KERN OPTICS

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User instructions Jewellery microscope (stereo zoom)

KERN **OZG 497**

Version 1.0
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GB

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1 Before use

1.1 General notes

You must open the packaging carefully, to make sure that none of the accessories in the packaging fall on the floor and get broken.

In general, microscopes should always be handled carefully because they are sensitive precision instruments. When using or transporting the microscope it is particularly important to avoid abrupt movements, as this may damage the optical components.

You should also avoid getting dirt or finger prints on the lens surface, because in most cases this will reduce image clarity.

To maintain the performance of the microscope, it must never be disassembled. So components such as lenses and other optical elements should be left as they were before use. Also the electrical parts in the base of the device must not be tampered with, as in this area there is an additional risk of triggering an electric shock.

1.2 Notes on the electrical system

Before connecting to a mains power supply, you must make sure that you are using the correct input voltage. The information to select the correct power supply is located on the device, on the rear of the stand base. You must comply with this information. If you do not comply with these specifications, then fires or other damage to the device could occur.

The main switch must also be switched off before the mains cable is connected. In this way you will avoid triggering an electric shock.

If the original fuse should blow, it must only be replaced by an appropriate fuse. Suitable replacement fuses are included with the delivery.

When carrying out any procedures whereby you come into contact with the electrical system of the device, such as, for example, changing the bulb or fuse, only carry out these procedures when the power is disconnected.

Under no circumstances should you touch the integrated halogen bulbs or housings either during operation or directly after use. These bulbs produce significant heat and therefore there is a risk that the user could be severely burnt. So before handling the bulbs, you must check that they have cooled down.

1.3 Storage

You should ensure that the device is not exposed to direct sunlight, temperatures which are too high or too low, vibrations, dust or a high level of humidity.

The ideal temperature range is between 0 and 40°C and a relative humidity of 85% should not be exceeded.

The device should always be located on a rigid, smooth, horizontal surface.

For devices with pillar stands, the microscope holder must not be rotated back too far. If you do this, there is a risk that the microscope could tip over.

When the microscope is not being used, you should fit the objective cap and cover the microscope with the enclosed dust protective cover.
If the eyepieces are being stored separately, the protective caps must be fitted to the tube connectors. In most cases, if dust and dirt gets inside the optical unit of a microscope this can cause irreversible errors or damage.

The best way to store accessories which consist of optical elements, such as, for example, eyepieces and objectives, is in a dry box with desiccant.

1.4 Maintenance and cleaning

In any event, the device must be kept clean and dusted regularly.
If any moisture should be occur, before you wipe down the device you must ensure that the mains power is switched off.

When glass components become dirty, the best way to clean them is to wipe them gently with a lint-free cloth.

To wipe oil stains or finger prints off the lens surface, moisten the lint free cloth with a mixture of ether and alcohol (70 / 30 ratio) and use this to clean the lens.

You must be careful when handling ether and alcohol, as these are highly flammable substances. You must therefore keep it away from naked flames and electrical devices which can be switched on and off, and only use it in well-ventilated rooms.

However organic solutions of this type should not be used to clean other components of the device. This could lead to damage to the paint finish. To do this, it is sufficient to use a neutral cleaning product.

