



A12.0911

Biological Microscope

Instruction Manual



This instruction manual is for the operation guide, troubleshooting and maintenance to the 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.

Before Use

1. Components.....	1
2. Assembling	5
2-1 Assembling Scheme	5
2-2 Assembling Steps	6
3. Operations	8
3-1 Set Illumination.....	8
3-2 Adjust Color Temperature.....	8
3-3 LCD Display	8
3-4 Place the Specimen Slide	9
3-5 Adjust the Focus.....	9
3-6 Adjust the Focusing Tension.....	9
3-7 Adjust the Diopter	9
3-8 Adjust the Interpupillary Distance	10
3-9 Center the Condenser	10
3-10 Adjust the Field Diaphragm.....	10
3-11 Aperture Diaphragm.....	11
3-12 Use the Oil Objective (100X)	11
3-13 Use the Filter	12
3-14 Use Button and Interface of the Digital Head	12
4. Assembling and Operation of Accessories.....	13
4-1 Assembling and Operation of the LED Fluorescence Device.....	13
4-2 Assembling and using of the TV Device.....	15
4-3 Assembling the Photography Device	15
4-4 Assembling the Phase Contrast Device.....	16
4-5 Assembling and Operation of Dark Field Flapper	17
4-6 Assembling and Operation of Simple Polarizing	17
4-7 Operation of Digital Observation Head	18
5. Troubleshooting.....	19

1. Operation Notice

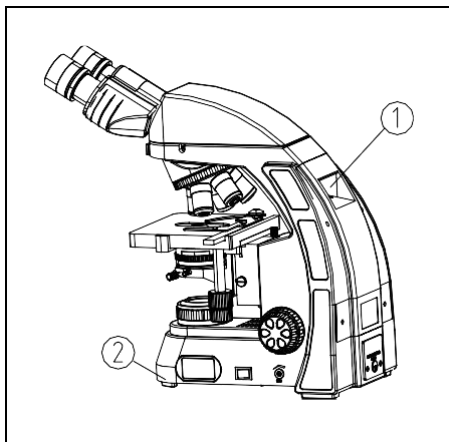


Fig.1

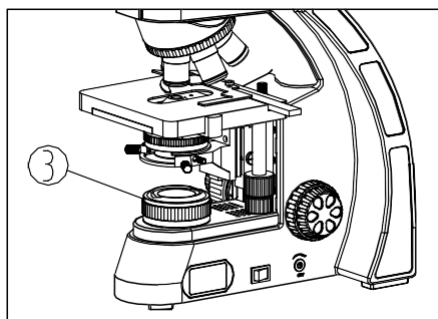


Fig. 2

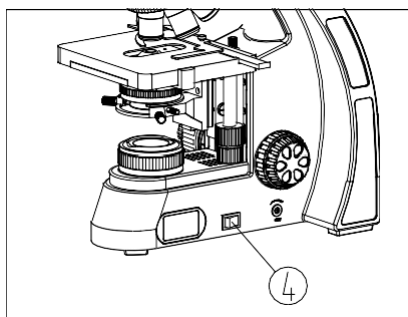


Fig. 3

1. As the microscope is a high precision instrument, always operate it with care. Do not expose the microscope in the sun directly, either not in the high temperature, damp, dust or acute shake. Make sure the worktable is flat and horizontal. Following environment is required when operating: Indoor temperature: 5°C~40°C, Max relative humidity: 80%.

2. 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. 1).

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

3. When working, the surface of condenser will be very hot. Make sure there is enough room for the heat dissipating around the condenser③ (see Fig. 2).

4. For safety, make sure the power switch ④ is at “O” (off) and power it off before replacing the LED lamp, and wait until the lamp and base cool down completely (see Fig. 3).

★ Bulb selected only: single 3W LED (class 3B)

5. External power supply adaptor is adopted. Wide voltage range is supported as 100~240V.

6. Use the special wire supplied by our company.

7. USB cable should meet the requirements of [GB4943 Information Technology Equipment Security].

8. The device should be placed in a well ventilated area or where the vents should not be blocked.

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

10. Please put the power plug or connector in an easily accessible place.

11. It is recommended to evaluate the electromagnetic environment before using the equipment.

12. Do not use near strong radiation sources (such as unshielded RF sources), otherwise the normal operation of device may be interfered.

13. The waste LED bulbs belong to the hazardous wastes specified in the *National Hazardous Waste List* and should be disposed by qualified institutions.

14. No contraindications for this product.

15. Any parts that can only be inspected or supplied by the manufacturer and replaced or repaired by the manufacturer's designated personnel.

16. Failure to use the equipment in accordance with the manufacturer's instructions may result in damage to the equipment.

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 when using, please power it off immediately and wipe it dry.

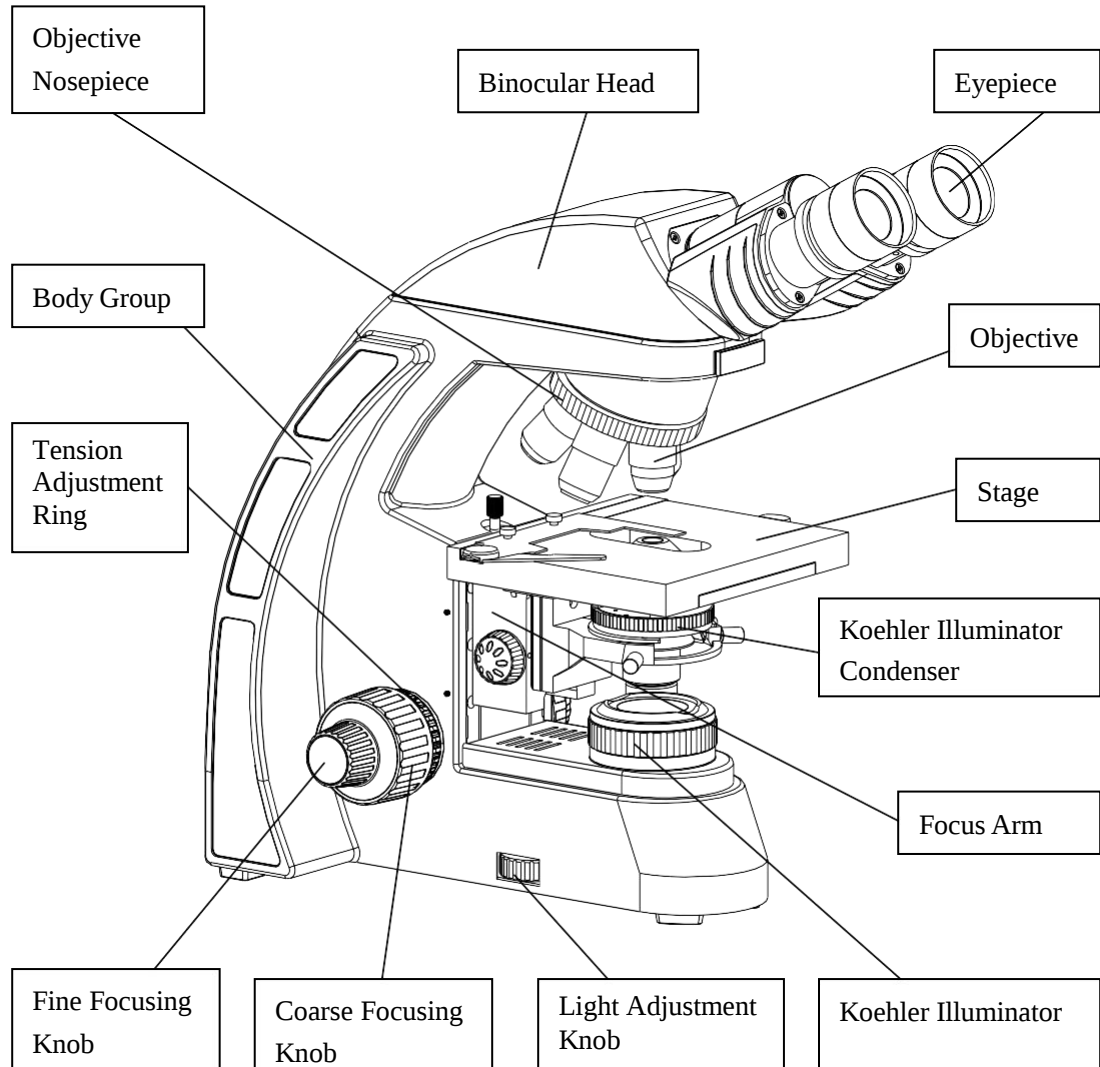
4. Never disassemble the microscope, otherwise the performance will be affected or the instrument will be damaged.

