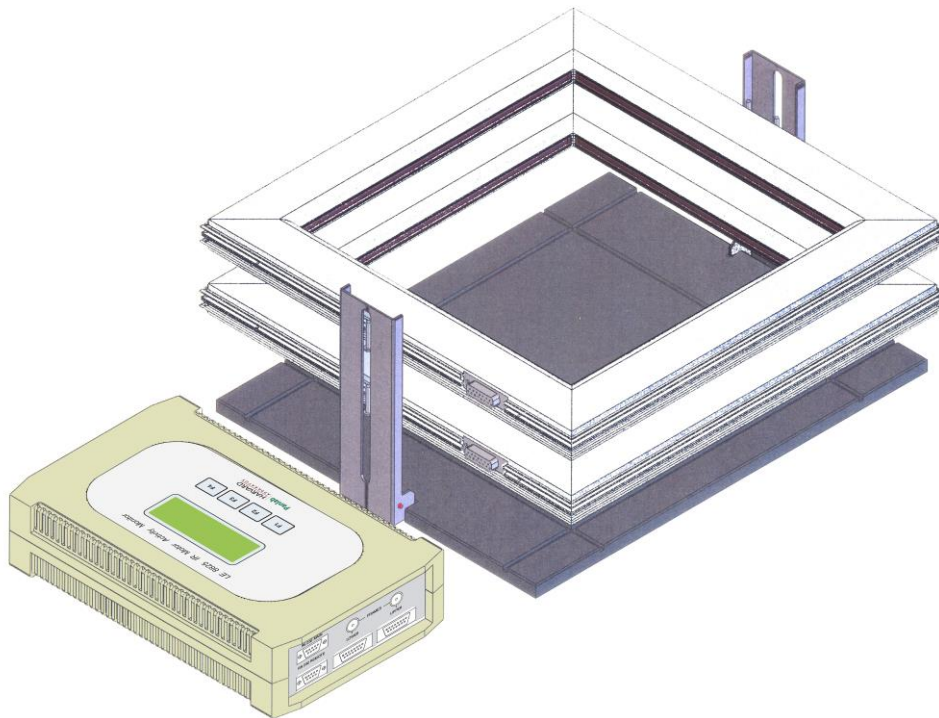


# Hardware User's Manual

---

## Data Logger

IR Actimeter



### References:

LE8825 (76-0134), LE8815 (76-0127), LE8816 (76-0128), LE8817 (76-0131),  
LE8818 (76-0132), LE8820 (76-0133)

### Publication:

PB-MF-MAN-059-REV1.1

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#### Limitation of Liability

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


Some symbols may have more than one interpretation by professionals unaccustomed to their usage.

PANLAB reserves the right to modify, in part or in total, the contents of this document without notice.

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## 1. SYMBOLS TABLE

Recognising the symbols used in the manual will help to understand their meaning:

DESCRIPTION	SYMBOL
Warning about operations that must not be done because they can damage the equipment	
Warning about operations that must be done, otherwise the user can be exposed to a hazard.	
Protection terminal ground connection.	
Warning about a hot surface which temperature may exceed 65°C	
Warning about a metal surface that can supply electrical shock when it's touched.	
Decontamination of equipments prior to disposal at the end of their operative life	
Waste Electrical and Electronic Equipment Directive (WEEE)	

## 2. GOOD LABORATORY PRACTICE

Check all units periodically and after periods of storage to ensure they are still fit for purpose. Investigate all failures which may indicate a need for service or repair.

Good laboratory practice recommends that the unit be periodically serviced to ensure the unit is suitable for purpose. You must follow preventive maintenance instructions. In case equipment has to be serviced you can arrange this through your distributor. Prior to Inspection, Servicing, Repair or Return of Laboratory Equipment the unit must be cleaned and decontaminated.



### Decontamination prior to equipment disposal

In use this product may have been in contact with bio hazardous materials and might therefore carry infectious material. Before disposal the unit and accessories should all be thoroughly decontaminated according to your local environmental safety laws

### 3. UNPACKING AND EQUIPMENT INSTALLATION

---



**WARNING:** Failure to follow the instructions in this section may cause equipment faults or injury to the user.


- A. No special equipment is required for lifting but you should consult your local regulations for safe handling and lifting of the equipment.
- B. Inspect the instrument for any signs of damage caused during transit. If any damage is discovered, do not use the instrument and report the problem to your supplier.
- C. Ensure all transport locks are removed before use. The original packing has been especially designed to protect the instrument during transportation. It is therefore recommended to keep the original carton with its foam parts and accessories box for re-use in case of future shipments. Warranty claims are void if improper packing results in damage during transport.
- D. Place the equipment on a flat surface and leave at least 10 cm of free space between the rear panel of the device and the wall. Never place the equipment in zones with vibration or direct sunlight.
- E. Once the equipment is installed in the final place, the main power switch must be easily accessible.
- F. Only use power cords that have been supplied with the equipment. In case that you have to replace them, the spare ones must have the same specs that the original ones.



- G. Make sure that the AC voltage in the electrical network is the same as the voltage selected in the equipment. **Never connect the equipment to a power outlet with voltage outside these limits.**



**WARNING**

For electrical safety reasons you only can connect equipment to power outlets provided with earth connections .

This equipment can be used in installations with category II over-voltage according to the General Safety Rules.

The manufacturer accepts no responsibility for improper use of the equipment or the consequences of use other than that for which it has been designed.

### PC Control



Some of these instruments are designed to be controlled from a PC. To preserve the integrity of the equipment it is essential that the attached PC itself conforms to basic safety and EMC standards and is set up in accordance with the manufacturers' instructions. If in doubt consult the information that came with your PC. In common with all computer operation the following safety precautions are advised.

- WARNING**
- To reduce the chance of eye strain, set up the PC display with the correct viewing position, free from glare and with appropriate brightness and contrast settings
  - To reduce the chance of physical strain, set up the PC display, keyboard and mouse with correct ergonomic positioning, according to your local safety guidelines.

## 4. MAINTENANCE

---



**WARNING:** Failure to follow the instructions in this section may cause equipment fault.

- **PRESS KEYS SOFTLY** – Lightly pressing the keys is sufficient to activate them.
- Equipments do not require being disinfected, but cleaned for removing urine, faeces and odour. To do so, we recommend using a wet cloth or paper with soap (which has no strong odour). **NEVER USE ABRASIVE PRODUCTS OR DISSOLVENTS.**
- **NEVER** pour water or liquids on the equipment.
- Once you have finished using the equipment turn it off with the main switch. Clean and check the equipment so that it is in optimal condition for its next use.
- The user is only authorised to replace fuses with the specified type when necessary.

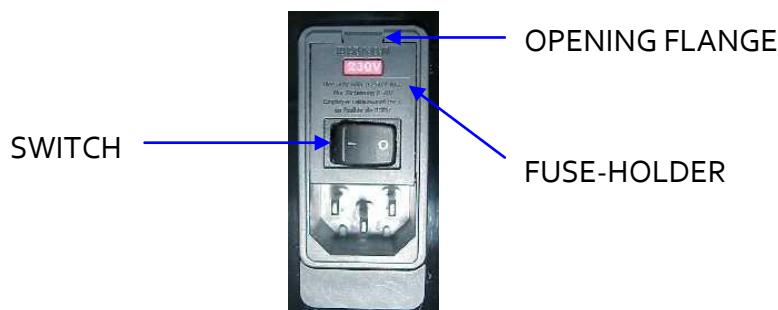


Figure 1. Power inlet, main switch and fuse holder.

### FUSE REPLACEMENT OR VOLTAGE SETTING CHANGE

In case of an over-voltage or other incident in the AC net making it impossible to turn on the equipment, or if the equipment voltage setting is incorrect, check fuses according to the following procedure.

- 1 Remove power cord from the power inlet.

- 2 Open fuse-holder by pulling the flange with a regular screwdriver.

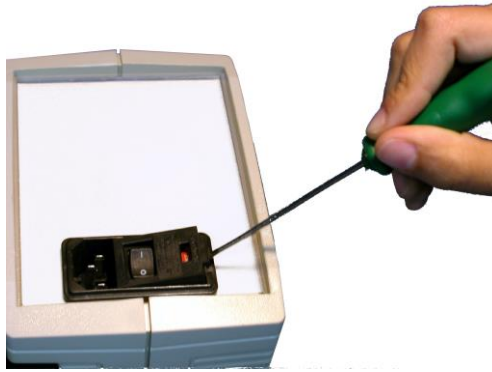


Figure 2. Open fuse-holder door.

- 3 Extract fuse holder using the screwdriver.

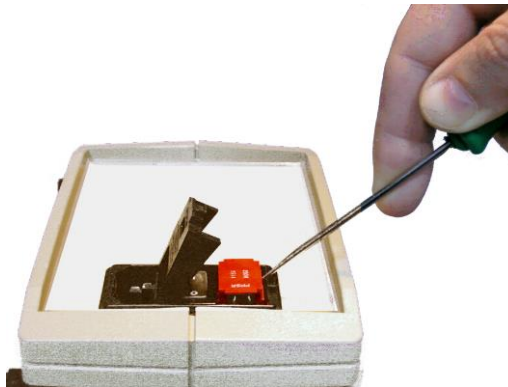


Figure 3. Extract fuse-holder.

- 4 Replace fuses if necessary. Insert fuses in the fuse-holder in the correct position.



CORRECT



INCORRECT

Figure 4. Fuses position.

- 5 Insert the fuse-holder again, positioning it according to the voltage in the AC net.



115V POSITON



230V POSITION

Figure 5 Fuse holder position.

- 6 If the fuses blow again, unplug the equipment and contact technical service.



**For electrical safety reasons, never open the equipment. The power supply has dangerous voltage levels.**

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## 6. INTRODUCTION

---

The LE 8825 system is used to measure motor activity in experimentation with animals. It is based on a grid of infrared cells, that make it possible to determine the magnitude of motor activity by analysis of the position and frequency with which the experimental animal breaks the infrared beams.

