Guangzhou Micro-shot Technology Co., Ltd.

MJ31

Metallurgical microscope
User manual

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Metallurgical Microscope MJ31

Sincerely thank you for purchasing our products

This instrument is a precision optical instrument. Although the design of our products provides the highest safety and reliability for your use, incorrect use methods or neglect of this manual may cause personal injury and property loss. For your safety, to ensure the service life of the instrument and correct daily maintenance, please read this manual carefully before using the instrument.

safety sign

the sign	significance
	Indicates that the surface temperature is very high and cannot be touched by hand
	Indicates a general hazard of uncertainty. Please follow the instructions following this symbol or follow the instruction manual
	Indicates that the main switch is connected (ON)
	Indicates that the main switch is cut off (OFF)
	Pay attention to environmental protection

Prepare

1. The microscope is composed of precision instruments. Be careful when operating and avoid sudden or violent bumps and vibrations. At the same time, please note that the microscope has no waterproof structure, please keep the environment dry during transportation, storage or use.

2. Do not use this microscope under the following conditions: direct sunlight, high temperature or high humidity, dusty, and places prone to strong vibration

3. When moving the microscope, first remove the lens barrel and the sample, then grasp the handle part behind the mirror arm and the front of the frame, and move the microscope carefully.

Warning: To avoid damage to the microscope, never carry the microscope by the stage or the coarse and fine focus knobs.

Make sure the table is stable when using it.

2. Maintenance, maintenance and storage

1. If you need to clean the lens or other glass components, please use the ear cleaning ball to blow off the dust on the surface, and then wipe it gently with a lens cleaning paper; if you need to remove fingerprints or oil stains, please use a lens cleaning paper dipped in a small amount of alcohol and wipe it gently .

Warn

1. Be careful when using absolute alcohol, use it in a well-ventilated environment, and keep away from fire sources. Before maintenance, turn off the main switch first, and then wait for the lamp house to cool completely before performing maintenance.

2. Do not use organic solvents to clean non-glass parts of the microscope.

3. Do not disassemble any parts except the parts allowed to be disassembled in this manual, so as not to cause failure or performance degradation.

4. After using the microscope, please turn off the main power switch, wait for the lamp chamber to cool down completely, and then put on the dust cover.

3. Design purpose and application field

This instrument is designed for observing magnified images of samples in various routine work and research fields.

