



Guangzhou Micro-shot Technology Co., Ltd.

MIX60/MIX60-FL

Inverted Biological Microscope User Manual



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Inverted Biological Microscope MIX60



Inverted Fluorescence Microscope MIX60-FL

Thank you for purchasing our company's product

To enable the microscope to perform at its best, proper installation and adjustment are of utmost importance. If you need to install the microscope by yourself, please read this instruction manual carefully.

Safety cautions

- This instrument can only be used for bright - field and fluorescence observation of inverted biological microscopes, and should not be used for other purposes. Otherwise, it may cause damage to the instrument.
- Do not disassemble on your own. This is a precision instrument pre-calibrated at the factory. Unauthorized disassembly may cause electric shock or damage. Only remove components as instructed in this manual.

If you have any questions or detect a malfunction in the instrument, please contact the manufacturer or your nearest distributor.

- Unpack carefully to avoid lens fingerprints, sweat, etc. which may affect observation and to avoid dropping accessories like lenses.

Do not place flammable items such as alcohol, gasoline, or paper near the light bulb to prevent fire hazards.

- When moving the microscope, hook one hand into the groove at the rear of the frame and support the front bottom of the frame with the other hand. Ensure a firm grip before carrying, and strictly prohibit dropping or colliding.
- If bacterial solution or water splashes on the stage, objective lens, or observation tube, unplug immediately and dry thoroughly to avoid damage.

- Maintain clearance around the microscope for air convection; place on a stable, level surface and keep base vents unobstructed.
- Ensure the machine is grounded to protect against lightning strikes.
- Use the power cord provided by the manufacturer. If replacement is needed, select a certified power cord. Using an incorrect power cord may compromise the safety and performance of the product.
- When installing the microscope, ensure sufficient distance between the power cord and light source to prevent the cord from melting due to heat exposure and causing electric leakage.
- Firmly connect the microscope's grounding terminal to the wall grounding terminal; otherwise, electrical safety and equipment performance cannot be guaranteed.
- Handling and Use

Before moving, turn off the power, unplug the power plug, and secure the power cord.

Take care not to pinch fingers when placing the instrument.

As a precision device, it must be handled gently. Use caution during operation; severe vibration or forced manipulation may cause serious damage to components.

- The instrument should be used in an indoor environment with a temperature of 0°C～40°C and a maximum relative humidity of 85%.

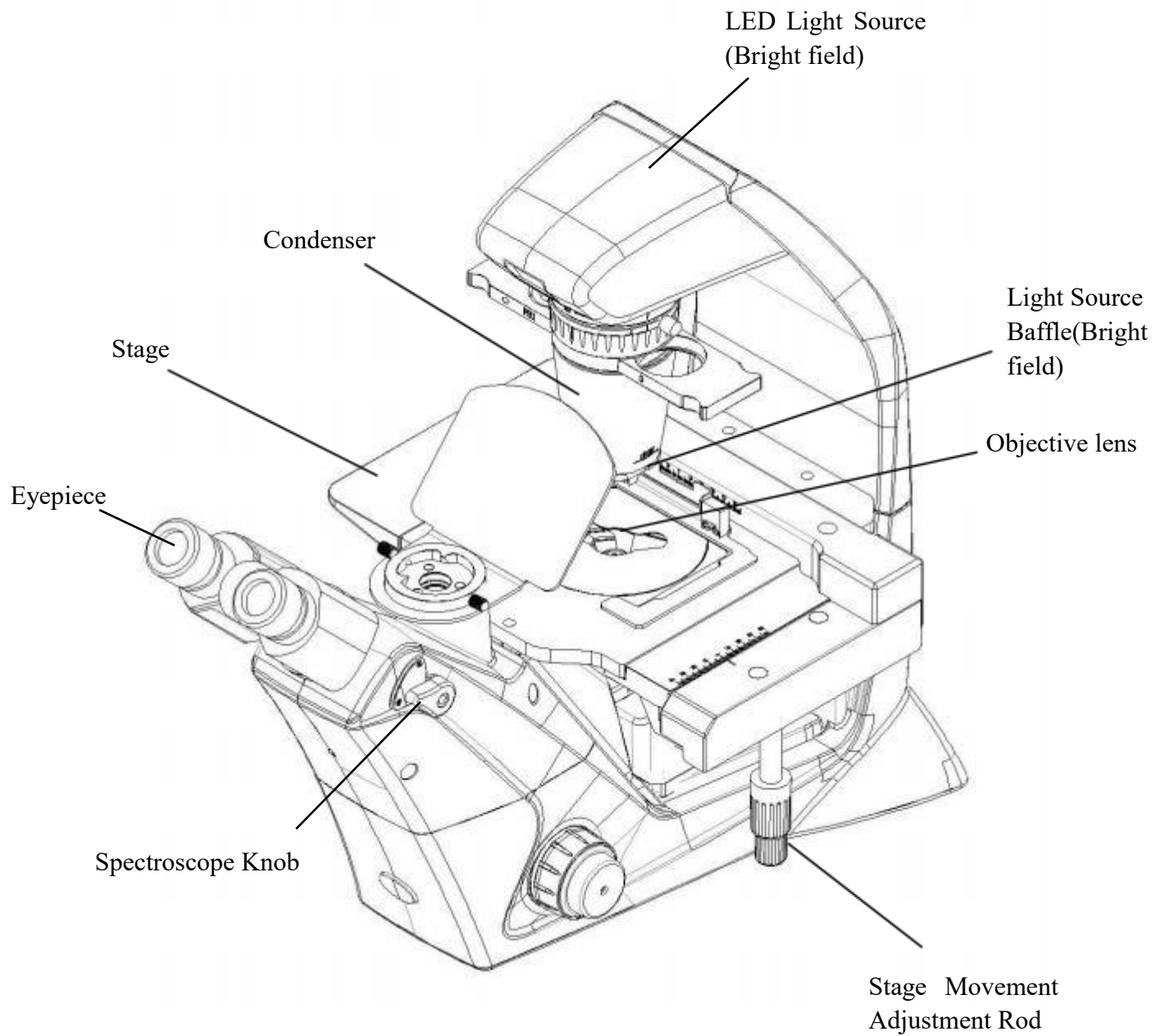
Excessive temperature or humidity may cause mold, fogging, or condensation on optical components, rendering the instrument inoperable.

