Oxion

euromex
microscopes holland

user manual

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Contents

1. Introduction

The Oxion 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 everyday use, equipped with excellent optical and mechanical components. Specific attention to production methods resulted also in an excellent price/performance ratio

2. General safety instructions

Intended use: as a non-medical device
This microscope is intended for general observation of cells and tissues. The microscope is intended to be used 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)
This microscope is intended for observation and diagnostics of cells and tissues at hospitals or by physicians and veterinaries 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 and veterinaries use microscopes to identify the different types of cells and spot abnormal cells. This product helps in identifying and treating diseases

2.1 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

2.2 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

2.3 Photobiological safety instructions fluorescence light sources

- Fluorescent light sources - such as HBO mercury vapor lamps or LED - can be harmful to human eyes, especially ultraviolet and violet light
- Therefore, always mount and use the orange protection shield, supplied with the fluorescence attachments, when applicable
- Operators must close the shutter of the fluorescence attachment, equipped with an HBO mercury vapor illumination, or switch off the LED for fluorescence, when observation of the sample is postponed for a longer time
- Avoid direct exposure of the eye to any fluorescent light source while switched on
- Before looking through the eyepieces of the device, lower the intensity of the LED for fluorescence illumination
- Avoid long and high-intensity exposure to LED light because this can cause acute damage to the retina of the eye
- Mercury vapor lamps ***must*** be replaced when reaching a maximum of 200 hours (due to explosion hazard) and properly disposed of, in accordance with local regulation. When replacing the lamp, safety goggles must be used
- Mercury vapor lamps are always under high pressure, even when cool. When turning on a mercury light bulb, it needs to stay on for at least 15 minutes before switching it off. Do not switch it on again for at least 30 minutes, so it has plenty of time to cool down. In the event of a broken bulb, immediately vacate the area for at least 30 minutes before returning

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. 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 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

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 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 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 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. Construction of the microscope

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

A. Photo port
B. Microscope head
C. Set screw for tube
D. Stand arm
E. Stage controls
F. Coaxial fine adjustment
G. Coaxial coarse adjustment
H. On/Off switch with light adjustment
I. Lamp unit
J. Eyepieces
K. Eye cups
L. Diopter adjustment
M. Filter slot (with dust cover)
N. Revolving nosepiece for 5 objectives
O. Objectives
P. Object clip
Q. Object x/y stage
R. Condenser with iris diaphragm
S. Height adjustment condenser (not visible)
T. Köhler (field) diaphragm + filter holder
U. Slide protection screw

4. Asembling the Oxion microscope

Euromex Microscopes will always try to keep the number of assembly steps for their customers as low as possible but in some cases there are some steps to be taken. The steps mentioned below are often not necessary but described for your convenience nonetheless

4.1 Inserting/replacing the light source

- Align the oriented pin and power pin on the light source to oriented holder and power socket, and then push light source into arm smoothly and plug it thoroughly. When replacing the bulb, turn off the main power and wait until the LED and holder cool down. Replace whole LED light source if LED bulb is defect

4.2 Mounting the objectives

- Rotate the coarse focusing knob to lower the stage to the lowest position.
- Install the objectives into the objective nosepiece from the lowest magnification to the highest in a clockwise direction from the rear side of the microscope. When using the microscope, start using the low magnification objective (4X or 10X) to search for specimen and focus, and then continue with high magnification objective to observe

4.3 The microscope head

The standard Oxion series configuration is supplied with the head assembled. However, if your order contains the fluorescence it should be mounted first. The dovetail on the bottom side of these parts fits into the slot on the top side of the other parts

4.4 Placing the eyepieces

- Remove the cover of eyepiece tube
- Insert the eyepiece into the eyepiece tube
- When adjusting diopter by adjustable eyepiece, lock eyepiece with hexagon lock-screw to avoid the eyepiece group from rotating in eyepiece tube

4.5 The eyeshades

Each eyepiece has its rubber eyeshade. This prevents damage to the lens, and prevents stray light. The eyeshade can simply be slipped over the eyepiece

4.6 Connecting the power cord

The Oxion series microscopes supported a wide range of operating voltages: 100 to 240V. Please use a grounded power connection

- Make sure the power switch is at“0” (OFF) before connecting
- Insert the connector of power cord into the Oxion’s power socket, and make sure it connects well
- Insert the other connector into the mains socket, and make sure it connects well

