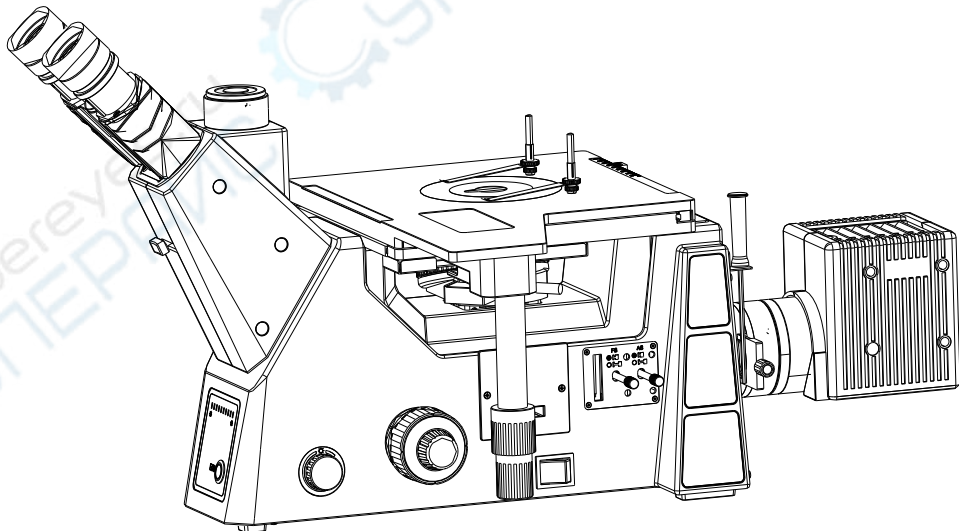




A13.0912-A

Inverted Metallurgical Microscope,
BF/DF, DIC, PL, ECO

Instruction Manual



Before using

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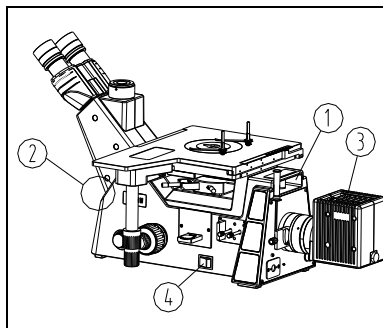
Attentions

Fig. 1

1. As the microscope is precision instruments, it should be taken carefully and avoid impact during transportation.
2. Do not expose the microscope in the sun directly, either not in the high temperature, damp, dusty or acute shake place. Make sure the worktable is horizontal. Following environment is required: Indoor temperature: 5°C~40°C, Max relative humidity:80%.
3. To move the microscope, need One hand need to jack up the lower side of observation tube ①, another hand need to lift up the Handle ②, and lay it carefully.

(Fig. 1)

★ It will damage the microscope if handling the stage, focus knob, observation head and lamp house during moving microscope.

4. The lamp will be very hot during working ③, please make sure there is enough space around for dissipating.
5. Please make sure the power switch ④ is "0"(Off) **(Fig. 1)** and the bulb cool down before replace the bulb or fuse.

★ **Bulb: 12V/50W halogen bulb (Philips 7027.**

6. It adopt widely voltage 90~240V, and do not need any transformer. Please make sure the power supply before using.
7. Please use special wires supplier by our company.



