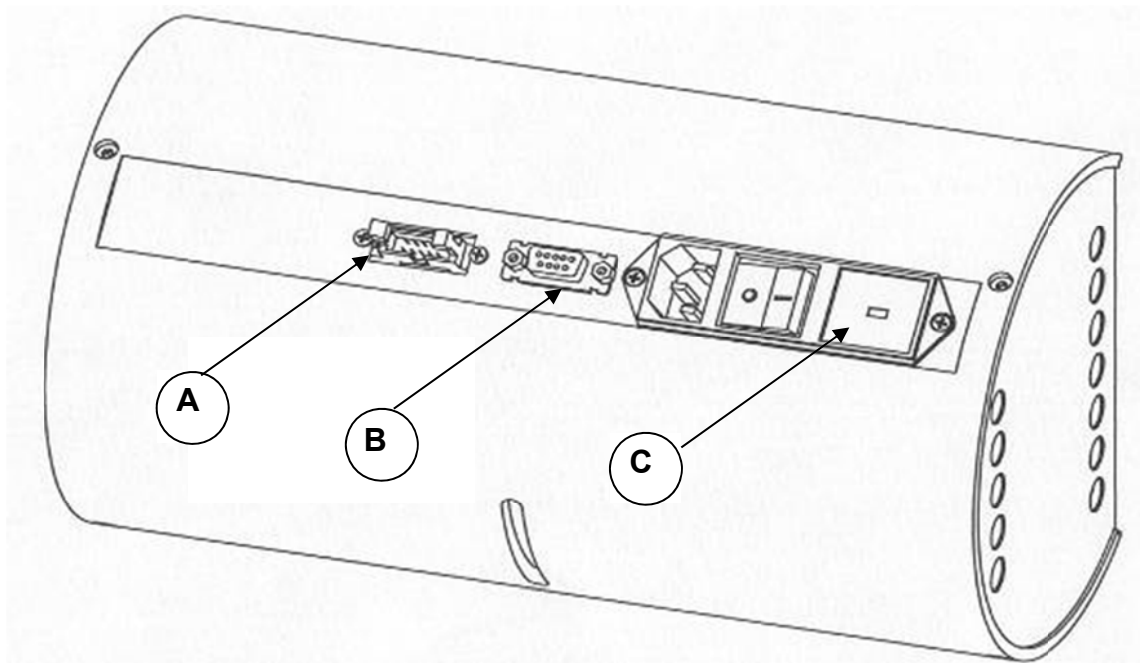
*Figure 1 "Upper Panel "*

Its upper panel, see Figure 1 "Upper Panel " incorporates:-

- the graphic LCD **display**, see paragraph 1.4.2
- the printer, see 1.4.1

and

- the control keyboard, see 1.4.3

*Figure 2 "Back Panel "*

The **back panel** (see Figure 2 "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 MODULE (**C**), see also paragraph 3.5.

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 socket-connector to the Animal Cages.

7441 are provided with an internal memory capable of storing the data from several experiments, for scrolling screen review and optional output to PC, see paragraph 2-DATA ACQUISITION.

1.4.1 Thermal Printer

This is a thermal array device, printing on its 58 mm wide paper; for paper feeding see paragraph 8.3.

The red LED on the front panel lights when the Electronic Unit is switched on.

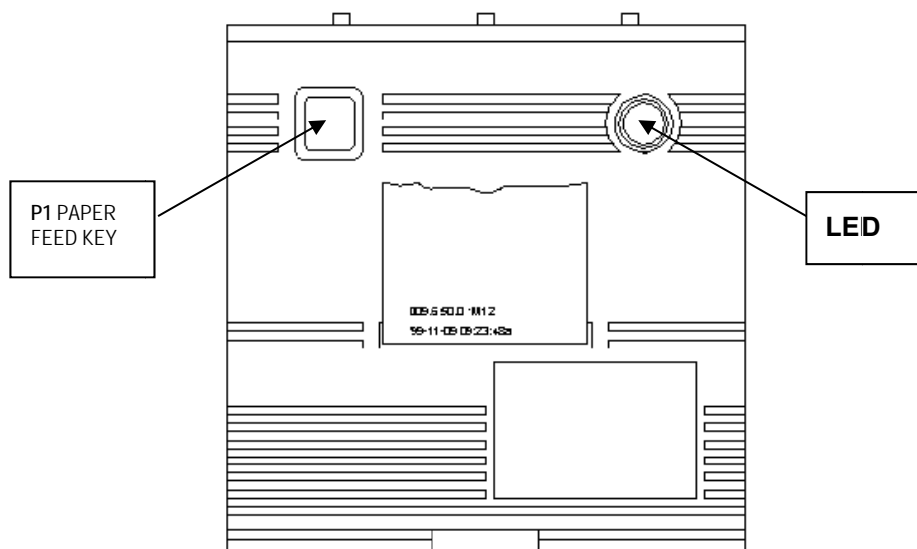


Figure 3 "Printer Panel"

A red key (P1, see Figure 3 "Printer Panel" and paragraph 8.3) for paper feeding is provided on the front panel. The same key, held depressed for some seconds while switching on the unit, enables the printer to carry out its self-checking.

To view a sample of data print-out, see paragraph 5.2.

1.4.2 Graphic Display

The graphic display presents all available commands. The operator sets the experiment configuration via the keyboard located below the display, see paragraph 1.4.2.



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

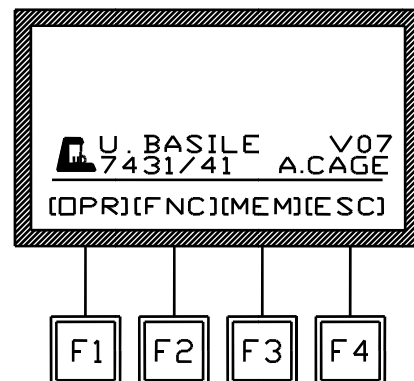
The data can be customized if required, namely completed with animal & experiment numbers, sex indication, etc.

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**.



1.4.3 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 paragraph 1.4.5 for reference.

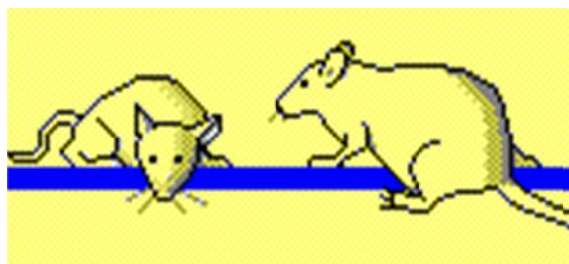
Each function menu has in fact a different sub-routine software, which is entered when the corresponding function key is depressed. If a key is kept depressed more than one second, the command is repeated at a higher speed.

