UPRIGHT BRIGHT OR DARK FIELD TRANSMITTED

OR REFLECTED LIGHT MICROSCOPE

MJ33

User Guide

Congratulations and Thank You for your purchase of

The Microscope

This precision instrument has been designed to require a minimum of optical and mechanical maintenance. Its excellent design assures years of high quality, reliable service. We recommend you read this entire manual carefully before beginning to use the instrument.

WARNING

PLEASE DISCONNECT PLUG FROM MAINS SOCKET BEFORE REMOVING THE BOTTOM PLATE, OPENING THE LAMP REPLACEMENT DOOR, OR REMOVING THE LAMP HOUSE

WARNING

THE POWER CORD PROVIDED WITH THE EQUIPMENT HAS A GROUNDED PLUG. ALWAYS USE THE POWER CORD WITH A PROPERLY GROUNDED WALL OUTLET.

DO NOT EXPOSE THE INSTRUMENT TO HIGH TEMPERATURES OR HUMIDITY. AVOID USING THE INSTRUMENT IN EXTREMELY DUSTY LOCATIONS.

OPERATING ENVIRONMENT TEMPERATURE 5℃ TO 35℃

OPERATING ENVIRONMENT HUMIDITY: 20% TO 80% @ 25℃

CAUTION: NEVER IMMERSE THE INSTRUMENT IN WATER OR SOLVENT

CAUTION: DO NOT PUT ANY FOREIGN OBJECTS IN THE FRAME OR INTO ANY MOVING MECHANICAL PARTS

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Getting started

This user guide is written on the assumption that it will be used by experienced microscopist. It covers the essential adjustments and controls of microscopes. No attempt has been made to include fundamentals of microscopy. Read this user guide prior to unpacking the microscope. This user guide is designed to illustrate a sequential method for assembly and operation. We recommend the instructions be followed in a sequential process. After assembling the instrument, re-read the user guide and become familiar with all adjustments and functions before using your new microscope.

Components installed

1. Remove all parts from their packages and retain them in the event you need to transport the product. Take out the main body ①， demount interfix packing and dustproof covers.
2. Loosen the set-screw by hexagon wrench and take out trinocular or binocular ②.
3. Unpack reflected illumination and lamp house， take out the reflected illumination ④ and lamp house ⑤，demount dustproof covers.
4. Mount the lamp house with reflected illumination and close the set-screw by hexagon wrench, then install the reflected illumination unit on the main body and close the set-screw by hexagon wrench. Connect the power supply input of lamp house to the power supply output of main body.
5. Mount the trinocular or binocular on the reflected illumination and close the set-screw by hexagon wrench. Note: the eyepiece tube of trinocular or binocular locates the frontispiece of main body.
6. Install two eyepieces③ into eyepiece tube, turn the eyepieces for about a circumference to make the eyepieces fit the eyepiece tube.
7. Connect power supply to the power outlet of main body.
8. Put the glass plate in the square slot of stage.
9. Check the reliability and security of the above installations.
10. Check and collate attached accessories and tools within the package, properly stored the accessories and tools to avoid missing.
11. Schematic diagram of installation process.

