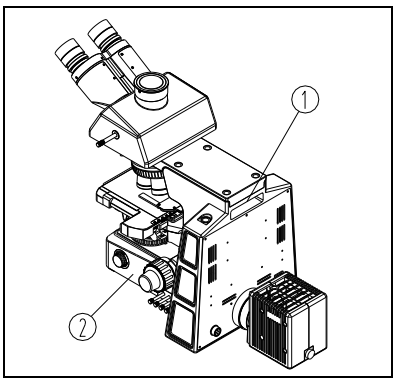
STALWART

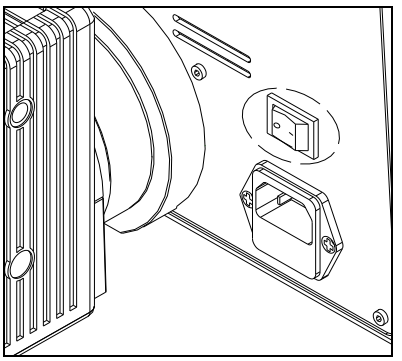
STM-2082 Series Biological Microscope Instruction Manual

This instruction manual is for the operation guide, troubleshooting and maintenance to the STM-2082 series biological 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.

Contents *STM-2082 Series*

1. Operation Notice





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℃～40℃, Max relative humidity: 80%.
3. When moving the microscope, use both hands to hold its back hand-clasping ① and the front base ②, and lay it down carefully (see Fig. left).

★ 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 is at "O" (off) and power it off before replacing the bulb or fuse (see Fig. left).
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.

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 or turning off the electrical device, please use these chemical in a ventilated place.

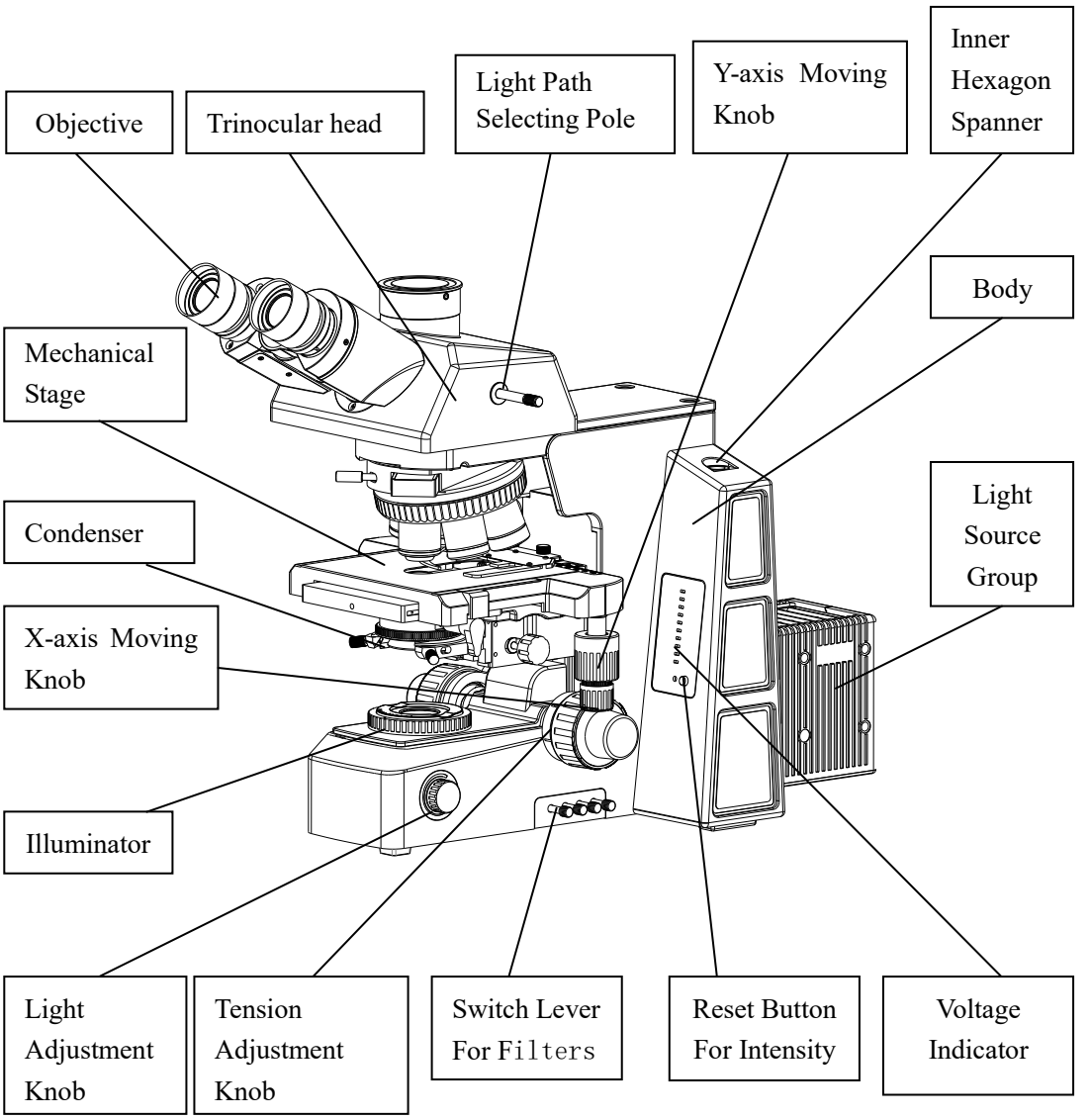
2. Don't use organic solution to wipe the surfaces of the other components. Please use the neutral detergent if necessary.
3. If the microscope is damped by liquid, please power it off immediately and wipe it dry.
4. Never disassemble the microscope, otherwise the performance will be affected or the instrument will be damaged.
5. After using, cover the microscope with a dust cover.

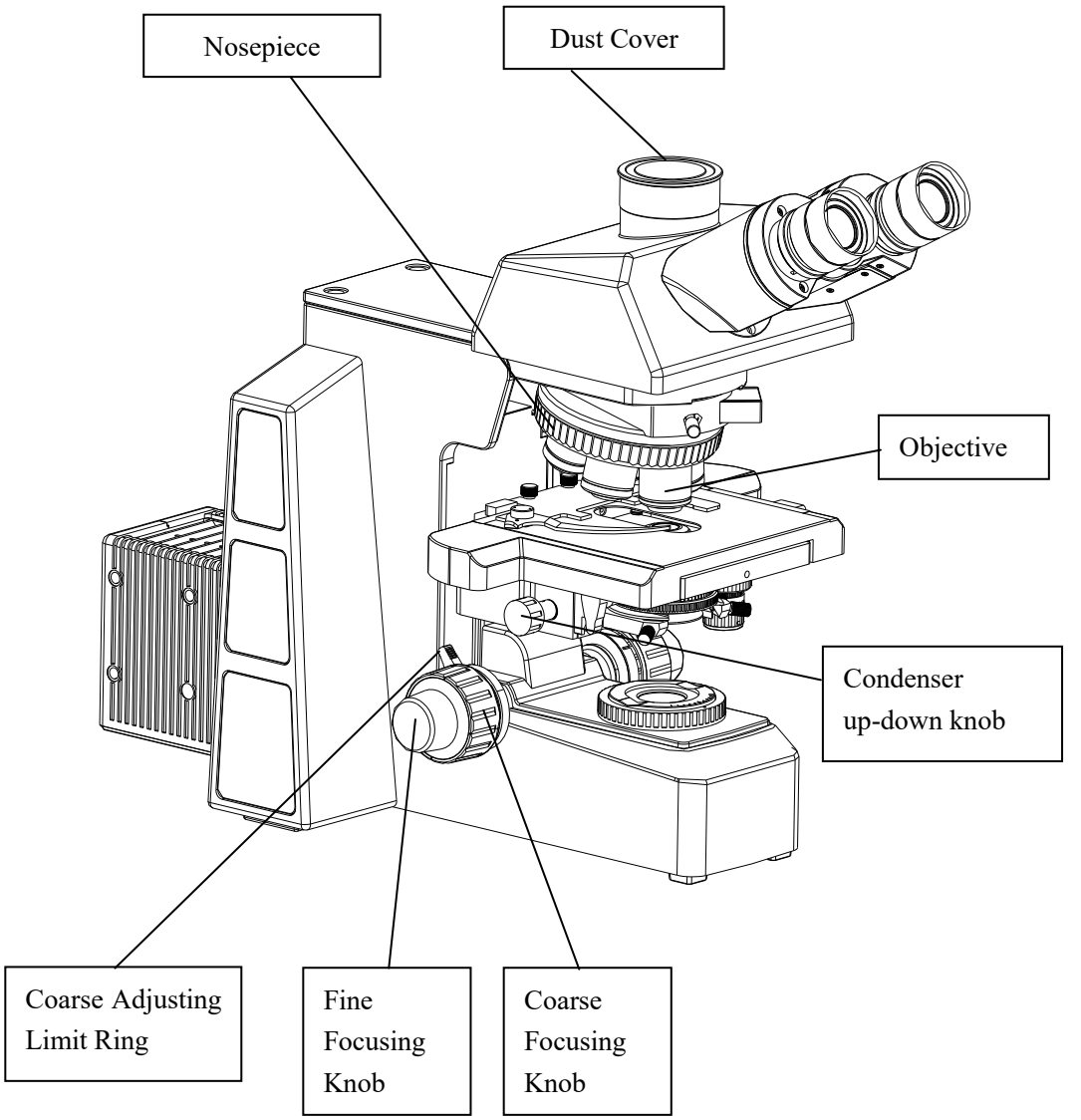
3. Safety Sign

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.
|	Main switch ON
O	Main switch OFF

