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**5108-M3000 SERIES
METALLURGICAL MICROSCOPE
(PROFESSIONAL TYPE)
MANUAL**



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◆ 15. Use of DIC formation

(1) Under the bright field observation, focus the specimen with 10X and 20X objective lenses to make the image of the specimen clear. (See Fig.30)

(2) Push the polarizer and the polarizer into the optical path to ensure that the polarizer and the polarizer are in an orthogonal state, that is, the field of view is the darkest. (See 3-12 for the use of simple polarizer)

(3) Loosen the locking screw ① on the front of the objective converter, pull out the dust plug plate, and then insert the DIC assembly ② into the slot face up, and insert it to the bottom, and tighten the locking screw ①.(Fig.30)

(4) Adjust the trimming knob ③ to make the interference color in the field of view consistent, select the appropriate background interference color for observation, and make the differential interference contrast image achieve the best effect, that is, the relief effect is the most obvious.

(5) The fine-tuning knob ③ can control the background interference color to change from gray to purple.

★ At the same time, the aperture diaphragm can be adjusted to achieve the best effect of inverse difference;

★ Due to the high sensitivity of differential interference phase contrast, the film surface shall be free of dirt and dust.

★ Materials with birefringence cannot achieve the effect of differential interference phase contrast mirror inspection.

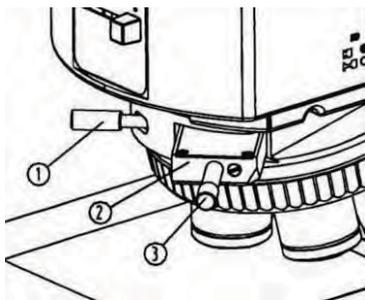
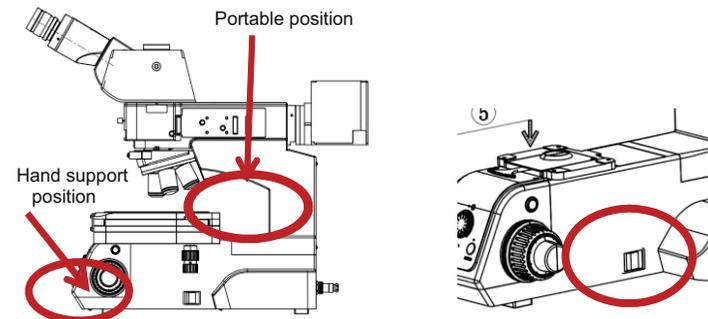


Fig.30

Instructions before use

- ◆ The microscope is a precision instrument. Be careful when operating and avoid physical vibration as much as possible.
- ◆ Avoid placing the microscope in places where there is direct sunlight, high temperature or humidity, dust and strong vibration, and ensure that the working surface is flat and level. Working environment requirements: room temperature 5°C~40°C, maximum relative humidity 80%.
- ◆ Two people are needed to move the microscope. One holds the arm with both hands, and the other holds the bottom of the mirror body, and handle it with care. (See the figure below).
 - ★ If you hold the stage, focusing knob, observation tube and light source of the microscope while moving the microscope, it will cause damage to the microscope.
- ◆ Two people are needed to move the microscope. One holds the arm with both hands, and the other holds the bottom of the mirror body, and handle it with care. (See the figure below).
- ◆ Ground the machine to avoid lightning strike.
- ◆ To ensure safety, before replacing the fuse, make sure that the main switch is at the "O" position (see the left figure) and cut off the power supply.
- ◆ This machine adopts wide voltage and can adapt to any voltage in the range of 90-240V without additional transformer. Ensure that the supply voltage is within this range.
- ◆ Use the special power adapter provided by our company.



