



Guangzhou Micro-shot Technology Co., Ltd

MF43-N

**Research grade fluorescence microscope
User Manual**

Website: www.m-shot.com

Tel:0086-20-38262481

Email: sales@mshot.com



Research grade fluorescence microscope MF43-N

Thank you for buying our product!

This unit is a precision optical instrument. Though with high safety design, wrong usage and overlook of this manual can do harm to you and your property. Thus, to ensure the life of this unit and maintain it properly, please read this manual carefully before operating.

Safety Reminder



Warning!

1. Be sure to turn off the power switch and remove the power cord before installing, replacing the bulb or fuse, plugging and unplugging the power supply.

To prevent electric shock or fire, be sure to turn off the power switch and remove the power cord before installing this unit, replacing the bulb or fuse, plugging and unplugging the power supply.



Warning!

2. Do not disassemble

Except the removable parts mentioned herein, no part of this unit shall be removed, otherwise the performance of this unit may be reduced, or may cause an electric shock, injury or damage to this unit. Please contact the supplier if any fault occurs.



Warning!

3. Input voltage

Check if the input voltage is consistent with your local voltage supply. If not, do not operate this unit and contact the supplier. Improper input voltage may cause a short circuit or fire thereby causes damage to this unit.



Warning!

4. Use specific bulb, fuse and power cord

Use of an improper bulb, fuse or power cord may cause damage or fire to this unit. Any extended power cord used must be grounded (PE).



Warning!

5. Protect this unit from high temperatures, dampness and foreign objects

To prevent short circuit or any other fault, do not expose this unit to any high temperatures or dampness environment for a prolonged period of time. A suitable operating environment is designated at a temperature of 5°C-35°C, and relative humidity of 20%-80% (at 25°C). If water splashes on this unit, turn off the power switch and remove the power cord immediately, and then wipe the water off with dry cloth. When any foreign object enters or drips onto this unit, please stop operating the unit and contact the supplier.



Warning!

6. Heat of light source

The lighting bulb generates high temperatures during operation. Do not touch the collector lens or lamp box when the lamp is illuminated, and do not touch the bulb within 30 minutes after the lamp goes out due to high temperatures arising from operation. When replacing the bulb, make sure it has cooled down properly (the lamp should be off for at least 30min).

★ To prevent burn, do not touch the bulb when the lamp is illuminated or within 30min after it goes out.

★ To prevent fire, do not place any fibrous product, paper, flammable or explosive material (e.g., gasoline, petroleum ether, alcohol) near the halogen lamp housing or mercury lamp housing.



Warning!

7. Coarse/fine focusing knobs

This unit employs a coarse/fine coaxial focusing mechanism. Do not turn the left/right coarse/fine focusing knob in the opposite direction. When the objectives lifting device reaches the limit of motion, do not continue to turn the coarse focusing knob, otherwise the focusing mechanism may be damaged.



8. Storage place

This unit is a precision optical instrument, and improper operation or storage may cause damage or its precision may be adversely affected. Consider the following when selecting a storage place:

- ※ Avoid placing the unit under direct sunlight, directly under interior lighting or any other bright place.
 - ※ A suitable operating environment is designated at a temperature of 5°C-35°C, and relative humidity of 20%-80% (at 25°C). Do not expose this unit to high temperatures, dampness or dust for a prolonged period of time, otherwise mist or mold may develop or dust may deposit on the lens, thus cause damage to this unit and shortening its life.
-



9. Installation of bulb

Do not touch the glass surface of the bulb directly with bare hands. When mounting the bulb, wear gloves or wrap it with cotton material.

- ※ Wipe off any dirt on the surface of the bulb with a clean cotton fabric dipped in alcohol. If the dirt is not thoroughly removed, it would etch the surface of the bulb weakening its brightness and shortening its life.
 - ※ Mount the bulb with care to avoid slipping off or injuries to your fingers.
 - ※ When replacing the bulb, make sure its contact is intact. If its contact is damaged, the bulb may be disabled or short-circuited.
 - ※ When replacing the bulb, the feet should be inserted into the holder as deeply as possible. If the feet are not tightly inserted, the bulb may go out or short circuit.
-



10. Instrument handling

This precision optical instrument is heavy and should be handled with care. Strong impact and rough handling are strictly prohibited, it may cause damage to this unit.



