



Introduction

Thank you for purchasing the Euromex Delphi-X Observer

The Delphi-X Observer series has been designed with all kind 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. An ideal microscope for daily cytology and anatomic pathology use. The 25 mm field of view of the eyepieces and the plan apochromatic objectives enable observations with perfect color rendering at high resolving powers. 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 save 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

Contents

General safety instructions	3
Dangers associated with the operation	3
Photobiological safety LED, important safety instructions	3
Prevention of biological and infectious hazards	3
Disinfection and decontamination:	4
Configuration, construction and controls	6
Assembling Delphi-X Observer	8
Operation	12
Placing the slide	12
Adjusting tension of X and Y axis control knobs	12
Switching between light sources	12
Getting the specimen in focus	12
Adjusting the coarse focus tension	13
Setting the focus lock	13
Switching the fine focus knobs	13
Adjust interpupillary distance	13
Adjust diopter of the eyepieces	14
The correct eye point	14
Select eyepiece and camera light throughput	14
Centering the condenser	15
Using the aperture diaphragm	15
Using LED WITH frosted filter	16
Using HALOGEN WITH LBD, ND 6 and ND25 filters	16
iCare sensor	16
Replacing the fuse	16
Cleaning optics	17
Troubleshooting	18
Phase Contrast Installation and Alignment	20
Notes	22

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

Intended use as in vitro medical device class A (Regulation (EU) 2017/746)

The models labelled with suffix /MD may be used as in vitro medical device and are intended for observation and diagnostics of cells and tissues in hospitals or by physicians in private practice in pathology, anatomy and cytology applications. To be used with transmitted/reflected illumination and with the specimen fixed on a slide. Physicians use microscopes to identify the different types of cells and spot abnormal cells. This product helps in identifying and treating diseases

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

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 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, 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
- 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

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 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

Model with rechargeable batteries

- Always disconnect the power cord from the microscope before you replace the rechargeable batteries
- The rechargeable batteries must not be thrown away as regular trash but should be taken to special waste collection sites, according your local or national regulations
- Risk of explosion: when removing the rechargeable batteries, do not throw the batteries into fire or any other heat source
- Do not replace the rechargeable batteries with non-rechargeable batteries
- Avoid extreme environmental conditions and temperatures which could affect the rechargeable batteries and lead to fire, explosion or leakage of hazardous substances
- If the rechargeable batteries have leaked, avoid contact of the chemicals with skin, eyes and mucous membranes
- When in contact with the chemicals, flush the affected areas immediately with plenty of fresh water and seek medical attention

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

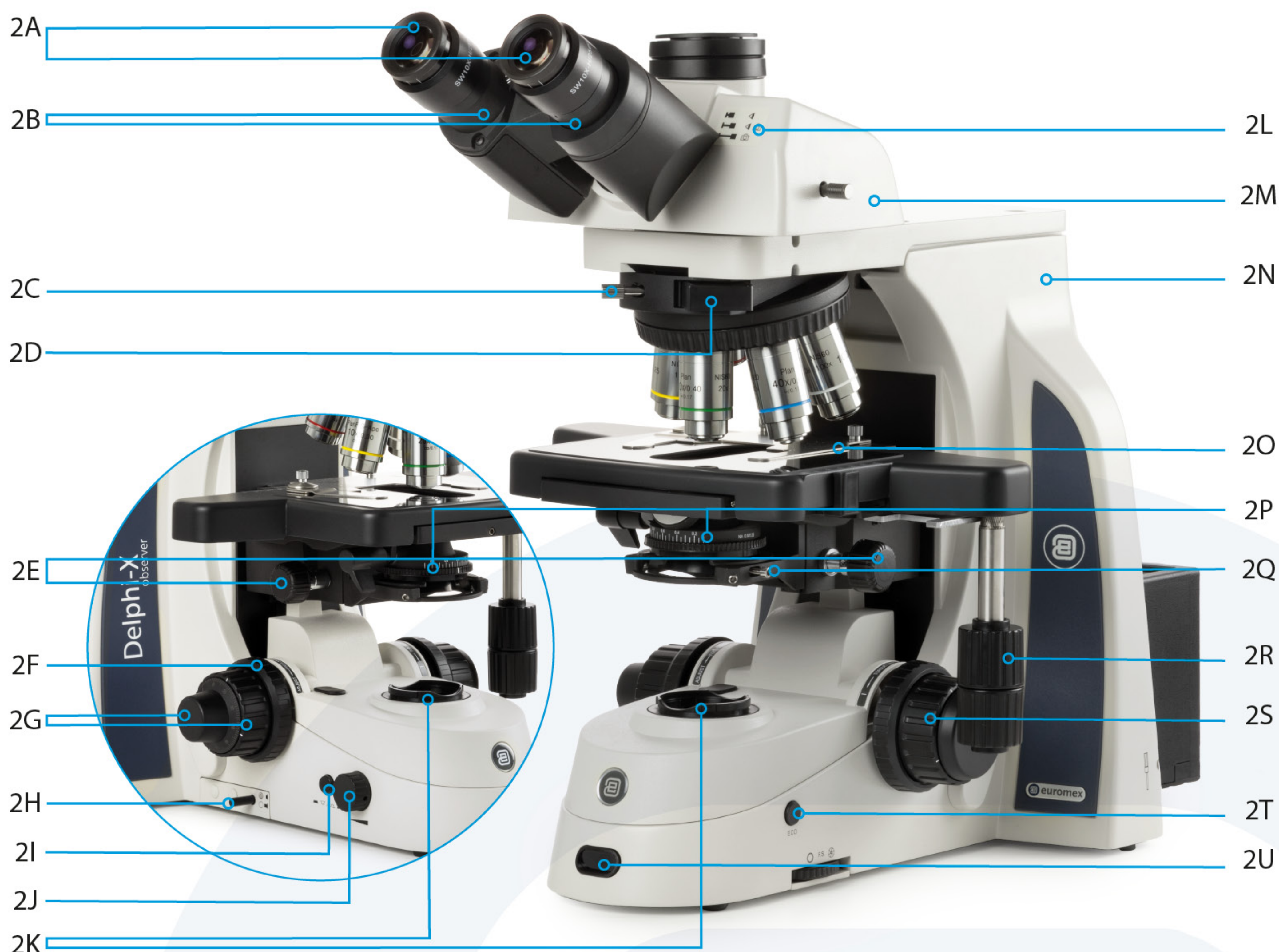
Configuration, construction and controls

This chapter describes the main parts and functions of the Delphi-X Observer



1A	Photo port	1J	Lamp housing unit fastening screw
1B	Optical light path selector	1K	Excess cable storage
1C	Nosepiece	1L	Allen wrench tool
1D	Objectives	1M	Lamp housing unit
1E	Stage	1N	On/off switch
1F	Coaxial control X-Y stage movement	1O	Power socket and fuse holder
1G	Coarse and fine focusing control knobs	1P	Lamp housing unit plug
1H	Tension control knobs	1Q	Power connector (not used)
1I	Field diaphragm adjustment wheel	1R	External grounding rod

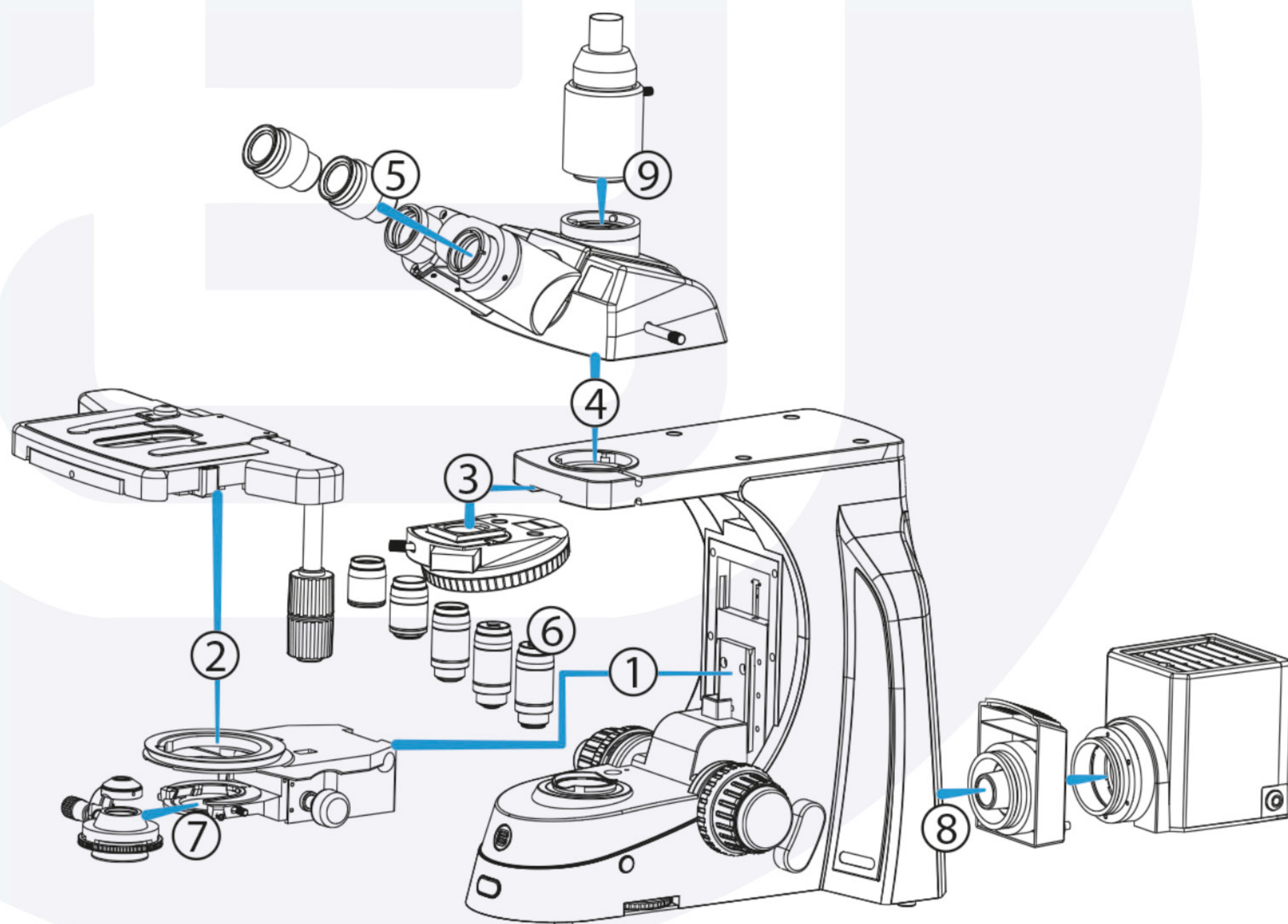
Configuration, construction and controls



