Guangzhou Micro-shot Technology Co., Ltd

ML31

User Manual

Welcome to use ML31 biological microscope!

ML31 series biological microscope is widely used at biology and medical university laboratory, medical treatment and public health, scientific study instrument, etc.

This unit is a precision optical instrument. Our product has been design to provide the highest level of safety, however, improper operation or negligence in following the instructions in this manual may cause personal injuries and property losses. In order to ensure your safety, prolong the life of this unit and maintain it properly, please read this manual carefully before operating this unit.

Safety Reminder

1. Be sure to turn off the power switch and remove the power cord before installing this unit, replacing the bulb or fuse, plugging and unplugging the power supply.

To prevent electric shock or fire, be sure to turn off the power switch and remove the power cord before installing this unit, replacing the bulb or fuse, plugging and unplugging the power supply.

2. Do not disassemble

Except the removable parts mentioned herein, no part of this unit shall be removed, otherwise the performance of this unit may be reduced, or may cause an electric shock, injury or damage to this unit. Please contact the supplier if any fault occurs.

3. Input voltage

Check if the input voltage is consistent with your local voltage supply. If not, do not operate this unit and contact the supplier. Improper input voltage may cause a short circuit or fire thereby causes damage to this unit.

4. Use specific bulb, fuse and power cord

Use of an improper bulb, fuse or power cord may cause damage or fire to this unit. Any extended power cord used must be grounded (PE).

5. Protect this unit from high temperatures, dampness and foreign objects

To prevent short circuit or any other fault, do not expose this unit to any high temperatures or dampness environment for a prolonged period of time. A suitable operating environment is designated at a temperature of 5°C-35°C, and relative humidity of 20%-80% (at 25°C). If water splashes on this unit, turn off the power switch and remove the power cord immediately, and then wipe the water off with dry cloth. When any foreign object enters or drips onto this unit, please stop operating the unit and contact the supplier.

6. Heat of light source

The lighting bulb generates high temperatures during operation. Do not touch the collector lens or

lamp box when the lamp is illuminated, and do not touch the bulb within 10 minutes after the lamp goes out due to high temperatures arising from operation. When replacing the bulb, make sure it has cooled down properly (the lamp should be off for at least 10min).

★ To prevent burn, do not touch the bulb when the lamp is illuminated or within 10min after it goes out.

★ To prevent fire, do not place any fibrous product, paper, flammable or explosive material (e.g., gasoline, petroleum ether, alcohol) near the halogen lamp housing or mercury lamp housing.

Warning!

7. Coarse/fine focusing knobs

This unit employs a coarse/fine coaxial focusing mechanism. Do not turn the left/right coarse/fine focusing knob in the opposite direction. When the objectives lifting device reaches the limit of motion, do not continue to turn the coarse focusing knob, otherwise the focusing mechanism may be damaged.

Caution!

8. Storage place

This unit is a precision optical instrument, and improper operation or storage may cause damage or its precision may be adversely affected. Consider the following when selecting a storage place:

※ Avoid placing the unit under direct sunlight, directly under interior lighting or any other bright place.

※ A suitable operating environment is designated at a temperature of 5°C-35°C, and relative humidity of 20%-80% (at 25°C). Do not expose this unit to high temperatures, dampness or dust for a prolonged period of time, otherwise mist or mold may develop or dust may deposit on the lens, thus cause damage to this unit and shortening its life.

Caution!

9. Installation of bulb

Do not touch the glass surface of the bulb directly with bare hands. When mounting the bulb, wear gloves or wrap it with cotton material.

※ Wipe off any dirt on the surface of the bulb with a clean cotton fabric dipped in alcohol. If the dirt is not thoroughly removed, it would etch the surface of the bulb weakening its brightness and shortening its life.

※ Mount the bulb with care to avoid slipping off or injuries to your fingers.

※ When replacing the bulb, make sure its contact is intact. If its contact is damaged, the bulb may be disabled or short-circuited.

※ When replacing the bulb, the feet should be inserted into the holder as deeply as possible. If the feet are not tightly inserted, the bulb may go out or short circuit.

Caution!

10. Instrument handling

This precision optical instrument is heavy and should be handled with care. Strong impact and rough handling are strictly prohibited, it may cause damage to this unit.