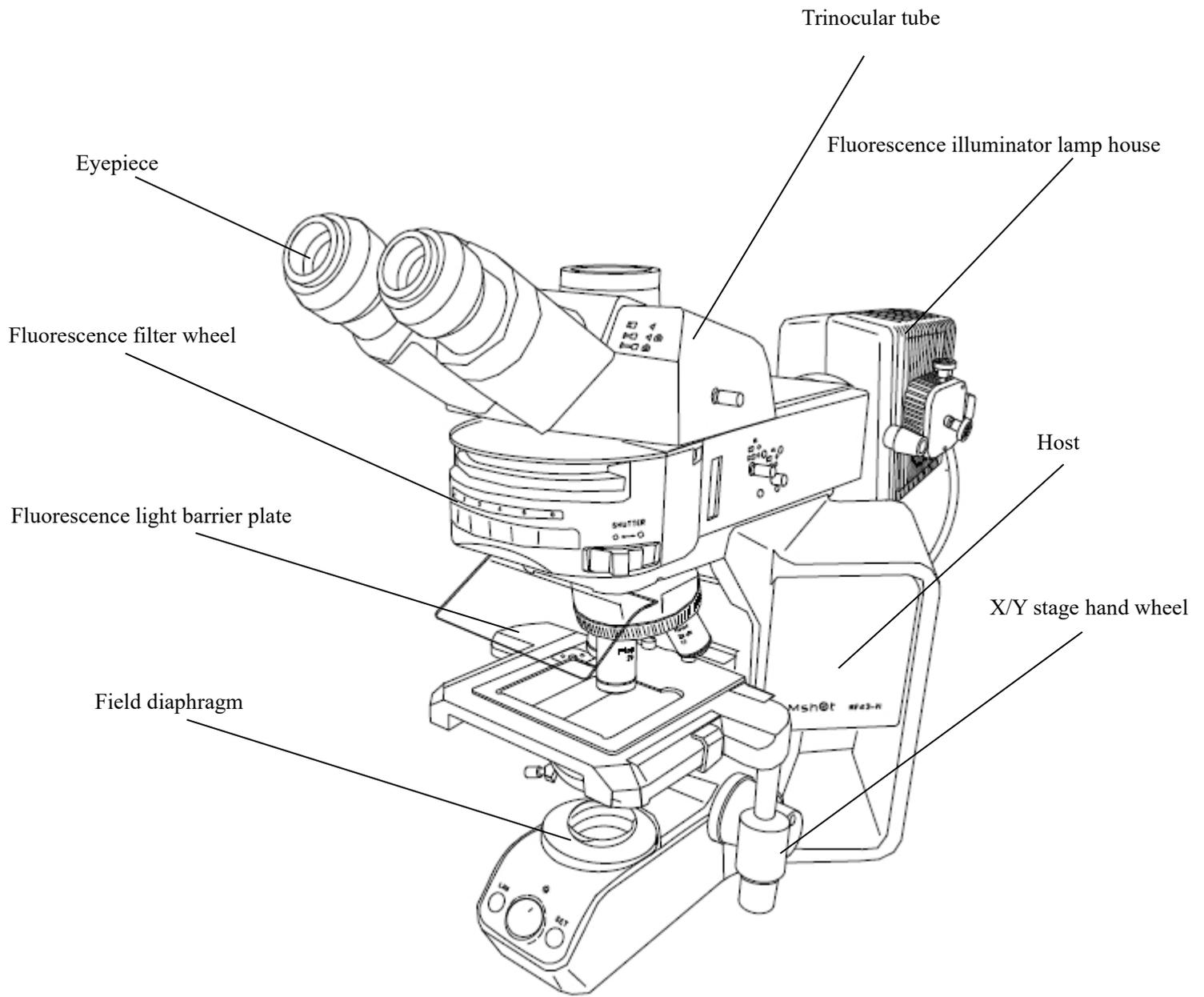
11. Environmental protection

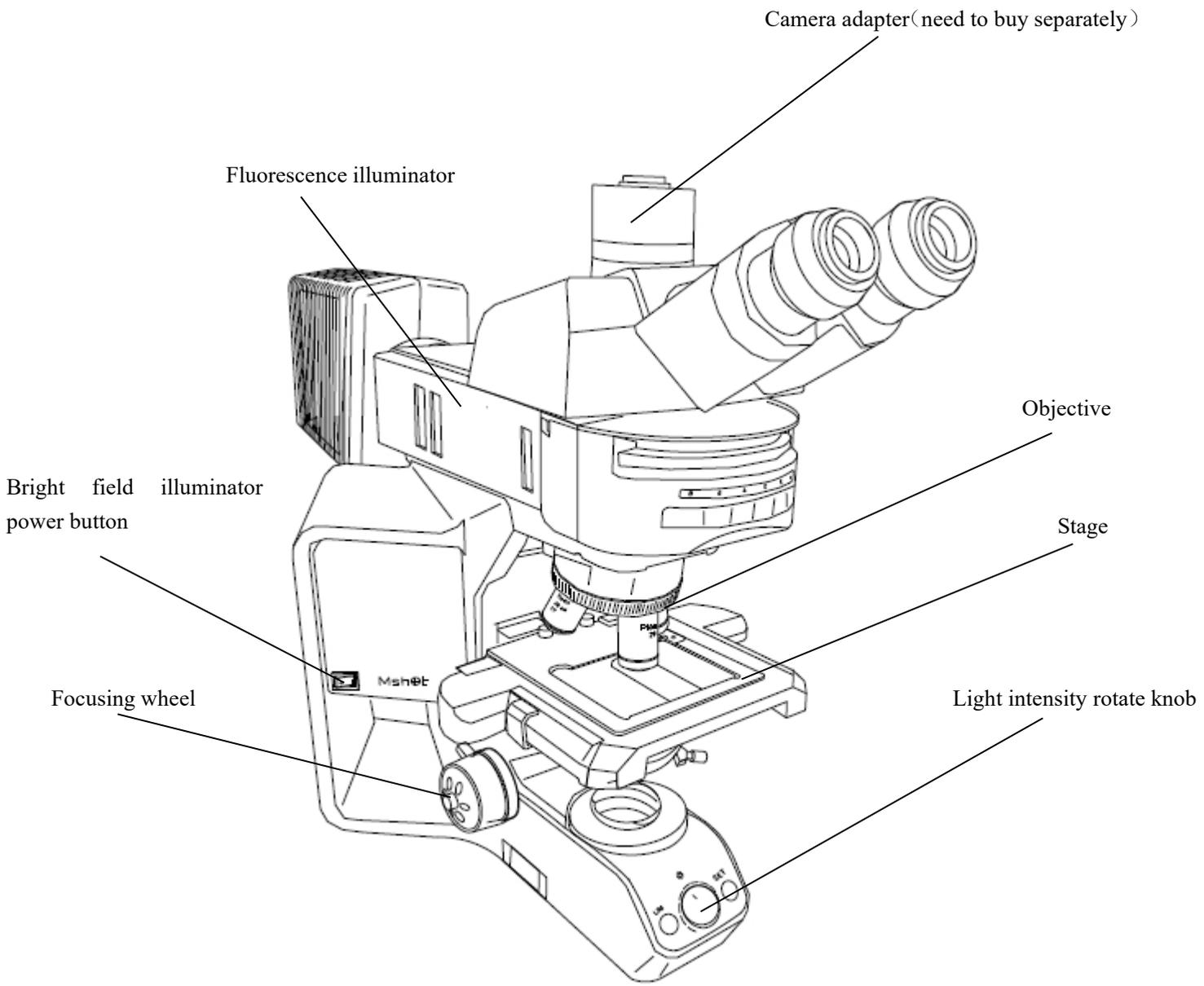
Please dispose the wastes from the packaging and operation of this unit by category such as cartoon, foam, plastic, bulb and etc. Do not discard the damaged mercury lamp carelessly in order to avoid creating environmental poll

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I.Components

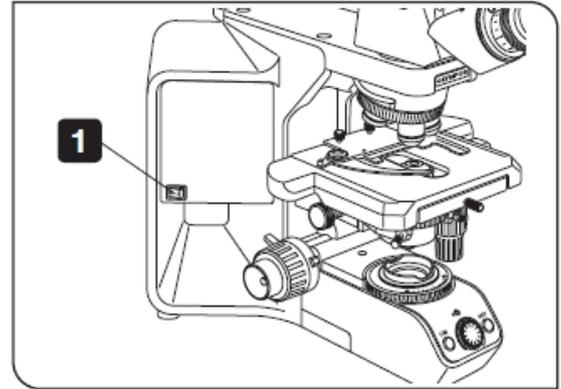




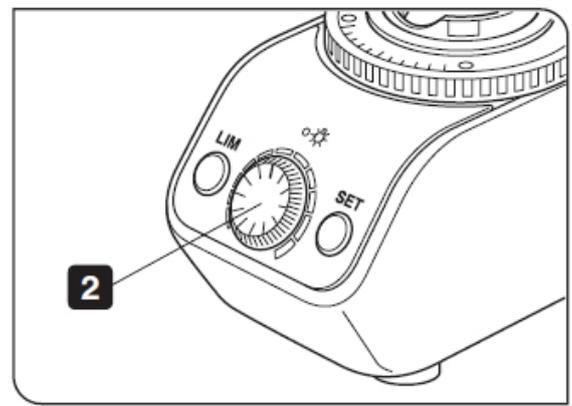
II. Installation and operation

2-1、 Basic operation

1. Turn on the power supply: turn on the power supply and turn the main switch on the side of the microscope to the "-" state.



2. Adjust the light intensity: turn the knob to adjust the lighting intensity.



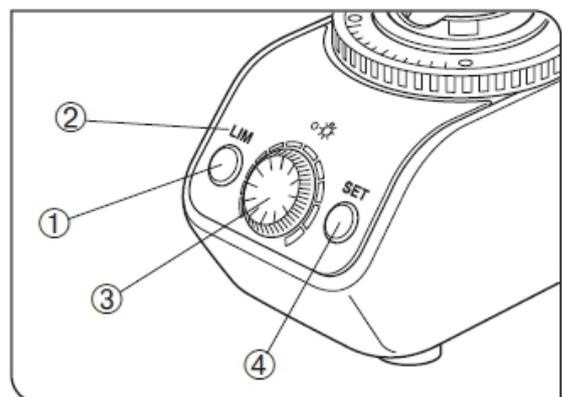
SET LIM(light intensity control) brightness

1、 Turn off LIM switch ① (when LIM indicator light ② is off) and turn the low magnification objective into the light path to focus the sample.

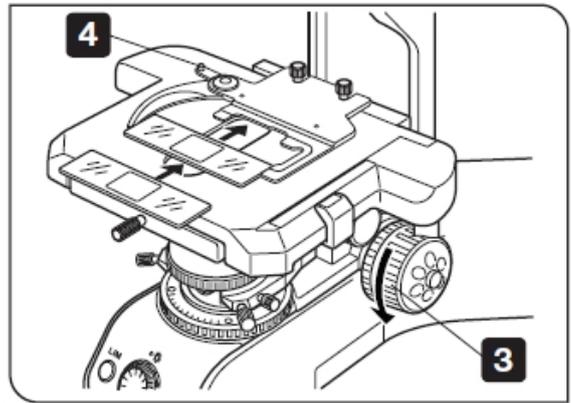
2、 Turn the brightness adjustment knob ③ to select the best observation brightness. Press the LIM setting button (set key) to input the current brightness.