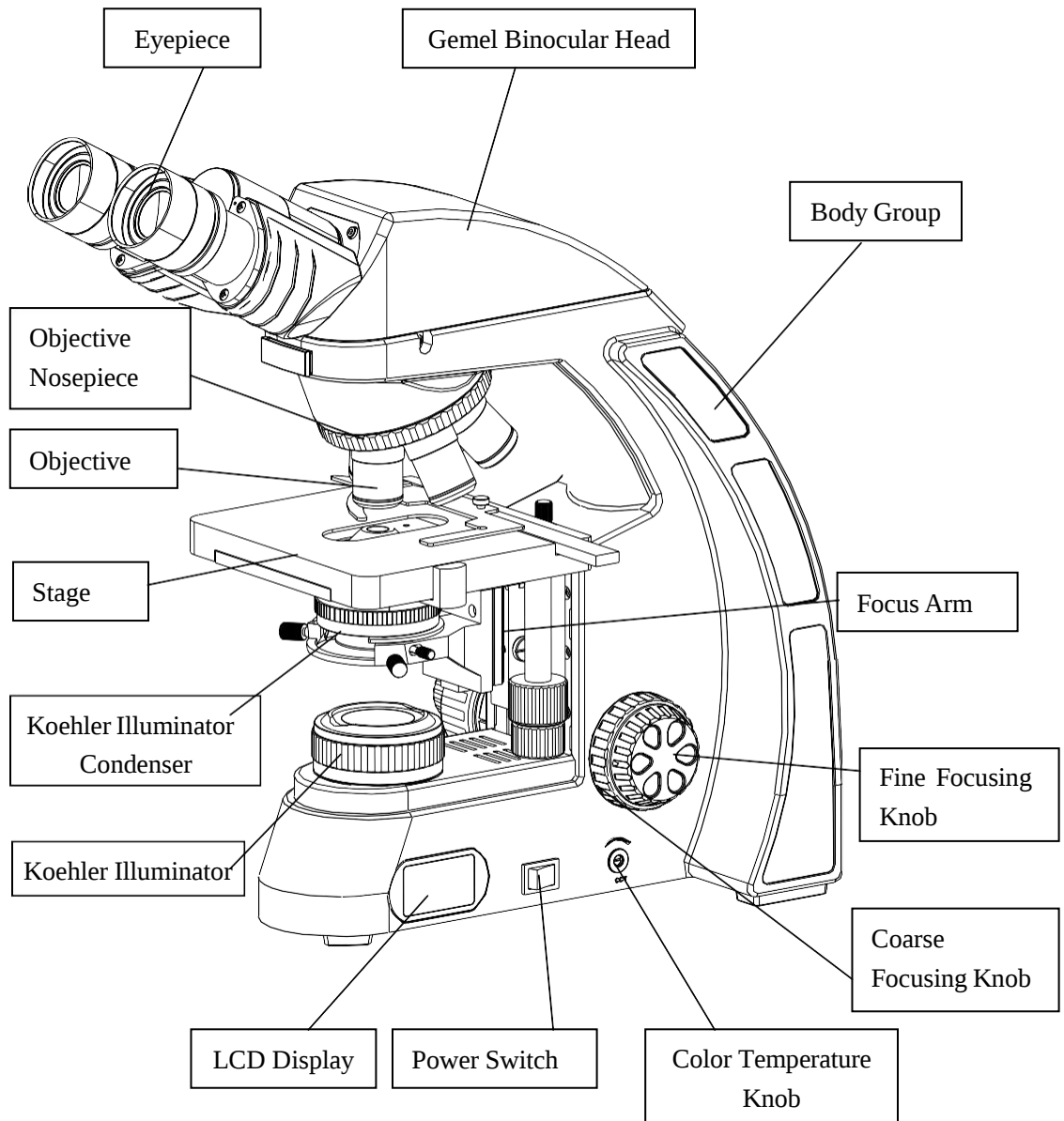
5. After using, cover the microscope with a dust cover.

3. Safety Sign

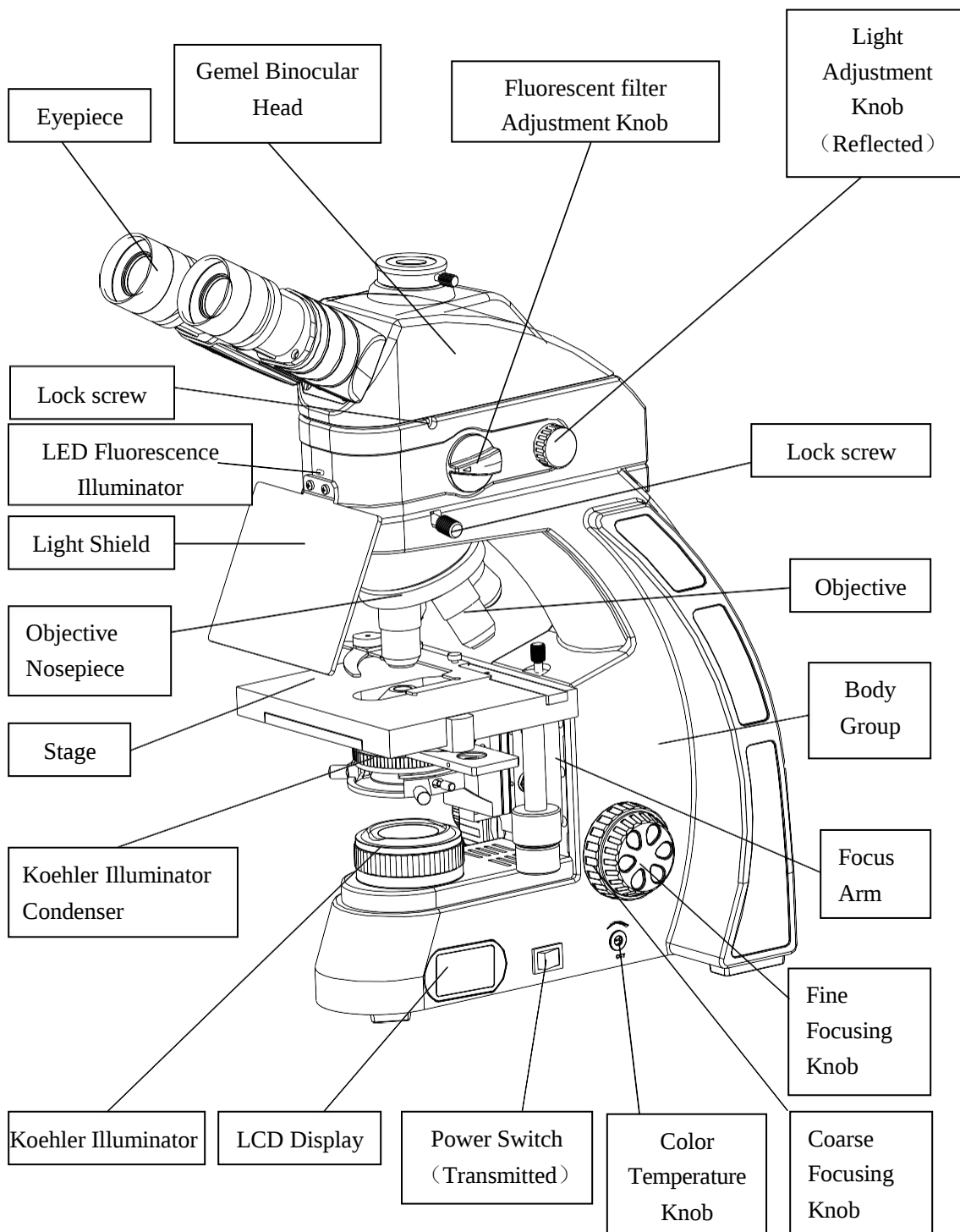
Sign	Signification
	Study the instructions before use. Unsuitable operation would lead to person hurt or instrument faulty.
	Main switch ON
O	Main switch OFF