11. Environmental protection

Please dispose the wastes from the packaging and operation of this unit by category such as cartoon, foam, plastic, bulb and etc. Do not discard the damaged mercury lamp carelessly in order to avoid creating environmental poll

Content

Product introduction.....错误！未定义书签。

Specification.....错误！未定义书签。

Installation and Use.....3

1. Installation.....3

2.Microscope adjustment.....4

Components operation.....6

Electronic parts.....6

Sample setting.....6

Condenser adjustment.....7

Pupil distance and diopter adjustment.....9

Focus and stopper.....10

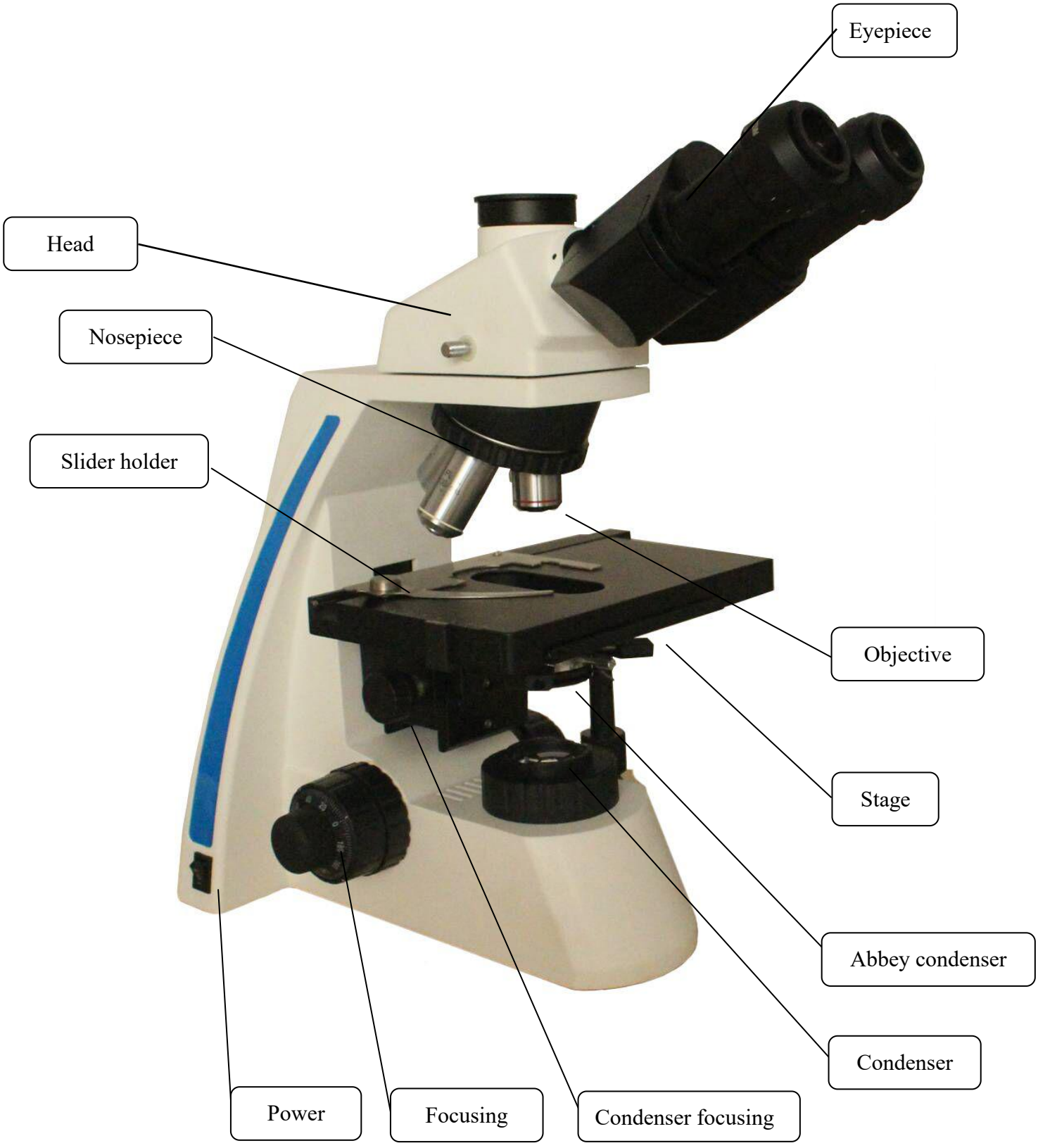
Eyepiece/Photo.....11

Coarse and fine hand wheel.....12

Maintenance.....错误！未定义书签。

Troubleshooting.....错误！未定义书签。

I.Production introduction



ML31 biological microscope diaphragm

II. Specification

Item	Specification	Standard ●	Option ○	Quantity
Eyepiece	Wild field WF10X /F.N.22mm	●		2
	Wild field WF16X /F.N.15mm		○	2
Tube	Hinge trinocular，30° inclination，pupil distance 53–75mm	●		1
Objective	Infinity plan achromatic 4X/0.1 WD：21.5mm	●		1
	Infinity plan achromatic 10X/0.25 WD：7.5mm	●		1
	Infinity plan achromatic 40X/0.65 WD：0.65mm	●		1
	Infinity plan achromatic（oil）100X/1.25 WD：0.185mm	●		1
Focus	Coaxial coarse and fine with limit and locking devices, low coaxial focus adjusting handle, fine adjusting handle scale value 0.001mm, coarse focusing circle range 40.0mm, fine focusing circle range 0.2mm, focusing moving range 24mm	●		1
Nosepiece	Quadruple backward	●		1
Stage	Double layer stage，size:210mm×140mm Moving range：76mm× 50mm	●		1
Transmitted illumination	Abbey condenser NA1.25	●		1
	Abbey condenser NA1.25（phase contrast, bright field） (need to adjust with phase contrast objective)		○	1
	LED light source, brightness adjustable	●		1
Adapter	1XC	●		1
	0.5XC		○	1
Power line		●		1
Dust cover		●		1
Oil	Immersion oil 8ml	●		1
Others	Excellent infinity optical system Kohler illumination system Power line AC220V/50HZ			

III. Installation and Use

1. Installation

It is advised to keep necessary package in case there is need in the future.

