ICM-100/ICM-100BD

Industry Check and Measure 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.

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

Caution!

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

Reminder !

Provide instructions and skills in operating this unit.

Pay attention to environmental protection.

Safety Reminder

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.

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.

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.

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).

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.

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.

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 cartoon, foam, plastic, bulb and etc. Do not discard the damaged mercury lamp carelessly in order to avoid creating environmental poll

Table of Contents

I. Characteristics and applications of this unit

ICM-100/ICM-100BD Industry check and measure microscopes are suitable to observe surfaces structure and geometry of workpiece. It is equipped **e**xcellent UIS optical system and modularization function design so that update system expediently and achieved polarization, dark field observation. Lift or down the optical and illumination unit along the leader to adjust the distance from stage to objective, so that enable using for different thickness workpiece. Quickly and effectively locate the observation part of workpiece by moving the mechanical stage. The motion of the focusing is roll that the roller bearing moved guiding the trigon slideway, so that the moving process is smooth. This is ideal optical instrument for checking and measure in the field of precision part, integrated circuit, packing material etc.

II.Structural features of this unit

1. The structural features of ICM-100

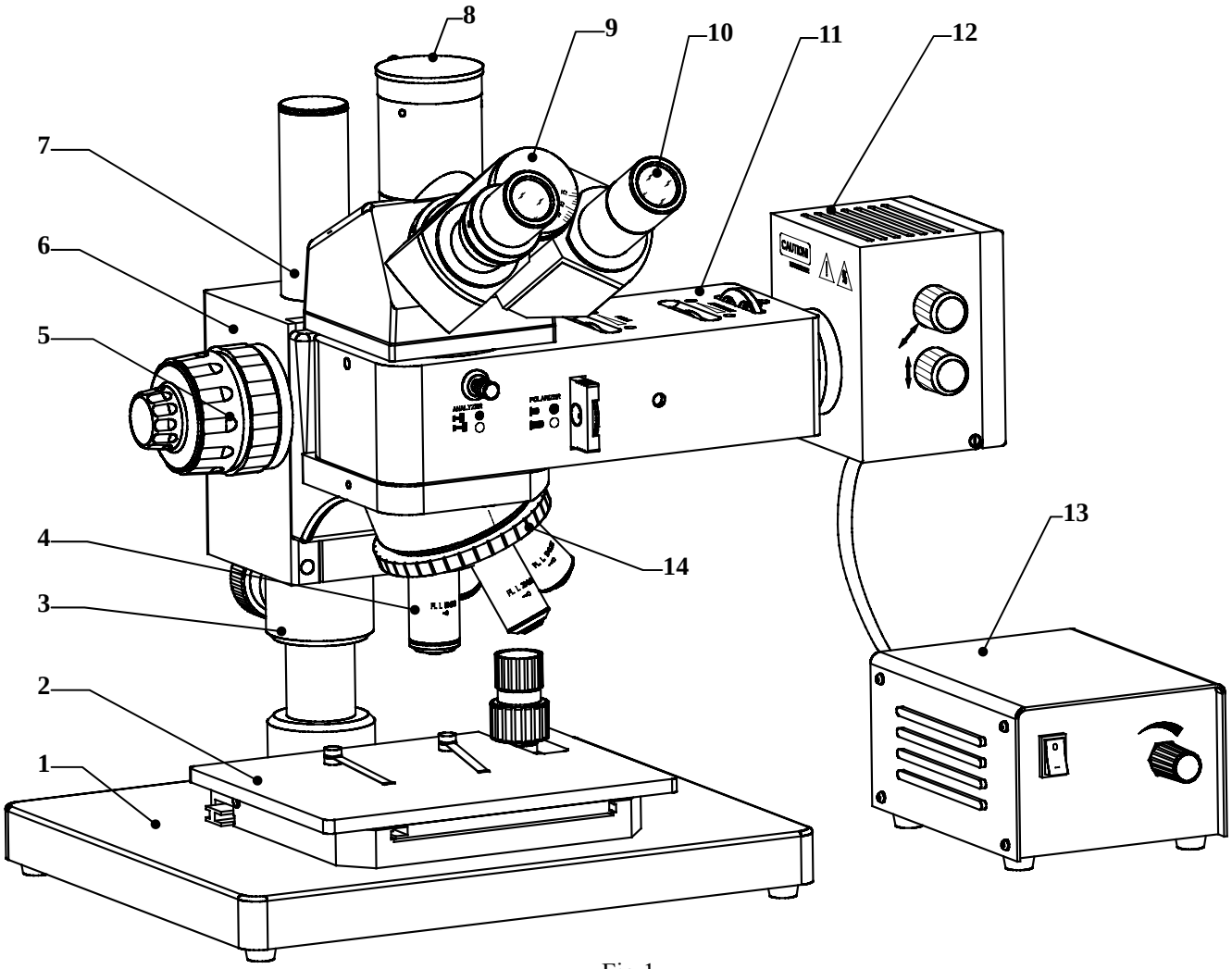


Fig.1

1.Base 2. Working stage 3.Bearing sleeve 4.Objective (bright field) 5.Focusing device 6. Running up and dovwn unit 7. Steel guide pillar 8.Trinocular 9.Eyepiece tube 10.Eyepiece 0 11.Reflected illuminator system 12.Lamp house 13.Power supply （6V30W） 14.Nosepiece