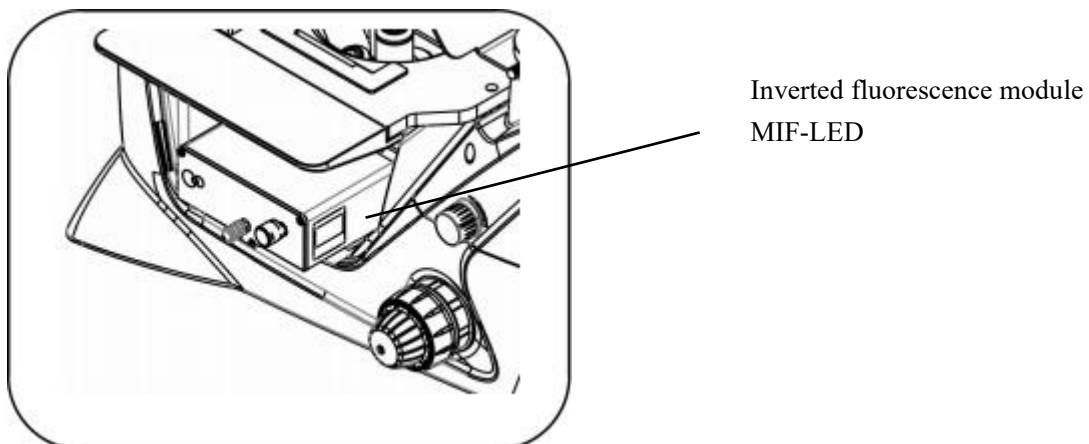
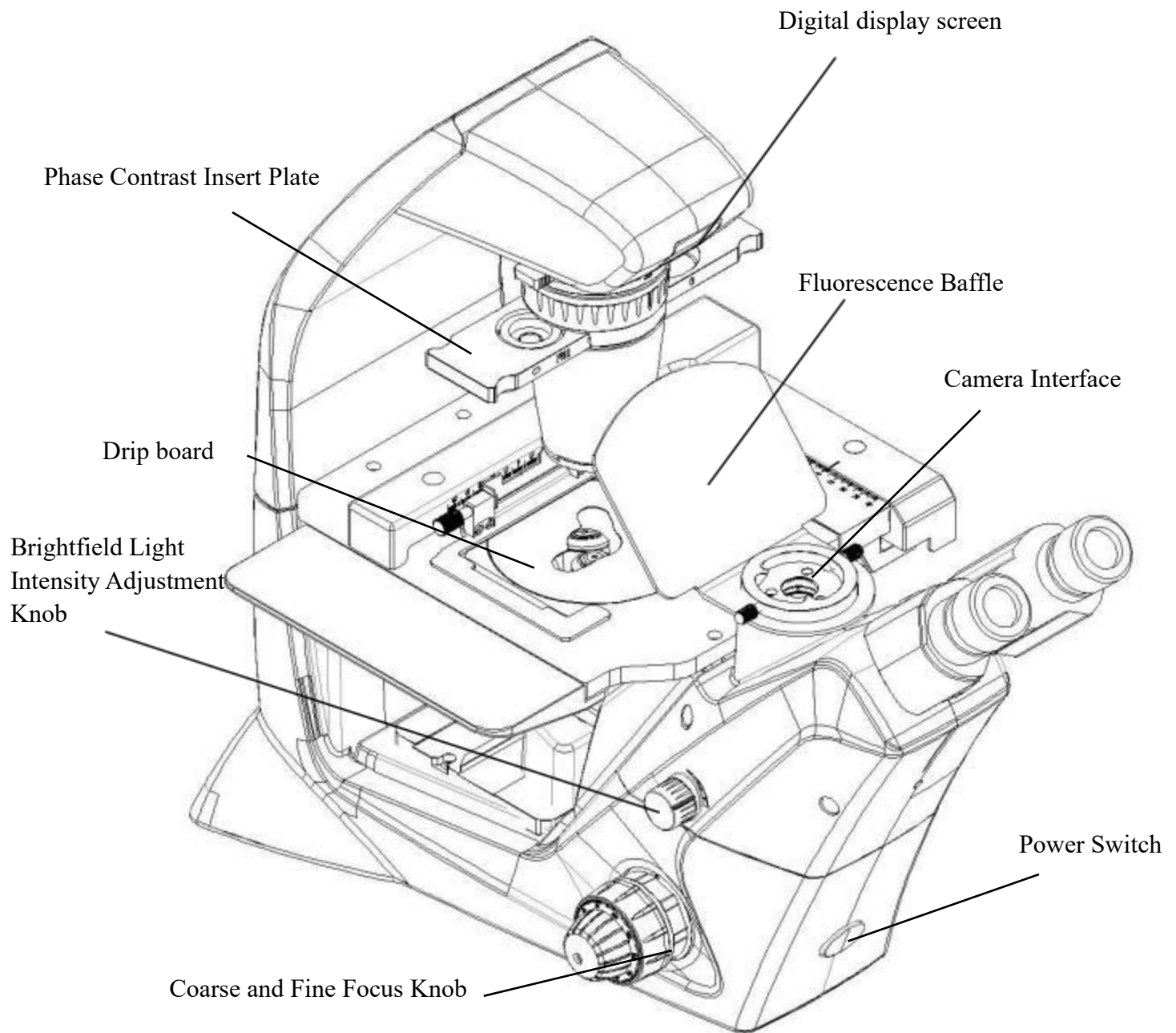
- Properly sort and dispose of packaging waste (such as cardboard boxes and foam) from the microscope, or send it to a recycling station to protect the environment

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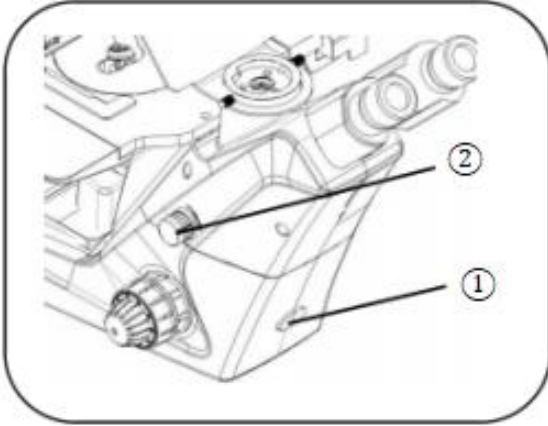
1、 Component Names





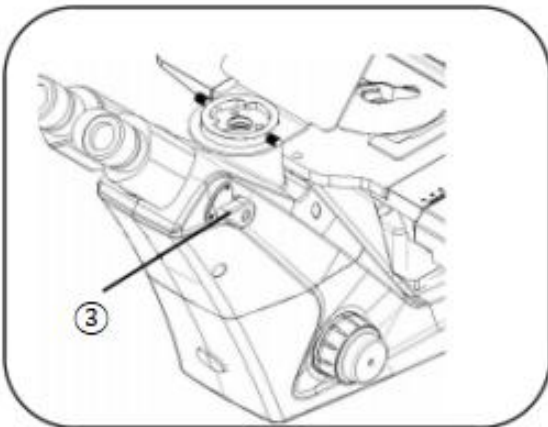
2、 Simple Observation Procedure

Brightfield Observation



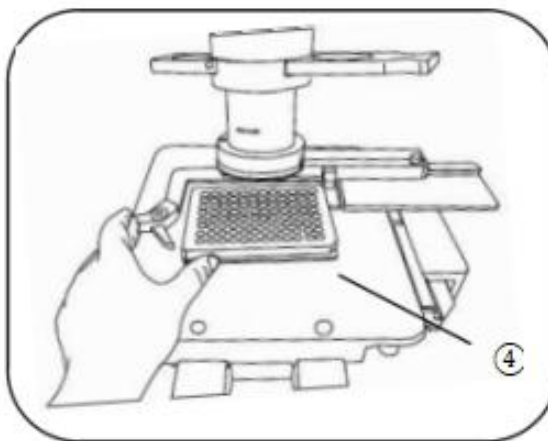
(1) Press the brightfield power switch button ① to turn on the brightfield light source.

