



BS-6012 Series Upright Metallurgical Microscope Instruction Manual



This instruction manual is for the operation guide, troubleshooting and maintenance to the BS-6012 Series Upright Metallurgical Microscope. Please study this manual thoroughly before operating, and keep it with the instrument. The manufacturer reserves the rights to the modifications by technology development. On the basis of operation ensured, technical specifications may be subject to changes without notice.

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Before Use

BS-6012 Series

1. Operation Notice

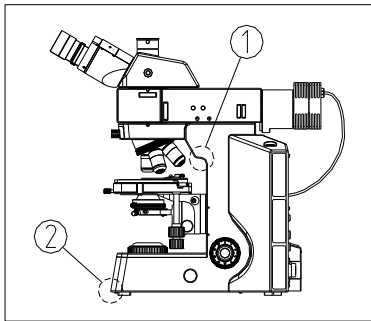


Fig.1

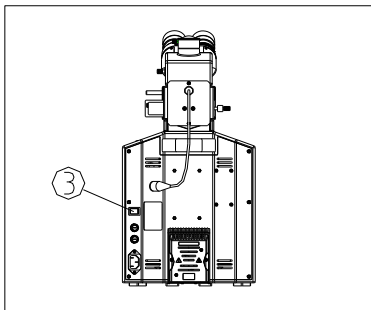


Fig.2

(1) As the microscope is a high precision instrument, always operate it with care, and avoid physical shake during the operation.

(2) Do not expose the microscope in the sun directly, either not in the high temperature, damp, dust or acute shake. Make sure the worktable is flat and horizontal. Following environment is required when operating: Indoor temperature: 5°C ~ 40°C, Max relative humidity: 80%.

(3) When moving the microscope, use one hand to hold its arm ① and the other hand to hold its front base ②, and lay it down carefully (See Fig. 1).

★ **It will damage the microscope by holding the stage, focusing knob, head or light source when moving.**

(4) When working, the surface of light source will be very hot. Make sure there is enough room for the heat dissipating around the light source.

(5) Connect the microscope to the ground to avoid lightning strike.

(6) For safety, make sure the power switch ③ is at "O" (off) and power it off before replacing the fuse (See Fig. 2).

(7) Wide voltage range is supported as 100~240V. Additional transformer is not necessary. Make sure the voltage is in this range.

(8) Use the special wire supplied by our company.

(9) All the power OFF devices have been set in the position where is easy to operate.

2. Maintenance

(1) Wipe the lens gently with a soft tissue. Carefully wipe off the oil marks and fingerprints on the lens surfaces with a tissue moistened with a small amount of 3:7 mixture of alcohol and ether or dimethylbenzene.

★ **As the alcohol and ether is flammable, don't place these chemical near to fire or fire source. For example, when turning on/ off the electrical device, please use these chemicals in a ventilated place.**



(2) Don't use organic solution to wipe the surfaces of the other components. Please use the neutral detergent if necessary.

(3) If the microscope is damped by liquid when using, power it off immediately and wipe it dry.

(4) Never disassemble the microscope, otherwise the performance will be affected or the instrument will be damaged.

(5) After using, cover the microscope with a dust cover.

3. Safety Sign

Sign	Signification
	The surface gets hot and don't touch it with bare hand.
	Study the instructions before use. Unsuitable operation would lead to person hurt or instrument faulty.