2A	Eyepieces	2L	Label for selecting light path of photo tube
2B	Eyepiece tubes	2M	Head
2C	Screw for fixing extension slot	2N	Main body
2D	DIC extension slot	2O	Slide holder
2E	Condenser height control knob	2P	Condenser
2F	Focusing lock	2Q	Condenser centering screw
2G	Coarse and fine focusing control knobs	2R	Coaxial control X-Y stage movement
2H	Filter selector	2S	Coarse and fine focusing control knobs
2I	Light selector	2T	iCare on/off button
2J	Light intensity control knob	2U	iCare sensor
2K	Collector lens		

Assembling Delphi-X Observer

This chapter describes the steps that need to be taken to assemble the Delphi-X Observer microscope. Euromex Microscopes will always try to keep the number of assembly steps for their customers as low as possible but there are some steps that need to be taken. The steps mentioned on the following pages are not always necessary but described for your convenience nonetheless:

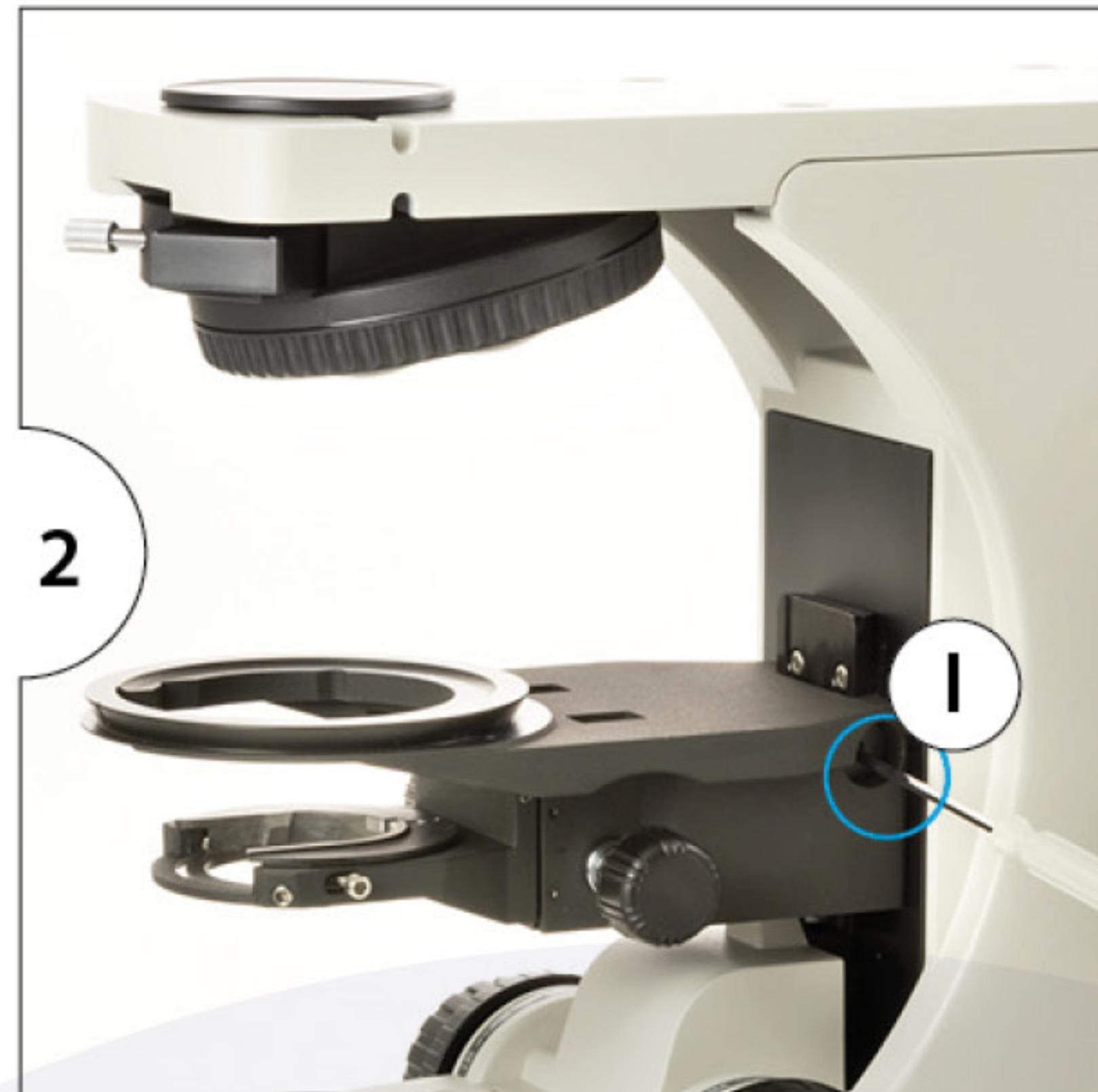


The diagram shows the order of each component's installation

Step 1	Attaching the focus cassette	Step 5	Placing the eyepieces
Step 2	Attaching the mechanical X/Y stage	Step 6	Mounting the objectives
Step 3	Attaching Nosepiece	Step 7	Placing the condenser
Step 4	Placing the microscope head, C-mounts and photo ports	Step 8	Attaching the LED lamp chamber
		Step 9	Attaching the phototube

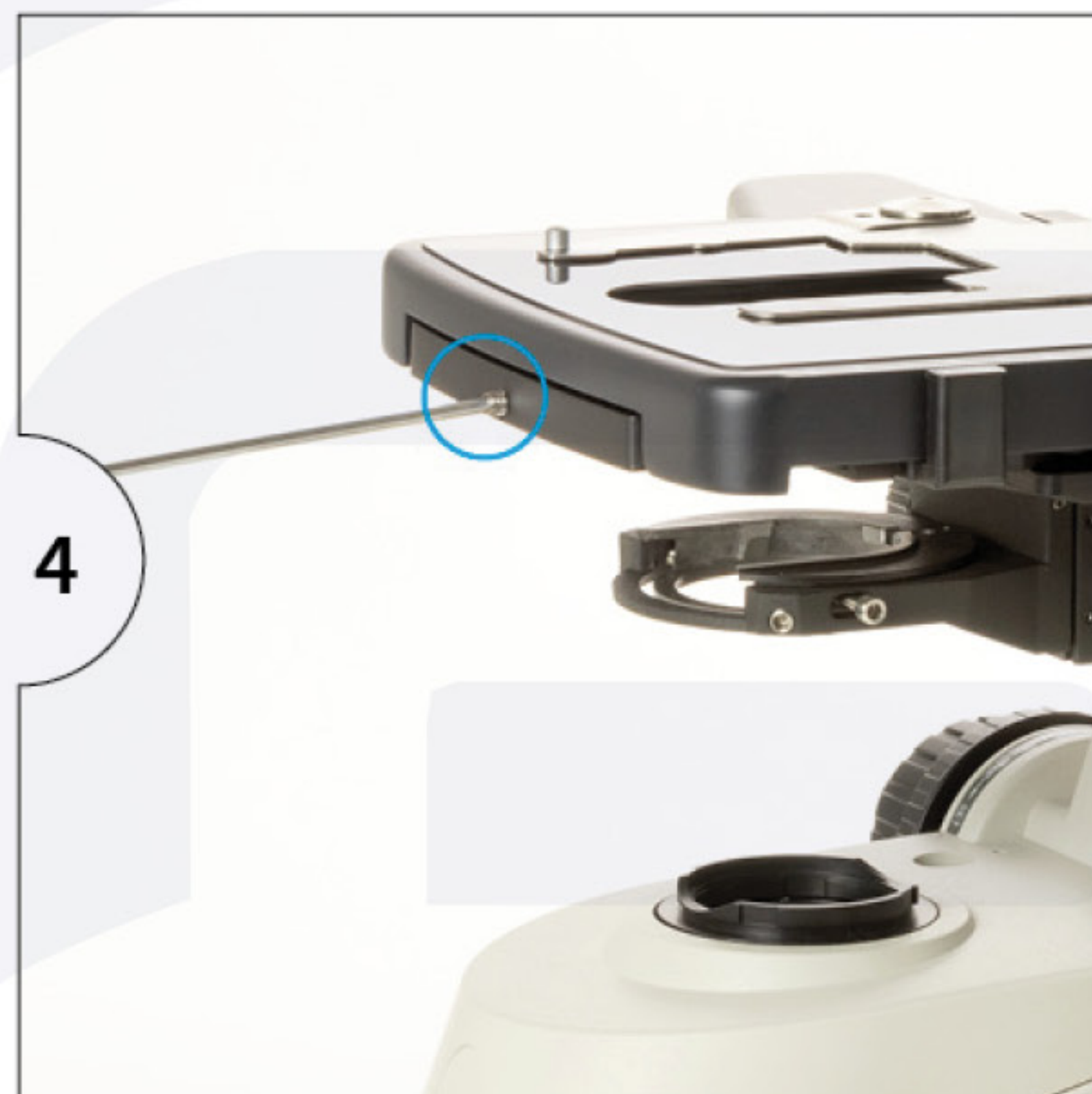
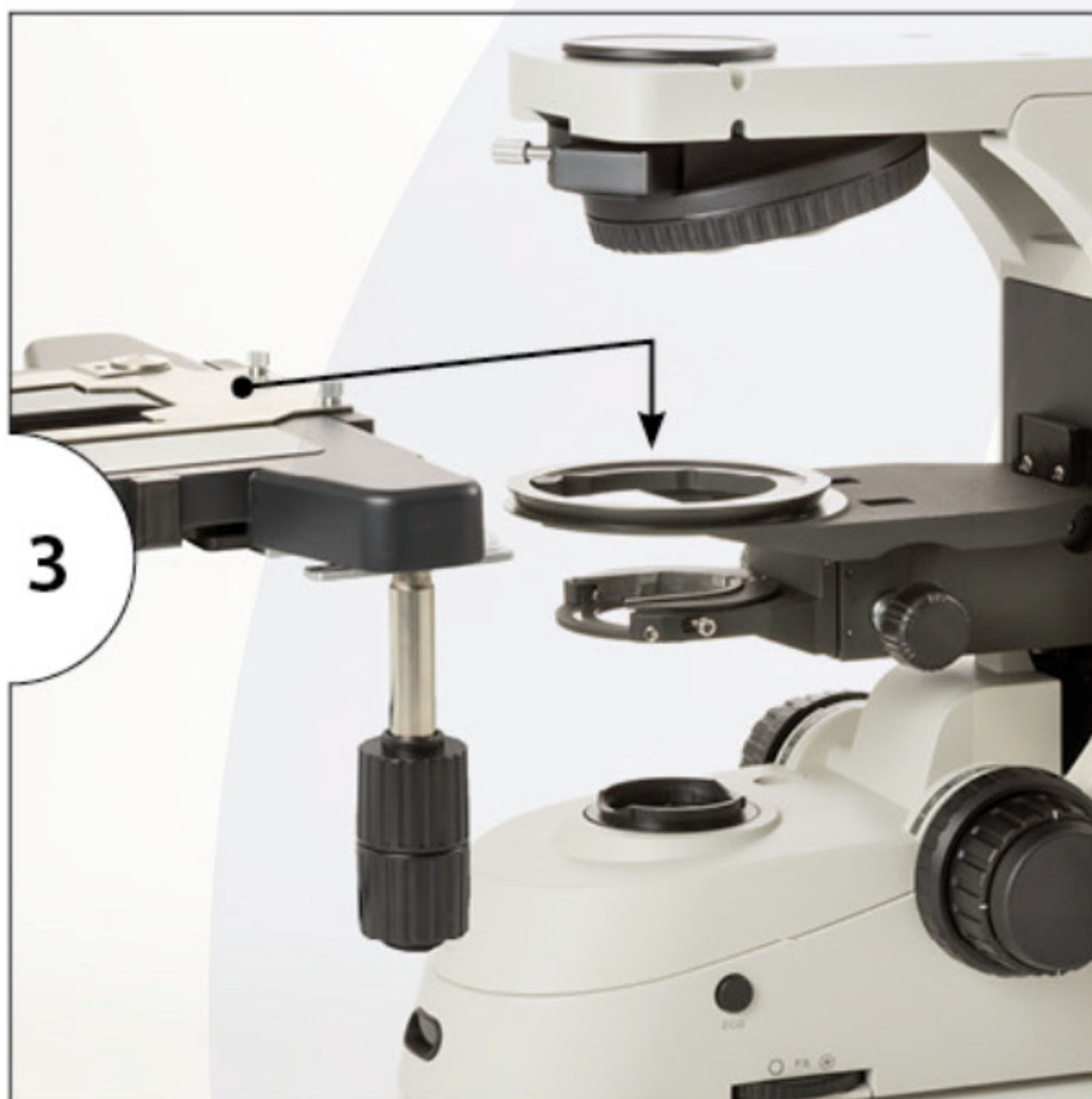
Step 1 | Attaching the focus cassette