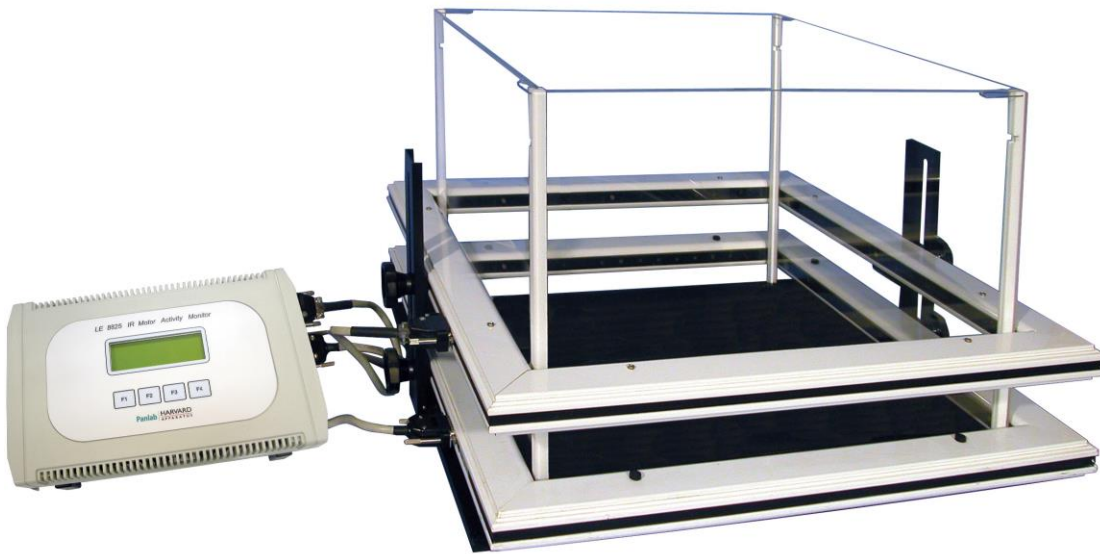


Figure 6. LE 8825 system.

The system is comprised of the following parts:

	RAT	MOUSE
IR FRAME	LE 8815	LE 8816
FRAME SUPPORT	LE 8817	LE 8818
DATA LOGGER	LE 8825	
HOLE BOARD	LE 8820	
ARENA	LE 8814	LE 8813
ARENA FOR 2 SUBJECTS	LE 8821	LE 8823

With the following possible combinations:

- 1 FRAME
- 1 FRAME & HOLE BOARD
- 1 HOLE BOARD
- 2 HOLE BOARDS

The IR FRAME configures the detection unit where the experimental subjects are placed and consists of a 45x45 cm frame (RAT) or 25x25 cm frame (MOUSE) containing a total of 16x16 infrared beams at an interval of 2.5 cm (RAT) or 1.5 cm (MOUSE), located on the sides (there are a total of 32 cells in each frame).

The FRAMES are held in place by the FRAME SUPPORT. This component facilitates adjustment to the required height depending on the type of activity being recorded.

The CONTROL UNIT or DATA LOGGER can control two FRAMES independently. It is designed to let the researcher configure parameters and functions definable in an experiment, analyse the data generated by the breaks of the infrared beams, accumulate results and visualize them in the display, or send them to the PC via RS-232 communication for viewing and subsequent analysis by means of the **Sedacom** program (not included, should be purchased separately). The data can even be processed as trajectory (tracking) using the ACTITRACK program (not included, should be purchased separately).

The HOLE-BOARD is an accessory that lets the user measure the animal's "curiosity" shown by how often it pries into the holes. It uses a frame to measure the number of times the animal puts its head into the holes. Another frame may be used simultaneously to measure deambulatory movement.

## 7. EQUIPMENT DESCRIPTION

### 7.1. CONTROL UNIT KEYBOARD

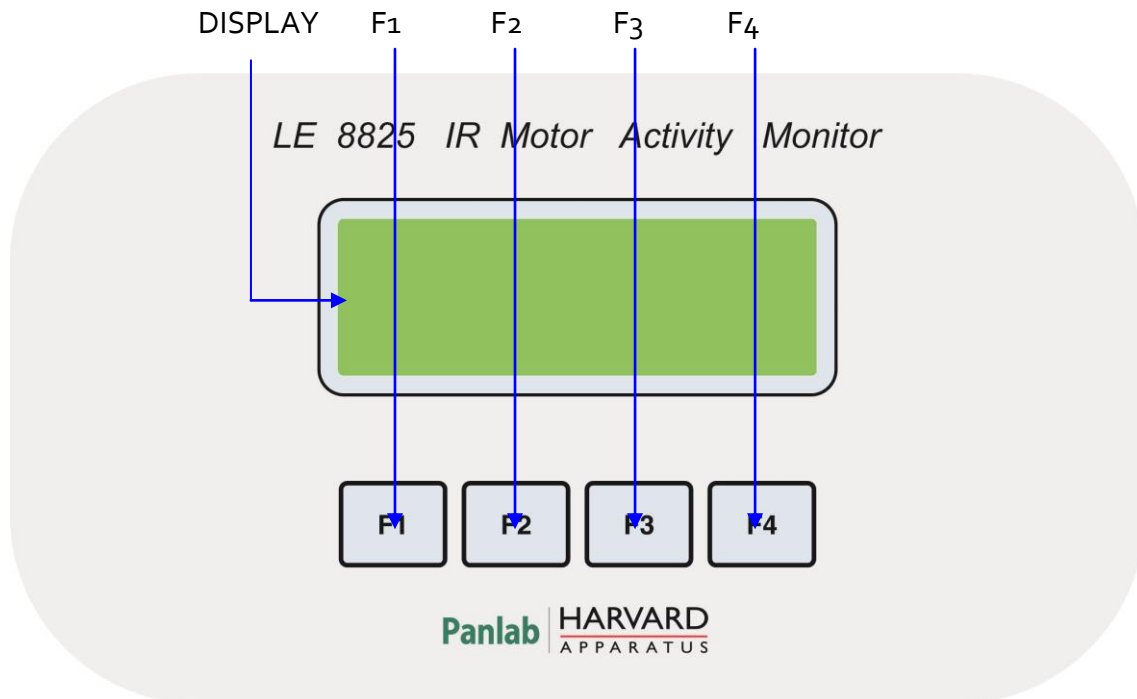


Figure 7. Control unit keyboard.

- **DISPLAY:** Display with 4 rows and 20 columns of characters. It is used to show menus, IR frame tests and data recorded during experiments.
- **F1, F2, F3 and F4:** Function buttons. The function of these buttons can change depending on the menu. There is always a label on the display close to the button that informs as to the current function of the respective button.

## 7.2. CONTROL UNIT FRONT PANEL

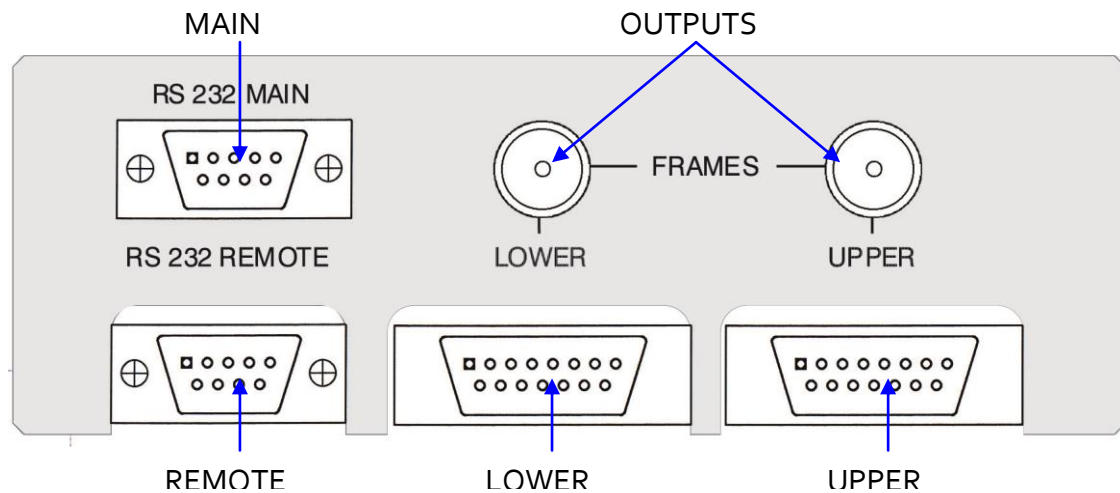


Figure 8. Control unit front panel.

- **MAIN:** DB9 female connector. When several control units are connected to a computer, the MAIN connector of the first control unit is connected to the computer serial port, and the MAIN connector of each unit is connected to the REMOTE port of the previous control unit.
- **REMOTE:** DB9 male connector. When several control units are connected to a computer, the REMOTE connector of each control unit is connected to the MAIN connector of the next control unit, and the REMOTE connector of the last control unit is left free.
- **OUTPUTS:** Two BNC connectors, one for each activity frame (upper and lower). Each time an IR beam is cut in the frame, a 12.5 ms TTL pulse is given in the respective output.
- **LOWER:** DB15 female connector used to connect the lower IR frame to the control unit.
- **UPPER:** DB15 female connector used to connect the upper IR frame to the control unit.

### 7.3. CONTROL UNIT REAR PANEL

---

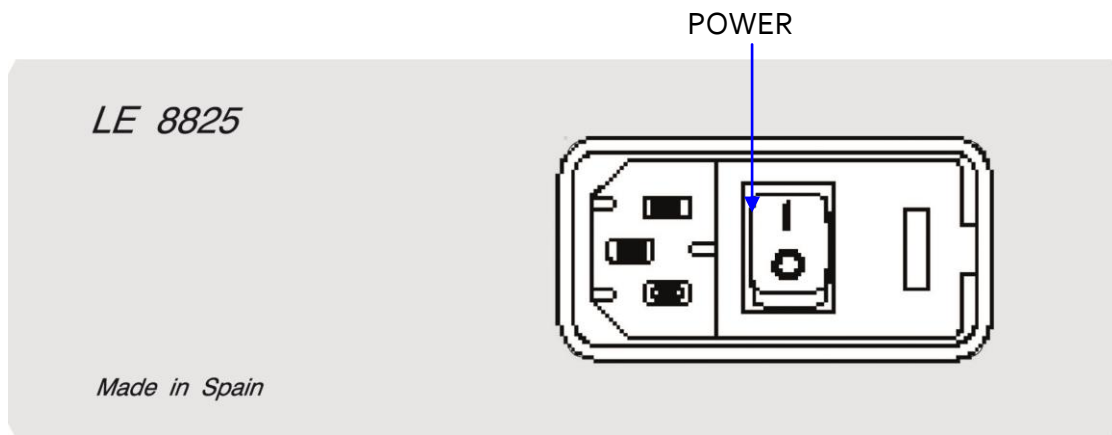


Figure 9. Control unit rear panel.