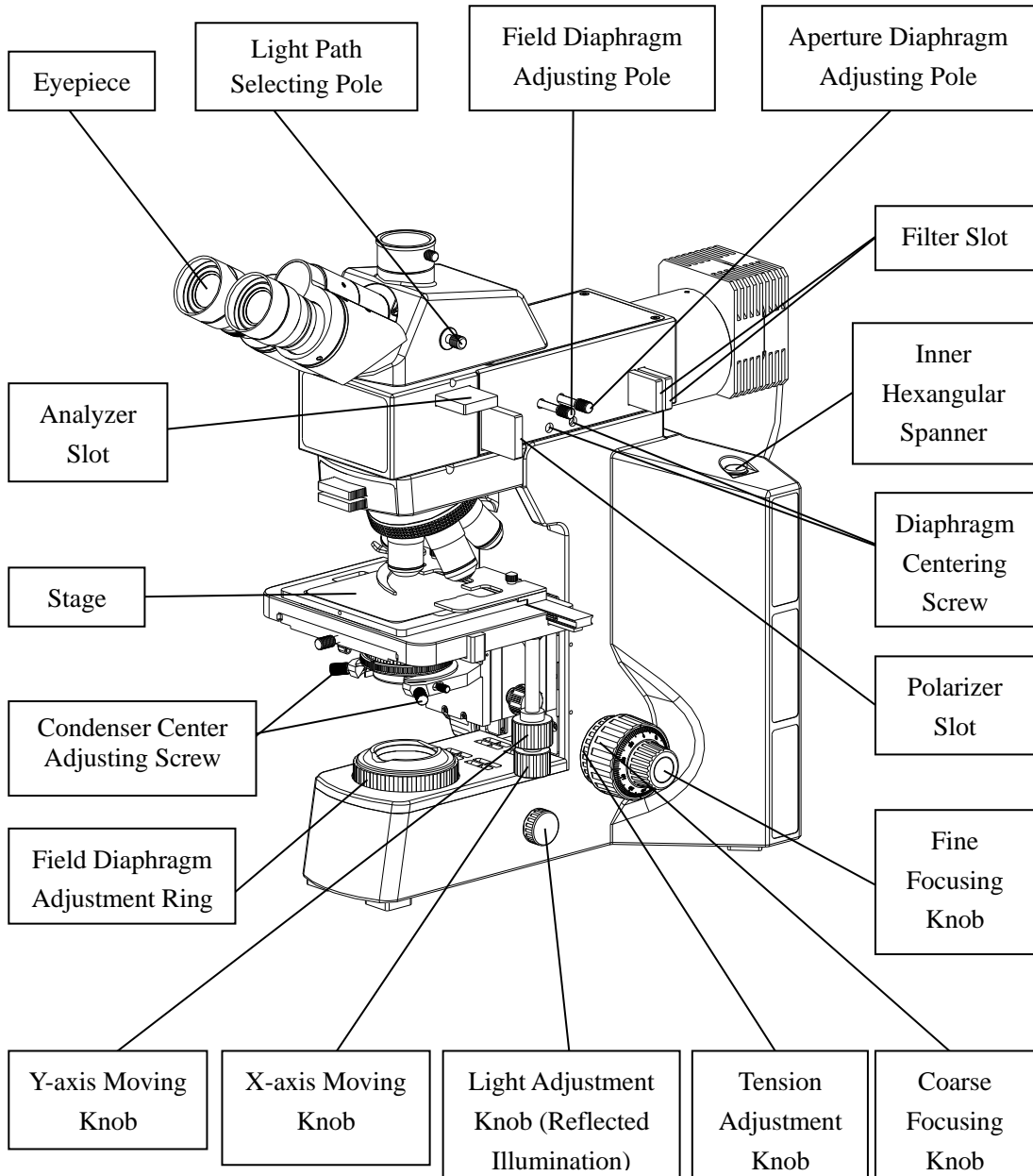
BestScope International Limited

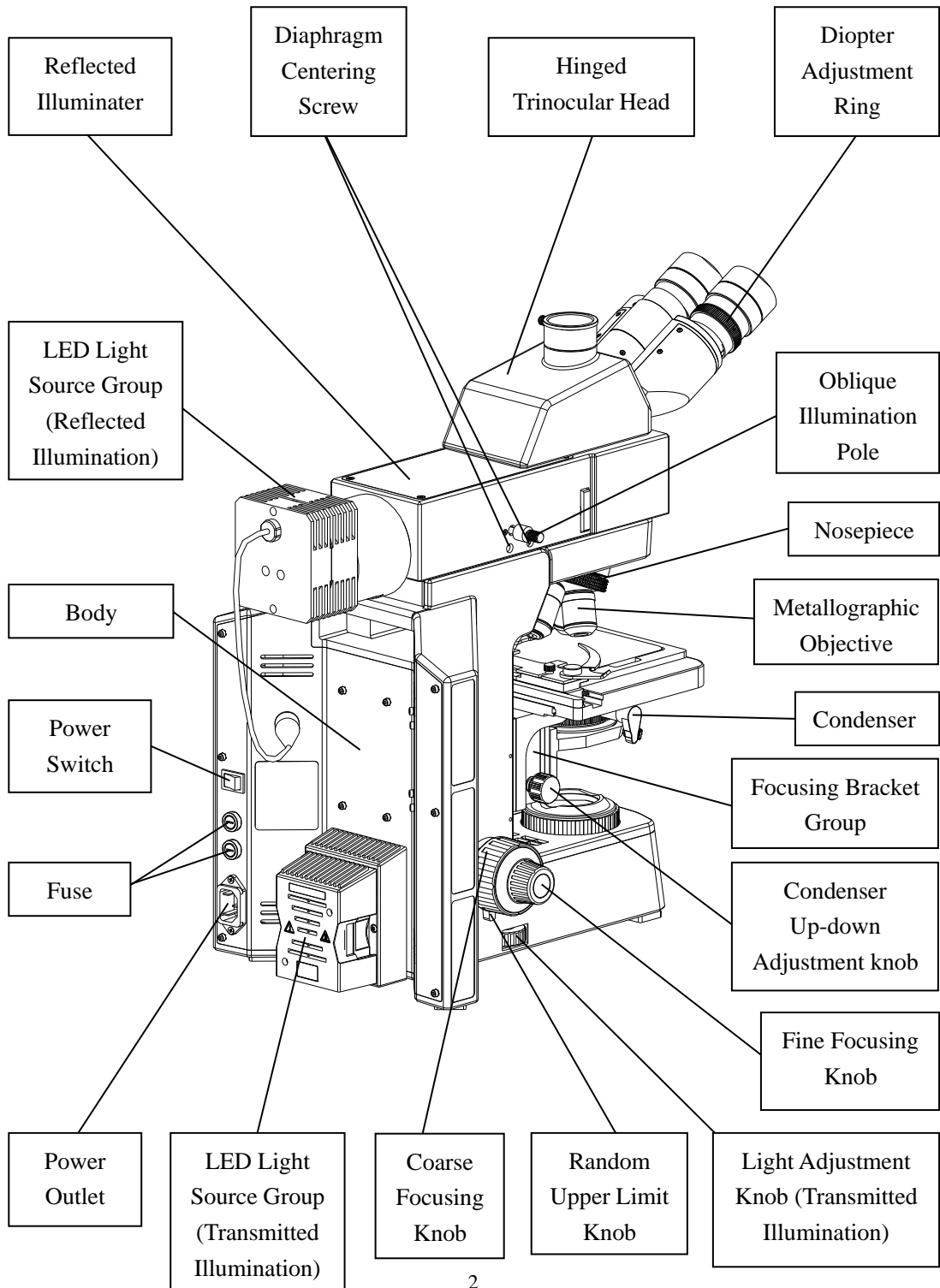
I	Main switch ON
O	Main switch OFF

1. Components

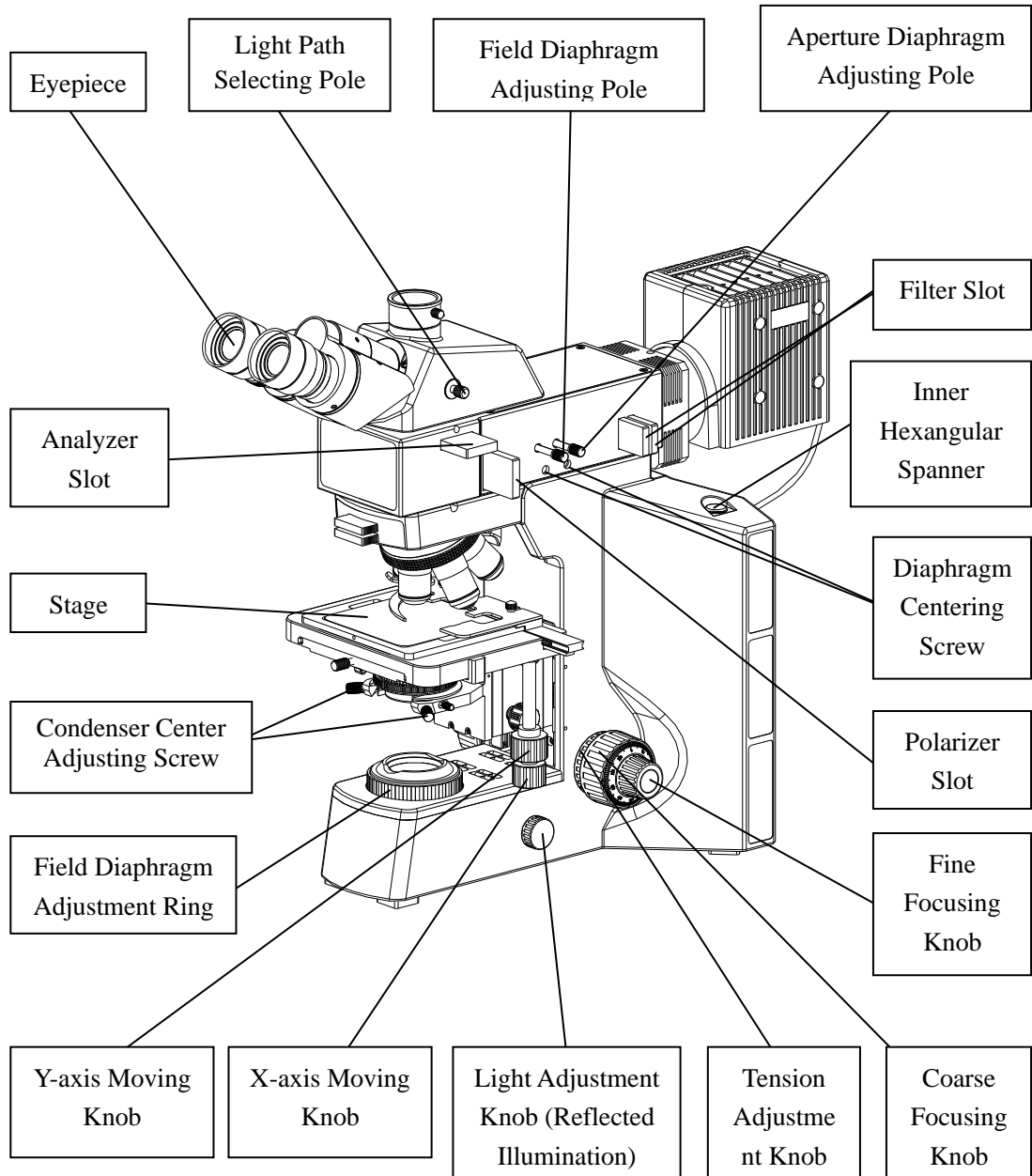
BS-6012 Series

