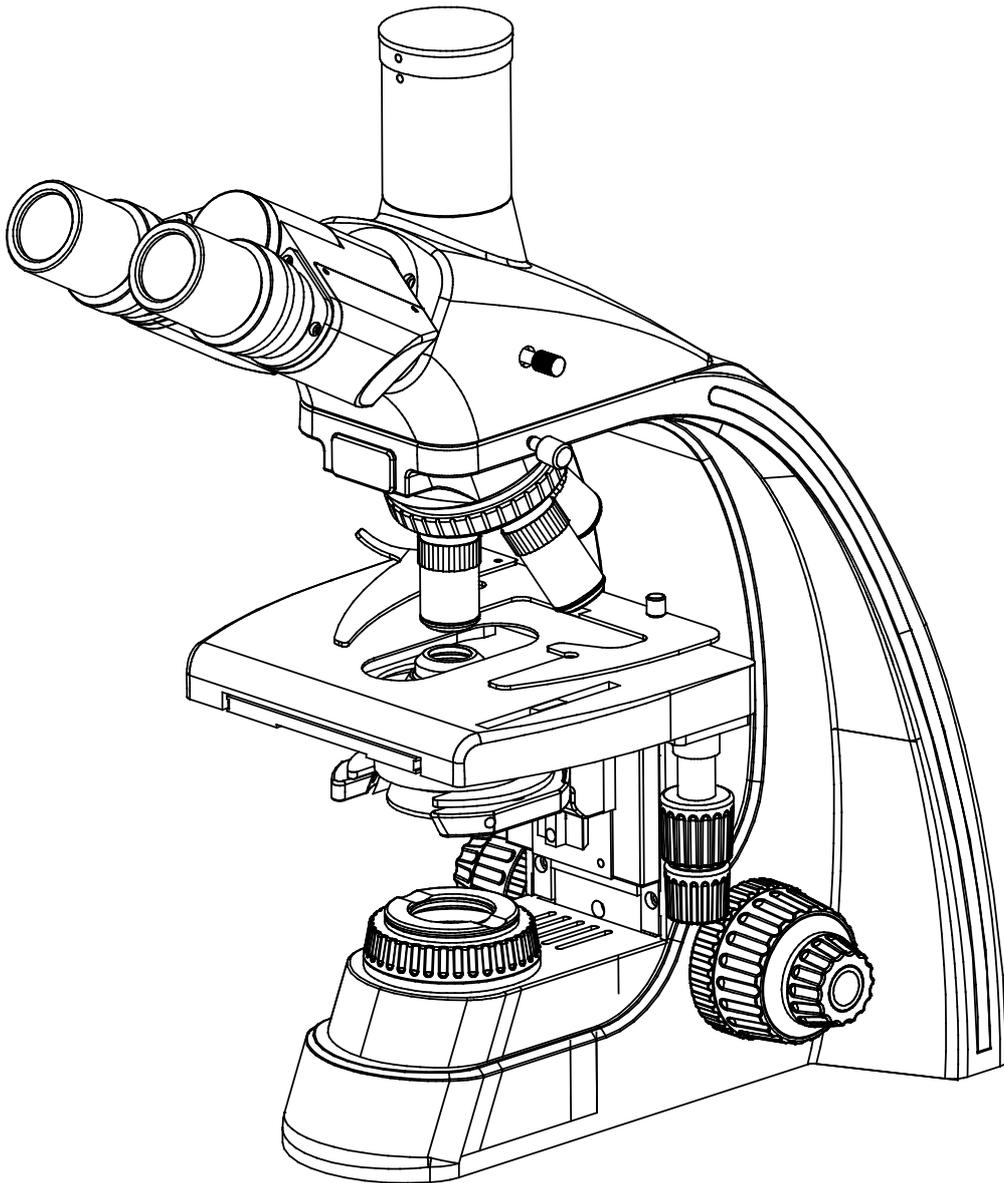

SOLARIS Biological Microscope
Operating Manual



Thank you for buying our product!

This unit is a precision optical instrument. Our product has been design to provide the highest level of safety, however, improper operation or negligence in following the instructions in this manual may cause personal injuries and property losses. In order to ensure your safety, prolong the life of this unit and maintain it properly, please read this manual carefully before operating this unit.

.....

Caution!

This manual uses the following symbols for safety reminders. Be sure to observe these warnings in order to operate this unit properly and safely.

**Warning!**

Negligence in heeding the warning of this symbol may cause personal injury or damage to this unit!



