OPTIKA®
ITALY

**B-190 Series**

# INSTRUCTION MANUAL

| Model |
| --- |
| B-190PL Series (B-191PL / B-191SPL / B-192PL / B-192SPL / B-193PL) |
| B-190TBPL |

Ver. 7.10 2026

## Table of contents

## 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 uses 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. Package content

### 3.1 B-191SPL/B-191PL/B-192SPL/B-192PL/B-193PL


① Frame
② Observation head
- monocular (B-191PL / B-191SPL)
- binocular (B-192PL / B-192SPL)
- trinocular (B-193PL)

③ Photo tube (only B-193PL)
④ Eyepieces
⑤ Objectives
- 4X/10X/40X/100X (B-191PL/B-192PL/B-193PL)
- 4X/10X/40X/60X (B-191SPL/B-192SPL)

⑥ Dust cover
⑦ Green filter
⑧ Power supply
⑨ Immersion oil (B-191PL/B-192PL/B-193PL)
⑩ Tension adjustment tool

### 3.2 B-190TBPL


① Frame
② Digital observation head
③ Eyepieces
④ Objectives (4X/10X/40X/100X)
⑤ Dust cover
⑥ Green filter
⑦ Immersion oil
⑧ Power supply
⑨ Tension adjustment tool
⑩ Digital imaging unit power supply
⑪ USB cable 0,5 m
⑫ Digital imaging unit

**NOTE: OPTIKA reserves the right to make corrections, modifications, enhancements, improvements and other changes to its products at any time without notice.**

## 4. 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.

## 5. Intended use

**Standard models**

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

**IVD Models**

Also for diagnostic use, aimed at obtaining information on the physiological or pathological situation of the subject.

## 6. Symbols and conventions

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

**CAUTION**

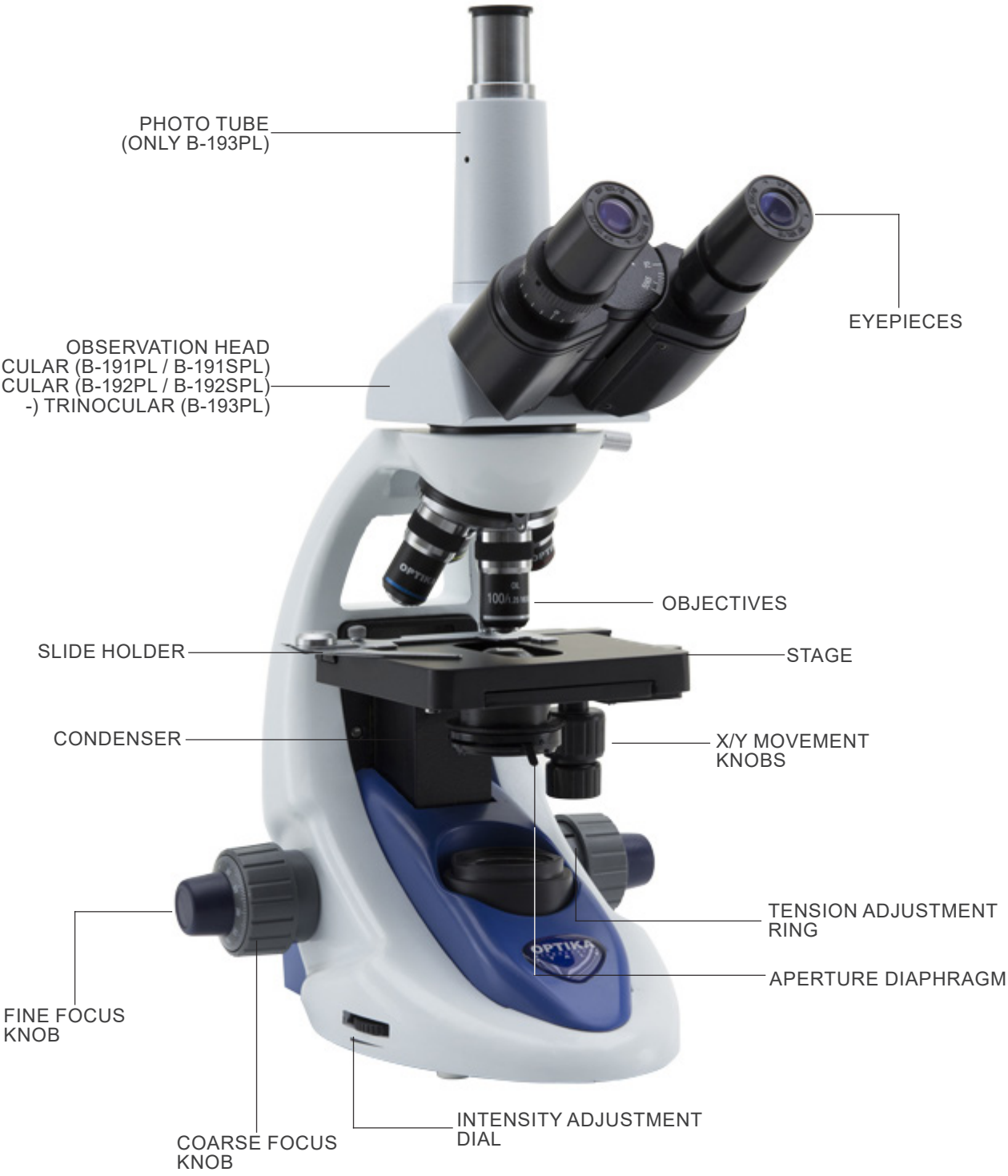
This symbol indicates a potential risk and alerts you to proceed with caution.