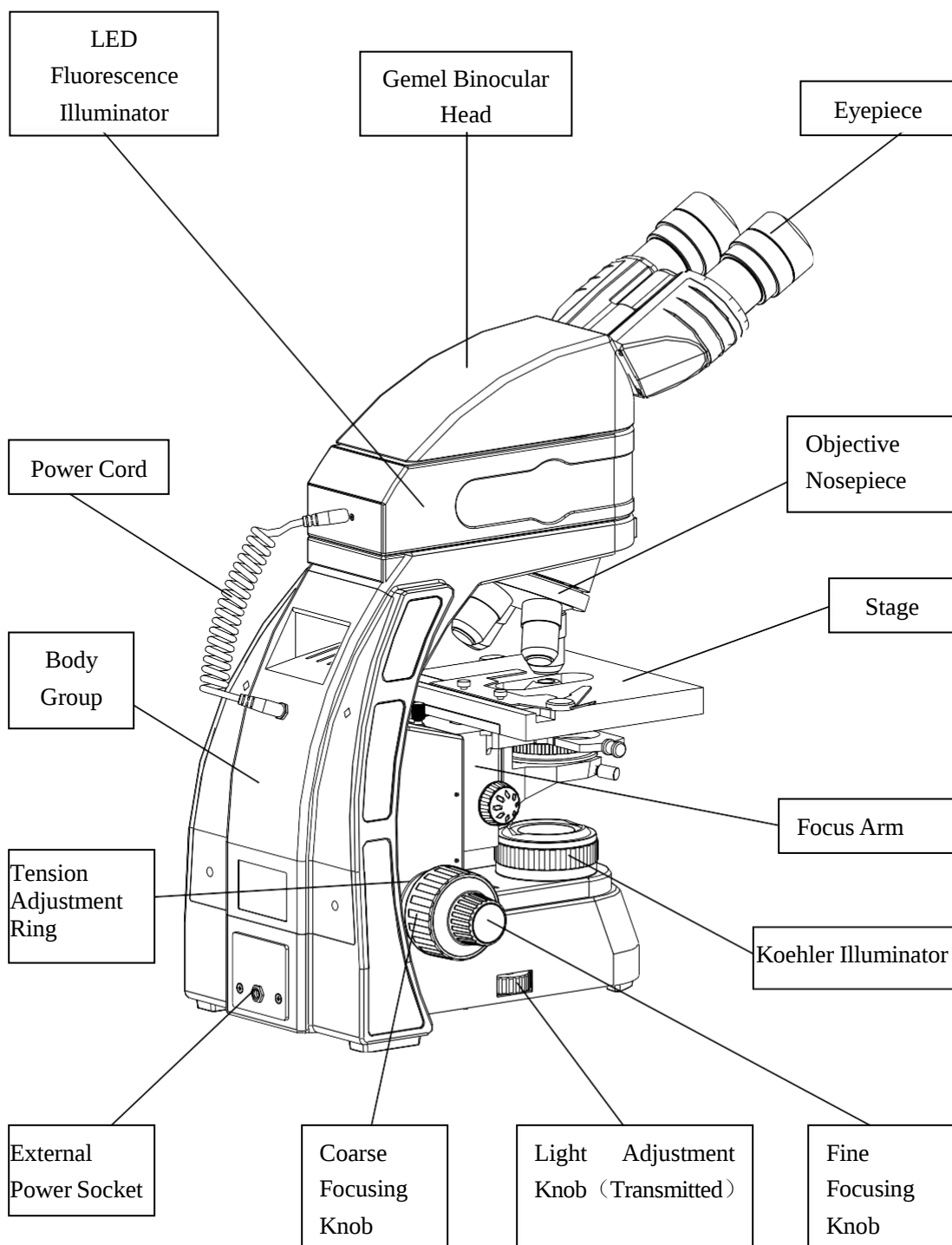
series biological microscope





series biological microscope (with LED fluorescence device)

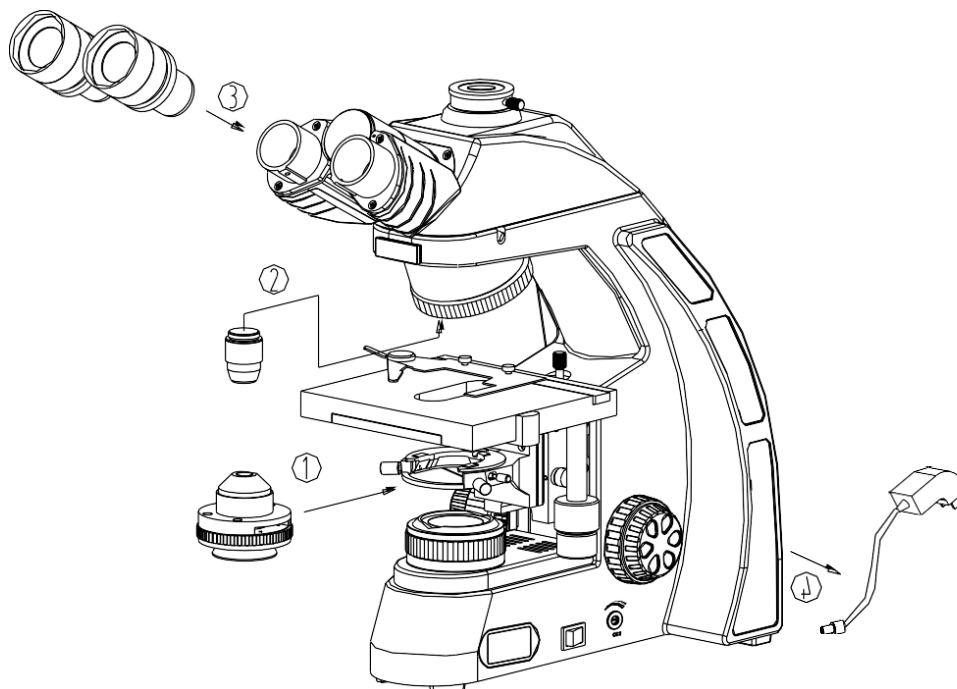




2-1 Assembling Scheme

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

- ★ Before assembling, make sure there is no dust, dirt or other materials which will disturb it. Assemble carefully and do not scrap any part or touch the glass surface.



2-2 Assembling Steps

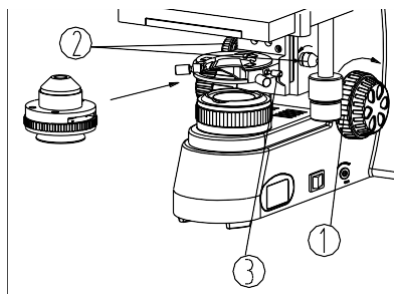


Fig.4

2-2-1 Assemble the Koehler Illuminator Condenser

- (1) Rotate the coarse focusing knob① to raise the stage to the highest position (see Fig. 4).
- (2) Rotate the condenser up-down knob② to lower the bracket of condenser to the suitable position.
- (3) Fully loosen the condenser lock-screw③.
- (4) Align the orientation screw at the back of condenser with the groove of condenser base, and push the condenser to the innermost of the condenser base.
- (5) Tighten the lock-screw③ of condenser, then raise the condenser with the up-down knob② to the highest position.