- Attach the focus cassette according to the path shown in figure 1
- The dovetail slot needs to be aligned with the slot of focusing cassette
- Slide it down until it reaches the locking pin
- Then use the hex wrench tool to tighten the screw shown as I (in figure 2)



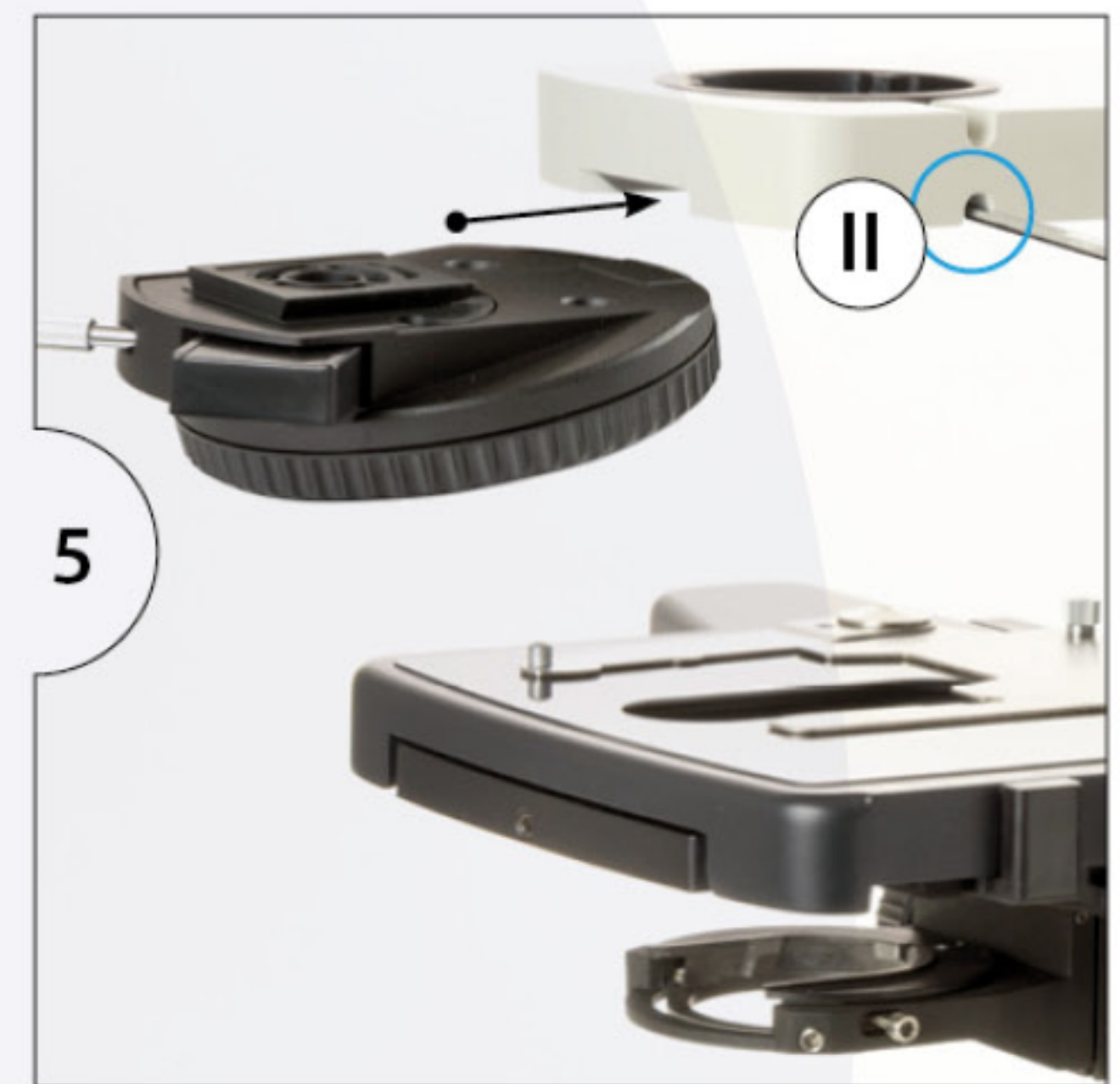
Step 2 | Attaching the mechanical X/Y stage

- Turn the coarse focus knob until the elevating section is brought to the lowest position
- Attach the mechanical object stage according figure 3 by aligning the stage above the ring of the focus cassette
- Fix the mechanical stage into place with screw (figure 4)



Step 3 | Attaching Nosepiece (figure 5)

- Slide the nosepiece into the slot
- Fix into place with screw (II)



Step 4 | Placing the microscope head (figure 6)

- Place the head by loosening the screw (III)
- Mount the head in its position inside the microscope arm
- Secure it by tightening the screw again



Step 5 | Placing the C-mount or photo port, onto the microscope head (figure 7)

- loosen the screw (IV)
- Place either the C-mount or photo port and tighten the screw



Step 6 | Placing and mounting the eyepieces (figure 8)

- First remove the dustcover of eyepiece tubes
- Insert the eyepieces into the eyepiece tubes



Step 7 | Placing the condenser (figure 9)

- Use the condenser height control knob (V) to lower the condenser holder to the lowest position
- Insert the condenser into the holder as shown in figure 9
- Then secure the condenser by fixing the screw indicated
- Centering the condenser is described later in this manual



Step 8 | Attaching the LED Lamp HOUSING UNIT (figure 10A)

- Slide the lampunit (Halogen or LED) into position at back of microscope base
- Use the wrench screw tool to secure bolt (VI)



Step 9 | Connecting the power cord

The Delphi-X Observer microscopes support a wide range of operating voltages: 100 to 240 V. **Please use a grounded power connection**

- Make sure the power switch is off before connecting.
- Insert the connector of the power cord into the Delphi-X Observer power socket (figure 10B), and make sure it connects well
- Insert the other connector into the mains socket, and make sure it connects well
- Put the power switch to ON



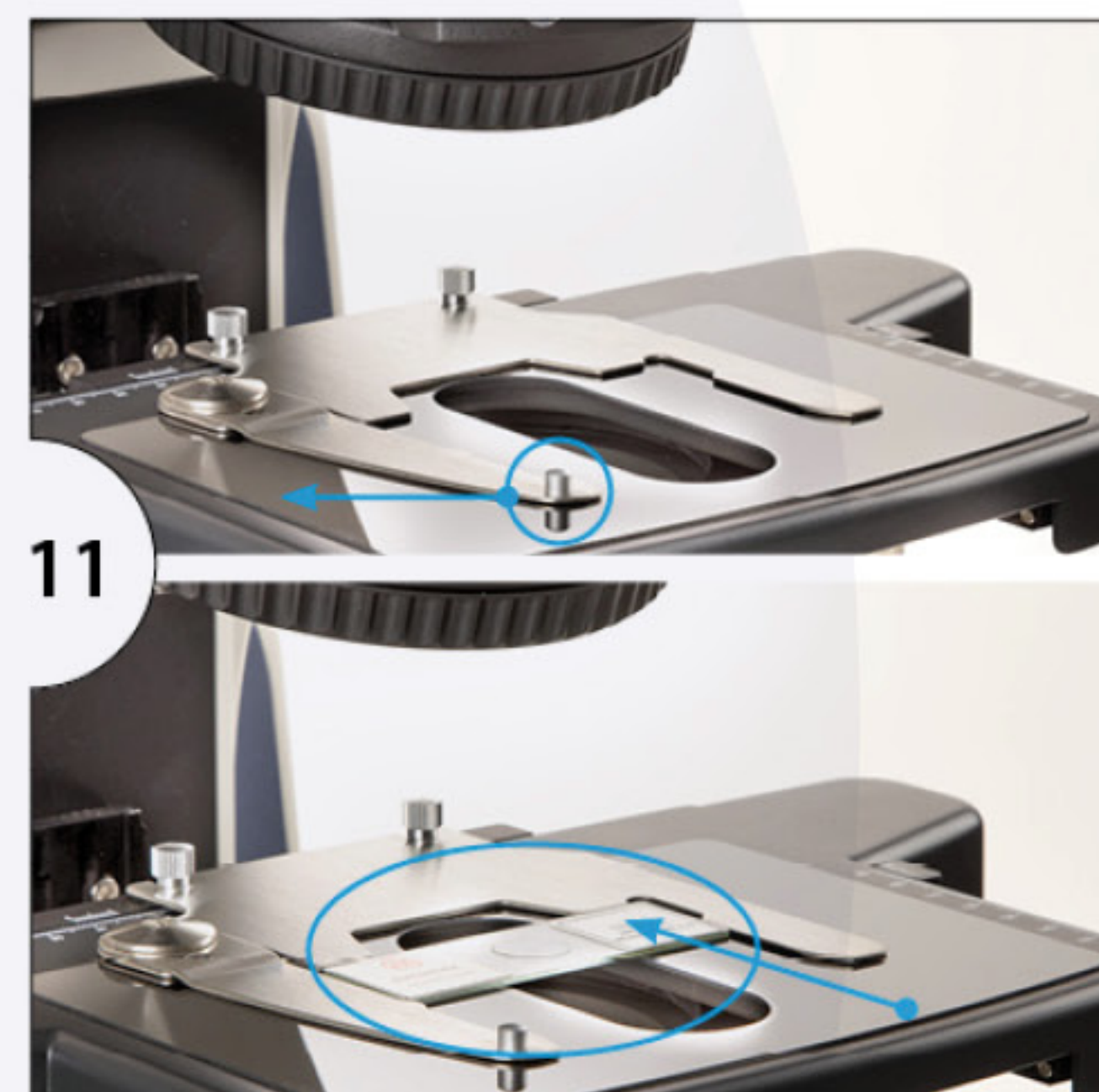
Do not bend or twist the power cord, it will get damaged. Use the special cord supplied by Euromex. If it is lost or damaged, choose one with the same specifications

