

Microscope Research

Trinocular Compound

Code 663-539C

PLEASE READ THESE INSTRUCTIONS BEFORE USE.

1. Product Description

1.1 Introduction

An advanced laboratory research compound microscope capable of binocular and trinocular viewing.

The microscope offers a guaranteed 95% flat field measured from the field centre with the high-grade DIN infinity corrected PLAN achromatic lenses. Furthermore, the lenses guarantee a view free from image distortion and chromatic aberration at the edges.

For advanced image contrast control, the microscope includes a Koehler illumination system with a field iris diaphragm.

For improved functionality, the large-scale body has a streamlined body with low positioned focus knobs, an XY stage rod, a carrying handle, and an easy bulb replacement process.

The high-resolution multi-layer lenses are anti-mould, anti-glare, and anti-scratch for ease of mind.

Additionally, the built-in safety stop limit protects the objective lenses and microscope slides from damage.

1.2 Intended Use

Suitable for use in dark field, phase contrast, polarizing, and fluorescence microscopy.

1.3 Features

- Premium Laboratory Research Trinocular Compound Microscope
- Built-In Safety Limit Stop to Protect Objective Lenses & Slides
- DIN Infinity Corrected PLAN Achromatic Optical System
- Bottom Transmitted Hi-Power LED Daylight Illumination
- PLAN Infinity Eyepiece, Wide Field of View of 20mm
- Binocular or Trinocular Observation Head Viewing
- Basic Powers of 40X, 100X, 400X & 1000X
- User-Friendly Co-Axial Focusing Control
- Large Double-Layer Mechanical Stage
- High Resolution Multi-Layer Lenses

1.4 Accessories

- Vinyl dust cover
- Power cord with an Australian style plug

TABLE OF CONTENT

1. Product Description
 - 1.1 Introduction
 - 1.2 Intended Use
 - 1.3 Features
 - 1.4 Accessories
2. Technical Specifications
3. Safety Precautions
4. Maintenance & Cleaning
5. Installation
6. Operation
7. Troubleshooting
8. Product Recycling

PRODUCT CODE

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2. Technical Specification

Optical System	DIN infinity corrected PLAN achromatic.
Observation Head	Binocular or trinocular, Siedentopf (compensation-free), 30 degrees inclined. Inter-pupillary distance adjustment 55mm to 75mm.
Magnification	40X to 1000X standard magnification maximum. Magnification is extendable to 2000x with the 20X PLAN eyepiece.
Eyepiece	PLAN infinity eyepiece, wide field of view of 20mm.
Nosepiece	Reversed, quintuple, 5-hole.
Objectives	Infinity-corrected PLAN achromatic objectives 4x, 10x, and 40x(S). Optional objectives 20x, 80x(S), and 100X (S).
Focusing	Co-axial coarse and fine focus adjustments. Focusing knob tension adjustment and stop limit.
Stage	A double-layer mechanical stage with dimensions of 155mm by 140mm. A movable range of 76mm by 50mm.
Illuminations	LED daylight (5W), Koehler illumination with a field iris diaphragm.
Condenser	Abbe condenser NA 1.25 with reserved slots for dark field, polarizing, or phase contrast functions upgrade.
Filters	Frosted, blue, green, and yellow.
Safety Feature	A safety limit stop built-in to protect objective lenses and slides.
Input Voltage	AC 100V to 240V auto-switching power supply, CE approved.
Unit Dimensions	185mm W x 280mm D x 390mm H
Carton Quantity	1
Carton Dimensions	480 x 250 x 550mm
Carton Weight	9kg

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3. Safety Precautions

Read the following safety precautions prior to using the microscope. Never use the unit in any manner not specified in this manual.

- Wear personal protective equipment during the operation of the unit.
- Always install the unit on a flat, stable, and non-slippery surface.
- Always unplug the power adaptor before cleaning the unit.
- Never touch moving parts. Do not move the unit during operation.
- The unit is not to be operated in a hazardous, explosive, or flammable environment and not to be used to mix explosive or highly reactive material. Do not use the unit under water.
- Do not use the microscope if it shows signs of electrical or mechanical damage. If any damage is found, contact your supplier immediately.
- Ensure that the attachments are secured properly prior to operation.
- Do not use without appropriate training. Always follow the installation instructions.
- Do not expose the microscope to the direct sun, elevated temperature, dampness, dust, or acute shaking.
- Do not hold the microscope by the stage, focusing knobs or head when moving the unit.
- If the microscope is dampened by liquid while in operation, please power off the microscope immediately and wipe it dry.

The safety of the user cannot be guaranteed if the unit:

- Is operated with accessories that are not supplied with the unit.
- Is operated with accessories that are not supplied or recommended by the manufacturer.
- Is operated improperly or contrary to the manufacturer's specifications.

4. Maintenance & Cleaning

- Always unplug the power adaptor before cleaning the unit.
- Wear protective gloves and safety glasses while cleaning the unit.
- Excessive amounts of liquid should be avoided. After cleaning, ensure that all the parts are dried.
- If repairs are performed by unauthorized personnel, the product warranty may become void.
- Wipe the microscope lens gently with a soft tissue.
- Carefully wipe of all oil marks and fingerprints from the lens surface with a tissue moistened with a small amount of 3:7 mixture of alcohol and ether or dimethylbenzene.

ATTENTION! *The alcohol and ether is flammable. Do not place these chemicals near fire or a fire source. Please use these chemicals in a well-ventilated area.*

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- Do not place the rotor into cleaning solution.
- Regular cleaning of the rotor is important.
- After cleaning, ensure that all the parts are dried before using the unit.
- In the event of contamination caused by aggressive agents, the rotor must be cleaned immediately with a natural cleaning liquid. Pay particular attention to the bores of the tubes. If any damage is seen, contact the service technician.
- Before using cleaning or decontamination methods, other than those mentioned by the manufacturer, contact the manufacturer to ensure that the intended method will not damage the centrifuge.

5. Installation

1. Open the packaging and gently remove the microscope from the box.
2. Place the unit gently onto a firm and levelled surface.
3. Unpack every individual component.
4. Assemble the components as instructed in this manual for optimal performance.

ATTENTION: The manual should be kept with the device and all the packaging should be kept in safe storage for at least two years for warranty purposes.

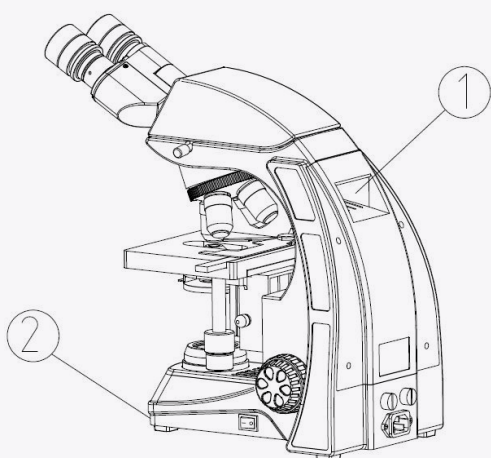
Location and mounting

Place the microscope on a flat, solid, and levelled surface. Ensure that all four feet stand on the surface firmly. Avoid installing on a slippery surface or a bench prone to vibration.

- Do not place the unit in direct sunlight.
- Keep a minimum clearance of 300mm from all directions to guarantee safe operation.
- Keep the unit away from heat or water to avoid sample temperature errors.
- Do not place the microscope in an area that makes it difficult to operate the unit.

Moving the microscope

When moving the unit, do not hold the microscope by the stage, focusing knobs or head. To move the microscope, use both hands to hold it by the back hand-clasping [1] and the front base [2], and then lay it down carefully.