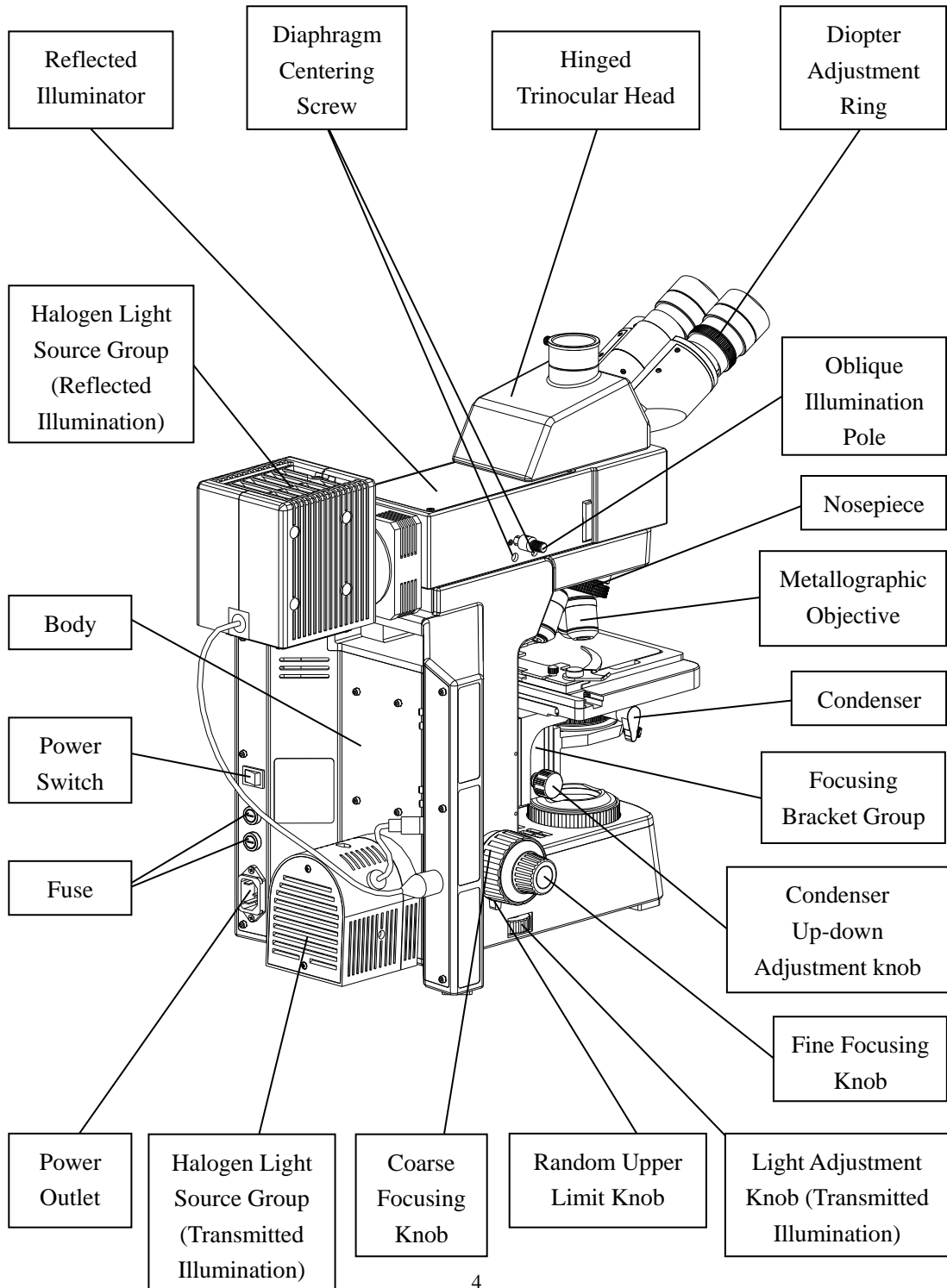
BS-6012 Series Upright Metallurgical Microscope (LED Illumination) Components





BS-6012 Series Upright Metallurgical Microscope (Halogen Illumination) Components