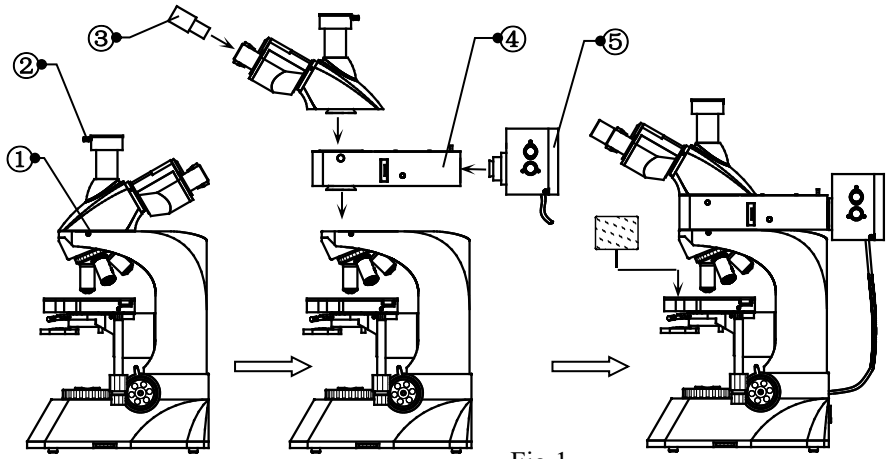

Fig.1

Components

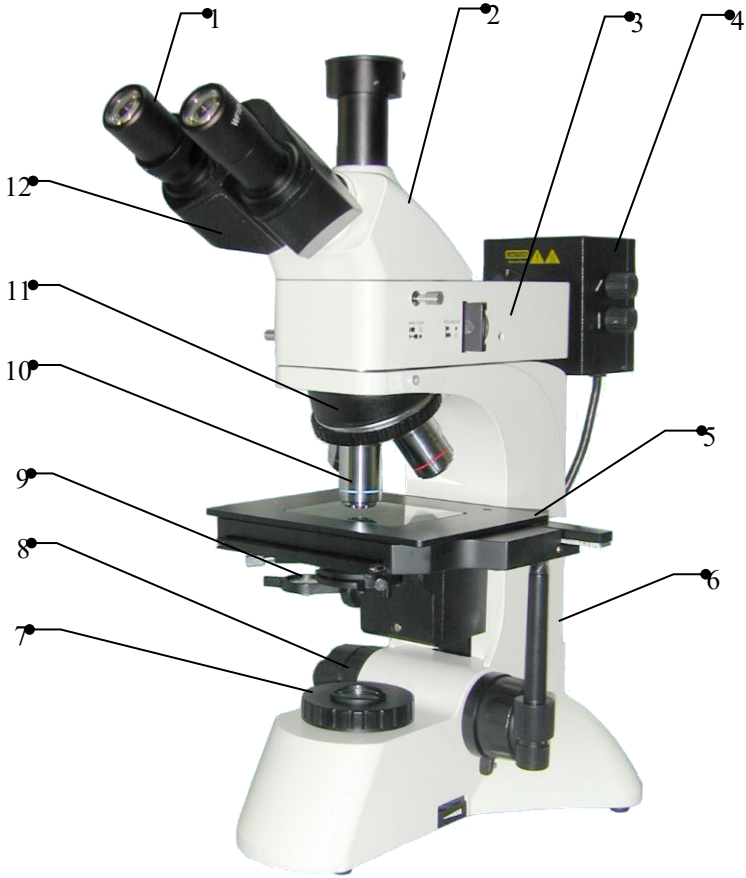

Fig.2

1.Eyepieces 2.Trinocular 3. Reflected illumination 4.Lamp house 5.Stage 6.Main body 7.Collector with field diaphragm 8. Coaxial coarse/fine focus system 9.Abbe condenser with iris diaphragm 10. Objective 11.Nosepiece 12.Eyepieces tube

Technical Specifications

Eyepieces: 10X wide field eyepiece, focal length 25mm, field of view number Φ22 mm.

Trinocular: Inclined 30°, interpupillary distance 53~75 mm.

Objective: Infinity plan achromatic bright or dark field objective (no cover glass)

Magnification	Numerical aperture	Working distance (mm)	Mark
5X	0.12	8.40	
10X	0.25	9.30	
20X	0.40	7.20	
40X	0.60	3.00	
60X	0.70	1.95	**Selection**

Nosepiece: Quadruple backward ball bearing inner locating.

Stage: Double layer mechanical Size: 210X140mm, moving range: 75X50mm.

Condenser: Abbe condenser NA.1.25 Rack & pinion adjustable

Focus system： Coaxial coarse/fine focus system, with tension adjustable and limit stopper, minimum division of fine focusing: 2μm..

Illumination:

Reflected illumination: 12V/50W halogen lamp, adjustable brightness.

Transmitted illumination: 12V/30W halogen lamp, adjustable brightness.

Power supply： Input 85~265V 50/60Hz

Anti-fungus: Yes.

