Guangzhou Micro-shot Technology Co., Ltd.

MI52-CF

Cell factory
User manual

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Cell Factory MI52-CF

Sincerely thank you for purchasing our products

This instrument is a precision optical instrument, although the design of our company's products provides the highest safety for your use. However, improper use or ignorance of this manual may result in personal injury and property damage. For your safety, to ensure the service life of the instrument and correct daily maintenance, please read this manual carefully before using the instrument.

Attention please

In this manual, safety instructions are indicated by the following symbols. Please be sure to follow the prompts of the following symbols to ensure correct and complete operation.

Warn

Ignoring the warnings of this symbol may result in personal injury or damage to the instrument!

Notice

Ignoring the hints of this symbol may affect the microscope observation effect.

Attention

Remind the user of the operating skills of the microscope.

Pay attention to environmental protection.

Safety warning

Warn **Before installing the microscope, replacing bulbs, fuses, and plugging and unplugging the power supply, the power switch must be turned off and the power cord must be unplugged.**

To prevent electric shock or fire, the power switch must be turned off and the power cord must be unplugged before installing the microscope, replacing the bulb, replacing the fuse, and plugging or unplugging the power supply.

Warn **Decomposition is strictly prohibited**

Except for the detachable parts mentioned in this manual, it is strictly forbidden to disassemble any other parts. Otherwise, the performance of the instrument may be reduced, resulting in electric shock, injury and damage to the instrument. In case of any malfunction, please contact the supplier.

Warn **Input voltage**

Please confirm whether the input voltage is consistent with the power supply voltage in your area. If not, do not use the microscope and contact the supplier. If the wrong input voltage is applied to the microscope, it can cause a short circuit or cause a fire, which can damage the microscope.

Warn **Use Specific Bulbs, Fuses, and Power Cords**

Use of an incorrect lamp, fuse, or power cord may result in instrument damage or instrument fire. If you use an extended power cord, you must use a grounded power cord (PE).

Warn **The microscope needs to be protected against high temperature, moisture and foreign matter**

In order to prevent short circuit or other failures, please do not use it in a high temperature and humid environment for a long time. The suitable working environment temperature is 5° C~35° C, and the relative humidity is 20%~80% (at 25 ° C) . If water is spilled on the microscope, please turn off the power switch immediately,

unplug the power cord, and then wipe off the water with a dry cloth. When foreign matter enters or drops into the microscope, please stop using it and contact the supplier .

Warn **LED light source protection**

When the fluorescence excitation light source is not used for a long time or switched to bright field observation, please cut off the power of the module.

Warn **Coarse and fine focus adjustment handwheel**

The instrument adopts coarse and fine coaxial focusing mechanism. Please do not rotate the left and right coarse and fine focus knobs in opposite directions at the same time. When the objective lens elevating device has reached the limit position of movement, please do not continue to rotate the coarse focus adjustment handwheel. Otherwise, the focusing mechanism will be damaged.

Attention **Placement**

This microscope is a precision optical instrument, if it is used or stored improperly, it will cause damage to the instrument or adversely affect its accuracy. Please consider the following criteria when choosing a place of use:

※. Avoid placing the microscope in the following places: places with direct sunlight, vertically below indoor lighting and other bright places.

※. Suitable working environment temperature is 5° C~35° C, relative humidity is 20 % ~80 % (at 25° C). Do not place the microscope in a place with high temperature, humidity and dust for a long time, otherwise the lens will be fogged or moldy, and dust will Warn late, which will damage the microscope and shorten its service life.

Attention **Install the light bulb**

Please do not touch the glass surface of the bulb directly with your fingers. When installing the bulb, please wear gloves or wrap the lamp body with cotton material before installing.

※ . To wipe the dirt on the surface of the lamp body, use a clean cotton cloth dipped in alcohol to wipe. If it is not wiped clean, it will be etched on the surface of the bulb, reducing its brightness and life.

※ .Be careful when installing the bulb to prevent the bulb from slipping or hurting your fingers.

※ .When replacing the bulb, please confirm whether the contacts of the bulb are in good condition. If the contacts are damaged, the bulb may not light or short out.

※ . When replacing the bulb, pay attention to whether the soldering point is intact . If there is a weak soldering , the bulb may be out or there may be a bad connection.

Attention

Instrument handling

The microscope is a precision optical instrument and heavy in weight. Be careful when handling it. Strong impact and brutal operation are strictly prohibited , otherwise it will cause damage to the instrument.

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11. Environmental Protection

Please sort the waste generated during the packaging and use of the microscope, such as cartons, foam, plastic, lights, batteries, etc., and dispose of them properly to protect the environment !

