

Installation and Operating Instructions

# **Cole-Parmer®** **MSS-400 Series Professional Trinocular Stereozoom Microscopes**

Models 78904-48, -51, -54, -57, -60, -63



CE

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## Introduction

With your purchase of a Cole-Parmer MSS-400 Series microscope you have chosen a quality product. The MSS-400 Series stereomicroscopes are developed for professional industrial purposes, scientific research and education because of the excellent optical and mechanical properties, while very attractively priced.

The stereomicroscope consists of two separate microscope tubes which are combined as a unit, in order to focus them simultaneously on the object. Each tube has prisms, plan achromatic objectives and a widefield eyepiece in order to obtain a large, flat field of view. Both eyes are looking at the object under a different angle to reach a deep stereoscopic image. The maintenance requirement is minimal when using the microscope in a proper manner.

This manual describes the construction of the microscope, how to use the microscope and its maintenance.

# 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 fibers
- 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 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 organization
  - 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 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 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 fiber-free tissue, dampened 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
- 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 Cole-Parmer dealer, an RMA (return authorization form) together with a decontamination statement must be filled in! This document must be shipped together with the microscope at all times

## 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 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 MSS-400 Series 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

- Maximum altitude: 2000 m
- Pollution degree: 2
- 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 20 to 80% RH
- 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

## Models

The MSS-400 Series is available in several different models, with a choice of stands and illuminations.

The MSS-400 Series microscopes are equipped with 45° inclined tubes, two zoom objectives and a pair of wide field WF 10x/23 eyepieces.

Model	Type	Magnification	Working distance	Stand	Illumination	Power	Weight
78904-48	Trinocular	0.65 to 5.5x	110 mm	Rack & pinion	Incident (3 W LED); transmitted (3 W LED)	100–240 VAC, 50/60 Hz	11.7 lb (5.3 kg)
78904-51	Trinocular	0.65 to 5.5x	110 mm	Pillar	Incident (3 W LED); transmitted (3 W LED)	100–240 VAC, 50/60 Hz	11.5 lb (5.2 kg)
78904-54	Trinocular	0.65 to 5.5x	110 mm	Double-arm boom stand	Incident (3 W LED); transmitted (3 W LED)	100–240 VAC, 50/60 Hz	48.9 lb (22.2 kg)
78904-57	Trinocular	0.65 to 5.5x	110 mm	Single-arm universal stand	Incident (3 W LED); transmitted (3 W LED)	100–240 VAC, 50/60 Hz	34.6 lb (15.7kg)
78904-60	Trinocular	0.65 to 5.5x	110 mm	Pillar	Incident (3 W LED); transmitted (3 W LED) with rotating mirror	100–240 VAC, 50/60 Hz	11.2 lb (5.1 kg)
78904-63	Trinocular	0.65 to 5.5x	110 mm	Pillar with dual flexible arms	Incident on dual flexible arms (3 W LED); transmitted (3 W LED)	100–240 VAC, 50/60 Hz	11.7 lb (5.3 kg)

# Components of the stereomicroscope

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



A	Eyepiece/s	I	Stand (rack & pinion version)
B	Diopter adjustment	J	Zoom adjustment knobs
C	Head fixation screw	K	Focusing knobs (only one is visible)
D	Objective cover	L	Incident illumination
E	Brightness adjustment for transmitted illumination	M	Brightness adjustment for incident illumination
F	Stand base	N	Object clips
G	Object plate with transmitted illumination below it	O	On/Off switch
H	Photo tube (or third tube) port		

The stereomicroscope consists of a stand with holder/focusing system, in which the stereo head is placed and locked with a fixation screw (C).

## Eyepieces

The MSS-400 Series is supplied with a pair of HWF 10x/23 mm eyepieces.

## Head

Trinocular heads with 45° inclined tubes, which are rotatable over 360°. Both eyepieces have a  $\pm 5$  diopter adjustment (B). Interpupillary distance adjustable between 54 mm and 75 mm. Trinocular head is supplied with a fixed light path beam splitter (50:50).