Maintenance

- ◆ Gently wipe and clean the lens with gauze. If fingerprints and oil stains are to be removed, gently wipe them with a small amount of 3:7 ethanol ether mixture or xylene wet gauze.
 - ★ Both ether and alcohol are extremely flammable. Pay attention not to put these chemicals close to open flames and possible sources of electric sparks. For example, when opening and closing electronic equipment, try to use these chemicals in a well-ventilated room.
- ◆ Do not use organic solvent to wipe the non-optical parts of the microscope. If you want to clean, please use neutral detergent.
- ◆ When using, if the microscope is wet with liquid, cut off the power supply immediately and wipe it dry.
- ◆ Never disassemble any part of the microscope. This will affect the function of the microscope or damage the microscope.
- ◆ When the microscope is not used, it should be covered with dust cover.

Safety signs

- ◆ Mark I represents main switch ON
- ◆ Mark O represents main switch OFF
- ◆ Sign! It means to read the instructions carefully before use. Improper operation may cause personal injury or instrument failure.

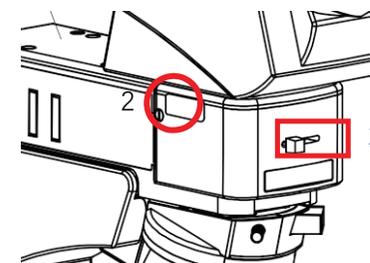


Fig.28

- ◆ 14 Installation and use of camera device
 - (1) Loosen the locking screw ① on the three-eye observation cylinder and install the three-way dust cover② Remove. (See Fig. 29)
 - (2) Remove the dust covers at both ends of the camera receiver ③, install the camera receiver into the tee connector in the direction shown in the figure, and tighten the locking screws ①.
 - (3) Connect the CCD or industrial camera to the adapter CTV ③.
 - (4) Carry out binocular observation. After the image is clear, pull the optical path selector rod ④ to the outside and observe the image. If it is not clear.

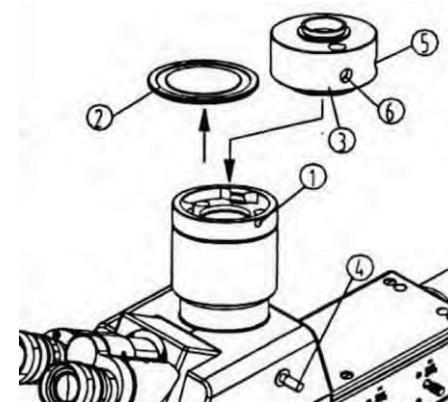


Fig.29

◆ 12 Use of simple polarizer

The simple polarizing device includes a polarizer and a polarizer.

(1) Remove the dust cover ① from the socket of the reflection illuminator, and then insert the polarizer insert plate ② into the socket of the reflection illuminator in the direction shown in the figure, and then move the polarizer into the optical path after two clicks. (See Fig.27)

★ When using polarizer, the color filter should be pulled out.

(2) Remove the dust cover ③ on the reflector polarizer socket ④, and insert the 360-degree rotation polarizer plug ⑥ into the reflector polarizer socket ④ face up in the direction shown in the figure, and insert it into the fixed position.

(3) When the 360-degree rotating polarizer is aligned to zero (or fixed polarizer is used), the polarizer and polarizer are in an orthogonal state.

(4) Move the dial 7 of the rotary polarizer to change the orthogonal state of the polarized light.

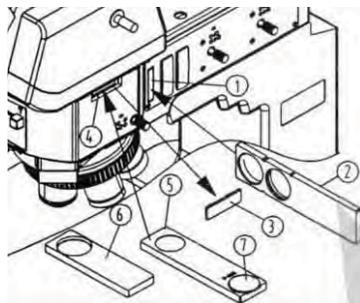


Fig.27

◆ 13 Switch between light and dark fields

The light and dark fields of the system can be switched by dialing ① fast. When the dial is pushed to the leftmost BF, the system is in the light field for observation. On the contrary, the system is in the dark field. (See Fig.28)

For dark-field illumination, the aperture aperture aperture and field aperture should be opened to the maximum.