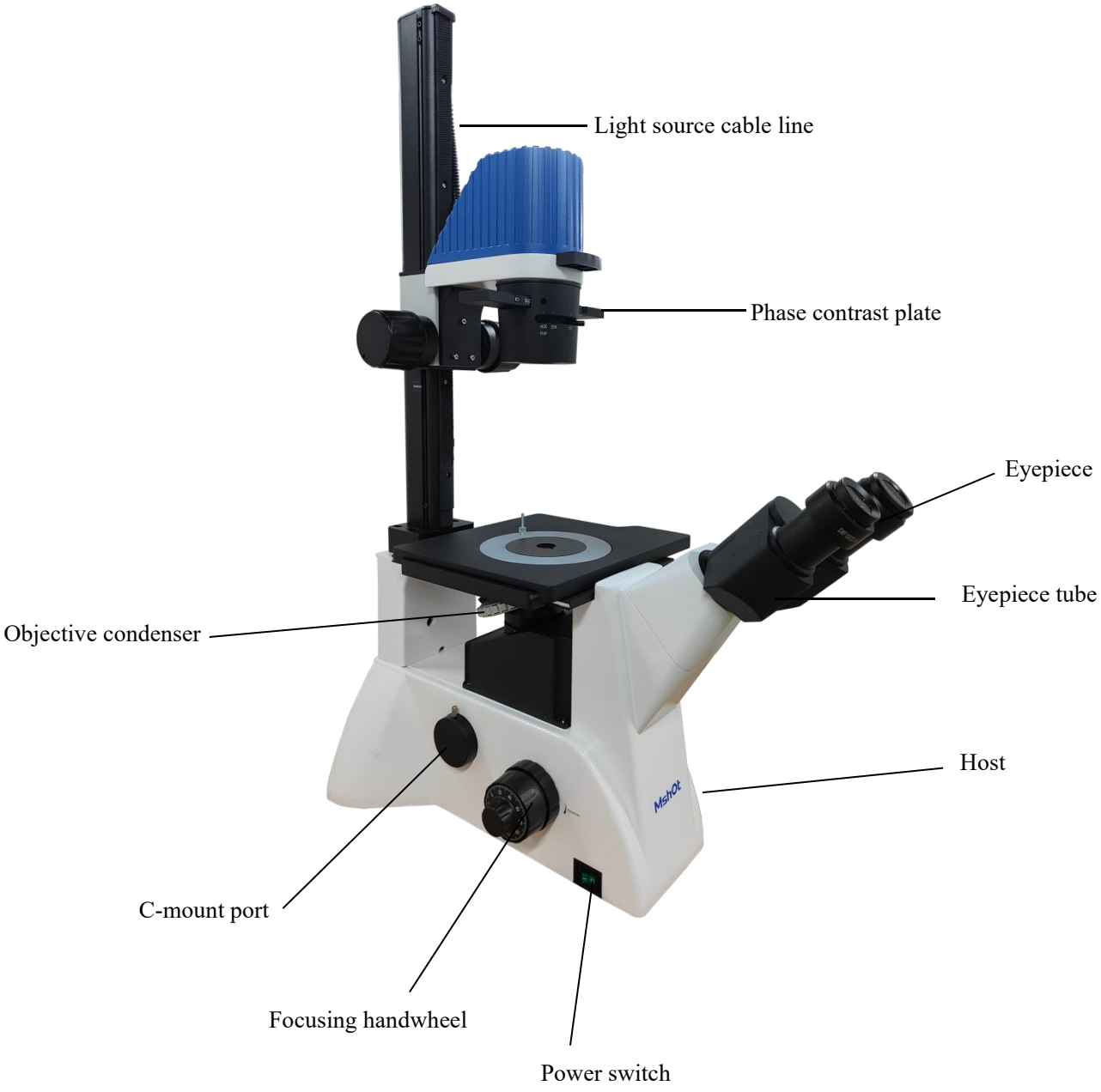
Table of contents

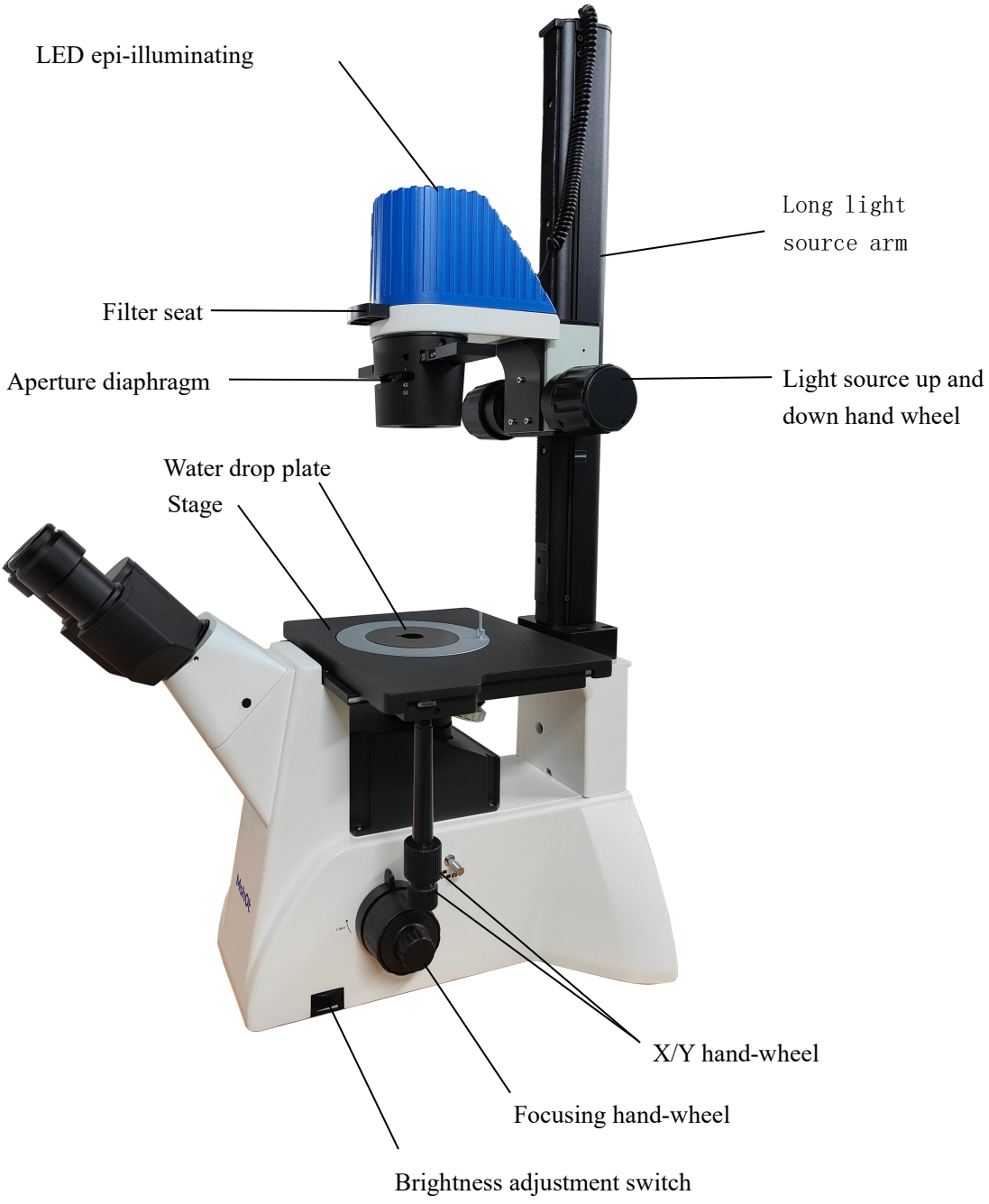
1. Instrument features and applications

MI52-CF is a multifunctional inverted biological microscope, which adopts excellent infinity optical system and can realize bright field, phase contrast and fluorescence observation **.** The compact and stable high-rigidity body fully embodies the anti-vibration requirements of micromanipulation. Equipped with a detachable mechanical stage, it adopts a coaxial gearless and rack-and-rack transmission system to make the transmission more stable and safe. Rotating swing-in swing-out concentrating system can observe cultured cells in tall culture dishes or cylindrical flasks without contamination. The epi-fluorescence microscope system adopts a modular design concept. LED is used as the excitation light source, and the illumination system can be adjusted safely and quickly to achieve efficient and simple fluorescence observation.

This instrument is suitable for microscope observation of cell tissue and transparent liquid tissue, and can also be used for dynamic microscopic observation of cultured tissue in a petri dish. It can be used in scientific research institutes, colleges and universities, medical and health care, inspection and quarantine, agriculture, animal husbandry and dairy and other departments.

