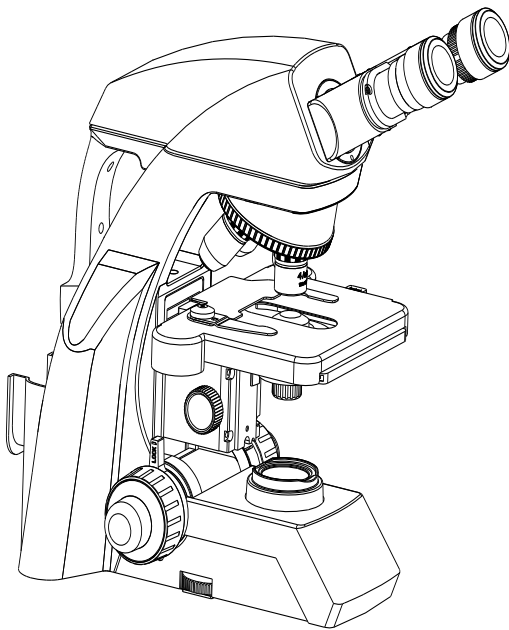




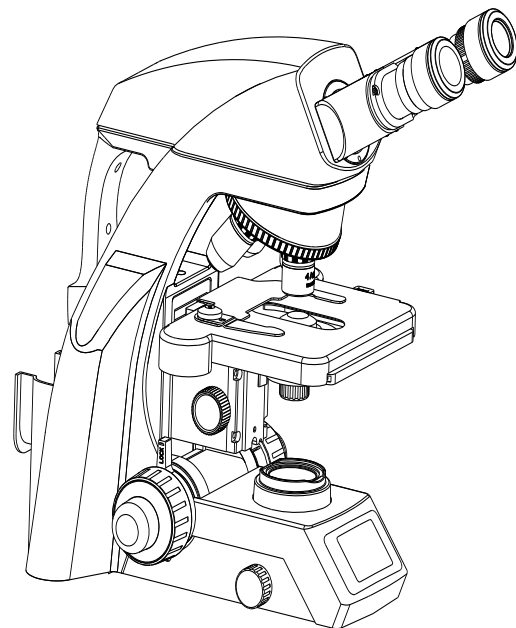
# Biological Microscope

## BS-2053, 2054 Series

### Instruction Manual



BS-2053B



BS-2054B

This manual is for BS-2053, 2054 series biological microscopes. To ensure the safety, obtain optimum performance and to familiarize yourself fully with the use of this microscope, it is recommended strongly that you study this manual thoroughly before operating the microscope.

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**USER NOTICE**

**BS-2053, 2054**

**I . Safety Notice**

1. Open the box carefully to avoid the accessories, like lens, dropping to ground or being damaged.
2. Do keep the instrument out of direct sunlight, high temperature or humidity, dusty and easy shaking environment. Make sure the stage is flat, horizontal and firm enough.
3. When moving the microscope, carefully carry it with the handle and the base.
4. Make sure the instrument is earthed, to avoid lighting strike.
5. For safety, be sure the main switch is in “O” (off) state and cut off the power supply before replacing the bulb or the fuse. If you replace the bulb during use or right after use, allow the lamp bulb and the lamp house to cool completely before touching.

**Designated bulb:** 1W S-LED Lamp (BS-2053); 3W S-LED Lamp (BS-2054).

6. Check the input voltage: be sure the input voltage which is signed in the back of the microscope is consistent with the power supply voltage, or it will bring a serious damage to the instrument.
7. Always use the power cord provided by We.
8. The electrical equipment of the microscope should be discarded as electronic waste.

