

metallurgical



Introduction

Thank you for purchasing the Euromex Delphi-X Observer metallurgical

The Delphi-X Observer series has been designed with all kinds of industrial 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. 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

| | |
|---|-----------|
| 1. General safety instructions | 3 |
| Dangers associated with the operation | 3 |
| Disinfection and decontamination: | 3 |
| Environment, storage and use | 4 |
| 2. Configuration, construction and controls | 5 |
| 3. Assembling Delphi-X Observer | 8 |
| 4. Operation | 11 |
| 4.1 Placing the sample | 11 |
| 4.2 Switching between light sources | 12 |
| 4.3 Getting the specimen in focus | 12 |
| 4.4 Adjusting the coarse focus tension | 12 |
| 4.5 Setting the focus lock | 12 |
| 4.6 Switching the fine focus knobs | 12 |
| 4.7 Adjust interpupillary distance | 13 |
| 4.8 Adjustments of dioptr of a compound microscope | 13 |
| 4.9 The correct eye point | 13 |
| 4.10 Select balance between eyepiece- and camera light throughput | 14 |
| 4.11 Centering the condenser | 14 |
| 4.12 Using the aperture diaphragm | 14 |
| 4.13 Using halogen with LBD, ND 6 and ND 25 filters | 14 |
| 4.14 iCare sensor | 14 |
| 4.15 Replacing the fuse | 15 |
| 5. Reflected illumination unit | 15 |
| 5.1 Use of the optional color filter (Fig. 31) | 15 |
| 5.2 Reflective optical path selection (fig. 31) | 15 |
| 5.3 Diaphragm against mid-field view | 16 |
| 5.4 Use of the aperture diaphragm (fig. 34 and 35) | 16 |
| 5.5 Use of the polarizer and analyzer (fig. 36) | 17 |
| 6. Cleaning optics | 17 |
| 7. Troubleshooting | 18 |

1. General safety instructions

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

Disinfection and decontamination:

- Exterior casing and mechanical surfaces must be wiped with a clean cloth, dampened with a disinfectant
- Soft plastic parts and rubber surfaces can be cleaned by gently wiping a clean cloth, dampened with a disinfectant. Discoloration can occur if alcohol is used
- The front lens of eyepieces and objectives are sensitive to chemicals. We recommend not to use aggressive disinfectants but to use lens paper or a soft fibre-free tissue, damped in cleaning solution. Cotton swabs may also be used. We recommend you use personal eyepieces without eyeshades in order to minimize risk
- Never immerse or dip the eyepiece or objective into a disinfectant liquid! This will damage the component
- Never use abrasive compounds or cleaners that may damage and scratch optical coatings
- Properly clean and disinfect all possible contaminated surfaces of the microscope or contaminated accessories before storing for future use. Disinfection procedures must be effective and appropriate
- Leave the disinfectant on the surface for the required exposure time, as specified by the manufacturer. If the disinfectant evaporates before the full exposure time, reapply disinfectant on the surface
- For disinfection against bacteria, use a 70% aqueous solution of isopropanol (isopropyl alcohol) and apply for at least 30 seconds. Against viruses, we recommend to refer to specific alcohol or non-alcohol based disinfection products for laboratories

Before returning a microscope for repair or maintenance through a Euromex dealer, an RMA (return authorization form) together with a decontamination statement must be filled in! This document - available from Euromex for any reseller- must be shipped together with the microscope at all times

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 halogen bulb

Note: Always disconnect the power cord from your microscope before handling the halogen bulb and power unit and allow the system to cool down approximately 35 minutes to avoid burns

- Never touch the halogen bulb 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 halogen bulbs
- 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

- 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 bulbs 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