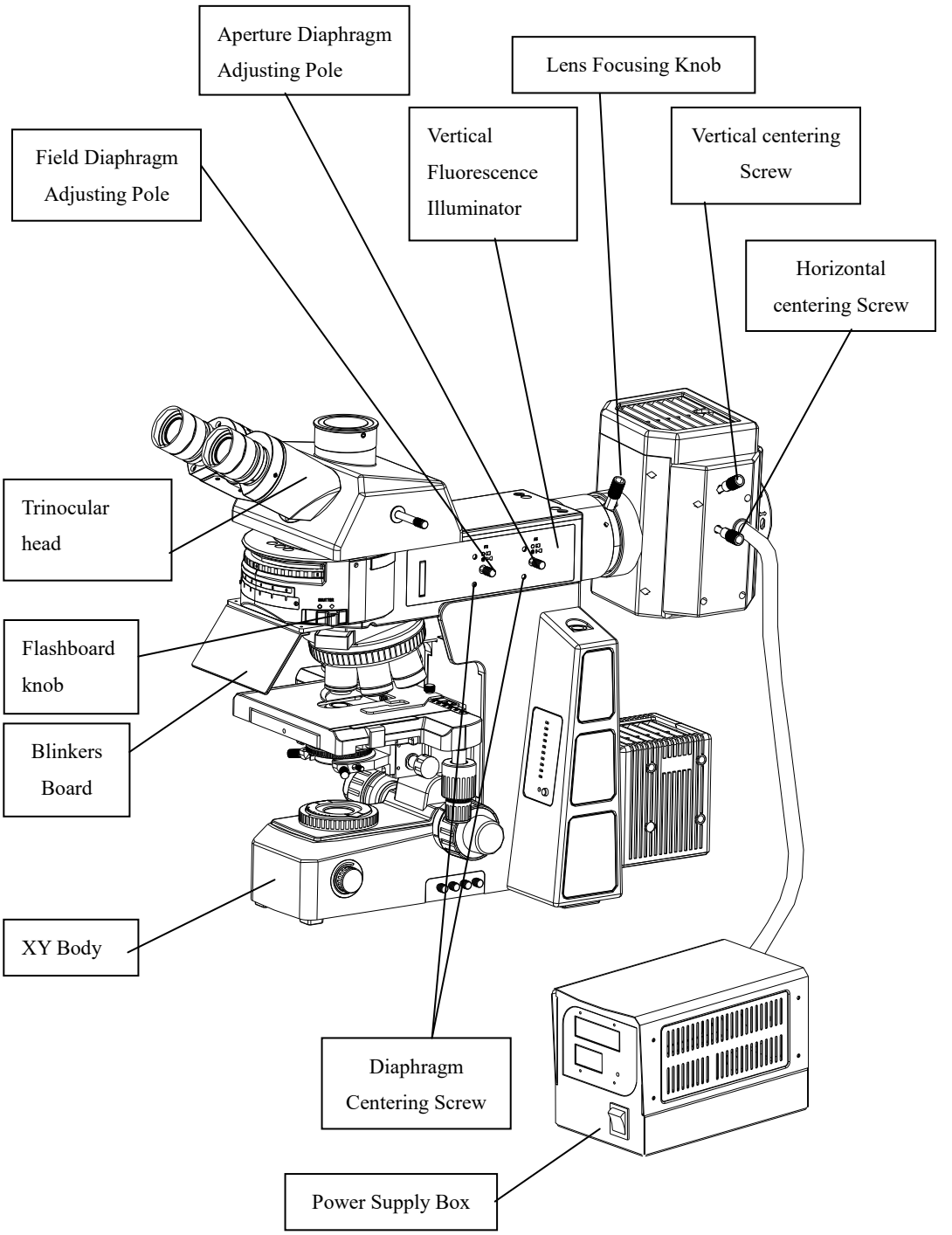
1. Components *STM-2082 Series*

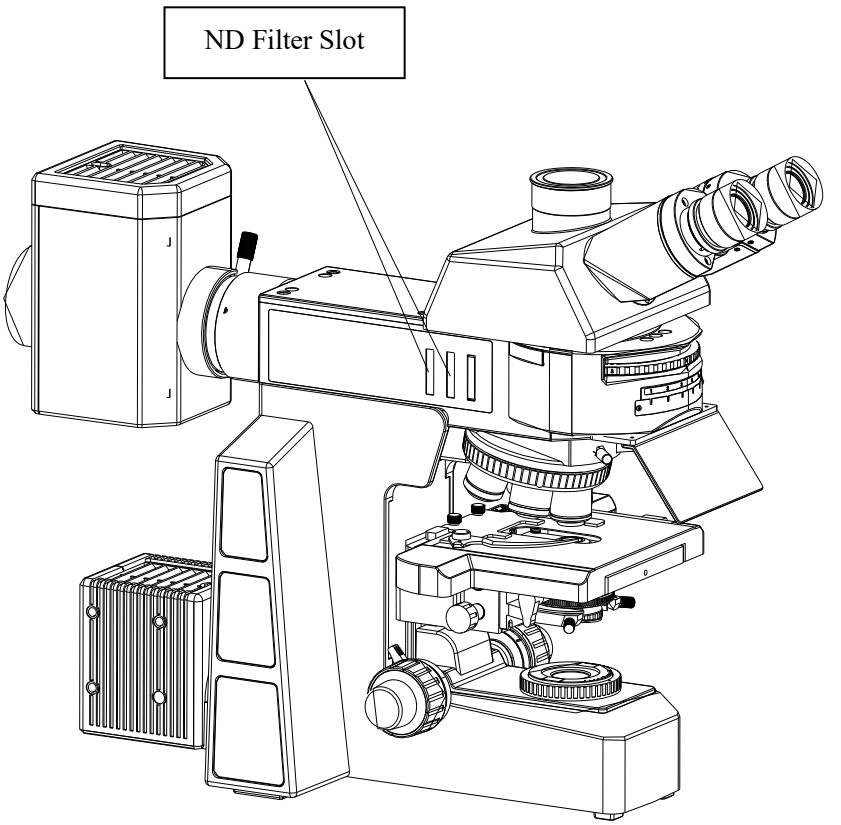
STM-2082 Series Biological Microscope Components




Nosepiece
Dust Cover
Objective
Condenser
up-down knob
Coarse Adjusting
Limit Ring
Fine
Focusing
Knob
Coarse
Focusing
Knob

