



Microscope binocular (2)801854

# User manual



## INTRODUCTION

Thank you for purchasing the Covetrus biological microscope for routine investigation

The Covetrus microscopes are developed for use at schools and laboratories. Specific attention to production methods resulted also in an excellent price/performance ratio

Please read this manual carefully before using this product to ensure correct and safe usage

- The contents of this manual are subject to change without notice
- The appearance of the actual product can differ from the models described in this manual
- Not all equipment mentioned in this manual has to be part of the set you have purchased
- All optics are anti-fungus treated and anti-reflection coated for maximum light throughput

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## Notes on handling and Safety

### 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 objective

### Handling the LED

Note: Always disconnect the power cord from your microscope before handling the LED bulb and power unit and allow the system approximately 35 minutes to cool down 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 Covetrus original replacement LEDs
- 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 approximately 35 minutes to cool down to avoid burns

### Dirt on the lenses

- Dirt on or inside the optical components such as eyepieces, lenses, etc., affect 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 in this manual carefully

### 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
- Do not place the product in direct sunlight
- The ambient temperature should be between 5 to +40°C and humidity is maximum 80% at 31 degrees decreasing linearly to 50% at 40 degrees. 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, this will damage the microscope
- Never use undue force when turning the knobs
- Make sure that the microscope system can dissipate its heat
- Keep the microscope approximately 15cm free from walls and obstructions
- 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 your microscope, this can cause short circuiting your device, causing malfunction and damage on your system

### Moving and assembling

- The 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

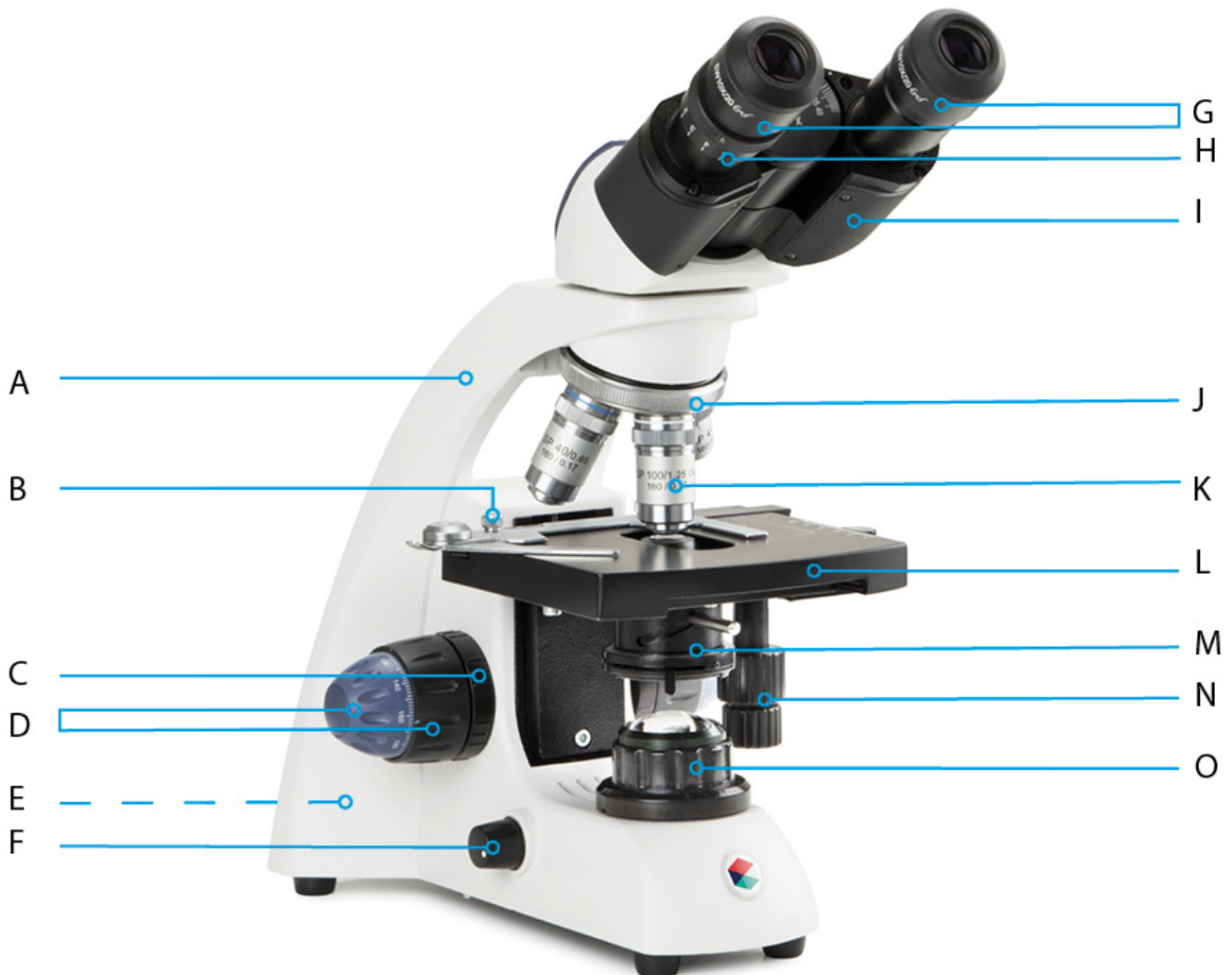
The S40x and S100x objectives are equipped with a spring mount, to prevent damage to the front lens and the slide. The Numeric Aperture - N.A. – of the objective is an indication for the resolving power of the objective. The total magnification can be calculated by multiplying the magnification of the eyepiece with the magnification of the objective. The magnifications are displayed in the table below:

