BlueScope

biological microscope



euromex
microscopes holland

user manual

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1. Introduction

Thank you for purchasing the Euromex BlueScope. The BlueScope series has been designed with all kinds of Life Sciences applications and great durability in mind. This resulted in a modern, robust and high-level microscope for advanced use, equipped with the best optical and mechanical components. 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 use

- The content of this manual is 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

**All technical specifications stated are nominal values and are provided for reference purposes only. No rights or claims may be derived from these values. Euromex Microscopen makes no warranty as to the exact accuracy or achievement of these values*

2. General safety instructions

Intended use: a non-medical device
This device is intended for general observation of cells and tissues, with transmitted/reflected illumination and with the specimen fixed on a slide

2.1 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

2.2 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

2.3 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

2.4 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

2.5 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. Alcohol may cause discoloration
- 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, 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 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

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

2.6 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 range should be within 50% and 80%
- 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

3. Models

The BlueScope series includes models with Semi Plan objectives and PLAN PLi IOS (Infinity Optical System) objectives. The optical systems are model-specific. PLAN IOS models: BL.1152-PLi (binocular) and BL.1153-PLi (trinocular). Both are supplied with PLAN PLi IOS 4x, 10x, S40x and S100x oil-immersion objectives. The BL.1153-PLi trinocular model is supplied with a standard 0.5x C-mount camera port. Optional 0.35x C-mount and 23.2 mm photo tube accessories are available.

Please note: *For the latest BlueScope models and accessories, visit www.euromex.com.*

3.1 Objectives

The total magnification of the microscope is calculated by multiplying the eyepiece magnification by the objective magnification. This applies to both Semi Plan and PLAN PLi IOS configurations.

Eyepiece magnification	Objective magnification	Total magnification
10x	4x	40x
10x	10x	100x
10x	20x	200x
10x	40x	400x
10x	60x	600x
10x	100x	1000x

The S40x, S60x and S100x objectives are equipped with a spring mount to help prevent damage to the front lens and specimen slide.

Important: *Use objectives intended for the optical system of the microscope. Semi Plan and PLAN PLi IOS objectives must not be interchanged without confirmation of compatibility.*

4. Components of the microscope

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

A. Camera tube	**N.** One of two condenser centering points
B. Eyepieces	**O.** Köhler lamp house
C. Diopter adjustment	**P.** Friction adjustment
D. Microscope head	**Q.** Coaxial coarse-and fine adjustment
E. Slot for polarization filter	**R.** Screw for fixating head
F. Nosepiece for 4 objectives	**S.** Transport handle
G. Objectives	**T.** Storage compartment
H. Rackless X-Y mechanical stage	**U.** X-Y adjustment control
I. Quick focus aid	**V.** Slide protection adjustment
J. Height adjustment condenser	**W.** Light intensity adjustment knob
K. Screw for fixating/removing condenser	**X.** USB-C power input
L. Color coded condenser with iris diaphragm	**Y.** Slot for Kensington lock
M. Condenser iris adjustment handle	**Z.** Power button