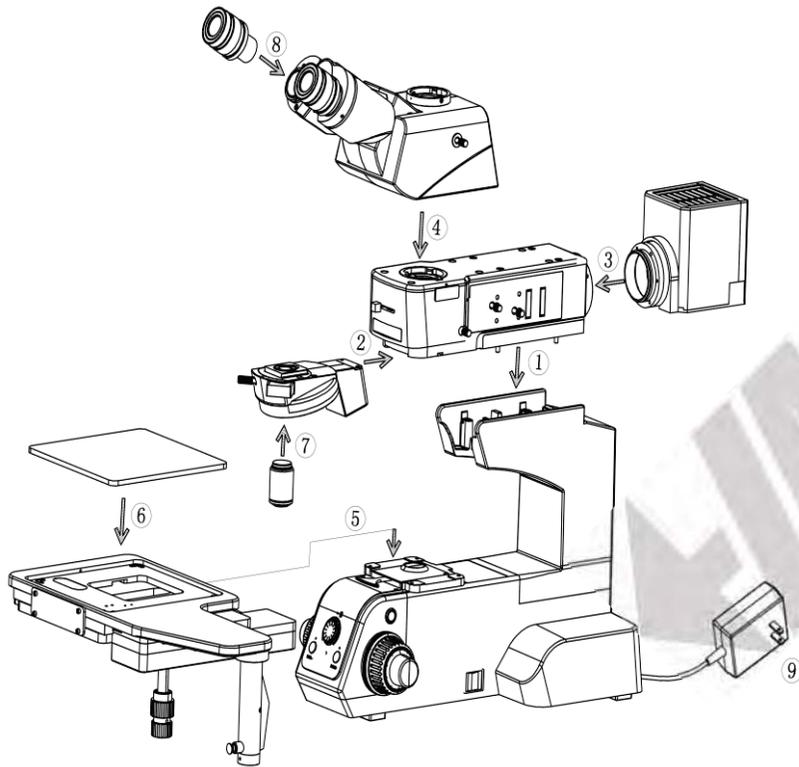
BF represents light field observation, DF represents dark field observation.

Structural



Installation diagram

- ◆ The following illustration shows how to install various components, and the number indicates the installation sequence.
- ★ Before installation, make sure that all parts are free of dust, dirt and other foreign matters affecting assembly. Be careful not to scratch during installation.



- ◆ 11 Use color filter
 - The use of color filters can make the background light of the image more suitable to improve the contrast of the image. (See Fig.25)
 - ★ When the color filter is not used, the attached dust cover shall be covered. When using the external color filter, now take off the dust cover ② on the reflection illuminator socket 1, and insert the color filter insert ③ into the slot of the lighting system face forward in the direction shown in the figure. (See Fig.25)
 - The filter has three colors: green, blue and red.
 - ★ When the color filter is not used, the attached dust cover shall be covered. When using the built-in color filter, push the pull rod (1) inwards and inwards, and move the color filter into the optical path. (See Fig. 26)

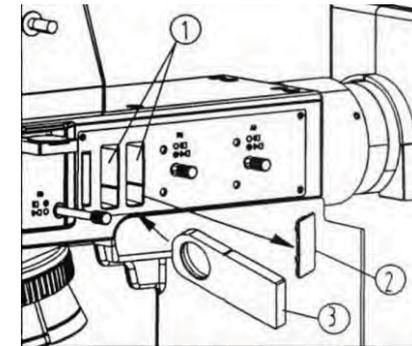


Fig.25

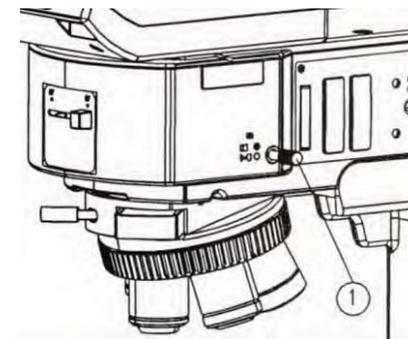


Fig.26

◆ 10 Aperture diaphragm adjustment

(1) The aperture aperture determines the numerical aperture of the lighting system. The matching of the numerical aperture of the lighting system and the numerical aperture of the objective lens can provide better image resolution and contrast, and can increase the depth of field.

