

Instruction manual

VWR® Microscope VisiScope Series 534

Model	European Catalogue Number
TL534B FL BG	630-3270
TL534B FL4	630-3243
TL534B-SA FL4	630-3244
VisiCube TL_B	630-3245
VisiCube TL_G	630-3246
VisiCube TL_V	630-3247
VisiCube TL_UV	630-3248
VisiCube TL_R1	630-3249
VisiCube TL_R2	630-3250
VisiCube TL_R3	630-3251
VisiCube TL_FR	630-3252
VisiCube TL_A	630-3253



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1. Warning

This microscope is a scientific precision instrument designed to last for many years with a minimum of maintenance. It is built to high optical and mechanical standards and to withstand daily use.

We remind you that this manual contains important information on safety and maintenance, and that it must therefore be made accessible to the instrument users.

We decline any responsibility deriving from incorrect instrument use that does not comply with this manual.

2. Safety information



Avoiding electrical shock

Before plugging in the power supply, make sure that the supplying voltage of your region matches with the operation voltage of the equipment and that the lamp switch is in off position.

Users should observe all safety regulations of the region. The equipment has acquired the CE safety label. However, users have full responsibility to use this equipment safely.

Please follow the guidelines below, and read this manual in its entirety to ensure safe operation of the unit.

3. Intended use

For research and teaching and teaching use only. Not intended for any animal or human therapeutic or diagnostic use.

4. Symbols and conventions

The following chart is an illustrated glossary of the symbols that are used in this manual.



CAUTION

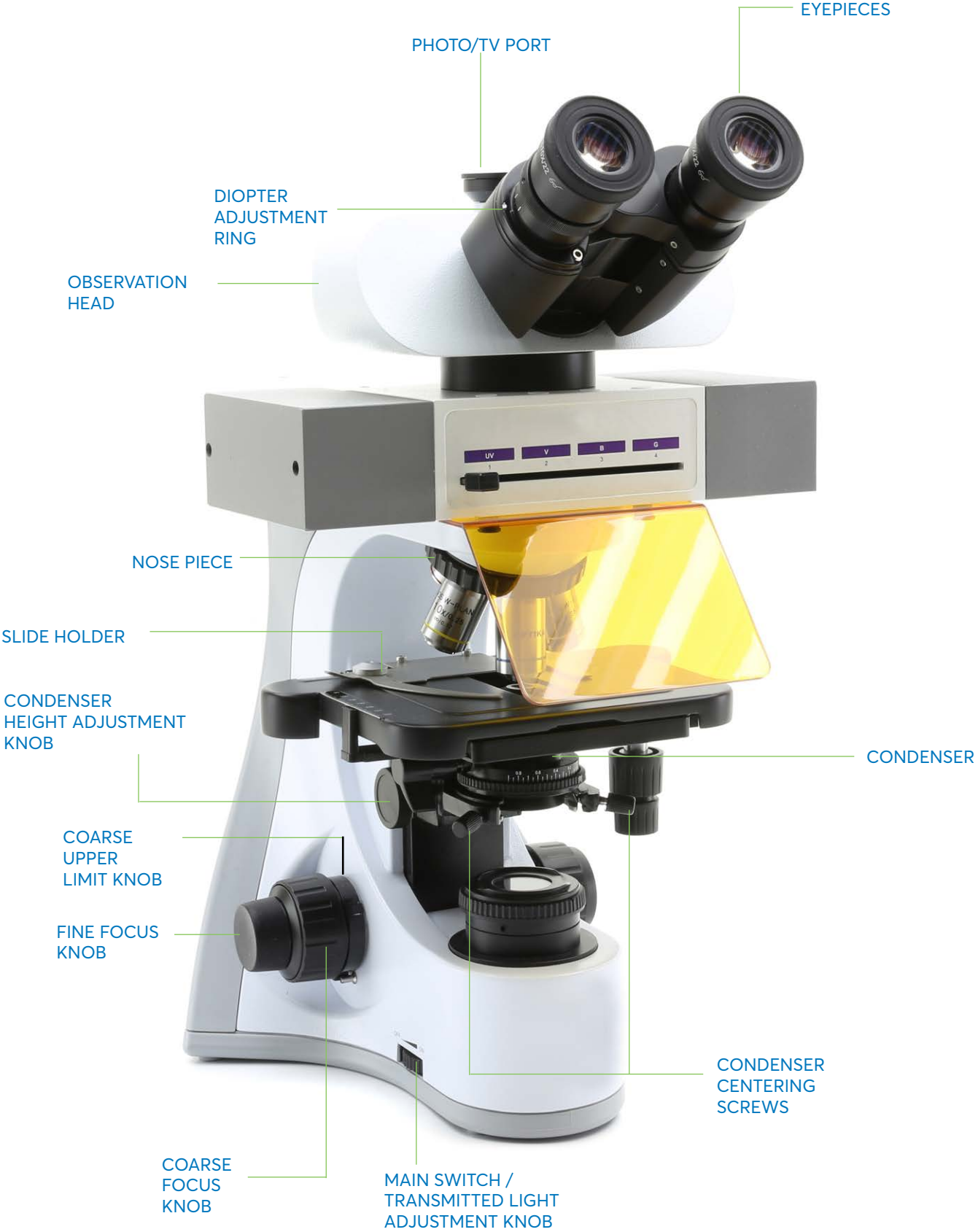
This symbol indicates a potential risk and alerts you to proceed with caution