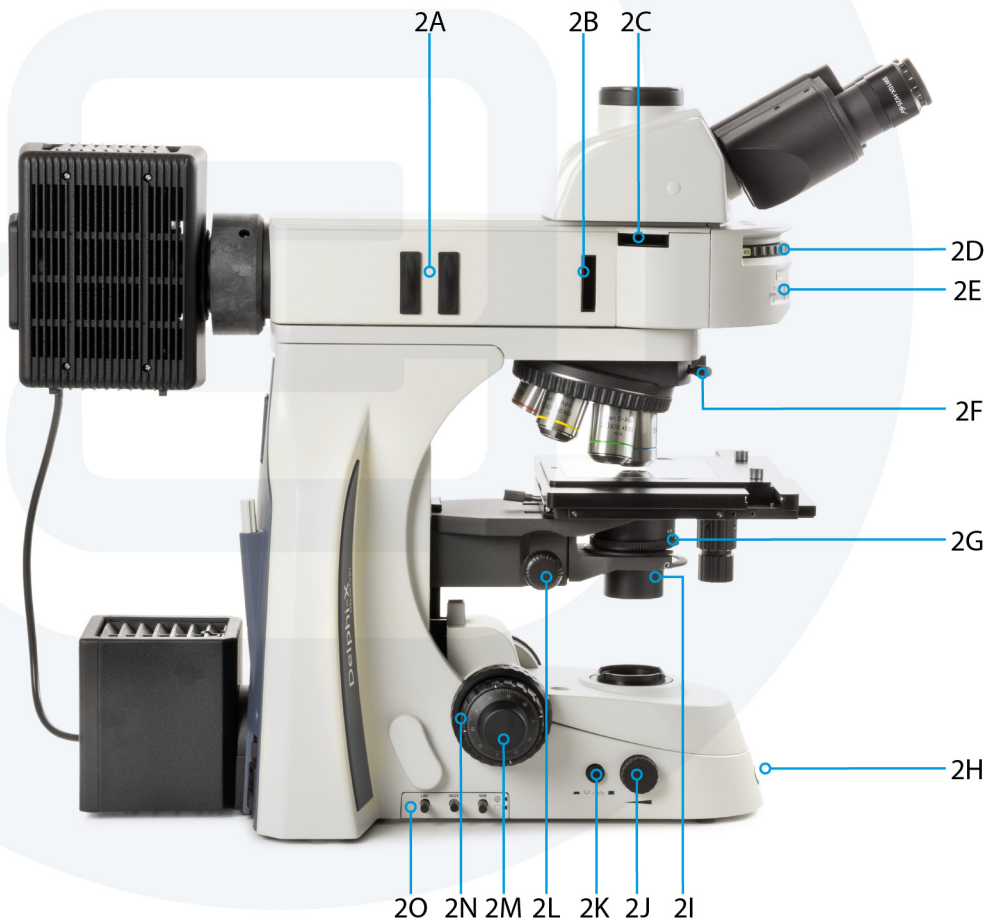
- This microscope is a relatively heavy system, consider this when moving and installing the system
- Always lift the microscope by holding the main body and base of the microscope
- Never lift or move the microscope by its focusing knobs, stage or head
- When needed, move the microscope with two persons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

2. Configuration, construction and controls

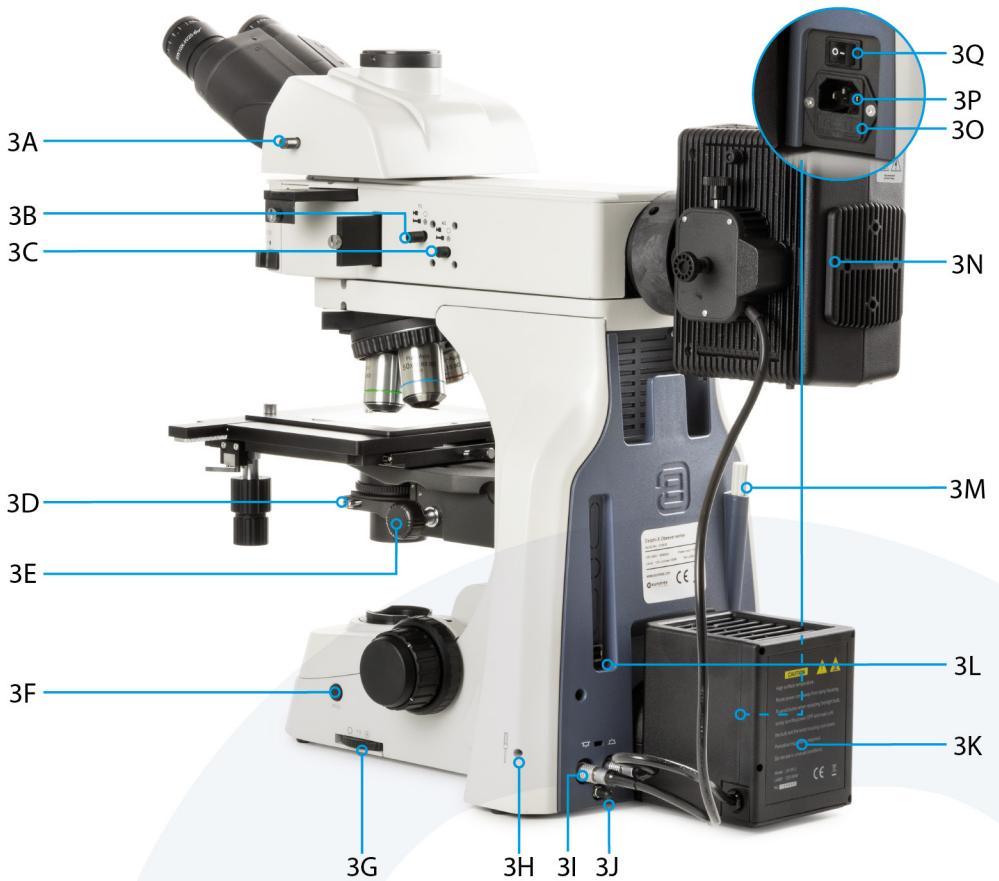
This chapter describes the main parts and functions of the Delphi-X Observer



