Hardware User's Manual

Temperature Control Unit

Homeothermic Blanket

References:

HB101 (76-0385), RS (76-0111)

Version:

1.0

Panlab | Harvard Apparatus

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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.
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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 65ºC	
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 INSTALATION

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.

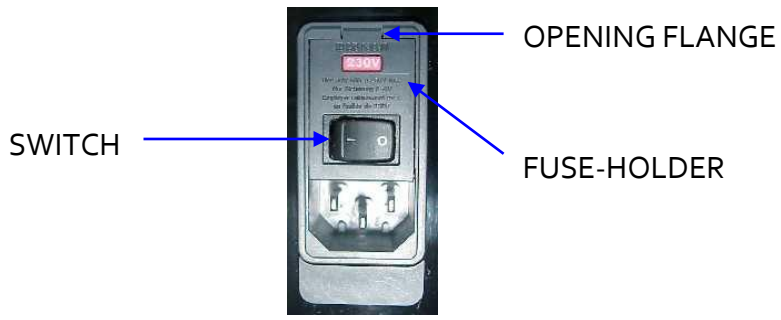


Figure 1. Power inlet, main switch and fuse holder.

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.

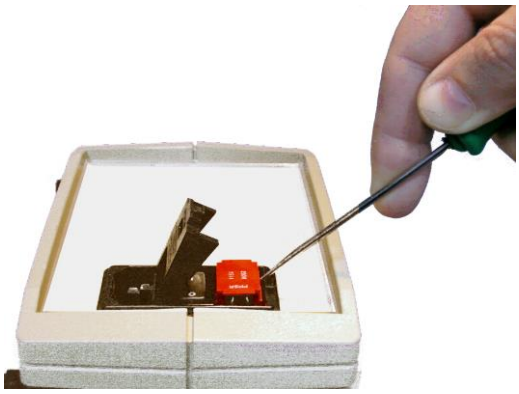


Figure 3. Extract fuse-holder.

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.

5. TABLE OF CONTENTS

6. INTRODUCTION

The HB 101/2 is a device used for monitoring the warming and temperature of homeothermic blankets for mice, rats and rabbits. The goal is the maintenance of body temperature in experimental animals. A rectal probe monitors the animal's body temperature, and this value is shown on the **TEMPERATURE** display.

Figure 6. HB101/2.

The RS versions enhance the standard model with the capability to transmit the current probe temperature to a PC and save it for future reference, using the **Sedacom** program (to be purchased separately).