Eyepiece	Objective	Magnification
10x	4x	40x
10x	10x	100x
10x	40x	400x
10x	60x	600x
10x	100x	1000x

## Components of the microscope

The names of the several parts are listed below and are indicated:

- C Stand arm
- D Safety device
- E Tension adjustment
- F Coaxial coarse-and fine adjustment
- G On/Off switch (not visible)
- H Light intensity control
- I Eyepiece(s)
- J Dioptic adjustment (bino/trino type)
- K Tube (mono/bino/trino 360° rotatable)
- L Revolving nosepiece for 4 objectives
- M Objectives
- N Object stage (mechanical stage or clips)
- O Condenser with irisdiaphragm + filterholder
- P Coaxial stage controls
- Q Lamp housing



## Preparing the microscope for use

Carefully remove the items from its packaging 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. Make sure the table or surface is flat and horizontal

When moving the microscope, use the left hand to hold the transport handle and hold the base of the microscope with the right hand



Hold the microscope at the top of the stand arm when it should be moved

Holding the microscope by its stage or focusing knob will damage the microscope

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



## Assembling Steps

Covetrus 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

### Mounting the objectives

1. Rotate the coarse focusing knob to lower the stage to its 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

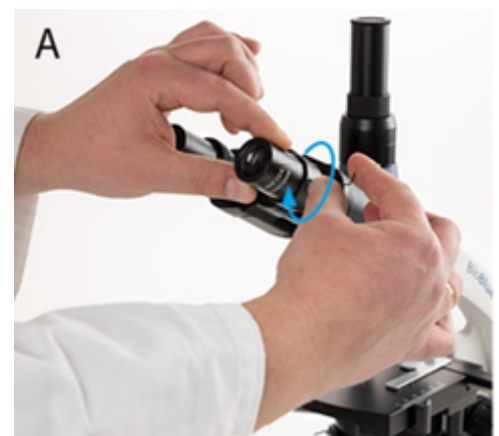
### Placing the eyepieces

1. Remove the cover of eyepiece tube
2. Insert the eyepiece into the eyepiece tube
3. Lock the eyepieces with a hexagon screw



### Locking the eyepieces

To lock the eyepieces in binocular models please find the screw as indicated in picture (A). Please note that location can be slightly rotated from model to model.



### The eyeshades (optional)

The eyepieces can be equipped with optional rubber eyeshades. This prevents damage to the lens, and stray light. The eyeshade can simply be slipped over the eyepiece

### Connecting the power cord

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

1. Make sure the power switch is off before connecting
2. Insert the connector of power cord into the microscope power socket, and make sure it connects well
3. Insert the other connector into the mains socket, and make sure it connects well

**Do not bend or twist the power cord**, it will be damaged. Use the power cord that is supplied by Covetrus. If it's lost or damaged, choose one with the same specifications

## Operation

### Setting up the illumination:

For optimal contrast and resolution one should follow the below procedure:

1. Place a specimen on the object stage and focus using the 4x objective, with a fully opened iris diaphragm
2. Turn light intensity to lowest position, then look through the eyepiece(s) and turn up to the comfortable light intensity level
3. Turn the condenser in the highest position
4. Close the iris diaphragm, until it is just visible on the edge of the field of view

The microscope is properly set for use with the 4x objective. For each other magnification in bright field use this procedure should be repeated to ensure the best balance between contrast and resolution



### Caution:

The maximum light intensity when using the 4x and 10x can damage the eyes!

