iScope

fluorescence with 6-position turret attachment

supplementary

user manual

euromex
microscopes holland

v.431481

Contents

1. 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

1.1 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

1.2 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 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

1.3 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 microscope, 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

1.4 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 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

1.5 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 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

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

1.6 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 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, fabrick, 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

2. Introduction

The IScope series has been designed with all kinds of Life Sciences applications and great durability in mind. This resulted in a modern, robust and high level microscope for everyday use, equipped with excellent optical and mechanical components. Specific attention to production methods also resulted in an excellent price/performance ratio

This manual is a supplementary manual and is to be used together with the general manual for the IScope series. Both are supplied with this microscope. Please read the manual in full before you start working on your microscope

3. Safety symbols

The following symbols are found on the system. Study the meaning of the symbols and always use the equipment in the safest possible manner

Symbol	Explanation
	Indicates that the surface becomes hot, and should not be touched with bare hands
	Indicates that the high voltage (upper 1KV) inside could cause electric shock if not handled properly
	Before use, read the user manual carefully. Improper handing could result in personal injury to the user and/or damage to the equipment
	Indicates that the main switch is ON
	Indicates that the main switch is OFF

4. Maintenance and storage

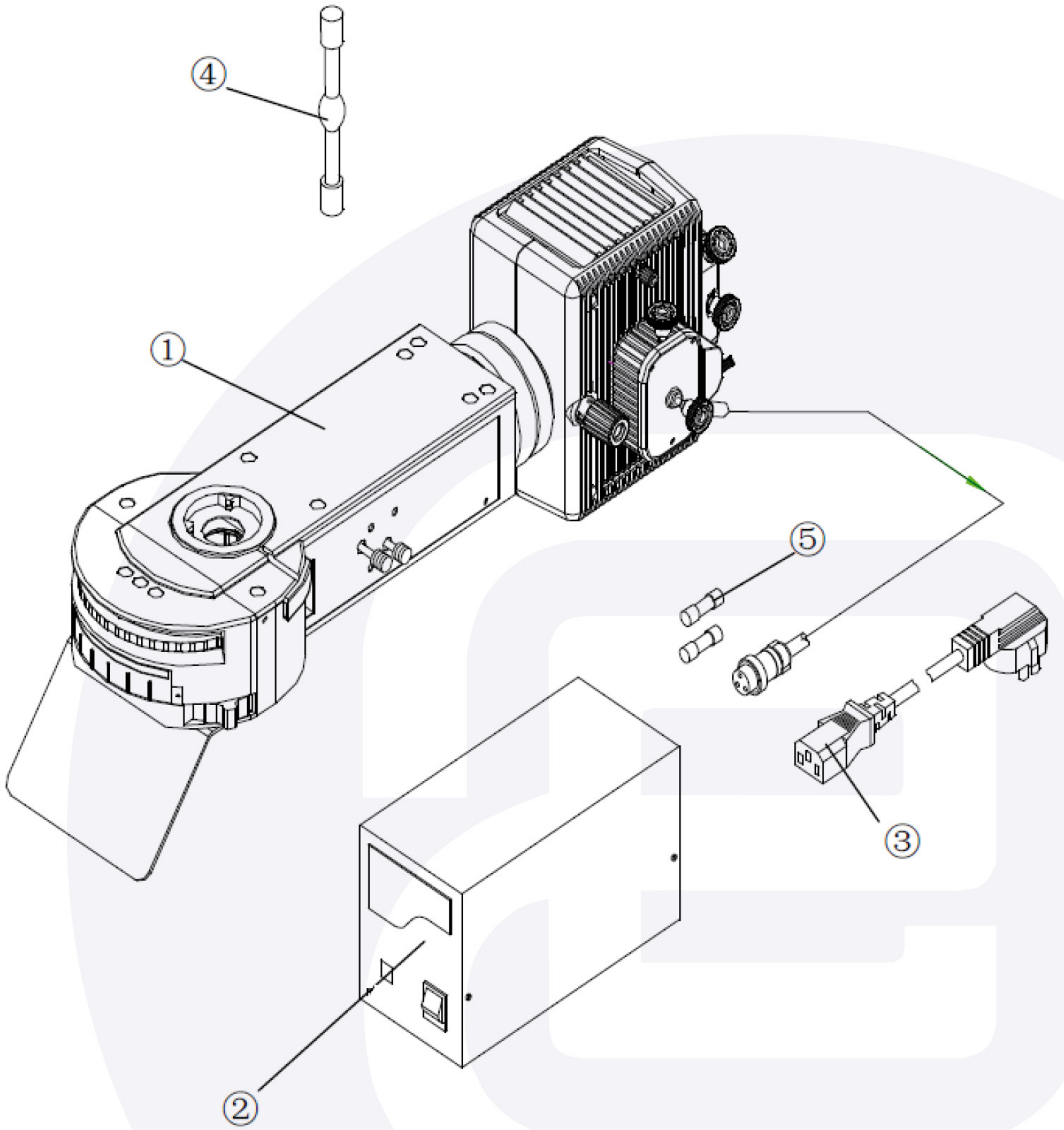
1. Clean all glass components by wiping gently with cleaning cloth. To remove fingerprints or oil smudges, wipe with gauze slightly moistened with a mixture of ether (70%) and alcohol (30%). The Euromex cleaning kit is very suitable as it contains all products needed for cleaning the optics

Note: since solvents such as ether and alcohol are highly flammable, they must be handled with care. Be sure to keep these chemicals away from open flames or potential sources of electrical sparks. For example, electrical equipment that is being switched on or off. Also remember to always use these chemicals only in a well-ventilated room. Euromex cleaning kit agents are non-alcohol, non-toxic, and inflammable

2. Do not attempt to use organic solvents to clean the non-optical component of the equipment. To clean these, use a lint-free, soft cloth lightly moistened with a diluted neutral detergent
3. Do not disassemble any part of the power supply unit as malfunction or damage may occur
4. In order not to impair the safety of the equipment, replace the 100W HG Lamp when the counter of power supply indicates “100.00” hours. To prevent any hazard, always turn the main switch on the power supply unit to “O” (OFF), unplug the power cord from the mains outlet, and wait for at least 10 minutes before replacing the 100W HG lamp. High-pressure gas is sealed within the mercury vapor100W Hg lamp. Thus, if it is continued to be used past its service life expectancy, the glass tube may deform and may sometimes rupture, even explode

5. Components

1. Main body of the epi-fluorescent attachment
2. Power supply unit
3. Power cord (please use the power cord provided by Euromex)
4. Mercury vapor100W Hg lamp
5. Fuses (8A)



6. Assembly of the fluorescent microscope

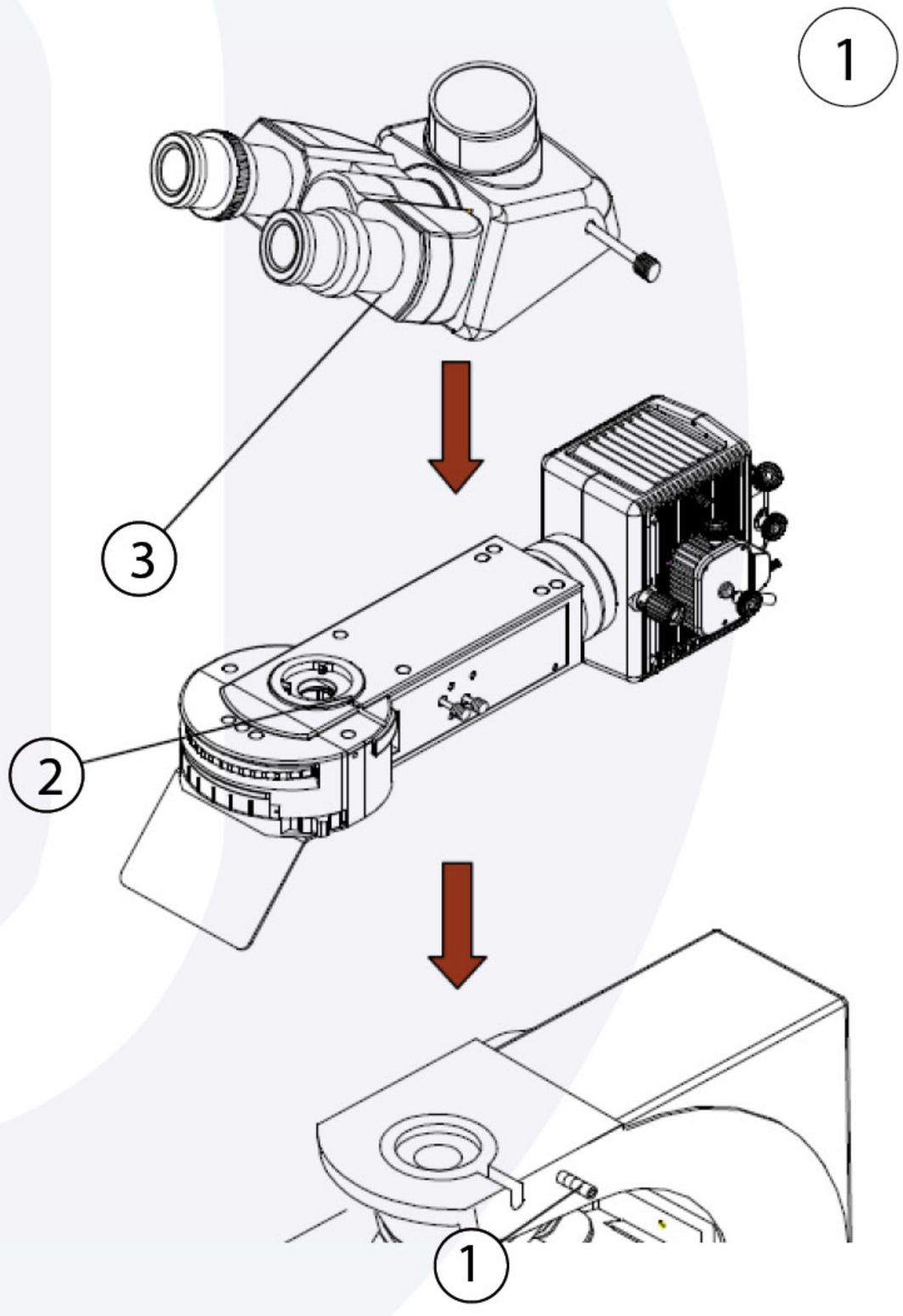
(fig. 1)