3、 Repeat the above steps to set the best brightness for each objective.

Each objective can be set a special brightness separately. After setting the brightness for the objective lens, when the objective lens is selected, turn on LIM switch ①, and the brightness will be automatically adjusted to the preset value; If it is necessary



to reset the best brightness, turn off LIM switch ① (when LIM indicator light ② goes out), turn the objective lens that needs to reset the best brightness into the optical path, turn off Lim switch, and then repeat the above steps 3 and 4. Rotating the focusing knob to lower the stage.



3. Pull the slide holder apart and place the slide.

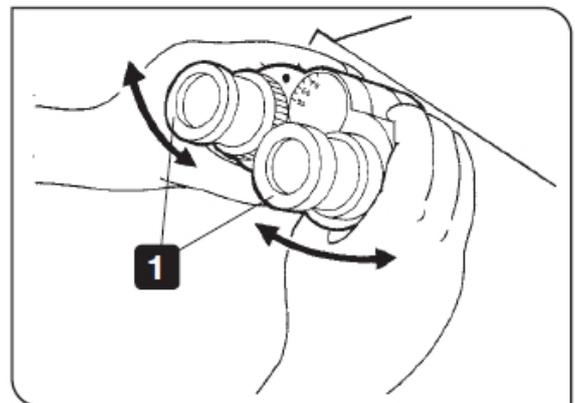
4. Rotate the objective holder to turn the 10x objective into the optical path (Adjust the fluorescent accessory to neutral)

5. Rotate the coarse and fine focus system to focus the sample.

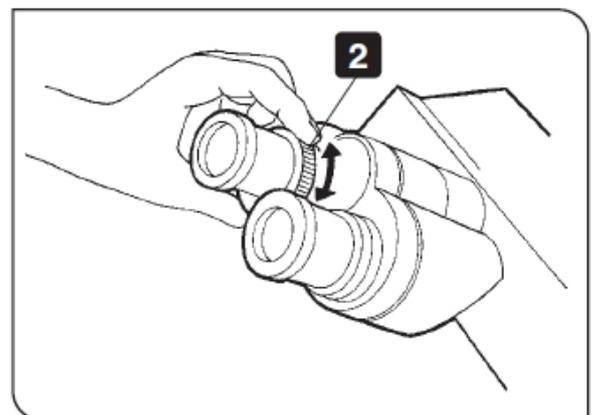
6. Moving the stage control hand wheel to adjust the observation sample area

2-2 Microscope adjustment

1. Adjust the pupil distance: adjust the binocular lens tube to the left and right till the right field of view is completely coincident.



Adjust the diopter: turn the diopter adjusting rings on both sides to the scale "0", turn the 40x objective into the optical path, observe with the right eye from the right eye lens, and focus the sample by rotating the coarse and fine focus spiral.

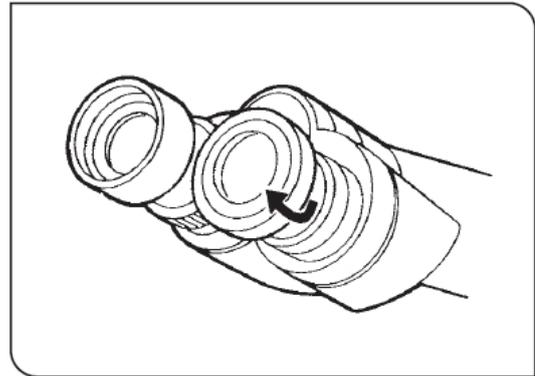


Turn the 10x objective into the optical path, and turn the right diopter adjusting ring

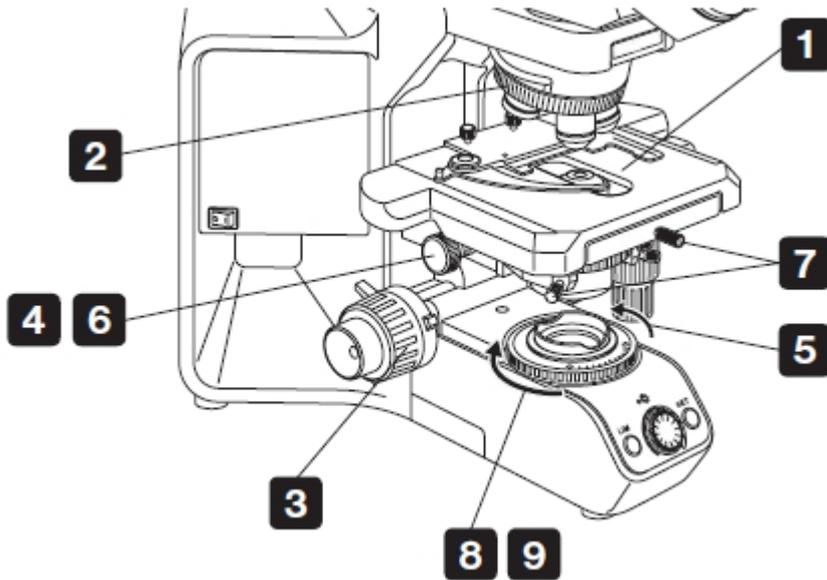
- ① to focus the sample. Do not adjust the coarse and fine focusing knob during focusing system. Use the left eye to observe from the left lens, turn the left diopter adjusting ring
- ② to focus the sample.

Use eyepiece rubber clap

When wearing glasses, put the goggles in the normal folded position to prevent eye contact and scratching. When not wearing glasses, open the folded eyepiece rubber clap in the direction of the arrow to prevent the external light between the eyepiece and the eye from entering.



2-3 Adjust alignment

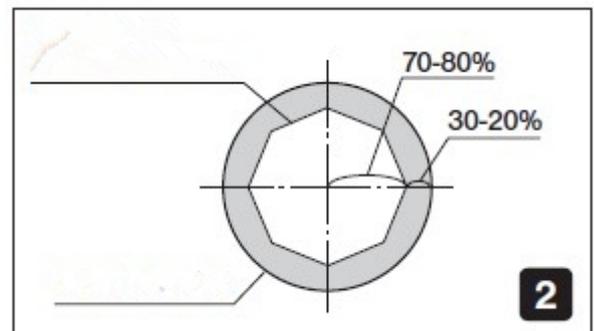
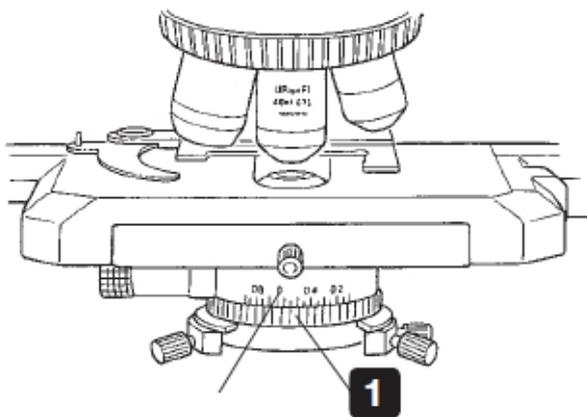


1. Put on the sample.
2. Rotate the objective nosepiece and select 10x objective.
3. Turn the coarse and fine focusing knob to focus the sample.

4. Turn the height of the condenser and adjust the knob of the condenser to raise the condenser to the highest level.
5. Rotate the field of view diaphragm adjusting ring along the direction of the arrow to reduce the diaphragm.
6. Turn the coarse and fine focusing knob to focus the field aperture image.
7. Turn the two centering screws of the condenser to move the field aperture image to the center of the field of view.
8. Rotate the adjustment ring of the field of view diaphragm to make the field of view diaphragm connected to the field of view.