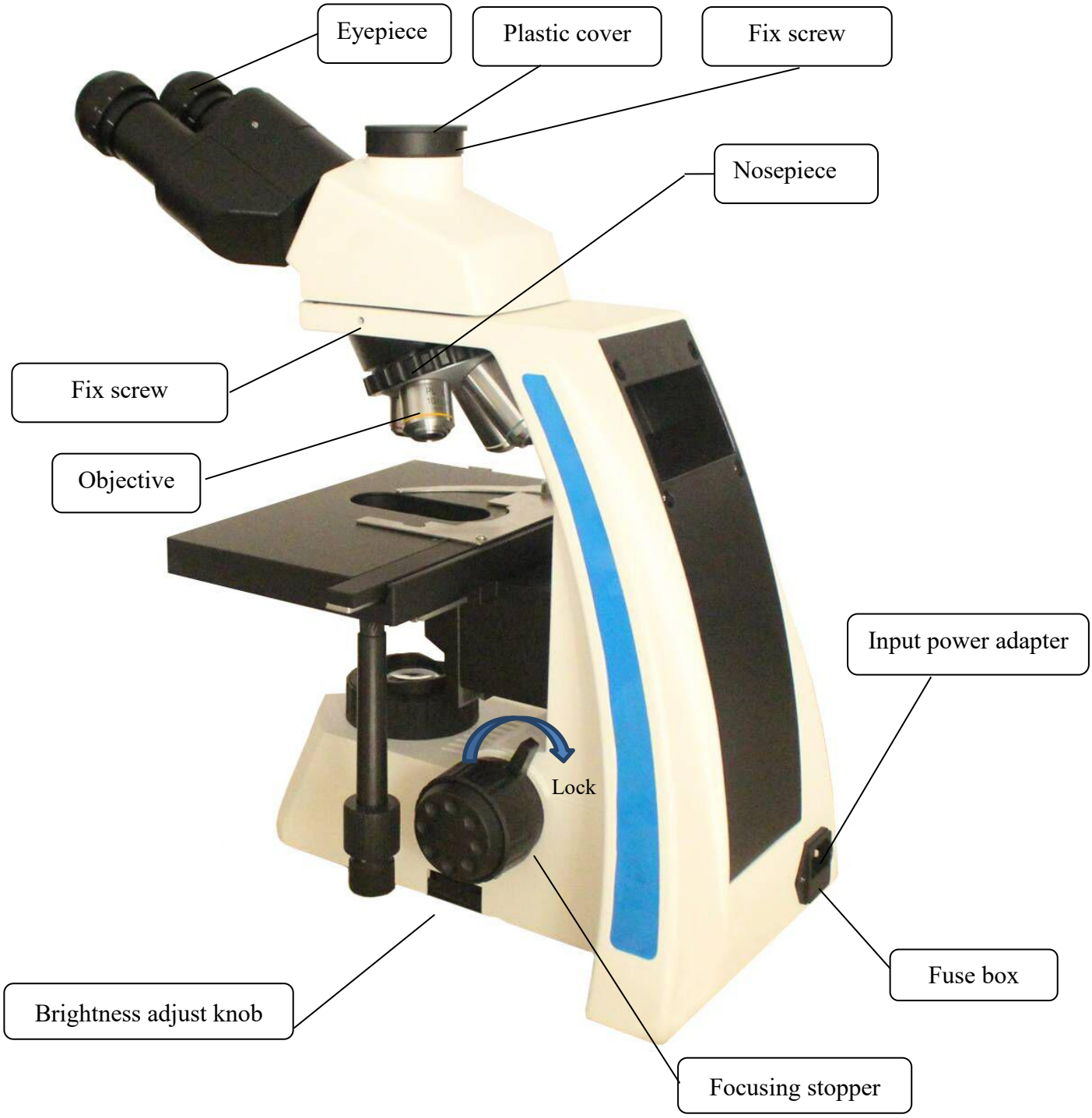


Figure 2 Installation guide

Steps:

1. Take off cover on eyepiece and insert in eyepiece to eyepiece tube.
2. Loosen screw on microscope head, rotate head with 180°, then lock trinocular head.
3. Screw in objective to nosepiece in order.
4. Connect power line with electronic power and microscope.
5. Check if Abbey condenser has been locked well.

