OPTIKA®
ITALY

IM Series

INSTRUCTION MANUAL

Model
IM-300

Ver. 1.0 2023

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

① Microscope body
② Eyepieces
③ Phase contrast slider
④ Filter holder slider
⑤ Blue filter LBD
⑥ Green filter IF550
⑦ Metal insert for stage
⑧ Glass insert for stage
⑨ Objectives
⑩ Dust cover
⑪ Cleaning tissue
⑫ Centering telescope
⑬ Power supply

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.

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.

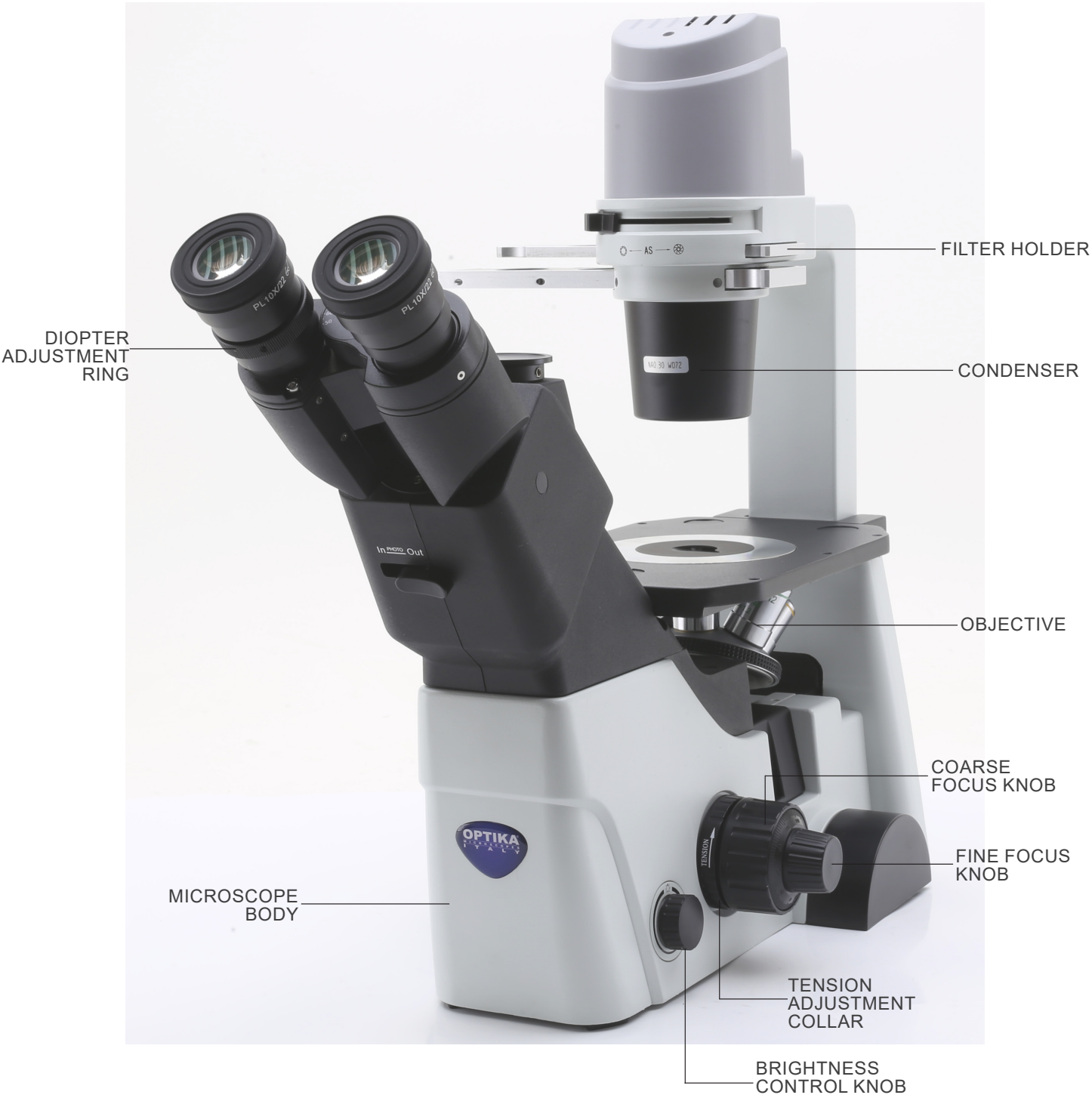
CAUTION

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



Opposite side

8. Assembling

8.1 Installing the objectives

1. Turn the coarse focusing knob ① until the nosepiece reaches its lowest position.

- **For a safe transport, the nosepiece is placed in the lowest position and the tension adjustment collar ② is adjusted to the proper tension when the microscope leaves the factory. (Fig.1)**