Note: do not screw the fixing screw of the condenser in the middle of the alignment knob wrong

2-4 Adjustable aperture diaphragm



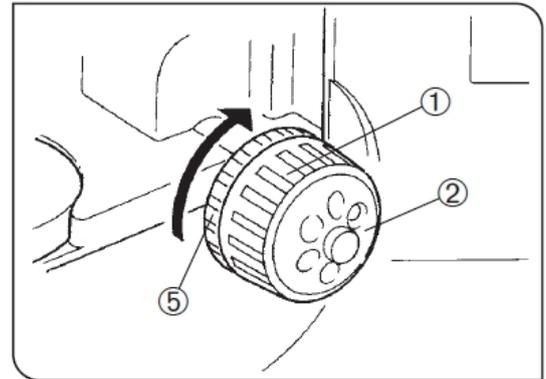
1. Rotate the adjusting ring of the numerical aperture of the condenser to make the numerical aperture of the condenser equal to 70% - 80% of the numerical aperture of the objective. According to the image, the aperture size can be adjusted to the position of moderate image resolution and contrast.

2. Remove the eyepiece and observe from the lens barrel. The aperture image can be seen, as shown in Figure 2 above.

2-5 Focusing system

① Coarse focus knob: move the stage up and down to focus

② Fine focus knob (right side of frame): fine adjustment of focusing position



③ Fine focus knob (left side of bracket) to fine adjust the focus position

④ Coarse focus limiting device: set the upper limit of stage position (to avoid collision)

After locking the coarse focus limit device, the coarse adjustment travel will be limited to the position set by the limit and cannot rise to the height beyond the limit.

⑤ Loose and tight device for coarse and accurate focus: adjust coarse and accurate focus, rotate focus, rotate focus

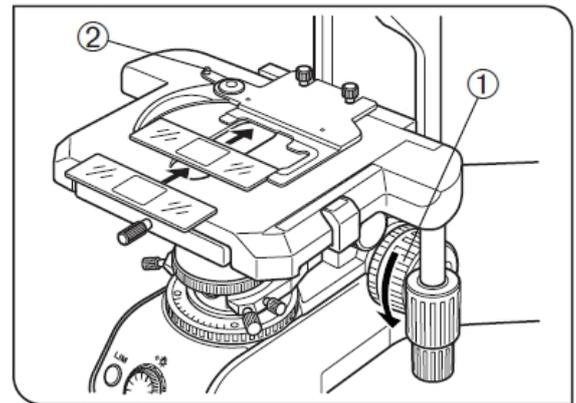
⑥ The tightness of the knob as it turns. The coarse focusing device has been adjusted in advance and is easy to use.

If necessary, the loose and tight state can be changed by using the loose and tight device ⑤. When the adjusting ring is rotated in the direction of the arrow, the helical tension of the coarse focus increases, on the contrary, it decreases.

2-6 Stage

① Turn the coarse focusing knob to lower the stage.

② Open the spring finger ② on the slide holder, slide one or two sample slides from the front into the stage.



③ Push the slide in as far as you can, and then gently release the trigger

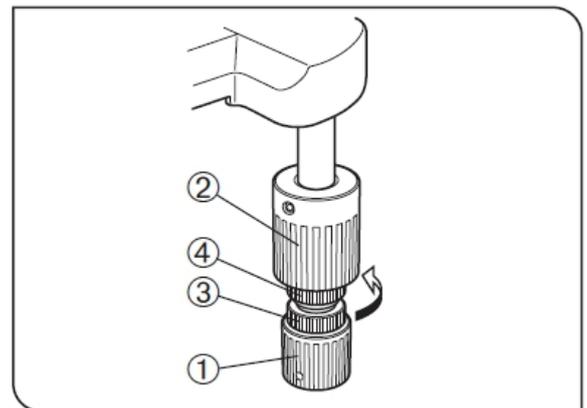
The slide size should be $26 \times 76\text{mm}$, 0.9 to 1.2mm in thickness, and 0.17mm in thickness. When observing a large sample, remove the clip and put the sample directly on the stage.

2-7 Adjust the tension of the x-axis and y-axis knobs

Hold the x-axis knob ①, screw the y-axis knob ② upward to expose the knob rod.

1、 Turn the x-axis adjusting knob ③ or y-axis adjusting knob ④ clockwise (arrow direction) to increase the tension, and turn the y-axis adjusting knob ④ counterclockwise to decrease the tension.

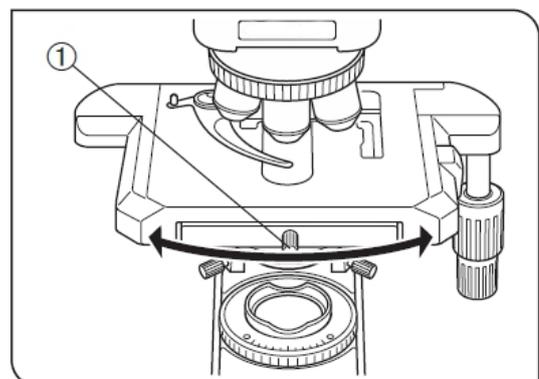
If the tension is adjusted too tightly, the clucking sound can be heard when the stage rises or falls, or the accuracy of the stage stop is reduced.



Rotating stage

1、 Slightly loosen the table fixing knob ①.
2、 Using the fixed knob of the loading platform, the platform can rotate clockwise or anticlockwise.

It is normal to hear and feel a click during rotation

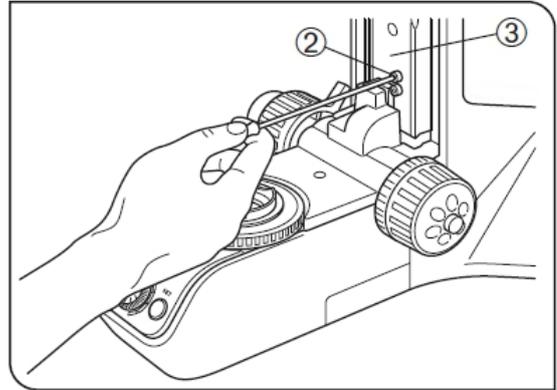


Adjust the height of the stage

- 1、 Lower the stage to the lowest level, and then remove the stage from the microscope.
- 2、 Using a hexagon screw driver, loosen the fixed screw ① of the stage bracket to remove the stage bracket.
- 3、 Turn the coarse focus knob to raise the focus slide plate ③ to the place where the limit screw can be seen from the mirror arm
- 4、 Use a hexagon screw driver to loosen and remove the upper limit screw ②.

Re-install the stage bracket and stage

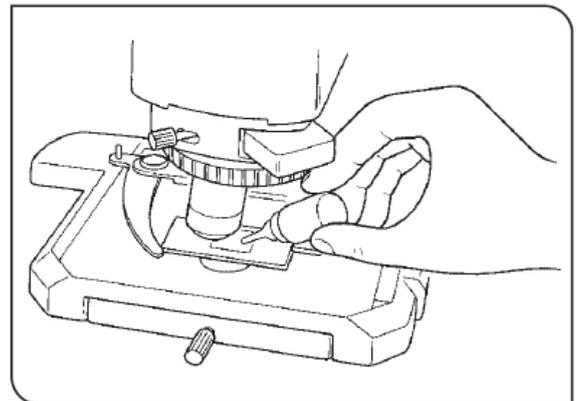
Please keep the removed screws properly for reuse.



Use oil mirror

- 1、 Focus the sample in the order from low magnification objective to high magnification objective
- 2、 Before using the oil lens, place a drop of oil on the area to be observed of the sample.
- 3、 Turn the objective nosepiece into the optical path and adjust the fine focus button.