2. The name of each part



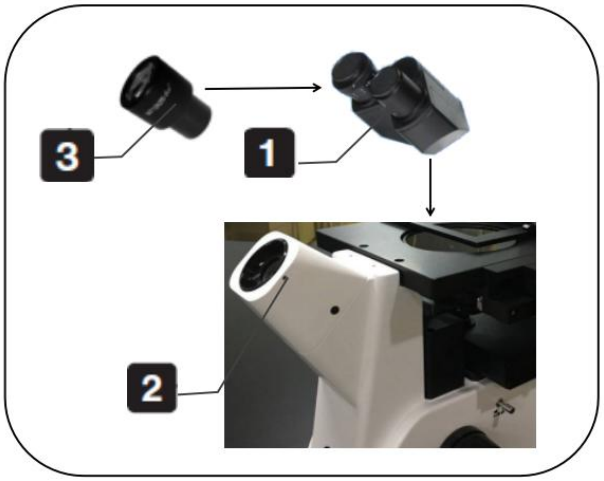

LED epi-illuminating
Long light source arm
Filter seat
Aperture diaphragm
Light source up and down hand wheel
Water drop plate
Stage
X/Y hand-wheel
Focusing hand-wheel
Brightness adjustment switch

3. Instrument installation

3-1 . Take out the host

Unpack the product packing box, take out the main unit and place it on the workbench stably, and remove the relevant support packages and dust bags .

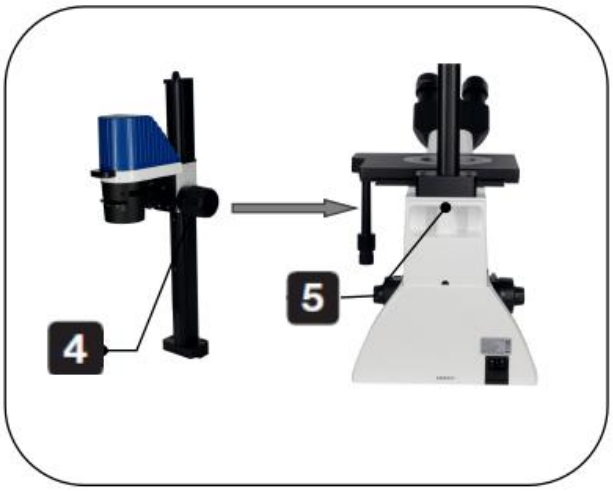
3-2 . Install the eyepiece observation tube and eyepiece



1. Take out the eyepiece tube 1 , remove the dust cover at the bottom, install it on the observation mirror base of the main unit, and tighten the eyepiece tube fixing screw 2 with an inner hexagonal tool of appropriate size .

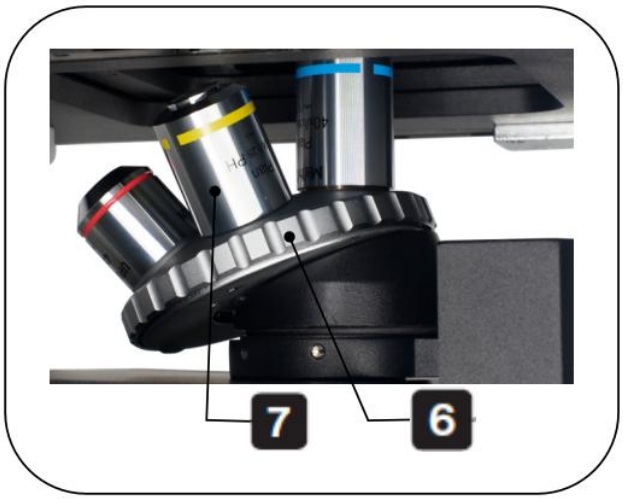
2. Take off the dust cover of the binocular tube, insert the two eyepieces 3 into the eyepiece tube respectively, and rotate them to make the eyepiece and the eyepiece tube fit well.

3-3.Light source extension column installation



Take out the extended light source column 4 , pass the bottom terminal through the round hole of the mounting base 5 , fix it on the mounting base with the attached screws, and connect the aviation male connector with the wiring female base of the base firmly.