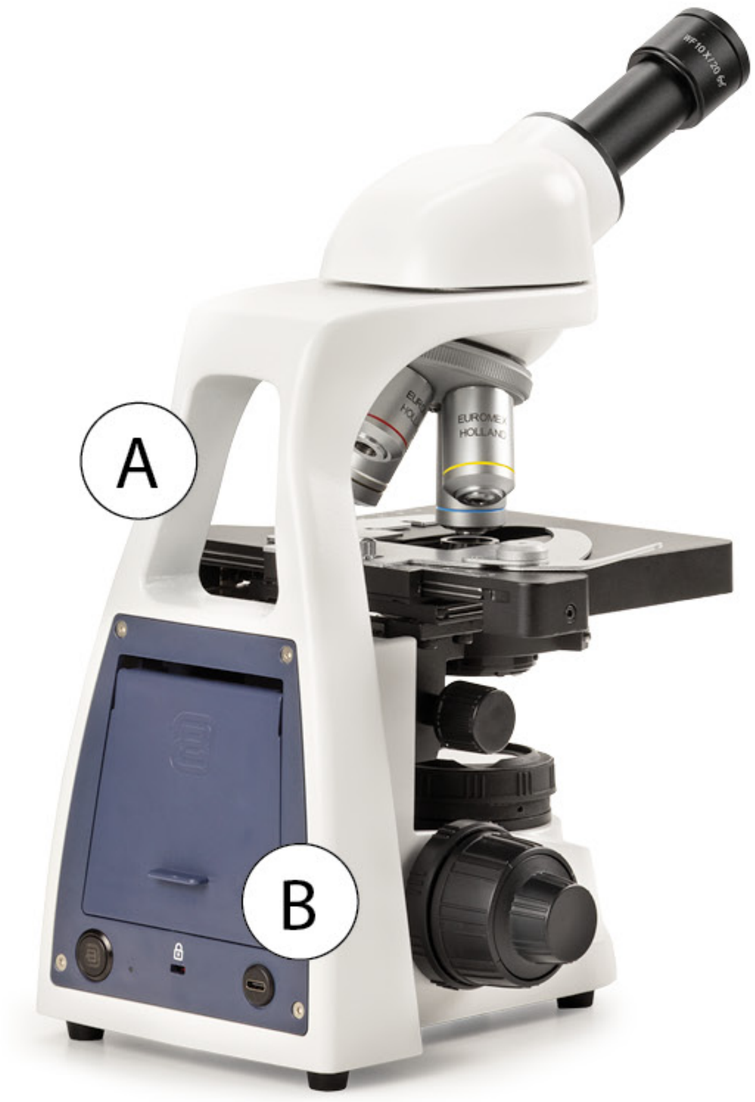
5. Preparing the BlueScope for use

- 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 **(A)** and hold the base of the microscope with the right hand

⚠ ***Caution!*** Hold the microscope at the top of the stand arm when it is moved

- Insert the USB-C power cord into the power input at the back of the microscope **(B)**

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



5.1 Assembling steps

Euromex Microscopen BV always tries 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 nonetheless described for your convenience nonetheless

5.1.1 Mounting the objectives

- Rotate the coarse focusing knob to lower the stage to its lowest position
- Remove the dust protection cap from the nosepiece (if in place)
- Install the objectives into the nosepiece from the lowest magnification to the highest, in a clockwise direction. When using the microscope, start by using a low magnification objective (4x or 10x) to easily search for specimen, and focus. Then continue with higher magnification objectives to observe

⚠ ***Note:*** *PLAN PLi IOS objectives are designed specifically for BlueScope PLAN IOS models (BL.1152-PLi and BL.1153-PLi). These objectives are not interchangeable with the Semi Plan objectives used on standard BlueScope models. Always use objectives that are compatible with the microscope's optical system.*

5.1.2 The microscope head

The standard BlueScope series configuration is supplied with the head assembled

5.1.3 Placing the eyepieces

The standard BlueScope series configuration is supplied with the eyepieces assembled. However, if your order contains additional eyepieces, please follow these steps to mount/replace them

- Remove the current eyepiece from the eyepiece tube, unlocking it with a screwdriver as shown in the pictures (A and B)

⚠ ***Note:*** *The eyepiece tubes have three screws. In order to remove the eyepiece you need to unscrew the one aligned with "0" (see picture C)*

- Insert the eyepiece into the eyepiece tube
- Lock the eyepieces with a screwdriver







5.1.4 The eyeshades (optional)

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

5.1.5 Connecting the USB-C power cord (A/B)

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

- Make sure the power switch is off before connecting
- Insert the USB-C connector of the power cord into the BlueScope power socket (A) and make sure it connects well
- Insert the other USB connector into the mains adapter and make sure it connects well
- The switch (B) allows you to choose between white or halogen colored LED light



Do not bend or twist the power cord, it may get damaged. Use the power cord that is supplied by Euromex. If it is lost or damaged, choose one with the same specifications