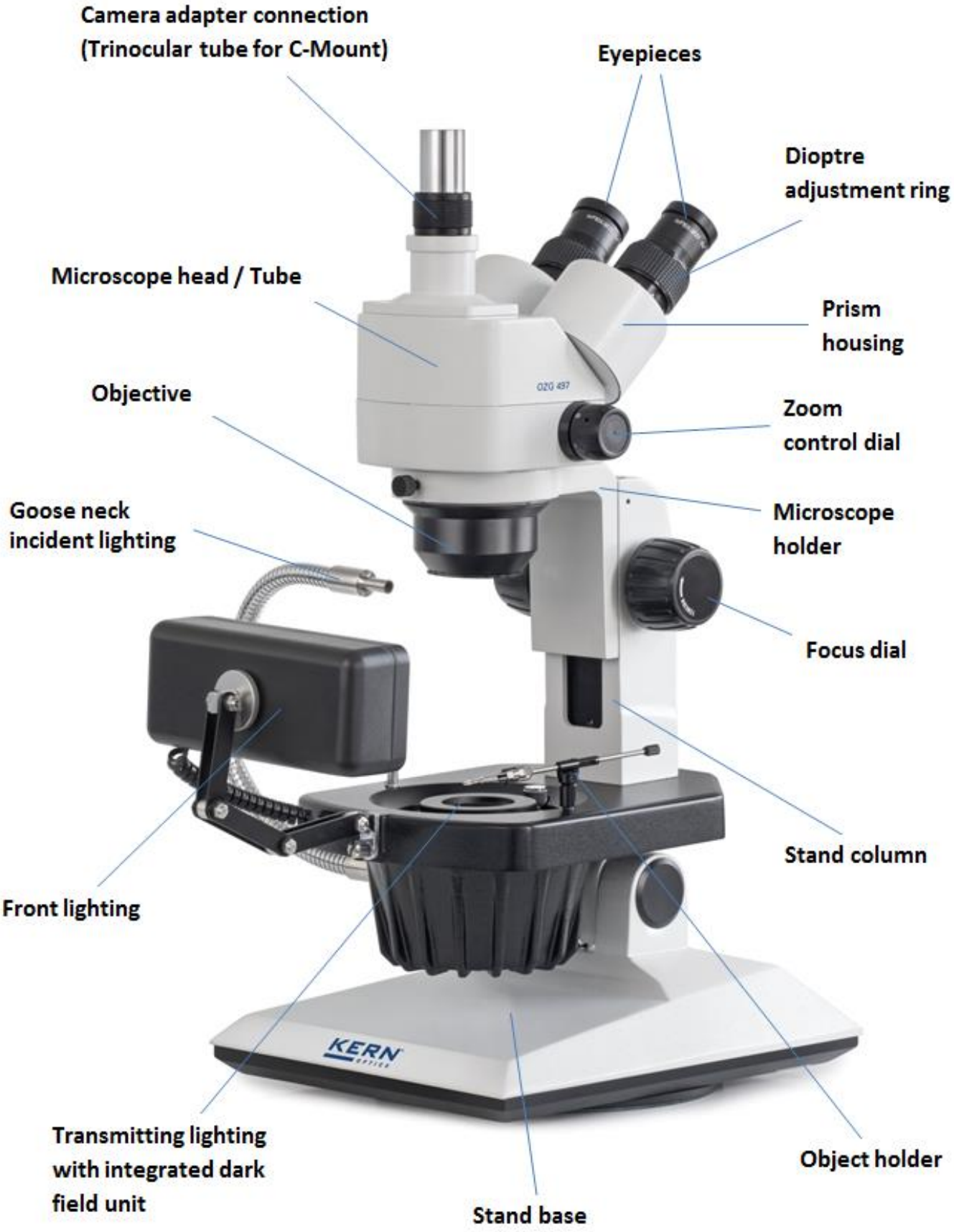
You could also use the following cleaning products to clean the optical components:

- Special cleaner for optical lenses
- Special optical cleaning cloths
- Bellows
- Brush

When handled correctly and checked regularly, the microscope should give many years of efficient service.

Should repairs still be necessary, please contact your KERN dealer or our Technical Department.

2 Nomenclature



Rear view


Main switch
Fuse
Power connection
Dimmer
Tilt construction

3 Basic data

Optical system	Greenough
Magnification ratio	6.7:1
Dimmable lighting	Yes
Tube	angled at 45°
Interpupillary distance	55 – 75 mm
Dioptre adjustment	On both sides
Packaging dimensions WxDxH	600x480x400 mm
Product dimensions WxDxH	340x235x580 mm
Gross weight	14,7 kg
Net weight	11,5 kg

Standard configuration

Model **KERN**	**Tube**	**Eyepiece**	**Field of view** **mm**	**Objective** **Zoom**	**Stand**	**Illumination**
OZG 497	Trinocular	HWF 10x Ø 23 mm	Ø 33 – 5.1	0.75x – 5.0x	Arm curved	12V / 10W Halogen (transmitted+incident light) 10W Fluorescent lighting (front light)

4 Assembly

The first step is to position the **microscope stand on a firm, level surface**.