STM-2082F Series Biological Fluorescence Microscope Components



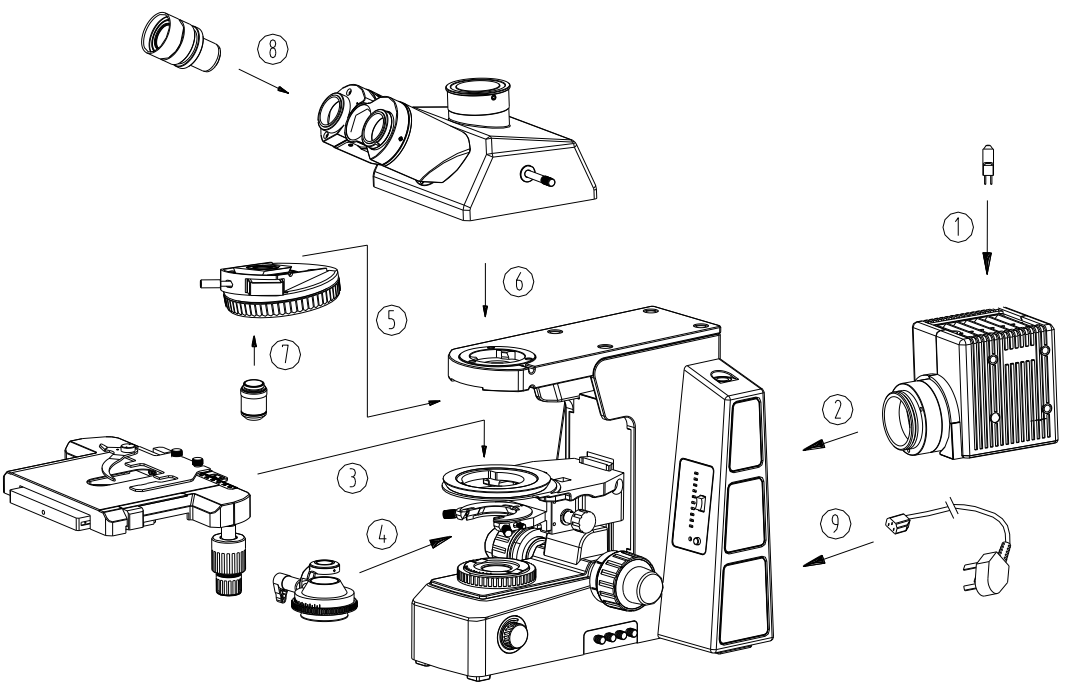

ND Filter Slot

2-1 *Assembling Scheme*

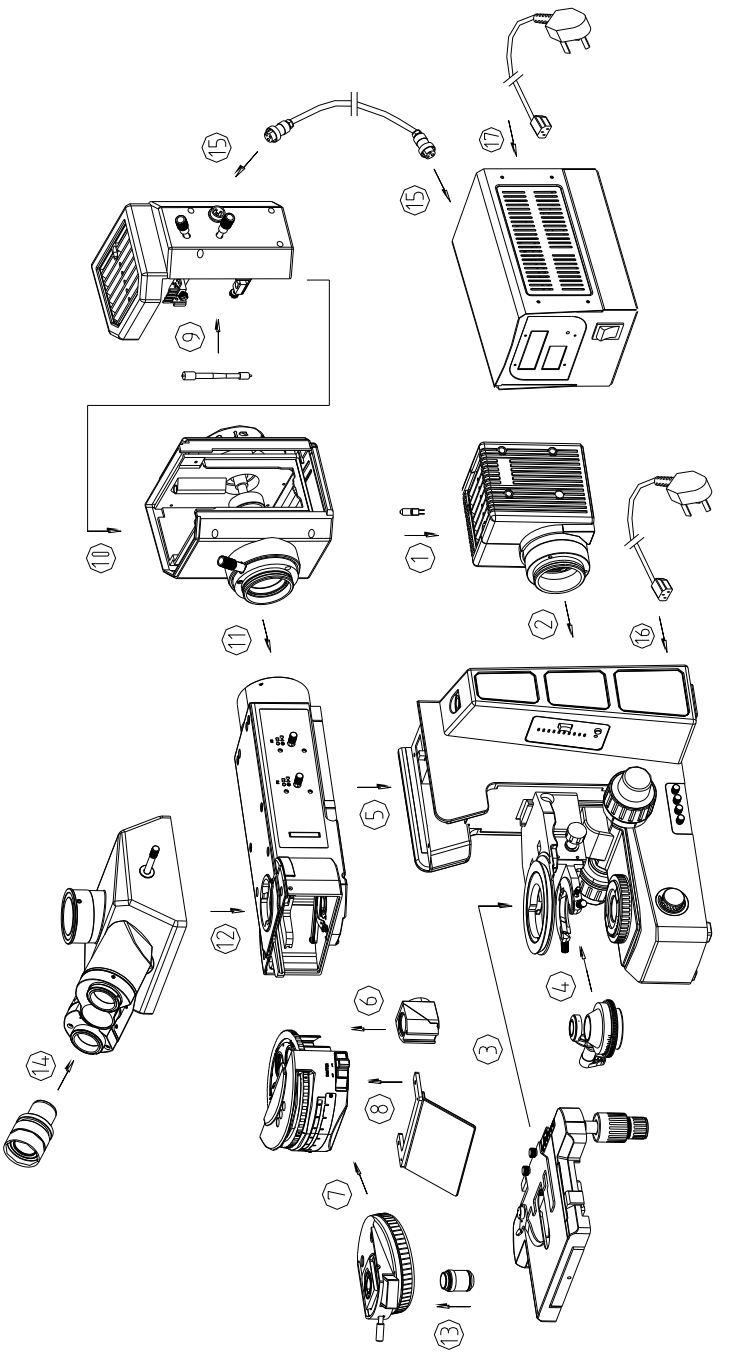
Following is the Assembling Scheme, and the numbers denote the assembling order.

★ **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.**

1. STM-2082 Series Biological Microscope Assembling Scheme



2. STM-2082 Series Biological Fluorescence Microscope Assembling Scheme



2-2 *Assembling Steps*

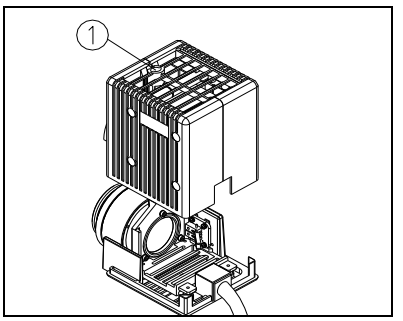


Fig.1

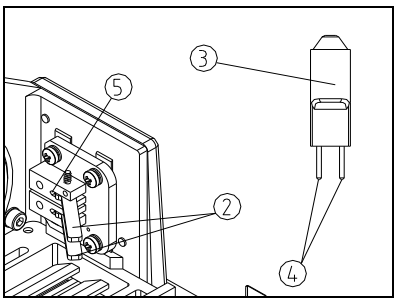


Fig.2

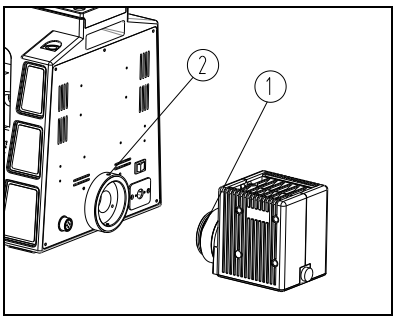


Fig.3

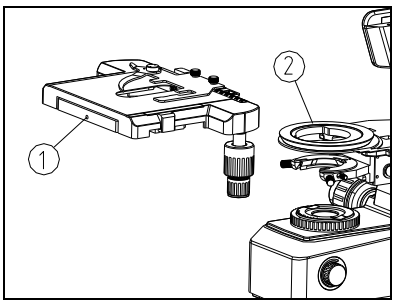


Fig.4

2-2-1 *Assemble and Replace the Halogen Bulb*

(1) Loose lock-screw ① completely by M4 spanner, then take off the cover group. (See Fig. 1)

(2) Open the bulb lock piece②, and take the bulb③ with clean glove or soft tissue, insert the bulb pins④ into the jack on the bulb holder⑤, the bulb should be vertical after assembly. (See Fig. 2)

(3) Loose the bulb lock piece②, lock the bulb and install the cover group.

★Don't touch the bulb with fingers. If there is a fingerprint left on the bulb, please wipe it with clean soft cloth.

★Bulb selected only: 12V/100W Halogen bulb (Philips 7724).

★Before replacing the bulb, make sure to cut off the main power and wait for both the bulb base and bulb cooling down.

2-2-2 *Assemble the Light Source Group*

Push the light source holder① into the body holder, Make the light source group to be horizontal with the body group and lock the screw②. (See Fig. 3)

2-2-3 *Assemble the Stage*

(1) Loosen the lock-screw① on the stage. (See Fig. 4)

(2) From a rear area of the rounded hole center on the base, carefully ring the two "V" buttons on the bottom of the stage into the "V" rounded groove②, then screw down the lock screw①.

