



# Biological Microscope

**BS-2038 Series**

## Instruction Manual



To ensure safety and obtain optimum performance and familiarize yourself with the use of this microscope, we recommend that you read this manual thoroughly before operating the microscope. Retain this instruction manual in an easily accessible place near the microscope for further reference.

## Attentions ! !

### 1. Purpose

This series microscope is used only for microscopic observation, not available for other purpose, otherwise result in equipment damage.



### 2. Disassembly only by the professionals

The microscope has been adjusted before shipping, Unprofessional-person should not disassemble and remove any other parts. Disassemble and remove any other parts will result in equipment damage .

If you have any questions, please contact with manufacturer or local distributor.

### 3. Note the input voltage if correspond.

This instrument designed for wide input voltage (100V~240V, 50/60HZ), applicable to most area .But if the supply voltage exceeds this range, the instrument will be seriously damaged.

### 4. Prevent Burns And Fire

When using power equipment, bulbs and collecting mirror and other nearby parts of the set will rise sharply in temperature until it reaches a thermal equilibrium state. Pay attention to anti-hot logo, they should be careful not be burn when in use.

**Alcohol, gasoline, paper and other flammable materials can't near the lamp in case of fire.**



### 5. Notes On Replacing The Bulb.

Replacement should be based on the identity of the instrument using the same specifications of the bulb, otherwise it may cause equipment damage.

The power supply must be cut off before bulb replacement, the bulb must be cooled off completely before proceeding! !



### 6. Carry

Power must be cut off before moving. Be careful not to crush your finger when placed.

This instrument is a precision instrument, and it should be handle with care, severe shock can cause serious damage to equipment-related parts.

### 7. Installation

Please refer to the installation instruction in order to avoid to damage the instrument

### 8. Operation Environment

The required available environment for using of the equipment:

Indoor temperature: 0 °C ~ 40 °C      maximum relative humidity: 85%

High temperature or high humidity may cause mildew, fog or dew of the optical components, and make the instrument not work.

### 9. Packing Waste Disposal

For the protection of the environment, please properly handle the microscope packing waste or send to salvage station(such as: cardboard, foam, etc. )!



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- ✧ Outstanding infinity adjustable optical system for high resolution and excellent definition.
- ✧ Distinctive 100X water immersion objective.
- ✧ Exclusive innovation in low power light-adjustable objective, freely change from high power to low power without adjusting brightness .
- ✧ Drip modeling design, comfortable operating environment.
- ✧ Ergonomic design with low position, work for a long time without fatigue.

BS-2038 series biological microscope is applied to college teaching and hospital clinical examination, best choice for laboratory .

## 1. Technical Parameter

### 1.1 Total Magnification

Objective Eyepiece	4×	10×	40×	100×
10×	40×	100×	400×	1000×
16×	64×	160×	640×	1600×

### 1.2 Objective (with 10×Eyepiece, subject to standard outfit)

Infinity Plan Achromatic Objective	Numerical Aperture N.A.	Objective Field (mm)	Resolution ( $\mu\text{m}$ )	Working Distance (mm)
		Field $\phi 20$		
4×	0.10	5	2.8	10
10×	0.25	2	1.1	2.1
40×(s)	0.66	0.5	0.42	0.58
100×(water, s)	1.25	0.2	0.22	0.19
100×(oil, s)	1.15	0.2	0.22	0.19