Fig. 1

2. Screw the lowest magnification objective on the nosepiece from the right side, then turn the nosepiece clockwise. Mount the other objectives in the same way, following the sequence from low to high.

- **Note: the objectives can also be installed through the stage opening. (Fig. 2)**
- Clean the objectives regularly. In inverted microscopes, the objectives are very sensitive to dust.
- To prevent dust and contamination from entering the microscope, cover all the unused holes with dust caps ③. (Fig. 3)
- When operating, use a low power objective to search and focus the specimen, then switch to higher magnifications.
- When switching between objectives, slowly turn the nosepiece until it clicks. The click means that the objective is in the right position, in the center of the light path.


Fig. 2

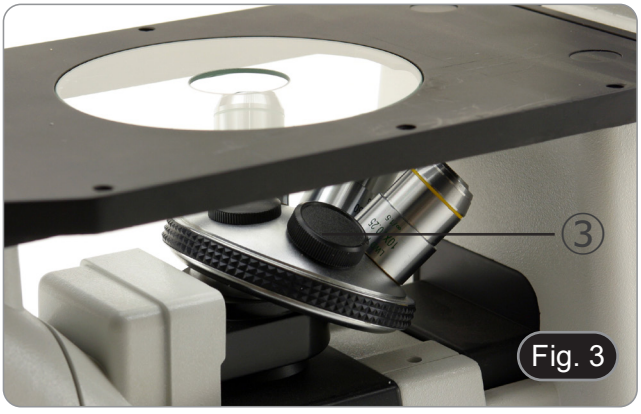


Fig. 3

8.2 Installing stage extension or mechanical stage

- **Stage extension and mechanical stage are optional accessories for some models.**
- Stage extension can be installed on either side of the stage to enlarge the working surface.
- **Mechanical stage can only be installed on the right side**.

1. Installing the units: screw the bolts in the fixing holes of the stage, then mount the unit from **<u>below the stage</u>**. (Fig. 4)

- **NOTE: The stage has a series of holes in the underside. To install the mechanical stage it is necessary, starting counting from the front of the microscope, to use the third and fifth holes. By using a different set of holes, the mechanical stage will not be installed correctly.**


Fig. 4

8.3 Installing the stage insert

- Install the glass or metal plate according to individual preferences.

Install the stage insert in the stage opening. (Fig. 5)


Fig. 5

8.4 Installing the eyepieces

Insert both eyepieces into the tubes of the optical head. (Fig. 6)


Fig. 6

8.5 Installing color filters

1. Place the filter slider ① on the table and insert the desired colored filter into one of the two empty positions ②. (Fig. 7)

- **Take care that the filter is positioned horizontally in the slider to prevent it from getting stuck during movement.**


Fig. 7

8.6 Installing filter slider

1. Insert the filter slider into the upper slot of the condenser ① with the grooves ② facing the rear of the microscope. (Fig. 8)

- **The slider has two positions to accommodate two colored filters. Move the slider to the position containing the desired filter until it clicks into place.**

Fig. 8

8.7 Connecting the power supply

1. Insert the plug of the power supply into the socket ① at the rear of the instrument. (Fig. 9)
2. Plug the power supply into the wall socket.