**ELECTRICAL SHOCK**

This symbol indicates a risk of electrical shock.

# 7. Instrument description

## 7.1 B-191PL/B-191SPL/B-192PL/B-192SPL/B-193PL



## 7.2 B-190TBPL


DIGITAL IMAGING UNIT
HEADPHONE
MICRO HDMI
USB TYPE C
MICRO SD CARD SLOT
USB-A3.0
POWER
DIGITAL HEAD
EYEPIECES
SLIDE HOLDER
OBJECTIVES
STAGE
COARSE FOCUS KNOB
X/Y MOVEMENT KNOBS
APERTURE DIAPHRAGM
FINE FOCUS KNOB
INTENSITY ADJUSTMENT DIAL
TENSION ADJUSTMENT RING

# 8. Assembling

## 8.1 Assembling the microscope

### 8.1.1 B-191SPL/B-191PL/B-192SPL/B-192PL/B-193PL

1. Remove the dust cap from the microscope frame and from the bottom of the observation head.
2. Insert the optical head above the stand and tighten the screw. (Fig. 1)

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


Fig. 1

3. Insert both eyepieces into the tubes of the optical head. (Fig. 2)


Fig. 2

4. Insert the power supply jack in the socket placed at the rear side of the microscope. (Fig. 3)


Fig. 3

**Only for B-193PL**

5. Unscrew the protection cap mounted on the photo port and screw the photo tube. (Fig. 4)


Fig. 4

### 8.1.2 B-190TBPL

1. Remove the dust cap from the microscope frame and from the bottom of the observation head.
2. Insert the optical head above the stand and tighten the screw. (Fig. 5)

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


Fig. 5

3. Insert both eyepieces into the tubes of the optical head. (Fig. 6)
4. Insert the power supply jack in the socket placed at the rear side of the microscope. (Fig. 3)


