

euromex DZ Series Trinocular Microscope



# euromex DZ Series Trinocular Microscope User Manual

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**euromex DZ Series Trinocular Microscope**



## **General safety instructions**

Intended use: a non-medical device

This microscope is intended for general observation of a sample or object with transmitted/reflected illumination

## **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 microscope, 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

## **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 microscope and show it to everybody before they use the microscope or before they do some maintenance work on the microscope! Agents can be bacterial, spores, enveloped or nonenveloped virus particles, fungi or protozoa
- Contamination hazard:
  - A sample that is properly enclosed with a cover glass never comes in direct contact with the microscope 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 microscope and may be a hazard to humans and/or the environment. Therefore, check the microscope and accessories on possible contaminations. Clean the microscope surfaces and its components as thoroughly as possible. Should you identify a possible contamination, inform the local responsible person in your organization
  - Microscope operators could be contaminated by other activities and cross-contaminate components of the microscope. Therefore, check the microscope and accessories on possible contaminations. Clean the microscope surfaces and its components as thoroughly as possible. Should you identify a possible contamination, inform the local responsible person in your organization. It is recommended to wear sterile gloves when preparing the slides and handling the microscope in order to reduce contamination by the operator
- Infection hazard: direct contact with the focusing knobs, stage adjustments, stage and eyepieces/tubes of the microscope 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 protection 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 vapors. 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 fiber-free tissue dampened in the cleaning solution. Cotton swabs may also be used. We recommend you use personal eyepieces without eyes shades 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 microscope 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 the 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 referring to specific alcohol or non-alcohol-based disinfection products for laboratories Before returning a microscope 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 microscope at all times

#### **Reference documents:**

World Health Organisation: <https://www.who.int/ihr/publications/biosafety-video-series/en/>

Robert Koch Institut: <https://link.springer.com/content/pdf/10.1007/s00103-013-1863-6.pdf>

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 microscope before handling the LED bulb and power unit and allow the system to cool down for 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 microscope 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 microscope 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 microscope system can dissipate its heat (fire hazard)
- Keep the microscope away from walls and obstructions for at least approximately 15 cm
- Never turn the microscope on when the dust cover is in place or when items are placed on the microscope
- Keep flammable fluids, fabric, etc. well out of the way

### **Disconnect power**

Always disconnect your microscope 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 microscope, this can cause short circuiting your device, causing malfunction and damage to your system

### **Moving and assembling**

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

### **Introduction**

- The Euromex DZ microscopes are zoom stereo microscopes for life- and materials science applications. Stereo microscopes are among the favorite microscopes for life- and materials science but they are also highly appreciated for a multitude of industrial applications. The Euromex DZ microscopes are top level stereo microscopes, which are commonly used for these areas
- The DZ series is designed around a highly precise infinity parallel zoom body equipped with a plan apochromatic corrected common main objective, providing the necessary resolving power and high contrasting images for high-tech applications. You can choose between a 1:6.3, 1:8 or a 1:10 zoom ratio zoom body. All three versions can be equipped with three different plan achromatic common main objectives with 0.5x, 1.0x and 2.0x magnifications. Together with standard extended wide field EWF10x/22 corrected eyepieces, magnifications up to 160x are achievable.
- Optionally WF 15x/16 and WF 20x/12 eyepieces for magnifications up to 320x are available
- Two stereo head versions are available; a fixed 20° bino head or an ergonomic head with adjustable inclination from 5° up to 35°. The DZ series can be mounted on an ergonomic stand, with both incident and transmitted LED illumination. Both illuminations can be adjusted with separate knobs

A dual iris diaphragm DZ.9010 can be added to the configuration in order to achieve higher contrast and depth of focus

- Phototubes: the optional phototube DZ.9005 has one standard 23.2 mm tube. The optional DZ.9007 comes

with two standard 23.2 mm phototubes. The DZ.9009 phototube with one 23.2 mm tube is suitable for the fluorescence attachment. The phototubes can either be equipped with a C-mount thread to accommodate CCD and CMOS type cameras or an adapter for Canon, Nikon or other SLR cameras

