

# Oxion

## OXION LED Fluorescence microscope



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## Introduction

- The microscope has been designed with all kind of life science applications and great durability in mind. This resulted in a modern, robust and high level microscope for everyday use, equipped with excellent optical and mechanical components. Specific attention to production methods resulted also in an excellent price-performance ratio of value for money
- The microscope features a unique swiveling concept allowing the viewing height to be easily matched with the user height and compared to traditional microscopes add approximately 40 mm extra viewing height. The Siedentopf tubes have standard HWF plan 10x eyepieces with 22 mm field of view and adjustable diopter. The interpupillary distance is 50 to 75 mm. Eyepieces can be secured to the tubes. The microscope head has an ergonomic viewing angle of 30°. The microscope is available in various configurations suitable for Life Sciences applications in laboratories, high schools and universities but also for routine medical applications and veterinary medicine. Besides the brightfield contrast method, configurations with phase contrast, dark field contrast, simple polarization or fluorescence illumination can be used
- The computer optimized design of the microscope ensures high stability and durability which results in an advanced ergonomical all-round microscope. Below the head, the microscope features an opening for insertion of an optional polarizer. A handgrip at the back of the stand allows easy transportation of the microscope
- The large 150 x 140 mm table with 76 x 50 mm translation mechanical stage and a reversed nosepiece for up to 5 objectives makes the microscope suitable for advanced laboratory work. Ergonomically placed adjustment knobs minimize fatigue during long microscopy sessions. The general shape of the stand has been specifically designed to match today's standard. The height adjustable Abbe N.A. 1.25 condenser accepts sliders for economical phase contrast and dark field applications
- The 3 Watt adjustable LED illumination offers the user a comfortable illumination with a very constant color temperature and a very long term usage. The Koehler illumination enables highest contrast and maximum achievable resolving power of the optics. Besides low energy consumption and no heating, the high powered LED has a long operating lifetime. The Fluorescence light source enables use for various fluorophores and can be controlled very easily

## General safety instructions

### **Intended use: as a non-medical device**

This microscope is intended for general observation of cells and tissues. The microscope is intended to be used with transmitted/reflected illumination and with the specimen fixed on a slide

### **Intended use as in vitro medical device class A (Regulation (EU) 2017/746)**

This microscope is intended for observation and diagnostics of cells and tissues at hospitals or by physicians and veterinaries in private practice in pathology, anatomy and cytology applications. To be used with transmitted/reflected illumination and with the specimen fixed on a slide. Physicians and veterinaries use microscopes to identify the different types of cells and spot abnormal cells. This product helps in identifying and treating diseases

### **Suffocation hazard**

The packaging can contain protective plastic bags without perforations, as well as dust protection bags that could be pulled over the head of a child. To avoid danger of suffocation:

- Keep the bags away from babies and children
- Tie a knot in plastic bags before throwing them out
- Plastic bags should be stored out of reach of children
- The installation and use of this product must always be supervised by a qualified adult

### **Dangers associated with the operation**

- Improper use could result in injury, malfunction or damage to property. It must be ensured that the operator informs every user of existing hazards
- Danger of electrocution. Disconnect the power to the entire lighting system before installing, adding or changing any component
- Not to be used in corrosive or explosive environments

- Avoid direct exposure of eyes to the collimated light beam or direct light from the light guides or fibres
- To avoid a hazard to children, account for all parts and keep all packing materials in a safe place

### Photobiological safety LED, important safety instructions

- Avoid direct eye exposure to any LED light source while switched on
- Before looking through the eyepieces of the device, lower the intensity of the LED illumination
- Avoid long and high-intensity exposure to LED light because this may cause acute damage to the retina of the eye

### Photobiological safety instructions fluorescence light sources

- Fluorescent light sources can be harmful to human eyes, especially ultraviolet and violet light
- Therefore, always mount and use the orange protection shield, supplied with the fluorescence attachments, when applicable
- Operators must close the shutter of the fluorescence attachment, equipped with an HBO mercury vapor illumination, or switch off the LED for fluorescence, when observation of the sample is postponed for a longer time
- Avoid direct exposure of the eye to any fluorescent light source while switched on
- Before looking through the eyepieces of the device, lower the intensity of the LED for fluorescence illumination
- Avoid long and high-intensity exposure to LED light because this can cause acute damage to the retina of the eye

### Prevention of biological and infectious hazards

Infectious, bacterial or viral biohazard substances under observation may be a risk to the health of humans and other living organisms. Special precautions should be taken during in vitro medical procedures:

- **Biological hazards:** keep a logbook of all the biological substances or pathogenic microorganisms that were under observation with the device and show it to everybody before they use the device or before they do some maintenance work on the device! Agents can be bacterial, spores, enveloped or non-enveloped virus particles, fungi or protozoa
- **Contamination hazard:**
  - A sample that is properly enclosed with a cover glass never comes in direct contact with the device parts. In that case prevention of contamination lies in the handling of the slides; as long as the slides are decontaminated before use and are undamaged and treated normally, there is virtually zero risk of contamination
  - A sample that is mounted on a slide without cover glass, can come in contact with components of the device and may be a hazard to humans and/or the environment. Therefore, check the device and accessories on possible contaminations. Clean the device's surfaces and its components as thoroughly as possible. Should you identify a possible contamination, inform the local responsible person in your organisation
  - Operators could be contaminated from other activities and cross-contaminate components of the device. Therefore, check the device and accessories on possible contaminations. Clean the device's surfaces and its components as thoroughly as possible. Should you identify a possible contamination, inform the local responsible person in your organisation. it is recommended to wear sterile gloves when preparing the slides and handling the device in order to reduce contamination by the operator
- **Infection hazard:** direct contact with the focusing knobs, stage adjustments, stage and eyepieces/tubes of the device can be a potential source of bacterial and/or viral infections. The risk can be limited by using personal eyeshades or eyepieces. You can also use personal protections such as operation gloves and/or safety goggles, which should be changed frequently to minimize the risk

- **Disinfectant hazards:** before cleaning or disinfecting, check if the room is adequately ventilated. If not, wear respiratory protective gear. Exposure to chemicals and aerosols can harm human eyes, skin and respiratory system. Do not inhale vapours. During disinfection, do not eat, drink or smoke. Used disinfectants must be disposed of according to local or national regulations for health and safety

## Disinfection and decontamination:

- Exterior casing and mechanical surfaces must be wiped with a clean cloth, dampened with a disinfectant
- Soft plastic parts and rubber surfaces can be cleaned by gently wiping a clean cloth, dampened with a disinfectant. Discoloration can occur if alcohol is used
- The front lens of eyepieces and objectives are sensitive to chemicals. We recommend not to use aggressive disinfectants but to use lens paper or a soft fibre-free tissue, damped in cleaning solution. Cotton swabs may also be used. We recommend you use personal eyepieces without eyeshades in order to minimize risk
- Never immerse or dip the eyepiece or objective into a disinfectant liquid! This will damage the component
- Never use abrasive compounds or cleaners that may damage and scratch optical coatings
- Properly clean and disinfect all possible contaminated surfaces of the device or contaminated accessories before storing for future use. Disinfection procedures must be effective and appropriate
- Leave the disinfectant on the surface for the required exposure time, as specified by the manufacturer. If the disinfectant evaporates before the full exposure time, reapply disinfectant on the surface
- For disinfection against bacteria, use a 70% aqueous solution of isopropanol (isopropyl alcohol) and apply for at least 30 seconds. Against viruses, we recommend to refer to specific alcohol or non-alcohol based disinfection products for laboratories

Before returning a device for repair or maintenance through a Euromex dealer, an RMA (return authorization form) together with a decontamination statement must be filled in! This document - available from Euromex for any reseller- must be shipped together with the device at all times

## Reference documents:

### World Health Organisation:

<https://www.who.int/>

### US Centre for Disease Control and prevention

<https://www.cdc.gov/infectioncontrol/guidelines/disinfection/index.html>

## Handle with care

- This product is a high quality optical instrument. Delicate handling is required
- Avoid subjecting it to sudden shocks and impacts
- Impacts, even small ones, can affect the precision of the instrument

## Handling the LED

**Note:** Always disconnect the power cord from your device before handling the LED bulb and power unit and allow the system to cool down approximately 35 minutes to avoid burns

- Never touch the LED with your bare hands
- Dirt or fingerprints will reduce the life span and can result in uneven illumination, lowering the optical performance
- Use only original Euromex replacement LEDs
- The use of other products may cause malfunctions and will void warranty
- During use of the device, the power unit will get hot; never touch it while in operation and allow the system to cool down approximately 35 minutes to avoid burns

### **Dirt on the lenses**

- Dirt on or inside the optical components, such as eyepieces, lenses, etc., affects the image quality of your system negatively
- Always try to prevent your device from getting dirty by using the dust cover, prevent leaving fingerprints on the lenses and clean the outer surface of the lens regularly
- Cleaning optical components is a delicate matter. Please, read the cleaning instructions further on in this manual