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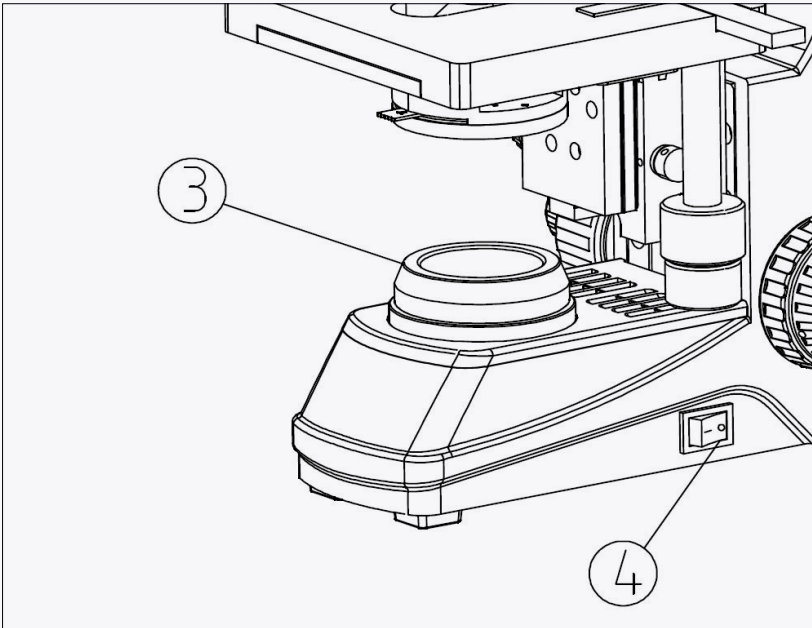
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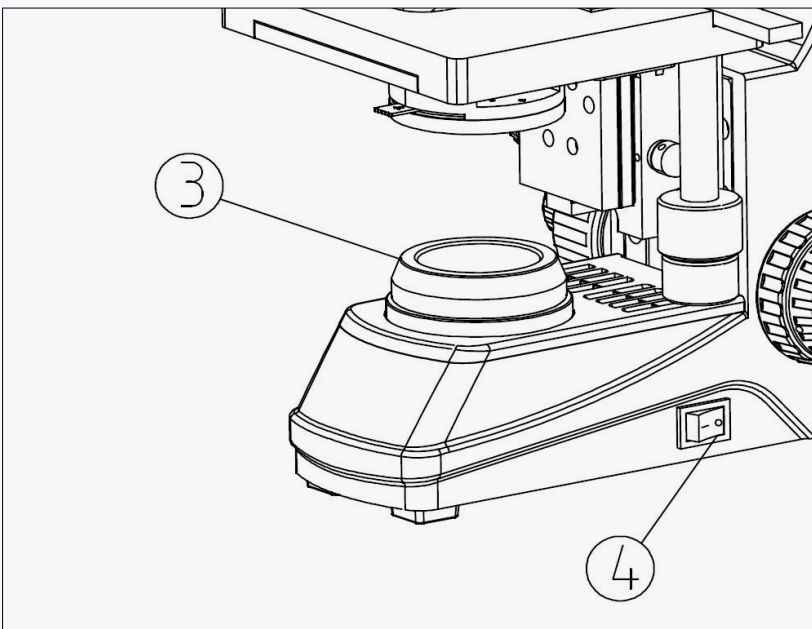
Condenser

When in operation, the surface of the condenser will become extremely hot. Ensure that there is sufficient room for the heat dissipating around the condenser [3].



Replacing the bulb or fuse

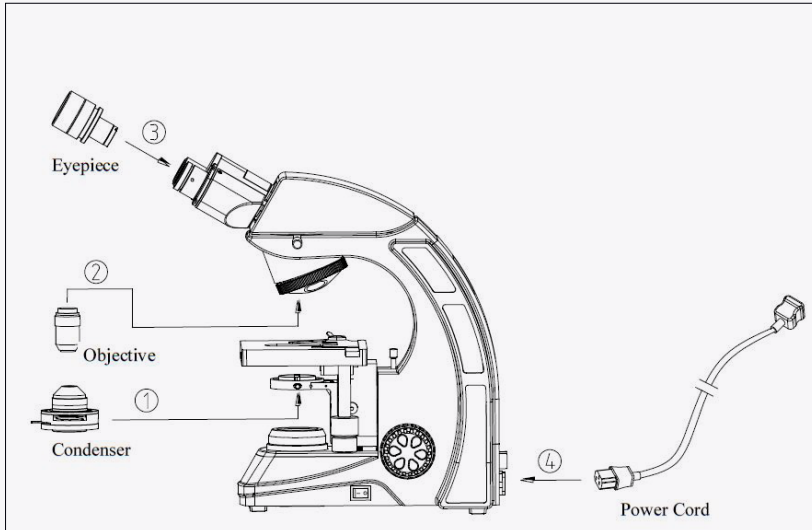
For safety, ensure that the power switch [4] is at '0' before replacing the bulb or fuse. Additionally, allow a cooling period for the lamp to cool down.



Assembling the microscope

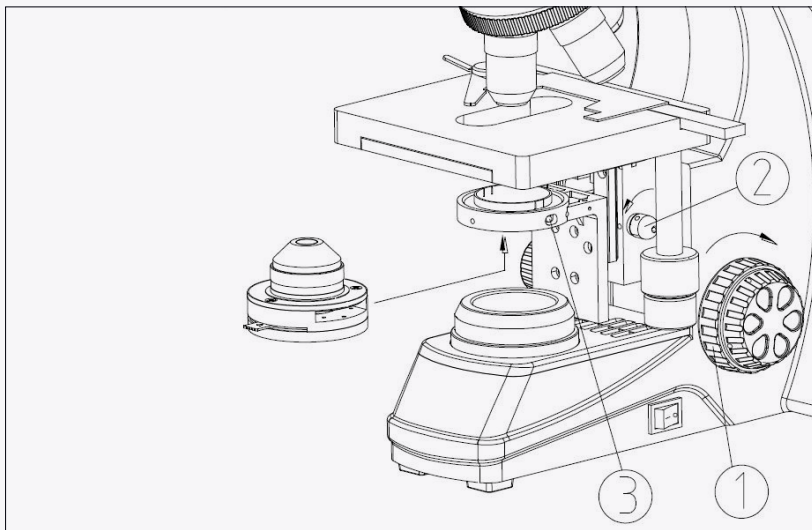
The numbers below denote the assembling order.

ATTENTION! Prior to assembling the microscope, ensure that there is no dust or dirt. Assemble the unit carefully and do not scrap any part or touch the glass surface.



Assemble the condenser

1. Rotate the coarse focusing knob [1] to raise the stage to the highest position (see below figure).
2. Rotate the condenser's up-down knob [2] to lower the bracket of the condenser to the required position.
3. Loosen the condenser's lock screw [3] fully.
4. Insert the condenser into the hole of the stand according to the arrow head, until the condenser is equal with the stand.
5. Then rotate the condenser to ensure that the handle is frontward.
6. Tighten the condenser's lock screw [3].
7. Then raise the condenser's up-down knob [2] to the highest position

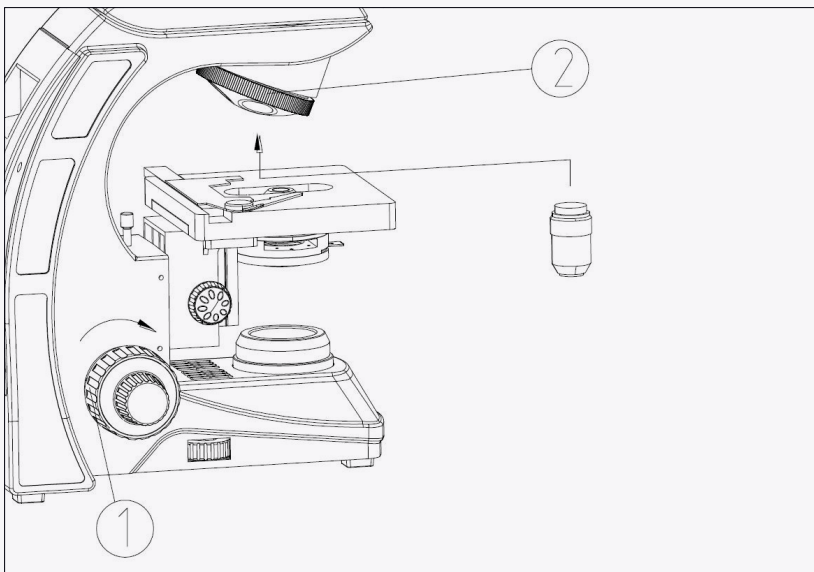


Assembling the objective

1. Rotate the coarse focusing knob to lower the stage to a suitable position (see below figure).
2. Install the objectives into the objective nosepiece [2] from the lowest magnification to the highest in a clockwise direction from the rear.

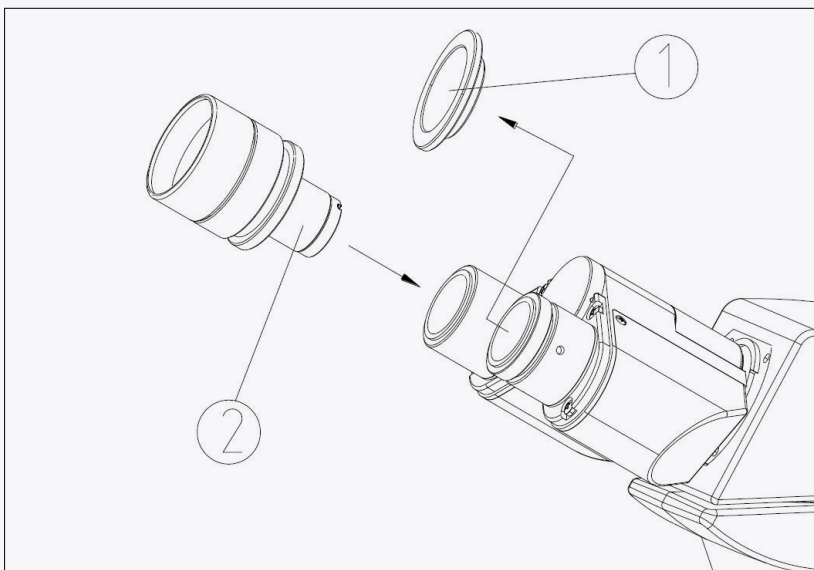
ATTENTION! During operation, first use the lowest magnification objective (4X or 10X) to search for specimen and focus, and then replace with the higher magnification objectives to observe.