**II. Maintenance and Care**




1. All the lenses have been adjusted properly; do not dismount them by yourself please.
2. The nosepiece and coarse and fine focusing parts are so delicate that it is forbidden to disassemble them carelessly by yourself.
3. Keep the instrument clean, and do not pollute the optical element when wiping away the dust on the instrument.
4. The contaminations on the prism, like fingerprints and oil smudges, could be gently wiped with a piece of soft cloth or tissue paper, gauze which has been immersed in pure alcohol or ether. (Note that the alcohol and ether are highly flammable, do keep them away from the fire or potential sources of electrical sparks, and use them in a drafty room as possible as you can.)
5. Do not attempt to use organic solvents to clean the microscope components other than the glass components. To clean them, use a lint-free, soft cloth slightly moistened with a diluted neutral detergent.
6. When using, if the microscope is splashed by liquid, cut off the power at once, and wipe away the splash.
7. Do not disassemble any parts of the microscope, as this will affect the function or reduce the performance of the microscope.
8. Place the instrument in a cool, dry position. When not using the microscope, keep it covered with a dust cover. Make sure the lamp socket is cool before covering the microscope.

**III. Configuration Instruction**

1. BS-2053 is the basic model and uses NIS45 system;
2. BS-2054 is the coding model, using NIS45 system, with brightness memory, adjustable color temperature stage and other configurations.

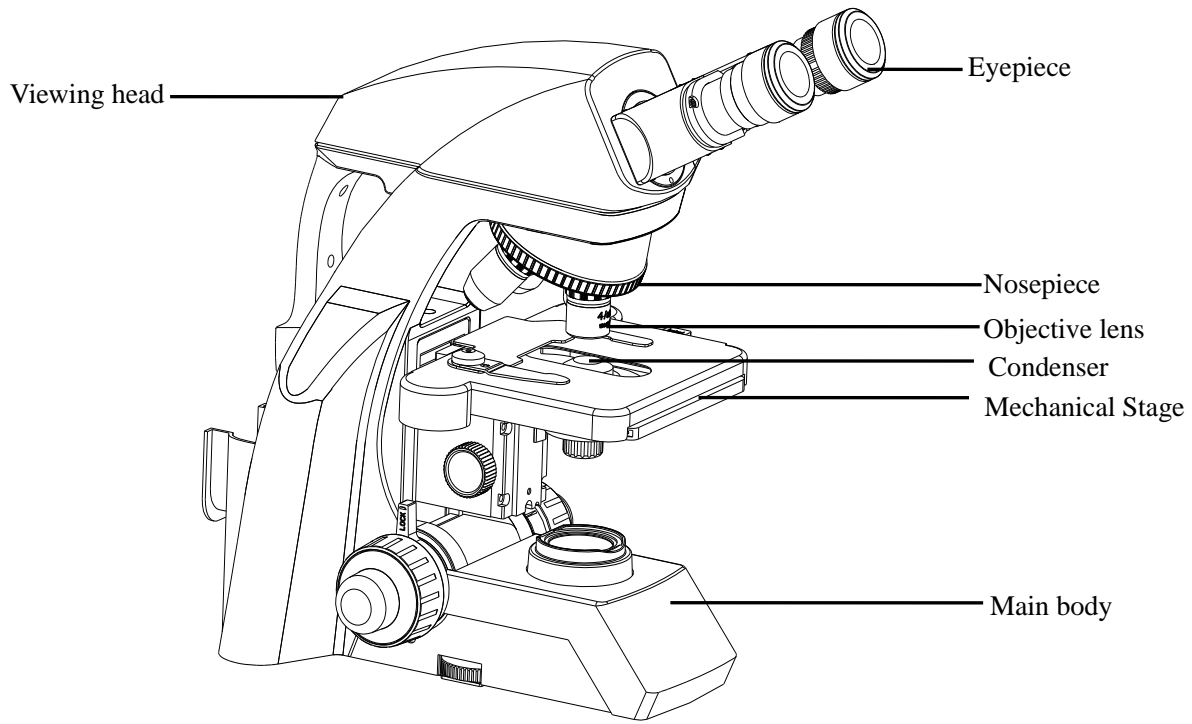
**IV. Safety Marks**

The Following marks are on the microscope. Figure out the meaning of these symbols and always use the microscope in the safest way.

