Hardware User's Manual

Physiocage

OXYLETPRO

References:

LE1331 (76-0800), LE1332 (76-0801), LE1333 (76-0802), LE1335 (76-0813), LE1336M (76-0814), LE1336R (76-0821), LE1337M (76-0815), LE1337R (76-0822), LE1308 (76-0816

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Panlab | Harvard Apparatus

Panlab, s.l.u
C/Energía, 112
08940 Cornellà de Ll.(Barcelona)
Spain
www.panlab.com

International Calls: +34 934 750 697
Domestic Call: 934 190 709
Fax: +34 934 750 699
Info@panlab.com

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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 equipment 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.
- Equipment does 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 does not have a 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 authorized to replace fuses with the specified type when necessary.

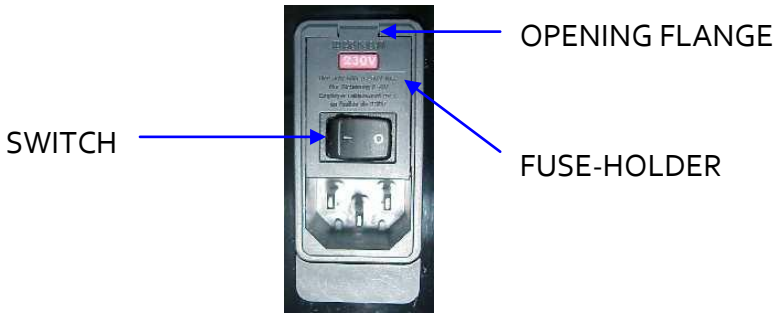


Figure 1: Power inlet, main switch and fuse holder

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.

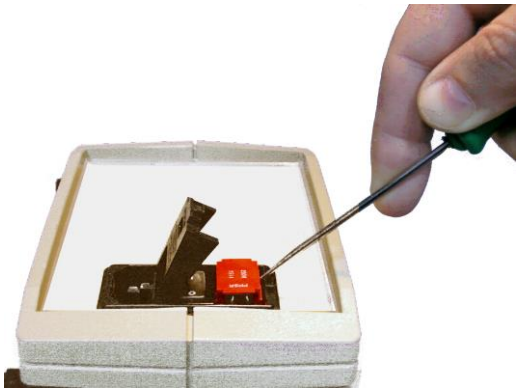


Figure 3: Extract fuse-holder

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.

WARNING

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

5. TABLE OF CONTENTS

6. INTRODUCTION

The **OxyletPro PhysioCage** is a system designed to monitor food and drink consumption, in addition to activity and rearing of rats and mice.

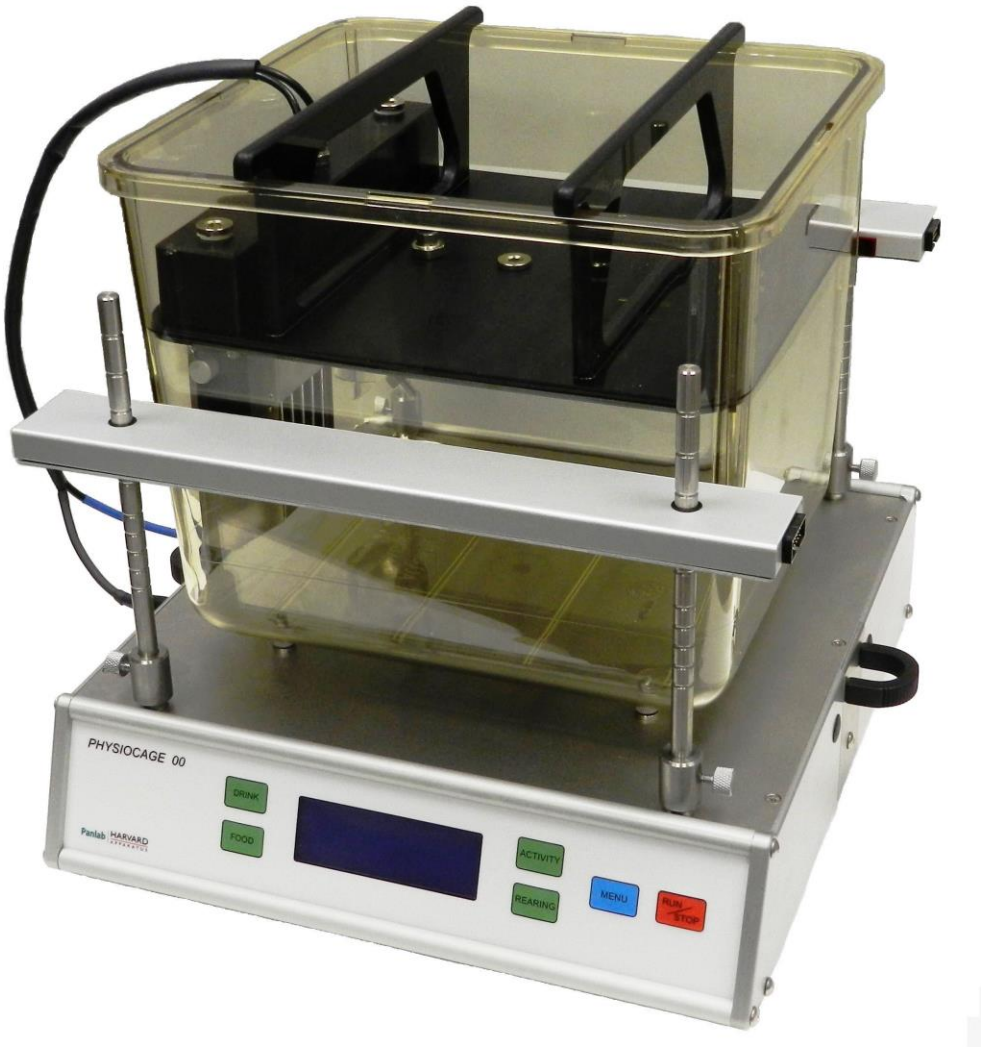


Figure 6: OxyletPro PhysioCage

This equipment was designed to facilitate experiments, with a simple setup and intuitive interface; users collect precise and accurate data quickly and easily.

Once the food and drink dispensers are filled and the animal is placed in the cage, simply press a button for the equipment to begin recording measurements. Users do not have to tare counters before beginning a new experiment.

The equipment has two working modes:

- **RUN**: Equipment is working and the display shows the accumulated total of consumption, activity and rearing values. When the RUN mode begins, all counters are reset and a new experiment begins.
- **STOP**: The values are no longer counted and the display shows end results of the experiment.

Equipment can work in either stand-alone or remote control mode. In stand-alone mode, the user has to control each unit. In remote mode, up to 32 units can be connected to one computer using RS-232 cables. This way, all of the cages are easily controlled and monitored. Once the **START** button is pressed in the **Metabolism** software, each control unit begins taking measurements and the data is sent to the computer.

6.1. FOOD AND DRINK CONSUMPTION

The equipment has dispensers for food and drink. Food and drink consumption is calculated with high precision through weight changes detected by load cells.

The system takes measurements by removing thermal and evaporation drifts. Therefore, the equipment is especially appropriate to measure an animal's low consumption.

6.2. ACTIVITY

To monitor activity, the OxyletPro PhysioCage detects changes of potential and kinetic energy produced by the animal when moving. The system measures the animal's physical work or exertion during the experiment.

A transducer platform located under the cage detects changes of activity. All devices are calibrated with the same sensitivity, making it possible to compare the activity of different animals.

6.3. REARING

Optionally, IR sensor bars can be added to detect when the animal stands up to explore. The height of the IR sensor bars can be adjusted to accommodate different research species. The IR sensor bars, both emitter and detector, features 11 IR beams placed at a uniform distance.

7. EQUIPMENT DESCRIPTION

7.1. FRONT PANEL

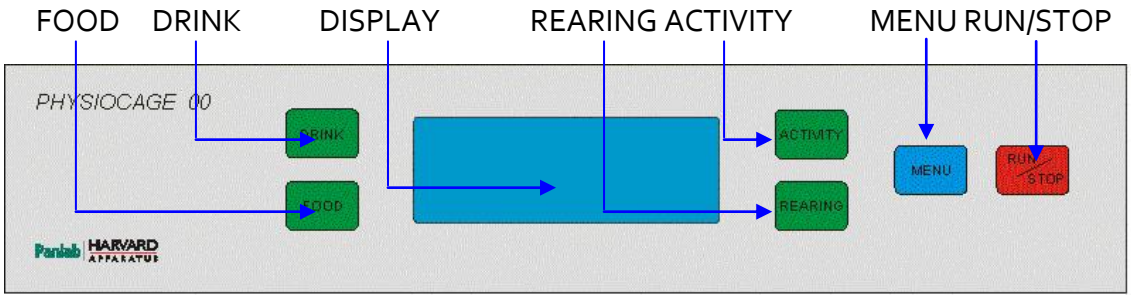


Figure 7: Front Panel

- **DISPLAY:** The unit has a 4-row, 20-column screen to display information regarding food and drink consumption, activity and rearing. The display is also used to show the menus.