The holder is firmly attached to the pillar of the stand. You can then fit the **microscope head** to the holder, by passing the objective through the holder ring until the rest of the head is above the ring.
Please see section 5.5 for more details on adjusting the stand.

The head must then be fixed in a suitable position, using the small screw on the front of the holder ring.
Ideally it is then parallel on the central axis of the stand base *(see figure on page 10).*

Then you can remove the protective caps from the tube connectors so that you can then **fit the eyepieces**. When doing this, please be particularly careful that you do **not touch the optical lenses with your fingers** and that no dust enters the apertures.
You should also **never fit two eyepieces with different magnifications**.

The front light is fitted to the **front of the stand base** using the **hinged arm** delivered with the microscope. To do this there is a **screw connection** both on the stand as well as the bulb housing of the front light. After that you should bring the front light into the correct position.

Now the **goose neck** can be fitted. This is a **bendable optical fibre**, which has on the one end section a longer metal rod and on the other end section a shorter rod. **The end section with the longer rod is used for the connection to the housing**. The appropriate connection point is on the left-hand side of the microscope below the working stage. Before you can attach the goose neck here you have to slide the cover plate upward and loosen the fixing screw so that it does not block the aperture.
Then **the end section with the longer rod has to be pushed into the aperture up to the stop and fixed by the screw**. After that you can bring the goose neck into the required position by bending.

The provided **clamp** has to be attached **to the working stage** instead of an already mounted place holder. An enclosed metal pin is serving as bracket. You have to attach this pin into a socket where there was one of the place holders before. The clamp can easily be put on the pin by means of its counter piece.

Additional optional attachments:

- The eye cups supplied with the microscopes can be fitted to the eyepieces. *(see section 5.6).*
- You can fit a C-mount adapter to the appropriate connection point on the top of the microscope head. This enables you to fit and use digital cameras. (remove protective cap first) *(see section 5.9)*.

Assembled jewellery microscope (stereo zoom)

5 Operation and functionality

5.1 Getting started

After assembly, if the microscope is ready for use, then you must first establish a **power connection** using the cable which is connected to the device.
Please see section 5.7 for more details on adjusting the lighting.

Do not forget to remove the cap from the bottom of the objective, so that you will then be able to see a reflection of the object being observed in the eyepiece.

All important functions which relate to the use of the devices in this document are described in the following sections.

5.2 Adjust the interpupillary distance

Different users have different interpupillary distances. So each time a different person uses the microscope, the gap between the two eyepieces must be re-adjusted.
While you are looking through the eyepieces, use one hand to hold the righthand or lefthand prism housing firmly.
By rotating outwards or inwards, you can either increase or reduce the interpupillary distance.
As soon as the lefthand and righthand visual fields exactly overlap each other, this is the correct interpupillary distance.

5.3 Adjusting the magnification

As the KERN OZG 497 series covers stereo zoom microscopes, then you adjust the magnification using the two zoom adjustment wheels on the lefthand and righthand side of the microscope head.

Chapter 6 “Optical data” gives information on the possible overall magnification which the microscope can produce. It will also include the optional use of different eyepieces.

5.4 Dioptre adjustment and focussing

A special feature of stereo microscopes is that they are fitted with an optical unit which has a relatively high depth of field. In order to be able get the most benefit from this feature, each user must synchronise the focussing mechanisms for themselves.

The steps to do this are described in the following section.

1. Place the object to be observed on the working surface under the objective.
2. Put both dioptre adjustment rings into the starting position of 0.
3. Use the zoom control dials to set the smallest possible magnification.
4. Look through the right eyepiece with the right eye and bring the object into focus by using the focus control dials.
5. Now set the largest possible zoom factor.
6. Once again, still only looking through the right eyepiece, bring the object into focus
7. Then set the smallest possible zoom factor again.
8. If the object then does not appear to be in focus, adjust the focus on the dioptre adjustment ring of the right eyepiece.
9. In order to get the highest level of accuracy when adjusting the focus, you should repeat steps 5-8.
10. Afterwards set back to the smallest possible zoom factor.
11. Then look through the left eyepiece with the left eye and use the lefthand dioptre adjustment ring to also adjust the optimum focus of the object.
12. In this way, the object being observed will be in focus at any zoom setting.