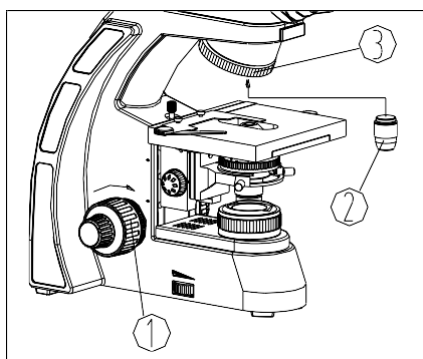


Fig.5

2-2-2 Assemble the Objective

1. Rotate the coarse focusing knob① to lower the stage to a suitable position (see Fig. 5).
2. When installing the objectives, install the 4X, 10X, 20X, 40X, 100X objective matching with the nosepiece hole 1, 2, 3, 4, 5 (see Fig. 6).

★ When operating, first use the low magnification objective (4X or 10X) to search for specimen and focus, and then replace with high magnification objective to observe.

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

3. The objective nosepiece has memory function, which can automatically memorize the brightness value saved by the objectives of each magnification.

When the nosepiece is rotated clockwise or counterclockwise but does not enter the next objective position, the brightness value and magnification display remain unchanged. After entering the new objective magnification position, the brightness value is displayed as the value previously saved by the magnification objective, and the objective magnification display is updated to the current objective magnification.

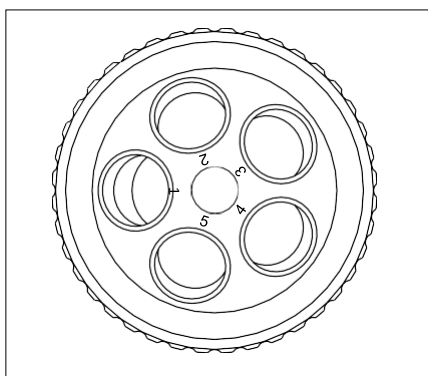


Fig.6

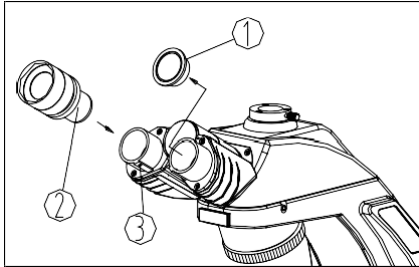


Fig.7

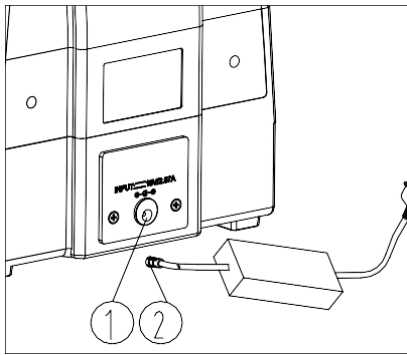


Fig.8

2-2-3 Assemble the Eyepiece

- (1) Take down the cover of eyepiece tube①.
- (2) Insert the eyepiece② into the eyepiece tube, until it touches the surface (see Fig. 7).
- (3) When adjusting diopter with adjustable eyepiece, lock eyepiece with hexagon lock-screw ③ to avoid the eyepiece group② rotating in eyepiece tube, as the figure shows.

2-2-4 Connect the Power Cord

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

1. Make sure the power switch is at "O"(OFF) before connecting the power cord.
2. Insert the connector① of power cord into the power socket②, and make sure it connects well (see Fig. 8).
3. Insert the other connector into the socket of power supply, and make sure it connects well.

★ **Input power: DC15V2.67A (GST40A15-P1J), the whole machine is working regularly.**

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

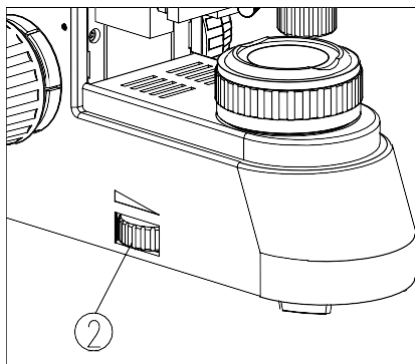


Fig. 9

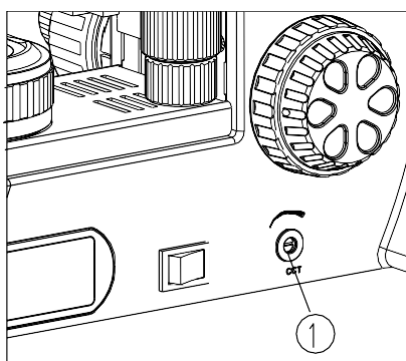


Fig. 10

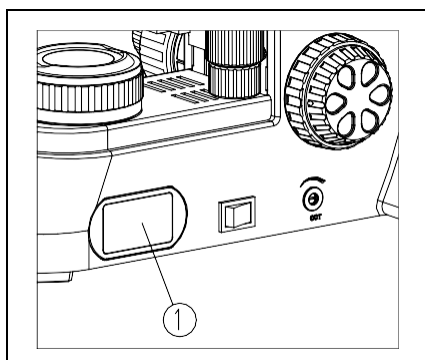


Fig. 11

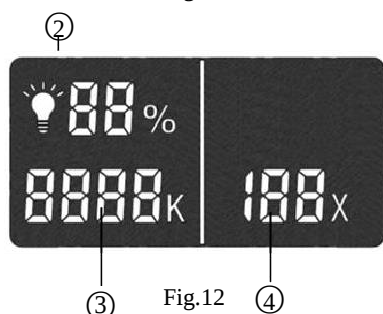


Fig. 12

3-1 Set Illumination

1. Put through the power and turn on the main power switch to "ON" (turn on) on the side.
2. Adjust the light adjustment knob ② until the illumination is comfortable for observation. Rotate the light adjustment knob in 360 ° clockwise to raise the voltage and brightness, and gradually enlarge the LCD display illumination brightness to 99%. Rotate the light adjustment knob in 360 ° counterclockwise to lower the voltage and brightness, and gradually decrease the LCD display illumination brightness to 10% (see Fig. 9).

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

3-2 Adjust Color Temperature

The illumination color temperature can be adjusted from 3000K to 5600K according to the demand. Insert a flat tip spanner into the color temperature adjustment knob ① to select increase or decrease with step 100. Rotate clockwise to increase color temperature, and rotate counterclockwise to decrease color temperature. (See Fig. 10)

3-3 LCD Display

The LCD screen displays the current illumination brightness, color temperature, and objective magnification values. (See Fig. 11)

1. The brightness of the illumination is adjustable, and the brightness adjustment range is 10%-99%.
2. The illumination color temperature is adjustable, and the color temperature adjustment range is 3000K-5600K.
3. The objective nosepiece with the memory function can automatically memorize the brightness value saved by each magnification objectives.

In Fig. 11, the enlargement at ① is as shown in Fig. 12, ② shows the current illumination brightness; ③ shows the color temperature value; ④ shows the objective magnification value.

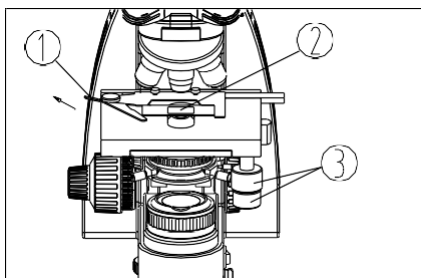


Fig. 13

3-4 Place the Specimen Slide

- (1) Push the wrench① of the specimen holder backwards.
- (2) Place the slide② into the clip, loosen the wrench① and clamp the slide. Make sure the specimen faces up, while there is a cover glass, make sure the cover glass face up (see Fig. 13).
- (3) Rotate the X and Y-axis knob③ of the stage, and move the specimen center into the light path.