(2) Rotate ② to adjust the light intensity: Rotate the knob on the brightfield power control box to adjust the light source from "0" (off) to "100" (maximum brightness). Set the light source to a suitable brightness level.

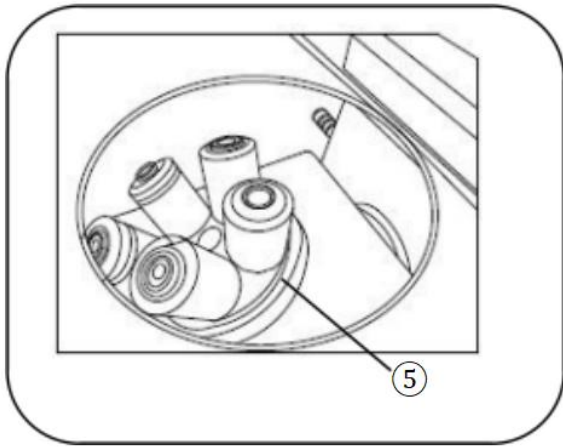


(3) Rotate the spectroscopy knob ③ to switch to eyepiece observation mode.

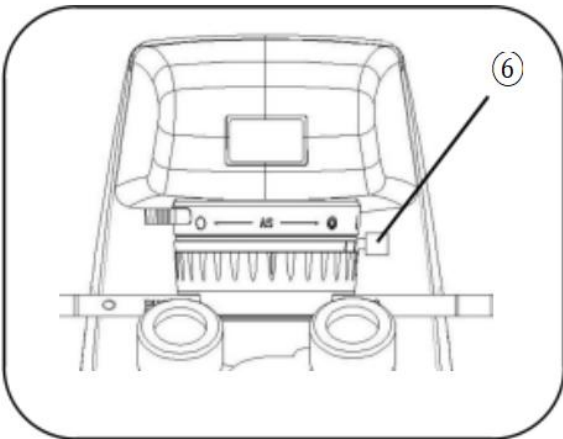
Use the spectroscopy knob to switch the optical path between eyepiece observation and microphotography/micro videography.



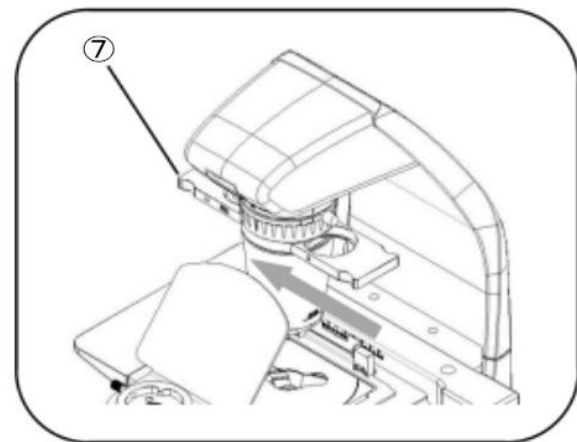
(4) Place the sample on the stage ④.



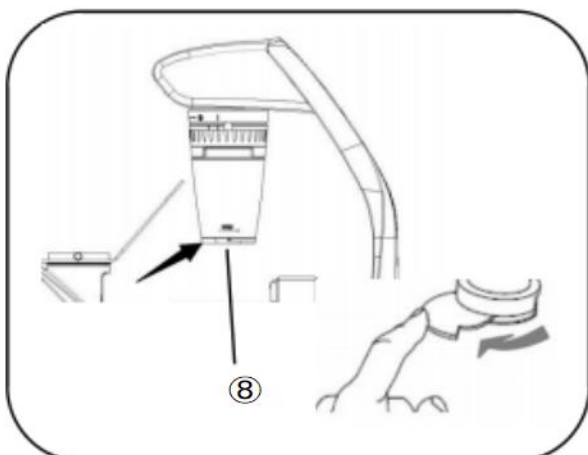
(5) Rotate the nosepiece ⑤ to swing the required magnification objective into the optical path.



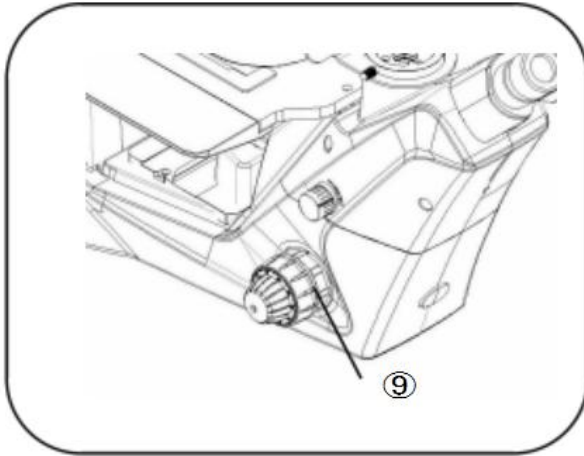
(6) Adjust the aperture diaphragm adjustment rod ⑥ to change the intensity of light passing through the condenser.



(7) Push the phase contrast insert plate ⑦ to the neutral position (or remove it) so that the light is not blocked by the phase ring on the insert plate.



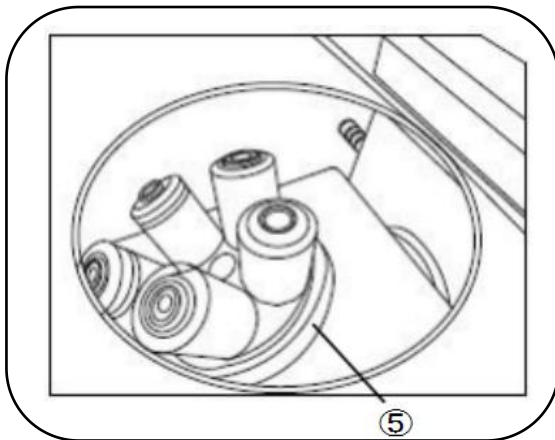
(8) Move the brightfield light baffle ⑧ out of the optical path so that light passes through the condenser to the sample.



(9) Adjust the focus knobs ⑨ to focus on the sample.

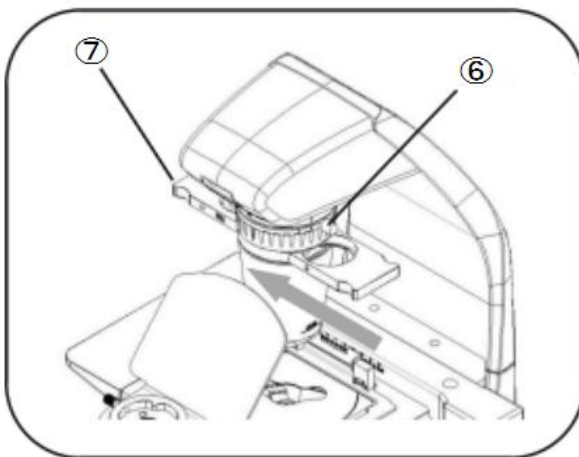
When rotating the right coarse and fine focus knobs clockwise, the objective lens rises; conversely, it falls. When rotating the left coarse and fine focus knobs clockwise, the objective lens falls; conversely, it rises.

