Hardware User's Manual

TMP812RS

Digital Thermometer

References:
TMP812RS (76-0065)

Version:
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Panlab | Harvard Apparatus

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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.

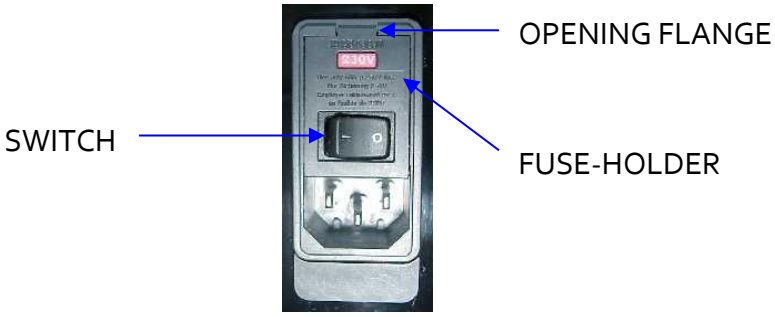

Figure 1. Power inlet, main switch and fuse holder.

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.

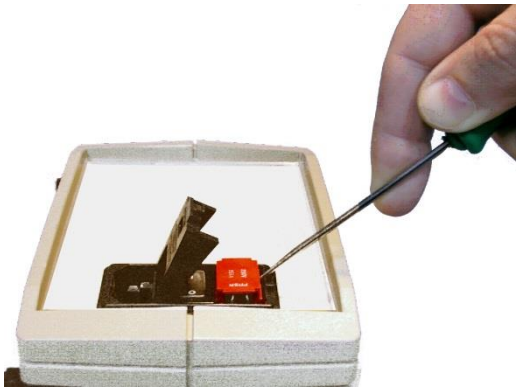

Figure 3. Extract fuse-holder.

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 TMP 812 RS is a self-calibrated digital thermometer that can work with up to 12 temperature probes simultaneously. The RS232 output of the device can be used for the transfer of data to an external device: printer or PC associated to the SEDACOM software (both options are not included with the device, they should be purchased separately).

Figure 6. TMP 812 RS.

The analogical to digital conversion is performed with 13 bits precision.

Range of temperature readings	0ºC - 50ºC
Temperature precision	0.1ºC
Required probe model	YSI series 400
Probe temperature reading	250 msec/probe
Renewal of the reading of each probe	3 sec.
Information format	ASCII

7. EQUIPMENT DESCRIPTION

7.1. CONTROL UNIT FRONT PANEL

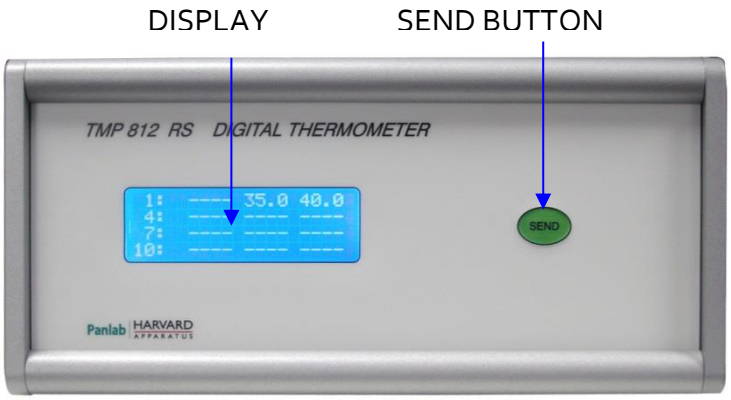

Figure 7. TMP 812 RS Front Panel.

- **DISPAY:** The display simultaneously shows the temperature of the 12 probes in ºC. If a probe is broken or not connected the display will show "----" for it.

- **SEND BUTTON:** When this button is pressed, the TMP812 RS will send the temperatures to the connected external options (printer or software) through the RS2323 output.

7.2. DISPLAY

Figure 8. Digital Display.

The temperature of the 12 probes is shown on the display simultaneously in 4 rows and 3 columns. The number at the beginning of each row is the number of the first probe in that row. Thus, the first row contains probes 1, 2 and 3; the second row contains probes 4, 5 and 6; the third row contains probes 7, 8 and 9 and the last row contains probes 10, 11 and 12.