7. EQUIPMENT DESCRIPTION

7.1. FRONT PANEL

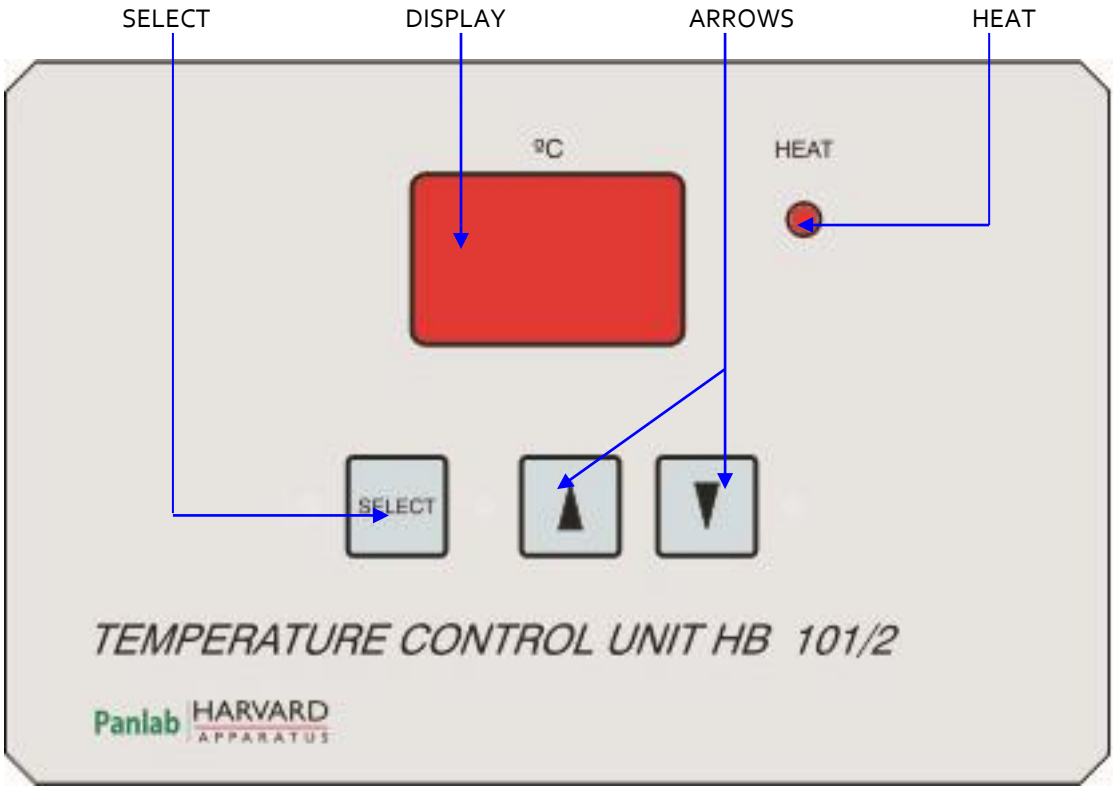


Figure 7. HB101/2 Front Panel.

- **SELECT:** This button is used to set the blanket temperature between 32.0ºC and 45.0ºC. The display will show a flashing decimal dot, and the temperature setting can be modified with the ARROWS. The display will show the blanket temperature again if SELECT is pressed, or if 15 seconds pass without any button being pressed.

- **DISPLAY**: The display shows the blanket temperature with a resolution of 0.1ºC. The display will show "---" if the temperature probe is not connected or the temperature is lower than 20ºC. The decimal dot flashes when the device is in temperature selection mode.

- **HEAT**: This LED remains on while the blanket is heating.

- **ARROWS:** The selected temperature can be modified with the arrows after pressing the SELECT button. The temperature range is between 32.0ºC and 45.0ºC.

7.2. REAR PANEL

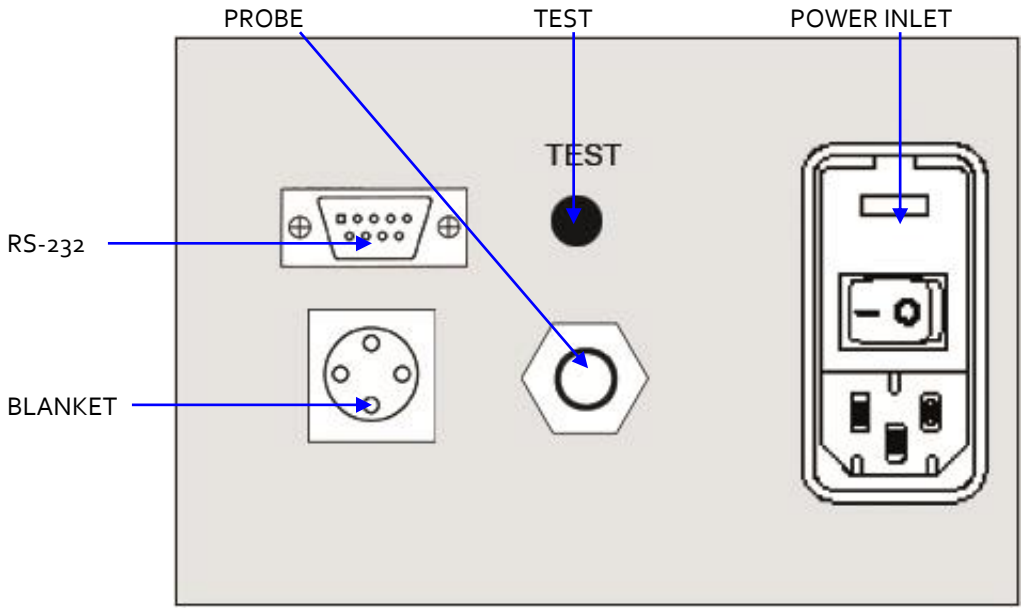


Figure 8. HB 101/2 Rear Panel.

- **BLANKET:** This connector is used to plug in the homeothermic blanket.