2. Assembling

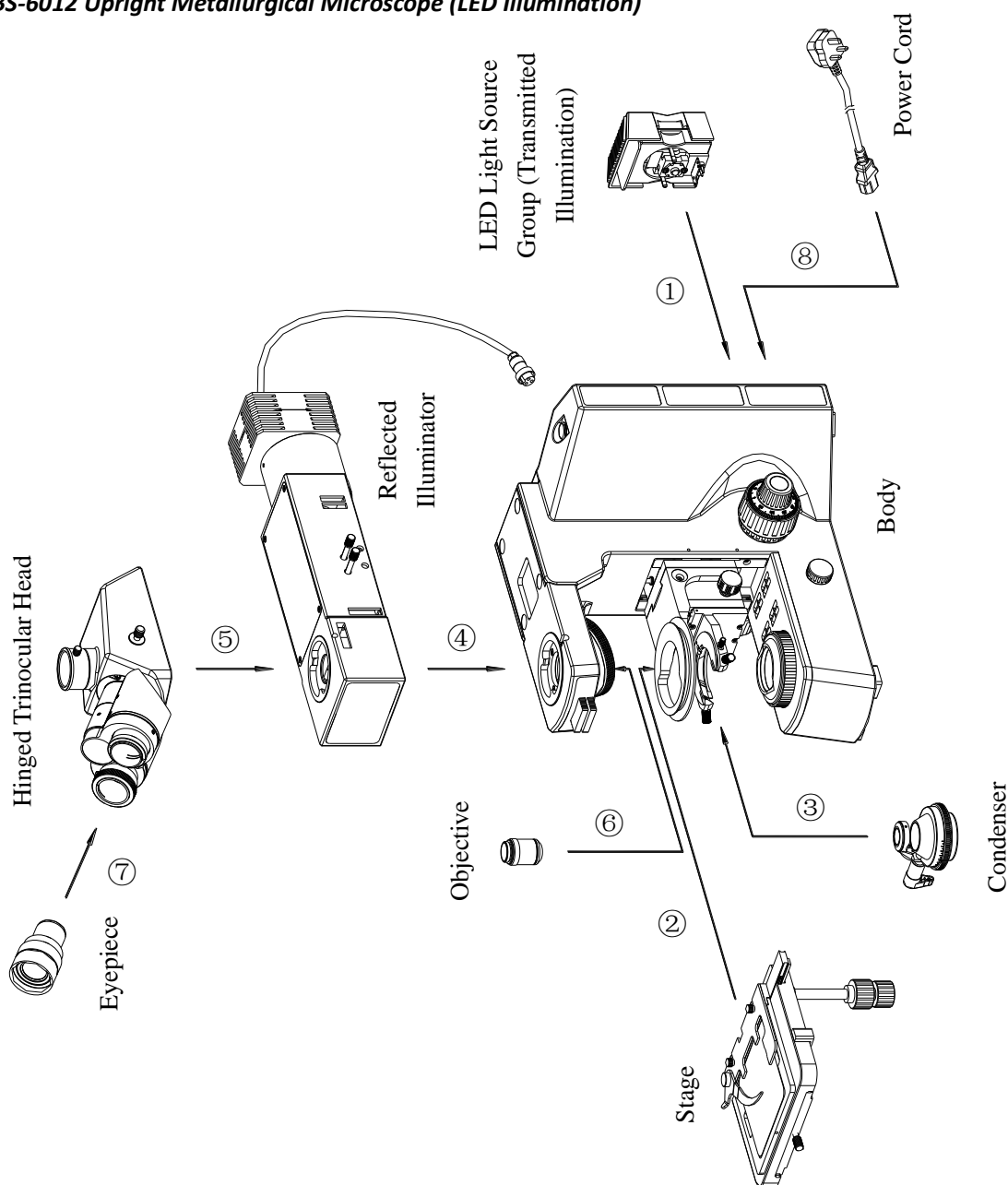
BS-6012 Series

2-1 Assembling Scheme

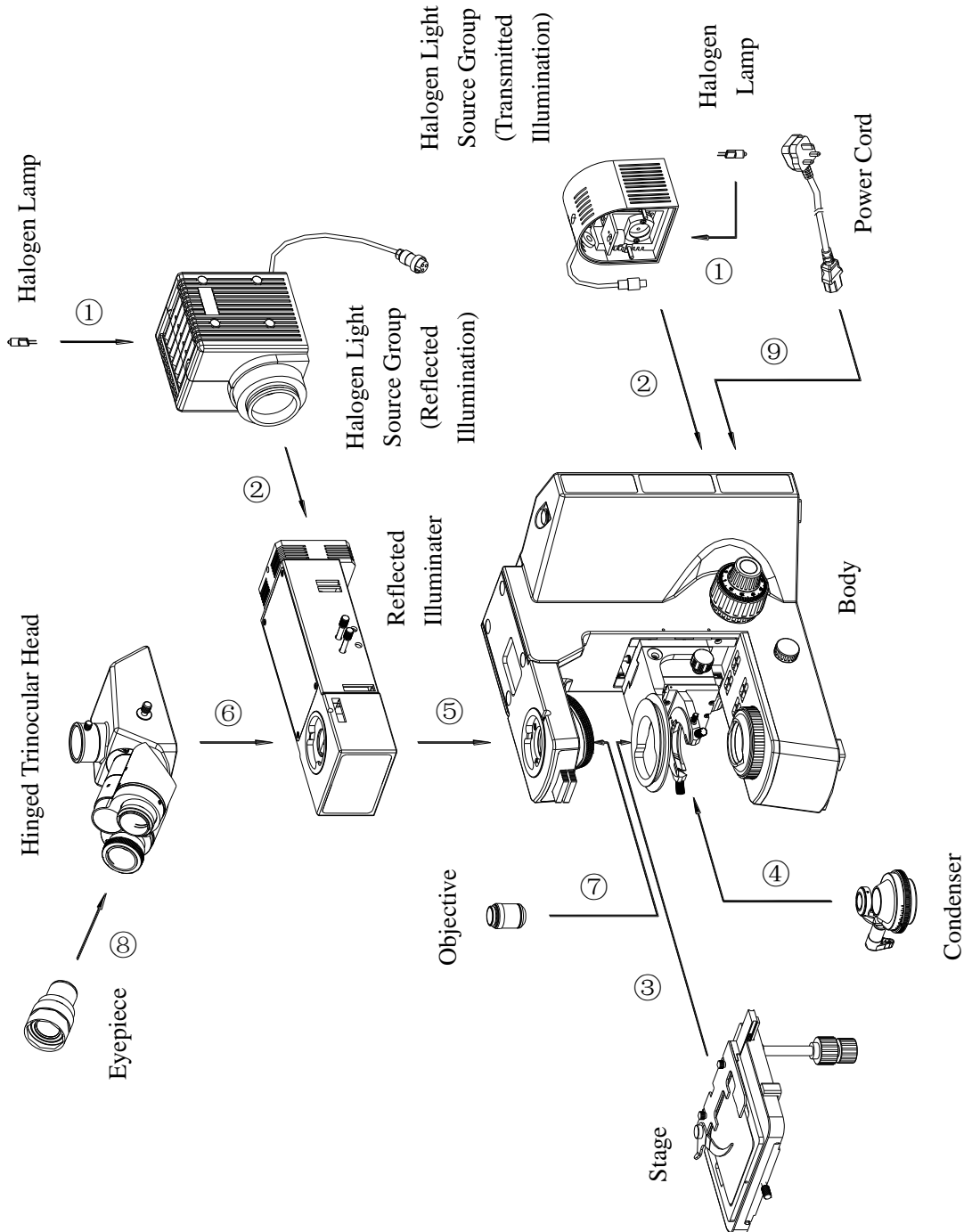
Following is the Assembling Scheme, and the numbers denote the assembling order.

- ★ Before assembling, make sure there is no dust, dirt or other matters to affect the assembly. Assemble carefully and do not scrap any part or touch the glass surface.

BS-6012 Upright Metallurgical Microscope (LED Illumination)



BS-6012 Upright Metallurgical Microscope (Halogen Illumination)



2-2 Assembling Steps

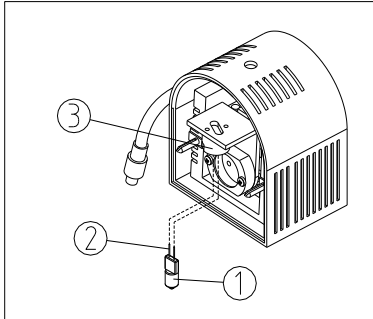


Fig.3

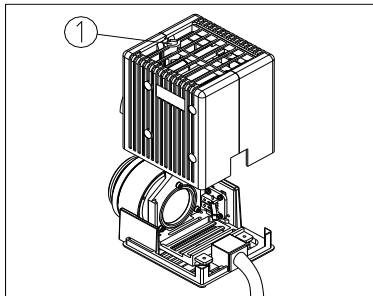


Fig.4

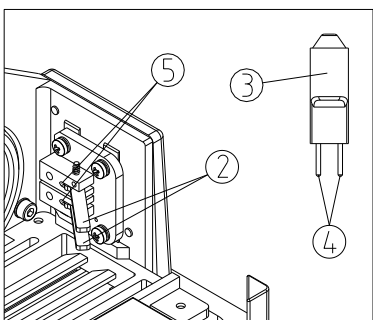


Fig.5

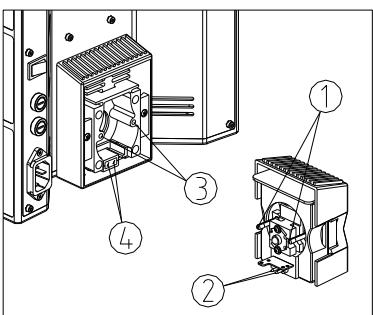


Fig. 6

2-2-1 Assemble and Replace the Halogen Bulb

◎For Transmitted Illumination

When assembling the halogen bulb for transmitted illumination, hold the bulb (1) with clean glove or tissue and fully insert the pins (2) into the receptacles (3) of the bulb holder. Make sure the bulb is vertical (See Fig. 3).

◎For Reflected Illumination

(1) Loosen the lock screw (1) with the M4 inner hexangular spanner which is equipped with the microscope, to take off the cover group (See Fig. 4).

(2) Open the bulb lock sheet (2), hold the bulb (3) with clean glove or tissue and fully insert the pins (4) into the receptacles (5). Make sure the bulb is vertical (See Fig. 5).

(3) Loosen the bulb lock sheet (2) to lock the bulb, and put on the cover group.

★Before replacing, cut off the main power supply, and wait until the bulb and bulb holder cool down.

★Don't touch the bulb with fingers. If there is any fingerprint on it, clear it with clean tissue.

★Bulb selected only: 12V/50W HAL Bulb (Philips 7027).

2-2-2 Assemble the Light Source Group

◎For Transmitted Illumination (LED light source)

Match the guide pins (1) and power supply pins (2) of light source group with the guide receptacles (3) and power socket (4) of base, and push the light source group into the base thoroughly. (See Fig. 6)

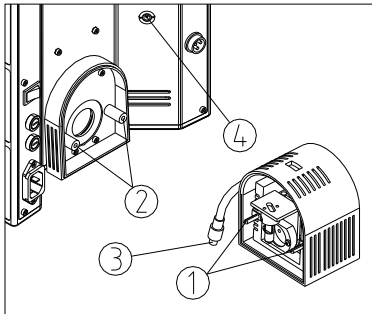


Fig. 7

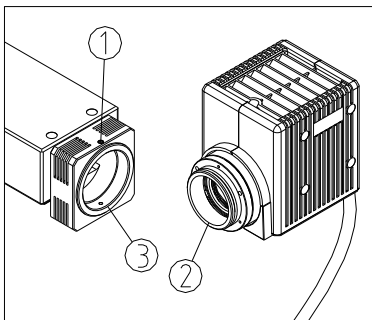


Fig. 8

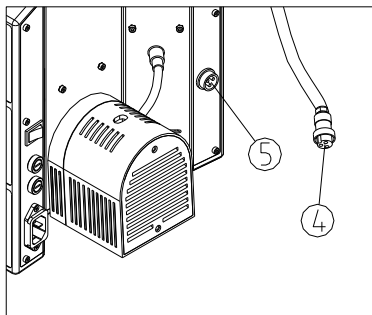


Fig. 9

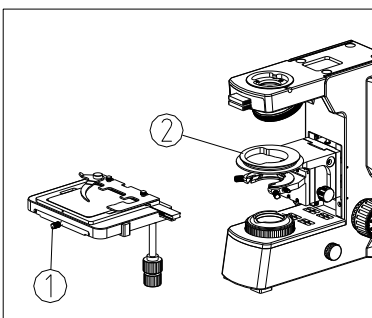


Fig.10

☉ **For Transmitted Illumination (Halogen light source)**

- (1) Match the guide pins ① of light source group with the guide receptacles ② of base, and push the light source group into the base thoroughly. (See Fig. 7)
- (2) Insert the plug ③ of light source group into the socket ④ of the microscope body.