A. Loosen the setscrew (1) and take the bino or trinocular viewing head from the body of the microscope. (no numbers indicated on the image)

B. Insert the epi-fluorescent attachment into the microscope correctly and tighten the setscrew (1) until it is installed firmly. (no numbers indicated on the image)

C. Insert the viewing head (3) into the epi-fluorescent attachment correctly and tighten the setscrew (2) until it is installed firmly. (no numbers indicated on the image)

D. Place the objectives (if not factory pre-installed by Euromex)



6.1 Mounting the mercury bulb

(fig. 2 and fig. 3)

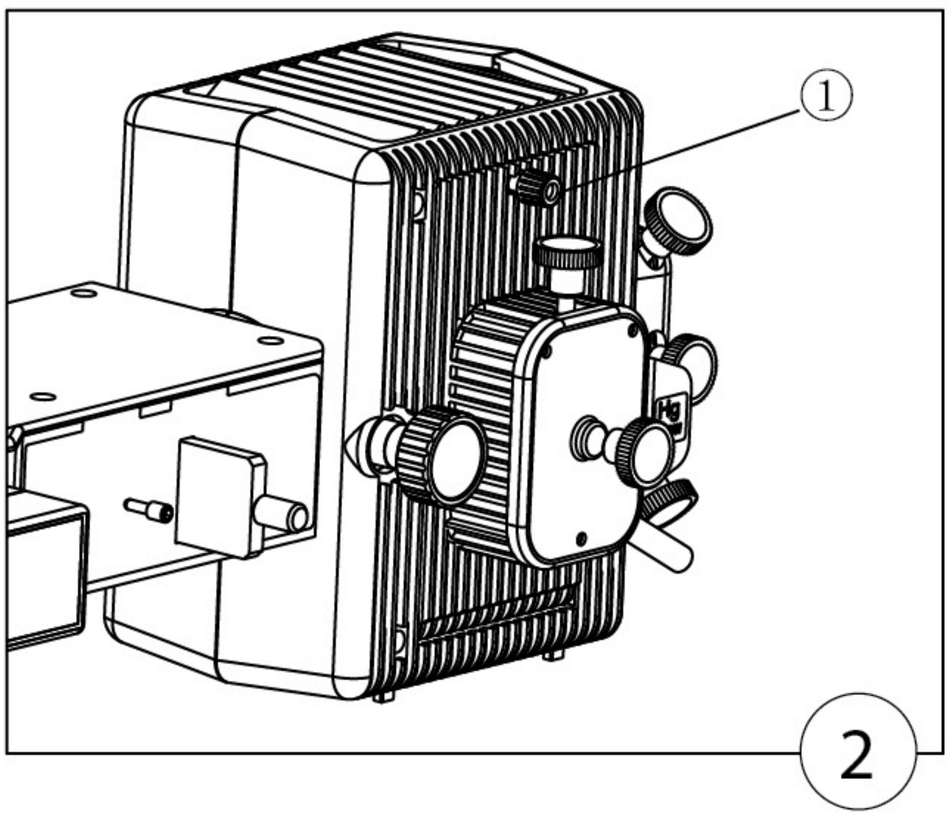
A. Loosen the lamp socket clamping screw (1), and remove the lamp socket (fig.3)

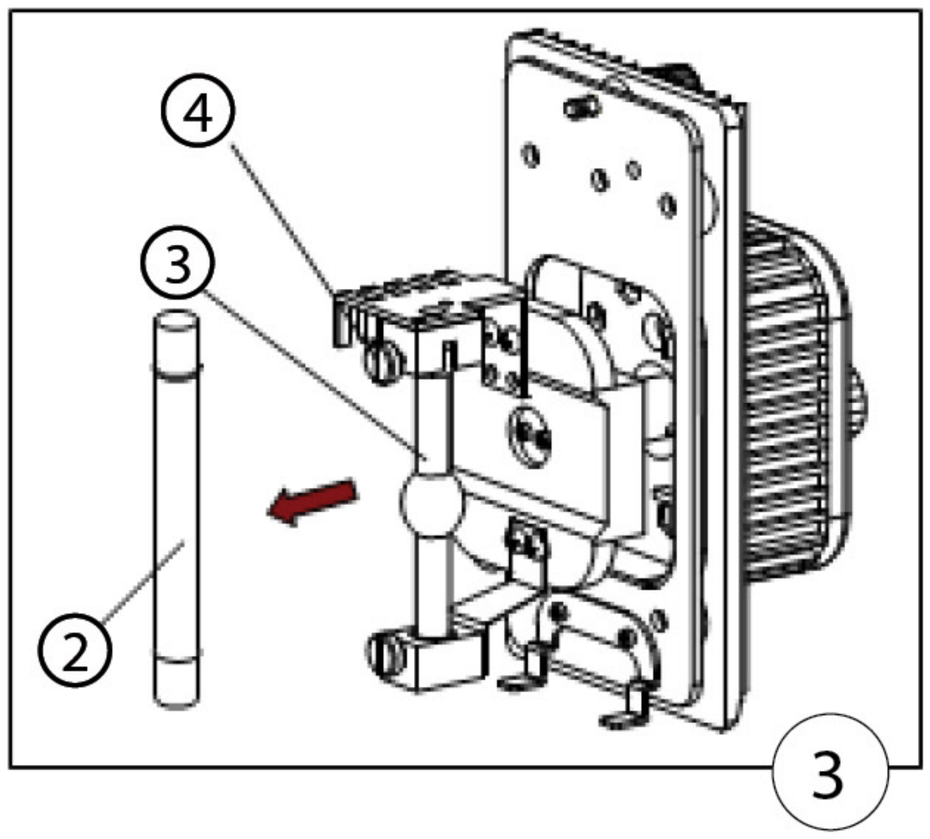
B. After removing the foam backstop (2), securely attach the + pole of the specified mercury bulb (3) to the lower mount and the - pole to the upper mount, then tighten the socket clamping screws (4)

C. Close the lamp socket with lamp into the original position and tighten the socket clamping screw (1)

- Be sure to use an original 100W bulb (lamp)
- Never subject the lamp to excessive force when mounting the mercury bulb
- Be careful and avoid leaving fingerprints or dirt on the mercury bulb. Fingerprints may cause distortion in the glass which could result in a ruptured lamp. If stained, clean by wiping gently with gauze, slightly moistened with a mixture of ether (70%) and alcohol (30%)

Note: to prevent any hazard, always turn the main switch on the power supply unit to "O" (OFF), unplug the power cord plug from the mains outlet, and wait for at least 10 minutes before replacing the lamp