- **PROBE:** This connector is used to plug in the temperature probe.

- **TEST:** This button is used to check the control unit. Unplug the probe and the blanket, then select a temperature of 40.5ºC by pressing the SELECT button, followed by the ARROWS. Press SELECT again to confirm the selection, then press the TEST button. The display will show approximately 40.0ºC and the "HEAT" LED will be on because the selected temperature is higher than the displayed temperature. Now select 39.5ºC and press the TEST button. The display will show approximately 40.0ºC and the "HEAT" LED will go off, because the selected temperature is lower than the displayed temperature.

- **POWER INLET:** Power inlet, main switch and fuse holder.

- **RS-232:** This is a 9 pin female delta connector only available in the RS version. It is used to send data to a PC for processing with the **Sedacom** software.

7.3. HOMEOTHERMIC BLANKET

Connect it to the Blanket Connector on the Rear Panel.

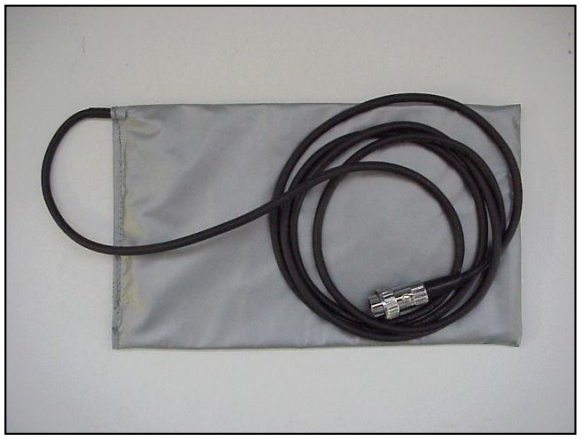


Figure 9. Homeothermic blanket.

The homeothermic blanket models are as follows:

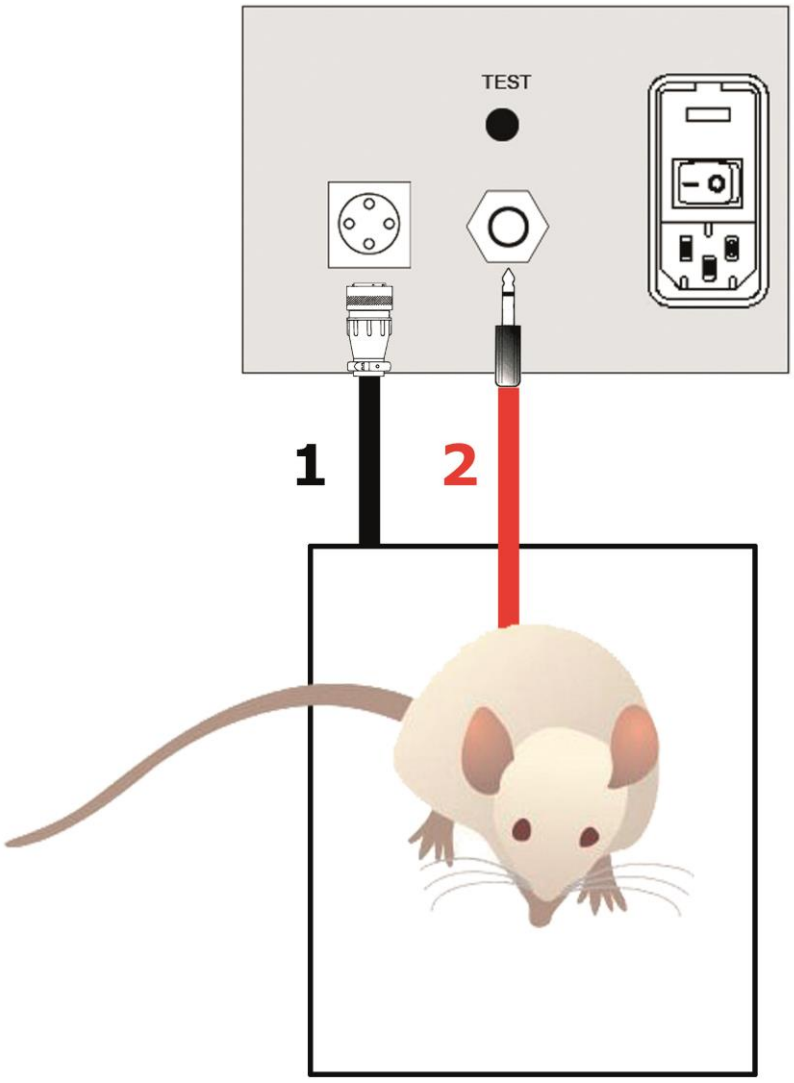
DESCRIPTION	DIMENSIONS (mm)
Soft blanket for rabbit	400x700
Hard blanket for rat	105x230
Soft blanket for rat	150x250
Hard blanket for mouse	90x114
Soft blanket for mouse	100x150

