OPTIKA®
ITALY

B-1000 Series

INSTRUCTION MANUAL

Model
B-1000
B-1000BF
B-1000PH
B-1000TI-2
B-1000TI-3
B-1000TI-5
B-1000TI-10

Ver. 3.2 2020

CE

Summary

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. 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.

3. 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.

4. Intended use

Standard models

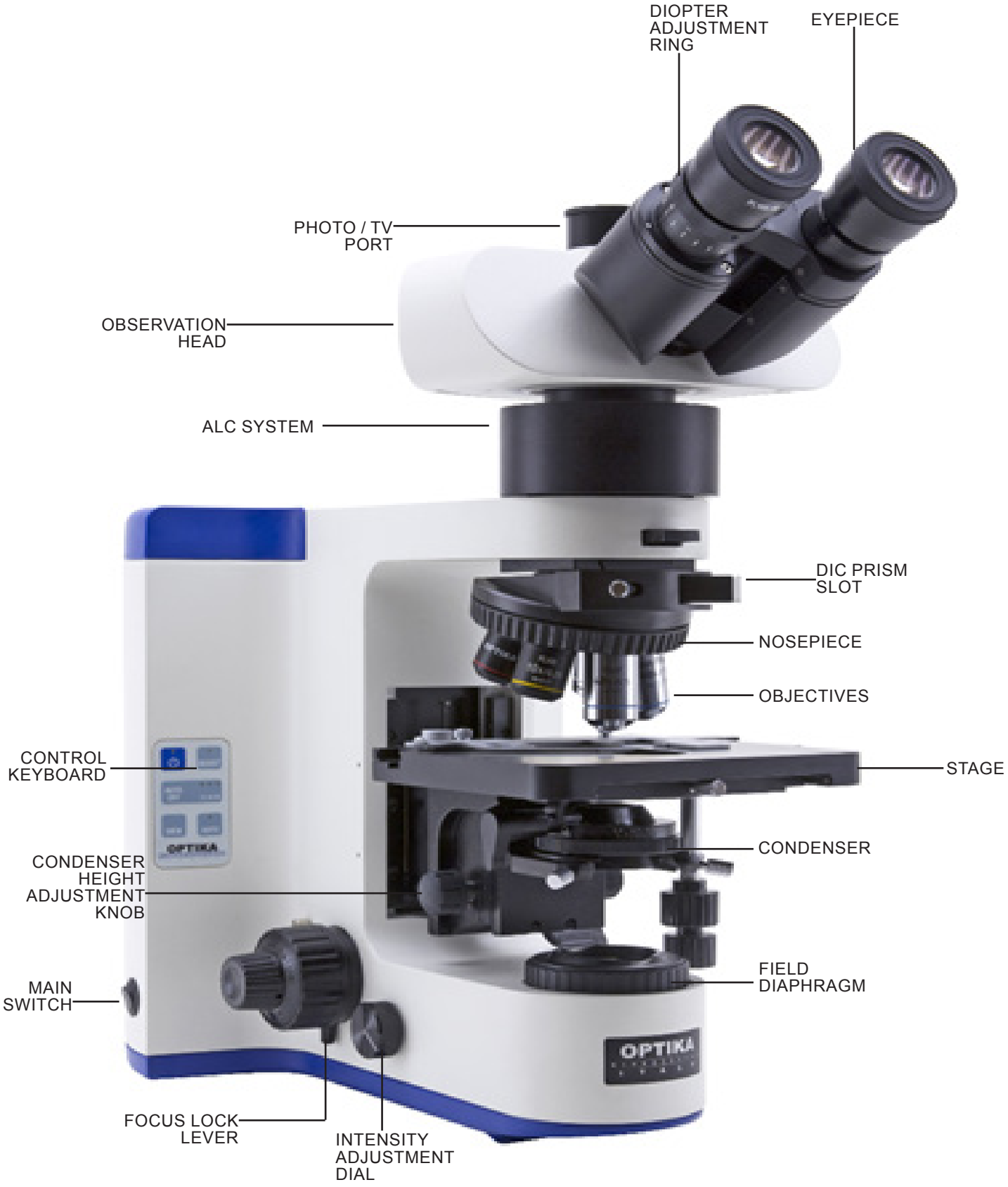
For research and teaching use only. Not intended for any animal or human therapeutic or diagnostic use.

IVD Models

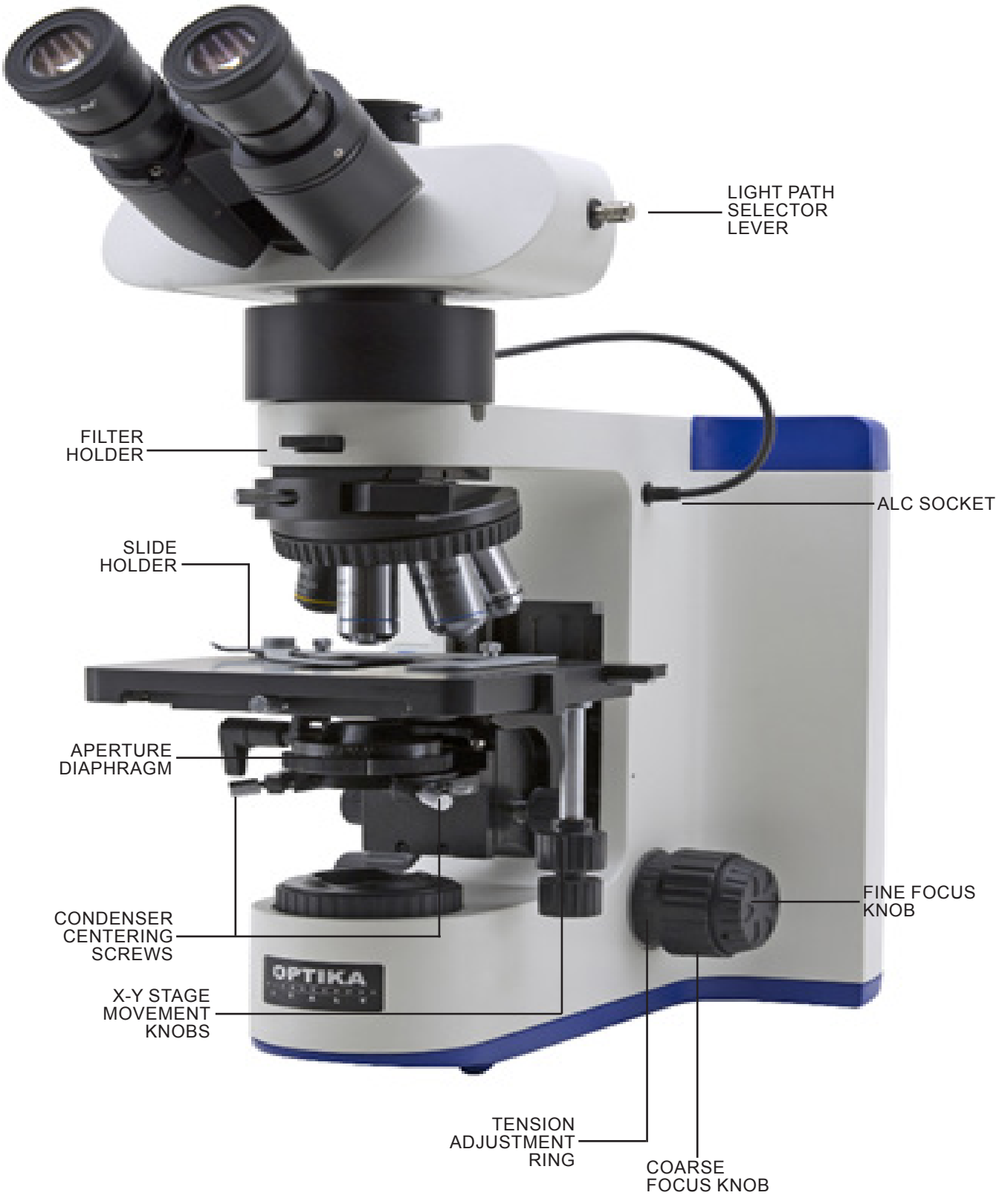
Also for diagnostic use, aimed at obtaining information on the physiological or pathological situation of the subject.