- **POWER:** Main switch, power inlet and fuse holder.

#### 7.4. ACTIVITY FRAMES

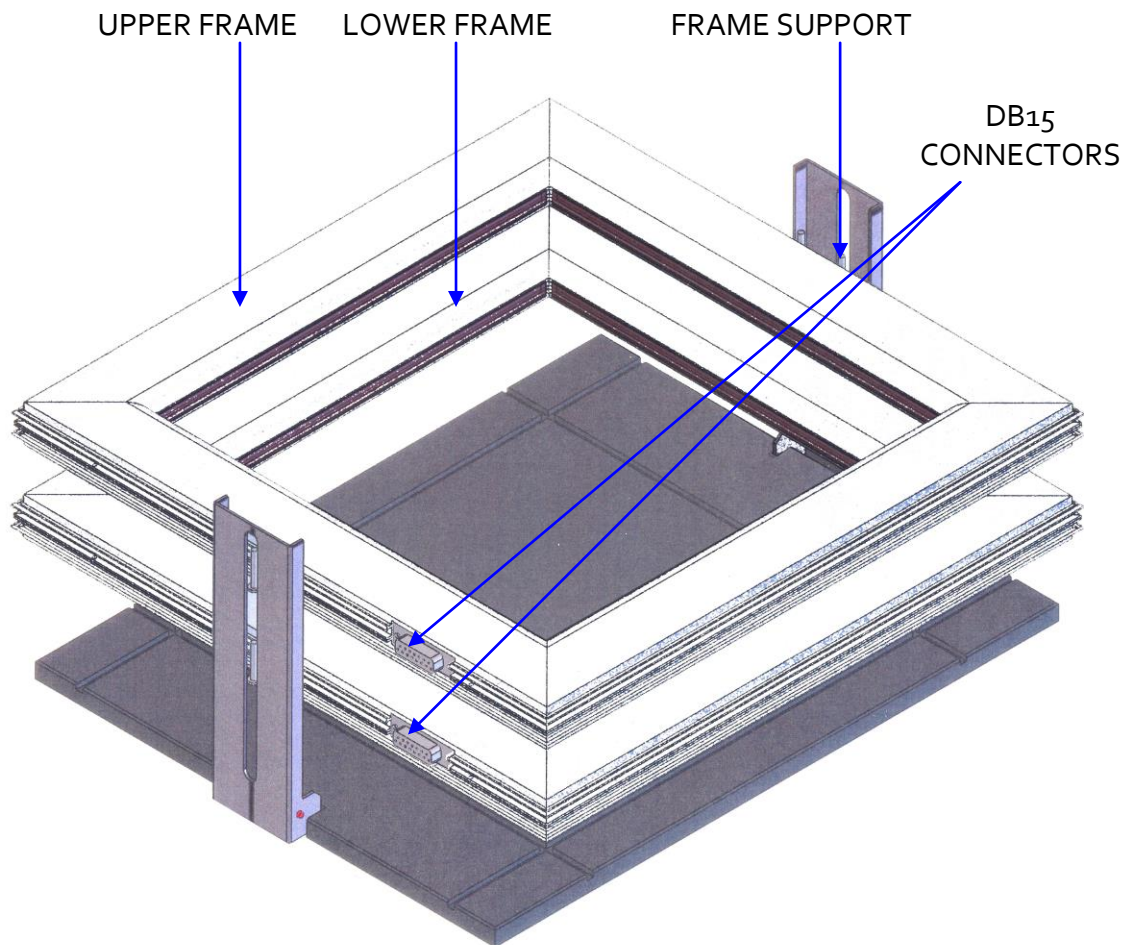


Figure 10. Mouse activity frames.

Figure 10 shows mouse activity frames, but all of the same elements are also present in rat activity frames. The only difference is that the rat frames are larger.

The frames are placed in the frame support, which has two guides to align the frames that are fixed to the guides by two large, black plastic screws. These two guides can turn from a vertical to a horizontal position to reduce space when the frames support is not in use.

Frames have 16 IR beams in an X axis and 16 IR beams in a Y axis. The frames have a DB15 connector to connect them to the control unit (connectors labelled UPPER and LOWER).

A transparent arena is also available. It makes it possible add walls to the area inside frames to prevent animals from escaping, and divide the area into four smaller parts, to work with two animals at the same time.

## 8. EQUIPMENT CONNECTION

The necessary connections are shown in the following schematic:

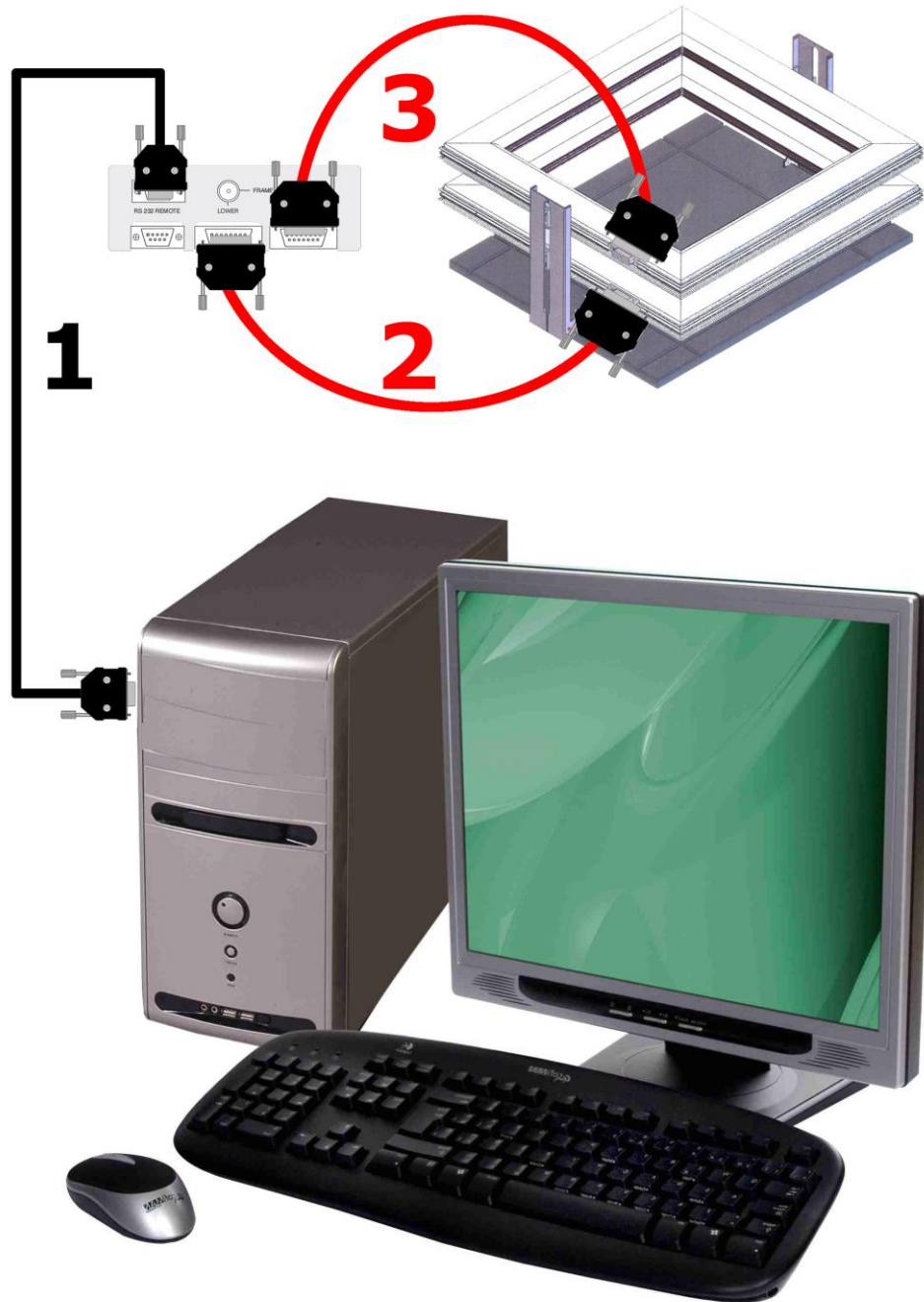


Figure 11. Equipment connection.

The necessary cables and connections are listed in the following table:

	FROM	TO	CABLE
1	LE 8825 MAIN	PC Serial port	DB9 Cable
2	LE 8825 LOWER	Lower Frame	DB15 Cable
3	LE 8825 UPPER	Upper Frame	DB15 Cable



A computer is able to control up to 16 control units connected in series, but the following rules must be respected when connecting more than one control unit to the same computer.