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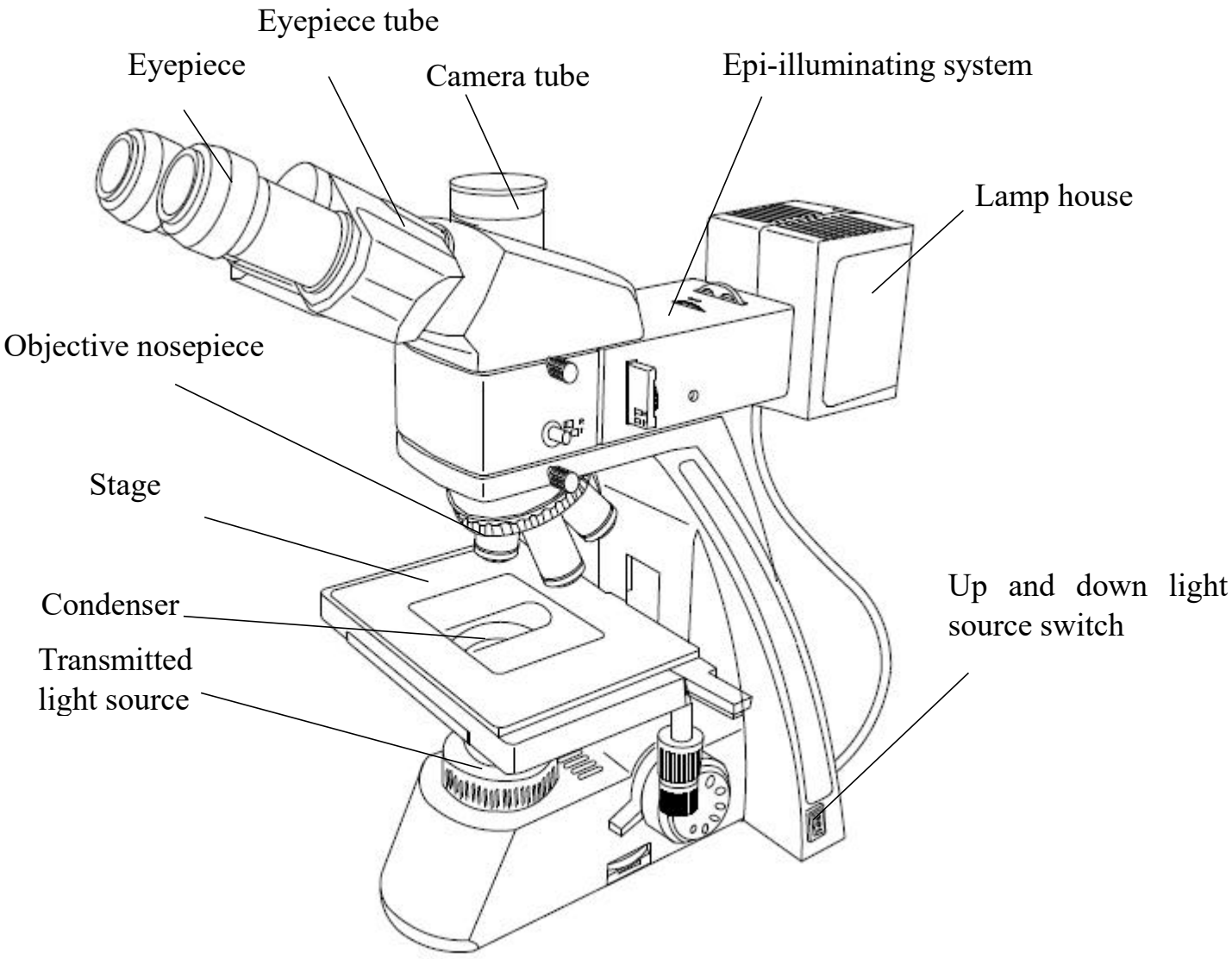
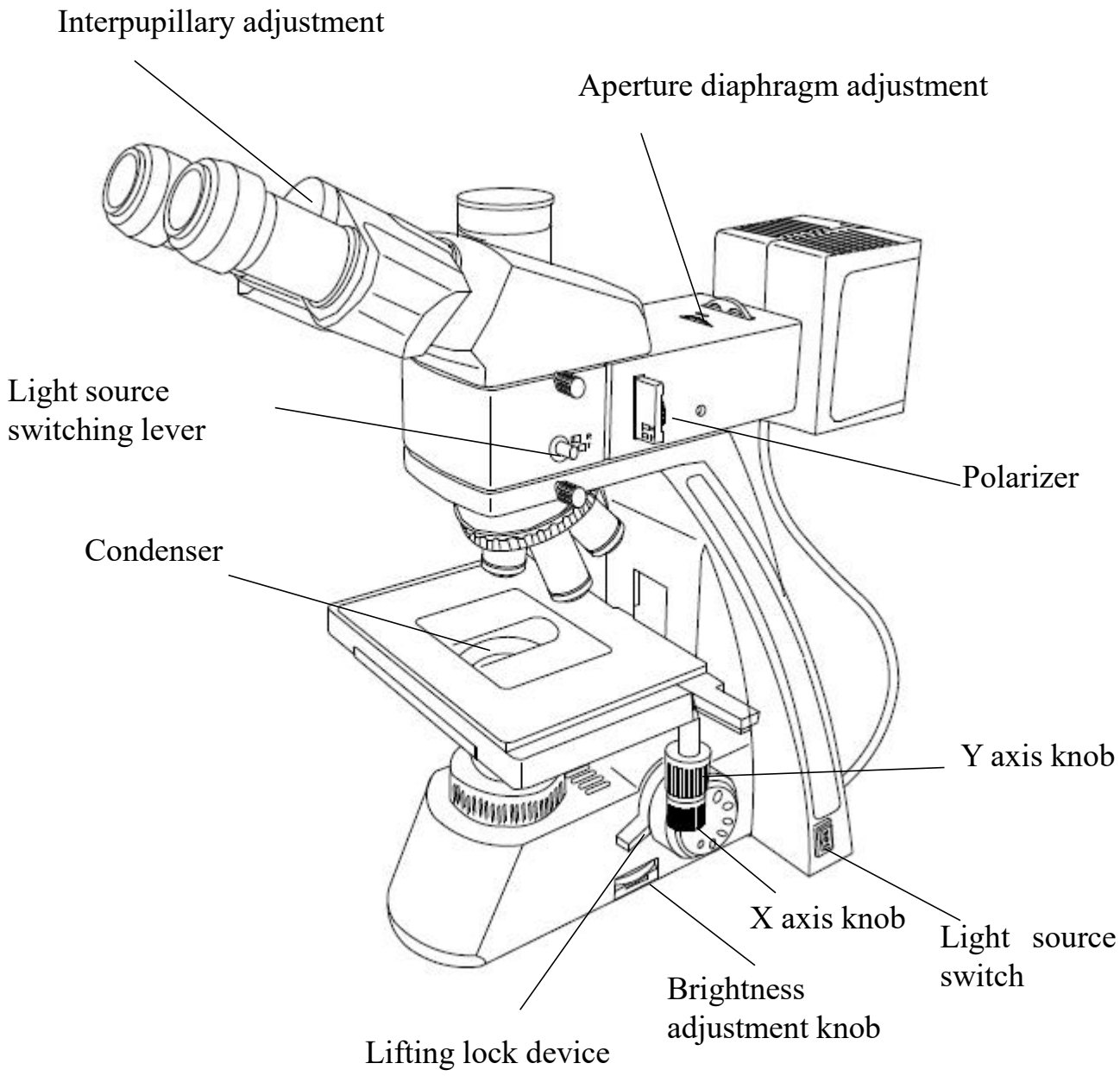
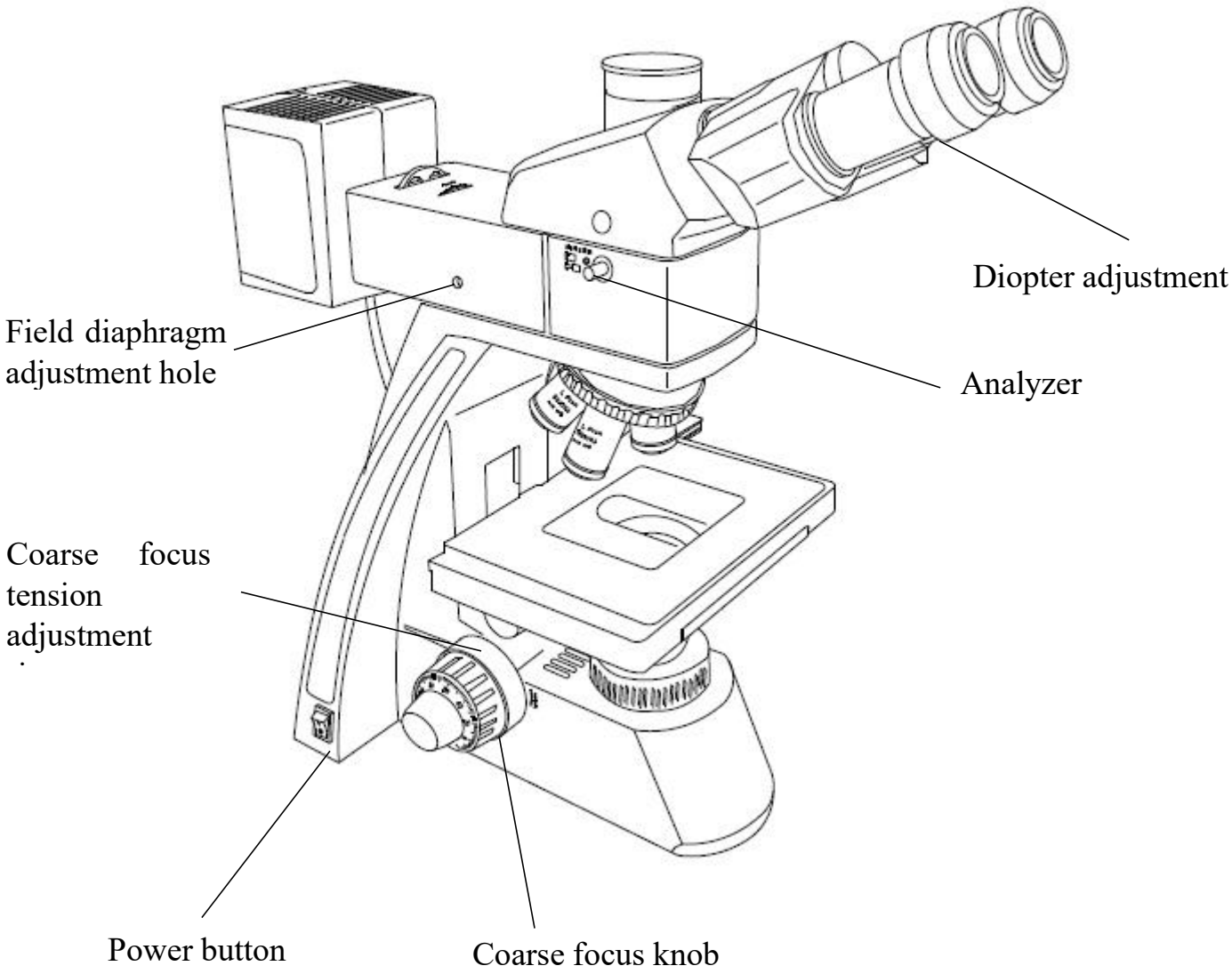
一. Parts name

