



Metallurgical Microscope

Model Number

BS-6000A/AT

User Manual

This manual is written for Metallurgical Microscope of BS-6000A/AT. For safety and for exerting the best performance, making you familiar with the instrument entirely, it is strongly recommended that you read this manual carefully before using the microscope.

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I. Safety note

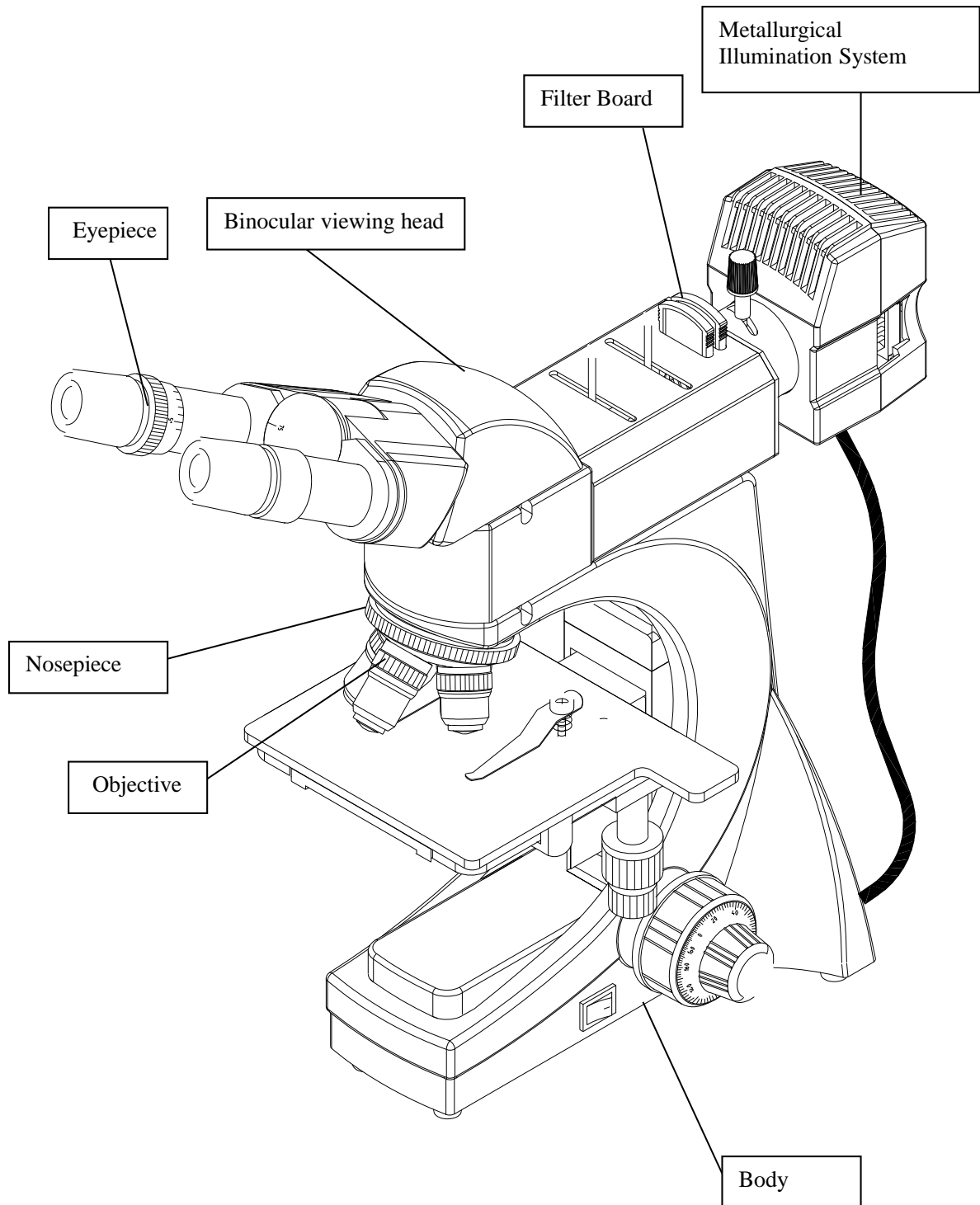
1. Carefully open the box, avoid the accessories, like lens, dropping to ground and being damaged.
2. Do keep the instrument out of direct sunlight, high temperature or humidity, dusty and easy shaking environment. Make sure the stage is smooth, horizontal and firm enough.
3. When moving the instrument, please use two hands to grip with the two sides of the microscope body.
4. If the bacterium solution or the water splash to the stage, objective or viewing tube, pull out the power cord at once, and wipe up the microscope. Otherwise, the instrument will be damaged.
5. When running, the lamp house and nearby parts will be very hot. Please ensure there is enough cooling room for them.
6. Make sure the instrument is earthed, to avoid lighting strike.
7. For safety, be sure the main switch is in "O"(off) state before replace the halogen lamp or the fuse, then cut off the power, and do the operation after the lamp bulb and the lamp house completely cool.
8. Check the input voltage: be sure the input voltage which signed in the back of the microscope is consistent with the power supply voltage, or it will bring a serious damage to the instrument.
9. Use the factory supplied power cord, please.