### **Environment, storage and use**

- This product is a precision instrument and it should be used in a proper environment for optimal use
- Install your product indoors on a stable, vibration free and level surface in order to prevent this instrument to fall thereby harming the operator
- Do not place the product in direct sunlight
- The ambient temperature should be between 5 to +40°C and humidity should be within 80% and 50%
- Although the system is anti-mold treated, installing this product in a hot, humid location may still result in the formation of mold or condensation on lenses, impairing performance or causing malfunctions
- Never turn the right and left focus knobs in opposite directions at the same time or turn the coarse focus knob past its farthest point as this will damage this product
- Never use undue force when turning the knobs
- Make sure that the device can dissipate its heat (fire hazard)
- Keep the device away from walls and obstructions for at least approximately 15 cm
- Never turn the device on when the dust cover is in place or when items are placed on the device
- Keep flammable fluids, fabric, etc. well out of the way

### **Disconnect power**

Always disconnect your device from power before doing any maintenance, cleaning, assembling or replacing LEDs to prevent electric shocks

### **Prevent contact with water and other fluids**

Never allow water or other fluids to come in contact with your device, this can cause short circuiting your device, causing malfunction and damage to your system

### **Moving and assembling**

- This device is a relatively heavy system, consider this when moving and installing the system
- Always lift the device by holding the main body and base of the device
- Never lift or move the device by its focusing knobs, stage or head
- When needed, move the device with two persons instead of one

## Brightfield

A large scale of applications is covered by the common light-transmitted brightfield contrast method. Besides the standard plan achromatic 4x, 10x, 20x, S40x, S60x, S100x oil brightfield, the microscope can also be engaged with newly designed high contrast plan semi-Apochromatic objectives. The improved correction of these objectives results in lower aberrations and improved resolving power for the complete optical system. All objectives are treated with a multi-layer anti-reflection coating and are anti fungus

## Fluorescence

Today, fluorescence microscopy offers a faster and reliable identification of infectious diseases and allows observation of complex interactions in unstained living cells. The high contrast plan 4x, 10x, 20x, S40x and S100x oil objectives combined with the 22 mm eyepieces of the microscope, offer the necessary resolution and field of view for fast detection of small pathogens. A LED light source combined with the high performance fluorescence filters produce excellent contrasted images with an outstanding signal-to-noise ratio

## General warning for use of your fluorescence microscope

- In order to protect eyes, do not stare at fluorescence light directly
- Fluorescence samples will fade by ultraviolet radiation, so they cannot be saved for long periods of time
- When working, the surface of the light source might be very hot. Make sure there is enough space for heat dissipating
- Make sure the switch is at the off position, cut off power supply and wait for all parts to cool down before moving the microscope or replacing fuse



### **Caution!**

*In this manual a standard configuration is described. Many items are optional!*

## Preparing the microscope for use

### Handling

- Your microscope is a delicate product, please handle it with care.
- Carefully remove the items from their packing and place them on a flat, firm surface. Please do not expose the microscope to direct sun light, high temperatures, damp, dust or acute shake. Please make sure the worktable is flat and horizontal
- When moving the microscope, use the left hand to hold tightly the lower side of the microscope head or the bottom of the microscope body, and the right hand to lift up at the groove of the microscope arm



*Holding the microscope at the stage, stage focusing knobs or head will damage the microscope.*



*For safety reasons, make sure the power switch is turned off ("0") and remove the plug before replacing the led or fuse, and make sure the unit is not too warm*



*If the bacterial solution or water splatters over the stage, objective or head, pull out the power cord immediately and dry the microscope*

## Configuration

The names of the several parts are listed below and are indicated in the picture



- A.** Photo port
- B.** Microscope head
- C.** ON/OFF switch/ intensity fluorescence light
- D.** Stand arm
- E.** Stage controls
- F.** Coaxial fine adjustment
- G.** Coaxial coarse adjustment
- H.** On/Off switch with light adjustment
- I.** Lamp unit
- J.** Eyepieces
- K.** Eye cups
- L.** Diopter adjustment

