

Hardware User's Manual

Shocker with scrambler

Behavioral chambers



References:

LE100-26 (76-0159)

Publication:

PB-MF-MAN-020-REV1.0

Limitation of Liability








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

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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.

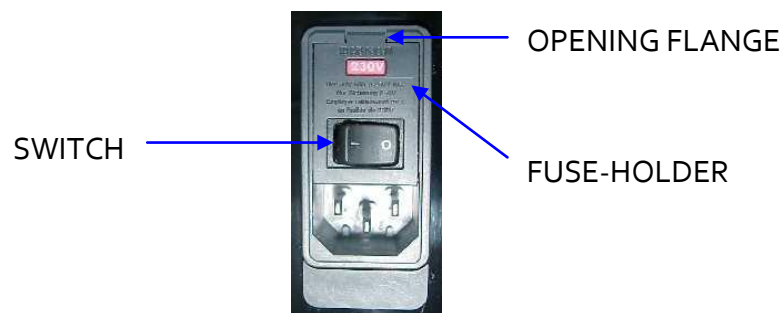


Figure 1. Power inlet, main switch and fuse holder.

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.

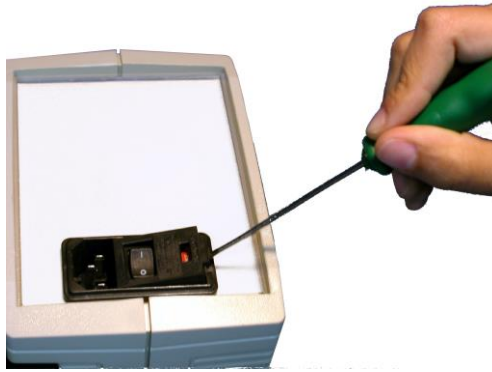


Figure 2. Open fuse-holder door.

- 3 Extract fuse holder using the screwdriver.

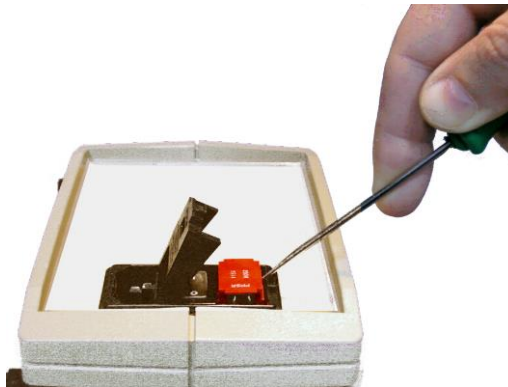


Figure 3. Extract fuse-holder.

- 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.



WARNING

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

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6. INTRODUCTION

The LE 100-26 module is basically an Electric Shock Generator Unit, designed to supply controlled electrical shocks to an animal through floor grids.



Figure 6. LE100-26 Shocker.

This source supplies electrically floating current. Therefore, it is insulated from the rest of power sources.

The shock consists of rectangular pulses that appear in a set sequence and speed among the six bars (scrambler). This prevents two nearby bars with the same polarity from being found.

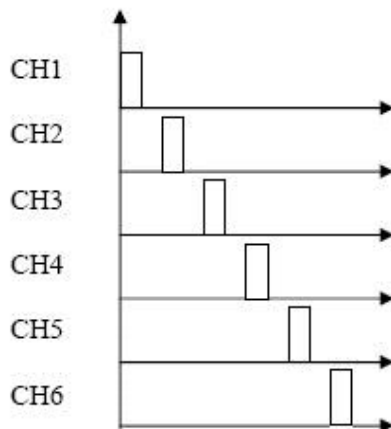


Figure 7. Grid current sequence.

The module is equipped with a timer that allows adjustment of the discharge duration within a range from 0.1 up to 9.9 seconds in increments of 0.1 s.

The module functions can be externally controlled using signals from +5 to +24V DC in the input connectors.



WARNING: Do not touch the electrical grid while Shocker is working, you may receive electrical shock.

