

**MICROSCOPIO PROFESIONAL  
PROFESSIONAL MICROSCOPE  
MICROSCOPE PROFESIONEL**

REF. - CODE - RÉF. HBC002



Este manual es parte inseparable del aparato por lo que debe estar disponible a todos los usuarios del equipo. Le recomendamos leer atentamente el presente manual y seguir rigurosamente los procedimientos de uso para obtener las máximas prestaciones y una mayor duración del mismo.

*This manual should be available for all users of these equipments. To get the best results and a higher duration of this equipment it is advisable to read carefully this manual and follow the processes of use.*

*Ce manuel est une partie indissociable de l'appareil et doit être mis à la disposition de tous les utilisateurs de l'équipement. Nous vous recommandons de lire attentivement ce manuel et de suivre scrupuleusement les procédures d'utilisation afin d'obtenir des performances maximales et une plus longue durée de vie de l'appareil.*

**LANGUAGE INDEX**

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Thank you for choosing this equipment. We sincerely wish that you enjoy your Ura Technic professional microscope code HBC002. We highly recommend looking after this equipment according to what is stated in this manual.

Ura Technic develops its products according to the CE marking regulations as well as emphasizing the ergonomics and security for its user. The correct using of the equipment and its good quality will permit you to enjoy this equipment for years.

The improper use of the equipment can cause accidents and electric discharges, circuit breakers, fires, damages, etc. Please read the point of Maintenance, where we expose the security notes.

**TO GET THE BEST RESULTS AND A HIGHER DURATION OF THE EQUIPMENT IT IS ADVISABLE TO READ THOROUGHLY THIS MANUAL BEFORE OPERATING WITH THE EQUIPMENT.**

Please bear in mind the following:

- This manual is inseparable from professional microscopes Ura Technic code HBC002, so it should be available for all the users of this equipment.
- You should carefully handle the microscope avoiding sudden movements, knocks, free fall of heavy / sharp objects on it. Avoid spilling liquids inside the equipment.
- Never dismantle the different pieces of the microscope to repair it yourself, since it could produce a defective use of the whole equipment and a loss of the product warranty, as well as injuries on people that handle the microscope
- To prevent fire or electric discharges avoid dry or dusty environments. In case it may happen unplug the equipment immediately.
- If you have any doubt about setting up, installation or functioning do not hesitate in contacting your wholesaler. You can also tell us any doubts or suggestions you have by contacting Ura Technic Technical Assistance Department by email to [asistencia@auxilab.com](mailto:asistencia@auxilab.com).
- This equipment is protected under the Warranties and consumer goods regulation (10/2003).
- Overhaul is not covered by the microscope warranty.
- Operations made by non-qualified staff will automatically produce a loss of the microscope warranty.
- Neither fuses nor accessories (including their loss), are covered by the product's warranty. The warranty neither covers piece's deterioration due to the course of time.
- Please make sure you keep the invoice, either for having the right to claim or asking for warranty coverage. In case you have to send the equipment to Ura Technic Technical Assistance Department you should enclose the original invoice or a copy as guarantee.
- Manufacturer reserves the right to modify or improve the manual or equipment.



**ATTENTION!! IF EQUIPMENTS ARE NOT PROPERLY CLEAN AND DISINFECTED THEY WOULD NOT BE ALLOWED TO REPAIR BY OUR TECHNICAL SERVICE.**

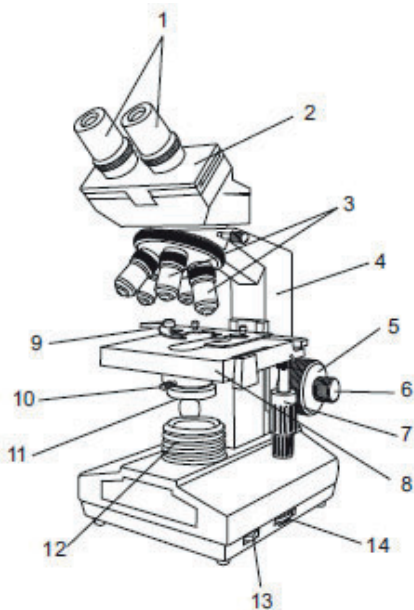
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## 1. USES OF THE INSTRUMENT

Ura Technic professional microscopes code HBC002 are very sturdy equipments designed to provide the highest satisfaction in a wide range of demands. They are equipped with high quality optics and a wide range of accessories to complete the microscope.