Note: Spare fuse is hold at fuse box.

2.Microscope adjustment

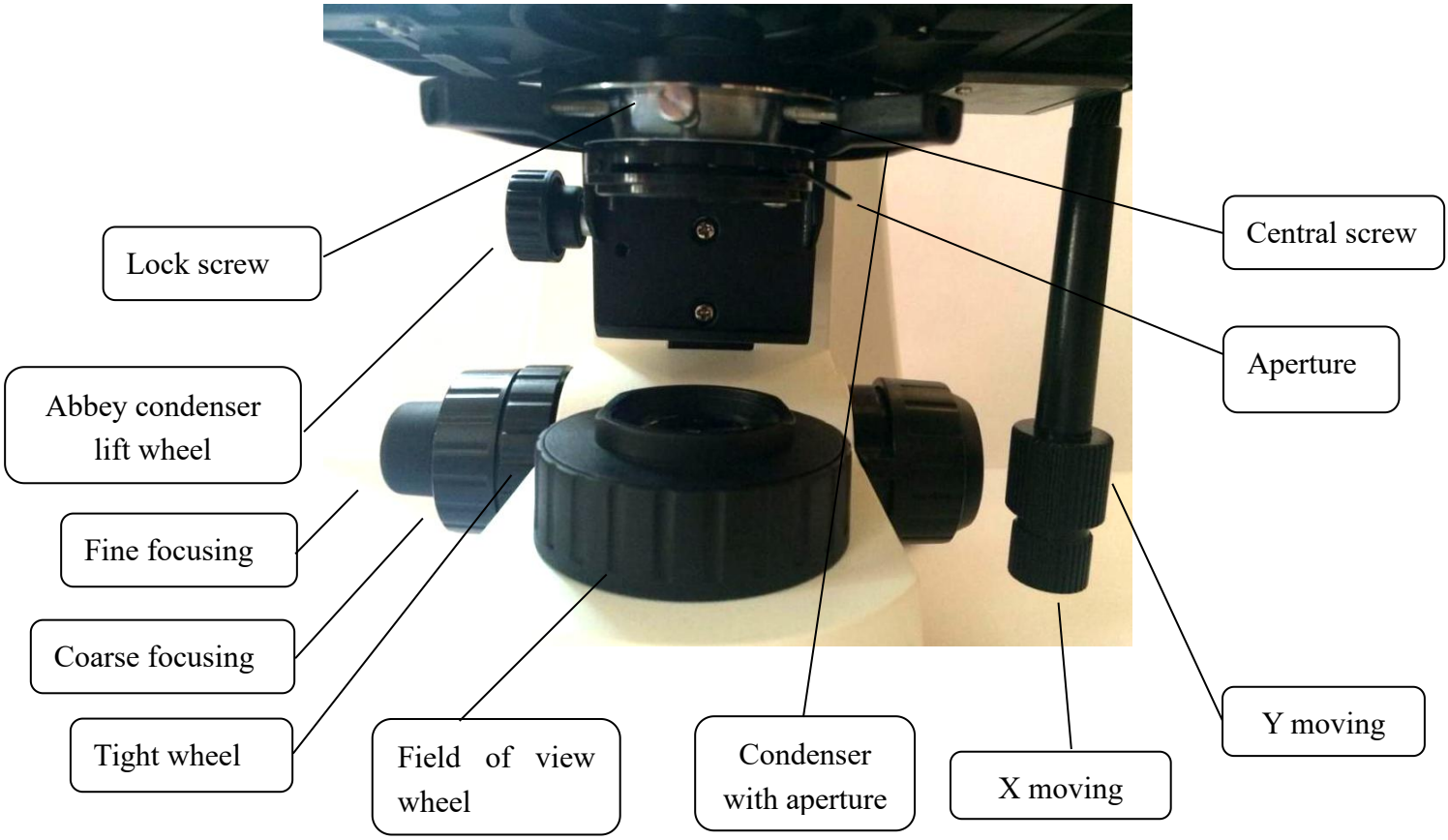
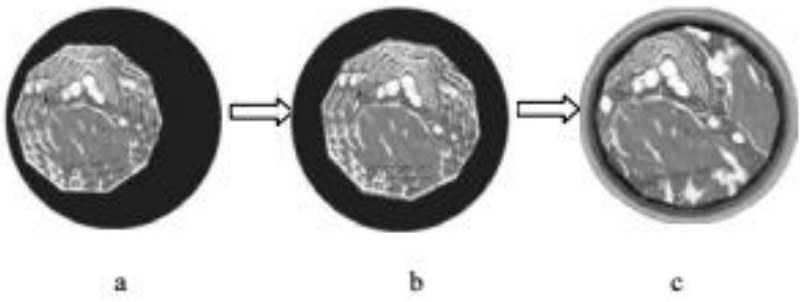


Figure 3 Microscope adjustment

Steps:

1. Start power button
2. Move slider holder and put on slider
3. Rotate Abbey condenser lift wheel, lifting Abbey condenser to the top position.
4. Set 10X objective to light path and move X moving wheel to move slider into central of field of view, get down transmitted light brightness of microscope to minimum brightness, move coarse focusing wheel to till the image is clear in eyepiece. Then rotate field of view wheel to the minimum field, as image a shows.Adjust condenser central screw, make field of view diaphragm show as image b, then open field of view diaphragm to check if light in eyepiece view is even. If the light is not even, fine adjust central screw.