5. Instrument description

5.1 Manual version



Opposite side



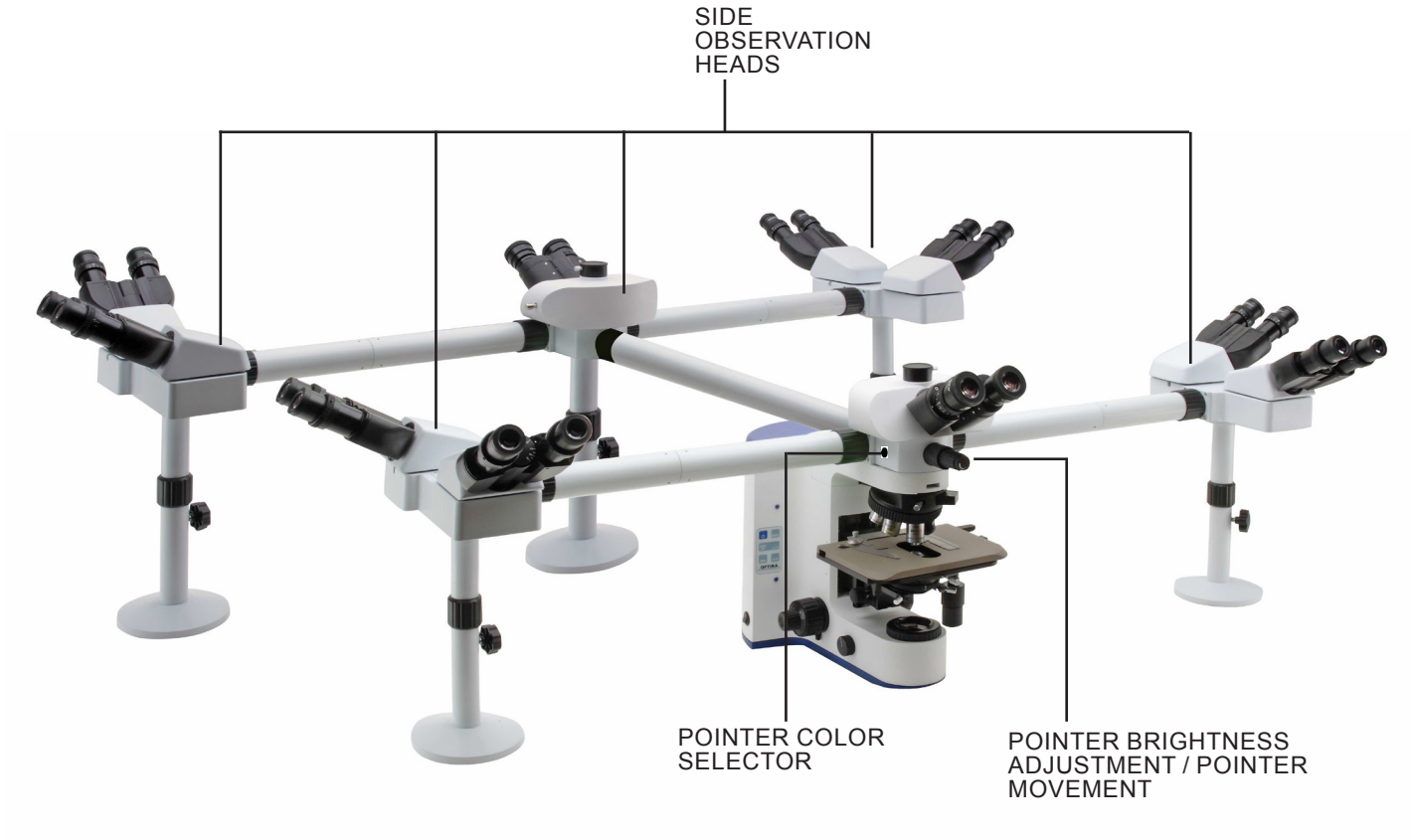
5.2 Motorized version

Only the parts related to the motorized version are highlighted.

Opposite side

5.3 B-1000TI-2 / 3 / 5 / 10

Only the multi-head parts are highlighted.



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:

7.1 Manual version

① Frame
② Objectives
③ Stage
④ Condenser
⑤ Observation head
⑥ Eyepieces
⑦ ALC system (M-1030) (Optional)
⑧ Power supply
⑨ Dust cover
⑩ Allen wrench
⑪ Immersion oil

7.2 Motorized version

① Frame
② Objectives
③ Stage
④ Condenser
⑤ Observation head
⑥ Eyepieces
⑦ ALC system (M-1030) (Optional)
⑧ Microscope power supply
⑨ Motorized parts power supply
⑩ Serial cable
⑪ PS/2 mouse
⑫ Dust cover
⑬ Allen wrench
⑭ Immersion oil

7.3 B-1000TI-2/3/5/10

⑧

① Frame
② Objectives
③ Stage
④ Condenser
⑤ Main observation head
⑥ Side observation heads
- one for B-1000TI-2
- two for B-1000TI-3
- four for B-1000TI-5
- nine for B-1000TI-10

⑦ Eyepieces
- 10x/22 (one pair for main head)
- 10x/20 (one pair for B-1000TI-2)
- 10x/20 (two pairs for B-1000TI-3)
- 10x/20 (four pairs for B-1000TI-5)
- 10x/20 (nine pairs for B-1000TI-10)

⑧ Power supply
- one for microscope (6V dc)
- one for multi-head attachment (5Vdc)

⑨ Dust cover
⑩ Allen wrench
⑪ Immersion oil

7.4 Assembling the microscope

7.4.1 Manual version

1. Put the microscope stand on a solid table. Insert M-1030 attachment (if provided) above the stand, using the 2mm Allen wrench to tighten the screw. (Fig. 1)


Fig. 1

2. Connect the cable of the ALC (Automatic Light Control) system to the socket placed on the right side of the frame. (Fig. 2)


Fig. 2

3. Insert the optical head above the attachment, using the 2mm Allen wrench to tighten the screw. (Fig. 3)


Fig. 3

4. Insert eyepieces into the empty eyepiece sleeves. (Fig. 4)


Fig. 4

5. Insert the condenser under the stage: position until it is well inserted into its holder (under the condenser there is a pin that must fully enter the holder guide). (Fig. 5)
6. Lock the condenser fixing knob ①.

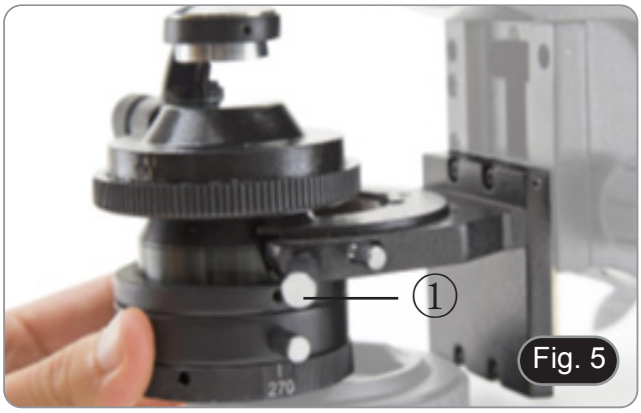


Fig. 5

7. Mount the stage: lower the support using the coarse focus knob, then place the stage and firmly tighten the lock screw ②. (Fig. 6)

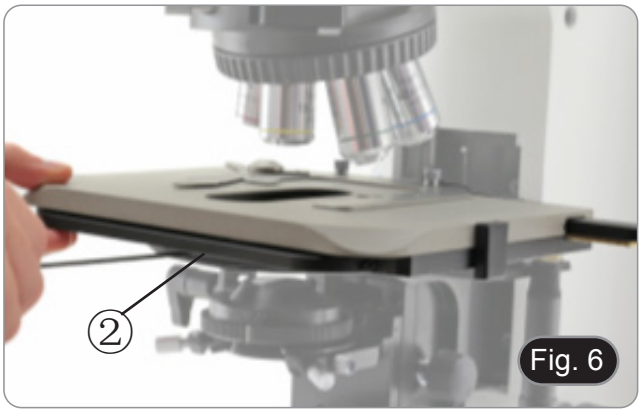


Fig. 6

8. Screw each objective into the thread of the nosepiece, clockwise with increasing magnification. (Fig. 7)


Fig. 7

9. Insert the power supply jack in the socket placed in the rear side of the of the microscope. (Fig. 8)


Fig. 8

7.4.2 Motorized version

1. Assemble the stage in the same way as the manual version. Check the perfect alignment of the rear part of the stage with the rear arm of the frame. An imperfect alignment could lead to an incorrect functioning of the system. (Fig. 9)

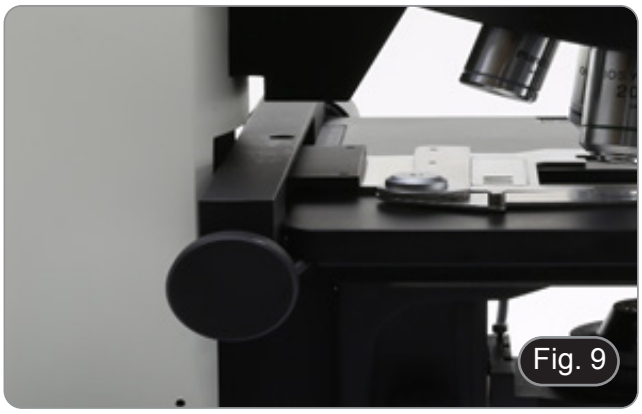


Fig. 9

2. Connect the cable ① from the stage to the frame and tight the locking screws of the connectors ②. (Fig. 10)

Fig. 10

3. Connect the provided cables: ③ 12V power supply for the motorized parts; ④ 6V microscope power supply; ⑤ serial cable; ⑥ PS/2 mouse. Connect power cables as the last step. (Fig. 11)

Fig. 11

7.4.3 B-1000TI-2 / 3 / 5 / 10

1. Place the splitter attachment of the multi-discussion system and tighten the lock screw ① on the right side of the frame. (Fig. 12)