Basic Operation

The microscope is a multi-purpose industrial inspection optical instrument. Can be used in the bright field of view observation of transmitted light, and used in the dark field of view observation of reflected light. The following instructions ware base on different usage requirements for introduction.

Observation in transmitted light

1. Turn on power switch ①, push the reflected light or transmitted light switch ② to position "I" . See fig.3.

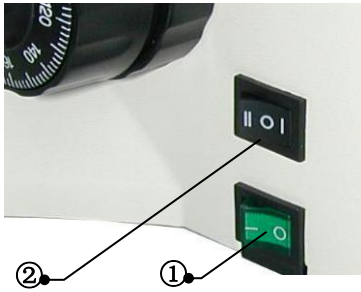

Fig.3

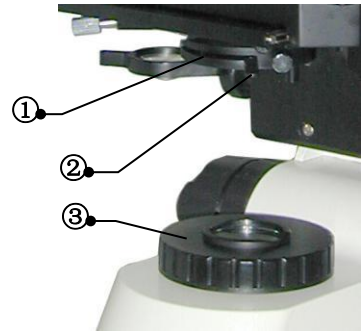

Fig.4

2. Open the iris diaphragm ① under the Abbe condenser. Clockwise turn iris diaphragm lever ② to make the iris diaphragm larger. Counterclockwise turn to smaller. Then open field diaphragm ③, Clockwise turn field diaphragm plate to make the field diaphragm lager. Counterclockwise turn to smaller. See fig.4.
3. Push the bright/dark push rod ① of reflected illumination in, like the mark " BF ", mean is bright field of view observation. Push the bright/dark push rod ① of reflected illumination out, like the mark " DF ", mean is dark field of view observation. See fig.5.
4. Push the eyepiece observation/photography push rod ② in, mean is eyepiece observation, like the mark " ". Push the eyepiece observation/photography push rod ② out, mean is photography, like the mark " ". See fig.5.
5. Push the analyzer push rod ① in, mean is

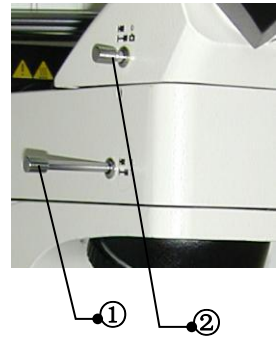

Fig.5

analyzer out of optical path. Like the mark “ ■ ○ ”. Push the polarizer unit ① out, mean is polarizer out of optical path. Like the mark

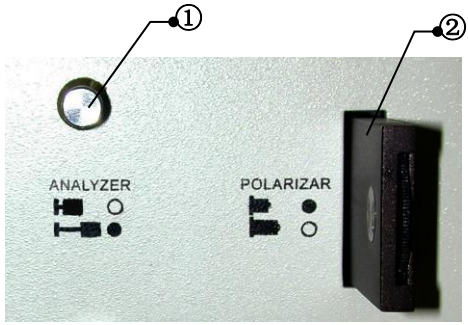

Fig.6

“■ ○” .See fig.6.

6. Put a transmitted specimen on the glass plate.

Adjusting microscope in transmitted bright field of view

1）Transmitted illumination adjusting

a. The illumination brightness is controlled by brightness control ①. The mark“ ▬ ” means the illumination brightness from low to high. See fig.7.

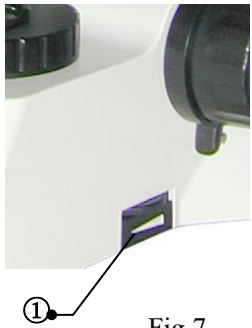

Fig.7

Note: Using the light at brightest setting reduces life span of bulb!

b. If the field of view brightness asymmetry, you should adjust the position of lamp to collector. Can use light bulb centering thumbscrew ① to adjust the lamp position. First, you should incline microscope towards back of main body and loosen light bulb centering thumbscrew. Second, push the thumbscrew front or back. When ensure the

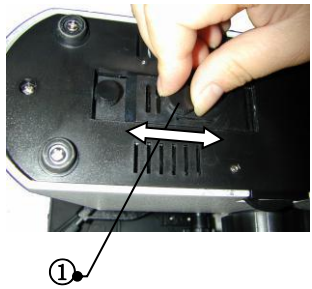

Fig.8

position of light bulb and the field of view brightness uniformity, you can close the thumbscrew again. See fig.8.