5.Lock screw.

IV. Components operation

4.1 Electronic parts (Figure 4）

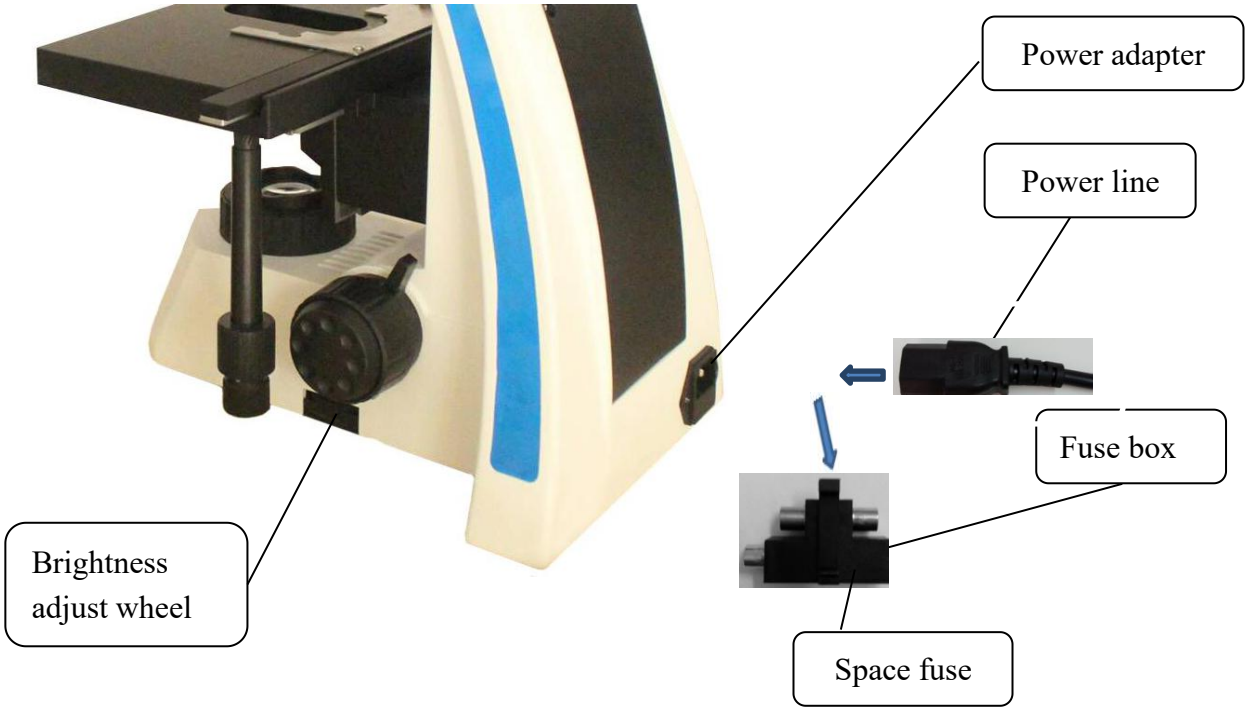


Figure 4

Connect power line to host back bottom side.Set illumination knob (on the left bottom side of microscope host)to lowest brightness, rotating illumination brightness by need during operation.

Exchange fuse: as figure 4, draw out fuse box and take off trouble fuse,set

spare fuse to fuse box. Put box back to holder.

Attention: Before start power, please make sure voltage if meet the instrument requirement, please do not use microscope if the voltage is different, it may cause damage or fire.

4.2 Sample setting

Open slider holder, put on slider with upper to upside. Take notice do not damage slider.The slider should be even put on the stage, rotate stage moving wheel with X and Y to make slider into light path (as figure 5).