Negligence in heeding the caution of this symbol may affect the viewing performance of this unit.



Provide instructions and skills in operating this unit.



Pay attention to environmental protection.

Safety Reminder



Warning!

1. 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.

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 10 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 10min).

- ★ To prevent burn, do not touch the bulb when the lamp is illuminated or within 10min 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.

Caution!**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.

Caution!**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.

Caution!**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 carton, foam, plastic, bulb and etc. Do not discard the damaged mercury lamp carelessly in order to avoid creating environmental pollution.

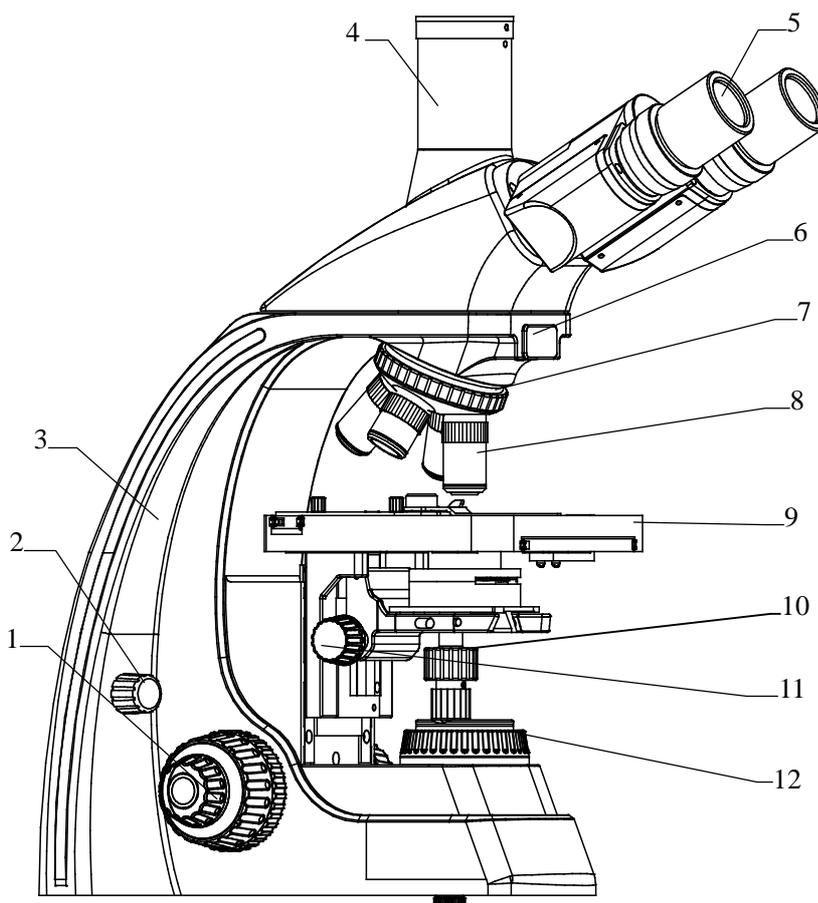
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I. Characteristics and applications of this unit

SOLARIS biological microscope is equipped with eminent UIS optical system, provides excellent optical performance and the update of the system. Because of the streamline figure and pastel color, it has more beautiful appearance. It achieves the notion of ergonomics design, so it can provides the more comfortable operation and operational room. It can be used in the field of the biology, medicine, industry, agriculture, at the same time it is the perfect research instrument for the department of hospital, teaching and academy.

II. Structural features of this unit.



SOLARIS Biological Microscope

1. Coarse and Fine Focus
2. Brightness Control
3. Body
4. Trinocular
5. Eyepieces
6. Analyzer
7. Nosepiece
8. Objective
9. Stage
10. Longitudinal and Transverse Adjustment
11. Condenser Adjustment
12. Condenser