### 1.3 The Other Specification (Subject to standard outfits)

1.3.1 Mechanical Tube Length: 160mm

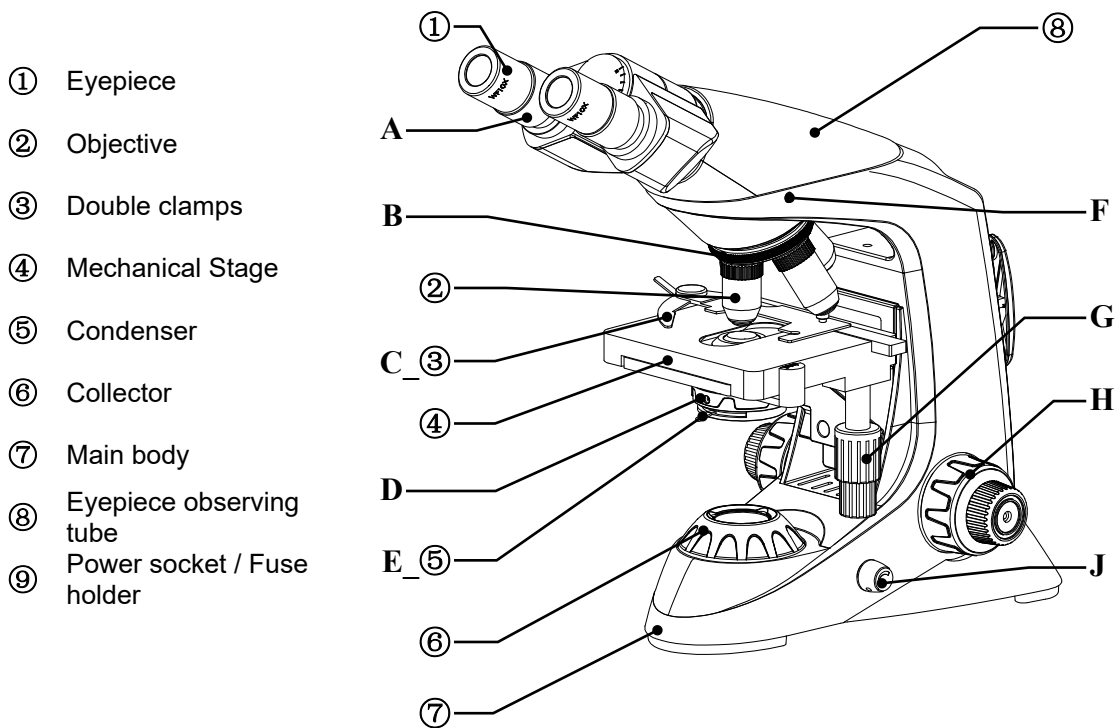
1.3.2 Conjugate Distance : Infinity

1.3.3 Head : Inclined 30° Seidentopf Binocular (Trinocular) , Interpupillary Adjustable Distance

is 50-75mm, Diopter adjustable range  $\pm 5^\circ$  , anti-fungal .

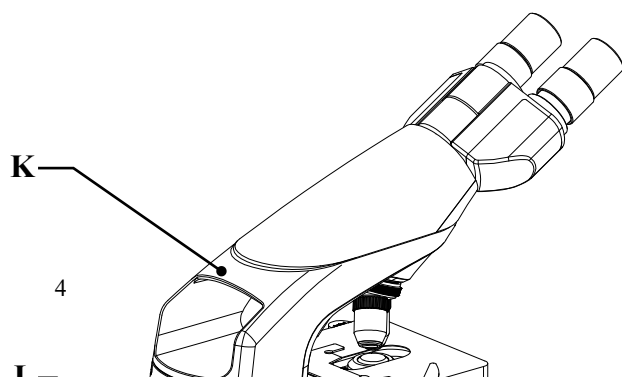
- 1.3.4 Nosepiece: Quadplex Nosepiece
- 1.3.5 Mechanical stage: Size 125mm×125mm , Y-X travel 35mm×75mm
- 1.3.6 Focusing system: Coaxial Coarse And Fine Focusing Knobs,  
Coarse stroke maximum 25mm, up position is optional, Fine division 2 $\mu$ m.
- 1.3.7 Condenser: Abbe, N.A. 1.25, Adjustable aperture, Aperture center can be adjustable,  
up-down range 12mm.
- 1.3.8 Illumination: Non-spherical illumination System.
- 1.3.9 LED Light Source:  
Input voltage AC100V~240V, 50/60Hz      Output voltage DC0.4~3.4V;  
LED 3.4V/3W, MAX 750MA, Angle 110°      Brightness 13250mcb  
Color temperature 5500K~6000K  
Full of electricity use time above 100000 hours.
- 1.3.10 Potentiometer: with independent knob.
- 1.3.11 Fuse holder: 2A  $\phi 5 \times 20$

**2. Parts Name:**



- ① Eyepiece
- ② Objective
- ③ Double clamps
- ④ Mechanical Stage
- ⑤ Condenser
- ⑥ Collector
- ⑦ Main body
- ⑧ Eyepiece observing tube
- ⑨ Power socket / Fuse holder

- A Diopter adjusting ring
- B Nosepiece
- C Clamp handle
- D Adjustable handle for condenser
- E Handle of Iris Aperture Diaphragm
- F Locking screw



**Number is microscope component.**  
**Letter is operational adjusting parts.**

### 3. Installation and Carry

Please clean the operation desk before installation, for example paper, cotton or packing waste, avoiding any interference in installation.