6.2 Mounting filter blocks

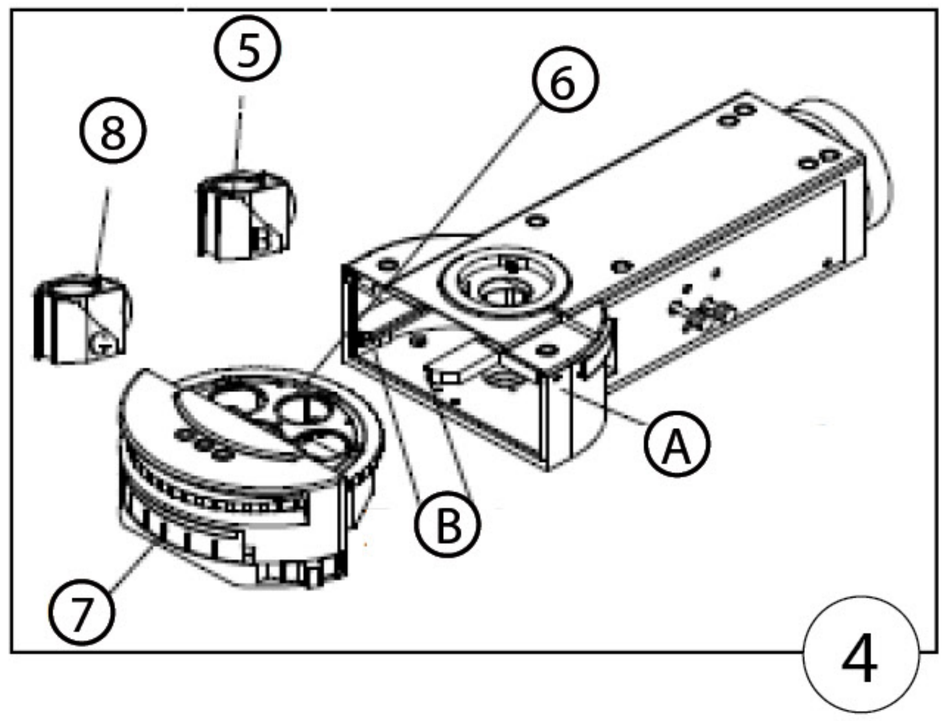
(fig. 4 and fig. 5)

A. Unscrew the hexagon bolt (A) with the a screwdriver and take out the front part of the fluorescence attachment(filter block turret (6))

B. Put the filter block turret (6) on its back, several metal shields (9) are visible. Loosen and take out one of the metal shields by unscrewing the screw (10)

C. Mount the fluorescence filter block (8) and tighten the bolt. Beside the bolt, you can see a number on the turret indicating the fluorescence filter block. This identifies the position for putting a label on the front side of the turret. Mount other filter blocks in the same way

D. Push the complete filter block turret back into the rail slot (B) and tighten the hexangular screw to finalize this procedure



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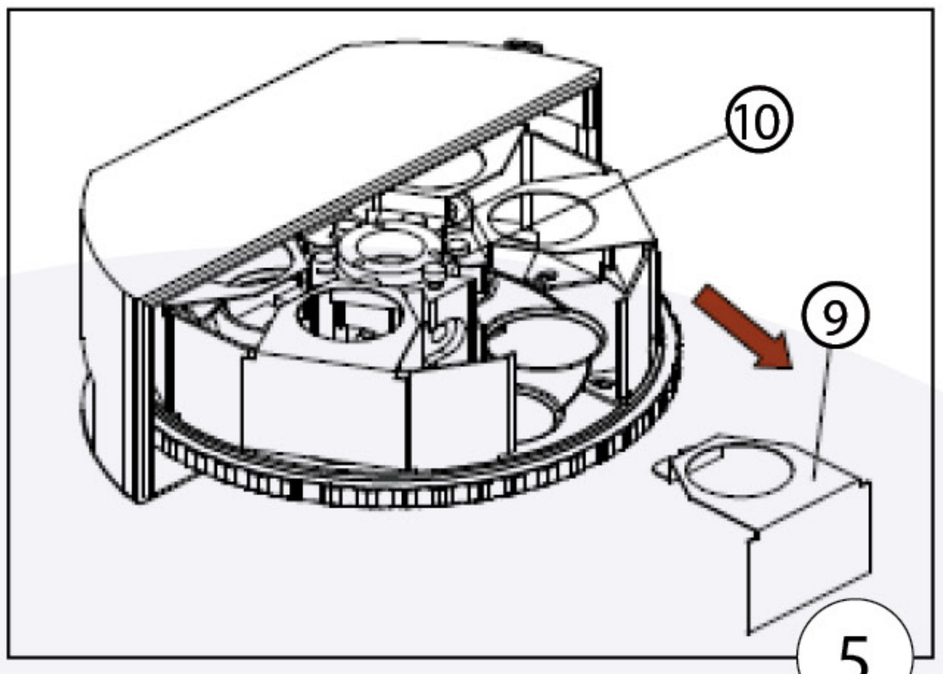

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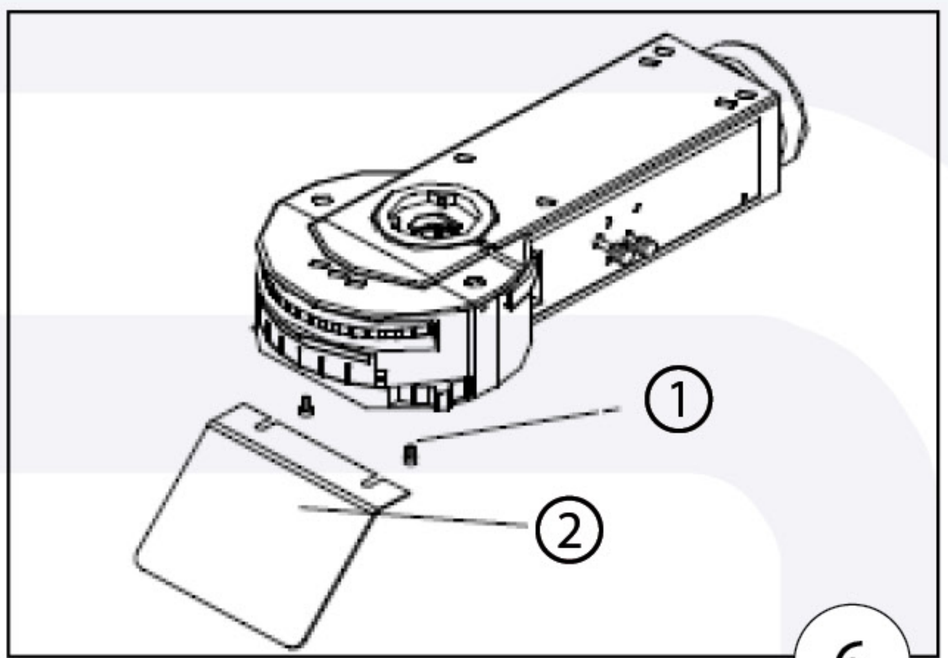
6.3 Mounting the UV protection shield

(fig. 6)

Install the UV protection shield (2) on the attachment by tightening the screw (1)



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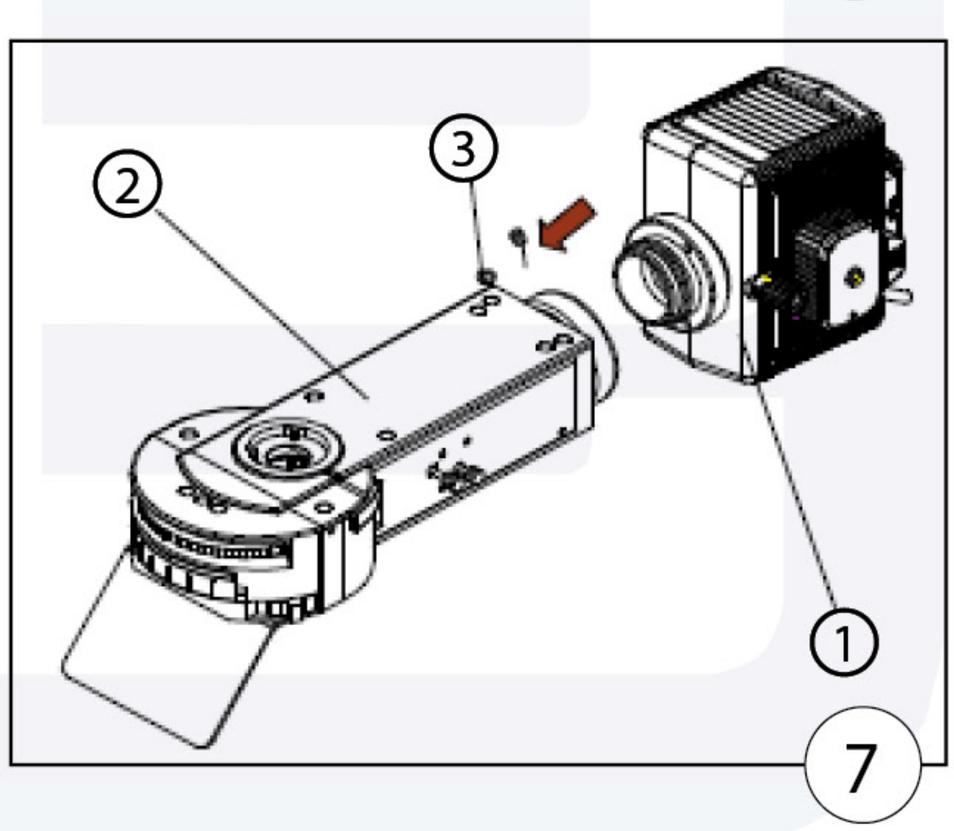
6.4 Assembly of the fluorescent attachment

