Transmitted light laboratory microscope

OBE-12, OBE-13

OBE 121, OBE 122, OBE 124, OBE 131, OBE 132, OBE 134

PROFESSIONAL MEASURING

English version

Operating instructions Transmitted light laboratory microscope

Version 1.1
2024-09
en
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English

KERN Optics OBE-12, OBE-13

Transmitted light laboratory microscope

Operating instructions Transmitted light laboratory microscope

Version 1.1 2024-09 English version

Table of contents:

1 Technical data

Kern model	OBE 121	OBE 122	OBE 124
Item number/type	OBE 121	OBE 122	OBE 124
Dimensions (WxDxH)	360x395x320 mm		
Tubus Art	Monocular	Binocular	Trinocular
Optical system	Finite		
Revolving nosepiece screw-in positions	4		
Lens quality	Achromatic		
Standard objectives	4x 10x 40x		
Eyepiece field width	HWF		
Illuminance Transmitted light	3W		
Type of lighting Transmitted light	LED		
Lighting equipment	Transmitted light		
Condenser type	ABBE		
Condenser aperture	1,25		
Input voltage power supply / current [Max]	100 - 240V AC 50/60Hz 0.3A		
Input voltage device / current [Max]	5V, 1A		
Plug-in power supply type	Plug-in power supply		
Fuse	-		
Focusing mechanism	Coaxial coarse and fine drive		
Packaging dimensions	425x340x245 mm		
Net weight	4.488 kg		
Gross weight	6 kg		

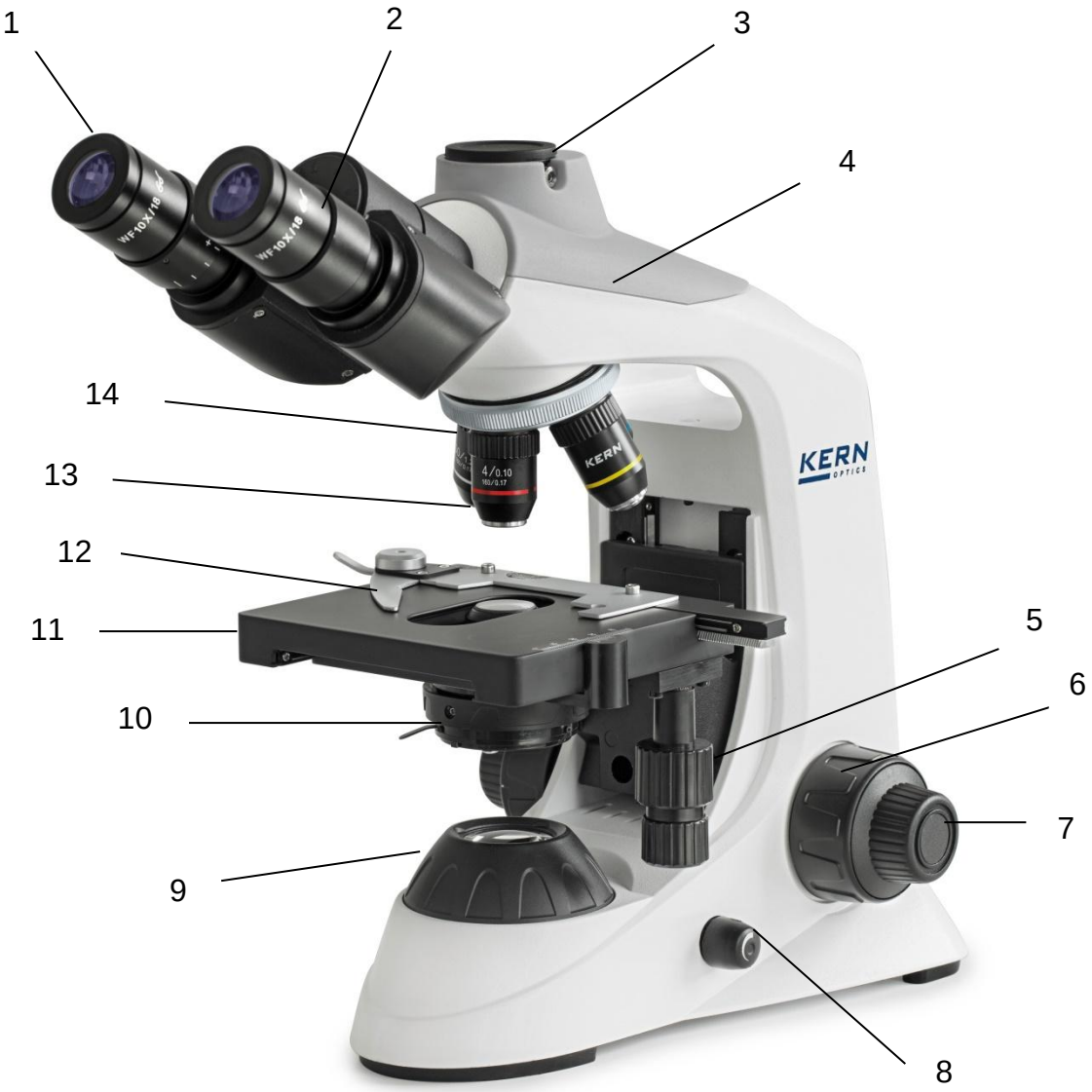
Kern model	OBE 131	OBE 132	OBE 134
Item number/type	OBE 131	OBE 132	OBE 134
Dimensions (WxDxH)	360x395x320 mm		
Tubus Art	Monocular	Binocular	Trinocular
Optical system	Finite		
Revolving nosepiece screw-in positions	4		
Lens quality	Achromatic		
Standard objetives	4x 10x 40x 100x		
Eyepiece field width	HWF		
Illuminance Transmitted light	3W		
Type of lighting Transmitted light	LED		
Lighting equipment	Transmitted light		
Condenser type	ABBE		
Condenser aperture	1,25		
Input voltage power supply / current [Max]	100 - 240V AC 50/60Hz 0.3A		
Input voltage device / current [Max]	5V, 1A		
Plug-in power supply type	Plug-in power supply		
Fuse	-		
Focusing mechanism	Coaxial coarse and fine drive		
Packaging dimensions	425x340x245 mm		
Net weight	4.488 kg		
Gross weight	6 kg		