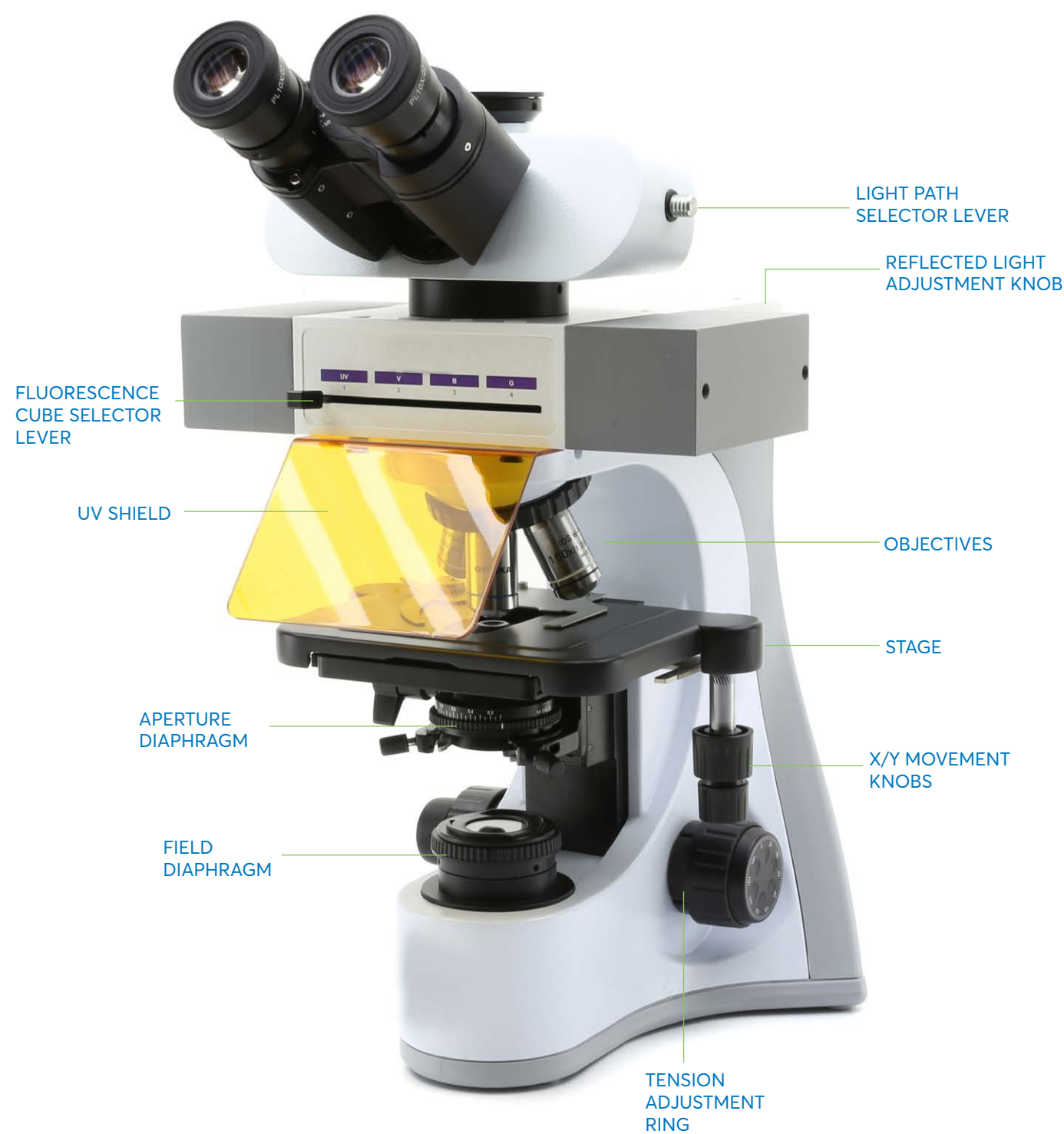
ELECTRICAL SHOCK

This symbol indicates a risk of electrical shock.

5. Instrument description



Opposite side



6. Unpacking

The microscope is housed in a moulded Styrofoam container. Remove the tape from the edge of the container and lift the top half of the container. Take some care to avoid that the optical items (objectives and eyepieces) fall out and get damaged. Using both hands (one around the arm and one around the base), lift the microscope from the container and put it on a stable desk.



Do not touch with bare hands optical surfaces such as lenses, filters or glasses. Traces of grease or other residuals may deteriorate the final image quality and corrode the optics surface in a short time.

7. Assembling

Once opened the box, the microscope parts are the following:



- 1 Microscope frame
- 2 Eyepieces
- 3 Objectives
 - TL534B FL BG / TL534B FL: W-PLAN series
 - TL534B-SA FL4: W-PLAN F series
- 4 Observation head
- 5 Epi-illuminator
- 6 Allen wrench

- 7 Tension adjustment tool
- 8 Immersion oil
- 9 Dust cover
- 10 Power supply
 - 6V for transmitted light
 - 12V for fluorescence
- 11 Light excluding plate
- 12 UV protection shield

7.1 Microscope assembling

- 1 Insert the round dovetail socket of the illuminator (1) into the hole in the microscope body and tighten the locking screw (2). (Fig 1).



FIGURE 1

- 2 Insert the power supply jack in the connector (3) placed at the rear side of the illuminator. (Fig. 2)

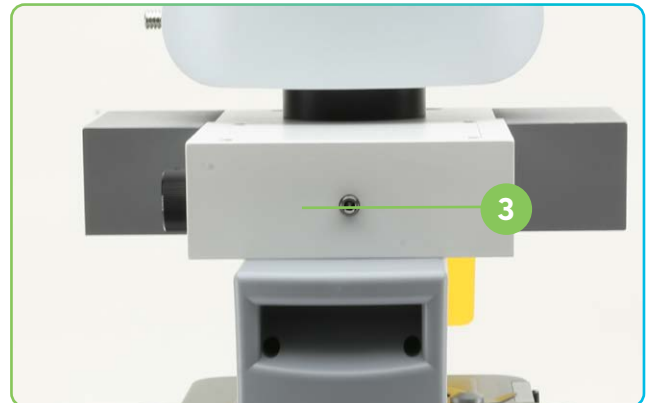


FIGURE 2

- 3 Insert the optical head above the epi-illuminator and tighten the screw (4). (Fig. 3)

Hold the head with one hand during the locking in order to avoid that the head falls.



FIGURE 3

- 4 Insert both eyepieces into the tubes of the optical head. (Fig. 4)

Condenser is pre-installed in the factory. To remove the condenser use an Allen wrench 1,5 mm diam and operate on the locking screw placed on the right side of the condenser holder.



FIGURE 4

- 5 Screw each objective into the thread of the nosepiece, clockwise with increasing magnification. (Fig. 5)



FIGURE 5

- 6 Insert the power supply jack in the connector placed at the rear side of the microscope. (Fig. 6)



FIGURE 6

7.1.1 Installing fluorescence filter

This procedure is only necessary for TL534B FL and TL534B-SA FL4 models. TL534B FL BG model comes with B and G cubes preinstalled.