1.4.4 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** and the **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.



1.4.5 Function Key Abbreviations

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

(ALL)	All (Serial + Printer)
(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)	Annulment
(OFF)	Channel Inactivation
(ON)	Channel Activation
(OK)	Enter
(OPR)	Operation Channel Menu
(OUT)	Output Menu
(PHO)	Cage with the Sensor
(PRN)	Data Printing Selection
(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
(I-P)	Intermediate Printing

See also the **FUNCTION KEY BLOCK DIAGRAM**, in the section “WIRING DIAGRAMS”.

2 DATA ACQUISITION

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 paragraph 3.6-Connections.

Data output is managed by the Data Acquisition Software Cat. 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!



3 INSTALLATION

3.1 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.



Protect the environment!

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

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.

The Activity Cage is packed into three individual carton boxes: the first contains the electronic 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.

3.2 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 paragraph 8.6-Customer Support) specifying the series number of your instrument.

3.3 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.

3.4 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.

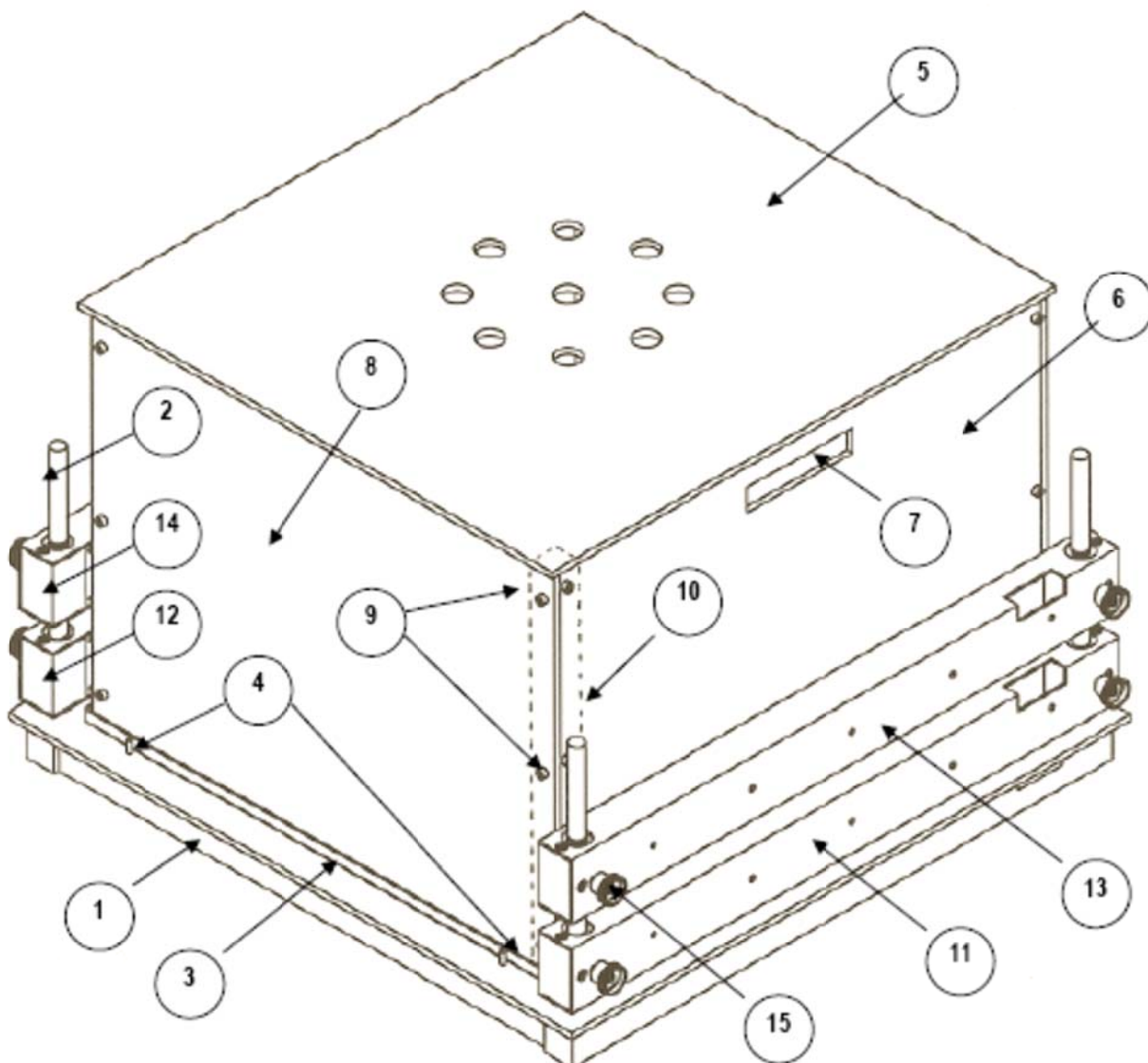


Figure 4 "Animal Cage"



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.