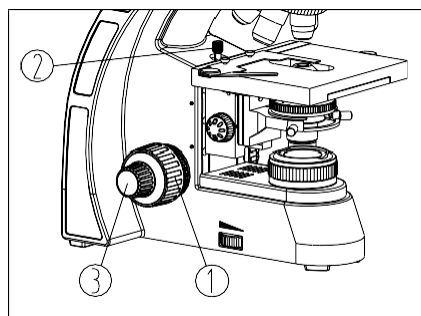


Fig. 14

3-5 Adjust the Focus

- (1) Move the objective 4X or 10X to the optical path.
- (2) Observe the right eyepiece with right eye, rotate the coarse focusing knob ① until the specimen outline appears in the view field (see Fig. 14).
- (3) Rotate the fine focusing knob③ for clear details and lock the position screw②.

★ The position screw can stop the objective touching the clips.

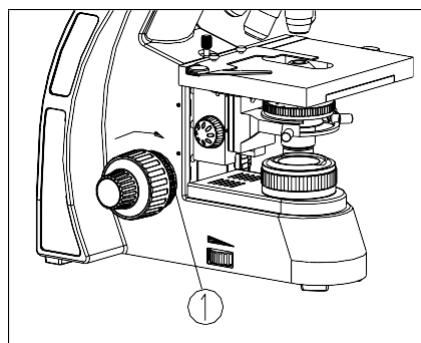


Fig. 15

3-6 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 adjust the tension adjustment ring① (see Fig. 15).

To tighten the focusing arm, rotate the tension adjustment ring① according to the arrowhead pointed; to loosen it in the reverse direction.

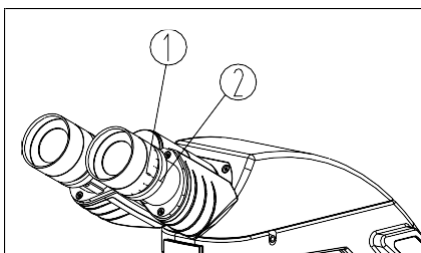


Fig. 16

3-7 Adjust the Diopter

Align the scale "0" of diopter adjustment ring① with the scale②, and then focus to get a clear image. Then observe through the other eyepiece, rotate the diopter adjustment ring until it is clear. (see Fig.16).

★ There is ± 5 diopter on the ring①. To align with the scale value② is your eye's diopter.

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

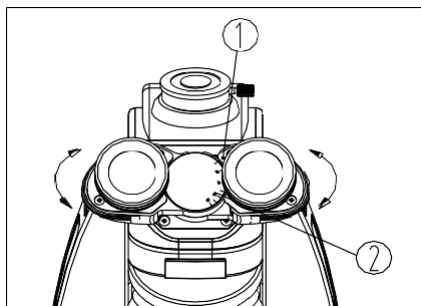


Fig.17

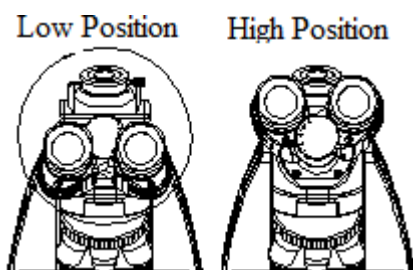


Fig. 18

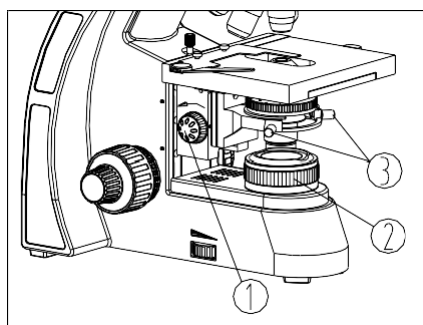


Fig. 19

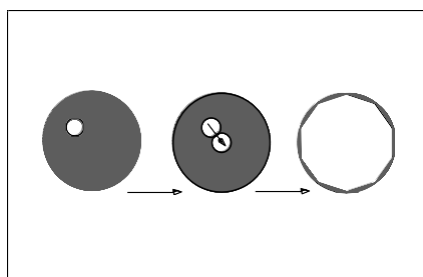


Fig. 20

3-8 Adjust the Interpupillary Distance

When observe with two eyes, hold the base of the prism and rotate them around the axis until there is only one field of view.

“。”① on the eyepiece base points to the scale② of interpupillary indication, which means the value of interpupillary distance (see Fig. 17).

Adjustable range: 50~75mm.

★Remember your interpupillary distance for further operation.

★ This gemel eyepiece tube can be rotated for 360°. User can select corresponding eyepoint height according to his own height. For example, when the interpupillary distance is 65mm, rotate front part of eyepiece tube for 180° can increase eyepoint for 34mm (see Fig. 18).

3-9 Center the Condenser

(1) Rotate the condenser up-down knob① to raise it to the highest position (see Fig. 19).

(2) Rotate the objective 10X to the light path and focus the specimen.

(3) Rotate the field diaphragm adjustment ring② to put the field diaphragm to the smallest position. At the moment, the image of field diaphragm will be observed in the eyepiece.

(4) Adjust the center adjustment screw③ and put the image to the center of the field of view (see Fig.20).

(5) Open the field diaphragm gradually. If the image is in the center all the time, it shows the condenser has been centered correctly.

(6) In fact, 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 the beam 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 show the best performance and obtain the clearest image.

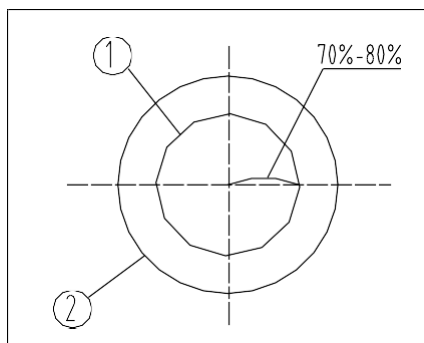


Fig. 21

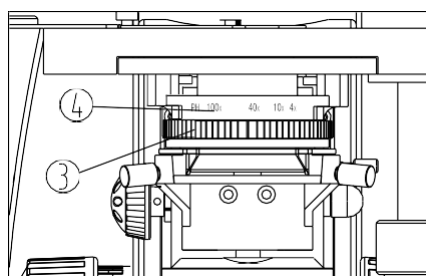


Fig. 22

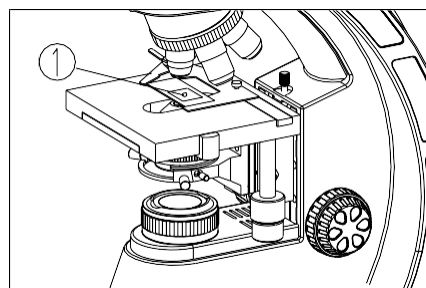


Fig. 23

3-11 Aperture Diaphragm

(1) The aperture diaphragm decides the numerical aperture of the illumination system. Only when the N.A. of illumination system is matching with the N.A. of the objective, it can obtain better resolution and contrast, and also increase the depth of field.

(2) As the contrast is usually low, rotate the diaphragm adjust ring ③ to make the arrowhead pointed to the related magnification position on condenser base ④, namely, to adjust the condenser aperture diaphragm to be 70%-80% of the N.A. of objective. The eyepiece can be taken off when it's necessary to observe from the tube. Adjust the ring ③ until see the figure as shown in Fig. 21, to adjust the proportion (see Fig. 21&22, ① is the image of aperture diaphragm, ② is the edge of objective).

3-12 Use the Oil Objective (100X)

(1) Use the 4X or 10X objective to focus the specimen.

(2) Place a drop of oil ① on the specimen observed (see Fig. 23).