(2) The change direction of the aperture size is the same as that of the field aperture. The aperture size is controlled by adjusting the aperture dial ①. Adjust the left and right aperture diaphragm adjusting screws ② to adjust the image of the aperture diaphragm to the center of the aperture. If necessary, remove the eyepiece, observe from the eyepiece barrel, and adjust the aperture diaphragm adjusting ring ① until you see the image shown in Fig.23.

(3) Adjustment of aperture diaphragm for projection illumination: control the size of diaphragm by adjusting the aperture diaphragm adjusting handle 1. If necessary, remove the eyepiece, observe from the eyepiece barrel, and adjust the aperture diaphragm adjusting handle ① until the image shown in Fig.24 is seen.

In actual use, the size of the aperture diaphragm can be adjusted according to the size of the image contrast of the observed sample, subject to comfortable observation and good contrast.

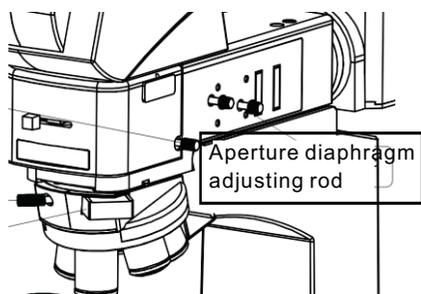


Fig.22

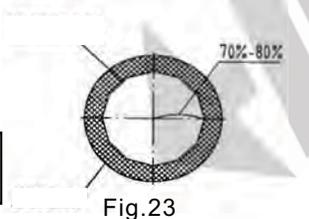


Fig.23

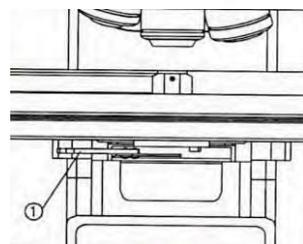


Fig.24

① Installation steps:

◆ 1 Installation of lighting system

(1) Use a small arrow tool to counter the notch of the cap on the illuminator and take off the cap.

(2) Place the illuminator roughly along the matching fillet of the side into the mirror body, and then push it towards the direction of the light source to make the falling illuminator flush with the mirror body (As shown in Fig.1)

(3) Use M5 Allen wrench to lock the four M5 Allen screws in the illuminator, and then put the cap back in place.

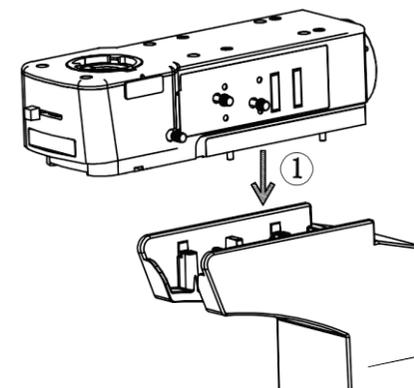


Fig.1

◆ 2 Install the lamp source assembly

- (1) Loosen the fastening screws ① on the illuminator completely. (See Fig.2)
- (2) Gently push the light source group ② into the light source connection base ③ of the illuminator group and push it to the bottom, then tighten the fastening screw ①.

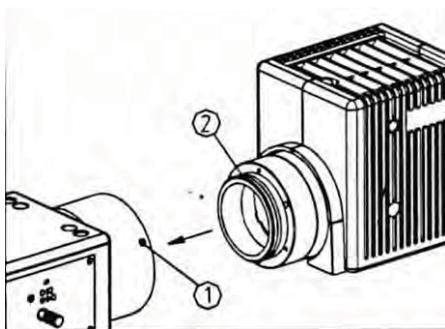


Fig.2

◆ 3 Install the observation tube

- (1) Loosen the observation head locking screw ① completely.
- (2) Turn the dovetail connector at the bottom of the observation tube from the center of the round hole on the illuminator to the left, slightly tilt to the right, insert the round hole along the hole opening, make the two tubes of the observation tube face forward, and tighten the locking screw ①. (See Fig.3)