- **DRINK:** The function of this button varies depending on the menu on the display. In **RUN** mode, it resets the drink counter.

- **FOOD:** The function of this button varies depending on the menu on the display. In **RUN** mode, it resets the food counter.

- **ACTIVITY:** The function of this button varies depending on the menu on the display. In **RUN** mode, it resets the activity counter.

- **REARING:** The function of this button varies depending on the menu on the display. In **RUN** mode, it resets the rearing counter.

- **MENU:** This button is used to enter in the main menu and exit from the different submenus.

- **RUN/STOP:** This button begins or ends the current experiment. This function is also available from the **Metabolism** software.

7.2. DISPLAY

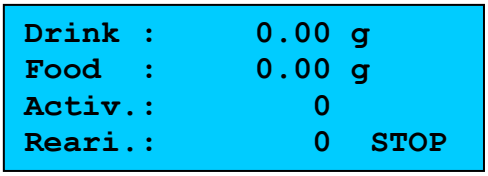


Figure 8: Display

- **Drink**: Amount of drink the subject consumed, in grams.
- **Food:** Amount of food the subject consumed, in grams.
- **Activ.:** Amount of activity by the subject, expressed in activity units. One activity unit refers to a fixed amount of activity.
- **Reari.:** Number of rearing episodes made by the subject.
- **STOP/RUN:** Label that shows the device's current working mode.
    - **STOP:** Equipment is not measuring and the display shows final experiment data. Access to the menu is allowed in this state.
    - **RUN:** Equipment is running and the display shows food and drink consumption, activity and number of rearing episodes. In this state, access to the menu is not allowed. Counters can be reset by pressing the respective buttons.
    - **WAIT:** Temporary state while dispensers are tared.

7.3. REAR PANEL

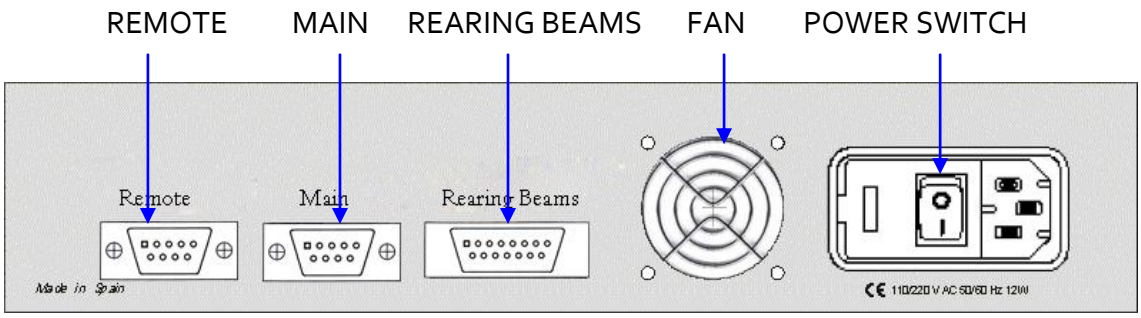


Figure 9: Rear Panel

- **MAIN:** DB9 female connector used to connect the unit to the computer's serial port if there is only one control unit, or it is connected to the **REMOTE** port of the previous unit when several control units are connected to a single computer in series.

- **REMOTE:** DB9 male connector used to connect the control units to the **MAIN** port of the next control unit, when several units are connected to a single computer in series. The **REMOTE** port of the last unit is kept free.

- **REARING BEAMS:** DB15 connector used to connect the infrared emitters and detectors to the control unit through a flat cable.

- **FAN:** The fan extracts heat from the control unit.

- **POWER SWITCH:** Power switch, fuse holder and mains connector.

7.4. EXPERIMENTATION CAGE

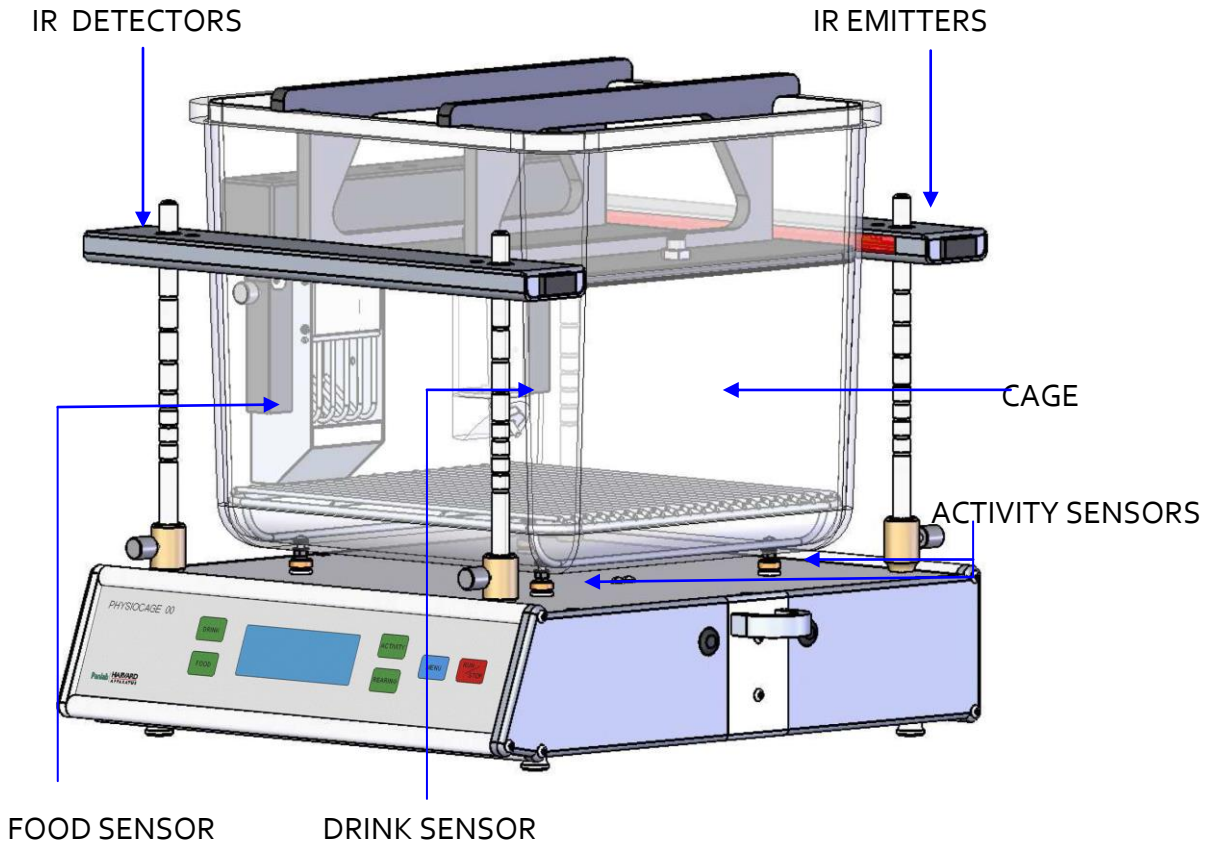


Figure 10: PhysioCage Configuration Components

- **CAGE:** Perspex Cage with metabolic lid for O_2 and CO_2 studies.
- **DRINK SENSOR:** The cage features a load cell to measure drink weight and thus calculate drink consumption.
- **FOOD SENSOR:** The cage features a second load cell to measure food weight and thus calculate food consumption.
- **IR EMITTERS:** Sensor bars of 11 IR beams. The emitter set can be identified by the white support holes. The IR sensor bars detects animal rearing.
- **IR RECEPTORS:** The second part of the IR Barrier. The receptor set can be identified by the black support holes.
- **ACTIVITY SENSOR:** There is a third load cell with 4 legs that hold the cage. It detects animal movement.

Figure 11: Food and drink dispensers

- **FOOD DISPENSER** The food dispenser is hung from the axis of the load cell transducer. It has a special shape so that the food that is not eaten falls into the catch at the bottom of the food dispenser.

- **DRINK DISPENSER** The drink dispenser is hung from the axis of the load cell transducer. It has a valve that the animal must push to obtain a droplet of drink.

8. INSTALLATION

Place the instrument on a flat, horizontal surface, leaving at least 10 cm of free space between it and the rear wall. Do not place the instrument in an environment with vibrations, or under direct sunlight or air currents.