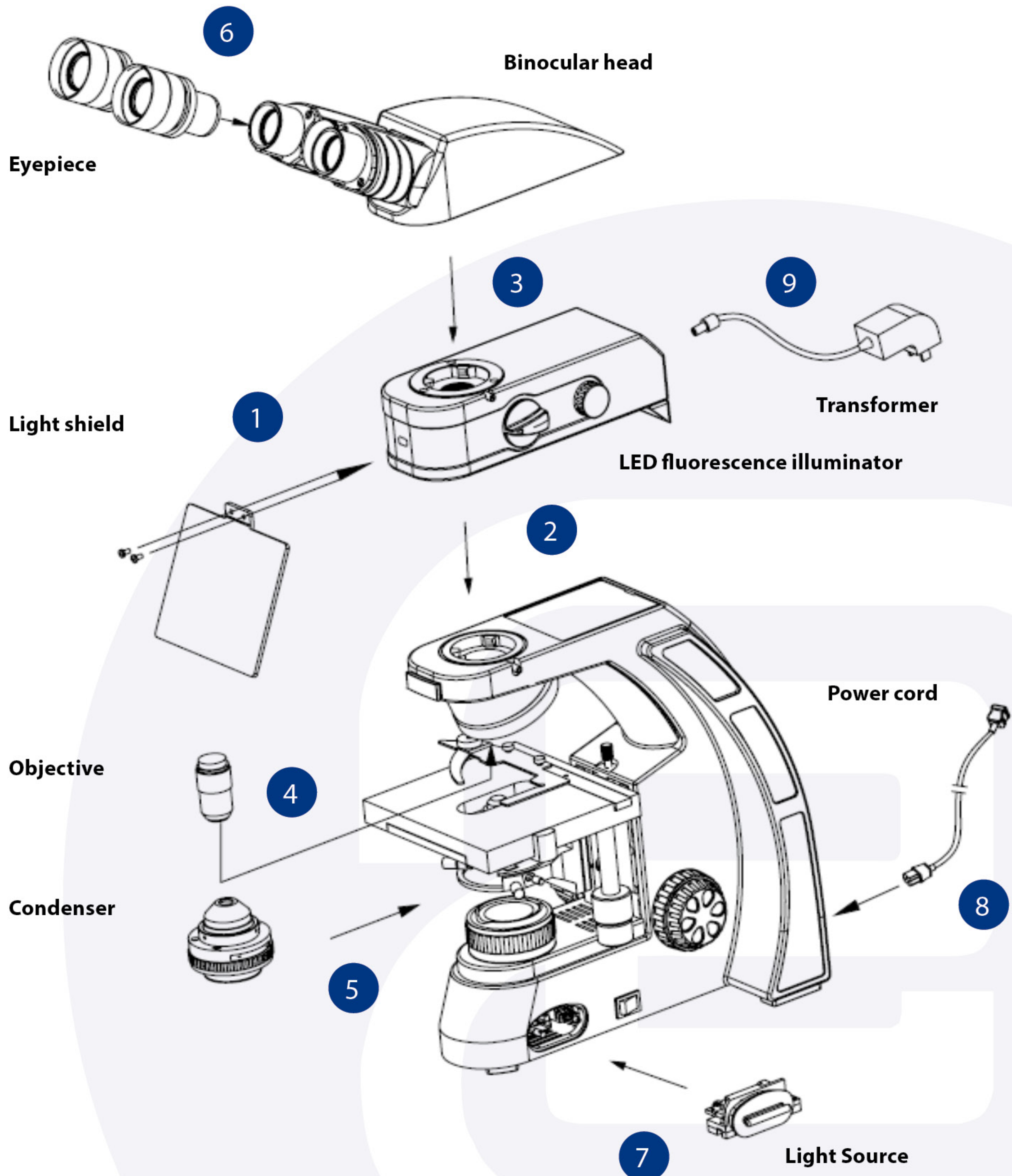
- M.** Filter slot (with dust cover)
- N.** Revolving nosepiece for 5 objectives
- O.** Objectives
- P.** Object clip
- Q.** Object x/y stage
- R.** Condenser with iris diaphragm
- S.** Height adjustment condenser (not visible)
- T.** Köhler (field) diaphragm + filter holder
- U.** Selector switch
- V.** Indicator fluorescence light
- W.** Slide protection screw

## Assembling steps

Our microscopes will always try to keep the number of assembly steps for their customers as low as possible but in some cases, there are some steps to be taken. The steps mentioned below are often not necessary but described for your convenience, nonetheless