(fig.7)

Mount the lamp housing (1) into the other end of the attachment (2) and fix it with two screws (3)



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6.5 Cable and cord connections

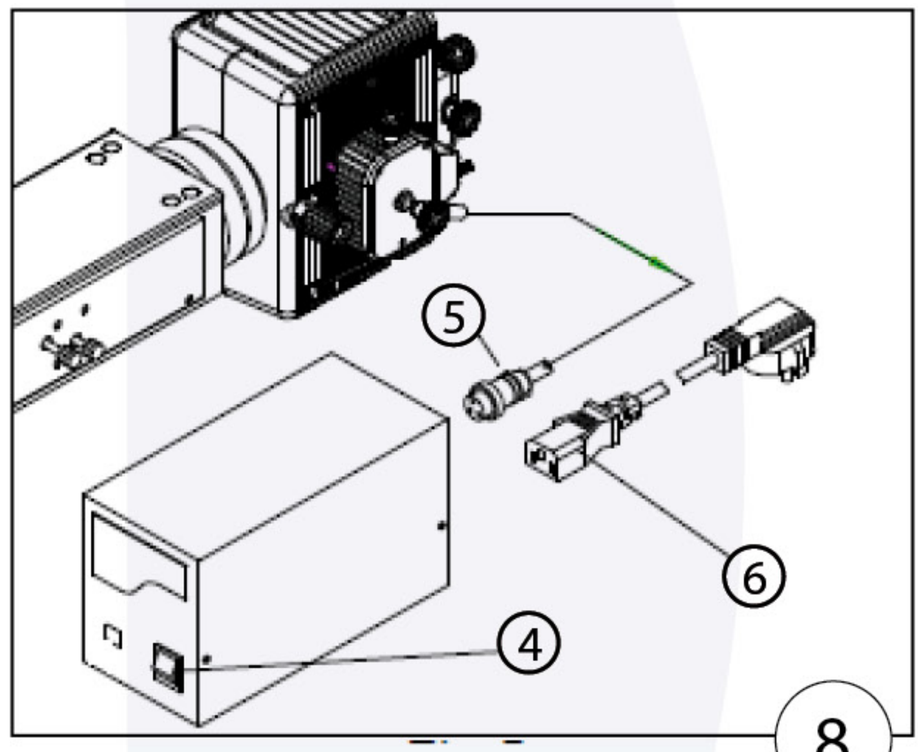
(fig.8)

A. Make sure that the main switch (4) of the power supply is set to "O" (OFF) before connecting cables. The power cord should not be connected yet.

B. Plug the connector (5) from the lamphouse securely into the connector on the power supply unit and make sure the cord is correctly connected

C. Connect the power cord connector (6) into connector on the power supply unit and make sure the cord is correctly connected

- Verify that the voltage and the frequency of the AC mains outlet match the setting of the voltage switch and the frequency switch on the rear of the power supply units. Improper setting may degrade burner performance, or in the worst case (although very rare) cause the burner to explode
- It is recommended to use the power cord provided by Euromex. The same type of power cord should be used if you lose or damage the old one



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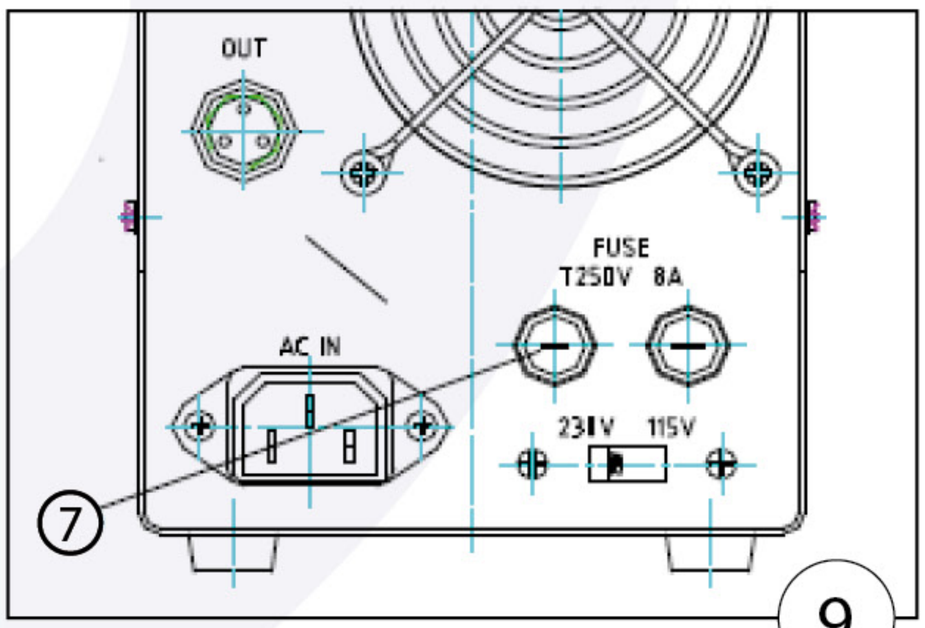
6.6 Fuse replacement

(fig.9)

A. Set the main switch (4, fig. 8) to "O" (OFF) and unplug the power cord before replacing a fuse

B. Using a flat screwdriver, remove each of the fuse holders (7) by tuning it counter- clockwise and pulling it out

C. Replace both fuses with new ones



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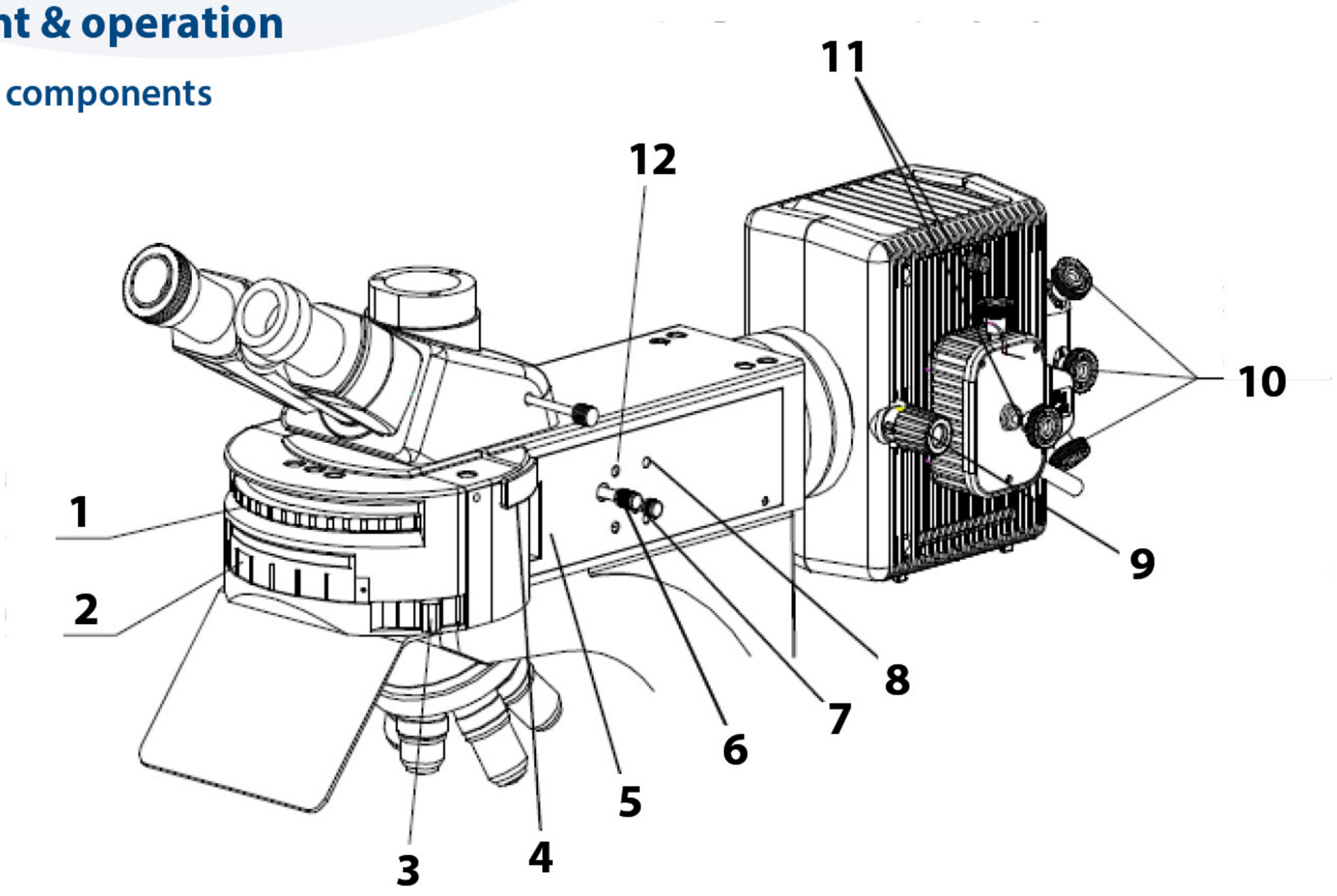
Note: Always use the designated fuses (8A). Make sure the voltage of the fuse matches the voltage of the AC mains outlet

