OPTIKA®
ITALY

IM Series

INSTRUCTION MANUAL

Model
IM-3MET

Version: 3
Issued: 08, 08, 2017

CE

Table of Contents

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.

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.

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.

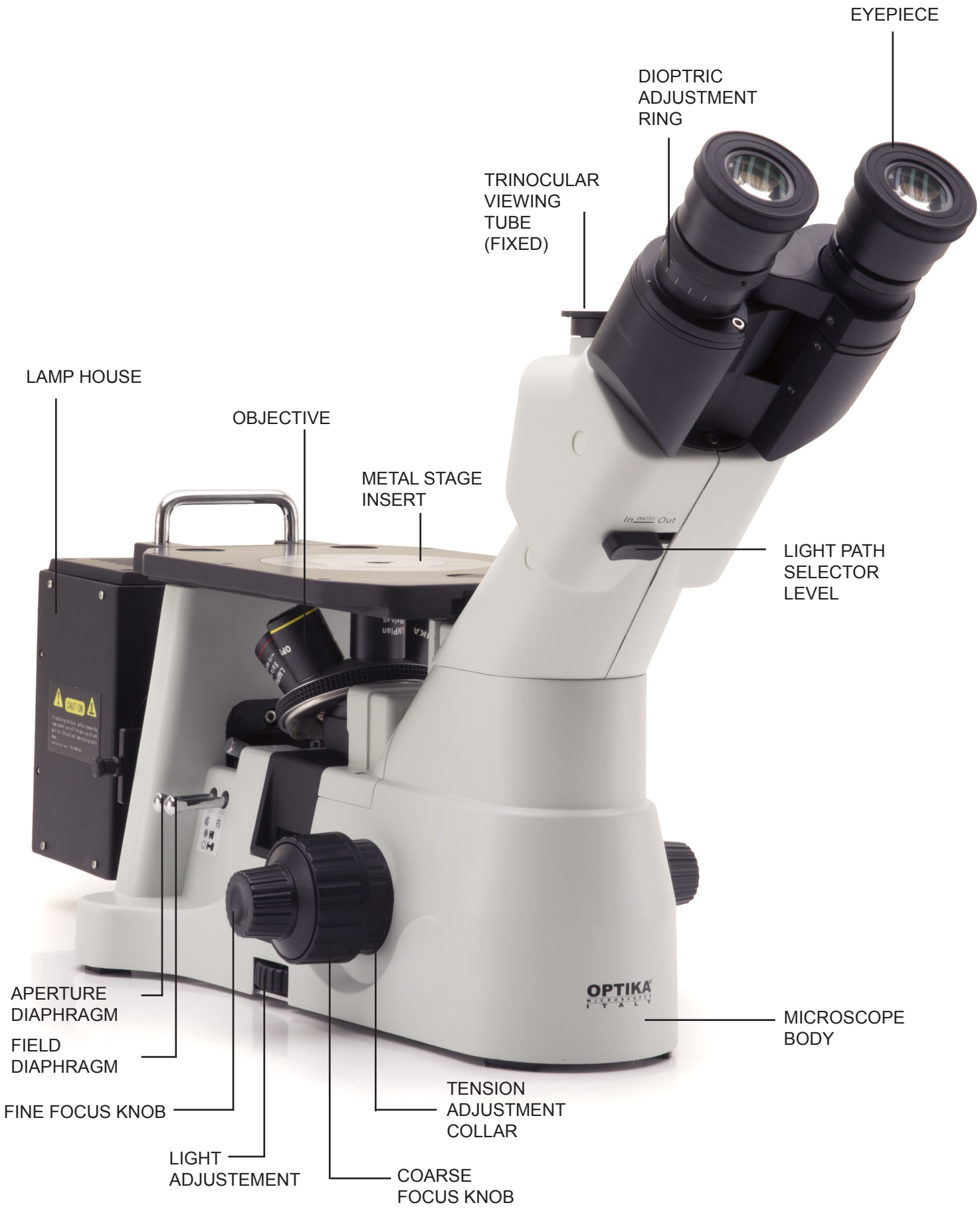
Intended use

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

List of accessories and spare parts

CAT. NO.	DESCRIPTION
M-625	Eyepiece EWF10x/22mm.
M-601	Eyepiece WF15x/16mm.
M-602	Eyepiece micrometer EWF10x/22mm.
M-005	26x76 mm micrometric slide. Range 1 mm, div. 0,01 mm.
M-735	Objective IOS LWD MET PLAN 5x/0,15.
M-736	Objective IOS LWD MET PLAN 10x/0,3.
M-737	Objective IOS LWD MET PLAN 20x/0,45.
M-738	Objective IOS LWD MET PLAN 50x/0,55.
M-746	Objective IOS LWD MET PLAN 100x/0.80.
M-699	Universal adapter for M-114, M-116, M-173 and eyepiece cameras.
M-789	Focusable C-Mount adapter for 1/3” sensor.
M-789.1	Focusable C-Mount adapter for 1/2” sensor.
M-789.2	Focusable C-Mount adapter for 2/3” sensor.
M-622	Halogen bulb 12V/50W (only for IM-3M).
DC-004	TNT dust cover, large, 700(l)x550(h) mm.
M-792	Mechanical stage for IM-3 series.
M-793.1	Holder for Petri diameter 38mm (M-793.2 needed).
M-793.2	Holder for Terasaki and Petri diameter 65mm.
M-793.3	Holder for slide and Petri diameter 54mm.
M-793.4	Holder for 2+2 slides.
M-793.5	Holder for metallurgical samples.
M-793.7	Load-bearing side extension for IM-3 series.
M-114	C-Mount adapter for 1/2” sensor.
M-116	C-Mount adapter for 2/3” sensor.
M-173	Photo adapter for APS-C and Full Frame Reflex cameras.
