



Metallurgical microscope

OKO-1

OKO 178



PROFESSIONAL MEASURING

English version

Operating instructions Metallurgical microscope

Version	1.2
	2025-06
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OPTICS

KERN Optics OKO-1**Metallurgical microscope****Operating instructions Metallurgical microscope**

Version 1.2 2025-06 English version

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1 Technical data

Kern model	OKO 178
Item number/type	TOKO 178-C
Dimensions (WxDxH)	472x211x440 mm
Tubus	Trinocular
Optical system	Infinity
Revolving nosepiece screw-in positions	5
Lens quality	Infinity Semi-apochromatic
Standard objectives	5 10x 20x 50x
Eyepiece field width	HWF
Illuminance Incident light Transmitted light	5W / 5W
Type of illumination Transmitted light	LED
Lighting device	Incident light Transmitted light Separate
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
Power supply type	Plug-in power supply
Focusing mechanism	Coaxial coarse and fine drive
Packaging dimensions	520x470x450 mm
Net weight	10.5 kg
Gross weight	13 kg

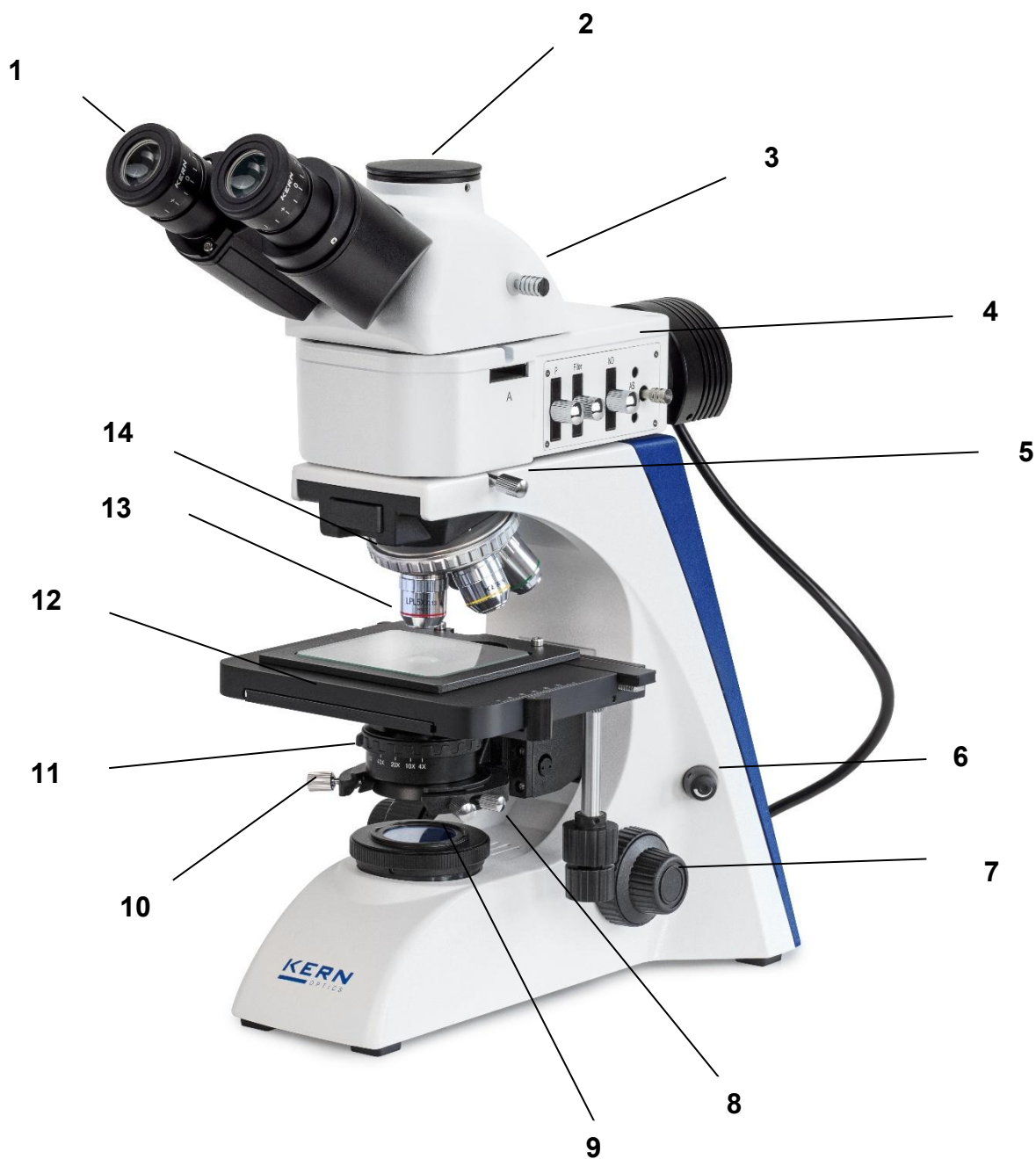
2 Declaration of conformity

The current EC/EU declaration of conformity can be found online at:

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3 Overview of the device

3.1 Nomenclature



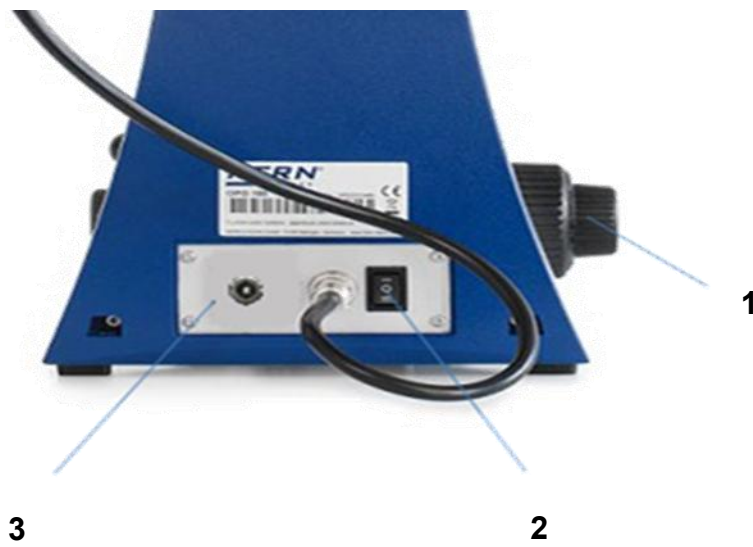
	Description
1	Eyepieces
2	Camera adapter connection
3	Microscope head/tube
4	LED incident light unit
5	Microscope head locking screw
6	Dimmer
7	Coarse and fine drive
8	Condenser locking screw
9	Field lens with light field diaphragm
10	Centering screw condenser
11	Condenser with aperture adjustment