7. Adjustment & operation

7.1 Name of the components

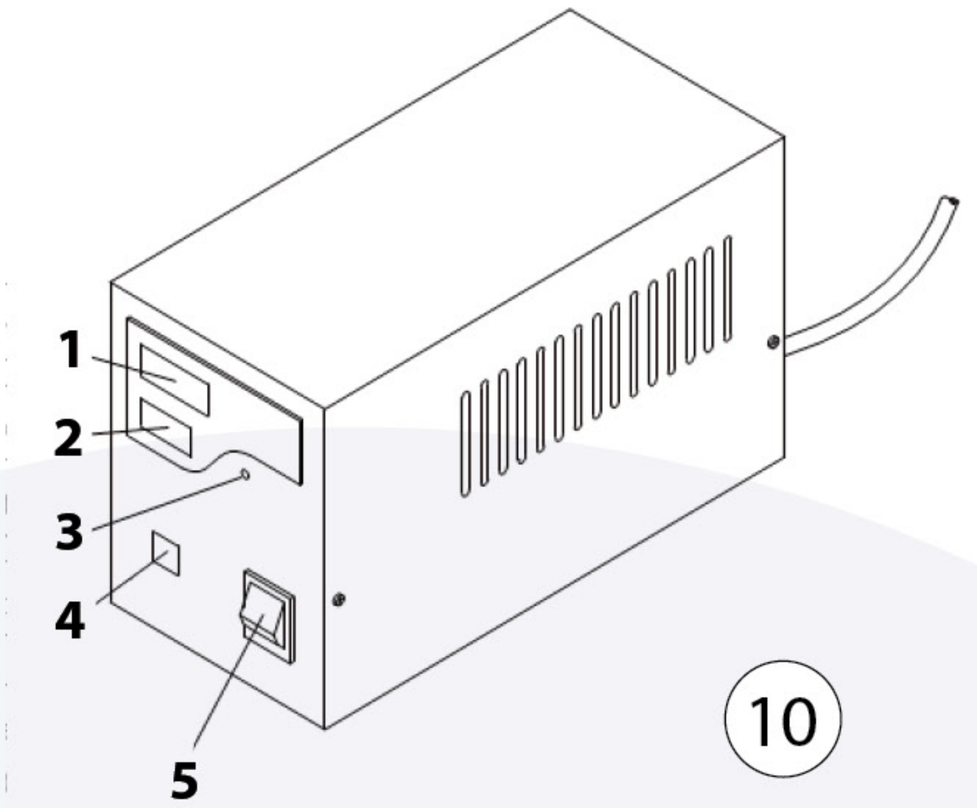


1. Filterblock turret	**7.** Aperture diaphragm lever
2. Filterblock label	**8.** Aperture diaphragm centering screw
3. Light shutter	**9.** Collector adjustable knob
4. Slot for slider	**10.** Mirror centering knob
5. Slot for slider	**11.** Lamp centering knob
6. Field diaphragm lever	**12.** Field diaphragm centering screw

- The reflected light fluorescent mirrors for B-excitation and G-excitation have been installed in the filter turret at the factory
- More filters and filter holders are optional
- ND filters are optional

(fig. 10)

1. Hour counter
2. Current indicator
3. Reset switch
4. Start reset button
5. Main switch



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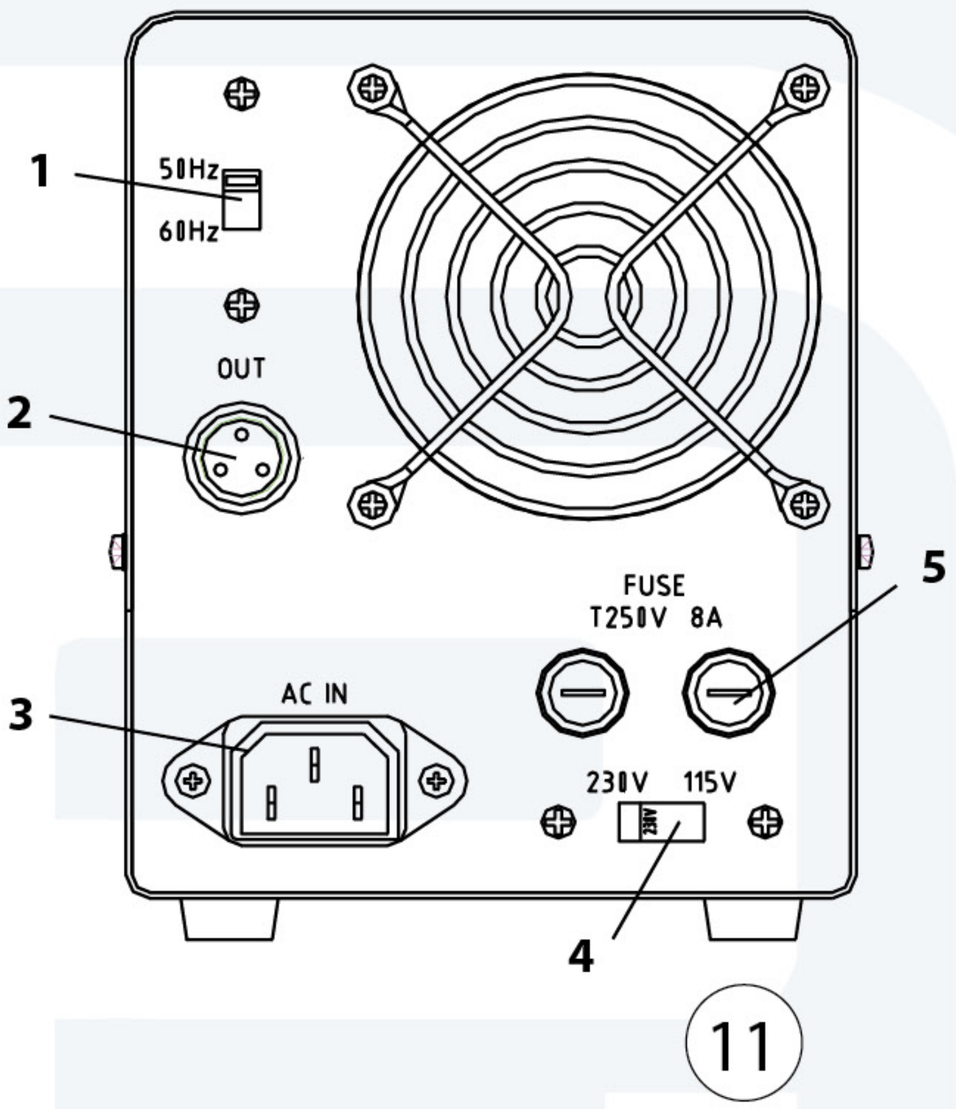
(fig. 11)

1. Frequency switch
2. Lamp house connector
3. Power cord connector
4. Voltage switch
5. Fuse holders



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7.2 Operation

7.2.1 Preparation

1. Verify that the voltage and the frequency of the AC mains outlet match the setting of the voltage switch and the frequency switch on the rear of the power supply units
2. Make sure the cords are connected firmly
3. When it is required to interrupt observation for a short period, use the shield in the holder. (Repeatedly turning the mercury vapor100W Hg lamp on and off will shorten its life span considerably)
4. Precautions on the specimen color fading:

   The system employs high-intensity excitation light to enable bright observation of dark fluorescent specimens. As a result, if high-power objectives are used frequently, color fading of the specimen occurs early, degrading the view (contrast) of fluorescent images. So it is effective to use the shutter frequently to avoid illuminating the specimen for a longer period than necessary