2. The structural features of ICM-100BD

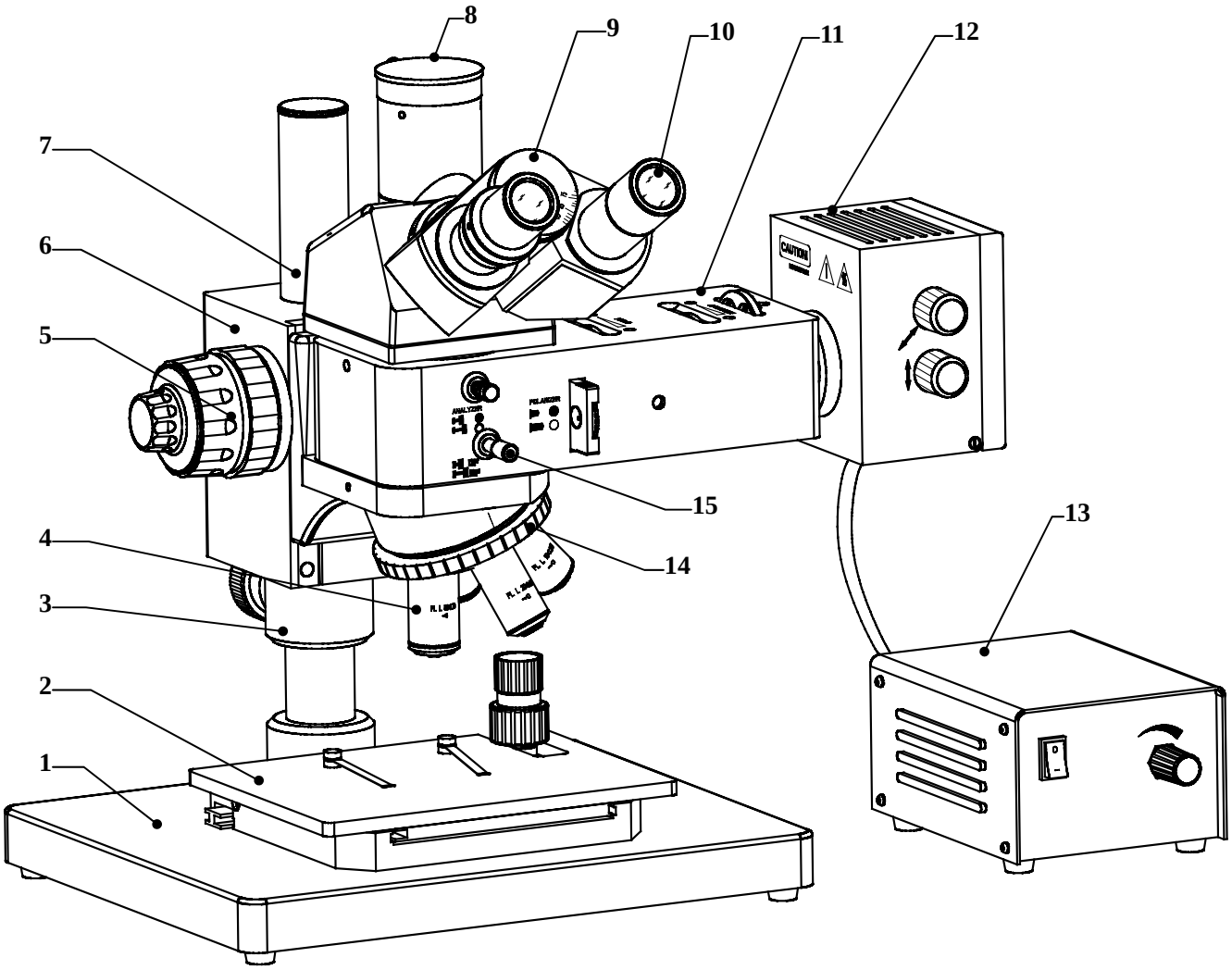


Fig.2

1.Base 2. Working stage 3.Bearing sleeve 4.Objective (bright/dark field) 5.Focusing device 6.Running up and dovwn unit 7. Steel guide pillar 8.Trinocular 9.Eyepiece tube 10.Eyepiece 0 11.Reflected illuminator system 12.Lamp house 13.Power supply （12V50W） 14.Nosepiece

III. Installation of this unit

1. Installation diagram

Caution! Before installing, be sure every components is clean, no score any parts or glass surface.