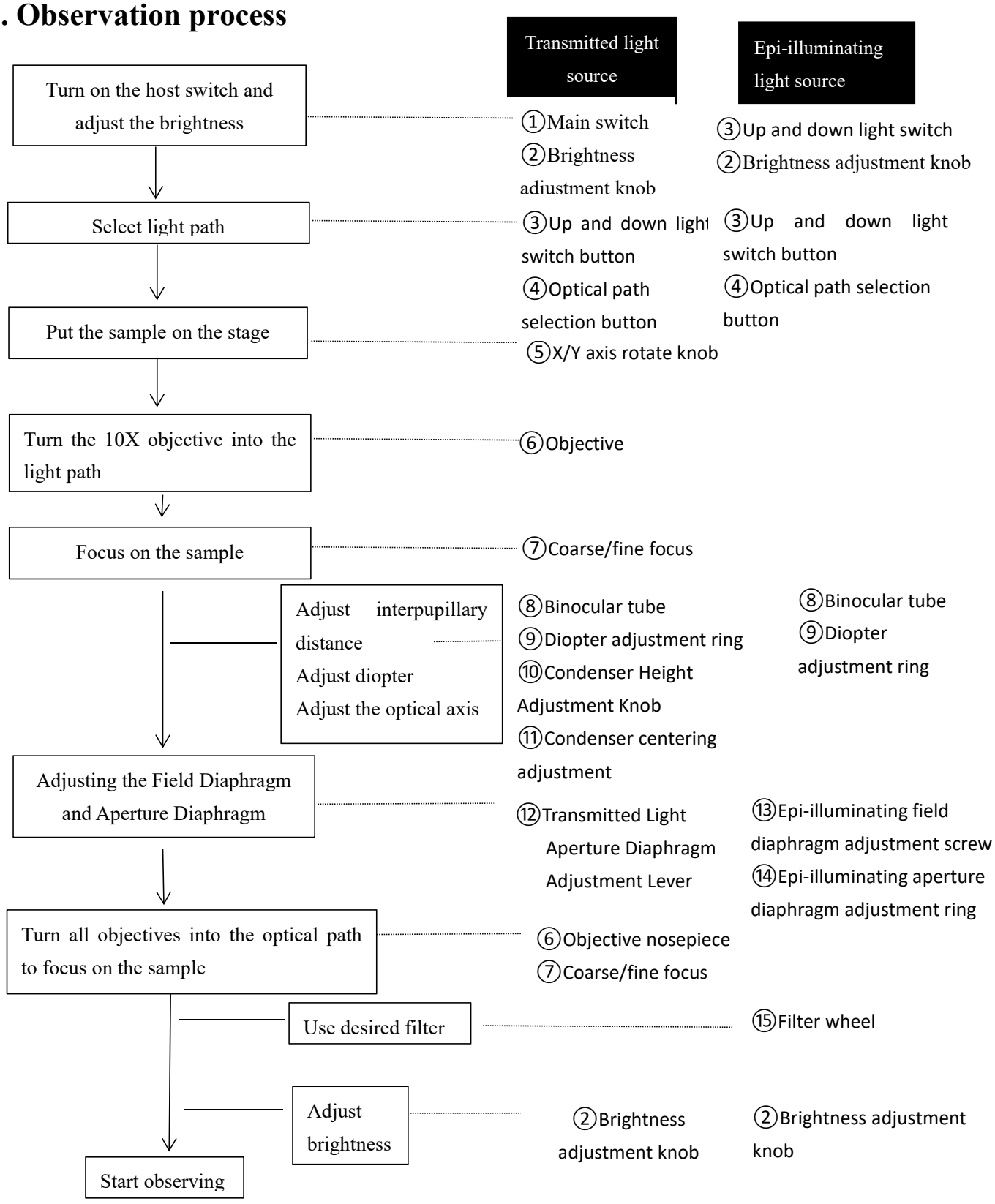

Eyepiece tube
Eyepiece
Camera tube
Epi-illuminating system
Lamp house
Objective nosepiece
Stage
Condenser
Transmitted light source
Up and down light source switch

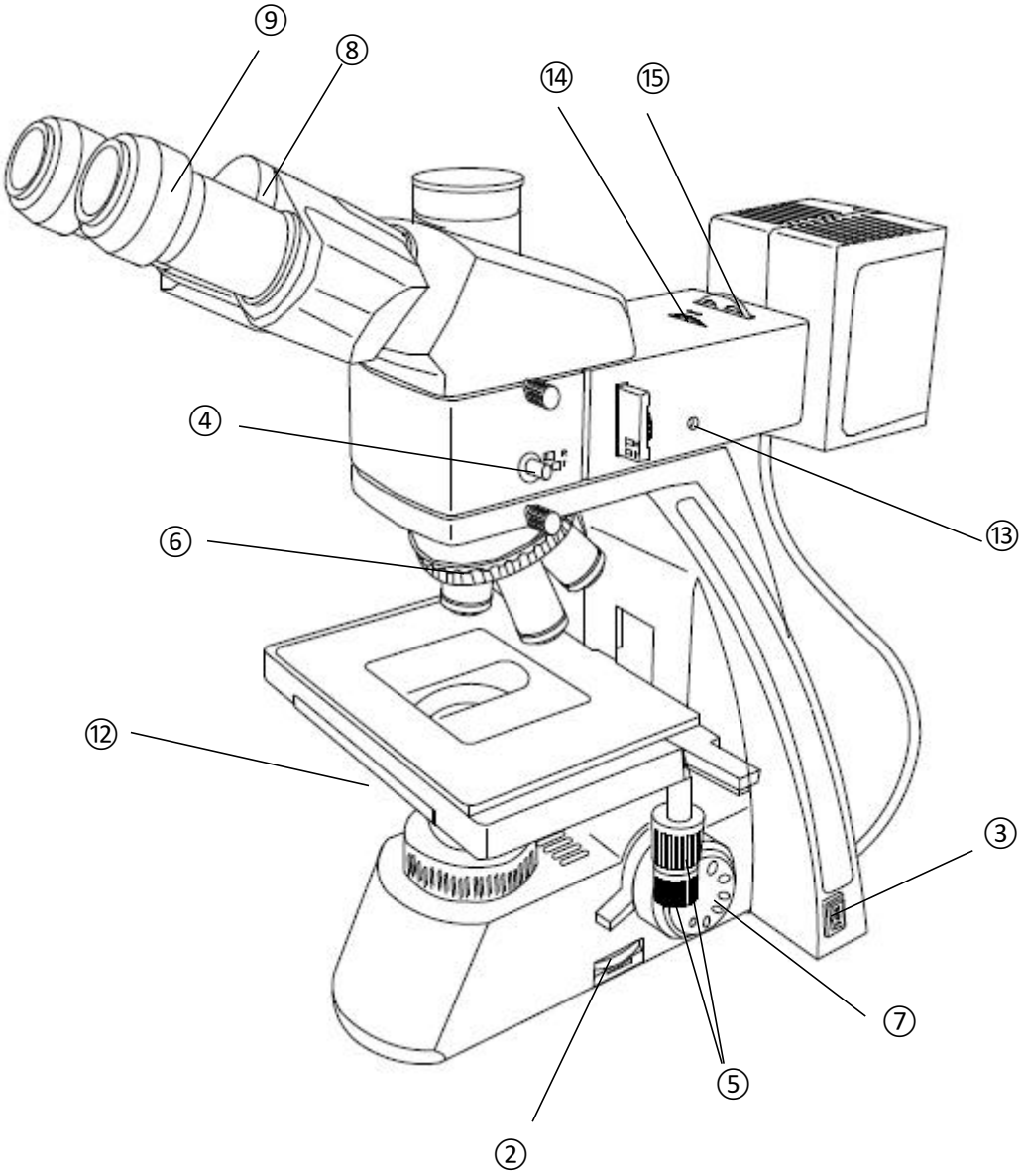
2. Adjustment device




Diopter adjustment
Field diaphragm adjustment hole
Analyzer
Coarse focus tension adjustment
Power button
Coarse focus knob