II. Maintenance

1. All the lenses have been well checked and adjusted. It is forbidden to disassemble them yourself.
2. The nosepiece and coarse/fine focus unit have a compact and precise frame, please don't disassemble them as possible as you can.
3. Keep the instrument clean, wipe dust regularly, and be attention to avoid contaminating the optical elements especially.
4. The contaminations on the prism, as finger mark and oil, could be gently wiped with a piece of soft cloth or tissue paper, gauze which has been immersed in pure alcohol or xylene. **(note that the alcohol and the xylene are all burned easily, do not let them near the fire, and use them in a drafty room as possible as you can.)**
5. Don't use organic solvent to wipe the non-optical elements, when you need to clean, use the soft detergent, please.
6. When using, if the microscope is splash by liquid, cut off the power at once, and wipe up the moisture.
7. Do not disassemble any parts of the microscope. That will affect the function or decline the performance of the microscope.
8. Place the instrument in a cool, dry position. After using the microscope, remember to cover it with dust helmet. Do wait for the lamp house cooling completely before cover.

1. Name of Components

BS-6000A/AT



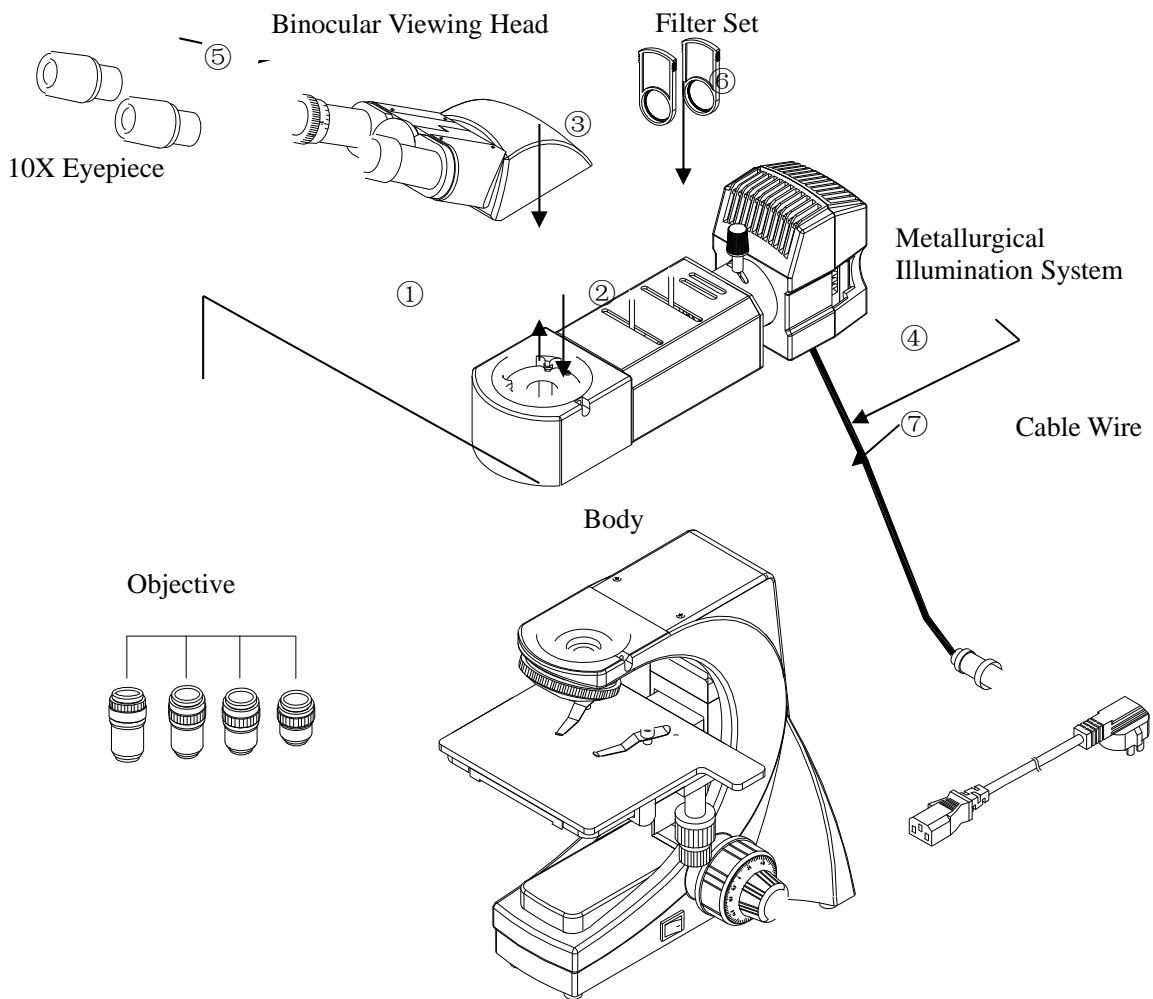
2. Installation

BS-6000A/AT

2.1 Installing Illustration

The following shows the installing order of the spare parts. The number expresses the installing process.

- ★ Before the installing, make sure there is no dust and stain on the spare parts. No marks by outside force on the surface of the spare parts or glass.
- ★ Keeping the hexagon- spanner well, when change the spare parts, you will use it.