Phase Contrast Observation



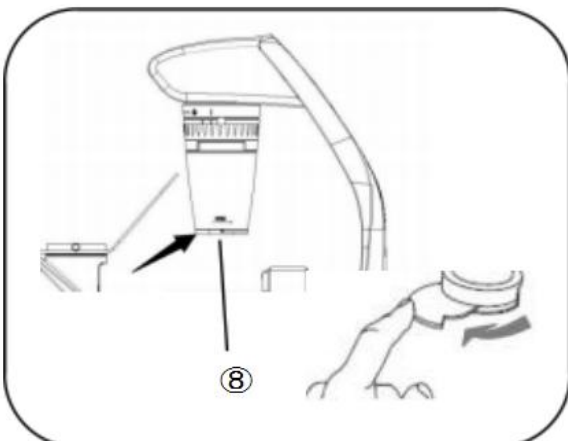
(10) Based on brightfield observation, rotate the nosepiece ⑤ to bring the 10X or 20X phase contrast objectives into the optical path.

There is a "PH" label on the casing of the phase-contrast objective lens.

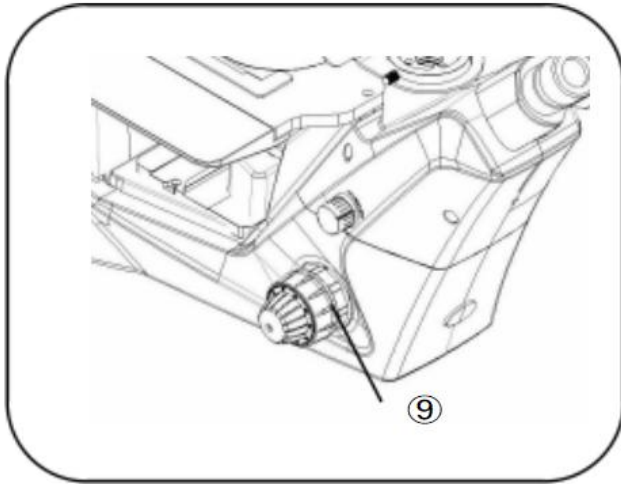


(11) Push the phase contrast insert plate ⑦ into the phase contrast insert slot (refer to the microscope installation procedure for inserting the phase contrast plate) so that the phase ring corresponding to the objective magnification is in the optical path. Adjust the aperture diaphragm adjustment rod ⑥ to the corresponding position.

Note: The magnification of the phase ring must match the objective magnification. For example, if using a 10X phase contrast objective, select the 10X aperture position on the phase contrast insert plate.



(12) Move the condenser baffle ⑧ out of the optical path to allow light to pass through the condenser to the sample.

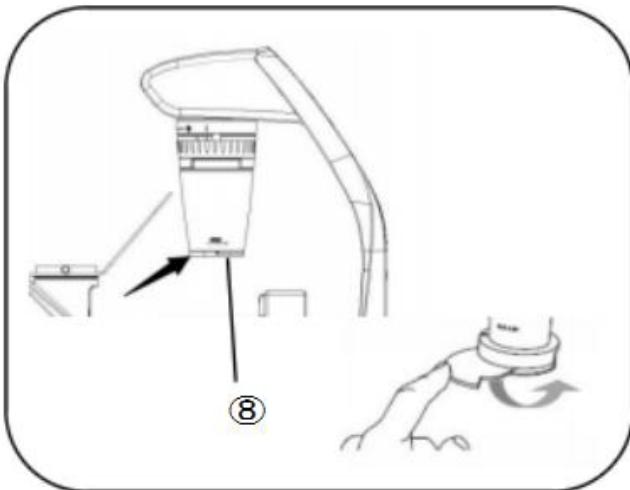


(13) Adjust the focus knob ⑨ to focus on the sample.

Fluorescence Observation

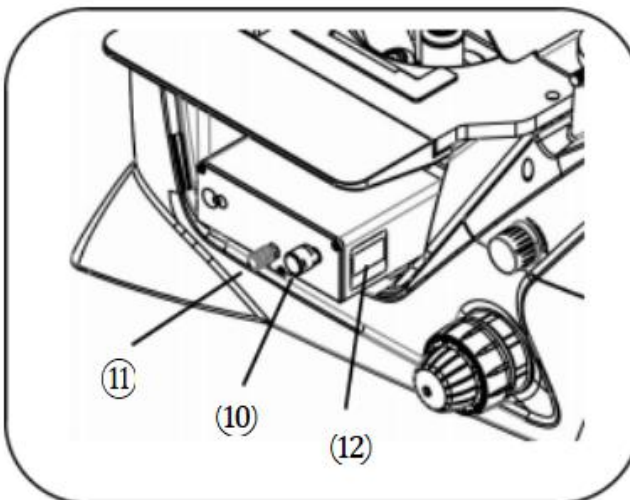
The fluorescence module is an optional accessory.

Refer to the following steps when fluorescence observation is required



(14) Push the condenser baffle ⑧ into the optical path.

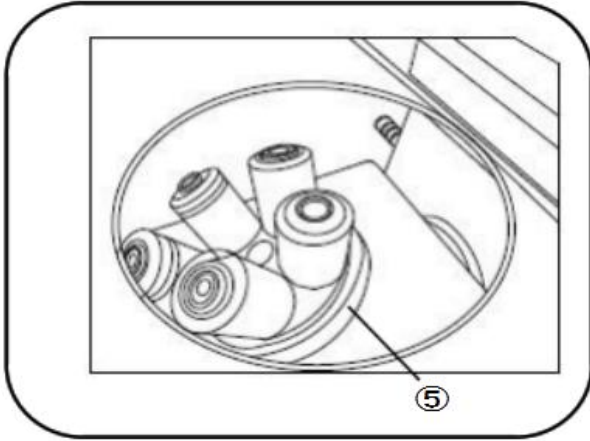
During fluorescence observation, the condenser baffle reduces stray light reflected by the condenser from entering the optical path, enhancing fluorescence observation performance.



(15) Gently press the power switch ⑩ on the side of the fluorescence module to turn on the fluorescence light source. The front digital display screen ⑫ will illuminate, indicating the fluorescence module is in the "ON" power-on state.

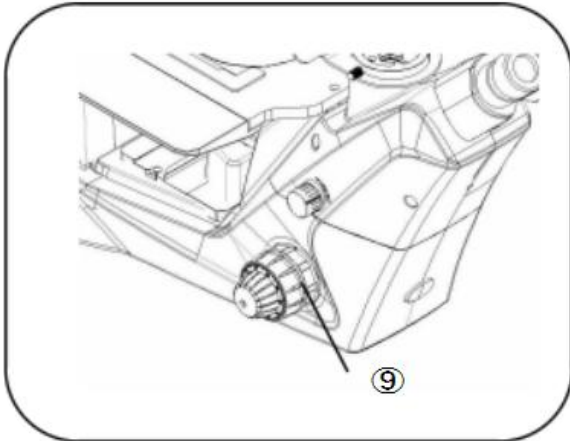
Pull the lever ⑪ to switch between different fluorescence channels. Rotate the switch ⑩ to adjust the brightness, and the front digital display screen ⑫ will show the current fluorescence channel and brightness level.