☉ **For Reflected Illumination**

- (1) Fully loosen the lock screw ① of the reflected illuminator. (See Fig. 8)
- (2) Push the light source group base ② into the reflected illuminator light source base ③ thoroughly, then lock the lock screw ①.
- (3) Insert the aviation plug ④ of the light source group into the aviation socket ⑤ of the microscope body. (See Fig. 9)

★ **The installation and connection of reflected illumination light source group (LED light source) is same as the halogen light source.**

2-2-3 Assemble the Stage

- (1) Fully loosen the lock-screw ① on the stage. (See Fig. 10)
- (2) From a rear area of the rounded hole center on the bracket, carefully ring the two “V” buttons on the bottom of the stage into the “V” rounded groove ②, then screw down the lock screw ①.

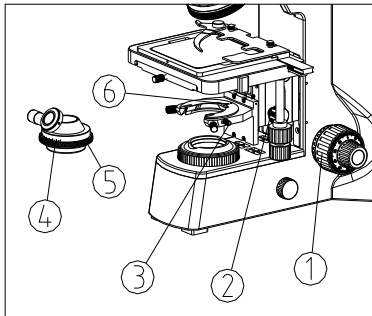


Fig.11

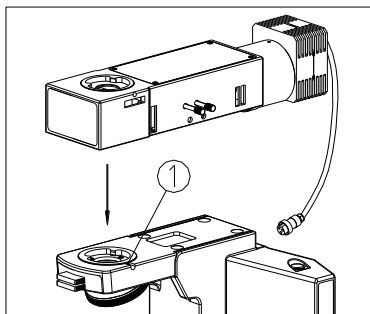


Fig.12

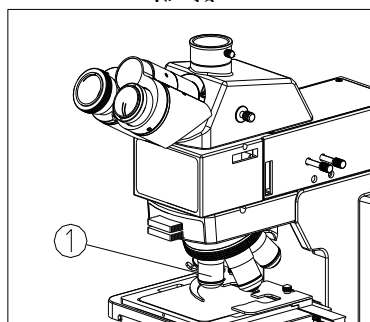
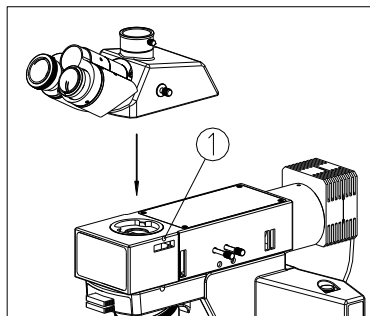


Fig.14

2-2-4 Assemble the Condenser

- (1) Rotate the coarse focusing knob ① to raise stage to the highest. (See Fig. 11)
- (2) Rotate the condenser up-down knob ② to move the condenser bracket to the lowest.
- (3) Loosen the condenser lock-screw ③ fully.
- (4) Swing out the front lens of condenser ④ with the scale forward. Make the lock screw ⑤ behind the condenser in alignment with the groove ⑥ of the condenser stand. Push the condenser ④ into the innermost of stand.
- (5) Screw down the condenser lock-screw ③, and raise the condenser ④ to the highest position with the condenser up-down knob ②.

2-2-5 Assemble the Epi-Illuminator

- (1) Loosen the lock screw ① of the Epi-Illuminator fully. (See Fig. 12)
- (2) From a little right position of the rounded hole center on the microscope body, insert the coattail interface on the bottom of epi-illuminator into the hole, with a little left inclined, and then screw down the lock screw ①.

2-2-6 Assemble the Head

- (1) Loosen the head lock-screw ① fully. (See Fig. 13)
- (2) From a little right position of the rounded hole center on the epi-illuminator, insert the coattail interface on the bottom of head into the hole, with a little left inclined. Keep the two eyepiece tubes forward, and then screw down the lock screw ①.

2-2-7 Assemble the Objective

Rotate the coarse focusing knob to lower the stage. Then install the objectives into the nosepiece from the lowest magnification to the highest in a clockwise direction (See Fig.14).

★ Search and focus the sample by low magnification objective (5X or 10X) when operating. Then get change to the high magnification ones according to the observation requirements.

★ When replacing the objective, rotate the nosepiece until it sounds “ka-da”, to make sure the objective is in the center of the light path.

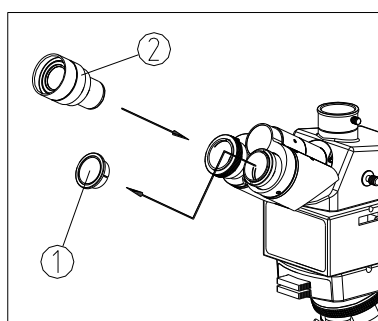


Fig.15

2-2-8 Assemble the Eyepiece

- (1) Take down the cover of eyepiece tube ①. (See Fig. 15)
- (2) Insert the eyepiece ② into the eyepiece tube, until touch the bottom.

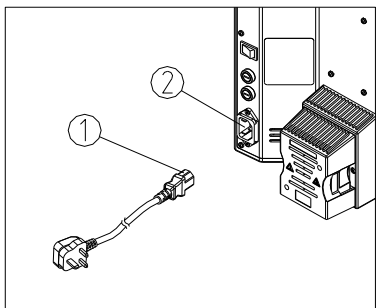


Fig.16

2-2-9 Connect Power Cord

- (1) Make sure the main power switch is at “O” (OFF) position. (See Fig. 16)
- (2) Insert one end of power cord ① into the power socket ② of the microscope.
- (3) Insert the other end of power cord ① into the power supply socket.

★ Don't use strong force when the power cord is bended or twisted, otherwise it will be damaged.

★ Use the special wire supplied by our company. If it's lost or damaged, choose one with the same specifications.

★ Connect the power cord appropriately to make sure the instrument is connected to ground.

3. Operation

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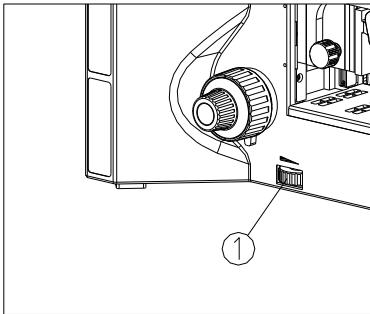


Fig.17

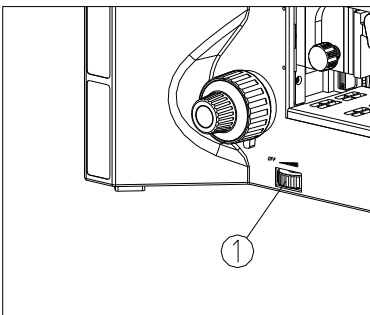


Fig.18

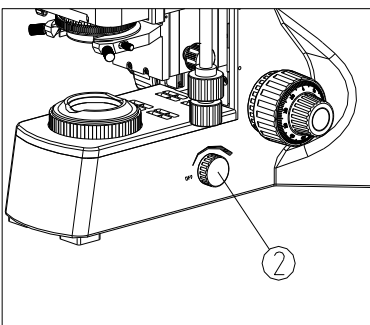


Fig.19

3-1 Set Illumination

☉ **For Reflected Model**

(1) Put through the power and turn on the main power switch to “—” (ON).

(2) Adjust the light adjustment knob ① until the illumination is comfortable for observation. Rotate the light adjustment knob ① clockwise to raise the brightness. Rotate the light adjustment knob ① counterclockwise to lower the brightness. (See Fig.17)

☉ **For Transmitted&Reflected Model**

(1) Put through the power and turn on the main power switch to “—” (ON).