(3) Rotate the nosepiece counterclockwise and rotate the oil objective (100X) into the light path. Then use the fine focusing knob to focus.

★ **Make sure there is no air bubble in the oil for fear affect the image.**

A. Move the eyepiece to examine the air bubble. Open the aperture diaphragm and field diaphragm fully and observe the edge of the objective from the tube (It seems round and light).

B. Rotate nosepiece slightly and swing the oil objective for some times to remove the air bubble.

(4) After using, wipe the front lens with a tissue moistened with a small amount of 3:7 mixture of alcohol and ether or with dimethylbenzene. Wipe off the oil on the specimen.

★ **Don't put another objective to the light path before the oil is wiped to avoid wetting the dry objective.**

★ **Too much dimethylbenzene would dissolve the lens's stickiness.**

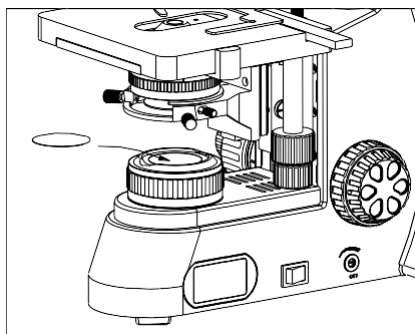


Fig. 24

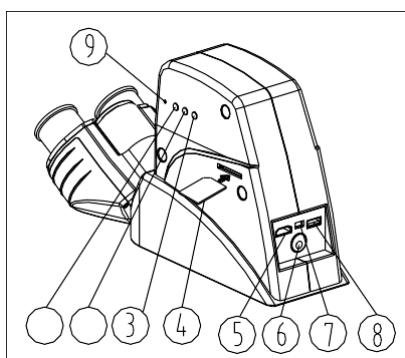


Fig. 25

3-13 Use the Filter

Filter can make the background be more suitable and increase the contrast (see Fig. 24).

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

★ Place the filter's rough side downward.

3-14 Use Button and Interface of the Digital Head

1) Press and hold for 3-5 seconds on the switch button①. The indicator ⑨ turns from orange to green to indicate that the power on is completed. (See Fig. 25)

★ The indicator flashes to indicate that the camera is working.

2) Photo button②, when the camera is working, press once to take a photo.

3) Recording button ③, when the camera is working, the first press is the recording start, and the second press is the recording end.

4) The SD card is shown as ④, and the chamfer is inserted to the left.

5) HDMI cable interface⑤, connected to the HDMI cable for outputting clear image signals.

6) Digital head power socket ⑥, is using DC12V/3.3A external transformer.

7) MINI interface⑦, connect the MINI cable for USB function image output.

8) USB interface⑧, connect the USB cable to connect the mouse, U disk and other devices.

4-1 Assembling and Operation of the LED Fluorescence Device

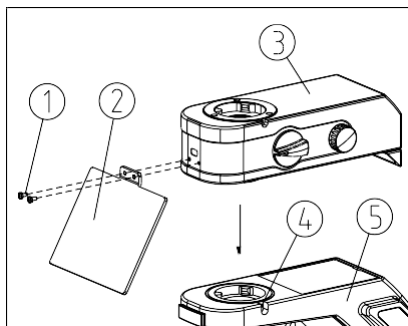


Fig. 26

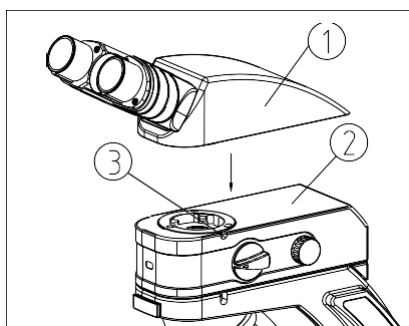


Fig. 27

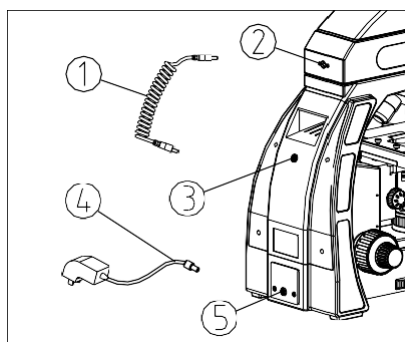


Fig. 28

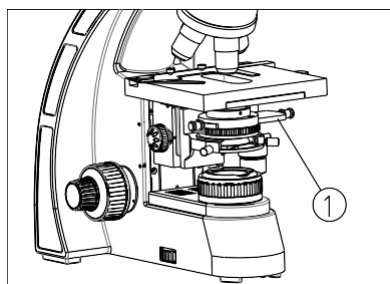


Fig. 29

4-1-1 Assembling and Operation of the LED Fluorescence Illuminator

(1) Fix the light shield ② on the LED fluorescence illuminator ③ with the screw ①. (See Fig. 26)

(2) Put the LED fluorescence illuminator ③ on the arm ⑤, and fix it with the lock screw ④ by the hexagon spanner.

★ **Assemble the light shield ② only when observing in UV lighting.**

(3) Put the binocular/ trinocular Head ① on the LED fluorescence illuminator ②, and fix it with the lock screw ③ by the hexagon spanner. (See Fig. 27)

(4) Insert one end of the power cable ① into the power socket ② of the LED fluorescence illuminator back, and then insert the other end into the power socket ③ of the microscope back, and ensure them be connected well. (see Fig. 27)

(5) Insert one end of the external power adaptor ④ into the power socket ⑤ of the microscope back, and then insert the other end into the power supply socket, and ensure them be connected well. (see Fig. 28)

★ **Before connecting the external power adaptor, firstly rotate the transmission power switch and the reflection adjustment knob(with switch) to “Off”(turn off).**

(6) When observing the fluorescence slide, pull the fluorescence flashboard ① a bit left, it will sound a “Dida” when moved to the fluorescence observation position, and the transmission illumination path is totally covered. (See Fig. 29)

★ **For transmission illumination observation, pull the fluorescence flashboard ① to the right side, to make the transmission illumination path completely get through.**

(7) The LED fluorescence filter block adjustment knob ① can be rotated for 180° according to the arrowhead direction, to change between transmission brightfield and LED fluorescence. Fluorescence means fluorescence observation, and Brightfield means brightfield observation. (See Fig. 30)

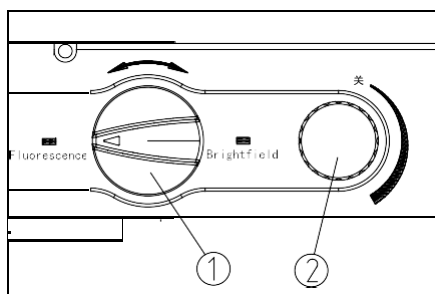


Fig. 30

(8) Illumination: Rotate the adjustment knob ② in clockwise, it will sound a “Dida” when the LED fluorescence lamp is turned on, and increase the brightness in clockwise; Rotate the adjustment knob ② in counterclockwise to reduce the brightness of the LED fluorescence lamp, and turn it off until it sounds a “Dida”. (See Fig. 30)

★ When the LED fluorescence lamp is turned on, also the LED fluorescence indicator will be bright, which indicates the LED fluorescence observation mode; the indicator will be turned off when the LED fluorescence lamp is off.

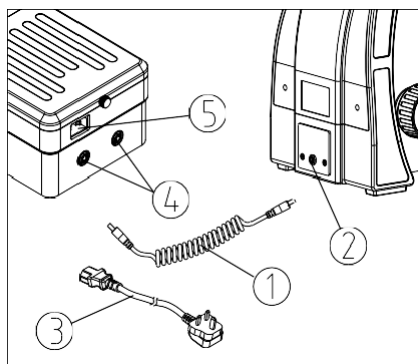


Fig. 31

4-1-2 Use the Rechargeable Battery Box (Recommended in power failure situation)

(1) Insert one end of the power cable ① into the power socket ② of the microscope back, then insert the other end into the power output port ④ of the battery box (can be connected to either output port), and ensure they be connected well. (See Fig. 31)

★ Before connecting the power cable ①, firstly rotate the rechargeable battery box switch ⑥, the transmission power switch and the reflection adjustment knob (with switch) to “Off” (turn off).