Note: Don’t use 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

5. Operation

5.1 Setting up the illumination

- Connect the Oxion microscope to a mains power source and turn on the main power switch on
- Adjusting the light adjustment knob until the illumination is comfortable for observation. Rotate the light adjustment knob clockwise to raise brightness. Rotate the light adjustment knob counterclockwise to lower brightness

Caution: The maximum light intensity when using the 4x and 10x can damage the eyes! We recommend using the neutral filter with these magnifications

5.2 Place 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

5.3 Focusing and slide protection

- Select the objective 4x to the optical path
- Rotate the position screw to top, observe the right eyepiece with right eye. Rotate the coarse focusing knob until the image appears
- Rotate the fine focusing knob for detailed focusing and lock the slide protection screw. The slide protection screw protects the slide by limiting the travel of the table. This way the objectives will not touch or break your slides

5.4 Adjusting the focusing tension

The Oxion series microscope focusing knobs can be adjusted for tension. 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 itself, the tension should be set higher. To tighten the focusing arm (more heavy), rotate the tension adjustment ring according to the arrowhead pointed; to loosen it, please turn it in the reverse direction

5.5 The interpupillary distance

Using a binocular (or trinocular) tube is less tiring for the eyes than the use of a monocular tube. In order to obtain a smooth "compound" image, one should go through the below steps.
The correct interpupillary distance is reached when one round image is seen in the field of view (see image below). This distance can be set by either pulling the tubes towards each other or pulling them 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 Oxion's swiveling eyepiece tube can be rotated 360º. You can select corresponding eye point height according to your own preference

Field of view before adjustment	*Field of view after adjustment*

5.6 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

5.6.1 People wearing glasses

When the eyeshades bother people wearing glasses, the Oxion series eyeshades simply can be folded back to create more space

5.7 Adjusting the diopter

Using a binocular (or trinocular) tube is less tiring for the eyes than the use of a monocular tube. In order to obtain the right interpupillary setting, one should go through the below steps:

- Turn the diopter adjustment ring of the left eyepiece tube until the scale shows the same reading as on the indicator
- Close the right eye and focus the left tube by means of the coarse- and fine adjustment knobs
- Close the left eye and focus the right tube with the diopter adjustment ring.

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

5.8 Abbe condenser

Beneath the object stage an Abbe condenser (M) N.A. 12.5 is mounted. The condenser can be adjusted in height by means of a rack and pinion movement and knob (H). With this one can focus the light on the specimen by which the contrast can be optimized. The condenser is factory pre- centered if needed the following procedure can be followed to center the condensor

- Move the condenser to the highest position.
- Select the 10x objective to the light path and focus the specimen.
- Rotate the field diaphragm adjustment ring to put the field diaphragm to the smallest position.
- Rotate the condenser up-down knob, and adjusting the image to be clearest.
- Adjusting the center adjustment screw and put the image to the center of the field of view.
- Open the field diaphragm gradually. If the image is in the center all the time and inscribed to the field of view, it shows condenser has been centered correctly.

5.9 The field (Köhler) diaphragm

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

5.10 Adjusting the Aperture Diaphragm

- The aperture diaphragm is used to select the numerical aperture of the illumination. When the N.A. of illumination is matching with the N.A. of the objective, the highest possible resolution, dept of field and contrast are obtaine
- When contrast is low, rotate the diaphragm adjustment ring to 70%-80% of the N.A. of objective this will improve the contrast of the image. The diaphragm is factory pre- centered

5.11 Use of the S100x oil-immersion objective

The Euromex Oxion range microscopes are equipped with an S100x N.A. 1.25 oil immersion objective. Please follow these instructions for using this objective

1. Remove the dust protection 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 centre of the slide (always 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
8. The distance between the lens of the objective and the slide is only 0.14 mm!
9. In case there are small bubbles visible turn the S100x objective a couple of times left/right so that the front of the objective moves in the oil and the bubbles will disappear
10. After using the S100x objective turn the table with the fine adjustment knobs downwards until the front lens doesn't touch the oil any longer
11. Always clean the front lens of the S100x objective with a piece of lens paper that is moistened with a drop of Xylol or alcohol. We recommend using Euromex lens paper and Xylol or alcohol
12. Clean the slide after use as well

Note: The S100x can also be used without immersion oil (dry). Please be aware of the fact that in such case the resolution will be much lower and parfocallity is lost!

Caution: Never put a drop of Xylol or alcohol directly on the lens of the objective. It could enter the objective and dissolve the glue that holds the lenses! Avoid oil contact with any of the other objectives!