### Place the specimen slide

Place slide into the clamp of the mechanical stage (G) and can be carefully moved into X- and Y- directions

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 4x objective and make sure that it is placed correctly in the optical path
2. Rotate the position screw to top, observe the right eyepiece with your right eye. Rotate the coarse focusing knob until the image appears
3. Rotate the fine focusing knob to sharpen the image
4. When you perform focusing with a S100x objective, you need to lock the slide protection handle. The slide protection handle protects the slide by limiting the travel range of the mechanical stage. This way the objectives will not touch or break your slides



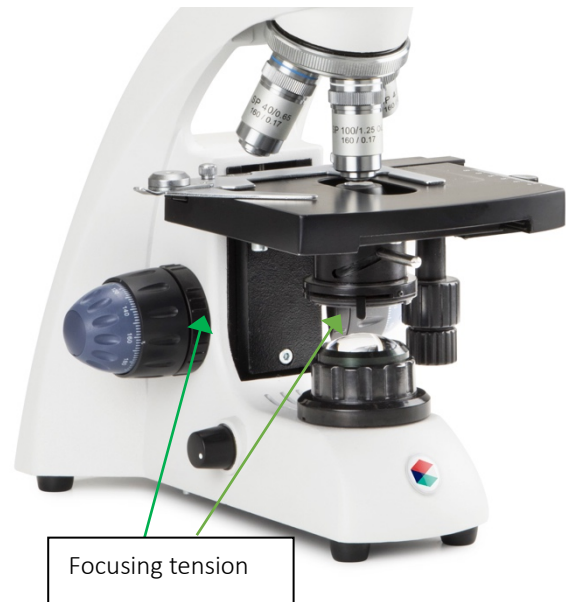
## Adjusting the focusing tension

The tension of the focusing knobs can be adjusted. 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 or the stage declines out of its own, then you need to adjust the tension

To tighten the focusing knob (more heavy), rotate the tension adjustment ring counter-clockwise; to loosen it, please turn it in the clockwise direction

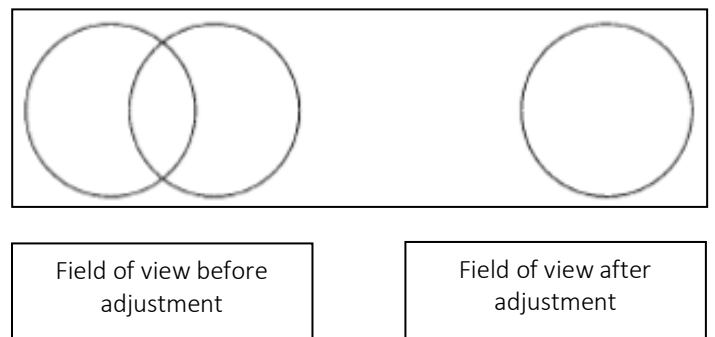
## Eyepieces

Using a binocular (or trinocular) tube is less tiring for the eyes than a monocular tube. In order to obtain a smooth “compound” image, we recommend you to go through the below steps



### 1. The interpupillary distance

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 away 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



### 2. 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

### 3. Adjusting the diopter

- Set diopter adjustment ring to zero.
- Close the left eye and focus the right tube by adjusting the coarse- and fine adjustment knobs.
- Close the right eye and focus the left tube with the diopter adjustment ring

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

## Abbe condenser

Beneath the object stage an Abbe condenser N.A. 12.5 is mounted. The condenser can be adjusted in height by moving the rack and pinion knob beneath the mechanical stage. By adjusting the condenser you can focus

the light on the specimen for an optimized contrast. The condenser is factory pre-centered. If needed, the following procedure can be followed to center the condenser

1. Move the condenser to its highest position
2. Select the 10x objective and place it into the light path and focus the specimen
3. Rotate the field diaphragm adjustment ring to put the field diaphragm to the smallest position
4. Adjust the condenser to the point where the image is the sharpest
5. Adjusting the center adjustment screw and put the image to the center of the field of view
6. Open the field diaphragm gradually
7. The condenser is centered correctly if the image remains in the center when you open the field diaphragm and inscribed to the field of view

