MZ.4500

monocular zoom microscope

euromex
microscopes holland

user manual

Introduction

This instruction manual is for the operation guide, troubleshooting and maintenance to the MZ.4500 monocular zoom microscope. Please read this manual thoroughly before operating and keep it with the instrument

Contents

General safety instructions

Intended use: a non-medical device

This microscope is intended for general observation of cells and tissues, with transmitted/reflected illumination and with the specimen fixed on a slide

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

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 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 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 organisation
  - Microscope operators could be contaminated from 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 organisation. 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 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 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 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 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

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

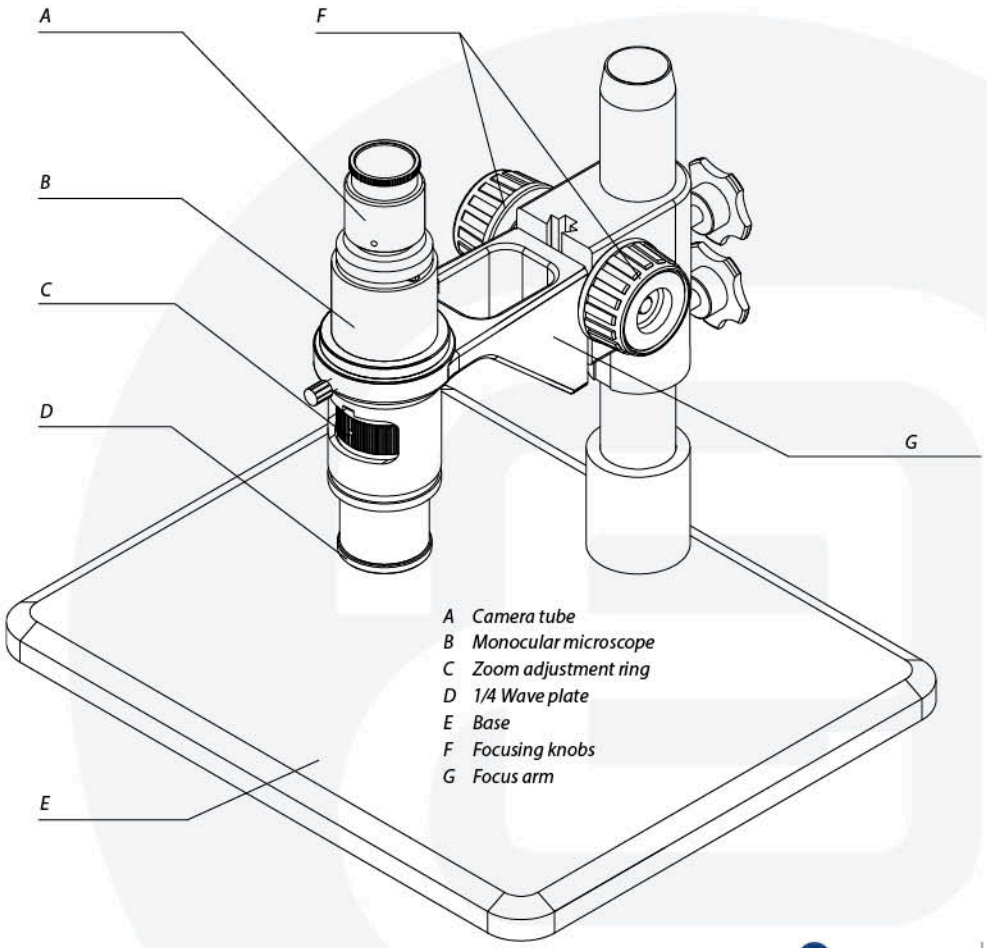
- This product is a precision instrument and it should be used in a proper environment for optimal use
- Install your product indoors on a stable, vibration free and level surface in order to prevent this instrument to fall thereby harming the operator
- Do not place the product in direct sunlight
- 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, fabrick, 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

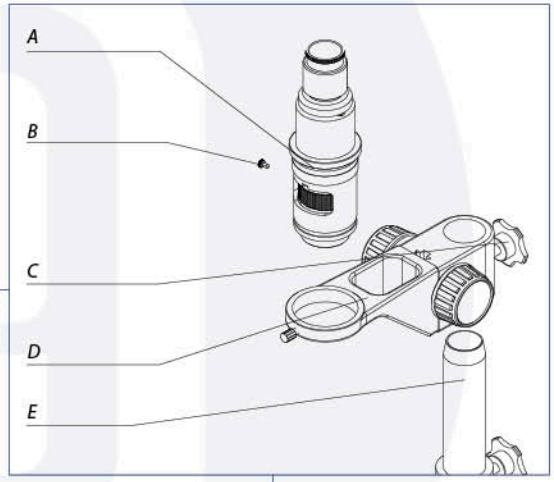
Moving and assembling
- This microscope is a relatively heavy system, consider this when moving and installing the system
- Always lift the microscope by holding the main body and base of the microscope
- Never lift or move the microscope by its focusing knobs, stage or head
- When needed, move the microscope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