ATTENTION! When replacing the objective, rotate the objective nosepiece until it sounds 'ka-da,' to ensure that the objective is in the centre of the optical path



Assembling the eyepiece

1. Remove the cover of the eyepiece tube [1].
2. Insert the eyepiece [2] into the eyepiece tube, until it touches the surface (see below figure).



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Connect the power cord

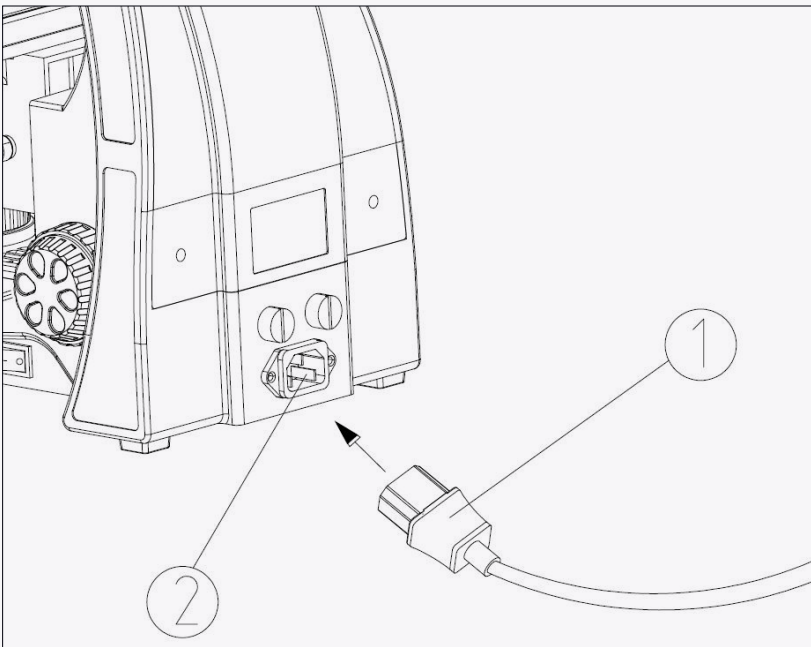
ATTENTION! Do not use force when the power cord is bent or twisted.

1. Ensure that the power switch is at '0' (OFF) before connecting the power cord to the unit.
2. Insert the connector [1] of the power cord into the power socket [2]. Ensure that it connects correctly.
3. Insert the other connector into the socket of the power supply. Ensure that it connects correctly.

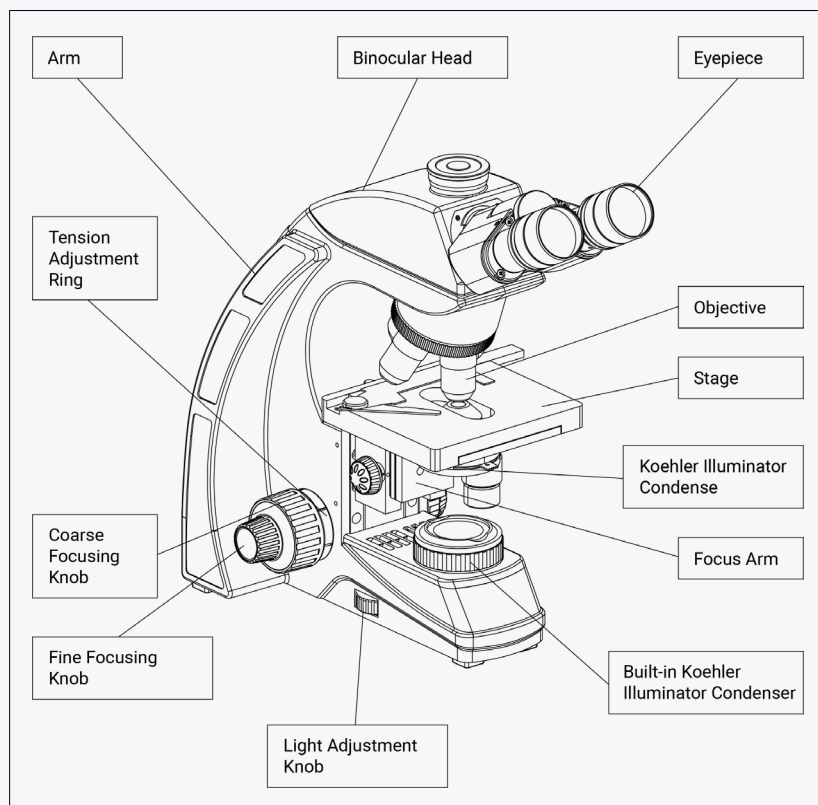
ATTENTION! Only use the supplied power supply with the microscope or use one of the exact specifications.

ATTENTION! The wide voltage range is supported as 100V to 240V.

ATTENTION! Connect the power cord appropriately to ensure that the microscope is connected to the ground.

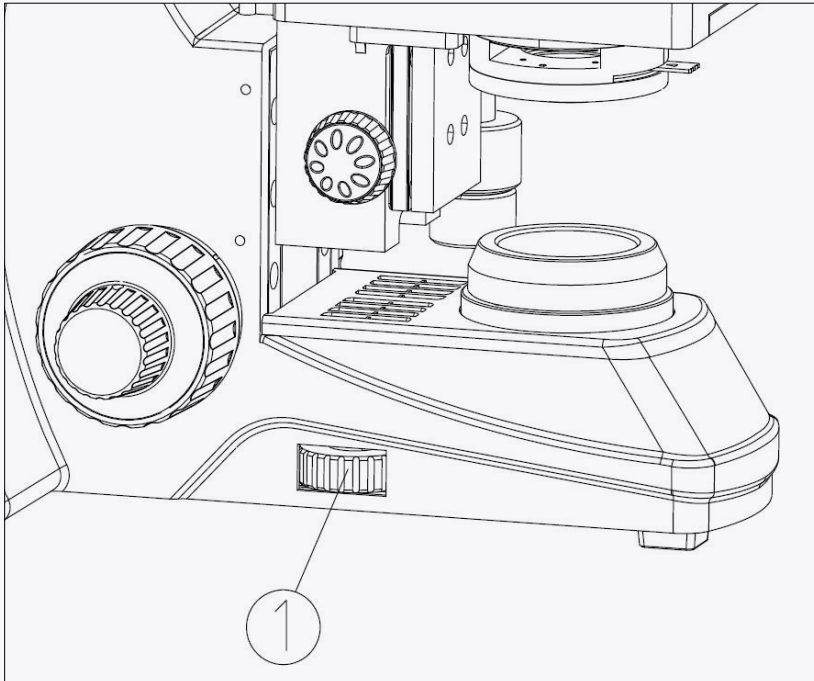


6. Operation



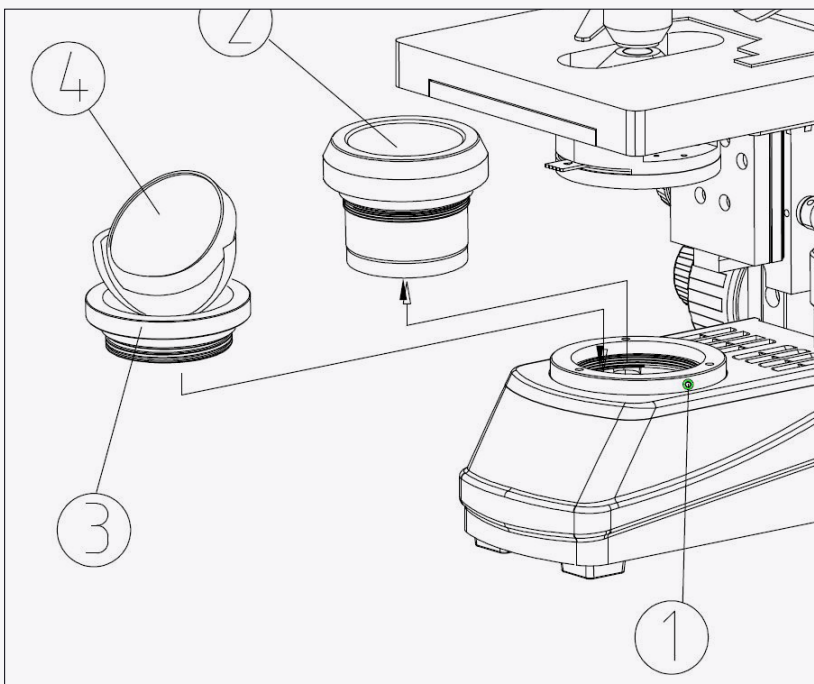
Set the illumination

1. Turn on the microscope by switching the main power switch to '1'.
2. Adjust the light adjustment knob [1] until the illumination is comfortable for observation.
3. Rotate the light adjustment knob clockwise to raise the voltage and brightness.
4. Rotate the light adjustment knob counterclockwise to lower the voltage and brightness (see figure below).