2 Declaration of conformity

The current EC/EU Declaration of Conformity can be found online at:
https://www.kern-sohn.com/shop/de/DOWNLOADS/

3 Overview of the device

3.1 Nomenclature



15

	Description
1	Eyepieces
2	Lens barrel
3	Camera adapter connection
4	Microscope head / Tube
5	Setting wheel X - Y axis Object
6	Coarse adjustment knob
7	Fine adjustment knob
8	Dimmer+ Main switch

9	Field lens
10	Condenser
11	Specimen stage
12	Object holder
13	Objective
14	Nosepiece
15	Power connection

4 Before use

4.1 General information

The packaging must be opened carefully to prevent the accessories inside from falling to the floor and breaking.

In general, a microscope should always be handled with great care, as it is a sensitive precision instrument. Avoiding abrupt movements during operation or transportation is therefore particularly important, especially to avoid endangering the optical components.
You should also avoid dirt or fingerprints on the lens surfaces, as in most cases this impairs the sharpness of the image.

If the performance of the microscope is to be maintained, it must never be disassembled. Parts such as objective lenses and other optical components should therefore be left as they are at the start of operation.

5 Basic information (general)

5.1 General information on warnings

Warnings are used in these operating instructions to warn you of possible personal injury or damage to property in certain situations.

Signal word	Description
DANGER	Failure to observe the instructions will lead directly to serious injury, permanent impairment (e.g. loss of a limb) or death of the user or third parties
WARNING	Failure to observe the instructions may result in serious injury, permanent impairment (e.g. loss of a limb) or death of the user or third parties
CAUTION	Failure to observe the instructions may result in minor injuries or temporary damage to the user or third parties (e.g. minor cuts)
NOTE	Failure to observe the instructions may result in damage to property

Symbols in warning notices :

Icon	Meaning
Warning signs	Warning signs warn you of dangers that may lead to personal injury. The symbol indicates the type of hazard.
	Indicates general hazards or a danger point
	Warning of electrical voltage
	Warning of optical radiation
	Indicates electrostatic sensitive devices

Icon	Meaning
Commandment sign	Mandatory signs prescribe measures that you must take to avoid personal injury or damage to property. The symbol indicates the necessary actions or objects to prevent damage.
	Indicates a prescribed action

5.2 Intended use

The OBE-12 and OBE-13 are versatile and are mainly used for the analysis of translucent and thin, high-contrast, less demanding specimens (e.g. plant tissue, stained cells and parasites).