- 1 Disconnect the power supply plug from the fluorescence illuminator.
- 2 Open the side cover of the illuminator, by unscrewing the side screws (1). (Fig. 7)

It could be helpful to remove the observation head.

The cubes are mounted on the opposite side of the cover: opening the left cover acts on the right side of the slider and vice versa.



FIGURE 7

- 3 Open the top door of the fluorescence illuminator by unscrewing the four screws (2) and release the cover. (Fig. 8)

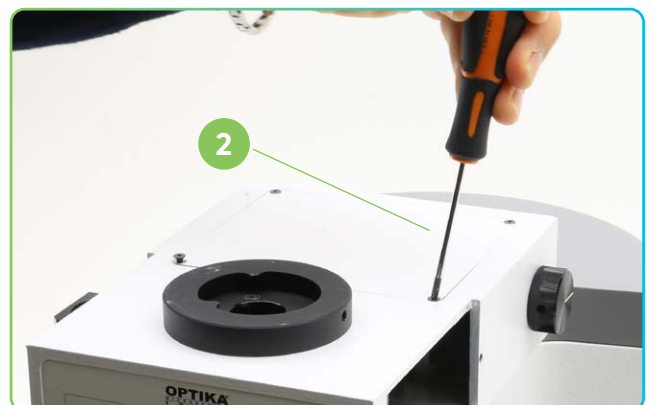


FIGURE 8

4 Loosen the front locking screw (3) on the fluorescence cube slider. (Fig. 9)

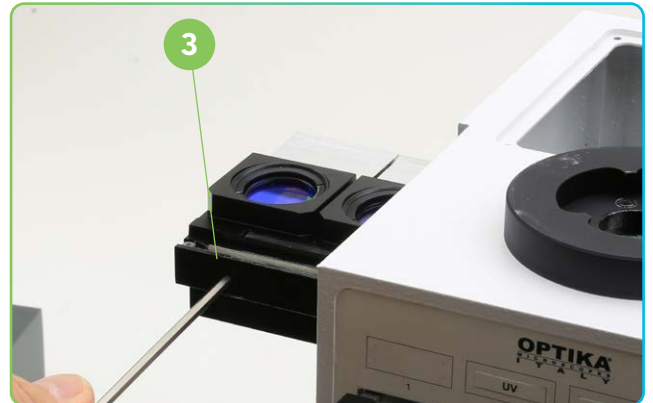


FIGURE 9

5 Insert the fluorescence cube into the dovetail (4) of the cube slider and move it to the click position. (Fig. 10)

6 Insert the cube connection cable into the illuminator.

7 Tighten the locking screw (3). (Fig. 10)



FIGURE 10

8 Connect the plug of the fluorescence cube (5) in one of the free connectors (6) to power the LED. (Fig. 11)

9 Apply the adhesive marker (3) for the fluorescence cube on the illuminator. (Fig. 12)

10 Close the top door.

11 Close the side cover.

12 Connect the power supply.

13 Start working.

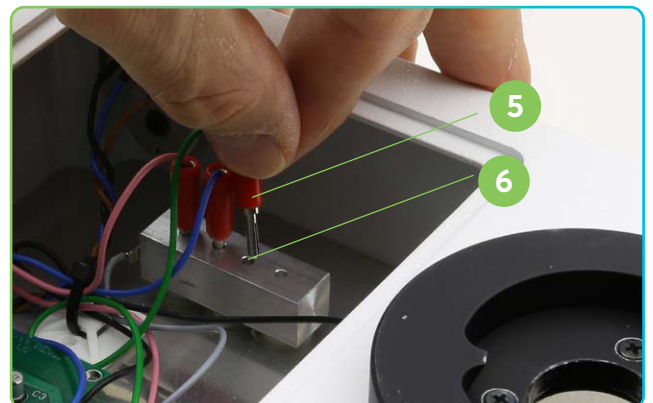


FIGURE 11

7.1.2 Replacing fluorescence filter

1 Disconnect the power supply plug from the fluorescence illuminator.

2 Open the side cover of the illuminator, by unscrewing the side screws (1). (Fig. 7)

It could be helpful to remove the observation head.

The cubes are mounted on the opposite side of the cover: opening the left cover acts on the right side of the slide and vice versa.

3 Open the top door of the fluorescence illuminator by unscrewing the four screws (2) and release the cover. (Fig. 8)

4 Loosen the front locking screw (3) on the fluorescence cube slider. (Fig. 9)

5 Disconnect the plug (5) related to the cube you want to replace. (Fig. 11)

6 Remove the fluorescence cube from the dovetail of the cube slider.

7 Repeat steps 4. to 9. of paragraph 7.1.1. to install a new fluorescence cube.



FIGURE 12

7.2 Polarizing set (optional)

- 1 Place the polarizer on the light exit (1) at the base of the microscope. (Fig. 13)



FIGURE 13

- 2 Loosen the head fixing knob (2) and remove the head from the microscope frame. (Fig. 14)



FIGURE 14

- 3 Insert the analyzer into the hole inside the frame (3). (Fig. 15)
- 4 Put back the head into its original position and lock the fixing knob.