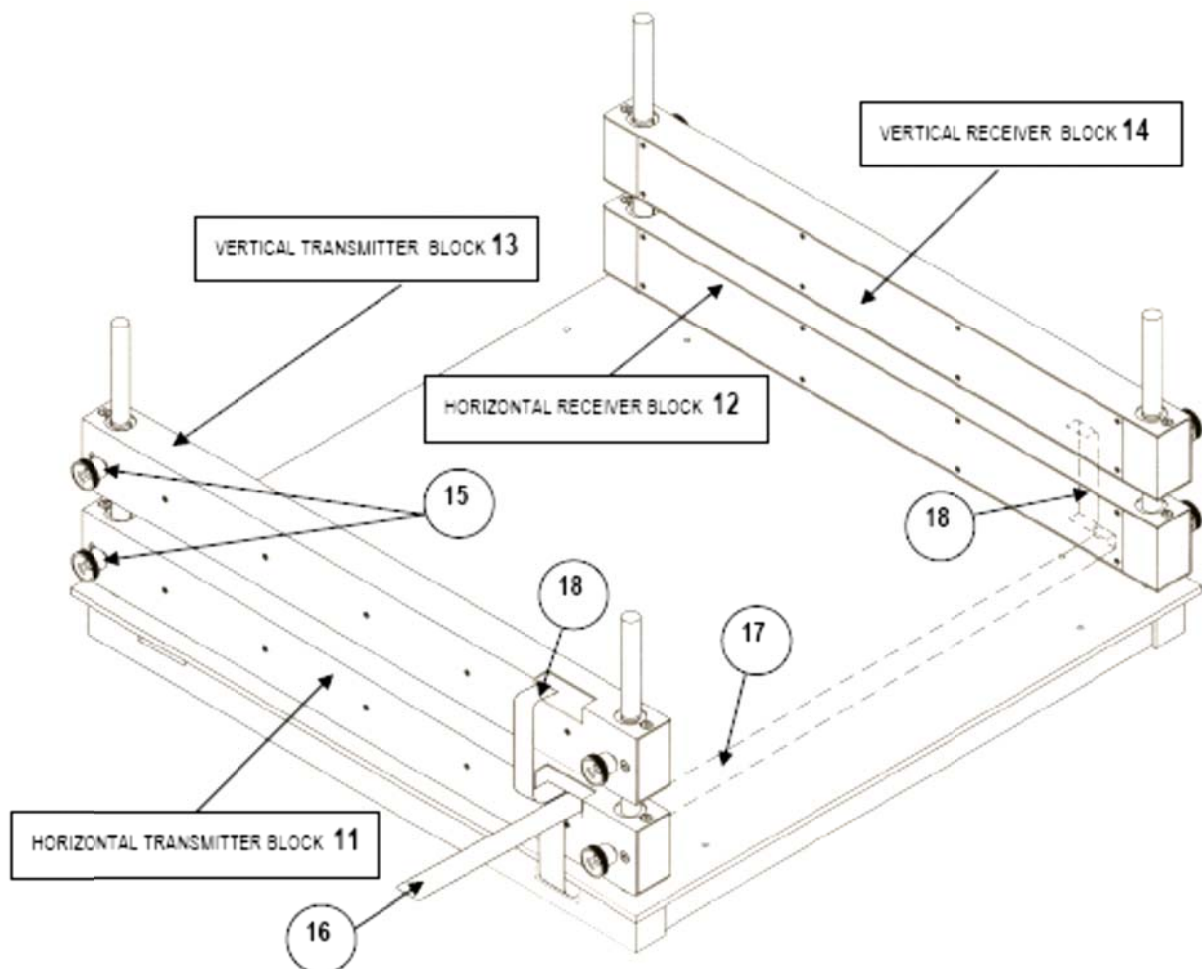


Figure 5 "Assembling the Sensors"

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 inter-block connection cable (**16**) is clearly shown on Figure 5 “Assembling the Sensors”.

Consider the connection cable electronic unit/animal cage (**17**). At the cage side the cable divides itself. Plug the first connector to the female connector A, transmitter side.



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.

3.5 Before Applying Power

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

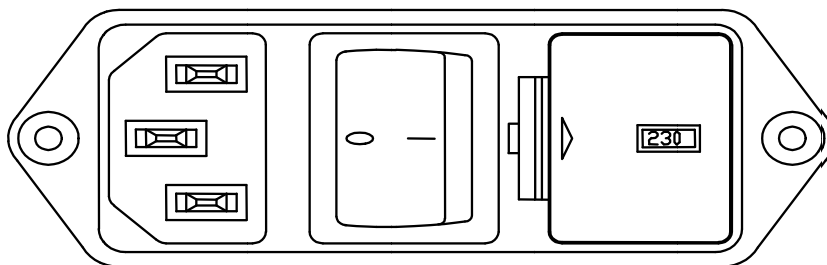


Figure 6 “Power Module”

3.5.1 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)

3.5.2 Fuse Holder & Voltage Selector

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. To replace the fuses, see paragraph 8.1-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 paragraph 8.1.

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, see also 3.6 & 3.7.

3.6 Connections

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

The back panel (see paragraph 1.4-Electronic Units) also embodies two connectors:

TO ANIMAL CAGE: the socket 10-pin connector enables the connection of the Animal Cage to the electronic 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 paragraph 3.4-Assembling the Instrument and Figure 5 "Assembling the Sensors".

3.7 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.

3.8 Additional Safety Consideration

- a. Place your Activity Cage on a steady flat surface (e.g. your table).
- b. Do not obstruct free and comfortable access to the power module.
- c. Use original accessories and spare parts only, see also paragraph 9- ORDERING INFORMATION.
- d. Immediately disconnect and replace a damaged mains cable.
- e. Do not use in hazardous environments or outside prescribed environmental limitations (i.e. +10C° / +40C°, 95% relative humidity, non-condensing), see also paragraph 9.2-Specifications.
- f. Do not spray any liquid on the connectors; see also paragraph 8- MAINTENANCE.

**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.

4 OPERATION

4.1 Switching On

Switch on the 47420 by acting on the Mains Switch placed on the back side of the instrument; see paragraph 3.5.1 & 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, see paragraph 1.4.2.

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

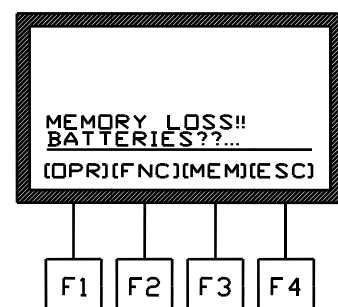
NOTE : the **drawings illustrating the displays**, featured as examples in this manual, may vary from what you see on your electronic-unit display; in fact some of the features the experimenter is asked to set (date, output selection, etc., not to speak of the number of cages) slightly modify the display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

4.1.1 *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 paragraph 8.2.

The data saved in the memory are lost.





Once the batteries have been replaced, the operator has to set again date, time (see paragraph 6.2) and the experiment configuration including sequence number, calibration, etc., see paragraph 4.2.

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 or to print them before exiting any experimental session.

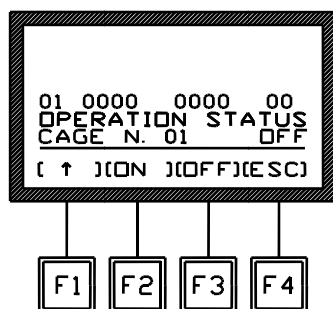
4.2 Starting the Experiment

Drop the animal/s into the cage.