Operation

Placing the slide

(figure 11)

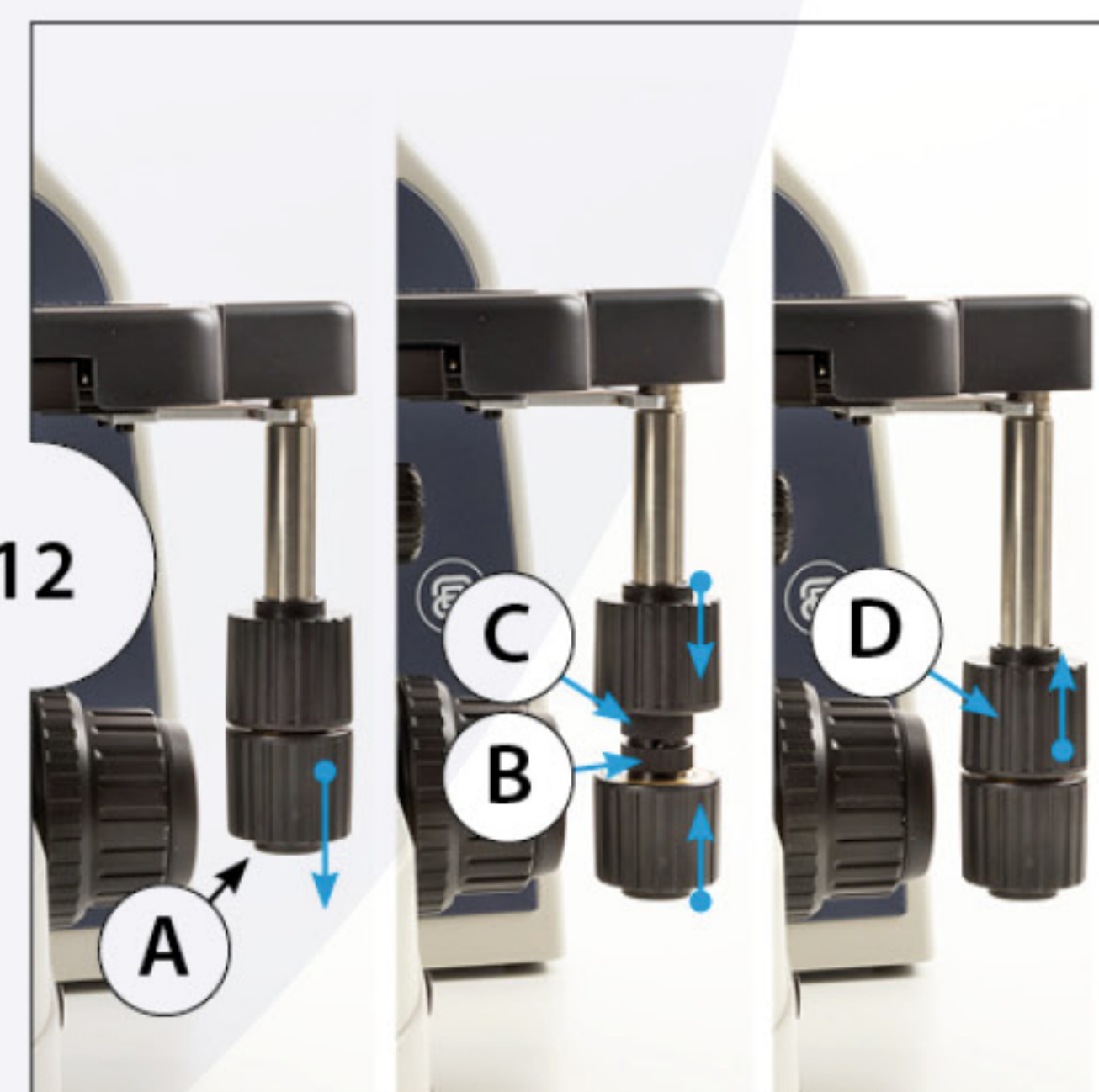
- Lower the condenser slightly from the uppermost position by turning the condenser focus knob
- Open both aperture and field diaphragm entirely
- Bring the 4x objective (or lowest objective in your configuration) into the optical path by rotating the nosepiece until the right objective clicks into position
- Pull back the spring clamp of the specimen holder and gently place the slide into position
- Gently release pressure from the spring clamp so it softly moves back in position securing the slide
- Use the X and Y axis control knobs of the mechanical stage to move to area of interest of the slide into the light path



Adjusting tension of X and Y axis control knobs

(figure 12)

- The degree of tension on the X and Y axis control knobs can be adjusted
- To do that, draw down hand wheel (A) and find two adjusting rings (B,C)
- By rotating these rings the movement of the knobs can be set lighter and heavier
- Ring B is used for adjusting the X direction
- Ring C is used for adjusting the Y direction

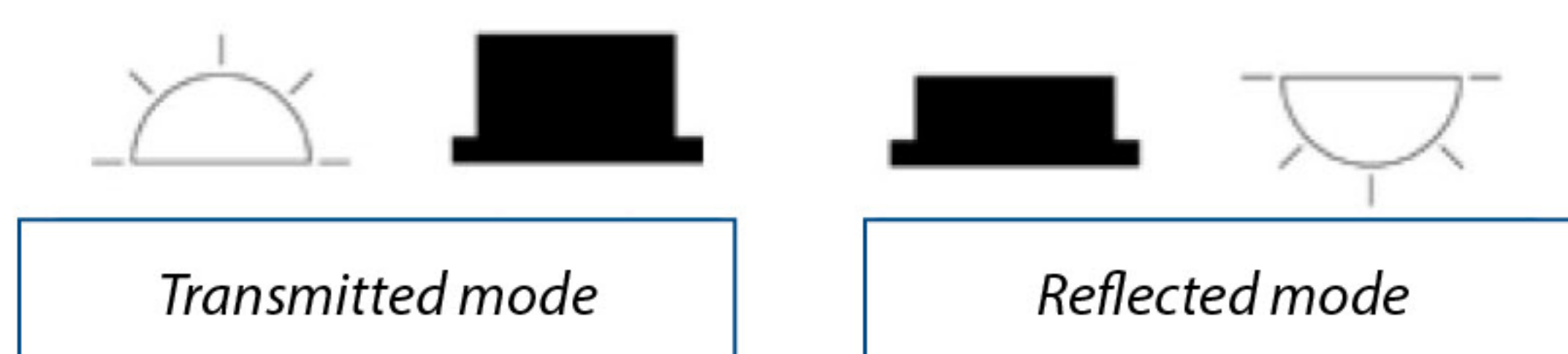


Switching between light sources

(figure 13)

Next to the intensity controller there is a button for switching between transmitted and reflected illumination. The standard brightfield configuration used for this manual does not have this option

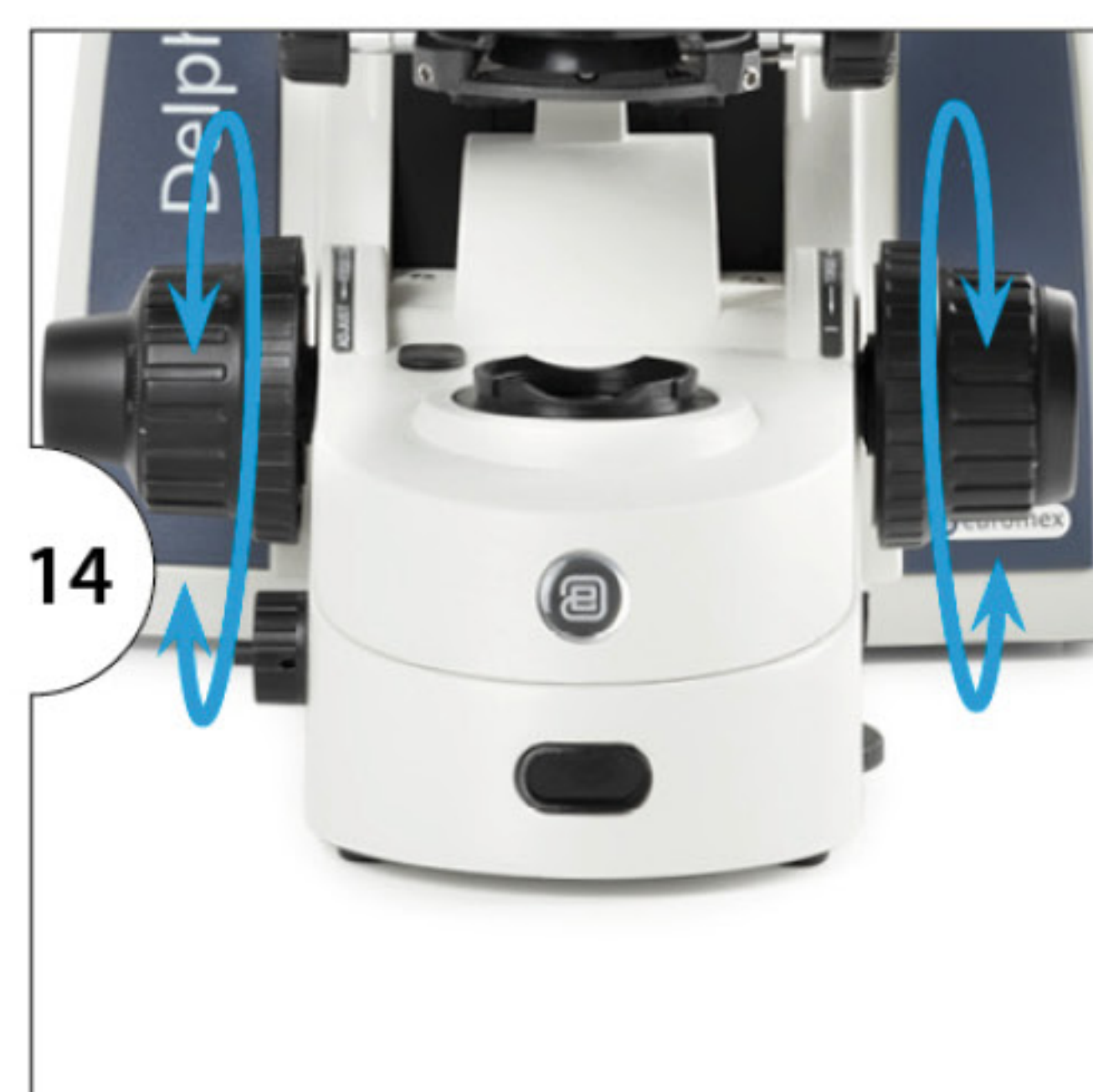
- When the button is pushed in, the light is set to reflected mode
- When the button is pushed out, the light is set to transmitted mode (standard)



Getting the specimen in focus

(figure 14)

- Use the coarse control knobs to adjust the focus quickly and roughly
- Get the specimen into sight through the eyepieces
- Then use the fine focus control knob to adjust the focus in detail



Adjusting the coarse focus tension

(figure 15)

Next to the right side coarse focus knob there is a ring for adjusting the coarse focus tensions. This can be used to make the coarse control move lighter or heavier, according to user preference.