8.1. PLACEMENT OF THE CAGE

The plastic cage must be placed with the cage feet seated in all four of the supports located on top of the platform, see below. It is very important to keep it from touching the food or drink dispensers and that the cage is in all four of the supports to ensure proper monitoring of the system.

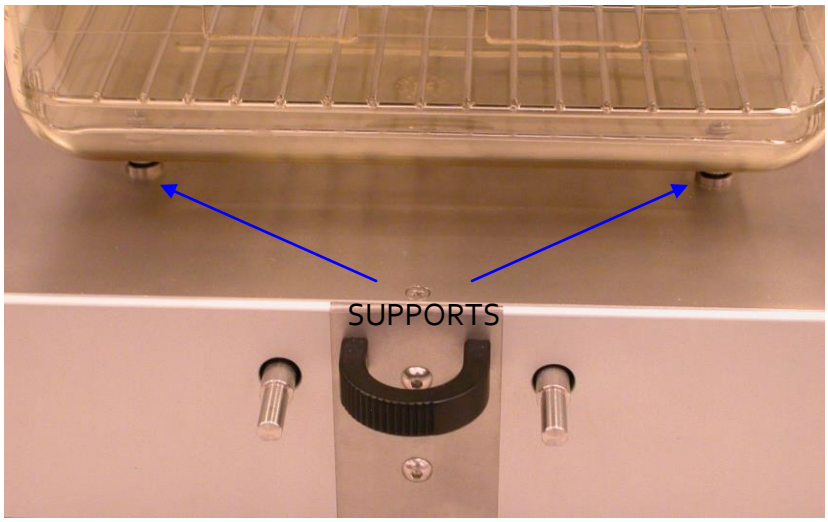


Figure 12: Plastic cage over the supports

8.2. ASSEMBLING IR EMITTERS & RECEPTORS

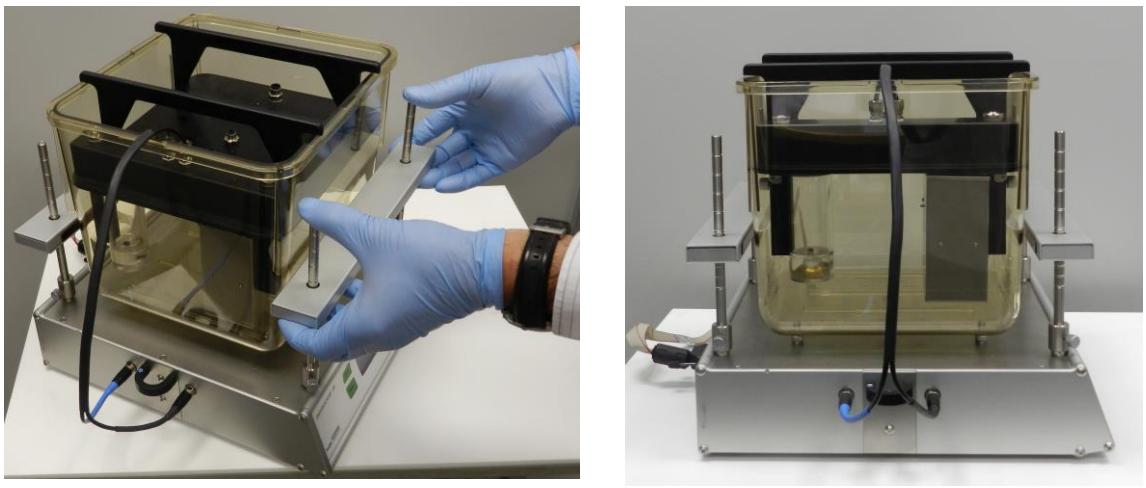


Figure 13: Placement of Emitters and Detectors

Install the four notched rods in the each corner of the system platform and secure them with the thumbscrews. These vertical rods will support the IR sensor bars.

The IR emitter sensor bar, as identified by its white plastic fastening holes, slides down the two rear vertical support rods.

The IR detector sensor bar, as identified by its black plastic fastening holes, slides down the two front vertical support rods.

Working together, these two make an 11-beam IR sensor bar set and are used to detect subject rearing (standing up on hind paws to explore) behaviour. The emitter and detector bars must be placed at a height above the subject while it is in a normal, horizontal position. It is also very important that both IR sensor bars are placed at the same height so that the corresponding emitter and detectors alight, otherwise, rearing will not be able to be detected.

WARNING

The short end of the flat cable that connects both IR sensor bars with the control unit must be connected to the emitter bar (rear of the cage) and the long end to the receiver bar (at the front of the cage). The IR sensor bars will not function if the cable connections are reversed.

8.3. PREPARING THE CAGE FOR THE SUBJECT

- Remove the cage from the sensor platform and place it on a solid surface.
- Fill the cage with approximately 200ml of bedding, if desired.

Figure 14: Preparing the cage for the subject

8.3.1. LUBRICARING THE LID O-RING

- Clean the edge of the lid where the O-ring is fitted with a soft, clean, dry cloth to remove any debris or dust.

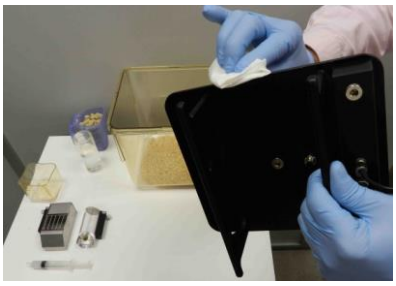
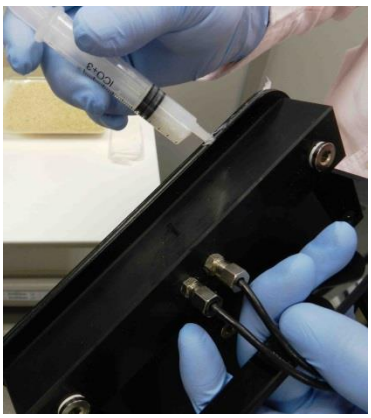


Figure 15: Cleaning the edge of the lid

- Lubricate the O-ring of the lid using a neutral lubricant (e.g. Vaseline).



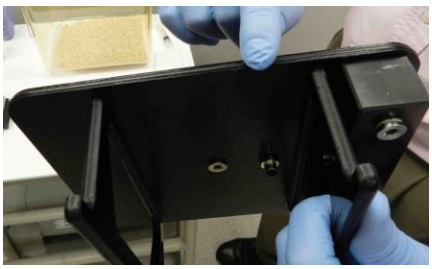


Figure 16: Lubricating the O-ring of the lid

8.3.2. POSITION THE LID OVER THE CAGE IN ORDER TO INSTALL AND FILL THE FOOD AND DRINK DISPENSERS

- Rest the lid askew over the cage top (see Figure 17) to freely handle the food and drink dispensers.

Figure 17: Preparing the lid

8.3.3. FILLING AND INSTALLING THE DRINK DISPENSER

- Fill the bottle with the liquid to be used.
- As shown in Image 18, use a finger to test the pipe valve. When pressed, liquid drops should fall from sipper tube.

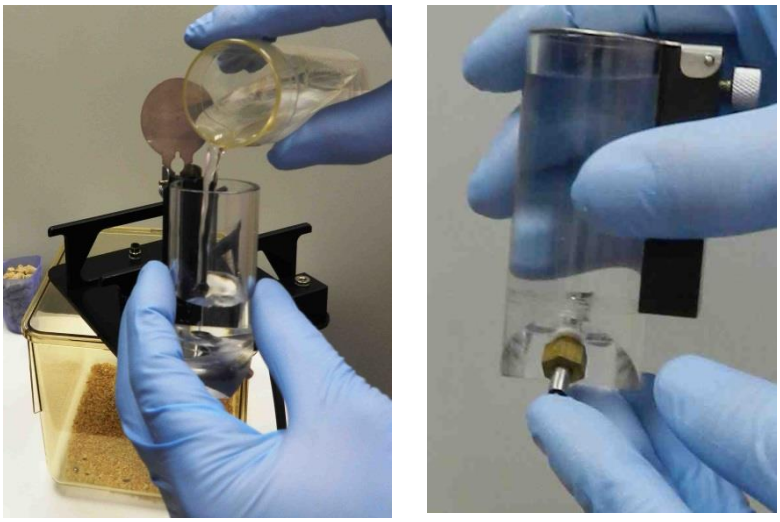


Figure 18: Checking the bottle

- Install the bottle onto the left transducer rail, seating it up to the cage lid.
- Tighten the bottle in place with the thumbscrew.

Figure 19: Installing the bottle

8.3.4. FILLING AND INSTALLING THE FOOD DISPENSER

- Fill the food dispenser with the food selection to be used.

Figure 20: Filling the food dispenser

- Install the food dispenser onto the right transducer rail, seating it up to the cage lid.
- Tighten the food dispenser in place with the thumbscrew.