3. Observation process

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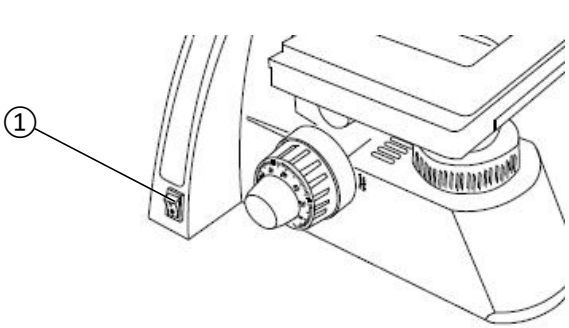
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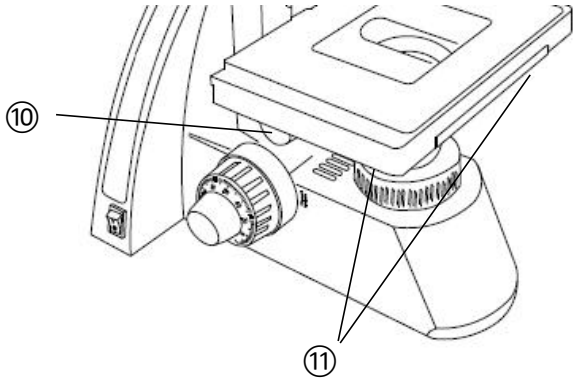
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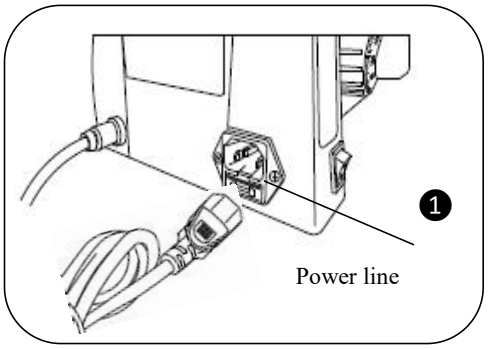
4. Concise observation steps (direct observation of samples)

4-1 Basic Observation (Transmitted Light Path/Episode Light Path)

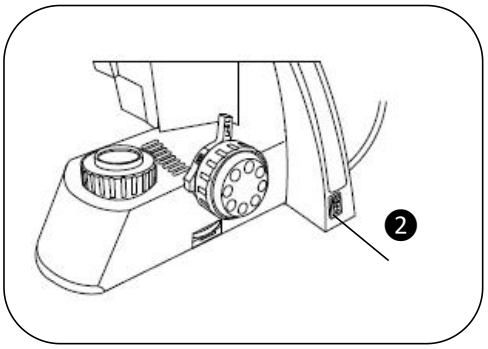


❶Plug the power cord into the power input socket to power on the microscope.

Turn on the power switch

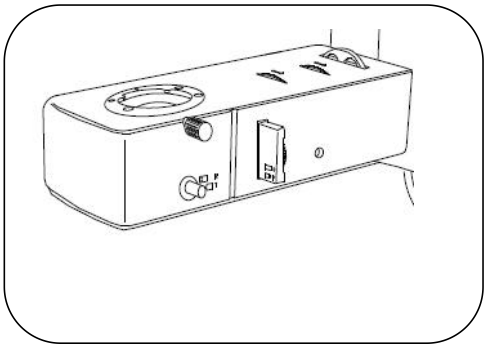
Note: Before turning on the power switch, please confirm whether the voltage used by the instrument is consistent with the power supply voltage. If not, please do not use the microscope. If the microscope uses a wrong input voltage, it will cause damage to the circuit or cause a fire, thereby damaging the microscope .

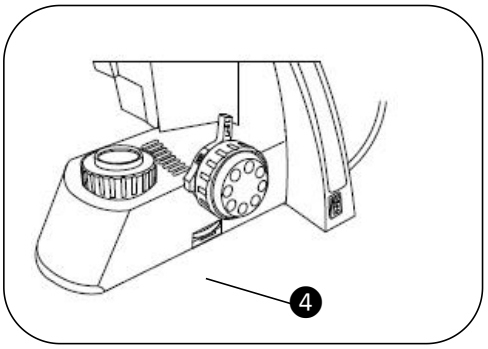
When observing with transmitted light path



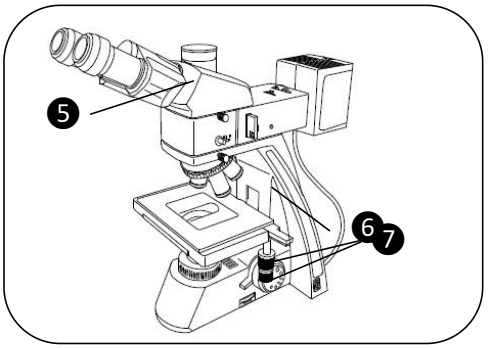
❷ Adjust the brightness adjustment knob of the upper and lower light source switching buttons to the "one" position, and switch the light path to transmitted light.

❸ Pull out the upper and lower light source switching lever to the "T" position .



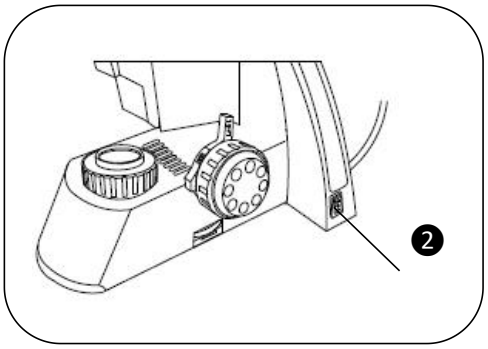


❹Adjust the brightness adjustment knob to make the brightness suitable for the lighting needs of each magnification .



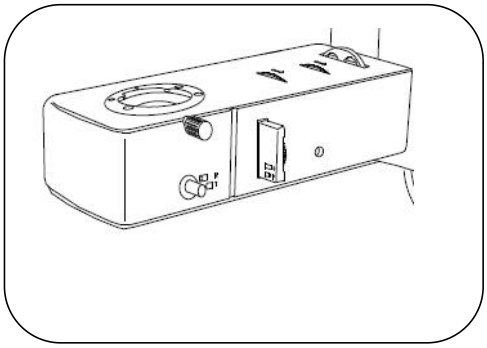
❺Turn the objective turret to turn the 10X objective lens into the optical path. Put the sample on the stage .
❻Turn the coarse and fine focus knobs to focus on the sample.
❼Turn the XY axis knob of the stage to adjust the observation position.