2.2 Installing Setps

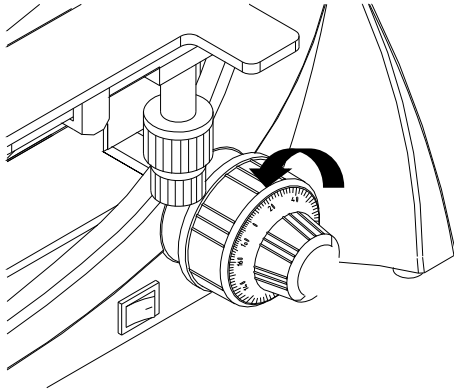


Fig.1

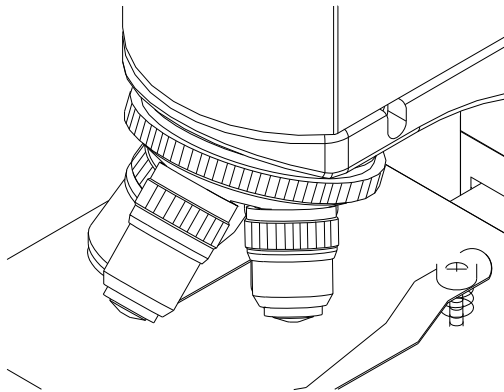


Fig.2

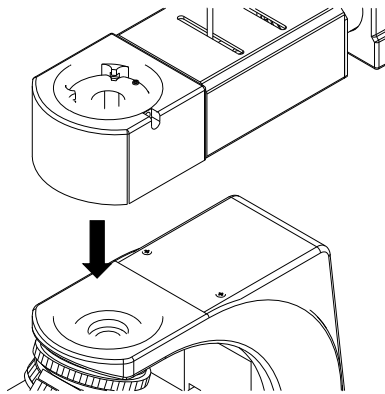


Fig.3

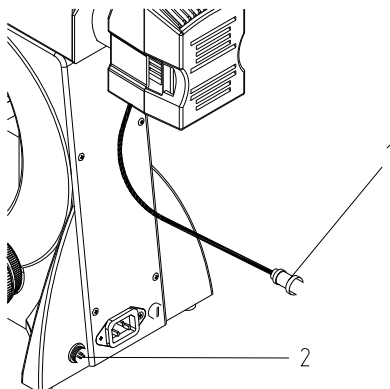


Fig.4

2.2.1 Installing the Objective (Fig.1-2)

1. Adjust the coarse & fine focus knob, till the mechanical stage to the low limited place.
2. Screw down the objective to nosepiece from left or right side, low magnification objective first. Install all the objective form low to high magnification following the clock hand.

◇ According to this way to install the objective will make it easier to change magnification in operation.

- ★ Clean the objective frequently.
- ★ At first, use the 10X objective to looking for image, then change another one.
- ★ Turn the objective till hear the “Kai. Kai” sound, make sure the objective enter the objective center.

2.2.2 Installing the Metallurgical Illumination Set (Fig.3-4)

1. Insert the Metallurgical Illumination Set with Lamp House installed into the Microscope Body. Align the position and screw down the bolt with hexagon wrench.
2. Plug the power cord① of the Metallurgical Illumination Set into the socket②. Then screw the bolt firmly on the socket.

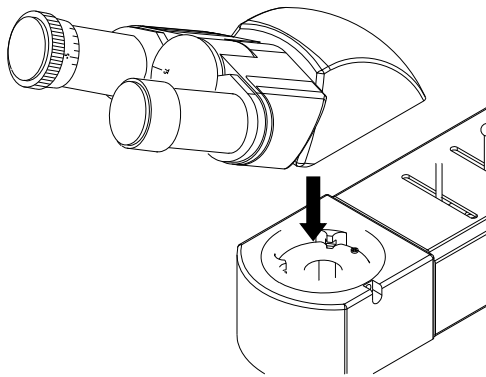


Fig.5

2.2.3 Install the binocular viewing head (Fig.5-6)

Insert the binocular viewing head in the head of the body, turn to the right place, then fix up it by bolts

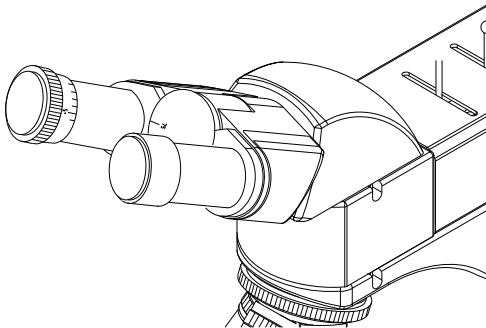


Fig.6

2.2.4 Install the eyepiece (Fig.7-8)

Insert the eyepiece in the eyepiece tube till end. Fig.8 picture shows the station after the installing.