## Objectives

The MSS-400 Series is supplied with a 1:8.4 zoom objective with 0.65x to 5.5x magnifications, a field of view from 35.4 mm to 4.2 mm. Working distance 110 mm.

## Object stage

The rack-and-pinion stands and the pillar stands are equipped with an object stage with a semi-transparent stage plate (G) and two object clips (N). The boom and universal stands are not equipped with such stage.

## Focusing

With the two coarse focusing knobs (K) the object can be sharply focused. Head holder with coaxial coarse & fine focusing knobs also available as an option.

## Magnification adjustment

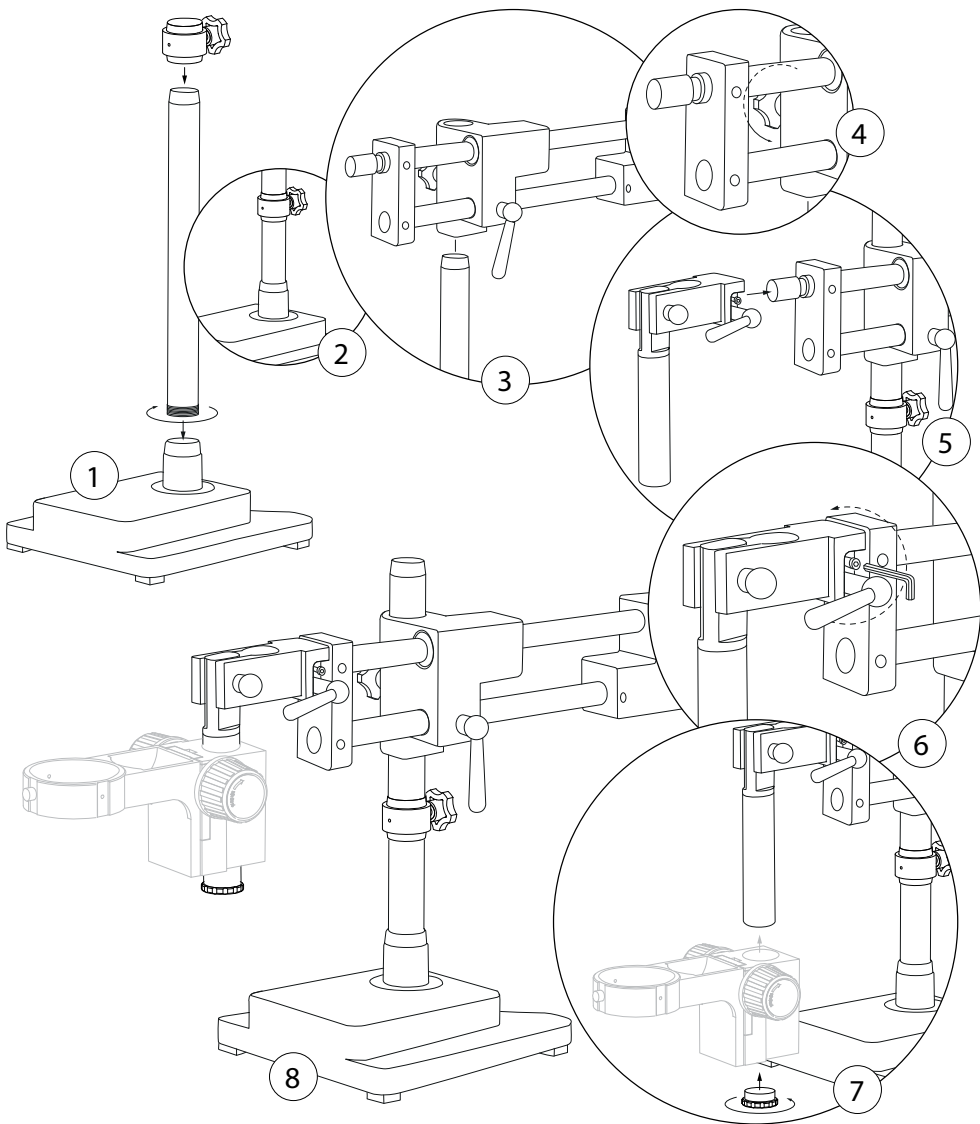
The MSS-400 Series stereomicroscopes are equipped with two plan achromatic zoom objectives. By using the zoom knobs (J), the magnification can be adjusted in a smooth, stepless way. This series is equipped with click-stops.