| | | | |
|----|---------------------------------|----|-------------------------------|
| 1A | Eyepieces | 1H | Nosepiece |
| 1B | Photo port | 1I | Objectives |
| 1C | Optical light path selector | 1J | Stage |
| 1D | Trinocular head | 1K | Long distance condenser |
| 1E | Metallographic attachment | 1L | X-Y stage movement |
| 1F | Reflected light stop button | 1M | Coarse and fine focusing knob |
| 1G | Optional slider (DIC, POL, etc) | 1N | Body |



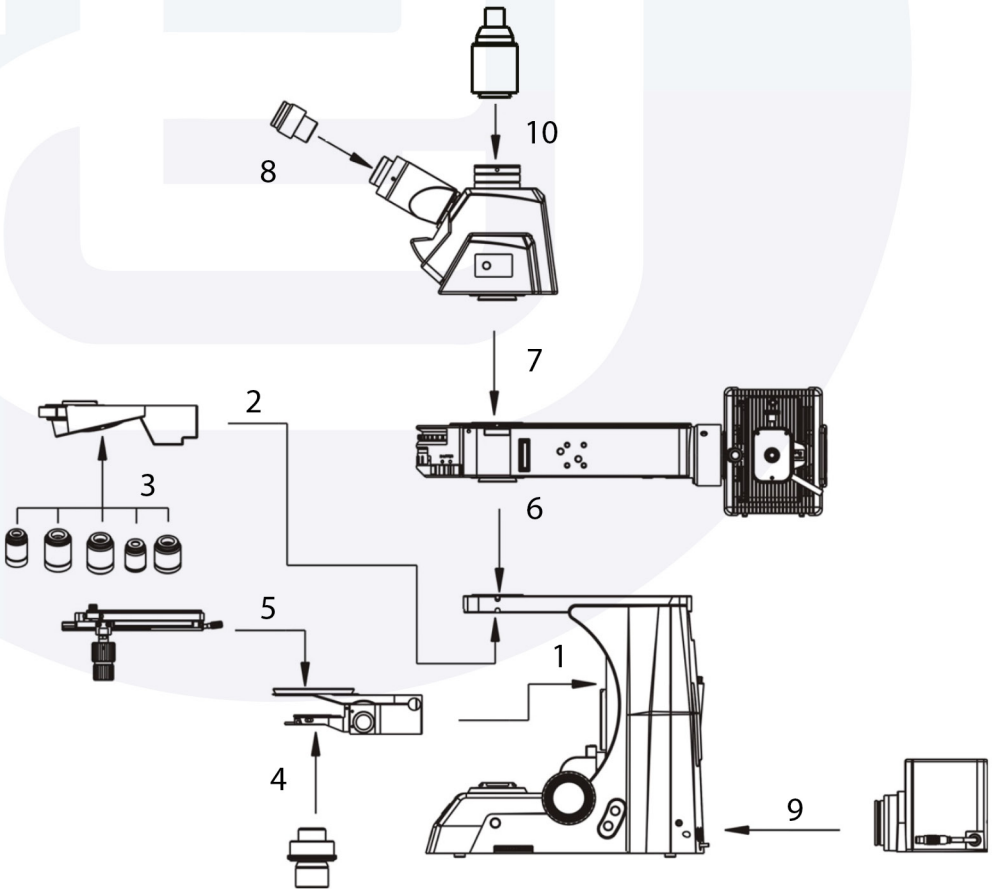
| | | | |
|----|------------------------------------|----|---------------------------------|
| 2A | ND filter slots | 2I | Long distance condenser |
| 2B | Slot for polarization slider | 2J | Light intensity control knob |
| 2C | Slot for analyser slider | 2K | Upper and lower lighting switch |
| 2D | Rotating turret | 2L | Condenser height control |
| 2E | Turret position indicator | 2M | Coarse and fine focusing knob |
| 2F | Slider fastening screw | 2N | Adjustable rack stop |
| 2G | Condenser diaphragm adjusting ring | 2O | Filter switch levers |
| 2H | iCare sensor | | |