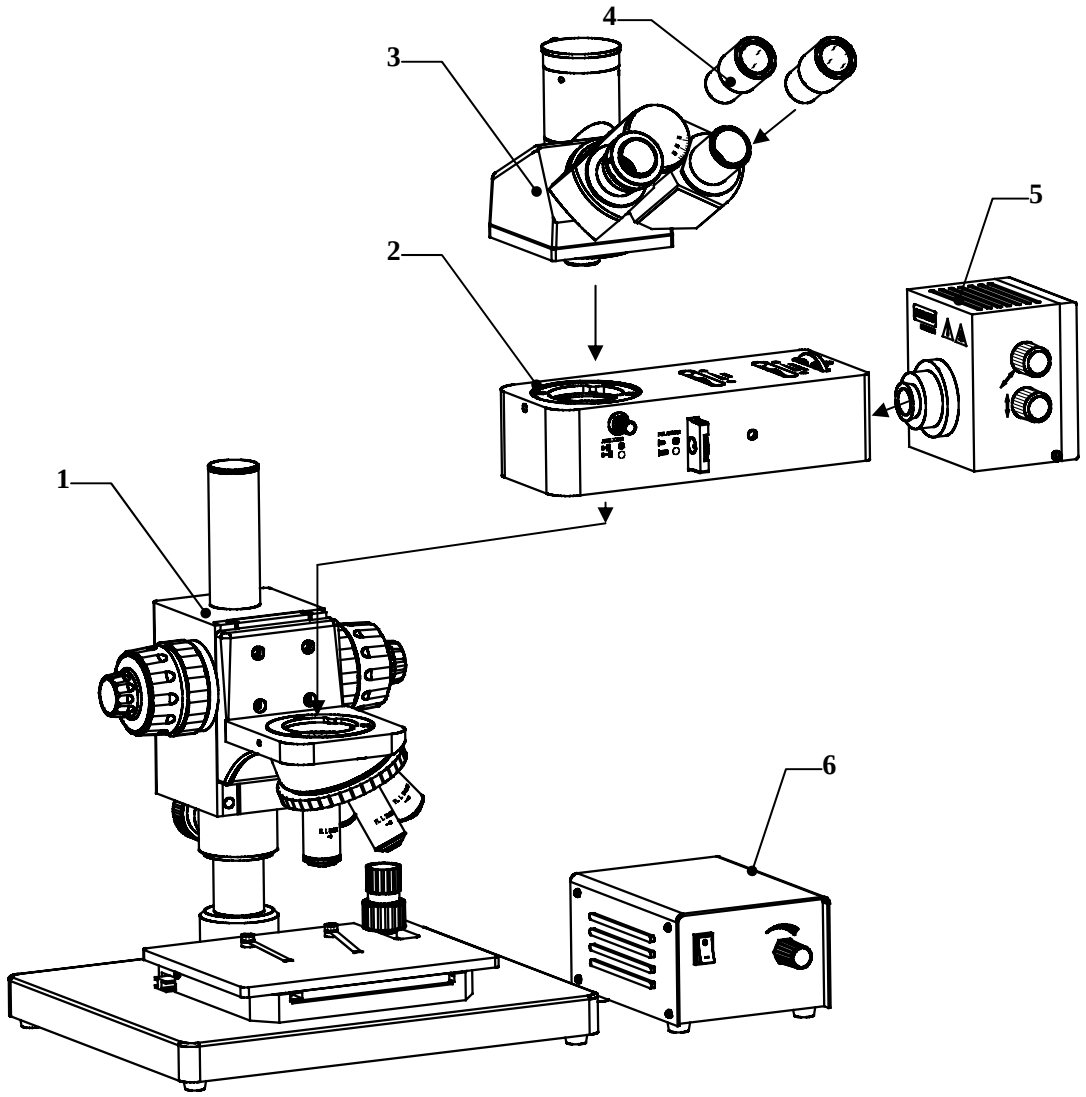


Fig.3

2. Installation steps

There are three styrofoam boxes within the carton box.

The first box contains reflected illuminator, lamp house, spring clip and tools. Second box contains power supply unit, trinocular, 2 pcs eyepieces and spare lamp and fuse.

The final box contains main body included objectives. As shown fig.3. The number in the following installation steps is shown in the installing diagram, such as "1" is "Main body" in Fig.3. the following is installation steps:

（1）Take out the main body 1 , place it on a stable work bench, remove the supporting package and the dust cap (bag).

Loose the knob ④ on the back of Running up and down device, lift the device to a certain height, then lock the knob.

（2）Take out reflected illuminator **2** and lamphouse **5**. Firstly, install the reflected illuminator on the running up and down unit adapter, lock it with a inner hexagonal socket wrench. Secondly, install the lamp house and connected the power supply line.

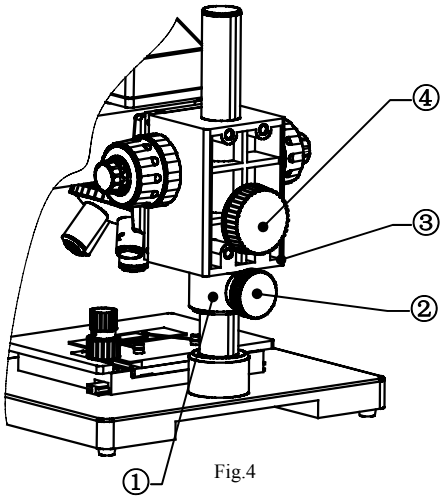


Fig.4

（3）Take out trinocular **3**, eyepieces **4**, power supply unit **6**. Instal the trinocular on the top of reflected illuminator adopter and lock it. Remove the dust cap of eyepieces tube, insert eyepeces and turn them so that fits the eyepiece tube well.

（4）Adjust the running up and down unit height

In the installation process, the step of adjusting running up and down unit is important. According to the working distance of objective and specimen height, set the running up and down unit height, so that can observe clera image in the effective focusing range and using any objectives. Accord the following steps to adjust, as shown the fig.4:

a. Loose the knob ② of bearing sleeve ①， decline to a certain height, lock the knob ②again.

b.Loose the knob ④ of running up and down unit ③, decline the unit to the top of bearing sleeve and lock the knob ④ again.

c. When lift the running up and down unit, should loose the knob ④ and lift the unit firstly, then locked at a certain height, finally, locked the bearing sleeve ① on the bottom of unit.

Caution!

When adjust the running up and down unit, should accord the above operation method and steps, otherwise, the unit will quickly decline to break down, because the high magnification objective working distance is very short, the objective will hit the working stage if no careful.

(5) Check if the above installation is secure and safe.

(6) Inspect and gather the accessories and tools enclosed in the package and keep them in a safe place to avoid misplacemen.