## 2. DESCRIPTION



1. Eyepieces
2. Head
3. Objectives
4. Estate
5. Coarse adjustment knob
6. Fine adjustment knob
7. Stage movement knobs
8. Stage
9. Clips / mechanical stage
10. Condenser
11. Iris diaphragm
12. Precondenser
13. Switch
14. Light's intensity control knob

### 3. TECHNICAL SPECIFICATIONS

<b>Code</b>	HBC002
<b>Head</b>	Binocular
<b>Eyepieces</b>	WF10x/18 mm (Ø23 mm) + WF16x/11mm (Ø23 mm)
<b>Interpupillary dist.</b>	53 - 72 mm
<b>Diopter correction</b>	±2 diopters (both eyepieces)
<b>Nosepiece</b>	Quadruple
<b>Objectives</b>	Achromatic and antifungals 4x (NA:0.10) 10x (NA:0.25) 40x (R) (NA:0.65) 100x (R)(I)(NA:1.25)
<b>Stage</b>	130 x 140 mm double bed mechanics
<b>Condenser</b>	Abbe (AN: 1.25)
<b>Diaphragm</b>	Iris
<b>Filters</b>	Blue and Green (Ø 32 mm)
<b>Lamp</b>	LED
<b>Power</b>	100-240V, 50/60 Hz

#### 1. Estative

Metallic, very stable, provided with coaxial controls at both sides to enable coarse and fine focusing. The right control has a tension adjusting ring; the left one has a fast focusing device. The nosepiece is quadruple.

#### 2. Focusing travelling

- Macro = 25 mm with final stop.
- Micro = 25 mm, 0-200 microns each 2 microns.

### 3. Head

We have available different types of head depending on the model you choose:

- Binocular, inclined 45° and rotary 360°. Symmetrical interpupillary graduation with scale from 53 up to 72 mm, dioptic equalizing rings (2 dioptries each), with tube's equalizing scale (160 mm).

### 4. Condenser: Abbe double lens.

- Numerical aperture: 1.25.
- Moveable filter holder. It includes blue and green filters (32 mm diameter).
- Vertically variable by pinion and rack.

### 5. Stage

- Coaxial and vertical control knobs.
- Dimensions: 140 x 140 mm
- Travelling area: 70(X) x 50(Y) mm.
- Graduated scales at 0,1 mm.

### 6. Iris diaphragm

- Located under the condenser and the stage, it controls the amount of light that enters the condenser.

### 7. Illuminator

- LED diode high luminosity 5 V 1W, built-in feeder (220-230V 50Hz  $\pm 10\%$ ), switch and intensity adjust potentiometer. Concave mirror included for reflected light lighting.

### Optical specifications

■ Achromatic objectives: they correct chromatic aberrations so that the optical system can transmit white light beams without being separated in the spectrum colours.

Specifications of each objective are coded as follows:

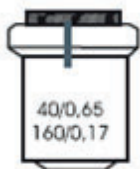


Figure 2

**40:** Objective magnification

**0.65:** Numerical aperture

**160:** Tube's length

**0.17:** Thickness of the microscope slide

■ Achromatic objectives:

Magnifications	4X	10X	40X	100X
Working distance (mm)	17.50	7.32	0.63	0.19
Numerical aperture	0.10	0.25	0.65	1.25

■ Total magnification:

This is the result of multiplying the eyepiece's magnifications by the objective's magnifications.

	Objectives	4X	10X	40X (R)	100X(R)(I)	
W.F/10X	Total magnification	40	100	400	1000	- W.F.: Wide Field
	Field of view (mm)	4.50	1.80	0.45	0.18	- P.: plan achromatic.
P/16X	Total magnification	64	160	640	1600	- R: retractile.
	Field of view (mm)	2.75	1.10	0.27	0.11	- I: Immersion objective (oil)

- **N.A.:** Numerical aperture, it determines the objective's properties. The numerical aperture of a microscope objective is a measure of its ability to gather light and resolve fine sample detail at a fixed object distance. Thus, the bigger it is, the brighter and better resolved the image will be.
- **Working distance:** It is the distance in millimetres between the microscope slide and the objective's front lens when the image is focused.
- **Focal distance:** It is the distance, expressed in millimetres, from the main image plane to its image focus.
- **Resolution:** It is the reciprocal value of the separating power, that is to say, the smallest distance between two points on a sample that can still be distinguished as two separate entities. It is expressed in lines/mm.
- **Number of field:** It expresses the diameter (mm) of the field's diaphragm that is composed by the eyepiece.
- **Field of view:** Dimensions of the real field we are observing, expressed in millimetres.