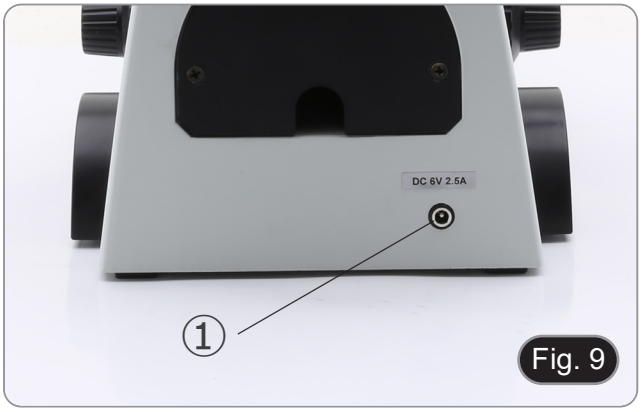
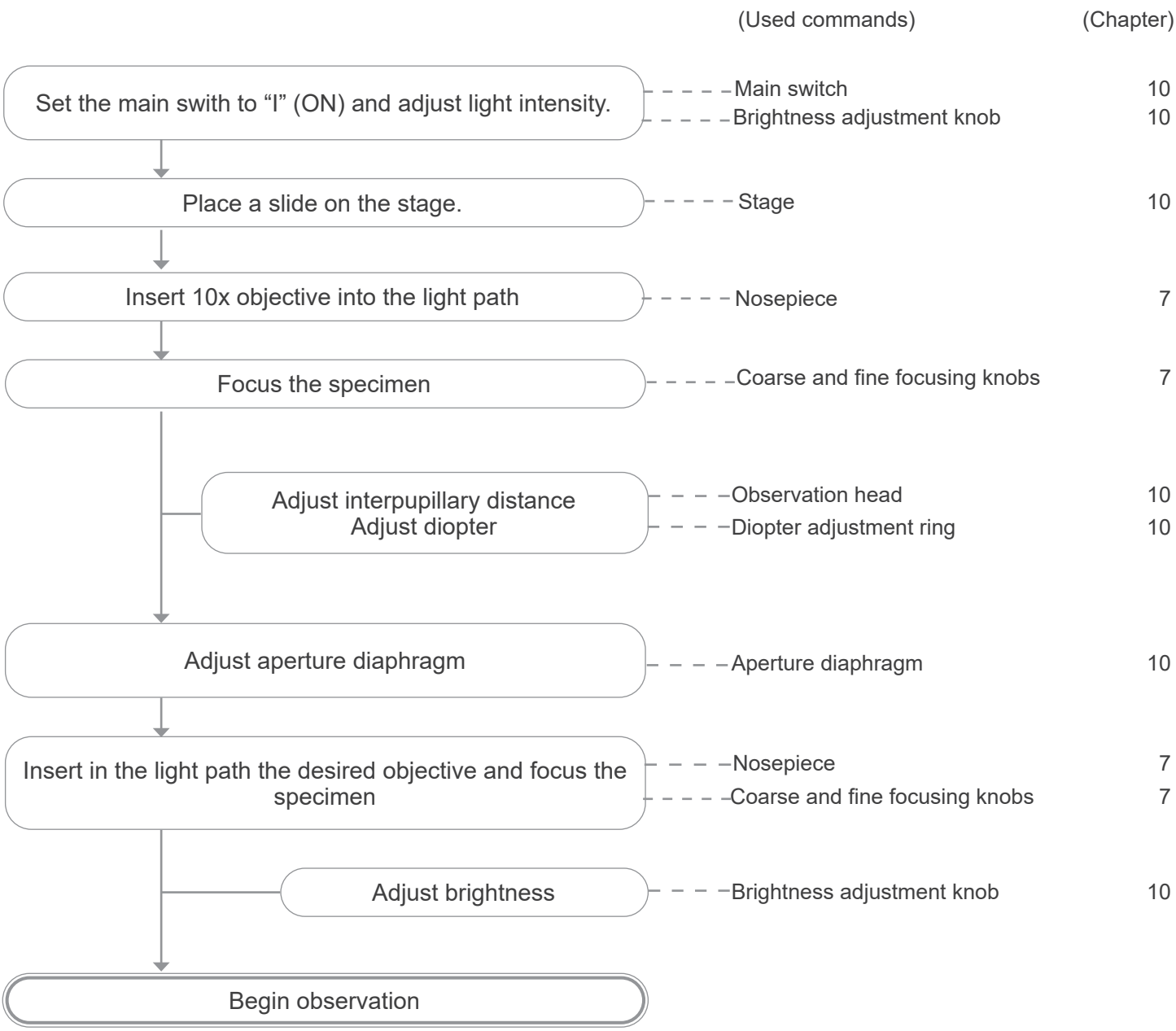