IV.Technical specifications

<table>
<tr><td colspan="4">Technical specifications (standard)</td></tr>
<tr><td>Eyepiece</td><td colspan="3">10X wide field plan eyepiece and field of view number is Φ22mm, the eyepiece interface is Φ30mm</td></tr>
<tr><td rowspan="8">Infinity plan achromatic objectives</td><td rowspan="4">ICM-100
（Equipped bright field objective）</td><td colspan="2">PL L5X/0.12　work distance：26.1 mm</td></tr>
<tr><td colspan="2">PL L10X/0.25　working distance：20.2 mm</td></tr>
<tr><td colspan="2">PL L20X/0.40　working distance：8.80 mm</td></tr>
<tr><td colspan="2">PL L50X/0.70　working distance：3.68 mm</td></tr>
<tr><td rowspan="4">ICM-100BD
（Equipped with dark / bright field objective）</td><td colspan="2">PL L5X/0.12 BD　working distance：9.70 mm</td></tr>
<tr><td colspan="2">PL L10X/0.25 BD　working distance：9.30 mm</td></tr>
<tr><td colspan="2">PL L20X/0.40 BD　working distance：7.23mm</td></tr>
<tr><td colspan="2">PL L50X/0.70 BD　working distance：2.50 mm</td></tr>
<tr><td>Eyepiece tube</td><td colspan="3">Trinocular inclined 30˚, can be shot in 100% light flux.</td></tr>
<tr><td>Focusing system</td><td colspan="3">Coaxial coarse/fine focus system, with tension adjustable device, minimum division of fine focusing: 1.0μm.</td></tr>
<tr><td>Nosepiece</td><td colspan="3">Quintuple (Backward ball bearing inner locating)</td></tr>
<tr><td>Stage</td><td colspan="3">Mechanical stage，overall size：185mmX140mm，moving range: 35mmX30mm</td></tr>
<tr><td rowspan="4">Illumination system</td><td>ICM-100</td><td colspan="2">6V30W halogen and brightness enable control.</td></tr>
<tr><td>ICM-100BD</td><td colspan="2">12V50W halogen and brightness enable control.</td></tr>
<tr><td colspan="3">Integrated field diaphragm , aperture diaphragm and puller type polarizer.</td></tr>
<tr><td colspan="3">Equipped with frosted glass and yellow ,green and blue filters</td></tr>
</table>

V.Operation

● ICM-100 industry check and measure microscope in bright field

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 right 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.

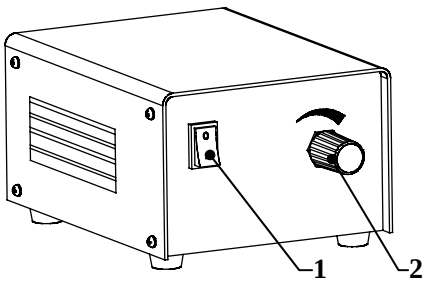


Fig.5

Caution!

Do not 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 use, turn the brightness adjusting knob to the low position to maintain the electric functions of this unit.

2. Check the position state of observation / photography switch pole 1. Push the pole in to observation with eyepeices, pull it out to photography. As shown in Fig.6.

3. Check the position state of analyzer pole 2. Pull the pole out optical path, as show the remark "■ ○". Check the position state of polarizer 3. Pull the polarizer out optical, as show the remark " ▬ ○". As shown in Fig.6.

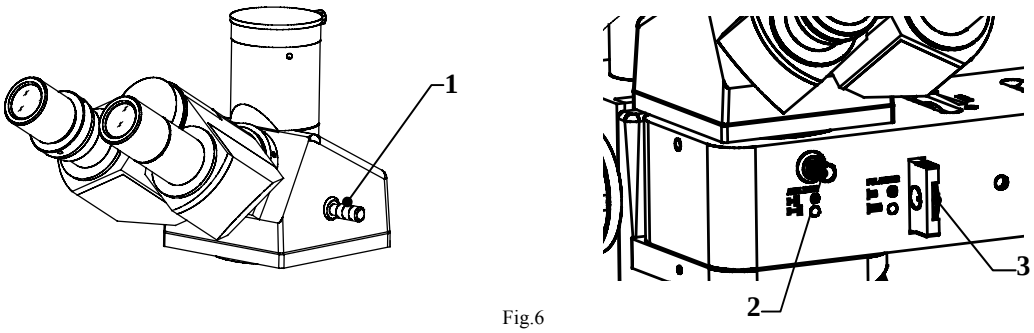


Fig.6

4. Reset diopter adjustment ring

Turn the diopter adjustment ring 1 on the left eyepiece tube, so that the "0" diopter position is aligned with the side scale (remark white line), as shown in Fig. 7.

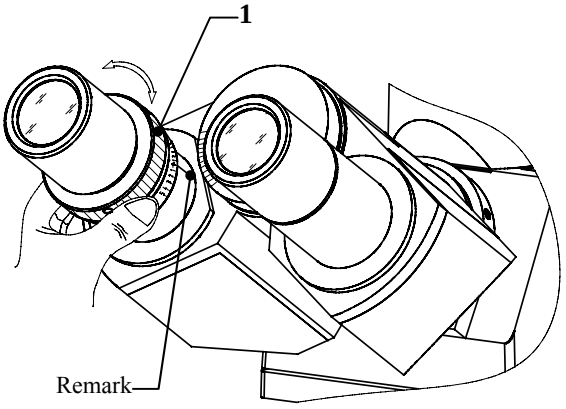
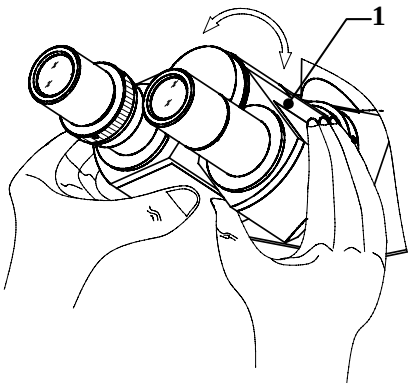


Fig.7

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.6-a, alter the exit pupil center distance of the eyepiece tubes by turning the left or right frame body 1 until the field of view becomes a fully overlapped circle, as shown in



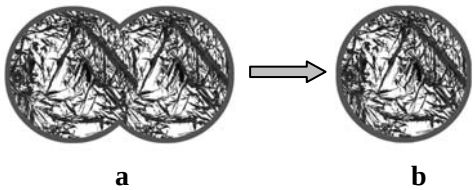


Fig.8

Fig. 8-b.