## 4. INSTALLATION / SETTING UP

### ■ Preliminary inspection

- Unwrap the microscope, take off the involving plastic and take off the poliespan protection in which it comes fitted. Take off all the protective items and, without connecting the microscope to the net, make sure that it does not present any damage because of the shipment. In case the microscope presents any damage tell it immediately to your transport agent or dealer so that they can make the claims in the correct time limit.
- Please keep the original wrapping; you will always need it for returns enclosed with all the accessories supplied.
- Please check that all the accessories are enclosed with the equipment:
  - Eyepieces 2x WF10x/18mm and 2xWF16x/11 mm
  - Standard Shuko cable
  - Set of filters (green and blue) (diametre 32 mm)
  - Stand and mirror for life lighting
  - Immersion oil
  - Plastic cover
  - Instruction manual

**We will not accept any equipment in return period unless it comes in its original wrapping.**

### ■ Installation

- Before using this instrument, it is convenient for you to familiarize with its components and basic essentials.

### **PLEASE READ THOROUGHLY THE INSTRUCTIONS BEFORE CONNECTING AND OPERATING WITH THIS EQUIPMENT.**

- Please put the microscope on top of a horizontal, plane and stable table making a free space at least at 30 cm per side. Do not put the microscope near any warm supply (burners, blowlamps...), nor expose it directly to the sun, etc.

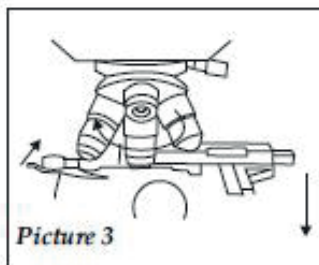
- Avoid inflammable or toxic substances in the working area.
- The microscope is supplied with a Schuko standard wire
- Please insert the wire that feeds the AC electric current in the base of current 220V 50Hz  $\pm 10\%$  provided with earth wire and to the other end to the microscope connector.

**Neither the manufacturer nor the distributor will assume any responsibility for the damages ,produced to the equipment during its installation or damages to persons suffered by the improper use of the electric connection. The tension should be 220V 50Hz  $\pm 10\%$ .**

- If you are not using the microscope for a long period of time please make sure it is disconnected from the net and protected from dust (this way you will avoid accidents and will extend its working-life).

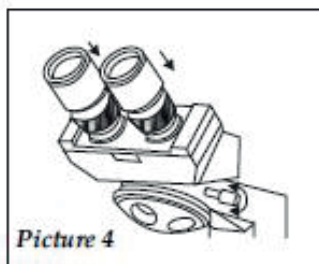
#### ■ Setting up

- The operator has to assume a comfortable, upright position with the back straight. It is convenient to work in a dark table in order to avoid an awkward fatigue and parasite light, as it may dazzle the operator or decrease the image sharpness.
- Lower the stage with the help of the coarse control. Notice objectives in the nosepiece must be placed clockwise (4x-10x-40x-100x) in an ascendant way (pic. 3).



**VERY IMPORTANT:** Never hold the microscope by the stage nor the tube, as all the equipment's weight would fall on the fine screw and mechanical and precision parts would be slowly eroded.

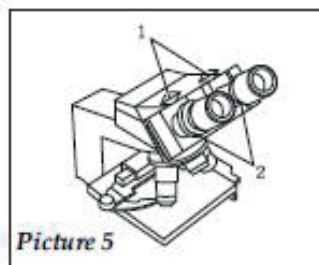
- Mount the head and tighten it with the screw provided.
- Insert the eyepiece/s (WF10x, P16x) as shown in picture 4.
- Binocular tube is normally facing the front of microscope, but you can place it in any other direction if necessary.
- Always use the microscope's plastic cover when you are not using it for long periods of time so as to avoid dust laying on the optics.