Fig. 9

9. Brightfield observation



10. Use of the microscope in brightfield

10.1 Turning on the microscope

Move the main switch ①, placed on the left side of the microscope, in the “I” (ON) position. (Fig. 10)

Fig. 10

10.2 Adjusting the light intensity

Turn the brightness adjustment knob ②, placed on the right side of the microscope, to increase and decrease the brightness. (Fig. 11)

Fig. 11

10.3 Adjusting the coarse focus tension

- **The coarse focusing knob ④ is pre adjusted to a tight tension upon leaving the factory.**

- If the nosepiece drops down by itself, or the specimen defocuses while adjusting the fine focus knob ⑤, the coarse focus knob is too loose.
- Turning the tension adjustment collar ④ in clockwise direction tightens the coarse focus tension ③.
- Rotate in the opposite direction to decrease the tension. (Fig. 12)

Fig. 12

10.4 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 ⑥ to compensate. (Fig. 13)

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

Fig. 13

10.5 Adjusting interpupillary distance

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

- **The graduation on the interpupillary distance indicator ①, pointed by the spot "." on the eyepiece holder, shows the distance between the operator's eyes. (Fig. 14)**

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

Fig. 14

10.6 Use of eyeshields

- **Use with eyeglasses**

Fold rubber eyeshields with both hands. Folded eyeshields avoid scratching the lenses of eyeglasses. (Fig. 15)


Fig. 15

- **Use without eyeglasses**

Raise eye shields and observe at the microscope placing eyes to the shields, avoiding external light to disturb the observation. (Fig. 16)


Fig. 16

10.7 Selecting the light path

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

1. Move the selector ① to the left (In) or to the right (Out) to distribute the light. (Fig. 17)

POSITION	LIGHT
Out	100% EYEPIECES
In	50% EYEPIECES - 50% TV

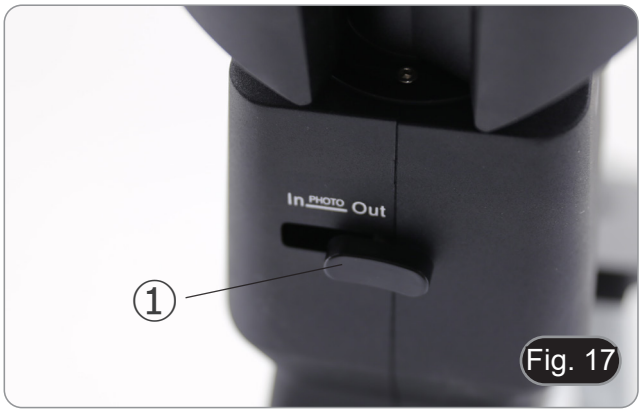


Fig. 17

10.8 Stage and stage inserts

- **For the best image quality, use flasks, Petri dishes and slides with a 1.2 mm thickness.**

1. Place the proper insert for your specimen (according to the table below) on the stage, and fix it with the stage clip.
2. Turning the X and Y knobs, move the specimen to the required position. (Movement Range: 120 (width) × 78 (length) mm).

Moving the specimen

Move the specimen to the desired position by freehand or by turning the knobs ① of the mechanical stage. (Fig. 18)

- **When switching objectives, take care not to touch the holder plates with the objectives, as their weight may damage the front lens.**

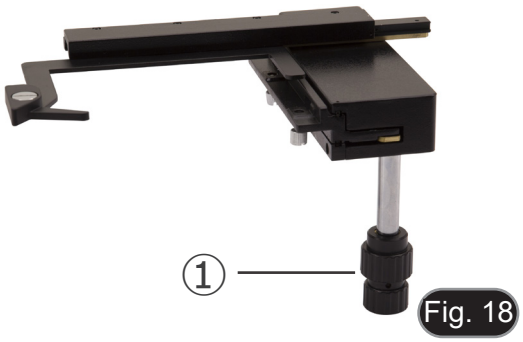
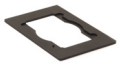
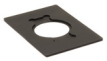


Fig. 18

	**M-793.1** Holder for Petri diameter 38 mm (holder for Terasaki needed
	**M-793.2** Holder for Terasaki and Petri diameter 65 mm
	**M-793.3** Holder for slide and Petri diameter 54 mm
	**M-793.4** Holder for 2+2 slides
	**M-793.6** Holder for Utermöhl-Chamber (holder for Petri diameter 54 mm needed)
	**M-793.7** Load-bearing side extension