| | | | |
|----|---|----|--|
| 3A | Optical path selector | 3J | Earthing connection screw |
| 3B | Viewing diaphragm | 3K | Lamp house unit |
| 3C | Aperture diaphragm | 3L | USB interface (future feature, not in use now) |
| 3D | Condenser fastening screw | 3M | Universal tool |
| 3E | Condenser height control | 3N | Lamp house unit |
| 3F | iCare button | 3O | Fuse compartment |
| 3G | Field aperture control (for transmitted light mode) | 3P | Power socket |
| 3H | Lamp house fastening screw | 3Q | Power switch |
| 3I | Light source plug | | |

3. Assembling Delphi-X Observer

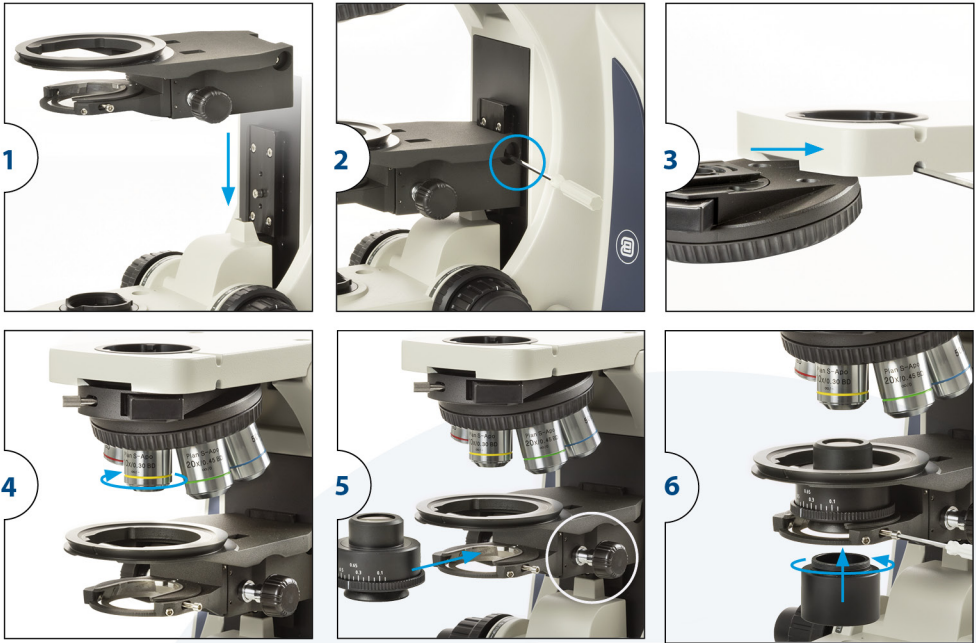
This chapters describes the steps that need to be taken to assemble the Delphi-X Observer metallographic microscope. Euromex Microscopes will always try to keep the number of assembly steps for their customers as low as possible but there are some steps that need to be taken. The steps mentioned on the 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 6 | Attaching reflected illumination |
| Step 2 | Attaching the nosepiece | Step 7 | Placing the microscope head |
| Step 3 | Inserting the objectives | Step 8 | Placing the eyepieces |
| Step 4 | Placing the condenser | Step 9 | Attaching the halogen lamp chamber |
| Step 5 | Attaching the mechanical X/Y stage | Step 10 | 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 hexagon wrench (Allen) tool to tighten the screw shown as I (in figure 2)



Step 2 | Attaching nosepiece (figure 3)