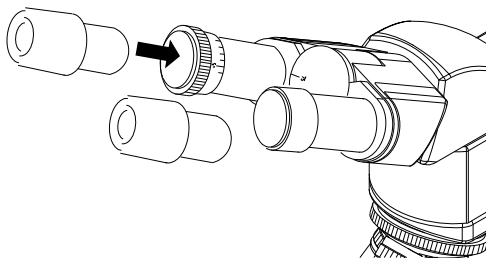


Fig.7

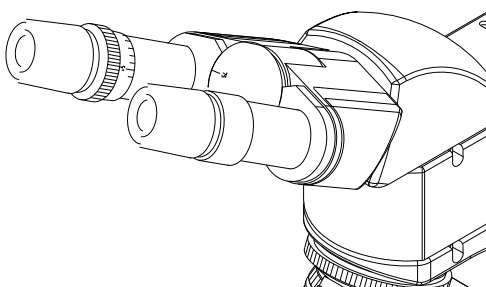


Fig.8

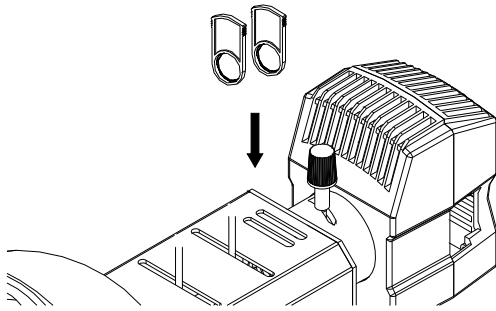


Fig.9

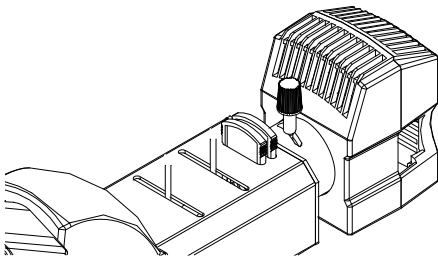


Fig.10

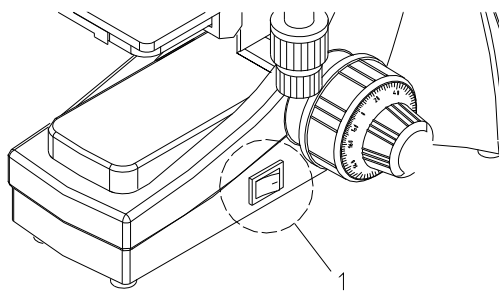


Fig.11

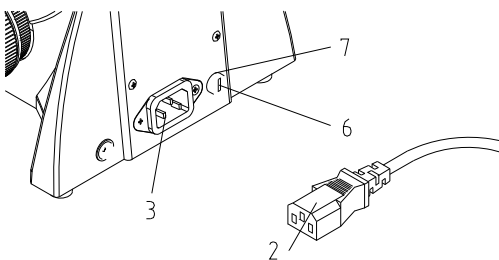


Fig.12

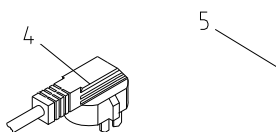


Fig.13

2.2.5 Install the color filter (Fig.9-10)

Put the filter into the jack of the illumination system.

★ There is three type of color filter. The color is blue, yellow and green.

2.2.6 Connecting the Power Cord (Fig.11-13)

★ Do not force on the Power Cord. The cable and wire are easier to be damaged when bended or wrapped.

1. Before connecting the power cord, switch the main On-Off ① to “O”(off).
2. Plug the power cord② into the socket③ on microscope safely. Make sure be connected.
3. Plug the power cord④ into the power source socket⑤ safely. Make sure be connected.

★ Do use the supplied power cord all the time. If lost or damaged, select the same standard cord, please.

★ This machine has High-Band voltage. It can adapt any voltage between 100V and 240V.

2.2.7 Replacing the fuse(Fig.11-12)

Do remember to turn the main switch① on the state of “O”(off) before replacing the fuse, and unplug the power cord. Rotate the fuse⑥ kits out of the holder⑦ by the “--”type screwdriver, replace a new fuse, then rotate back to the holder again.

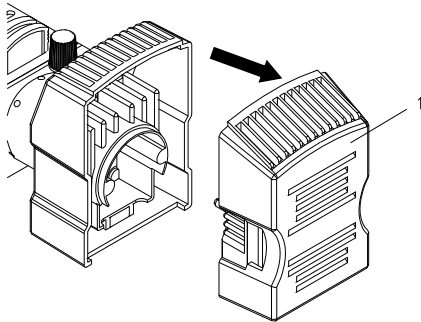


Fig.14

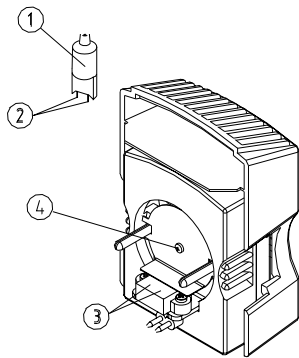


Fig.15

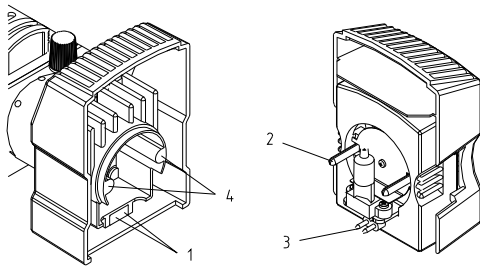


Fig.16

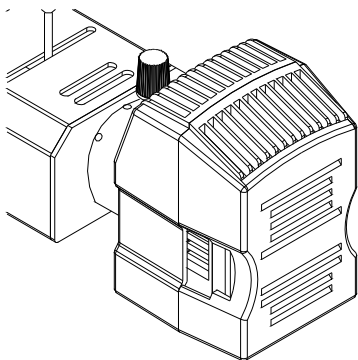


Fig.17

2.2.8 Installing and replacing the lamp (Fig.14-17)

◇ Please use the specified halogen Lamp 6V30W.