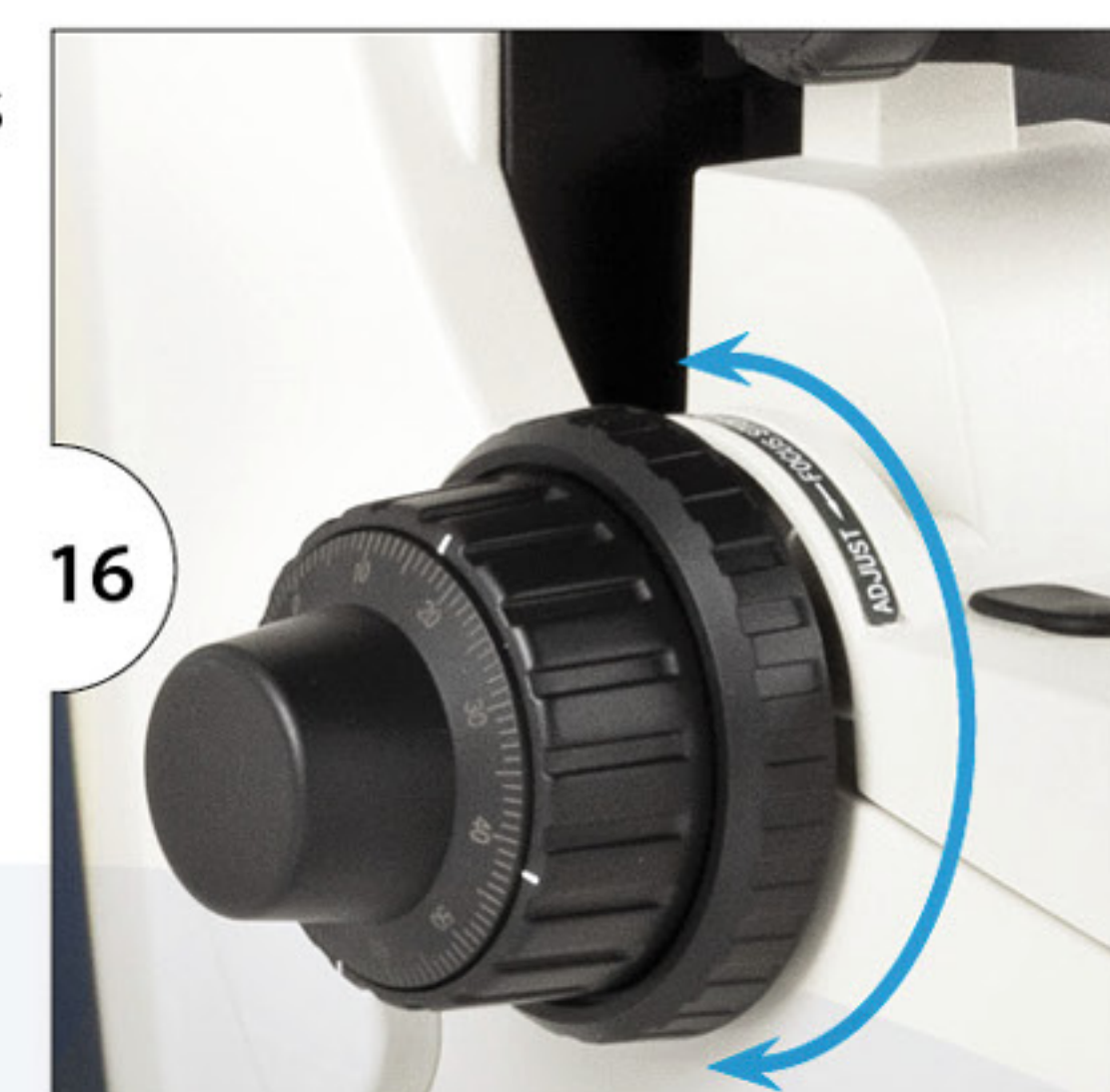


Setting the focus lock

(figure 16)

Next to the left side coarse focus knob there is a ring setting the focus lock. The focus lock can be used to limit the maximum position of the stage at a certain height. This is ideal for preventing objectives to get damaged, slides from breaking or to set the stage at a reference height.

- Move the stage to the desired height then fix the ring tight to lock the mechanical stage's maximum height
- The stage still can be lowered but the highest position is now limited to the set position
- Release the ring to undo the focus lock



Switching the fine focus knobs

(figure 17 and 18)

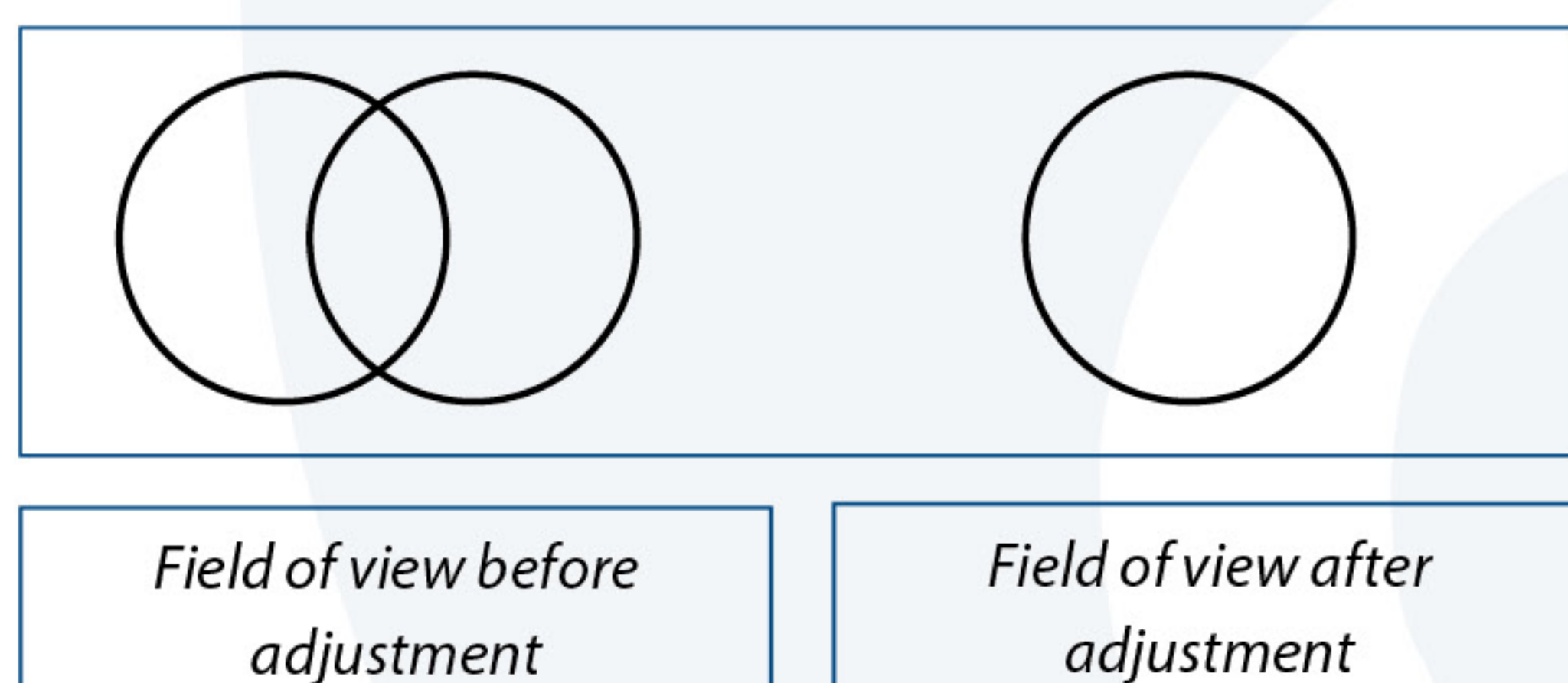
The fine focus knobs can be switched from left to right to meet user preference.

- Pull the knobs with moderate force to release the magnet which is holding the knobs onto the stand
- Attach the magnets onto the holder and let it grab the knobs again to mount them onto the holder



Adjust interpupillary distance

The Delphi-X Observer has an interpupillary distance range of 47 to 78 mm. The correct interpupillary distance is reached when one round image is seen in the field of view.



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 this should be set individually. When more users are working with the microscope it is recommended to remember your interpupillary distance for a quick setup during new microscopy sessions.