MSS-400 Series		
Eyepieces	Zoom indication	Magnification
10x	0.65x	6.5x
10x	1x	10x
10x	1.5x	15x
10x	2x	20x
10x	2.5x	25x
10x	3x	30x
10x	3.5x	35x
10x	4x	40x
10x	4.5x	45x
10x	5x	50x
10x	5.5x	55x

## Illumination

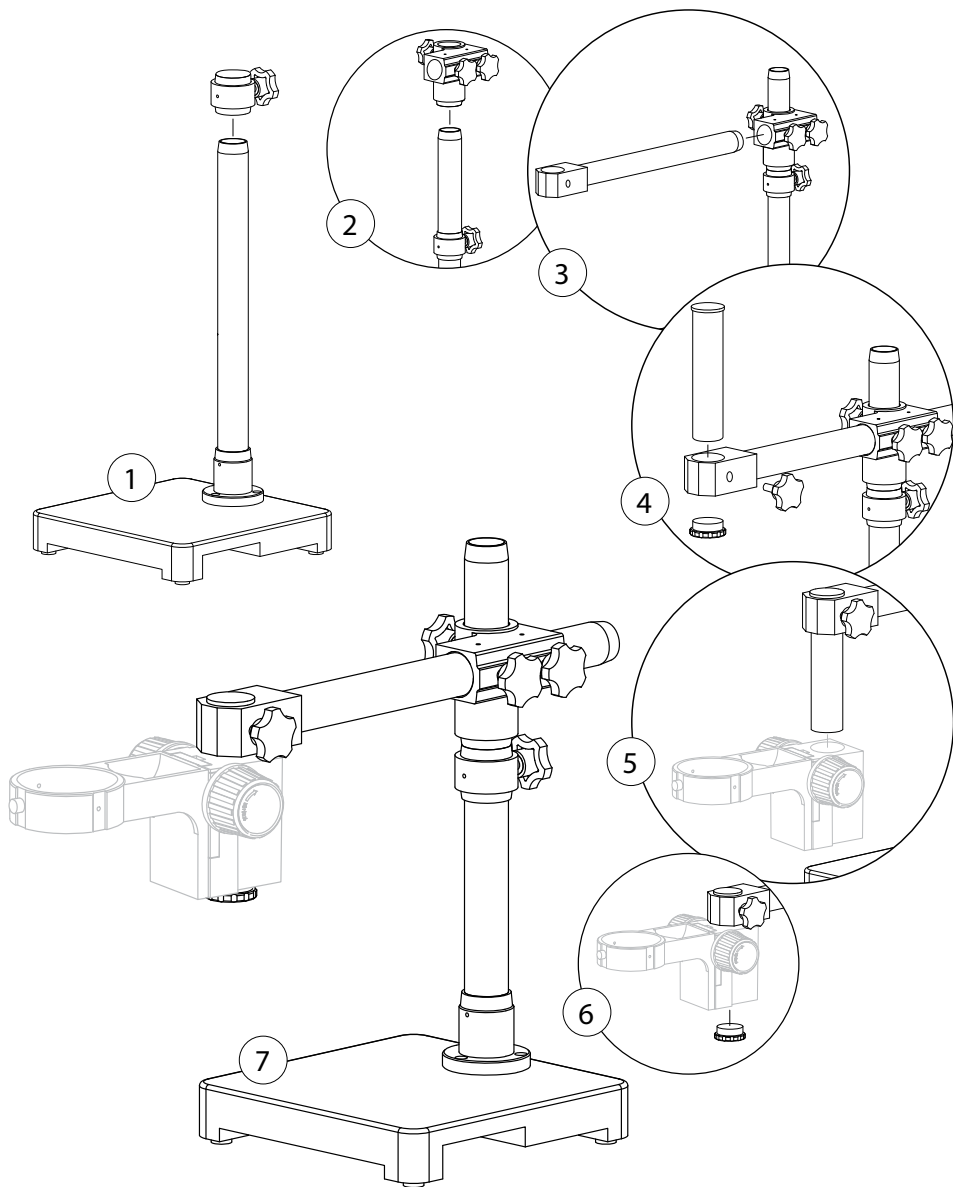
The stands of the 78904-48, 78904-51, 78904-63 and 78904-60 models are equipped with transmitted and incident 3 W LED illumination. The incident illumination of the 78904-63 model features two flexible gooseneck arms whereas the transmitted illumination of the 78904-60 model is used in combination with a rotating mirror. The illuminators can be used simultaneously, and their brightness can be adjusted using (E) and (M) wheels.