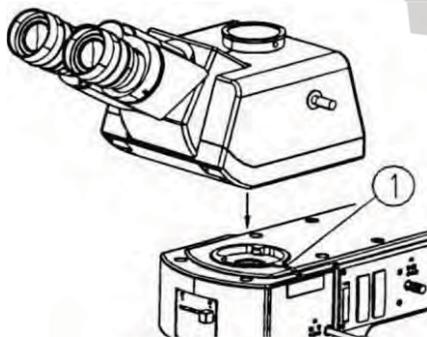


Fig.3

◆ 9 Field diaphragm adjustment

The field of view diaphragm limits the diameter of the beam entering the condenser, thus eliminating the peripheral light and enhancing the image contrast. When the imaging of the field aperture is just at the outer edge of the field of view, the objective lens can play the best performance and obtain the clearest image. (1) Turn the adjustment dial ① of the field diaphragm to the outermost end, that is, turn the field diaphragm to the minimum. (See Fig.20)

(2) Through eyepiece observation, the imaging of the field aperture can be seen in the field of view at this time.

(3) Adjust the left and right field diaphragm centering screws ② to adjust the image of the field diaphragm to the center of the field.

(4) Open the field diaphragm step by step. If the image of the field diaphragm is inscribed with the field of view, it means that the field diaphragm is correctly aligned. (See Fig.21)

(5) In practical use, slightly enlarge the field of view diaphragm so that its image is just tangent to the field of view. XY moves quickly in two directions. If you need to turn off the fast move function, press the fast switch button 3, and the clutch control lever 5 will reset, and the fast move function will stop.

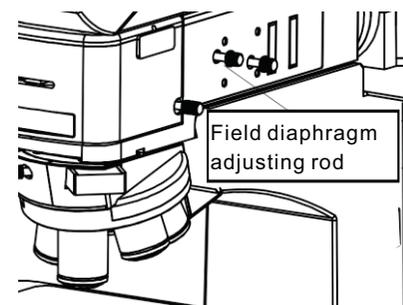


Fig.20

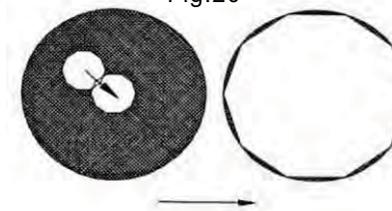


Fig.21

◆ 8 Stage adjustment

- (1) Loosen the four fixing screws in front of the platform to make the platform normal.
- (2) Place the sample to be observed on the stage and move the 5X objective into the optical path.
- (3) Rotate the X and Y axes of the stage to move the handwheel, move the sample to the center position, and align it with the center of the objective lens.
- (4) If the position of the sample to be moved is far from the central area of the objective lens when observing multiple samples, the platform can be used to move quickly (the 6/8-inch platform has the function of rapid movement). The specific operation method is as follows: first press and hold the clutch control lever 5 in the direction of the handle, then release it, and then quickly move the platform in XY direction through the handle ④. If you need to turn off the quick move function, press the quick switch button 3, and the clutch control lever 5 will reset, and the quick move function will stop.

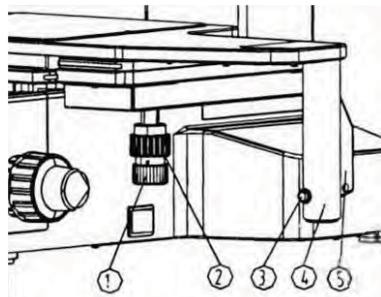


Fig.18

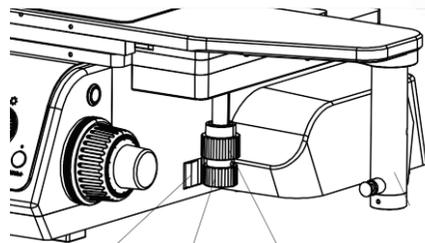


Fig.19

power switch	X-axis movement knob	Y-axis movement knob
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◆ 4 Installation of stage/glass platform

- (1) Turn the rough hand wheel ① in the direction of the arrow to lower the stage bracket ② to the lowest. (Fig.4)
- (2) Place the stage gently in the center of the stage bracket.
- (3) Align the screw hole on the stage with the screw hole on the stage bracket and fix it with screws. (See Fig.5)
- (4) Gently put the glass platform into the groove of the loading platform, keep the glass platform perpendicular to the optical axis, and fix the glass platform with locking screws.