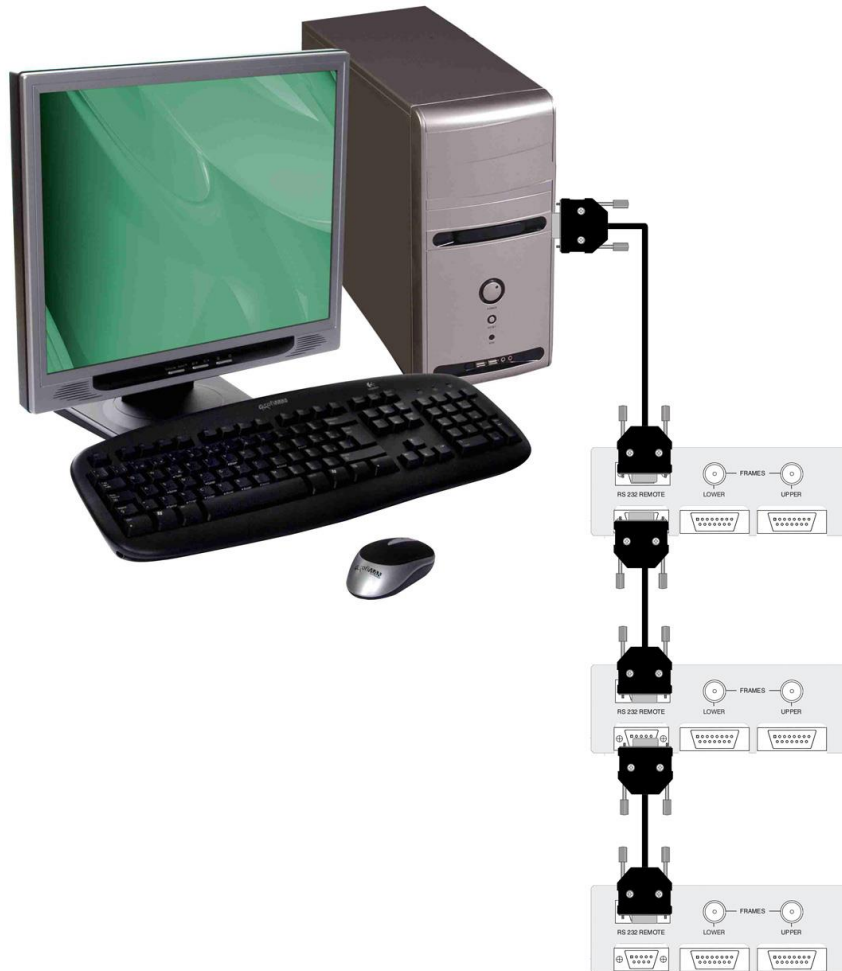


Figure 12. Example of a 3 control units connection.

- All units must have different IDs so that the computer can identify them.
- It is not necessary for all ID numbers to be correlative. For example, it is as correct to work with cages 1, 2 and 3 as it is to work with cages 1, 5 and 7.
- It is not necessary for cages to be physically located in the order of their ID numbers. For example it will be correct to work with cages 1-2-3, 1-3-2, 2-1-3, 2-3-1, 3-1-2 or 3-2-1.
- The computer serial port is always connected to the MAIN port of the first control unit.
- The REMOTE port of each control unit is always connected to the MAIN port of the next control unit.
- The REMOTE port of the last control unit is left free.

## 9. INSTALLATION

---

### 9.1. ASSEMBLING THE FRAMES

---

The Detection Unit consists of one or two height-adjustable frames that should be installed in the support provided for this purpose. Height is adjusted using the fixing screws located on the sides of each frame.

The FRAMES are equipped with 32 transmitters and 32 receivers, all of which are aligned with each other. The transmitters / receivers are split into groups of 16 along each one of the axes (x, y). The frames are functionally identical, and may be installed anywhere on the support, regardless of which one is used as the upper or lower frame.

If two FRAMES are used, the lower one will provide information on deambulatory movement, while the upper one will supply information on rearings (assuming that the second frame is installed at a height which prevents it from being triggered by the deambulatory movements).

Alternatively, the frames may be installed separately, in which case each one may accumulate deambulatory movement information, although the DATA LOGGER may be the same, since it monitors up to two FRAMES simultaneously.

## 10. STARTING UP THE UNIT

---

The activity monitor may be used in two different work modes, each of which has its own specific characteristics.

- AUTONOMOUSLY. In this mode, the operating parameters of each detection unit will be programmed directly through the control unit. The computer only receives the data stored in each control unit and displays them on the control unit display, or in a computer via the **Sedacom** software.
- PROGRAMMING FROM THE COMPUTER. The user has the option of “centralising” the configuration of each control unit from the PC. This work mode is particularly useful if the experiment entails collecting data on several detection units: the experimenter will not have to configure each one of the control units directly. This operating mode works with both programs: **Sedacom** and ACTI-TRACK (both allows the simultaneous control of up to 16 activity monitors).

At this point it should be made clear that while detection units will work in the same way using both options (autonomously and centrally programmed from the computer), they do not generally generate the same results. This will now be discussed in greater depth.

### 10.1. FRAME POSITION

---

The LE 8825 actimeter allows two work modes:

#### SUPERIMPOSED FRAMES

This is the usual working mode. The experimenter will be able to measure activity (using the lower frame) and rearings (using the upper frame).

#### SEPARATE FRAMES

The upper frame can be disassembled, separated and used as a second actimeter, but it should be noted that no information will be obtained on possible rearings.

## 11. CONTROL UNIT MENU

---

After powering up the Control Unit, and following the parameter check, the program's main screen will appear:

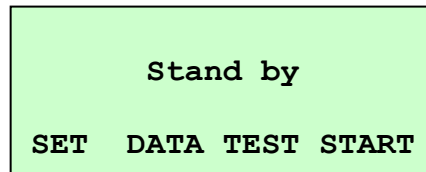


Figure 13. Control unit main screen.

The four programmable sections will appear:

1. **SET:** Configuration of the actimeter parameters.
2. **DATA:** Information on the experiments.
3. **TEST:** Checks the frames.
4. **START:** Beginning of an experiment.

The layout of buttons F<sub>1</sub>, F<sub>2</sub>, F<sub>3</sub> and F<sub>4</sub> has been conceived to match the instruction on screen that is at the same height as each one: in this case F<sub>1</sub> will be used to access the SET menu, F<sub>2</sub> to access DATA, F<sub>3</sub> to access TEST and F<sub>4</sub> to access START.

In the course of these instructions, whenever an instruction is referred to, it will be assumed that the associated key will be the one used, and vice-versa.

## 11.1. SET-UP MENU

This section contains all the information necessary to program the variables needed to define the Actimeter's work parameters. To scroll through all the variables one by one until finding the one to define, simply press **[+]** to scroll forward or **[-]** to go back through the menu. Once the desired option is found, press **[ENT]** to access the option:

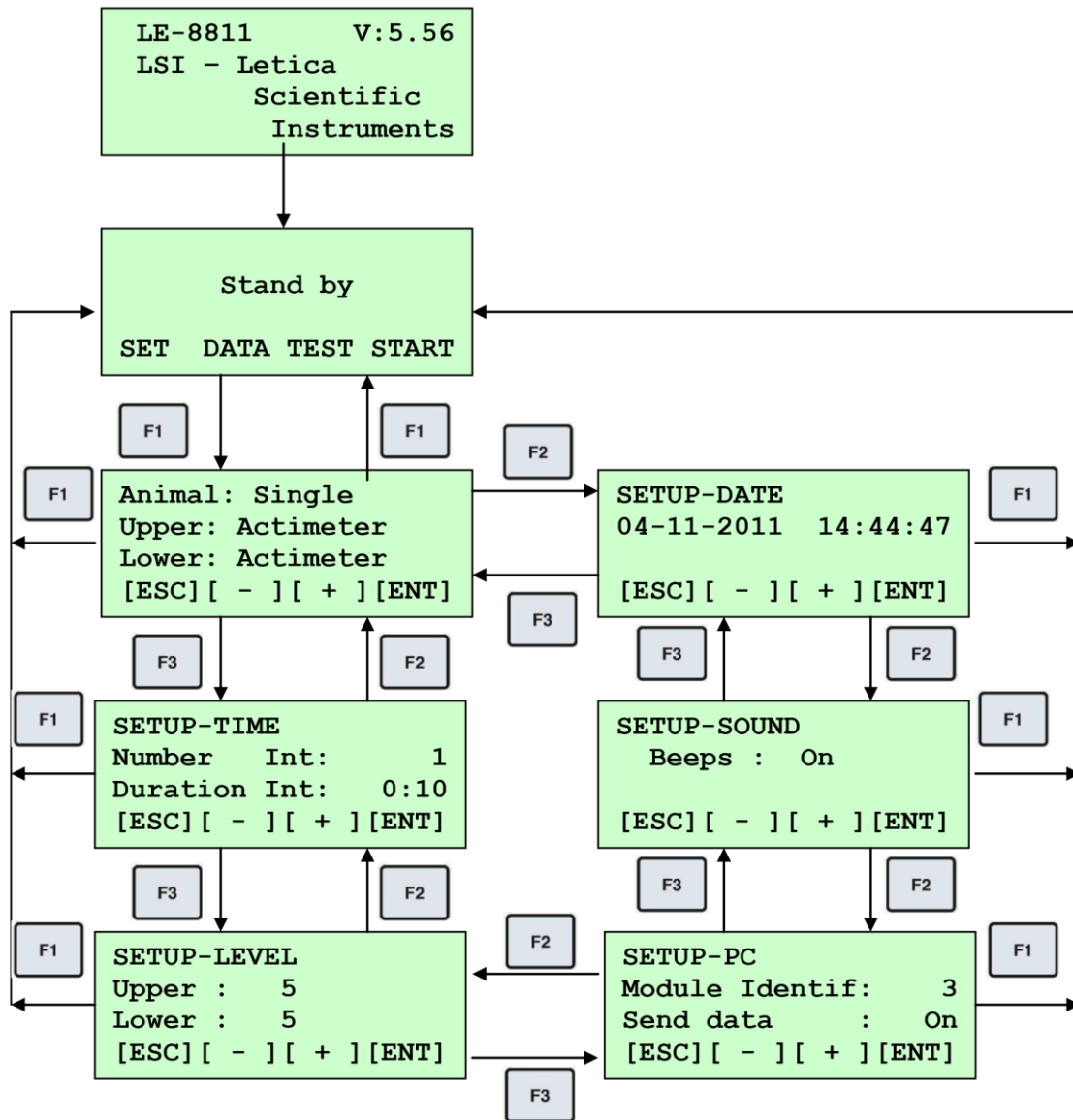


Figure 14. Setup menu screens.

As already explained, since the parameter is placed between square brackets, this screen is the one with which it can be modified. The F1, F2, F3 and F4 function keys will carry out different operations. These functions will now be discussed in greater detail.