2）Adjusting coaxial coarse/fine focus system

a. Focusing： Coarse adjustment knobs ② / ⑤ are located on each side of the frame, can accomplish coarse adjusting. Fine adjustment knobs ① is located on each side of coarse adjustment knobs and same axis to them. When Clockwise turn coarse adjustment knobs or fine adjustment knobs, make the stage raise, counterclockwise turn to make stage fall. Minimum division of fine focusing is 2μm. See fig.9.

b. Focus Tension Adjustment: The tension of the coarse focus is adjustable and preset at the factory for ease of use. If you wish to adjust the coarse focus tension, first locate the tension adjustment ring ③. Turning the ring toward the front of the microscope (counterclockwise) increases the tension, and toward the rear of the microscope (Clockwise) loosens it. See fig.9.

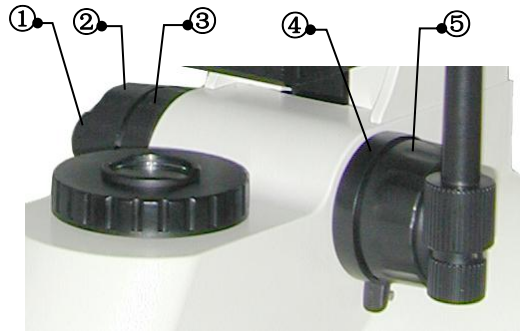

Fig.9

Note: Tension is too high if you experience physical discomfort!

c. Pre-focusing or Focus Stop Control: Use of this feature will insure that the short working distance objectives don't contact the stage or slide glass when using the microscope. Its use also simplifies focusing. After focusing on the slide glass with the coarse adjustment ② in low magnification objective, then rotate the stop control lever ④ toward the rear of the

microscope to set an upper limit on the coarse adjustment movement. After changing objectives, focusing is easily accomplished by rotating the coarse adjustment knob to reach the pre-focused position, then making fine adjustments with the fine adjustment knob ①. See fig.9.

Note Focusing movement with the fine adjustment isn't affected by using the pre-focusing lever!

3）Adjusting diopter and Interpupillary

a. Diopter Adjustment: Proper correction for individual vision is accomplished via the diopter adjustment ring ① located at the left eyepiece. Using the 40X objective, bring an image into focus with your right eye only. Once the image is well focused, observe with left eye, fine adjust the diopter adjustment ring to correct for your vision. The diopter adjusting range is ±5 (diopter). See fig.10.

Fig.10

b. adjusting interpupillary distance, Proper interpupillary distance, or the distance between eyepieces, is crucial to the comfort of the user. Adjusting the interpupillary distance is accomplished through a "folding" action of the optical head, the adjusting range is 53~75 mm. See fig.11.

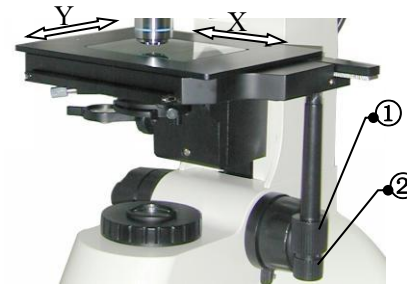

Fig.11

4）Adjusting stage

The transverse (X-Axis) adjusting knob ② and longitudinal (Y-Axis) adjusting knob ① is coaxial. The knob ① control the moving of Y axis and the knob ② control X axis. The moving range of longitudinal is 0~50mm, the transverse is ： 0~75mm. See fig.11.