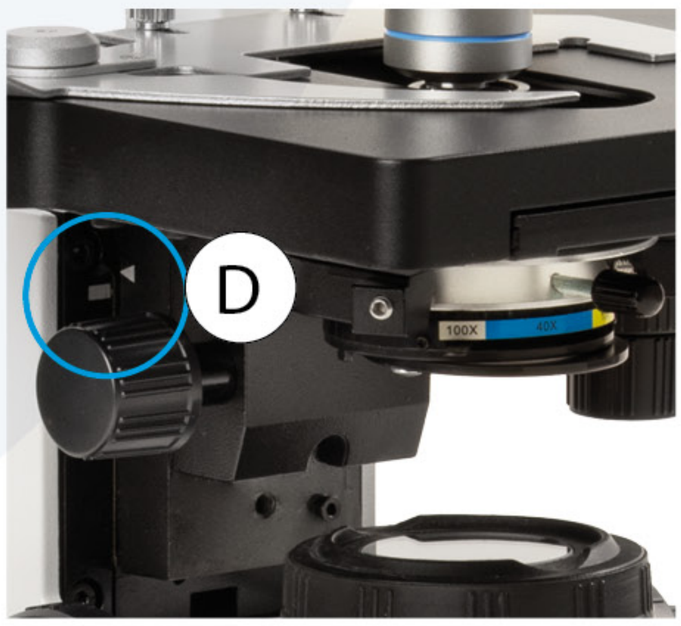
Note: the power supply can be supplied with 3 snap-on country specific adapters. Select the right one and mount it on the power supply

5.1.6 Storage compartment (C):

The storage compartment can be opened by pulling the lid. It can be used to store the power supply, cable, or any other microscope accessories that the user sees fit to store. Two Allen key holders are available in the back panel of the storage compartment

5.1.7 Quick focus aid (D)

By aligning the quick focus mark, the samples is placed in or close to the focus area of the objective. After this the user only needs some small corrections in stage height to fully focus the sample



5.1.8 Placing or replacing the rechargeable batteries (E)

- Gently lay the BlueScope on its side
- Use an Allen key to unscrew the battery compartment cover
- Remove the cover and pry the batteries loose
- Insert the AA rechargeable batteries in the correct position
- Replace the cover and close the battery compartment



Caution:

Always remove the power cable from the mains supply!

6. Operation

6.1 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 brightfield 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!

6.1.1 Dual colour LED

The blueScope is equipped with Dual color LED, this allows you to switch between white light and warm light to simulate halogen light

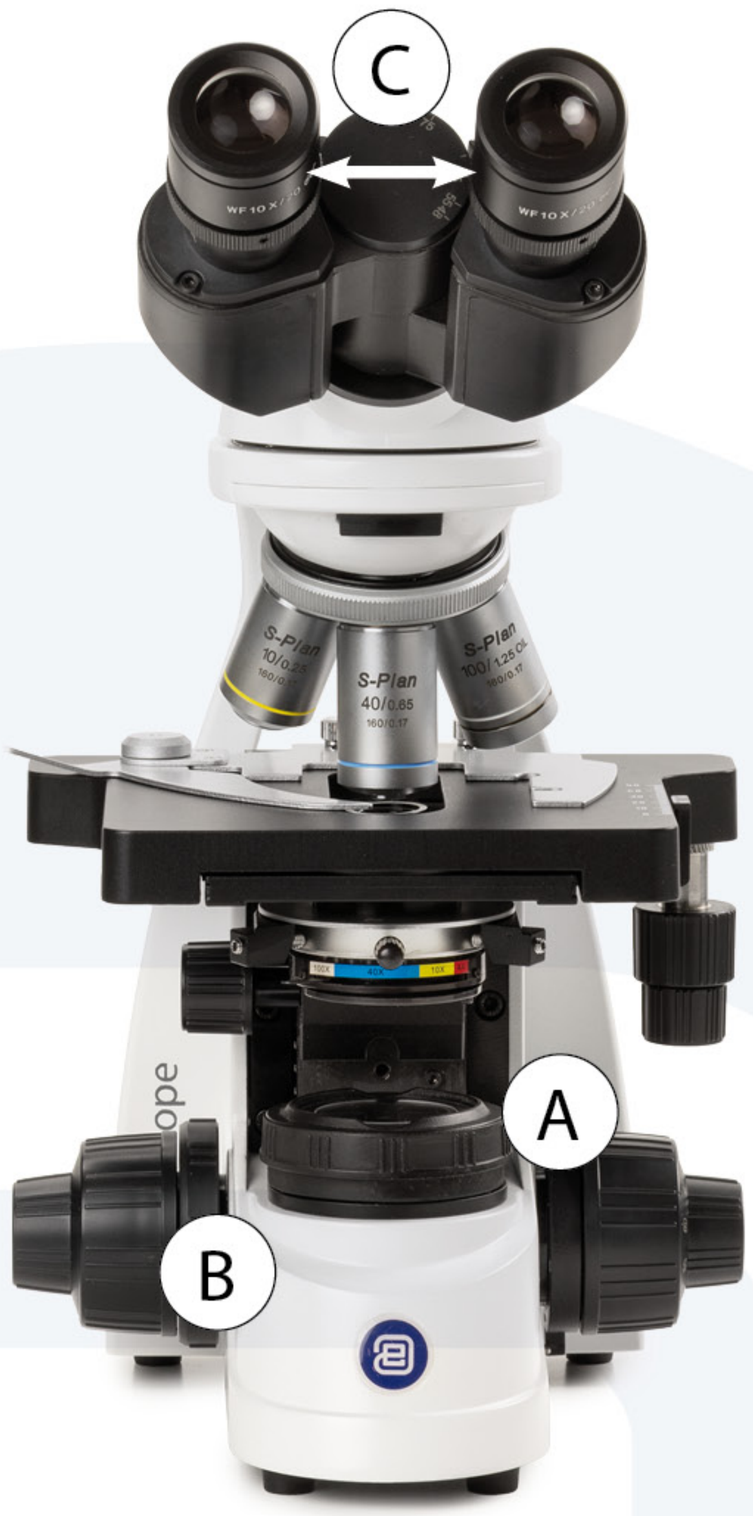
- Push the power button (B on previous page) once to turn on the microscope's illumination
- Push the power button again to switch the color of the light
- Push the power button again to turn off the light