(2) For transmitted illumination, rotate the light adjustment knob ① counterclockwise until a sound of “DiDa” is heard, turn on the down illumination light source, then adjust the light adjustment knob ① until the illumination is comfortable for observation. (See Fig. 18)

Rotate the light adjustment knob ① anticlockwise to raise the brightness. Rotate the light adjustment knob ① clockwise to lower the brightness, the light source is shut down until a sound of “DiDa” is heard.

(3) For reflected illumination, rotate the light adjustment knob ② clockwise until a sound of “DiDa” is heard, turn on the up illumination light source, then adjust the light adjustment knob ② until the illumination is comfortable for observation. (See Fig. 19)

Rotate the light adjustment knob ② clockwise to raise the brightness. Rotate the light adjustment knob ② counterclockwise to lower the brightness, the light source is shut down until a sound of “DiDa” is heard.

★ Use the bulbs in the low-voltage state can extend the bulb life.

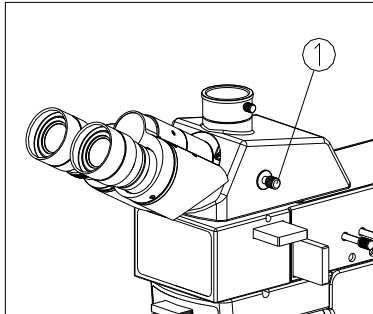


Fig.20

3-2 Select the Light Path

For trinocular head, the light path selecting pole ① controls the light-energy ratio of binocular and trinocular. When the light path selecting pole ① is pushed to the innermost, all the light will enter the binocular head. When it is pulled to the outmost, binocular and trinocular can be observed simultaneously. Usually, push the light path selecting pole to the innermost for binocular observation, while pull it to the outmost for trinocular observation (TV&Photography). (See Fig. 20)

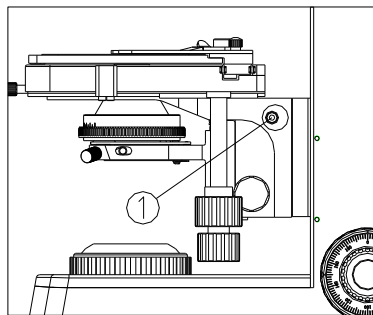


Fig.21

3-3 Adjust the Bracket (For Reflected Illumination)

(1) It can be observed at the normal position (Factory Position) for the specimen which is below 27mm in height (See Fig. 21).

(2) When observing the specimen which is 27mm-33mm in height, loosen the bracket lock screw ① with the inner hexangular spanner which is equipped with the microscope. Move the bracket down to the appropriate position, then lock the bracket lock screw ①.

★Hold the bracket when loosen the lock screw ①, to avoid the bracket falling.

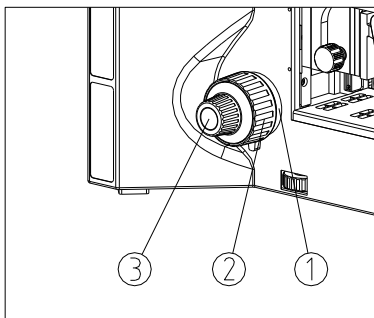


Fig.22

3-4 Adjust Focusing

(1) Put the slice on the stage, and hold it down with the clip. Shift the 5X objective into the light path.

★Make sure the observation surface is vertical with the objective when placing the sample. Use plasticene if necessary.

(2) Loosen the random upper limit knob ①, then observe the right eyepiece with the right eye. Rotate the coarse focusing knob ② until the image appears in the view field, then lock the random upper limit knob ①. (See Fig.22)

★The random upper limit knob can prevent the objective touching the slice when focusing.

★The random upper limit knob does not react on the fine focusing knob.

(3) Rotate the fine focusing knob ③ for clear details.

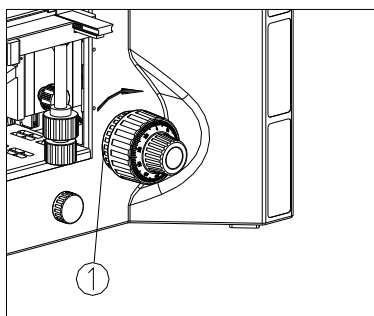


Fig.23

3-5 Adjust the Focusing Tension

If the handle is very heavy when coarse focusing or the specimen leaves the focus plane after focusing, or the stage declines itself, please rotate the tension adjustment ring ① according to the arrowhead pointed direction to adjust the focusing tension. (See Fig. 23)

3-6 Adjust the Diopter

After the image is clear in the right eyepiece, observe the left eyepiece with the left eye, if the image is not clear enough, rotate the diopter adjustment ring ① until the image is clear (See Fig. 24).

There are ± 5 diopters on the diopter adjustment ring ①, and the value aligned with the scale ② is your eye's diopter. The dot "." on the left side can also indicate.

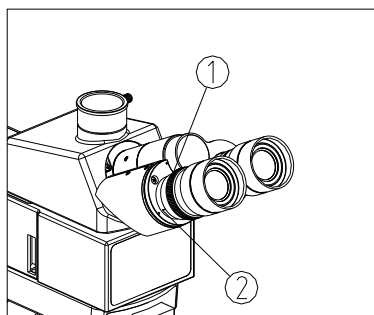


Fig.24

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

★If both the left and right eyepiece tubes have diopter adjustment ring, either side can be chosen as the observation baseline, then adjust the other side. First, make sure the baseline eyepiece tube is adjusted to the position of diopter "0", then focusing observe.

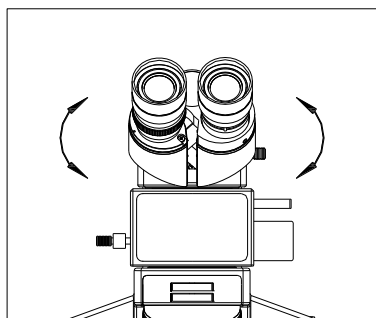


Fig.25

3-7 Adjust the Interpupillary Distance

When using two eyes to observe, hold the left and right bases of prism and rotate them around the axis to adjust the interpupillary distance, until there is only one field of view, and is comfortable for observation. (See Fig. 25)

The dot “.” on the left eyepiece base points to the scale of the interpupillary distance indicator. The scale value is the interpupillary distance.

Interpupillary distance adjustable range: 50~76mm.

★Remember your eyes’ interpupillary distance, so that you can use it next time.

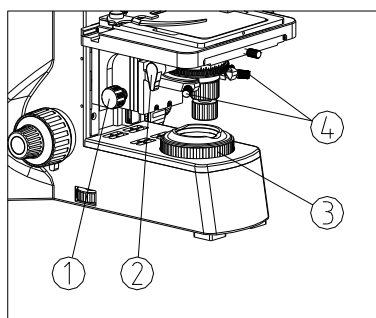


Fig.26

3-8 Center the Condenser (For Transmitted Illumination)

(1) Rotate the condenser up-down knob ① to raise the condenser to the highest position. (See Fig. 26)

(2) Rotate the spanner ② to move the front lens into light path.

★Move the front lens of condenser into light path when the objective is beyond 20X.

(3) Move the 20X objective into light path and focus the specimen.

(4) Rotate the field diaphragm adjustment ring ③ to open the field diaphragm to the smallest position, then the image of field diaphragm can be observed through eyepiece.

(5) Rotate the condenser up-down knob to adjust the image to the clearest.

(6) Adjust the condenser center adjusting screw ④ to put the image to the center of the field of view.

(7) Open the field diaphragm gradually. If the image is in the center all the time and inscribed to the field of view, it shows the condenser has been centered correctly. (See Fig. 27)

(8) In actual use, enlarge the field diaphragm a little, to make its image circumscribed to the field of view.

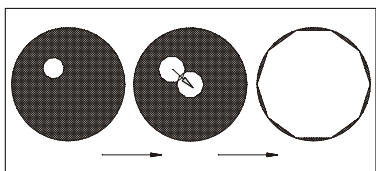


Fig.27

3-9 Adjust the Field Diaphragm

By limiting the diameter of light entering the condenser, the field diaphragm can prevent other light and strengthen the image contrast. When the image is just on the edge of the field of view, the objective can perform best and obtain the clearest image.