5.3 Improper use

Do not use the device in potentially explosive atmospheres or for measurements in liquids or on live parts.
Unauthorized structural changes, additions and conversions to the appliance are prohibited.

5.4 Warranty

The guarantee expires in the event of

- Non-compliance with our specifications in the operating instructions
- Use outside the described applications
- Changing or opening the device
- Mechanical damage and damage caused by media, liquids, natural wear and tear
- Improper set-up or electrical installation
- Improper assembly or electrical installation

6 Basic warnings and safety instructions

6.1 Observe the notes in the operating instructions

Read the operating instructions carefully before commissioning/using the device, even if you already have experience with KERN devices. Always keep the instructions in the immediate vicinity of the appliance.

6.2 Staff training

The appliance may only be used by persons who have read and understood the operating instructions, in particular the chapter on safety.

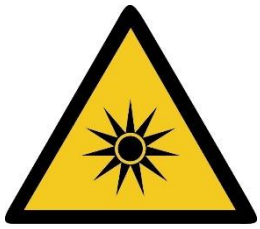
6.3 Safety

⚠ WARNING	
	**Read all safety information and instructions.** Failure to observe the safety information and instructions may result in electric shock, fire and/or serious injury**.** **Keep all safety information and instructions for future reference.** ● The design of the device must not be modified. This can lead to incorrect measurement results, safety defects and destruction of the device ● Do not operate the appliance in potentially explosive rooms or areas and do not install it there. ● Do not operate the device in an aggressive atmosphere. ● Do not immerse the appliance in water. Ensure that no liquids penetrate the inside of the device. The device may only be used in a dry environment and under no circumstances in rain or relative humidity above the operating conditions. ● Protect the device from permanent direct sunlight. ● Do not expose the device to strong vibrations. ● Do not remove any safety signs, stickers or labels from the device. Keep all safety signs, stickers and labels in a legible condition ● Do not open the device ● The lamp generates a lot of heat during operation. Avoid touching the lamp housing during operation and for some time afterwards. ● Do not operate the device in an aggressive atmosphere

⚠ WARNING	
	**Risk of injury due to electric shock!** ● Risk of short circuit due to penetration of liquids into the housing! ● Do not immerse the appliance or accessories in water. Make sure that no water or other liquids get into the housing. ● Work on electrical components may only be carried out by an authorized specialist company! ● Take care not to twist or kink the mains cable. ●Only use the original adapter supplied

⚠ WARNING	
	**There is a risk of suffocation!** Do not leave the packaging material lying around carelessly. It could become a dangerous toy for children. ● The appliance is not a toy and does not belong in the hands of children. ● This appliance can be dangerous if it is used improperly or not as intended by untrained persons! Observe the personnel qualifications!

⚠ WARNING	
	**Electrostatic sensitive device!** ● The device can be destroyed by electrostatic discharge. Connectors for HF signals are particularly at risk. ● Please observe the handling instructions for electrostatically sensitive components.

⚠ WARNING	
	**There is a risk from optical radiation!** Gas discharge lamps, LED lights and other white light sources generate intense optical radiation, including UV (ultraviolet), visible light (VIS) and IR (infrared). This radiation can cause both skin and eye damage. The extent of the damage is determined by the wavelength, the duration of exposure and the operating mode (continuous or pulsed). ●Do not expose your eyes and skin to radiation. ●Do not insert any reflective objects into the beam entrance. ●**Use** suitable protective equipment/protective clothing if necessary. ● Never remove the cover or cladding during operation. ● Never look into the eyepieces when the beam path is open (using the control lever for illumination) and an empty filter position is selected on the FL module. There is an acute risk of blindness here.

CAUTION

Keep a sufficient distance from heat sources.
Do not use the device in environments with high humidity or water mist

NOTE

● To avoid damaging the device, do not expose it to extreme temperatures, extreme humidity or moisture.
● Do not use harsh cleaners, abrasive cleaners or solvents to clean the appliance.