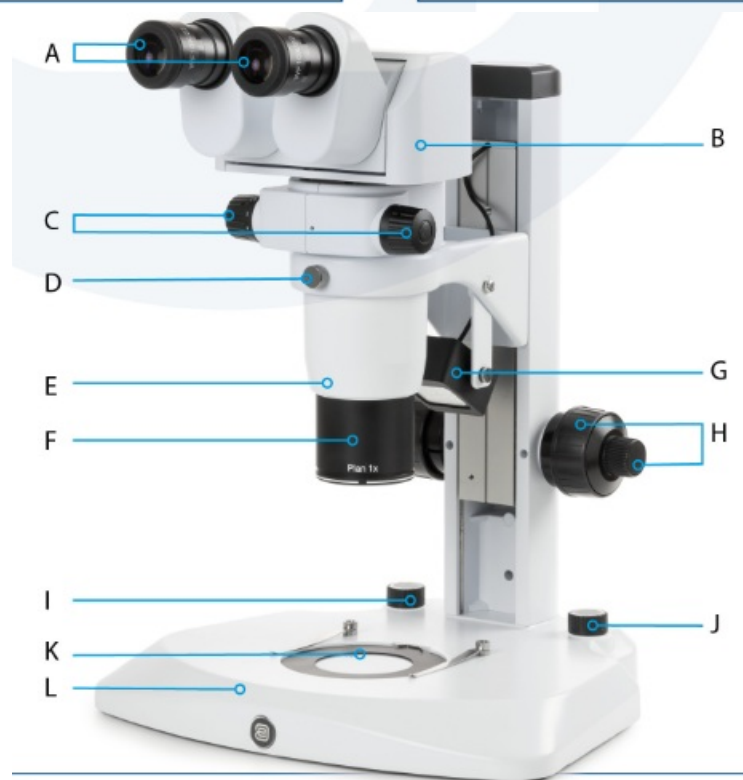
- Several industrial ring LED illumination systems with intensity and segment controllers and/or multiple cold light sources can easily be added to the DZ stereo microscopes for different contrast methods
- A universal stand with holder enables the observer to examine larger objects and move away the stereo head when necessary
- The fluorescence attachment consists of a filter house for a maximum of 4 filter blocks and a 100 Watt mercury-vapor lamp unit. A mechanical shutter can block the excitation light to reach the sample. The DZ.9009 phototube with a 23.2 mm tube can also be added to the fluorescence attachment. When the phototube is engaged, the sample can be observed through one (left) eyepiece
- Caution! In this manual a standard configuration is described. Many items are optional!

## Construction of the microscope

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

<b>A.</b> Adjustable WF10X eyepieces
<b>B.</b> Binocular ergonomic viewing head
<b>C.</b> Magnification dials
<b>D.</b> Clamping knob
<b>E.</b> Zoom body
<b>F.</b> Objectives

<b>G.</b> Incident lighting
<b>H.</b> Coarse and fine focus control
<b>I.</b> Brightness adjusting knob (reflected)
<b>J.</b> Brightness adjusting knob (transmitted)
<b>K.</b> Glass stage plate
<b>L.</b> Dual LED illumination base



## Assembling Steps

Euromex 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 objectives**

- Rotate the objective into the objective mount thread on the lower end of the zoom body (1)
- Align the positioning pin of the zoom body to the positioning groove on the binocular viewing head (2)
- Insert the dovetail mount at the bottom of the head into the mounting port on the zoom body, and tighten the viewing head clamping screw with provided hexagonal driver

### **Placing the eyepieces**

1. Remove the cover of eyepiece tube
2. Insert the eyepiece into the eyepiece tube (3)

### **The eyeshades**

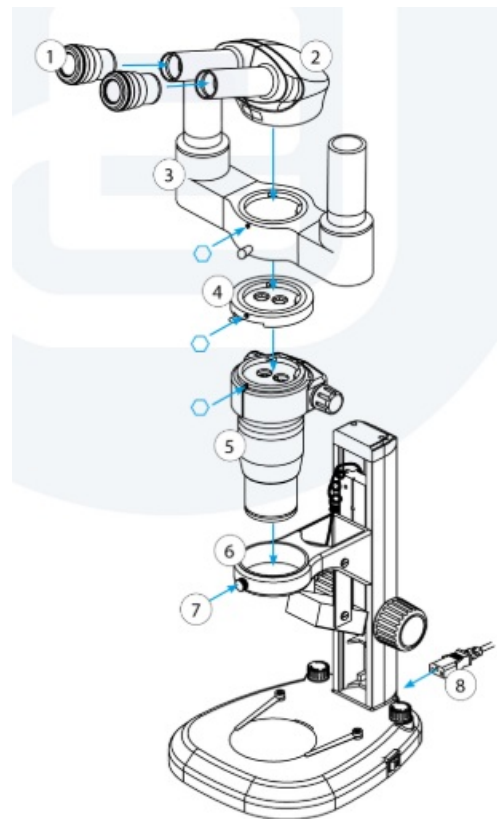
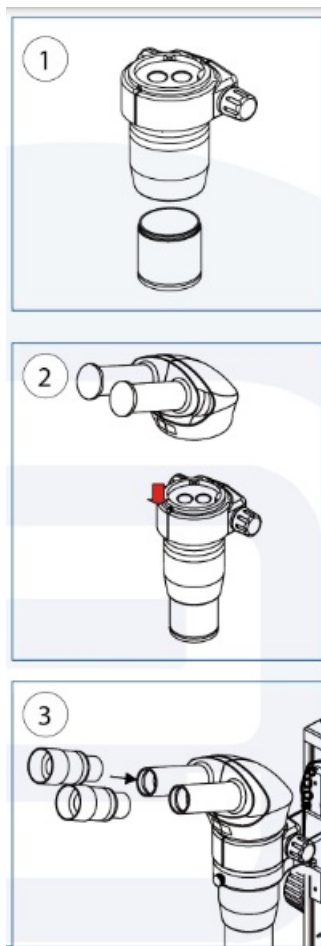
Each eyepiece has its rubber eyeshade. This prevents damage to the lens and prevents stray light. The eyeshade can simply be slipped over the eyepiece