Maintenance

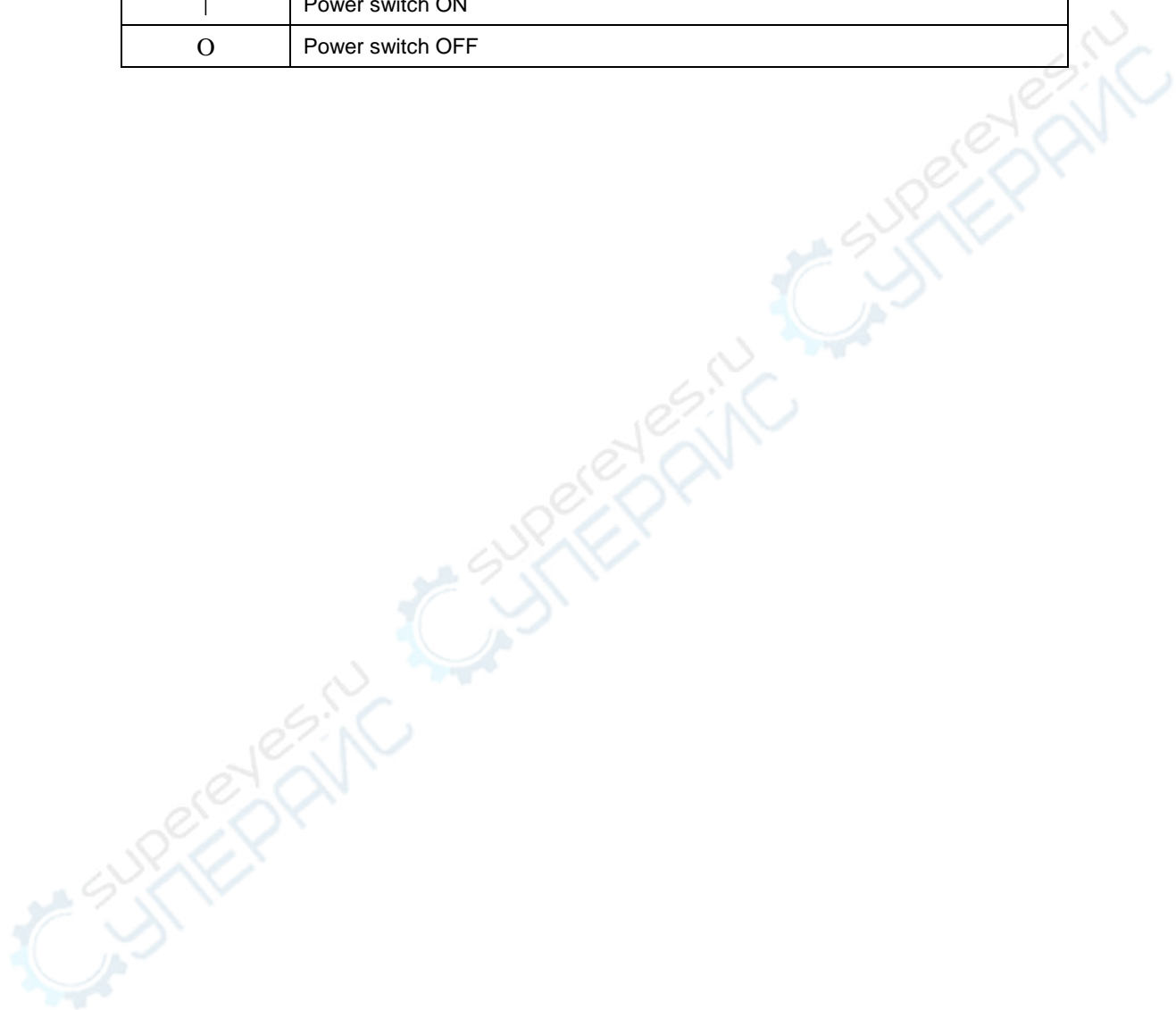
1. Clean the lenses gently with a soft lens tissue. Carefully wipe off oil or fingerprints on the lens surfaces with tissue moistened with 3:7 mixture of ethanol and aether or dimethylbenzene.

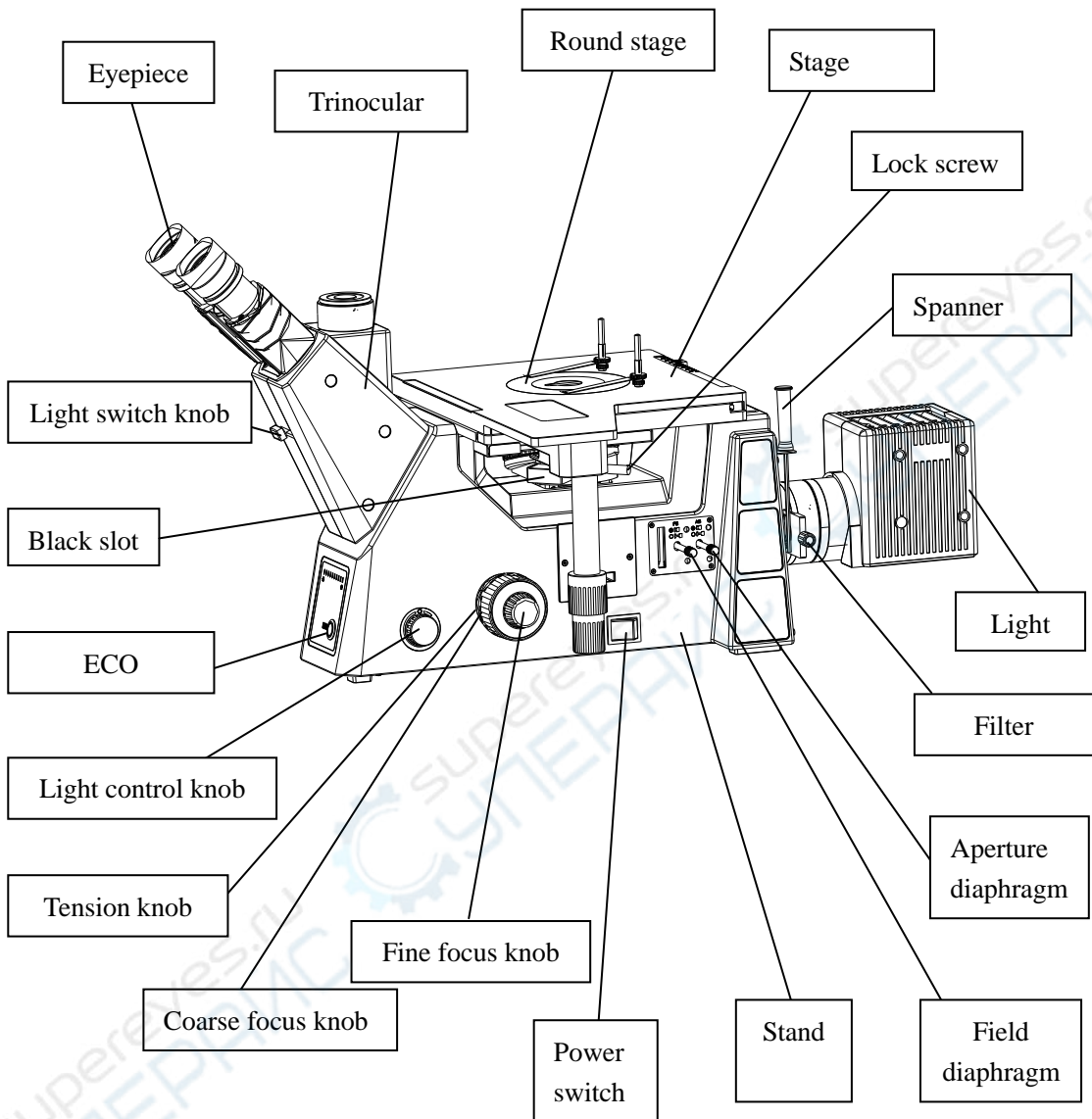
★ **Ethanol and Aether are both flammable. Please leave them away from fire or fire source, especially during the power switch turn on and turn off.**