#### ■ Operating instructions

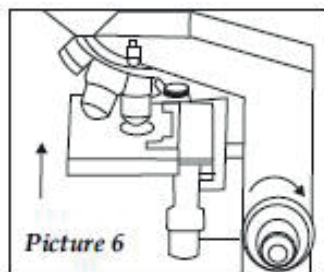
- In those models provided with binocular observation system, the eyepieces should be properly adjusted. This will depend on:
  - a) Interpupillary distance (pic. 5): Adjust the interpupillary distance by separating or joining the eyepieces until you obtain a total fusion of the two images.

b) Dioptic compensation of the tubes: By closing first one eye and then the other you will notice quite a difference if focusing. To correct this defective image you should adjust the dioptic compensation ring to zero by looking through the right eyepiece and focusing the sample with coarse and fine adjustment knobs. Once you have focused the sample you should look through the left eyepiece and adjust the dioptic compensation ring until you obtain a sharp image. Should the observer suffer from astigmatism, he will have to keep his glasses on previously checking there is enough distance to the eyepiece so as to avoid the glasses brush the tube.



Once you have find out these values it will be very useful to memorize them to avoid repeating this process each time you are using the microscope, above all in case the equipment is shared by more than a user.

- You should lower the stage according to the appropriate working distance for the objective with lesser magnification before placing the sample on it. Once you have done this, you should place the slide by looking directly at it (not by the eyepiece) and placing the sample centred on the stage opening.
- Looking through the eyepiece using the objective with lesser magnification you should now raise the stage by using the coarse knob until the sample appears. Then, you should move the fine knob until the image is focused (picture 6).



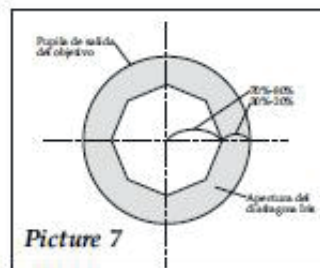
**IMPORTANT:** You should always start operating by using the objective with lesser magnification, as it facilitates focusing and makes impossible to ruin the slides or get the objectives dirty. Furthermore, it is essential to adjust the previous lighting to using the higher magnification, and it helps you to see the whole topographic structure of the sample so as you can concentrate on the more appealing parts to observe them at higher magnifications.

- By turning the nosepiece you will pass to an objective with higher magnification. As they are paracentric you will only have to adjust focusing with the fine adjustment knob.
- Adjust the condenser's height as to obtain a uniform field of view (the higher the magnification is, the lower the field will be). Thus, condenser's adjustment will be more precise as the magnification value increases: when working with 40 magnifications (4x objective and 120x eyepiece) you should lower the condenser to cover a wide field and avoid too much lighting intensity, raising it in a progressive way with higher magnification objectives in order to gather the light beam and gain contrast and illumination. With the oil immersion objective you should play with the condenser's height to focus properly.
- Iris diaphragm enables decreasing the numerical aperture to a value similar to objective's. Thus you avoid marginal illumination that decreases contrast and therefore it will be more closed when you use a lesser magnification objective and with a small numerical aperture. You will only use its total aperture when you use the oil immersion objective.

**In order to properly adjust the microscope you should start using the maximum aperture. As contrast increases diffraction phenomena appear, limiting resolution because the diaphragm is more closed. You will obtain the adequate adjustment value when you reach the maximum contrast without distorting resolution**

A useful way of making the adjustment is the following one

- Take off the eyepiece and observe the objective's exit pupil through the empty tube adjusting the diaphragm aperture. Normally it is convenient to maintain the diaphragm aperture on approx. 70-80% of the objective's numerical aperture. (pic.7)
- Closing the diaphragm by reducing the optical system's numerical aperture increases the focusing depth. You must not surpass the diffraction limit as an excuse to increase the focusing depth. Diaphragm must not be used to reduce luminous diffraction.



### ■ Security

- The microscope must be used by previously qualified staff that knows how it works thanks to the user manual.
- You should put the microscope in a horizontal plane stable table, having a safety area of at least 30 cm per side.
- Do not place the microscope near any warm supply (burners, blowlamps, etc), nor expose it directly to the sun. Avoid vibrations, dust and dry environments.
- During its functioning dangerous materials such as flammable or pathological substances must be out of the safety area.
- When you are not using the microscope for a long period of time please make sure it is unplugged in order to avoid possible accidents.
- It is essential to have the equipment switched off and unplugged from the net before cleaning, checking components or replacing any piece (e.g. replacement of a fuse).
- Never try to repair the microscope by yourself, since you will lose the warranty and may provoke damages to the general operating system or the electrical installation, as well as injuries to the people that usually handle the equipment (burns, hurts...).
- Made under the European regulations for electrical security, electromagnetic compatibility and security on machines.