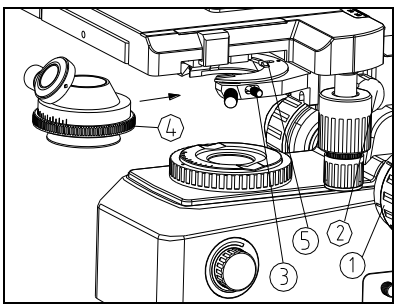


Fig.5

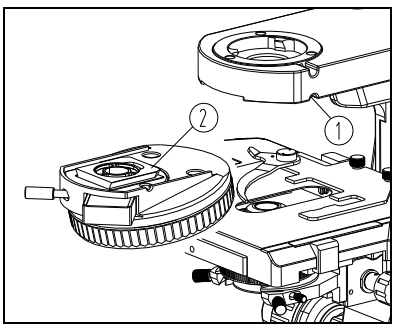


Fig.6

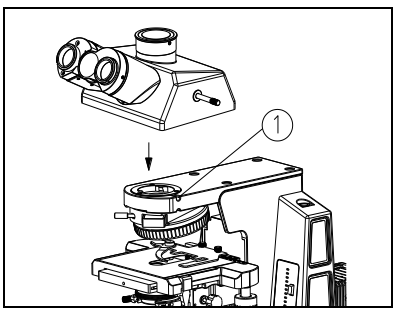


Fig.7

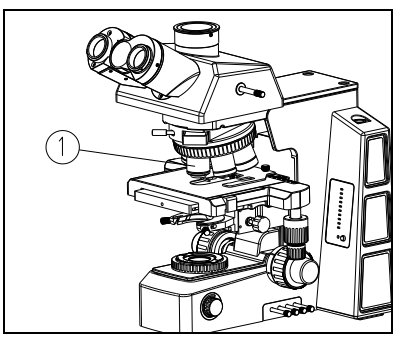


Fig.8

2-2-4 ***Assemble the Condenser***

(1) Rotate the coarse focusing knob① to raise stage to the highest. (See Fig. 5)

(2) Rotate the condenser up-down knob② to lower the condenser bracket to the lowest.

(3) Loosen the condenser lock-screw③ fully.

(4) Swing out the front lens of condenser with the scale forward. Make the lock screw④ of condenser in alignment with the groove⑤ of the condenser stand. Push the condenser into the innermost of stand.

(5) Screw down the condenser lock-screw③, and raise the condenser to the highest position with the condenser up-down knob②.

2-2-5 ***Assemble the Nosepiece***

(1) Loose the lock screw① on the arm. (See Fig. 6)

(2) Match the dovetail interface② of the nosepiece with the dovetail groove of the arm, and push it to the bottom. Tighten the lock screw①.

2-2-6 ***Assemble the Head***

(1) Loosen the head lock-screw① fully. (See Fig. 7)

(2) From a little right position, insert the coattail interface on the bottom of head into the hole of middle head with a little left inclined. Keep the two eyepiece tubes forward, and then screw down the lock screw①.

2-2-7 ***Assemble the Objective***

Rotate the coarse focusing knob to lower the stage. Install the objectives into the nosepiece from the lowest magnification to the highest in a clockwise direction. (See Fig.8)

★Search and focus the sample by low magnification objective (4X 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.

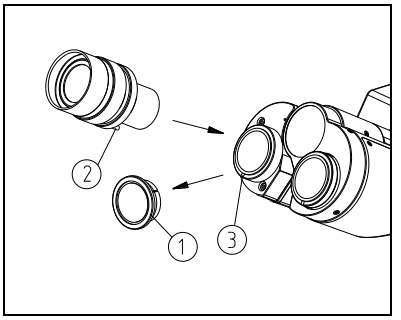


Fig.9

2-2-8 ***Assemble the Eyepiece***

(1) Take down the cover of eyepiece tube① (See Fig. 9).

(2) Insert the eyepiece into the eyepiece tube, until touch the bottom.

Note: if there is position screw on the eyepiece, match the position screw② to the groove③ on the eyepiece, and insert the eyepiece into the eyepiece tube, until touch the bottom.

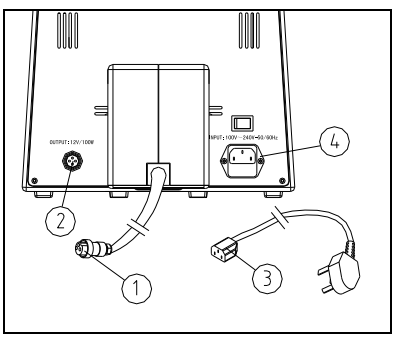


Fig.10

2-2-9 ***Connect Power Cord***

(1) Make sure the main switch is at "O" (OFF) position.

(2) Match the gap of the lower light source aviation plug① to the gap of the aviation socket②, and insert it to the bottom. (See Fig. 10)

(3) Insert one end of power cord③ into the power socket④ of the microscope.

(4) Insert the other end of power cord 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.

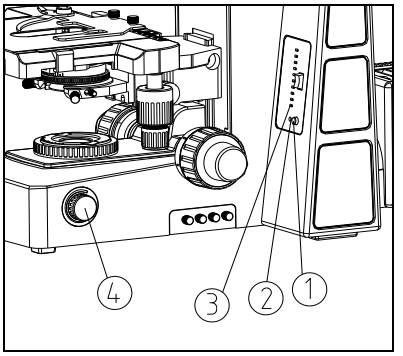


Fig.11

3-1 ***Set Illumination***

(1) Put through the power and turn on the main power switch to"—" (see Fig. 11).

(2) Adjust the light adjustment knob④ until the illumination is comfortable for observation. Rotate the light adjustment knob clockwise to raise the voltage and brightness. Rotate the light adjustment knob counterclockwise to lower the voltage and brightness.

(3) Press the light intensity reset button①, reset the light intensity to preset position. Rotate the setting screw② with a small "-" type screwdriver to set the light intensity. Rotate it in clockwise to raise the light intensity, while lower it in counterclockwise.

★ The number on the right on Voltage Indicator③ show the voltage.

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

★ When the light intensity reset button is pressed, rotate the light adjustment knob does not work.

★ The light intensity of this machine is preseted to the best for photomicrography by LBD filter. (About 8V, at location of sign)

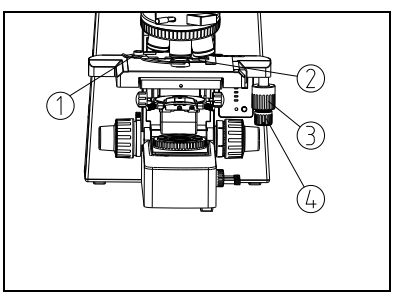


Fig.12

3-2 ***Place the Specimen Slide***

(1) Push the wrench① of the specimen holder backwards (see Fig. 12).

(2) Loosen the wrench①, and clamp the slide② by the clips while the cover glass faces up.

(3) Rotate the X-axis knob④ and Y-axis knob③. Move the specimen to the center (alignment with the center of the objective).

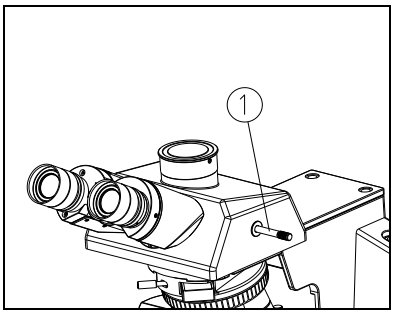


Fig.13

3-3 *Select the Light Path*

For trinocular head, the light path selecting pole① control the light-energy ratio of binocular and trinocular. When the light path selecting pole is pushed to the innermost, all the light will enter the binocular head. When the light path selecting pole is pulled to the middle position, binocular and trinocular can be observed simultaneously. When it is pulled to the outmost, all the light will enter the trinocular head, which can only used for trinocular observation (TV&Photography). (See Fig. 13)

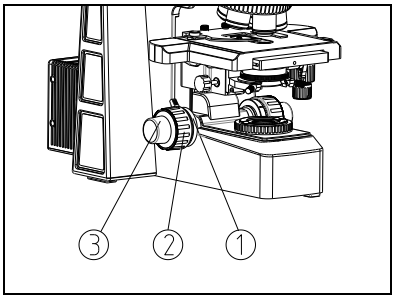


Fig.14

3-4 *Adjust Focusing*

(1) Put the slice on the stage, and hold it down with the clip. Shift the 4X objective into the light path. (See Fig. 14)

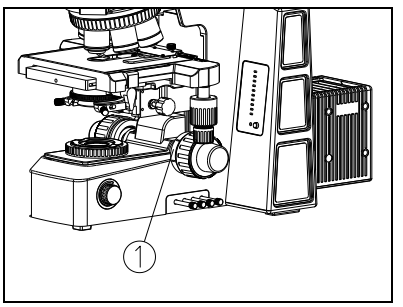
(2) Loosen the random upper limit knob①, then observe the right eyepiece with the right eye. Rotate the coarse focusing knob② until the image appears in the view field, then lock the random upper limit knob①.

★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 knob③ for clear details.