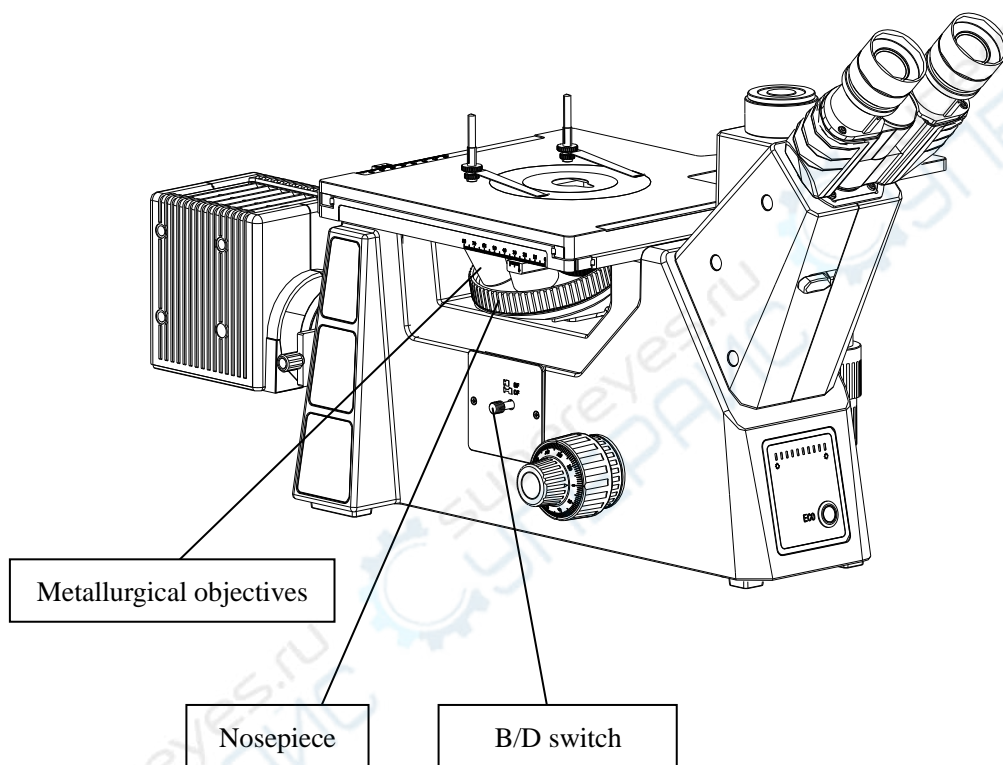
2. Don't use organic solution to clean the surfaces of the microscope, especially for plastic parts, Please use the neutral detergent if necessary.
3. If the microscope damped by the liquid during working, please cut off the power immediately and make it dry.
4. Do not disassemble or assemble the microscope to avoid damaging the capability.
5. After using, put on dust cover to protect microscope.

Safety Sign

Sign	Signification
	It shows the surface gets hot and don't touch with bare hand.
	Read the introduction before using. Unsuitable operation would lead person hurt or instrument faulty.
	Power switch ON
O	Power switch OFF