☉ For Transmitted Illumination

Rotate the field diaphragm adjustment ring^③ in clockwise, to enlarge the field diaphragm; otherwise, to decrease it in counterclockwise. (See Fig. 26)

☉ For Reflected Illumination

(1) Push the field diaphragm adjustment pole^① to the innermost, to minimize the field diaphragm (See Fig. 28).

(2) The image of field diaphragm can be observed in the view field through eyepiece.

(3) Adjust the two field diaphragm centering screws^② on the both sides of illuminator with the hexagon spanner, until the image is in the center.

(4) Open the field diaphragm gradually, if the image of field diaphragm is inscribed with the field of view, then the field diaphragm is centered correctly (See Fig. 27).

(5) In actual use, enlarge the field diaphragm a little, to make its image circumscribed to the field of view.

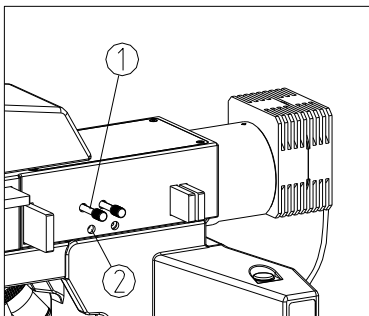


Fig.28

3-10 Adjust the Aperture Diaphragm

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

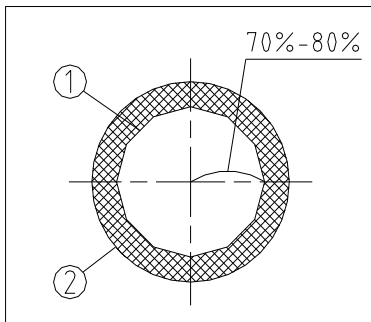


Fig.29

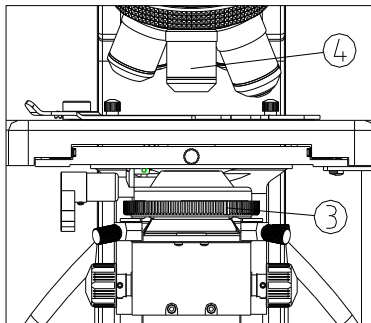


Fig.30

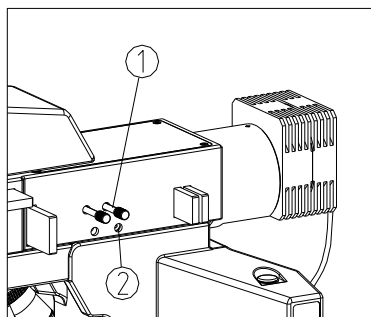


Fig.31

Since the contrast of microscopic samples is usually low, in actual use, it is advised to adjust the condenser aperture diaphragm to be 70%-80% of the N.A. of objective. In actual use, according to the contrast of samples, adjust the aperture diaphragm, to obtain comfortable observation and good contrast.

◎For Transmitted Illumination

Adjust the aperture diaphragm adjusting ring (3) to control the size of diaphragm. Take off the eyepiece if necessary, observe from the eyepiece tube and adjust the aperture diaphragm adjusting ring (3) until see the image as shown in Fig. 29, to adjust the proportion (see Fig. 29&30, ① in Fig. 29 is the image of aperture diaphragm, and ② is the edge of objective).

Use of scale: Set the scale of condenser N.A. to the 80% value of objective (4) N.A.

For example, when use 50X objective (N.A. 0.55), set the scale of aperture diaphragm to $0.55 \times 0.8 = 0.44$.

◎For Reflected Illumination

The changing direction of the aperture diaphragm is as same as the field diaphragm, adjust it by the aperture diaphragm adjusting pole (1). Adjust the two aperture diaphragm centering screws (2) on the both sides of illuminator with the hexagon spanner, to move the image of aperture diaphragm to the center of the view field. The eyepiece can be taken off when it's necessary to observe from the tube. Adjust the aperture diaphragm adjusting pole (1) until see the image as shown in Fig. 29, to adjust the proportion (See Fig. 29&31).

★The aperture diaphragm of reflected illuminator is centered in factory setting, and usually the users do not need to adjust it.

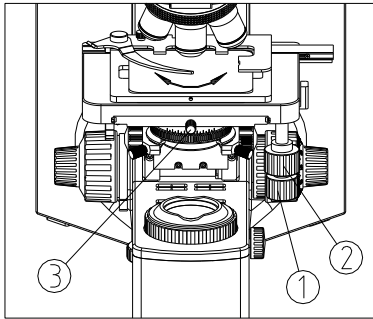


Fig.32

3-11 Adjust the Stage

When observing, move the stage by rotating the X-axis① and Y-axis② adjustment knob. If the moving direction of the stage is different from the image's, rotate the stage to adjust it (See Fig. 32).

- (1) Loosen the stage lock screw③ a little.
- (2) Rotate the stage clockwise or counterclockwise for some angle, until the moving direction of the stage is as same as the image's, and then lock the lock screw. Rotate angle: For right hand, clockwise 90 degree, counterclockwise 20 degree. For left hand, clockwise 20 degree, counterclockwise 90 degree.

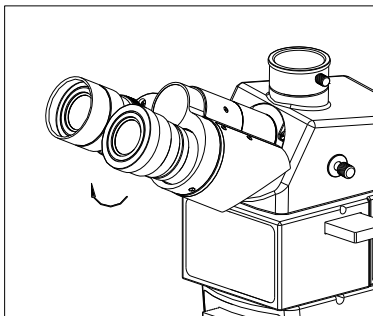


Fig.33

3-12 Use the Eye-cap

- (1) Turn down the eye-cap if the user is wearing glasses, so that it can prevent the glasses touching the eyepieces and avoid damaging to both glasses and eyepieces.
- (2) Open the eye-cap if the user doesn't wear glasses, so that it can prevent stray light disturbing the observation. (See Fig. 33)

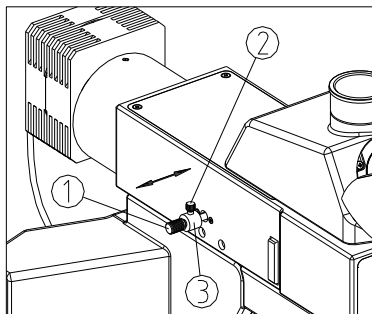


Fig.34

3-13 Adjust the Oblique Illumination (For Reflected Illumination)

It can be switched by the rod①, when the rod is pushed to the innermost, the system is in the oblique illumination observation, otherwise it is in the normal reflected illumination observation (See Fig. 34).

The position of the limit block③ can be adjusted according to the various requirements for different samples observation. When adjusting, first loosen the lock screw② on the limit block③, then move the limit block③ according to the direction as shown in Fig. 34, and lock the lock screw② when adjusted to the appropriate position.

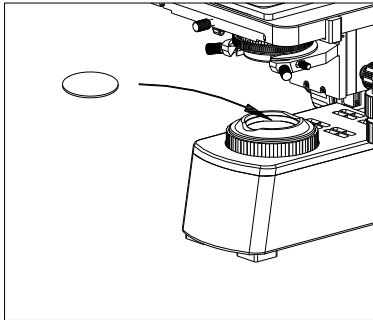


Fig.35

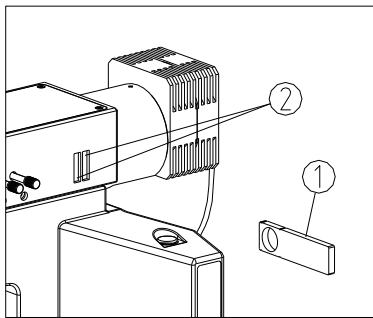


Fig.36

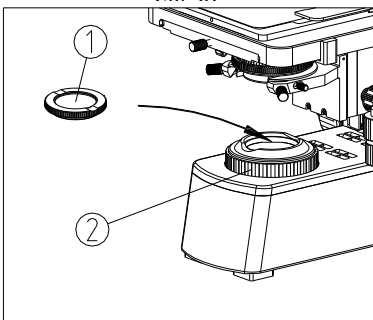


Fig.37

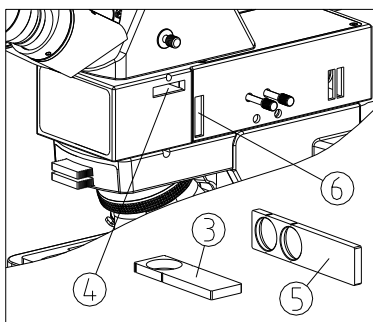


Fig.38

3-14 Use the Color Filter

The color filter can make the background more suitable and strengthen the image contrast.