6. Check the center of light source

The optical system center of light souce has been calibrated before factory release. But the center may deviate due to any possible violent vibration or inclination during transport, so that check the center of light source according the following steps.

（1）Prepare a piece of white paper 2 (about 40mmX50mm) and place it on the working stage, press it with spring clip 1, as shown in Fig. 9-a.

（2）Take out a objective and turn the nosepiece to make the through-hole into optical path, as shown in Fig.9-b.

（3）Open the field diaphragm 3 and aperture diaphragm 4, At this point, a bright light spot will be shown on the white paper, with a filament image inside，as shown in Fig.9-f.

（4）If the filament image is unclear, adjust the collector lens to make clear by adjusting knob 7.

（5）If the filament image deviates from the center of the bright light spot, as shown in Fig.9-f, the bulb center should be adjusted, adjust the lamp transverse adjustment knob 5 and vertical adjustment knob 6 to calibrate bulb center.

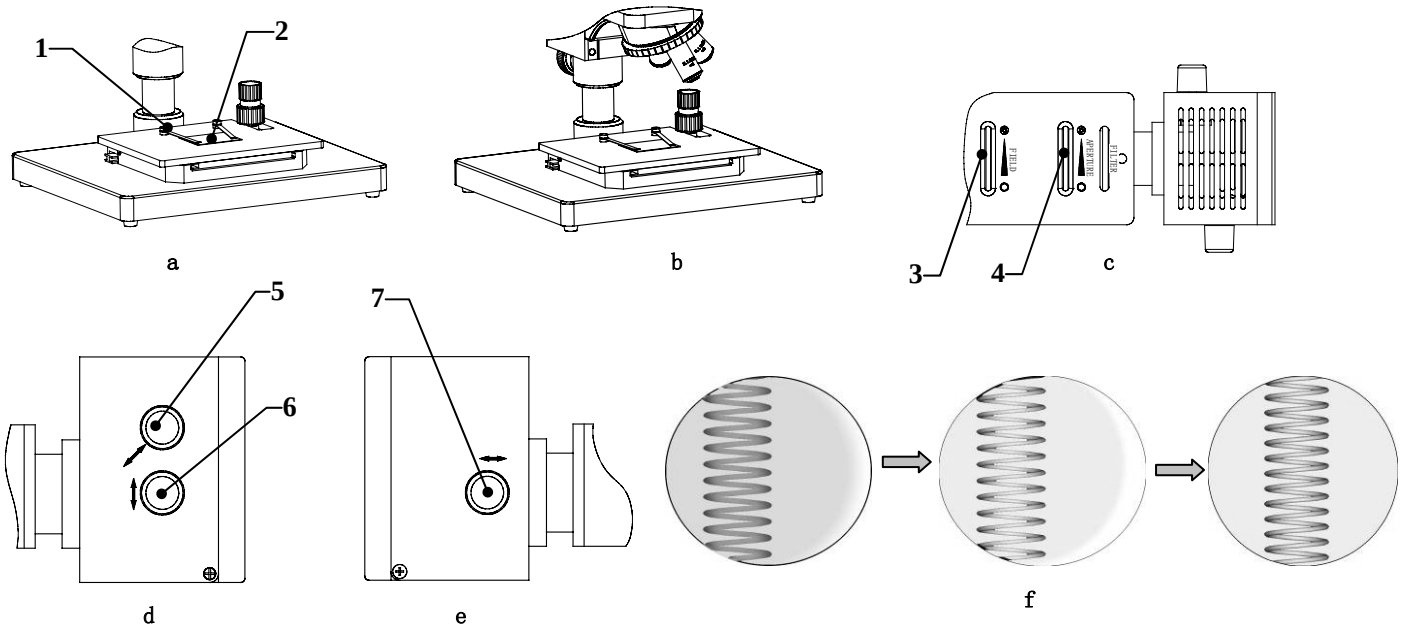


Fig.9

7. Inspecte the center of field diaphragm

(1) Turn the 10X plan objective into optical path.

(2) Open the aperture diaphragm 3, and close the field diaphragm 1, a light spot will be seen in the field of view, as shown in Fig.10-a.

(3) If the light spot deviates from the center of the field of view, as shown in Fig.10-a, take out the plastic dustproof caps 2 and adjust the centering adjustment screw with two inner hexangular wrenchs to make the field diaphragm center

superposition with the field of view center , as shown Fig.10-b, then cover the adjusting hole again.

(4) Open the field diaphragm, so that the observed specimen image fills field, as shown in Fig.10-c.

8. Adjust the aperture diaphragm

The center of aperture diaphragm 3 has been calibrated before factory release, so that it has no use for centering. When use low magnification objective, adjust the aperture diaphragm bigger, use high magnification objective, adjust the aperture diaphragm smaller.