Adjust diopter of the eyepieces

(figure 19)

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 40x 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 40x objective without touching the coarse and micrometric adjustments



The correct eye point

(figure 20)

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

Select eyepiece and camera light throughput

(figure 21)

The Delphi-X Observer gives users the option to select out of three output types, giving large flexibility when using cameras. The push/pull rod on the side of the microscope head can be set to 3 positions:

POSITION 1 | The optical light path is sent to the eyepieces only. Ideal for when no camera is used

POSITION 2 | The optical light path is sent to the eyepieces for 20% only. Ideal standard setting for when a camera is used

POSITION 3 | The optical light path is sent to the camera only. Ideal for when camera is used at low light imaging

These positions are indicated on the head as well for user convenience

Icon	Action	Eyepiece / camera
	Push rod in completely	100 / 0
	Pull rod towards the middle	20 / 80
	Pull rod out completely	0 / 100

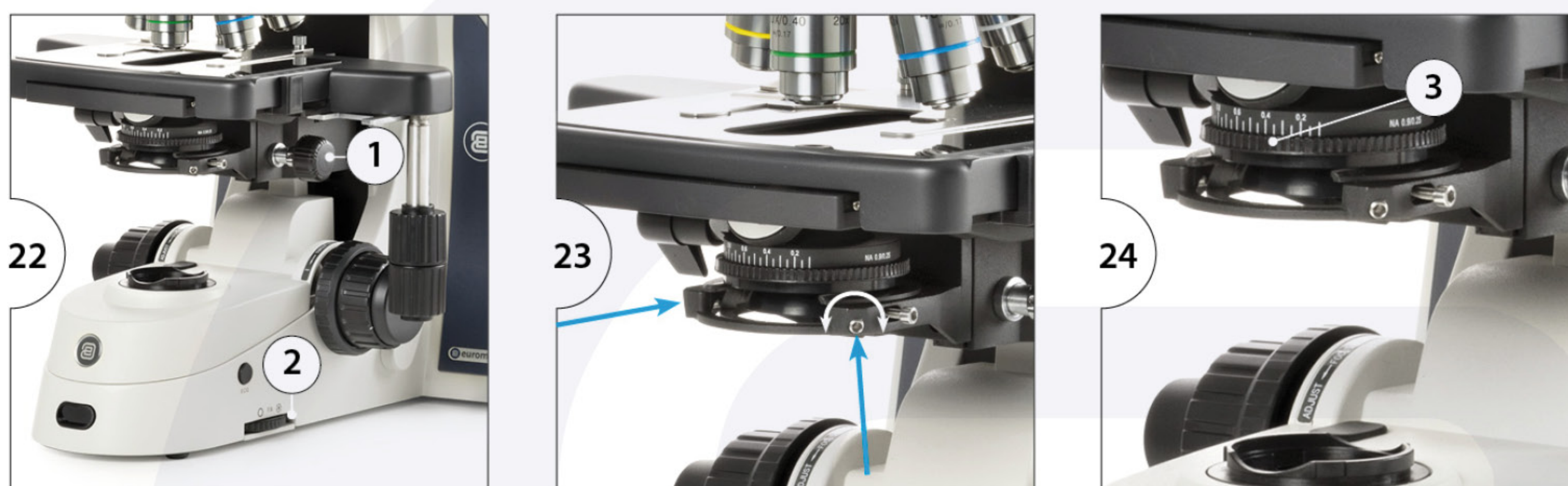
Centering the condenser

(figure 22)

- Move the condenser to the top position (1)
- Focus on a specimen using the smallest objective (f.e. 4x or 10x objective)
- Close the field diaphragm (2)*
- Use screws (figure 23) to move the field diaphragm into to view center
- Open the field diaphragm carefully to the outside of the field of view to ensure the field diaphragm is in the center and so the condenser has been centered properly

* The iris can only be closed in brightfield position, in the phase or DIC position the iris is blocked from closing for best image quality

Using the aperture diaphragm



The aperture diaphragm (figure 24/3) should be used to adjust the numerical aperture, not to adjust image brightness. When the aperture diaphragm is opened to the 70 ~ 80% of objective aperture the ideal position is reached

The simplest way to do this is to use the markings on the condenser

Example: when a 40x objective with N.A. 0.65 is used, one can set the condenser to 70 – 80% of 0.65 which is 0.45 to 0.58

Using LED WITH frosted filter

(figure 25)

For LED models there is only 1 push button

- Push the button in for placing the frosted filter into the light path

LED version with frosted filter



Using HALOGEN WITH LBD, ND 6 and ND25 filters

(figure 26)

The halogen version has three filter options:

1. LBD is a filter for increasing color temperature
2. ND25 is a filter with 25% light transmittance
3. ND6 is a filter with 6% light transmittance

Halogen version with LBD and two ND filters



iCare sensor

(figure 27)

The unique iCare Sensor is developed to avoid unnecessary loss of energy. The illumination of the microscope automatically switches off shortly after the user steps away from his or her position

- Pushing the iCare button will re-activate the light
- The iCare function is turned on by default
- To turn off the iCare function push the iCare button for 4 seconds
- The function will be deactivated and the bright LED will dim to indicate the function has been turned off
- Repeating this step will turn the function back on



Replacing the fuse

(figure 28)

The fuse is placed in a drawer

- To open it push the drawer aside with a screwdriver
- Take out the drawer and replace the fuse gently



Cleaning optics

How to keep the optics clean?

Dust and dirt particles have a negative affect on the image quality. Keeping the optical system of your microscope clean is essential for the best image quality and overall lifetime of your microscope. Dust and dirt on optical elements such as lenses, prisms and filters that are left unattended can become difficult - or even impossible - to remove and may cause mold

FIGURE A |

- Place your objective or eyepiece on a secure location
- Objectives can be screwed into the cover of an objective case
- Eyepieces can be placed in the microscope box
- Condensers and collector lenses can remain in place in the microscope

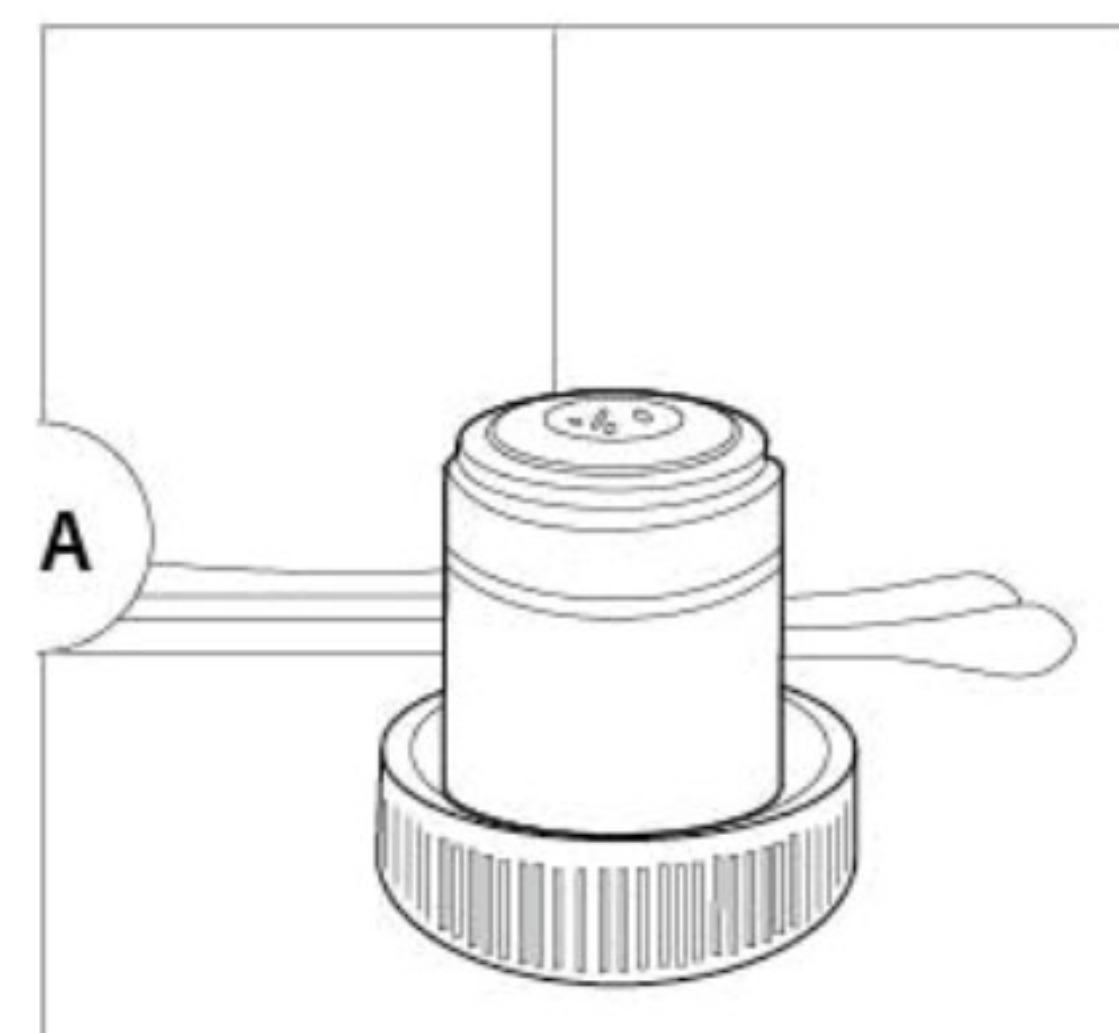


FIGURE B |

- To prevent scratches on coatings and optical glass try to remove dirt and dust that sticks to the optical surface first with an air-blower or with pressurized dry air (oil-free and under moderate pressure version only)

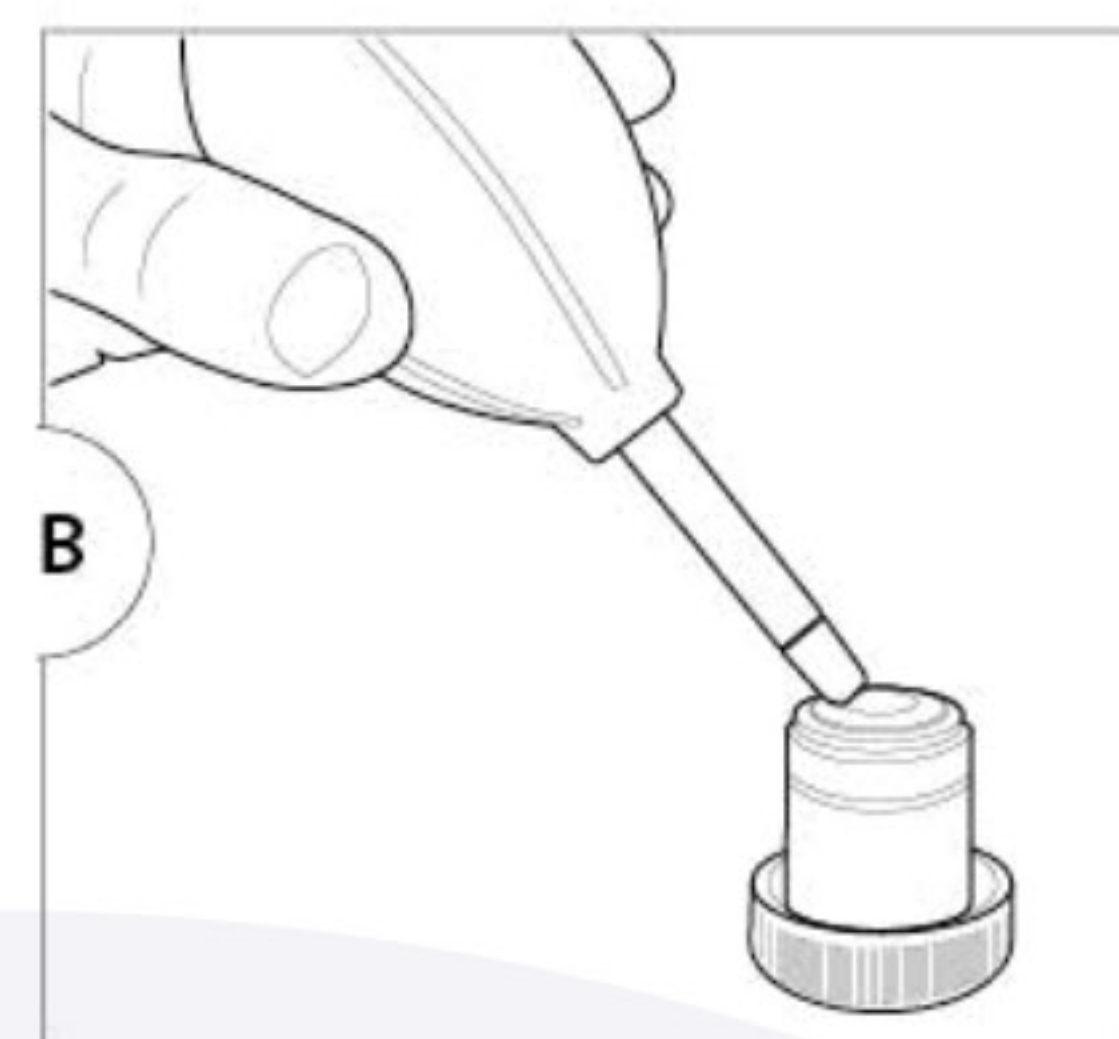


FIGURE C |

- Use an absorbent lens paper or cotton swap.
- Dampen a swap or towel with a small amount of lens cleaning fluid or cleaning mixture (either pure iso-propanol or a mixture of 7 parts ether and 3 parts alcohol)