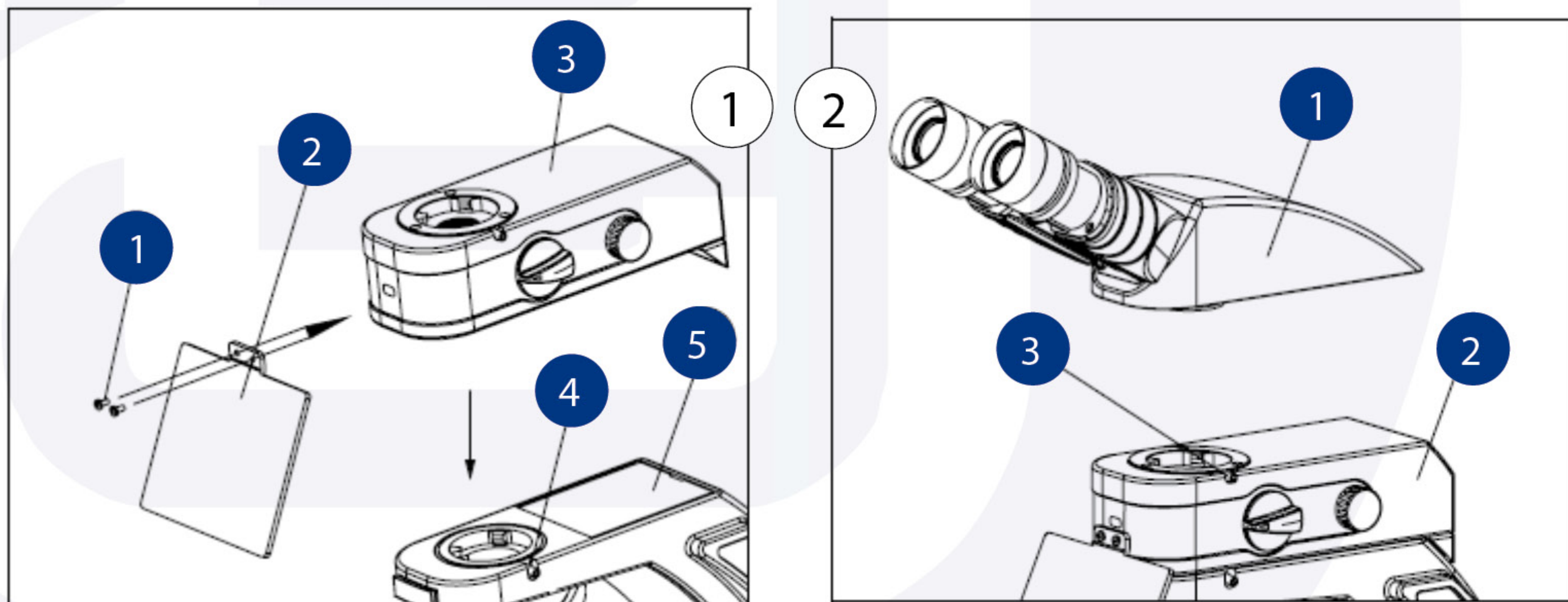
### The microscope head and fluorescence unit

The standard microscope configuration is supplied with the head assembled. However, if your order contains the fluorescence it should be mounted first. The dovetail on the bottom side of these parts fits into the slot on the top side of the other parts. See below steps for details



## Assembly steps for the fluorescence attachment

1. Fix the light shield (2) on the LED fluorescence attachment (3) with the screw (1)
2. Put the LED fluorescence attachment (3) on the arm (5), and fix it with the lock screw (4) by using the hexagon spanner. (See Fig. 1)
  - Assemble the light shield (2) when observing in UV lighting
3. Put the binocular/ trinocular Head (1) on the LED fluorescence attachment (2), and fix it with the lock screw (3) by using the hexagon tool (See Fig. 2)



## Mounting the objectives

1. Rotate the coarse focusing knob to lower the stage to the lowest position
2. Install the objectives into the objective nosepiece from the lowest magnification to the highest in a clockwise direction from the rear side of the microscope. When using the microscope, start using the low magnification objective (4X or 10X) to search for specimen and focus, and then continue with high magnification objective to observe

## Placing the eye pieces

1. Remove the cover of eyepiece tube
2. Insert the eyepiece into the eyepiece tube
3. When adjusting diopter by adjustable eyepiece, lock eyepiece with hexagon lock-screw to avoid the eyepiece group from rotating in eyepiece tube

## The eyeshades

Each eyepiece has its own rubber eyeshade. This prevents damage to the lens, and prevents stray light. The eyeshade can simply be slipped over the eyepiece

## The orange light shield

The orange light shield is simply screws on the fluorescence attachment using the 2 supplied screws

## Connecting the power cord

The microscope microscopes supported a wide range of operating voltages: 100 to 240V. Please use a grounded power connection

1. Make sure the power switch is at "0" (OFF) before connecting
2. Insert the connector of power cord into the microscope's power socket, and make sure it connects well
3. Insert the other connector into the mains socket, and make sure it connects well



**Caution:** Don't use bend or twist the power cord, it will get damaged. Using the special cord supplied by us. If it's lost or damaged, choose one with the same specifications