12	Object table
13	Objective
14	Objective nosepiece

3.2 Illumination unit



	Description
1	Analyzer
2	Polarizer
3	Filter insert / Color filter
4	Frosted glass slider
5	Aperture diaphragm

3.3 Rear view



	Description
1	Coarse and fine drive
2	Main switch — Incident light ○ Off = Transmitted light
3	Power connection

4 Before use

4.1 General

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

In general, a microscope should always be handled with great care, as it is a sensitive precision instrument. It is therefore particularly important to avoid sudden movements during operation or transport, especially to avoid damaging the optical components. You should also avoid dirt or fingerprints on the lens surfaces, as this will impair image sharpness in most cases.

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 warning notices

This operating manual uses warning notices to alert you to possible personal injury or property damage in certain situations.

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

Symbols in warning notices :

Symbol	Meaning
Warning signs	Warning signs warn you of hazards that could potentially cause personal injury. The symbol indicates the type of hazard.
	Indicates general hazards or a hazardous location
	Warning of electrical voltage
	Warning of optical radiation
	Indicates electrostatic sensitive equipment

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

5.2 Intended use

The OKO-1 is versatile and is mainly used for analyzing opaque and thick specimens, workpieces (surfaces, fracture edges, coatings). It is used in metallurgy, materials testing, and quality assurance.