10.8.1 Installing stage inserts

1. Install the holder in the mechanical stage. (Fig. 19)

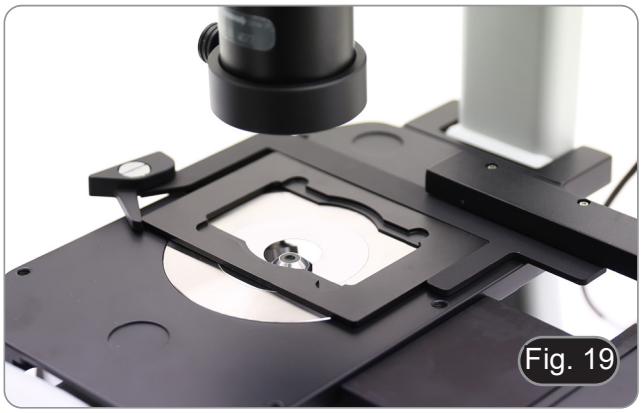


Fig. 19

2. Multi well plates can be directly inserted in the mechanical stage. (Fig. 20)

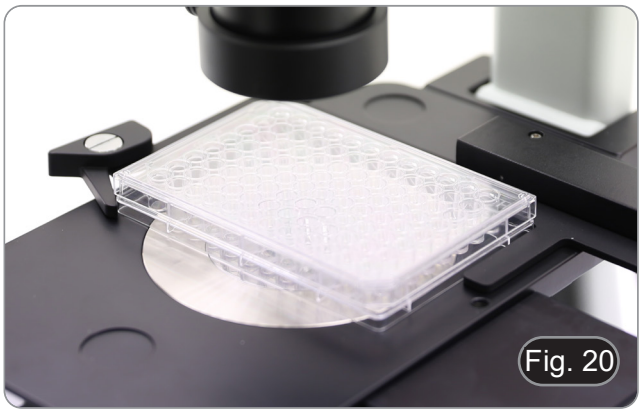


Fig. 20

10.9 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 move the Aperture Diaphragm lever (AS) ① to set the numerical aperture to about 70%-80% of the objective's N.A. (Fig. 21)

If necessary, remove one eyepiece and, looking into empty sleeve, adjust the aperture diaphragm ring in order to obtain an image like the one in Fig. 22.

Fig. 21

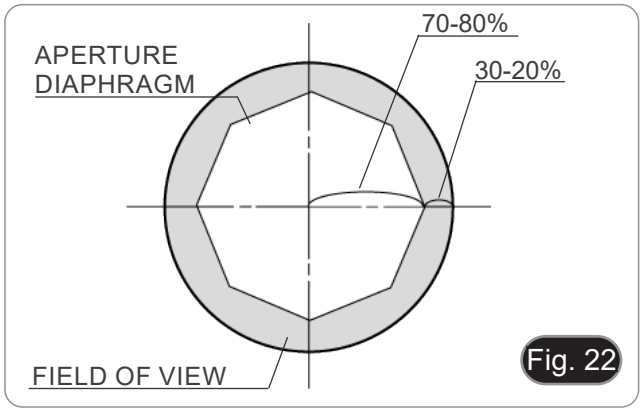


Fig. 22

10.10 Using color filters

Selecting the appropriate color filter according your need. (Fig. 23)

FILTER	USE
Green (IF550)	Phase contrast microscopy
Blue (LBD)	Conversion to daylight

Fig. 23

11. Use of the microscope in phase contrast

11.1 Installing the phase contrast slider

1. Insert the slider into the lower slot of the illumination system, printed face up. (Fig. 24)
2. Pull the slider into the desired position, until it arrives to the click stop.
3. When in phase contrast observation, keep the aperture diaphragm adjustment lever ① on the “O” (open) position.