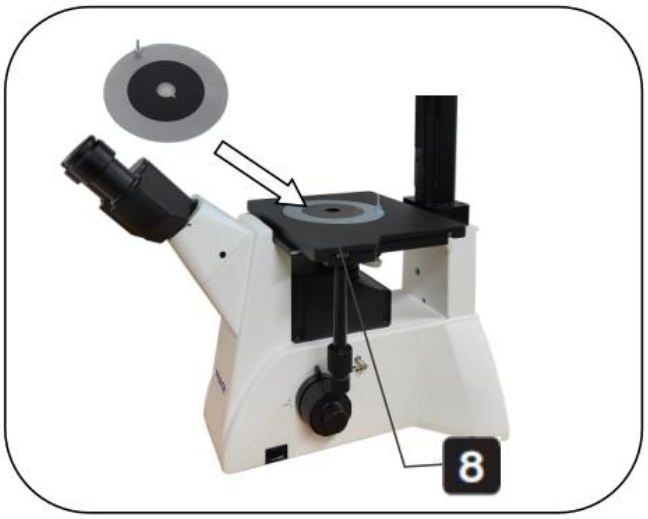
3- 4. Objective lens installation



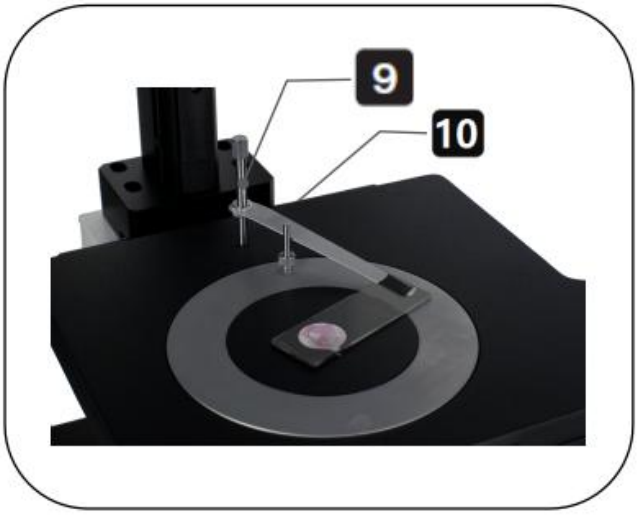
6 on the objective lens turntable , install the objective lens 7 , and tighten it (thread engagement).

Note: The installation of objective lenses is generally arranged from the same category and low magnification to high magnification, which is conducive to switching from low magnification to high magnification during use.

3-5. Drip plate and sample holder installation



1. Put the drip plate on the mounting hole of the stage 8 .



2. If the sample clamp is required to fix the sample, please take out the sample clamp fixing screw 9 and the sample clamp piece 10 . The sample holder is not required, please ignore this step.

3- 6. Other installation

1. Connect the power cord to the host power socket .

2. Check whether the above installation is reliable and safe.

3. Connect the power cord to the power socket.

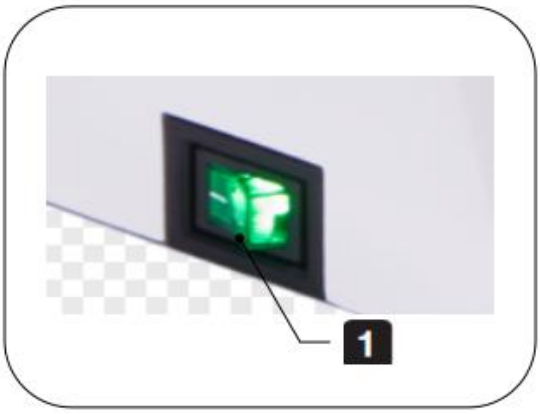
4. Check and organize the accessories and tools attached to the package, and store them properly to avoid omission.

4.Technical specifications

Project	Specification
Eyepiece	SWF10X/22 plan eyepiece, high eye point, one of which can adjust the diopter to center the telescope
Eyepiece tube	45° tilt, interpupillary distance adjustment 53–75mm, adjustable diopter
Objective lens	Long working distance plan objective M-UPLFLN 4X/0.1 3 Working distance: 1 7.15 mm
	Infinity long working distance plan achromatic objective lens P lan 40X/0.5 8 Working distance: 2.5mm
	Infinity Long Working Distance Plan Phase Contrast Objective Lens Plan10X/0.25 PH Working Distance: 4.1mm
	Infinity Long Working Distance Plan Phase Contrast Objective Lens Plan20X/0.45 PH Working Distance: 5mm
Phase difference	1 10X phase difference ring, 1 shared 20X/40 phase difference ring

ring plate	
Stage	Mechanical mobile stage , overall size: 242mm ×200mm ; moving range : 30mm × 30mm
	Circular rotatable stage plate : outer diameter φ1 30 mm, diameter of light opening < 20 mm
Nosepiece	Five-hole internal positioning converter, ball bearing internal positioning, with anti-mildew device
LED shot lighting	White LED, brightness continuously adjustable
	Push-pull plate type phase contrast condenser, working stroke 55mm-400mm
	green filter
interface	Built-in 0.75XC
Focus mechanism	Coarse and fine adjustment coaxial, equipped with limit device and locking device, coaxial focusing handwheel with low hand position, fine adjustment handwheel scale value 2 μm

5.Operation and debugging method

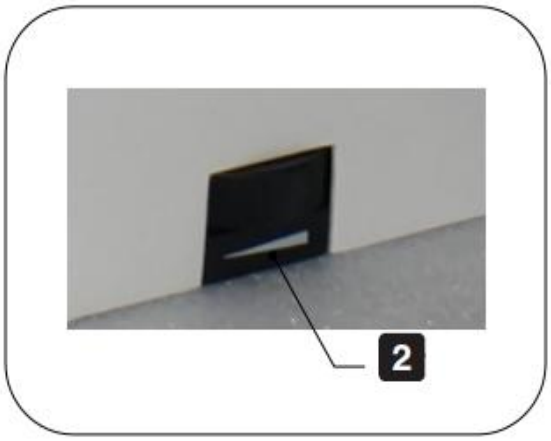


5-1 Bright field observation

1. Turn on the lighting switch and adjust the brightness

Turn on the power switch 1 (turn the switch to "-") to make the light bulb shine. Rotate the dimmer knob 2 to adjust the brightness of the bulb, so that the brightness of the field of view is suitable for visual observation ;

Precautions:



①Before turning on the power switch, please confirm whether the input voltage of the instrument is consistent with the power supply voltage. If it doesn't match, don't use the microscope. If the wrong input voltage is used for the microscope, it may cause a short circuit or cause a fire, which will damage the microscope.