6.2 Placing the specimen slide

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

6.3 Focusing and slide protection

- Select the 4x objective and make sure that it is placed correctly in the optical path
- Move the stage to the top by using the coarse adjustment knob and focus till the image appears
- Rotate the fine focusing knob to sharpen the image
- Repeat focusing with the other remaining objectives. Once the sample is precisely focused with the S100x objective, turn the stage just a little upwards without the objective touching the cover glass and lock the slide protection handle (A). This way the stage can no longer be moved upwards and the objectives and the sample can never be damaged during observation

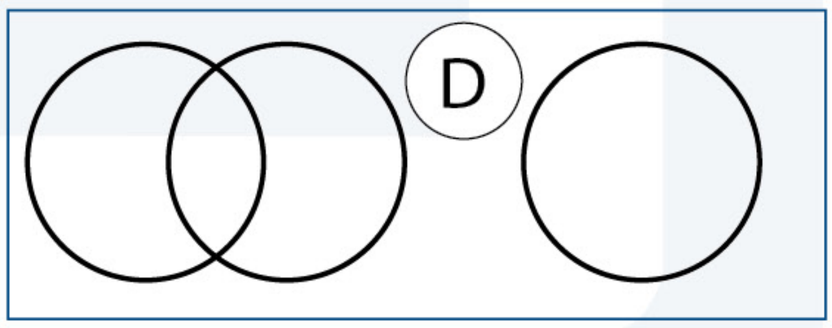


6.4 Adjusting the focusing tension

The tension of the focusing knobs can be adjusted (B). 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 out of its own, then you need to adjust the tension. To tighten the focusing knob (heavier), rotate the tension adjustment ring counter-clockwise. To loosen it, turn it in the clockwise direction

6.5 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



6.5.1 The interpupillary distance (C)

The correct interpupillary distance is reached when one round image is seen in the field of view (D). 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. The BlueScope’s swiveling eyepiece tube can be rotated 360º. You can select corresponding eye point height according to your own preference

6.5.2 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

6.5.3 Adjusting the diopter

In order to compensate for human eye differences, distortion, thickness differences in cover glasses and tune for the best parfocality between objectives, 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 10x objective, look for an interesting area on the specimen and focus on this area
- Select the S40x objective and focus on the specimen