7.3. CONTROL UNIT REAR PANEL

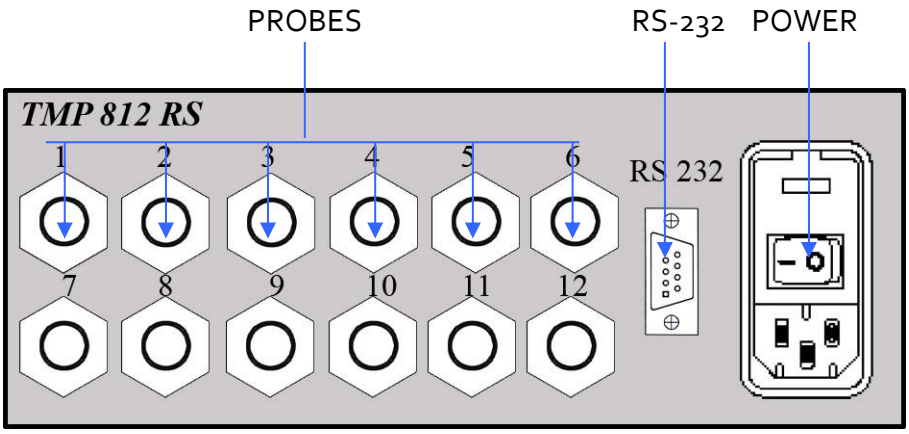

Figure 9. Rear Panel.

- **PROBES:** There are 12 jack plugs distributed in 2 rows and 6 columns. They are all labelled with probe numbers from 1 to 12. When a probe is not connected or damaged the display will show "----".

- **RS 232:** A DB9 female connector used to connect the TMP 812 RS to the computer serial port. Temperatures are sent external output device options through this connector when the **SEND** button is pressed.

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

8. EQUIPMENT CONNECTION

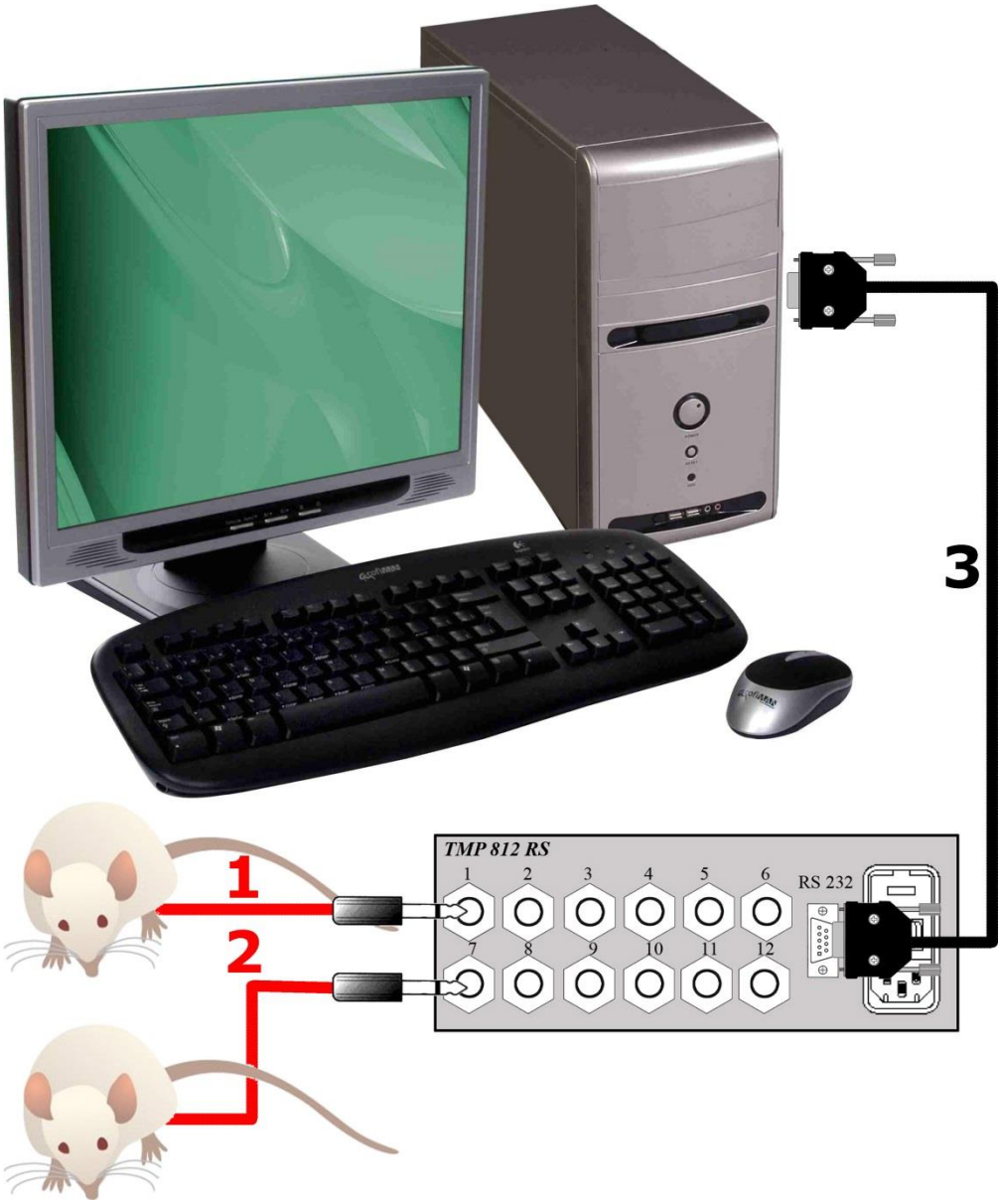

Figure 10. Connection example.