5.12 Using filters

Filter can change the background to a more suitable view and increase the contrast. Please see the Oxion brochure for all available filters

6. Using the Oxion range accessories

6.1 Using the phase contrast slider

- Keep the phase contrast slider face up (text up); insert it from left to right into the condenser slider socket as the direction of the arrow pointed
- Each slider has 3 positions, 2 phase contrast positions and in the center of the slide the bright field position for normal use without phase contrast. Each phase contrast objective used has to be matched with the phase contrast ring on the slider. For example: when the 10x phase contrast objective is used the slider should be positions to match the 10 phase diaphragm)
- When observing phase contrast, please set the aperture diaphragm indicator to “PH” position

Note:

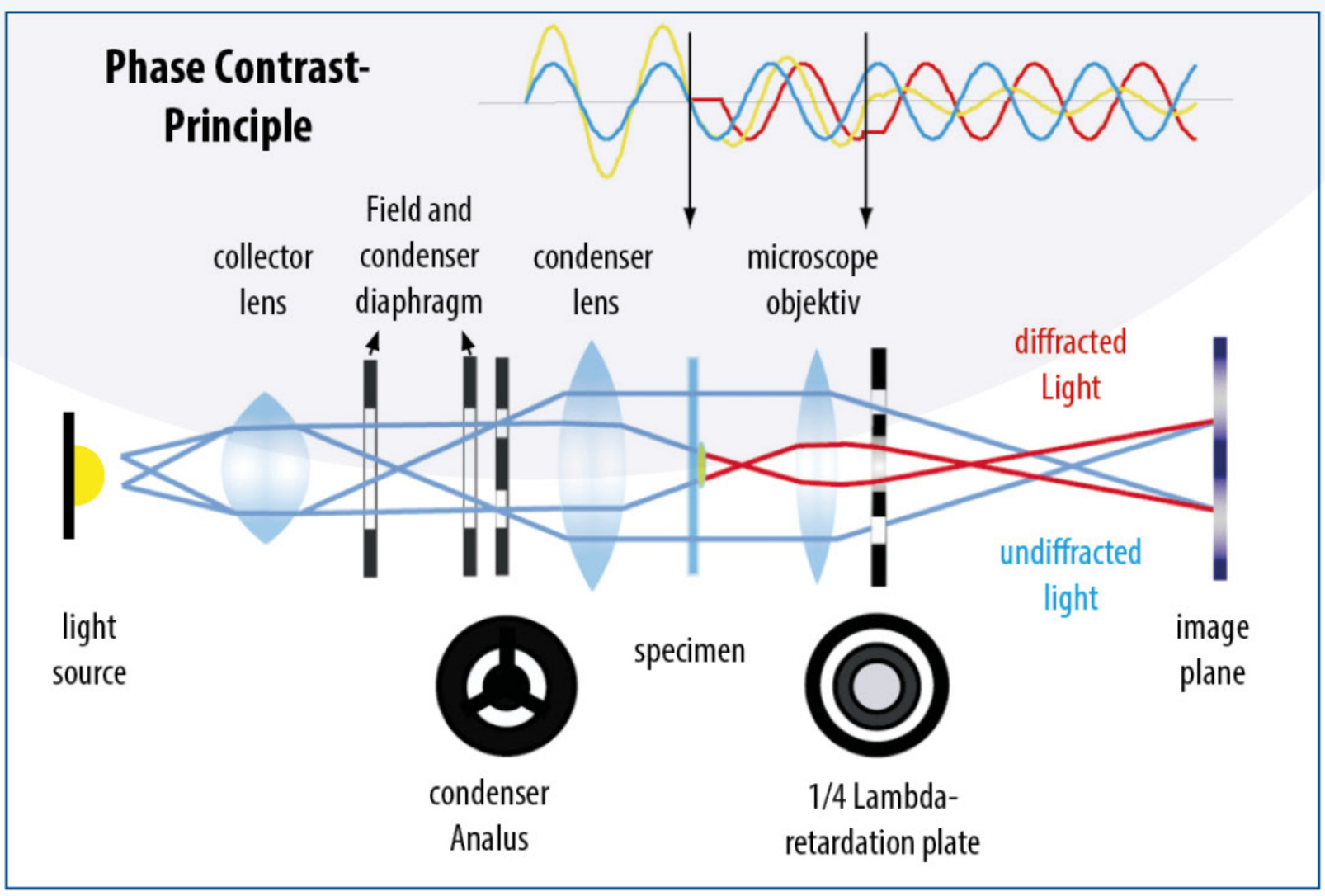
The phase diaphragms in the sliders are pre-centered do not need to be adjusted in operation