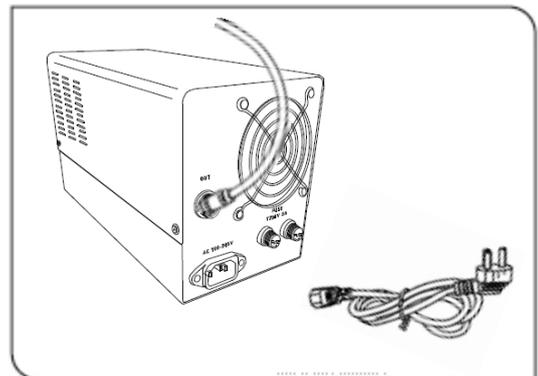
Bubbles in the oil will affect the observation, please make sure there are no bubbles in the oil



III、 Installation steps

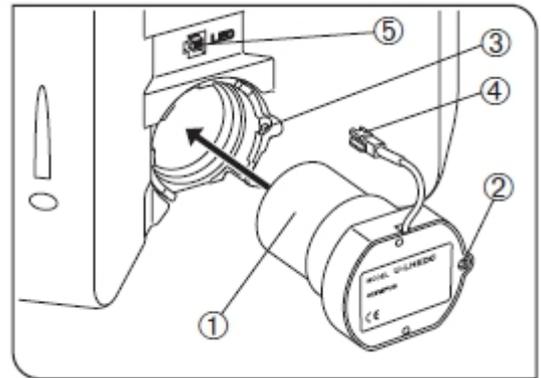
3-1 Install LED light room

- 1、 1. Align the fixing screw ② with the screw hole ②, and install the LED lamp chamber ① into the mounting hole at the back of the microscope.



2、 Use the hexagon key to tighten the set screw ②.

3、 Insert the plug ④ on the lamp chamber into the socket of microscope ⑤.



3-2 Install the objective nosepiece

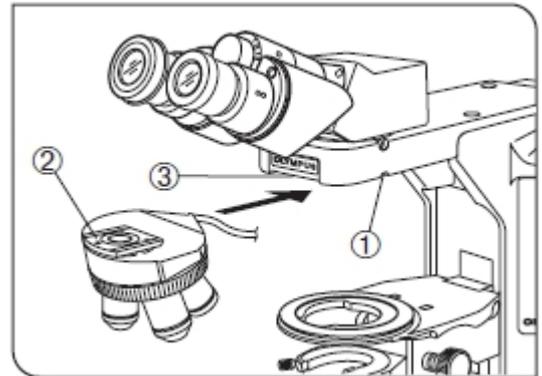
1、 Turn the coarse focusing knob to lower the stage.

2、 Slightly loosen the fixing screw ① of the objective turntable.

3、 Do not screw the fixing screw ① too loose, otherwise it is difficult to replace the objective nosepiece.

3、 Hold the objective lens nosepiece, keep the dovetail mounting port ② horizontal, insert it into the dovetail ③ on the microscope arm, and gently push it into the end.

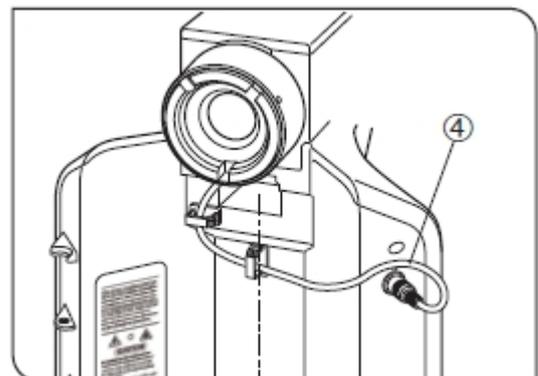
4、 Tighten the fixing screw of objective lens turntable ①.



When installing or removing the objective nosepiece with cable, the cable must be removed in advance.

3-3 Installing cables

Pass the cable ④ under the microscope body arm to the rear panel, let the cable pass through the cable rack, and then plug the cable into the socket on the rear panel.



3-4 Install the condenser

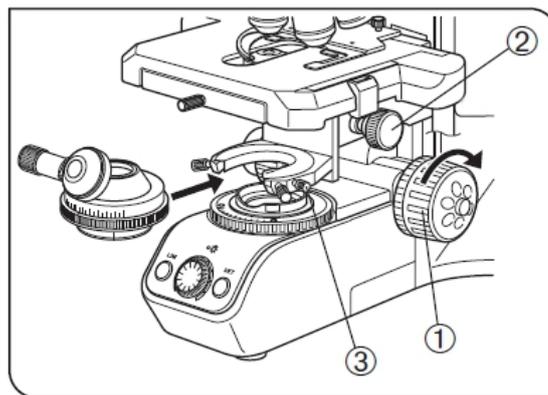
1、 Turn the coarse focusing knob ① to raise the stage to the highest position.

2、 Turn the condenser height adjusting knob ② to minimize the condenser frame.

3、 Completely loosen the fixing screw ③ of the condenser.

4、 Hold the condenser with the numerical aperture number facing forward. Carefully push the condenser into the innermost part along the dovetail slot.

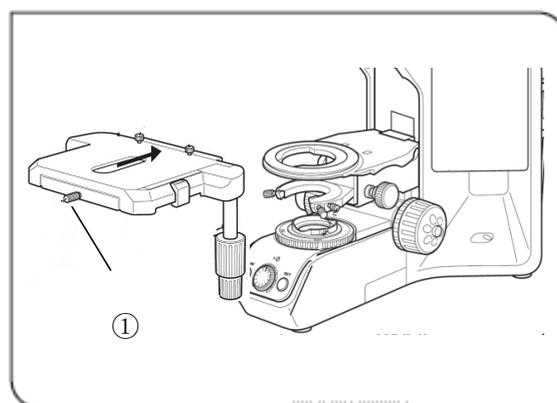
5、 Tighten the fixing screw ③ of the condenser, and then raise the condenser to the highest position.



3-5 Install the stage

1、 Place the stage gently on the stage bracket of the microscope body and clip it into the fixed position of the bracket to prevent the stage from shaking up and down.

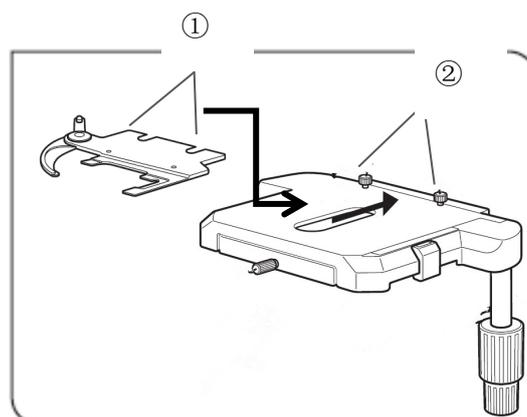
2、 Tighten the fixing screw ① of the stage.



3-6 Install the gripper

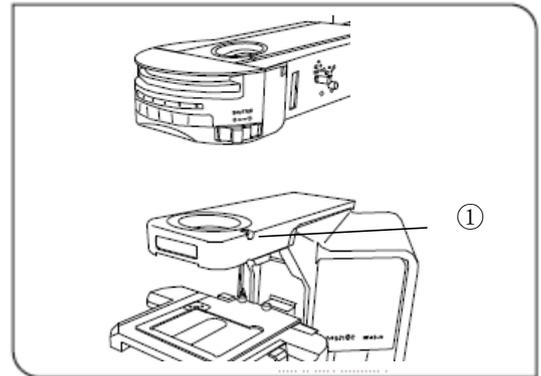
1、 Gently clip the two bayonets ① of the gripper into the fixing screw ② of the gripper along the stage.