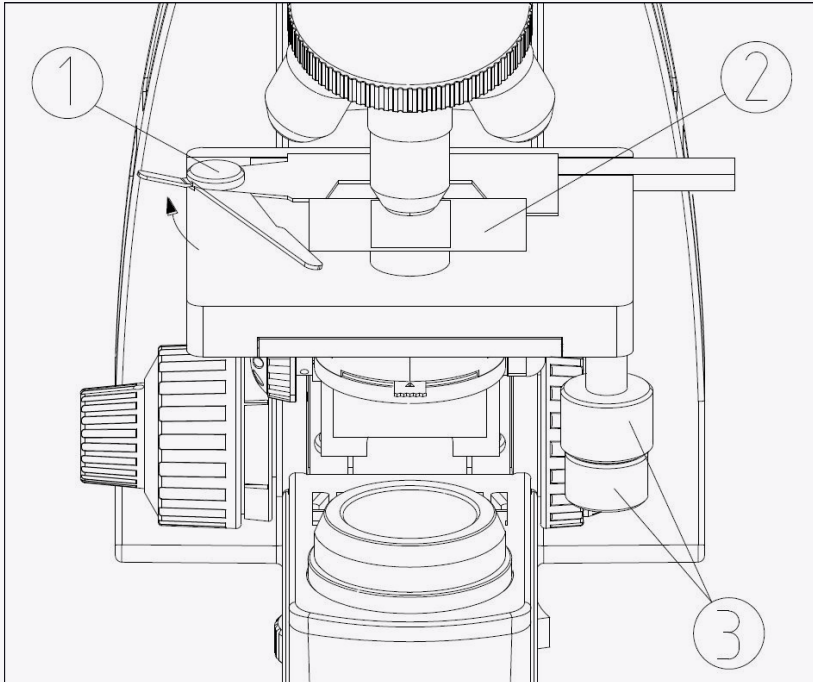
Assembling the mirror [optional]

1. Ensure that the power switch is at '0' (OFF).
2. Loosen the hexagonal screw [1] with a spanner.
3. Screw off the built-in Koehler illuminator condenser [2] (see below figure).
4. Screw on the mirror [3] according to the arrow head, and tighten the hexagonal screw [1] with a spanner.
5. Rotate the mirror stand [4], to fill the field with light.



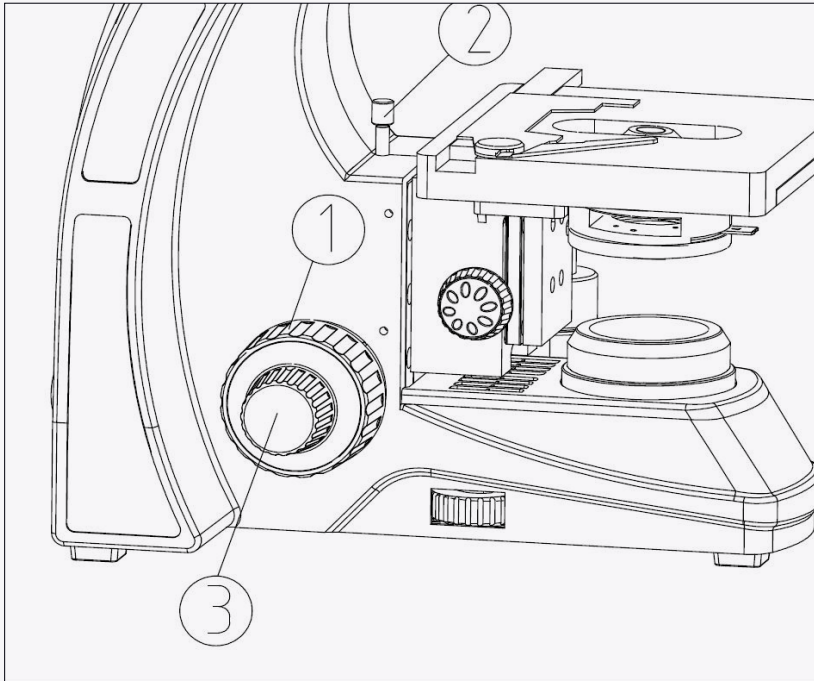
Setting the specimen slide

1. Push the wrench of the specimen holder backwards.
2. Loosen the wrench [1], and clamp the slide [2] by the clips. Ensure that the cover glass faces upwards (see below figure).
3. Rotate the x- and y-axis knob [3].
4. Move the specimen to the centre and align with the centre of the objective.



Adjusting the focus

1. Move the objective 4X to the light path.
2. Observe the right eyepiece with the right eye.
3. Rotate the coarse focusing knob [1] until the image appears (see below figure).
4. Rotate the fine focusing knob [3] for clarity.
5. The position screw [2] will stop the objective from touching the clips.

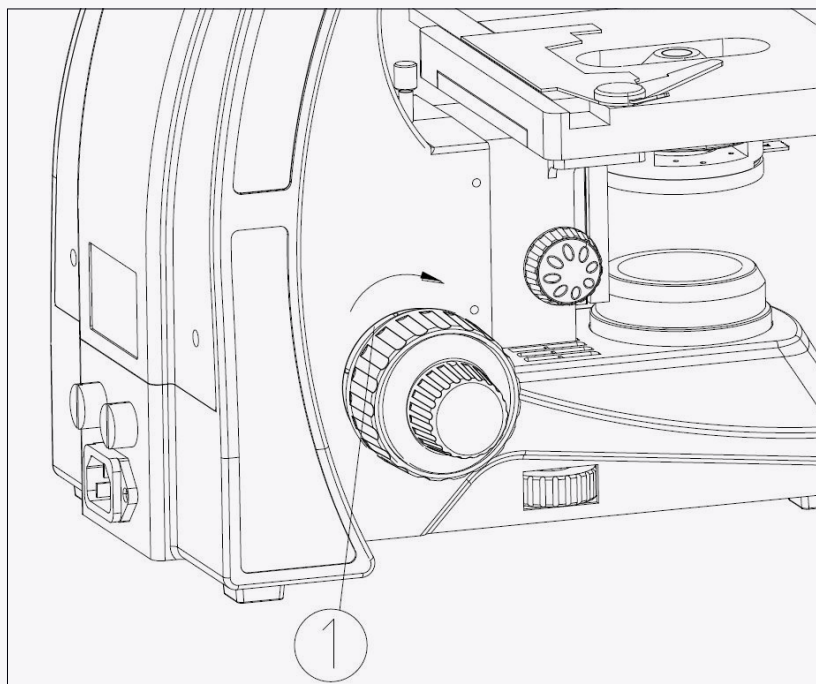


Adjusting the focusing tension

Adjust the tension adjustment ring [1] (see figure below) if the following are true:

- if the handle is heavier than normal when focusing
- the specimen leaves the focus plane after focusing
- the stage declines itself

To tighten the focusing arm, rotate the tension adjustment ring [1] according to the arrow head. To loosen, rotate it in the reverse direction.