- F1 [ESC] Return to the main screen.
- F2 [-] Go to the previous screen. If F4 is pressed before, it modifies the value. The value will decrease by one unit whenever the button is pressed.
- F3 [+] Go to the next screen. If F4 is pressed before, it modifies the value. The value will increase by one unit whenever the button is pressed.
- F4 [ENT] Activate the parameter to be modified. When the identification value is believed correct, press this key to store it and go back to the previous screen which, as already explained, provides access to other parts of the menu.

#### **11.1.1. MODE**

Press [ENT] and use [+] to go through the different possible values for the parameter, and [ENT] to accept the choice and go to the next one.

```
Animal: Single
Upper: Actimeter
Lower: Actimeter
[ESC] [ - ] [ + ] [ENT]
```

Figure 15. Mode screen.

A parameter value will be displayed between square brackets [ ] while being edited until it is validated.

- ANIMAL: choose between working with one [SINGLE] or [SEVERAL] animals.
- UPPER: choose the mode desired for the upper Frame to work in. It may work as an actimeter [ACTIMETER], for rearings [REARING], a hole board [HOLE BOARD] or be inactive [OFF]
- LOWER: choose the mode desired for the lower Frame to work in. The same functions as for the UPPER frame are available.

Once the values of each parameter have been selected, press [ENT] to conclude the configuration of the parameters and return to the previous parameter. You may press [ESC] to exit the menu you are in and go back to the previous one at any point.

### 11.1.2. SETUP TIME

```

SETUP-TIME
Number   Int:      1
Duration Int:    0:10
[ESC] [ - ] [ + ] [ENT]

```

Figure 16. Set up Time screen.

An INTERVAL is the length of time during which the data will be accumulated in the relevant COUNTERS. The user may access this screen to decide the duration of the data accumulation interval, i.e. the period during which motor activity counts should be accumulated in the respective counters (for each zone, fast or slow movements). When the accumulation interval is complete, the data is transferred to the control unit memory (and sent via the RS232 port if thus established by the respective parameter), the counters are reset again and a new interval starts. This process is repeated the number of times set in the "Number of intervals" parameter. The minimum duration of the interval is 10 seconds, and the maximum is 59 min : 59 secs. The operating mode is similar to the one explained previously. Thus, press F4 [ENT] to go to the next screen where the value can be modified. Press F1 [ESC] to return to the previous screen.

Press F2 [-] or F3 [+] in succession to modify this interval. Once the desired interval is achieved, press F4 [ENT] to store the value displayed.

- **NUMBER OF INTERVALS**

Up to 200 intervals may be defined. Therefore, the experimenter may ascertain the duration of the experiment by multiplying the number of intervals by each of their duration.

The maximum work time is  $(200) * (59:59) = 199:56:40$  i.e around 8.5 days.

- **DURATION INTERVALS**

This value stands for the duration of each interval. It can be set from 10 seconds up to 59 min 59 sec in steps of 1 second, by pressing the [+] and [-] keys.

### 11.1.3. SETUP LEVEL

```

SETUP-LEVEL
Upper :    5
Lower :    5
[ESC] [ - ] [ + ] [ENT]
  
```

Figure 17. Set up Level screen.

The LE 8825 activity monitor can detect between 2 and 100 breaks in each one of the photocells per minute. Therefore, these are the margins the experimenter will have to define as the value they deem appropriate for the threshold between fast or slow movements. A distinction should be made between counts made by the actimeter depending on whether there is one or several animals:

- UPPER: Is the threshold for the upper frame
- LOWER: Is the threshold for the lower frame

- **FOR SEVERAL animals:**

Two counters are used: SM (SLOW MOVEMENTS) and FM (FAST MOVEMENTS). It measures the activity of several animals at the same time, regardless of their position. Each movement is logged on the SM or FM counter depending on the speed at which the movement was made. A discrimination threshold (SETUP LEVEL), ranging from 1 (maximum speed) to 15 (minimum speed) should be established beforehand:

LEVEL	SPEED (cm/s)
1	100
2	50
3	33.3
4	20
5	15
6	10
7	7.5
8	5
9	3.33
10	2.5
11	2
12	1.5
13	1
14	0.75
15	0.5

- **FOR ONE ANIMAL:**

In this case, a distinction is made between the deambulatory movements described above (SLOW and FAST Movements) and stereotyped movements (rocking in the same position – Fast and Slow Stereotypic, FS – SS), which will be counted according to the speed of the movement and a constant pre-set threshold.



#### 11.1.4. SETUP-PC

```

SETUP-PC
Module Identif:    3
Send data         :  On
[ESC] [ - ] [ + ] [ENT]
    
```

Figure 18. Set up PC screen.

When activated (ON), information is relayed to the computer and displayed immediately on the monitor whenever an interval is completed.

#### MODULE ID(ENTIFICATION)

This menu is needed to configure the LE 8825 system when more than one control unit is active and connected to the computer. In this case, each control unit must have an associated identification number (ID) that distinguishes it from the rest. The experimenter can use up to 16 numbers for this purpose. Obviously, the experimenter should ensure that each control unit has a different ID. By default, all control units will have the number 1 associated.



**WARNING:** If two or more control units have the same number associated, the computer program will not alert users to this, nor will any indication appear on the central unit display. Experimenters must remember that the system will not work properly in these conditions.

#### SEND DATA

This menu option allows you to transfer all the available information into the control unit's memory, using the RS 232 communication port. To proceed, the information reception unit (a PC) must be connected to the control unit and the **Sedacom** communication program, supplied with the motor activity monitor, should be running.



**WARNING:** If **Send Data** is set to ON, and RS-232 cable is not connected between computer serial port and control unit, as soon as you press [START] to begin an experiment, control unit will be blocked and you must re stat it. To prevent this happens set the parameter to OFF or connect the RS-232 cable.

#### 11.1.5. SETUP SOUND

```
SETUP-SOUND
Beeps : On

[ESC] [ - ] [ + ] [ENT]
```

Figure 19. Set up Sound screen.

You can enable/disable the BEEP by setting this parameter to ON or OFF.

#### 11.1.6. DATE AND TIME

```
SETUP-DATE
04-11-2011 14:44:47

[ESC] [ - ] [ + ] [ENT]
```

Figure 20. Set up Date screen.

A date and time will appear, which may be modified (except for the seconds) by pressing F<sub>4</sub> (ENT) and then F<sub>3</sub> (+) or F<sub>2</sub> (-).

## 11.2. DATA

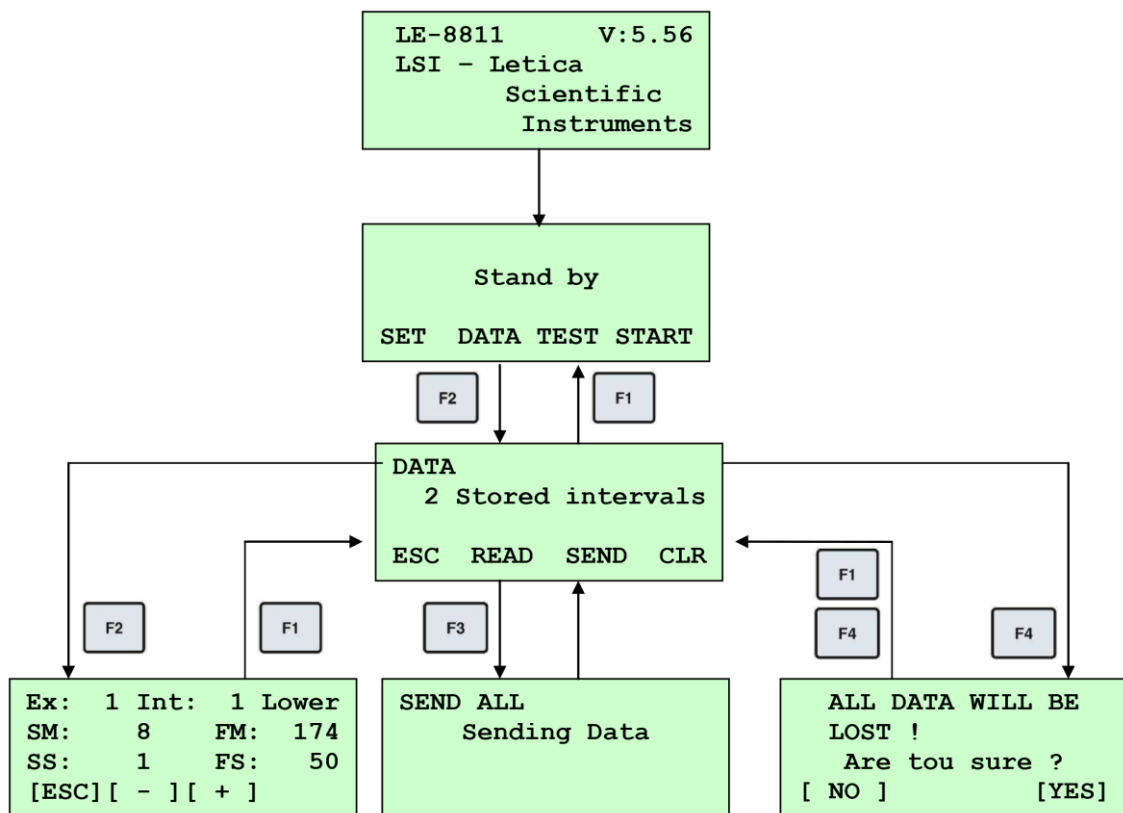


Figure 21. Screens of DATA menu.

Pressing the DATA button on the main screen will access the screen shown in . The second line contains the number of stored intervals. The buttons have the following functions:

### 11.2.1. ESC

Press this button to return to the main screen.

### 11.2.2. READ

Press this button to access the saved data from the experiments.

```

Ex:  1 Int:  1 Lower
SM:   8      FM: 174
SS:   1      FS:  50
[ESC] [ - ] [ + ]
  
```

Figure 22. Example of DATA screen.