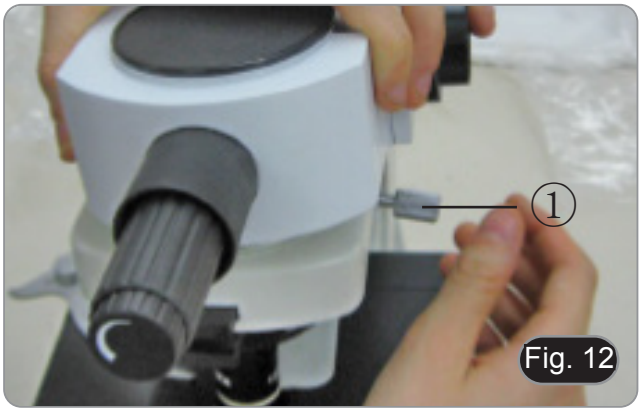


Fig. 12

2. Connect the 5Vdc power supply to the rear socket of the splitter attachment. (Fig. 13).

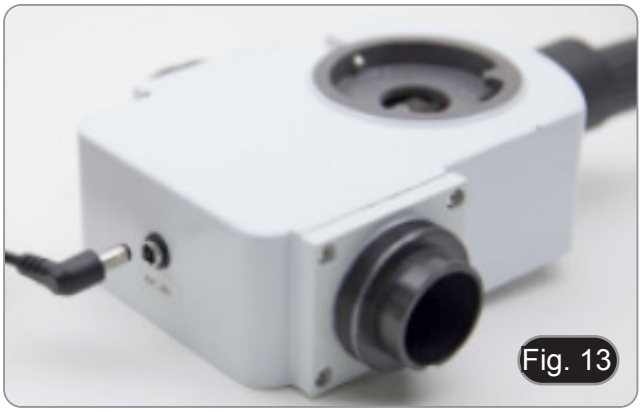


Fig. 13

3. Connect the first part of the extension tube to the optical splitter. Insert the tube into the splitter all the way down and screw on the black sealing ring completely. (Fig. 14-15).

- **Each connection is labeled with a letter printed on both sides of the connection. Make sure to match the letters in order to correctly assemble the microscope.**

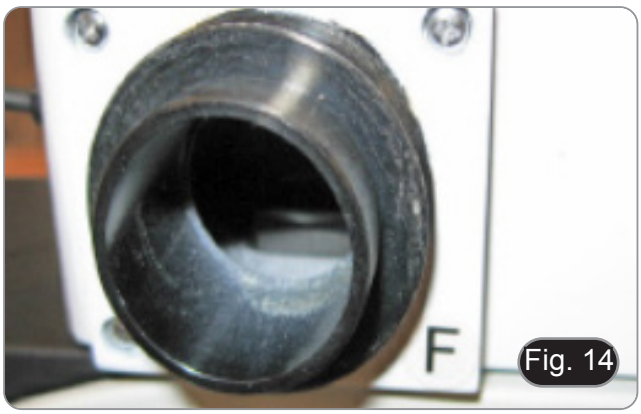


Fig. 14

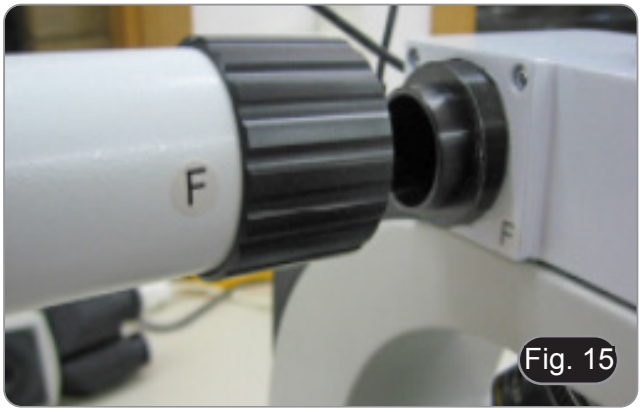


Fig. 15

4. Insert the second part of the extension tube. (Fig. 16).
5. Fully insert the second extension tube in the right position. Using the provided Allen wrench (small one) lock the fixing screws ① to block the extension tube.

- **At the end of the first extension tube there is a lens (Fig. 17). Make sure it is free from dirt, dust or other contaminants before to proceed with the assembling of the second extension tube.**

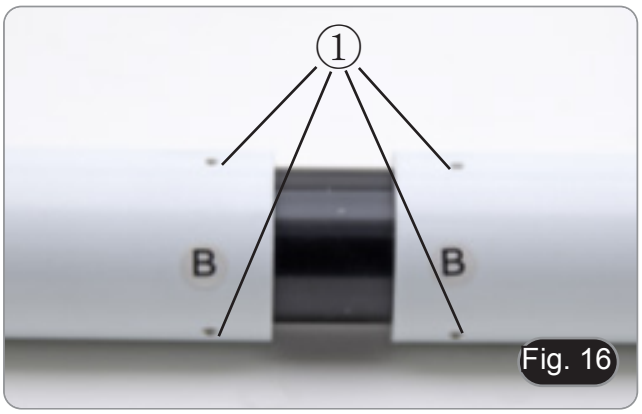


Fig. 16

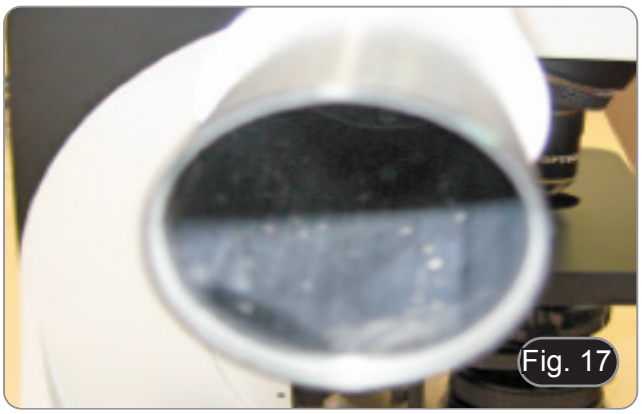


Fig. 17

6. Adjust the height of the multi-head holder. Loosen the base fixing knob ②, unscrew the base ③ in order to reach the desired height, then lock the knob. (Fig. 18). Make sure that each extension tube is perfectly horizontal.

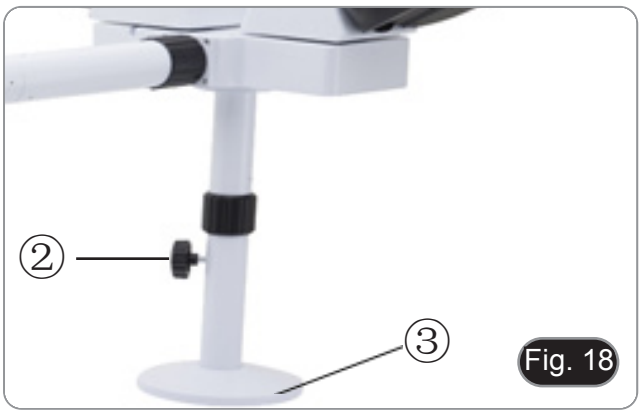


Fig. 18

7. Insert the binocular heads, matching the reference letter. (Fig. 19).


Fig. 19

8. Insert the provided eyepieces (WF10X/20) into binocular heads. (Fig. 20)
9. Repeat all the above operations for each observation point.