Fig.1

III. Installation of this unit

1. Installation diagram

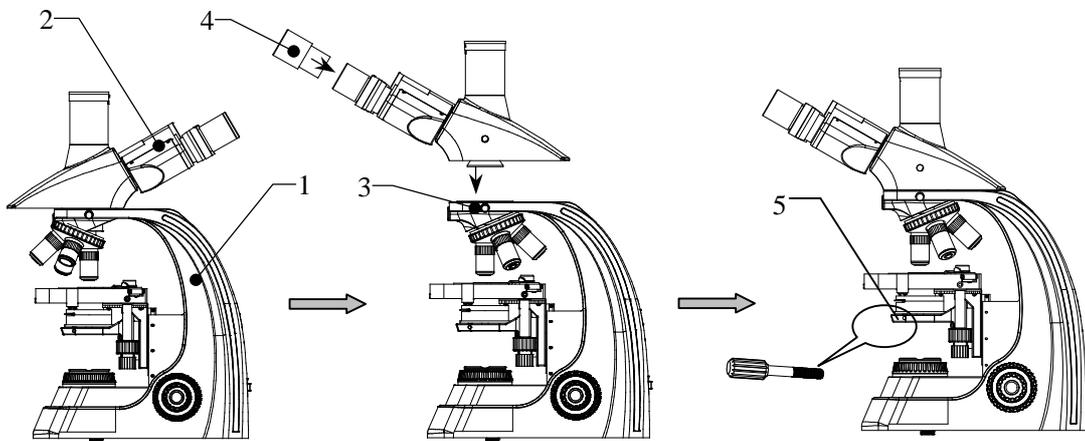
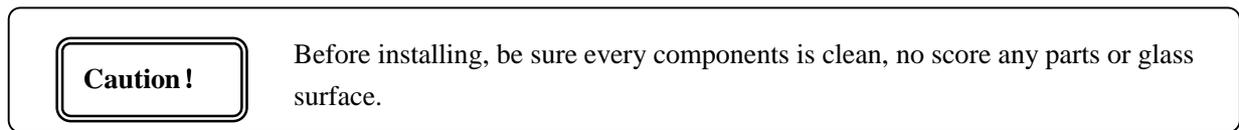


Fig.2

2. Installation steps

1. Remove all parts from their packages and retain them in the event you need to transport the product. Take out the main body 1, demount interfix packing and dustproof covers.
2. Loosen the set-screw 3 by hexagon wrench
3. Mount the trinocular or binocular on the reflected illumination and close the set-screw by hexagon wrench.
Note: the eyepiece tube of trinocular or binocular locates the frontispiece of main body.
4. Install two eyepieces 4 into eyepiece tube; turn the eyepieces for about a circumference to make the eyepieces fit the eyepiece tube.
5. Take out the condenser according to Abbe and turn down the support of condenser, put the condenser according to Abbe into the support of condenser
6. Connect power supply to the power outlet of main body.
7. Check the reliability and security of the above installations.
8. Check and collate attached accessories and tools within the package, properly stored the accessories and tools to avoid missing.

IV. Technical specifications

Table 1

Main Parameter	All Magnification	40X~1000X(standard)			
	Mechanical Tube Length	Infinity (∞)			
	Object Conjugate Distance	Infinity (∞)			
Eyepieces	Plan Objective	WF 10X	field: Φ 22mm	Objective Port: Φ 30mm	Parfocalization Distance: 10mm
Trinocular	Articulated Binocular, view in 30° , Interpupillary Distance: 48~75mm				
Infinity Plan Achromatic Objective	Magnification	NA	Work	Coverglass	Remark
	4X	0.10	19.8		
	10X	0.25	5.0	0.17	
	40X	0.65	0.66	0.17	include spring
	100X(oil)	1.25	0.36	0.17	include spring, oil
Condenser	Abbe Condenser (NA:1.25) can be moved freely up and down				
Stage	Double Layer Mechanical Stage, size: 193 X 155mm, Moving Range: 75 X 50 mm				
Light Source	Halogen Bulb 6V 20W, adjustable of the brightness				
Power Supply	AC Voltage 85V~265V 50/60Hz, fuse parameter: 250V 3.0A				
Optional Accessory	Eyepieces	Centring Telescope			
		Objective	Infinity phase contrast plan achromatic 10X0.25 PHP		
	Infinity phase contrast plan achromatic 20X0.40 PHP				
	Infinity phase contrast plan achromatic 40X0.65 PHP(spring)				
	Infinity phase contrast plan achromatic 100X1.25 PHP(Spring, oil)				
	Turnplate Phase Contrast Condenser (PH-III)				
	Dark Field of Condenser	Dry Dark Field of Condenser			
		Wet(Immersion Oil)Dark Field of Condenser			
	Colour Filter	Green Colour Filter			
		Yellow Colour Filter			
	Simple Polarizing System	Polarizer 360° rotatable stage			
		Analyzer Sliding type			
Camera	digital and video microscope camera				
Illuminator	White light HIGH INTENSITY LED illumination				

V. Operation

1. Turning on the power switch and adjust brightness control



Warning

Before turning on the power switch, check if the input voltage is consistent with local voltage supply. If not, do not operate this unit. If this unit uses an improper input voltage, short circuit or fire may arise, thereby cause damage to this unit!