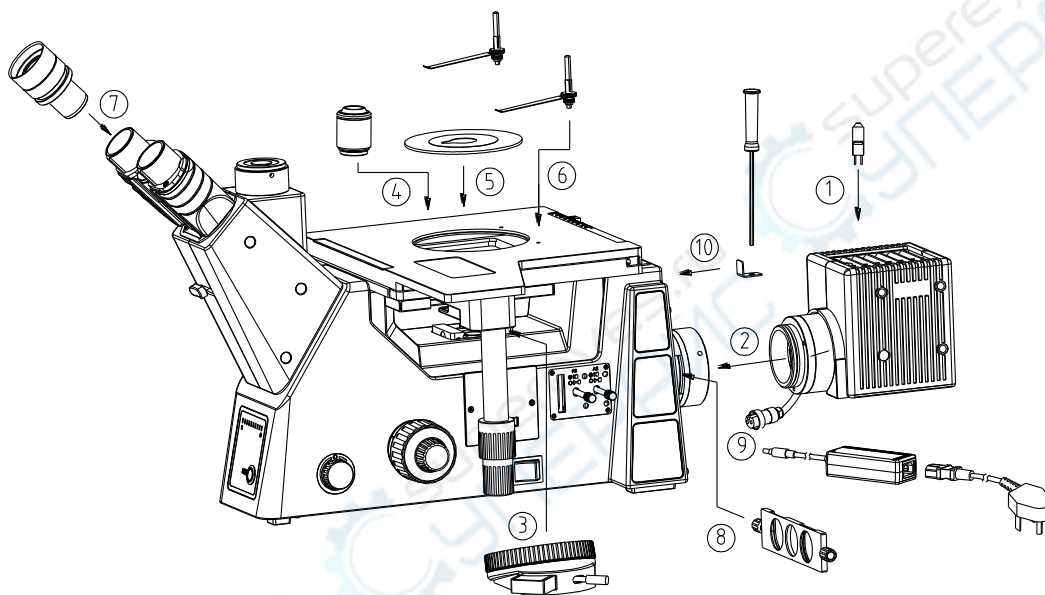
2. Assemblage

A13. 0912

2-1 Assemblage scheme:

The numbers denote the assemblage order:

- ★ Before assembling, make sure there is no dust or dirt.
- ★ Assemble carefully and do not scrap any part or touch the glass face.



2-2 Assemblage step

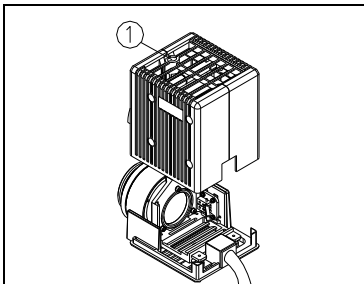


Fig. 2

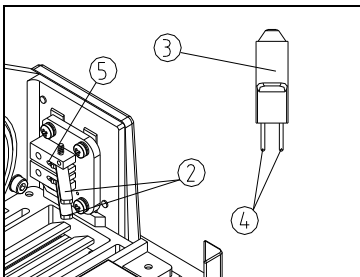


Fig. 3

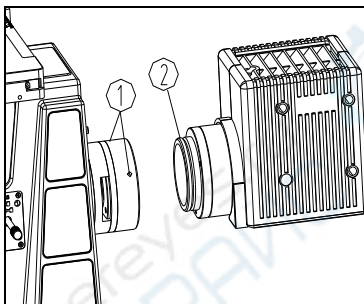


Fig. 4

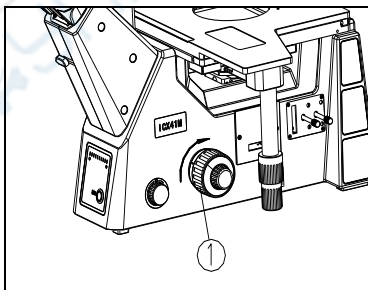


Fig. 5

2-2-1 Set the bulb

(1) Loose the lock screw ① completely and take off lamp house (Fig.2).

(2) Take off lock chip ② for the lamp, and hold the lamp with glove or clean cloth. Then put the lamp feet ④ into the slot ⑤. Make sure the lamp should be vertical. (Fig.3)

(3) Put on lock chip ② and lamp house and lock the screw ①.

★ **Standard bulb: 12V/50W halogen bulb.**

★ **In order to prevent the reduction of lamp life and Bulb burst, don't touch the bulb with finger. If there is a fingerprint on it, clear it with clean gauze.**

★ **Replace the bulb during or after operation:**

During or just after operation, the bulb, bulb house and around is very hot. Before replace the bulb, please set the power supply at "o"(OFF) and take off the power plug. After all of them cooling down to replace bulb.

2-2-2 Assemble the lamp house

(1) Loose the lock-screw ①. (Fig.4)

(2) Put the lamp house ② into connect holder and lock ①.

2-2-3 Assemble nosepiece

(1)With the showed direction to turn coarse focus knob ① to make the focus to limit position. (Fig.5)

(2) Loose the lock screw ①. (Fig.6)

(3)Set the nosepiece and lock. (Fig.6)