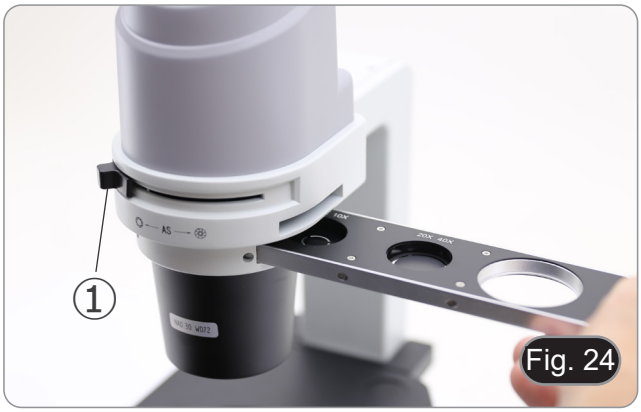


Fig. 24

11.2 Phase contrast slider

- The phase ring is pre-centered when the microscope leaves the factory. It should therefore need no further adjustment. Should a re-centering is needed, it can be performed via the two side bolts (see chapter 10.3).
- The 4x/10x position ② must be used with 4x and 10x phase contrast objectives, the 20x/40x position ③ with the 20x and 40x and the SL position ④ is used for brightfield. (Fig. 25)

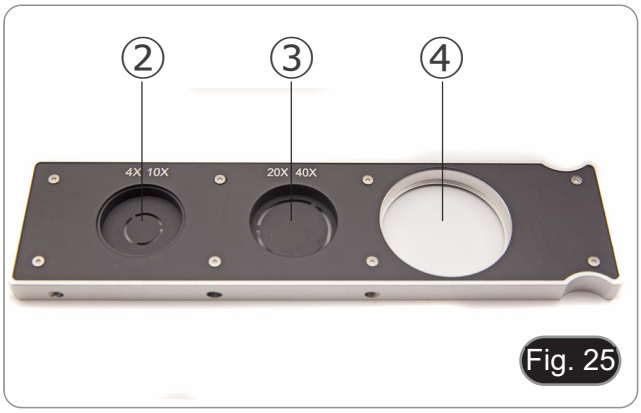


Fig. 25

SLIDER POSITION	MEANING	APPLICATION
SL	empty hole	brightfield observation
4x/10x	phase ring 4x/10x	phase contrast observation with 4x and 10x objectives
20x/40x	phase ring 20x/40x	phase contrast observation with 20x and 40x objectives

11.3 Centering the phase ring

- **Usually this operation is not needed. If necessary, please proceed with the following steps:**

1. Place a specimen on the stage and focus it.
2. Take out the eyepiece from the eyepiece tube without the diopter adjustment, and replace it with the centering telescope (CT). (Fig. 26)
3. Check that the phase ring and the objective match, and that both are steadily set on a click stop.

Fig. 26

4. Use the CT to focus the condenser phase ring (bright) ① and the objective phase ring (dark) ② image. If the bright phase ring's image is not sharp, adjust the CT head until you can see a clear image of the phase ring. (Fig. 27)
5. Adjust the bolts of the two centering holes in the phase contrast slider using the provided Allen wrenches ③ until the bright ring and the dark ring match. (Fig. 28)
6. The 4x and the 10X phase contrast objectives use the same ring on the phase contrast slider. The coincidence of the phase ring center and the phase contrast center must be verified with both objectives. (Fig. 29)

- **If the phase ring is incorrectly centered, the contrast will be severely impaired.**
- **The phase ring may need recentering during and after observation of very thick specimens.**
- **The phase ring may show an apparent misalignment if the specimen is not flat.**