5）Adjusting Abbe condenser

Centering Abbe condenser： Turn 10X objective into optical path, turn down the field diaphragm ⑤ of collector to minimum. Adjust the substage adjustment knob ③ to make the image of field diaphragm clear. If the center of field diaphragm offset the center of eyepieces field of view, like the fig.12-a, you can adjust the Abbe condenser centering screws ① to make collector field diaphragm center and eyepieces center coincide, like the fig.12-b. After adjusting above steps, you can open the field diaphragm for your need, like fig.12-c. when use the microscope, you should adjust the aperture of iris diaphragm ④ according to the numerical aperture of objective. Using 5X or lower magnification objective, you should turn the accessional condenser ② into optical path to make the illumination of field uniformity. See fig.12.

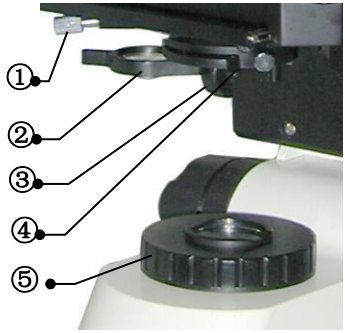

Fig.12

6) Photography operation in trinocular

Trinocular can be observation for eyepieces and microphotography in 100% light flux, suits for dark field microphotography. Loosen the set-screw ② , take out dustproof cover ① . Then install the photography device in the adapter of trinocular and close the set-screw ② again. First, observe with your

Fig.13

eyepieces and focus to make image clear. Second pull out the push rod ③ , like the mark“ ”, micro image will display your monitor. If the image no clear, you should fine focus to make image clear. Normally, the direction of image in monitor and eyepieces is identical. If the direction different, you can loosen the set-screw ② and rotate the photography device to make them identical, then close the set-screw again. See fig.13.

Observation in reflected light

1. Turn on power switch ①, push the reflected light or transmitted light switch ② to position “II” . See fig.3.
2. Push the bright/dark push rod ① of reflected illumination in, like the mark “ B ”, mean is bright field of view observation. Push the bright/dark push rod ① of reflected illumination out, like the mark “ D ”, mean is dark field of view observation. See fig.5.
3. Push the eyepiece observation/photography push rod ② in, mean is eyepiece observation, like the mark “ ”. Push the eyepiece observation/photography push rod ② out, mean is photography, like the mark “ ”. See fig.5.
4. Push the analyzer push rod ① in, mean is analyzer out of optical path. Like the mark “ ”. Push the polarizer push rod ① out, mean is polarizer out of optical path. Like the mark “ ”.See fig.6.
7. Put an opaque specimen on the glass plate.

Note: Observes in dark field of view, you should open the field diaphragm and iris diaphragm to maximal!

Adjusting microscope in reflected light

1）Adjusting reflected illumination

a. The illumination brightness is controlled by brightness control ①. The mark “ ” means the illumination brightness from low to high. See fig.7.

Note: Using the light at brightest setting reduces life span of bulb!

b. If the field of view brightness asymmetry, you should adjust the position of light bulb to collector lens. Can use collector lens adjusting knob ① and light bulb centering knob ②,③ to adjust the light bulb position. First, take out any objective from nosepiece，put a piece of white paper on the glass plate of stage, a light spot with filament image will display on the paper, like fig.14-a. Adjust the lens adjusting knob ① to make the filament image clear, like fig.14-b.If the filament image offset the center of light spot, like fig.14-c. you can adjust the light bulb centering knobs, the knob ② is used for left and right adjustment (X axis), the knob ③ is used for up and down adjustment (Y axis). After adjusting, the filament is in the center of light spot. Like fig.14-c.