Note: The brightfield light source should be turned off during this operation.



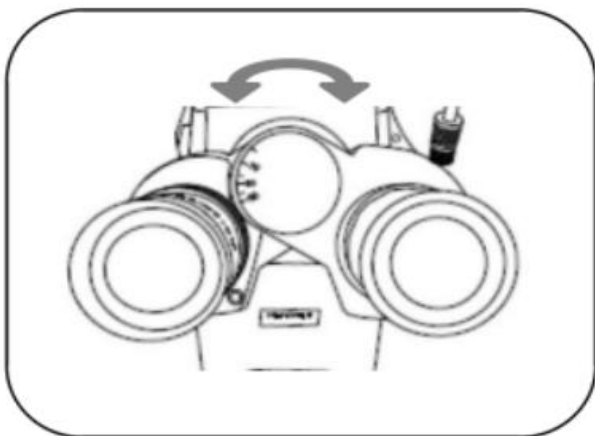
(16) Rotate the nosepiece ⑤ to swing the required magnification objective into the optical path.

Note: For fluorescence observation, it is better to prioritize the use of fluorescence objectives.



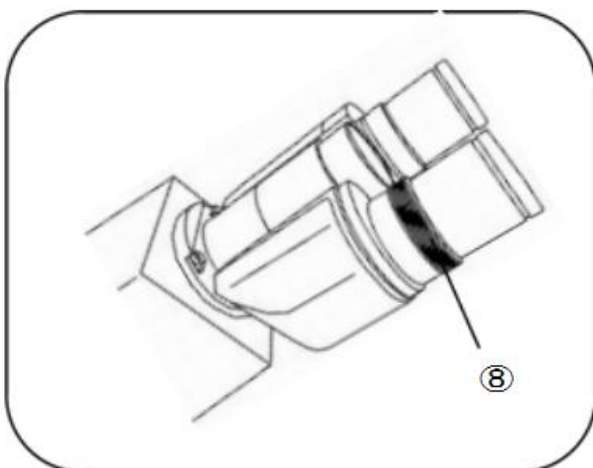
(17) Adjust the focus knob ⑨ to focus on the sample.

The following operation steps apply to all observation modes.

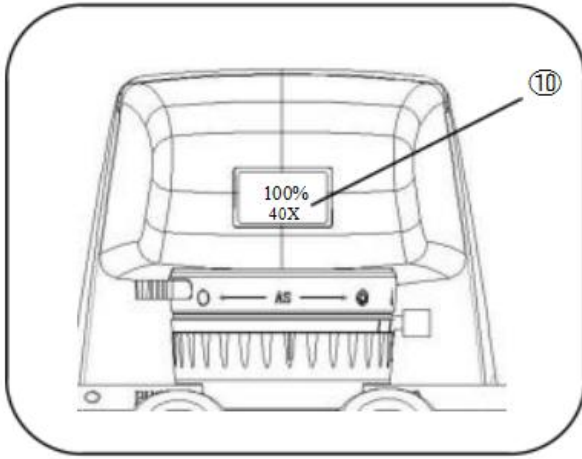


(1) Adjusting Pupil Distance: When observing through the eyepieces, adjust the binocular tubes until the left and right fields of view fully coincide.

The dot “.” indicates the pupil distance. Note down your pupil distance scale for future use.

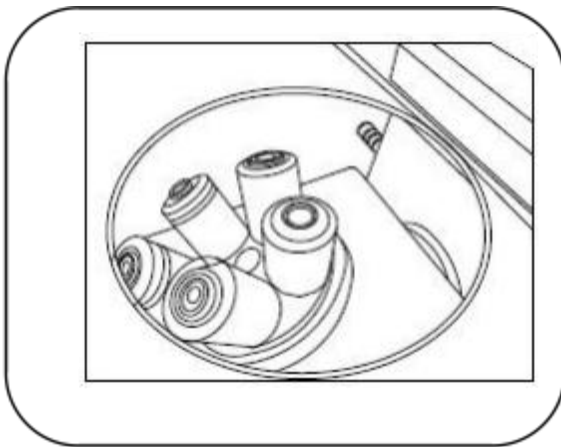


(2) Adjusting Diopter: After focusing the right eyepiece tube clearly, observe the left eyepiece tube. Adjust the diopter adjustment ring ⑧ on the left eyepiece tube until the image in the field of view is sharp.

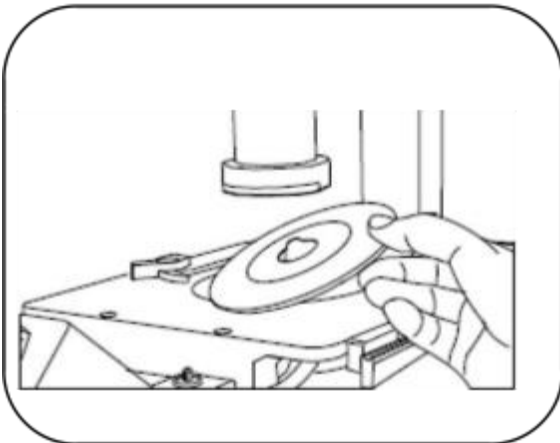


(3)The brightness of the microscope's brightfield light source and the currently used objective magnification can be viewed on the digital display screen ⑩.

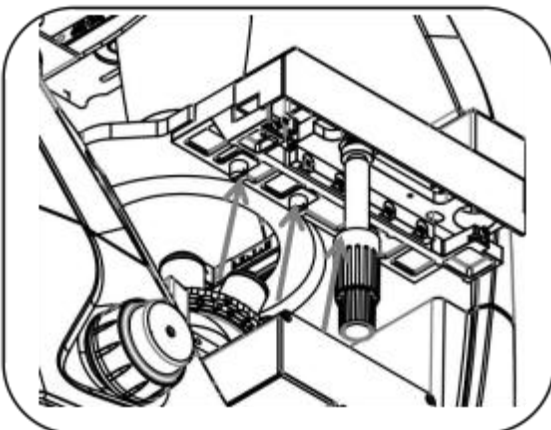
3、 Microscope Installation and Debugging



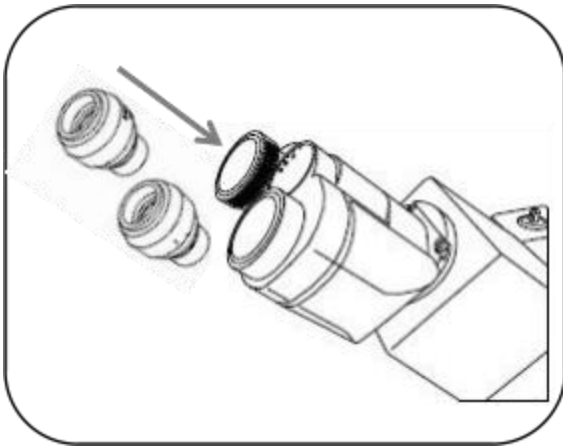
(1)Screw the objectives onto the nosepiece in the order of increasing magnification.