7 Transportation and storage

7.1 Note

If you store or transport the device improperly, the device may be damaged. Observe the information on transporting and storing the appliance.

7.2 Transportation

We recommend using the original packaging for shipping, transportation or storage of the microscope components. To prevent damage from shocks, all moving parts that can be assembled and disassembled must be packed separately.

7.3 Storage

Avoid exposing the device to direct sunlight, high or low temperatures, shocks, dust and high humidity.

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

The appliance should always be placed on a firm, smooth and horizontal surface.

When the microscope is not in use, it is best to cover it with the dust cover supplied. Dust or dirt inside the optics of a microscope can in many cases lead to irreversible malfunctions or damage.

Accessories consisting of optical elements, such as additional lenses, are preferably stored in a drying box with desiccant.

7.4 Packaging/return transportation

Returns are only possible within the limits of the general terms and conditions Keep all parts of the original packaging for any necessary return transportation.

- Only the original packaging is to be used for return transportation.
- Disconnect all connected cables and loose/movable parts before shipping.
- Refit any transportation locks provided.
- Secure all parts against slipping and damage.

8 Unpacking and commissioning

8.1 Unpacking

! In the event of a return, please observe the instructions in the chapter "Packaging/return transportation

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On receipt of the device, you should first check that no damage has occurred during transportation, that the outer packaging, the housing, other parts or even the device itself have not been damaged. If any damage is evident, please notify KERN GmbH immediately.

8.2 Initial commissioning

To ensure the function of the microscope, it must be cleaned as described in chapter 9 described in chapter 9.

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9 Assembly

9.1 Microscope head

The microscope head is firmly attached to the rest of the microscope and therefore cannot be removed or rotated.
The tube, however, can be rotated 360° thanks to the butterfly design, which allows flexible adjustment of the eyepieces.

9.2 Objectives

Depending on the model, all three or four lenses are already screwed onto the nosepiece. After removing the protective film, the objectives are ready for use. They are arranged in such a way that the objective with the next highest magnification appears when the nosepiece is turned clockwise. If the objectives are unscrewed, care must be taken to ensure that the lenses are not touched with bare fingers and that no dust enters the openings. For objectives marked "OIL", an immersion oil with the lowest possible inherent fluorescence effect must be used.

9.3 Eyepieces

For binocular devices, eyepieces with the same magnification for both eyes must always be used. These are already attached to the tube socket and fixed in place with a screw so that they can be turned but not pulled out. To remove them, loosen the small silver screw underneath the eyepiece on the tube socket. You should always make sure that you do not touch the lenses with your bare fingers and that no dust gets into the openings.

9.4 Condenser

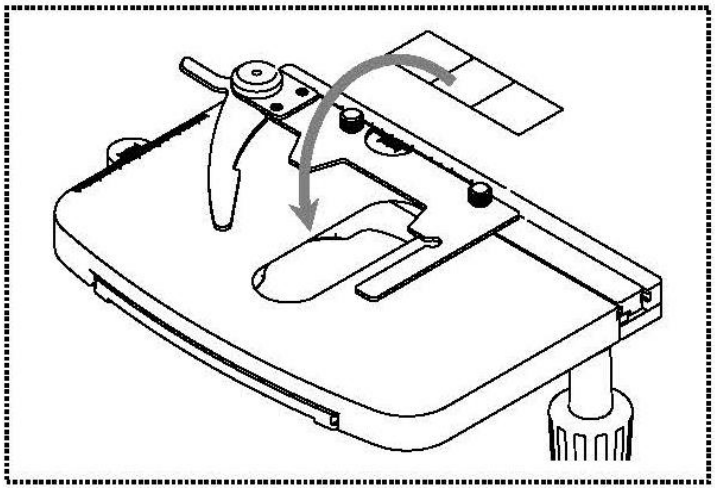
The condenser is firmly fixed to a retaining ring (condenser carrier) below the stage. The lever for the aperture diaphragm points to the front. The height of the condenser can be adjusted, but it cannot be centered.
The height is adjusted by rotating the condenser around its vertical axis.
You should always avoid touching the optical lenses with your bare fingers.