- Slide the nosepiece into the slot
- Fix into place with screw

Step 3 | Inserting the objectives

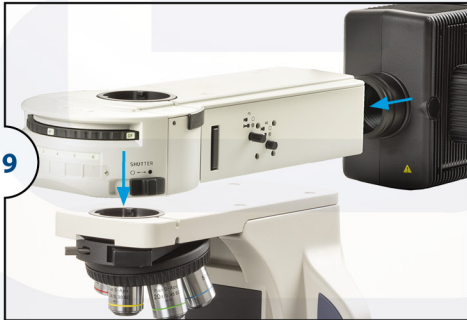
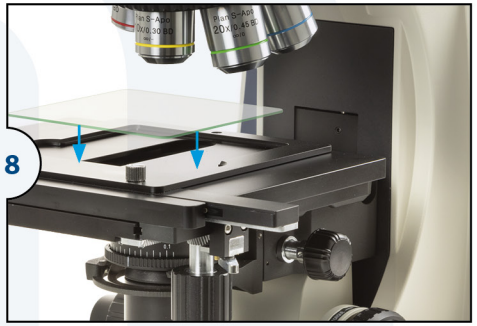
- Insert the objectives ranging from low to high magnification (figure 4)

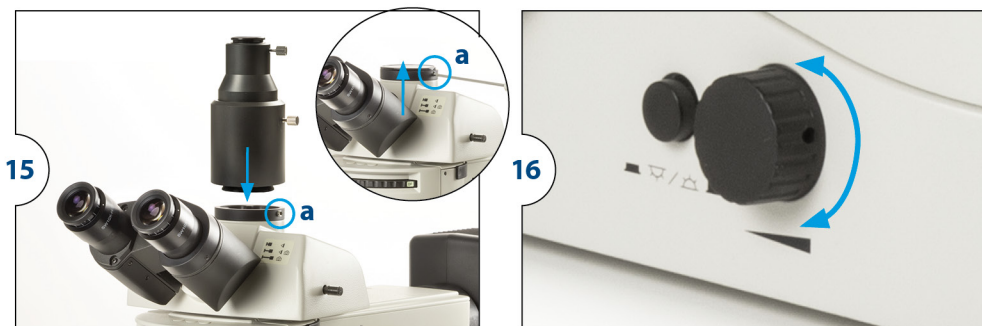
Step 4 | Placing the condenser (figure 5, 6)

- Use the condenser height control knob to lower the condenser holder to the lowest position
- Unscrew the two parts of the condenser
- Insert the top part of the condenser into the holder as shown in figure 5 and secure it by fixing the screw indicated in figure 6. (Centering the condenser is described later in this manual)
- Then screw the lower part into the top part

Step 5 | 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 7 by aligning the stage above the ring of the focus cassette
- Fix the mechanical stage into place with screw at the back of the stage
- Place the glass plate (figure 8)





Step 6 | Placing the reflected light attachment and lamp house (figure 9, 10)

- The metallographical attachment must be inserted between the body and the head of the microscope in accordance with the serial number in Fig. 5 and transferred to the appropriate position, then tighten the screw with hexagon wrench to fasten

Step 7 | Placing the microscope head (figure 11)

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

Step 8 | Placing and mounting the eyepieces (figure 12)

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

Step 9 | Attaching the halogen lamp chamber (figure 13, 14)

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

Step 10 | Placing the C-mount or photo port onto the microscope head (figure 15)

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

Step 11 | 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 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**

4. Operation

4.1 Placing the sample

- Lower the stage to make room for the sample
- 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
- Gently place the sample into position and make sure it will not damage the objective
- Use the X and Y axis control knobs of the mechanical stage to move to area of interest of the sample into the optical path

4.2 Switching between light sources

(figure 16)

Next to the intensity controller there is a button for switching between transmitted and reflected illumination

Note: transmitted light is only available on some models

- 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)



Transmitted mode

Reflected mode

4.3 Getting the specimen in focus

(figure 17)

- 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

4.4 Adjusting the coarse focus tension

(figure 18)

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's preference

4.5 Setting the focus lock

(figure 19)

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 in order to prevent 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

4.6 Switching the fine focus knobs

(figure 20)

The fine focus knobs can be switched from left to right to meet the user's preference

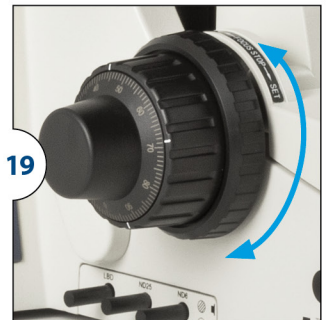
- Pull the knobs with moderate force to release the magnet holding the knobs onto the stand
- Attach the magnets onto the holder and let it grab the knobs again to mount them onto the holder