Fig. 6

5. Fix the rotating part of the junction using the black wing-nut ①. (Fig. 7)

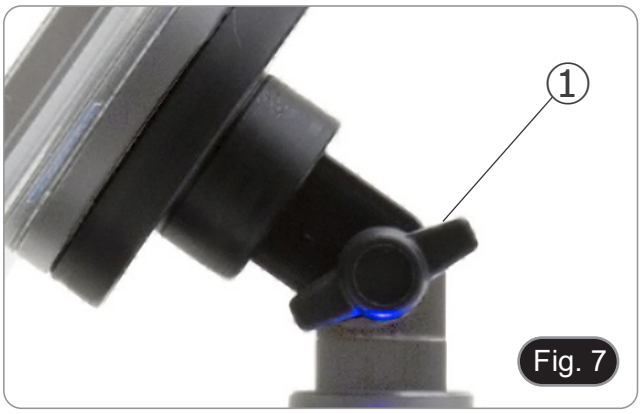


Fig. 7

6. Then hook the digital imaging unit onto the 4 screws of the junction and pull toward down to firmly lock the Digital imaging unit in the holder. (Fig. 8)

- To unlock the digital imaging unit proceed with the opposite operation: push toward up and remove it from the holder.


Fig. 8

7. Plug one side of the USB cable ② to the digital head and the other side to the digital imaging unit using the connector ③. (Fig. 9-10).
8. Plug the power supply cable to the digital imaging unit for battery recharge using the connector ④. (Fig. 10)

- The digital imaging unit has been set with the Rotation function disabled: this prevents any flipping of the Live View in order to get a continuous and as large as possible view of your slide also when the digital imaging unit is removed from the holder.
- To enable this function again: you can activate the Rotation by swiping the screen on his bottom right side and selecting Settings + Screen. Anyway, it's not suggested to activate the function when the camera is in Live View mode as it may give troubles when the camera runs at high resolutions.