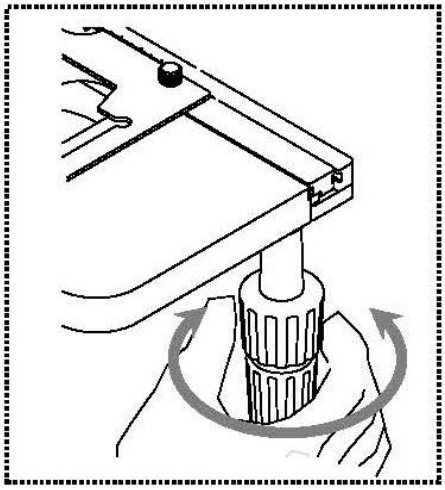
10 Operation

10.1 First steps

The first thing to do is to **connect the power supply using the mains plug**. The **light intensity control (dimmer)** should first be set to a **low level so that** the eyes are not immediately exposed to too much light when looking into the eyepieces for the first time. The **lighting** can now be switched on using the **main switch**.

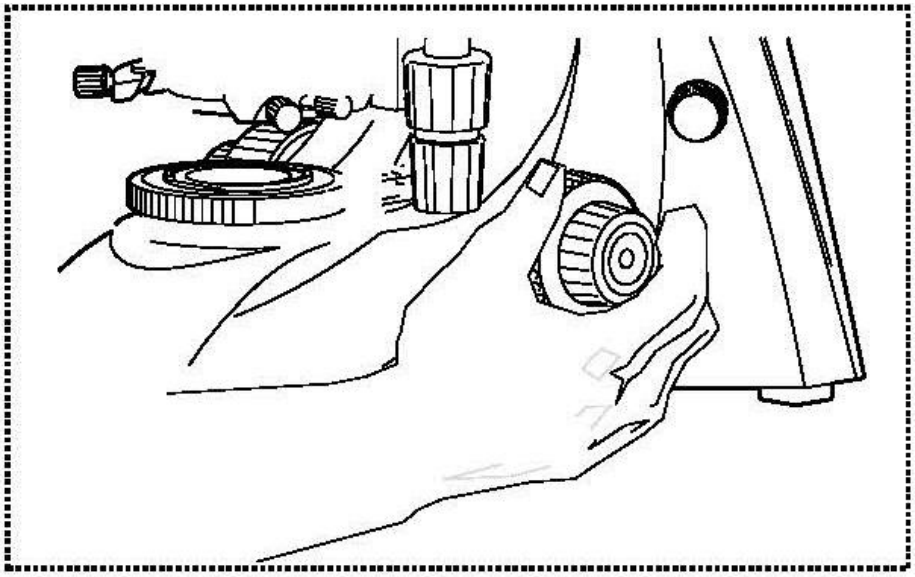
The next step is to **place a slide** with a sample on the stage. The cover glass must be facing upwards for this. The object holder can be used to fix the slide on the stage (*see illustration on the left*). To move the sample into the beam path, the adjustment wheels on the right-hand side of the mechanical stage must be operated accordingly (*see illustration on the right*).
A total of two slides can be placed at the same time.





10.2 (Pre-) focusing

When you are observing an object, you must have the correct distance to the objective to achieve a sharp image. In order to find this distance at the beginning (without other default settings of the microscope) place the objective with the lowest magnification in the beam path, look through the right eyepiece with the right eye and turn it slowly using the coarse adjustment knob (see illustration).



The simplest way of doing this would be to first raise the specimen stage (using the coarse adjustment knob) until it is just under the objective and then lower it slowly. As soon as an image is recognisable (no matter how sharp), then you should only adjust the focus using the fine adjustment knob.

Adjusting the torque of the coarse and fine adjustment knob

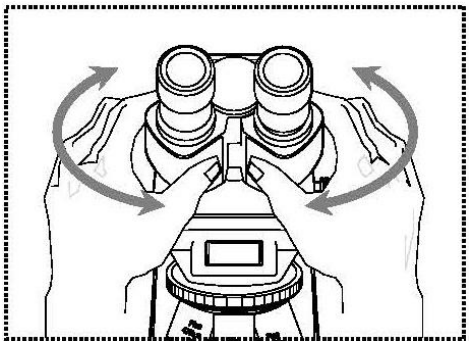
Next to the left adjustment wheel for the coarse and fine adjustment knob there is a ring which you can use to alter the torque of these wheels. Turning it in a clockwise direction reduces the torque and turning it in an anti-clockwise direction increases it. On one hand, this function can help to make it easier to adjust the focus and on the other hand it can prevent the specimen stage from slipping down unintentionally.