5.3 Improper use

Do not use the device in potentially explosive areas or for measurements in liquids or on live parts.

Unauthorized structural modifications, additions, and conversions to the device 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
- Modifying 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 instructions in the operating manual



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

6.2 Staff training

The device 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



Choking hazard!

- 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!

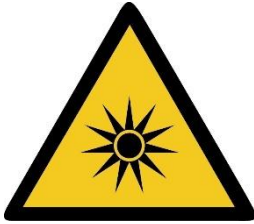
⚠ WARNING



Electrostatically sensitive device!

- The device can be destroyed by electrostatic discharge. Connectors for RF signals are particularly at risk.
- Please observe the handling instructions for electrostatic-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 eyes and skin to radiation.
- Do not insert any reflective objects into the beam entrance.
- If necessary, use suitable protective equipment/protective clothing.
- 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 damage to the device, do not expose it to extreme temperatures, extreme humidity, or moisture.
- Do not use harsh cleaners, abrasives, or solvents to clean the device.

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, transport, or storage of the microscope components. To prevent damage from vibration, 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



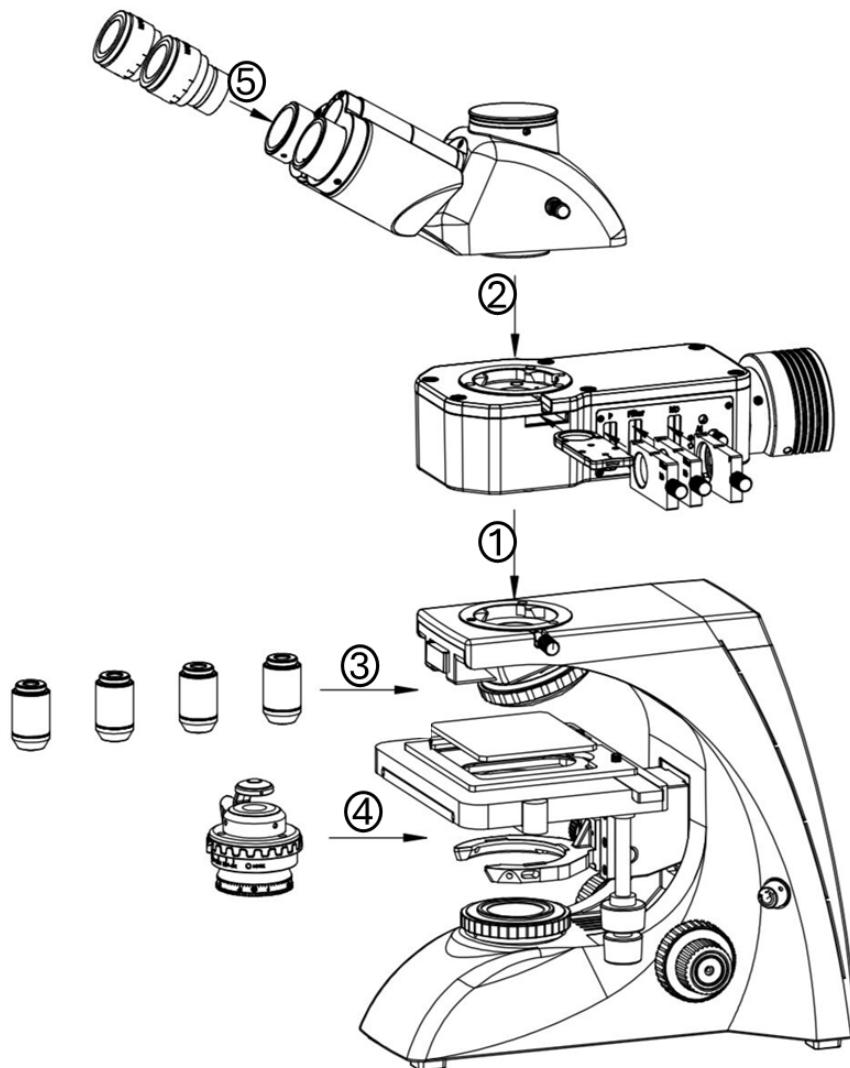
In the event of a return, please note the information in the chapter "Packaging/return transportation."