7. EQUIPMENT DESCRIPTION

7.1. FRONT PANEL

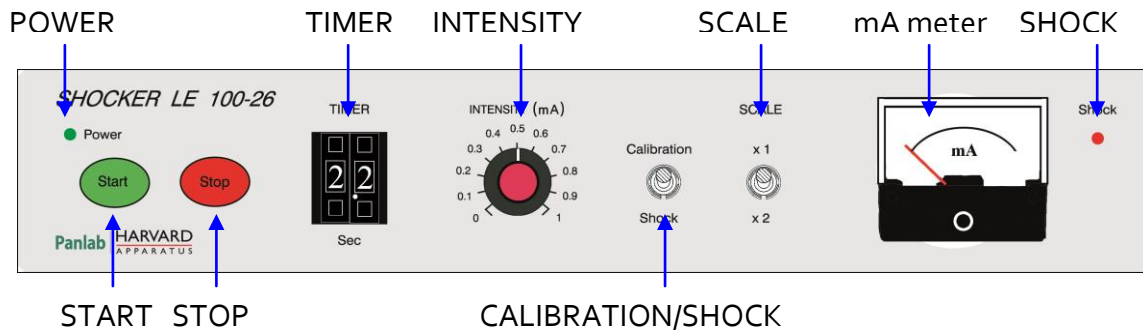


Figure 8. LE100-26 Front Panel.

- **POWER:** Green led that remains on while the control unit is turned on.
- **TIMER:** Decimal selector used to select times between 0.1 and 9.9 seconds in increments of 0.1sec. This time will be the shock activation time once the START button is pressed.
- **INTENSITY:** Potentiometer used to select shock current intensity. The selected value is modified by the factor selected in the SCALE selector.
- **SCALE:** Selector that modifies the value of INTENSITY potentiometer and the value read in the mA-METER.
 - X1: The selected and read intensity values are real.
 - X2: The selected and read intensity values must be multiplied by 2 to obtain the real value.
- **mA meter:** Displays the RMS value of current intensity. This value is modified by the SCALE selector.
- **SHOCK:** Red led that blinks while shock is activated.
- **START:** Shock is active during the time selected in the TIMER selector when this button is pressed. Shock can be ended earlier by pressing the STOP button.
- **STOP:** This button ends shock if the START button has been previously pressed.
- **CALIBRATION/SHOCK:** Selects the mA-METER mode.

- CALIBRATION: In calibration mode the mA-METER shows the RMS current value selected with the INTENSITY potentiometer.
- SHOCK: In shock mode the needle will only move when the animal receives shock. If the grid is clean and there is no animal on the grid the needle will show 0mA although the SHOCK led is blinking.

7.2. REAR PANEL

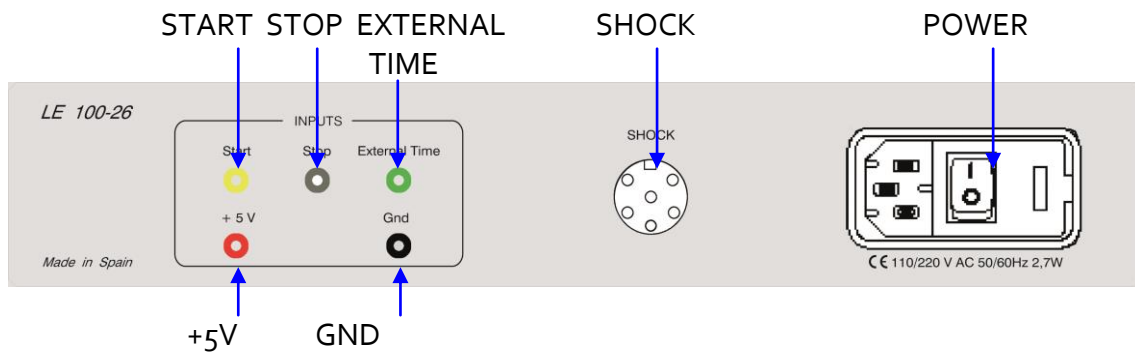


Figure 9. LE100-26 Rear Panel.