Important

In order to avoid damaging to the focussing system, the left and right adjustment wheels for the coarse and fine adjustment knob must never be rotated at the same time in opposite directions.

10.3 Adjusting the interpupillary distance

(for binocular and trinocular devices)



With binocular viewing, the interpupillary distance must be adjusted accurately for each user, in order to achieve a clear image of the object. While you are looking through the eyepieces, use your hands to hold the righthand and lefthand tube housing firmly. By pulling them apart or pushing them together, you can either increase or reduce the interpupillary distance (see illustration). As soon as the field of views of the lefthand and righthand eyepieces completely overlap each other, i.e. they combine to form a circular image, then the interpupillary distance is set correctly.

10.4 Diopter adjustment

(for binocular and trinocular devices)

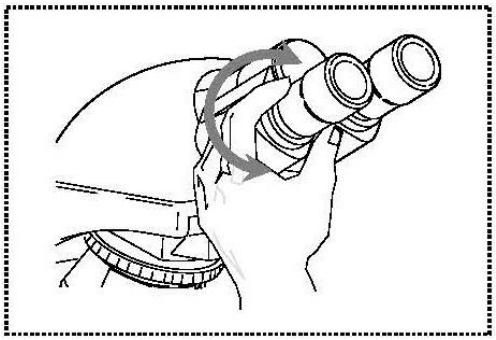
The eye strengths of each eye of the microscope user can often be slightly different, which in daily life has no consequences. But when using a microscope this can cause problems in achieving precise focussing.

You can use a mechanism on both tube connectors (dioptre adjustment rings) to compensate for this as follows.

1. Put the right dioptre adjustment ring to position 0.

2. Look through the right eyepiece with the right eye and bring the object into focus by using the coarse and fine adjustment knob.

Then look through the left eyepiece with the left eye and use the lefthand dioptre adjustment ring to focus the image. To do this, you just need to turn the ring in both directions (see illustration), to find out where the image is at its most focussed.

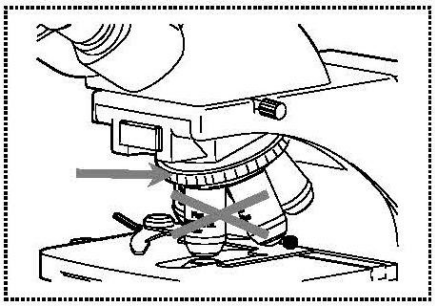


10.5 Adjusting the magnification

After pre-focusing has been carried out using the lens with the lowest magnification (*see 10.210.2)*,you can then adjust the overall magnification using the nosepiece, as necessary. By turning the nosepiece you can bring any one of the four other objectives into the beam path.

When adjusting the nosepiece, you must take the following points into account:

- The required objective must be properly locked in place at all times.



- The nosepiece should not be rotated by holding individual objectives, you should use the silver ring above the objectives (see illustration).

- When rotating the nosepiece you must always make sure that the objective which is about to be positioned in the beam path does not touch the object holder. This can lead to significant damage to the objective lens. We recommend that you always check from the side to make sure that there is sufficient leeway. If this should not be the case, the specimen stage must be lowered accordingly.

If you have focussed the object to be observed for a specific magnification, then if you select the objective with the next greatest magnification, then the object will be slightly out of focus. Use the fine adjustment knob to make a slight adjustment and restore the focus

10.6 Setting the lighting

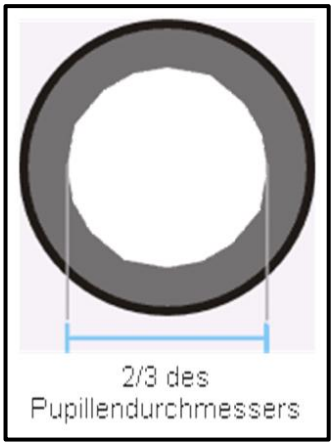
In order to obtain perfect image results during microscopic observation, it is important that the microscope's light guidance is optimized.