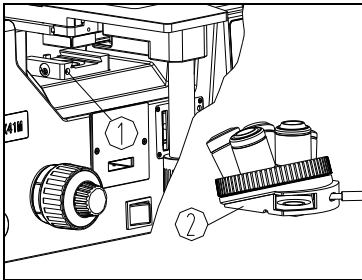


Fig. 6

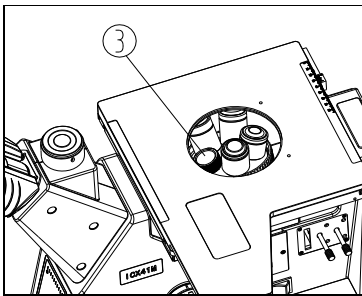


Fig. 7

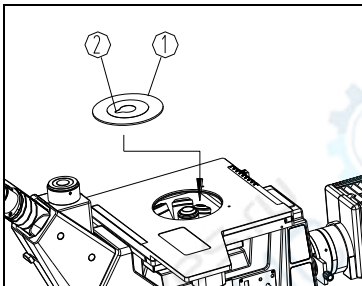


Fig. 8

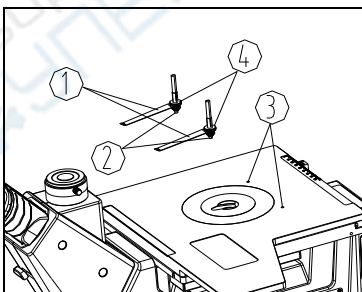


Fig. 9

2-2-4 Assemble the objectives

(1) With the showed direction to turn coarse focus knob ① to make the focus to limit position. (Fig.5)

(2) Install the objective into the microscope nosepiece from the lowest magnification to the highest in a clockwise direction from the left or right side.

★ The objective could be assembled by aperture on the stage.

★ Clean the objectives periodically, cause the inverted microscope objective is sensitive.

★ Search and focus the sample by low magnification objective (5X or 10X) when using the equipment.

Then change to the high magnification ones according as the situation observation requires.

★ When changing the objectives, Turn the nosepiece and make sure the objective is shift in the light path until hear a “click”.

2-2-5 Assemble the round sample stage

(1) Assemble the metal stage ① on the stage hole.

(2) Turn the metal stage to face ② to the user.

(3) When assemble the glass stage, it is much easier to put on directly.

2-2-6 Assemble the slice clips

(1) Take out clips ① from ②. (Fig.9)

(2) Screw ② into hole on stage and lock.

(3) Put clips ① into ② and make it points to stage Center.

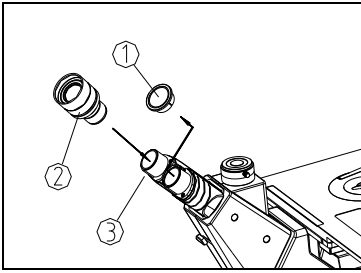


Fig. 10

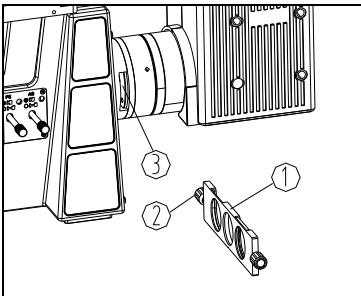


Fig. 11

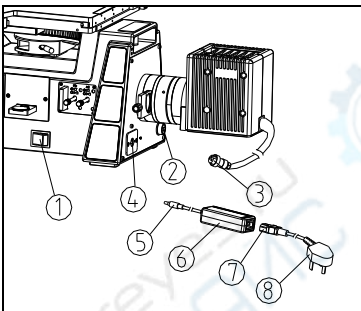


Fig. 12

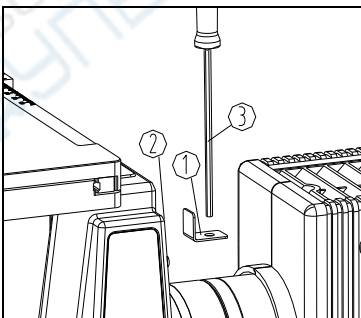


Fig. 13

2-2-7 Assemble the Eyepiece

(1) Take off the cover① of eyepiece tube. (Fig.10)

(2) Insert the eyepiece② into the tube thoroughly.

(3)When using eyepiece with diopter adjusting, please use screw③ to fix the eyepiece② in order to prevent the eyepiece② truning.

Put clips① into② and make it points to stage

2-2-8 Set the filter board

Take off the knob② from filter board①, and insert the board① into slot③. After “click”, it shows the filter board set correctly, then lock the knob②. (Fig. 11)

2-2-9 Connect power supply

(1) Ensure the main switch① is on“O”(OFF) (Fig.12)

(2) Insert one side of the wire③ to aviation plug socket ②.

(3)Insert plug⑤ into slot④ from the microscope well.

(4) Insert plug⑦ into slot⑥ from the power supply.

(5) Connect③.

★ Please curve and enlance the plug wire softly to Avoid damage it.

★ Please use the standard plug wire provide our company. Select suitable one when missing or damaging.

2-2-10 Fix spanner

(1) Absorb the spanner holder on microscope stand②. (Fig. 13)

(2) Put the spanner③ on the holder①.