The information that appears is:

<b>Ex: 1</b>	[EXPERIMENT]	The number of the experiment, in this example 1.
<b>Int:1</b>	[INTERVAL]	The number of the interval, in this example 1.
<b>Lower</b>	[LOWER]	The frame, which can be Upper or Lower
<b>SM</b>	[SLOW MOVEMENTS]	Slow movements, number of displacements below the threshold.
<b>FM:</b>	[FAST MOVEMENTS]	Fast movements, number of displacements above the threshold
<b>SS</b>	[SLOW STEREOTYPED MOVEMENTS]	Slow stereotype, number of movements without displacement below the threshold. Frame in Actimeter mode
<b>FS:</b>	[FAST STEREOTYPED MOVEMENTS]	Fast stereotype, number of movements without displacement above the threshold. Frame in Actimeter mode
<b>SH:</b>	[SLOW HOLES]	Slow hole, number of times that the mouse places its head in the Hole Board below the threshold. Frame in Hole Board mode
<b>FH:</b>	[FAST HOLES]	Fast hole, number of times that the mouse places its head in the Hole Board above the threshold. Frame in Hole Board mode
<b>SR:</b>	[SLOW REARING]	Slow rearing, number of times the animal stands up below the threshold. Frame in Rearing mode.
<b>FR:</b>	[FAST REARING]	Fast rearing, number of times the animal stands up above the threshold. Frame in Rearing mode.
<b>[ESC]</b>	[ESCAPE]	Returns to the previous screen.
<b>[ - ]</b>		Moves to the previous saved data.
<b>[ + ]</b>		Moves to the next saved data.

### 11.2.3. SEND

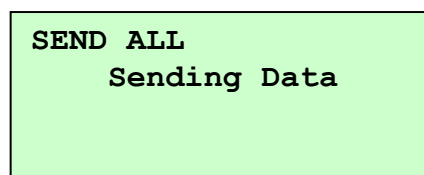
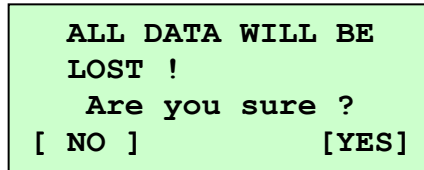


Figure 23. Send Data screen.

Sends data to the PC (to the **Sedacom** software) via the RS-232 communications port.

#### **11.2.4. CLR**

Clears all data saved in the memory of the Control Unit. Pressing CLR produces the following screen:



**ALL DATA WILL BE  
LOST !  
Are you sure ?  
[ NO ]                      [YES]**

**Figure 24. Clear Data screen.**

Press NO to return to the DATA screen. Press YES to erase the data saved in the Control Unit memory.

### 11.3. TEST

Use TEST to check the operation of the photocells. An asterisk (\*) indicates that the beam is being broken by an opaque body. A dash (-) indicates that the beam is reaching the receiver. Pressing TEST produces a screen like this:

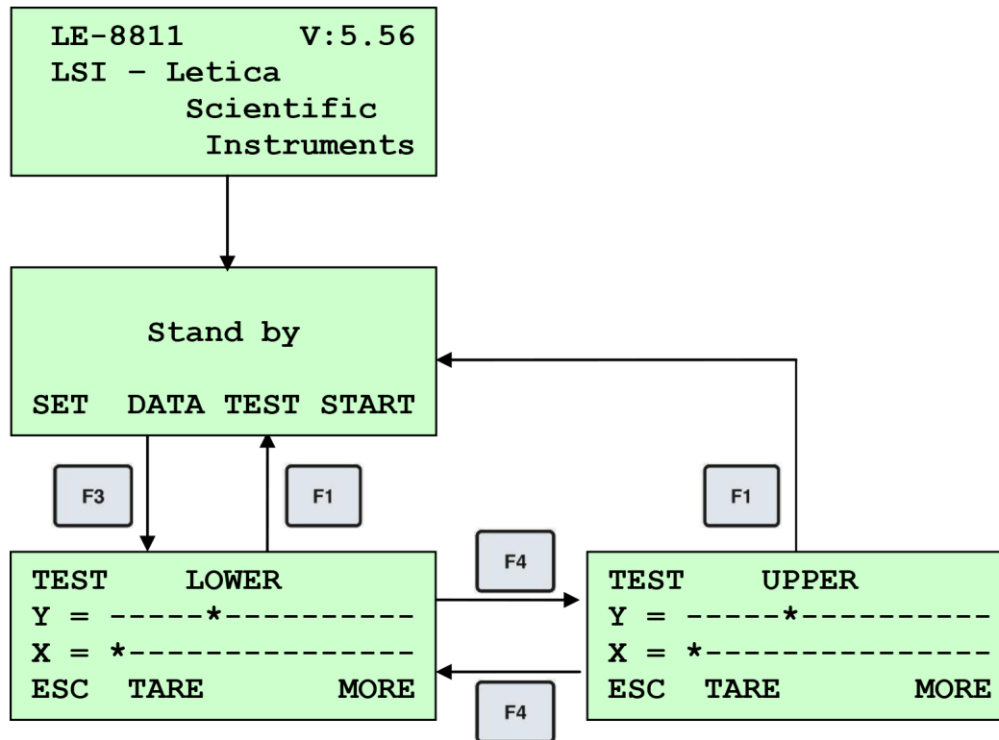


Figure 25. Test screen.

<b>UPPER</b>	[UPPER]	Is the selected frame, in this case the Upper one. Toggle between frames by pressing the MORE button.
<b>Y</b>		Is the Y axis. * indicates a cut beam, - indicates an uncut beam
<b>X</b>		Is the X axis. * indicates a cut beam, - indicates an uncut beam.
<b>ESC</b>	[ESCAPE]	Returns to the main screen.
<b>TARE</b>	[TARE]	If a beam is failing, skip it by pressing TARE. The control unit will ignore this cell.
<b>MORE</b>	[MORE]	This button toggles between the Upper and Lower frames.

#### 11.4. START

Pressing this button starts an experiment.

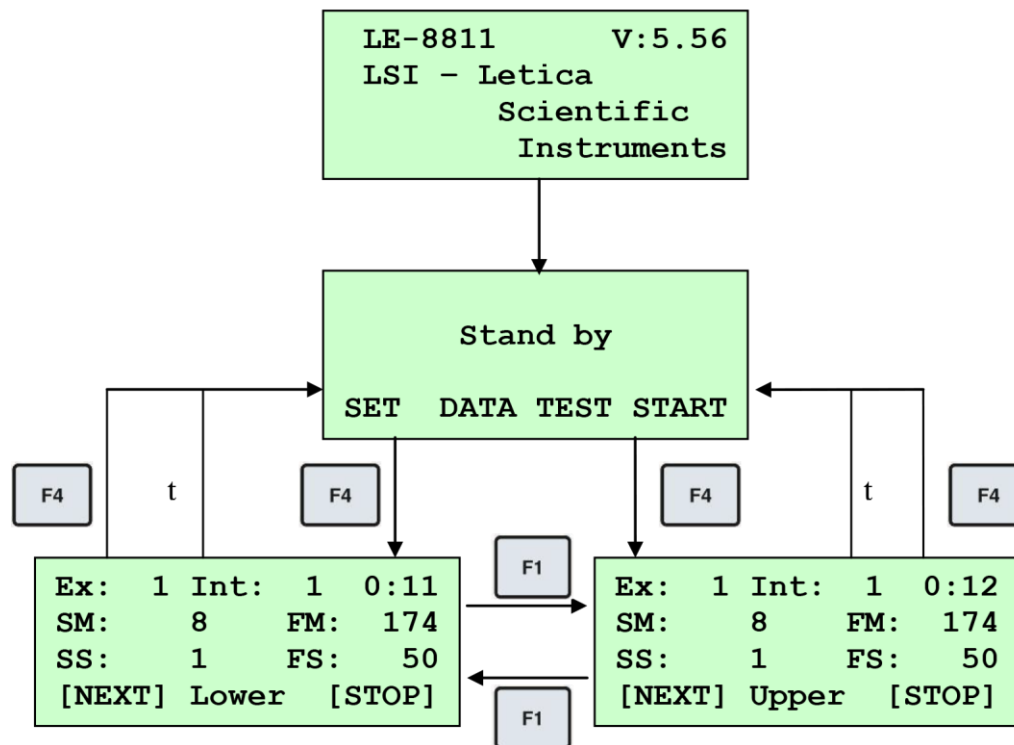


Figure 26. Start menu screens.



**WARNING:** If the memory is full or there is not enough capacity for the current experiment, the system displays the following error message, and does not run the experiment by pressing the START button.

```

----- WARNING -----
Too many intervals
for the remaining
memory
    
```

Figure 27. Full memory error screen..

To solve the problem, send the data to the PC if you want to save (see section o) and clear the memory (see Section 11.2.4)

## 12. USING THE ACTIMETER AS A HOLE BOARD

---

The system counts the number of times that the animal's head is inserted into the holes of the board. It has 16 holes of 30mm in diameter.

The count is broken down into two counters (SH) slow and (FH) Fast, thereby distinguishing the counts with long lock times (SH) and short times (FH). The discrimination threshold (SETUP LEVEL) determines the boundary between them. The levels range from 1 to 15:

LEVEL	TIME (sec)
1	0.025
2	0.050
3	0.075
4	0.125
5	0.175
6	0.25
7	0.325
8	0.5
9	0.75
10	1
11	1.25
12	1.675
13	2.5
14	3.325
15	5

The times greater than the selected threshold are considered as SH, and those who are below the selected threshold are considered as FH.

The module LE8825 can be connected together two panels of holes, or combinations of a board and a frame of activity or rearing. Although it is customary to use a single board.

To facilitate the choice of threshold level, the display shows the shutter time produced. This time appears only when using a single hole board.



## 12.1. TYPES OF BOARDS AVAILABLE

---

There are available two types of hole boards.