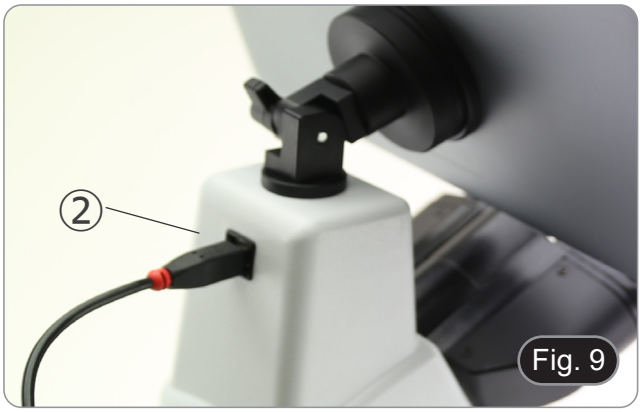


Fig. 9

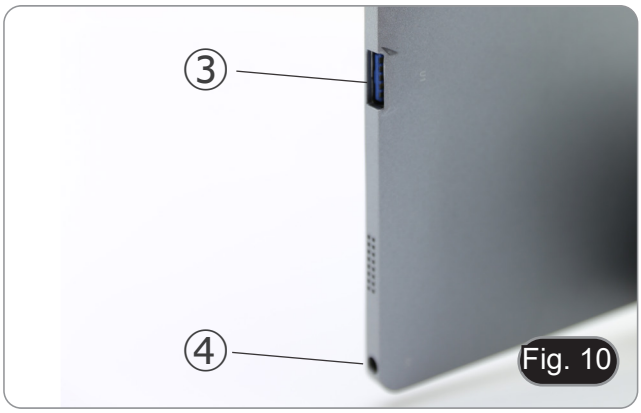


Fig. 10

### 8.2 Polarizing set (optional)

1. Place the polarizer on the light exit ① at the base of the microscope. (Fig. 11)

Fig. 11

2. Loosen the head fixing knob ② and remove the head from the microscope frame. (Fig. 12)

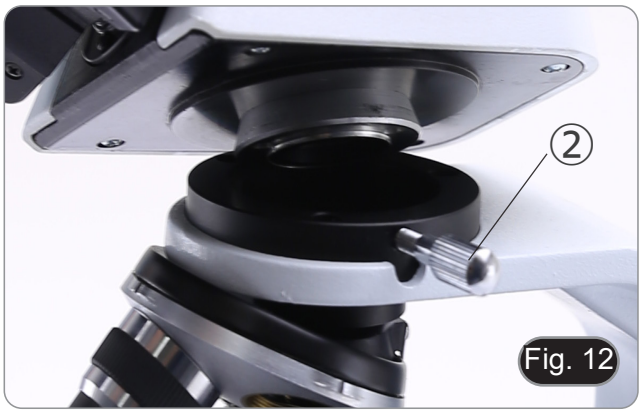


Fig. 12

3. Insert the analyzer into the hole inside the frame ③. (Fig. 13)
4. Put back the head into its original position and lock the fixing knob.

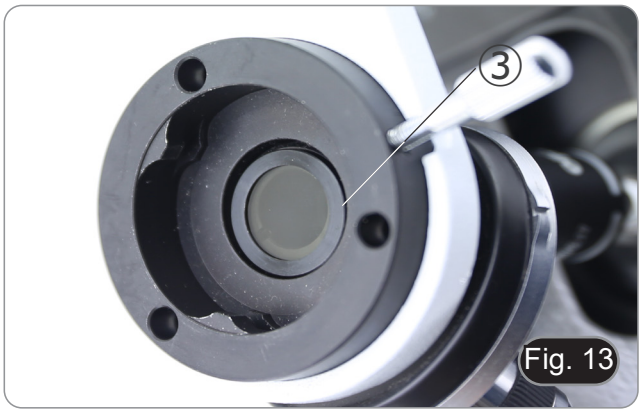


Fig. 13

## 9. Use of the microscope

### 9.1 Switching on the microscope

Operate on the main switch ① placed in the rear side of the microscope, moving the selector on “I” (Fig. 14)

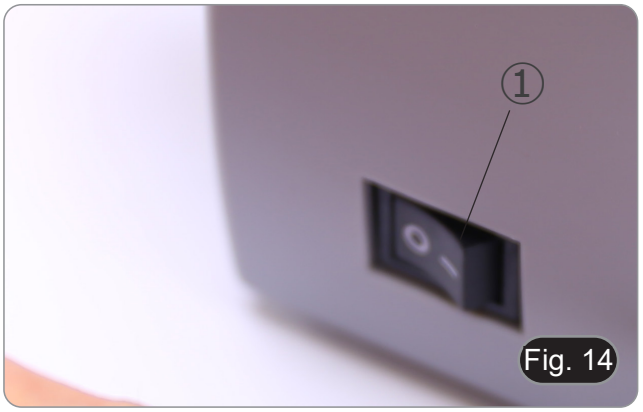


Fig. 14

### 9.2 Light intensity adjustment

Operate on the light intensity dial to increase or decrease the illumination intensity. (Fig. 15)


Fig. 15

### 9.3 Coarse focus tension adjustment

- **Adjust the tension using the provided tool**.

The coarse knob tension is preset in the factory.

1. To modify the tension according to personal’s needs, rotate the ring using the provided tool. (Fig. 16)

- 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.


Fig. 16

### 9.4 Stage

Stage accepts standard slides 26 x 76 mm, thickness 1.2 mm with coverslide 0.17 mm. (Fig. 17)

1. Open the spring arm of the slide holder ② and place the slide from the front on the stage.
2. Gently release the spring arm of the slide holder.

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

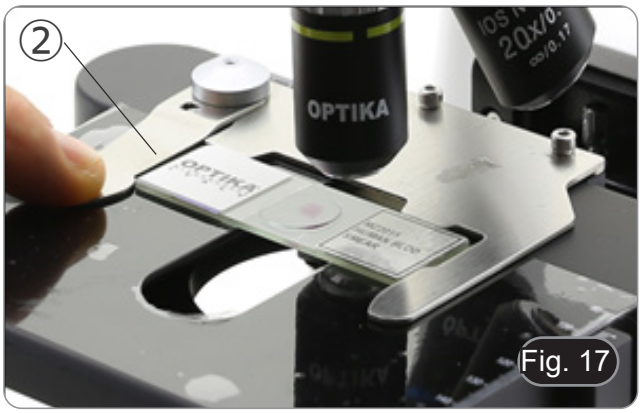


Fig. 17

### 9.5 Adjust the interpupillary distance

- **Except B-191PL / B-191SPL**

Hold the right and left parts of the observation head using both hands and adjust the interpupillary distance by turning the two parts until one circle of light can be seen. (Fig. 18)