# Boom Stand Assembly (Model 78904-54)

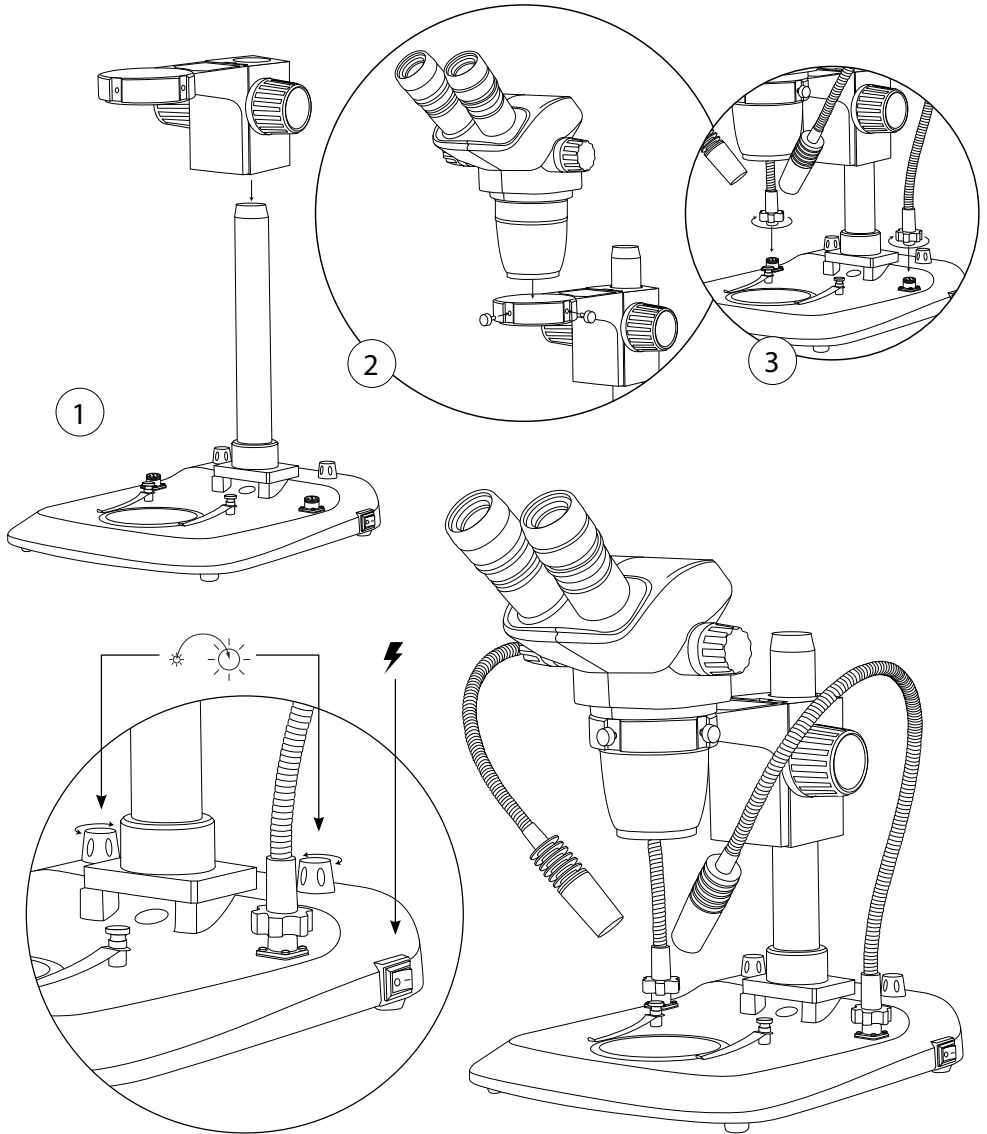




# Universal Stand Assembly (Model 78904-57)



# Dual Flexible Arm Stand Assembly (Model 78904-63)



## Preparing the stereomicroscope for use

Carefully remove the items from its packaging and place them on a flat, firm surface. Please do not expose the stereomicroscope to direct sun light, high temperatures, damp, dust or acute shake. Make sure the table or surface is flat and horizontal. When moving the stereomicroscope, use one hand to hold the pillar or column and the other hand to hold the base



**Caution!** Holding the stereomicroscope by its focusing knobs will damage it



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

## Assembling steps

### Mounting the head

Remove the microscope head from its packaging and mount it on the microscope head holder. To do so, loose the head fixation screw (C) so that the head can be inserted all the way into the head holder. Once the head is in place, tighten the head fixation screw again. The photo tube of the trinocular versions is packed in the lid of the foam packing. Take it out and screw it into the photo tube port (H)

### Placing the eyepieces

Unpack the two eyepieces (A) and remove their dust covers. Then remove the dust covers of the eyepiece tubes and insert the two eyepieces into the tubes (the eyepieces should be pushed all the way down, touching the tubes). The eyepieces can be secured with a hexagon type screw. The exact location of the hexagon screw may differ. 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 microscope