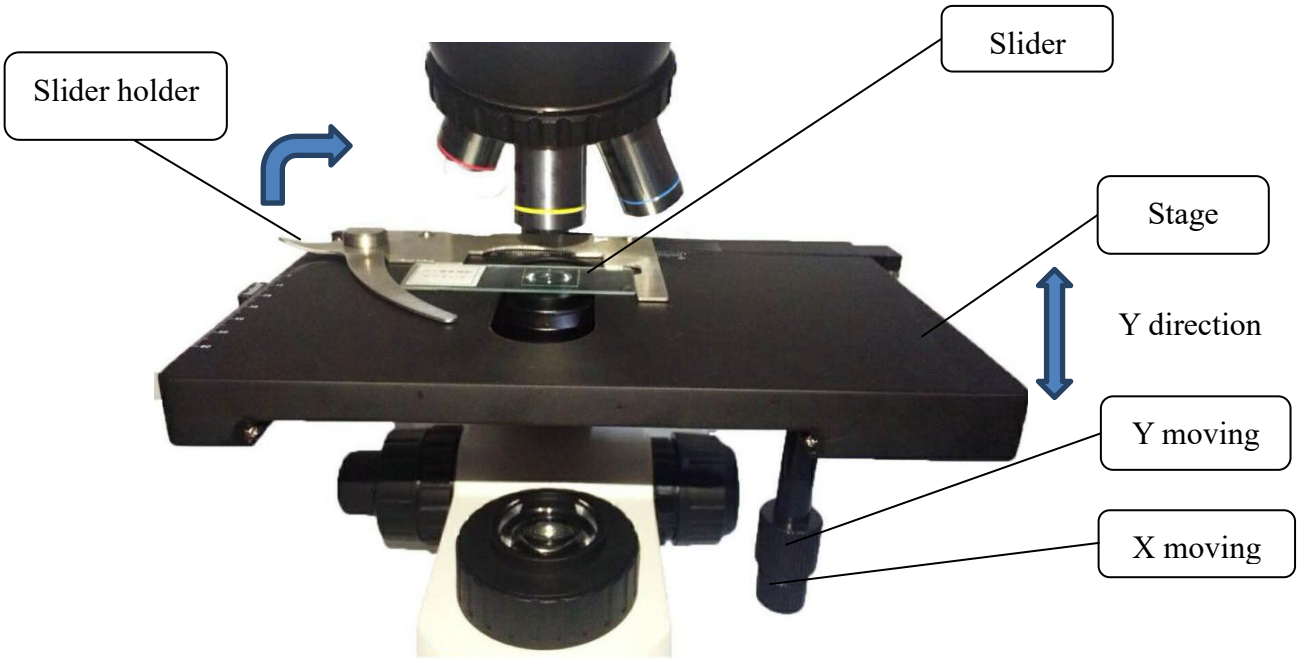


Figure 5 Stage sets

Figure 6

4.3 Condenser adjustment

4.3.1 Abbey condenser lifting wheel（Figure 6）：

Through rotate abbey condenser lifting wheel to adjust distance between condenser and slider can make

brightness even to achieve best brightness and contrast.

4.3.2 Aperture adjustment（Figure 6）：

Move aperture wheel and change size of aperture to change slider contrast.In common, objective times smaller, aperture is smaller.

Attention: Aperture adjustment needs to match with objective field of numerical aperture(FN), FN is smaller, aperture size should be smaller, otherwise the same. Change field of view brightness can not achieve through change aperture size and position.