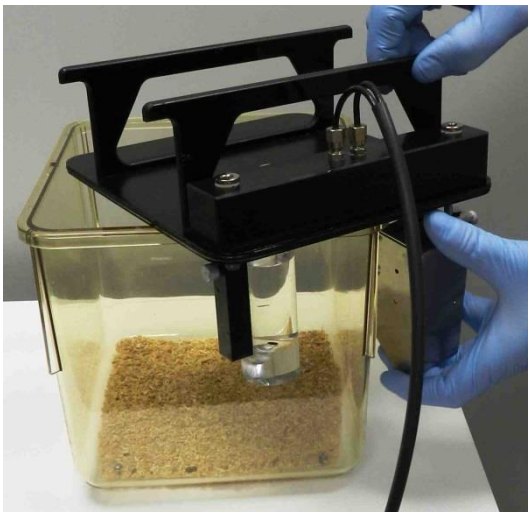


Figure 21: Installing the food dispenser

8.3.5. PLACING THE LID IN THE CAGE

- Hold the lid grips with both hands and press firmly down until the grips touch the edge of the cage.

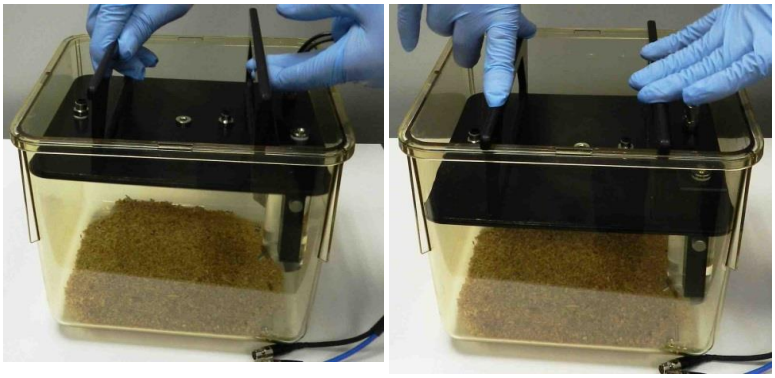


Figure 22: Inserting the lid

9. EQUIPMENT CONNECTION

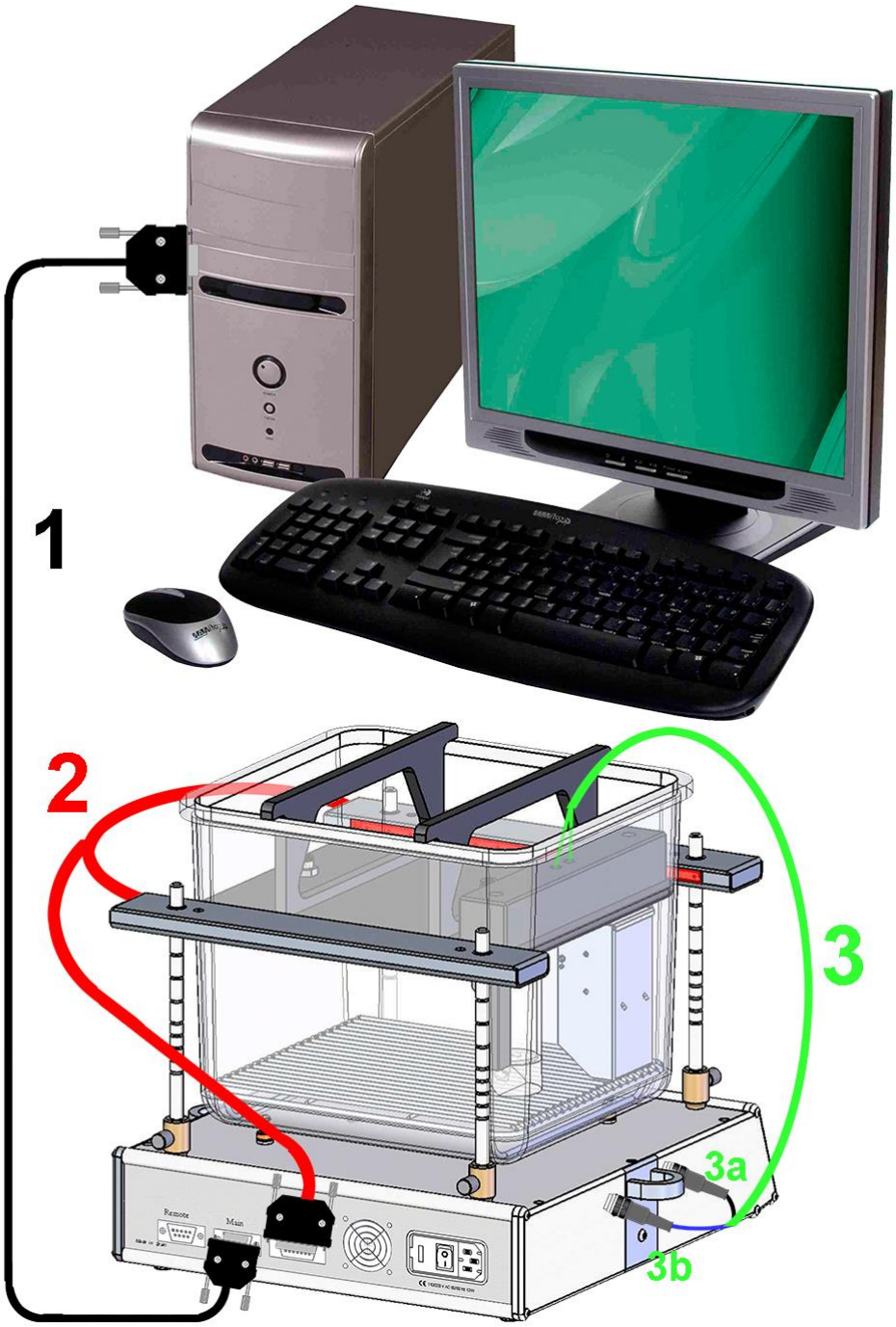


Figure 23: Hardware connections

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

	FROM	TO	CABLE
1	Physiocage MAIN	Computer COM Port	RS 232
2	Physiocage REARING BEAMS	IR BARRIER	DB15 to 2 Ansley 10
3a	Physiocage FOOD	FOOD SENSOR	Mini DIN cable (black)
3b	Physiocage DRINK	DRINK SENSOR	Mini DIN cable (blue)

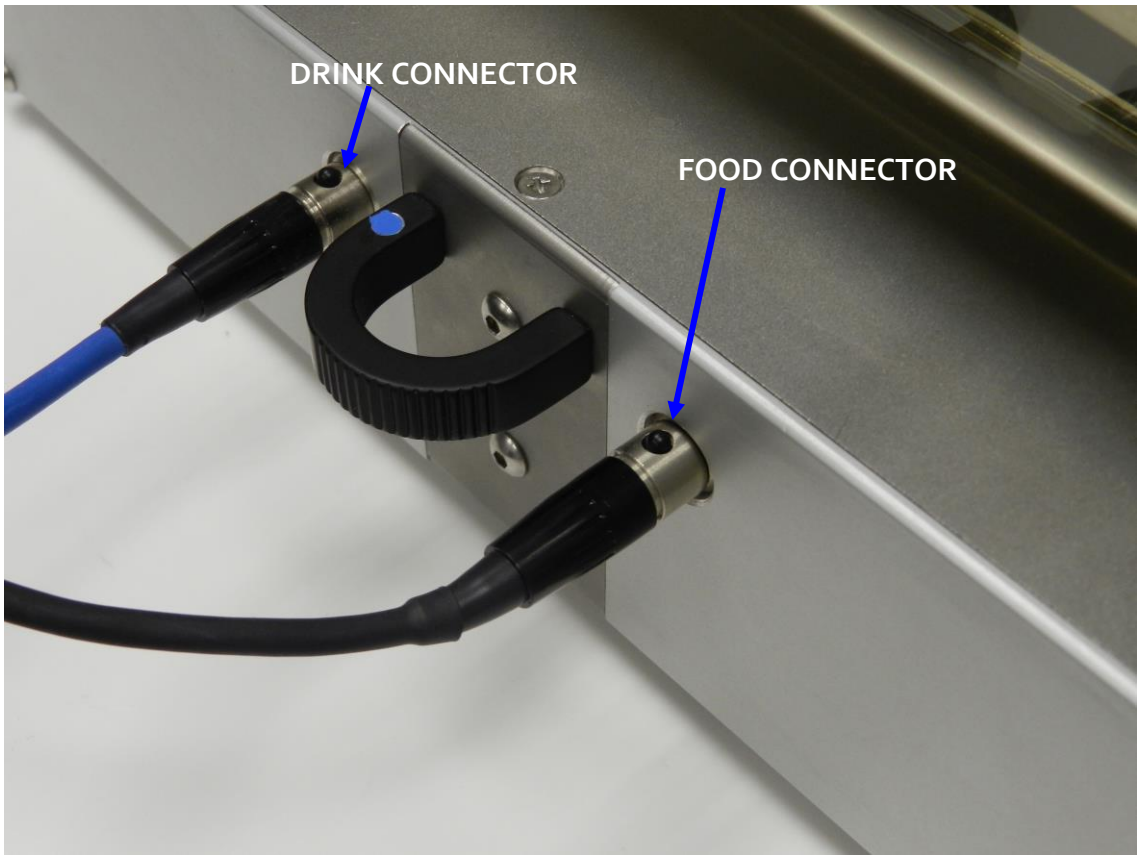


Figure 24: Food and drink connectors

The food and drink cables are colour coded to help identify the respective connections to the sensor platform. The drink cable is blue, and connects to the fitting as noted by the blue dot on the left side of the sensor platform handle. The food cable is black, and connects to the fitting on the all-black side of the sensor platform handle.