- **START:** If a pulse between 5VDC and 24VDC is applied in this input, shock is activated as if the START button on the front panel had been pressed.
- **STOP:** If a pulse between 5VDC and 24VDC is applied in this input, shock is stopped as if the STOP button on front panel had been pressed.
- **EXTERNAL TIME:** Shock will be active and the SHOCK led will blink while 5V to 24V DC are applied in this input. Shock will stop once the voltage is set to ground.
- **+5V:** 5V output that can be used as source of control signal.
- **GND:** Ground connection.
- **SHOCK:** DIN6 female connector used to connect the LE100-26 to the grid.
- **POWER:** Power inlet, fuse holder and main switch.

8. EQUIPMENT CONNECTION

8.1. MANUAL CONTROL

The following schematic shows how to manually control the shocker using either the front panel controls or a foot switch connected to the rear panel.

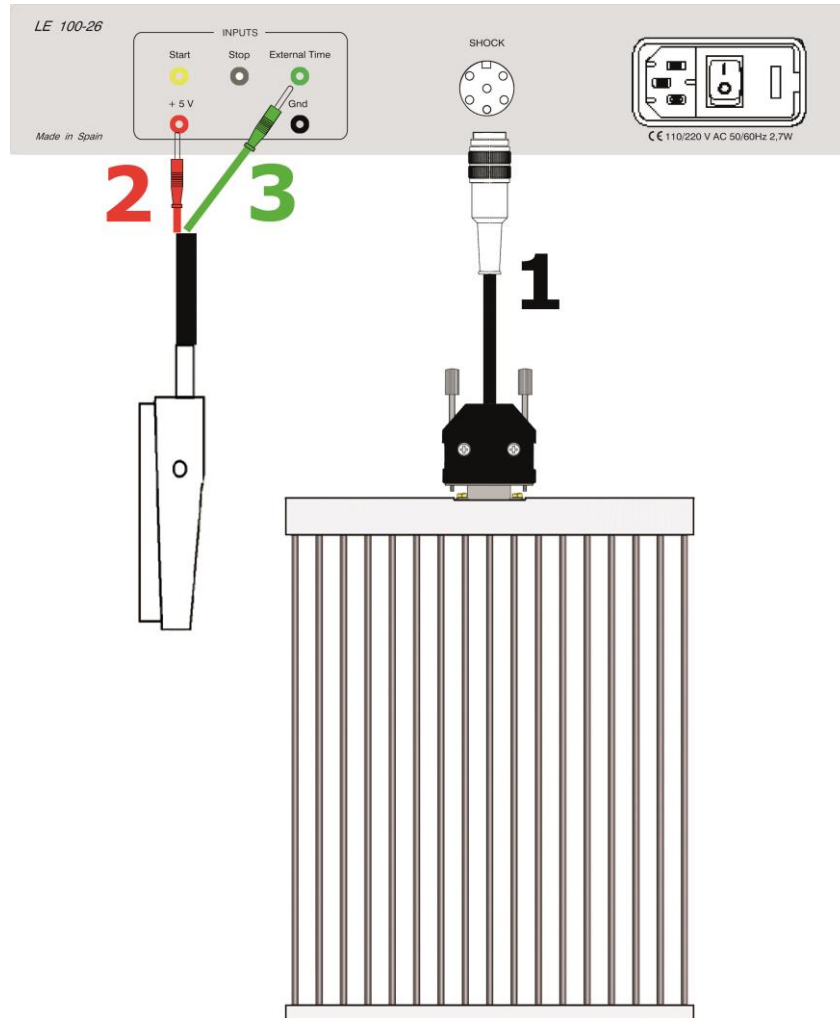


Figure 10. Shocker manual control connections.

The necessary cables are listed in the following table:

	FROM	TO	CABLE
1	LE 100-26 Shocker	Grid	Cable DIN6 to DB9
2	LE 100-26 +5V	Foot switch red banana	Foot switch cable
3	LE 100-26 External Time	Foot switch green banana	Foot switch cable

8.2. REMOTE CONTROL

The LE 100-26 Shocker can be used as a complement to other equipment such as the Skinner cage, Passive avoidance cage or Active avoidance cage. In such case, the shocker would be controlled by the cage control unit, being activated by the **External Time** input. The grounds of both units are connected by the **GND** input.