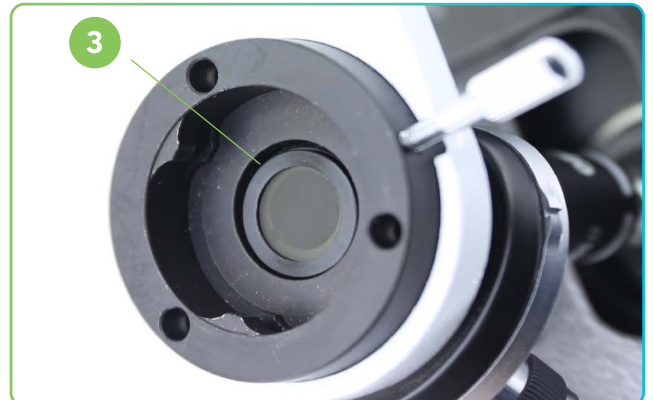
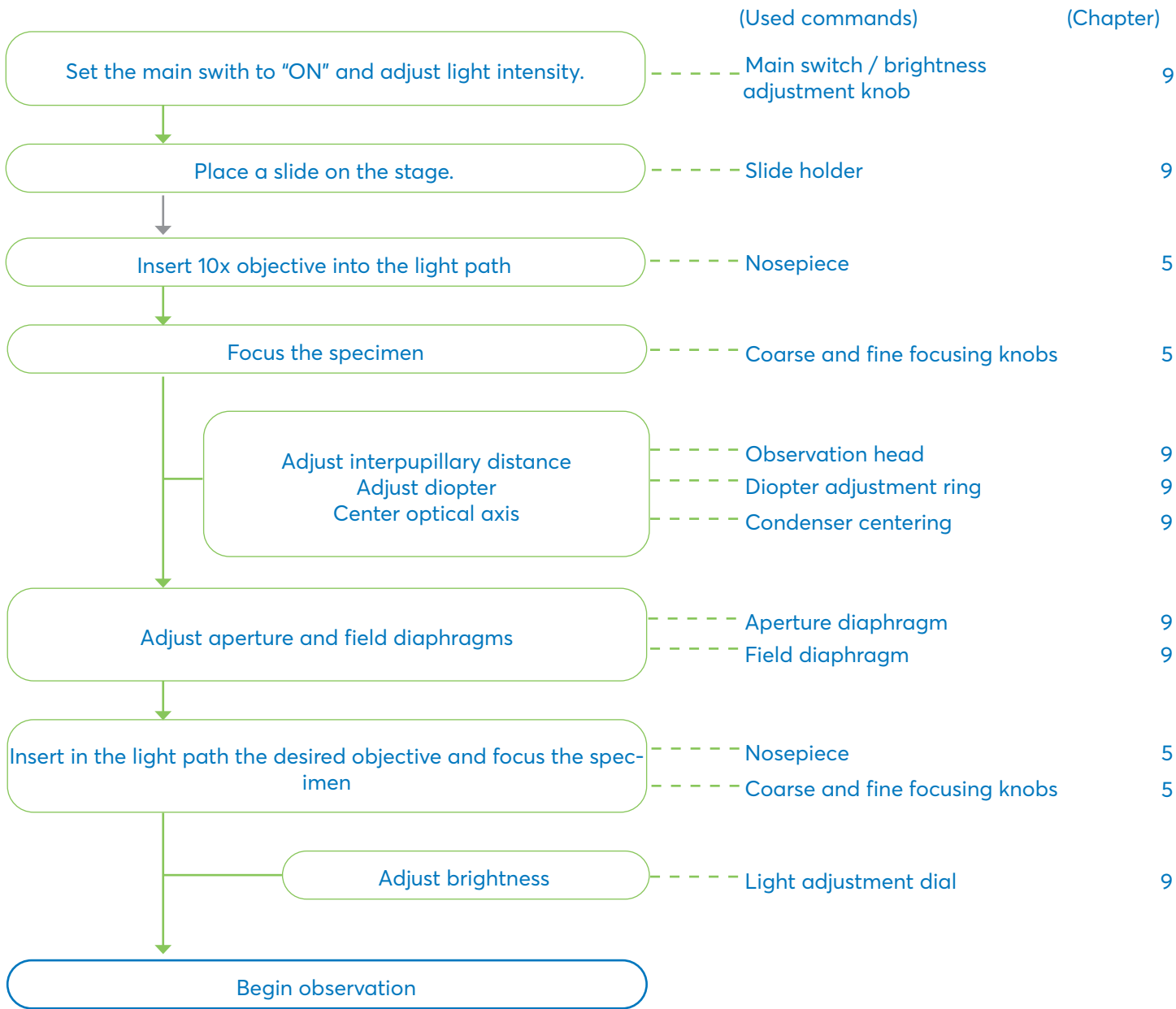


FIGURE 15

8. Brightfield observation procedures (transmitted light)



9. Use of the microscope (transmitted light)

9.1 Light intensity adjustment

Operate on the light intensity adjustment knob to turn ON/OFF the microscope and to increase/decrease the illumination voltage (1). (Fig. 16)



FIGURE 16

9.2 Coarse focus tension adjustment

Adjust the tension using the provided tool.

The coarse knob tension is pre-setted in the factory.

To modify the tension according to personal's needs, rotate the ring (2) using the provided tool. (Fig. 17)

Clockwise rotation increases the tension.

If the tension is too loose, the stage could go lower by itself or the focus easily lost after fine adjustment. In this case, rotate the knob in order to increase the tension.



FIGURE 17

9.3 Coarse upper limit lever

The upper limit knob has two functions: prevent the contact between slide and objective and acts as "focus memory".

1 After focussing the specimen, pull the lever (3) toward the front of the microscope and lock it. (Fig. 18).

In this way the focus upper limit is set.

2 Now one can lower the stage with coarse focus knob, replace the specimen and raise again the stage up to the upper limit: specimen will be in approximate focus and will need a fine adjustment to get the proper focus.

- Fine focus movement is not affected by the coarse focus lock.
- To unlock, move the lever in the opposite direction to the one used for the locking.

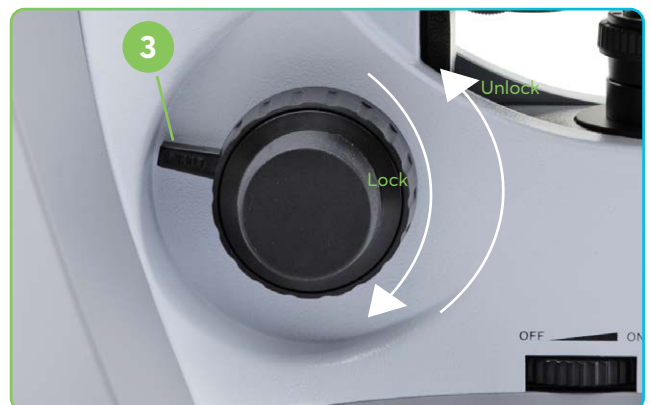


FIGURE 18

9.4 Stage

Stage accepts standard slides 26 x 76 mm, thickness 1,2 mm with coverside 0,17 mm.

It is possible to place two slides side by side on the stage.

Open the spring arm of the slide holder (4) and place frontally the slides on the stage. (Fig. 19)

Gently release the spring arm of the slide holder.