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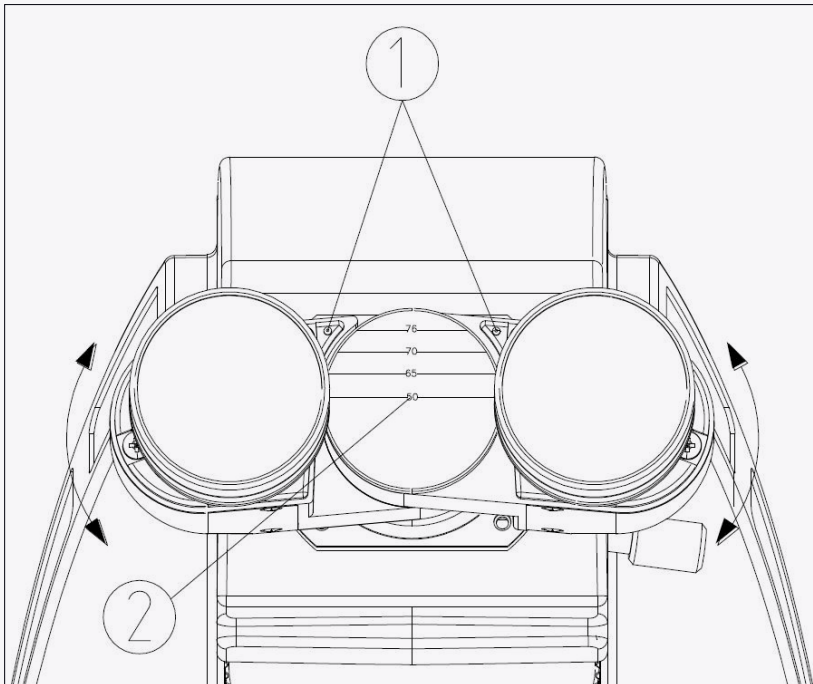
Adjusting the interpupillary distance

When observing with both eyes, hold the base of the prism and rotate them around the axis until there is only one field of view.

The symbol “°” [1] on the eyepiece base points to the scale [2] of the interpupillary indication, which means the value of interpupillary distance (see below figure).

Range of 50mm to 76mm.

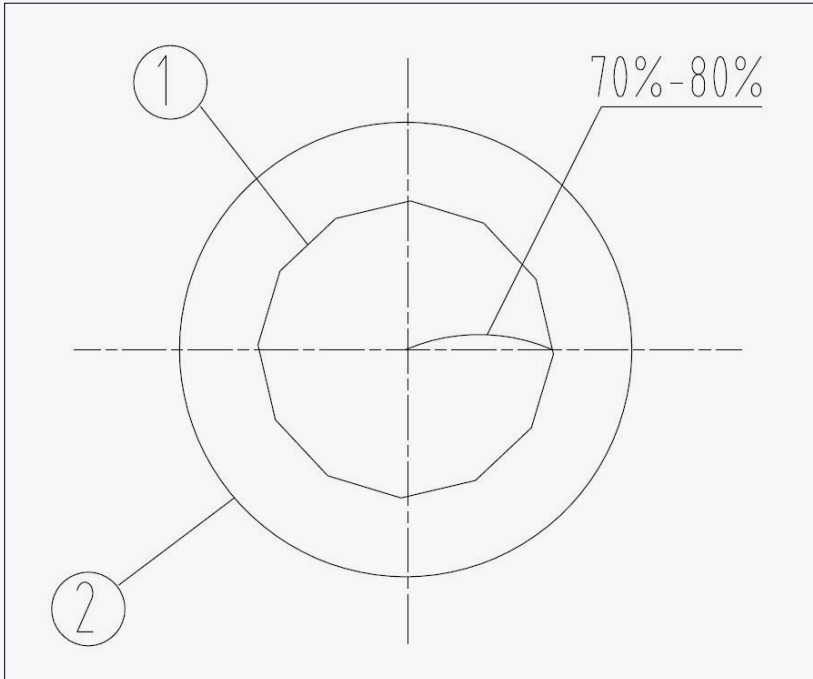
ATTENTION! Take a note of your interpupillary distance for further operation of the microscope.



Adjusting the field diaphragm

Also known as the iris diaphragm of Koehler illumination condenser.

By limiting the diameter of the beam entering the condenser, the field diaphragm can prevent other light and strengthen the image contrast. When the image is just on the edge of the field of view, the objective can show the best performance and obtain the clearest image.



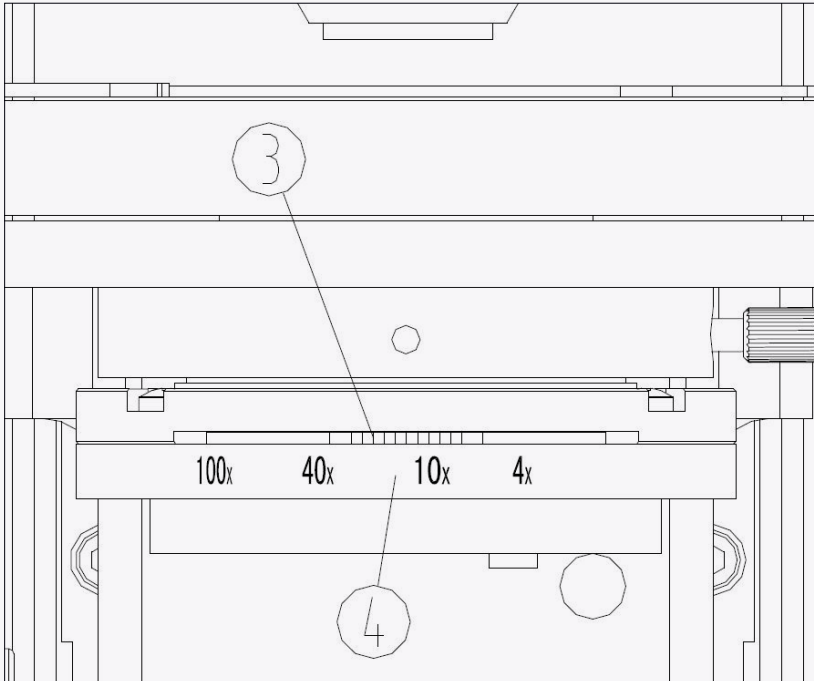
Adjusting the aperture diaphragm

For the fixed condenser holder

The aperture diaphragm decides the numerical aperture of the illumination. Only when the N.A. of the illumination is matching with the N.A. of the objective, can it improve the resolution and contrast, and increase the depth of field.

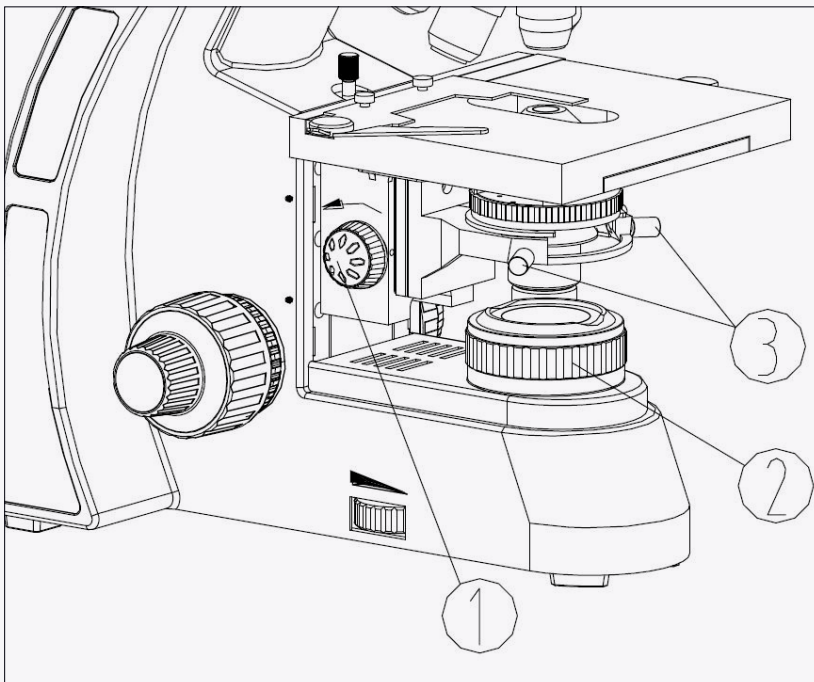
As the contrast is usually low, rotate the handle [3] so that the arrow head points to the related magnification position on the condenser base [4], namely, to adjust the N.A. of illumination to 70% to 80% of the N.A. of the objective. The eyepiece can be taken off when it's necessary to observe from the tube.

Adjust the ring [3] to adjust the proportion.



For the adjustable condenser holder

1. Rotate the condenser's up-down knob [1] to raise it to the highest position (see below figure).
2. Rotate the objective 10X to the light path and focus the specimen.
3. Rotate the field diaphragm adjustment ring [2] to put the field diaphragm to the smallest position.
4. Rotate the condenser's up-down knob [1], and adjust the image to be the clearest.