M-788	Photo adapter for REFLEX camera with FULL FRAME sensor.
VP-IM	IQ/OQ/PQ Validation Protocols.

Overview


EYEPIECE
DIOPTRIC ADJUSTMENT RING
TRINOCULAR VIEWING TUBE (FIXED)
LAMP HOUSE
OBJECTIVE
METAL STAGE INSERT
LIGHT PATH SELECTOR LEVEL
APERTURE DIAPHRAGM
FIELD DIAPHRAGM
FINE FOCUS KNOB
LIGHT ADJUSTEMENT
COARSE FOCUS KNOB
TENSION ADJUSTMENT COLLAR
MICROSCOPE BODY
OPTIKA

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.

Assembling

Once you open the box, these are the microscope's components:

① Microscope body
② Eyepieces
③ Objectives
④ Metal insert for stage
⑤ Lamp house
⑥ Brightfield filters (LBD and IF550)
⑦ Analyzer filter
⑧ Polarizer filter
⑨ Filter holder
⑩ Power cable
⑪ Power cable

Installing the objectives

1. Turning the coarse focusing knob ① till 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 appropriate tension when the microscope leaves the factory. (Fig.1)**

2. Screw the lowest magnification objective on to the turret from the right side, then turn the turret 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 the low magnification objective (10X) 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.

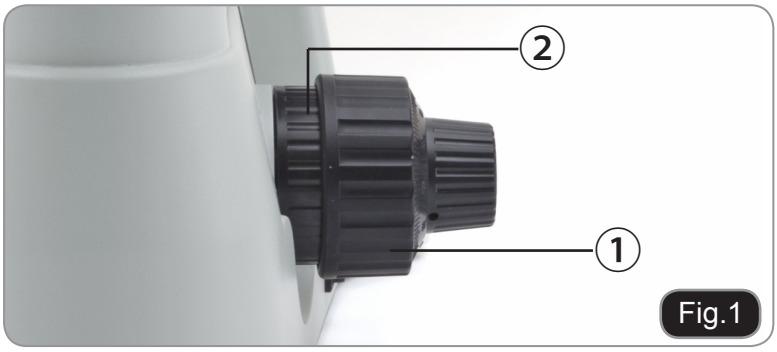


Fig.1


Fig.2

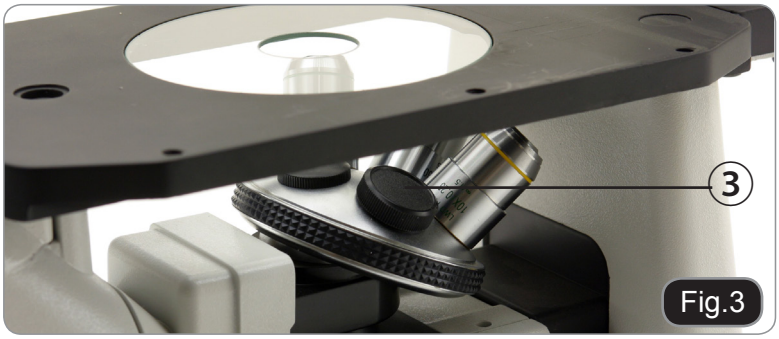


Fig.3

Installing the stage extension and the mechanical stage (OPTIONAL)

The stage extension can be installed on either side of the stage to enlarge the working surface. The mechanical stage must be installed on the side opposite the extension.
For right-handed operators, the mechanical stage is normally installed on the right side.