FIGURE D |

- Clean the lens by using the tip of the cotton swap or the lens paper. Use enough lens paper so that solvents do not dissolve oils from your hands which can make their way through the paper on to the coated surface
- When cleaning a large lens surface, wipe with little pressure from the centre towards the periphery in a circular motion. **Do not use zig-zag motion**
- Discard each lens paper or cotton swap after a single use

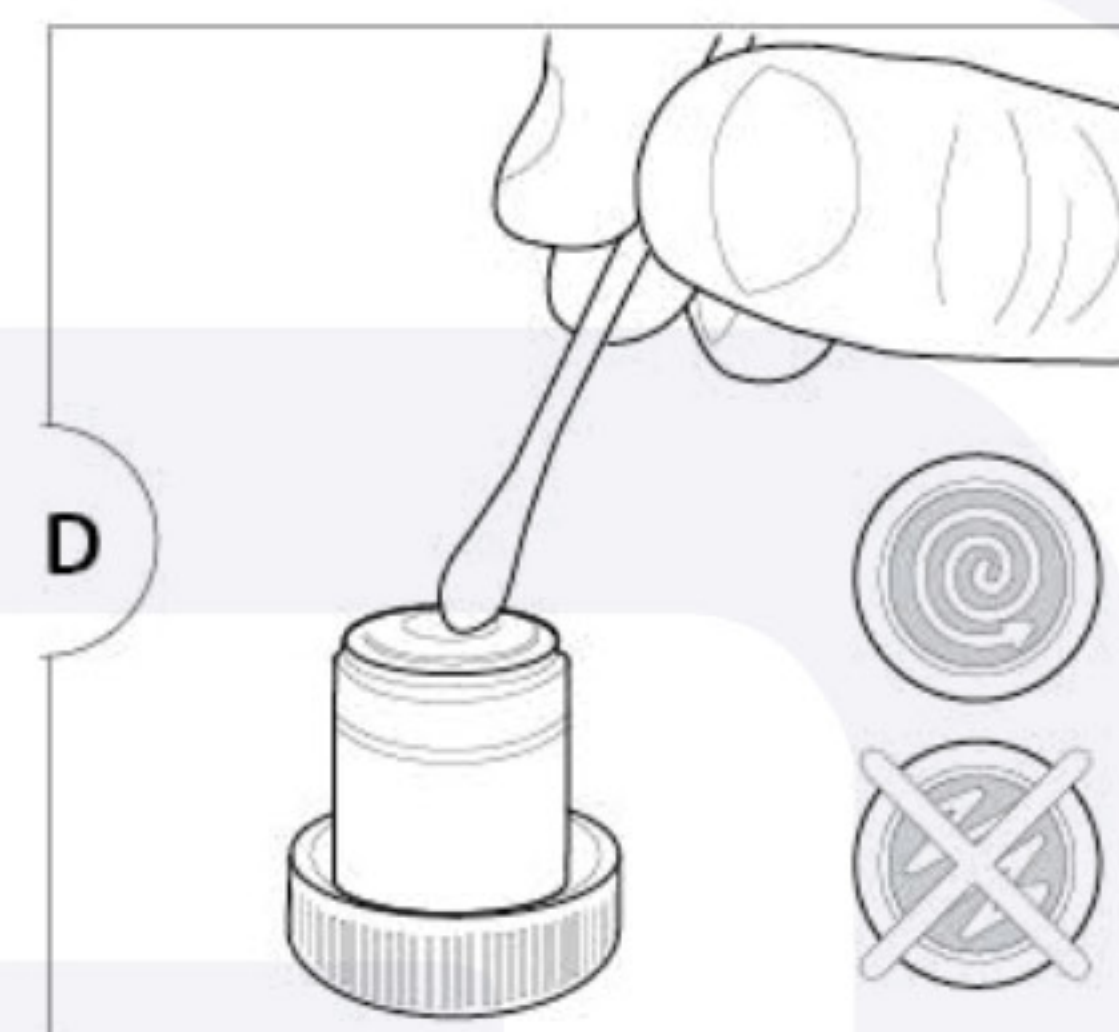
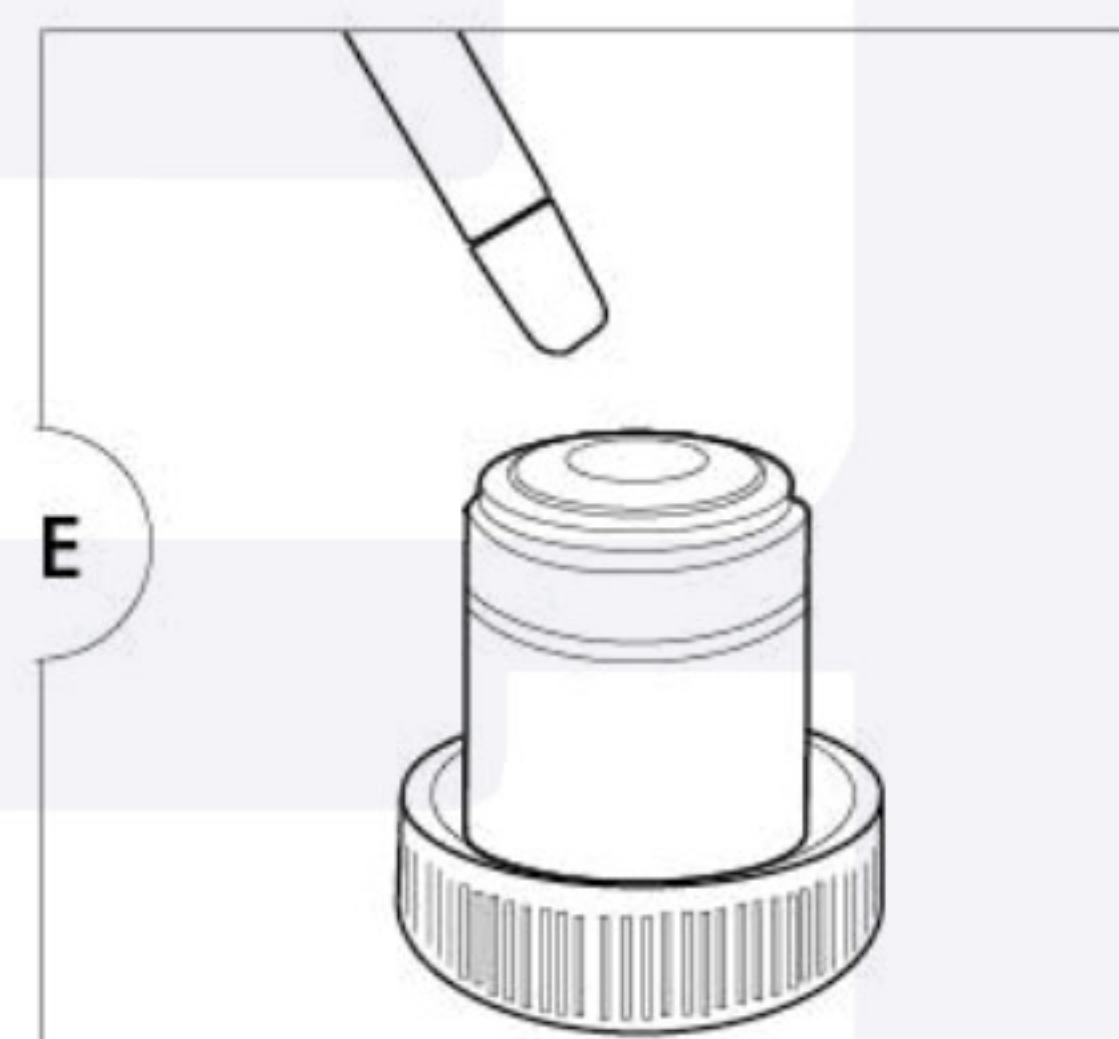


FIGURE E |

- Wait until the cleaning fluid is evaporated, or speed up this process by using pressurized dry air
- Check if the surface is clean by using a magnifying glass
- Place the cleaned item back on the microscope



Please note that cleaning of the optical surfaces indicated in this instruction only applies to external surfaces of objectives, eyepieces, filters and condensers. Internal surfaces must always be done by your Euromex microscopes distributor

Troubleshooting

Proper use and maintenance ensure best performance of your Delphi-X Observer. If problems occur this chapter explains how to resolve most issues. Please make sure this chapter is read and checked before contacting your Euromex distributor for service. If a problem is not described in this list or the suggested solution does not bring the result needed, please contact your Euromex distributor