### **Connecting the power cord**

The DZ series microscopes support a wide range of operating voltages: 100 to 240V. Please use a grounded power connection

Note: Make sure the power switch is at "0" (OFF) before connecting

- Insert the connector of power cord into the DZ's power socket and make sure it connects well
- Insert the other connector into the mains socket and make sure it connects well
- Don't bend or twist the power cord, it will get damaged. Use the special cord supplied by Euromex. If it is lost or damaged, choose one with the same specifications



## Assembly diagram

- Put the eyepieces in place (1)
- Attach the head (2) onto the zoom body (5)
- Optionally a single or dual photo tube attachment (3) and/or a dual iris diaphragm (4) can be mounted between

the head and the zoom body

- Use the Allen screw to secure head, photo tube attachment and/or the dual iris diaphragm
- Lower head into head holder (6)
- Secure with the screw (7)
- Attach the power cord (8)

## Adjustment and Operation

### The interpupillary distance

In order to obtain a smooth 'compound' image, one should go through the steps below

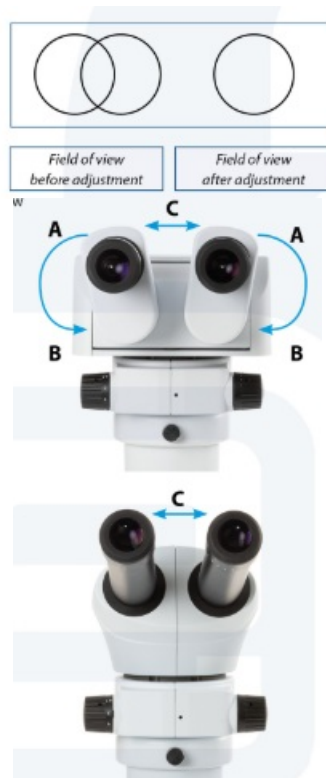
The correct interpupillary distance is correctly set when both images of the two optical trains are seen as one (see image below). This distance can be set by either pulling the tubes towards each other or pulling them from each other (C). This distance is different for each observer and thus should be set individually. Additionally, the DZ's swiveling eyepiece tubes can be positioned in an upper (A) and lower (B) position in order to adapt the operator's eyepoint height according to his preference

### The correct eyepoint

The eyepoint 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 eyeshades can simply be folded back or removed to create more space



### Adjusting the diopter

In order to compensate for human eye differences, distortion, thickness differences in cover glasses on the one hand and tune for the best parfocality between objectives on the other, one can use the diopter to do so. Take a good prepared slide for your reference:

- Set (both) the diopter adjustments of the eyepieces to "0"
- Select the lowest magnification, look for a interesting area on the specimen and focus on this area
- Select the highest magnification and focus on the specimen

Warning: don't change the coarse and fine adjustment anymore

- Select the lowest magnification again
- With your dominant eye open (close your other eye), rotate the diopter adjustment from "+" to "-" until the selected area get as sharp as possible as with the highest magnification
- If during this operation the image becomes unsharp, take your eyes from the eyepieces and turn the diopter adjustment – without looking into the eyepieces – a few divisions back from "-" to "+"
- Look into the eyepieces again and turn the diopter adjustment from '+' to '-' until the selected area on your specimen gets the optimal sharpness
- Repeat for your non-dominant eye, and with the second diopter

#### **Verification:**

- Take your eyes from the eyepieces and look for two seconds to a far point in the room in order to "reset" your eyes
- Look into the eyepieces again. If the adjustment is not good, repeat the operation until you reach the same sharpness for the lowest and highest magnification without touching the coarse and micrometric adjustments

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

#### **Adjusting the focusing tension**

The DZ microscope focusing knobs can be adjusted for tension. You can set it from light to heavy according to your own preference. Please note that when the specimen leaves the focus plane after focusing, the tension should be set higher. To tighten the focusing (heavier), rotate the tension adjustment collar with provided wrench; to loosen it, please turn it in the reverse direction

#### **Brightness adjustment**

The right brightness adjustment knob (B) is used to adjust the bottom illumination, and the left brightness adjustment knob (A) is used to adjust the top illumination



## Maintenance and cleaning

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

### Cleaning the optics

When the eyepiece or auxiliary lenses are dirty, they can be cleaned by wiping a piece of lens paper over the surface (circular movements). If this does not help put a drop of alcohol on the lens paper and wipe it. Never put isopropyl or alcohol directly on the lens! Please note that Euromex offers a special microscope cleaning kit: PB.5275

It is not necessary – and not recommended – to clean the lens surfaces at the inner side of the eyepieces or zoom system. Sometimes dust can be removed with high pressured air

### 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

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## Documents / Resources

 <p>DZ series</p> <p>euromex</p>	<p><a href="#">euromex DZ Series Trinocular Microscope</a> [pdf] User Manual DZ Series Trinocular Microscope, Trinocular Microscope, Microscope</p>
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## References

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