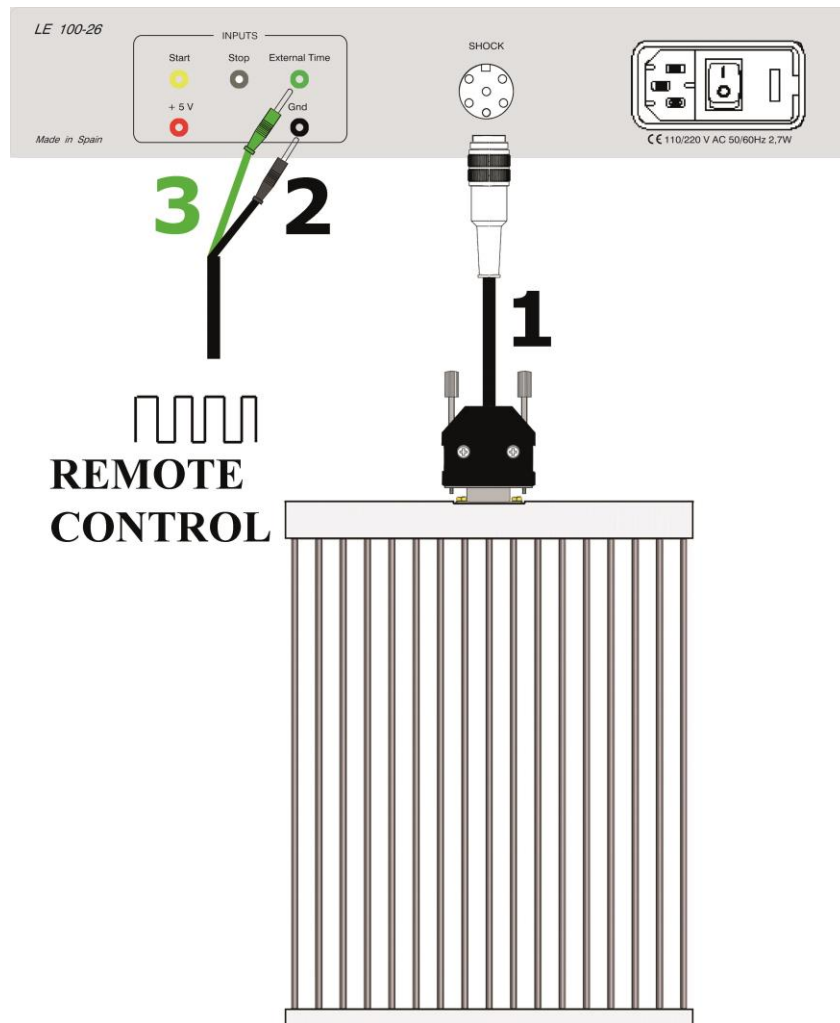


Figure 11. Shocker remote control.

The necessary connections are listed in the following table.

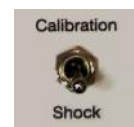
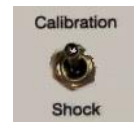
	FROM	TO	CABLE
1	LE 100-26 Shocker	Grid	Cable DIN6 to DB9
2	LE 100-26 GND	External unit GND	Remote cable*
3	LE 100-26 External Time	External unit signal	Remote cable*

*This cable will differ depending on the external control unit. Read the external control unit user manual for further information.