(2) Turn on the battery box switch ⑥ to start powering the microscope. The indicator light ⑦ is “green” when the power is normally supplied, and the indicator light ⑧ is “orange-yellow” (the indicator light ⑧ is green after the electric is full), while the last grid of the light bar indicator ⑨ is “red”, and the remaining few grids are “green”. When the battery is low, the indicator light ⑦ is “orange-yellow” and the indicator light ⑧ is “orange-yellow”. At the same time, the light bar indicator ⑨ only has the last grid of red color. (See Fig. 32)

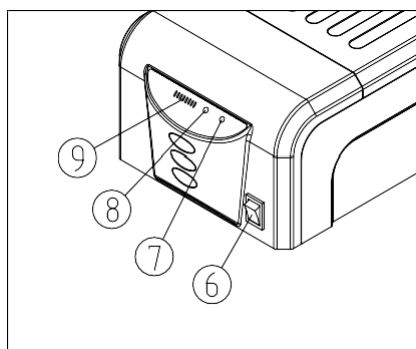


Fig. 32

(3) When the battery voltage is low, the battery pack should be charged. Insert one end of the power cord ③ into the battery box power socket ⑤, and insert the other end into the power supply outlet. When charging, keep the switch ⑥ at “on” turned on state, and the indicator light ⑧ at this time is “orange-yellow”. When the battery is fully charged, the indicator light ⑧ is green. At the same time, the light bar indicator ⑨ is all on

(last grid is "red" and the remaining seven grids are "green"). (See Fig. 31, 32)

4-2 Assembling and using of the TV Device

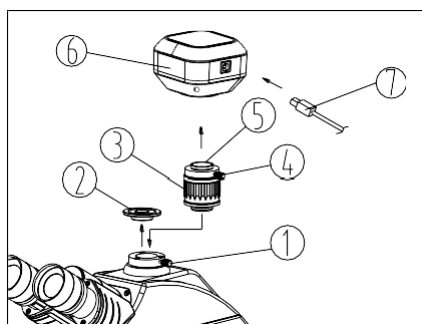


Fig. 33

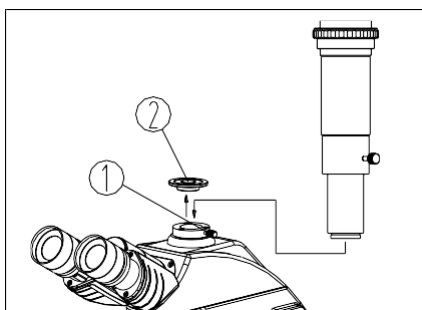


Fig. 34

(1) Loosen the lock screw① of trinocular head, take out the triplet dust-cover②. (See Fig. 33)

(2) Take down the dust-cover of the TV adapter③. Insert the TV adapter into the trinocular head according to the figure and screw down the lock screw①.

(3) Loosen the lock-screw④ of the TV adapter③. Take down the vidicon interface (C type) ⑤ from the TV adapter③, and screw into the external camera⑥. Then install the interface with the external camera⑥ into the TV adapter③, and screw down the lock-screw④.

(4) At last insert the USB cable⑦ into the external camera⑥, and the other end into the USB interface compliant with 3C, UL safety certification of PC.

(5) For binocular observation, after the image is clear, view the output video through the corresponding video capture analysis software. If the image is unclear, rotate the TV adapter③ for focusing until it is clear.

★ The output terminal is designed as a USB dedicated interface, 5V/500mA safety rated working voltage

4-3 Assembling the Photography Device

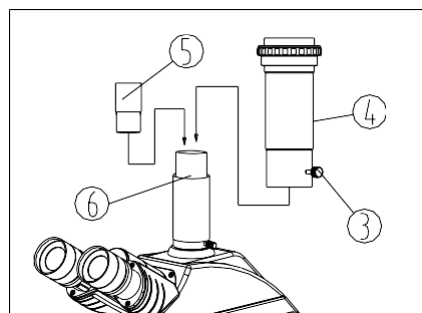


Fig. 35

(1) Loosen the lock screw① of trinocular head, take out the triplet dust-cover②(see Fig.34).

(2) Insert the photography device into the trinocular head as shown in the figure, and screw down the lock screw①.

(3) Loosen the lock-screw③ of the photography adapter and take down the photography adapter ④ (See Fig. 35).

(4) Insert the 3.2X photography eyepiece⑤ into the eyepiece base⑥, then install the photography adapter④ and tighten the lock-screw③.

(5) After the image is clear through observation, then operate the photography device according to its instructions.

4-4 Assembling the Phase Contrast Device

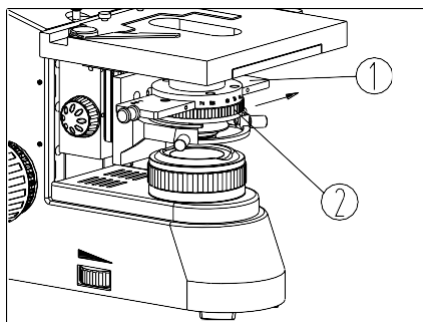


Fig. 36

4-4-1 Assembling and Operation of Phase Contrast Flapper

(1) Keep the phase contrast flapper ① face up (upward the face with word), insert it from left to right into the condenser flapper socket as the direction of the arrow pointed (see Fig. 36).

(2) Every diaphragm or hole has its corresponding position, one diaphragm or hole is inserted into the center of optical path when it sounds “ka-da” during phase contrast flapper rotating.

(3) When observing phase contrast, keep the adjusting ring of the aperture diaphragm ② indicator to “PH” position.

★ Each magnification phase contrast objective is used with matched ring diaphragm (Like 10X phase contrast objective corresponding to 10X ring diaphragm).

★ As the ring diaphragm is pre-centered, it doesn't need to be adjusted in operation in normal cases.

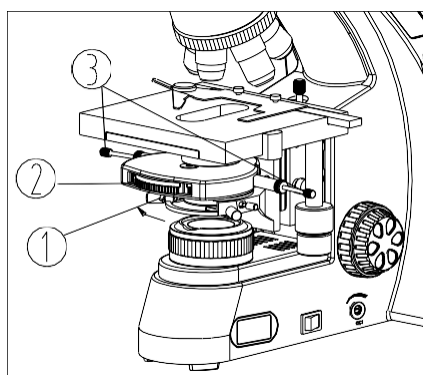


Fig. 37

4-4-2 Assembling and Operation of Disc Phase Contrast Condenser

(1) Assembling of Condenser please refer to 2-2-1, change the objective on the nosepiece to phase contrast objective, Center the phase contrast condenser before use.

(2) Rotate the phase contrast ring ② to “BF” position in bright field observation. When it sounds “ka-da” in rotating, it indicates that one diaphragm or hole is rotated into the center of optical path (see Fig. 37).

4-4-2-1 Centering Halo

In phase contrast microscopy observation, slide the aperture diaphragm lever ① to the most left as the direction of the arrow pointed (always keep the aperture diaphragm at maximum). (See Fig. 37)

(1) Put specimen on the stage and focus.

(2) Take out one observation eyepiece and insert one CT (centering telescope) into the tube

(3) Confirm the corresponding phase ring (in phase contrast objective) and halo (in phase contrast disc ②) are moved into optical path.