The control element that plays the most important role in the OBE-12 and OBE-13 series is the height-adjustable condenser with aperture diaphragm.

For the first lighting setting, the smallest possible lens magnification must be selected before the following steps can be carried out.

1. Adjust the height of the condenser by rotating it around the vertical axis so that the image has a suitable contrast. As a rule, the condenser is brought to just below the maximum height for this purpose.

2. This can be further refined with the aperture diaphragm of the condenser, because by adjusting its lever you try to find the optimum compromise between contrast and resolution for the microscopic image. For the objective with the lowest magnification, the lever must be almost all the way to the right so that the aperture diaphragm has a rather small opening. The higher the magnification of the objective, the larger the aperture diaphragm opening should be and the lever should be moved to the left accordingly.



   The view into the tube, without the eyepiece, should look something like the illustration on the right.
   The diameter of the then visible aperture diaphragm should be about 2/3 of the pupil diameter.

   When removing the eyepiece during this check, make absolutely sure that no dirt or dust can enter the tube.

3. The brightness is always adjusted via the lamp brightness (using the dimmer) and not via the aperture diaphragm.

10.7 Using the eyecups

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 a 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).

Eyecups

High Eye Point eyepiece
(recognizable by the glasses symbol)

10.8 Use of oil immersion lenses

The 100x objectives of the OBE-13 series are objectives which can be used with oil immersion (they are always marked with the word “OIL”). Using these generates a particularly high resolution for microscopic images.

To use oil immersion correctly, please follow these steps.

1. Place a drop of oil on the cover slip (with a standard thickness of 0.17 mm) of the preparation.

2. Lower the stage and bring the 100x objective into the beam path.

3. Very slowly move the specimen stage or the specimen towards the objective until light contact is made.

4. Observe the object.

The object slide and objective must not be pressed against each other. The oil constitutes the contact layer.

If the contact is made too jerky, there is a chance that existing air bubbles in the oil cannot escape. This would have a negative impact on image clarity.

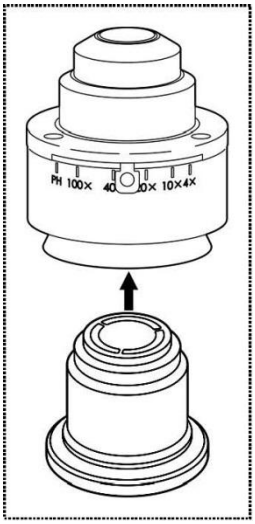
After use or before changing the slide, any components which have been in contact with the oil must be cleaned thoroughly. *See chapter 16.1.Cleaning.*

11 Changing the bulb

The appliances in the OBE-12 and OBE-13 series with lighting are all equipped with LED lamps.
Due to the long service life of LED lighting, regular lamp replacement will not be necessary with this microscope.
In most cases, problems with the lighting would therefore be caused by defects in the electrical system. In such a case, our Technical Service can help.

12 Use of optional accessories

12.1 Dark field unit



The following option is available for realizing dark field applications.

A dark field insert with an integrated black disk can be screwed into the standard condenser of the microscope from below (*see illustration on the right*). **Please refer to the instructions supplied with the dark field insert.**

12.2 Camera connection

OBE 124, OBE 134

Due to the trinocular tube, which is a standard fitting for the models OBE 124 and OBE 134, it is possible to connect microscope cameras to the device, in order to digitally record images or sequences of images of an object being observed.

After the plastic cover has been removed from the camera adapter connector on the top of the microscope head, then a suitable adapter must be fitted.
In general there are two C-mount adapters available for this (1x and 0.5x magnification). After fitting one of these adapters it can be fixed with the fixing screw. A camera which has a C-mount thread is then screwed on top of the adapter.

We recommend that you first adjust the field of view using the eyepieces on the device for the existing requirements, and then carry out the observation using the microscope camera (i.e. using the PC screen which is connected).
The tube has a light distribution that guarantees the providing of light for the eyepieces and the camera connection at the same time. This means that it is possible to simultaneously observe by the eyepieces and PC screen.