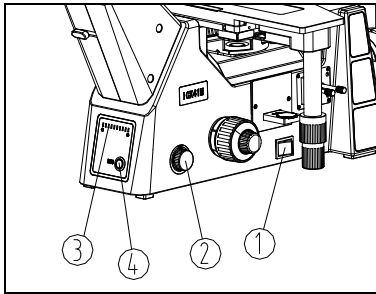


Fig. 14

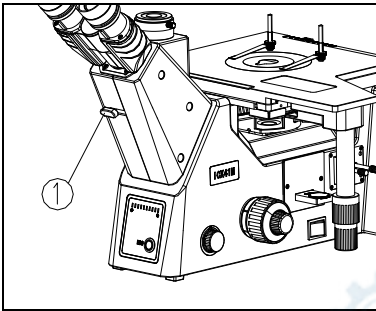


Fig. 15

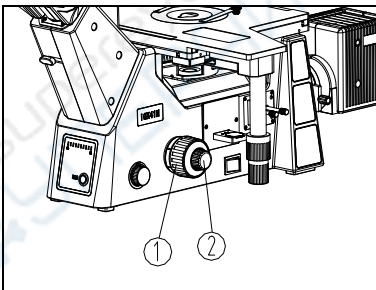


Fig. 16

3-1 Illumination

(1) Turn on the power supply, and put the power switch ① at “ON” position. (Fig. 14)

(2) Turn the knob ② to adjust brighten till comfortable. Turning in clockwise to make the light brighter while anticlockwise for weak light. The brightness will show on ECO display ③.

★ Use the bulb in low voltage to increase the service life of it.

(3) The button ④ is for ECO function to save electricity. When the operator leave for 30 minutes, the light will get off itself. When the operator come back again, the light will get on again.

★ The standard ECO time is 30 minutes.

3-2 Shift the optical way

Shift the optical way by moving the block ①. When the block is at most left, the prismatic is 0:100(binocular: trinocular), the light is exactly for third-tube out-put. When the block is at most right, the light is all for binocular. (Fig. 15)

3-3 Focus

(1) Place the sample on the stage , move the objective 5X/10X into the light path.

(2) Adjust the right diopter adjustment ring to “0” , (see 3-6 Adjust diopter), Observe the right eyepiece by the right eye. Turn the coarse focus knob ① and the fine focus knob ② to focus the specimen.(Fig. 16)

(3) Turning the fine focus knob ② to make image clear.

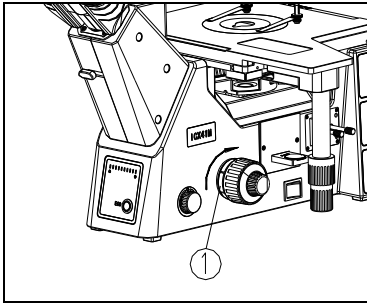


Fig. 17

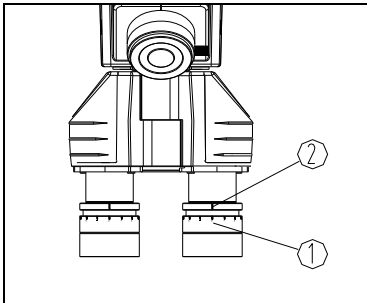


Fig. 18

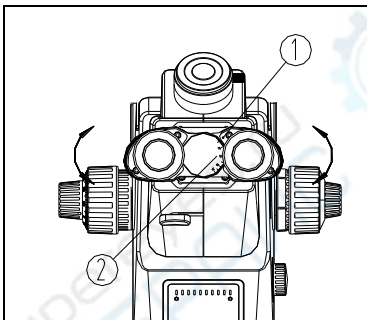


FIG. 19

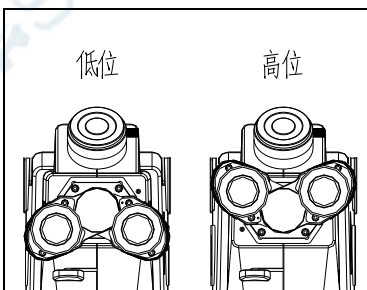


Fig. 20

3-4 Adjust the focusing tension

If the handle is very heavy when focusing or the specimen leave the focus plane after focusing or the stage declines itself, you can solve the problem by adjusting the tension adjustment ring ①. (Fig. 17)

The arrow shows the direction of adjusting the tension ①, rotation by the opposite direction of arrow adjusts the relax.

3-5 Adjust the diopter

Turn the diopter ring ① on the eyepiece to make "0" position accordance with level ② to make the image clear. Then observe through another eyepiece. If you can not get clear image, you can turning the diopter until image clear. (Fig. 18)

★There is ± 5 diopter on the ring. The number level ② show the number on the base is your eye's diopter.

★Remember your eye's diopter, so that you could use next time.

3-6 Adjust the interpupillary distance

When observe through binocular, please turning the the two prism house to adjust interpupillary distance until get comfortable image.

The "①" on the side has a function for marking ②, it show figure of interpupillary distance. (Fig. 19)

The standard is 50-75mm.

★Remember interpupillary distance for next time.