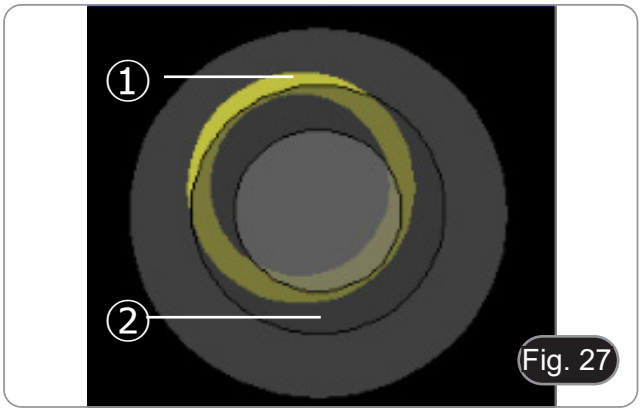


Fig. 27

Fig. 28

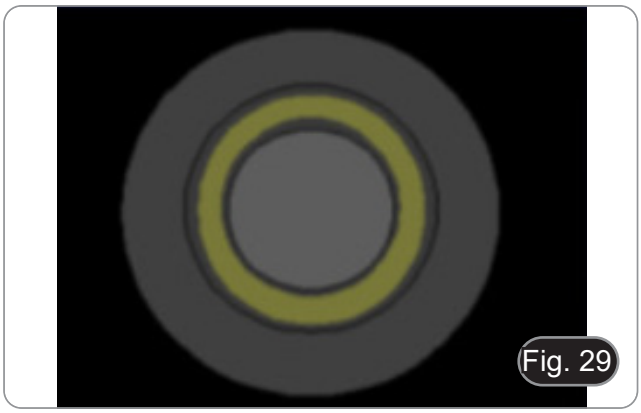


Fig. 29

12. Use of the microscope in RPC

Relief phase contrast (RPC) is a modification of conventional phase contrast that leads to visible improvements in image quality in optical microscopy. Specifically, the following parameters can be improved: contrast, focal depth, sharpness, three-dimensionality, flatness, and halo artifacts. These effects can be achieved when the phase rings of the condenser are replaced by slit rings.

Similar to phase contrast observation, RPC observation requires the use of a slider containing slit phase rings and dedicated RPC objectives.

The use of the slider and objective are identical to those for phase contrast.

12.1 Installing the RPC slider

1. Insert the slider into the lower slot of the illumination system, printed face up. (Fig. 30)
2. Pull the slider into the desired position, until it arrives to the click stop.
3. When in RPC observation, keep the aperture diaphragm adjustment lever ① on the “O” (open) position.

Fig. 30

12.2 RPC slider

- Two sliders are available for the use with different objectives.
- One slider is dedicated to 4X objective (Fig. 31) and another is for 10X/20X/40X objectives. (Fig. 32)
- Both have an empty hole and a RPC ring.

SLIDER POSITION	MEANING	APPLICATION
EMPTY	empty hole ②	brightfield observation
4x	RPC ring 4x ③	RPC observation with 4x objective
10x/20x/40x	RPC ring 10x/20x/40x ④	RPC observation with 10x, 20x and 40x objectives

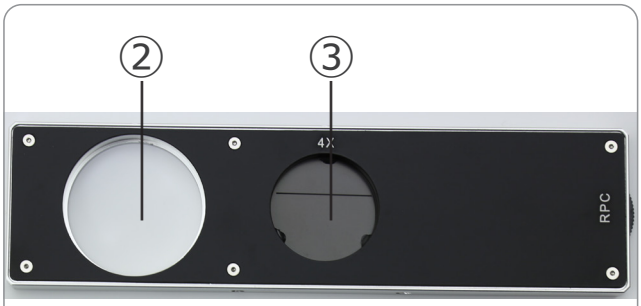


Fig. 31

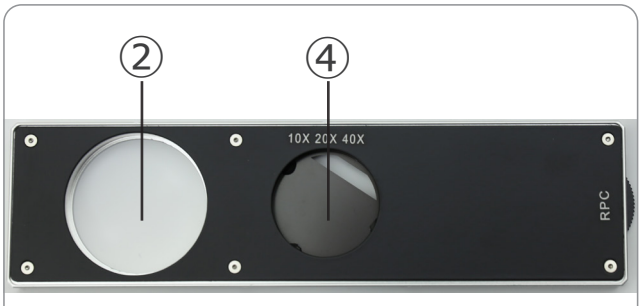


Fig. 32

12.3 RPC observation

- **RPC rings don’t need a centering.**

1. Place a specimen on the stage and focus it.
2. Check that the RPC ring and the objective match, and that both are steadily set on a click stop.
3. While observing in the eyepiece, modulate the contrast of the sample by turning the ring nut mounted on the slider. (Fig. 33)

- The image will take on a different three-dimensional effect depending on the position of the slit.
- **When using the RPC with the 4x objective, the use of the diffuser filter is recommended (see section 10.8.8).**