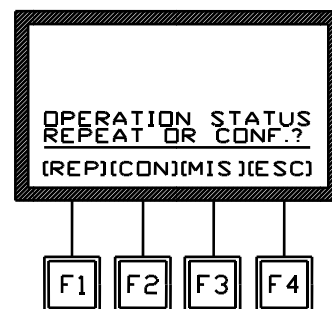
Before starting an experimental trial, it is necessary to configure each cage connected to the electronic unit. In particular, the operator will be asked to:-

- confirm whether the cage is active
- set the experiment duration
- set the trial number

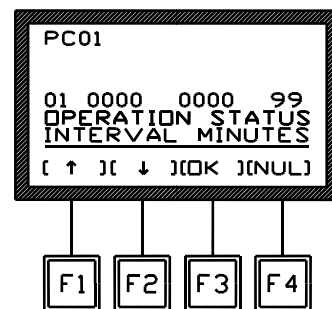
From the main menu, depress the **F1 (OPR)** key, followed by the **F2 (CON)** key.



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.

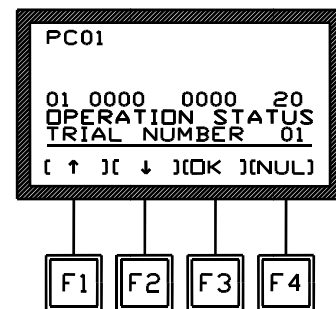




4.2.1 Experiment Duration

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.

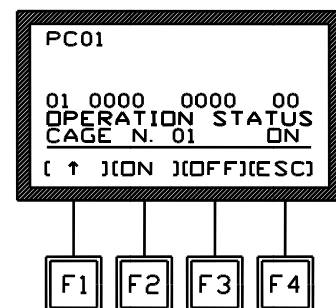


4.2.2 Trial Number

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

Confirm the selected figure by depressing the **F3** (**OK**) key.

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

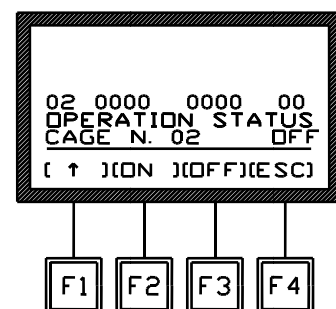


A multiple activity cage (cat. 47420, see 1.2-Instrument Configuration) is involved, before leaving the configuration stage, it is necessary to configure all the other cages.

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.

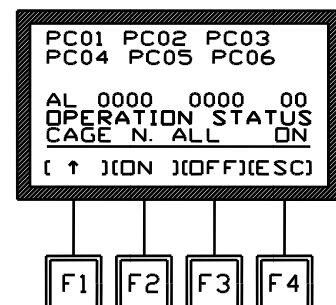


At this point, you may leave the configuration stage by depressing the **F4** (**ESC**) key.

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.

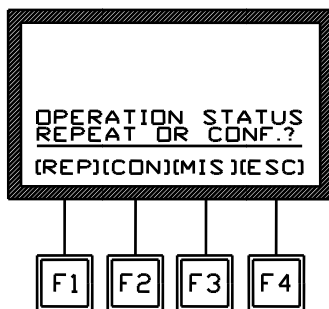
This option will set all the six cages "ON".

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





4.2.3 How to Recall a Previously Set Configuration



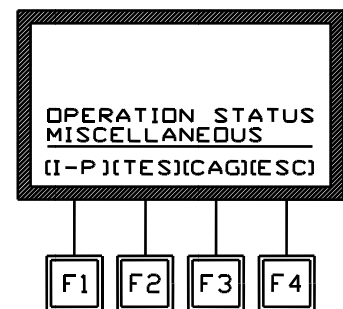
In the case the configuration set for the previous experimental session is still valid, the researcher may maintain it.

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

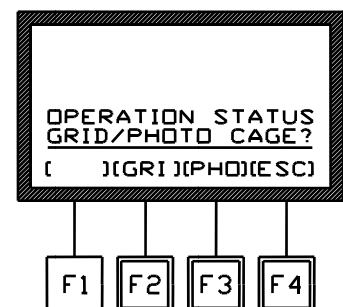
4.2.4 Selecting Cage Type

Although in this manual we consider the I.R. beam cages only, the activity cage electronic units are designed to accept also signals from 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 be printed on the Mini-Printer or routed to the PC, see paragraph 5.1-How to Set the Data Output Path.

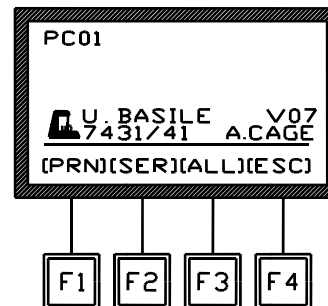
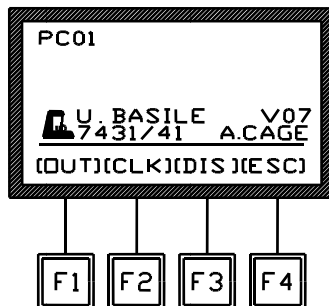
5 DATA PRINT-OUT AND PC OUTPUT

5.1 How to Set the Data Output Path

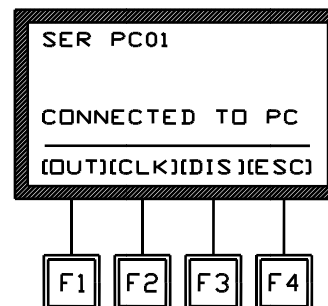
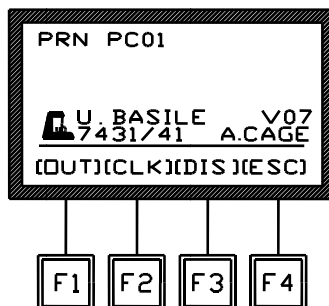
If no path is set, the acquired data are saved in the 47420 internal memory only. During the experimental trial, the data can also be printed-out in real time on its Thermal Printer or routed to the PC for real-time or remote communication.



To print the data in real time on the thermal printer, from the main menu, depress **F2 (FNC)** key, followed by the **F1 (OUT)** key.



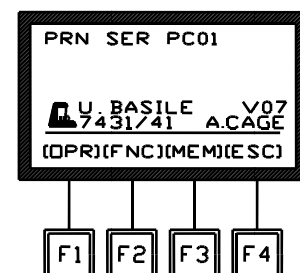
Select now the **F1 (PRN)** key to enable the data print-out in real time (see paragraph 1.4.1 Thermal Printer) or **F2 (SER)** followed by **F4 (ESC)** for direct connection to the PC to export the experimental data in real time or in remote conditions, see displays below:-



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.