The food and drink cables terminate in mini DIN connectors. These connectors feature a notch in the male connector that must match with the notch in the socket wall connection. To release, simply push the button while pulling from the connector.

9.1. CONNECTING SEVERAL CAGES

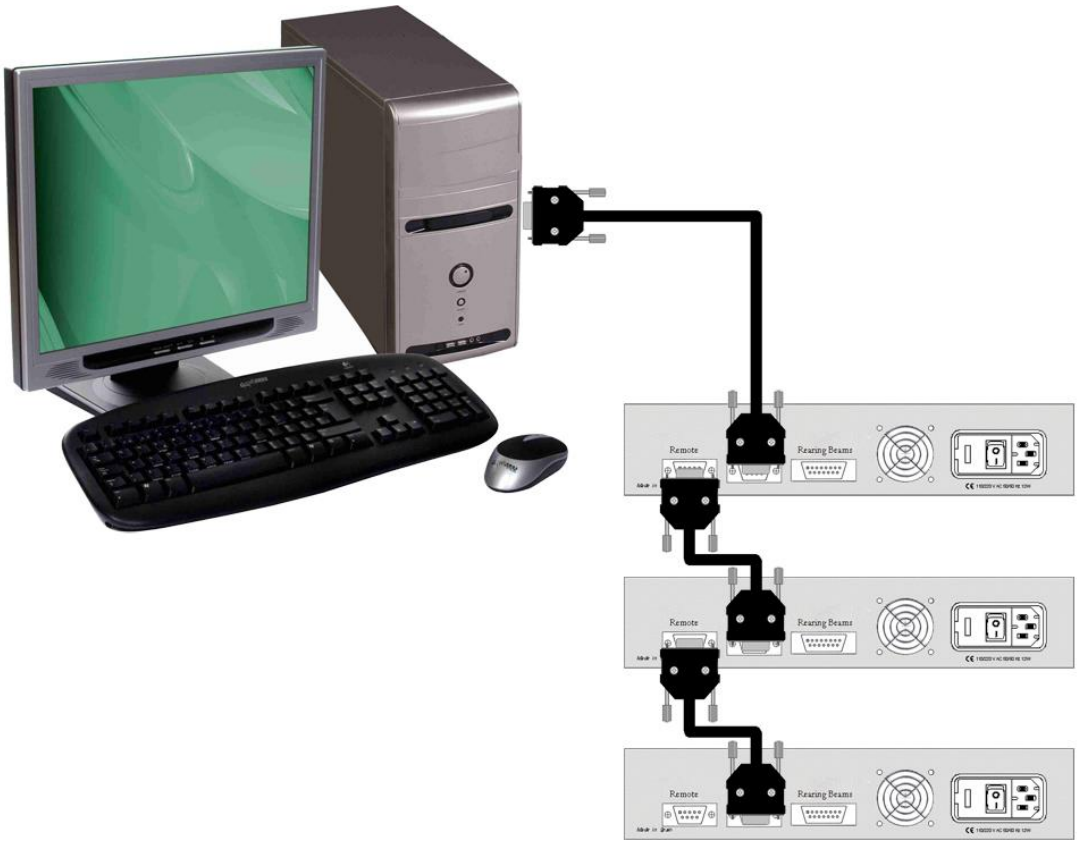


Figure 25: 3 cages with 1 computer

Up to 32 cages can be connected to 1 computer in series using the **MAIN-REMOTE** ports and the RS-232 cables. In this case, the following points must be observed for the system to work properly:

- All of the connected cages must have a different ID number.
- The ID numbers must be consecutive and begin by 1, for example if we have 3 cages they must have the ID numbers 1, 2 and 3.
- It is not necessary that cages must be physically ordered by the ID number in the connection.
- The **MAIN** port of cage 1 is connected to the computer COM port.
- The **REMOTE** port of each cage is connected to the **MAIN** port of the next cage.
- The **REMOTE** port of the last cage is left free.

10. MAIN MENU

Press the MENU key to enter in the main menu. The screen will show:

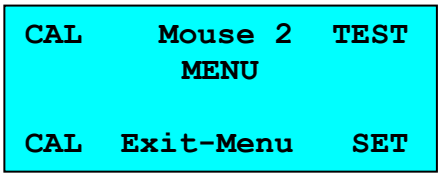


Figure 26: Main menu screen

The above Menu shows the type of subject selected and the identifier number assigned to this unit.

In this menu, each key is associated with a function as described in the following table:

Function	Key	Description
CAL	DRINK	Calibration of the drink sensor
CAL	FOOD	Calibration of the food sensor
TEST	ACTIVITY	Tool to check the rearing
SET	REARING	Configuration of parameters
EXIT	MENU	Return to the main screen

The layout of keys has been arranged to match the labels that appear on the screen at the same height and on the same side. In this case, "DRINK" will be used to calibrate the drink transducer, and so on.

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

10.1. SET-UP MENU

In the Main menu screen (see Figure 26), press the [**SET**] REARING key in the menu to enter the set-up menu. The display will show:

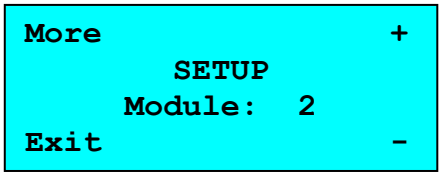


Figure 27: Set-up screen

Press the [**MORE**] DRINK key to go through the possible parameters to be configured: **Module, Animal, Backlight** and **Beep**.

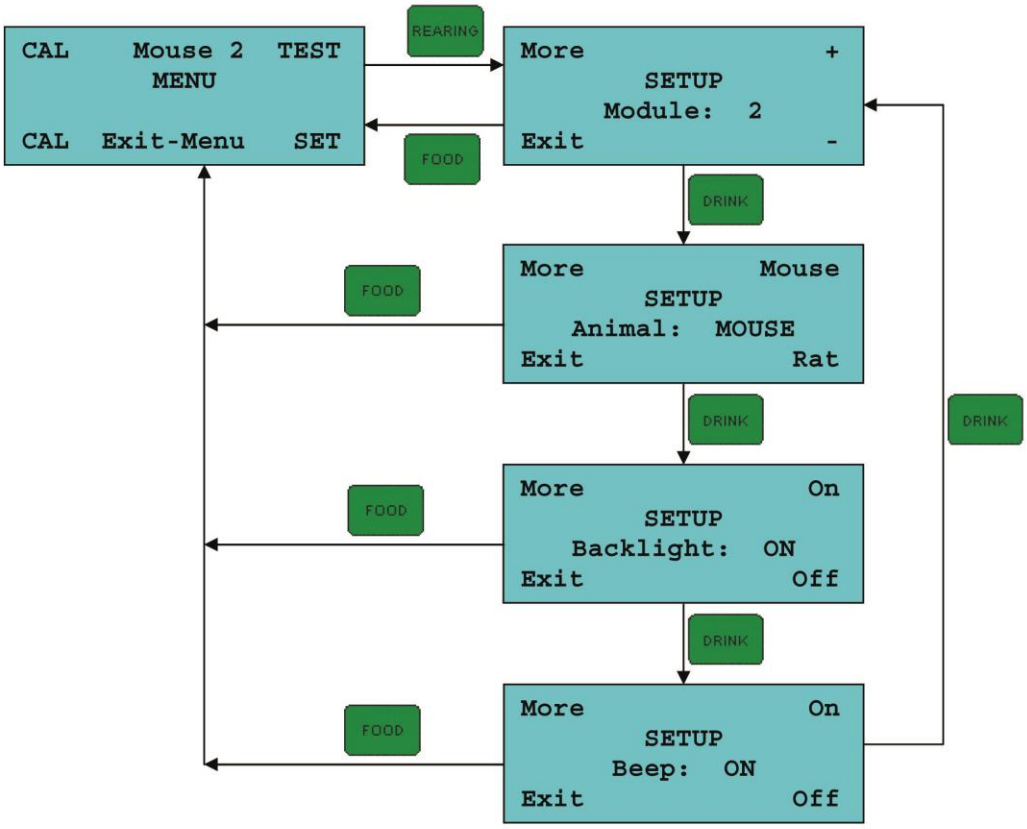


Figure 28: Navigation in the Set-up menu

The following sections feature complete information on the set-up of each of these parameters.