1. Pull out the lamp-house① as the picture show (Fig.14)
2. Hold to the bulb ①after you wrap it with gauze or other protection materials, then depress the plugs② into the jack③ on the lamp house, ensure the filament and the bolt④ are in a same level.(Fig.15)
3. Replacing the lamp when using or soon after
When using, or soon after it is turned off, the lamp, the lamp house and nearby parts will be very hot and will cause serious burns. Please turn the main switch on “O” (off), pull up power plug, and make sure the bulb, the lamp house and periphery are all cool. Then, you can do your replacing.

★ Please insert the lamp gently, or it will be damaged by excessive extrusion.

★ Do not touch the Halogen bulb with your hands. It will shorten the service life or cause it to burst. If you leave fingerprints on the surface carelessly, clean it with a dry soft cloth.

4. Align the socket① and pins② and align the bolt③ and the jack④. Then push the lamp-house into the Metallurgical Illumination Set until covered.(Fig.15-16)

3. Adjustment & Operation

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3.1 Adjustment Set Diagram (Fig.18-19)

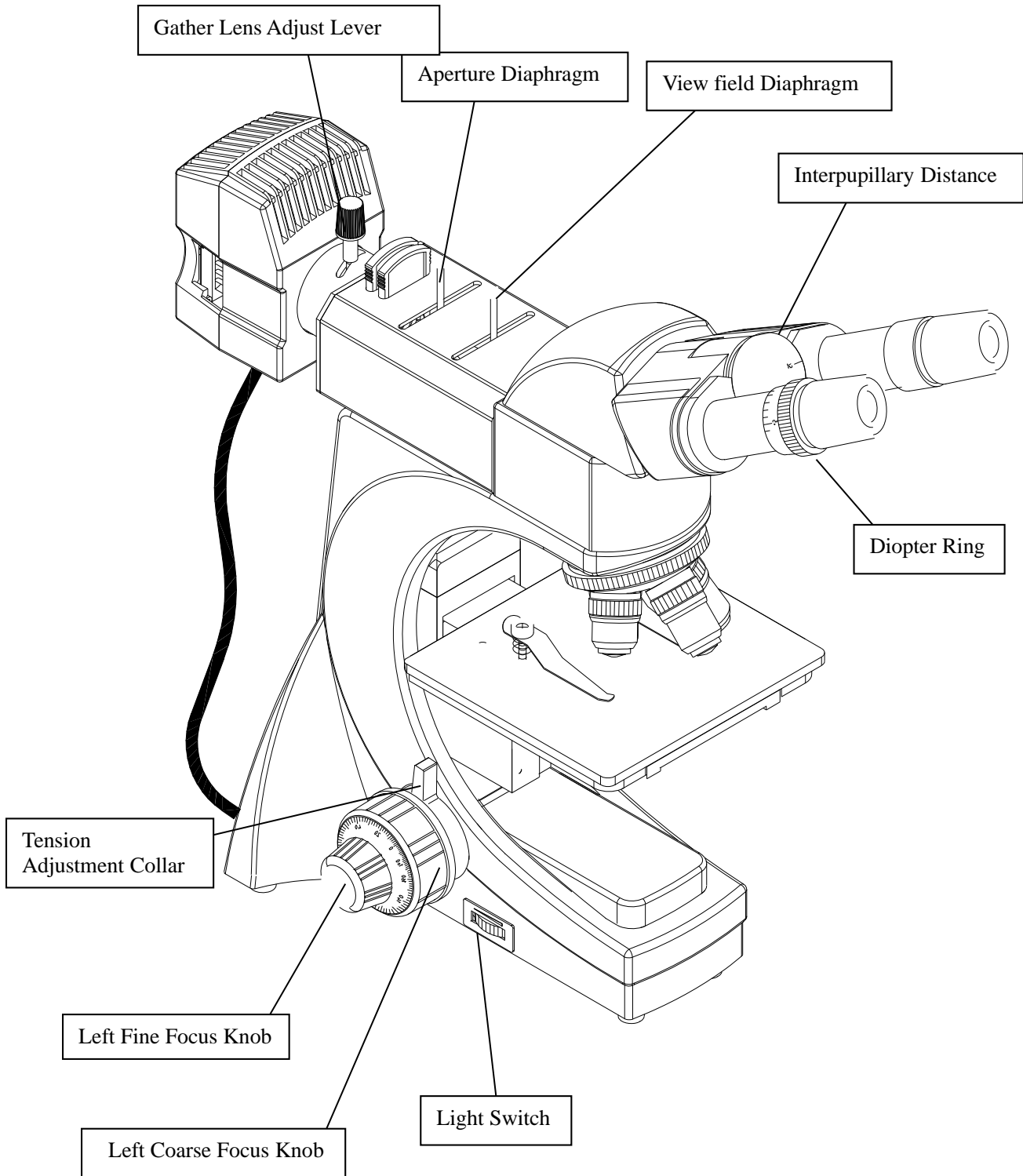


Fig.18

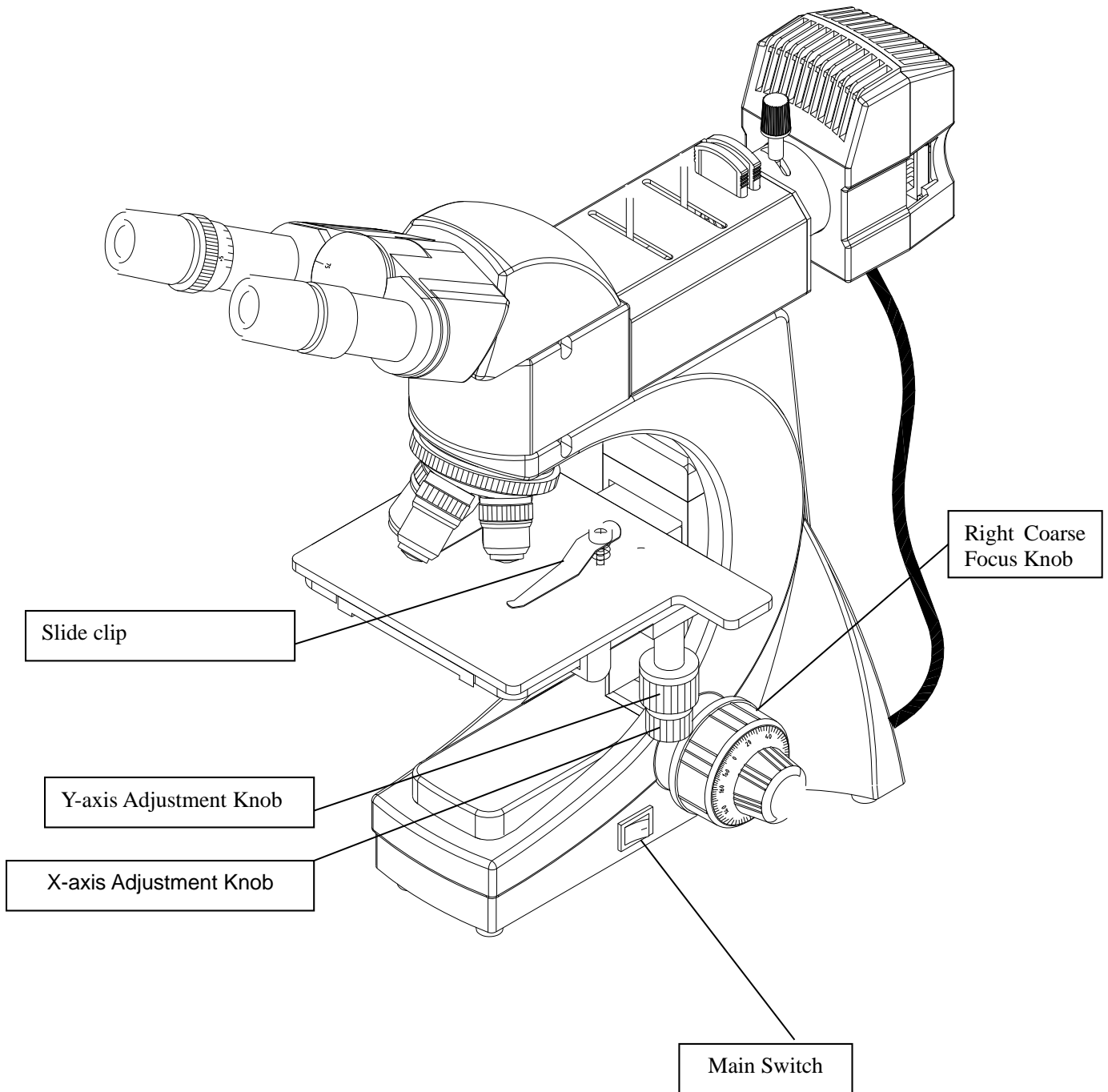


Fig.19

3.2 Operation

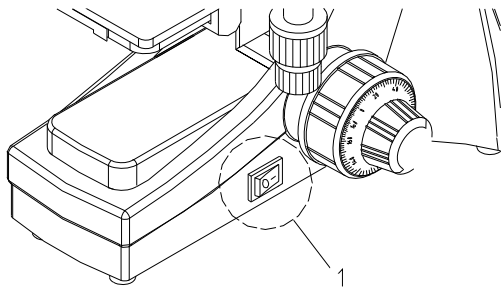


Fig.20

3.2.1 Open Lamp-House (Fig.20)

Connect the power, turn on the main switch (figure 15) to “-”(on).

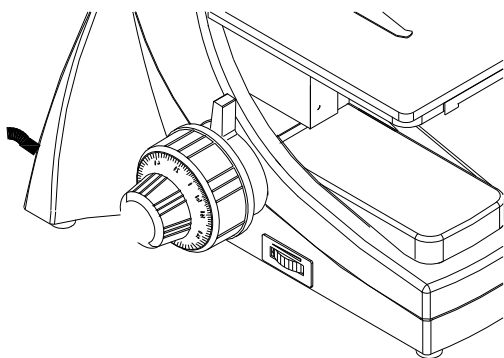


Fig.21

3.2.2 Adjusting the brightness(Fig.21)

Turning the brightness adjustment knob anti-clockwise, the voltage raise, and the brightness strengthen; turning it clockwise, the voltage decline, and the brightness weaken.