The **F3 (ALL)** key enables the researcher to select both output paths (to Printer and to PC) simultaneously.

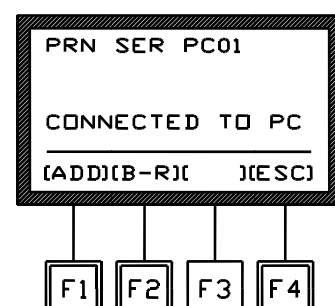
In case the operator wants to **cancel one of the previously activated choices** (PRN, SER or ALL), it is necessary to enter the OUT menu and depress the **F4 (ESC)** key (once or twice), selecting no option.



5.1.1 Instrument Address 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.



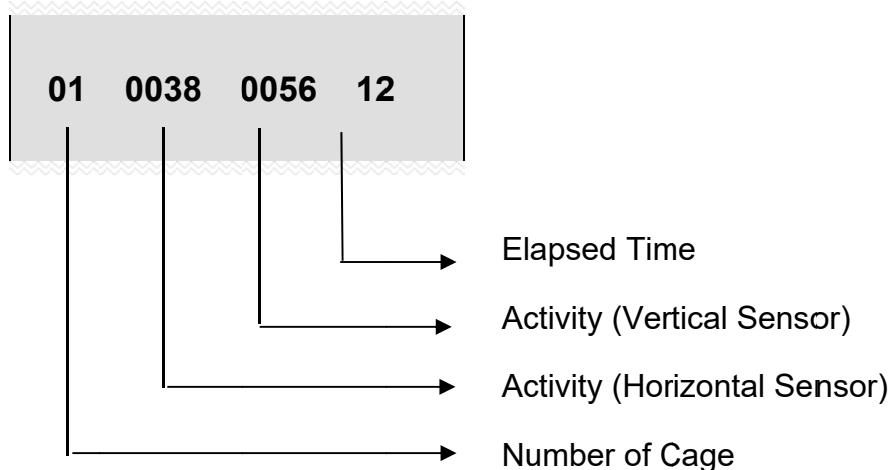
To change the factory set baud-rate, depress the **F2 (B-R)** key. Select by the arrows the desired value in the loop which includes **300 - 600 - 1200 - 2400 - 4800 BPS**.

Then depress the **F4 (ESC)** key.

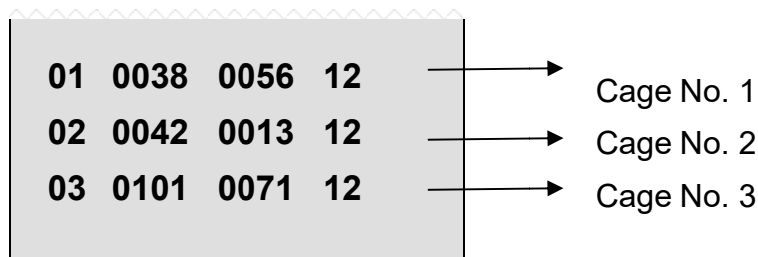
The baud-rate must be identical to the value set on the Win-DAS software (see 52010 manual).

5.2 Datum Format

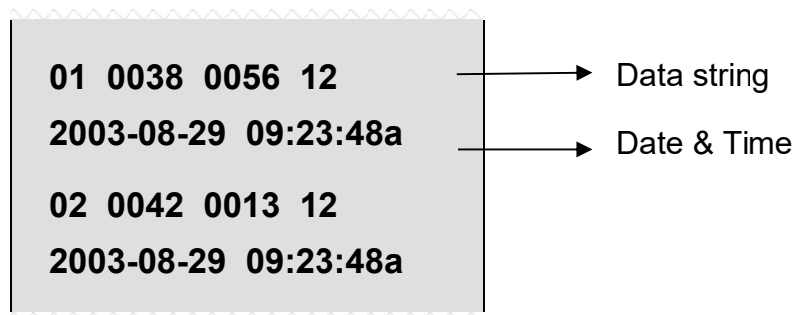
When the data print-out option has been selected, see paragraph 5.1, the datum format appears as follows:-



If we consider a multiple activity cage, the print-out will look as follows:-

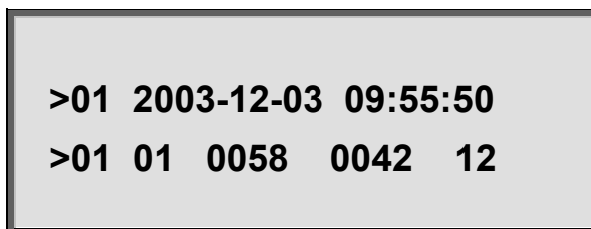


If the operator has selected the combination of the experimental datum with date and time (see paragraph 6.2-Setting Time & Date), this information appears on a second line.



When the data are routed to the 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 print-out refers.

The address may be 01 (default) or other (preset by the operator), see paragraph 5.1.1.

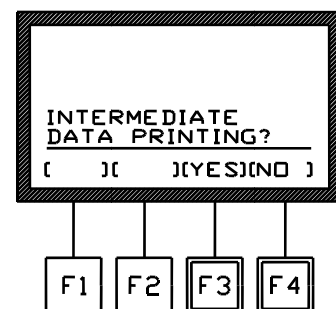


5.3 Intermediate Print-Out

For monitoring the experiment progress, the researcher can obtain an intermediate print at any moment. From the **MAIN** menu, depress the **F1 (OPR)** key, followed by **F3 (MIS)**.

At this point, depress the **F1 (I-P)** key again. Confirm or avoid the print-out by depressing **F3 (YES)** or **F4 (NO)**.

The described intermediate print-out does not affect the memory.



5.4 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 complete manual to go deep into details.