10.1.1. MODULE ID (IDENTIFICATION)

In the SETUP menu (see Figure 27), press the [**MORE**] DRINK key several times until the display shows **Module**:

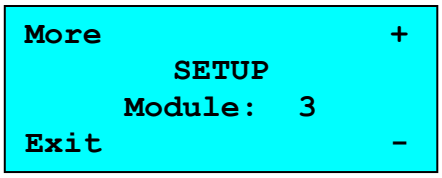


Figure 29: Module screen

This menu is needed to configure the system when more than one unit is active and connected to the same computer. In this case, each unit must have an associated identification number (ID) that distinguishes it from the rest. The experimenter has 32 numbers available for this purpose. By default, all the control units will have the number 1 associated with them.

- If two or more control units have the same number associated, neither the **Metabolism** program nor control units will inform on this problem. In this case the system will not work properly. Be sure that all ID numbers are different.
- The identification numbers ID must be consecutive and start with the number 1. That is, if there are three cages, they must have the identification numbers 1,2 and 3.

To change the module number, press [**+**] ACTIVITY to increase or [**–**] REARING to decrease.

The assigned number will be shown on the menu screen after the word "Rat" or "Mouse" i.e. Mouse 3, for module 3.

10.1.2. ANIMAL SPECIES SELECTION

In the SETUP menu (see Figure 27), press the [**MORE**] DRINK key several times until the display shows the word "**Animal**".

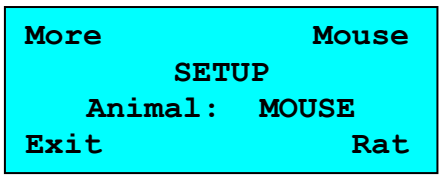


Figure 30: Animal selection screen

This menu option makes it possible to select the type of animal that you use. Press the [**Mouse**] ACTIVITY key or [**Rat**] REARING key. The default value is **Animal: Mouse**.

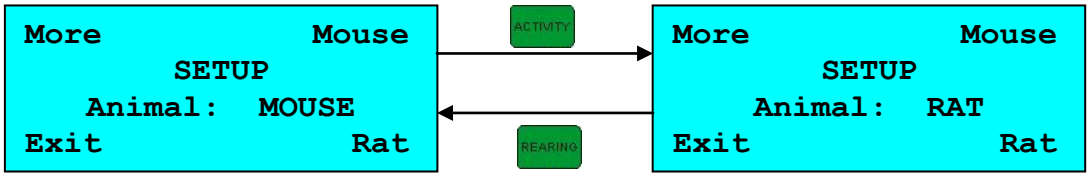


Figure 31: Toggle between animal types

10.1.3. BACKLIGHT

In the SETUP menu (see Figure 27), press the [**MORE**] DRINK key several times until the display shows the word "**Backlight**".

Figure 32: Backlight selection screen

This menu option allows you to turn the light in the display on or off. Press the [**On**] ACTIVITY key to turn on the light or press the [**Off**] REARING key to turn off the light. In the off state the light is in standby mode. The default value is: **Backlight: ON**.

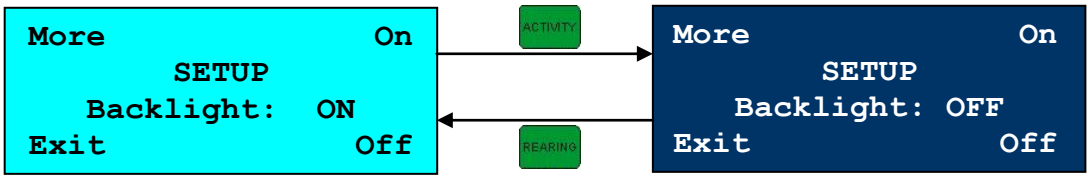


Figure 33: Toggle between backlight modes

10.1.4. SOUND SETUP

In the SETUP menu (see Figure 27), press the [**MORE**] DRINK key several times until the display shows the word "**Beep**".

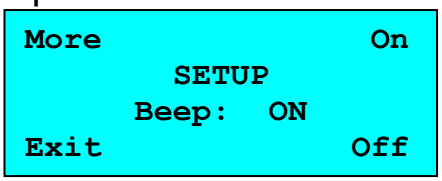


Figure 34: Beep selection screen

You can enable/disable the BEEP by setting this parameter to the ON or to OFF value. Press the [**ON**] ACTIVITY key to enable the beep or press the [**OFF**] REARING key to disable the beep. The default value is: **Beep: ON**.

Figure 35: Toggle between beep modes

10.2. TEST

In the Main menu screen (see Figure 26), press the [**TEST**] 

key in the menu screen to enter the test menu. The display will show:

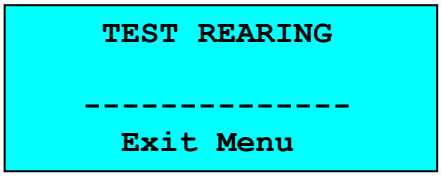


Figure 36: Test screen

Check the operation of the infrared beams with TEST.

- A [*****] indicates that the beam is interfered with by an opaque body (beam cut)
- A [**–**] indicates that the beam reaches the receiver (beam not cut).

Once the cage is placed and without the animal inside it, if all systems are in correct working order, a screen like the one in Figure 36 will be displayed.

Press the 

key to exit.

10.3. WEIGHT CALIBRATION

- In order to calibrate the transducers, remove the screwed lip that covers the top of the transducer (Figure 37).

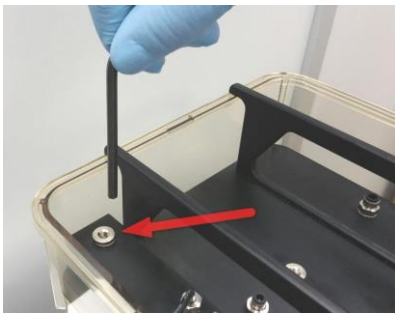


Figure 37: Transducer's top lid.

- With a #5 Allen key, release the screw in a counter-clockwise direction (Figure 38).

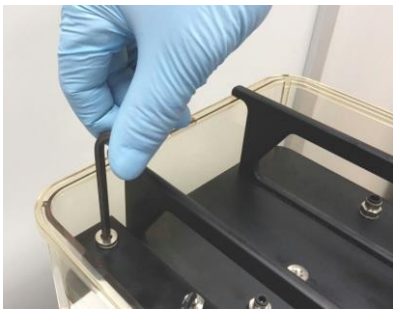


Figure 38: Unscrewing the lid.

- Press the MENU key to enter in the main menu.

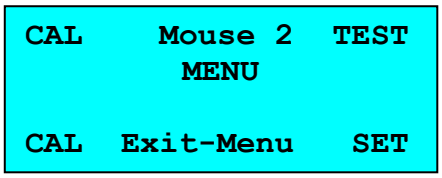


Figure 39: Main menu

- Press the [**CAL**] key in the MENU screen, (DRINK to calibrate drink or FOOD to calibrate food) to enter in calibration menu. The display will show **Waiting** for a short time and then ask the user to **put weight 20gr**.

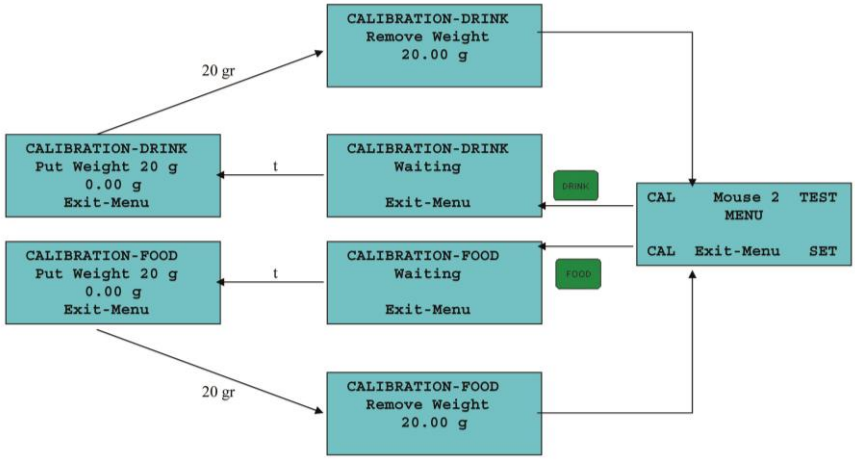


Figure 40: Calibration screen navigation

- Place the 20g reference weight in the top part of the transducer (Figure 41).