★When observing with the 4X or 10X objective, open both the aperture diaphragm and field diaphragm to the maximum position, and swing out the front condenser lens. See "3-9 Center the Condenser" for condenser operations.



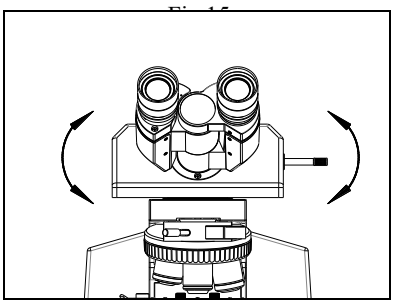


Fig.16

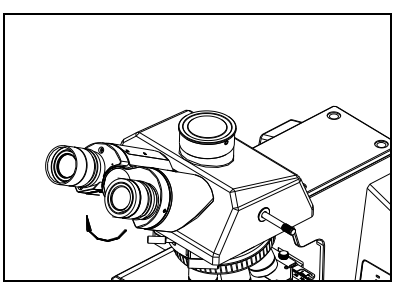


Fig.17

3-5 ***Adjust the Focusing Tension***

If the handle is very heavy when focusing or the specimen leaves the focus plane after focusing, or the stage declines itself, please rotate the tension adjustment knob① according to the arrowhead pointed direction. (See Fig. 15)

3-6 ***Adjust the Interpupillary Distance***

When using two eyes to observe, hold the bases of the prism and rotate them around the axis to adjust the interpupillary distance, until there is only one field of view. (See Fig. 16)

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

Adjustable range: 50~76mm.

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

3-7 ***Use the Eye-cap***

(1) Turn over 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. 17)

3-8 ***Adjust Stage***

When observation, move the stage by rotating the x-axis adjustment knob① and the y-axis adjustment knob② (See Fig. 18) . The moving range of x-axis and y-axis is 80x55mm.

Adjust the x-axis and y-axis knob:

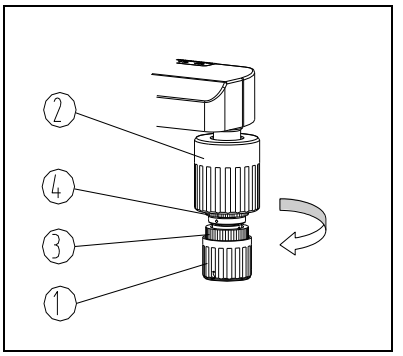


Fig. 18

(1) Hold the x-axis knob①, tighten up the y-axis knob②, to expose the adjustment knob.

(2) Rotate the x-axis knob③ or the y-axis knob④ in clockwise (the direction of the arrow), to reduce tension, while increase tension in counterclockwise.

★ If the tension is too tight, a creak sound will be heard when landing the stage; or the accuracy of the stage stop will be reduced.

Caution: After long time use, the stage rail may be offset, and the moving range will be shorten. However, it is not a fault and can be easily regulated in the following method.

[Process]

Horizontal: Hold the sample holder, and move left and right the stage rail, hit the limit stopper.

Vertical: Hold the top surface of the stage and move back and forth, hit the limit stopper.

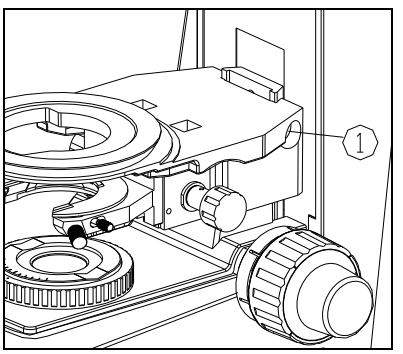


Fig. 19

◎ For reflected illumination

Lower the stage bracket, the microscope can adapt the height of sample no more than 35mm, which is very useful when observing metallurgical samples and other thick objects.

(1) Move the stage to the lowest, and then remove the stage from the microscope.

(2) Loosen the stage bracket lock screw①, and then remove the stage bracket. (See Fig. 19)

(3) Rotate the coarse focusing knob, and rise up the focus skateboard② to the position where the limit screw③ can be seen from the mirror arm. (See Fig. 20)

(4) Loosen and remove the limit screw③.

(5) Reinstall the stage bracket and the stage.

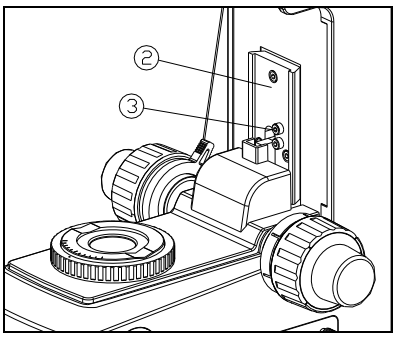


Fig. 20

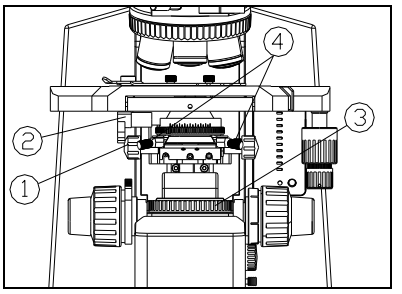


Fig.21

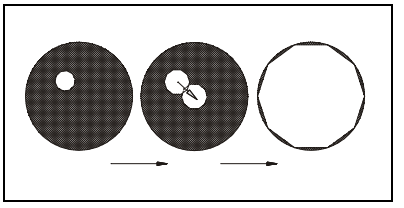


Fig.22

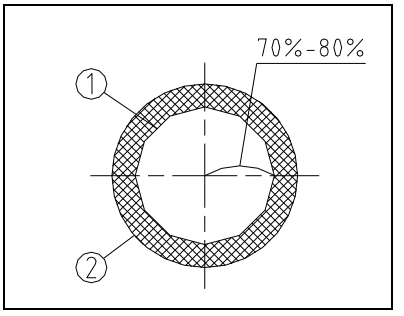


Fig.23

3-9 ***Center the Condenser***

(1) Rotate the condenser up-down knob① to raise it to the highest position. (See Fig. 21)

(2) Rotate the spanner② 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 ring③ to put 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 screw④ 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 condenser has been centered correctly. (See Fig. 22)

(8) In actual use, you can enlarge the field diaphragm a bit and make the image circumscribed to the field of view.

3-10 ***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.

Rotate the field diaphragm adjustment ring③ in clockwise, to enlarge the field diaphragm; otherwise, to decrease it in counterclockwise. (See Fig. 21)

3-11 *Adjust the Aperture Diaphragm*

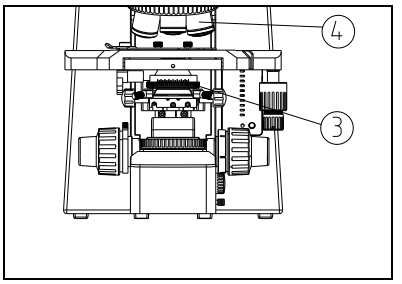


Fig. 24

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.

Adjust the aperture diaphragm adjusting ring③ to control the size of diaphragm. Take off the eyepiece if necessary, observe from the eyepiece tube and adjust the aperture diaphragm adjusting ring③ until see the figure as shown in Fig. 23 (see Fig. 23&24).

Use of scale: set the scale of condenser N.A. to the 80% value of objective④ N.A (see Fig.24).

In actual use, adjust the aperture diaphragm according to the size of the sample image contrast, until it's comfortable for observation and the contrast is good.

3-12 *Use the Color Filter*

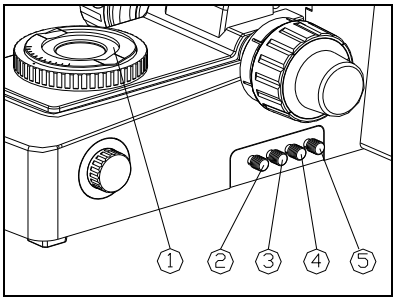


Fig. 25

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

When an external color filter is used, put a diameter 45mm filter into the groove of the condenser base①(See Fig. 25).

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

★Place the rough side of filter downwards.