1. Installing the stage extension: Screw the bolts on to the extension, then mount the extension from below the stage. (Fig.4)
2. Installing the mechanical stage: As for the extension, the mechanical stage is fixed with two bolts under the stage. (Fig.5)


Fig.4


Fig.5

Installing the stage insert

1. When using the metal stage, make sure that the insert is horizontal.
2. Install the stage insert in the stage opening. (Fig.6)

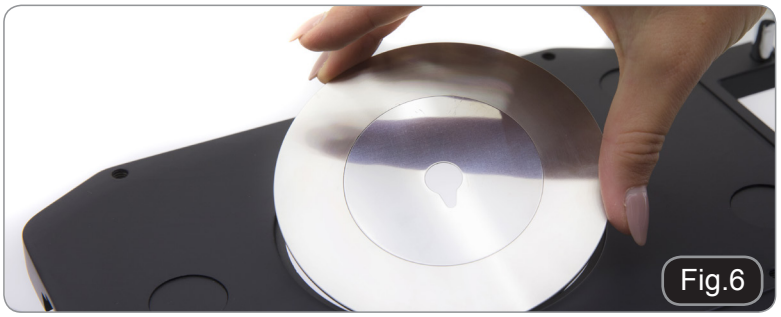


Fig.6

Installing the eyepieces

Insert both eyepieces into the tubes of the optical head. (Fig.7)


Fig.7

Installing the lamp house

Insert the lamp house and tighten the provided allen screws (Fig. 8)


Fig.8

Slide the filter holder into the tube in front of the lamp. (Fig. 9).


Fig.9

Open the lamp door. (Fig. 10)

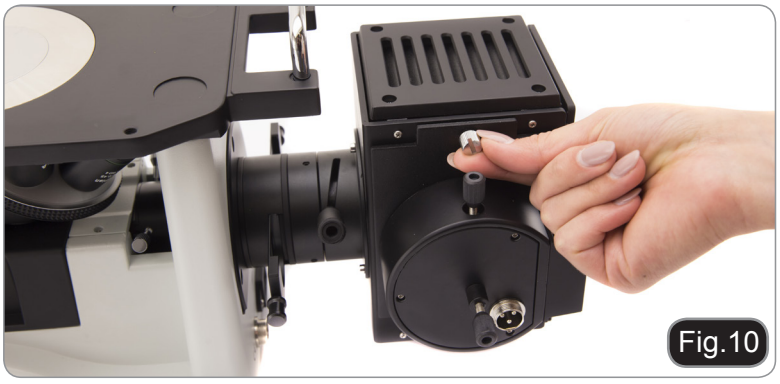


Fig.10

Insert the halogen lamp into its holder. Do NOT touch the lamp bulb with the bare hands, this could reduce the lamp efficiency and lifetime. (Fig. 11)

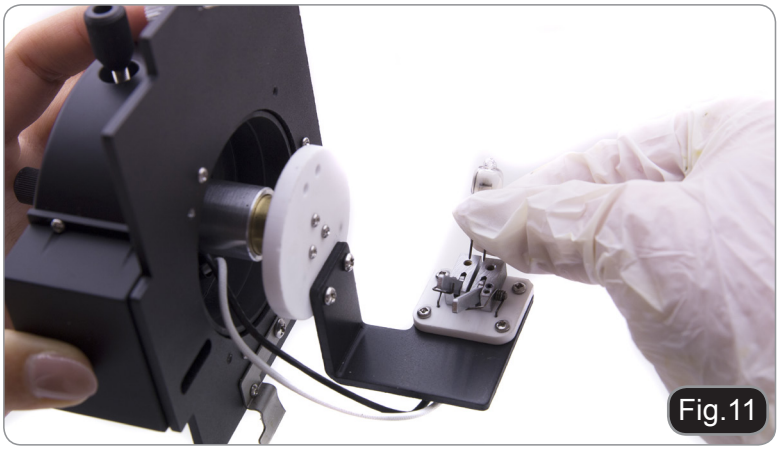


Fig.11

Plug the power cable to the lamp house. (Fig. 12)