A sudden release of the spring arm could cause the falling of the slide.



FIGURE 19

9.5 Diopter adjustment

- 1 Look into the right eyepiece with your right eye only, and focus on the specimen.
- 2 Look into the left eyepiece with your left eye only. If the image is not sharp, use the diopter adjustment ring (1) to compensate. (Fig. 20)

The adjustment range is ± 5 diopter. The number indicated on the adjustment ring graduation should correspond to the operator's dioptric correction.



FIGURE 20

9.6 Adjusting the interpupillary distance

Observing with both eyes, hold the two eyepiece prism assemblies. Rotate them around their common axis until the fields of view coincide.

The graduation on the interpupillary distance indicator (2), pointed by the spot "." on the eyepiece holder, shows the distance between the operator's eyes. (Fig. 21)

The range of the interpupillary distance is 48-75 mm.

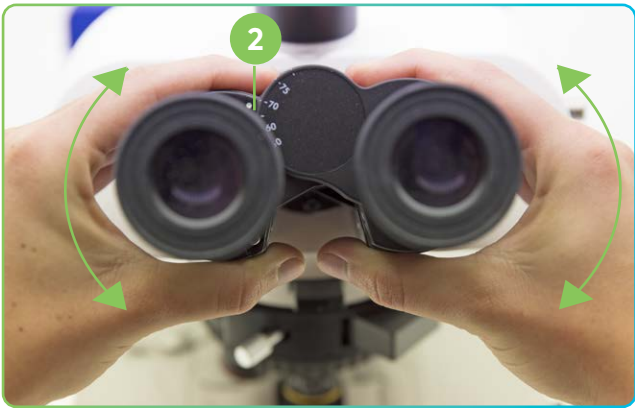


FIGURE 21

9.7 Light path selection

The observation head is equipped with an optical path selector that allows the light to be split to the eyepieces and to the photo/TV port.

- 1 Move the selector (3) to one of the two possible positions to split the light. (Fig. 22)

Position	Light
In	100% Eyepieces
Out	100% Tv

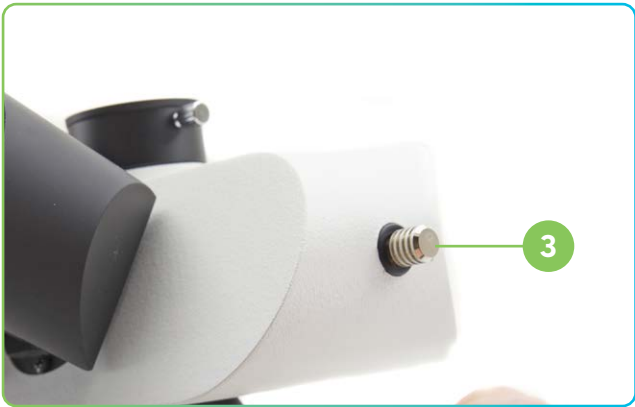


FIGURE 22

9.8 Use of eye shields

Use with eyeglasses

Fold rubber eyeshields with both hands. Folded eyeshields avoid scratching the lenses of eyeglasses. (Fig. 23)



FIGURE 23

Use without eyeglasses

Raise eye shields and observe at the microscope placing eyes to the shields, avoiding external light to disturb the observation. (Fig. 24)



FIGURE 24

9.9 Centering the condenser

- 1 Place the specimen on the stage, insert 10x objective into the light path and focus.
- 2 Insert the front lens of the swing-out condenser (1). (Fig. 25)
- 3 Rotate the field diaphragm ring (2) in counterclockwise direction, to fully close the diaphragm.
- 4 Rotate the condenser height adjustment knob (3) to focus the edges of the diaphragm.
- 5 Rotate the two centering screws (4) to bring the bright spot in the center of the field of view.
- 6 Gradually open the diaphragm. The condenser is centered when the diaphragm image is symmetrical to the field of view.
- 7 In normal use, open the diaphragm until it circumscribes the field of view.



FIGURE 25

9.10 Effects of the field diaphragm

Field diaphragm adjusts the illuminated area to obtain a high contrast image.

Set the diaphragm according to the objective in use until it circumscribes the field of view, in order to eliminate unnecessary light to eyepieces. (Fig. 26)

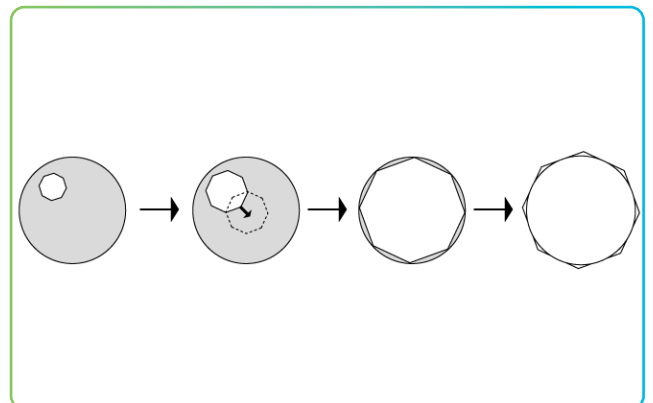


FIGURE 26

9.11 Aperture diaphragm

The Numerical Aperture (N.A.) value of the aperture diaphragm affects the image contrast. Increasing or reducing this value one can vary resolution, contrast and depth of focus of the image.

With low contrast specimens set the numerical aperture value (1) (printed on the condenser ring) to about 70%-80% of the objective's N.A. (Fig. 27) If necessary, remove on eyepiece and, looking into empty sleeve, adjust the condenser's ring in order to obtain an image like the one in fig. 28.