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 that the microscope functions properly, it must be assembled as described in the chapter "9 ."

9 Assembly



9.1 Incident light unit

First, the lamp housing and the light unit must be joined at their connection points. The connection is then secured with an Allen screw on the right-hand side of the lamp housing connection point.

The analyzer, polarizer, and color filter sliders can now be inserted into the corresponding slots.

To subsequently attach the light unit to the microscope, first loosen the fastening screw at the tube connection point and remove the black protective cover.

The round dovetail mount on the incident light unit can now be inserted into the round dovetail mount on the housing and fixed with the fixing screw. Always make sure that the lenses are not touched with bare fingers and that no dust enters the openings.

Finally, use the power cable must be used to make the connection between the lamp housing to the connection socket on the back of the microscope.

9.2 Microscope head

First you must loosen the fixing screw on the tube connection point and remove the black protective cover. You can then insert the round dovetail bracket on the head into the round dovetail bracket on the housing and fix it with the fixing screw. When doing this, you should always make sure that you do not touch the lenses with your bare fingers and that no dust enters the apertures.

9.3 Objectives

The specimen stage must be in its lowest position so that the objectives can be screwed into the nosepiece. You can then screw the objectives into the nosepiece so that when you turn the nosepiece in a clockwise direction, the objective with the next strongest magnification appears. You must make sure that you do not touch the lenses with your bare fingers and that no dust enters the apertures.

9.4 Condenser

It is best to move the stage to the top position using the coarse drive. The focus wheel of the condenser must now be used to move the condenser carrier to a middle position. The condenser can then be inserted into the condenser carrier at the appropriate position and fixed in place with the locking screw. The scale should be legible from the front. Avoid touching the optical lenses with your bare fingers.

The transmitted light polarizer (incl. scale) is located on the underside of the condenser. It is fixed to the side of the condenser with an Allen screw. When this screw is loosened, the polarizer can be rotated in both directions.

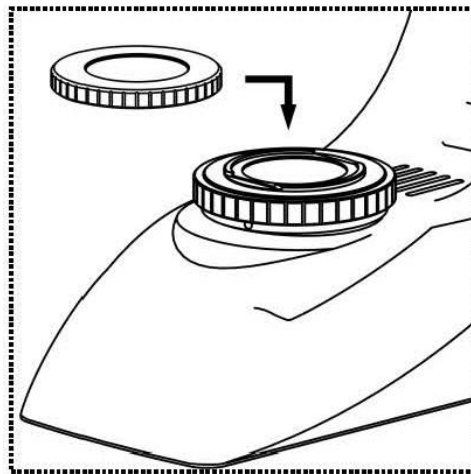
9.5 Eyepieces

Eyepieces with the same magnification must always be used for both eyes. These are simply placed on the tube sockets after removing the plastic protective caps. There is no option for fixing them in place. Care should always be taken not to touch the lenses with your bare fingers and to prevent dust from entering the openings.

9.6 Polarization unit

The polarization unit consists of two parts: a polarizer and an analyzer.

Both parts consist of a round glass plate with an outer retaining ring. To attach the analyzer, a slider with a mount is attached to the side of the incident light unit (see section 3.2) above the objective revolver, where the analyzer can be easily inserted. The polarizer, on the other hand, is simply placed on the ring holder of the field lens (see *illustration*).



There are two points to note when using the polarization unit:

- The aperture setting of the condenser must be in the **PH** position.
- The polarizer must be rotated from its initial position to the position at which the highest degree of darkness is perceived in the field of view (without specimen).