Fig. 33

13. Microphotography

13.1 Use of C-mount cameras

1. Loosen the clamping screw ① on the trinocular port and remove the dust cap ②. (Fig. 34)

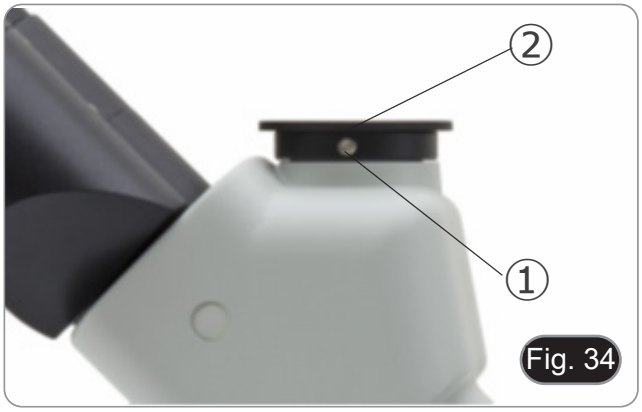


Fig. 34

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. 35)

Fig. 35

13.2 Use of Reflex cameras

1. Insert the Reflex adapter ② into the relay tube ①.
2. Screw the “T2” ring ③ (not provided) to the reflex adapter.
3. Connect the Reflex camera ④ to the “T2” ring just installed. (Fig. 36)
4. Mount the other end of the relay tube ① into the empty hole of the trinocular port, then tighten the clamping screw. (Fig. 34)

- “T2” ring is not provided along 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.**

Fig. 36

14. 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 75 % (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 included 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.

15. Troubleshooting

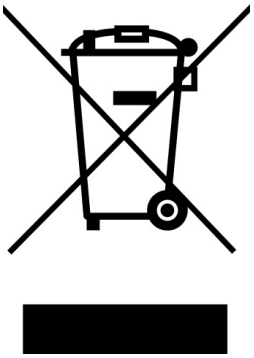
Review the information in the table below to troubleshoot operating problems.

PROBLEM	CAUSE	SOLUTION
I. Optical Section:		
The illumination is on, but the field of view is dark.	The plug of the LED holder is not connected to the illumination set	Connect them
	The brightness is too low	Adjust to a proper setting
The edge of the field of view is vignetted or the brightness is asymmetric.	The nosepiece is not in the correct position	Turn the nosepiece to a click stop
	The color filter is partially inserted	Insert the filter to full depth
	The phase contrast slider is not in the proper position	Move the slider to a click stop
Dust and stains can be seen in the field of view.	There are stains and dust on the specimen	Clean the specimen
	There are stains and dust on the eyepiece	Clean the eyepiece
Image looks double	The size of the aperture diaphragm is too small	Open the aperture diaphragm
Poor image quality: • The image is not sharp • The contrast is not high • The details are not clear • The phase contrast is low.	The nosepiece is not in the center of the light path	Turn the nosepiece to a click stop
	The aperture diaphragm in the view of field is opened too much or too little	Adjust the aperture diaphragm
	The lenses (condenser, objective, eyepieces are culture dish) is dirty	Thoroughly clean all the optical system
	In phase contrast observation, the bottom thickness of the sample is more than 1.2mm	Use a sample holder whose bottom thickness is 1,2mm
	A brightfield objective is used for phase contrast observation	Switch to a phase contrast objective
	The condenser ring is not aligned with the objective phase ring	Adjust the condenser ring to match the objective phase ring
	The light ring and/or the phase contrast ring is not centered	Adjust the bolts to center them
	The objective used is not compatible with the phase ring	Please use a compatible objective
	The phase contrast depends on the sample position	The sample holder is not flat. Move the sample around until a compatible area is found.
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
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. Electrical 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:		
The field of view of the two eyes is different	The interpupillar distance is not correct	Adjust the interpupillar distance
	The diopter correction is not right	Adjust the diopter correction
	The viewing technique is not correct, and the operator is straining the eyesight	When look into the objective, do not stare at the specimen but look at the whole field of view. Periodically, move the eyes away to look at a distant object, then back into the objective
V. Microphotography and video:		
The image is unfocused	Incorrect focusing	Adjusting the focus system as in the present manual
The edge of the image is unfocused	To some degree, it is inherent to the nature of achromatic objectives	The problem can be minimized by a correct setting of the aperture diaphragm
Bright patches appear on the image	Stray light is entering the microscope through the eyepieces and through the camera viewfinder	Cover the eyepieces and the 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.