2、 Tighten the clip holder fixing screw ②.



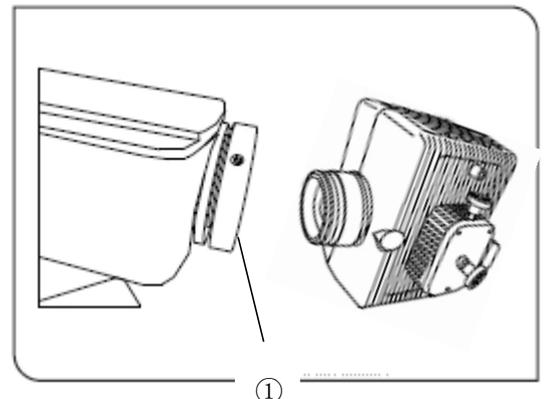
3-7 Install the fluorescent module

Clip the dovetail interface of the fluorescence module into the dovetail slot of the microscope host, and tighten the right inner hexagon screw ①.



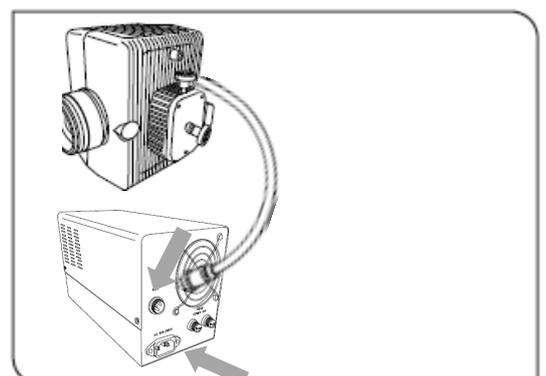
3-8 Installation of fluorescent light box

Clip the mercury lamp box into the interface behind the fluorescent module, and tighten the two fixing screws ① on the interface.



3-9 Fluorescent module installation cable

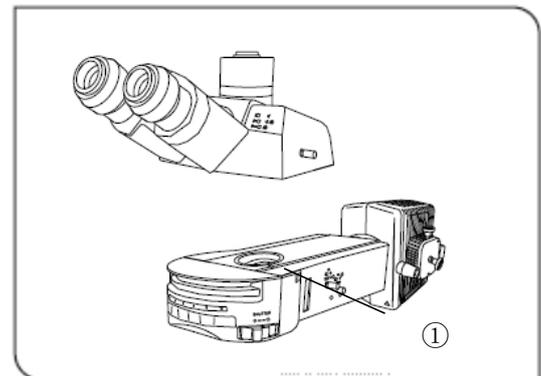
Plug the cable of the light box into the interface of the fluorescent power control box and connect the



power line.

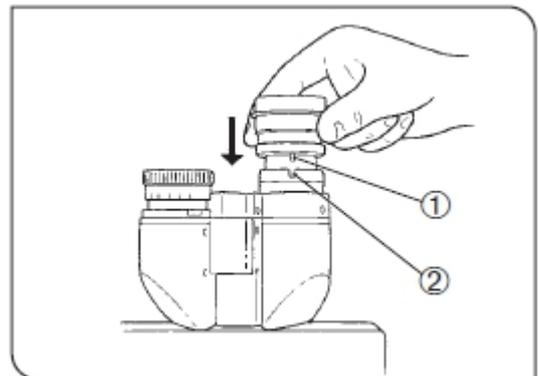
3-10 Install the eyepiece tube

Clip the dovetail connector of the three lens barrel into the dovetail slot above the fluorescent module, and tighten the right inner hexagon screw ①.



3-11 Installing eyepiece

Gently insert the two eyepieces into the eyepiece barrel until the end. **When using the eyepiece with micrometer, the eyepiece can be installed in the right eyepiece barrel.**

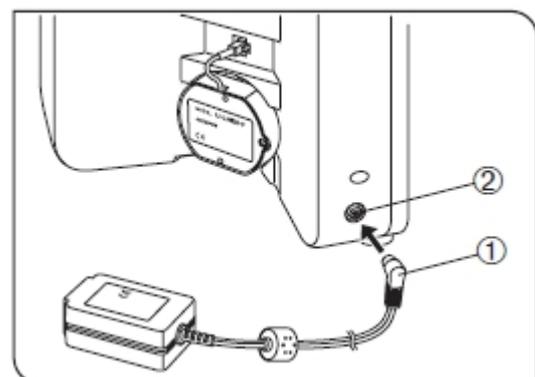


3-12 Install the adapter

Insert the plug of the power adapter ① into the socket of the microscope.

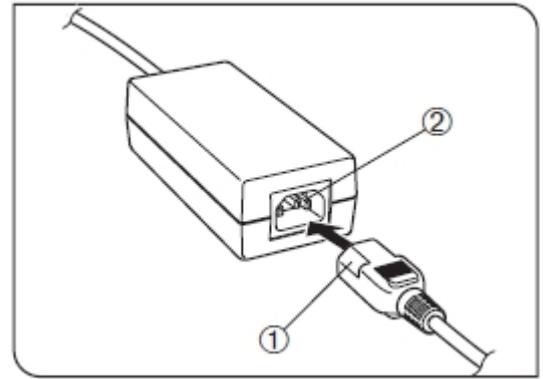
When bending and winding, the power cord is easy to be damaged, do not use too much

force. Be sure to turn off the main switch before connecting the power cord
Always use the specified adapter to avoid failure.