4.4 Binocular pupil distance adjustment and diopter

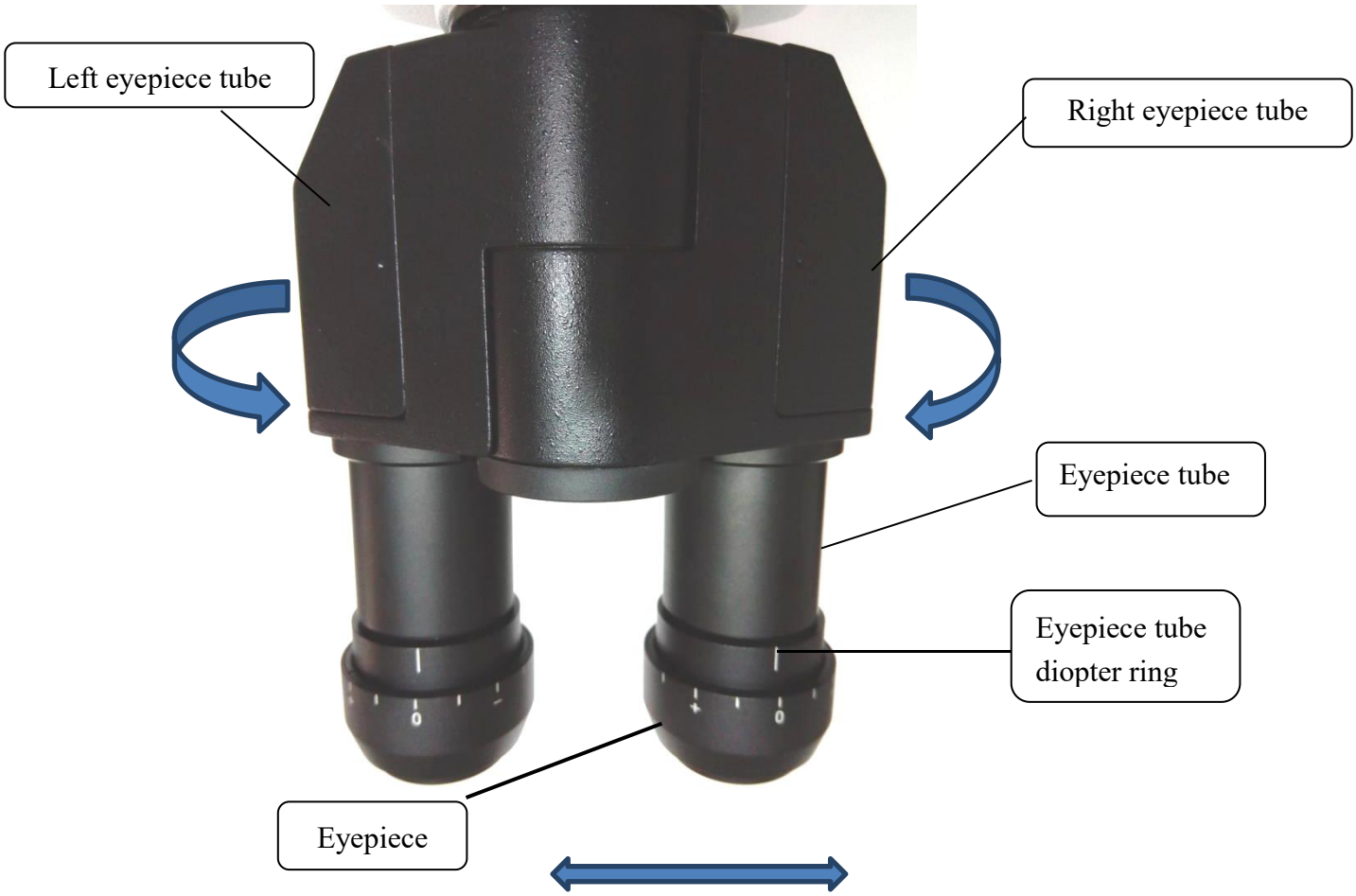


Figure 7

4.4.1 Pupil distance adjustment

The pupil distance (eye distance) varies from person to person, so before using this instrument, the pupil distance of the binocular should be readjusted.

A) transfer the eyepiece on the left and right sides to the 0 pairs of lines according to (Fig. 7).

B) 10X objective is screwed into the light path, moving specimens to the light path, observing the eyepiece, adjusting the coarse and find hand wheel to make the image clear.

C) hold the binocular left mirror tube and the right mirror tube respectively, and rotate it according to (Fig. 7) until the specimen is seen by both eyes.

Complete coincidence (the process of A to B and then to C)

4.4.2 visual adjustment

A) transfer the left eyepiece tube and right eyepiece tube to the 0 pairs of lines according to (Fig. 7); move the specimen to the light path.

B) Turn 40 X objective to light path. The right eyepiece is used to observe the specimen in the right eyesight. Adjust the coarse and find focusing hand wheel to make the specimen clearly visible.

C) Observing the specimen on the left eyepiece. If the imaging is not clear, it is necessary to adjust the eyepiece's visibility, so that a clear specimen image can be observed in left eye (adjust diopter ring, the range is: N= + 5 diopter).

4.5 Focus and stopper

A) Loosen the limit handle shown in Fig. 8 and turn it into the 10X objective into the light path, and slowly turn the coarse moving handwheel unit the image is clear in the eyepiece. Roughly clear, then slowly rotate the micro motion handwheel to make the imaging clear. Turn to other times objective, it should be properly rotate the hand wheel to make the image clear. The minimum scale handwheel is 0.002mm.

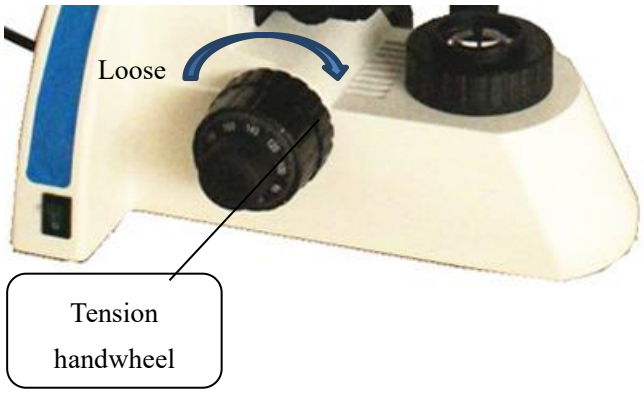


Figure 8

B) For convenience observation and avoid objective to touch with the slider, use stopper when focusing well(figure 8).

Attention: Do not rotate the coarse and fine hand wheel in negative direction.Do not move stage too quick. It may damage the focusing system.

Attention: As working distance of 10X objective is too long, use the objective to focus because it is more easy to find the right position of focusing and do not touch the slider.