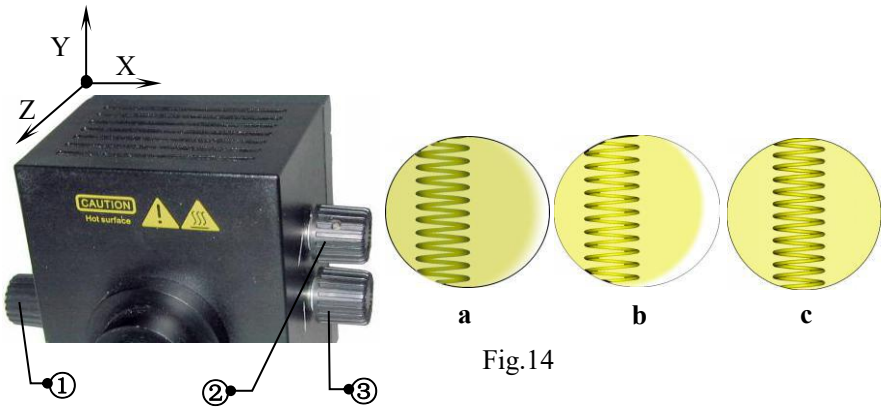

Fig.14

2）Centering field diaphragm

Turn 10X objective into optical path and turn down the field diaphragm ① to minimum. If the field diaphragm offset the center of eyepieces field of view, Like fig.15-a，you can adjust the center of field diaphragm by two hexagon wrenches, insert the hexagon wrenches in the holes ④ to make field diaphragm center and eyepieces field of view center coincide, like fig.15-b. After adjusting, open the field diaphragm to accord with your need, like fig.15-c.

3）Adjusting iris diaphragm

The iris diaphragm ② has a good center at the factory**,** user no need center it. Using low magnification objective, open the iris diaphragm to bigger. Using high magnification objective, open the iris diaphragm to smaller. See fig.15.

4) **Adjusting filter turn-plate**

The filters of reflected illumination are installed in the turn-plate ③，have yellow, green, blue filter, frosted glass and through-hole. Turning the turn-plate, you can select different filter or frosted glass to change the substrate of image. See fig.15.

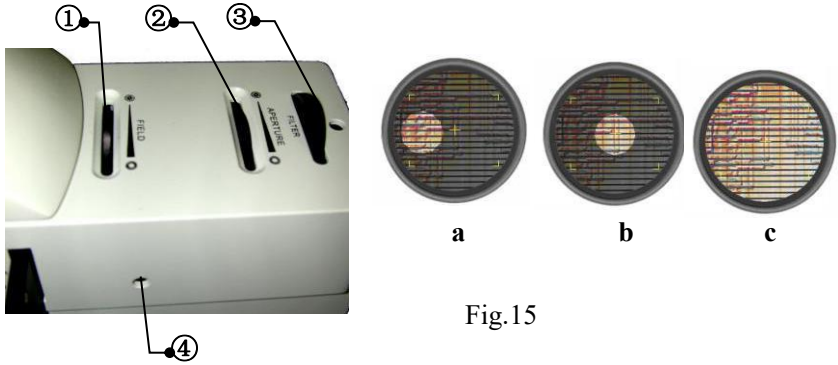

Fig.15

3) Adjusting polarizing device

The microscope can be observed for polarizing in reflected light. Pull out the analyzer push rod ① and push the polarizer unit ② into optical path, then turn the polarizer turn-plate ③ to change the angle of polarizer, when

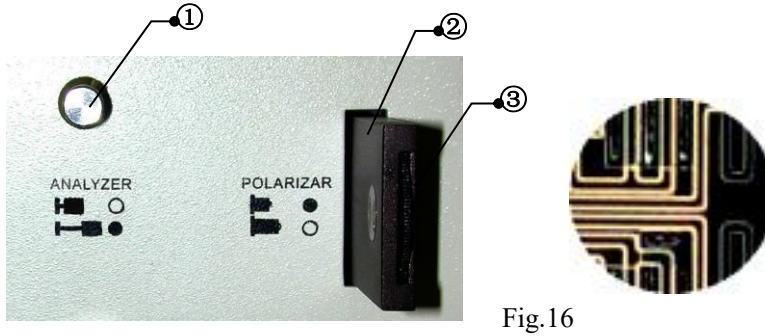

Fig.16

the analyzer and polarizer are orthogonal polarization, the micro-image or field of view is best dark. See fig.16

4）Adjusting dark field device

The microscope can be observed in dark field. Pull out the bright or dark field switch push rod ① (See fig.17) , open field diaphragm and iris diaphragm to maximum, the analyzer and polarizer are located on the position, like mark " ■ ○ " and " ▬ ○" (See fig.16). When observe in dark field, you can adjust the lens adjusting knob ① (See fig.14) to obtain satisfactory dark field illumination effect.