10 Operation and function of the microscope

10.1 First steps

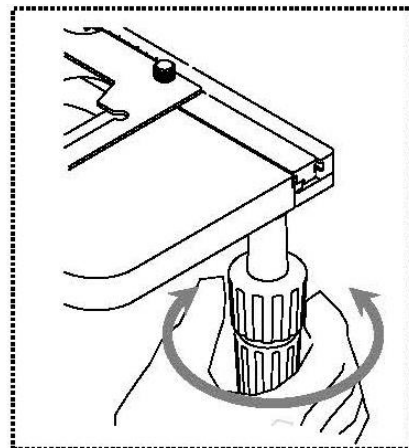
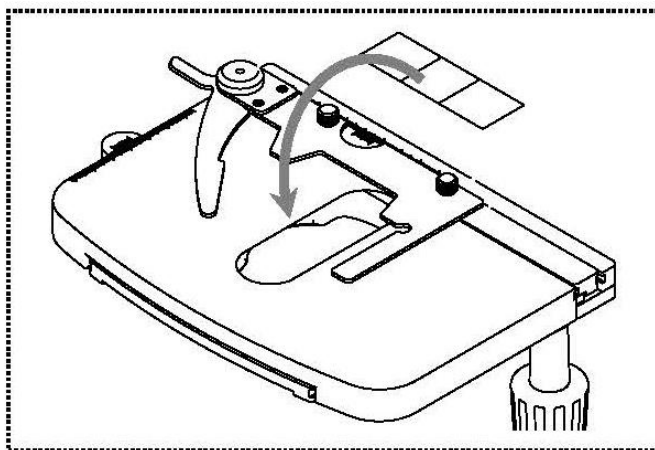
Once the microscope has been assembled and is ready for use, it must first be connected to the power supply via the power cord. Only plug the power plug into a suitable power outlet. Ensure that the power cord is laid out correctly.

The following sections describe all the important functions that are useful for operating the device.

The first thing to do is to connect the power supply using the power plug. The light intensity control (dimmer) should first be set to a low level so that your eyes are not immediately exposed to excessive light when you first look into the eyepieces. Now the lighting can be switched on using the main switch.

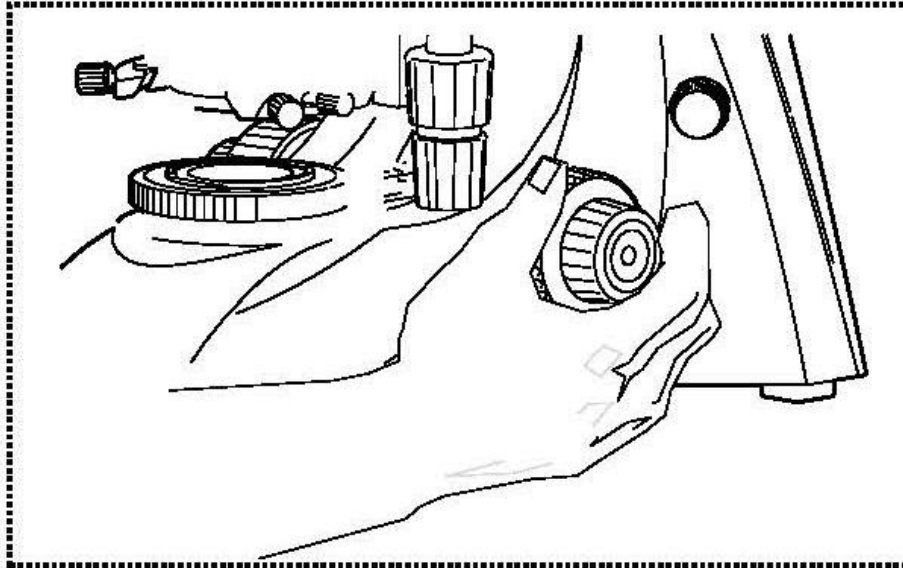
The next step is to place an object or slide with a sample on the cross table. This object must be prepared appropriately so that it is suitable for the application of polarized transmitted and/or reflected light. The slide can be fixed to the table using the object holders. The sample must be placed so that it is in the beam path and can be observed.

To move the area of the object to be observed into the beam path, the adjustment wheels on the right-hand side of the cross table must be operated accordingly (see illustration).