5.5 Adjusting the stand

Torque of the focus wheels

You adjust the torque of the focus wheels by holding one of the two wheels in place and using the other hand to turn the other wheel.
Depending on the direction of the turn, the torque will be increased or decreased.
On one hand, this function can help to make it easier to adjust the focus and on the other hand it can prevent the microscope head from slipping down unintentionally. In this way you can avoid possible damage which could occur if the objective lens and the object being observed should collide.

Tilt function

The stand of the microscope has a tilt function. This is enabled by a hinge built-in on the stand underneath the working stage (*Tilt direction see figure below*). For special applications the tilt function can be helpful in terms of handling and ergonomics.
For tilting the microscope you have to push or pull strongly along the tilt direction on the column of the stand (*see figure below*).
Due to the sluggishness of the hinge an additional fixation is not needed.

Tilt function OZG 497

5.6 Using eye cups / High Eye Point eyepieces

The eye cups supplied with the microscope can basically be used at all times, as they screen out intrusive light, which is reflected from light sources from the environment onto the eyepiece, and the result is better image quality.

But primarily, if eyepieces with a high eye point (particularly suitable for those who wear glasses) are used, then it may also be useful for users who don't wear glasses, to fit the eye cups to the eyepieces.

These special eyepieces are also called High Eye Point eyepieces. They can be identified by the glasses symbol on the side. They are also marked in the item description by an additional "H" (example: HSWF 10x Ø 23 mm).

When fitting the eye cups, make sure that the dioptre setting is not moved. We would therefore advise that you hold the dioptre adjustment ring on an eyepiece with one hand while you fit the eye cup with the other.

Before using the microscope, users who wear glasses must remove the eye cups, which you may find on High Eye Point eyepieces.

As the eye cups are made of rubber, you must be aware that when you are using them, they can become slightly dirty through grease residues. In order to maintain hygiene, we would therefore recommend that you clean the eye cups regularly (e.g. with a damp cloth).

Eye cups

High Eye Point eyepiece
(identified by the glasses symbol)

5.7 Lighting control

A main switches fitted on the left rear of the stand basis ensures that the device will be supplied with power when the plug is connected.

As far as the goose neck is attached, the light source, originally intended for the transmitted lighting, provides also the incident lighting.

You can control the light intensity of these two lightings by turning the dimmer wheel on the right-hand side of the rear of the stand base in a particular direction.

The front light must be treated separately to the reflected and transmitted light, due to the way it is controlled.

Indeed it also only operates if the mains switch is switched on, but it also has its switch on its housing which can be used to switch it on and off.
It is not connected to the dimmer wheel and does not have one of its own.
So the light intensity does not vary at all.

However, the advantage of the front light is that it can be adjusted to various positions because of its hinged arm bracket.

The transmitted lighting is in addition standardly equipped with a dark field unit. This is absolutely necessary for gemology applications and includes two more elements, which also can be used for controlling the lighting.

Firstly it includes an iris diaphragm, which can be operated with by a metal lever attached to the aperture of the transmitted lighting. That serves the purpose of a field diaphragm.

Secondly it includes a cover plate for the transmitted lighting. By turning a knob (mounted on the working stage nearby the stand column) you can choose between common transmitted lighting method (cover open) and dark field method (cover closed).

5.8 Fitting and adjusting a camera

You can connect special microscope cameras to the devices in the OZG 497 series, so that you can digitally record images or sequences of objects being observed.

The connection for this is on the top side of the microscope head.

To fit a microscope camera properly, you must use an adapter with a C-mount thread.

There is already an adapter fixed to the camera adapter connection (white varnishing), which is not suitable for C-Mount cameras. You firstly have to remove this adapter in order to attach an appropriate one.

In total there are three focusable adapters to choose from *(see figure below)*. The difference between these adapters is that they have different integrated magnification (0.3x, 0.5x, 1.0x).
The camera and adapter are then united using the C-mount thread.

C-mount adapter

The image which is shown on the camera connected to the device can often have a different level of focus compared with the image on the eyepiece. In order to be able to bring both images into focus, **the focus can be adjusted by those adapters when turning the attached black plastic ring.**

5.9 Changing the bulb

Halogen

Before changing the halogen bulb, you must always **switch off** the device and **unplug it from the mains**. You must also make sure that the **bulb and housing** have cooled down, so that you avoid any risk of possible burn injuries.