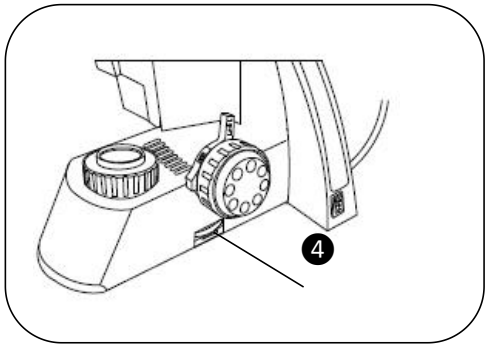
When using epi-illuminating observation



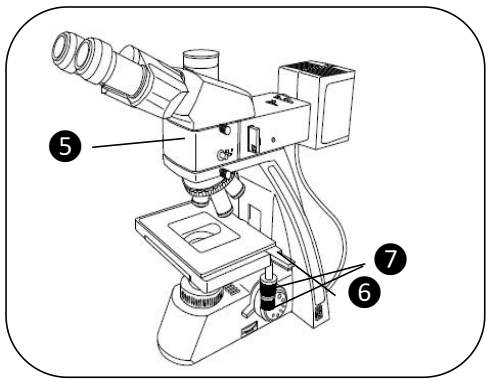
❷Adjust the brightness adjustment knob of the upper and lower light source switching buttons to the "2" position, and switch the light path to epi-light.

❸ Pull out the upper and lower light source switching lever to "R" position.



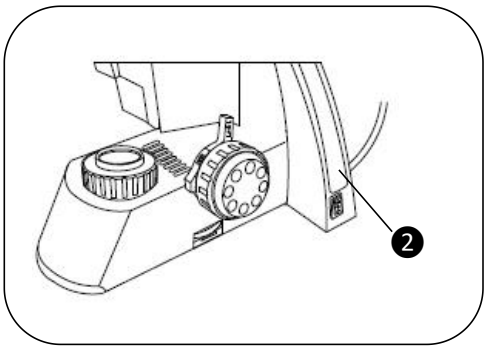


❹Adjust the brightness adjustment knob to make the brightness suitable for the lighting needs of each magnification



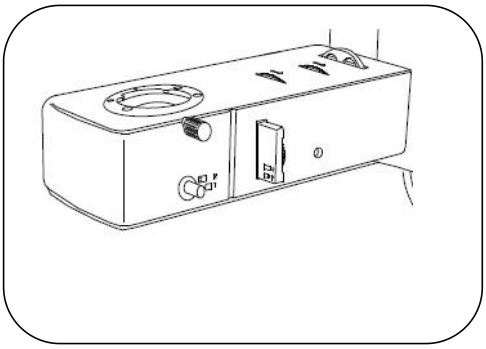
❺Turn the objective turret to turn the 10X objective lens into the optical path. Put the sample on the stage .
❻Turn the coarse and fine focus knobs to focus on the sample.
❼Turn the XY axis knob of the stage to adjust the observation position.

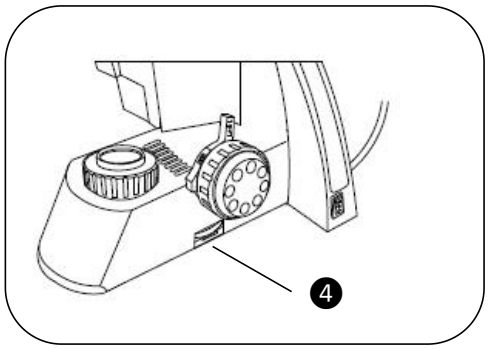
When observing with epi-illuminating polarized light



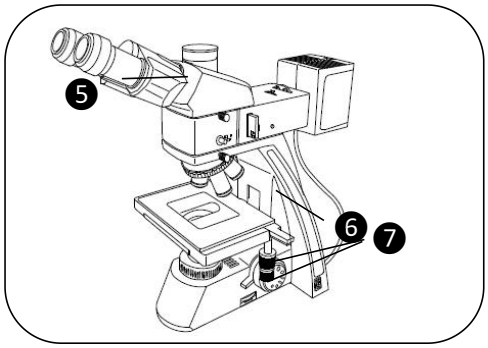
❷Adjust the brightness adjustment knob of the upper and lower light source switching buttons to the "2" position, and switch the light path to epi-light.

❸ Pull out the upper and lower light source switching lever to "R" position.



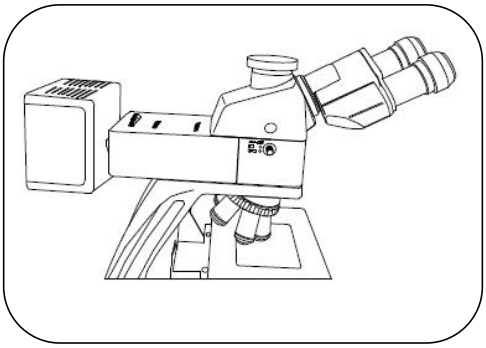


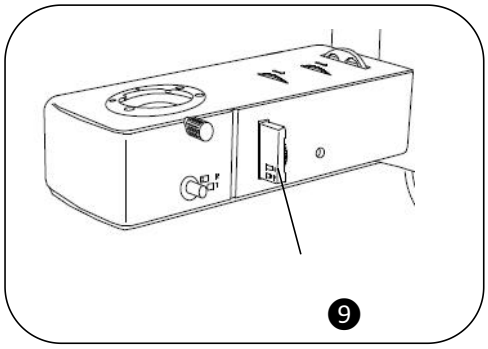
❹Adjust the brightness adjustment knob to make the brightness suitable for the lighting needs of each magnification .



❺Turn the objective turret to turn the 10X objective lens into the optical path. Put the sample on the stage .
❻Turn the coarse and fine focus knobs to focus on the sample.
❼Turn the XY axis knob of the stage to adjust the observation position.

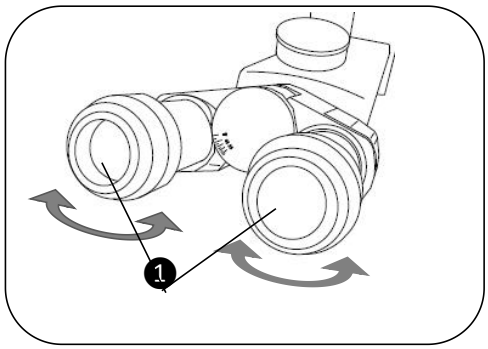
❽ Pull out the analyzer to the "●" position, so that the analyzer is in the observation light path.





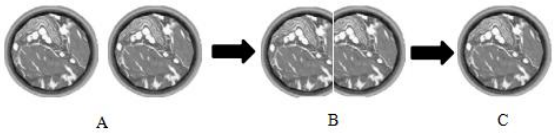
❾Turn the polarizer rotary dial on the side of the polarizer, and at the same time observe that the background of the sample under the eyepiece becomes black, that is, the analyzer and the polarizer are in a perpendicular state.
Observe the sample .