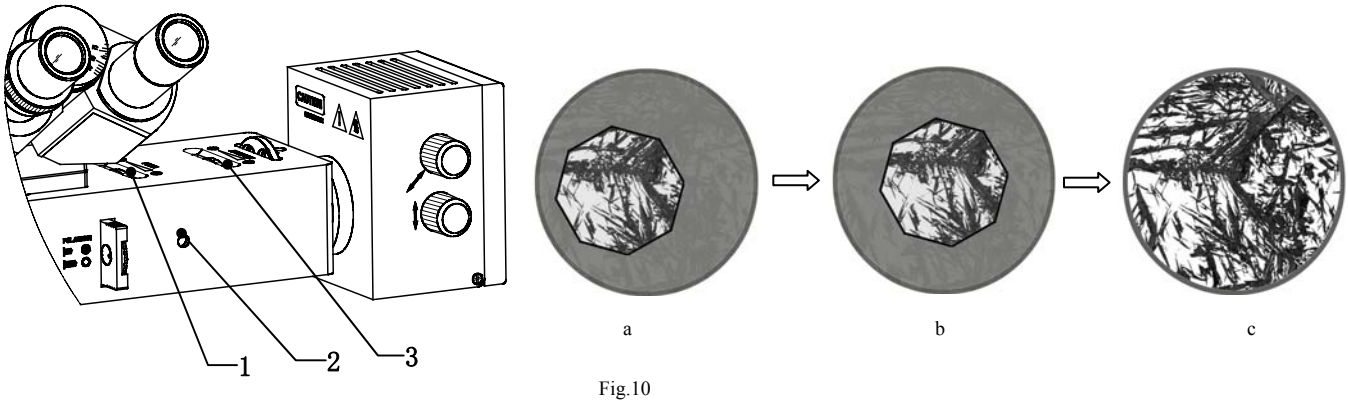


Fig.10

9. Adjust the filters

The filters are fixed in the slots of turnplate 1, there are yellow, green, blue filter and ground glass, through-hole. Turn the turnplate to switch different filters or ground glass through to exchange the image underlay or adjust the brightness of illumination，as shown in Fig. 11.

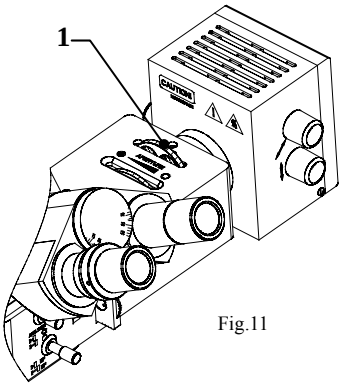


Fig.11

10. Place the metallurgical specimen or sample

Place the metallurgical specimen or sample 3 on the stage and press with two spring clips. Turn the control knob 2 and 1 to adjust the stage longitudinal (Y) and transverse (X) movement , make the specimen or sample observation area located down the objective, as shown in Fig. 12.

11. Operate stage

The knob 2 control longitudinal movement, the knob 1 control transverse movement. The stage mobile range is 35mmX30mm for X and Y. As shown fig.12.

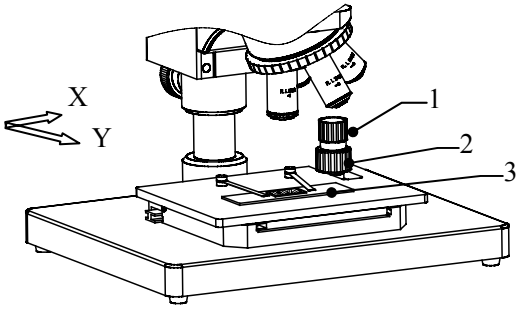


Fig.12

12. Operate coarse and fine focusing control knob

(1) Focus with the 10X objective

The coaxial coarse and fine focusing system is adopted in this instrument, with coarse tension adjusting device. 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.13. When focusing, firstly use 10X objective, turn coarse control knob to observe profile image, then turn fine control knob to focus the image clear. So that can observe image and focuse it clear with high magnification objective, no break down this kind of objective which working distance is short.

The tension of the coarse focus control knob is adjustable and preset at the factory for ease of use. If wish to adjust the coarse focus tension, turn the knob 3 to tension adjustment. Turn the wheel anticlockwise decrease the tension, and clockwise increases it, as indicated by the arrow in the figure 13.

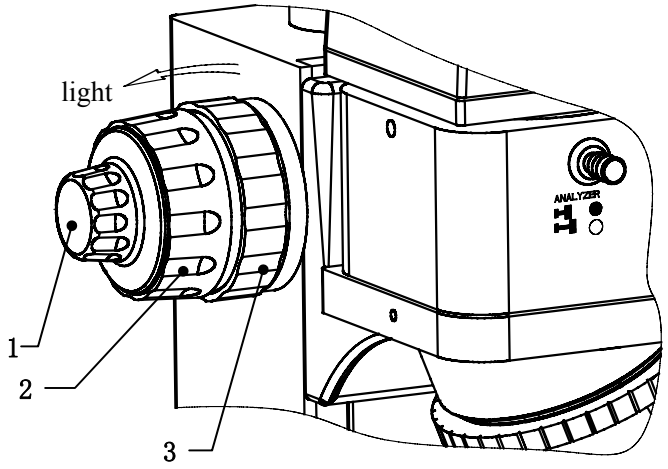


Fig.13

Caution! Too high tension may be affacted operation and physical discomfort.

13. Diopter adjustment

Adjust the diopter adjusting ring 1 (as shown fig.7) on the left eyepiece tube to calibrate diopter, which is difference between both eyes of different user.