### 12.1.1. LE8820

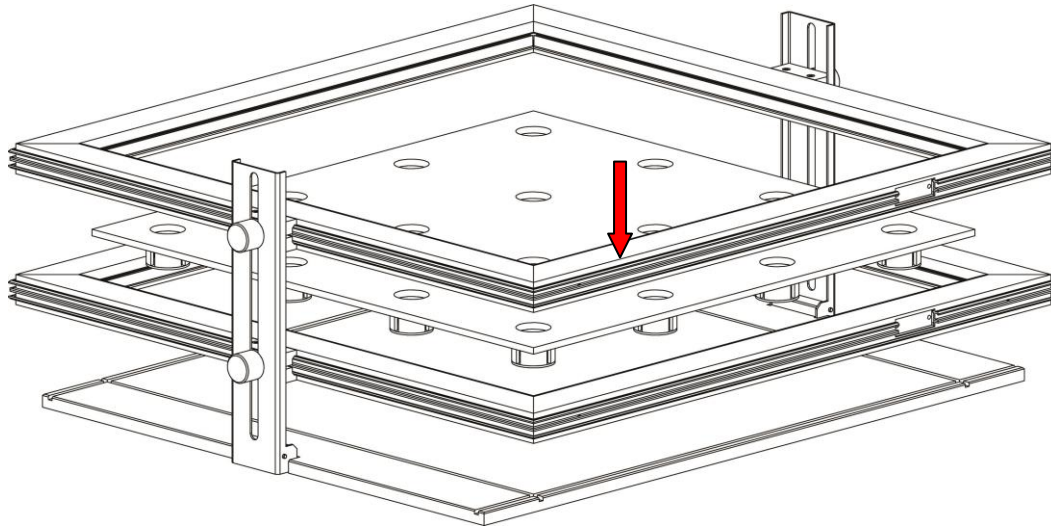


Figure 28. Assembly of the frames with the Hole board.

The figure shows that the lower frame is for Poke Hole detection and the upper frame Rearing or Activity detection.

### 12.1.2. LE8850

This is a specific HOLE POKE board.



Figure 29. LE8850.

## 12.2. APPLICATION EXAMPLE

---

For the specific case of using only one hole board connected to the LOWER frame, single animal, 3-minute interval and level of discrimination of 1 second, with sound of beeps, in module 1, and no option to send the PC. The SET menu must be set so:

PARAMETER	VALUE
Animal:	Single
Upper;	Off
Lower:	Hole Board
Number Int:	1
Duration Int:	3:00
Level Upper	7
Level Upper	10
Module Identif:	1
Send-PC:	Off
Beeps:	On

### 13. USING THE ACTIMETER TO MEASURE REARINGS

---

If it is desired to measure rearings in addition to activity, the lower frame should be configured as actimeter and the upper one for rearings. The counts of the upper frame will be distributed over two counters, depending on whether they are short (FR) or long (SR) rearings, according to the level of discrimination (SETUP LEVEL). The time/level ratio is the same as in the case of the Hole Board.

## 14. CONDUCTING AN EXPERIMENT

---

To conduct an experiment, first connect the control unit. The following screen will appear, and remain visible for 3 seconds.

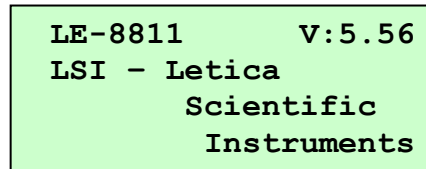


Figure 30. Screen that appears when you turn on the device.

If there is no error message, the following screen should appear:

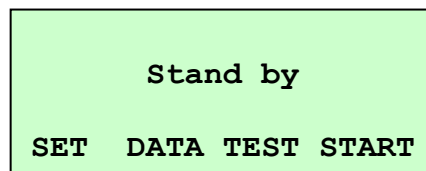


Figure 31. Main screen.

#### 14.1. ACTIMETER / REARINGS

Once all the parameters have been duly configured, press the F<sub>4</sub> button [START] to start a new experiment. On doing so, the control unit will show a new screen, which will remain there throughout the experiment, showing:

```
Ex:  7  Int:  4  0:04
SM:   8    FM: 174
SS:   1    FS:  50
[NEXT] Lower [STOP]
```

Figure 32. Screen during the experiment.

<b>Ex: 7.</b>	[EXPERIMENT]	Number of the current experiment. The number increases with each new experiment begun by a user. Up to 200 experiments may be conducted in a single session.
<b>Int: 4</b>	[INTERVAL]	Current interval number. The main unit accumulates the data and when the interval is complete, it stores the data, resets the accumulators and starts a new interval.
<b>0:04</b>	[TIME mm:ss]	Time (mm:ss) left for the interval to finish.
<b>SM</b>	[SLOW MOVEMENTS]	Number of slow deambulatory movements logged in this interval.
<b>FM</b>	[FAST MOVEMENTS]	Number of fast deambulatory movements logged in this interval.
<b>SS</b>	[SLOW STEREOTYPED MOVEMENTS]	Number of slow stereotyped movements logged in this interval (in the case of a single animal).
<b>FS</b>	[FAST STEREOTYPED MOVEMENTS]	Number of fast stereotyped movements logged in this interval (in the case of a single animal).
<b>Upper</b>	[UPPER]	Activity in the upper frame ("UPPER"). Press F <sub>1</sub> [NEXT] to see the data of the lower frame.

If you use the upper frame to measure rearings, you will see the following on the display corresponding to this frame:

```
Ex:  2  Int:  1  0:10
SR:   1    FR:  50
[NEXT] Upper [STOP]
```

Figure 33. Screen with Rearing selection.

<b>SR</b>	[SLOW REARING]	Number of long rearings
<b>FR</b>	[FAST REARING]	Number of short rearings

## 14.2. HOLE BOARD

Once the experiment is under way, the frame used as a Hole Board will show:

```
Ex: 12 Int: 1 0:10
SH: 8 FH: 174
SH: 1 FH: 50
Up+Lo [STOP]
```

Figure 34. Screen with Hole Board mode.

<b>Ex</b>	[EXPERIMENT]	Number of the experiment, in this example 12.
<b>Int</b>	[INTERVAL]	Number of the interval, in this example 1.
<b>Time</b>	[TIME mm:ss]	Time of the experiment in mm:ss.
<b>SH</b>	[SLOW HOLE]	Number of long blockings.
<b>FH</b>	[FAST HOLE]	Number of short blockings.
<b>Up+Lo</b>	[UP + LOW]	Shows which frames are working (Upper, Lower or Up+Lo).
<b>STOP</b>		Stops the experiment.

### 1. Conducting a new experiment using the same conditions as the previous experiment.

In this case, press the F4 [START] key again to start the new experiment. The number of experiments that may be carried out depends on the memory available in the control unit. If there is not enough memory available to store the new experiment, the experimenter will be informed and the experiment will not start.

### 2. Changing work conditions to conduct a new experiment.

To do so, access the different menu options (press key F1 [SET]) and change the target parameter. You may then start a new experiment under the new conditions.

### 3. Sending the accumulated information in the control unit to the PC for analysis.

In this case, access the "SEND" option of the options menu. Once the connections with the reception unit (PC) and the **Sedacom** program are ready, press F4 [SEND]. It is important to note that the "send data" option refers to all the information present in the memory of the control unit, not only the last experiment, so that data pertaining to experiments already sent to the PC should be cleared from memory to avoid sending redundant information (see the section on "Clear data" in the chapter describing the options menu).

### 14.3. CLEAN THE FRAMES

---



**WARNING:** In order to clean the red transparent IR frames parts never use neither alcohol nor alcoholic derived products, otherwise stripes will appear in the transparent plastic.

To clean the frames you can use a lightly wet cloth and then dry them with a dry cloth. If they're too dirty you can wet the cloth with a soapy solution to clean them, then remove foam with a wet cloth and finally dry them with a dry cloth.

### 14.4. CLEAN THE FRAMES SUPPORT

---

To clean the frame support you can use a lightly wet cloth and then dry it with a dry cloth. If it's too dirty you can wet the cloth with a soapy solution to clean it, then remove foam with a wet cloth and finally dry it with a dry cloth.

### 14.5. CLEAN THE TRANSPARENT ARENA

---

To clean the transparent arena you can use a lightly wet cloth and then dry the transparent walls with a dry cloth. If they're too dirty you can wet the cloth with a soapy solution to clean them, then remove foam with a wet cloth and finally dry them with a dry cloth.



**WARNING:** In order to clean transparent walls never use neither alcohol nor alcoholic derived products, otherwise stripes will appear in the transparent plastic.

## 15. WORKING WITH THE SEDACOM SOFTWARE

---

The purchase of the **Sedacom** software is needed for transferring the data to a computer (please contact your local sales delegate for more information). The **Sedacom** software reference is composed a USB Flash key containing the software Installer, License for use and **Sedacom** User's Manual. Follow next instructions:

- Please refer to the **Sedacom** User's Manual for instructions on how to install and use the software with the present device.
- A serial port (RS232) communication cable (provided with the present device) is needed for connecting the present devices to the computer in which the **Sedacom** software is installed. Please refer to the present User's Manual chapter 8 for instructions about how to connect this cable to the device.
- If the computer does not have any serial port, the RS232/USB adapter is needed (ref. CONRS232USB, contact your local sales delegate for more information)

**WARNING:** the RS232 communication cable provided with the device is used for any connection from the device to any associated software (**Sedacom**, etc.). Even when the device is used without software in first instance the cable is to be preserved and kept in a secure place in case the need of using the system with a software arises in the future. In this last case, if the user loses the cable, a new one should be purchased to his local sales delegate (ref. CONRS232). The warranty duration of the cable is the same than the warranty duration of the device.



## 16. TROUBLESHOOTING

This table features instructions to solve the most frequent problems.