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

- With your dominant eye open (close your other eye), rotate the diopter adjustment from "+" to "–" until the selected area gets as sharp as possible
- 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 eyepiece 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

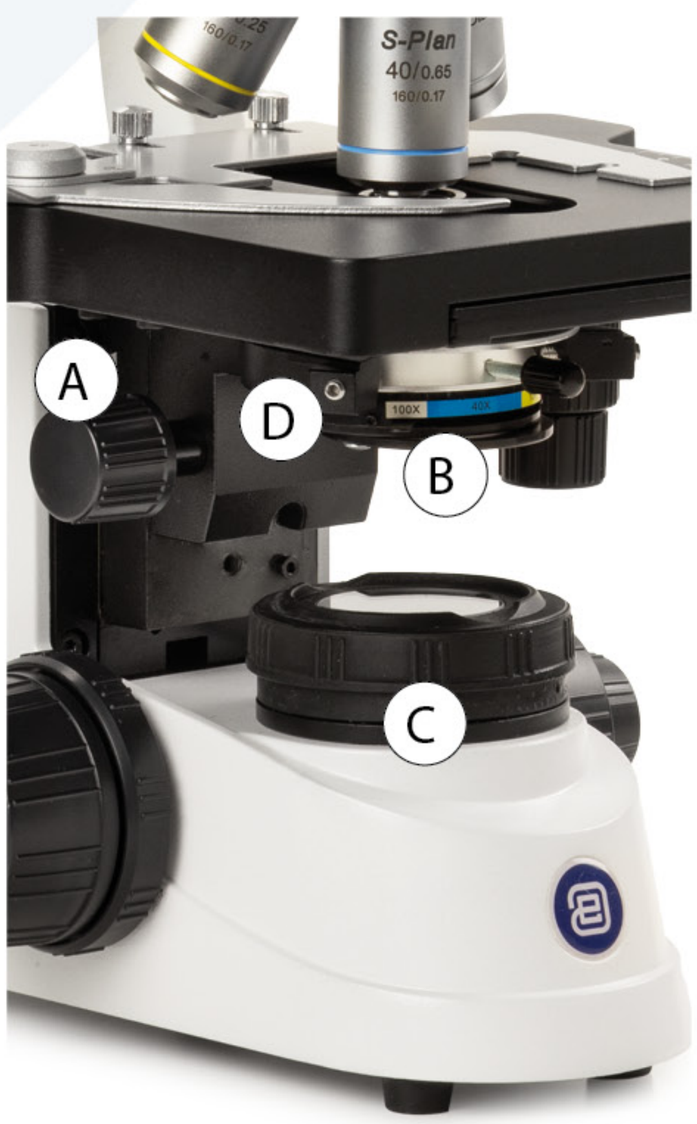
Verification:

- Take your eyes from the eyepieces and look for 2 seconds to a far point in the room in order to "reset" your eyes
- Look again into the eyepieces. If the adjustment is not good, repeat the operation till you reach the same sharpness for the 10x and S40x objective without touching the coarse and micrometric adjustments

6.6 Abbe condenser

Beneath the object stage an Abbe condenser N.A. 1.25 is mounted. The condenser can be adjusted in height by moving the rack and pinion knob (A) beneath the mechanical stage. By adjusting the condenser diaphragm (B) 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. Select the 10x objective and place it into the light path and focus the specimen
2. Close the field diaphragm (Köhler) completely with the adjustment ring (C)
3. Move the condenser downwards till it can be seen sharp through the eyepiece(s)
4. Adjust the image to the center of the field of view, using the Allen screwdriver on both sides of the condenser (D)
5. Open the field diaphragm (Köhler) completely with the adjustment ring (C)



6.7 The field Köhler diaphragm

By limiting the diameter of the beam entering the condenser, the field diaphragm (C) can prevent other light from entering and increase the image contrast. When the image is just on the edge of the field of view, the objective will show the best performance and obtain the clearest image. The diaphragm is factory pre- centered

6.8 Adjusting the aperture diaphragm

- The aperture (condenser) diaphragm (B) is used to select the numerical aperture (N.A.) 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
- When contrast is low, adjust the aperture diaphragm to optimize contrast and resolution (resolving power). The color code on the condenser indicates the region for each objective to adjust the aperture diaphragm