When an internal color filter is used, pull the pole②—⑤ to the outmost, the filter will be moved into the light path. Otherwise, push the pole into the innermost, the filter will be moved out of the light path. (See Fig. 25)

	Filter type/function
②	ND6 (Neutral density filters, used for light intensity adjustment, which transmission is 6%）
③	ND25 (Neutral density filters, used for light intensity adjustment, which transmission is 25%）
④	LBD (Chroma balance, daylight-type color filters)
⑤	OP (Optional) Filter base

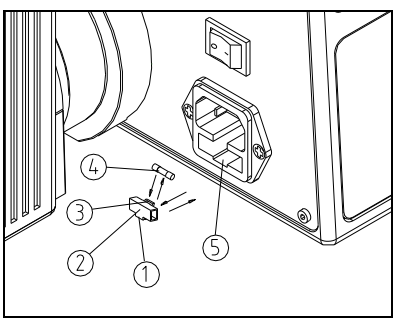


Fig. 26

3-13 ***Replace the Fuse***

(1) Before replace fuse, please set the main power supply at "O" (OFF) and take off the plug.

(2) Fasten the flute ① under the fuse holder ② by fingers, take out the fuse holder ② from socket ⑤. Then take off the fuse ④ from the above flute ③ and replace it with a new one. Then put it to the flute ③ and push the fuse holder ② into the socket ⑤, until a sound of "kada" is heard. (See Fig. 26)

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

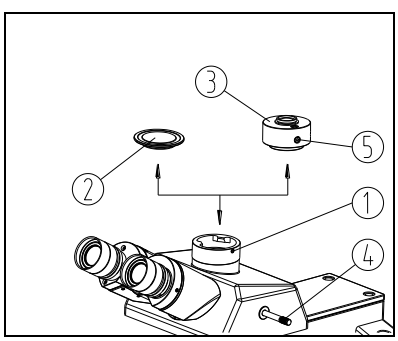


Fig.27

3-14 ***Assemble and Use the TV Device***

(1) Loosen the lock screw① of trinocular head, and take out the dust-cover②(See Fig.27).

(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) Screw CCD or video camera into CTV, make sure it is locking.

(4) For binocular observation, pull the light path selecting pole④ to the outmost and observe the image. If the image is unclear, rotate the adjustment crew⑤ until it is clear.

4-1 *Assemblage Steps*

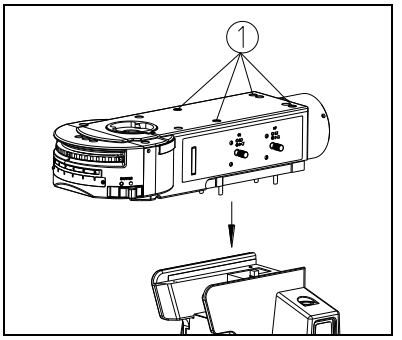


Fig. 28

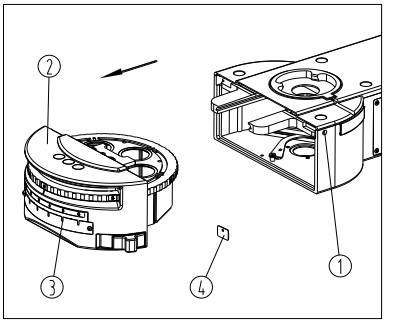


Fig.29

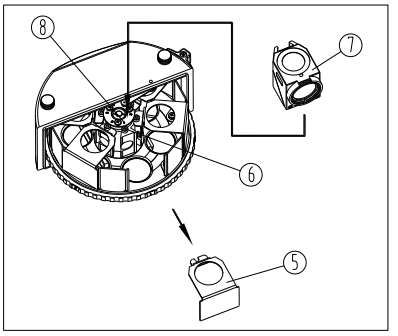


Fig.30

4-1-1 *Assemble the Fluorescence Illuminator*

(1) Use a tool with cuspidal end to plug into gaps of the caps① on the illuminator, take off the caps. (Fig. 28)

(2) Put the illuminator into the body along with the rounded side, then push it toward the light source direction, make the epi-illuminator close to the body.

(3) Tighten the 4pcs M5 hexagon screws in the illuminator with the spanner, then cover back the cap.

4-1-2 *Assemble the Fluorescence Filter Sets*

(1) Loose the right side lock screw ① of the turntable fluorescence illuminator, with a M4 inner hexagon spanner, and pull the front cover group ② out of the dovetail groove. (See Fig. 29)

(2) The blinker board ⑤ is installed in the fluorescence filter group. When using the fluorescence filter group, first loose the lock screw ⑥ with the inner hexagon spanner, and take off the blinker board ⑤. (See Fig. 30)

(3) Put the diaphragm slice of the fluorescence filter group ⑦ which is to be assembled upward, and match the dovetail groove of the fluorescence filter group ⑦ with the dovetail wedge of the front cover group ②, and push to the bottom. Tighten the lock screw ⑥.

(4) Check the ID ⑧ on the dovetail interface, and insert the nameplate ④ of the fluorescence filter group into the interface ③ with the same number in front of the front cover group ②.

(5) Repeat the steps above, to assemble other fluorescence filter groups into the turntable of the front cover group ②.

(6) Then match the dovetail wedge of the front cover group ② with the dovetail groove of the turntable epi-illuminator, and push to the bottom. Tighten the lock screw ①.

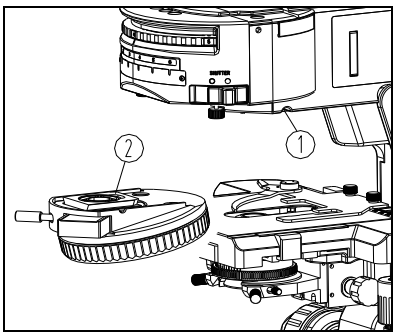


Fig.31

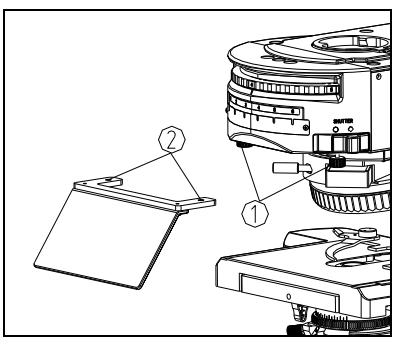


Fig.32

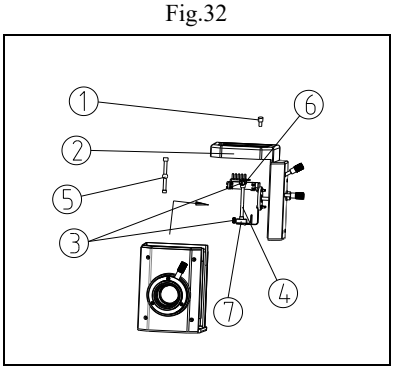


Fig.33

4-1-3 ***Assemble the Nosepiece***

(1) Loose the lock screw on the arm. (See Fig. 31)

(2) Match the dovetail interface② of the nosepiece with the dovetail groove of the arm, and push to the bottom. Tighten the lock screw①.

4-1-4 ***Assemble Blinkers Board***

(1) Take off the lock-screw ① on fluorescence illuminator. (See Fig. 32)

(2) Match the hole ② on blinkers board to the hole on lock-screw ① and lock the screw.

4-1-5 ***Assemble Mercury Lamp***

(1) Loose lock-screw ① completely by the M4 inner hexagon spanner, then take off the bulb holder ②. (See Fig. 33)

(2) Loose the lock screw ③ of the mercury lamp first, and take off the supporting rod ④, and then insert the positive side (big end) of the new mercury lamp ⑤ into the positive holder ⑥ thoroughly; then put the negative holder ⑦ on the negative side (small end) of bulb and lock the screw ③. (See Fig. 33)

★ Please make sure the mercury lamp is put vertically. If there is aspirating hole on bulb, please make sure the hole directly to the ceramic holder.

(3) Put the bulb holder ② into bulb house and lock the screw ①.

★ Replace bulb during or after operation:

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

★ After bulb replacing, set the timer on power supply to zero. For more details, see "*4-2-1 Set Illuminations*".

4-1-6 ***Assemble Mercury Lamp Light Source***

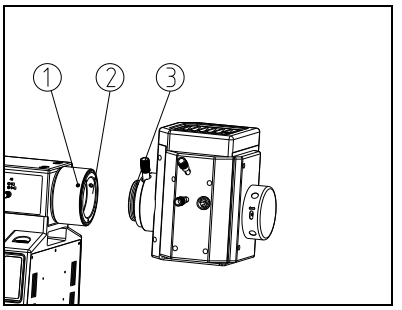


Fig.34

(1) Loose the lock-screw ① completely on fluorescence illuminator.(See Fig.34)

(2) Push the light source holder ② into the holder ③ on the fluorescence illuminator to the bottom. Make the upper plane of the light source group to be horizontal and lock the screw ①.

★ In operation, make sure there is enough space around the light source for heat radiation, especially on the top and bottom.