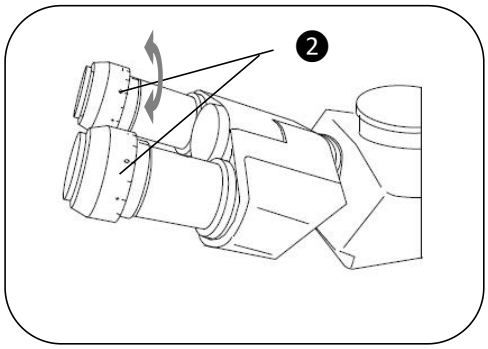
4-2 Microscope Adjustment (Improve Observation Image)



❶Adjust interpupillary distance
Hold the left and right mirror tubes of the binoculars with both hands and rotate until the specimen images seen by the binoculars are completely overlapped (the process from A to B and then to C) .
Write down your interpupillary distance data for quick recall later .

▲ The interpupillary distance (eye distance) varies from person to person, so the interpupillary distance should be readjusted before using the instrument.





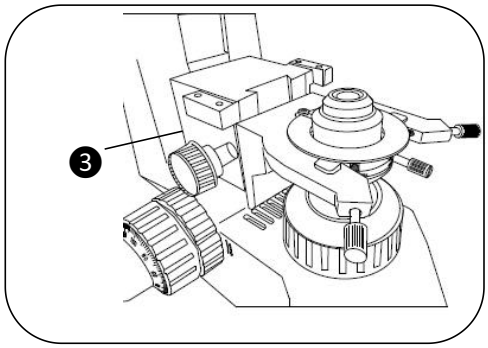
❷ Adjust diopter

a) Adjust the left and right eyepieces to the 0 pair of reticles, and move the specimen to the optical path;

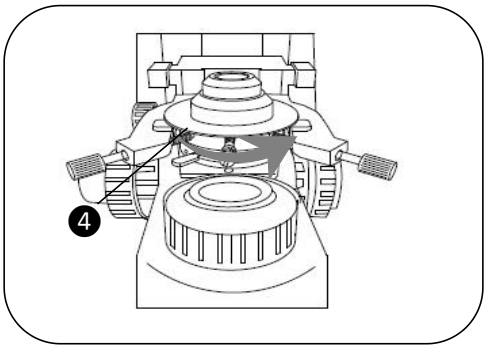
b) Turn the 40x objective lens into the light path, use the right eye alone to observe the specimen image in the right eyepiece, and adjust the coarse and fine focus knobs to make the image of the specimen in the eyepiece clear.

c) Use the left eye to observe the specimen image in the left eyepiece. If the image is not clear, you need to adjust the diopter of the eyepiece so that the left eye can also observe a clear specimen image. (Grab the eyepiece tube of the eyepiece with one hand, and the eyepiece diopter adjustment ring of the eyepiece with the other hand and turn to adjust). **The range is: N=±5 diopters .**

Abbe condenser centered

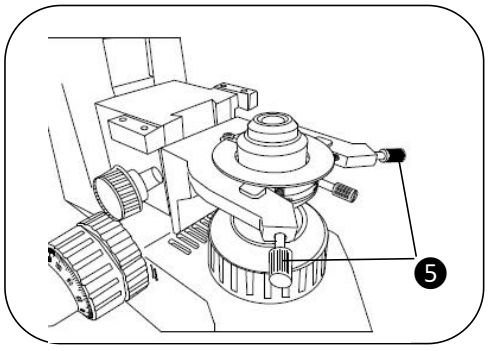


❸ Rotate the Abbe condenser lifting handwheel to raise the Abbe condenser to the highest position;
Put the 5X objective lens into the optical path, place the specimen on the stage and move it into the optical path, adjust the brightness knob to adjust the brightness to a moderate level, observe the eyepiece and turn the coarse knob to make the eyepiece see the specimen image clearly .

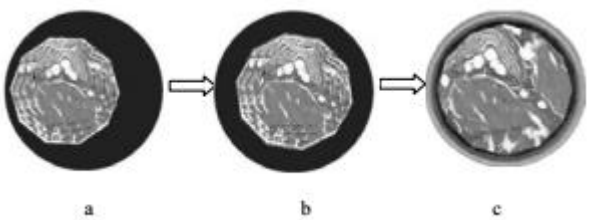


❹Turn the aperture diaphragm knob to the far right to close the aperture diaphragm .

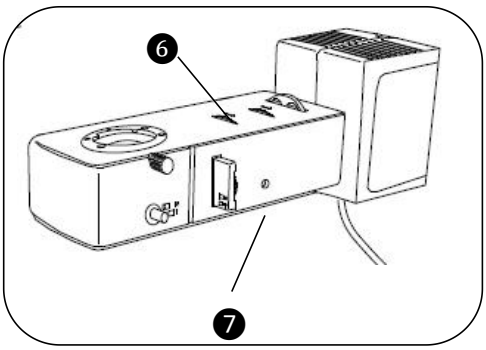
Abbe condenser centered



❺Adjust the centering screw of the condenser to make the field of view diaphragm as shown in Figure b, then open the diaphragm appropriately to check whether the eyepiece illumination is uniform, if not, fine-tune the centering screw appropriately to make the entire field of view evenly illuminated as shown in Figure c;
Adjust the distance between the condenser and the specimen to be observed by turning the hand wheel of the Abbe condenser to change the uniformity of the illumination to obtain the desired optimum brightness and contrast .

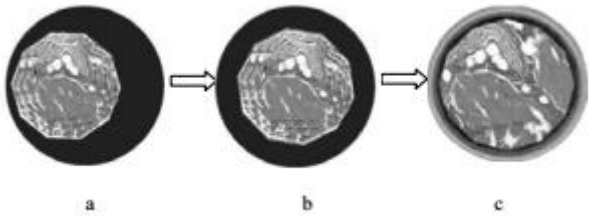


Epi-illuminating centering

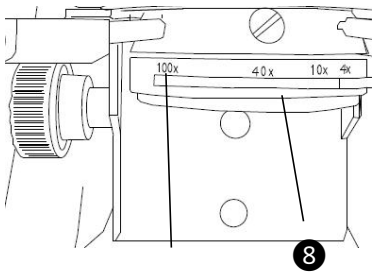


❻ Turn the field diaphragm knob to close the small field diaphragm, observe under the eyepiece, adjust the coarse and fine focus knobs to focus the spot of the field diaphragm into a clear image

❼ Use a tool key to adjust the field diaphragm adjustment holes on both sides of the epi-illumination device to center the image of the field diaphragm, and then turn the field diaphragm knob to enlarge the field diaphragm.