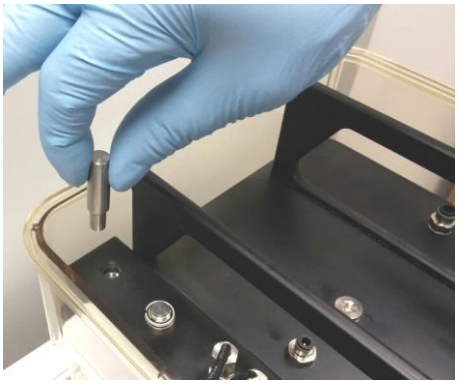


Figure 41: Placing the weight in the transducer

- To ensure that it touches and properly calibrates the transducer, visually inspect that the reference weight does not touch the edge of the screw hole (Figure 42).

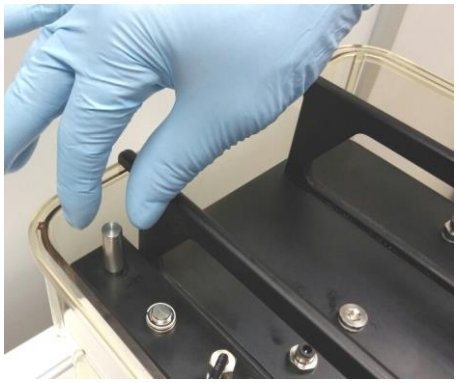


Figure 42: Checking the weight position

- Once the weight is placed, there will be a brief pause and then an audible beep. The screen will display the instruction, **Remove weight**.
- Once the weight is removed, after a short time, the screen will return to the Main menu (Figure 39).
- If the weight used in the calibration is not equal to 20.00 g the calibration will not be correct. Be sure to use a calibrated weight.
- Press the MENU key to exit.
- Replace the removed screw and retighten with the #5 Allen key. If this screw is not replaced after the calibration is completed, the cage would lose its sealing and this would impact the experimental results.

WARNING

- During the calibration process, avoid vibrations, movements and air currents. The equipment has a highly sensitive transducer for detecting movement. If movement is detected during the calibration process, the calibration will be delayed until the movement terminates.
- The weight used for calibration should be 20.0g ± 0.5 g.
- The cage, feeder and bottle should be removed during the calibration process to enhance the stabilization of the process.

11. WORKING WITH THE EQUIPMENT

11.1. STARTING UP THE UNIT

a. Connect all the cables.

b. Switch the rear-panel mains switch **ON**. The header screen will be shown for a few seconds and then the Warm-up screen will be shown.

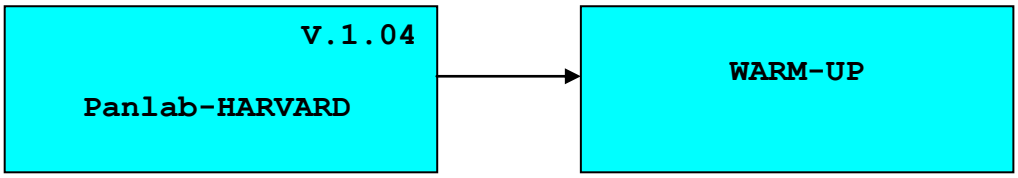


Figure 43: Header and Warming screens

c. After the initial screens, the display will show the main screen.

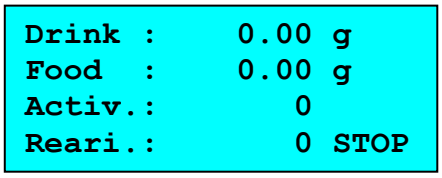


Figure 44: Main screen

d. Program settings in each module (see chapter 10.1).

e. Fill food and drink dispensers.

f. Set the cage up and place the subject inside.

g. Press the 

button to begin the experiment.

h. During the experiment an * will flash in the line of activity every time the subject moves. The value of activity does increase slowly. The sensor is extremely sensitive and the value of activity is divided by one hundred.

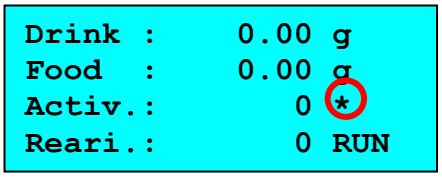


Figure 45: Screen during an experiment

i. Once the experiment has ended press the 

button and the values will remain constant on the display.

NOTE: If the **Metabolism** software is used, the control of cages is done through the software. It is easier to deal with the complete system this way.

12. FINISHING AN EXPERIMENT AND CLEAN UP

12.1. REMOVE THE LID TO CLEAN THE CAGE AND DISPENSERS

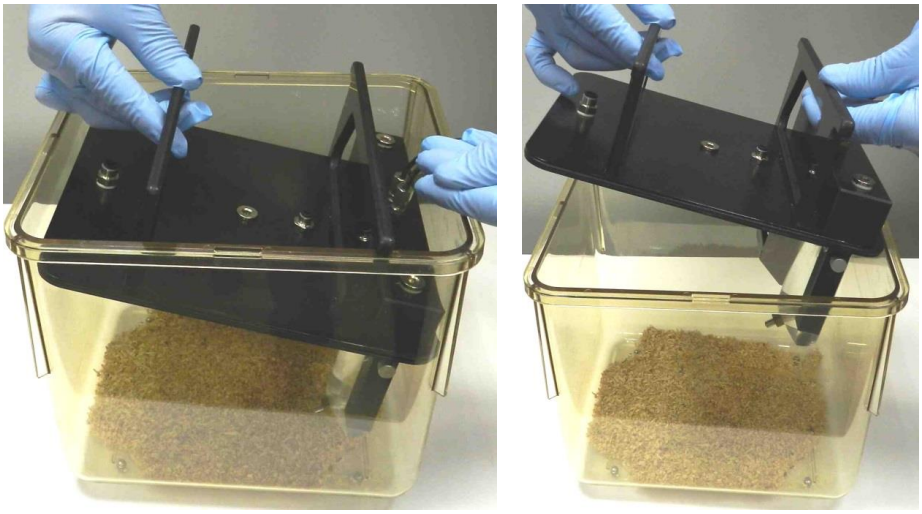


Figure 46: Removing the lid

- Switch off the LE1305 sensor platform.
- Remove the cage from the LE1305 sensor platform and place it on a solid surface.
- Hold the lid grips with one hand (as shown in Figure 46) and pull upwards from the grip located at the opposite side of the transducers. The other hand can help by holding the cage.
- Unplug the transducer cables from the LE1305 sensor platform by pushing the connector button and pulling to free the connection.

12.2. CLEANING THE CAGE

Accumulated urine and faeces in the cage should be cleaned. To clean the cage, use a soapy solution and rinse with water. To dry, use a clean, soft cloth.

WARNING

Only the cage is able to be autoclaved. **Do not** autoclave the other components as they can be damaged**. Do not** use alcohol nor alcoholic derived products on the cage lid, as they will damage the lid material.

12.3. CLEANING THE PLATFORM

You must ensure that no chips of food or bedding accumulate on the top of the control unit; this could interfere with activity detection.

To clean the top cover of the sensor platform, use a dry cloth or one moistened with alcohol. Care must be taken with the cage supports - do not to apply excessive force to the supports as this would cause damage to the load cell within the platform. Suction can be used to clean the top of the sensor platform.

12.4. FOOD DISPENSER CLEANING

- Rest the lid over the cage (Figure 47) to freely handle the food and drink dispensers.
- Remove the food dispenser from the lid and clean it using a soapy water solution followed by water.

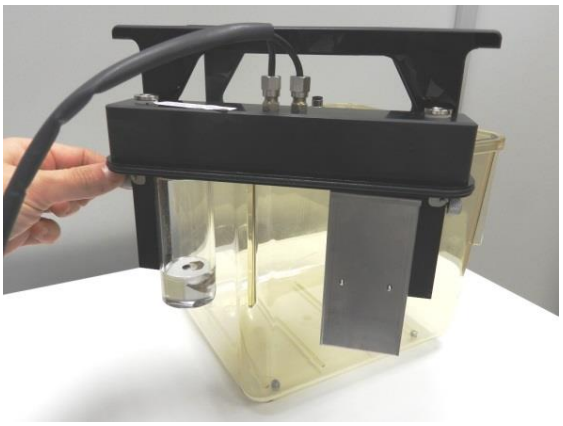


Figure 47: Dismounting the dispensers

12.5. CLEANING THE BOTTLE

- Remove the bottle from the lid and clean it with water.
- Remove any residuals from the pipe valve using a pressurized air spray or similar.