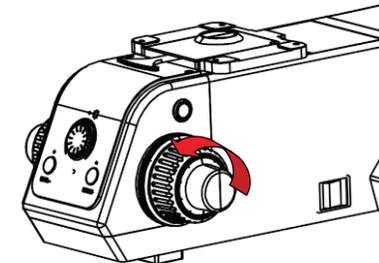


Fig.4

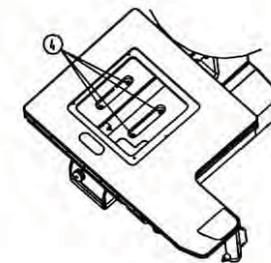


Fig.5

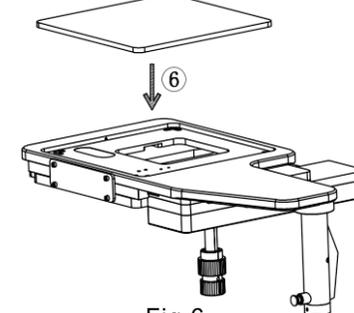


Fig.6

◆ 5-1 Installation of objective lens

- (1) Unscrew the locking screw ① on the illuminator. (See Fig.7)
- (2) Align the dovetail connector ② on the objective converter with the dovetail slot of the illuminator, push it to the innermost part, and then tighten the locking screw ①.

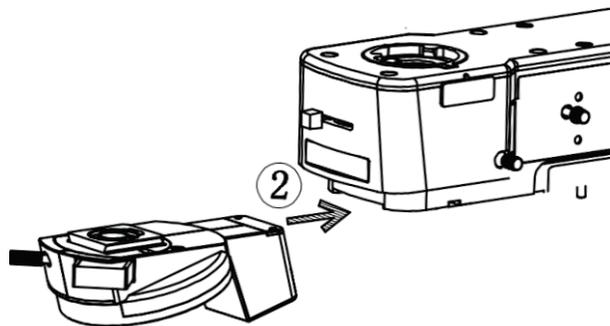


Fig.7

◆ 5-2 Installation of objective lens

Turn the rough hand wheel, lower the stage, and then install the objective lens on the objective lens converter clockwise from low to high magnification. (See Fig.8)

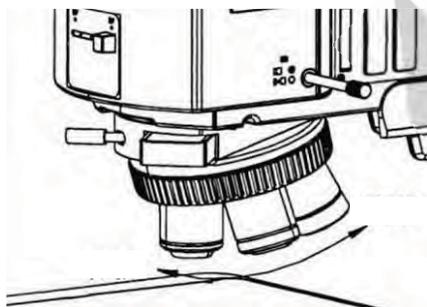


Fig.8

◆ 6 pupillary distance adjustment

When observing with both eyes, hold the left and right prism bases and rotate around the rotation axis to adjust the pupil distance until the left and right fields of view are combined and the observation is comfortable. (As shown in Fig.16) Adjustment range of pupil distance: 50~76mm.

The indicator point "." above the left eyepiece base points to the scale on the pupil distance indicator, indicating the size of pupil distance. (See Fig.16)

★ Remember your pupil distance for next use.