Put the microscope from the foam and put it on the desk. Make sure the power switch is off at “o” and the supply voltage meets the instrument’s requirement .

#### 3.1 Installation Process:

##### 3.1.1 Integrative head :

Loose F slightly (use attached wrench except knurled thumb screw ),  
 put ⑧ into ⑦ main body’s joint,  
 adjust position, tight F again.

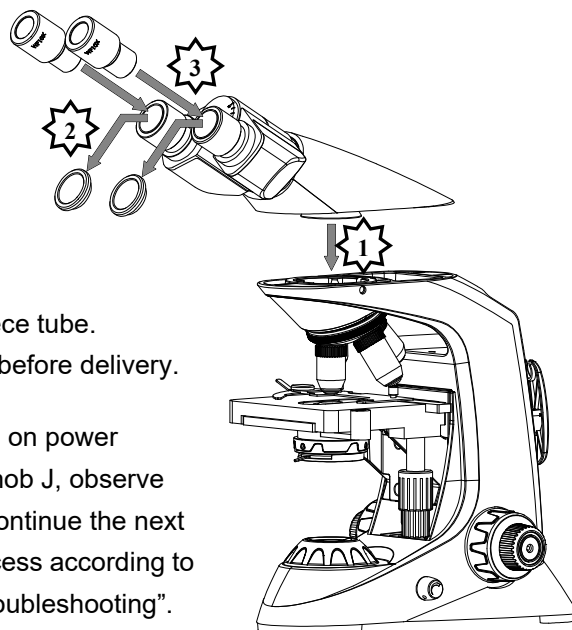
##### 3.1.2 Put out the dust cover for reservation .

##### 3.1.3 Eyepiece: Pull out and plug in eyepiece tube.

##### 3.1.4 Condenser and objective: All installed before delivery.

##### 3.1.5 Electrical Equipment Checking :

Plug power line in power input ⑨, turn on power switch M, rotate brightness control knob J, observe brightness of light collector ⑥ , then continue the next step. Otherwise, please check the process according to appendix “common malfunction and troubleshooting”.

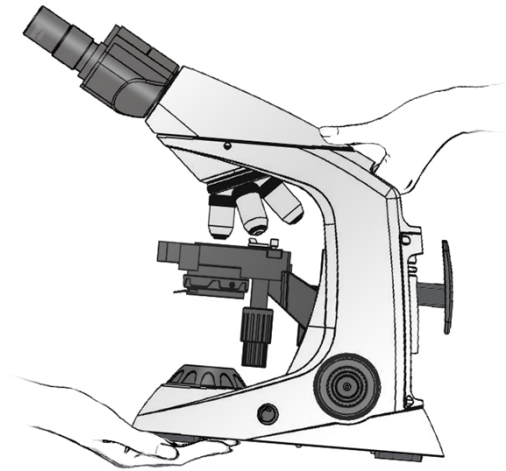


▲ Please don’t touch eyepiece or optical lens during installation, otherwise will effect the common observation.