Fig.17

Changing the light bulb and fuse

NOTE: Changing the light bulb and fuse, you should disconnect the power plug and wait to be sure the bulb is cool!

1）Changing the transmitted light bulb

Incline microscope towards back of main body and loosen the thumbscrew ①. Open the lamp house door ④. Pull the old light bulb ③ straight out of the socket. Always use a clean cloth or lens tissue to prevent grease or oil getting on the glass of the new light bulb. Insert the light bulb pins straight into the socket. Close lamp house door and center the light bulb in the field of view by light centering thumbscrew. See fig.18.

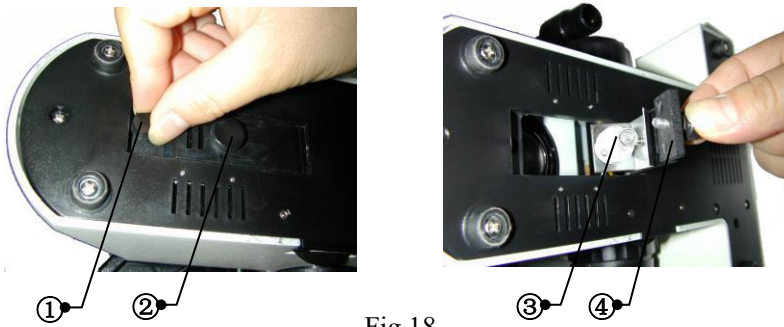

Fig.18

2）Changing the reflected light bulb

The back cover ① of reflected illumination lamp house can be turned out. Turn out the back cover of lamp house ①. Pull the old light bulb ③ straight out of the socket. Always use a clean cloth or lens tissue to prevent grease or oil getting on the glass of the new light bulb. Insert the light bulb pins straight into the socket. Close the back cover again. Using the light bulb centering knobs to adjust. See fig.19.

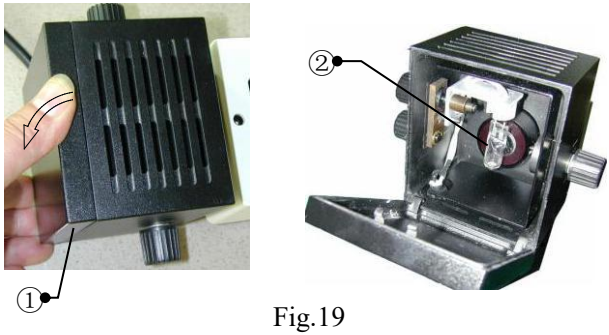

Fig.19

3）Changing the fuse

The fuse of microscope is integrated in the power supply socket ①. Pull out power supply plug, take out the seat of fuse ②， replace a new fuse and insert the seat again. See fig.20.

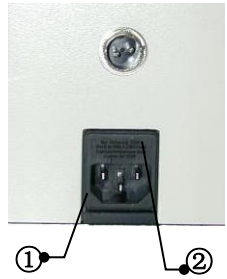

Fig.20.

Preventative Maintenance

1. Cleaning frame and stage

Disconnect the plug from power supply socket before cleaning. Clean the frame and stage with a soft cloth moistened with a mild detergent solution. Be sure the instrument is dry before using again.

2. Cleaning optical parts

Microscope eyepieces and objectives are coated. They should not be wiped while dry as dirt or dust may scratch the coating. It is best to remove parts from the frame prior to cleaning. Always blow loose dust away first. Use cotton swabs or lens tissue moistened with a lens cleaner or a small amount of alcohol, and then wipe the surface clean with a good quality lens tissue. Solvents such as Xylene should NOT be used as cleaner.

3. No disassembling microscope

The microscope is precision instrument, do not disassemble the microscope parts to avoid any danger to their operational effectiveness and accuracy, if failure, you should send it to a professional repair department or contact suppliers.

4. Non-use of instrument

Non-use of microscope, use plexiglass or polyethylene cover to keep the microscope, there is no mold breeding. The best on the objectives and eyepieces have an enclosed container with desiccant.

NOTE: DO NOT DISASSEMBLE OBJECTIVE LENSES!