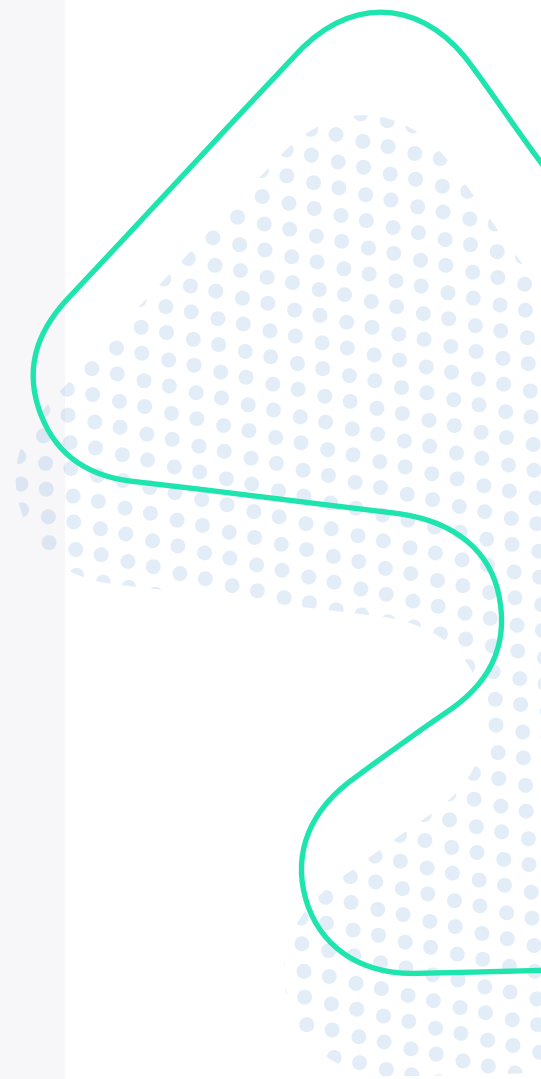


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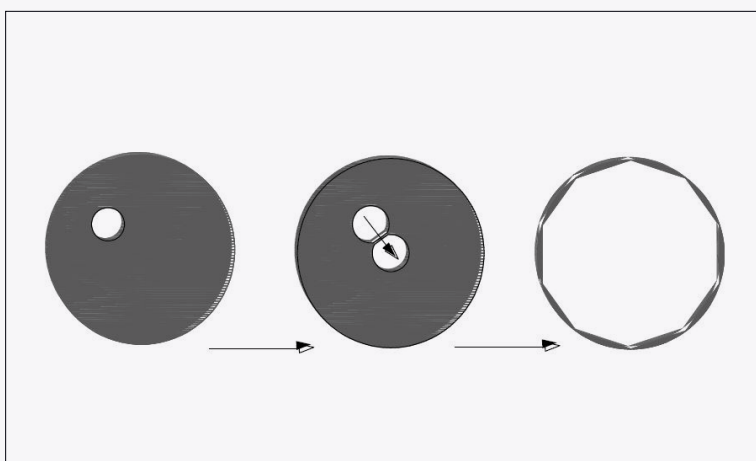
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5. Adjust the centre adjustment screw [3] and put the image to the centre of the field of view (see below figure).
6. Open the field diaphragm gradually. If the image is in the centre all the time and inscribed to the field of view, it shows that the condenser has been centred correctly.
7. The field diaphragm can be enlarged slightly to make the image circumscribed to the field of view.
8. By limiting the diameter of the beam entering the condenser, the field diaphragm can prevent other light and strengthen the image contrast. When the image is just on the edge of the field of view, the objective can show the best performance and obtain the clearest image.



Using the oil objective 100X

1. Use the objective 4X to focus the specimen.
2. Place a drop of oil [1] on the specimen.
3. Rotate the nosepiece counterclockwise and rotate the oil objective 100X to the light path. Then use the fine focusing knob to focus. Ensure that there are no air bubbles in the oil that could affect the image quality.
 - a. Move the eyepiece to examine the air bubble. Open the aperture diaphragm and field diaphragm fully and observe the edge of the objective from the tube.
 - b. Rotate the nosepiece slightly and swing the oil objective a couple of times to remove the air bubble.
4. After using the front lens, wipe it with a tissue with a small amount of 3:7 mixture of alcohol and ether, or with dimethylbenzene. Wipe oil on the specimen.
 - a. Do not put another objective to the light path before the oil is wiped to avoid wetting the dry objective.
 - b. Too much dimethylbenzene will dissolve the lens's stickiness.

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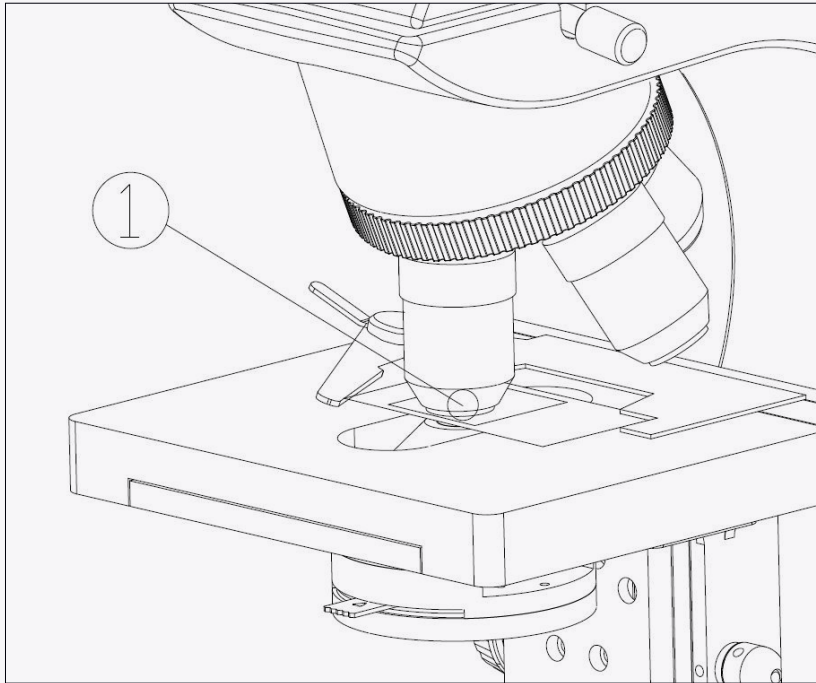
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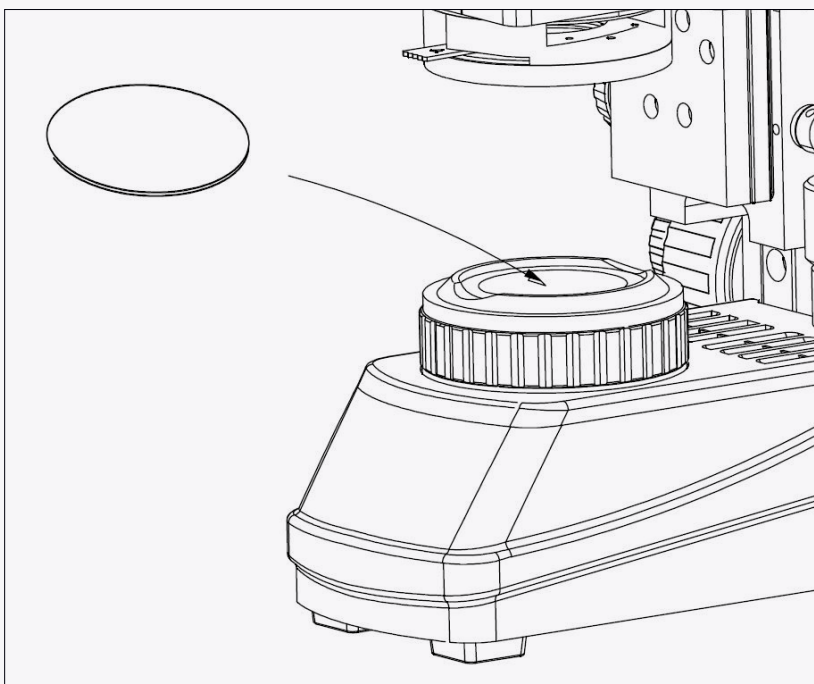


Using the filters

The filter can improve the background and increase the contrast. There are four kinds of filter supplied: blue, yellow, green, and frosted white.

The built-in Koehler illuminator condenser:

1. Screw the condenser cover [1] off of the condenser base [2].
2. Place the filter into the groove of the condenser base [2]. Ensure that the filter's rough side is facing downward.
3. Screw the the condenser cover [1] onto the condenser base [2].