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

Command Description	Command Sequence	See also
---------------------	------------------	----------



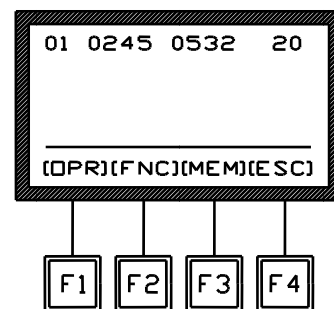
		<i>paragraph</i>
Set display to show DATA in progress	Repeat (ESC) (F4) key until the configuration is reached	1.4.4
Repeat Previous Experiment	(OPR) - (REP)	4.2.3
Print DATA in Real Time	(FNC) - (OUT) - (PRN)	5.1
Print INTERMEDIATE DATA	(OPR) - (MIS) - (I-P) - (YES)	5.3
Print DATA in the MEMORY	(MEM) - (OUT) - (YES)/(NO) to combine or not Time & Date - (PRN) .	6
Send MEMORY DATA to PC	(MEM) - (OUT) - (YES)/(NO) to combine or not Time & Date - (SER) .	6
Set TIME	(FNC) - (CLK) - (TIM) - (↑)/(↓) to set the correct Time - (ENT)	6.2
Set DATE	(FNC) - (CLK) - (DAT) - (↑)/(↓) to set the correct Date - (ENT)	6.2
Set DISPLAY CONTRAST	(FNC) - (DIS) - (↑)/(↓) depressed until the desired contrast is reached - (ESC) - (ESC)	6.3

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.

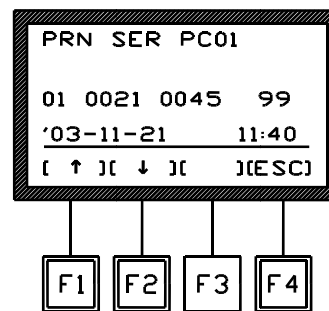
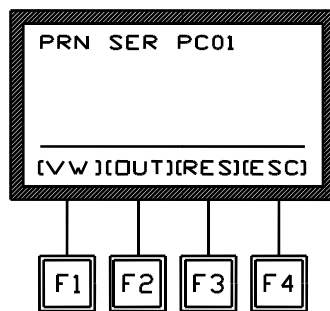
6 MEMORY MANAGEMENT

Each datum, no matter whether printed or sent to the PC, 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 acquisition Date & Time.



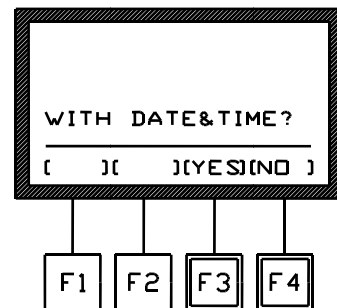
Use the vertical-arrow keys **F1 (↑)** or **F2 (↓)** to scan the data; by momentarily depressing the key, the displayed datum will increase (or decrease) of one measurement. Keeping these keys depressed longer will scan the data at higher speed.



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 the data stored in the memory to the PC or to print them.

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



If the researcher selects the combined printing, the time and date will appear on the second line, see paragraph 5.2-Datum Format. The researcher can now select the data output path, see paragraph 5.1.

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

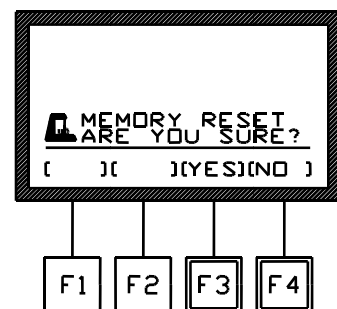
Before starting a new experimental session, we suggest to check the memory, which may contain some data of the previous trial. If it is the case, enter the proper software level and RESET the memory.

6.1 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 cancel 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 lines.



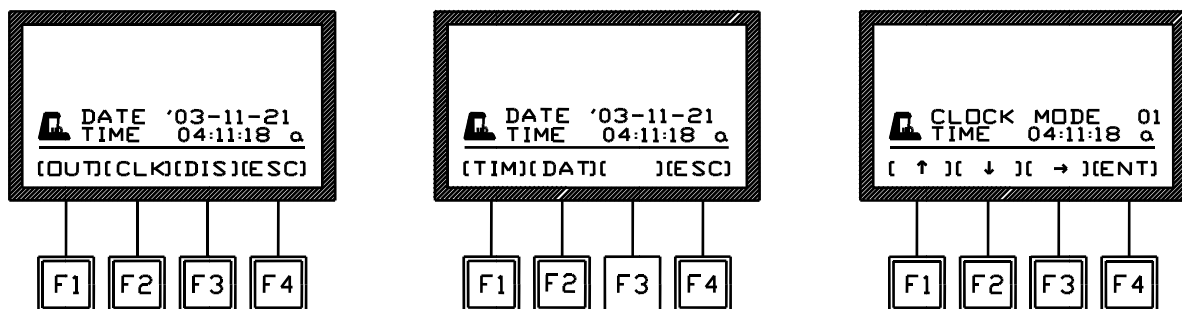
6.1.1 "Memory Full" Message

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 paragraph 6.1.
- 2) in the case the data previously saved in the memory are necessary, proceed in order to Print and/or send them to PC as previously explained (see paragraph 6-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.

6.2 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 possibilities:-

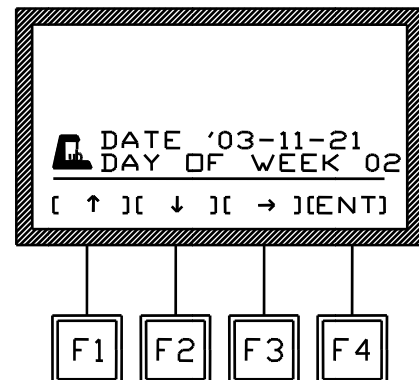
- 00 = 24-hour mode**
- 01 = anti-meridian (a.m.) time**
- 02 = post-meridian (p.m.) time**

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:-

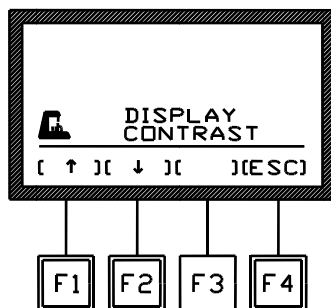
01 =	Monday
02 =	Tuesday
03 =	Wednesday
04 =	Thursday
05 =	Friday
06 =	Saturday
07 =	Sunday



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

6.3 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.

7 SELF-DIAGNOSIS

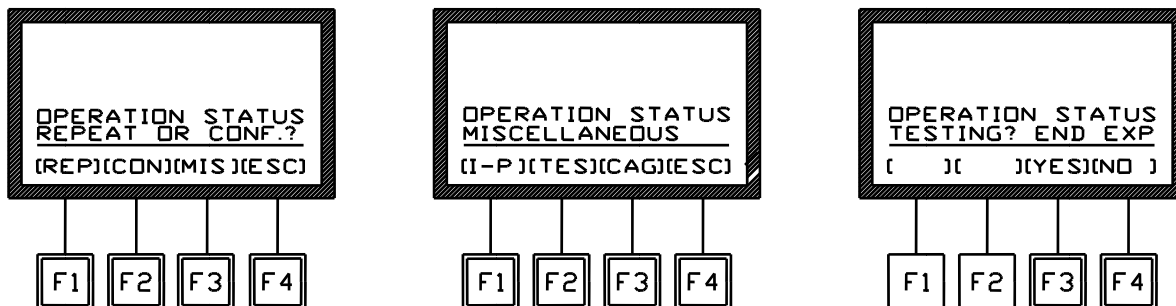
Before any session, it is recommended to test the status of the instrument.