②Try not to use the brightness adjustment knob at the brightest position for a long time, so as not to reduce the service life of the bulb. For unsuitable instruments, it is advisable to adjust the brightness adjustment knob to the lowest position, which is beneficial to the protection of the instrument's electrical functions.

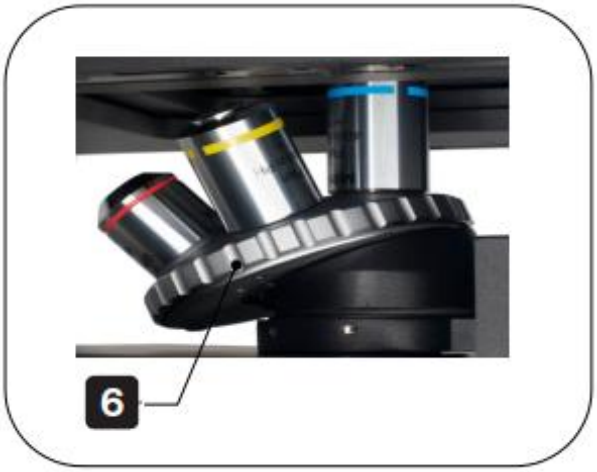
2. Debug the extended light source column debugging knob 3 to adjust the light source components to the appropriate position;

3. on the stage ;

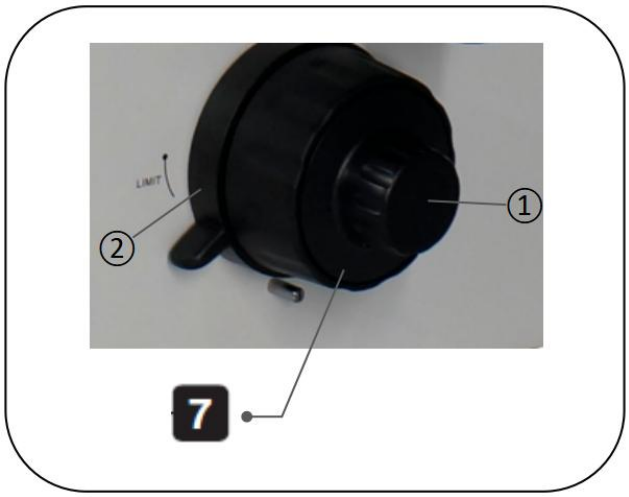
4.To adjust the phase contrast device , pull plate type phase contrast device, please place the phase contrast pull plate 5 at the position of the middle light hole.

Note: During phase contrast observation, the phase contrast objective lens must correspond to the phase contrast ring plate in the phase contrast condenser, that is, the magnification of the objective lens corresponds to the pull plate scale or the insert plate scale, otherwise the imaging effect during phase contrast observation will be affected.

5.Turn the objective lens turret to turn the objective lens into the optical path 6 ; (adjust the fluorescence accessory to the neutral position , or the U position)



6.Turn the coarse and fine focus screw 7 to focus on the sample;

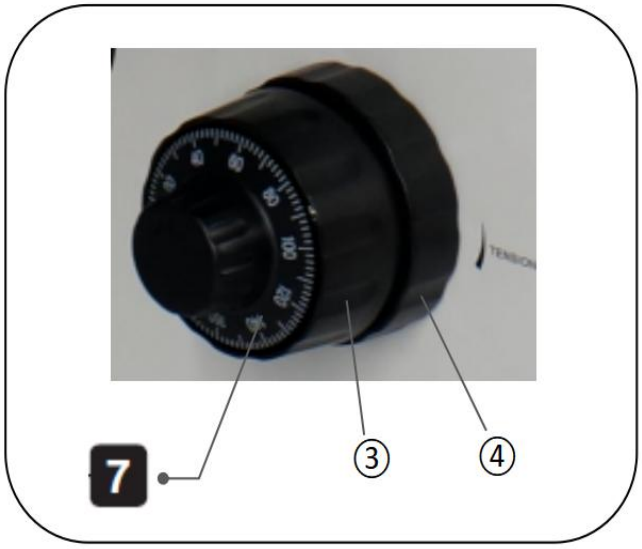


① Fine focus knob : finely adjust the focus position ;

② Coarse and accurate focus limit device (right) : set the upper limit of the stage position (avoid the sample from contacting the objective lens or simplify focusing)

Note: After locking the coarse and accurate focus limit device, the coarse adjustment motion stroke will be limited by the position set by the limit, and cannot be raised beyond the limit height.