### 3.2 Carrying

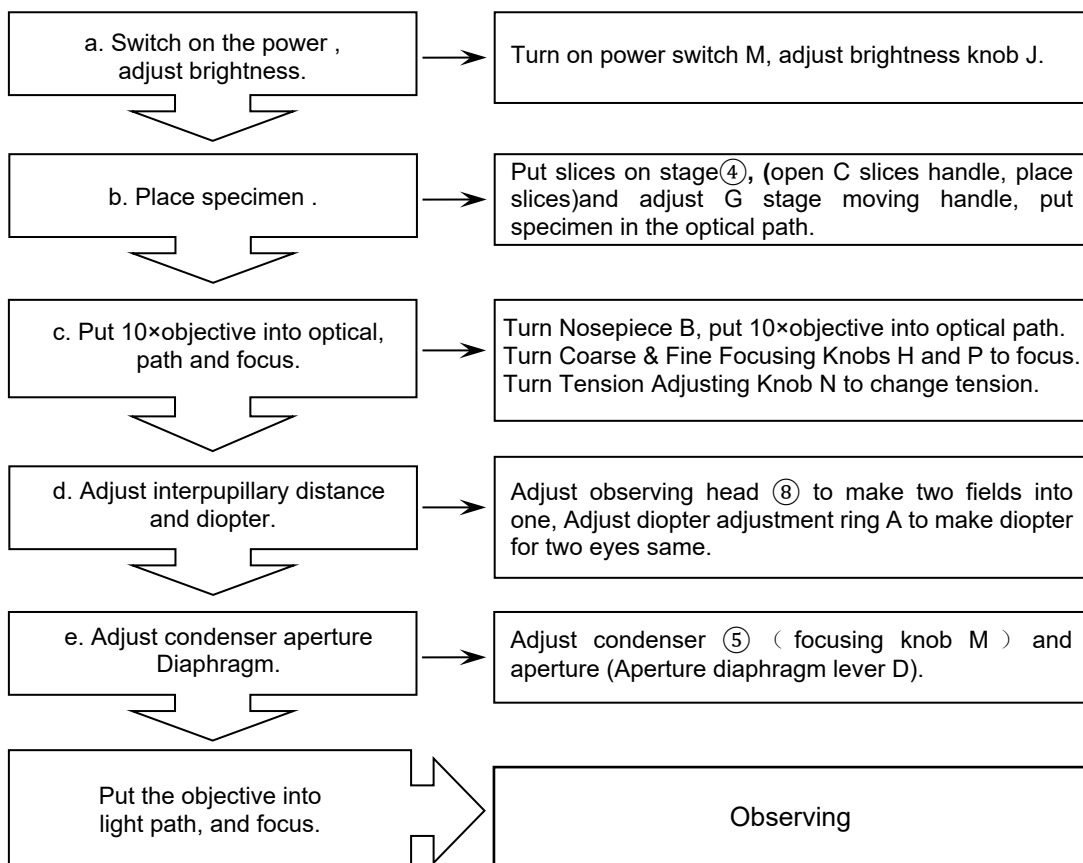
Microscope is a precision instrument, carry carefully. Shut down power supply , pull out power line. Lock the eyepiece tube and condenser etc, no slice left on stage. Don't move nosepiece , focusing knob, mechanical stage and eyepiece tube etc, don't make the eyepiece off. Avoid stumble into the chair, violent shocks and collision can cause damage.

When moving the microscope, one hand must turn back the microscope slightly by holding body handle **K**, the another hand holding the microscope's forepiece.



## 4. Operation And Use

### 4.1 Methods of Bright Field Observation

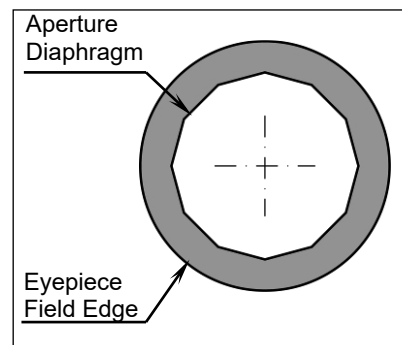


- ▲ Cover slip: using cover slip of thickness 0.17mm can get ideal working environment for objective and reach design performance.
- ▲ Slide glass: using slide glass of thickness 1.2mm(0.9~1.4mm) for better image.
- ▲ Avoid reverse rotating left and right coarse & fine focusing knob together, otherwise it will damage focusing unit.
- ▲ Don't switch objective directly when changing objective, should rotate the nosepiece tooth ripple to put objective in optical path. When changing with 4X, 10X light-adjustable objective, brightness control knob should not be use.
- ▲ Interpupillary distance is different from person to person, so readjustment each time.
- ▲ Phenomena of automatic mechanical stage moving downward may occur after long-term use . Tension adjustment ring can adjust firmness and comfortable sensation of the coarse and fine focusing knob, prevent moving downward. Clockwise, can relax, instead, can lock.

#### 4.2 Adjustment of Condenser & Aperture Diaphragm

4.2.1 Rotate condenser focusing knob D to adjusting distance between condenser ⑤ and specimen, will change the uniform illumination to obtain the best brightness.