Problem	Cause	Action
There is no light from the lamp	No power	<i>Check if the power cable is connected well, try other power cable</i>
	The bulb is not inserted	<i>Remove the bulb and place it back</i>
	The bulb is defective	<i>Remove the bulb and place it back</i>
	The transmitted-reflected illumination switch is in the wrong position	<i>Change position of the switch</i>
	The fuse has blown	<i>Replace the fuse</i>
	There is no power from the mains connection	<i>Replace it</i>
The lamp burns out suddenly	Poor bulb quality	<i>Use the specified lamp to replace it. If the problem is not solved, contact your reseller</i>
The bulb flickers or the brightness is vertiginous	The bulb is at the end of it's life span	<i>Replace the bulb</i>
	The bulb is not inserted entirely into the holder	<i>Remove the bulb and replace it</i>
iCare sensor does not turn off the illumination	There are other things in front of microscope (within 1 meter)	<i>Clear all object in a 1 meter radius</i>
	The iCare function is turned off	<i>Press and hold the iCare button for 3 seconds to activate the function</i>
OPTICAL SYSTEM		
Problem	Cause	Action
The edge of the field of view is dark or the brightness is not uniform	The nosepiece is not in the located position (objective and light path are not coaxial)	<i>Locate the nosepiece properly where it clicks</i>
	The image of the lamp is not centered	<i>Center the lamp</i>
	The lens (objective, condenser, eyepiece or collector) is dirty	<i>Clean it thoroughly</i>
Find dust and stain in the field of view	First rotate the eyepieces, if the dust moves:	<i>Clean the eyepieces</i>
	Next move the stage with slide, if the dust moves:	<i>Clean the slide or replace the slide</i>
	Next move the condenser up and down, if the dust moves (using 4 or 10x objective):	<i>Clean the top of the condenser</i>
	Next change objective, if the dirt is no longer visible:	<i>Clean the bottom lens of the objective</i>
	If problem remains:	<i>Clean the collector lens</i>
Image quality is not optimal (resolution or contrast)	There is no cover slip on the specimen	<i>Add cover slip</i>
	The cover slip is too thick or too thin	<i>Use the standard coverslip (0.17mm)</i>
	The specimen is placed upside down	<i>Turn slide around</i>
	There is oil on a non-oil lens, this often happens to the 40x objective	<i>Clean the objective</i>
	There are stains on the lens (including condenser, objective, eyepiece and collector)	<i>Clean the optical elements</i>
	No oil is used for the 100x oil objective	<i>Use Euromex immersion oil (PB.5255)</i>
	There are bubbles in the oil	<i>Try to remove the bubbles or create a new slide</i>
	Wrong oil is used	<i>Use Euromex immersion oil (PB.5255)</i>
	The size of the aperture diaphragm is too large	<i>Close the diaphragm</i>
	The size of the aperture diaphragm is too small	<i>Open the diaphragm</i>

	The position of the condenser is too low	<i>Adjust the position</i>
Periphery of the image is dark/ unclear (unevenly illuminated)	For low magnification objectives (4x, 2x) the swing-out condenser was not used correctly	<i>Swing out the top lens of the condenser</i>
	Diaphragm(s) closed too far	<i>Open the diaphragms</i>
	Lamp unit is not placed correctly	<i>Take out lamp unit and re-install</i>
	Incorrect position of the light path switching lever	<i>Set to right position</i>
	The nosepiece is not in the right position	<i>Turn the nosepiece until it "clicks " into position</i>
One side of the image is dark	The condenser is not centered correctly	<i>Center the condenser</i>
	The condenser is placed inclined in it's holder	<i>Install the condenser again and center it</i>
	The nosepiece is not in the right position	<i>Turn the condenser until it "clicks " into position</i>
	Diaphragm is not centered	<i>Center diaphragm</i>
One part of the image is not in focus. Part of the image becomes out of focus while moving specimen	The condenser is placed inclined in it's holder	<i>Install the condenser again and center it</i>
	The stage is tilted	<i>Re-install the stage making sure it is levelled</i>
	The specimen slide is not placed flat on the stage	<i>Replace the slide on the stage</i>
	The nosepiece is not in the right position	<i>Turn the nosepiece until it "clicks " into position</i>
	The specimen slide is not prepared well	<i>Try a specimen of known quality and confirm</i>
Image can not be focused while stage is in highest position	Focus lock system is secured at the wrong position	<i>Release the focus lock, focus and lock again</i>
	The stage is not installed correctly	<i>Re-install the stage making sure it is levelled</i>
The image through the eyepieces is shown as a double image or half moons appear	Interpupillary distance has not been set correctly	<i>Perform interpupillary adjustment</i>
	Dioptr adjustment has not been done correctly	<i>Perform diopter adjustment</i>
Eyes are getting tired	Interpupillary distance has not been set correctly	<i>Perform interpupillary adjustment</i>
	Dioptr adjustment has not been done correctly	<i>Perform diopter adjustment</i>
	Brightness is not correct	<i>Adjust brightness using intensity control knob or filters</i>
The image is too dark	Too low intensity set on intensity controller	<i>Increase the intensity by rotating the controller</i>
	The size of the aperture diaphragm is too small	<i>Adjust again</i>
	The position of the condenser is too low	<i>Adjust the position</i>
	Poor bulb quality	<i>Use the specified lamp</i>
	Diaphragm(s) closed too far	<i>Open the diaphragms</i>
	Light path selector set in wrong position	<i>Select the 100:0 or 20:80 position</i>
	The bulb is at the end of it's life span	<i>Replace the bulb</i>
	The Köhler incident light is not in the centre	<i>Adjust the bolt of Köhler incident light</i>
The image is too bright	Too high intensity set on intensity controller	<i>Decrease the intensity by rotating the controller</i>
	The size of the aperture diaphragm is too large	<i>Adjust again</i>
	The position of the condenser is too high	<i>Adjust the position</i>
The image appears blue-ish, yellow-ish or orange-ish	Too low or too high intensity set on intensity controller (Halogen illumination only)	<i>Increase or decrease the intensity by rotating the controller, and use the ND filters</i>
	The bulb is at the end of it's life span	<i>Replace the bulb</i>
The image cannot be focussed when using high magnification objectives	The cover slip is too thick	<i>Use the standard coverslip (0.17 mm)</i>
	The specimen is placed upside down	<i>Turn slide around</i>
	Focus lock system is secured at the wrong position	<i>Release the focus lock, focus and lock again</i>

The objective touches the specimen when the magnification is being changed	The cover slip is too thick	<i>Use the standard coverslip (0.17 mm)</i>
	Focus lock system is secured at the wrong position	<i>Release the focus lock, focus and lock again</i>
Large focus deviation while changing objectives	An objective is placed incorrectly, not screwed in all the way	<i>Make sure the right objective is used and screw it all the way into the revolving nosepiece</i>
	The tension of the X/Y controls of the stage are set too tight	<i>Adjust tension to proper setting</i>
	Diopter adjustment has not been done correctly	<i>Perform diopter adjustment</i>
The slide does not move, or moves too heavily	The specimen is not placed between the specimen holder	<i>Place specimen between the holder</i>
	The tension of the X/Y controls of the stage are set too tight	<i>Adjust tension to proper setting</i>

Phase Contrast Installation and Alignment

Centering the Condenser and Aligning Phase Rings

1. Install Phase Contrast Objectives

Mount the phase contrast objectives on the nosepiece in clockwise order, from the lowest to the highest magnification.

2. Install the Phase Contrast Condenser

Install the Phase Contrast turret condenser (N.A. 1.25) onto the condenser carrier.

3. Raise the Condenser

Raise the condenser to its normal upper working position.

4. Select Brightfield Position

Rotate the condenser turret to the BF (Brightfield) position.

5. Select the 10× Phase Objective

Rotate the nosepiece to the 10× phase contrast objective.

6. Focus a Stained Specimen

Place a stained slide on the stage and focus the specimen using brightfield illumination.

7. Focus the Field Diaphragm

Close the field diaphragm. Adjust the condenser height until the image of the field diaphragm is sharply focused.

8. Center the Field Diaphragm

Use the condenser centering screws to center the image of the field diaphragm. Open the field diaphragm until its edge is just outside the field of view.

9. Replace with a Phase Contrast Specimen

Replace the stained specimen with an unstained phase contrast specimen (for example, a fresh cheek-cell preparation).

10. Insert the Alignment Telescope (CT)

Remove one eyepiece and insert the supplied CT alignment telescope. Focus the telescope until the phase ring inside the objective is sharply visible.

Alignment Telescope (CT)



Remove one eyepiece and insert the CT. Focus on the phase ring inside the objective

11. Select the Matching Condenser Annulus

Rotate the condenser turret to the position corresponding to the selected objective (10×, 20×, 40× or 100×).

Through the alignment telescope two rings will become visible:

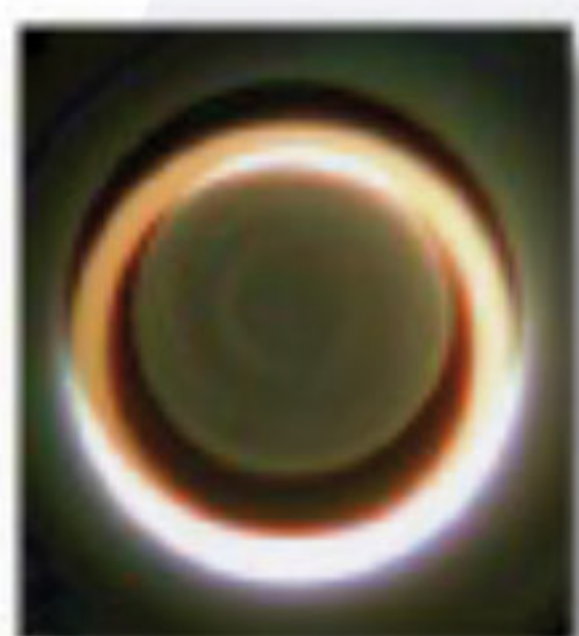
- The dark objective phase ring
- The bright condenser annulus

12. Align the Annulus

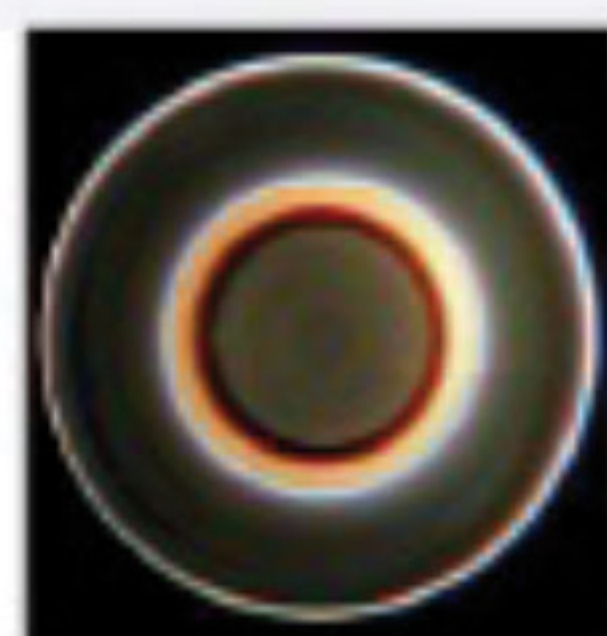
Using the two annulus centering screws on the condenser turret, move the bright condenser annulus until it is perfectly concentric with the objective phase ring.



The alignment is correct when both rings have an equal spacing around the complete circumference



Not centered



Centered properly

13. Repeat for Remaining Objectives

Repeat the alignment procedure for the remaining phase objectives using the corresponding condenser positions. Do not forget to select the correct position of the condenser(matching the objective magnification)

Notes:

- Always perform condenser centering in brightfield (Köhler illumination) before aligning the phase rings.
- Make only small adjustments to the annulus centering screws.
- Do not confuse the condenser centering screws with the annulus centering screws.
- Repeat the alignment for every installed phase objective.
- Correct alignment provides maximum contrast and optimum phase contrast performance.

Notes

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