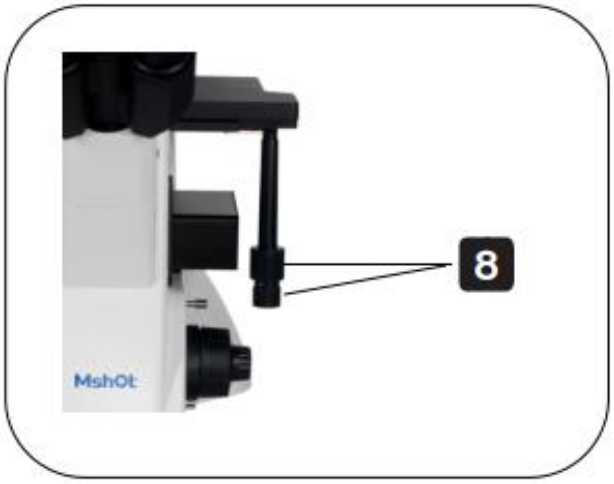
③ Coarse focus knob : quickly adjust the focus position ;



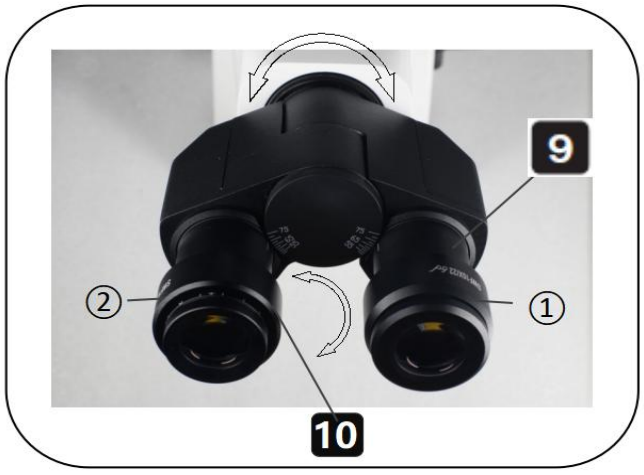
④ Coarse and accurate focus tensioning device (left) : Adjust the tension of the coarse focus adjustment handwheel according to the user's needs. Turn the tension adjustment ring of the coarse focus handwheel clockwise to increase the tension; vice versa to decrease the tension .

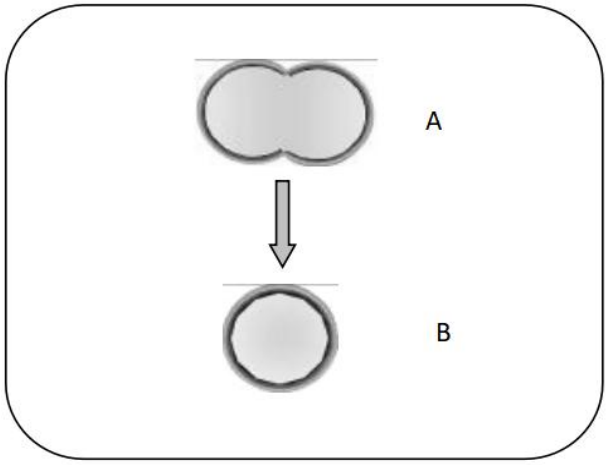
Note: If the objective lens slides down by its own gravity, or defocuses quickly after using the fine focus handwheel to focus, this is caused by too small tension. You need to turn the tension adjustment ring of the coarse focus handwheel along the thick direction of the line to increase the tension .

7. Turn the stage knob 8 to adjust the observation position;



8. Adjust the interpupillary distance 9 : Adjust the binocular tube until the left and right fields of view completely overlap , AB .





8. Adjust the diopter 10 : Turn the diopter adjustment rings on both sides to the scale "0", turn the 10X objective lens into the optical path, use the right eye to observe from the right eyepiece, and turn the coarse and fine focus screw to focus on the sample;

Turn the right diopter adjustment ring ① to focus on the sample; do not adjust the coarse and fine focus knobs during the focusing process;

Looking through the left eyepiece with the left eye, turn the left diopter adjustment ring ② to focus on the sample.

5-2 Operation of camera unit

The instrument adopts push-pull to switch between visual observation and photographic camera observation. The photographic camera output port is located at the lower left side of the host. The operation method is as follows:

1. Loosen the fastening screw of the camera output port. Nail 1 , take out the dust cover 2 .
2. Install the camera device (adapter) on the output port, and tighten the screw with a screwdriver tool. Turn on the photo camera device to make it work normally.
3. Turn the 10x objective into the light path.

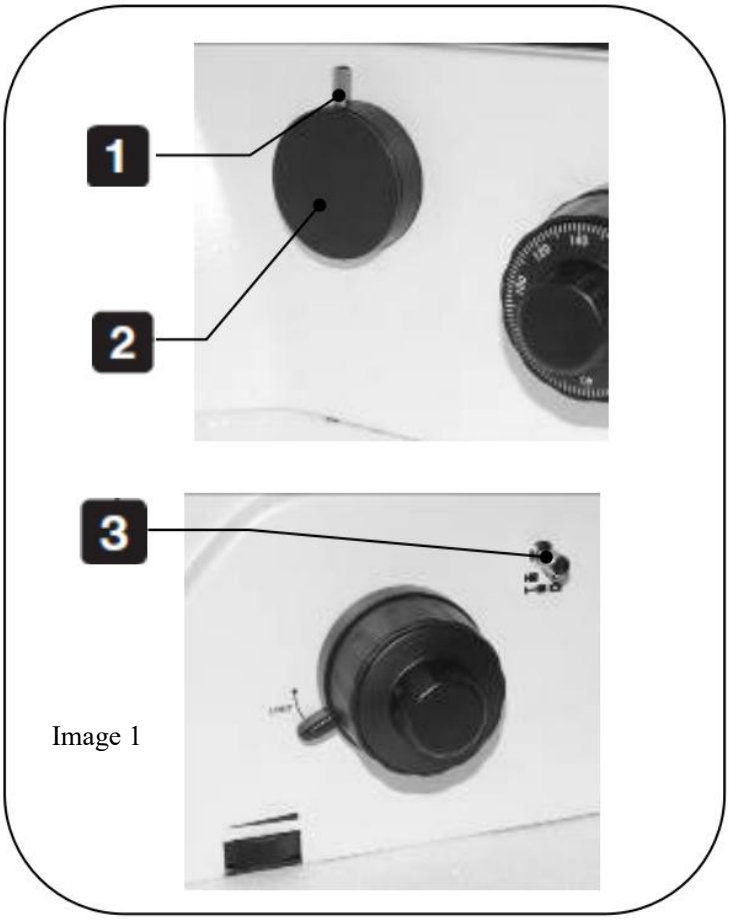


Image 1

Push in the photography/visual switching push rod 3 , visually observe the specimen image, and adjust the focus to make the specimen image clear.