17



18

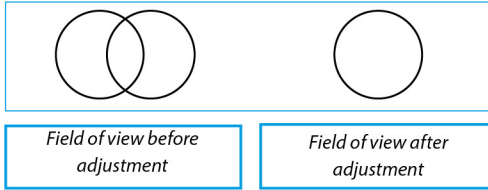


19

4.7 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



4.8 Adjustments of dioptre of a compound microscope

(figure 21, 22)

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 dioptre to do so:

- Take a good prepared slide for your reference
- Set (both) the dioptre 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 touch the coarse and fine adjustment anymore**
- Select the 10x objective again
- With your dominant eye open (close your other eye), rotate the dioptre adjustment from "+" to "-" until the selected area gets as sharp as possible as with the 40x objective
- If during this operation the image becomes unsharp, take your eyes from the eyepieces and turn the dioptre adjustment, **without looking into the eyepieces**, a few divisions back from "-" to "+"
- Look into the eyepieces again and turn the dioptre adjustment from "+" to "-" until the selected area on your specimen gets the optimal sharpness
- Repeat for your non-dominant eye, and with the second dioptre

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

4.9 The correct eye point

(figure 23)

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



4.10 Select balance between eyepiece- and camera light throughput (figure 24)

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 three 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 for the user's convenience

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

4.11 Centering the condenser (figure 25)

(figure 25)

- 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 26) to move the field diaphragm into to view center
- Open the field diaphragm (2) 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

4.12 Using the aperture diaphragm

The aperture diaphragm (figure 27/3) 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

4.13 Using halogen with LBD, ND 6 and ND 25 filters (figure 28: Halogen version with LBD and two ND filters)

(figure 28: Halogen version with LBD and two ND filters)

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

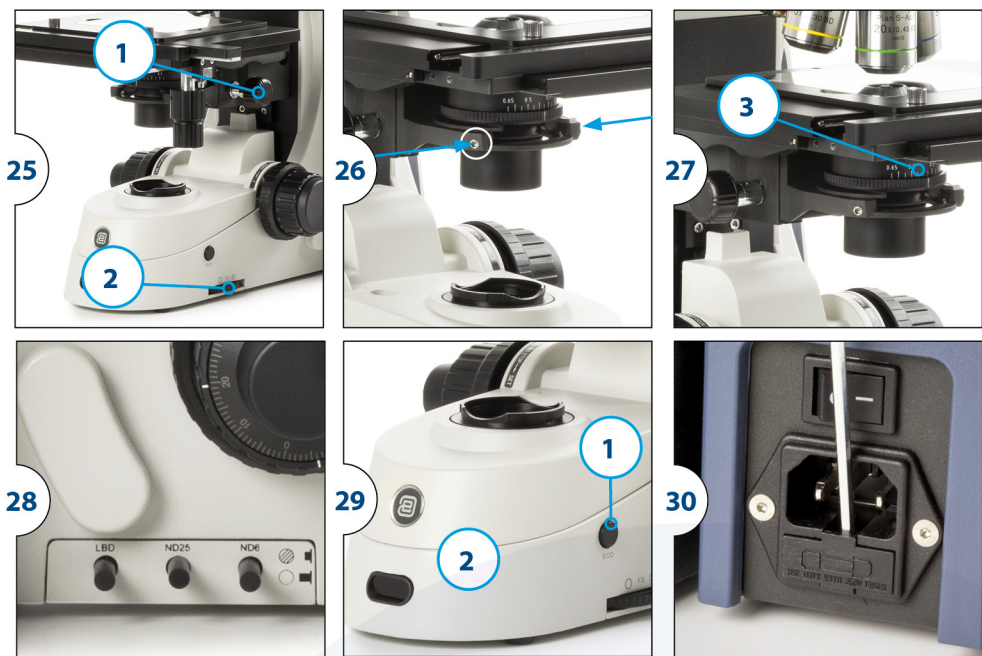
*LBD: light-balancing daylight filter

4.14 iCare sensor (figure 29)

(figure 29)

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 (1) will re-active 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 (2) will dim to indicate the function has been turned off
- Repeating this step will turn the function back on



4.15 Replacing the fuse

(figure 30)

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

5. Reflected illumination unit

5.1 Use of the optional color filter (Fig. 31)

- Insert the filter slider for the observation purposes into the filter slot (1, Fig. 31). Make sure you insert it from the left
- The first "click" means that the empty position is in place. The second "click" indicates that the filter is in the light path