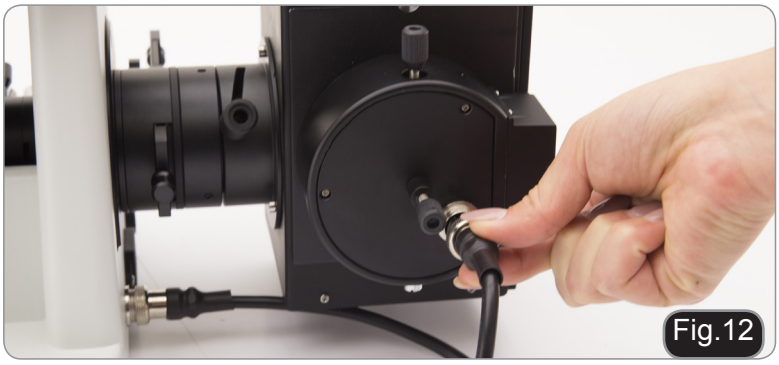


Fig.12

Connecting the power cord

1. Turn the main switch ① to “O”(off) before connecting the power cord. (Fig.13)
2. Insert the cable into the power socket of the microscope. (Fig.14)
3. Plug the power cord into the mains socket. Check for a safe connection.

► **Please use the supplied power cord. If lost or damaged, please refer to qualified service.**
► **Connect the power cord to a grounded (earthed) power supply only.**

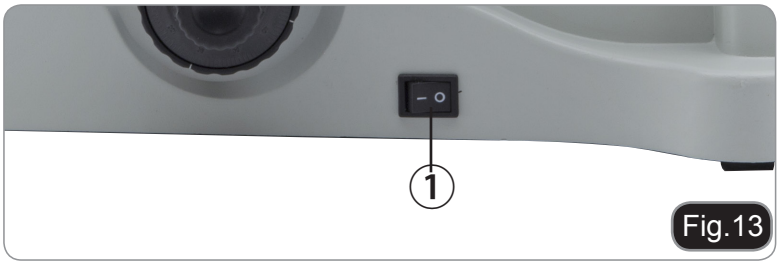


Fig.13


Fig.14

Replacing the fuse

Before replacing the fuse, turn the main switch to “O” (off) and unplug the power cord.
Rotate the fuse support out of the holder using a straight screwdriver. Insert a new fuse in the support, then rotate the support back into the holder. (Fig.15)

► **Fuse rating:**
see back of the microscope.

Fig.15

Using the microscope

INITIEL SETUP

Turning on the LED
Connect the power, turn on the main switch ①. (Fig.16)

Adjusting the brightness
Turn the brightness adjustment knob ② to increase and decrease the brightness. (Fig.17)

Adjusting the tension

► **The coarse focusing knob (1) 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 ③, the coarse focus knob is too loose. Turning the tension adjustment collar ② in clockwise direction tightens the coarse focus tension ①. Rotate in the opposite direction to decrease the tension.