4.2.2 Slide handle of iris aperture diaphragm E to change iris aperture's size , will change the specimen's contrast. Narrow diaphragm , lower brightness and resolution, higher contrast and depth of field ; widen diaphragm, higher brightness and resolution, lower contrast and depth of field. Numerical aperture(N/A) is decided by iris aperture diaphragm . Illumination N/A is match with objective N/A, can provide excellent resolution and contrast , increase depth of field.



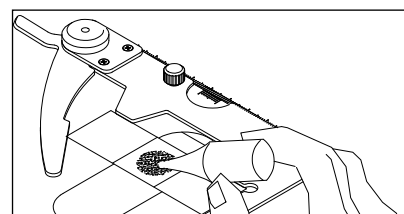
Because the microscopic specimens usually has low contrast, so in use, recommend the condenser aperture diaphragm set to objective numerical aperture's 70%~80%, when necessary, unload the eyepiece in direct observations from eyepiece tube, readjust again.

- ▲ If iris aperture diaphragm is too narrow, you will get double image.

#### 4.3 Usage of Immersion Objective

Oil immersion objective and water objective can be provided as optional accessory .

This microscope with 100X objective can observe





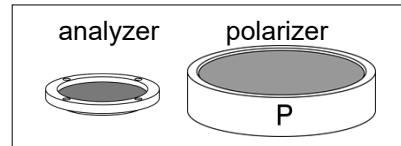
specimen without immersion oil. But little non-synthetic resin immersion oil or distilled water between the objective and specimens will fully grasp the objective function, bubbles and impurities can't in immersion oil which will affect image.

First pull out 40X objective after focusing, apply a drop of oil will then baptized into light objective 100X. This should gently turning telescope converter or slightly rotation handle and mobile platform of small, at the same time, slightly turn the handle, micro focus to exclude the bubbles, otherwise immersed will seriously affect imaging results.

- ▲ Immediately after observing with absorbent cotton, lens paper, gauze or soft cloth dips in with industrial ethyl alcohol (proportion 1:4) to wipe the oil on instrument and slices.
- ▲ Although immersion oil is non-toxic, please thoroughly flush with soap and water if touching skin, such as thoroughly flush eyes with water for fifteen minutes, if the eye and skin appearance changes or pain, please immediately go to the hospital.

#### 4.4 Installation and Usage for Polarizing Attachment

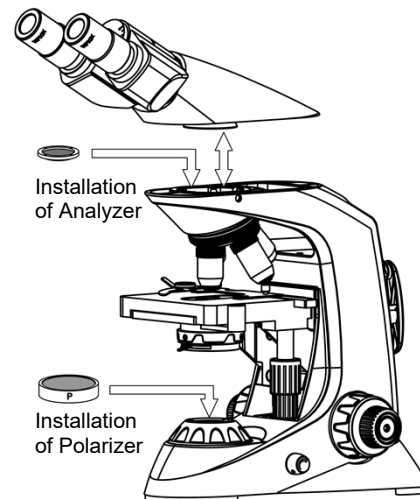
Polarizing Attachment is consist of analyzer and polarizer, mainly used for identify isotropic material and anisotropic material.



##### 4.4.1 Installation

Loosening locking screw F with wrench, take the eyepiece observing tube ⑧ down, put analyzer into the arm by following the illustration direction, install eyepiece again.

Put polarizer in the installation hole of collector.



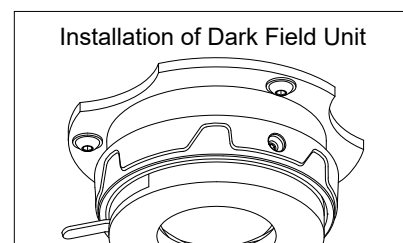
##### 4.4.2 Usage

By following bright field observation to adjust the microscope, Adjust the aperture diaphragm to maximum position,

When no sample on the stage, rotate polarizer( 360°), eyepiece field should change from bright to dark until complete dark, analyzer and polarizer at orthogonal polarization state. Polarizer, then place sample on the stage and rotate polarizer for next steps.

#### 4.5 Usage of Dark Field Unit

Observe by dark field, micro object point can be



found even if it can't be seen in bright field observation. It can show shiny shape in dark environment, especial for object point with low contrast and high refraction.

Reference bright field observation to adjust the microscope, Adjust the aperture diaphragm to maximum position, dark field attachment is screwed into the condenser bottom thread interface .