4. Pull out the photographic/visual switching push rod 3 , and observe whether the image on the monitor or display screen is clear. If not, please slightly adjust the microscope micro-focusing handwheel to make the displayed image clear.

5. If there are strict synchronization requirements for visual observation and photographic images (consistency between image center and direction), synchronization adjustment is required, as follows:

1) Push in the photographic/visual switching pusher 3 , visually observe the specimen image, find a feature point (easy to identify target, such as point S in Figure 2-a) in the field of view , and move it to the If there is a reticle eyepiece, the target can be moved to the intersection of the reticle eyepiece reticle. As shown in Figure 16-b.

2) Pull out the photographic/visual switching push rod 3 , observe the image on the monitor or display screen, and observe whether the target image calibrated in the previous step is near the center of the display field of view (the offset relative to the center of the field of view is not greater than One-fifth of the diagonal of the monitor or display screen), if the deviation from the field of view is too poor, you can use a screwdriver tool to adjust the three screws on the output port to move the calibration target image to near the center of the field of view.

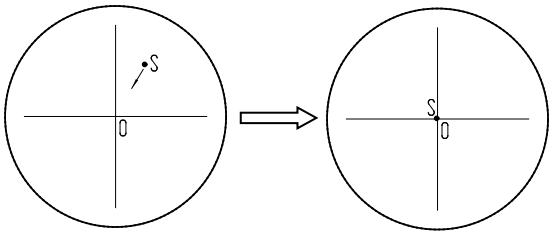


Image 2

3) Move the specimen on the stage, and observe whether the moving direction of the image on the monitor or display screen is consistent with the moving direction of the specimen. If the moving direction is not the same, it is necessary to adjust the direction of the photography and camera device. Use a tool to loosen the fastening screw on the

output port, rotate the photography and camera device so that the image display direction is consistent with the moving direction of the specimen on the stage, and then tighten the screw.

5-3 Phase difference optical path debugging

1) Take out one eyepiece in the binocular tube, and insert the centering eyepiece 2 into the eyepiece tube, as shown in Figure 1A below .
2) 5 and a bright ring 6 can be observed in the field of view of the centering eyepiece , as shown in Figure 2C below .
3) If the edge of the dark ring and the bright ring in the field of view is not clear, you can adjust the adjustment ring 1 of the centering eyepiece to make the edge of the dark ring and the bright ring clear.
4) Phase contrast observation requires that the center of the dark ring coincides with the center of the bright ring. If the centers of the two rings do not coincide, as shown in Figure 2C below, you need to adjust the center of the phase contrast pull plate. The hexagonal key 3 can be used to adjust the turntable phase contrast; the adjustment of the draw plate can be realized by adjusting the centering screw 4 of the phase contrast draw plate . After the adjustment is completed , it is shown in Figure 2D below .
5) After the phase contrast device has been centered, the centering eyepiece can be removed and reinserted into the observation eyepiece.

> **Attention** When switching phase contrast objective lenses with different magnifications for observation, it is necessary to re-center the phase contrast device, otherwise the effect of phase contrast observation will be affected.