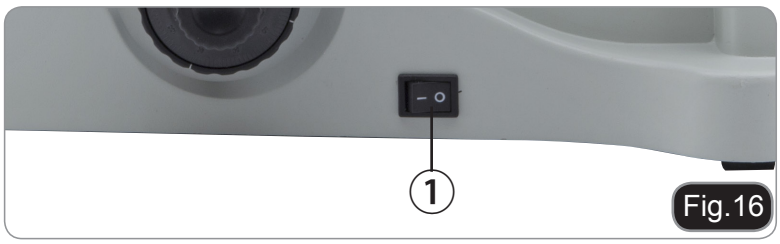


Fig.16

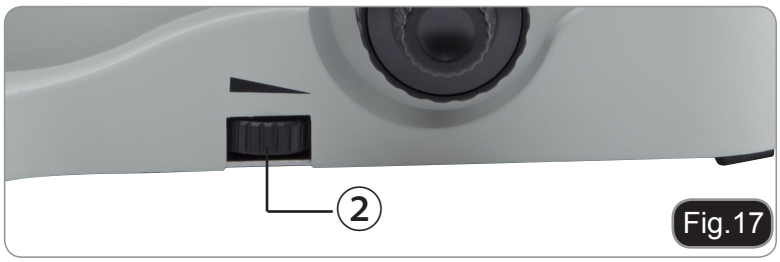


Fig.17

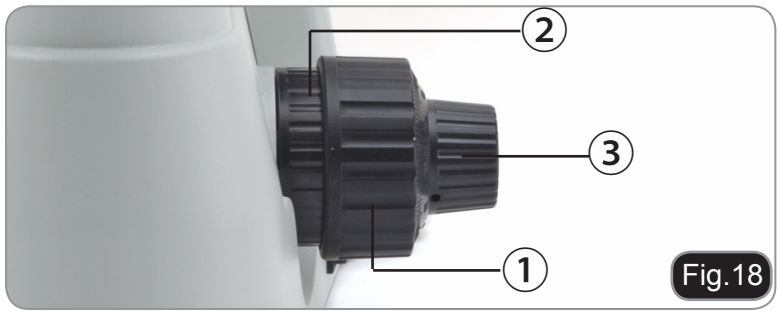


Fig.18

STAGE (OPTIONAL)

Setting the specimen

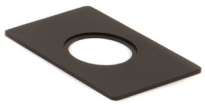
► **For the best image quality, use flasks, Petri dishes and slides with a 1.2 mm thickness.**

1. Place the proper insert for your specimen (according to the table on the right) 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 of the mechanical stage.

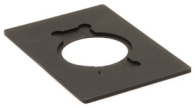
► **When switching objectives, take care not to touch the adaptor plates with the objectives, as their weight may damage the front lens.**

M-792
Mechanical stage for IM-3 series.



M-793.1
Holder for Petri diameter 38mm (M-793.2 needed)

M-793.2
Holder for Terasaki and Petri diameter 65mm.

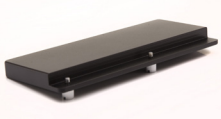


M-793.3
Holder for slide and Petri diameter 54mm.

M-793.4
Holder for 2+2 slides.

M-793.5
Holder for metallurgical samples.

M-793.6
Holder for Utermöhl-Chamber (M-793.3 needed).



M-793.8
Load-bearing side extension for IM-3 series.

VIEWING TUBE

Dioptric 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 dioptric adjustment ring ① to compensate. (Fig.19)

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

Fig.19

Adjusting the interpupillary distance

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

► **The graduation on the interpupillary distance indicator ②, pointed by the spot "." on the eyepiece holder, shows the distance between the operator's eyes. (Fig.20)**

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

Fig.20

Selecting the light path

Pull the light path selector lever ③ sideways using your thumb, selecting the light path you need. (Fig.21)

Fig.21

LIGHT PATH SELECTOR LEVER	BRIGHTNESS	APPLICATION
In	20% used for binocular observation, and 80% used for video or photography	Binocular observation, television, and micrography or video can be operated simultaneously
Out	100% used for binocular observation	Binocular observation

ILLUMINATION UNIT

Using color filters

Selecting the appropriate color filters according your need. (Fig.22)

Fig.22

If you need to work with polarized incident light, insert the polarizer filer into the slot in front of the lamp (Fig. 23)

Fig.23

Insert the analyzer filter into the slot under the objectives (Fig. 24).


Fig.24

Using the aperture and field diaphragms

When in brightfield observation, the aperture diaphragm controls the numerical aperture of the illumination system. When the numerical aperture of the objective and the aperture of the illumination system match, the highest resolution is achieved.
The aperture can be changed by moving the aperture adjustment lever ① (Fig.25)
Generally, when observing a fully chromatic specimen, you need to set the size of the condenser to 70-80% of the aperture of the objective.
Fully close the field diaphragm ②.
(Fig.25) (Fig.26 A).
Act on the diaphragm centering screws ③ until you move the bright spot in the center of the image field (Fig.25) (Fig.26 B).
Then re-open the field diaphragm ②.
(Fig.25) (Fig.26 C)