✧ Using the lamp in a low voltage condition, will prolong the use life.

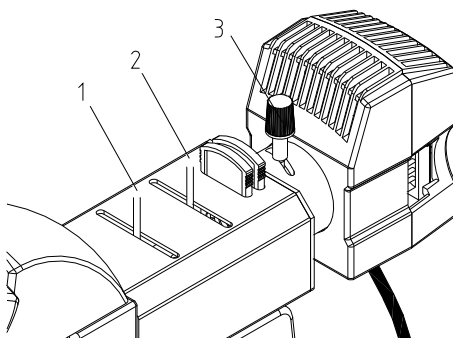


Fig.22

3.3.3 Adjusting the Illumination Set (Fig.22)

1. Make sure the ray brightness in view field is even, have no filament shadow. If there is filament shadow, please adjust the Condenser Knob③ to proper position.
2. Adjust the View field Diaphragm① and Aperture Diaphragm② until the two Diaphragm open size is properly. Then you can get clear image. When in using, you need to adjust simultaneously, part observe until to the high-point.

★ **Aperture Diaphragm:** The aperture diaphragm (iris diaphragm) is designed for matching the objective's numerical aperture, not use for adjusting brightness. When the objective is adjusted full of light, the Aperture Diaphragm is in best state and the image is clear. What to be notice is that when switch objective, the Aperture Diaphragm size should change along with the adjusting.

★ **View field Diaphragm:** Used to control view field size, to reduce Anti- cast light and Dizzled light. When the objective is adjusted full of light, the image is clear and in high-point state.

3.3.4 Adjusting the Diopter (Fig.23)

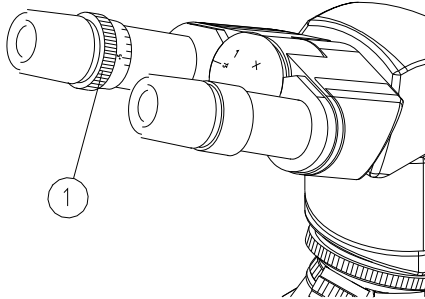


Fig.23

1. Observe the right ocular tube with your right eye. Turn the Coarse & Fine Focus Knob to focus the specimen.
2. Observe the left ocular tube with your left eye. If not in focus just adjust the Diopter Ring① to make it in focus.

★ The range of Diopter Ring is ± 5 , as the value align the reticle② of the ring.

3.3.5 Adjusting the Interpupillary Distance (Fig.24)

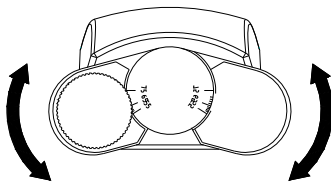


Fig.24

The interpupillary distance range:55mm~75mm.

When observing with two eyes, hold on the left and right prism holder, turn around the axis, adjust the interpupillary distance until the left and right fields of view coincide completely.

3.3.6 Focusing (Fig.25)

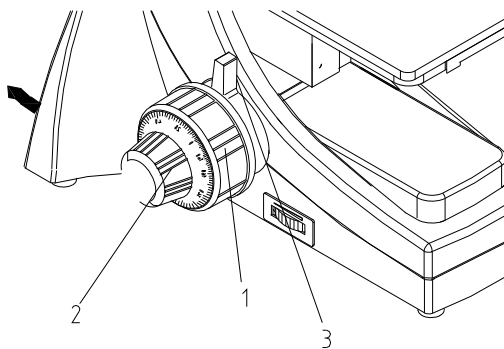


Fig.25

1. Use the 10×objective focus, to avoid the objective touch with the specimen, you should raise the mechanical stage at first, let the specimen close to the objective, then slowly separating them to focus. The operator can converse turn the coarse focus knob① to get the specimen down ,and search images in the 10×ocular simultaneously, then use the fine knob② to focus. At this moment, you can replace other magnification objectives safely, and focus without the risk of destroying the specimen.

★ If you need to fix the stage on a vertical position to make the observation become more convenience, take use of the locking set.

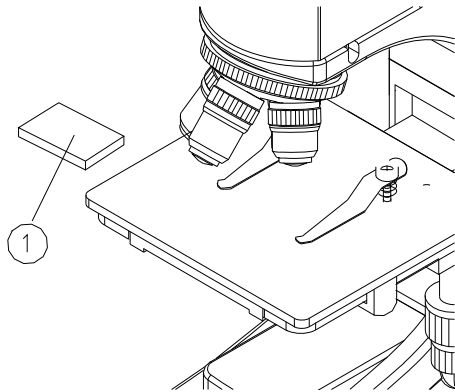


Fig. 26

3.3.7 Placing Specimen (Fig.26)

1. Place the slide on the mechanical stage. Use the stage clips to clamp the slide gently.
2. Turn the portrait and lateral adjustment knob of the mechanical ruler, move the specimen onto the required position.

★ Be careful when changing the objective. If you finish the observation with the short working distance objective, and want to change another one, be careful of not letting the objective touch the specimen.