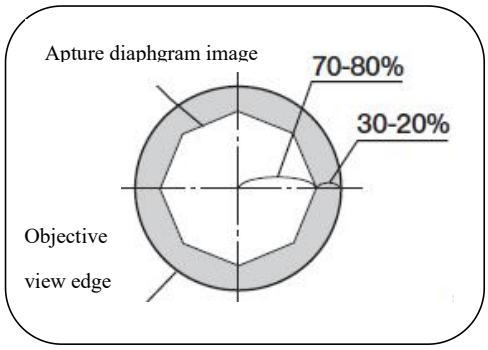
Contrast adjustment



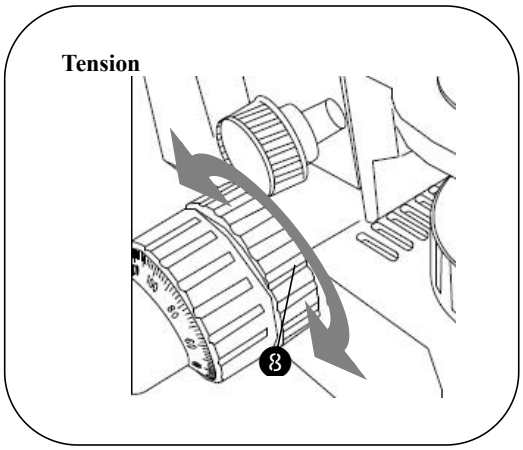
Numerical aperture scale

❽Turn the numerical aperture adjustment ring of the condenser to make the numerical aperture of the condenser equal to 70%-80% of the numerical aperture of the objective lens used. After that, observe the image and fine-tune the size of the aperture stop again to a position where the image resolution and contrast are moderate.

❾Remove the eyepiece, observe from the lens barrel, and you can see the image of the aperture diaphragm. Adjust the aperture stop image to approximately what you see in the image above.

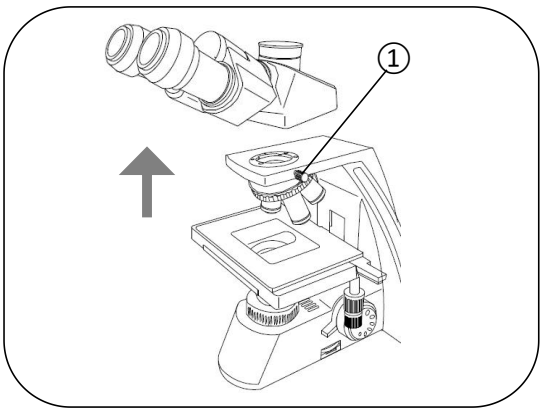


Coarse focus hand wheel tightness adjustment

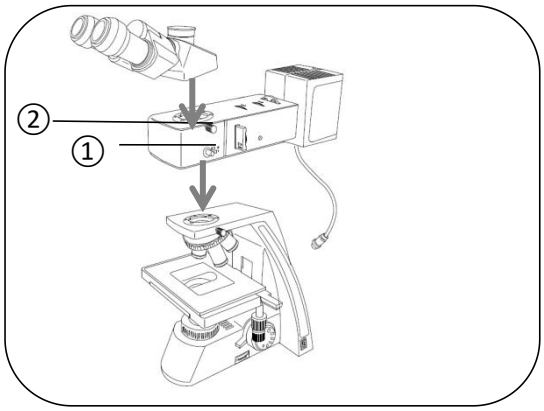


❽The elastic handwheel can adjust the tightness of the coarse and fine movement group to prevent the stage from sliding down by itself, and at the same time adjust the comfort of the coarse and fine movement operation. Turn clockwise to lock; reverse to loosen.
After the instrument is used for a long time, the stage may automatically slide down.

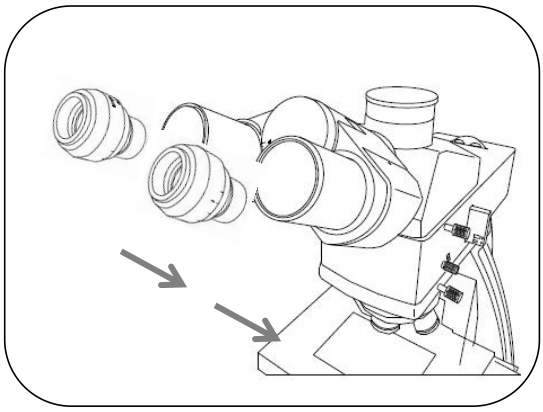
5. Detailed installation steps



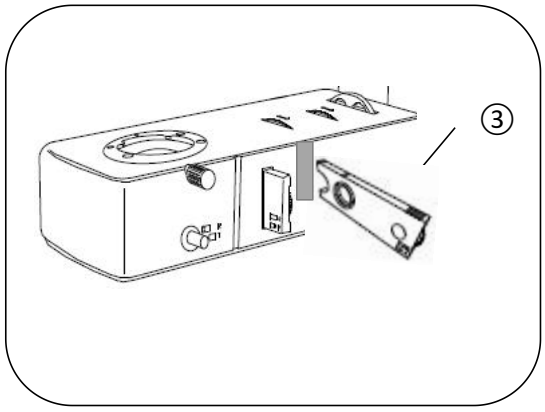
❶ Loosen the thumb screw ① on the right side of the microscope main body , gently remove the trinocular tube from the side, and remove the trinocular tube from the frame;



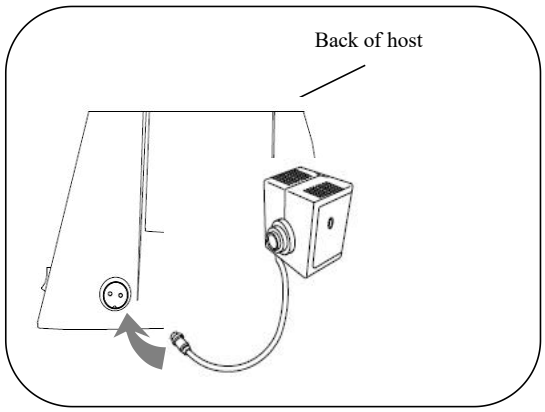
❷Clip the epi-illuminator into the dovetail groove above the rack, and tighten the thumb screw ①;
Insert the base of the trinocular tube into the dovetail groove above the epi-illuminator, and tighten the thumb screw ②;
Confirm that each bayonet is snapped into the dovetail groove and tighten the screws to prevent the epi-illuminator and trinocular tube from shaking



❸Insert the two eyepieces into the trinocular tube respectively

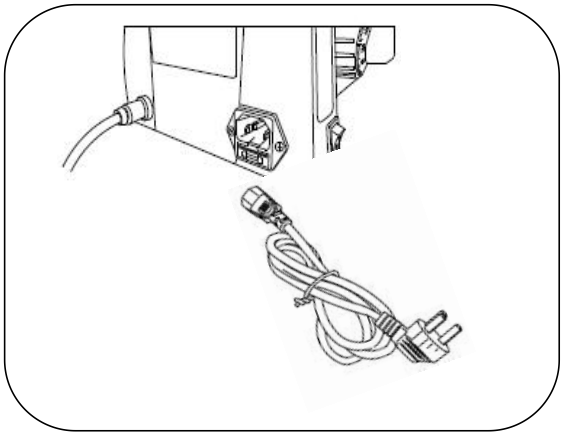


❹ Insert the polarizer ③ into the epi-illuminator

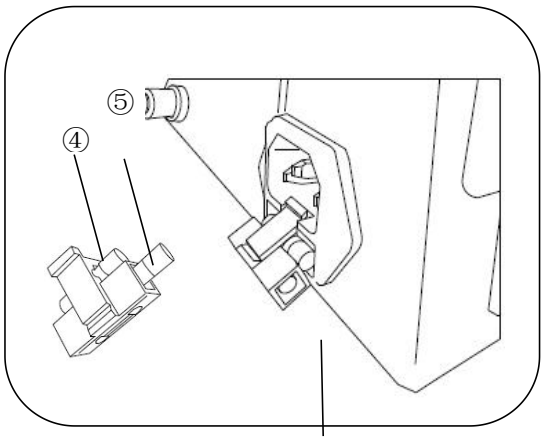


❺Clip the light box power cable of the epi-illuminator into the bottom of the main frame, and tighten the screws to fix it

❻Plug in the power cord and turn on the power.