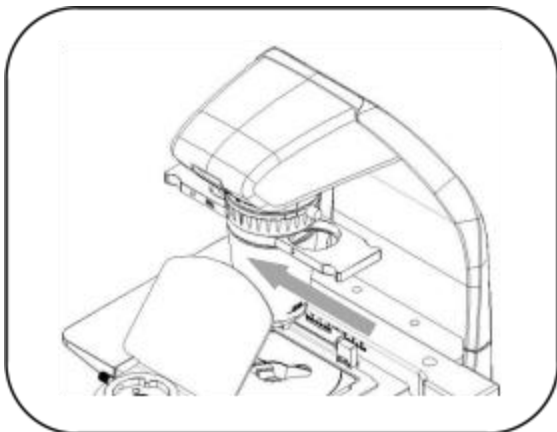
(2)Place the Drip board above the stage.



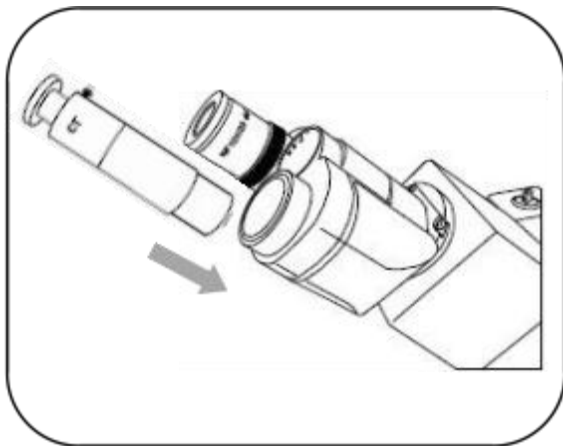
(3)Align the stage movement rod with the right side of the stage, tighten the three bottom screws, and fix the XY-axis movement rod.



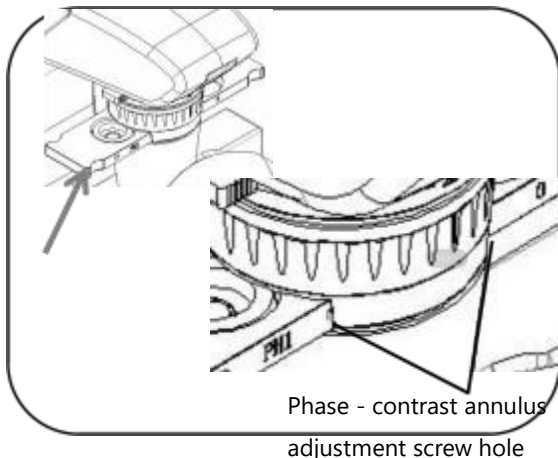
(4) Open the covers of the eyepiece tubes, and respectively insert the two eyepieces into the tubes.



(5) Insert the phase - contrast insert plate into the insert slot above the condenser.



(6) Remove one eyepiece and insert the centering telescope into the eyepiece tube. Rotate the 10X objective into the optical path, and push the phase-contrast insert plate into the optical path corresponding to the 10X aperture position. Unscrew the screw above the centering telescope to pull out the lens appropriately. Observe the image in the centering telescope with one eye until two circular rings appear in the field of view, then tighten the screw to fix the final position of the telescope lens.



(7) Use a hex key to adjust the two screws on the left and right of the 10X aperture position, so that the bright ring and dark ring in the field of view of the centering telescope become concentric circles (A-B). After adjustment, remove the centering telescope and replace it with an eyepiece for observation.

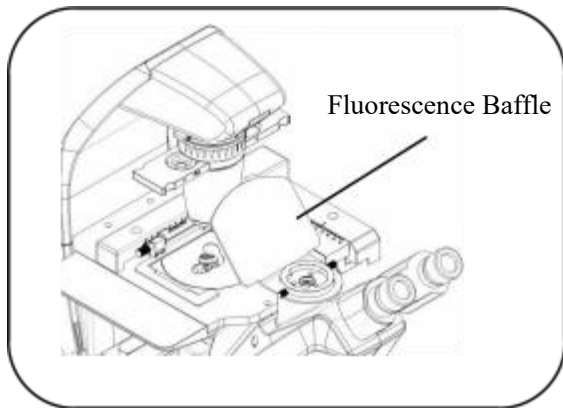
Adjust the optical path centering of phase-contrast objectives with different magnifications respectively, and observe through the eyepiece as shown in the figure below:



A

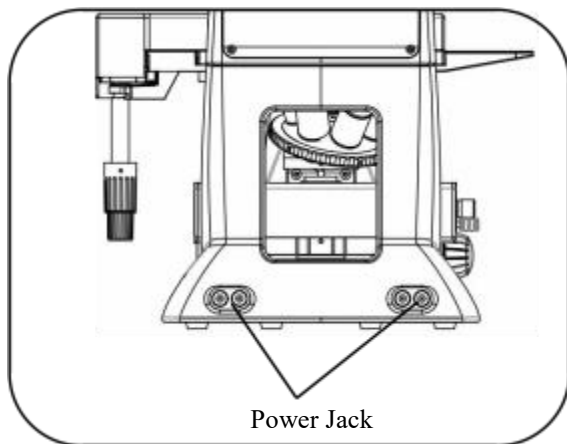


B



(8)Clip the fluorescence baffle onto the screw at the front of the microscope stand.

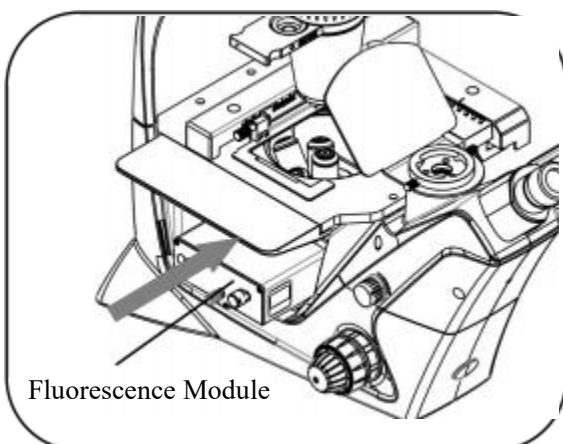
The fluorescence baffle protects the observer's eyes.



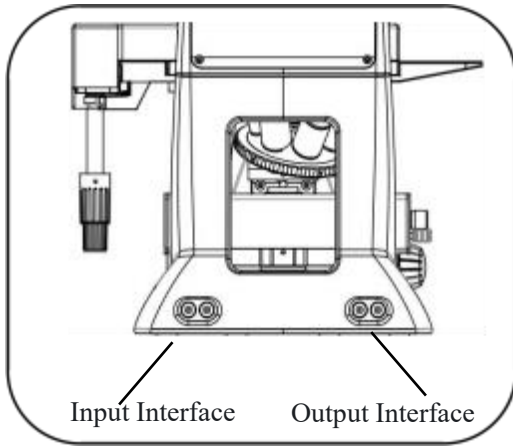
(9)Clip the fluorescence baffle onto the screw at the front of the microscope stand.

The fluorescence baffle protects the observer's eyes.

