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User instructions
Stereo microscope

KERN **OSE 409**

Version 1.0
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GB

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Stereo microscope

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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 mains cable supplied has an external power supply. The necessary values are shown on this power supply. 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 you are using an extension cable, then the mains cable you use must be earthed.

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

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.

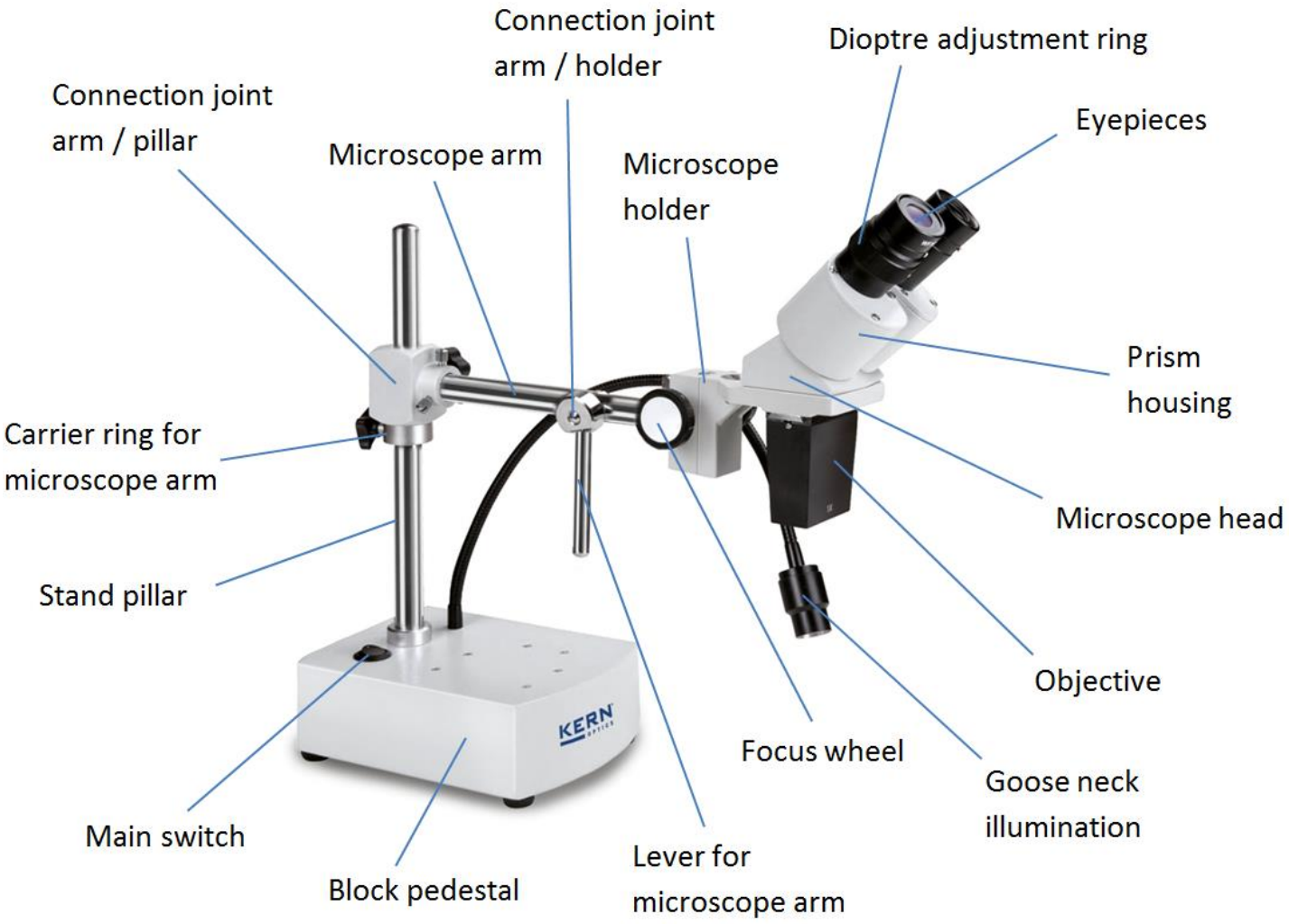
You could also use the following cleaning products to clean the optical components:

- 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



3 Basic data

Optical system	Greenough
Dimmable lighting	No
Tube	angled at 45°
Gap between the eyes	55 – 75 mm
dioptre compensation	One-sided (left)
Packaging dimensions WxDxH	435x410x200 mm

Standard configuration

Model KERN	Tube	Eyepiece	Field of view mm	Objective	Stand	Illumination
OSE 409	Binocular	WF 10x Ø 20 mm	Ø 20	1x	Pillar	3W LED goose neck (Incident light)

4 Assembly

The assembly of the microscope stand together with the holder has to be carried out as follows:

1. **Microscope stand base**
   Place the stand with the attached pillar on an even and stable table surface.

2. **Microscope arm**
   Attach the arm to the pillar with help of the joint, which is already fitted to the arm. Fasten the appropriate screws for arm, joint and carrier ring.

3. **Connecting joint arm - holder**
   On the end of the microscope holder, which is already firmly connected to the microscope head, there is a connection point, which needs to be united with the end of the microscope arm.
   This is carried out with help of the supplied screw and the lever.
   The lever consists of a ring and a rod, which firstly need to be screwed together.

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 supplied.
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 (if present), 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

For the OSE 409 you can select only one magnification factor. The standard total magnification equals from the factor of the eyepieces (10x) and the factor from the objective (1x). Thus it is always 10x.

Chapter 6 “Optical data” gives information on the possible total magnification which the microscope can produce, when considering the use of different optional eyepieces.

5.4 Dioptre compensation and focussing

A special feature of stereo microscopes is that they are fitted with an optical unit which has a relatively large range. 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 surface under the objective.

2. Use the objective to set the smallest possible magnification.

3. Look through the righthand eyepiece (without dioptre compensation ring) with the right eye and bring the object into focus by using the focus control dials.

4. Now set the largest magnification.

5. Once again, still only looking through the righthand eyepiece, bring the object into focus

6. Then set the smallest possible zoom factor again.

7. Then look through the lefthand eyepiece with the left eye (with dioptre compensation ring) and bring the object into focus, by turning the dioptre compensation ring left or right at the right point.