- The graduation on the interpupillary distance indicator ①, pointed by the spot "." on the eyepiece holder, shows the distance between the operator's eyes.

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

Fig. 18

### 9.6 Diopter adjustment

- **Except B-191PL / B-191SPL**

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 ② to compensate. (Fig. 19)

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

Fig. 19

### 9.7 Use of oil immersion objective

- **B-191PL / B-192PL / B-193PL / B-190TBPL**

1. Focus the specimen with a low power objective.
2. Lower the stage.
3. Put a drop of oil (provided) on the area of the specimen to be observed. (Fig. 20)

- **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 circular 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 (even not impossible) due to the presence of an additional thickness on the objective.**


Fig. 20

### 9.8 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. Move the diaphragm ring ① (Fig. 21) on the value corresponding to the objective in use. In this case the optimal setting of the condenser is achieved.

- With low contrast specimens set the numerical aperture to about 70%-80% of the objective's N.A. If necessary, remove on eyepiece and, looking into empty sleeve, adjust the condenser's diaphragm in order to obtain an image like the one in Fig. 22.

- **NOTE: The condenser has an A.N. of 1.25. However, this value is only obtained when the condenser is used "with oil," i.e., by placing a drop of oil on the front lens of the condenser. If the condenser is used "dry," the maximum A.N. that can be obtained is 0.9.**

Fig. 21

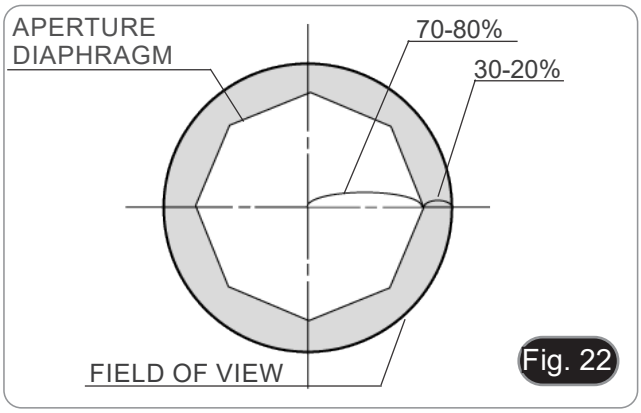


Fig. 22

### 9.9 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. Microphotography

### 10.1 Cameras with projection lens

1. Remove dust caps from camera and projection lens.
2. Screw the projection lens to camera thread. (Fig. 23)

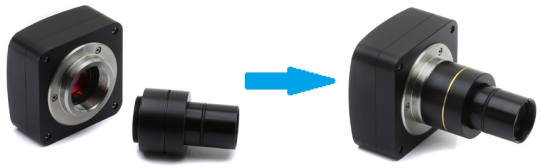


Fig. 23

3. Insert the projection lens into the photo tube. (Fig. 24)

Fig. 24

### 10.2 Reflex camera

1. Screw the “T2” ring (not provided) at the end of the projection lens (M-173), then install the whole onto the reflex camera. (Fig. 25)


Fig. 25

2. Insert the projection lens into the photo tube. (Fig. 27)

Fig. 27

## 11. Use of software and digital head

The camera inside the digital head is driven by PROVIEW software.

For the instructions about the use of the software, please refer to the specific instruction manual.

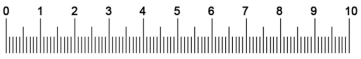
The manual can be accessed by selecting *Help* > *Help Contents*. A PDF file containing the software instruction manual will open.