## Operation:

### Setting up the brightfield illumination

1. Connect the microscope to a mains power source and turn on the main power switch on
2. Adjusting the light adjustment knob until the illumination is comfortable for observation. Rotate the light adjustment knob clockwise to raise brightness. Rotate the light adjustment knob counterclockwise to lower brightness



**Caution:** The maximum light intensity when using the 4x and 10x can damage the eyes! We recommend using the neutral filter with these magnifications

### Placing the specimen slide

1. Push the arm of the specimen holder backwards
2. Release the arm slowly clamping the slide with the cover glass facing up
3. Rotating the X and Y-axis knob will move the specimen to the center for alignment with the center of the objective

### Focusing and slide protection

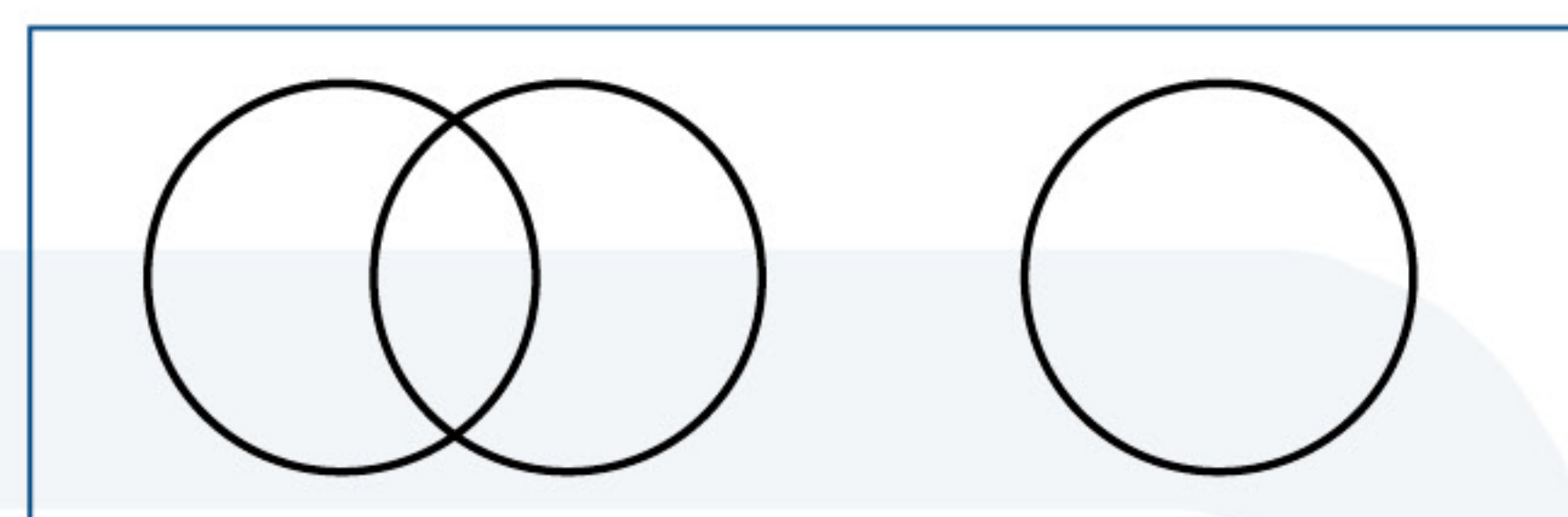
1. Select the objective 4x to the optical path.
2. Rotate the position screw to top, observe the right eyepiece with right eye. Rotate the coarse focusing knob until the image appears
3. Rotate the fine focusing knob for detailed focusing and lock the slide protection screw. The slide protection screw protects the slide by limiting the travel of the table. This way the objectives will not touch or break your slides

### Adjusting the focusing tension

The microscope focusing knobs can be adjusted for tension. You can set it from light to heavy according your own preference. Please note that when the specimen leaves the focus plane after focusing or the stage declines itself, the tension should be set higher. To tighten the focusing arm (more heavy), rotate the tension adjustment ring according to the arrowhead pointed; to loosen it, please turn it in the reverse direction

### The interpupillary distance

Using a binocular (or trinocular) tube is less tiring for the eyes than the use of a monocular tube. In order to obtain a smooth "compound" image, one should go through the below steps. The correct interpupillary distance is reached when one round image is seen in the field of view (see image below). This distance can be set by either pulling the tubes towards each other or pulling them from each other. This distance is different for each observer and thus should be set individually. When more users are working with the microscope it is recommended to remember your interpupillary distance for a quick set up during new microscopy sessions. The microscope's swiveling eyepiece tube can be rotated 360°. You can select corresponding eye point height according to your own preference