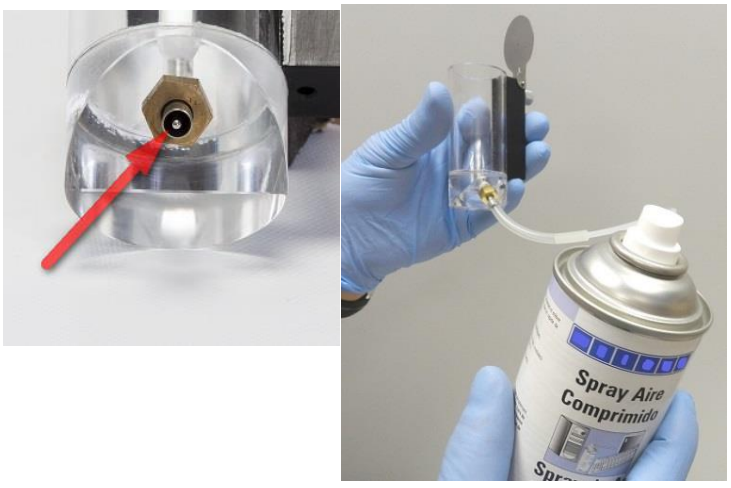


Figure 48: Cleaning the bottle

12.6. CLEANING THE FOOD AND DRINK DISPENSER STANDS

If there are accumulated chips of food or bedding in the feeder and bottle supports, this can interfere with the detection of the load cells.

Periodically clean the stands with an aspirator. Care should be taken so not to apply too much pressure as this would damage the load cells.

12.7. CLEANING THE LID

In order to clean the O-ring see Chapter **¡Error! No se encuentra el origen de la referencia.**

WARNING

Do not use alcohol or alcoholic derived products on the cage lid, as they will damage the lid material.

Use a damp clean cloth and follow with a dry clean cloth to clean the lid. If necessary, use a wet cloth with a soapy solution, remove any soap foam with a wet cloth and dry the lid with a dry, clean cloth.

13. USE RECOMENDATIONS

- Place the cage over a solid table, free from vibrations and air currents.
- Set up the Perspex cage with the food and drink dispensers, make sure that the dispensers are correctly mounted.
- Analyze **Metabolism** software graphics and reject any strange measurements due to strange animal behaviour (for example, friction of food between dispenser and cage).
- Clean the hardware periodically. Before beginning a new experiment, check that the feeders are correctly mounted on their supports.
- To avoid accumulation of excessive food waste, do not work more than 24 hours with a rat or 48 hours with a mouse between cleanings.

13.1. SOFTWARE

The OxyletPro PHYSIOCAGE system utilizes **Metabolism** software. **Metabolism** is an application which logs the data sent by the different units, displays the data on the computer screen and generates data files in formats that may be used by other programs for analysis.

Please refer to the included **Metabolism** User's Manual for a more detailed explanation of the provided functionalities.

14. TROUBLESHOOTING

This table features instructions to solve the most frequent problems.

PROBLEM	SOLUTION
The equipment does not start up.	• Ensure that the voltage of mains is the same as that selected in the fuse holder. • Check the condition of the fuses.
The equipment starts but remains blocked on the warm up screen.	• Check that the food and drink connectors are properly connected. • Pulling from the food bar or the drink bar you should notice that they can move and that they are not blocked.
Rearing counter does not work.	• Connect cable to this connector. • Verify that both bars are at the same height. • Enter in test menu and check that none of the IR beams are cut (an * will appear in the display if this happens). • Take out the cage and check if the beams continue to appear cut. If not, clean the cage. • If the beams continue to appear cut, clean the frame. If the error continues, call the technical service.
The backlight in the display is off.	• Turn it on as indicated in section 10.1.3 in this manual.
One or several units do not send data to the computer.	• Check the connections. See Figure 25. • Verify that each unit has a different module number. See section 10.1.1 • Verify that the ID numbers begin by 1 and are consecutive. See section 10.1.1

PROBLEM	SOLUTION
Uncallibrated appears on the display,	• Calibrate the feeder as explained in chapter 10.3. • Verify that the weight used to calibrate is 20gr ± 0.5 g (range between 19.5 g and 20.5 g) • The table where the equipment is placed must be free of vibration to stabilize the measure.
When food and drink sensors are calibrated , the system is in the phase of "Put 20g weight" and does not reach the stage of "Remove Weight"	• The feeder or bottle must be properly mounted. • Remove the cage while performing the calibration process to facilitate stabilization of the process. • Pulling from the food bar or the drink bar, they can move and that they are not blocked. If they are blocked contact with technical service.

15. PREVENTIVE MAINTENANCE

	EXPERIMENT	WEEKLY	MONTHLY
CHECK CALIBRATION			☑[1]
CLEAN THE CAGE	☑		
CLEAN THE PLATFORM		☑	
CLEAN THE FEEDER	☑		
CLEAN THE BOTTLE	☑		
CLEAN BOTTLE AND FEEDER SUPPORTS		☑	
CHECK IR SENSOR BARS			☑[2]
CHECK PLACEMENT OF FEEDER AND BOTTLE			☑[3]

[1] Read chapter 10.3
[2] [2] Read chapter 10.2
[3] [3] Read chapters 8.3.3 and 8.3.4

16. TECHNICAL SPECIFICATIONS

POWER SUPPLY	
Input voltage:	115 / 230 VAC
Frequency:	50 /60 Hz
Fuse type:	2 fuses 5x20mm 250mA 250V Fast
Maximum Power:	10W
Conducted Noise:	EN55022 /CISPR22/CISPR16 class B
GENERAL SPECIFICATIONS	
Warm-up time	< 10 seconds (under stable weight)
WEIGHT SENSOR	
Technology:	Load cell
Number of sensors:	2, one for each feeder
Measurement range:	0-600 g
Resolution:	20 mg
Linearity:	0.03%
Accuracy:	+/- 0.005% F.S.
Zero tracking:	Automatic
ACTIVITY SENSOR	
Technology:	Load cell
Measurement range:	0-2000 g
Resolution:	50 mg
Linearity:	0.05%
Accuracy:	+/- 0.005% F.S.
Zero tracking:	Automatic
REARING	
Technology:	Infrared beams
Bar:	11 beams
Maximum space between beams:	15 mm
ENVIRONMENTAL CONDITIONS	
Operating temperature:	10°C to +40°C
Operating Relative Humidity:	0% to 85% RH, non-condensing
Storage temperature:	0°C to +50°C, non-condensing
SERIAL OUTPUT	
Type:	RS232C
Baud rate:	19200
Frame:	1 Start bit + 8 bits data + 1 Stop bit
Main Connector:	Sub D 9 female
Remote Connector:	Sub D 9 male
DIMENSIONS	
Width x Height x Depth:	294 x 290 x 320 mm
Weight:	8.5 kg

DECLARACIÓN DE CONFORMIDAD
DECLARATION OF CONFORMITY
DECLARATION DE CONFORMITÉ

Nombre del fabricante: Manufacturer's name: Nom du fabricant:	**Panlab s.l.u.** www.panlab.com info@panlab.com
Dirección del fabricante: Manufacturer's address: Adresse du fabricant:	Energía, 112 08940 Cornellà de Llobregat Barcelona SPAIN
Declara bajo su responsabilidad que el producto: Declares under his responsibility that the product: Déclare sous sa responsabilité que le produit:	**PHYSIOCAGE PLATFORM**
Marca / Brand / Marque:	**PANLAB**
Modelo / Model / Modèle:	**LE1305**

Cumple los requisitos esenciales establecidos por la Unión Europea en las directivas siguientes:
Fulfils 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:

2006/95/EC	Directiva de baja tensión / Low Voltage / Basse tensión
2004/108/EC	Directiva EMC / EMC Directive / Directive CEM
2012/19/EU	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)
2011/65/EU	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)
2006/42/EC	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:	**EN61010-1:2011**
EMC:	**EN61326-1:2012 Class B**
FCC:	**FCC47CFR 15B Class B**
Safety of machinery:	**EN ISO 12100:2010**

En consecuencia, este producto puede incorporar el marcado CE y FCC:
Consequently, this product can incorporate the CE marking and FCC:
En conséquence, ce produit peut incorporer le marquage CE et FCC:

En representación del fabricante:
Manufacturer's representative:
En représentation du fabricant:

Carme Canalís
General Manager
Panlab s.l.u., a division of Harvard BioScience

Cornellà de Llobregat, Spain
30/04/2014

(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 Verkaufstelle 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 especficos 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.