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

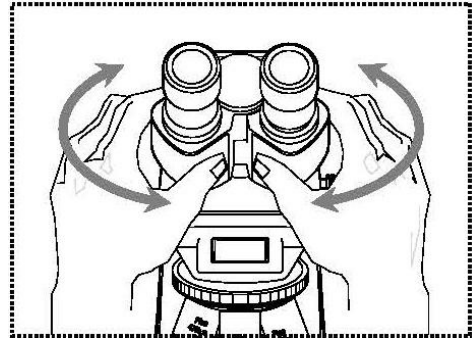
Next to the left adjustment wheel for the coarse and fine adjustment knob there is a ring which you can use to alter the torque of these wheels. Turning it in a clockwise direction reduces the torque and turning it in an anti-clockwise direction increases it. On one hand, this function can help to make 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

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.



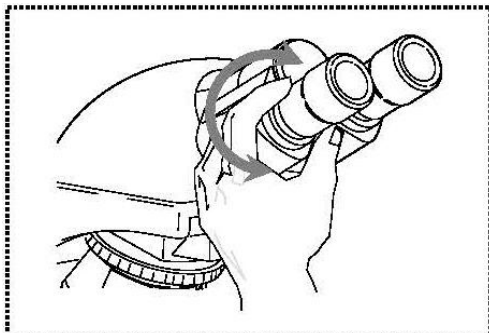
10.4 Diopter adjustment

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 focused.

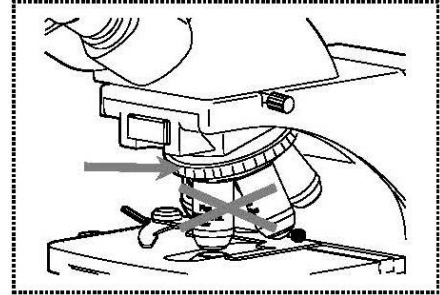


10.5 Adjusting the magnification

After pre-focusing has been carried out using the objective with the lowest magnification (see *section 10.2*) 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 Adjusting the Koehler illumination

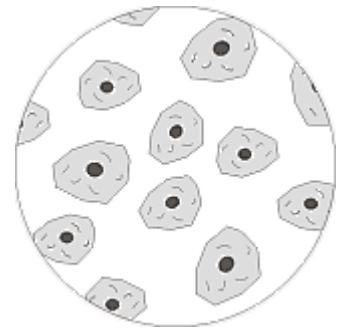
In order to obtain perfect image results during microscopic observation, it is important that the light guide of the microscope is optimized. If, as with the devices of the KERN OKO-1 series, the illumination can be adjusted according to Köhler, this results in homogeneous illumination of the specimen and a reduction in disturbing stray light.

The necessary controls for this are:

- Height-adjustable and centerable condenser with aperture diaphragm
- Illumination field diaphragm

For the initial setting of Köhler illumination, the smallest possible objective magnification must first be selected in order to then be able to carry out the following steps.

1. Use the condenser focus wheel to move the condenser to a position directly below the stage. Switch on the illumination and focus on the specimen, which is placed face up with the cover glass, using the coarse and fine focus controls.



2. Close the light field diaphragm completely using its adjustment ring. When looking into the microscope, a blurred image of the diaphragm appears. If the microscopic image becomes completely dark, the image of the light field diaphragm is outside the field of view and must be brought into the field of view using the centering screws of the condenser.



3. Adjust the height of the condenser until the image of the bright field diaphragm appears sharp in the field of view. With some microscopes, there is a risk of raising the condenser too far and causing it to collide with the slide. Therefore, caution is advised here.



4. Use the centering screws on the condenser holder to bring the image of the bright field diaphragm into the center of the field of view.



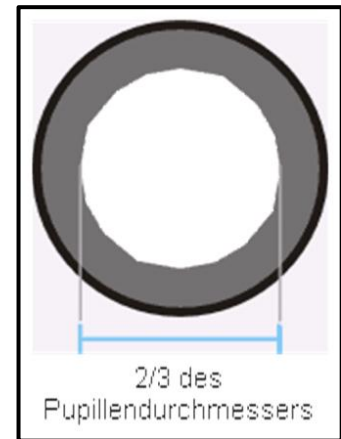
5. Open the light field diaphragm until it disappears from the field of view. If necessary, slightly re-center using the centering screws on the condenser holder.