9. EQUIPMENT SETUP

The necessary steps to set up the equipment are as follows:

1. Connect the cables as it's explained in chapter 8.
2. Turn on equipment
3. Select CALIBRATION mode with the selector labelled CALIBRATION/SHOCK
4. Select the scale with the selector labelled SCALE
 - a. x1: Scale from 0 to 1mA
 - b. x2: Scale from 0 to 2mA
5. Select the necessary current with the INTENSITY potentiometer. Selecting 0.8mA in Scale x1 will be equivalent to selecting 0.4mA in Scale x2. In both cases the current will be 0.8mA RMS. The mA-meter needle will point to the selected current.
6. Select shock time in the decimal selector labelled TIMER (between 0.1 and 9.9 seconds).
7. Set mode selector in SHOCK position to begin to work.
8. Press the START button without any animal on the grid. The shock led will blink during the selected time in TIMER. If the grid is clean the mA meter will show 0mA because there is not any connection among grid bars. However if the grid is dirty with excrements, urine or hair the mA meter needle will move, because two or more bars are connected through the residue. In this case clean the grid with soap and water and then thoroughly dry it.



The equipment is ready to work.

9.1. GRID CLEANING

As explained in step 8, when the grid is dirty part of the electrical shock is transmitted through the residue. This will produce erroneous data during the experiment because the animal behaviour to the shock negative reinforcement will not be correct (it will not receive punishment).

In order to clean the grid water and soap can be used and then It must be dried. Be sure to dry well the DBg connector otherwise its contacts may rust over time.

Special care must be taken in cleaning the plastic between bars, because urine is a good electrical conductor and current will flow through it.

10. 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"> • Ensure that the voltage of mains is the same as that selected in the fuse holder. • Check the condition of the fuses.
The animal does not receive shock.	<ul style="list-style-type: none"> • Check that the DB9 to DIN6 cable is connected between the grid and the Shocker. • Check that the jack mono to green and black bananas is connected between the control unit and LE100-26 Shocker when remote control is used. • Check that SHOCK/ CALIBRATION switch in the Shocker is in the SHOCK position. • Check that the INTENSITY knob in the Shocker is set to a value higher than 0mA. • Check that the grid is clean (urine and excrements can conduct current).
The needle of the mA meter moves without animal on the grid when the shocker is active.	<ul style="list-style-type: none"> • Clean the grid as it is explained in chapter 9.1. Urine and faeces are electricity conductors. • Disconnect the cable between shocker and grid, if the problem disappears, this mean grid is dirty or cable is shorted, if the problem does not disappear this mean some of the transistors inside the Shocker is faulty and must be replaced.

11. PREVENTIVE MAINTENANCE

	EXPERIMENT
GRID CLEANING	<input checked="" type="checkbox"/>

12. SPECIFICATIONS

POWER SUPPLY Input voltage: Frequency: Fuse: Maximum power: Conducted noise:	115 /230 VAC 50 /60 Hz 2 fuses 5x20mm 100mA 250V Fast 2.7 W EN55022 /CISPR22/CISPR16 class B
ENVIRONMENTAL CONDITIONS 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
SHOCK Waveform: Channels: Intensity: Impedance:	Rectangular waveform with 8.3ms amplitude Six sequential channels at 20Hz Scale x1: Adjustable from 0 to 1mA RMS Scale x2: Adjustable from 0 to 2mA RMS 160kΩ
INPUT SIGNALS START RESET EXTERNAL TIME	From +5V DC to +24V DC respect GND From +5V DC to +24V DC respect GND From +5V DC to +24V DC respect GND
OUTPUT SIGNALS SHOCK Led POWER Led	3mm red led 3mm green led
DIMENSIONS Width x Height x Depth: Weight:	285mm x 70mm x 250mm 1.6 kg

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

Nombre del fabricante: **Panlab s.l.u.**
 Manufacturer's name: www.panlab.com
 Nom du fabricant: info@panlab.com

Dirección del fabricante: **Energía, 112**
 Manufacturer's address: **08940 Cornellà de Llobregat**
 Adresse du fabricant: **Barcelona SPAIN**

Declara bajo su responsabilidad que el producto: **SHOCKER**
 Declares under his responsibility that the product:
 Déclare sous sa responsabilité que le produit:

Marca / Brand / Marque: **PANLAB**

Modelo / Model / Modèle: **LE 100-26**

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:

2006/95/EC	Directiva de baja tensión / Low Voltage / Basse tension
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
 25/06/2014

(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.