To change the bulb, the whole lamp housing, fitted underneath the working stage, has to be removed. Therefore you have to tip the device carefully to the back or side and then loosen the fixing screws (Allen wrench) at the bottom of the working stage. When doing this, please make sure that all microscope components are firmly fixed. The bulb which appears inside the open lamp housing can then be simply pulled out of its socket and replaced with a new bulb. You must then position and fix again the housing correctly.

Please always use cloth gloves or similar to hold and fit a new bulb otherwise grease and dust residue on the surface of the bulb could have a negative effect on its brightness and service life.

5.10 Changing the fuse

There is a fuse on the rear of the microscope stand base (label: “Fuse”).
If the fuse has blown, then with the device switched off and the power disconnected, the fuse can easily be unscrewed using a flat blade screw driver and replaced with a new one.

6 Optical data

OZG 497	Specifications – Objectives	
Eyepiece	**Magnification**	**Standard 1,0x**
HWF 5x	Total magnification	3,75x – 25x
	Field of view mm	Ø 31 – 4,6
HSWF 10x	Total magnification	7,5x – 50x
	Field of view mm	Ø 33 – 5
HWF 15x	Total magnification	11,25x – 75x
	Field of view mm	Ø 24 – 4,2
HSWF 20x	Total magnification	15x – 100x
	Field of view mm	Ø 20 – 3,5
HWF 25x	Total magnification	18,75x – 125x
	Field of view mm	Ø 15,8 – 2,4
Working distance		113 mm

7 Features

Model outfit		**Kern model** OZG 497	**Order number**
Eyepieces	HWF 5x / Ø 23,2 mm	oo	OZB-A4112
	HSWF 10x / Ø 23 mm	●●	OZB-A4118
	HWWF 15x / Ø 15 mm	oo	OZB-A4119
	HSWF 20x / Ø 14,5 mm	oo	OZB-A4120
	HWF 25x / Ø 11,7 mm	oo	OZB-A4121
C-Mount	1x	o	OZB-A4809
	0,3x	o	OZB-A4810
	0,5x	o	OZB-A4811
Dark field attachment	Dark field attachment	●	OZB-A4601
Object clamp	Object clamp (steel wire)	●	OZB-A4604
Stand	Arm curved, with 12V / 10W Halogen (transmitted light) and 10W fluorescent lighting (front light) + Goose neck lighting	●	

● = Standard configuration o = Option

8 Trouble shooting

Electrical system

Problem	Possible causes
The lighting unit (if fitted) cannot be switched on	The power cable is either not connected or not connected correctly
	The bulb is not fitted
	The bulb has blown
	The fuse has blown
	The brightness control is set to the lowest level
The bulb has blown	The wrong bulb has been used
	The input voltage was too high
The bulb flickers	The bulb is not correctly fitted
	The lamp is worn out
The bulb brightness is not sufficient	The wrong bulb has been used
	The input voltage is too low

Optical unit

Problem	Possible causes
You can see two images	The interpupillary distance is not set correctly
	The magnifications of the eyepieces do not match
There is dirt in the visual field	There is dirt on the object being observed
	There is dirt on the eyepiece surface
The image is unclear	There is dirt on the objective surface
The focus wheels are jammed	The torque of the focus wheels is set too high
The microscope head slips down while you are viewing the object	The torque of the focus wheels is set too low
Eyes get tired easily	The dioptre adjustment is not correct
	The brightness adjustment is not correct

9 Service

If, after studying the user manual, you still have questions about commissioning or using the microscope, or if unforeseen problems should arise, please get in touch with your dealer. The device may only be opened by trained service engineers who have been authorised by KERN.

10 Disposal

The packaging is made of environmentally-friendly materials, which you can dispose of at your local recycling centre. Disposal of the storage box and device must be carried out by the operator in accordance with all national or regional laws in force in the location of use.

11 Further information

The illustrations may differ slightly from the product.

The descriptions and illustrations in this user manual are **subject to change without notice**. Further developments on the device may lead to these changes.

All language versions contain a non-binding translation.
The original German document is the binding version.