7.2.2 Switch on the power supply

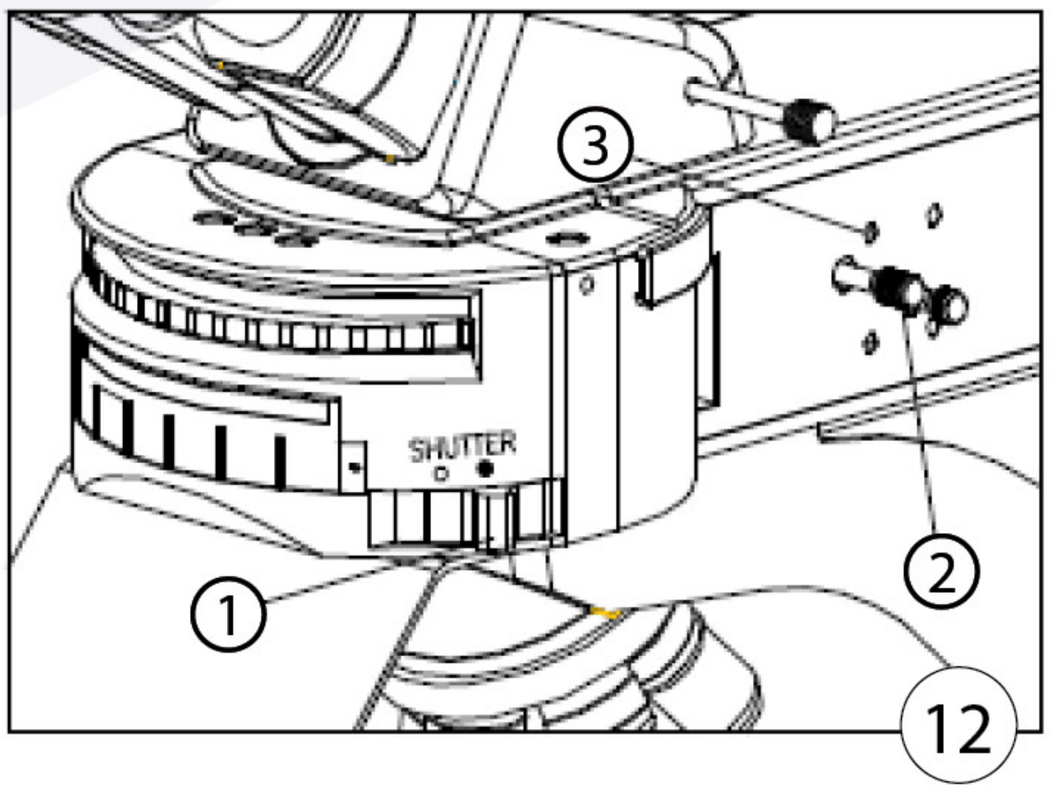
Set the main switch of the power supply unit to "1" (ON). The bulb will stabilize in 5 to 10 minutes after ignition

- Some mercury vapor100W Hg lamps may not ignite the first time the power is turned ON due to variance in production. If this occurs, set the main switch to "1" (ON), then press the starter reset switch on the front panel of the power supply between 1 to 4 seconds to ignite the 100W HG Lamp. Repeat if necessary
- To avoid shortening the 100W HG lamp life span, do not turn the 100W HG lamp off within 15 minutes after ignition
- The 100W HG lamp cannot be re-ignited for about 10 mimutes, that is, until the mercury vapour inside it has cooled down and condensed to liquid
- Ensure that the hour counter is reset to "000.00" after replacement of the 100W HG lamp. Resetting is done by inserting a thin object such as a paperclip tip into the reset hole on the front panel of the power supply unit to press the internal switch

7.2.3 Centering the field Iris diaphragm

(fig. 12)

1. Switch the light shutter (1) to "●"position
2. Revolve filter block turret to engage the one of the fluorescence filter blocks in the light path
3. Switch the light shutter (1) to "**O**"position.
4. Engage the 10X objective in the light path, place a specimen on the stage and bring into approximate focus
5. Pull the field iris diaphragm lever (2) out until the iris diaphragm closes to his maximum
6. Use the hexangular screwdriver to adjust the two field iris diaphragm centering screws alternately to move the image of the diaphragm to the center (fig. 13 shows the adjustment of diaphragm)



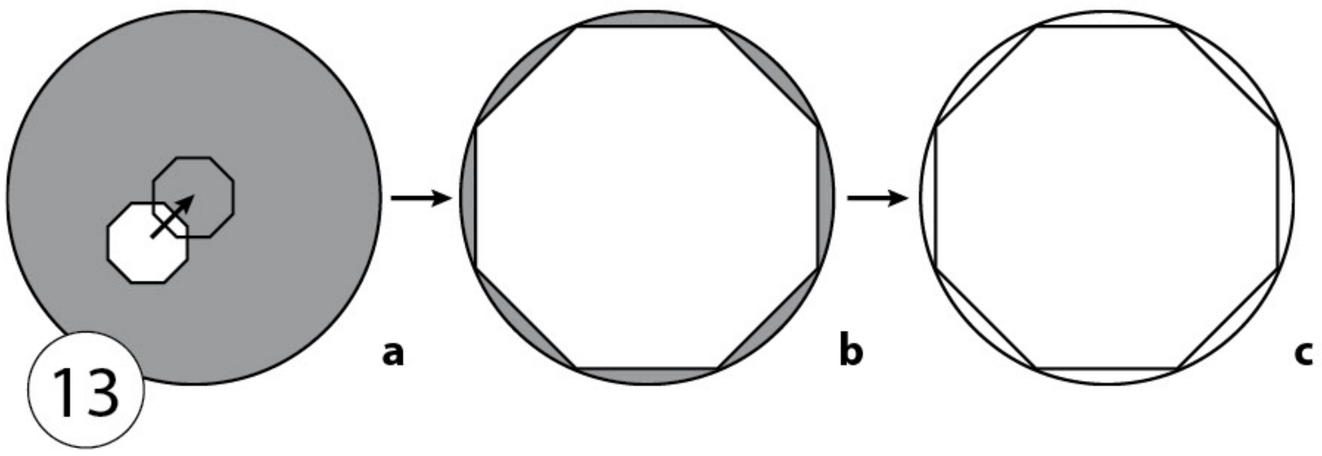
7. Push in the field diaphragm lever to open the diaphragm. If this makes slight deviation noticeable, adjust the centering again
8. Open the diaphragm until the iris diaphragm has disappeared just outside the field of view

7.2.4 Adjusting the field iris diaphragm

(fig.13)

The field diaphragm adjusts the diameter of the illuminating beam to obtain good image contrast

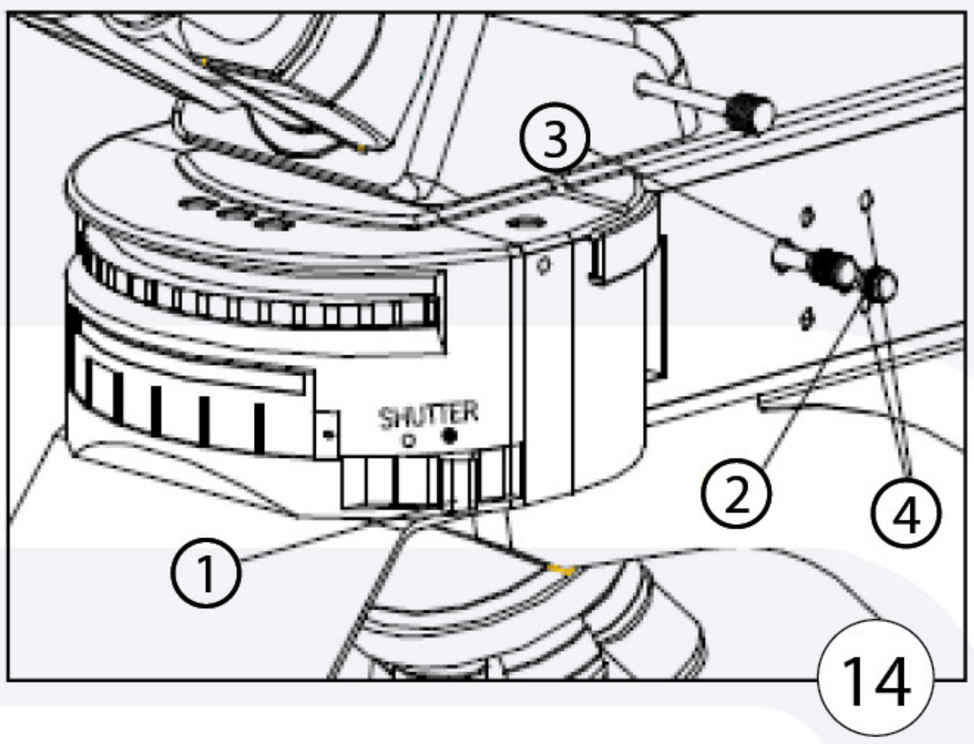
Keeping the field diaphragm stopped down to the smallest required area for each observation makes it possible to prevent color fading of areas outside the observation target region



7.2.5 Centering the aperture iris diaphragm

(fig. 14)