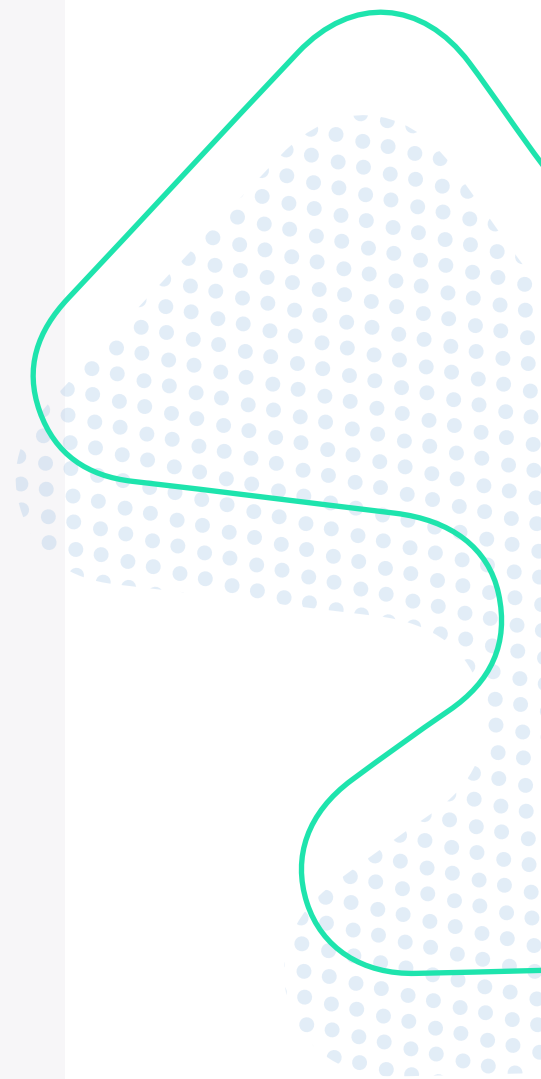


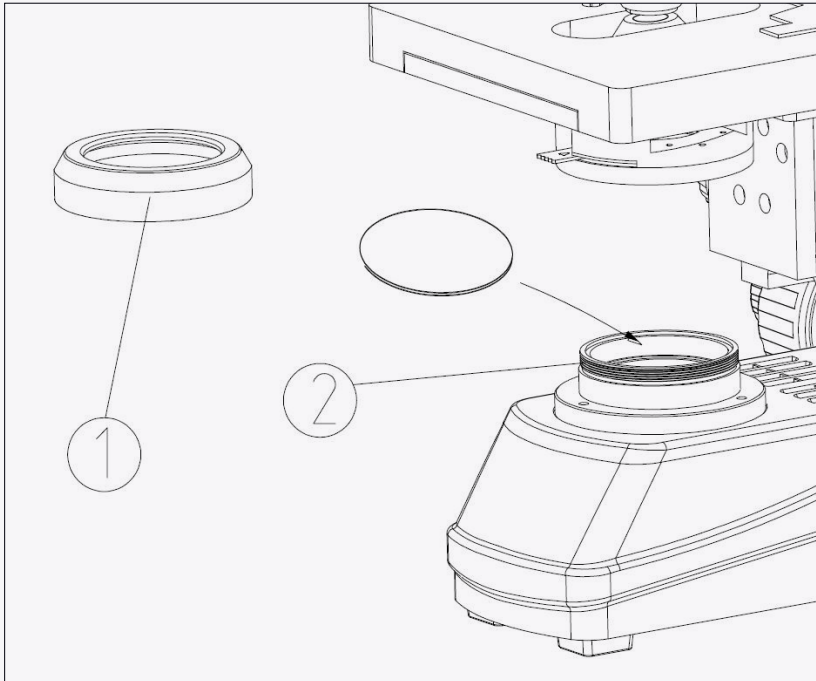
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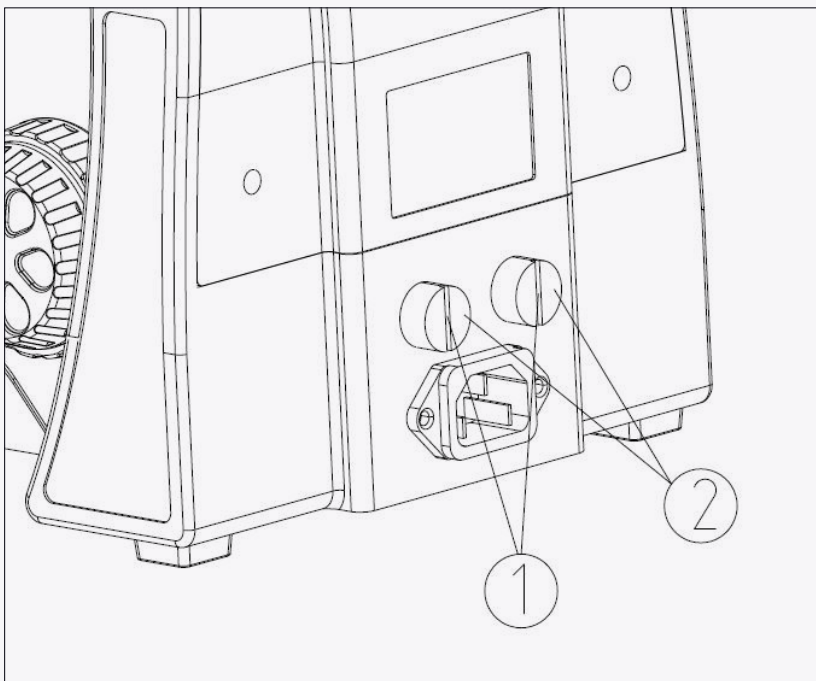




Replacing the fuse

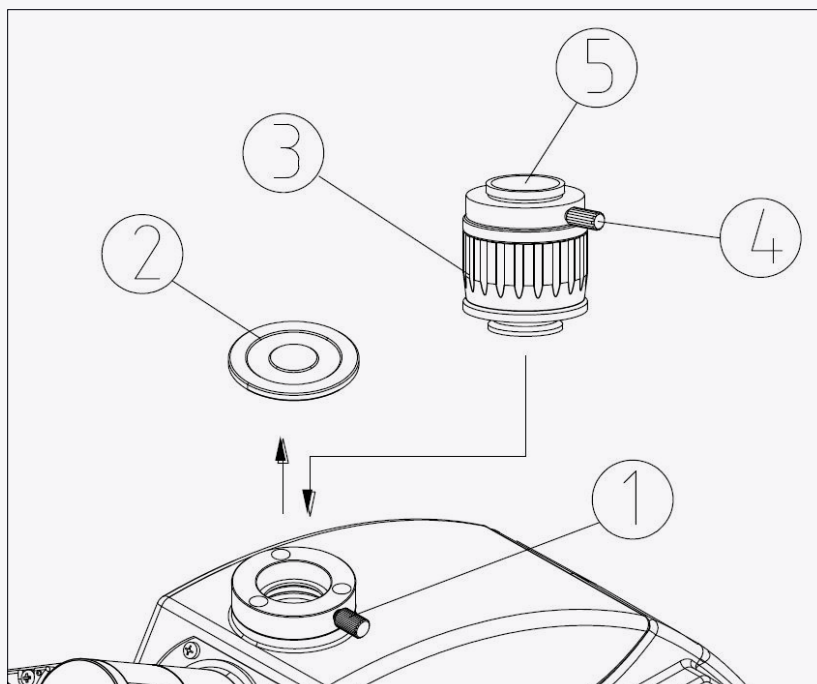
1. Turn the power switch to '0' and unplug the power cord.
2. Use a straight screwdrivers to screw the fuse [1] out of the fuse holder [2].
3. Replace with a new fuse.

ATTENTION! The fuse rating is 250V, 3.15A.