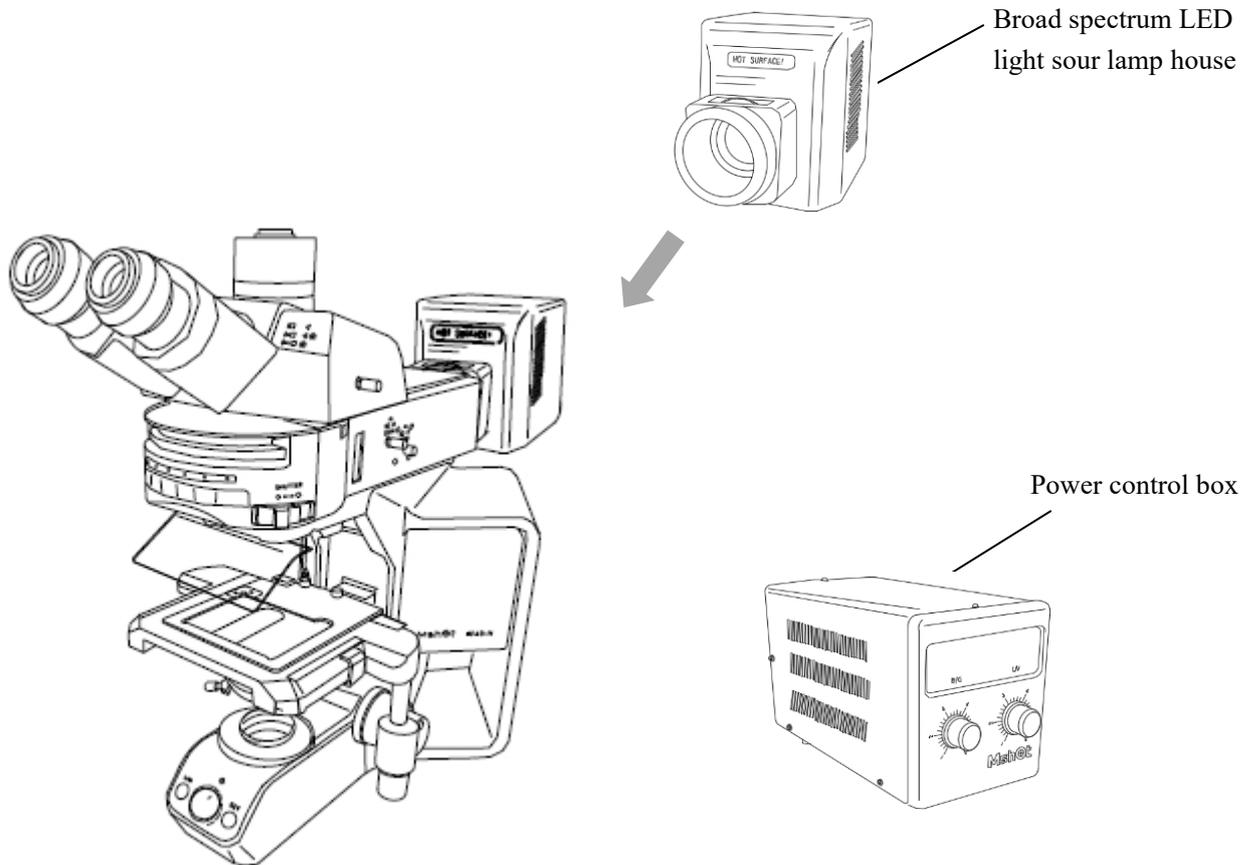


3-13 Install the power cord

1、Firmly insert the power cord plug ① into the input socket ② of the adapter



IV、 Broad spectrum LED light source



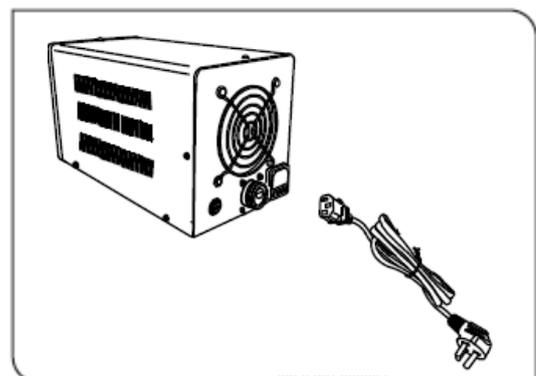
This light source is an optional product, providing three bands of LED light sources, corresponding to UV 360-380nm, B 430-465nm and G 505-545nm respectively.

4-1 Basic operations

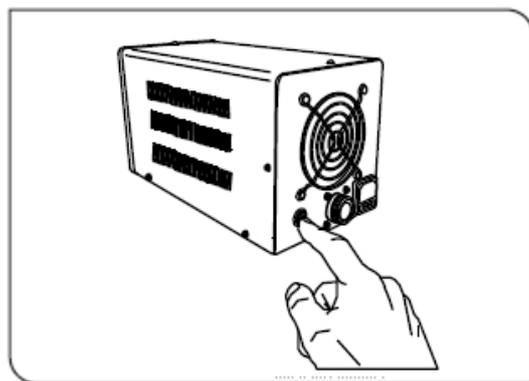
1、 Turn off the lower light source used in the bright field observation, and insert the power plug of the power control box into the power socket.

Before insertion, check whether the power

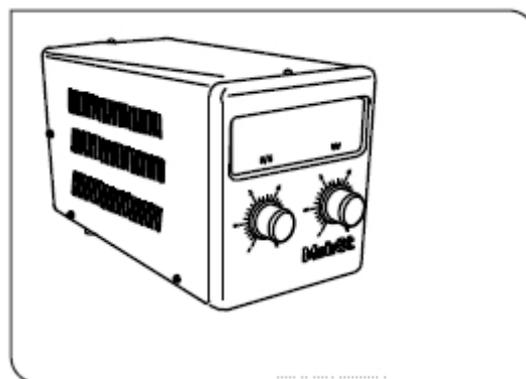
supply voltage is consistent with the power supply voltage required by the instrument.



2、 Turn on the switch of the power control box, and the power indicator is on. The condenser of the microscope is lowered and the aperture is reduced.

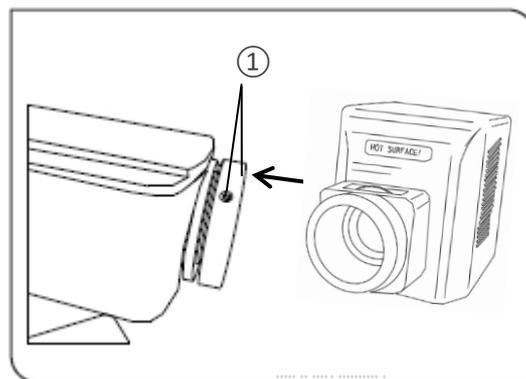


3、 The knob ① is used to adjust the brightness of b-band and G-band light source, and the knob ② is used to adjust the brightness of UV band light source. **The number above the knob shows the driving current and driving voltage of b-band and G-band LED lamps.**

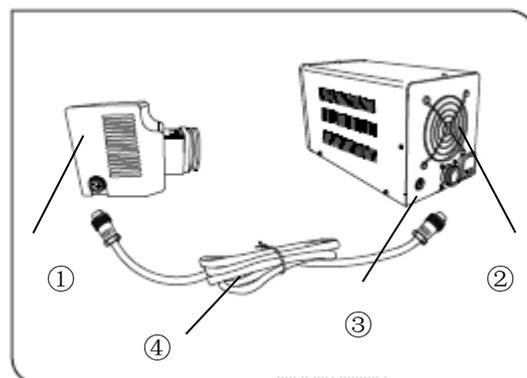


4-2 Installation method

1、 Clip the broad spectrum LED light box into the interface at the back of the fluorescent module, and tighten the two fixed hexagon screws ① on the interface.



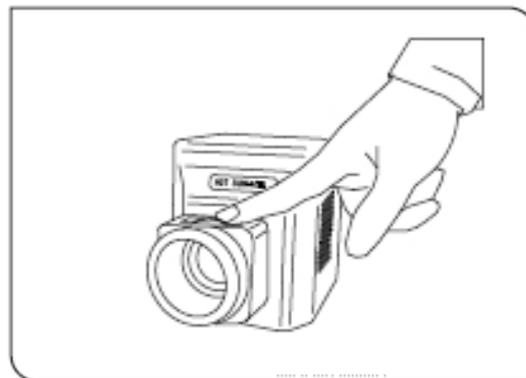
After connecting the ① wide spectrum LED light source and the ② power control box through the ④ connecting line (as shown in the figure above), install the ③ connector behind the fluorescent



accessory of the microscope, clamp the ① wide spectrum LED light source into the connector, and then tighten the screw.

4-3 Adjusting the condenser

Adjust the condenser in front of the light box to make the light source converge.



V、 Troubleshooting guidance

Problem	Lighting	Reason	Handle
The light is not bright	Common	No power on	Turn on the switch of bright field
	Mercury lamp	No power is connected	Turn on the switch of mercury light source
The light bulb burned out	Mercury lamp	The bulb model used is wrong	Please use the correct type of bulb
		Voltage instability	Installing the voltage regulator
		The bulb has reached its life limit	Replace the appropriate bulb
The field of view is dark	Common	LIM setting is not correct	Re-setting LIM
		The aperture diaphragm and field diaphragm are not large enough	Adjust to the right size

		The split rod is located at  position	Move the splitter lever to the  or 
		The condenser is not properly aligned	Re centering the condenser
		The condenser is too low	Adjust the height of condenser
	Fluorescence	Mercury lamp power is not on	Turn on the switch on the mercury lamp power control box
		The light path of mercury lamp is not aligned	Adjust the light path alignment of mercury lamp
		The field aperture and aperture aperture of the fluorescent module are not large enough	Adjust to the right size
		The bulb has reached its service life	Replace the bulb
The brightness does not change	Common	LIM function is turned on	Turn off LIM function
		The condenser is not properly aligned	Re centering the condenser
		The condenser is too low	Adjust the height of condenser
	Fluorescence	Normal condition	If you need to reduce the brightness, you can use a brightness attenuator