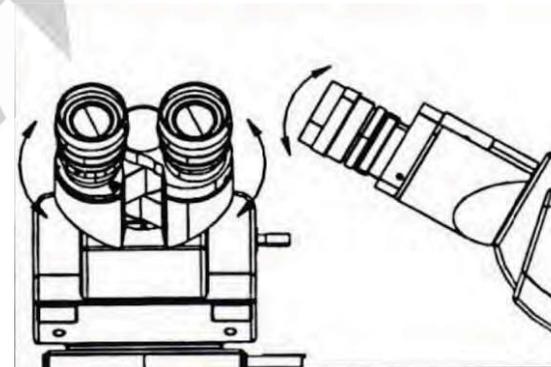


Fig.16

◆ 7 Use eye mask

(1) When users with glasses observe, turn down the goggles, so as to prevent the glasses from touching the eyepiece, so as to avoid scratching the glasses and eyepiece.

(2) When users without glasses observe, open the goggles to prevent stray light from interfering with observation. (See Fig.17)

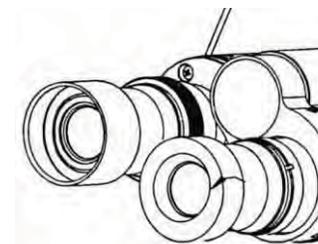


Fig.17

◆ 4. Adjustment of the tightness of the focusing mechanism

If the hand feel is heavy and uncomfortable during coarse focusing, or the sample leaves the focus plane quickly after focusing, and the stage drops automatically, these can be solved by adjusting the elastic adjusting ring ①, and the weight of the focusing mechanism can be changed by rotating in the direction shown in the figure. (See Fig.14)

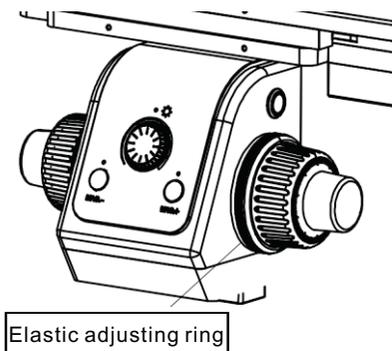


Fig.14

◆ 5 Visual adjustment

After the image of the right eyepiece is clear, observe the left eyepiece with the left eye. If it is unclear, clear, rotate the diopter adjusting ring ① until the image is clear. (See Fig.15).

There are ± 5 diopters on the adjusting ring, and the value aligned with the straight line on the seat is the diopter value of the eye. The indicator point "." on the left also serves as an indicator.

When using an eyepiece with adjustable visibility, first set the visibility of the eyepiece to zero. You can also adjust the visibility of the eyepiece during use to make the image clear.

★ Remember the visibility value of your eyes for the next use.

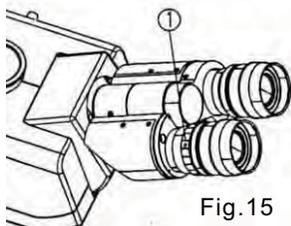


Fig.15

◆ 6 Mounting eyepiece

(1) Remove the eyepiece dust tube cover ①. (See Fig.9)
 (2) Insert the eyepiece ② into the eyepiece tube until the end. There are stop pins on the eyepiece. Make sure that the stop screw holes on the eyepiece barrel are aligned.

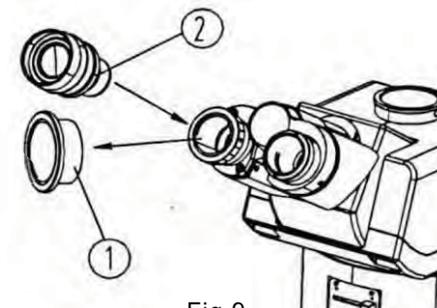


Fig.9

◆ 7 Connect the power cord

(1) Make sure the switch is in the "O" (OFF) state.
 (2) Insert the light box power cable connector ① into the gap of the microscope connector ② and align it with the gap of the microscope connector ②. After the connector ② is inserted to the end, lock the nut ④. (See Fig.10)
 (3) Plug one end of the 12V power cord into the power socket ③ of the microscope.
 (4) Plug the other end of the power cord into the power socket.

★When bending and winding, the power cord is easy to be damaged. Do not use too much force.

★Always use the power cord provided by the company. If it is lost or damaged, choose another suitable power cord.