## 5. MAINTENANCE AND CLEANING

**To get the best results and a higher duration of this equipment it is essential to follow the processes of use. Note: All the processes of use mentioned below will not have any value unless you keep a continued and careful maintenance.**

- Please follow the processes of use of this manual.
  - This manual should be available for all users of this equipment.
  - Always use original components and supplies. Other devices can be similar but they ,can damage the equipment.
  - The microscope is supplied with a Schuko standard wire and it should be connected to a current wire provided with an earth wire, it should be handy to be disconnected in case of emergency.
  - Never try to repair the microscope by yourself, since you will lose the warranty and may provoke damages to the general operating system or the electrical installation, as well as injuries to the people that usually handle the microscope (burns, hurts...) or damages in nearby equipments.
  - In the event of breakdown please contact your distributor to overhaul through Ura
  - Technic Technical Assistance Department.
  - In case the lamp blows you should replace it for another one, making sure it is an Ura
  - Technic halogen lamp 6V 20W original. Please take care and do not touch the lamp with bare hands.
- IMPORTANT:** Before changing the lamps/bulbs or fuses please make sure it is disconnected from the net. You must not use lamps with a higher power, as they could provoke over heating or any malfunction. For changing the lamps the microscope is provided with a device on the lower part. You should take off the screw, loosen the lamp holder screws and then change the lamp holding it firmly. Then, centre the lamp holder again if necessary.
- If it is necessary to change the fuse you should do as follows: Loosen the protective cover that is on the base of the microscope (FUSE), change the 0.5 A fuse and place it in the same position, screwing the protective cover again.
  - Please use the plastic cover provided to keep the microscope away from dust lying on the optical parts when it is not used for a long period of time.
  - Please keep the original packaging either to transport the equipment, when it is not being used for a long time or when you send it for an overhaul.

### ■ Cleaning

- Never use scourers or substances that can grate for cleaning metallic parts such as stainless steel, aluminium, coatings, etc. as they damage the microscope and produce an early ageing of the equipment.
- Use a fluff-free cloth dampened with soaped water that does not contain abrasives.
- Lenses must not be disassembled by the user. Were there any dust or dirt to be cleaned, you should clean it with a natural horse hair brush or a smooth piece of cloth, fluff-free, dampened with a bit of xilol or toluene.
- You should use non-corrosive lubricants in metallic parts, being careful of not touching optical parts.



**ATTENTION!! IF EQUIPMENTS ARE NOT PROPERLY CLEAN AND DISINFECTED THEY WOULD NOT BE ALLOWED TO REPAIR BY OUR TECHNICAL SERVICE.**

## 6. CHOICE OF OBJECTIVES AND EYEPIECES

- The observed image loses surface and sharpness as magnification increases. The mentioned increase should be done by changing objectives and putting each time a more powerful one and not by changing eyepieces to a higher magnification, as eyepieces only magnify the image obtained with the objective. Thus, the more magnification the eyepiece has, the higher will be the loss of sharpness, clarity and surface of the resulting image.
- For routine observations you should use the eyepiece with lesser magnification with more powerful objectives. The eyepiece with the higher magnification should be kept back for particular occasions, bearing in mind that it decreases definition and does not increase resolution.

## 7. CAUSES OF A DEFECTIVE IMAGE

In case of a defective image you should check the following:

- Illumination is well done and luminous intensity is neither excessive nor too weak. You should never adjust it with the condenser's diaphragm. Both the condenser and the lamp should be well centred. Check that between the field diaphragm and the aperture diaphragm there is not any diffuser filter.
- Eyepieces are well fit and objectives well screwed.
- When cleaning the entire optical system you should proceed as follows:
  - Make the eyepieces turn checking the little specks are moving; if so you should clean them. Make the head turn. You should never disassemble the head, but you can clean it with delicacy by blowing the accessible surfaces of prisms with a plastic bulb.
  - Turn the objective and, in case the parasite images also turn, clean it with the help of a dry brush to remove the dust. Watch the front part of the microscope with a magnifying glass or an inverted eyepiece.
- Immersion oil is enough and does not contain air bubbles or impurities.
- Thickness of slides, cover glasses and means of assembly is not too much as to avoid focusing with medium or high magnification (there are standard sizes for both the slides and cover glasses). Slides and cover glasses should be clean. Check that the slide is properly located and there are not two cover glasses superimposed.