Connect the power cable to the mains supply and switch on the microscope using the On/Off switch (O). Do not bend or twist the power cord as damage may occur. Use the power cord supplied with the unit. If the cord requires replacement, ensure that it is suitably rated. If in doubt consult your local dealer or qualified electrician.



## Working with the stereomicroscope

### The interpupillary distance

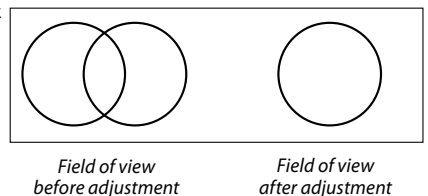
In order to obtain a smooth “compound” image, follow these steps.

The correct interpupillary distance is reached when one round image is seen in the field of view (see image at right).

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. If several users are working with the microscope it is recommended to remember your interpupillary distance for a quick set up during new microscopy sessions

### The correct eyepoint

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



# How to set up a stereomicroscope

Setting up your stereomicroscope properly is essential to getting parfocal images during the entire zoom range. It also prevents headaches, stressful eyes and fatigue. Below is a setup guide to get the best out of your microscope.



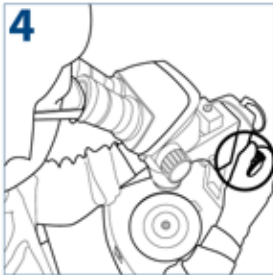
Turn the diopter adjustment rings of both eyepieces to position "0"



Put a specimen on the stage plate



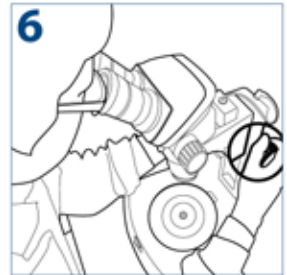
Turn the zoom adjustment knob to the lowest magnification



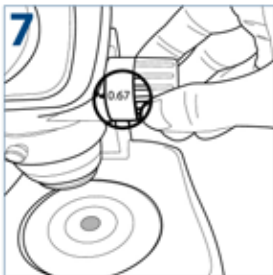
Rotate the focusing knob to bring the specimen into focus