Turn on the toggle switch 1 on the back of the main body frame (turn it to the “-” position), so that the transmitted halogen bulb is illuminated. Turn the brightness control knob 2 to adjust the brightness of the bulb, and make the brightness of the field of view suitable for visual inspection. As shown in Fig. 5.1.

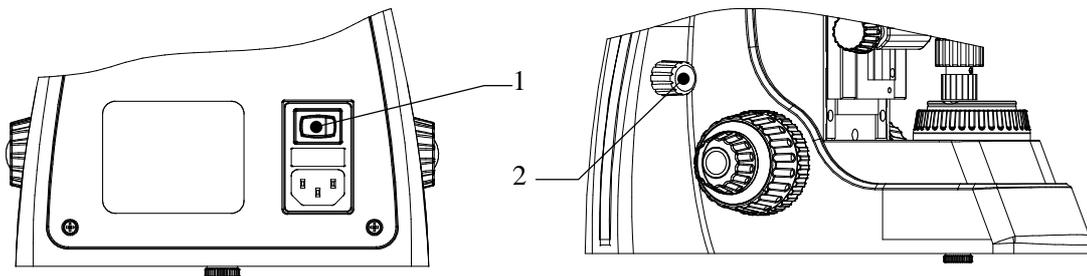


Fig.3

Caution!

Don't keep the brightness control knob at the brightest position for a prolonged period of time; otherwise the life of the bulb may be shortened! When this unit is not in working, turn the brightness adjusting knob to the low position for protecting the electric functions of this unit.

2 Adjusting condenser

- (1) Put the sample on the glass stage 1, adjust the .Condenser Adjustment knob 2, and make the condenser to the highest position.
- (2) Turn 10X objective into optical path, turn down the field diaphragm 6 little compare with field, as shown in Fig. 4-a, if the field diaphragm not in the center of field, it can be adjusted by the two inner hexangular wrench's to the center of field ,as be shown in Fig.4-b. Restart the field diaphragm to larger than field shown in Fig.4 -c

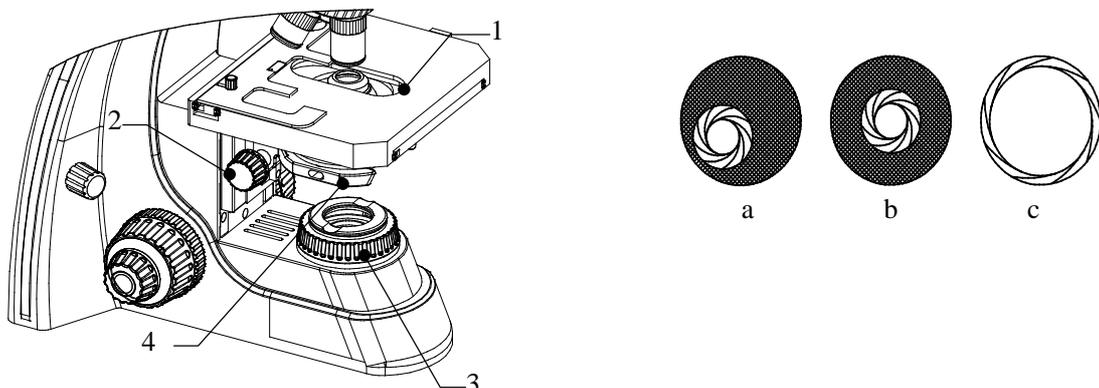


Fig.4

(3) If you choose the dark field condenser to observation, you need to adjust the center of the condenser for the symmetrical illumination. If you choose the dark field immersion oil condenser to observation, you need to put some anisol to fill the room of the between of sample and condenser for the dark field observation, as be shown in Fig.5.

(4) If you choose the phase contrast condenser to observation, you need to install the phase contrast condenser on the bracket of the contrast, loosen the screw of height limit for let out the position fid, and turn the Condenser Adjustment to the position of under the simple or little more high of it ,do it all of above and lock the screw, as be shown in the Fig.6. About the adjustment and observation of the phase contract condenser operation, please read the << The Manual of the Phase Contract Condenser Operation>>.