## 8. TROUBLESHOOTING

Before sending the microscope back to Ura Technic Technical Assistance Department you should check the following:

- If the lamp does not switch on:
  - Check it is properly connected to the right current intake.
  - Check both fuse and lamp are in good conditions. If not you should replace the fuse.
- If the field of vision is cut:
  - Check the nosepiece is properly fit. To do that, turn it slightly back and forth until it fits.
  - Check it is well centred. This operation is done by means of three screws that surround the condenser's mount.
- If there is dust or dirt in the field of vision:
  - Check there is dust on the precondenser's lens, upper lens of the condenser or the eyepiece, as well as the cleanliness of the sample. Once you find out where the dirt is you should clean it as explained before.
- If the sample gets fuzzy while observing:
  - Check the tension adjusting ring, as it may be too weak and provoke an involuntary fall of the stage.
- If an area in the field of vision is out of focus:
  - Check the objective is properly located on the luminous beam's path. If not you should return it until it is appropriate position.
  - Check the sample is properly located on the stage, making sure it is held by the stage clips. Then, if it does not focus you should revise the pre-focusing control.
- If the frontal lens of the objective touches the prepared slide when focusing:
  - Check the prepared slide is not the other way round (being the cover glass over the slide) and place it properly in case it is appropriate to do so. Check also the slide's thickness, which has to have a standard thickness of 0,17 mm.

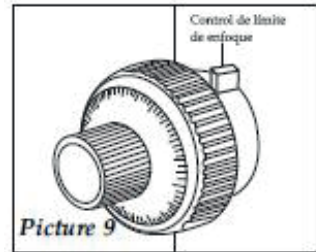
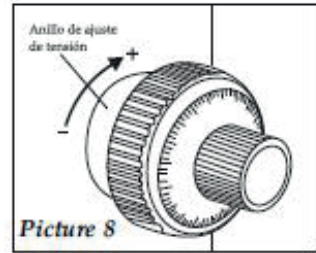
## 9. RECOMMENDATIONS

- As the head is rotary you should rather observe by the stage's frontal part, as it facilitates access to the mechanical control knobs.
- When using the oil immersion objective you should notice the following:
- In order to use all the numerical aperture of the oil immersion objective:
  - Pre-focusing: Focus the sample with the objective with less magnification (4x).
  - Put a drop of oil immersion on the cover glass.
  - Rotate the nosepiece, place the immersion objective and arrange the focusing with the fine adjustment knob.
- You should avoid air bubbles in the oil so as not to spoil the resulting image. To do so you should move the pre-focusing control up and down to make the oil layer uniform. Turn the nosepiece and then locate the oil immersion objective; you can adjust focusing with the fine knob.

• We highly recommend drying the frontal lens after each use. You should never use a duster. Instead of it you should use specific optics cloth and liquids that are sold to this purpose (as the ones for cleaning sunglasses or binocular lenses). You should not submerge the objective in any liquid, as this could provoke the lens' detachment.

• Depending on the observer preferences the tension of the coarse adjustment knobs can be modified, since it is provided with a tension adjustment ring that is located next to the right coarse knob of the microscope (pic.8). However, you should avoid loosening it excessively, as this could produce an involuntary fall of the stage and so provoke accuracy deterioration.

• There is also a control device for the focusing limit. All models of this series are provided with a ring that avoids the stage from rising beyond a certain point, which can be set once the sample has been focussed and thus avoid possible accidental collisions while observing (pic. 9). This mechanism also enables the possibility of a quick focusing, accelerating the observation process when you are working with different samples.



## INSTRUCTIONS ON ENVIRONMENT PROTECTION



At the end of its life cycle, please, do not dispose of this equipment by throwing it in the usual garbage; hand it over a collection point for the recycling of electrical and electronic appliances. It does not contain dangerous or toxic products for humans but a non adequate disposal would damage the environment.

The materials are recyclable as mentioned in its marking. By recycling material or by other forms of re-utilization of old appliances, you are making an important contribution to protect our environment. Please inquire at the community administration for the authorized disposal location.