### The field (Köhler) diaphragm

By limiting the diameter of the beam entering the condenser, the field diaphragm can prevent other light and increase 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 matches with the N.A. of the objective, you get the highest possible resolution, depth of field and contrast
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

All Covetrus microscopes are equipped with an S100x N.A. 1.25 oil immersion objective. Please follow the below instructions on how to use this objective:

1. Remove the dust protection cap from the revolving nosepiece to mount the S100x objective
2. Focus the image with the S40x objective
3. Lock the slide protection handle
4. Turn the revolving nosepiece so the S100x objective almost reaches the click-stop
5. Put a small drop of immersion oil on the center of the slide (always use Covetrus Immersion oil)
6. Now turn the S100x objective so that you feel the click stop
7. The front lens is in contact with the immersion oil
8. Look through the eyepiece and focus the image with the fine adjustment knobs
9. The distance between the lens of the objective and the slide is very small!
10. In case there are small bubbles visible, turn the S100x objective a couple of times from left to right so that the front of the objective moves in the oil and the bubbles will disappear
11. After using the S100x objective, loosen the slide protection handle and turn the table with the course adjustment knobs downwards until the front lens doesn't touch the oil any longer. Clean the front lens of the S100x objective

12. Always clean the front lens of the S100x objective with a piece of lens paper that is moistened with a drop of isopropanol. We recommend using Covetrus lens paper and isopropanol
13. Clean the slide after use as well

### **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!

### **Safety device**

To prevent damage to the objective lens, or breaking the slide, all types are equipped with a pre-fixed safety device

It is recommended to use slides of 1.0 – 1.2 mm thickness in combination with cover glasses of 0.13 mm or 0.17 mm thickness

### **Illumination**

The LED illumination of the microscope is equipped with rechargeable batteries.

The length of use after charging is about 60 hours. The full charging time is about 10 hours. At First use the batteries have to be fully charged. Connect the cable to the mains socket

The illumination has the following specifications:

- LED : 1W, 300 mA
- Charger : Primary AC 100 - 240 Volt-50Hz
- Batteries : 3 NiMh, AA type, 1.2 Volt 1600 - 2600 mA

### **Maintenance and cleaning**

Always place the dust cover over your microscope after use. Always keep the eyepiece and objectives 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 alcohol on the lens paper and wipe it. Never put xylol or alcohol directly on the lens! Please note that Covetrus offers a special microscope cleaning kit

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 fibers 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 then you can clean the surface 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 you can lubricate the bearing

## Changing the batteries of the microscope



**Caution:** Always remove the power cable from the mains supply!

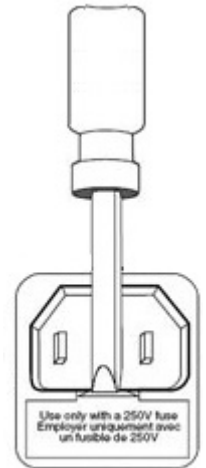
Remove the small lid out of the bottom cover of the microscope

- Place the batteries and put the lid back into its place

## Replacing the fuse

To change the fuse, please follow these procedures:

- Remove the power cord from the back of the microscope
- Locate the fuse compartment, which has a Fuse image. It is typically located beneath the power connector
- Remove the fuse compartment. To do so, insert a flat head screwdriver between the metal power tines and gently pry the fuse compartment loose with a slight down and out motion
- Insert the new fuse into the compartment, and replace the fuse compartment back to where it was originally
- Power up the microscope and test



**Note:** Fuse may blow. In most cases, replacing the fuse with the correct voltage will resolve the issue. However, should you encounter a blown fuse frequently, please contact your distributor for further assistance

**Fuse specification: 250V 1A**

## Digital models and cameras

Digital cameras are designed to be used on the photo port of the microscope head. It is also possible to use the digital camera in combination with a binocular head. To use the camera on a binocular head, you can simply remove the eyepiece[1] and then place the camera with mounted c-mount adapter into the eyepiece tube[2]. Focus the digital image with the coarse and fine controls of the microscope

Take an easy-to-view specimen and focus the image through the microscope's eyepieces. For focusing the camera, slowly move tube (A) up and down while watching at the screen till the camera view is in focus

Follow the manual that comes with the camera for camera operation