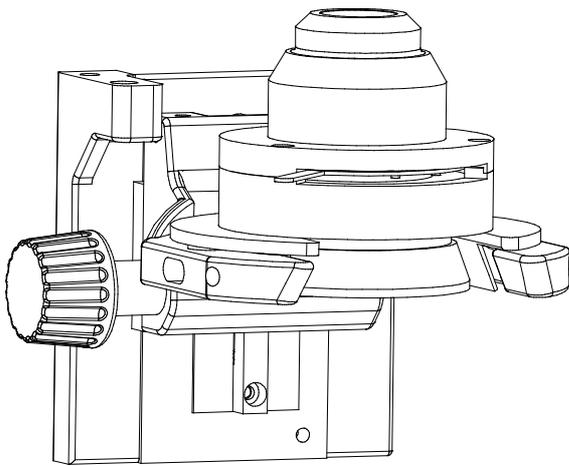


Fig.5

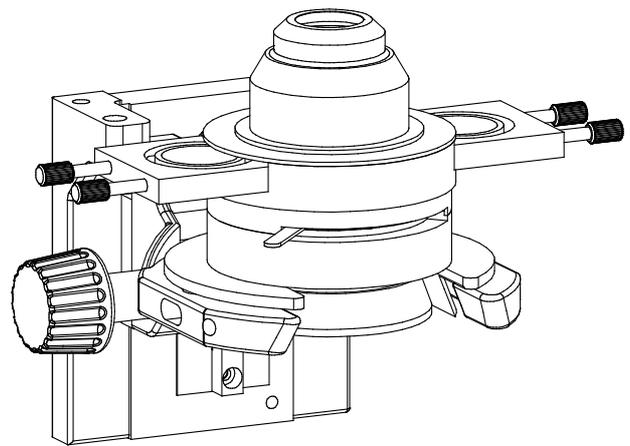


Fig.6

Reminder!

The aperture diaphragm size is proportion with the magnification ration of objective (numerical aperture), the smaller (larger) of objective numerical aperture, the smaller (larger) of the aperture diaphragm. Change the brightness of field by the adjust the size of aperture diaphragm is not be come true

Check the position state of observation / photography switch

pole 1. Push the pole into observation with eyepieces, pull it out to photography. As shown in Fig.7.

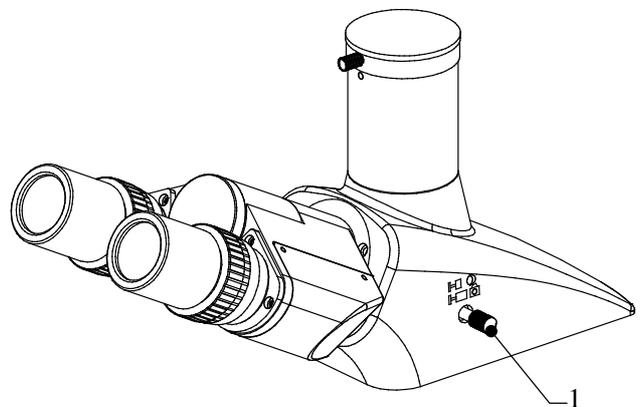


Fig.7

4. Reset diopter adjustment ring

Turn the diopter ring \perp of the left and right eyepiece tube, and when the “0” diopter position is aligned with the side scale (mark white line), as shown in Fig. 8

- (1) Turn the $40\times$ objective into the light path, turn the diopter ring of left and right eyepiece tube to “0” diopter position
 - (2) Only with your right eyes observe the right eyepieces as far as when the specimen image into focus.
 - (3) When the specimen image not into focus with you left eye observe, you need to adjust the diopter ring with your left eyes observe the left eyepieces as far as you can observe clearly.
- This series of microscopes have N=5 diopter for you adjustment.

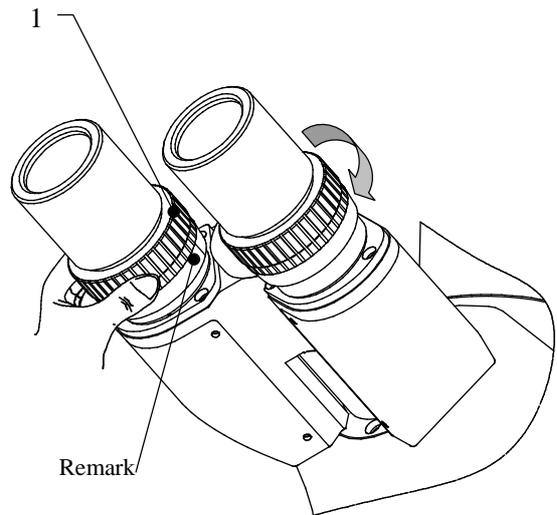


Fig.8

- (4) If you choice the right eyepieces as the calibration reference, please reset the diopter as above (1)-(3) steps just change the relative eye to another eye.