6.9 Use of the S100x oil-immersion objective

The Euromex BlueScope microscopes are equipped with an S100x N.A. 1.25 oil immersion objective. Please follow the instructions below 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. Turn the revolving nosepiece so the S100x objective almost reaches the click-stop
4. Put a small drop of immersion oil on the center of the slide (use Euromex immersion oil)
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

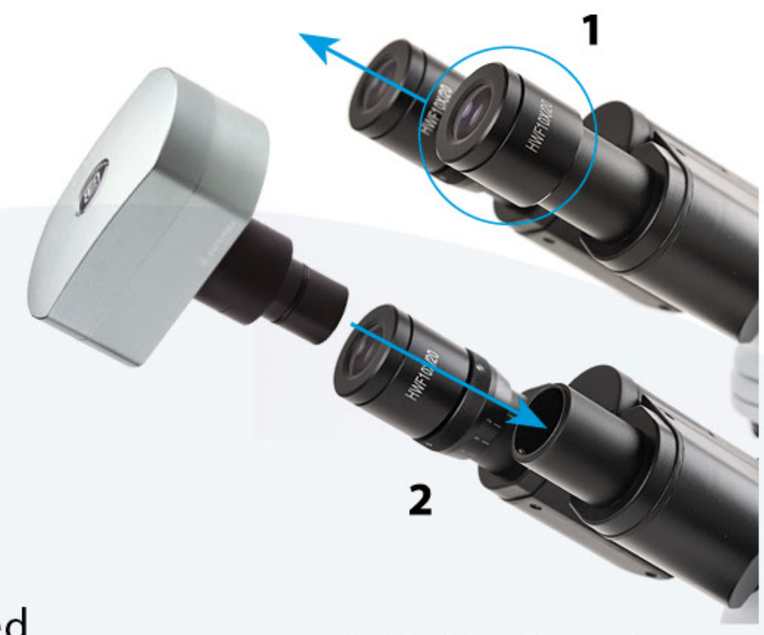
Note: The distance between the lens of the objective and the slide is very small!

8. 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
9. 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 Euromex lens paper and isopropanol
10. Clean the slide after use as well

6.10 Illumination BlueScope series

The illumination has the following specifications:

- Dual LED : 3W Dual LED for monocular models
  : 3W Dual NeoLED™ for binocular and trinocular models
- Power supply : Primary AC 100 - 240 Volt-50Hz.



7. Digital models and cameras

7.1 Digital models

Digital models are equipped with a built-in digital camera. Connect the supplied USB cable to camera and follow the dedicated manual for software installation and camera operation

7.2 Digital 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

Binocular

For using the camera on a binocular BlueScope, 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

Trinocular

Standard BlueScope models

For standard trinocular models, slide the camera with the mounted C-mount adapter into the 23.2 mm photo tube **(C).** Focus the image through the microscope's eyepieces. To focus the camera, release ring **(A)** and slowly move tube **(B)** up and down while observing the image on the screen. Secure the tube and camera after focusing.



BlueScope PLAN IOS models (BL.1153-PLi)