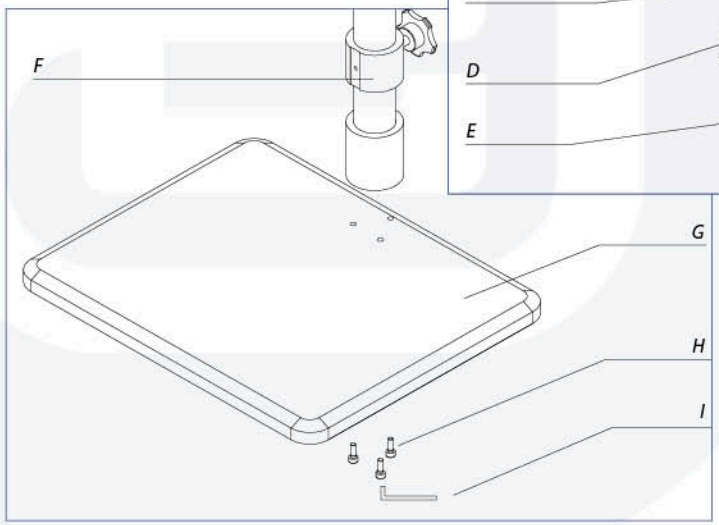
Components



Assembling

A Monocular microscope
B Magnification lock-screw
C Fixation screw
D Focus arm
E Column





F Safety device
G Base
H Screw
I Spanner

Operation

Adjusting the focusing tension

To adjust the focusing tension, grip one knob and rotate the other knob. Tension depends on the rotating direction of the knob: clockwise tight, counter-clockwise loose. (see fig. 1)

Adjusting the focus arm height

- To adjust the focus arm height, loosen the fixation screw and slide the focus arm over the column
- When needed adjust the position of the safety device. This prevents the focus arm from sliding down the column by accident

Place the specimen

Place the specimen on the base, directly under the microscope

Assemble camera

Connect the camera with the C-mount on the microscope
(see fig. 2)

Adjust the 1/4 wave plate

In the following operation, rotate 1/4 wave plate to get the best contrast (see fig. 4)