*Field of view  
before adjustment*

*Field of view  
after adjustment*

### The correct eye point

The eye point is the distance from the eyepiece to the user's pupil. To obtain the correct eye point, move the eyes towards the eyepieces until a sharp image is reached at a full field of view

### People wearing glasses

When the eyeshades bother people wearing glasses, the microscope eyeshades simply can be folded back to create more space

## Adjusting the diopter

Using a binocular (or trinocular) tube is less tiring for the eyes than the use of a monocular tube. In order to obtain the right interpupillary setting, one should go through the below steps

- Turn the diopter adjustment ring of the left eyepiece tube until the scale shows the same reading as on the indicator
- Close the right eye and focus the left tube by means of the coarse- and fine adjustment knobs
- Close the left eye and focus the right tube with the diopter adjustment ring

This procedure should be followed by each individual user. When more users are working with the microscope it is recommended to remember your diopter setting for a quick set up during new microscopy sessions

## Abbe condenser

Beneath the object stage an Abbe condenser (M) N.A. 12.5 is mounted. The condenser can be adjusted in height by means of a rack and pinion movement and knob (H). With this one can focus the light on the specimen by which the contrast can be optimized. The condenser is factory pre-centered if needed the following procedure can be followed to center the condenser

1. Move the condenser to the highest position
2. Select the 10x objective to the light path and focus the specimen
3. Rotate the field diaphragm adjustment ring to put the field diaphragm to the smallest position
4. Rotate the condenser up-down knob, and adjusting the image to be clearest
5. Adjusting the center adjustment screw and put the image to the center of the field of view
6. Open the field diaphragm gradually. If the image is in the center all the time and inscribed to the field of view, it shows condenser has been centered correctly

## The field (Köhler) diaphragm

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. The diaphragm is factory pre-centered

## Adjusting the aperture diaphragm

1. The aperture diaphragm is used to select the numerical aperture of the illumination. When the N.A. of illumination is matching with the N.A. of the objective, the highest possible resolution, dept of field and contrast are obtained
2. When contrast is low, rotate the diaphragm adjustment ring to 70%-80% of the N.A. of objective this will improve the contrast of the image. The diaphragm is factory pre-centered

## Use of the S100x oil-immersion objective

The microscopes are equipped with an S100x N.A. 1.25 oil immersion objective. Please follow these instructions for using this objective

1. Remove the dust protection from the revolving nosepiece to mount the S100x objective
2. Focus the image with the S40x objective
3. Turn the revolving nosepiece so the S100x objective almost reaches the click-stop
4. Put a small drop of immersion oil on the centre of the slide
5. Now turn the S100x objective so that you feel the click stop
6. The front lens is in contact with the immersion oil
7. Look through the eyepiece and focus the image with the fine adjustment knobs
8. The distance between the lens of the objective and the slide is only 0.14 mm!
9. In case there are small bubbles visible turn the S100x objective a couple of times left/right so that the front of the objective moves in the oil and the bubbles will disappear
10. After using the S100x objective turn the table with the fine adjustment knobs downwards until the front lens doesn't touch the oil any longer
11. Always clean the front lens of the S100x objective with a piece of lens paper that is moistened with a drop of Xylol or alcohol
12. Clean the slide after use as well
13. The S100x can also be used without immersion oil (dry). Please be aware of the fact that in such case the resolution will be much lower and parfocality is lost!