5. Adjustment of interpupillary distance

Parallax can be eliminated by adjusting the interpupillary distance so that the distance of the eyepiece tube is identical with interpupillary distance and enable to observe more comfortably and clearly. When observe through two eyepieces, if the field of view consists of two overlapping circles, as shown Fig.9-a, alter the exit pupil center distance of the eyepiece tubes by turning the left or right frame body \perp until the field of view becomes a fully overlapped circle, as shown in Fig.9-b, at the same time ,the eyepiece tube can be turned 360° for the different operators of eyes high.

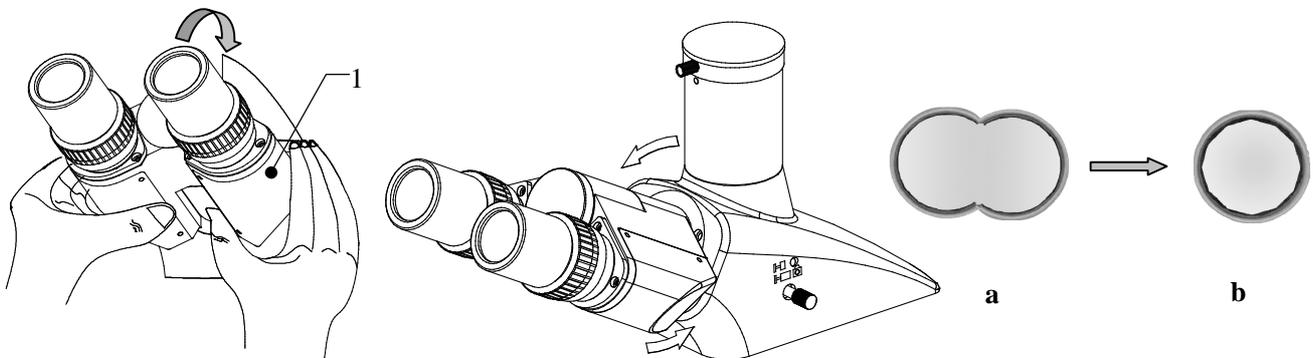


Fig.9

6 . Operate coarse and fine focusing control knob

The coaxial coarse and fine focusing system is adopted in this instrument, with coarse tension adjusting device.

- (1) The control knob 1 is for fine focusing, the control knob 2 is for coarse focusing。 Turn the coarse focusing control knob 2 anticlockwise to lift the objective and clockwise to lower it. As shown Fig.10
- (2) Put the 10X objective into the light path with the turn of nosepiece (When turn into the right position, the objective will has a automatic halt.).
- (3) Turn coarse control knob unit the stage in the highest position, observe through the eyepieces, slowly turn coarse control knob, with the stage slowly down, to focus until the image clear and stop turning.
- (4) Turn fine control knob to precision focus for a clearly image.
- (5) The knob 3 is to lock the stage position of height; this function is making sure the long working distance of objective not to be touched with stage or simple. When the stage be locked in the preset position with turn the coarse, you can rapidly focus the image clear.

Reminder!

When you use the high magnification objective, please use the 10X objective focus the image clear at first and set the knob 4 , then turn to observe by the high magnification objective, you can make the stage to the preset position by the coarse control knob, and make the more precision focus by the fine control knob

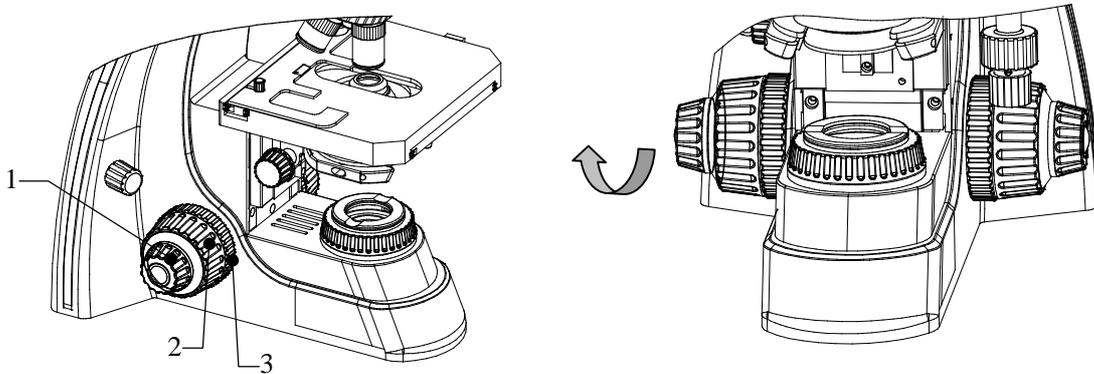


Fig.10

- (6) The tension of the coarse focus control knob 2 is adjustable and preset at the factory for ease of use. If you wish to adjust the coarse focus tension, turn the tension knob 4 to adjustment. Turn the wheel anticlockwise increase the tension, and clockwise decreases it, as indicated by the arrow in the figure 8.