Example: with objective PLAN 40x/0,65 set the scale to $0.65 \times 0.8 = 0,52$

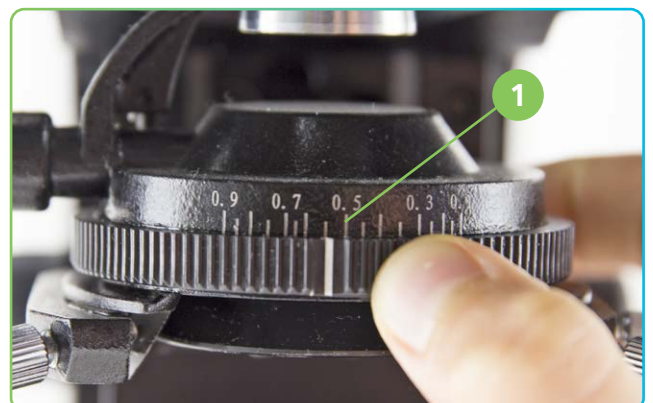


FIGURE 27

9.12 Use of oil immersion objective

- 1 Focus the specimen with a low power objective.
- 2 Lower the stage (remembering to lock the coarse upper limit lever).
- 3 Put a drop of oil (provided) on the area of the specimen to be observed. (Fig. 29)

Make sure that there are no oil bubbles. Air bubbles in the oil damage the image quality.

To check for bubbles: remove an eyepiece, fully open the aperture diaphragm and observe the objective exit pupil. (The pupil must be round and bright).

To remove the bubbles, gently move the nosepiece to the right and left to move the immersion objective a few times and allow the air bubbles to move.

- 4 Insert immersion objective.
- 5 Return the stage to the upper focusing point and obtain an optimal focus using the fine focus knob.
- 6 After use, gently remove the oil with a soft paper towel or a lightly moistened optic paper with a mixture of ethyl ether (70%) and absolute ethyl alcohol (30%).

The immersion oil, if not immediately cleaned, could crystallize creating a glass-like layer. In this situation the observation of the specimen would be difficult if not impossible due to the presence of an additional thickness on the objective.

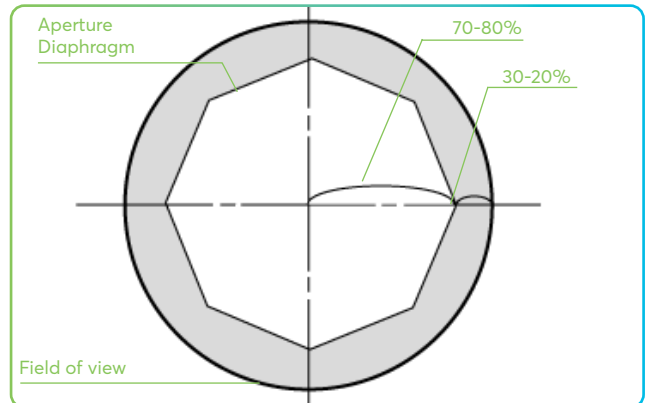


FIGURE 28

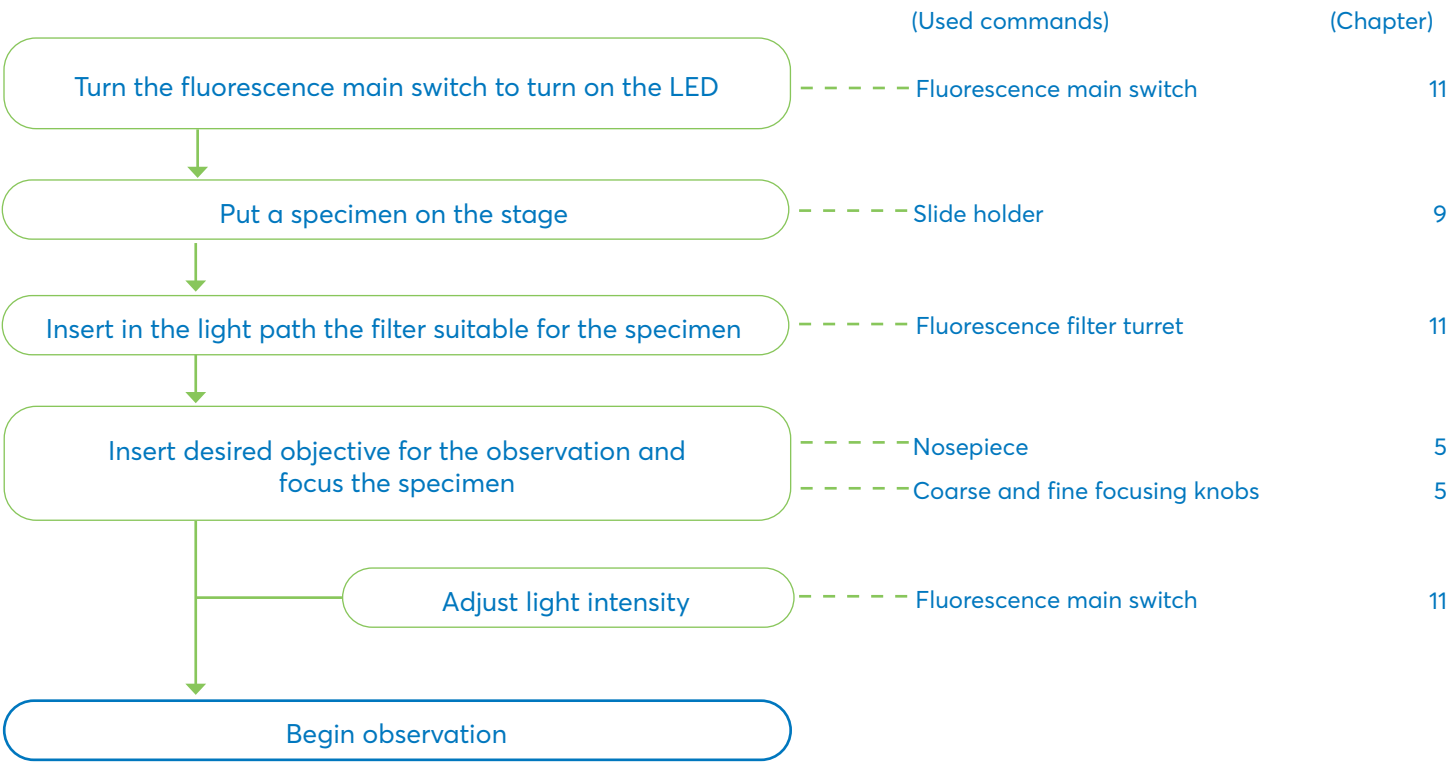


FIGURE 29

9.13 Use of the polarizer (optional)

- 1 Remove the specimen from the stage.
- 2 Looking inside the eyepieces, rotate the polarizer until the darkest position is achieved.
- 3 Once the dark is achieved ("extinction" or "Crossed Nicol" position) it is possible to begin the observation.