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.

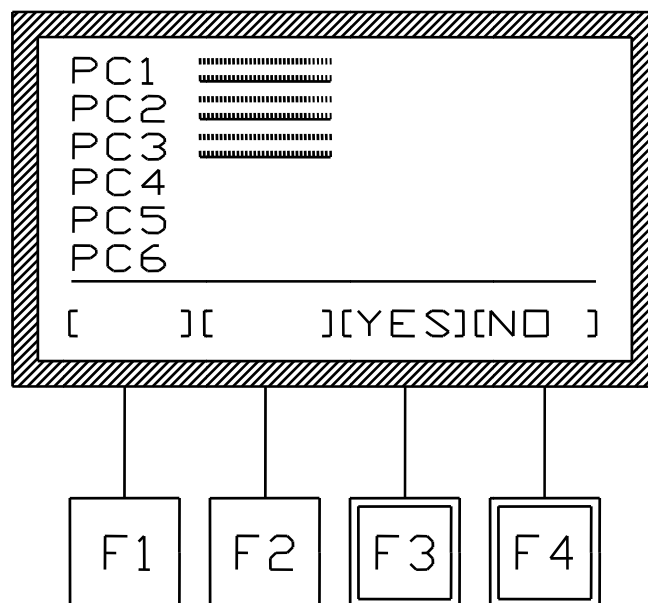
The following display shows the result of the self diagnosis for each cage; in our example, 3 cages are connected to the electronic unit.

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 aligned, 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 paragraph 8.6-Customer Support.

8 MAINTENANCE

While any service of the instrument is to be carried out by Ugo Basile personnel or by qualified personnel, authorized by UGO BASILE organization, this section of the instruc-



tion manuals describes normal maintenance procedures which can be carried out at the customer's facilities.



UNPLUG THE MAINS CORD BEFORE CARRYING OUT ANY MAINTENANCE JOB!

8.1 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, 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.

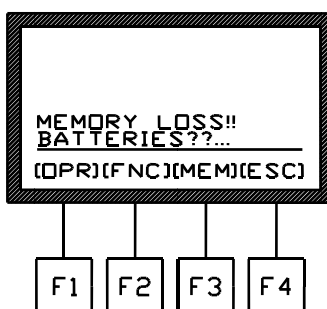
Having extracted the fuse slide, the Voltage selector becomes accessible. The same miniature screwdriver will help you to pry out the cross jumper on which the operation voltage is engraved. Place the jumper upside down if you have to shift from 115 to 230V or viceversa.

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

8.2 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.

8.3 Paper Loading

Changing the paper roll is a very simple business:

- a) The electronic unit must be “**ON**”.
- b) Open the lid by lifting it with your nail, acting on the front indentation.
- c) The roll is placed on the lodging rectangular space on the back of the mechanism.
- d) Insert the paper strip into the slot indicated by the arrow, see sketch below, after having scissored away the corner as the tip of an arrow.

Pay attention to the orientation of the roll.

If the roll is mounted in the reverse way, the thermal coating of the paper goes on the wrong side and no printing takes place.

There is no ambiguity on the way the roll sinks in its cubicle, because, when the paper emerges from the mechanism, the glossy side should be in front of you.

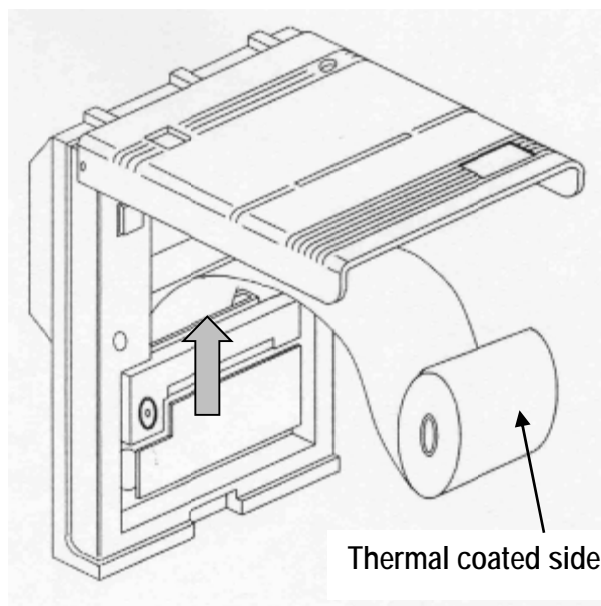


Figure 7 “Paper Loading”

- e) Hold the red key P1 depressed until the paper comes out, see Figure 3 “Printer Panel”.

8.3.1 Paper Roll

As replacement, you can order Cat. **2605** Package of 10 Heat-Sensitive Paper Rolls, see paragraph 9-ORDERING INFORMATION.

Replacement paper rolls can also be found on the local market. The printer manufacturer recommends:-

- Jujo Paper, type TP50KS-A
- Honshu Paper, type FH65B-X14N
- Mitsubishi Paper Mills, type F-2000U7N5



8.4 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.

8.5 Long Inactivity

The instrument does not require any particular maintenance after long inactivity, except cleaning, see paragraph 8.4.

We suggest to check the instrument performances, see paragraph 7-SELF-DIAGNOSIS.

8.6 Customer Support

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

**UGO BASILE S.R.L.**

Via Guido 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 get in touch with our service department (mentioning the serial number of your instrument) to obtain a return authorization number (R.A.N.) and shipping 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

9.1 Multiple Cage Set-Up

47420 **MULTIPLE ACTIVITY CAGE**, microprocessor controlled unit, standard package, complete with following parts:

7441 Microprocessor controlled Electronic Unit, for single cage operation

7433 Animal Cage, including transparent cage, lid, base with supporting rods, catch pan and connection cable

7435 Set of Horizontal Sensors (emitter/receiver), complete with connection cable

7436 Set of Vertical Sensors, (emitter/receiver), complete with connection cable

7439 Instruction Manual

37400-305 Package of 10 Heat-Sensitive Paper Rolls (*2 rolls are provided, see paragraph 8.3.1*)

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

52010 Win-DAS software package, version for Windows®

52010-320 USB to serial port converter

52010-322 Serial cable 9 to 9 pin

Set of 2 fuses for either 115 VAC or 230 VAC mains

Up to 5 additional cages, each with horizontal and/or vertical sensors can be added to complete the multiple set-up.