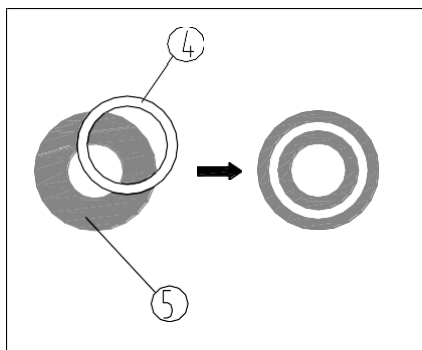


Fig. 38

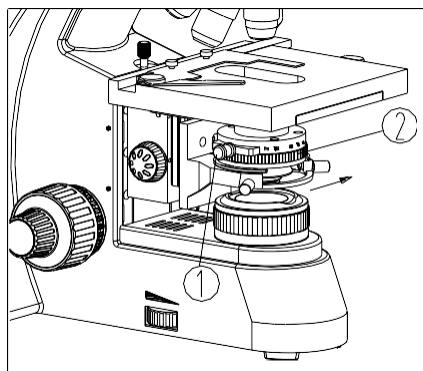


Fig. 39

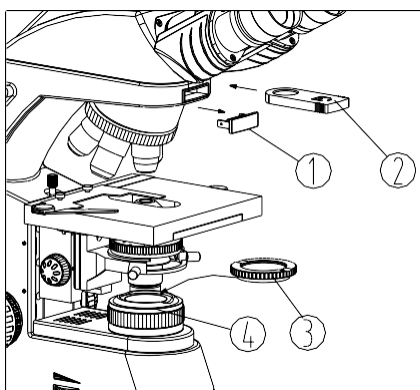


Fig. 40

(4) Adjust centering telescope to get a clear image of phase ring and halo in field of view (see Fig. 38).

(5) Center by phase contrast adjusting lever③ until halo④ center overlaps the phase ring⑤ center (see Fig. 37 and 38).

(6) Adjust phase ring and halo of other magnification phase contrast objective according to the above steps.

★ It cannot get the best phase contrast microscopy observation effect if the halo is not centered correctly.

4-5 Assembling and Operation of Dark Field Flapper

(1) Keep phase contrast flapper face up (upward the face with word), insert it from left to right into condenser flapper socket as the direction of the arrow pointed (see Fig. 39).

(2) Each diaphragm or hole has corresponding position, when it sounds “ka-da” in dark field flapper rotating, it indicates that one diaphragm or hole is inserted into the center of optical path.

(3) In dark field observation, adjust aperture diaphragm adjusting ring to the maximum position.

★ Dark field ring diaphragm is on the left side of flapper.

4-6 Assembling and Operation of Simple Polarizing

(1) Simple polarizing includes analyzer② and polarizer③ (see Fig. 40).

(2) Unplug analyzer dust-cover① from the arm, and insert analyzer② face up.

(3) Put the polarizer③ into the condenser④ groove as the figure shows.

(4) Rotate the polarizer③ can change the orthogonal status of polarization.

★ When view field of eyepiece is the darkest, it is polarization.

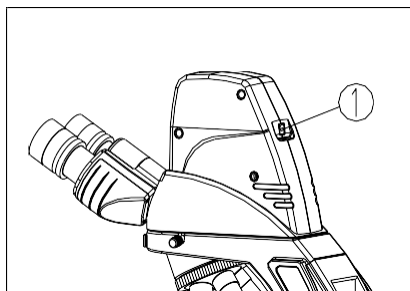


Fig. 41

4-7 Operation of Digital Observation Head

Insert one end of USB data cable into the USB output port① on the back of observation head, and the other end into the USB interface of PC (see Fig. 41). View the microscope video by the corresponding video capture and analysis software, and the binocular observation is also supported.

Digital USB interface: Voltage is 5V, Current $\leq 500\text{mA}$.

5. Troubleshooting

Series

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

Problem	Cause	Solution
1. Optical Part		
(1) The LED light is bright, but it's dark in the field of view.	Field diaphragm is not large enough.	Enlarge the field diaphragm.
	Condenser is too low.	Adjust the condenser.
	Condenser centered incorrectly.	Center the condenser.
	Condenser installed incorrectly, the fixed screw is not in the groove of bracket.	Install it correctly.
(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 such as condenser, objective, or eyepiece.	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	The cover glass is not standard.	Use a standard cover glass with thickness 0 or 0.17mm.
	The cover glass faces down.	Adjust it.
	The immersion oil has accumulated on the dry objective.	Clean it thoroughly.
	The immersion oil is not used for oil objective.	Use immersion oil.
	Air bubble is in the immersion.	Get rid of the air bubble.
	Use wrong immersion oil.	Use a correct one.
	The aperture diaphragm is not opened correctly.	Adjust the aperture diaphragm.
	Stain or dust has accumulated on the inlet lens of eyepiece.	Clean the lens.
	The condenser is too low.	Adjust the condenser to the highest position.
(5) One side of the field of view is dark or the image moves while focusing.	The nosepiece is not in the right position.	Turn the nosepiece into the right position.
	Condenser centered incorrectly.	Center the condenser.
	Condenser installed incorrectly, the fixed screw is not in the groove of bracket.	Install it correctly.

(6) The eyes feel tired easily. The right field of view doesn't superpose with the left.	Interpupillary distance is wrong.	Adjust the interpupillary distance.
	Diopter adjustment is wrong.	Adjust the Diopter.
2. Mechanical Part		
(1) Cannot get the objective focused in high magnification.	The cover glass faces down.	Put the cover glass to face up.
	The cover glass is too thick.	Use a standard cover glass with thickness 0 or 0.17mm.
(2) The objective touches the cover glass while turning the nosepiece from low to high magnification.	The cover glass is not standard.	Use a standard cover glass with thickness 0 or 0.17mm.
(3) Coarse focusing knob is too tight.	Tension knob is too tight.	Loosen a little.
(4) Stage declines itself, cannot stay on the focal plane when observing.	Tension knob is too loose.	Tighten a little.
(5) Coarse focusing knob can't decline.	The base of the condenser is too low.	Raise the base.
(6) The slide cannot move smoothly.	The slide is not fixed correctly.	Adjust it correctly.
	The stage is fastened incorrectly.	Fasten the stage correctly.
3. Electrical Part		
(1) The LED light does not work.	No power supply.	Check the connection of the power cable.
	The bulb is not installed correctly.	Install it correctly.
	The plug-in of LED light is not connected well.	Connect it correctly.
	The LED lights burnt out.	Replace it.
(2) The bulb burnt out very often.	A wrong bulb is used.	Replace it with a correct one.
(3) The field of view is not bright enough.	A wrong bulb is used.	Replace it with a correct one.
	The use of light adjustment knob is wrong.	Adjust correctly.
4. LED Fluorescence Device Part		

(1) LED fluorescence of illumination device is not bright.	The LED fluorescence adjustment knob switch is not turned on.	Turn on the LED fluorescence adjustment knob switch to bright enough, rotate the fluorescence filter block adjustment knob to “Fluorescence”, and check if the light source is on.
	No power supply.	Check the power cable connection.
	The connection cable is not connected well when the battery box is used.	Check the connection cable.
	The connection cable is broken.	Replace the connection cable.
	Low power supply when the battery box is used.	Recharge it in time.
(2) LED fluorescence lamp is bright but the view field is dark.	The fluorescence filter block adjustment knob is at “Brightfield”.	Rotate the fluorescence filter block adjustment knob to “Fluorescence”.
(3) The background is yellowgreen when in brightfield observation.	The fluorescence filter block adjustment knob is at “Fluorescence”.	Rotate the fluorescence filter block adjustment knob to “Brightfield”.
(4) The background is yellowgreen and the image contrast is bad when in fluorescence observation.	The fluorescence flashboard of condenser is at the position of brightfield observation(light hole).	Pull the fluorescence flashboard to the position of fluorescence observation(Apertures).
5. External Storage Battery Block		
(1) The battery box cannot be charged.	No net power supply.	Ensure normal power supply.
	The switch of battery box is not turned on.	Turn on the switch of battery box.