★Connect the power cord correctly and ensure the instrument is grounded.

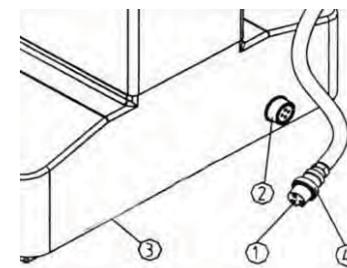


Fig.10

Usage method

◆ 1 Lighting

- (1) Turn on the power and put the main switch in the "-" state.
- (2) Adjust the dimming handwheel ①, and adjust the lighting brightness until it is comfortable to observe. Turn the dimming handwheel clockwise to enhance the brightness; On the contrary, it will weaken (as shown in Fig.11)

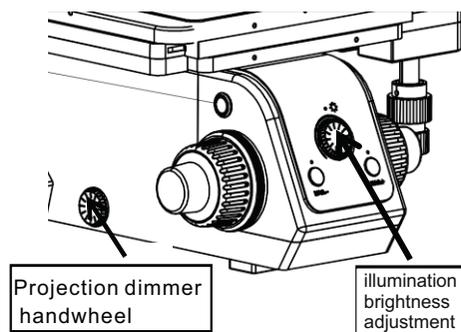


Fig.11

◆ 2 Selection of optical path

Push the light path selector ① to the innermost position, and the light enters the binocular for visual observation. (See Fig.12)When the selector lever is pulled to the outermost position, the light enters the three-way observation tube for photography.

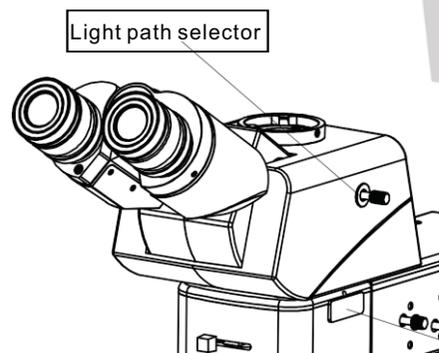


Fig.12

◆ 3 Focus

- (1) Place the sample to be observed on the stage and move the 5X objective lens into the optical path.
 - ★ When placing the sample, the observation surface should be perpendicular to the objective lens. If necessary, use plasticine to assist in placing the sample.
- (2) Loosen the rough adjustment upper limit handwheel ①, align the left sight adjustment ring of the observation cylinder to "0" (see 3-5 sight adjustment for details), observe the right eyepiece with the right eye, turn the rough adjustment handwheel ② until the outline of the observation specimen appears in the field of view, and then lock the rough adjustment upper limit handwheel. (See Fig.13)
 - ★ When using the eyepiece with adjustable visibility, the visibility of the eyepiece should be zero.
 - ★ Rough adjustment of the upper limit handwheel can prevent the objective lens from colliding with the sample during focusing, so as to avoid damaging the objective lens or the sample.
 - ★ Rough adjustment of the upper limit has no effect on the inching handwheel.
- (3) Turn the inching handwheel ③ to make the details of the specimen clear.

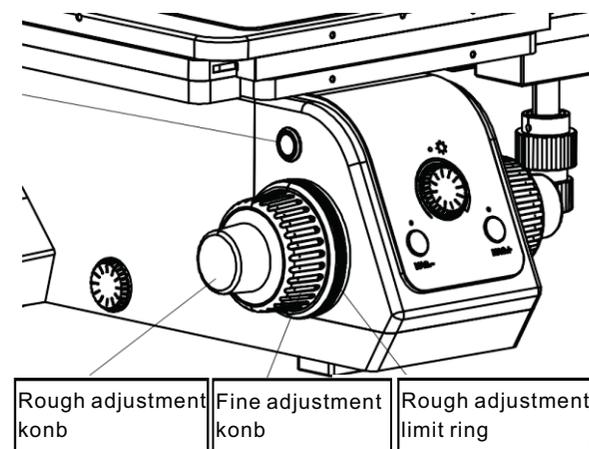


Fig.13