10. Fluorescence observation procedures (reflected light)



11. Use of the microscope (reflected light)

11.1 LED switch on

Turn the main switch (1). (Fig. 30)
Adjust to the desired brightness by rotating the dial (1).



FIGURE 30

11.2 Use of fluorescence

The filter turret is provided with 4 positions.
In each of the four positions a fluorescence filter can be inserted, which can be selected from the options shown in the table below.
You can always add or replace an additional filter after the first installation (see section 7.1.1 and 7.1.2).
If all four turret positions are full, the observation in transmitted light will be affected by the presence of the fluorescence filter.

- 1 Move the filter selector (2) in the desired position. (Fig. 31)
- 2 When the filter is in the click stop position, the dedicated LED will turn on.

When switching the fluorescence filter, the LED light goes out. This is not a defect.



FIGURE 31

Filter name	Excitation filter	Dichroic mirror	Barrier filter	Applications
VisiCube TL_UV	325-375 nm	415 nm	435LP nm	- DAPI - Hoechst
VisiCube TL_V	390-420 nm	440 nm	450LP nm	- Coumarin - Pacific Blue
VisiCube TL_B	455-495 nm	500 nm	510LP nm	- FITC - GFP
VisiCube TL_G	510-550 nm	570 nm	575LP nm	- Rhodamine - TRITC - Propidium Iodide
VisiCube TL_r1	582-603 nm	610 nm	615-645 nm	- Red#2 FISH
VisiCube TL_r2	590-650 nm	660 nm	665LP nm	- Cy5
VisiCube TL_r3	595-645 nm	655 nm	665-715 nm	- Cy5 - AlexaFluor 647 - Draq5
VisiCube TL_fr	623-678 nm	685 nm	690-750 nm	- Cy5.5
VisiCube TL_a	720-760 nm	770 nm	780LP nm	- Li_Cor IR dye 800

11.3 Use of light excluding plate

Microscope is provided with a light excluding plate that can be placed on the stage and prevents flare and reflections coming from the condenser front lens.

The plate can be used in two different ways.

Mode n° 1: place the plate on the stage (under the slide holder) and place the slide directly over the plate. (Fig. 32)



FIGURE 32

Mode n° 2: lower the condenser and insert the plate between the two layers of the stage. (Fig. 33).

In both cases it is possible to move the sample using the stage X-Y translation knobs.



FIGURE 33

11.4 Use of UV shield

Microscope is provided with a UV protection shield. This can be used to protect user from unwanted UV rays coming from the fluorescence light source.

1 Loosen the two locking screws (1). (Fig. 34)



FIGURE 34

2 Insert the grooves of the UV shield (2) into the holes (Fig. 35) and tighten the screws (1) again.



FIGURE 35

12. Microphotography

12.1 Use of C-mount cameras

- 1 Loosen the clamping screw (1) on the trinocular port and remove the dust cap (2). (Fig. 36)



FIGURE 36

- 2 Screw the C-mount adapter (3) to the camera (4) and insert the round dovetail of the C-mount into the empty hole of the trinocular port, then tighten the clamping screw (1). (Fig. 37)



FIGURE 37

12.2 Use of reflex cameras

- 1 Insert the Reflex adapter (1) into the relay tube to the microscope (2).
- 2 Screw the "T2" ring (3) (not provided) to the reflex adapter.
- 3 Connect the Reflex camera (4) to the "T2" just installed (Fig. 38).
- 4 Mount the other end of the relay tube (2) into the empty hole of the trinocular port, then tighten the clamping screw. (Fig. 36)

"T2" ring is not provided with the microscope, but is commercially available.

While shooting dark specimens, darken eyepieces and viewfinder with a dark cloth to minimize the diffused light.

**To calculate the magnification of the camera: objective magnification * camera magnification
* lens magnification.**

If using an SLR camera, mirror movement may cause the camera to vibrate.

We suggest lifting the mirror, using long exposure times and a remote cord.



FIGURE 38

13. Troubleshooting

Review the information in the table below to troubleshoot operating problems.