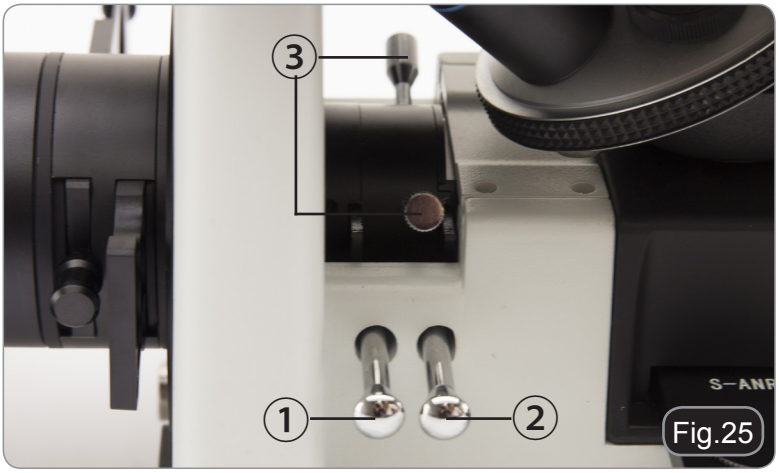


Fig.25

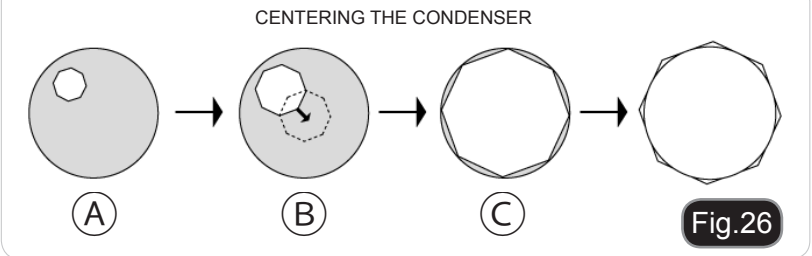


Fig.26

MICROPHOTOGRAPHY

Installing the photography adapter

1. To activate the video port, pull the light path selector lever to “In” position. (Fig.27)
2. Loosen the locking bolt ① on the trinocular viewing tube, and take out the dust cap ②. (Fig.28)
3. Install the photography adapter into the trinocular port according to its instructions, and screw down the locking bolt ①. (Fig.29)
4. Attach the camera ring (if any) to the adapter.
5. Attach the camera to the ring.

- Warning: for some cameras (mainly reflex) the ring is not included with the microscope, and it should be supplied by the user.
- For the photography of dark specimens, obscure the eyepieces and the viewfinder with a dark cloth in order to reduce stray light.
- The camera magnification can be calculated as objective magnification × camera + lens magnification.

► **When shooting with a SLR, the mirror movement may cause camera movement. Please lift the mirror, use long exposure times and use an extension cord.**

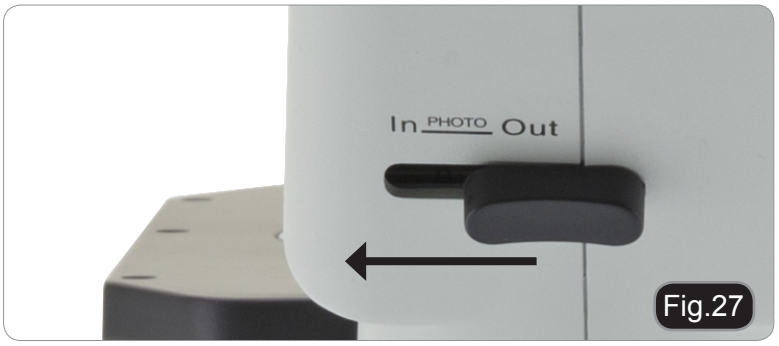


Fig.27

Fig.28

Fig.29

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.

Troubleshooting

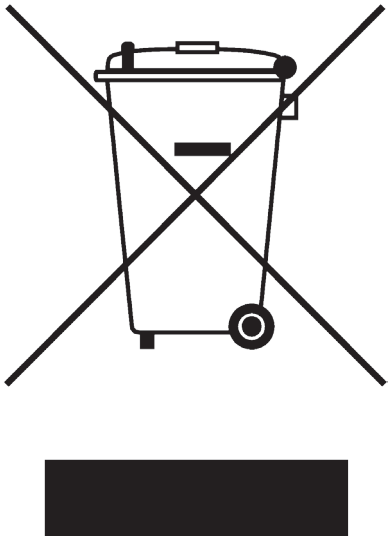
Review the information in the table below to troubleshoot operating problems.

PROBLEM	CAUSE	SOLUTION
I. Optical Section:		
The illumination is open, 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
	Too many colour filters have been stacked	Minimize the number of the filters
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
Dust and stains can be seen in the field of view.	There are dust or dirt on the specimen	Clean the specimen
	There are dust or dirt on the specimen	Clean the eyepiece
There is an apparent double image.	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 (objective, eyepieces) are dirty	Thoroughly clean all the optical system
	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.
	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. Viewing tube assembly		
The field of view of the two eyes is different	The interpupillar distance is not correct	Adjust the interpupillar distance
	The dioptric correction is not right	Adjust the dioptric 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 focussing	Adjusting the focus system as in the present manual
The edge of the image is unfocussed	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.

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