(1) Turn 40X objective into optical path, observe micro-image in right eyepiece which the eyepiece tube has no diopter adjusting ring, and focus to make micro-image clear

(2) Observe micro-image in left eyepiece only. If the image unclear, it is necessary to adjust the diopter adjusting ring 1 to make image clear. The diopter adjusting range is N=±5 diopters.

14. Observe in polarized light

Observe in polarized light to distinguish double refraction features matter, such as crystal of liquid macromolecule polymer, biomedical polymer and liquid crystal, widely used in geology, mechanics, metallurgy, electron and etc. Equipped with polarizer 2 and analyzer 1, the polarizer can be adjusted from 0° ~360° and drawed out, but the analyzer can't be adjusted and drawed out.

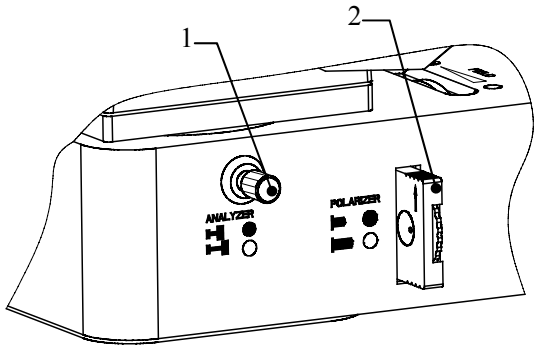


Fig.14

Push the anaylzer pole and polarizer into optical path, rotate the turnplate of polarizer to make orthogonal polarization，the field of view will be dark. Pay attention to the direction when install the polarizer, insert it from right of illuminationor to left, the position slot is located up according the direction of arrow "⇧" that marked on the polarizer，as shown in Fig. 14.

15. 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 coverd by a dust-proof cap 2. The following is peration steps.

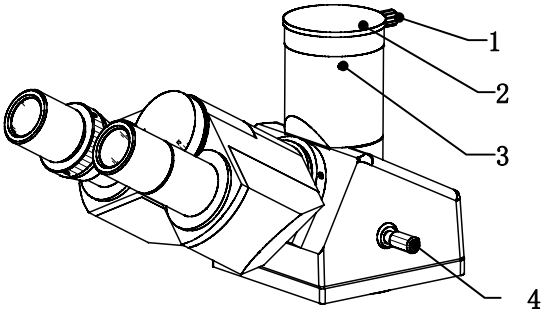


Fig.15

（1）Loosen the fastening screws 1 of the photography output terminal, and remove the dust-proof cap.

(2) Mount the photography device on the output terminal, then tighten the fastening screws again.

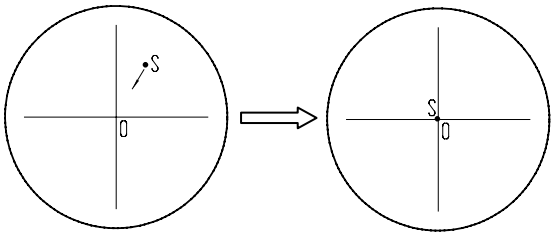
(3) Turn the 10X objective into the light path.

(4) Push the push-pull rod 4 in and focus to make micro-image clear.

(5) Push the push-pull rod 4 out to see whether the image with photograthy clear. 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, observe with eyepieces. Find a feature point in the field of view (a readily identifiable target, such as *S* point in Fig. 16-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. 16-b.



a Fig.16 **b**

b. Push the push-pull rod, 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 3 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. 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, then fasten the screws.

d. Push push-pull rod in, observe the specimen image with both eyes, and focus to make the specimen image clear.

e. Push the push-pull rod out to see if the image in the monitor or display screen is clear. If not, adjust the fine focusing control knob to make the image clear.

● **ICM-100BD industry check and measure microscope in bright / dark field**

ICM-100BD industry check and measure microscope can be used in bright or dark field, it's structural features ia as shown in fig.2. Observe in bright field of view according *ICM-100 industry check and measure microscope* operating manual, the ICM-100BD operating methold is base on the ICM-100, so that the following instruction is only included usage microscope in dark field of view.

1. Push the bright / dark field switching rod 2 out，as shown the remark " D F ".

2. Push the analyzer pole 3 out，as shown the remark " O " , mean that the analyzer is out of optical path. Draw out the polarizer 1，as shown the remark " O" , mean that the polarizer is out of optical path.

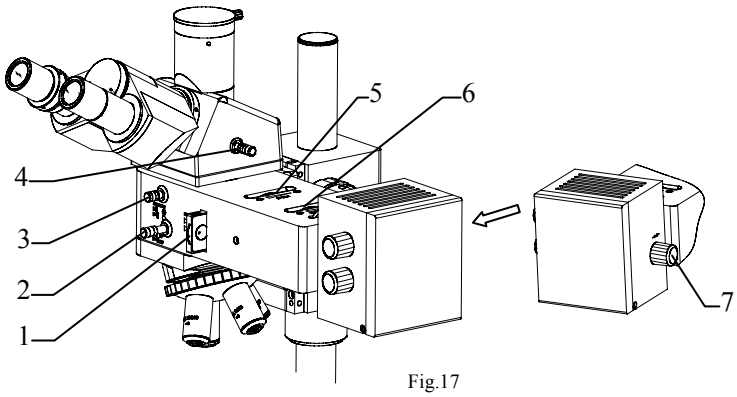


Fig.17

3. Open the field diaphragm 5 and aperture diaphragm 6 to maximum.

4. Place the specimen or sample on the working stage. Turn the control knob of stage to adjust longitudinal (Y) and transverse (X) movement , make the specimen or sample observation area located down the objective.