4-1-7 ***Assemble the Head***

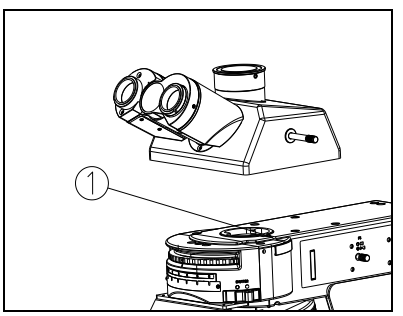


Fig.35

(1) Loose the lock-screw① completely on fluorescence illuminator. (See Fig. 35)

(2) From a little right position, insert the dovetail interface on the bottom of head into the hole of middle head with a little left inclined. Keep the two eyepiece tubes forward, and then screw down the lock screw①.

4-1-8 ***Assemble the Eyepiece and the Objective***

(1) Assemble the objective according to "2-2-7 Assemble the Objective".

(2) Assemble the eyepiece according to "2-2-8 Assemble the Eyepiece".

4-1-9 Connect Power Cord

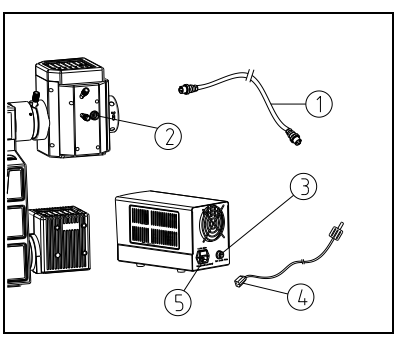


Fig.36

(1) Make sure the main switch of microscope and mercury lamp power supply are at "O" (OFF) position.

(2) Connect one end of the plug ① to the socket ②, insert it to the end, then lock the screw. (See Fig. 36)

(3) Use same way to connect other end of the plug ① to connector ③ of power supply.

(4) Connect one side of the plug ④ to socket ⑤ on mercury lamp power supply and other side to power supply socket.

★ **The power supply box supports wide voltage as 100-240V.**

★ **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, which can only be used for power supply for mercury lamp box.**

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

4-2 *Operation*

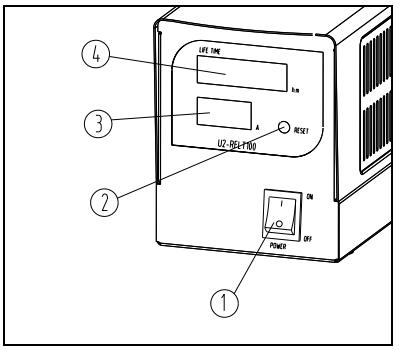


Fig.37

4-2-1 *Set Illuminations*

(1) After connect with main power supply, set the switch ① on mercury lamp power supply at "—" (ON), the mercury lamp is light on. It costs 5 minutes to warm up mercury lamp to be stable. (See Fig. 37)

(2) The timer（LIFE TIME）④ shows hour, minute, second of total 5 bits from left to right. If the number is more than 5 bits, it will show first 5 bits and hide the rest. To see the rest numbers, touch the timer reset button (RESET) ②, the rest number will be shown for 6 seconds and then return.

(3) If change a new mercury lamp or clear the numbers of the timer (LIFE TIME) ④, press the reset button (RESET) ② for more than 5 seconds, and all the hours, minutes and seconds will clear.

(4) The indicating range of the current ③ is 0~9.99A.

★No need to turn on the main switch when using fluorescence illumination.

★To avoid damage, do not cut off power supply within 15 minutes after mercury lamp light on.

★In order to prolong the life of mercury lamp and the power supply box, please do not re-light on it within 3 minutes after turned off.

★When the timer ④ indicates "200.00", it means the mercury lamp had lighted on for 200 hours and it is the life limit for replacement.

★For eyes protection, don't stare at fluorescence light directly.

4-2-2 *Center the Field Diaphragm*

By adjusting the field diaphragm, adjust the diameter of the light beam according to the objective, to shield the diffusion light, in order to obtain better image contrast. To prevent the fluorescence decrease, narrow the field diaphragm, and reduce the illuminated part.

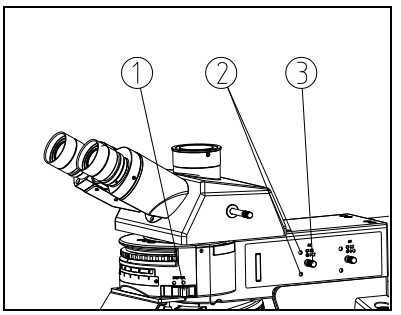


Fig.38

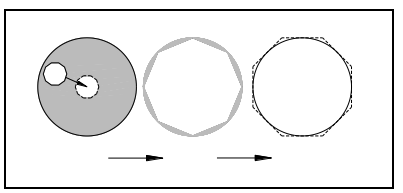


Fig.39

According to the magnification of the objective used, adjust the field diaphragm with the pole of fluorescence pole. When the field diaphragm image is just at the edge of field, the objective can provide best performance and the image is the clearest.

(1) Rotate the filter holder, turn the fluorescence filter B or G into the light path. (If there is no fluorescence filter B or G, use another fluorescence filter.) (See Fig. 38)

(2) Rotate the objective nosepiece, to turn the 10X objective into the light path.

(3) Push the fluorescence flashboard block ① to the position "O", to open the light path.

(4) Focus the slide on the stage, adjust it to be clear.

(5) Pull the field diaphragm adjusting pole ③ to the outmost to open the field diaphragm to the smallest, while push it to the innermost to the largest.

(6) Observe through eyepiece to find image of field diaphragm.

(7) Adjust two field diaphragm centering screws ② on the side of illuminator by a inner hexagon spanner, to move the image to the center of view field.(See Fig. 38)

(8) Open the field diaphragm gradually. If the image of field diaphragm is inscribed to the view field, it means the field diaphragm had been centered. (See Fig. 39)

(9) In actual use, please open the field diaphragm a little to make it ex-scribed with view field in order to obtain better image.

4-2-3 *Center 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.

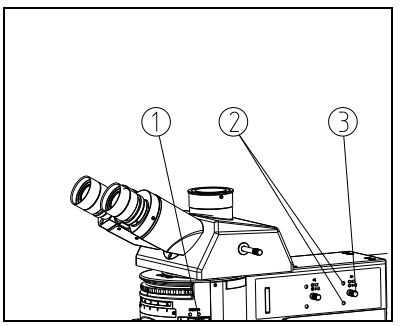


Fig.40

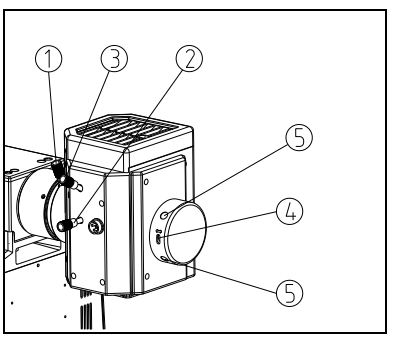


Fig.41

(1) Rotate the turntable, to turn the fluorescence filter B or G into the light path. (If there is no fluorescence filter B or G, use another fluorescence filter.) (See Fig. 40)

(2) Rotate the objective nosepiece, to turn the 10X objective into the light path.

(3) Put the fluorescence flashboard block ① to position "O", to open the light path.

(4) Focus the slide on the stage, and adjust it to be clear.

(5) Pull the aperture diaphragm pole② to the outmost, to open the aperture diaphragm to the smallest.

(6) Take off one eyepiece, replace it with the CT (Centering Telescope), and insert it into the observation tube. Adjust the CT to find the image of aperture diaphragm in the view field.

(7) Adjust the two aperture diaphragm centering screws ③ on the side of illuminator by a inner hexagon spanner, to move the image to the center of view field. (See Fig. 40)

(8) Open the aperture diaphragm gradually, if the image is inscribed with the view field, then it means the aperture diaphragm is rightly centered.

(9) In actual fluorescence observation, push the aperture diaphragm pole ②, to open the aperture diaphragm to the largest.

★ The aperture diaphragm is centered when leaving factory, so the user does not have to readjust it.

★ If the high-brightness excitation light is used, the fluorescence of sample will decrease, then firstly use the ND filter to reduce the brightness of the excitation light. If there is no ND filter, then narrow the aperture diaphragm to reach the same function.