★Binocular can be rotatable for 360° . The operator can Select comfortable position. For example, when the Interpupillary distance is 65mm, turning the eyepiece up To 180° to make the eye-point 34mm higher. (Fig. 20)

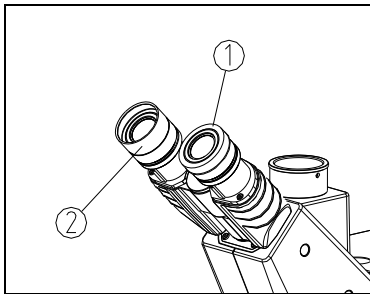
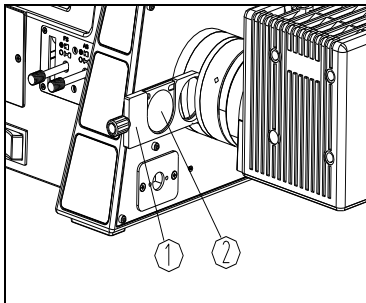


Fig. 21

3-7 Use eye-cap

(1) If the customer wears glasses, turn over the eye-cap①. It can prevent the glasses touching the eyepiece and avoid damaging the glasses and the eyepiece.

(2) If the customer doesn't wear glasses, open the eye-cap②. It can prevent stray light disturbing the observation.(Fig. 21)

**3-8 Use filter**

Filter can make the image contrast more better.

Pull out the filter holder ① to the left or right, here can put the filter② onto filter holder①. (Fig. 22)

Blue/green/yellow/LBD filter for selection.

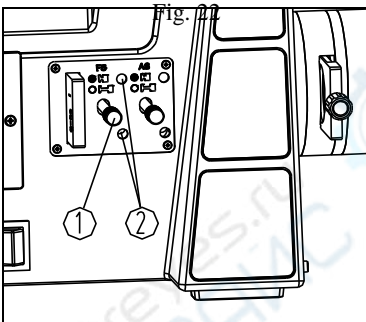


Fig. 23

3-9 Adjust field diaphragm

By limiting diameter of the beam entering the condenser, the field diaphragm can prevent other light and strengthen the image reflection. When the image of the field diaphragm is just on the edge of the field of view, you can obtain the clearest image.

(1) Adjusting deflector rod①to the right end, minimize the field diaphragm.. (Fig. 23)

(2) The image of the field diaphragm could be seen in the view field of the eyepiece.

(3) Adjusting the right and the left centering screws ② on the field diaphragm until center the image.

(4) Open the field diaphragm gently, if the image in the diaphragm field is inscribed with the view field, it means that the field diaphragm did centering.(Fig. 24)

(5)Largen the field diaphragm gently when using, make it circumscribe with the view field.

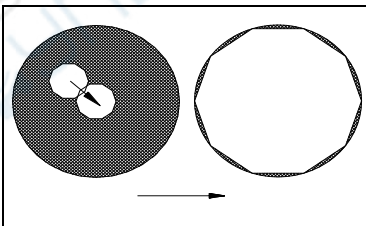


Fig. 24

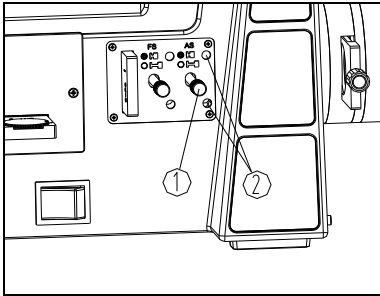


Fig. 25

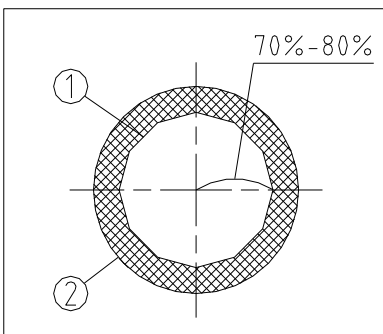


Fig. 26

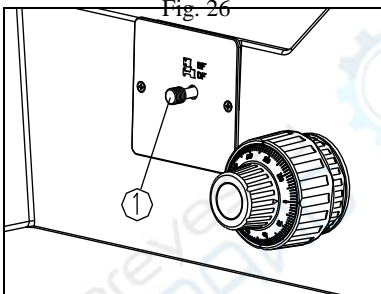


Fig. 27

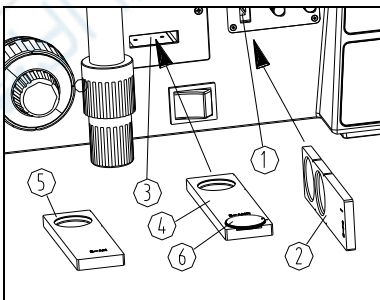


Fig. 28

3-10 Adjust aperture diaphragm

The aperture diaphragm decides the numerical aperture of the illumination. If the N.A. of illumination is matching with N.A. of the objective, you can obtain better resolution and the contrast and increase the depth of field.

The changing of the aperture diaphragm is the same as field diaphragm, adjusting it by the shift lever ① of the aperture diaphragm. (Fig. 25)

Adjust the size of the aperture diaphragm in order to observing more comfortably.)

3-11 How to switch Brightfield and Darkfield

The knob ① can switch dark field and bright field. (Fig.27)

★When observe under dark field, the aperture diaphragm and field diaphragm should be the largest.