**4.6 Notes after use**

4.6.1 After use, should shut off the power (switch to "o" side), unplug the power socket. If immersed in oil should be wiped clean objective and slide. Finally the instrument should be covered by dust cover.

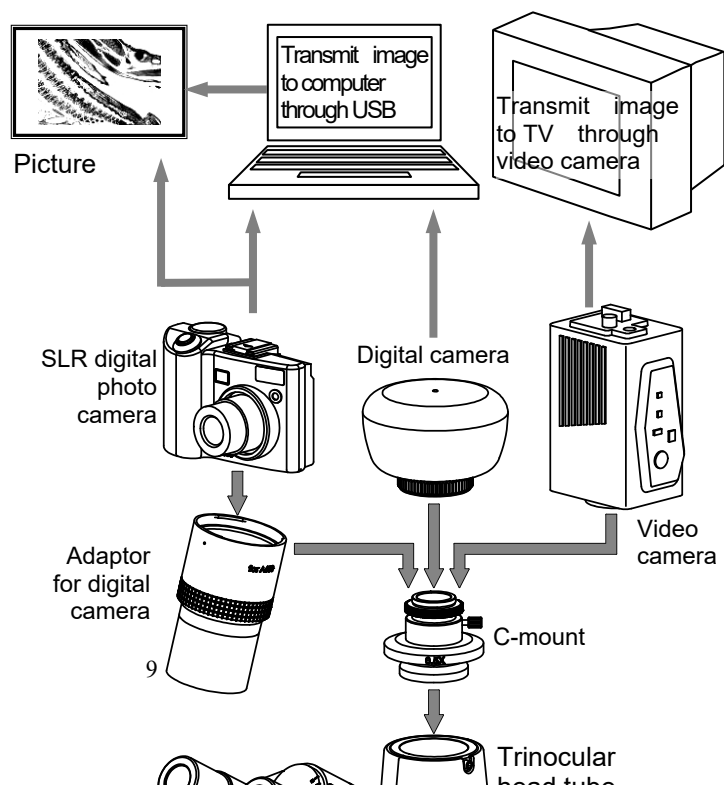
4.6.2 If instrument out of use for a long time, should take the eyepiece & objective out , and put in dry containers (such as moistureproof cylinder) with desiccant. At the same time, the body should be covered with dust cover.

**5. Installation and Usage of Photographic Camera**

This product is equipped with a variety of photographic camera, can be observed for general photography and digital camera . Different cameras and photographic device is mainly composed of different photographic camera tube and adaptor, can be connected, such as digital camera ,video camera, SLR digital photo cameras, can output to the computer, TV, projector and other external devices.

**5.1 Installation**

5.1.1 For Digital camera or video camera, put the C-mount onto the trinocular tube and fix it, then fix the digital camera or the video camera onto the upper port of the c-mount and adjust the image of the eyepiece, synchronize with the image of the screen.



5.1.2 For SLR camera, put the adaptor into the SLR camera ,then put the adaptor onto the upper port of the c-mount.

## 5.2 Usage

First, get the clear image of the eyepiece, then open the screen and camera to get clear images. If the image in screen isn't clear, adjust (H, P ) Focusing Knobs until the image clear.

▲ Camera, video recorder, monitor connection, operation and digital camera settings, please refer to the instruction manual.

## 6. Maintenance

### 6.1 Clean

6.1.1 Don't touch the lens with hand, Dust on lens should be cleaned by soft brush or absorbent cotton or cleaned by absorbent cotton, lens paper with the mixture of alcohol and ether (proportion 1:4).

6.1.2 Alcohol and ether all are burnt easily, please take them away from fire. Be careful for turn on and off power.

6.1.3 Don't clean painted metal and galvanizing metal with organic solvent such as alcohol, ether or the mixture of the both. Silicon cloth or soft cleaning preparation is suggested to clean it.

6.1.4 Plastic should be cleaned by soft cloth with clear water.

### 6.2 Application environment

6.2.1 Cold and dry environment , without shaking ,dust and steam without acid-base and other corrosive gas.

6.2.2 Normal operation condition: indoor temperature: 0°C~40°C , maximum relative humidity: 85%

6.2.3 High humidity area, recommend with dehydrating unit in case of mildew and frog.

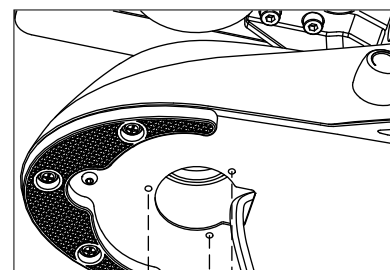
6.2.4 To avoid the strong vibration and impact during carrying and moving , so as not to scratch the desktop and damage the instrument.