For C-mount adapters, which have their own integrated magnification, 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.

13 Troubleshooting

Problem	Possible causes
The bulb does not light	The mains plug is not correctly plugged in
	There is no power at the socket
	Defective bulb
The field of view is dark	The aperture diaphragm and/or field diaphragm are not opened wide enough
	The condenser is not correctly centred
You cannot adjust the brightness	The brightness control has been set incorrectly
	The condenser has not been correctly centred
	The condenser is too low
The field of view is dark or is not correctly illuminated	The objective is not positioned correctly on the beam path
	The nosepiece is not correctly fitted
	The condenser is not correctly fitted
	An objective is being used which doesn't match the lighting area of the condenser
	The condenser has not been correctly centred
	The bulb is not correctly fitted
The field of view of one eye does not match that of the other eye	The interpupillary distance is not correctly adjusted
	Dioptre setting has not been carried out correctly
	Different eyepieces are used for the righthand and lefthand side
	The eyes are not used to using a microscope

Problem	Possible causes
Blurred details Bad image Bad contrast Vignetted field of view	The aperture diaphragm is not opened wide enough
	The condenser is too low
	The objective does not belong to this microscope
	The front lens of the objective is dirty
	An immersion object has been used without immersion oil
	The immersion oil contains air bubbles
	The condenser is not correctly centred
	The recommended immersion oil has not been used
	Dirt / dust on the objective
	Dirt /dust on the front lens of the condenser
Dirt or dust in the field of view	Dirt / dust on the eyepieces
	Dirt / dust on the front lens of the condenser
	Dirt / dust on the object
One side of the image is blurred	The stage was not correctly fitted
	The objective is not positioned correctly on the beam path
	The nosepiece is not correctly fitted
	The upper side of the object is facing down
The image flickers	The nosepiece is not correctly fitted
	The objective is not positioned correctly on the beam path
	The condenser has not been correctly centred
The coarse adjustment knob is difficult to turn	The rotational resistance brake is too tight
	The stage is blocked by a solid body
The stage moves down on its own The fine adjustment knob moves on its own	The rotational resistance brake is not tight enough

When you move the table, the image becomes blurred	The stage was not correctly fitted

14 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.

15 Power supply

15.1 Mains connection

The microscope may only be connected to the mains if the information on the microscope (sticker) and the local mains voltage are identical.

Important:

- Check the mains cable for damage before commissioning
- Ensure that the power supply unit does not come into contact with liquids
- The mains plug must be accessible at all times.

16 Maintenance, servicing and disposal

Disconnect the appliance from the power supply before carrying out any maintenance, cleaning or repair work.

16.1 Cleaning

The appliance must always be kept clean and regularly freed from dust.
Before wiping the appliance when it gets wet, make sure that the power is switched off.

Glass components should preferably be wiped lightly with a lint-free cloth if they become dirty.

To wipe oil stains or fingerprints from lens surfaces, the lint-free cloth is moistened with a mixture of ether and alcohol (70/30 ratio) and then cleaned

Ether and alcohol must always be handled with care as they are highly flammable substances. It is therefore essential to keep them away from naked flames and electrical appliances that are switched on and off and only use them in well-ventilated rooms.

However, organic solutions of this type should not be used to clean other components of the appliance. This could cause changes to the paintwork. It is sufficient to use a neutral cleaning agent for this purpose.

Other cleaning agents for the optical components include

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

If handled correctly and checked regularly, the microscope will function smoothly for many years.

16.2 Maintenance and repair

Do not make any modifications to the device or install spare parts. Contact the manufacturer for repair or device inspection.

16.3 Waste disposal

Old appliances and accessories must not be disposed of with household waste.

The operator must dispose of the packaging and the device at the place of use in accordance with the applicable national or regional legislation The device consists of various components and materials, such as

- Electronic components (printed circuit boards, electrical cables
- Plastic (housing)
- Metal

Improper disposal of the appliance can have harmful effects on people and the environment.

Proper and environmentally friendly disposal can prevent harmful effects and recover raw materials.

17 Further information

The illustrations may differ slightly from the product.

The descriptions and illustrations in these operating instructions are subject to change without notice. Further developments to the device may result in such changes.

All language versions include a non-binding translation.
The original German document is binding.