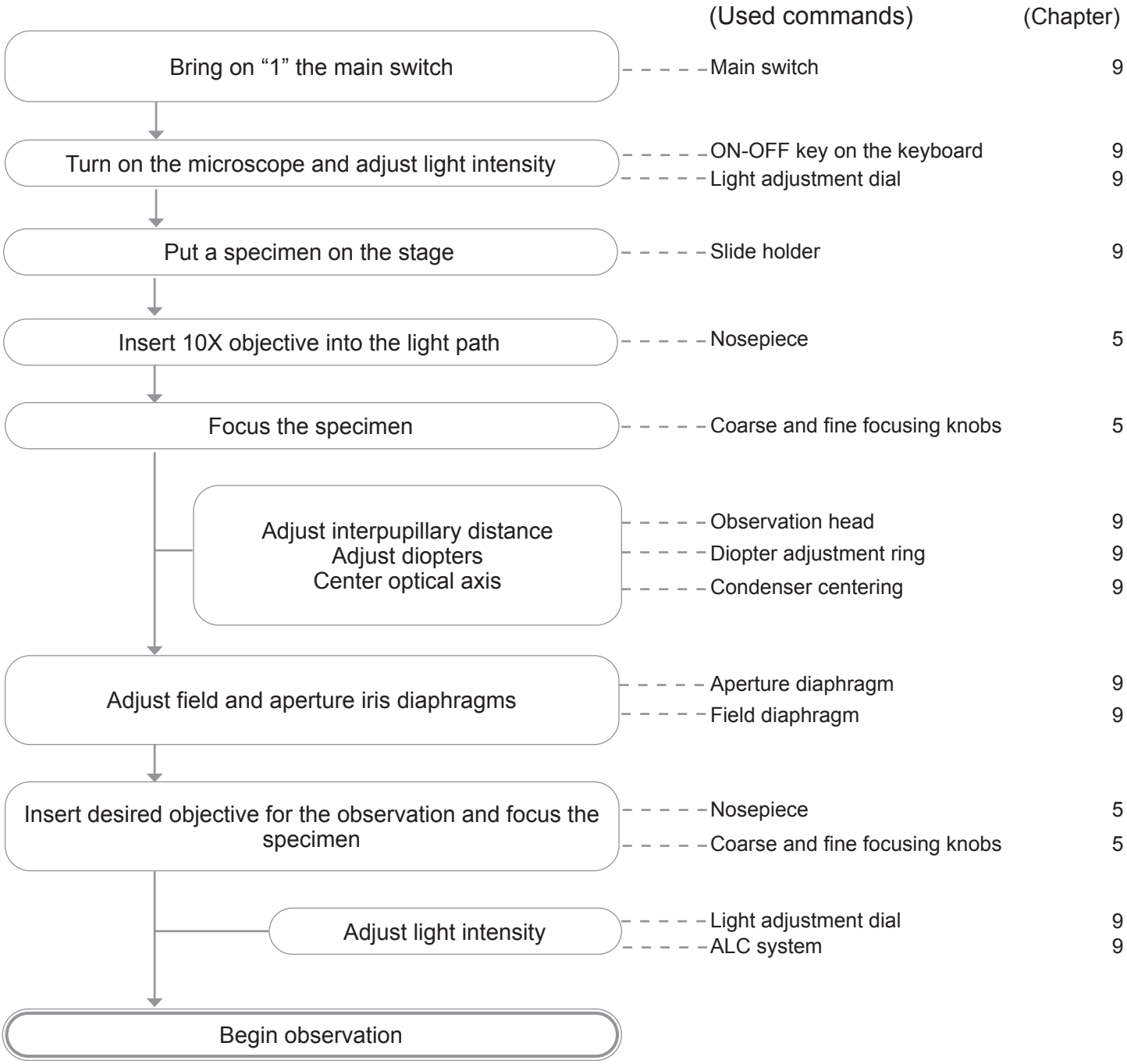

Fig. 20

10. Install the trinocular head over the splitter. (Fig. 21)


Fig. 21

11. Continue with the installation of all other components as described in the paragraph 7.4.1.

8. Summary of Brightfield observation procedures



9. Use of the microscope

9.1 General switch on

To activate the transmitted light illuminator, put the main switch ①, located on the left side of the stand, to the position “1”. (Fig. 22)

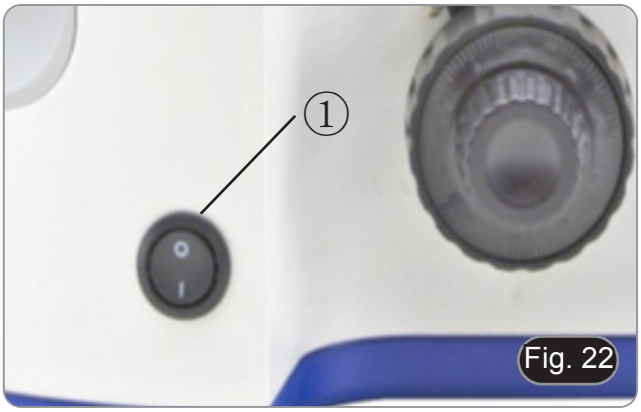


Fig. 22

9.2 Control keyboard

B-1000 illumination can be managed through the keyboard placed on the left of the stand. (Fig. 23)

- **ON-OFF** (②): press this key (after switching the main switch on “1”) to turn ON or OFF the microscope LED.
- **BOOST** (③): press this button in order to increase the brightness (useful for high-magnification objectives or very opaque specimens).

⚠ **Do not enable boost mode while observing with low magnification objectives (4x, 10x) with fully open diaphragm: the high brightness may hurt user’s eyes**.

- **AUTO OFF** (④): if you want the illuminator to switch off automatically, press this button until 15, 30 or 60 minutes delay is set. After this period of time, the light will turn off. You have to press the ON-OFF button to turn it on again.

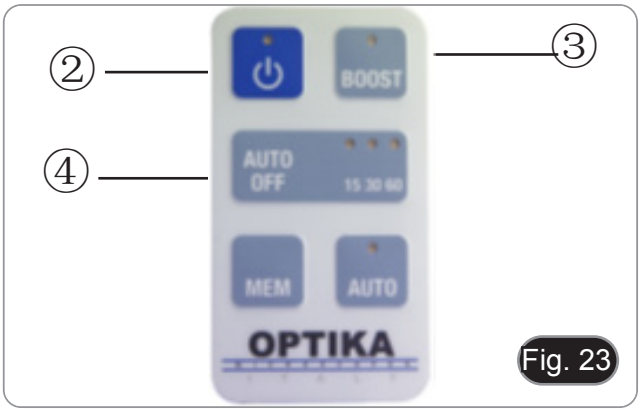


Fig. 23

9.3 Brightness adjustment

Use the brightness adjustment dial ⑤ on the left side of the microscope to increase or decrease the light intensity on the specimen. (Fig. 24)

Fig. 24

9.4 Adjust the observation head

Loosen the locking screw ①, turn the observation head to a comfortable position for observation, and then lock the locking screw again. (Fig. 25)

Fig. 25

9.5 Adjust 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. 26)**

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

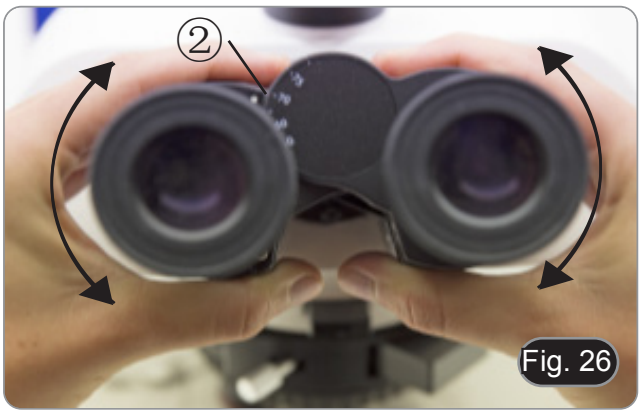


Fig. 26

9.6 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 ③ to compensate. (Fig. 27)

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

Fig. 27

9.7 Use of eyeshields

- **Use with eyeglasses**

Fold rubber eyeshields with both hands. Folded eyeshields avoid scratching the lenses of eyeglasses. (Fig. 28)


Fig. 28

- **Use without eyeglasses**

Raise eyeshields and observe at the microscope placing eyes to the shields, avoiding external light to disturb the observation. (Fig. 29)


Fig. 29

9.8 Light path selection

- 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 one of the three possible positions to distribute the light. (Fig. 30)

POSITION	LIGHT
IN	100% EYEPIECES
MIDDLE	50% EYEPIECES / 50% TV
OUT	100% TV

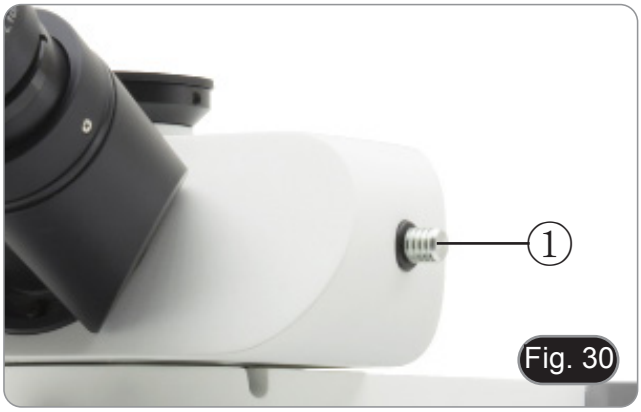


Fig. 30

9.9 Coarse focus tension adjustment

The tension of the coarse focusing knob is factory preset.

1. To modify the tension according to personal's needs, rotate the ring ②. (Fig. 31)

- 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.