4.6 Eyepiece/Photo

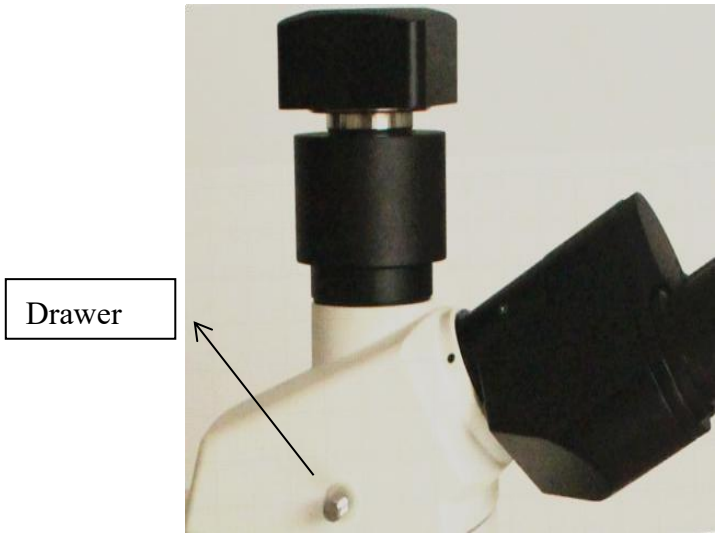


Figure 9

A)According to (Figure 9), loose the screw on joint, take off dust proof cover, connect photo device with adapter and put in trinocular head and locked.

B) Eyepiece / photo transfer

Lever (as figure 9) shown indicates that it can be observed by eyepiece, lever draw out means can seen by photo device.

C) Eyepiece and photo need to show the same field of view, please use 0.5X camera adapter to connect camera.

D) Connect the 0.5X adapter as figure 9, firstly observe by eyepiece, then turn to the 10X objective with focusing well, then transfer to 40X objective and adjust it clear, then transfer to photo with tool to loose the lock screw, adjust focusing knob till image is clear , then lock it with screw (as figure 10).

Figure 10 0.5 adapter port

4.7 Coarse and find hand wheel

After long time using of instrument, the stage may slide down. Can adjust hand wheel tension to avoid the stage from sliding down. Clockwise adjusting,the stage can be tighten, otherwise, loose.

Notice: The rotate speed of hand wheel

Maintenance

1.When moving instrument, please hold the microscope (as below photo) by both hands. There is grab handle on the back of hose, and design with a notch.
2.Keep all optical components tiny and clear, it is very important.
3.Cover the microscope with dust cover when do not using the microscope.
4.Before wiping dust or dirt, please blow off with air blower.
5.Avoid excessive using solvent lint free cloth, please soak lens paper and cotton swab with solvent before using.
6. It is easy to overstock dirt, dust and oily material on the front side of objective lens. Please use magnifying glass to check if there is not reference substance or under dark and confused surroundings.
7.If need to take off microscope lens body, please notice do not touch lens outside face to avoid impression. Or it will reduce image definition.
8. This instrument belongs to I type normal standard electrical equpment safety.
9. This instrument does not belongs to AP type or APG type equipment.
10. This instrument is equipment with protection against electromagnetic interference, surge voltage and surge current.
11. High pressure inside, non-professional people please does not open bottom base.

Attention: Please do not disassemble optical parts to protect machine!

VIII. Troubleshooting

Fault	Cause	Disposition
Electric system		
No light shown in the field of view using halogen lamp	The power switch is not	Turn on the power switch.
	The halogen lamp is damaged	Replace the halogen lamp.
	The fuse is damaged.	Replace the fuse.

	The connector of the electric chassis is in bad contact.	Check and have professional repair it.
	The halogen lamp mounted is nonconforming.	Use a conforming halogen lamp.
Optical system and imaging		
There is a black shadow on the edge of the field of view or unevenly illuminated, making it impossible to observe the whole field of view.	The nosepiece has not been turned to the fixed position.	Turn the nosepiece to the fixed position.
	The filament image deviates from the center of the	Reposition the lighting bulb.
	There is dirt or oil on the surface of the objective,	Wipe the lens surface or replace the lens.
Oil or dust is found in the field of view.	There is oil or dust on the eyepiece lens.	Wipe the eyepiece.
Defocusing or low resolution	The objective is damaged.	Repair the objective (by a professional).
	There is oil or dust on the surface of the lens of the	Wipe the objective or the eyepiece.
	The aperture of the aperture diaphragm is too small.	Adjust the aperture of the aperture diaphragm based on the objective magnification (or numerical aperture) used.
	The objective deviates from the light path.	Turn the nosepiece to the fixed position.
The focal plane of the image is inclined (brighter on one side and darker on the other)	The lighting bulb is seriously inclined.	Reposition the lighting bulb.
	The specimen is not laid flatly.	Lay the specimen flatly on the object stage and hold it stably.
Mechanical system		
The image cannot remain clear during observation.	The focusing mechanism flows (slides down) automatically.	Adjust the coarse adjusting hand wheel.
	The fine focusing mechanism fails	Check and have professional repair it.
	The stage loosens or is inclined.	Check and have professional repair it.