Fuse replacement

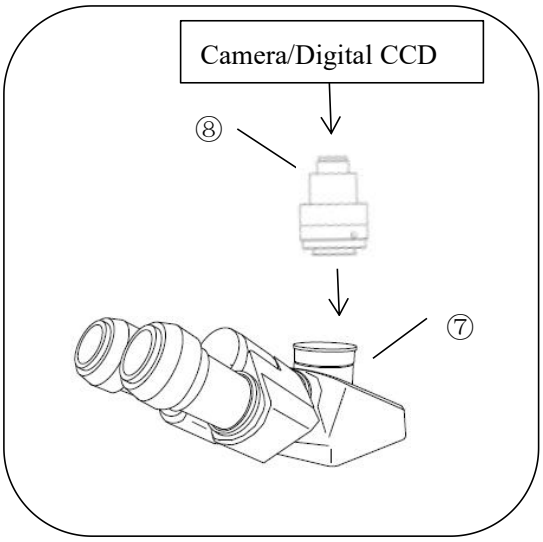


❼Replacement of the fuse

If the fuse is found to be blown, the fuse needs to be replaced

Pull out the blown fuse ④, insert the spare fuse ⑤ into ④, and snap it into the bottom of the power socket ⑥ .

Install camera



❽Remove the dust cover ⑦ on the camera interface of the trinocular tube (loosen the side fixing screw to remove the dust cover)

Insert the C-type CCD adapter ⑧ into the camera connection port on the top of the trinocular tube, and tighten the side fixing screws

Screw the camera/digital CCD into the thread above the adapter and make sure the camera/digital CCD is tightened

Precautions after use

After use, turn off the power of the instrument and unplug the power plug. If the instrument has been out of service for a long time, the objective lens and eyepiece should be removed from the host, and placed in a dry container (such as a moisture-proof cylinder) with a desiccant. At the same time, the host should be

covered with a corresponding dust cover, and then the host should be tightly covered with a dust cover.

6. Maintenance and Maintenance

1. The power switch of the host is for power supply control. When the observation is completed or the use is suspended, press the switch " O " to cut off the power to prevent the internal power of the instrument

Pneumatic components are still in working condition. When not in use for a long time, the power plug should be pulled out from the power socket and all kinds of connecting lines should be kept properly.

2. To clean the body , use clean gauze (or silk cloth, absorbent cotton) dipped in a little ethanol to wipe off the oil on the lens and the body, and wait until it is finished .

After cooling and drying completely, put on a dust cover.

3. Clean the lens: The eyepieces in the microscope and the lenses in the objective lens are coated. Please do not wipe in a very dry or dusty environment.

When wiping, first blow off visible dust. Then dip a cotton swab or lens tissue with a little lens cleaner or anhydrous alcohol to wipe the surface of the lens, Do not use solvents such as xylene to wipe the lens . Use a blower to blow it off or use a soft brush to wipe off the dust on the lens; heavy dirt and fingerprints can be wiped gently with lens paper or a soft cloth dipped in a little alcohol and ether mixture. Wipe (the mixture ratio of the two is about 20-30% alcohol, ether 70~80%).

4. Clean the surface of the instrument: Before wiping, unplug the power plug from the main power socket to ensure that the instrument is powered off. Then use a clean soft cloth dipped in a little neutral detergent to wipe the body and the loading table. Make sure the instrument is dry before using it .

5. Storage: When the microscope is not used for a long time, please turn off the power of the instrument, cover the microscope with a dust cover, and store it in a dry, ventilated, clean place without acid and alkali vapor to prevent the lens from becoming moldy.

6. Regular inspection: In order to maintain the performance of the microscope, the instrument should be inspected and maintained regularly .

> ⚠ Warning
> Do not disassemble the optical components by yourself to avoid damage to the instrument!

7. Performance parameters

The main parameters	total magnification		50X~500X (standard configuration)	
	optical system		Infinity (∞) f=200	
Eyepiece	Adjustable wide-field plan eyepiece		WF 10X	Field of view: Φ 22mm
Trinoculars	Hinged binoculars, observation angle is 30 degrees, interpupillary distance is 53~75mm			
Plan Objective	Magnification	Numerical aperture	Cover glass thickness	working distance
	5X	0.15	-	23.6
	10X	0.3	-	17.7
	20X	0.4	0	10.4
	50X	0.55	0	7
epi-illuminator	Kohler lighting with filters: green, blue, yellow, matte			
Condenser	Abbe condenser NA.1.25 , can be lifted up and down, with variable aperture diaphragm			
Stage	Double-layer mechanical stage , size: 210 X 140 mm , moving range: 75 X 50 mm			
Lighting source	3W white LED (color temperature 4000-4300K), brightness adjustable			
camera connector	1X camera connector			
power supply	AC voltage 220V/ 50Hz , fuse specification: 250V 0.5A			
Accessories available	Infinity plan objective without cover glass: 60X , 80X , 100X			
	Camera connector: 0.5X			
	Photographic device: digital camera, industrial camera			

8. Common Troubleshooting Table

Fault	cause of issue	Approach
Electrical part		
No illumination in field of view	The power switch is not turned on	Turn on the power switch
	Damaged lighting bulb	replace with new bulb
	broken fuse	replace new fuse
	Poor contact of electrical connectors	Check and send professional repair
Optical system and imaging part		
There is a dark shadow at the edge of the field of view or the illumination of the field of view is uneven, and the complete field of view cannot be observed	Translator not rolled into anchor point	Turn the converter to the positioning position
	Abbe condenser off-center	Adjust the Abbe condenser position
	Mildew or oil stains on the surface of the objective lens, eyepiece or condenser	Wipe the lens surface or replace
Oil or dust is found in the field of view	Oil or dust on the eyepiece lens	Wipe the eyepiece lens
Out of focus or low resolution	Damaged objective lens	Repair objective lens (requires professional maintenance)
	There is oil or dust on the surface of the objective lens or eyepiece lens	Wipe objective or eyepiece lenses
	The opening of the aperture diaphragm is not suitable for the aperture	Adjust the aperture diaphragm aperture size according to the objective lens magnification (or numerical aperture) used
	Objective lens deviated from optical path	Turn the converter to the positioning position
	The specimen is not leveled	Place the specimen flat on the stage and hold it steady
Mechanical part		
The image does not remain clear during observation	The focusing mechanism appears	Adjust the coarse movement and tightness adjustment

	self-flowing (automatically sliding down)	handwheel
	Ineffective focus adjustment mechanism	Check and send professional repair
	Stage is loose or tilted	Check and send professional repair