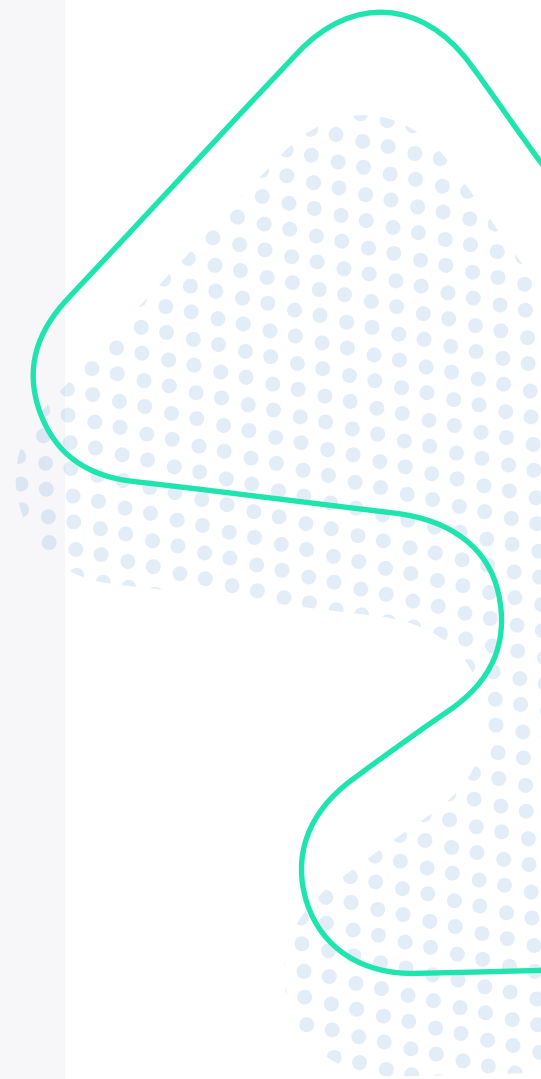
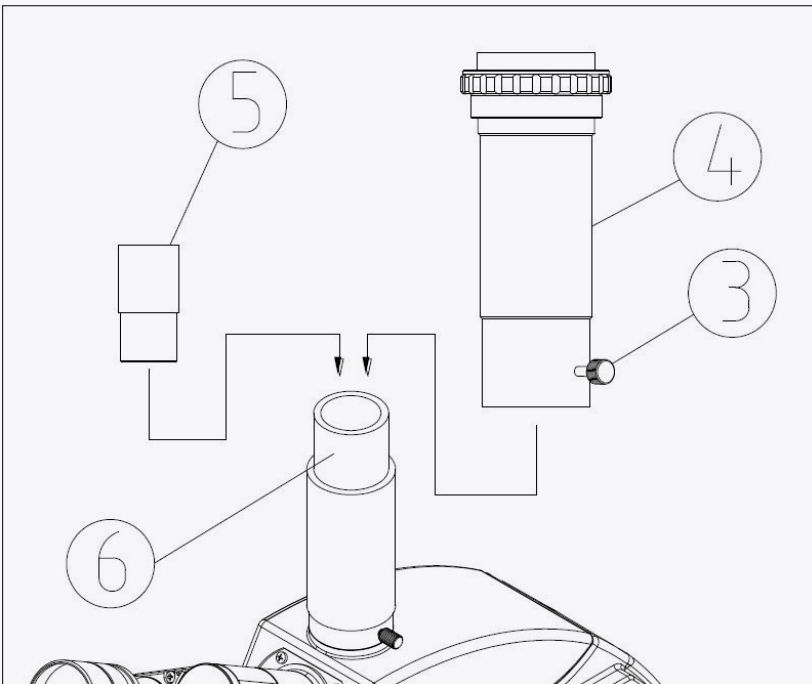
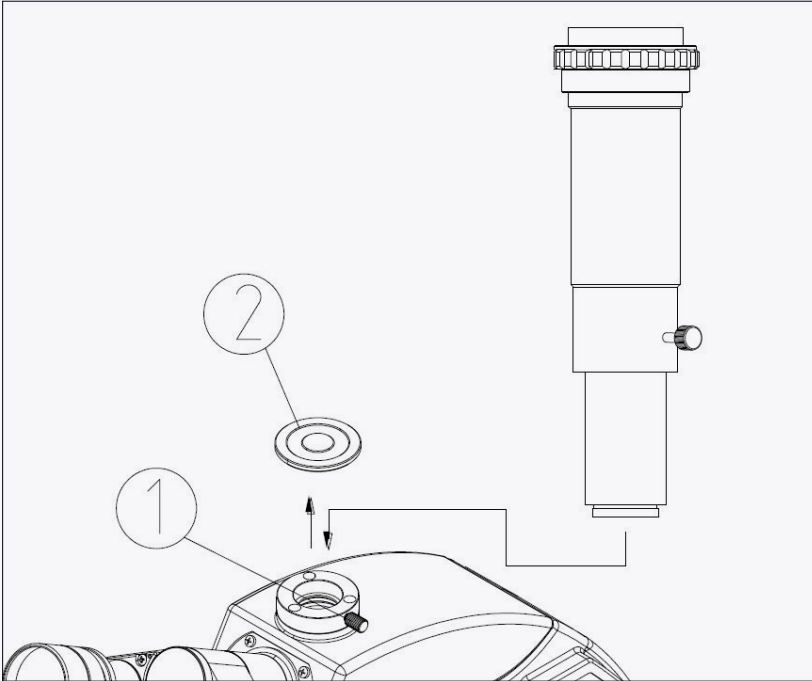
Assembling and using a microscope camera with a C-mount

1. Loosen the lock screw [1] on the trinocular tube and remove the dust cover [2].
2. Remove the dust cover from the camera adapter.
3. Place the camera adapter into the trinocular tube, and then lock the lock screw [1].
4. Loosen the lock screw [1] on the camera adapter.
5. Remove the C-mount [5] and assemble a CCD on the C-mount.
6. Place the C-mount with the CCD back on the camera adapter and then lock the lock screw [1].
7. Clear the image from the eyepieces, and then observe the image from the CCD.
8. Adjust the focusing adjustment [3] on the camera adapter until the image is clear.



Assembling and using the microscope camera

1. Loosen the lock screw [1] on the trinocular tube and remove the dust cover [2].
2. Place the photo tube into the trinocular tube, and then lock the lock screw [1].
3. Loosen the lock screw [1] on the photo tube, and remove the upper half [4].
4. Place the 3.2X eyepiece [5] into the eyepiece holder [6].
5. Assemble the upper half [4] and lock the lock screw [3].
6. After clearing the image, operate the microscope camera according to the camera's manual.



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7. Troubleshooting

Please contact our technical support team on 1800 358 101.

Optical part troubleshooting

Code	Issue	Solution
The LED light is bright, but the field of view is dark	Field diaphragm is not large enough	Enlarge the field diaphragm
	Condenser is too low	Adjust the condenser
The side of the field of view is dark or not even	The nosepiece is not in the right position	Turn the nosepiece into the right position
	A stain or dust has accumulated on the condenser, objective, eyepiece, or base lens	Clean the lens
Stain or dust is seen in the field of view	A stain has accumulated on the specimen	Clean the specimen
	A stain has accumulated on the lens	Clean the lens
Unclear image	No cover glass on the specimen slide	Add the cover glass
	The cover glass is not standard	Use a standard cover glass with a thickness of 0.17mm
	The cover glass is facing downwards	Turn the cover glass upwards
	The immersion oil is not used for the oil objective 100X	Use immersion oil
	Air bubble in the immersion oil	Remove the air bubble from the immersion oil (see operation section of this manual)
	Used the wrong immersion oil	Use the correct immersion oil
	The aperture is not opened correctly	Adjust the iris diaphragm
	Stain or dust has accumulated on the lens in the inlet of the head	Clean the lens
	The condenser is not in the correct position	Adjust the condenser

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Code	Issue	Solution
One side of the field of view is dark or the image moves while focusing	The specimen slide is not fixed	Fix the specimen slide with the clips
	The nosepiece is not in the correct position	Turn the nosepiece into the correct position
	The condenser is centred incorrectly	Centre the condenser
Eyes feel tired easily. The right field of view doesn't superpose with the left.	The interpupillary distance is incorrect	Adjust the interpupillary distance
	The eyepieces for the right are different from the left	Use the same eyepieces

Mechanical part troubleshooting

Code	Issue	Solution
The objective lens won't focus	The cover glass is not standard	Use a standard cover glass with a thickness of 0.17mm
	The cover glass is facing downwards	Turn the cover glass upwards
The objective lens touches the cover glass when adjusting the nosepiece	The cover glass is not standard	Use a standard cover glass with a thickness of 0.17mm
	The cover glass is facing downwards	Turn the cover glass upwards
Coarse focusing knob is too tight	Tension knob is too tight	Loosen the tension knob a little
Stage declines itself	Tension knob is too loose	Tighten the tension knob a little
Coarse focusing knob cannot rise	The limit stop knob is locked	Loosen the limit stop knob
Coarse focusing knob cannot decline	The base of the condenser is too low	Raise the base
Cannot move the slide smoothly	The slide is fixed incorrectly	Adjust the slide correctly
	The movable specimen holder is fixed incorrectly	Adjust the movable specimen holder correctly
The image moves a lot when touching the stage	The stage is fastened incorrectly	Fasten the stage correctly

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Electrical part troubleshooting

Code	Issue	Solution
The LED light does not work	No power supply	Check the connection of the power cable
	The LED light is inserted incorrectly	Insert the LED light correctly
	The LED light is burnt out	Replace the LED light
The LED light burns out regularly	Using the wrong LED light	Replace with the correct LED light
The field of view is not bright enough	Using the wrong LED light	Replace with the correct LED light
	The use of the light adjustment knob is incorrect	Adjust the light adjustment knob correctly

8. Product Recycling

In the case that the product is to be disposed of, the relevant legal regulations are to be observed.



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