The field of view is not bright, even the field of view is not illuminated	Common	The objective nosepiece is not in place	Make sure that the objective nosepiece is in the position of the click sound card
		The objective nosepiece is not installed correctly	Push the sliding dovetail connector all the way to the inside
		The condenser is not installed correctly	Re install the condenser
		The condenser is not properly aligned	Re centering the condenser
		The field of view aperture is too small	Open the field of view aperture until the field of view is circumscribed
See dirt or dust in the field of view	Common	Dirt or dust on eyepiece	Wipe it all clean
		There is dirt or dust on the surface of the condenser	
		There is dirt or dust on the sample	Blow out with a ball
There is dirt or dust on the filter in the fluorescent accessory			
Poor visibility/	Common	The condenser is too low	Adjust the height of condenser
		The aperture is too small	Open the aperture to the best

The image is not obvious/ Poor contrast/ The details are unclear/ Dazzling images/			position
		The objective nosepiece is not installed correctly	Push the dovetail joint all the way to the inside
		The lens of the objective is dirty	Clean the objective lens
		For oil mirrors, no immersion is used	Use immersion oil
		There are bubbles in the oil	Bubble removal
		There is dirt or dust on the sample	Clean up
	There is dirt or dust on the condenser		
	Fluorescence	The condenser drops too high	Adjust the height of the condenser to the minimum
		The aperture is too large	Reduce the aperture to a minimum
		The sample is not ideal	Sample preparation or replacement
The dye does not match the fluorescence band		Consult the manufacturer and recommend the appropriate scheme	
The image is blurred on	Common	The objective nosepiece is not in place	Make sure that the objective nosepiece is in the position of the

one side			click sound card
		Incorrect installation of stage	Re install the stage
		Incorrect installation of objective nosepiece	Push the dovetail joint all the way to the inside
		The condenser is out of alignment	Re-centering the condenser
		The thickness of the sample is not uniform	Replace the sample or prepare the sample again
The image fluctuates	Common	Incorrect installation of objective turntable	Push the dovetail joint all the way to the inside
		The objective nosepiece is not in place	Make sure that the objective nosepiece is in the position of the click sound card
		The condenser is out of alignment	Re-centering the condenser
The focus knob is difficult to turn	Common	The adjustment of the tightening device of the focusing knob is too tight	Loosen the adjusting knob elastic device
		After locking the limit device of coarse collimation knob, try to adjust the stage with	Turn on the limit device of coarse quasi focus knob

		coarse collimation knob	
Image cannot be focused / the stage slides automatically / the coarse and fine focus knob slides	Common/ fluorescence	Too loose adjustment of coarse collimation knob tightening device	Tighten the loose device of coarse collimation knob
The coarse focusing cannot rise all the time	Common/ fluorescence	The coarse collimation knob limit device blocks the stage	Turn on the limit device of coarse focusing knob
Coarse focus can never be reduced	Common/ fluorescence	The condenser frame is too low	Raise the condenser frame
Before focusing, the objective collides with the sample	Common/ fluorescence	The sample is upside down	Install the sample correctly
The field of view of one	Common	The pupil distance is not adjusted correctly	Correct adjustment of pupil distance

eye is different from that of the other		The diopter was not adjusted properly	Correct adjustment of diopter
		The eyepiece used in the left and right eyes is different	Use two identical eyepieces
		Not suitable for microscopic observation	When viewing from the eyepiece, look at the whole field of view before focusing on the sample range
X-axis and y-axis knob are too tight or too loose	Common	The tension in the horizontal direction of the x-axis or y-axis knob is too high or too low	Adjusting tension

Please operate with both hands carefully when installing, and be careful not to drop and damage the light source and accessories!

- ★ Clean the objective lens regularly. The objective lens is very sensitive to dust.
- ★ During the operation, low power (such as 4x / 10x) objective lens is used to search and focus the sample, and then other power objective lens is used for observation as needed.
- ★ When changing the objective lens, rotate the objective lens converter until the "click" sound is heard to ensure that the required objective lens enters the light path.
- ★ For the determination of the most suitable position of the camera interface, the specimen can be adjusted to a clear position by eyepiece observation, and then the imaging can be observed by installing the camera. Meanwhile, the position of the camera interface shall be adjusted accordingly to the clearest position of imaging, and then screw the screw at the No. XI.
- ★ The middle of the fuse is thin glass. Please operate carefully when opening the drawer of the fuse box and ejecting the fuse.

VI. Specification sheet

Item	Specification	
Microscope frame	Optical system	Universal Infinity-corrected optical system
	Structure	Original from international famous brand microscope
Observation	Super widefield trinocular head	
	Wide field eyepiece 10X, FN25, diopter is adjustable	
Revolving nosepiece	Interchangeable reversed quintuple nosepiece	
Objectives	Infinity plan semi-apochromatic fluorescence objective M-UPLFLN 4X/0.13 , WD: 17.15mm	
	Infinity plan semi-apochromatic fluorescence objective M-UPLFLN 10X/0.3 , WD: 7.68mm	
	Infinity plan semi-apochromatic fluorescence objective M-UPLFLN 40X/0.75 , WD: 0.78mm	
	Infinity plan semi-apochromatic fluorescence objective M-UPLFLN 100XO/1.30, WD: 0.15mm	
	Optional objectives	Infinity plan semi-apochromatic fluorescence objective M-UPLFLN 20X/0.50
Plan Fluor 4X/10X/20X/40X/100X Oil		
Epi-fluorescence	Turret accommodates maximum sextuple filter block cubes	

illumination system	Blue, Green and UV filters	
	Digital control LED light control box, AC110V/220V	
	100W broad-spectrum LED light source	
	Filter units	Wavelength
	FB-U-M	EX:375/30nm,DM:415nm,EM:460/50nm
	FB-B-M	EX:475/30nm,DM:505nm,EM:530/40nm
	FB-G-M	EX:540/25nm,DM:565nm,EM:605/55nm
	Optional illuminating system	100W HG mercury light box, center and focusing distance are adjustable
Digital control mercury light control box, AC110V/220V		
Osram HBO 100W DC mercury lamp		
Stage	Ceramic-coated coaxial stage with left or right hand low drive control: with rotating mechanism and torque adjustment mechanism, optional rubber grips available	
	Travel distance 80mm×50mm, 1mm per scale, accuracy 0.1mm	
Focus	25 mm stage stroke with coarse adjustment limit stopper, torque adjustment for coarse adjustment knobs, stage mounting position variable, minimum adjustment gradations: 1 μm	
Transmitted illumination system	Warm white LED lamp, brightness is continuously adjustable	
	Abbe condenser, N.A. 1.1	
Power line	According to user's country electrical requirement	
Screw driver	M3.0 hexagon screw driver	
Accessories	Immersion oil	
Dust cover	MSHOT special dust cover	
Optional adapters	1X/0.5X/0.75X C-mount adapter	

Optional accessories

Model	Specification	Qty
Semi-fluorescence objective	Plan Fluor 20X/0.5 working distance: 2mm	1
Olympus semi plan fluorescence objective (production time is not stable)	UPLFLN4X/0.13 working distance: 17mm	1
	UPLFLN10X2/0.3 working distance: 10mm	1
	UPLFLN20X/0.5 working distance: 2.1mm	1
	UPLFLN40X/0.75 working distance: 0.51mm	1
	UPLFLN100XO2/1.3 working distance: 0.2mm	1
Phase contrast components	M-PCD-BX	1
	PLCN10X/0.25PH working distance: 10.6mm	1
	PLCN20X/0.4PH working distance: 1.2mm	1
	PLCN40X/0.65PH working distance: 0.6mm	1
Polarizing components	Optional	1
Dark field components	Optional	1