8. In order to get the highest level of accuracy when adjusting the focus, you should repeat steps 4-7.

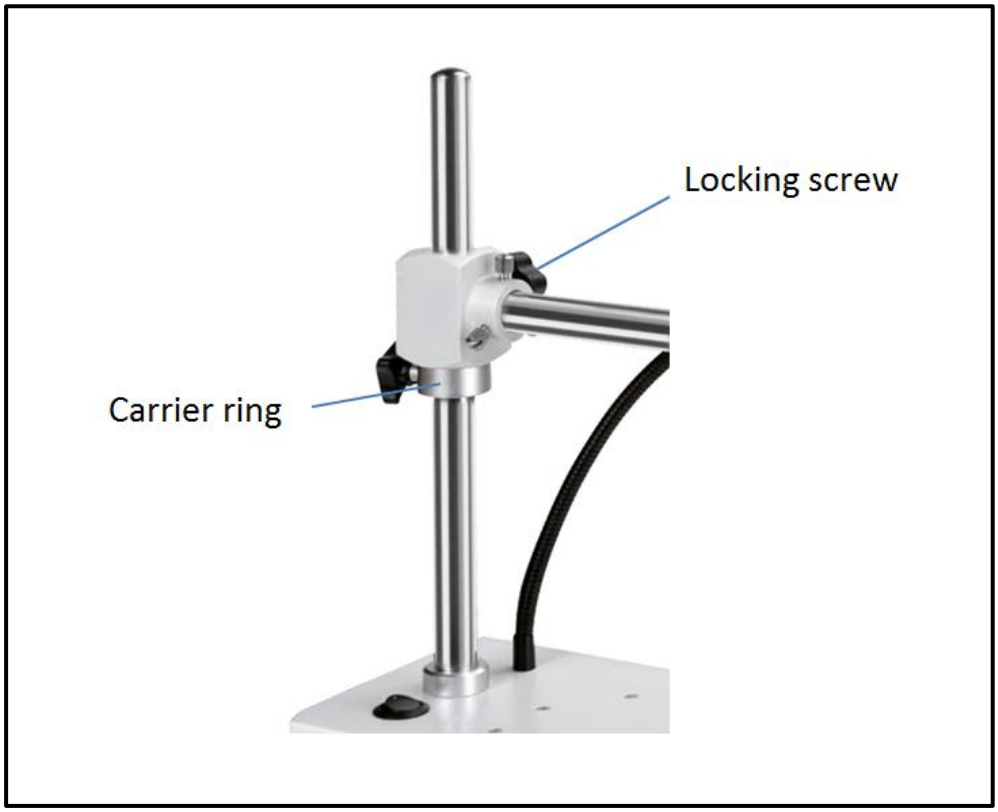
9. In this way, the object being observed will be in focus on any magnification setting.

5.5 Adjusting the stand

Torque of the focus wheels

You can adjust the torque of the focus wheels by turning the ring which is fitted along the axis of the lefthand focus wheel.
To do this you need a special wrench which is included with delivery. The ring has holes which the wrench can hook into, so that you can then turn it in the desired direction.
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.

Height adjustment



Fixing the microscope holder

With a stereo microscope on a pillar stand, the microscope head can be height adjusted using the focus wheels and in addition, the microscope holder can be fixed at any point on the pillar, depending on the application requirements.

To fix the position, use the locking screw on the holder and the additional carrier ring on the pillar, below the holder *(see figure)*.

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 compensation 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

In order to switch on the goose neck illumination you need to use the main switch.

The LED unit is located on the end of the fibre cable
This cable is flexible and therefore offers a large number of positioning options, so that the object being observed is perfectly illuminated.

The light intensity cannot be adjusted.

5.8 Changing the bulb

LED

The OSE 409 is fitted with LED bulbs.
Due to the long service life of an LED lighting system, for these microscopes it will not be necessary to simply change a bulb.
Problems with the lighting unit would therefore, in most cases, be caused by defects in the electrical system. If this is the case, then our Technical Service will be able to help.

6 Optical data

Eyepiece	Specifications – Objectives	
	Magnification	**1×**
WF 5×	Total magnification	5×
	Field of view mm	ø 20
WF 10×	Total magnification	10×
	Field of view mm	ø 20
WF 15×	Total magnification	15×
	Field of view mm	ø 15
WF 20×	Total magnification	20×
	Field of view mm	ø 10
Working distance		230 mm

7 Features

Model outfit		Kern model OSE 410	Order number
Eyepieces	WF 5x / Ø 16.2 mm	○○	OZB-A4101
	WF 10x / Ø 20 mm	●●	OZB-A4102
	WF 15x / Ø 15 mm	○○	OZB-A4103
	WF 20x / Ø 10 mm	○○	OZB-A4104
Stand	Pillar, without lighting	●	
	Pillar, with 0.21W LED lighting (reflected light)		
	Pillar, with 0.21W LED lighting (Transmitted light and reflected light)		
Stand inlay	black-white / Ø59.5 mm	●	OZB-A4816
	Frosted glass / Ø95 mm		OZB-A4805
	black-white / Ø95 mm		OZB-A4806
External illumination	For information on external lighting units, please see the Kern Optics main catalogue and visit our website www.kern-sohn.com		

● = Standard configuration ○ = 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 gap between the eyes 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.