Caution!

Too high tension may be affected operation and physical discomfort.

7. Operate trinocular device

This unit performs eyepiece and photographic observation, switch by push-pull rod 4, located at the right side of main frame body. The photography output is located at the top side of trinocular and covered by a dust-proof cap 2. As shown in Fig. 11. The following is operation steps.

- (1) Loosen the fastening screws 1 of the photography output terminal, and remove the dust-proof cap 2.
- (2) Mount the photography device on the output terminal, and then tighten the fastening screws gain.
- (3) Turn the 10X objective into the light path.
- (4) Push the push-pull rod 4 in and focus to make micro-image clear.
- (5) Pull the push-pull rod 4 out to see whether the image with photography clears. If unclear, adjust the fine focusing control knob to make the image clear.
- (6) If there is strict synchronization requirement for eyepieces and photographic images (consistency between the center and direction of the image), a synchronization adjustment will be necessary as follows:
 - a. Push in push-pull rod 4, observe with eyepieces. Find a feature point in the field of view (a readily identifiable target, such as *S* point in Fig. 12-a), move it to the center of the field of view. If there is a division eyepiece, move the target to the reticle intersection of the division eyepiece, as shown in Fig. 12-b.
 - b. Pull the push-pull rod 4, view the image in monitor or display screen, and see if the identified target image is at the center of the displayed window. If it deviates from the center of displayed window, adjust the three pcs screws 3 on the output terminal to move the identified target to center.
 - c. Move the specimen and see if the image in the monitor or display screen moves in the same direction as the specimen.

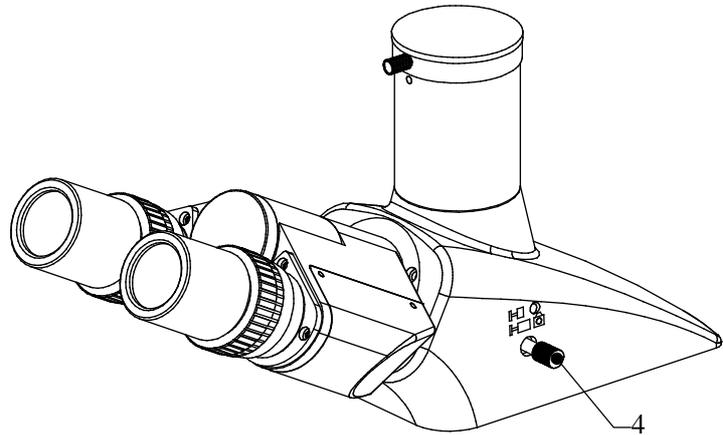


Fig.11

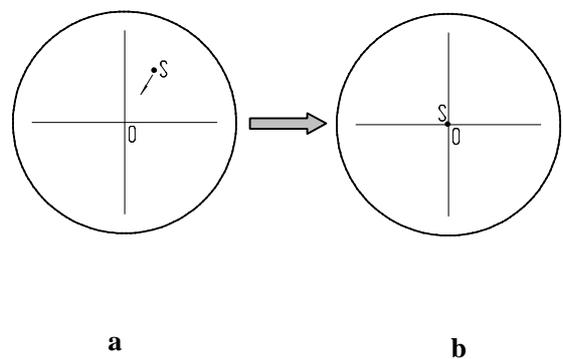


Fig.12

If move in different direction, it is necessary to adjust the direction of the photographic device. Loosen the fastening screws 1, turn the photographic device to make the displayed direction of the image inline with the direction of stage motion, and then fasten the screws.

VII. Replace Bulb and Fuse

1. Replace bulb

The unit light source is use 6V30W halogen bulb. When replace the halogen lamp, should ensure the specification in order to avoid electrical trouble. The following is operating steps.