1. Switch the light shutter (1) to "●"position to shut off the light path
2. Revolve the filter block turret to engage one of the fluorescence filter blocks into the light path
3. Switch the light shutter (1) to "**O**" position to open the light path
4. Engage the 10X objective in the light path, place a small white paper with a cross on the stage and bring into approximate focus
5. Move the cross of the centering plate to the center of the field of view
6. Remove any of objectives from the light path
7. Pull out the aperture diaphragm lever (2) to adjust the aperture iris diaphragm to the smallest diameter
8. Pull out the field iris diaphragm lever (3) to adjust the field iris diaphragm to the smallest diameter. The image of the aperture iris diaphragm can be found on the centering plate
9. Adjust the aperture iris diaphragm centering screws (4) with attached wrench to superimpose the image of aperture iris diaphragm on the cross of centering plate



7.2.6 Adjusting the aperture iris diaphragm

(Fig. 14)

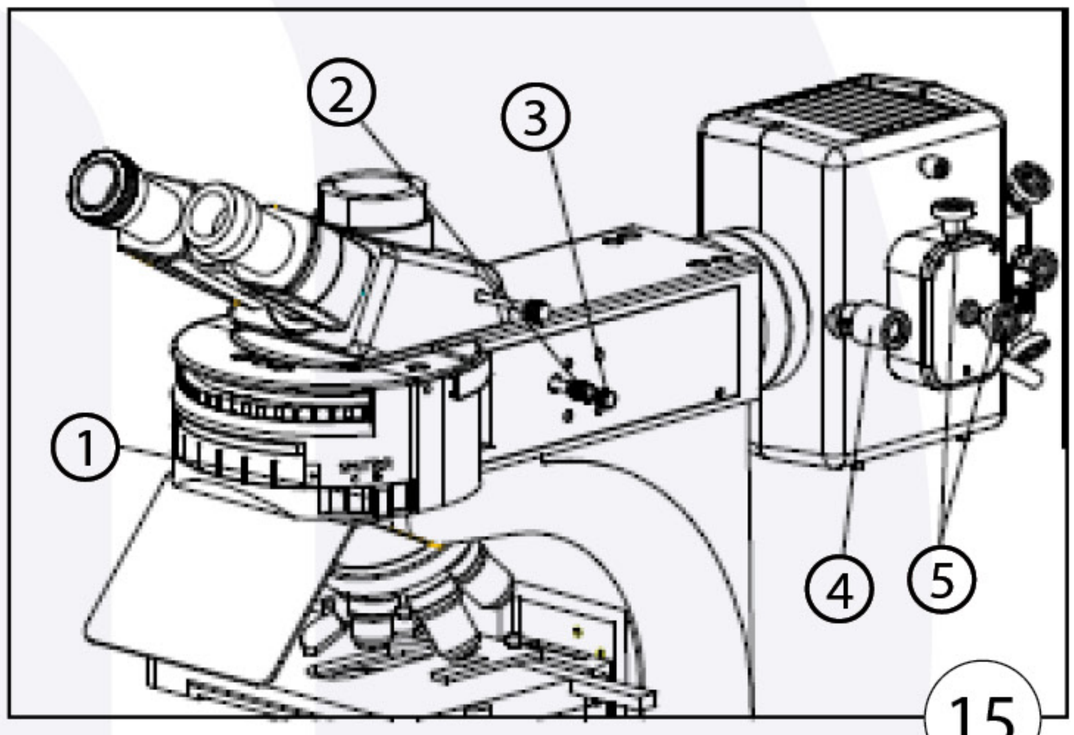
The aperture iris diaphragm adjusts image resolution and contrast

- For fluorescent observation, push in the aperture iris diaphragm lever (3). Both ND filter and small aperture diaphragm can help weaken the intensity of the excitation light to delay color fading of the specimen
- According to the objective in use, adjust the iris diaphragm using the field iris diaphragm lever (3) until the iris diaphragm has disappeared just outside the field of view

7.2.7 Centering the mercury burner

(fig. 15 - 16 - 17)

Before proceeding to center the burner, wait for the arc image to stabilize to protect against glare during arc image centering, it should be viewed across the excitation light protective shield



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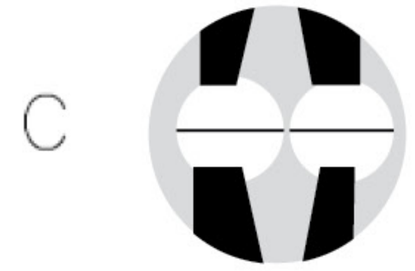
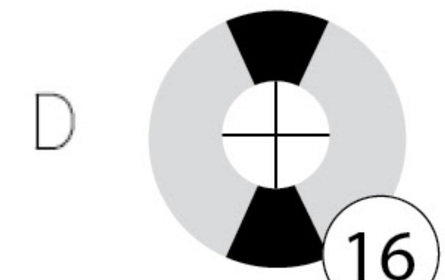
1. Switch the light shutter (1) to" ●" position to shut off the light path
2. Revolve the filter block turret to engage the green or blue excitation filter block into the light path. If U/V excitation filter block is used, be sure to use the protective shield
3. Revolve the nosepiece to engage 10X objective into the light path. Place the centering plate on stage, through transmission observation; adjust the stage until the cross is in the center of the field of view
4. Remove the objective from the revolving nosepiece position and engage this position in the light path
5. Pull out the field iris diaphragm lever (2) to close the iris diaphragm and push in the aperture iris diaphragm lever (3) to open the iris diaphragm to the limit
6. Switch the light shutter (1) to "**O**" position to open the light path
7. Turn the collector adjusting knob (4) to project the arc image on the centering plate and sharpen it (A)
8. Turn the burner adjusting knob (5) to move the arc image and the mirror reflected arc image in the symmetrical position (B)
9. Adjust the mirror focusing knob (6 fig. 17) to sharpen the mirror reflected arc image (C)
10. Turn the burner adjusting knob (5) to overlap the arc image with the mirror reflected arc image (D)

- Turn the collector adjusting knob (4) to make the field of view as bright and as regular as possible
- Maintain this condition until the next time the burner is replaced


A


B


C


D

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7.2.8 Centering the mirror reflected image

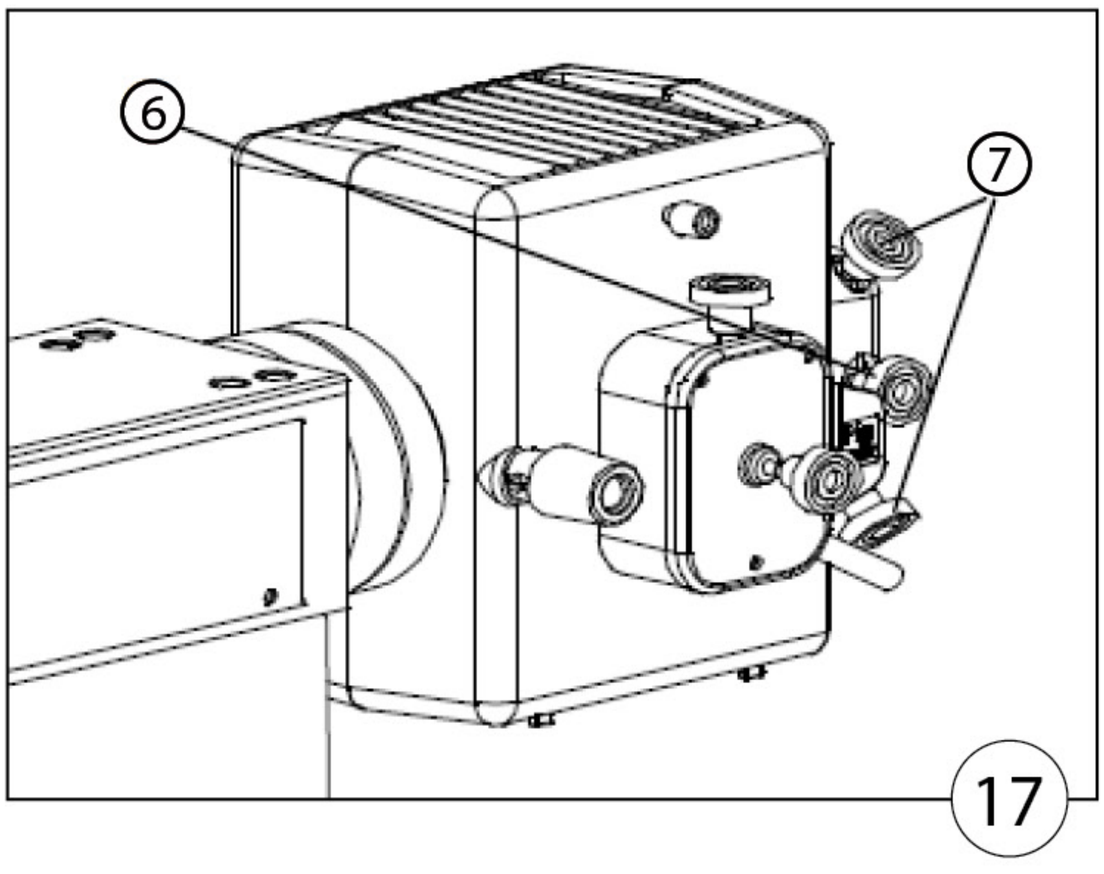
(fig. 17)