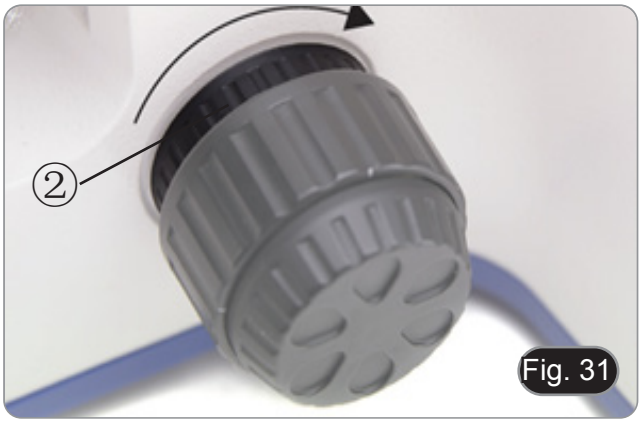


Fig. 31

9.10 Focus stop lever

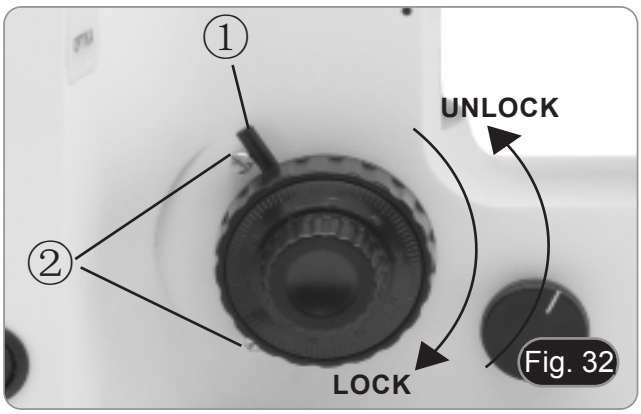


Fig. 32

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

1. After focusing the specimen, pull the lever ① toward the front of the microscope and lock it. (Fig. 32).

• 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.**

• **Two stoppers ② are inserted on the frame. DO NOT REMOVE THE TWO STOPPERS.**

9.11 Stage

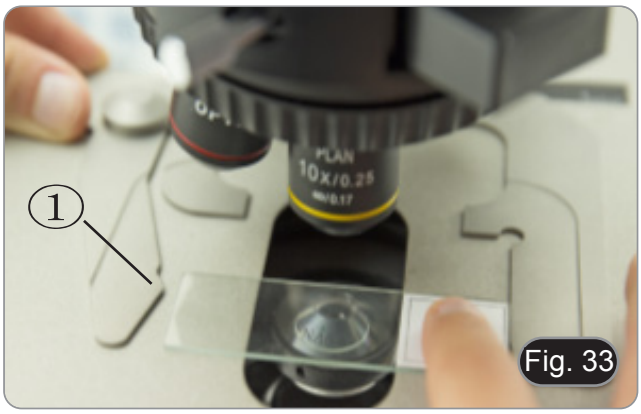


Fig. 33

Stage accepts standard slides 26 x 76 mm, thickness 1,2 mm with cover slide 0,17mm. (Fig. 33)
It is possible to place two slides side by side on the stage.

• **Open the spring arm of the slide holder ① and place from the front the slide on the stage.**
• **Gently release the spring arm of the slide holder.**
• **A sudden release of the spring arm could cause the falling of the slide.**

9.12 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. 34)
3. Rotate the field diaphragm ring ② clockwise, 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.

Fig. 34

9.13 Effect of 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. 35)

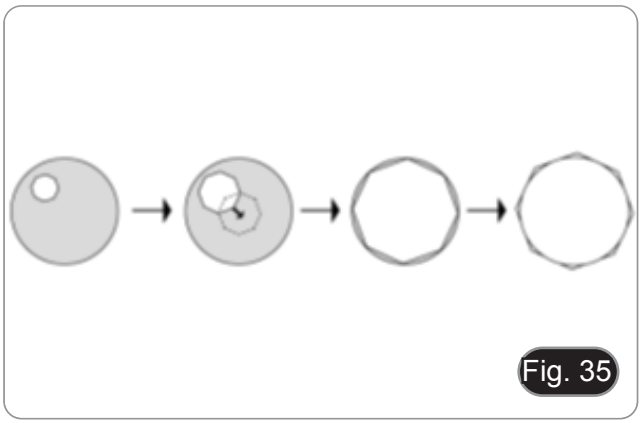


Fig. 35

9.14 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 ⑤ (printed on the condenser ring) to about 70%-80% of the objective's N.A. (Fig. 36). If necessary, remove one eyepiece and, looking into empty eyepiece sleeve, adjust the condenser's ring in order to obtain an image like the one in Fig. 37.

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

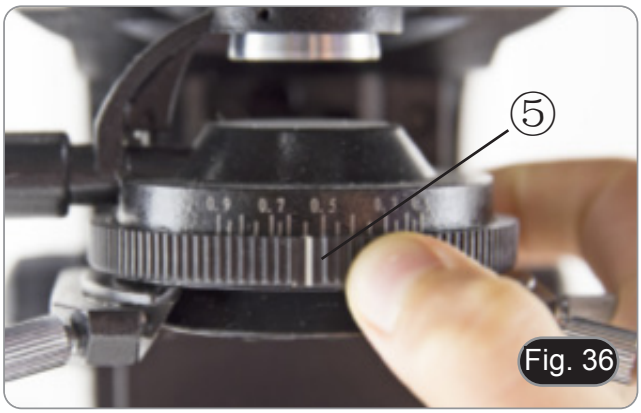


Fig. 36

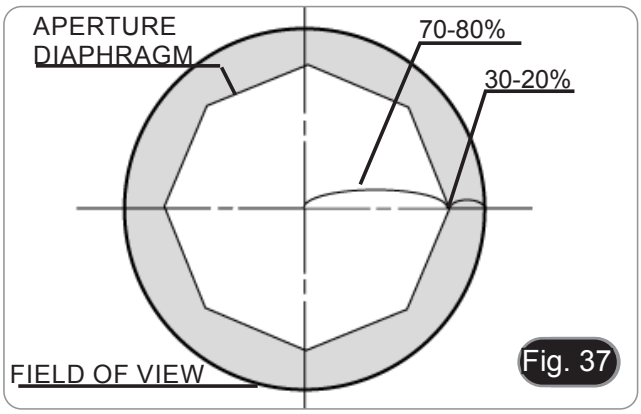


Fig. 37

9.15 Use of oil immersion objective

1. Focus the specimen with a low power objective.
2. Lower the stage (remember to lock the coarse upper limit knob).
3. Put a drop of oil (provided) on the area of the specimen to be observed. (Fig. 38)

- **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 to the left to move the immersion objective a few times and allow the air bubbles to move away.

4. Insert immersion objective in the light path.
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 alcohol (30%).

- **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.**

Fig. 38

9.16 Use of ALC system (optional)

1. Adjust the desired brightness through the eyepieces using the light intensity dial (chapter 9.3).
2. Press the MEM key ① to store this setting (Fig. 39). The light on the microscope will turn off for some seconds, the will turn on again.

- **The settings could not be working when the light intensity is too low or too high. This is not a defect.**

3. The LED ② of the AUTO key ③ will light up to show that the system is now active.
4. Now the system will automatically adapt the brightness to the eyepieces when an objective is changed, when the aperture diaphragm is used or when another specimen is placed on the stage.
5. Pressing the AUTO key, the ALC system will be disabled, but keeping in memory the setting of the illumination previously achieved.
6. Pressing the AUTO key again the setting is recalled.

- **When ALC system is active, the light intensity dial is not active.**
- **To store a new setting, repeat step 1 and 2. This will overwrite the old setting and will store a new one.**

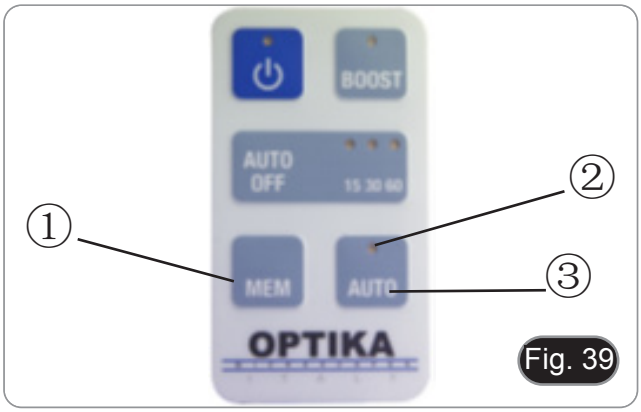


Fig. 39

9.17 Only for motorized version

9.17.1 Nosepiece rotation

1. To change magnification it is possible operate on the nosepiece movement buttons located on the right side of the frame. (Fig. 40). Orange button ① rotates the nosepiece clockwise, while the blue button ② rotates the nosepiece counterclockwise.
2. As an alternative it is possible operate on the right and left mouse buttons.

Fig. 40

9.17.2 Focusing

Focus motor is activated through the mouse wheel. Front or rear rotation of the mouse wheel raises or lowers the stage. (Fig. 41)

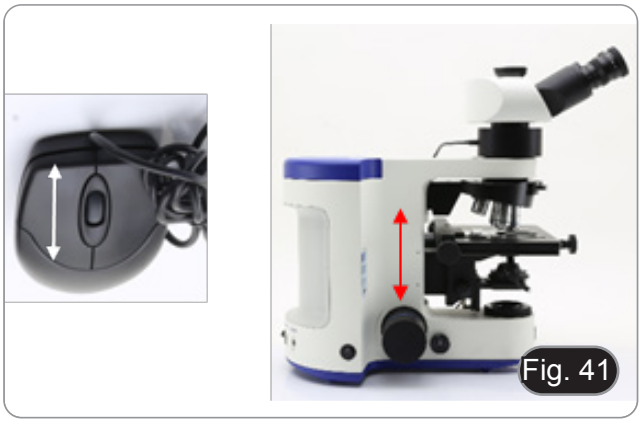


Fig. 41

9.17.3 Stage

1. Stage is moved through the mouse movement. A mouse movement to the front or to the back ③ causes a stage movement of the stage along the Y axis, while a left or right movement ④ causes a stage movement of the stage along the X axis. (Fig. 42)
2. It is always possible, however, operate on the translation knobs of the stage for a manual movement.