4-2-4 *Center the Mercury Lamp Filament*

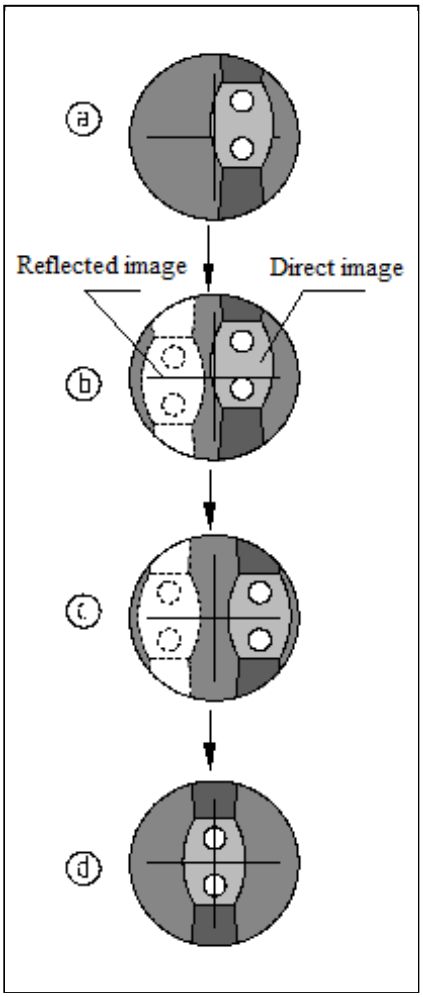


Fig. 42

★ Firstly set the main power switch to position " Ⅰ ", and wait for 5~10 minutes, until the mercury arc light stabilizes, and then center the filament.

(1) Install the centering objective into the nosepiece to move the centering objective into light path, and turn the frosted glass to the operating position. (See Fig.41)

(2) Move the fluorescence filter block B1 into the light path.

(3) Open the field diaphragm and aperture diaphragm to the largest.

(4) Adjust the condenser adjusting pole ①, the vertical adjusting screw ② of mercury lamp, and the horizontal adjusting screw ③ of mercury lamp to make the filament image projected on the "+" scale of the centering objective. (Fig. 41, 42a)

(5) Adjust the focusing screw ④ of reflecting lens and the centering screw ⑤, to make the reflected image projected on the "+" scale of the centering objective. (Fig. 41, 42b)

(6) Adjust the centering screw ⑤ to make the filament image and reflected image symmetry to the "+" scale of the centering objective. Adjust the focusing screw ④ to make both images with same size. (Fig. 41, 42c)

(7) Adjust the vertical adjusting screw ② of mercury lamp, and the horizontal adjusting screw ③ of mercury lamp to make the two images superposition to the center of "+" scale. (Fig. 41, 42d)

(8) Screw down the centering objective, install the fluorescence objective, and move the 10X objective into the light path. With the fluorescence filter block B1, set the slide on the stage, and rotate the coarse

focusing knob to find the image. Then rotate the fine focusing knob to make the image be clear.

(9) Observe through eyepieces and adjust the condenser adjusting pole ① to make the field of view to reach the normal brightness, then lock the knob.

★ Centering the filament after the mercury lamp excitation source is stable, it will be more precise.

★ Adjust the vertical and horizontal screw for the filament image, then the reflected image will also be moved.

★ After replacing the mercury lamp, it should be re-centered.

4-2-5 ***Replace the Fuse***

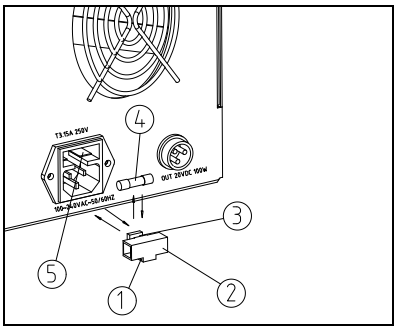


Fig.43

(1) Before replace the fuse, please set the main power supply and mercury lamp power supply at "O" (OFF) and take off the plug.

(2) Fasten the flute ① under the fuse holder ② by fingers, take out the fuse holder ② from socket ⑤. Then take off the fuse ④ from the above flute ③ and replace it with a new one. Then put it to the flute ③ and push the fuse holder ② into the socket ⑤, until a sound of "kada" is heard. (See Fig. 43)

4-2-6 ***Install the Filter***

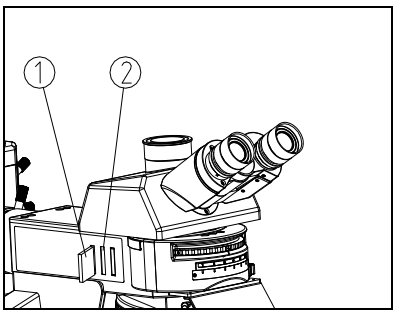


Fig.44

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

According to the requirements, insert filter or ND filter into position ① and ②. Make the surface with identifications face to the observer, and the filter comes into the light path when a sound of "DiDa" is heard. (See Fig. 44)

5. Troubleshooting *STM-2082 Series*

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

5-1 *Solutions of STM-2082 Series Biological Microscope Problem*

Problem	Cause	Solution
(1) The bulb is bright but it is dark in the field of view.	Field diaphragm is not large enough.	Enlarge the field diaphragm.
	Condenser is too low.	Adjust the condenser.
	Condenser is not centered.	Center the condenser.
	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.
(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	No cover glass on the specimen slide.	Add the cover glass.
	The cover glass is not standard.	Use a standard cover glass with thickness of δ0.17mm.
	The specimen faces down.	Put the specimen to face up.
	The immersion oil has accumulated on the dry objective.	Clean thoroughly.
	The immersion oil is not used for oil objective.	Use immersion oil.
	Air bubble in the immersion.	Get rid of the air bubble.
	Use wrong immersion oil.	Use a correct one.（Cedar oil）
	The aperture diaphragm is not opened correctly.	Adjust it.
	Stain or dust has accumulated on the lens of eyepiece.	Clean the lens.
	Condenser is too low.	Adjust the condenser.
(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.

Problem	Cause	Solution
(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.
(7) Cannot focus when using high magnification objective	The cover glass faces down.	Put the cover glass to face up.
	The cover glass is not standard.	Use a standard cover glass with thickness δ0.17mm.
(8) The objective touches the cover glass while turning the nosepiece.	The cover glass faces down.	Put the cover glass to face up.
	The cover glass is not standard.	Use a standard cover glass with thickness δ0.17mm.
(9) Coarse focusing knob is too tight.	Tension adjustment knob is too tight.	Loosen it to an appropriate position.
(10) Stage declines itself and cannot stay on the focal plane.	Tension adjustment knob is too loose.	Tighten it to an appropriate position.
(11) Coarse focusing knob cannot rise.	The coarse focusing limit knob is locked.	Loosen the coarse focusing limit knob.
(12) Coarse focusing knob cannot decline.	The condenser is too low.	Raise the condenser.
(13) Cannot move the slide smoothly.	The slide is not fixed correctly.	Adjust it correctly.
	The movable specimen holder is not fixed properly.	Adjust it correctly.
(14) The image moves obviously when touching the stage.	The stage is fastened incorrectly.	Fasten the stage correctly.
(15) 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.
(16) The bulb burnt out usually.	A wrong bulb is used.	Replace it with a correct one.
(17) 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.
(18) 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.

5-2 *Solutions of Mercury Bulb Fluorescent Device Problem*

Problem	Cause	Solution
(1) The mercury lamp is bright, but the view field is dark.	Field diaphragm is not large enough.	Open the field diaphragm larger.
	Filter blocks are not at correct position.	Adjust them.
	The fluorescence flashboard block shades the light source.	Adjust the fluorescence flashboard block.
(2) Unclear image	The objective is not in the light path.	Turn the nosepiece until a sound of “kada” is heard, to lock position.
	Stains have accumulated on the lens.	Clean the lens.
	Field diaphragm is too large or narrow.	Adjust it.
	The fluorescent color of filter block does not match with the specimen.	Adjust the filter block.
	Use wrong immersion oil.	Use a correct one.
(3) Blur field or brightness asymmetry.	Nosepiece is not at lock position	Turn the nosepiece until a sound of “kada” is heard, to lock position.
	Filter blocks are not at correct position.	Adjust them.
	Mercury lamp filament is not centered.	Center it.
	Condenser adjusting knob is not at correct position.	Adjust it.
(4) Mercury lamp does not light.	No power supply.	Check the connection of the power cable.
	Incorrect connection of light source.	Check the connection.
	The light source cable is broken.	Replace it with a new one.
	The mercury lamp burnt out	Replace the bulb.
	The fuse is burnt out.	Replace the fuse.
(5) Mercury lamp flashes.	The power supply has just been connected.	Wait for 5 minutes until the lamp is stable.
	The light source cable doesn’t connect well.	Connect it correctly.
	The bulb will burn out soon.	Replace it with a new one.