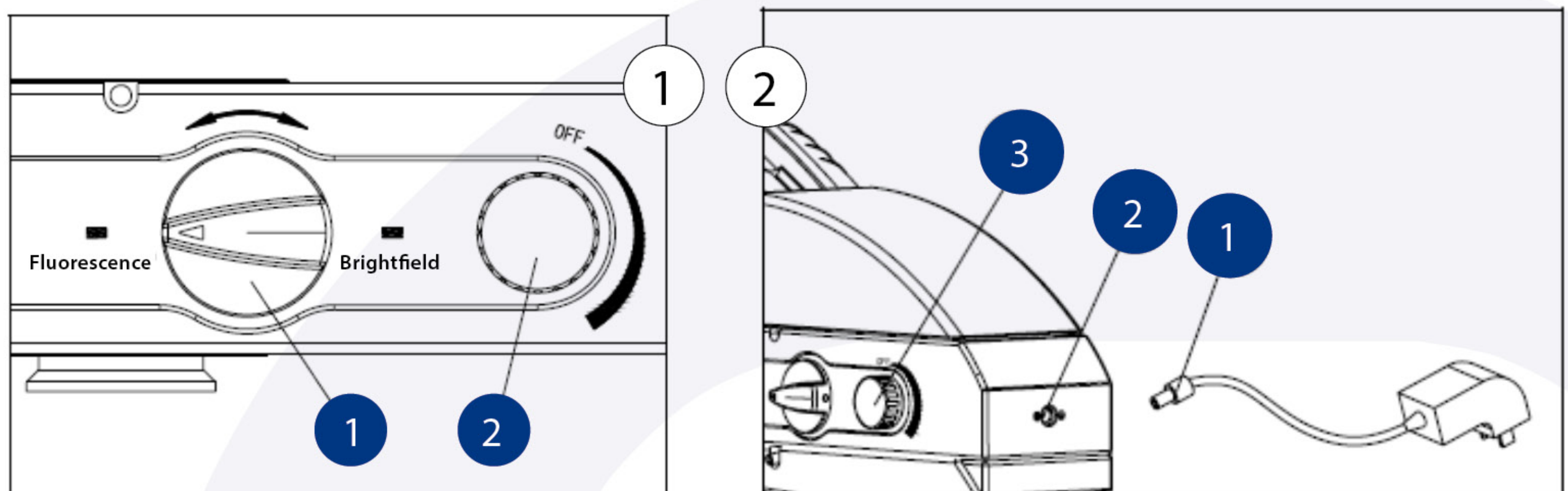
**Caution** Never put a drop of Xylol or alcohol directly on the lens of the objective. It could enter the objective and dissolve the glue that holds the lenses! Avoid oil contact with any of the other objectives!

## Use of the fluorescence attachment

1. To switch between the transmission brightfield and the LED fluorescence knob (1) can be rotated in 180°. "Fluorescence" means fluorescence observation, and "Brightfield" means brightfield observation (See Fig. 1)
2. Illumination: rotate the light adjustment knob (2) to turn on the LED fluorescence attachment. Rotate the knob to adjust the LED intensity make the LED brighter
  - If the switch is set to 'Fluorescence', the fluorescence indicator LED will be activated, fluorescence observation is now available. On the contrary, when switched to 'Brightfield', the fluorescence indicator will be off

## Power supply for LED fluorescence attachment

1. First make sure that the fluorescence attachment is turned off
2. First insert plug (1) into the back of the fluorescence attachment (2) (See Fig. 2)
3. Then insert the adapter directly into electric outlet



## Using the 0.5x ½ Inch CS/C-mount camera adapter

(for trinocular models only)

1. Screw the adapter on your cs/c-mount camera
2. Loosen the lock-screw on the trinocular head
3. Insert the camera adapter into the trinocular port according to the direction of the figure. Secure the lock-screw tightly
4. Focus on a specimen through binocular using your eyes, then observe the image through camera, if the image is un-sharp, rotate the adjustment tube to focus the image

## Maintenance and cleaning

Always place the dustcover over your microscope after use. Keep the eyepiece and objectives always mounted on the microscope to avoid dust entering the instrument

### Cleaning the optics

- When the eyepiece lens or front lens of the 10x or S40x objective are dirty they can be cleaned by wiping a piece of lens paper over the surface (circular movements). When this does not help put a drop of Xylol or alcohol on the lens paper. Never put Xylol or alcohol directly on the lens!
- When dirt is clearly visible in the field of view it resides on the lowest lens of the eyepiece.
- By using the Allen-key the eyepiece can be removed from the tube. Clean the outside of the lens.
- In case there is still dust visible please check if the dust is in the eyepiece by turning it. If this is the case remove the lowest lens carefully from the eyepiece and clean it
- It is not necessary – and not recommended – to clean the lens surfaces at the inner side of the objectives. Sometimes dust can be removed with high pressured air.
- There will never be dust in the objectives if the objectives are not removed from the revolving nosepiece



#### **Caution**

*Cleaning cloths containing plastic fibres can damage the coating of the lenses!*

### Maintenance of the stand

- Dust can be removed with a brush. In case the stand or table is really dirty the surface can be cleaned with a non-aggressive cleaning product
- All moving parts like the height adjustment or the coaxial course and fine adjustment contain ball bearings that are not dust sensitive. With a drop of sewing-machine oil the bearing can be lubricated

### Replacing the fuse

- Always remove the mains cable from the microscope and turn the main switch to "0" (OFF) before replacing the fuse
- Then screw off the fuse cap from the fuse base with screwdriver
- Install a new fuse  
(specification of the fuse: T250 V, 0.15 A)



**Note:** *When in doubt always contact your local distributor!*

## Notes

## Notes

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