5. Focus to make micro-image clear in dark field. If no any micro-image in the dark field, may be view in bright field to look for objective image and focus clear firstly, then view in dark field.

6. If asymmetry in the field, should adjust the collector lens focusing knob and lamp position adjusting knob to make the illuminator facula at the center of field.

Reminder!	General requirement upper illumination birghtness in dark field, so that the brightness control is turned to larger.

VI. Replace Bulb and Fuse

Warning! To replace the bulb and the fuse, turn off the power switch and unplug the power cord, otherwise fire, personal injury or damage to this unit may occur due to electric short circuit.

1. Replace bulb

The unit light source is 6V30W for the model ICM-100 and 12V50W for the model ICM-100BD. 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 1, and unplug the power cord, as shown in Fig.19-a.

(2) Wait at least 30 minutes until the bulb and its surroundings have cool down. This is to prevent hand getting burnt by heat.

（3）Catch hold of the lamp house back cover and pull out backward，take out the defective bulb and replace a new one. Close the back cover again.

（4）Connect the power cord and turn on power switch.

（5）Check and adjust the center of the bulb according to the above-mentioned centering method for alignment of illuminator in the inverted microscope .

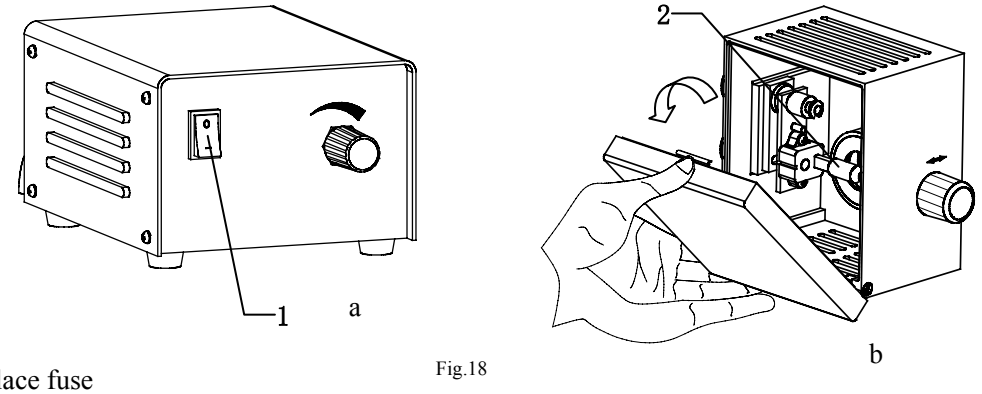


Fig.18

2. Replace fuse

The fuse is installed in the fuse socket 1, replace according the following steps.

(1) Turn off the power switch and unplug the power cord.

(2) Loose the fuse socket nut, remove the damaged fuse and replace a new one.

(3) Connect the power cord and turn on the power switch to check whether the fuse well.

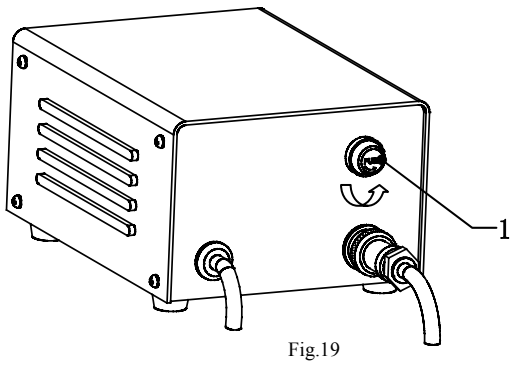


Fig.19

VII. Maintenance

1. The power switch of the main unit is the power control. When finish using this unit, press the switch to"O" to cut off the power supply, unless the electric components 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.
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%).

Reminder!

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

Wrong Right

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.

VIII. Troubleshooting

Fault	Cause	Disposition
Electric system		
No light shown in the field of view using halogen lamp	The power switch is not turned on.	Turn on the power switch.
	The halogen lamp is damaged.	Replace the halogen lamp.
	The fuse is damaged.	Replace the fuse.
	The connector of the electric chassis is in bad contact.	Check and have professional repair it.
	The halogen lamp mounted is nonconforming.	Use a conforming halogen lamp.
Optical system and imaging		
There is a black shadow on the edge of the field of view or unevenly illuminated, making it impossible to observe the whole field of view.	The nosepiece has not been turned to the fixed position.	Turn the nosepiece to the fixed position.
	The filament image deviates from the center of the collector.	Reposition the lighting bulb.
	There is dirt or oil on the surface of the objective, eyepiece or condenser	Wipe the lens surface or replace the lens.
Oil or dust is found in the field of view.	There is oil or dust on the eyepiece lens.	Wipe the eyepiece.
Defocusing or low resolution	The objective is damaged.	Repair the objective (by a professional).
	There is oil or dust on the surface of the lens of the objective or eyepiece.	Wipe the objective or the eyepiece.
	The aperture of the aperture diaphragm is too small.	Adjust the aperture of the aperture diaphragm based on the objective magnification (or numerical aperture) used.
	The objective deviates from the light path.	Turn the nosepiece to the fixed position.
The focal plane of the image is inclined (brighter on one side and darker on the other)	The lighting bulb is seriously inclined.	Reposition the lighting bulb.
	The specimen is not laid flatly.	Lay the specimen flatly on the object stage and hold it stably.
Mechanical system		
The image cannot remain clear during observation.	The focusing mechanism flows (slides down) automatically.	Adjust the coarse adjusting hand wheel.
	The fine focusing mechanism fails	Check and have professional repair it.
	The stage loosens or is inclined.	Check and have professional repair it.