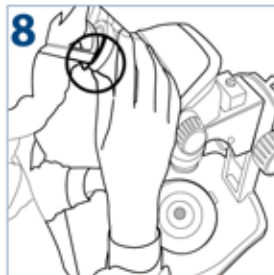
Turn the zoom adjustment knob to the highest magnification



Rotate the focusing knob to bring the specimen into focus



Turn the zoom adjustment knob to the lowest magnification



Rotate the diopter adjustment rings of the left and right eyepiece to bring the specimen into focus

**Please note:**

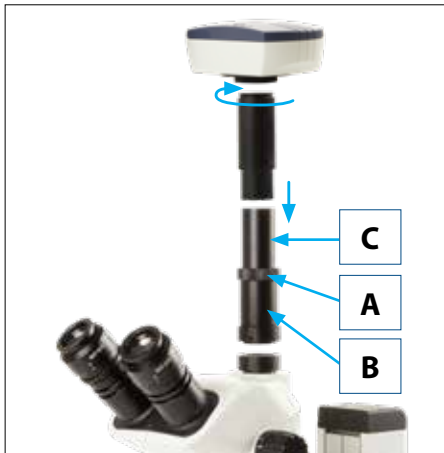
Put the zoom adjustment knob at the highest magnification again and check the image focusing. The diopter adjustment is complete when the image is accurately focused during zooming. If not, please repeat steps 3 to 8

# Photo and video

## Trinocular models

- For trinocular models using the standard supplied trinocular tube, slide the camera with mounted C-mount adapter into the 23.2 mm tube of the photo port. For focusing, loosen the ring (A) and slowly unscrew the tube (B) you will be able to match parfocality of the camera with the view through the eyepieces. Adjustment can be made by raising/lowering the height of the camera (C). Take an easy-to-view specimen and focus the image through the microscope's eyepieces (with dioptre adjustment set on "0"). Afterwards, perform this height adjustment procedure while watching the image on the computer screen. In this case, once you have obtained parfocality in the device, screw the ring (A) back
- When using one of the optional C-mount adapters, turn ring (D) to focus

Follow the manual that comes with the camera for camera operation



## Maintenance and cleaning

Always place the dust cover over your MSS-400 Series microscope after use. Always keep the eyepieces mounted on the microscope to avoid dust entering the instrument

### Cleaning the optics

When the eyepiece 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!

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



#### **Caution**

Cleaning cloths containing plastic fibers may damage the coating of the lenses!

### Maintenance of the stand

- Dust can be removed with a brush. In case the stand or base plate is really dirty, then clean the surface with a non-aggressive cleaning product
- All moving parts - like the height adjustment or the coaxial coarse 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

To change the fuse, follow the procedures below:

- Remove the power cord from the back of the microscope
- Locate the fuse compartment, which has a fuse image. It is typically located close to the power connector
- Remove the fuse compartment. To do so, insert a flat head screwdriver behind the fuse compartment and gently pry it loose
- Insert the new fuse into the compartment, and then replace the fuse compartment back to where it was originally
- Power up the microscope and test
- Fuse specification: 250 V F1A glass, 5 x 20 mm



**Note:** The fuse may blow in order to prevent internal damage to the microscope and in most cases, replacing the fuse with a correctly rated fuse will resolve the issue. However, should you encounter a blown fuse frequently, please contact your distributor for further assistance

## Accessories and spare parts

For current accessories and spares, please check our website [coleparmer.com](http://coleparmer.com)

## Warranty

These microscopes come with a five (5) year factory warranty against manufacturing defects, covering labor and parts. Warranty does not apply for consumable accessories and parts such as bulbs, batteries, fuses, cords, optical components, or any add-on accessories such as mechanical specimen holders that are not built into the microscope stage as an integral part of the original manufacture, etc. Warranty does not cover microscopes, lenses cameras or other accessories that have become inoperable due to dirt or damage due to misuse or lack of maintenance.

**Note:** Buyers are responsible for return shipping and handling cost for warranty services. Warranty covers parts and labor only.



**Cole-Parmer®**  
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Toll-free: **1-800-323-4340**

Phone: **1-847-549-7600**

Fax: **1-847-247-2929**

**coleparmer.com**