8. EQUIPMENT CONNECTION

8.1. HB101/2

The necessary connections are shown in the following schematic.

Figure 10.



Equipment connections.

The cables and connections are listed in the following table:

	FROM	TO	CABLE
1	HB101/2 blanket	Blanket	Blanket cable
2	HB101/2 probe	Animal rect	Temperature Probe

8.2. HB101/2 RS

HB101/2 RS has an RS-232 port to send data to the computer for processing with the **Sedacom** software. The necessary connections are shown in the following schematic.

Figure 11. Equipment connections.

The connections and cables are listed in the following table.

	FROM	TO	CABLE
1	HB101/2 blanket	Blanket	Blanket cable
2	HB101/2 probe	Animal rect	Temperature Probe
3	HB101/2 RS232	PC Com port	RS232 cable

8.3. CONNECTING THE BLANKET

To connect the blanket, align the connector with the socket (the mark must be visible on the upper part of the connector), insert the connector and then turn the metal ring to fasten it.

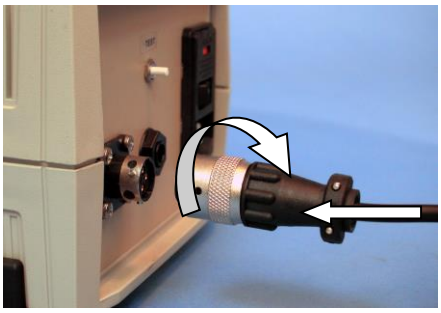


Figure 12. Connecting the blanket to the control unit.

8.4. CONNECTING THE TEMPERATURE PROBE

Insert the jack into the rear panel to connect the temperature probe to the control unit.

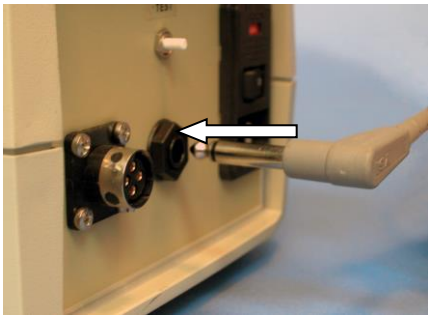


Figure 13. Connecting the probe to the control unit.

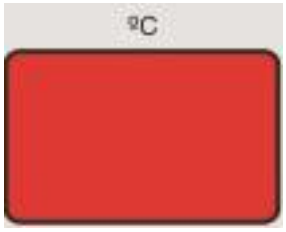
9. WORKING WITH THE EQUIPMENT

9.1. CONDUCTING AN EXPERIMENT

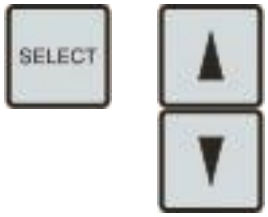
1 Connect the blanket and the temperature probe to the control unit rear panel.

2 Connect the power cord and turn the control unit on.

3 The display will show the probe temperature. If the probe temperature is lower than 20ºC, or the temperature probe is not connected, or the temperature probe is damaged, the display will show "---".



4 Press the SELECT button to select the temperature. The decimal dot will flash. Select the temperature with the ARROWS. Press SELECT again to save the changes, or wait 15 seconds without pressing any button. The display will then show the probe temperature and the decimal dot will stop flashing.



5 Prepare the animal in the blanket. Place the probe in its anus.

6 Now, the control unit will work to reach the target temperature. The HEAT led will stay on while the blanket is heating.