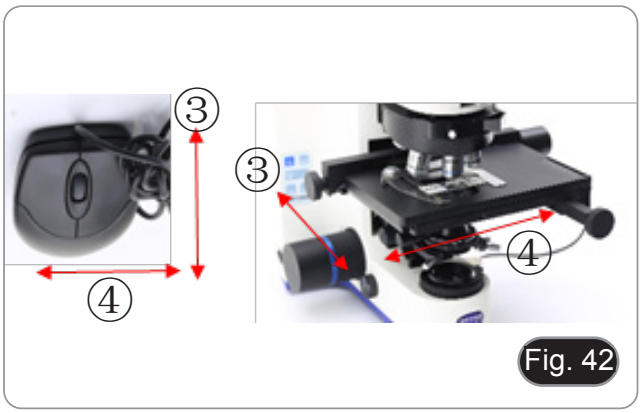


Fig. 42

9.18 Use of the pointer (B-1000TI-2 / 3 / 5 / 10)

1. By moving the joystick of the pointer ① it is possible to change the position of the light arrow within the observation field. (Fig. 43)
2. This arrow is used by the teacher to indicate an interesting portion within the observed sample.

3. Press the color selection button ② on the left side of the switch to change the color of the light arrow.
- Repeated pressure cyclically changes the color in this sequence: RED → GREEN → BLUE → OFF. (Fig. 44)

Fig. 43

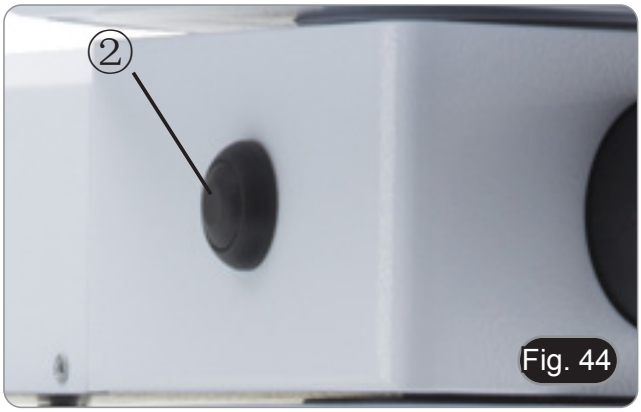


Fig. 44

4. Turn the intensity control switch ③ to change the brightness of the arrow (Fig. 45). Adjust the intensity according to the sample under examination.

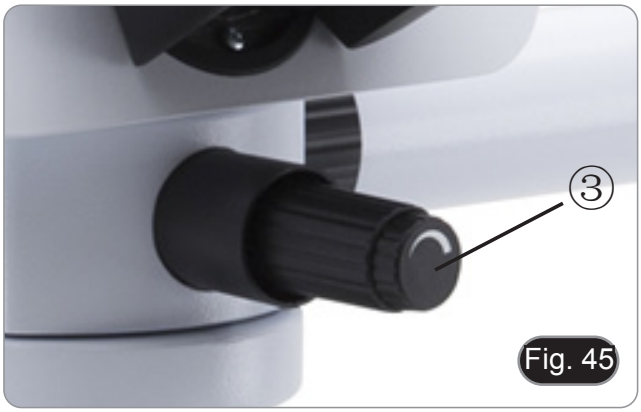


Fig. 45

10. Use of universal condenser for Brightfield / Darkfield / Phase contrast

Universal condenser provided with B-1000PH allows observation in brightfield, darkfield and phase contrast.

Fig. 46

Fig. 47

Fig. 48

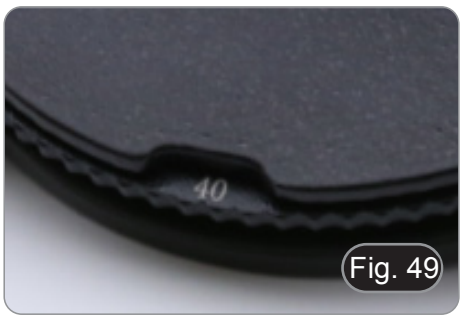


Fig. 49

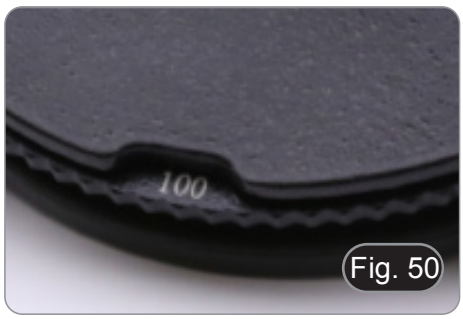


Fig. 50

Observation mode	Condenser turret position
Brightfield	BF (Fig. 46)
Darkfield	DF (Fig. 47)
Phase contrast 10x	10/20 (Fig. 48)
Phase contrast 20x	10/20 (Fig. 48)
Phase contrast 40x	40 (Fig. 49)
Phase contrast 100x	100 (Fig. 50)

10.1 Brightfield observation (BF)

1. Rotate the condenser turret to insert the “BF” position.
2. Now repeat the steps described in the procedure “*Summary of brightfield observation procedures*”.

10.2 Darkfield observation (DF)

1. Rotate the condenser turret to insert the “DF” position.

- **By inserting the darkfield ring, the aperture diaphragm opens automatically. This is a desired effect and should not be considered a defect**.

2. Place a specimen on the stage and focus.
3. Observing into eyepieces raise or lower the condenser until a homogeneous illumination of the specimen can be achieved, thus obtaining a proper darkfield effect.

- **Darkfield requires a huge amount of light. Switching from darkfield to brightfield, one could be dazzled. Do not keep your eyes on the eyepieces when moving the condenser turret from DF to BF.**
- **“Dry” darkfield observation, that is, without the use of oil, is only possible with objectives with N.A. lower than 0.7.**
- **Observing in darkfield, it may be necessary to raise the condenser from the normal position to obtain a more homogeneous illumination. This is not a defect.**

10.3 Phase Contrast observation (PH)

1. Center the condenser as already described at paragraph 9.12.

• This condenser does not have a swing-out lens, so the operation described in step 2 is not necessary.

2. Rotate the condenser turret to insert the “10/20” position.

• **By inserting any phase ring, the aperture diaphragm opens automatically. This is a desired effect and should not be considered a defect.**

3. Insert 10x objective into the light path.
4. Place a specimen on the stage and focus.
5. Remove one eyepiece and insert the centering telescope. (Fig. 51)
6. Rotate the upper part of the centering telescope until the two phase rings (one dark and one bright) visible in the telescope are in focus. (Fig. 52-54)
7. Using centering screws on the condenser ① (Fig. 51), center the phase rings to make the bright ring ② be concentric to the dark ring ③. (Fig. 53-54)
8. Insert 20x objective (do not rotate the condenser turret) and check the centering of the two rings.
9. Repeat the same operation with other objectives to check the ring centering: 40x objective – turret position “40”, 100x objective – turret position “100”.
10. At the end remove the centering telescope, reinstall the eyepiece and begin observation.

• **With 40x and 100x objectives it may be useful to slightly raise the condenser, to obtain a better projection of the phase rings. This is not a defect.**

• **With the 4X objective, the condenser could have a dark halo at the periphery of the field of view. This is not to be considered a defect.**