## 12. Micrometric Slide M-005

**Micrometric slide, 26x76mm, with 2 scales**
**(1mm/100div. for biological microscopes / 10mm/100div. for stereomicroscopes)**

1 DIV=0.01mm

**For biological microscopes calibration**




1 DIV=0.1mm

**For stereo microscopes calibration**

## 13. Maintenance

### Microscopy environment

This microscope is recommended to be used in a clean, dry and shock free environment with a temperature of 5°-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 vertically when moving it and be careful 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 off the light immediately, cover the microscope with the provided 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 need to be cleaned try first to: use compressed air.
- If that is not sufficient: use a soft lint-free piece of 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 in attempt to clean them.

**For the best results, use the OPTIKA cleaning kit (see catalogue).**

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

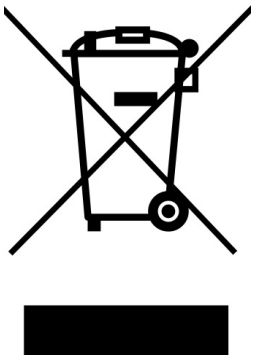
## 14. Troubleshooting

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

| PROBLEM | CAUSE | SOLUTION |
|---|---|---|
| | | |
| **I. Optical Section:** | | |
| LED operates, but field of view remains dark | Power supply is unplugged | Connect |
| | Brightness is too low | Set brightness to a proper level |
| Dirt or dust is visible in the field of view | Dirt/dust on the specimen | Clean the specimen |
| | Dirt/dust on the eyepieces | Clean the eyepieces |
| Image looks double | Aperture diaphragm is stopped down too far | Open aperture diaphragm |
| Visibility is poor<br>• Image is not good<br>• Contrast is poor<br>• Details are indistinct<br>• Image glares | Revolving nosepiece is in an incorrect position | Move the nosepiece to a click stop |
| | Aperture diaphragm is too closed or to open | Adjust aperture diaphragm |
| | Dust or dirt on lenses (condenser, objectives, eyepieces and slide) | Clean thoroughly |
| | For transmitted light observation, the coverglass thickness must not exceed 0.17mm | Use a coverglass with thickness 0.17mm |
| | Focus is not even | Slide holder is not flat. Move the specimen to a flat position |
| One side of the image is out of focus | The nosepiece is not in the center of the light path | Turn the nosepiece to a click stop |
| | The specimen is out of place (tilted) | Place the specimen flat on the stage |
| | The optical performance of the sample cover glass is poor | Use a cover glass of better quality |
| **II. Mechanical Section:** | | |
| The coarse focus knob is hard to turn | The tension adjustment collar is too tight | Loosen the tension adjustment collar |
| The focus is unstable | The tension adjustment collar is too loose | Tighten the tension adjustment collar |
| **III. Electric section:** | | |
| The LED doesn't turn on | No power supply | Check the power cord connection |
| The brightness is not enough | The brightness adjustment is low | Adjust the brightness |
| The light blinks | The power cord is poorly connected | Check the power cord |
| **IV. Observation tube:** | | |
| Field of view of one eye does not match that of the other | 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 |

## Equipment disposal

Art.13 Dlsg 25 July 2005 N°151. “According to directives 2002/95/EC, 2002/96/EC and 2003/108/EC relating to the reduction in the use of hazardous substances in electrical and electronic equipment and waste disposal.”




The basket symbol on equipment or on its box indicates that the product at the end of its useful life should be collected separately from other waste. The separate collection of this equipment at the end of its lifetime is organized and managed by the producer. The user will have to contact the manufacturer and follow the rules that he adopted for end-of-life equipment collection. The collection of the equipment for recycling, treatment and environmentally compatible disposal, helps to prevent possible adverse effects on the environment and health and promotes reuse and/or recycling of materials of the equipment. Improper disposal of the product involves the application of administrative penalties as provided by the laws in force.

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