- (1) Turn off the power switch, and unplug the power cord₂, as shown in Fig6.1
- (2) Wait at least 10 minutes until the bulb and its surrounding have cool down. This is to prevent hand getting burnt.
- (3) Take out the screws₄, and pull out the lamp house cover, take out the bad bulb₃, and place the new one.
- (4) If you want to adjust the position of the bulb , you can Loosen the adjustment screw and move the bulb Front and back as far as the appropriate position you want , finally close the screw .

NOTE: Above steps not for the LED illumination apparatus.

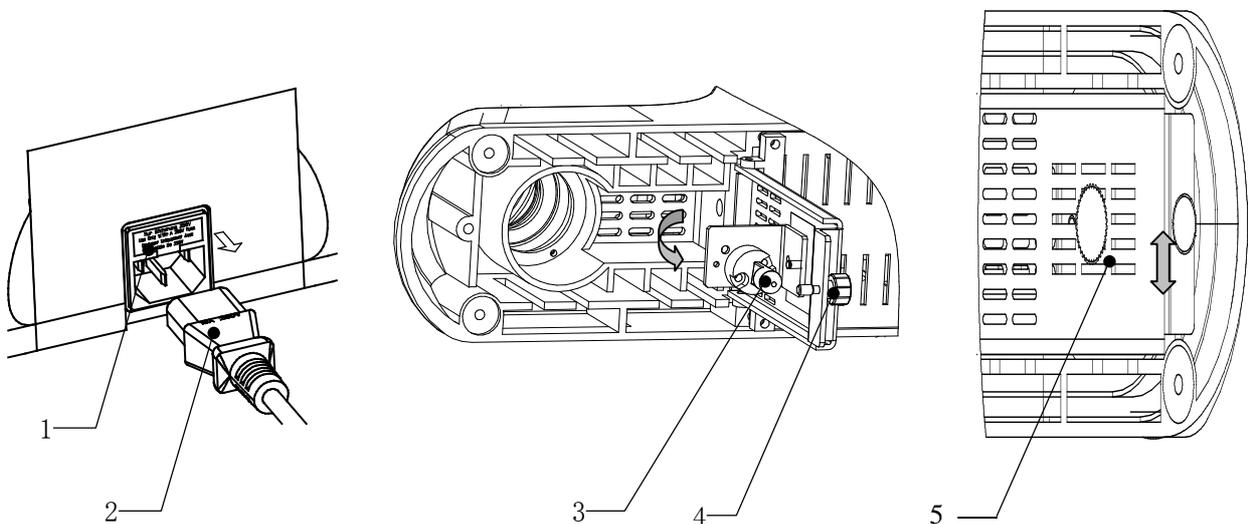


Fig. 13

2. Replace fuse

The fuse is installed in the fuse socket 1, as shown in Fig.13, replace according the following steps.

- (a) Turn off the power switch and unplug the power cord₂.
- (b) Loose the fuse₁ socket nut, remove the damaged fuse and replace a new one.
- (c) Connect the power cord and turn on the power switch to check whether the fuse well.

VII. Maintenance

1. The power switch of the main unit is the power control. When you don't using the unit, press the switch to "O" for cut off the power supply, unless the electric component in this unit is still operating. When this unit is not to be used for a long time, remove the power plug from the supply socket and keep all cables properly.

Reminder!

It is easier to clean the lens by wiping them from inside out as shown in the figure.



Wrong

Right

2. This unit should be kept clean. Remove any oil on the lens and clean the body with clean gauze (or silk fabric or absorbent cotton) dipped with a little alcohol. Put on the dust shield until this unit is completely cool and dry.
3. Cleaning the lens
Blow off or wipe off any dust on the lens with a blower ball or a soft brush; heavy dirt and fingerprints can be removed with lens tissue or soft cloth dipped with a little mixture of alcohol and ethyl ether gently (the mix ratio is: alcohol 20-30% and ethyl ether 70-80%).
4. Cleaning the surface of this unit: Wipe it with clean soft cloth; heavy dirt may be wiped off with a neutral detergent.
5. Keeping: When this unit is not to be used for a long time, turn off the power supply of this unit, allow the bulb to cool down sufficiently, put on the dust shield, store this unit at a dry, ventilated and clean place free from any acid, alkali or steam, otherwise mold may develop on the lens.
6. Periodic inspection: This unit should be inspected and maintained periodically to maintain its performance.

Caution!

Do not wipe this unit with any organic solvent (e.g., alcohol, ethyl ether or its dilute solution); otherwise the surface paint of this unit may come off. It is suggested that a layer of non-corrosive lubricant is applied on the moving parts of this unit before the dust shield is put on, and place the eyepiece and the objectives in a container with desiccant.