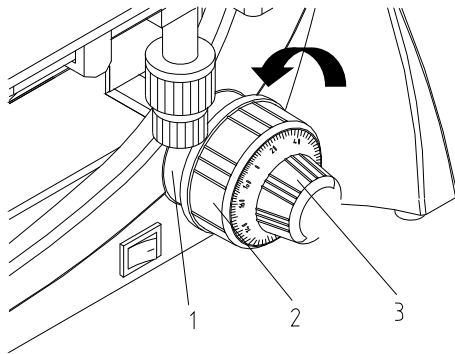


Fig. 27

3.3.8 Adjusting the Tension Adjustment Collar (Fig.27)

★ The tightness of the tension adjustment collar has adjusted before leaving factory, if finding it's loosing (the mechanical stage drop itself because of deadweight), please turning the tension adjustment collar① until the tightness is in order. Turn it along the direction show in the picture, the Coarse Focus Knob② will become tighter. Turn anti-direction will become loosen.

If the mechanical stage drop itself, or even lose focus just after adjusting the fine focus knob③. Mean the tightness of the Coarse Focus Knob② is too low. You should turn the tension adjustment collar along the direction show in the picture to make it tighter.

4. Technical Specifications
BS-6000A/AT
1. Main specifications

Optical System	Infinite Optical System
Viewing Head	Compensation Free Trinocular Head, Inclined at 30, Interpupillary distance: 48-75mm
Eyepiece (Ocular)	View field line 18mm
Nosepiece	Forward Quadruple Nosepiece
Objective	Infinite plan Achromatic: 4×, 10×, 20×(choose and buy), 40×
Focus System	Coaxial Coarse and Fine Focusing System, Sensitivity and Graduation of Fine Focus: 0.002mm.
Stage	Double layer mechanical stage, area: 150×140mm, movement range: 75×50mm
Lamp-House	halogen lamp 6V20W

2. Objective

Magnification	Numerical Value Aperture Diaphragm(N.A)	Working Distance (mm)	Conjugate Distance (mm)
4X	0.10	25.4	∞
10X	0.25	11	∞
20X (choose and buy)	0.40	6.06	∞
40X	0.60	3.7	∞

5. Trouble shooting
BS-6000A/AT

Some problems will happen in the using of the microscope, you could solve them according the following list.

PROBLEMS	REASON FOR PROBLEMS	SOLUTION
I. Optical Part:		
1. Illumination is on, but the field of view is dark.	The poor contact exists in the lamp house and the illumination system.	Ensure the contact pin and the lamp holder pin work well
	The lamp bulb spoils	change a new bulb
	The brightness adjustment knob is set too dark	Adjust the knob in a proper position
	No use the appointed lamp bulb	use the specified halogen Lamp 6V20W
2. The edge of the field of view has shadow or the brightness is asymmetry	The nosepiece is not in the located position	Adjust it into the located position
	The surface of the lamp become black	Change a new lamp bulb
	The filament shadow not clean up	Move in Condenser adjust knob front and back to change the focus position to clean up the filament shadow.
	The surface of the lens is moldy or has contaminant	Clean the lens
3. Find dust and stain in the field of view	There are stains on the specimen	Change the specimen
	There are stains on the eyepiece	Clean the eyepiece
4. The image is defocus, low-resolution	The objective damage	Mend and correct the objective (send to factory for overhauling)
	The lens of the objective and eyepiece is moldy or have contaminant	Do cleaning
	The opening of Aperture diaphragm and field diaphragm is not proper, and too much astigmatism.	Change the opening of the aperture diaphragm and field diaphragm
	Fine focus system is broken	Examine and repair the fine focus system(send to factory for overhauling)
	The objective is not in the center of the light path	Turn the nosepiece to the located position
5. The image focus surface incline(one side is clear and the other side is faint)	The illumination light incline serious	Adjust the filament position ,let the light distributing of the field of view become symmetrical and bright
	The specimen don't correctly place	Put the specimen on the right position
	The nosepiece is not in the located position	Turn the nosepiece in the required position
6. The eyes are uncomfortable, the left and right fields of view is not coincided .	The interpupillar distance is not correct	Adjust the interpupillar distance correctly
	The diopter is not right	Adjust the diopter according your sight
	Can't adapt to binocular observation	When look into the objective, do not stare at the specimen but at the whole field of view, or move the eyes away to see other things, then back into the objective

II. Mechanical Part:		
1. The coarse focus knob is hard to run	The tension adjustment collar is too tight	Loose properly
2. The image can't stay on the focal plane in the process of the observation	The tension adjustment collar is too loose	Tighten properly
III. Electric Part:		
1. The lamp can't light	No power supply	Check the power cord, and connect them exactly
	the installation of the bulb is wrong	Install the bulb correctly
	The bulb burn out	Change a new bulb
2. The bulb burn out in a high frequency	Not use the specified lamp	Use the required lamp
3. The height of the brightness is not enough	Not use a appointed lamp	use a appointed lamp
	The brightness adjustment knob is used wrong	Adjust the brightness adjustment knob in a correct way
4. The light glimpse	The bulb is going to spoil	Change the bulb
	The power cord have a poor contact	Check the power cord, and connect them exactly