Problem	Cause	Solution
I. Optical System:		
LED does not light	Power supply is unplugged	Connect into the power outlet
LED operates, but field of view remains dark	Brightness is too low	Set brightness to a proper level
	Fluorescence filter selector is not in a click stop	Move the selector to a click stop
	Fluorescence filter is not suitable for the specimen	Use a suitable filter
	Light path selector knob is set to the camera position	Move the knob to the eye position
Field of view is obscured or not evenly illuminated	Light path selector knob is in an intermediate position	Set the knob according to the observation method
	Nosepiece is not correctly engaged	Make sure that the nosepiece clicks properly into place
	Condenser is not attached properly	Re-attach it
	Nosepiece is not attached properly	Push the side dovetail all the way until it is stopped
	An objective that falls outside of the condenser's illumination range is used	Use a condenser to match the purpose
	Condenser is not properly centered	Center the condenser
	Field diaphragm is stopped down too far	Open the field diaphragm until it circumscribes the field of view
	Fluorescence filter selector is not in a click stop	Move the selector to a click stop
Dirt or dust is visible in the field of view	Dirt/dust on the eyepieces	Clean thoroughly
	Dirt/dust on the condenser surface	
	Dirt/dust on the specimen	
Image looks double	Aperture diaphragm is stopped down too far	Open aperture diaphragm
	The condenser is not well centered or it is in a wrong height	Set the condenser according to Koehler settings
Low image quality – Image is not sharp – Contrast is poor – Details are indistinct – Image glares	Condenser is lowered too much	Adjust the condenser height position
	Aperture diaphragm is stopped down too far	Open aperture diaphragm
	Nosepiece is not mounted properly	Push the slide dovetail all the way until it is stopped
	Immersion oil is not being used with an oil immersion objective	Use immersion oil
	Immersion oil contains bubbles	Remove the bubbles
	Recommended immersion oil is not used	Use the provided immersion oil
	For transmitted light observation, coverglass thickness must not exceed 0.17 mm	Use a coverglass with thickness 0.17 mm
	The nosepiece is not in the center of the light path	Turn the nosepiece to a click stop
One side of the image is out of focus.	The specimen is out of place (tilted)	Place the specimen flat on the stage.
	Stage is not correctly mounted	Re-attach it
	The optical performance of the sample cover glass is poor	Use a cover glass of better quality
Image appears to waver	Nosepiece is not corrected mounted	Push slide dovetail all the way until it is stopped
	Objective is not correctly engaged in light path	Make sure that nosepiece clicks into place correctly
	Condenser is not properly centered	Center the condenser
Field of view becomes only slightly brighter when the voltage is raised.	Condenser is not properly centered	Center the condenser
	Condenser is lowered too far	Adjust the condenser height position
II. Mechanical Section:		
Coarse adjustment knob is hard to turn	Tension adjustment ring is too tight	Loosen tension adjustment ring
	You are trying to raise stage while focus-lock lever is kept locked	Unlock focus-lock lever
Stage drifts down by itself or focus is lost during observation	Tension adjustment ring is too loose	Tighten ring
Coarse adjustment will not go all the way up	Focus-lock lever is locked at a too low height	Unlock focus-lock lever
Coarse adjustment will not go all the way down	Condenser holder is too low	Raise condenser holder
Objective makes contact with specimen before focus is obtained	Specimen is mounted upside down	Mount specimen correctly
III. Electrical Section:		
LED doesn't turn on	Power supply not connected	Check for proper connection
Brightness is not enough	Brightness setting is too low	Adjust brightness
Light blinks	Power supply not well connected	Check for proper connection
IV. Observation tube:		
The field of view of one eye does not match the field of view of the other eye	Interpupillary distance is incorrect	Adjust interpupillary distance
	Incorrect diopter adjustment	Adjust diopter
	Your view is not accustomed to microscope observation	Upon looking into eyepieces, try looking at overall field before concentrating on specimen range. You may also find it helpful to look up and into distance for a moment before looking back into microscope
V. Microphotography:		
Image edge is unfocused	To a certain extent it is due to achromatic objectives features	To minimize the problem, set the aperture diaphragm in a proper position
Bright spots appear on the image	Stray light entering in the microscope through eyepieces or camera viewfinder	Cover eyepieces and viewfinder with a dark cloth

14. Repair and maintenance

Microscopy environment

This microscope is recommended for use in a clean, dry and shock free environment with a temperature of 0-40°C and a maximum relative humidity of 85 % (non condensing). Use a dehumidifier if needed.



To think about when and after using the microscope

The microscope should always be kept vertical when moving it so that no moving parts, such as the eyepieces, fall out. Never mishandle or impose unnecessary force on the microscope.

Never attempt to service the microscope yourself.

After use, turn down the illumination intensity control and turn the light off. Cover the microscope with included the dust cover, and keep it in a dry and clean place.



Electrical safety precautions

Before plugging in the power supply, make sure that the supplying voltage of your region matches with the operation voltage of the equipment and that the lamp switch is in off-position.

Users should observe all safety regulations of the region. The equipment has acquired the CE safety label. However, users do have full responsibility to use this equipment safely.

Cleaning the optics

If the optical parts require cleaning first use compressed air.

If that is not sufficient use a soft lint-free cloth with water and a mild detergent.

And as a final option use the piece of cloth moistened with a 3:7 mixture of ethanol and ether.

Note: ethanol and ether are highly flammable liquids. Do not use them near a heat source, near sparks or near electric equipment. Use these chemicals in a well ventilated room.

Remember to never wipe the surface of any optical items with your hands. Fingerprints can damage the optics. Do not disassemble objectives or eyepieces attempting to clean them.

For the best results, use the VWR cleaning kit.

If you need to send the microscope to manufacturer for maintenance, please use the original packaging.

15. Technical service

Web Resource

Visit the VWR's website at www.vwr.com for:

- Complete technical service contact information
- Access to VWR's Online Catalogue, and information about accessories and related products
- Additional product information and special offers

Contact us For information or technical assistance contact your local VWR representative or visit. www.vwr.com.

16. Warranty

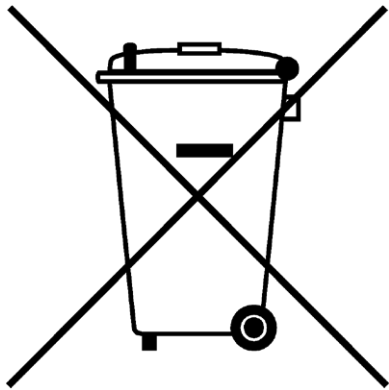
VWR International warrants that this product will be free from defects in material and workmanship for a period of five (5) years from date of delivery. If a defect is present, VWR will, at its option and cost, repair, replace, or refund the purchase price of this product to the customer, provided it is returned during the warranty period. This warranty does not apply if the product has been damaged by accident, abuse, misuse, or misapplication, or from ordinary wear and tear. If the required maintenance and inspection services are not performed according to the manuals and any local regulations, such warranty turns invalid, except to the extent, the defect of the product is not due to such non-performance.

Items being returned must be insured by the customer against possible damage or loss. This warranty shall be limited to the aforementioned remedies. IT IS EXPRESSLY AGREED THAT THIS WARRANTY WILL BE IN LIEU OF ALL WARRANTIES OF FITNESS AND IN LIEU OF THE WARRANTY OF MERCHANTABILITY.

17. Compliance with local laws and regulations

The customer is responsible for applying for and obtaining the necessary regulatory approvals or other authorizations necessary to run or use the Product in its local environment. VWR will not be held liable for any related omission or for not obtaining the required approval or authorization, unless any refusal is due to a defect of the product.

Disposal



This equipment is marked with the crossed out wheeled bin symbol to indicate that this equipment must not be disposed of with unsorted waste.

Instead it is your responsibility to correctly dispose of your equipment the end of its life cycle by handling it over to an authorized facility for separate collection and recycling. It is also your responsibility to decontaminate the equipment in case of biological, chemical and/or radiological contamination, so as to protect from health hazards the persons involved in the disposal and recycling of the equipment.

For more information about where you can drop off your waste equipment, please contact your local dealer from whom you originally purchased this equipment.

By doing so, you will help to conserve natural and environmental resources and you will ensure that your equipment is recycled in a manner that protects human health.

Thank you

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