6. The aperture diaphragm of the condenser can be used to set the optimal compromise between contrast and resolution for the microscopic image. The scale on the condenser serves as a guideline. Select the appropriate objective lens.

The view into the tube without the eyepiece should look similar to the illustration on the right.

The diameter of the aperture diaphragm that is then visible should be about $\frac{2}{3}$ of the pupil diameter.



If the eyepiece needs to be removed for inspection, please ensure that no dirt or dust can fall into the tube.

7. If necessary, use the **dimmer** to slightly adjust the brightness of the lamp. The brightness is always adjusted via the lamp brightness and not via the aperture diaphragm.
8. You may need to readjust the focus and x/y axis.
9. Observe the object.

If a different magnification is then selected, the Köhler illumination does not need to be readjusted; only the aperture and light field diaphragm need to be adjusted accordingly. In the course of this, you can also always check whether the condenser needs to be re-centered.

10.7 Use of the eyecups

The eyecups included in the scope of delivery can always be used, as they shield the eyepiece from distracting light reflected from light sources in the environment, thus improving image quality.

However, when using eyepieces with a high eye point (particularly suitable for eyeglass wearers), it can be useful for users without eyeglasses to attach the eyecups to the eyepieces.

These special eyepieces are also called high eye point eyepieces and can be identified by a glasses symbol on the side. They are also marked with an additional "H" in the item description (example: HSWF 10x Ø 23 mm).

In the OKO-1 series, the eyecups are already attached to the eyepiece. To use them, simply fold out the folded rubber parts.

When attaching the eyecups, care should be taken to ensure that the diopter setting is not adjusted. It is therefore recommended to hold the diopter adjustment ring of an eyepiece with one hand while attaching the eyecup with the other.

Glasses wearers must remove the eyecups before observing if they are attached to the High Eye Point eyepieces.

As the eyecups are made of rubber, it is important to note that they can easily become contaminated with grease residues during use. To maintain hygiene, it is therefore recommended that the eyecups be cleaned regularly (e.g., with a damp cloth).



Eyecups



High Eye Point Eyepiece
(indicated by the eyeglass symbol)

10.8 Adjustment of illumination for reflected light

Just like the components for transmitted light illumination, those for reflected light illumination can be adapted to different application requirements.

The following components are available for this purpose:

Aperture diaphragm

The diaphragm has the same function as explained for transmitted light adjustment (see section 10.6). This diaphragm is opened and closed using the slider labeled "AS" located on the side of the reflected light unit.

Color filter

The color filter slider has a round opening with an integrated blue filter. This slider is labeled "Filter" and must therefore be inserted into the slot also labeled "Filter." Depending on requirements, the opening must be locked into the beam path.

Polarization unit (analyzer/polarizer)

To bring the analyzer into the beam path, the analyzer slider must be inserted into the slot on the side below the microscope head (see section 3.2) so that the integrated rotary wheel points to the right, allowing the desired alignment of the analyzer to be set. If the analyzer is not to be used, it must be completely removed from the device, unlike the other sliders.

The polarizer slider has a round opening with an integrated polarizer. This slider is labeled "P" and must therefore be inserted into the slot also labeled "P". Depending on requirements, the polarizer must be locked into the beam path or removed.

Diffuser / frosted glass slider

Directly to the side of the upright unit is an insertion point labeled ND (see section 3.2) for the diffuser. This slider can be inserted to evenly diffuse the light from the LED.

1 Changing the bulb

The OKO-1 is equipped with LEDs.

Due to the long service life of LED lighting, regular lamp replacement is not necessary with this microscope.

Problems with the lighting would therefore in most cases be caused by defects in the electrical system. In such a case, our technical service can help.

11 Use of optional accessories

1.1 Camera connection

Thanks to the trinocular tube, which is standard equipment for the entire OKO-1 series, it is possible to connect microscope cameras to the device in order to digitally document images or sequences of an observation object.