7 The TEST button is to ensure that the unit is working properly. Disconnect the probe and push this button. A value of approximately 40.0ºC should be displayed. If the selected temperature is lower than 40.0ºC the HEAT led will not come on. If the selected temperature is higher than 40.0ºC the HEAT led will come on.

The temperature probe must always be in contact with the animal or the blanket. If the probe is in the ambient air, the blanket may exceed the pre-set temperature, potentially over-warming or injuring the animal.

9.2. CLEANING THE TEMPERATURE PROBE

Read the temperature probe manual in order to follow the manufacturer recommendations.

9.3. TEMPERATURE PROBE DISINFECTION

Read the temperature probe manual in order to follow the manufacturer recommendations.

9.4. TEMPERATURE PROBE STERILIZATION

Read the temperature probe manual in order to follow the manufacturer recommendations.

9.5. PAD OR BLANKET CLEANING

To clean the pad or the blanket 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.

10. USING THE SEDACOM SOFTWARE (RS version)

The purchase of the **Sedacom** software option is needed for transferring the data to a computer (please contact your local provider 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 the 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 the connection of the present device to the computer in which the **Sedacom** software is installed. Please refer to the Connection chapter 8 of the present User's Manual for instructions on how to connect this cable to the device.
- If the computer doesn't have any serial port, the RS232/USB adapter is needed (ref. CONRS232USB, contact your local provider for more information)

11. TROUBLESHOOTING

This table features instructions to solve 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 display of the HB101/2 shows "---" instead of a numeric value.	• Ensure that the temperature probe is connected to the control unit. • With the help of an auxiliary thermometer check that the blanket temperature is not lower than 20ºC or higher than 47ºC (measuring range of the control unit). • Press the TEST button on the rear panel, if the display shows a temperature around 40.0ºC and when you release the button the display shows "---", this means that the temperature probe is damaged and must be replaced by a new one.
The blanket does not heat	• Check that the blanket is connected to the control unit. • Check that the temperature probe is connected to the control unit. • Check that selected temperature is higher than the current temperature.
The blanket overheats above the selected temperature.	• Some overshoot of the temperature is expected. Wait a while to stabilize, if it returns to the selected temperature, the machine is working properly. If warming continues indefinitely despite the led HEAT being off contact the technical service.
The blanket feels hot but the temperature on the display varies slightly and does not reach the selected value.	• Ensure that the temperature probe remains in contact with the blanket or rectum of the animal whose temperature is regulated.

12. PREVENTIVE MAINTENANCE

	EXPERIMENT	MONTHLY
PAD OR BLANKET CLEANING	☑	
CLEAN TEMPERATURE PROBE	☑	
DISINFECT TEMPERATURE PROBE	☑	
STERYLIZE TEMPERATURE PROBE		☑
CHECK TEMPERATURE PROBE PLACING	☑	

13. SPECIFICATIONS

POWER SUPPLY	
Input voltage:	115 /230 VAC
Frequency:	50 /60 Hz
Fuse:	2 fuses 5x20mm 1A 250V Fast
Maximum power:	60 W
Conducted noise:	EN55022 /CISPR22/CISPR16 class B
Equipment start-up time:	<1 min
WARMING SPECIFICATIONS	
Temperature range:	32–45 ºC
Display resolution:	0.1 ºC
Accuracy:	+/-0.3 ºC
Highest temperature:	65 ºC (without probe feedback)
Maximum output voltage in blanket:	140 VDC
Minimum voltage in blanket:	30 VDC
Noise:	200 mV (peak to peak)
Noise frequency:	200 Hz
TEMPERATURE PROBE	
Technology:	Thermistor
Measurement range showed:	20-47 ºC
Linearity:	+/-0.1 ºC
Accuracy**:**	+/- 0.1 ºC
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
COMUNICATIONS OUTPUT	
Standard interface:	RS232C
Connector:	Delta 9 contacts female connector
DIMENSIONS	
Width x Height x Depth:	161 x 115 x 250 mm
Weight:	2.5 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:	**Manta Homeotérmica**
Marca / Brand / Marque:	**PANLAB**
Modelo / Model / Modèle:	**HB101/2**

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**
Safety of machinery:	**EN ISO 12100:2010**

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:

CE

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
27/06/2014

(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 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.