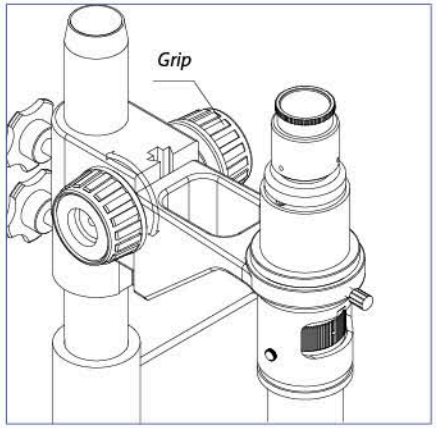


fig. 1

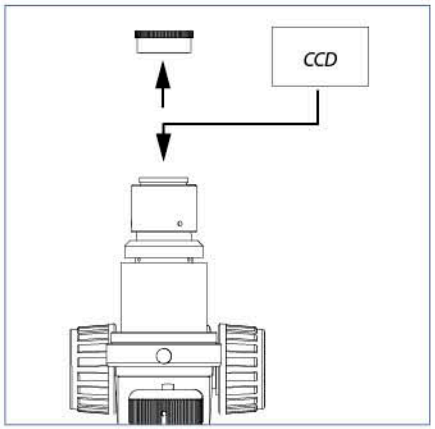


fig. 2

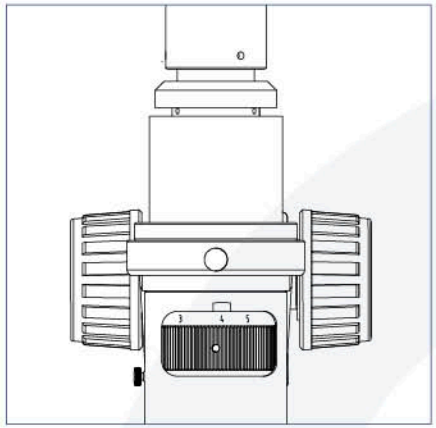


fig. 3

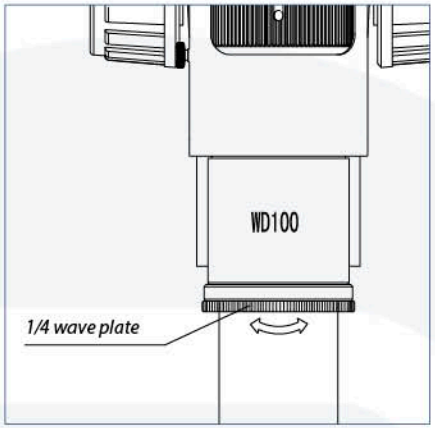


fig. 4

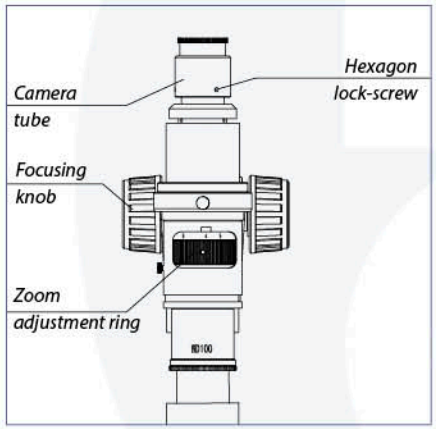


fig. 5

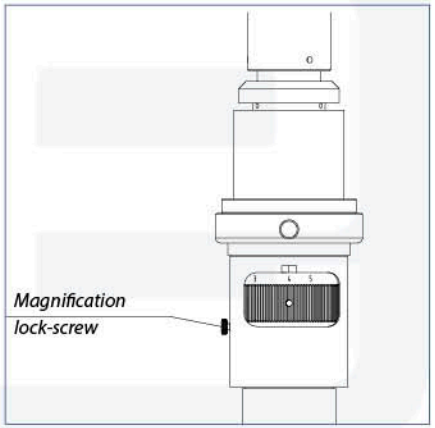


fig. 6

Adjust the focus

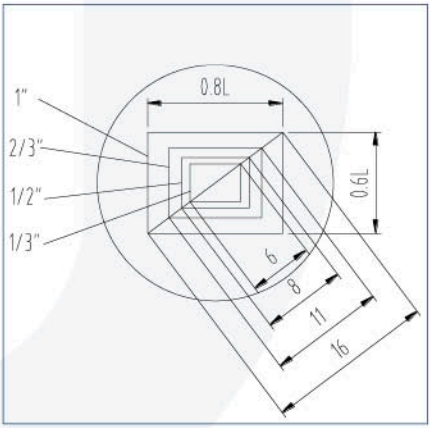
1. Rotate the zoom adjustment ring to the maximum magnification (see fig. 5)
2. Observe the image, if it is not in focus, rotate the focusing knob until the image comes into focus
3. Rotate the zoom adjustment ring to the lowest magnification, image should be in focus. If not, observe the image (still in the lowest magnification), loosen the hexagon lock-screw with the spanner and focus the image by adjusting the camera tube height
4. Rotate zoom adjustment ring to maximum magnification and observe the output image. If it is not clear, repeat step 2 above. Lock the hexagon lock-screw once you get the best high/low magnification parfocality possible

Fix the Magnification

The magnification can be fixed by thightening the magnificaion lock-screw (see fig. 6)

Magnification calculation

- Video output magnification =
  Electronic magnification x Optical magnification
- Electronic magnification =
  Display diagonal size/CCD surface diagonal size L
- Optical magnification β = Objective magnification × CTV magnification (×Auxiliary objective magnification)
- Field of view (mm) = L/β



CCD Dimension diagram

Troubleshooting

Problem	Cause	*Solution*
1. Stain or dust is observed in the field of view	Stains have accumulated on the specimen	*Clean the specimen*
	Stains have accumulated on the camera surface	*Clean the camera surface*
2. Image blur	Dirt on lens	*Clean it*
	Focusing is not correct	*Adjust the focusing*
	Inappropriate adjustment of camera tube	*Readjust it*
	1/4 wave plate is not correct	*Rotate 1/4 wave plate*
3. The focusing knob is not smooth	The focusing knob is too tight	*Loosen it to a suitable position*
4. The image is not clear due to the self-decline of the microscope body	The focusing knob is too loose	*Tighten it*
5. The focus knob can't be rotated during observation	The lock-screw is locked	*Loosen the lock-screw*

Euromex Microscopen bv • Papenkamp 20 • 6836 BD Arnhem • The Netherlands
T +31 (0) 26 323 22 11 • info@euromex.com • www.euromex.com