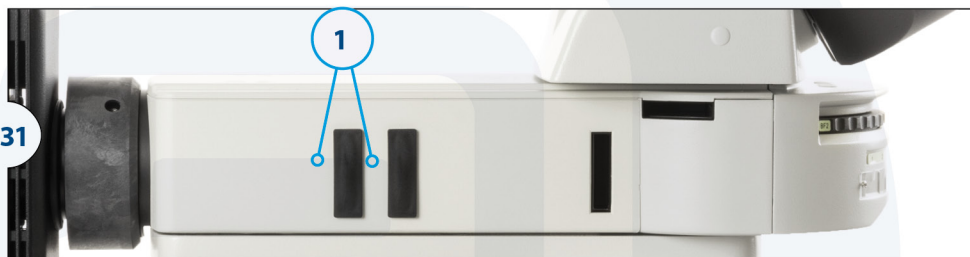
| Color filter | Applications |
|-------------------|--|
| Color temperature | Convert lighting to daylight for general observation and color photography |
| Green filter | Increase contrast for black-and-white photography |
| Yellow filter | Increase contrast when semi-conductor wafer is observed |
| Frosted sheet | Difusses light (but reduces intensity) |
| ND6 | Reduce light intensity (transmittance: 6%) |
| ND25 | Reduce light intensity (transmittance: 25%) |

5.2 Reflective optical path selection (fig. 31)

Rotate the disc (4) in the metallographic attachment according to the required observation path

- BF1: reflected brightfield observation (transmittance: 6%)
- BF2: reflected brightfield observation
- DF: reflected darkfield observation

31



* "BF2" is the standard brightfield position. In case of high light intensity "BF1" can be used as it contains a neutral density filter to lower the light intensity

5.3 Diaphragm against mid-field view

(fig. 32, 33)

1. Put the reflected light stop on the "●" position
2. Rotate the darkfield/brightfield quick selector (disc) to the BF position
3. Put the reflected light stop on the "○" position and let the light through
4. Rotate the nosepiece to place the 10x objective into the light path. The sample is then placed on the stage and the image is roughly focused
5. Pull the lever (3, fig. 32) until the aperture diaphragm is at its smallest diameter
6. Use a hexagonal wrench to insert the two field diaphragm centering holes (2, fig. 32). Adjust the image of the aperture to the center of the field of view (fig. 33 shows the adjustment process)
7. Push the rod (3, fig. 32) to open the aperture until the image of the aperture and the perimeter of the field of view are inscribed.
8. Open the diaphragm so that the image is exactly connected to the field of view (c in fig. 33)

● Field stop

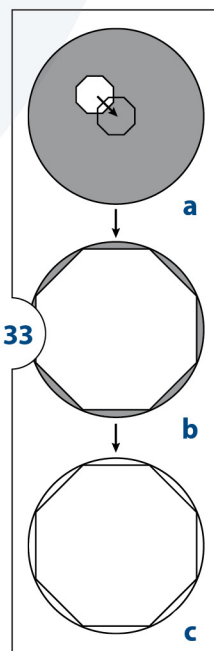
The field stop adjusts the lighting area to produce high-contrast images. According to the objective in use, adjust the rod of the field of view (no. 3, fig. 32) of the reflecting illuminator until the aperture image is outside the field of view, to screen out unnecessary light

Note

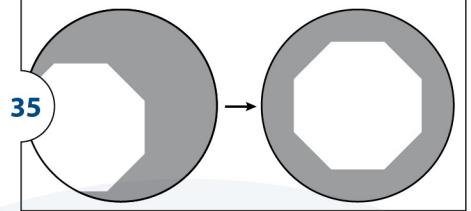
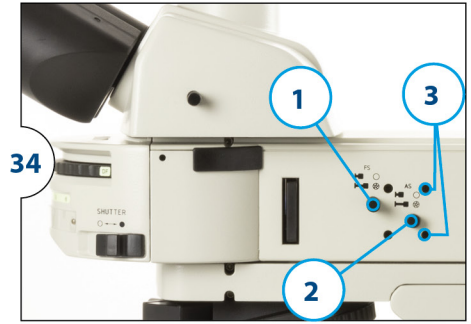
The diaphragm knob must be pushed forward to fully open the diaphragm