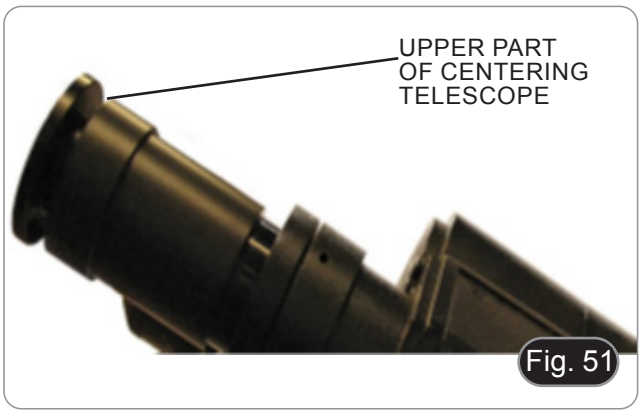


Fig. 51

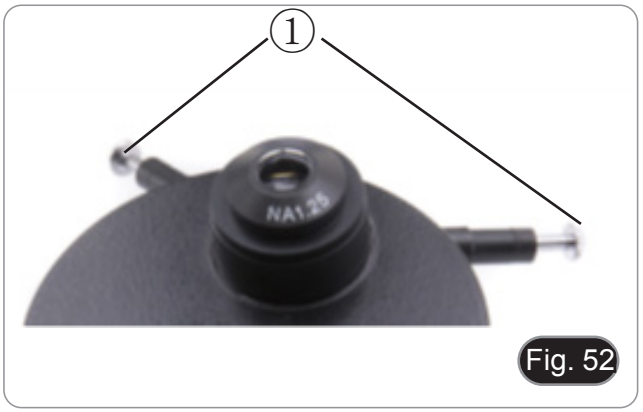


Fig. 52

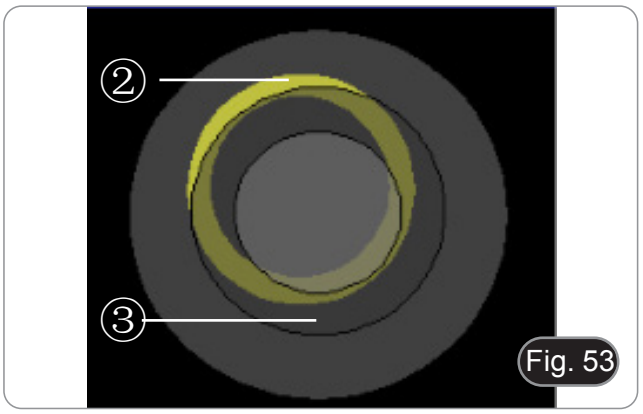


Fig. 53

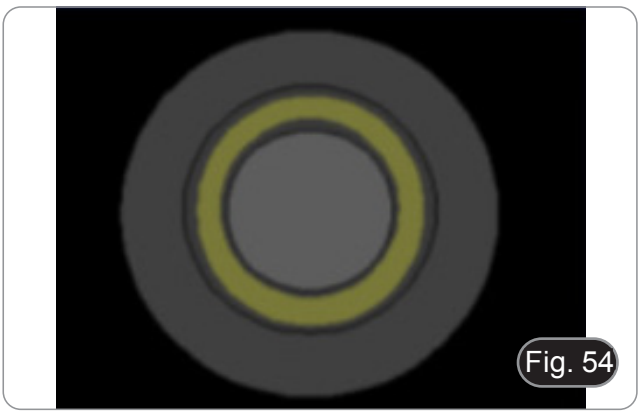


Fig. 54

10.4 Use of green filter

- Green filter is used to increase the contrast of the image during phase contrast observation.
- Place the filter on the field lens of the microscope and begin the observation. (Fig. 55)
- For brightfield or darkfield observation it advisable to remove the green filter from the light path.


Fig. 55

11. DIC observation

The microscope allows the observation in Differential Interferential Contrast (DIC) with two different methods: Koehler DIC and Nomarski DIC.
The Koehler DIC method is the simplest both from the point of view of installation and from the point of view of use, while the Nomarski DIC method provides for a more complex setup.

11.1 Koehler DIC transmitted light

The Koehler DIC observation in transmitted light requires the kit consisting of the following accessories: Polarizer ①, transmitted light Analyzer ②, Interferential green filter ③, DIC slider ④. (Fig. 56)

1. Place the polarizer on the lens at the base of the microscope.

Fig. 56

2. Remove the dummy slider from the nosepiece and insert the analyzer into the dummy slider, then insert the ⑤ assembly into the slot ⑥. (Fig. 57)
3. Remove the specimen from the stage.
4. Rotate the polarizer at the base of the microscope to achieve maximum darkening of the eyepieces.

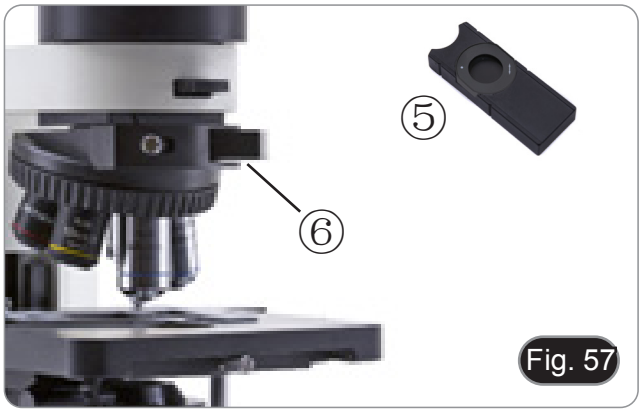


Fig. 57

5. Once the maximum darkening is achieved, remove the slider from the nosepiece, remove the analyzer from the dummy slider and insert it into the DIC prism. Now insert the DIC slider ⑦ into the slot ⑥. (Fig. 58)
6. Close the condenser aperture diaphragm a little.

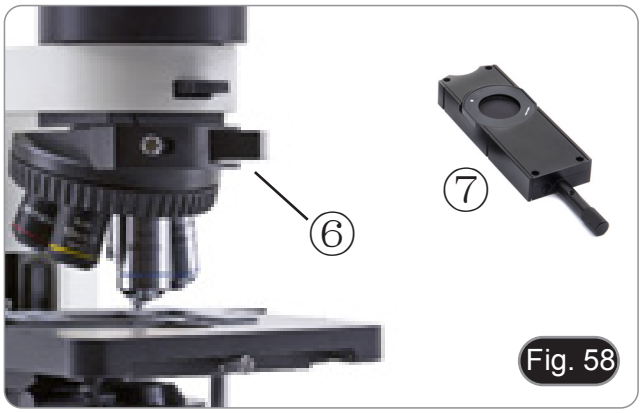


Fig. 58

7. Put a specimen on the stage and focus.
8. Begin the observation by rotating the DIC slider knob ⑧ to obtain a three-dimensional sample effect. (Fig. 59)

• For a better effect on the image you can use the green filter IF550 which must be placed above the polarizer.

Fig. 59

11.2 Nomarski DIC transmitted light

The Nomarski DIC observation in transmitted light requires the kit consisting of the following accessories: Universal condenser ① (containing the dedicated DIC prisms according to the objectives in use), transmitted light Analyzer ②, DIC slider ③. (Fig. 60)

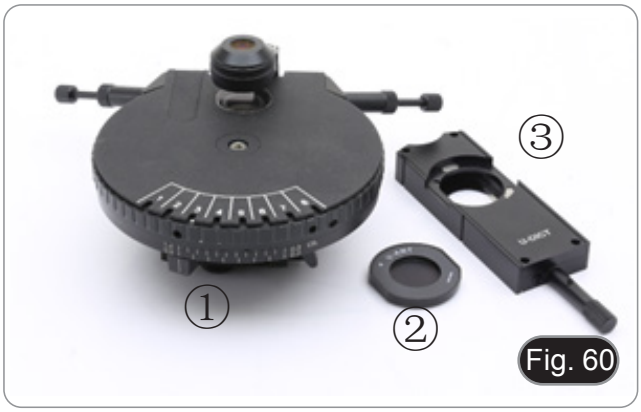
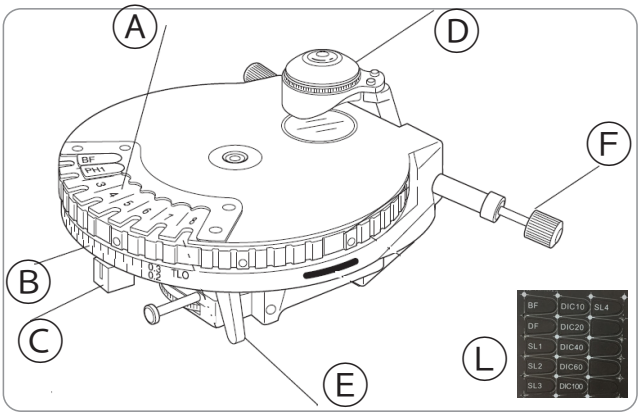
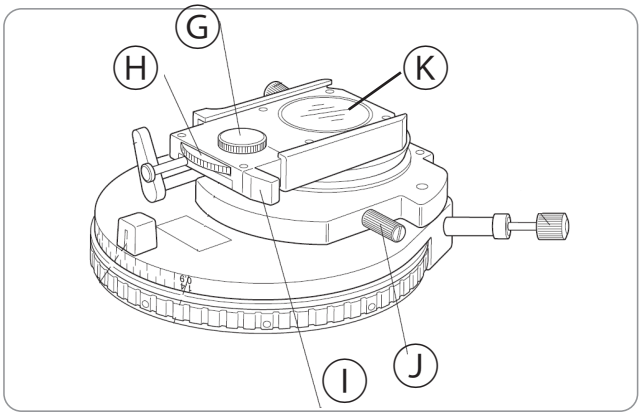


Fig. 60

Universal Condenser Controls





Ⓐ Optical inserts markers
Ⓑ Aperture diaphragm scale
Ⓒ Aperture diaphragm lever
Ⓓ Top lens
Ⓔ Top lens lever
Ⓕ Optical inserts centering screws
Ⓖ Polarizer rotation fixing screw
Ⓗ Polarizer rotation knob
Ⓘ Polarizer in/out knob
Ⓙ Polarizer slider locking screw
Ⓚ Polarizer
Ⓛ Indicator markers

1. Using the knob Ⓘ, insert the polarizer Ⓚ embedded in the condenser and loosen the polarizer rotation fixing screw Ⓖ. (Fig. 61)

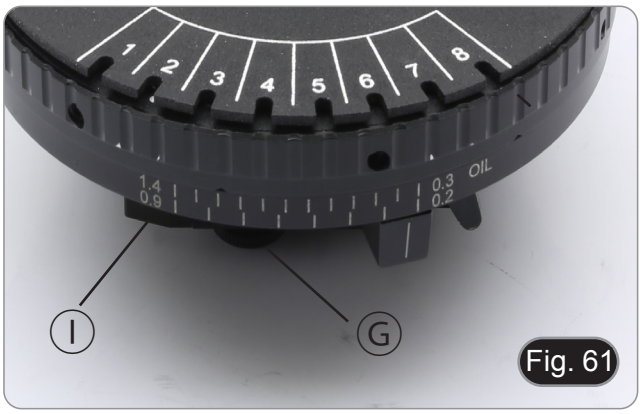


Fig. 61

2. Remove the dummy slider from the nosepiece and insert the analyzer into the dummy slider, then insert the ④ assembly into the slot ⑤. (Fig. 62)