PROBLEM	SOLUTION
The equipment does not start up.	<ul style="list-style-type: none"> <li>• Ensure that the voltage of mains is the same as that selected in the fuse holder.</li> <li>• Check the condition of the fuses.</li> </ul>
Pressing [F4] <b>START</b> button the control unit is blocked.	<ul style="list-style-type: none"> <li>• This occurs if the parameter <b>Send Data</b> is set to <b>On</b>, and the control unit is not connected to the serial port of the PC. To fix this you must turn off the control unit and connect it to the PC serial port, or leave the previous parameter to <b>Off</b>. (See Section o)</li> </ul>
The equipment does not send data to the program <b>Sedacom</b> .	<ul style="list-style-type: none"> <li>• Check that the cable is connected between the RS-232 device and the PC serial port (see Figure 11)</li> <li>• If there are multiple devices connected in series, check MAIN - REMOTE connections (see Figure 12).</li> <li>• If there are multiple control units connected in series check that all have a different ID number (see section o)</li> <li>• Make sure that both the serial port as the device selected in the <b>Sedacom</b> program are correct.</li> <li>• If you have several control units connected in series, all should be on in order not to cut communication MAIN - REMOTE.</li> </ul>
Without animals on the arena or in the cage clear the device detects activity or rearing.	<ul style="list-style-type: none"> <li>• Check with the TEST (see section 11.3) in which infrared beams appear the problem.</li> <li>• Remove the transparent cage or arena and check with the test if the problem is gone. If so, the problem is due to the transparent cage or arena, clean them with a wet cloth and try again.</li> <li>• Clean the red translucent plastic on the inside of the frame with a wet cloth, if it's dirt it can produce false positives.</li> </ul>

PROBLEM	SOLUTION
<p>When starting an experiment the device displays the error message "<b>WARNING Too many intervals for the remaining memory</b>" and does not run the experiment.</p>	<ul style="list-style-type: none"> <li>• This is because the memory of the control unit is full or has not enough free space in the course of the experiment .Send the data to the PC if you want to save (see section o) and clear the memory (see Section 11.2.4)</li> </ul>

## 17. PREVENTIVE MAINTENANCE

---

	EXPERIMENT
FRAMES CLEANING	<input checked="" type="checkbox"/>
FRAMES SUPPORT CLENING	<input checked="" type="checkbox"/>
TRANSPARENT ARENA CLEANING <sup>1</sup>	<input checked="" type="checkbox"/>
CHECK CABLES CONNECTION	<input checked="" type="checkbox"/>


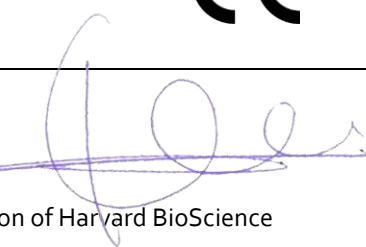
---

<sup>1</sup> Only when used.

## 18. SPECIFICATIONS

<b>POWER SUPPLY</b> Input voltage: Frequency: Fuse: Maximum power: Conducted noise:	115 /230 VAC 50 /60 Hz 2 fuses 5mm*20mm 250mA 250V 12 W EN55022 /CISPR22/CISPR16 class B
<b>ENVIRONMENTAL CONDITIONS</b> Operating temperature: Operating relative humidity: Storage temperature:	10°C to +40°C 0% to 85% RH, non-condensing 0°C to +50°C, non-condensing
<b>COMUNICATIONS OUTPUT</b> Standard interface: Connector:	RS232C Delta 9 contacts connector
<b>ACTIVITY FRAMES</b> Dimensions: Rat: Mouse: IR cells: X axis: Y axis: Distance between IR beams: Rat: Mouse;	45 x 45 cm 25 x 25 cm  16 16  2,5cm 1,5cm
<b>DIMENSIONS</b> Width x Height x Depth: Weight:	150 mm x 66 mm x 250 mm 1.41 kg

**DECLARACIÓN DE CONFORMIDAD  
DECLARATION OF CONFORMITY  
DECLARATION DE CONFORMITÉ**

Nombre del fabricante:	<b>Panlab s.l.u.</b>
Manufacturer's name:	<a href="http://www.panlab.com">www.panlab.com</a>
Nom du fabricant:	<a href="mailto:info@panlab.com">info@panlab.com</a>
Dirección del fabricante:	Energía, 112
Manufacturer's address:	08940 Cornellà de Llobregat
Adresse du fabricant:	Barcelona SPAIN
Declara bajo su responsabilidad que el producto:	<b>IR MOTOR ACTIVITY MONITOR</b>
Declares under his responsibility that the product:	
Déclare sous sa responsabilité que le produit:	
Marca / Brand / Marque:	<b>PANLAB</b>
Modelo / Model / Modèle:	<b>LE 8825</b>
Cumple los requisitos esenciales establecidos por la Unión Europea en las directivas siguientes: Fulfills the essential requirements established by The European Union in the following directives: Remplit les exigences essentielles établies pour l'Union Européenne selon les directives suivantes:	
<b>2006/95/EC</b>	Directiva de baja tensión / Low Voltage / Basse tension
<b>2004/108/EC</b>	Directiva EMC / EMC Directive / Directive CEM
<b>2012/19/EU</b>	La Directiva de Residuos de Aparatos Eléctricos y Electrónicos (WEEE) / The Waste Electrical and Electronic Equipment Directive (WEEE) / Les déchets d'équipements électriques et électroniques (WEEE)
<b>2011/65/EU</b>	Restricción de ciertas Sustancias Peligrosas en aparatos eléctricos y electrónicos (ROHS) / Restriction of the use of certain Hazardous Substances in electrical and electronic equipment (ROHS) / Restriction de l'utilisation de certaines substances dangereuses dans les équipements électriques et électroniques (ROHS)
<b>2006/42/EC</b>	Directiva mecánica / Machinery directive / Directive mécanique
Para su evaluación se han aplicado las normas armonizadas siguientes: For its evaluation, the following harmonized standards were applied: Pour son évaluation, nous avons appliqué les normes harmonisées suivantes:	
Seguridad / Safety / Sécurité:	<b>EN61010-1:2011</b>
EMC:	<b>EN61326-1:2012 Class B</b>
Safety of machinery:	<b>EN ISO 12100:2010</b>
En consecuencia, este producto puede incorporar el marcado CE : Consequently, this product can incorporate the CE marking: En conséquence, ce produit peut incorporer le marquage CE:	
<div style="text-align: right;">  </div>	
En representación del fabricante:	
Manufacturer's representative:	
En représentation du fabricant:	<div style="text-align: right;">  </div>
	<div style="text-align: right;"> Carme Canals General Manager Panlab s.l.u., a division of Harvard BioScience </div>
Cornellà de Llobregat, Spain 30/06/2014	

**(GB) Note on environmental protection:**



After the implementation of the European Directive 2002/96/EU in the national legal system, the following applies:

Electrical and electronic devices may not be disposed of with domestic waste. Consumers are obliged by law to return electrical and electronic devices at the end of their service lives to the public collecting points set up for this purpose or point of sale. Details to this are defined by the national law of the respective country. This symbol on the product, the instruction manual or the package indicates that a product is subject to these regulations. By recycling, reusing the materials or other forms of utilising old devices, you are making an important contribution to protecting our environment.

**(E) Nota sobre la protección medioambiental:**



Después de la puesta en marcha de la directiva Europea 2002/96/EU en el sistema legislativo nacional, Se aplicara lo siguiente:

Los aparatos eléctricos y electrónicos, así como pilas y baterías, no se deben tirar a la basura doméstica. El usuario está legalmente obligado a llevar los aparatos eléctricos y electrónicos, así como pilas y baterías, al final de su vida útil a los puntos de recogida municipales o devolverlos al lugar donde los adquirió. Los detalles quedaran definidos por la ley de cada país. El símbolo en el producto, en las instrucciones de uso o en el embalaje hace referencia a ello. Gracias al reciclaje, a la reutilización de materiales i a otras formas de reciclaje de aparatos usados, usted contribuirá de forma importante a la protección de nuestro medio ambiente.

**(F) Remarques concernant la protection de l'environnement :**



Conformément à la directive européenne 2002/96/CE, et afin d'atteindre un certain nombre d'objectifs en matière de protection de l'environnement, les règles suivantes doivent être appliquées.

Elles concernent les déchets d'équipement électriques et électroniques. Le pictogramme "picto" présent sur le produit, son manuel d'utilisation ou son emballage indique que le produit est soumis à cette réglementation. Le consommateur doit retourner le produit usager aux points de collecte prévus à cet effet. Il peut aussi le remettre à un revendeur. En permettant enfin le recyclage des produits, le consommateur contribuera à la protection de notre environnement. C'est un acte écologique.

**(D) Hinweis zum Umweltschutz:**



Ab dem Zeitpunkt der Umsetzung der europäischen Richtlinie 2002/96/EU in nationales Recht gilt folgendes:

Elektrische und elektronische Geräte dürfen nicht mit dem Hausmüll entsorgt werden. Der Verbraucher ist gesetzlich verpflichtet, elektrische und elektronische Geräte am Ende ihrer Lebensdauer an den dafür eingerichteten, öffentlichen Sammelstellen oder an die Verkaufsstelle zurückzugeben. Einzelheiten dazu regelt das jeweilige Landesrecht. Das Symbol auf dem Produkt, der Gebrauchsanleitung oder der Verpackung weist auf diese Bestimmungen hin. Mit der Wiederverwertung, der stofflichen Verwertung oder anderer Formen der Verwertung von Altgeräten leisten Sie einen wichtigen Beitrag zum Schutz unserer Umwelt.

**(I) Informazioni per protezione ambientale:**



Dopo l'implementazione della Direttiva Europea 2002/96/EU nel sistema legale nazionale, ci sono le seguenti applicazioni:

I dispositivi elettrici ed elettronici non devono essere considerati rifiuti domestici. I consumatori sono obbligati dalla legge a restituire i dispositivi elettrici ed elettronici alla fine della loro vita utile ai punti di raccolta collerici preposti per questo scopo o nei punti vendita. Dettagli di quanto riportato sono definiti dalle leggi nazionali di ogni stato. Questo simbolo sul prodotto, sul manuale d'istruzioni o sull'imballo indicano che questo prodotto è soggetto a queste regole. Dal riciclo, e re-utilizzo del material o altre forme di utilizzo di dispositivi obsoleti, voi renderete un importante contributo alla protezione dell'ambiente.

**(P) Nota em Protecção Ambiental:**



Após a implementação da directiva comunitária 2002/96/EU no sistema legal nacional, o seguinte aplica-se:

Todos os aparelhos eléctricos e electrónicos não podem ser despejados juntamente com o lixo doméstico. Consumidores estão obrigados por lei a colocar os aparelhos eléctricos e electrónicos sem uso em locais públicos específicos para este efeito ou no ponto de venda. Os detalhes para este processo são definidos por lei pelos respectivos países. Este símbolo no produto, o manual de instruções ou a embalagem indicam que o produto está sujeito a estes regulamentos. Reciclando, reutilizando os materiais dos seus velhos aparelhos, esta a fazer uma enorme contribuição para a protecção do ambiente.