★BF means bright field, DF means dard field.

3-12 Use the simple polarizing kits

The simple polarizing kits includes the polarizer ① and the analyzer ②.

(1)Take off the cover of polarizer slot ①, and insert the the polarizer ②. (Fig. 28)

★When using polarizer, the filter should be take out.

(2) Take off the cover of analysator slot ③, and insert the analysator ④ or ⑤.

(3)When the analysator points to zero position, it means orthogonality.

(4)Turning the analysator disc ⑥, it can change cross dircition.

the polarizer ②.

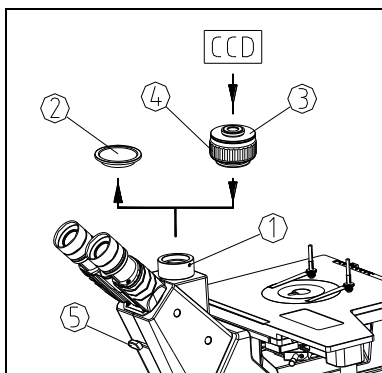


Fig. 29

3-13 Use CTV

- (1) Loosen the lock screw ① on third-tube, here can take out the dust-cover ②. (Fig. 29)
- (2) Take off the dust-cover on CTV ③ and CCD camera, and screw the CTV into CCD camera. Then assemble the whole CCD camera to third-tube and lock.
- (3) Observe through binocular first to get clear image, then observe on CCD camera. If the image is not clear, please focus the CTV lens ④ till it clear.

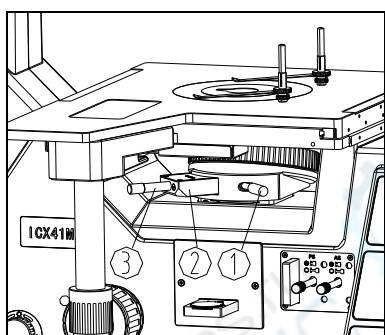


Fig. 30

3-14 Use DIC

- (1) Under bright field, use objective 10X or 20X to find clear image.
 - (2) Use polarizing kits and make it under orthogonality Position.
 - (3) Loosen the screw ① in front of nosepiece and take off dust-cover, then insert DIC ②.
 - (4) Turning the knob ③ to make the field color consistency and select suitable color. Now the DIC image is at most clear.
 - (5) The knob can control background color from grey-white to red.
- ★ Adjust aperture diaphragm simultaneously, it can make The image contrast to the best.
 - ★ DIC lens should be protected clean, without dust.
 - ★ The sample which has double refraction can not get DIC contrast.

4. Troubleshooting

A13. 0912

If the microscope can't be played fully for unskilled operation, it will provide some solutions for the trouble in the following table.

Problem	Cause	Solution
1. Optics		
(1) The bulb lightening but it is dark in viewing field	Field diaphragm is not large enough	argen the field diaphragm
	The light adjust button turned to dark end	Adjust to proper brightness
	Using the polarizer or the analyzer	Pull the slice out
(2) The side of the field of the view is dark or not even	The nosepiece is not in the right position	Turn the nosepiece into the right position
	Stain or dust has accumulated on the lens (objective, eyepieces)	Clean the lens
	The color filter and its holder placed incorrectly	Place them correctly
	The light path shifting block is not in the correct station	Pull it in the correct station
(3) Stain or dust is observed in the field of view.	Stains have accumulated on the specimen	Clean the specimen
	Stains have accumulated on the lens	Clean the lens
(4) Unclear image	Cover glass on the specimen slide	Using the one without cover
	The specimen and the objective is out of the vertical	Adjusting
	The nosepiece is not in the right position	Turn the nosepiece into the right position
	The aperture is not opened correctly	Adjusting
	Stain or dust has accumulated on the lens in the inlet of the head	Clean the lens
	The light path shifting block is not in the correct station	Pull it in the correct station
(5) One side of the field of view is dark or the image moves while focusing.	The specimen slide is not fixed	Fix with clips
	The nosepiece is not in the right position	Turn the nosepiece into the right position
(6) The eyes feel tired easily. The right field of view doesn't superpose with the left.	Interpupillary distance is wrong	Adjust the interpupillary distance
	Diopter adjustment is wrong.	Adjust the diopter
	The eyepieces for the right are different from the left	Use the same eyepieces

Problem	Cause	Solution
2. Mechanics		
(1)Coarse focusing knob is too tight	Tension knob is too tight	Loosen a little
(2)Stage declines itself	Tension knob is too loose	Tighten a little
3. Electrics		
(1)The bulb does not work	No power supply	Check the connection of the power cable
	The bulb is not inserted correctly	Insert it correctly
	The bulb burnt out	Replace it
(2)The bulb burnt out usually	Use a wrong bulb	Replace with a correct one
(3)The field of view is not bright enough	Use a wrong bulb	Replace with a correct one
	The use of light adjustment knob is wrong	Adjust correctly
(4)The bulb flickers or the brightness is not stable	The bulb will burn out soon	Replace with a new one