3. Remove the specimen from the stage.

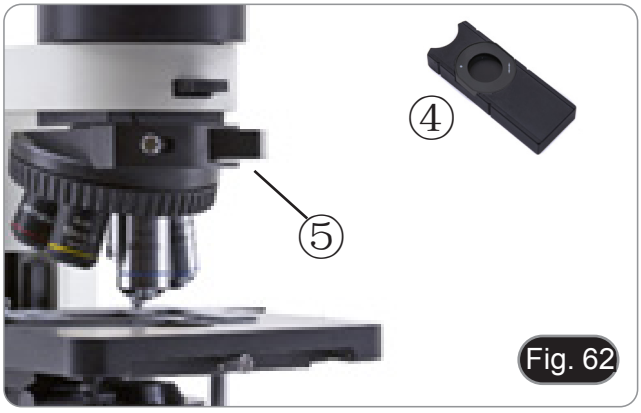


Fig. 62

4. Turn the polarizer knob Ⓗ under the condenser to achieve maximum darkening of the eyepieces, and then tighten the polarizer locking screw Ⓖ. (Fig. 63)

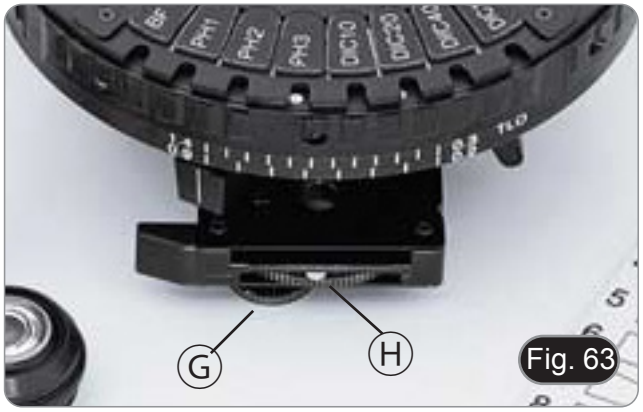


Fig. 63

5. Once the maximum darkening is achieved, remove the slider from the nosepiece, remove the analyzer from the dummy slider and insert it into the DIC prism. Now insert the DIC slider ⑥ into the slot ⑤. (Fig. 64)

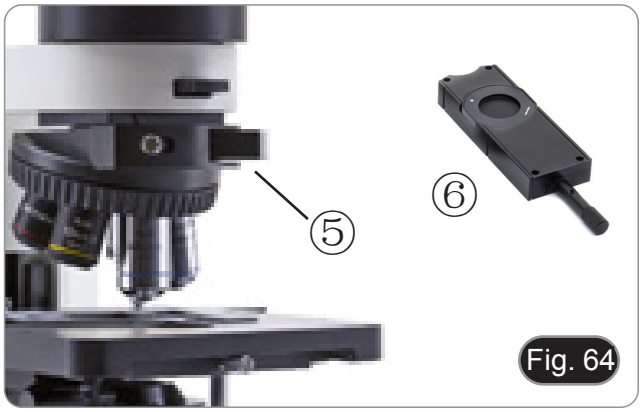


Fig. 64

6. Rotate the condenser turret ⑦ to insert the DIC prism matching the objective in use. (Fig. 65)

- **The condenser is supplied with magnetic markers. Each marker is specific to the type of insert mounted in the condenser (DIC, PH, DF, etc.).**

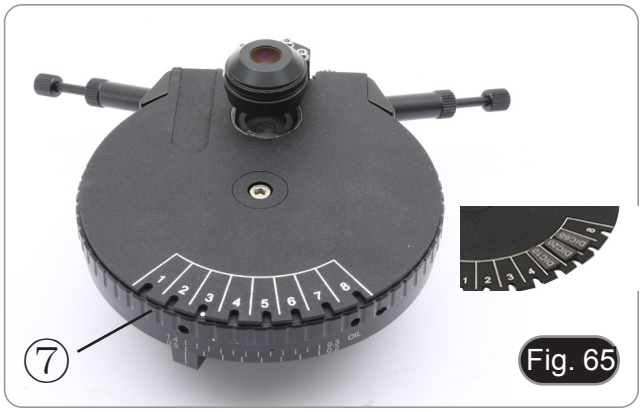


Fig. 65

7. Put a specimen on the stage and focus.
8. Begin the observation by turning the knob on the DIC slider ⑧ to obtain a three-dimensional effect of the sample. (Fig. 66)

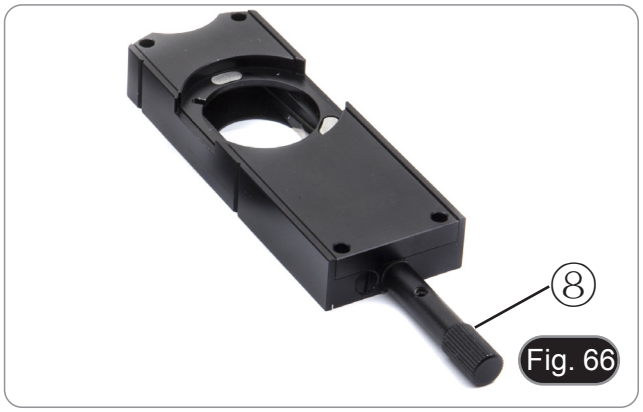


Fig. 66

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. 67)

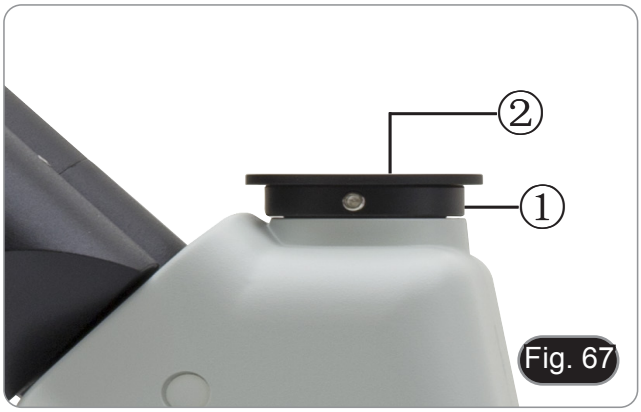


Fig. 67

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. 68)

Fig. 68

12.2 Use of reflex camera

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” ring just installed (Fig. 69).
4. Mount the other end of the relay tube ② into the empty hole of the trinocular port, then tighten the clamping screw. (Fig. 67)

Fig. 69

- “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.**

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 solve operating problems.

PROBLEM	CAUSE	SOLUTION
I. Optical Section:		
LED does not light	Power cord/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
	Light path selector knob is set to the camera position	Move the selector to the eye position
Field of view is obscured or not evenly illuminated	Light path selector knob is set to the camera position	Move the selector to the eye position
	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
	Condenser is not properly centered	Centre the condenser
	Field diaphragm is stopped down too far	Open the field diaphragm until it circumscribes the field of view
	The turret of the phase contrast condenser is in a wrong position	Move the turret to a click stop
Dirt or dust is visible in the field of view.	Dirt/dust on the specimen	Clean thoroughly
	Dirt/dust on the to surface of the condenser	
	Dirt/dust on the eyepieces	
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
Visibility is poor. • Image is not good. • Contrast is poor. • Details are indistinct. • Image glares	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 0.17 mm	Use a coverglass with thickness 0,17 mm
	For phase contrast observation a brightfield objective is used instead of a phase contrast objective	Use a phase contrast objective
	Phase rings of objective and condenser are not well centered	Operate on centering screws to obtain a proper centering
	Objective in use is not compatible with condenser phase ring	Use a compatible objective
	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.
	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 revolving nosepiece clicks into place correctly
	Condenser not properly centered	Center the condenser properly
Field of view becomes only slightly brighter when the voltage is raised	Condenser not properly centered	Center the condenser properly
	Condenser is lowered too far	Adjust the condenser height position
II. Mechanical Section:		
Coarse adjustment knob is hard to turn	Tension adjustment ring is tightened excessively	Loose 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
Image shifts when you touch stage	Stage is not properly mounted	Clamp stage
Specimen stops midway on the X axis movement	Specimen is not correctly positioned	Place specimen correctly
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 interpupillary distance is not correct	Adjust the interpupillary 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 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.

OPTIKA® S.r.l.
Via Rigla, 30 - 24010 Ponteranica (BG) - ITALY Tel.: +39 035.571.392
info@optikamicroscopes.com - www.optikamicroscopes.com

OPTIKA® Spain
spain@optikamicroscopes.com

OPTIKA® USA
usa@optikamicroscopes.com

OPTIKA® China
china@optikamicroscopes.com

OPTIKA® India
india@optikamicroscopes.com

OPTIKA® Central America
camerica@optikamicroscopes.com