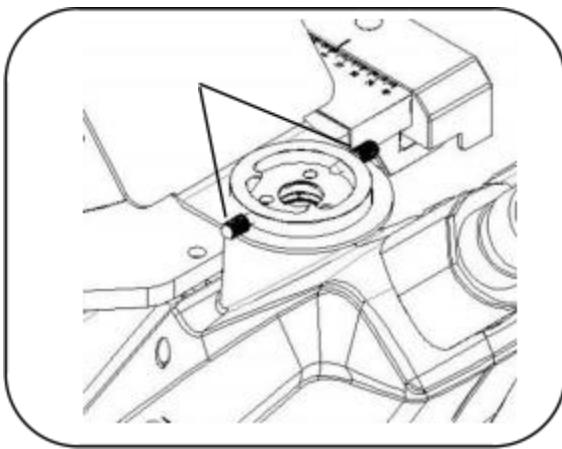
Fluorescence Module Installation (Optional) If you have purchased a fluorescence module, please refer to the following installation instructions:



(10)Clip the fluorescence module into the module base from the left side of the microscope, and slowly push it along the base track until it clicks into place on the base plate.



(11) Use a hex key to tighten the fixing screw at the exact rear position of the microscope, securing the fluorescence module to the base plate.



(12) Loosen the side fixing screws, remove the dust cover at the camera interface, and clip the dovetail groove of the C-mount camera interface into the camera connection port above the trinocular tube. Then tighten the side fixing screws.

Screw the camera into the threads above the adapter and ensure it is tightly secured.

4、XY-Axis Travel Calibration of the Stage

During transportation, the XY stage movement scale may shorten XY-axis travel. Calibrate travel when installing the scale as follows:

(1) X-Axis Travel Calibration:

As shown, fix X-axis adjustment knob ① with one hand. With the other hand, pull the X-axis movement scale at ② leftward (Fig.1 blue arrow) to the extreme left. Similarly, fix knob ① and pull the scale at ② rightward (Fig.2 blue arrow) to the extreme right.

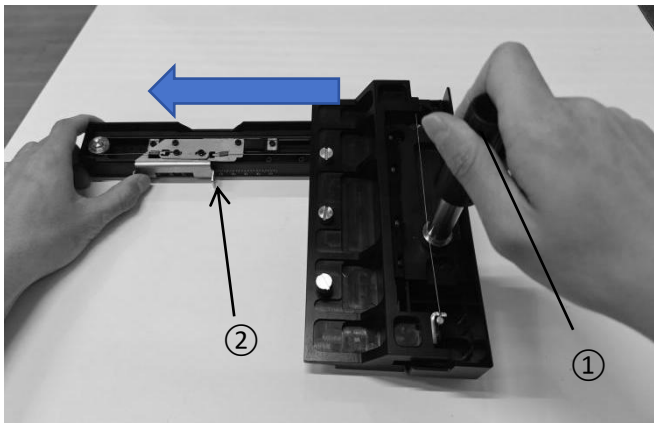


Fig.1

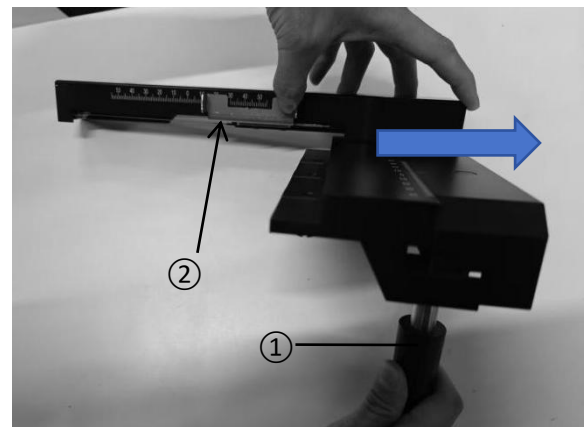


Fig.2

(2) Y-Axis Travel Calibration

As shown, fix Y-axis adjustment knob ③ with one hand. With the other hand, pull the Y-axis movement scale at ④ leftward (Fig.3 blue arrow) to the extreme left. Similarly, fix knob ③ and pull the scale at ④ rightward (Fig.4 blue arrow) to the extreme right.

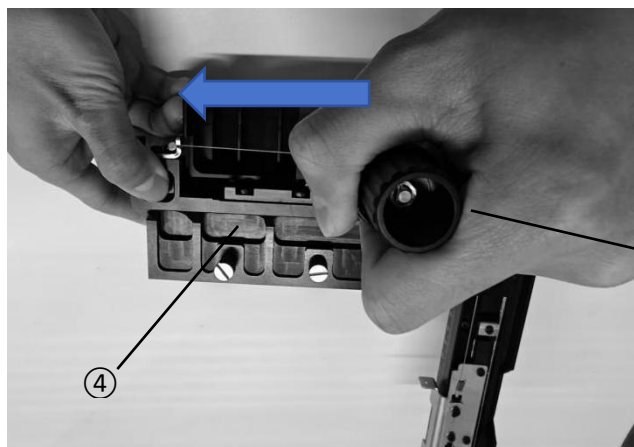


Fig.3

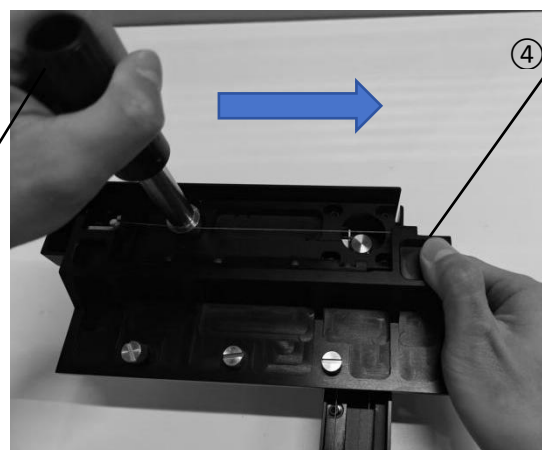


Fig.4

5、 Maintenance and Care

Cleaning the Instrument

Do not touch the surface of exposed lenses with hands. Dust can be removed with a soft brush or gauze. If necessary, use a clean soft cloth, absorbent cotton, or lens paper dipped in a small amount of 1:4 alcohol-ether mixture to wipe gently.

Caution: Alcohol and ether are highly flammable. Keep them away from open flames. Take care to avoid ignition when operating power switches.

For metal painted surfaces and electroplated surfaces, avoid cleaning with organic solvents (e.g., alcohol, ether, or their mixtures). Use a silk cloth or mild detergent instead.

For plastic surfaces, wipe with a soft cloth dampened with clean water.

Usage and Storage Environment

The instrument should be used and stored in a cool, dry, dust-free, shock-free environment free of acid-base vapors or any corrosive gases.

Normal operating conditions: Indoor temperature:

0°C–40°C Maximum relative humidity: 85%

In high-humidity areas, install dehumidification equipment to prevent mold and fogging on optical components, which may render the instrument inoperable.

When using or moving the instrument, handle it with care to avoid strong vibration or collision. Always carry the instrument with both hands—do not drag it on the workbench to prevent scratching the table or damaging the instrument.

When the instrument is not in use, disconnect the power supply, cover it with a dust-proof cover, and store it in a dry, cool place.

To maintain the instrument's performance, regularly inspect it. If faults are found, contact the manufacturer or nearest distributor for repairs.