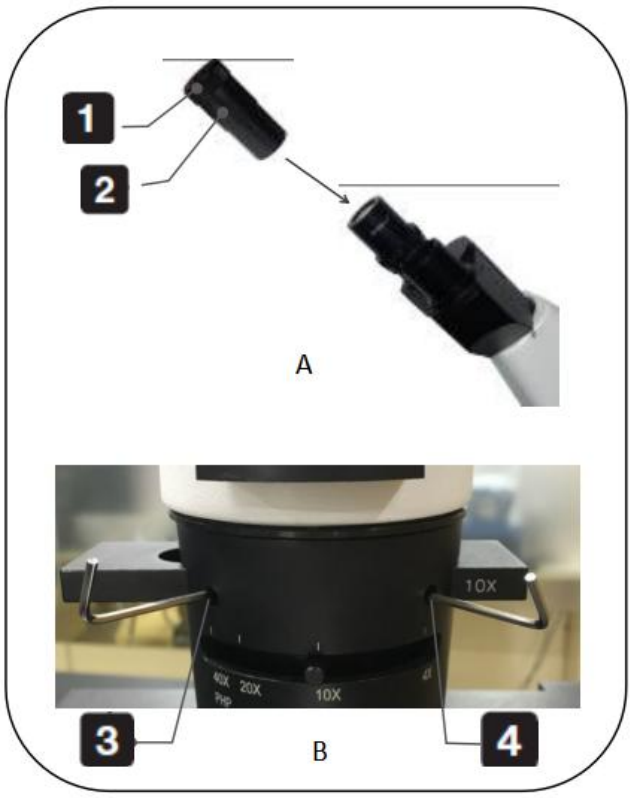


Image 01

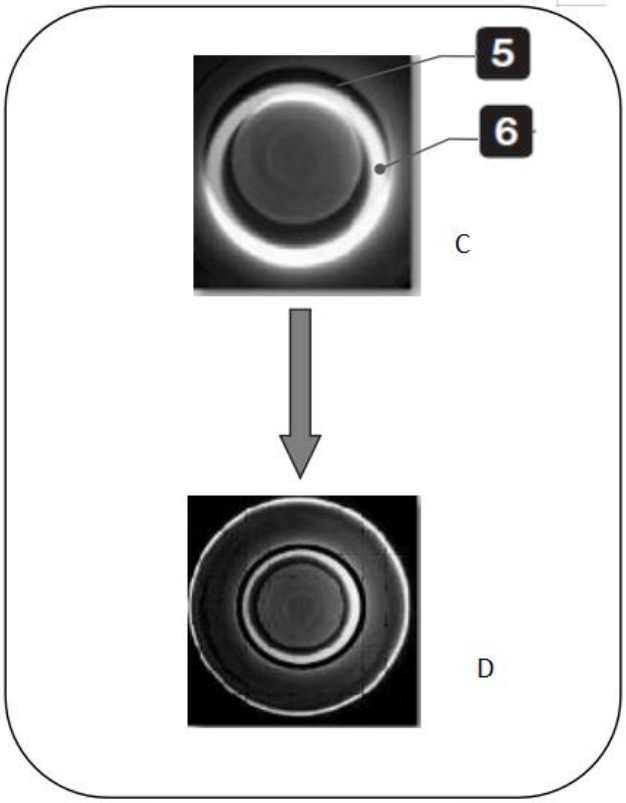
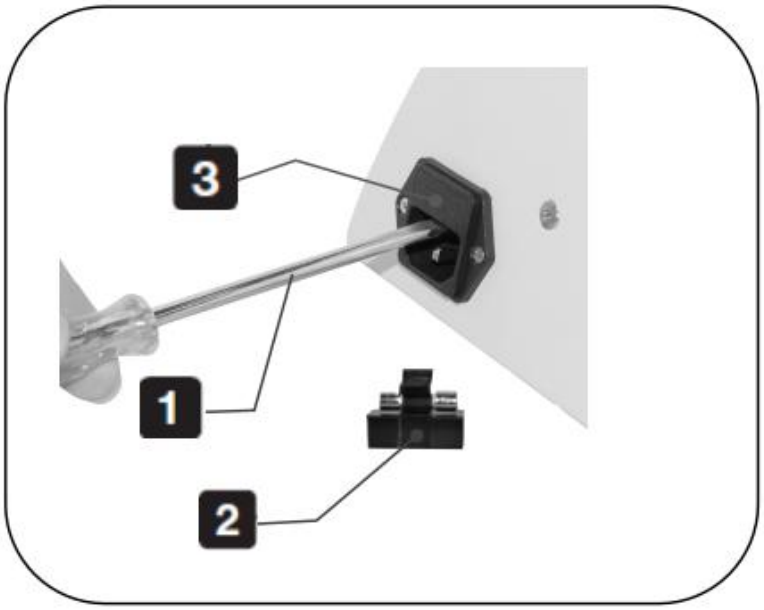


Image 02

6. Fuse Tube Replacement

The fuse tube of the host of the instrument is used for the circuit system used for transmission illumination, and the fuse tube 3 is integrated in the power input socket of the host. See Figure 1 below .

1. Turn off the power switch and unplug the power cord.
2. Use a flat screwdriver 1 or other tools to take out the fuse holder 2 as shown in the figure, take out the damaged fuse holder, replace it with a new fuse holder, and reinstall the fuse holder in the power



input socket of the host.

3. Reconnect the power cord and check whether the fuse tube is in good contact.

7. Instrument care and maintenance

1. The power switch of the host is controlled by power supply. When the observation is completed or the use is suspended, press the switch "O" to cut off the power, so as to prevent the electrical components in the instrument from still working. 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. The instrument should be kept clean. Use a clean gauze (or silk cloth, absorbent cotton) dipped in a little ethanol to wipe off the oil on the lens and the body. After it is completely cooled and dried, put on a dust cover.
3. Clean the lens: use a blower to blow off the dust on the lens 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 (mixing the two with about 20-30%, ether 70-80%).

Attention

Generally, it is easier to wipe the surface of the lens from the inside in the direction shown in the figure.

Wrong Correct

4. Clean the surface of the instrument: Wipe it with a clean soft cloth; heavy dirt can be scrubbed with a neutral detergent.

5. Storage: When the microscope is not used for a long time, please turn off the power of the instrument, fully cool the bulb, 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.

> Attention
>
> Do not use organic solvents (such as: alcohol, ether and its dilutions, etc.) to wipe, so as not to peel off the paint on the surface of the instrument. It is recommended to apply a layer of non-corrosive lubricant to the moving part of the microscope before covering the dust cover. The eyepiece and objective lens are placed in a container with desiccant.

8. Common faults and solutions

Fault	cause of issue	Approach
electrical system		
No illumination in field of view	The power switch is not turned on	Turn on the power switch
	broken fuse	replace new fuse
	Poor contact of electrical chassis connectors	Check and send professional repair
Optical system and imaging		
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
	There is oil or dust on the surface of the	Wipe objective or eyepiece lenses
	Aperture diaphragm aperture opened too small	Adjust the aperture diaphragm aperture size according to the objective lens magnification
	Objective lens deviated from optical	Turn the converter to the positioning position
	Specimen cover slip too thick or too	Add a cover glass according to the
The focal plane of the image is tilted (one side is bright and the other side is dark), and the fluorescent color is not pure (there is	The lighting bulb is tilted badly	Adjust the position of the lighting bulb
	The specimen is not leveled	Place the specimen flat on the stage and hold it
	The external environment is too bright	Observing Fluorescence in a Dim Environment
Phase contrast observation effect is not good	The phase contrast objective does not	Aligning Phase Contrast Objectives with
	Phase contrast condenser ring plate center deviates from phase contrast	Adjust the center of the phase contrast condenser so that the center of the ring plate
	The placed specimen is not suitable for	Replacing Specimens Suitable for Phase

computer system		
The image cannot remain clear during observation,	The focusing mechanism appears	Adjust the coarse movement and tightness
	Ineffective focus adjustment	Check and send professional repair
	Stage is loose or tilted	Check and send professional repair
The condenser lifting device cannot be positioned accurately when swinging in and	Loose set screw, making positioning	Recalibrating the set screw
	The locking mechanism is seriously	Check and send professional repair
Stage moving mechanism	It feels too light when moving	Adjust the tightness of the longitudinal
	It feels too light when moving	Adjust the tightness of the horizontal
	Loose or broken drive belt	Recommissioning/ replacing the transmission