5.4 Use of the aperture diaphragm (fig. 34 and 35)

1. Move the reflected light stop to the "●" position thus blocking the light path
2. Rotate the darkfield/brightfield quick selector (disc) to the BF position
3. Move the reflected light stop to the "○" position to admit the light
4. Turn the nosepiece to bring the 10x objective into the light path, then place the sample on the stage to roughly focus the image
5. Move the reflected light stop to the "●" position and close the light path
6. Rotate the darkfield/brightfield quick selector (disc) to the BF position
7. Move the reflected light stop to the "○" position and admit the light
8. Turn the nosepiece to bring the 10x objective into the light path, then place the sample on the stage to roughly focus the image



9. Adjust the aperture diaphragm until it is at its minimum diameter
10. Adjust the field diaphragm until it is at its minimum diameter. Meanwhile, the aperture diaphragm image can be seen as well
11. Insert the hex wrench into two aperture diaphragm alignment holes (3), the position can now be adjusted to the center position (see 35)



Aperture diaphragm image

● **In the light field of reflected light**

The aperture size is set between 70% and 80% of the numerical aperture of the objective (as shown in fig. 35). This position is generally the best viewing position

● **In the light-dark field of reflected light**

You must push the aperture diaphragm rod (2, fig. 34) to open the aperture diaphragm

○ For some samples, close the aperture diaphragm slightly to get both high contrast and low glare

5.5 Use of the polarizer and analyzer (fig. 36)

1. Remove the dustcover in the polarizer slot then place the polarizer slider with the text facing the operator into the polarizer slot (1). The slider has two positions, one contains the polarizer the other contains a hole for when no polarization is wanted
2. Remove the dust caps that close off the slot for the analyser then place the analyzer into the slot (text upwards) (2)
3. Turn the wheel of the analyzer to change the orientation of the polarization filter



6. Cleaning optics

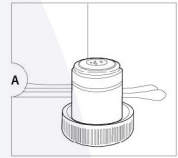
How to keep the optics clean?

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

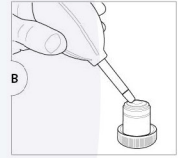


FIGURE A |

- 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 |**

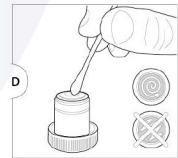
- To prevent scratches on coatings and optical glass try to remove dirt and dust that sticks to the optical surface first with an air-blower or with pressurized dry air (oil-free and under moderate pressure version only)

**FIGURE C |**

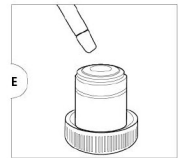
- Use an absorbent lens paper or cotton swap.
- Dampen a swap or towel with a small amount of lens cleaning fluid or cleaning mixture (either pure iso-propanol or a mixture of 7 parts ether and 3 parts alcohol)

**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

7. 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 | Check if the power cable is connected well, try other power cable |
| | The bulb is not inserted | Remove the bulb and place it back |
| | The bulb is defective | Remove the bulb and place it back |
| | The transmitted-reflected illumination switch is in the wrong position | Change position of the switch |
| | The fuse has blown | Replace the fuse |
| | There is no power from the mains connection | Replace it |
| | The light selector is in the wrong position | Press the light selector |
| The lamp burns out suddenly | Shutter is closed | Open the shutter |
| | Poor bulb quality | Use the specified lamp to replace it. If the problem is not solved, contact your reseller |

| | | |
|--|---|---|
| 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 lamps</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 are stains on the lens (including condenser, objective, eyepiece and collector) | <i>Clean the optical elements</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) | Diaphragm(s) closed too far | <i>Open the diaphragm(s)</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> |
| | Slider(s) is (are) not in correct position | <i>Place in right 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(s) is (are) not centered | <i>Center diaphragm(s)</i> |
| | Slider(s) is (are) not in correct position | <i>Place in right position</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 image is too bright | The Köhler incident light is not in the centre | <i>Adjust the bolt of Köhler incident light</i> |
| | 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 image appears blue-ish, yellow-ish or orange-ish | The position of the condenser is too high | <i>Adjust the position</i> |
| | 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 | A color filter is inserted | <i>Remove filter</i> |
| | Focus lock system is secured at the wrong position | <i>Release the focus lock, focus and lock again</i> |
| | The stage is not in the highest position | <i>Adjust height of stage</i> |
| The objective touches the specimen when the magnification is being changed | The sample is too small | <i>Change sample</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> |
| | Dioptr adjustment has not been done correctly | <i>Perform diopter adjustment</i> |
| The slide does not move, or moves too heavily | The tension of the X/Y controls of the stage are set too tight | <i>Adjust tension to proper setting</i> |