6、Specifications

MIX60(Standard Accessories)

Item		Specifications	Quantity
MIX60 Main Unit	Host	200mm infinity optical system, the body is equipped with ECO light-off function and can draw power	1
	Eyepiece tube	Inclination angle 45°, interpupillary distance 50-70mm, body split ratio = 100:0 or 0:100	1
	Centering telescope	Centering telescope	1
	Nosepiece	Quintuple nosepiece, ball bearing with anti fungus device	1
	Stage	Fixed stage size: 267.4mm×271.4mm	1
		Mechanical movement, movement range: 110mm×75mm	
	Drip board	Round transparent drip board: φ118mm	1
	Condenser	Numerical aperture N.A.: 0.3, Working distance WD: 72mm Compatible Objective Magnifications 4X, 10X, 20X, 40X, 60X Detachable condenser, container height ≥19cm can be placed on the stage	1
	Phase ring plate	10X ring, 20X/ 40X ring	1
	Focusing mechanism	Coaxial coarse/fine focus, with tension adjustable and up stop, minimum division of fine focusing is 2μm.	1
	Transmitted illumination system	3W full spectrum white LED, brightness continuously adjustable	1
		The filter holder can be inserted into φ34mm color filters (blue, green, yellow, etc.) and is removable	1
		With aperture diaphragm, aperture blades, manual control switch	1
Eyepiece	Digital display screen	Displays the current working status, including ECO, voice function, objective lens multiple and brightness, etc., and can perform voice broadcast of the current objective lens multiple.	1
	Dust Cover	Mshot-specific dust cover	1
		WF10X/22 plan eyepiece, high eye point, adjustable diopter	2
		WF10X/23 plan eyepiece, high eye point, adjustable diopter	2

Stage	XY stage moving ruler	1
	With stage expansion board	1
Universal Sample Clamp	Compatible with slides and various culture dish sizes	1
Objectives	Long working distance 4X plan objective (M)	1
	Long working distance 10X plan phase contrast objective (PH)	1
	Long working distance 20X plan phase contrast objective (PH)	1
	Long working distance 40X plan phase contrast objective (PH)	1
Adapter	12V2A	1
Optional Objectives	Long working distance 10X plan objective	1
	Long working distance 20X plan objective	1
	Long working distance 40X plan objective	1
	Long working distance 4X plan phase contrast objective (PH1)	1

MIX60-FL (Fluorescence Optional Configuration)

Upgrade MIX60 to the inverted fluorescence microscope MIX60-FL by adding fluorescence accessories and objectives. The post-upgrade configuration (eyepieces and optional objectives included) is as follows:

Item		Specifications	Quantity
MIX60-FL Main nit	Host	200mm infinity optical system, the body is equipped with ECO light-off function and can draw power	1
	Eyepiece tube	Inclination angle 45°, interpupillary distance 50-70mm, body split ratio = 100:0 or 0:100	1
	Centering telescope	Centering telescope	1
	Nosepiece	Quintuple nosepiece, ball bearing with anti fungus device	1
	Stage	Fixed stage size: 267.4mm×271.4mm	1
		Mechanical movement, movement range: 110mm×75mm	1
	Condenser	Numerical aperture N.A.: 0.3, Working distance WD: 72mm Compatible Objective Magnifications 4X, 10X, 20X, 40X, 60X Detachable condenser, container height ≥19cm can be placed on the stage	1

	Phase ring plate	10X ring, 20X/ 40X ring		1
	Focusing mechanism	Coaxial coarse/fine focus, with tension adjustable and up stop, minimum division of fine focusing is 2μm.		1
	Transmitted illumination system	3W full spectrum white LED, brightness continuously adjustable		1
		The filter holder can be inserted into φ34mm color filters (blue, green, yellow, etc.) and is removable		1
		With aperture diaphragm, aperture blades, manual control switch		1
	Digital display screen	Displays the current working status, including ECO, voice function, objective lens multiple and brightness, etc., and can perform voice broadcast of the current objective lens multiple.		1
	Dust Cover	MSHOT-specific dust cover		1
	Transmitted illumination system	3W full spectrum white LED, brightness continuously adjustable		1
Eyepiece		WF10X/23 plan eyepiece, high eye point, adjustable diopter		2
		WF10X/23 plan eyepiece, high eye point, adjustable diopter		2
Stage		XY stage moving ruler		1
		With stage expansion board		1
Universal Sample Clamp		Compatible with slides and various culture dish sizes		1
Objectives		Semi-apo M-UPLFLN objective 4X		1
		Long working distance fluor objective LPlan FL 40X		1
		Semi-apo fluor-phase contrast objective LPlan FLPH 10X		1
		Semi-apo fluor-phase contrast objective LPlan FLPH 20X		1
LED Fluorescence Accessories		Model	Excitation Wavelength	-
		MIF2-UBG	B:450-490nm、 G:510-550nm、 U:360-390nm	1
		MIF2-UBY	B:450-490nm、 Y:540-580nm、 U:360-390nm	1
		Module Fixing Plate		1
Fluorescence Extinction Plate	Rotary			1
Adapter	12V2A			1
	Long working distance 20x plan objective			1
	Long working distance 4x plan phase contrast objective (ph1)			1
	Long working distance 40x plan phase contrast objective (ph)			1

Optional Objectives	Long working distance 10x plan fluorite phase contrast objective (planfluorph)	1
	Long working distance 40x plan fluorite phase contrast objective (planfluorph)	1
	Long working distance 4x plan semi-apochromatic objective (planfluor)	1
	Long working distance 10x plan semi-apochromatic objective (planfluor)	1
	Long working distance 20x plan semi-apochromatic objective (planfluor)	1
	Long working distance 40x plan semi-apochromatic objective (planfluor)	

7、Troubleshooting

7-1 Optical Part

Problem	Cause	Solution
Edge dark or uneven field brightness	Turret is not in the positioning position (objective lens is not at the center of the optical path)	Rotate to the positioning position (rotate the objective lens to correctly enter the optical path)
	There is dirt on the lenses (referring to condenser, objective lens, eyepiece, collector lens)	Wipe clean with lens - cleaning paper dipped in alcohol
One - side of the image is dark	Turret is not in the positioning position	Rotate to make it in place
	Specimen is in a floating state	Reinforce it reliably
Image moves during focusing	Specimen is floating on the surface of the stage	Place it firmly
	Turret is not in the positioning position	Rotate to make it in place
Insufficient illumination brightness	Aperture diaphragm is set too small	Readjust it
	Inadequate brightness adjustment	Adjust the brightness knob

7-2 Mechanical Section

Problem	Cause	Solution
Binocular images not overlapping	Incorrectly adjusted interpupillary distance	Readjust the interpupillary distance
Excessive eye fatigue	No diopter adjustment made	Correctly adjust the diopter
	Inappropriate illumination brightness	Adjust the bulb voltage

7-3 Electrical Section

Problem	Cause	Solution
Bulb doesn't light up when the switch is on	No power supply or poor contact	Check the connection of the wires
	Bulb is burnt out	Replace the bulb
	Voltage is too low	Replace the bulb
Bulb flickers or brightness is unstable	Voltage problem	Check the voltage stability
	Brightness is too high or too low	Adjust the brightness knob to an appropriate level