The above figure shows an example of a connection between the TMP 812 RS and the computer for temperature measurement of 2 rodents. The necessary connections and cables are listed in the following table.

	FROM	TO	CABLE
1	TMP812RS probe 1*	Rodent 1*	YSI temperature probe
2	TMP812RS probe 2*	Rodent 2*	YSI temperature probe
3	TMP812RS RS232	Computer Serial port	RS232 cable

*N is the probe number from 1 to 12.

9. WORKING WITH THE EQUIPMENT

9.1. MEASURING PROCEDURE

1. Plug in the POWER CORD, making sure to have selected the correct voltage, with the power button in its OFF position.

2. Connect the desired number of PROBES to the rear panel SOCKETS. The instrument will automatically detect which channels are working.

3. Turn on the instrument by switching the power button to the ON position. If no probe is connected, the display will show "----" for each probe. If a probe is connected, the registered temperature will appear on the display in the relevant placement.

    a) If any probe temperature is below 0 ºC, the display will show in the relevant position "*<0 C*".

    b) If any probe temperature is above 50 ºC, the display will show in the relevant position "*>50C*".

4. If all the probes (12) are connected, it will take 3 seconds until every register shows its present value (it takes 250 msec. to take each register).

9.2. TESTING EQUIPMENT CALIBRATION

Along with the equipment are delivered two probes pattern of 35 ° C and 40 ° C. These probes are in fact fixed resistors that do not vary over time.

The equipment is calibrated in factory and the user cannot calibrate it. What if the user can do is to check its calibration with both pattern probes, for it simply they must be connected in any two channels and watch the display will show the values of 35 ° C and 40 ° C in the respective channels.

9.3. CLEANING THE TEMPERATURE PROBE

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

9.4. TEMPERATURE PROBE DISINFECTION

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

9.5. TEMPERATURE PROBE STERILIZATION

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

10. SENDING DATA TO A COMPUTER (SEDACOM)

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

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

11. 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 display shows "---" in the temperature of a channel.	• Make sure the temperature probe is properly connected on the rear panel. • If there is a probe connected, change the probe of channel to see if the problem is in the probe or in the channel.
The display shows "<0C" in the temperature of a channel.	• The measured temperature is lower than 0ºC. • If not, change the probe of channel to see if the problem is in the probe or in the channel.
The display shows "> 50C" in the temperature of a channel.	• The measured temperature is higher than 50ºC. • If not, change the probe of channel to see if the problem is in the probe or in the channel.
The equipment does not send data to Sedacom32.	• Make sure your equipment is connected to PC via RS-232. • Check that Sedacom32 settings so that the serial port and the equipment selected are correct. • Restart the equipment and the PC to do a RESET in communications.

12. PREVENTIVE MAINTENANCE

	EXPERIMENT	WEEKLY	MONTHLY	SERVICE
CHECKING CALIBRATION			☑	
CLEANING THE TEMPERATURE PROBE	☑			
DESINFECTING THE TEMPERATURE PROBE		☑		
STERILIZING THE TEMPERATURE PROBE[1]				☑

[1]You must sterilize the temperature probe before sending it back for servicing.

13. TECHNICAL SPECIFICATIONS

POWER SUPPLY	
Input Voltage	115 /230V~
Frequency	50 /60 Hz
Fuses	2 fuses 5x20mm 250mA 250V Fast
Maximum Power	12 W
Conducted noise	EN55022 /CISPR22/CISPR16 class B
BEHAVIOURAL CONDITIONS	
Working temperature	10°C a +40°C
Working relative humidity	0% a 85% RH, without condensation
Storage temperature	0°C a +50°C, without condensation
TEMPERATURE MEASUREMENT	
Range of temperature readings	0ºC to 50ºC
Temperature precision	0.1ºC
Probe model required	YSI series 400
Probe temperature reading	250 msec/probe
Renewal of the reading of each probe	3 sec.
COMUNICATIONS OUTPUT	
Standard Interface	RS232C
Connector	Delta 9 contacts female connector
DIMENSIONS	
Width x Height x Depth	232mm x 111mm x 297mm
Weight	3.5 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:	**DIGITAL THERMOMETER**
Marca / Brand / Marque:	**PANLAB**
Modelo / Model / Modèle:	**TMP812RS**

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:	**EN61326-1:2013 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
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.