9.2 Specifications

Commands	: via “soft keys”
Read-out	: multifunction graphic display
Print-out	: by incorporated thermal printer
Starting	: via keyboard on the electronic unit
Connection to PC	: through DELTA 9-pin connector. See paragraph 2.
Power Requirement	: 115 or 230 V, 50/60 Hz, 20 W max.
Operating Temperature	: 15° to 30° C
Sound Level	: negligible
Dimensions	
- electronic unit	: cm 27 (w) x 16 (d) x 19 (h)
- assembled cage	: cm 54 (w) x 50 (d) x 37 (h)
Weight	
- electronic unit	: Kg 2,70



- assembled cage : Kg 11,80 (with sensors 7435/7436)
Shipping Weight : 26.00 Kg approx.
Packing Dimensions : 66 x 50 x 63 cm (for each cage)

10 BIBLIOGRAPHY

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- C. Ambrogini Lorenzini et alia: "**Spontaneous and Conditioned Behaviour of Wistar and Long Evans Rats**" *Arch. Ital. Biol.*, 125: 155-170, **1987**.



WIRING DIAGRAMS

7430-431ES01 sh 1 of 3	Wiring Diagram, <i>Controller (single cage)</i>
7430-431ES01 sh 2 of 3	Wiring Diagram, <i>Controller (single cage)</i>
7430-431ES01 sh 2 of 3	Wiring Diagram, <i>Controller (single cage)</i>
2600-600EL01 sh 1 of 3	Electronic List, <i>Controller</i>
2600-600EL01 sh 2 of 3	Electronic List, <i>Controller</i>
2600-600EL01 sh 3 of 3	Electronic List, <i>Controller</i>
7430-D01EL01	Electronic List, <i>Controller</i>
2600-600EL02	Display Circuit, <i>Controller</i>
7430-431EC01	Board Component Layout, <i>Controller (single cage)</i>
7430-431ES03	Wiring Diagram, <i>Controller (single cage)</i>
7430-431EL03	Electronic List, <i>Controller (single cage)</i>
7430-431EC03	Board Component Layout, <i>Controller (single cage)</i>
7430-431EA01	Board Interconnection Diagram, <i>Controller (single cage)</i>
7430-431EX02	Electronic List, External Components, <i>Controller (single cage)</i>
7430-431EW01	Cables and Connectors
7430-433EA01	Interconnection Diagram, <i>Animal Cage</i>
7430-435ES01	Wiring Diagram, <i>Horizontal Sensor Receiver</i>
7430-435EL01 sh 1 of 2	Electronic List, <i>Horizontal Sensor Receiver</i>
7430-435EL01 sh 1 of 2	Electronic List, <i>Horizontal Sensor Receiver</i>
7430-435EC01	Board Component Layout, <i>Horizontal Sensor Receiver</i>
7430-435ES02	Wiring Diagram, <i>Horizontal Sensor Emitter</i>
7430-435EL02 sh 1 of 2	Electronic List, <i>Horizontal Sensor Emitter</i>
7430-435EL02 sh 1 of 2	Electronic List, <i>Horizontal Sensor Emitter</i>
7430-435EC02	Board Component Layout, <i>Horizontal Sensor Emitter</i>
7430-435EX01	Electronic List, External Components, <i>Horizontal Sensor</i>
7430-436ES01	Wiring Diagram, <i>Vertical Sensor Receiver</i>
7430-436EL01 sh 1 of 2	Electronic List, <i>Vertical Sensor Receiver</i>
7430-436EL01 sh 1 of 2	Electronic List, <i>Vertical Sensor Receiver</i>
7430-436EC01	Board Component Layout, <i>Vertical Sensor Receiver</i>
7430-436ES02	Wiring Diagram, <i>Vertical Sensor Emitter</i>
7430-436EL02 sh 1 of 2	Electronic List, <i>Vertical Sensor Emitter</i>
7430-436EL02 sh 1 of 2	Electronic List, <i>Vertical Sensor Emitter</i>



7430-436EC02	Board Component Layout, <i>Vertical Sensor Emitter</i>
7430-436EX01	Electronic List, External Components, <i>Vertical Sensor</i>
7440-441ES01 sh 1 of 3	Wiring Diagram, <i>Controller (six cage)</i>
7440-441ES01 sh 2 of 3	Wiring Diagram, <i>Controller (six cage)</i>
7440-441ES01 sh 2 of 3	Wiring Diagram, <i>Controller (six cage)</i>
7440-441EC01	Board Component Layout, <i>Controller (six cage)</i>
7440-441ES03	Wiring Diagram, <i>Controller (six cage)</i>
7440-441EL03	Electronic List, <i>Controller (six cage)</i>
7440-441EC03	Board Component Layout, <i>Controller (six cage)</i>
7440-441EW01	Cables and Connectors
7440-441EA01	Board Interconnection Diagram, <i>Controller (six cage)</i>
7440-441EL02 sh 1 of 2	Electronic List, External Components, <i>Controller (six cage)</i>
7440-441EL02 sh 1 of 2	Electronic List, External Components, <i>Controller (six cage)</i>
7440-440EF02	Block Diagram

WIRING DIAGRAMS ARE NOT INCLUDED IN THE MANUAL, BUT ARE AVAILABLE ON REQUEST.

PLEASE ADDRESS TO OUR AFTER SALES SERVICE, SEE ALSO PARAGRAPH 8.6-Customer Support

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Notes

This image shows a full page of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page, providing a template for handwriting practice or general writing. There are no margins, text, or other markings on the page.



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CE CONFORMITY STATEMENT

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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

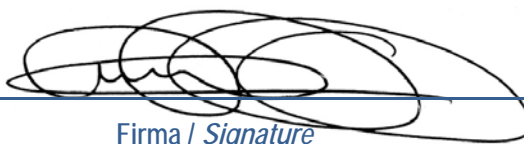
Account Manager

Mauro Uboldi

Nome / Name

October 2018

Date



Firma / Signature