The mirror reflected image has been centered before leaving the factory. Do not adjust the knob (7) if not necessary. Only when the burner has been centered precisely, can the knob (7) be adjusted

Note: once the knob is adjusted, the reflected mirror cannot be reconverted to the status when leaving the factory

Knob control: fig. 17

1. The middle knob (6)is the mirror reflected image focusing knob which can sharpen the reflected image
2. The knobs at both sides (7) can adjust the up/down or left/right position of the mirror reflected image



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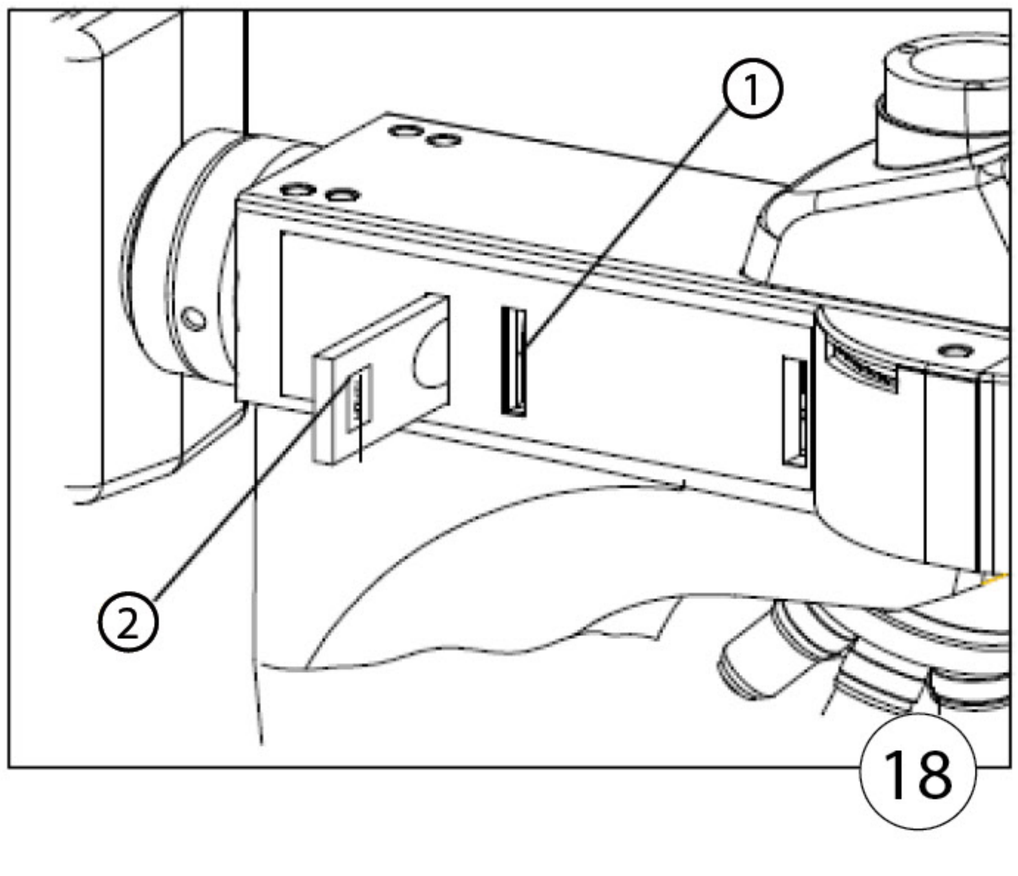
7.2.9 Mounting ND filter

(fig. 18)

1. The ND filter can reduce the excitation light intensity to delay color fading of the specimen. Use the ND filter as far as this does not hinder observation
2. There are two kinds of ND filters for option:
   ND6 and ND25 for position (1) and (2) respectively (fig. 18).
   To prevent the ND filter from being damaged, insert the filter with the indication surface facing the observation side
3. When the filter is inserted, there are two audible clicks.
   The filter is in the light path on the second click



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Note: When the mercury burner is lit for a long period while an ND filter is inserted, the filter and its metallic frame would become very hot. Take care not to burn yourself. When replacing the ND filter, be sure to wait until the ND filter cools down

7.2.10 Note on the hour counter

(fig 19)

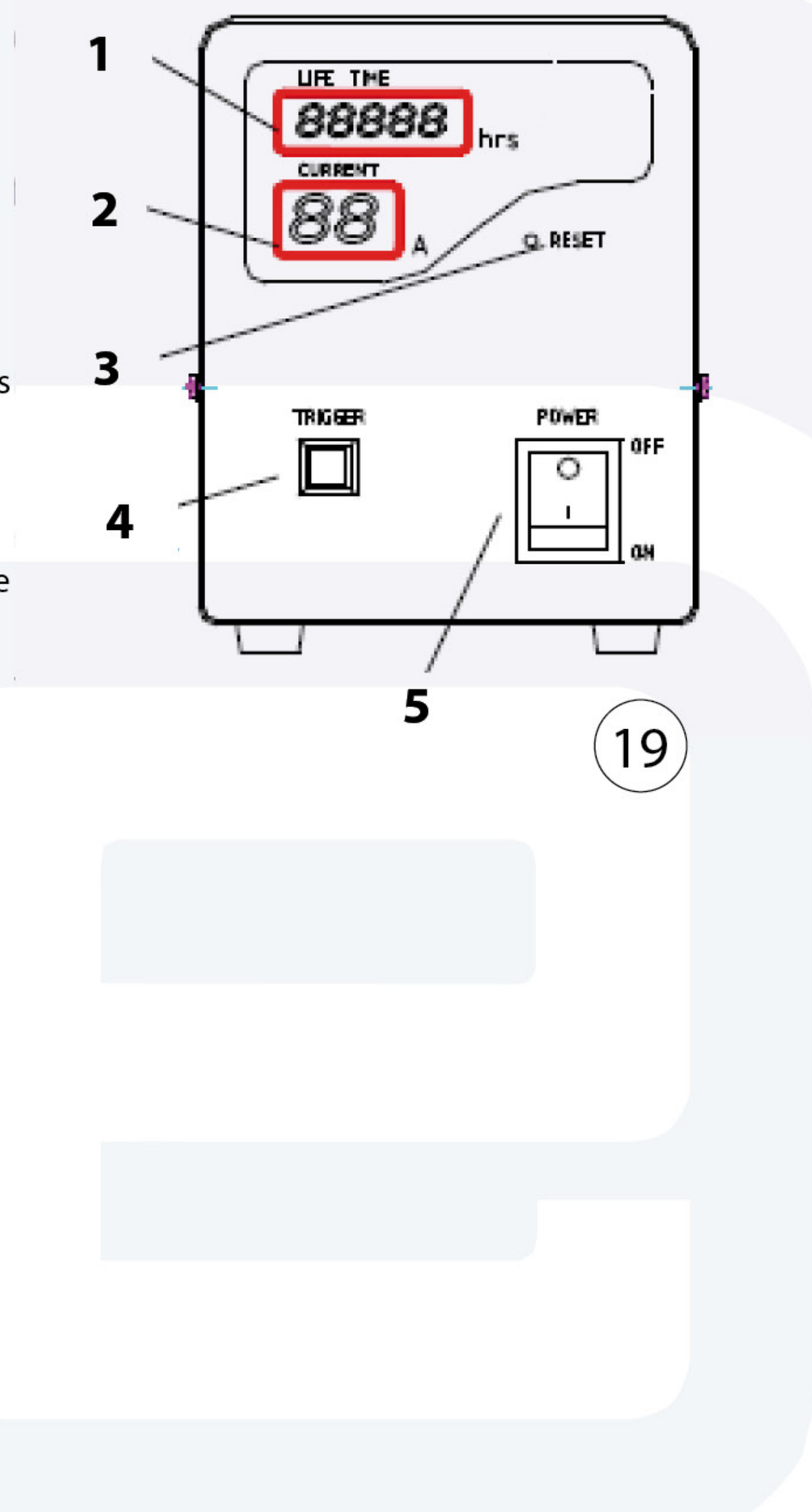
When the hour counter indicates "100.0":

- Set the main switch to "**O**"(OFF) for safety
- Wait for at least 10 minutes
- Then replace the lamp burner after making sure that the lamp housing has cooled down

A mercury burner contains high-pressure gas inside

Note: If the burner is used beyond its service life, stress may accumulate inside the burner, and in the worst (but very rare) case, the burner could explode

After replacing with a new burner, reset the hour counter, be sure to press the reset switch until "000.00" is displayed. (fig.19)



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A. Hour counter
B. Am meter
C. Reset switch
D. Start reset button
E. Main switch

8. Notes

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