▲ For safe operation, recommend the replacement of the original factory lamp.

### 6.3 Replacement of LED

#### 6.3.1 Shut off the power

Turn the power **M** switch off, and pull out power wire



from ⑨).

**6.3.2 Replacement of LED**

Lay aside the microscope reliably, unscrew the knurled thumb screw of the lamp housing cover on the underside of base, pull out lamp holder and loosen screw to take off damaged bulb, then replace it.

**6.3.2 Instrument restoration**

According to reverse order, restoring the instrument, cleaning the working stage and adjust light source for operation.

**6.4 Replacement of fuse**

6.4.1 First shut off power, pull out the plug.

6.4.2 Unscrew fuse tube socket in back of base, take out old fuse.

6.4.3 Replace with same specification fuse, then plug in fuse tube socket again.

**6.5 Not in use**

6.5.1 Please shut off the power, covered by dust cover, keep in dry and cool place.

6.5.2 The eyepiece and objective should be placed in dry containers (such as moistureproof cylinder) with desiccant.

▲ To maintain the instrument's performance, suggest checking instrument regularly. If any trouble need to repair, please contact with the manufacturer or dealer

**7. Troubleshooting**

If there is any troubles occurred in the process of using, please referring to the following sheet listed some common troubleshooting resolve them or keep in touch with us or local agency.

Trouble	Causation	Remedy
Switch on but bulb dark	No bulb	Install bulb
	Plug is unreliable	Check joint again
	Bulb is broken	Replace bulb
	Fuse is broken	Replace fuse
Bulb is flickering or brightness is unsteady.	Bulb is unstable	Insert again
	Bulb is broken	Replace bulb
Brightness of view field isn't enough or is uneven.	Bulb specification doesn't meet the requirement.	Replace bulb
	Bulb brightness is low.	Rotate potentiometer to adjusting brightness.
	Objective isn't in correct optical path.	Rotate the objective in correct position.
	The size of iris aperture is too Small.	Adjust the size of iris aperture.
	Lens (objective, eyepiece, condenser, light collector) has dust.	Clean it
Position of Condenser is too low .	Adjust condenser properly.	
Image isn't clear (contrast or definition isn't enough)	Cover glass of specimen doesn't meet the requirement.	Use required thickness cover glass (0.17mm).
	Cover glass of specimen isn't in up direction.	Place specimen correctly.
	Surface of objective lens is dirty (especially it is easy for the front lens of 40× objective to dip in immersion oil).	Clean it

	Immersion oil isn't used for 100× objective (oil)	Use immersion oil
	Immersion oil doesn't meet the requirement.	Use immersion oil supplied by us.
	There is bubble in immersion oil.	Clear the bubble away
	Size of iris aperture isn't proper.	Adjust the size of iris aperture.
	Position of condenser is too low.	Readjust again
One side of image is dark or image is moving as focusing.	Objective isn't in correct optical path.	Make the objective in correct position..
	Specimen isn't placed correctly.	Place specimen levelly on stage and clip it with clamp.
Dirt and dust can be seen in Field of view.	Dirt or dust on bulb glass	Clean it
	Dirt or dust on specimen	
	Condenser's front lens has dust or dirt.	
	Lens (objective, eyepiece, condenser, light collector) has dust.	
Objective touching specimen as changing low power to high power	Cover glass of specimen doesn't meet the requirement.	Place specimen correctly.
	Cover glass is too thick.	Use required thickness cover glass (0.17mm).
Image observed by two eyes aren't in superposition entirely.	Interpupillary distance isn't adjusted correctly.	Adjust Interpupillary distance.
	Diopter isn't adjusted correctly	Adjust diopter
	Left and right eyepiece is different.	Replace same eyepieces.
visual fatigue after observation.	Interpupillary distance isn't adjusted correctly.	Adjust Interpupillary distance.
	Diopter isn't adjusted correctly.	Adjust diopter
	Brightness isn't enough	Adjust brightness