After removing the plastic cover on the camera adapter connection at the top of the microscope head, a suitable adapter must first be attached to it.

Generally, two C-mount adapters are available for this purpose (1x and 0.5x magnification). After attaching one of these adapters, it can be secured with the locking screw. A camera with a C-mount thread is now screwed onto the top of the adapter.

It is recommended to first adjust the field of view via the eyepieces on the device for the existing requirements and then to observe via the microscope camera (or via the connected PC screen).

To do this, the trinocular switch rod on the right side of the microscope head must be pulled out. The light from the microscope illumination is thus completely redirected into the beam path for the camera, causing a dark field of view in the eyepieces. This means that simultaneous observation through the eyepieces and on the PC screen is not possible.

With C-mount adapters that have their own integrated magnification, the image displayed by a camera connected to the device often has a different degree of sharpness than the image produced by the eyepiece.

To be able to focus both images, such adapters are focusable.

1.2 Color filter

The color filter for transmitted light can be easily placed in the ring holder of the field lens.

The color filter of the incident light unit can be replaced. To do this, use an Allen key to open the screw on the side of the color filter slider.

The filter comes loose and can be replaced with another filter. To attach the filter, tighten the screw again with the Allen key.

12 Troubleshooting

Problem	Possible causes
Lamp does not burn	Mains plug not plugged in correctly
	No power available at the socket
	Lamp defective
Field of vision is dark	Aperture diaphragm and/or field diaphragm are not open wide enough
	The beam path selector slider is set to "Camera"
	The condenser is not centered correctly
Brightness cannot be adjusted	The brightness control is set incorrectly
	The condenser was not centered correctly
	The condenser is lowered too far
Field of vision is dark or not correct illuminated	The lens was not swiveled in correctly
	The beam path selector slide is in an intermediate position
	The object turret is not mounted correctly
	The condenser is not fitted correctly
	A lens is used that does not match the illumination range of the condenser
	The condenser was not centered correctly
	The luminous field diaphragm is closed too far
The field of vision of one eye does not match that of the other eye	The interpupillary distance is not set correctly
	The diopter setting was not made correctly
	Different eyepieces are used on the right and left
	The eyes are not used to microscopy

Problem	Possible causes
Blurred details Bad picture Poor contrast Vignetted field of view	Aperture diaphragm is not open wide enough
	Condenser is lowered too far
	The objective does not belong to this microscope
	The front lens of the lens is dirty
	An immersion lens is used without immersion oil
	The immersion oil contains air bubbles
	The condenser is not centered
	The recommended immersion oil is not used
	Dirt / dust on the lens
Dirt or dust in the field of vision	Dirt / dust on the front lens of the condenser
	Dirt / dust on the eyepieces
	Dirt / dust on the front lens of the Condensers
One side of the image is blurred	Dirt / dust on the object
	The table was not assembled correctly
	The lens is not correctly swiveled into the beam path
	The nosepiece is not mounted correctly
The picture flickers	The object rests with the top side facing down.
	The nosepiece is not correct mounted
	The lens is not mounted correctly swiveled into the beam path
The coarse drive is difficult to turn	The condenser was not installed correctly centered
	The adjusting wheel/torque is too Tightened
The table moves down by itself The fine adjustment drive adjusts itself	The cross table is operated by a Solid body blocked.
	The adjusting wheel/torque is not tightened enough

Touching the table blurs the image	The table was not assembled correctly
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13 Service

If, despite studying these operating instructions, you still have questions about commissioning or operation, or if, contrary to expectations, a problem should occur, please contact your specialist dealer. The device may only be opened by trained service technicians authorized by KERN.

14 Power supply

14.1 Mains connection



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



Important:

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

15 Maintenance, servicing and disposal



Disconnect the device from the power supply before performing any maintenance, cleaning, or repair work.

15.1 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.

15.2 Maintenance and repair

Do not make any changes to the device or install any replacement parts. Contact the manufacturer for repairs or device inspections.

15.3 Waste Disposal



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

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

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

Improper disposal of the device can have harmful effects on humans and the environment.

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

16 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 to the device may result in such changes.



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