☉ For Transmitted Illumination

Insert the filter into the condenser group groove, as the arrow direction shown in the figure. (See Fig. 35)

There are four colors of filter selectable: blue, green, yellow and white.

★Place the rough surface of filter downwards.

☉ For Reflected Illumination

Insert the color filter (1) into the slot (2) of reflected illuminator forward. (See Fig. 36)

There are four colors of filter selectable: green, blue, red and white.

★Insert the blank filter into the slot when the color filter is not used.

3-15 Use the Simple Polarizer Device

The simple polarizer device includes the polarizer and the analyzer.

★Pull out the color filter when using the simple polarizer device.

☉For Transmitted Illumination

(1) Put the polarizer (1) into the condenser group groove (2). (See Fig.37)

(2) Insert the analyzer (3) fully into the analyzer slot (4) of the reflected illuminator forward. (See Fig.38)

(3) The polarizer and the analyzer are orthogonal when the 360° rotating analyzer is zero adjusted (or the fixing analyzer is used).

(4) Dialing the rotatable analyzer drive plate can change the orthogonal state of the polarized light.

☉For Reflected Illumination

(1) Insert the polarizer (5) into the polarizer slot (6) of the reflected illuminator forward. (See Fig.38)

- (2) Insert the analyzer③ fully into the analyzer slot④ of the reflected illuminator. (See Fig.38)
- (3) The polarizer and the analyzer are orthogonal when the 360° rotating analyzer is zero adjusted (or the fixing analyzer is used).
- (4) Dialing the rotatable analyzer drive plate can change the orthogonal state of the polarized light.

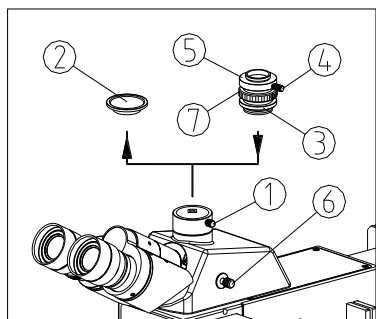


Fig.39

3-16 Assemble and Use the TV Device

- (1) Loosen the lock screw① of trinocular head, and take out the dust-cover② (See Fig.39).
- (2) Take down the dust-cover of the TV adapter③. Insert the TV adapter into the trinocular head as shown in the figure and screw down the lock screw①.
- (3) Loosen the lock screw④ of the TV adapter. Take down the vidicon interface (C type) ⑤ from the TV adapter, and screw into the CCD or vidicon. Then install the interface into the TV adapter, and screw down the lock screw④.
- (4) For binocular observation, pull the light path selecting pole⑥ to the outmost, then observe CCD image when the image is clear. If the image is unclear, rotate the adjustment tube⑦ for focusing until it is clear.

3-17 Use the Digital Head

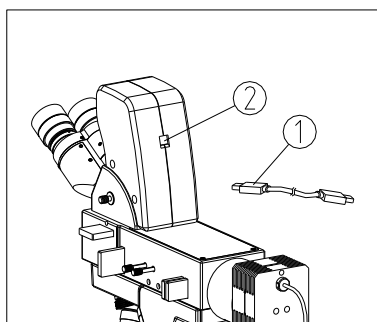


Fig.40

Insert the connector① of USB data cable into the USB interface② on the back of microscope head, and insert the other connector into the USB interface of the computer (See Fig.40), view the microscope video by video capture and analysis software, and also can use binocular observation.

Digital USB interface: voltage 5V, current ≤ 500mA.

★Don't use strong force when the data cable is bended or twisted, otherwise it will be damaged.

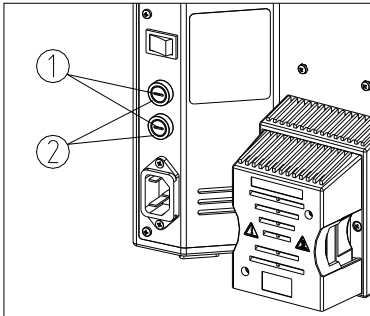


Fig.41

3-18 Replace the Fuse

Turn the main switch to “O” (OFF) before replacing the fuse. Pull out the power cord. Screw out the fuse group ① from the fuse base ②, with a “-” type screwdriver. Install a new fuse and screw it back into the fuse base thoroughly (See Fig. 41).

★**Specifications of the fuse: 250V, 3.15A.**

4. Troubleshooting
BS-6012 Series

As the performance of microscope can't play fully due to unfamiliar operations, the table below can provide some solutions.

Problem	Cause	Solution
1. Optical system		
(1) The bulb is bright but it is dark in the field of view.	Aperture diaphragm is not large enough.	Enlarge the aperture diaphragm.
	Condenser is too low.	Adjust the condenser.
	Polarizer or analyzer is used	Pull them out
	Light path selecting pole is in the trinocular observation position.	Push the light path selecting pole to the binocular observation position.
(2) The side of the field of 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 (condenser, objective or eyepieces).	Clean the lens.
	The color filter, polarizer or analyzer is not in the right position.	Insert them or move out of the light path.
	Light path selecting pole is not in right position.	Pull it into the right position
(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	Use the one without cover
	The specimen is not vertical to the objective	Adjust it
	The aperture diaphragm is not opened correctly.	Adjust it.
	Stain or dust has accumulated on the lens of eyepiece.	Clean the lens.
	Light path selecting pole is not in right position.	Pull it into the right position
(5) One side of the image is dark or the image moves while focusing.	The specimen slide is not fixed.	Fix it with clips.
	The nosepiece is not in the right position.	Turn the nosepiece into the right position.
	Condenser is not centered.	Center the condenser.

(6) The eyes feel tired easily. The right field of view doesn't superpose with the left.	Interpupillary distance is incorrect.	Adjust the interpupillary distance.
	Diopter adjustment is incorrect.	Adjust the diopter.
	The eyepiece for the right eye is different from the left one.	Use the same eyepieces.

Problem	Cause	Solution
2. Mechanical system		
(1) The objective touches the cover glass while turning from low magnification to high.	The stage is too high.	Lower it to an appropriate position.
(2) Coarse focusing knob is too tight.	Tension adjustment knob is too tight.	Loosen it to an appropriate position.
(3) Stage declines itself and cannot stay on the focal plane.	Tension adjustment knob is too loose.	Tighten it to an appropriate position.
(4) Coarse focusing knob cannot rise.	The random upper limit knob is locked.	Loosen the random upper limit knob.
(5) Coarse focusing knob cannot decline.	The condenser is too low.	Raise the condenser.
(6) The image moves obviously when touching the stage.	The stage is fastened incorrectly.	Fasten the stage correctly.
3. Electrical Part		
(1)The bulb does not work.	No power supply.	Check the connection of the power cable.
	The bulb is not installed correctly.	Install it correctly.
	The bulb burns out.	Replace it.
(2) The bulb burnt out usually.	A wrong bulb is used.	Replace it with a correct one.
(3) The field of view is not bright enough.	A wrong bulb is used.	Replace it with a correct one.
	The use of light adjusting knob is incorrect.	Adjust it correctly.

(4) The bulb flickers or the brightness is not stable.	The bulb will burn out soon.	Replace it with a new one.
	The wire doesn't connect well.	Connect it correctly.