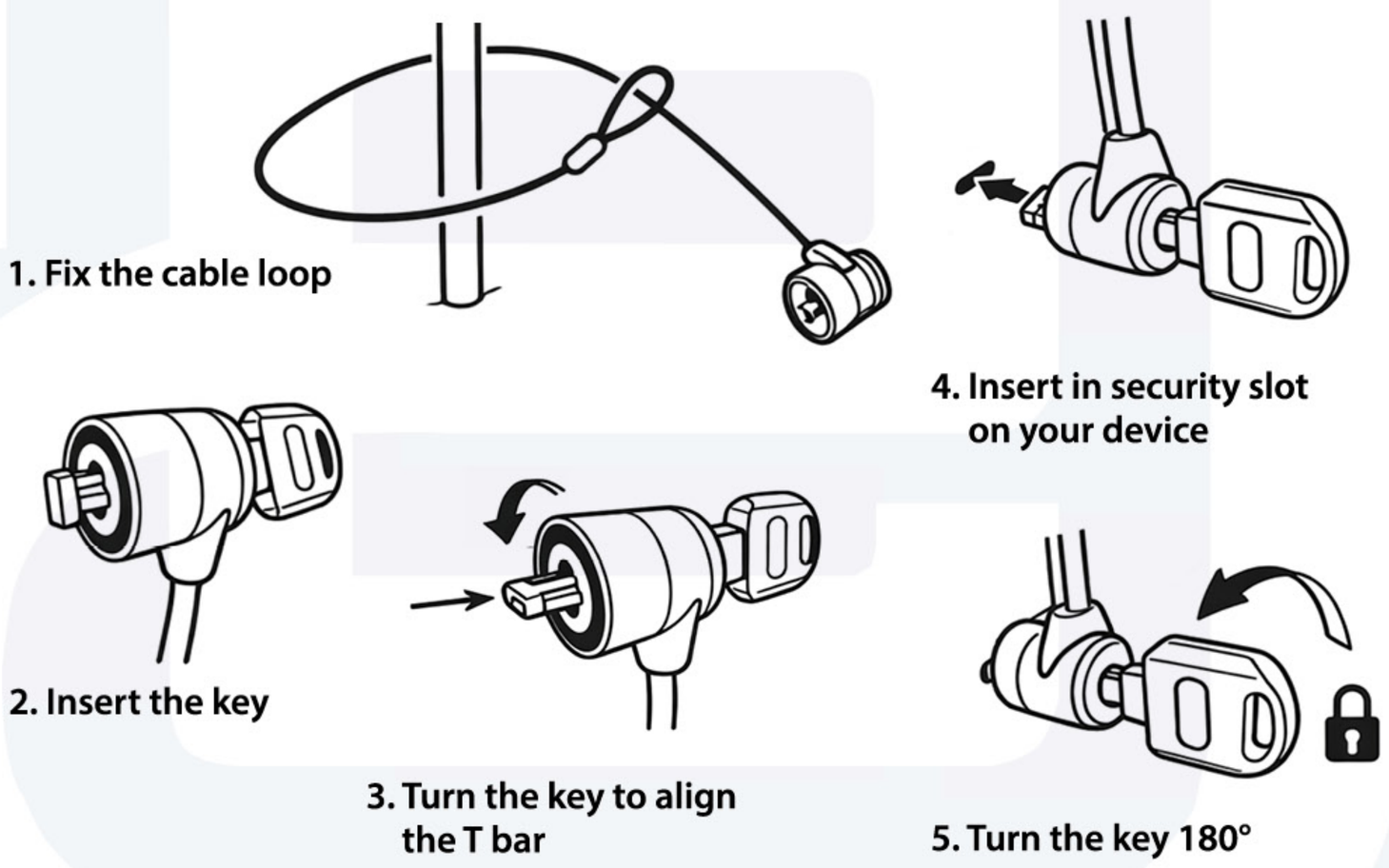
PLAN IOS trinocular models are supplied with a standard 0.5x C-mount camera port **(A)**. Mount a compatible digital camera directly onto the C-mount port and secure it properly. Focus the specimen through the microscope's eyepieces and check the camera image on the screen. For cameras requiring a different adapter, an optional 0.35x C-mount adapter (BL.9835) or universal 23.2 mm photo tube (BL.5120) is available.

Note: *Always select the appropriate camera adapter according to the camera specifications*

BL.1153-PLi

8. Using the Kensington security slot

At the backside of the microscope a Kensington security slot is placed, which can be used to secure the instrument from theft using a Kensington lock (not supplied)





9. Maintenance and cleaning

Always place the dust cover over your BlueScope microscope after use. Always keep the eyepiece and objectives mounted on the microscope to avoid dust entering the instrument

9.1 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 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 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!*

9.2 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. The bearings can be lubricated with a drop of sewing-machine oil.

10. Accessories and spare parts

For current accessories and spare parts, please visit our website www.euromex.com.
Optional accessories for BlueScope PLAN IOS models:

BL.5120 Universal 23.2 mm photo tube
BL.9835 C-mount adapter 0.35x
BL.9850 C-mount adapter 0.5x

Please ensure that the selected accessory is compatible with your microscope and camera.

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All information may be changed without prior notice *v.631221*