6.2 Mounting and operation of the Euromex Zernike phase contrast condenser set

6.2.1 Use of phase contrast with the Oxion microscope

The phase contrast method was designed in 1934 by the Dutchman Frits Zernike to observe very thin or transparent objects. This technique uses the fact that light travelling through tissue undergoes a phase shift due to diffraction

By recombining the phase shifted light with the background light, a contrasted image appears in the eyepiece



6.2.2 Using the Zernike phase contrast set

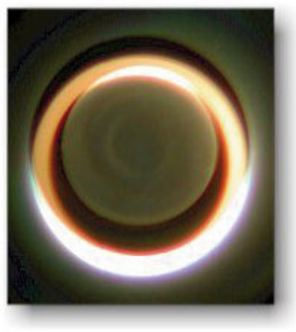
Any Oxion model with a Zernike phase contrast set comes with the condensor and objectives already mounted and centered on your microscope. If you suspect misalignment or want to check the alignment please see the next point for ”centering the phase rings”

The height of condenser can be adjusted in height by means of a rack and pinion movement. In this way the light beam is concentrated in the specimen for an optimum resolution

6.2.3 Centering the phase rings

Take following steps in order to centre the phase rings

- For centering of the 10x phase objective, turn the condenser disc in such a way that the corresponding phase ring is in place under the condenser
- Place the centering telescope in the eyepiece tube, and focus the phase ring of the objective by means of the adjustable eye lens
- Now focus the centering ring of the condenser by means of the coarse and fine adjustment knobs
- At last, center the phase ring beneath the condenser disc with the phase contrast adjusting levers, until the two rings visible in the eyepiece are in one centric line
- Repeat each step for all objectives



Not centered

Centered properly

6.3 Using the Dark Field Slider

- Keep the dark field slider face up (text up); insert it from left to right into the condenser slider socket as the direction of the arrow pointed.
- The slider has 2 positions, one position for dark field and one for normal bright field use without dark field.

Note:

When observing in dark field, please fully open the diaphragm to maximum

6.4 Using the simple polarizing set

- Simple polarizing includes analyzer and polarizer
- Remove the dust cover from the filter slot (M), and insert the analyzer text face up.
- Put the polarizer into the condenser slot.
- Rotate the polarizer to change the state of polarization.

6.5 Using the 0.5x C-mount camera adapter (AE.5057, for trinoculair models only

- Screw the adapter on your cs/c-mount camera
- Loosen the lock-screw on the trinocular head
- Insert the camera adapter into the trinocular port according to the direction of the figure. Secure the lock-screw tightly
- Focus on a specimen through binocular using your eyes, then observe the image through camera, if the image is un-sharp, rotate the adjustment tube to focus the image

6.6 Using the SLR camera adapter (AE.5527, for trinoculair models only)

- Loosen the lock-screw on the trinocular head and remove the dust-cover
- Insert SLR camera adapter to the trinocular. Secure the lock-screw
- Loosen the lock-screw on the photo tube and remove the photo tube
- Insert the photography eyepiece 3.2X to the eyepiece base. Insert and secure the tightly
- Place the T2-ring on the SLR camera adapter (some models come pre-mounted)
- Place your camera(without objective lens)

7. Maintenance and cleaning

Always place the dustcover over your Oxion microscope after use. Keep the eyepiece and objectives always mounted on the microscope to avoid dust entering the instrument

7.1 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 Xylol or alcohol on the lens paper. Never put Xylol or alcohol directly on the lens!
- When dirt is clearly visible in the field of view it resides on the lowest lens of the eyepiece. By using the Allen-key the eyepiece can be removed from the tube. Clean the outside of the lens
- In case there is still dust visible please check if the dust is in the eyepiece by turning it. If this is the case remove the lowest lens carefully from the eyepiece and clean it. Euromex strongly recommends using Euromex cleaning accessories for your Oxion microscope
- 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 fibres can damage the coating of the lenses!

7.2 Maintenance of the stand

- Dust can be removed with a brush. In case the stand or table is really dirty the surface can be cleaned with a non-aggressive cleaning product
- All moving parts like the height adjustment or the coaxial course and fine adjustment contain ball bearings that are not dust sensitive. With a drop of sewing-machine oil the bearing can be lubricated

7.3 Replacing the fuse

- Always remove the mains cable from the microscope and turn the main switch to “0” (OFF) before replacing the fuse
- Screw off the fuse cap from the fuse base with screwdriver
- Install a new fuse (specification of the fuse: T250V, .15A)

When in doubt always contact your local Euromex distributor!