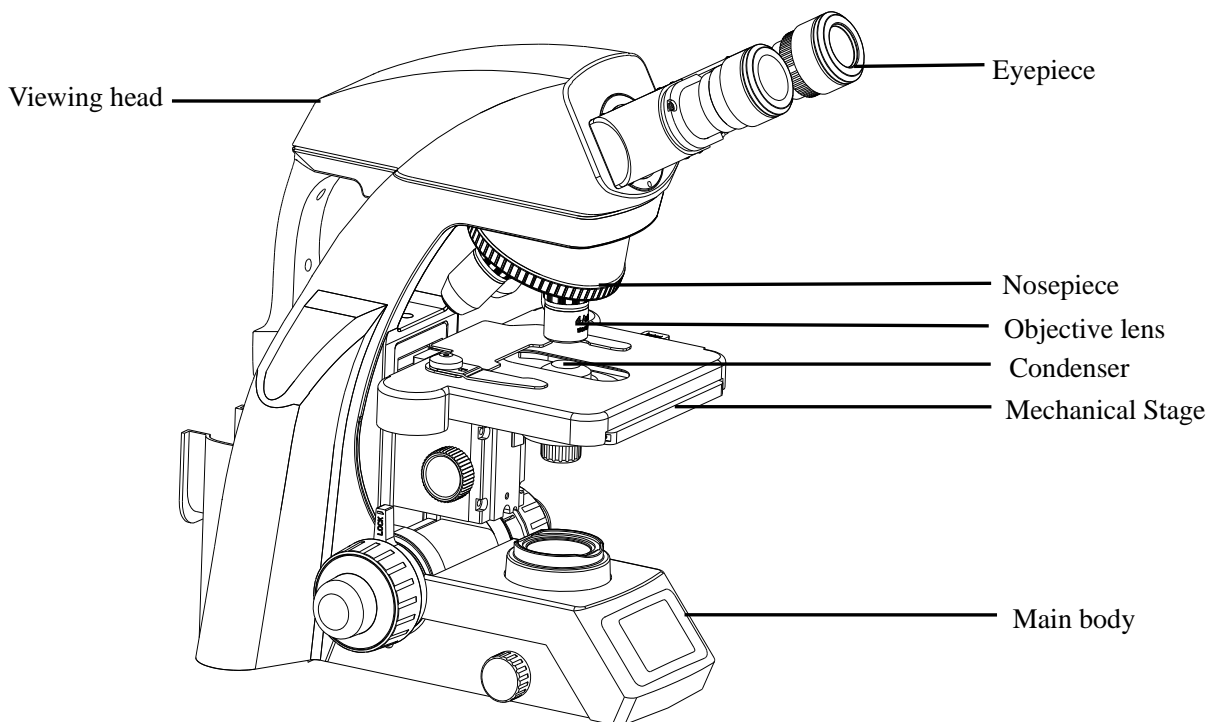
Symbol	Meaning
	Power on
	Power off
	Direction of light intensity. When turning to the tip, the intensity decreases from strong to weak
SLEEP	Dormant State
LOCK	Light intensity is locked

1. Components Name

BS-2053, 2054



BS-2053



BS-2054

## 2. Assembly

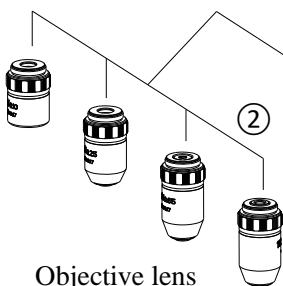
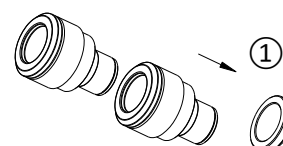
BS-2053, 2054

### 2.1 Assembly Diagram

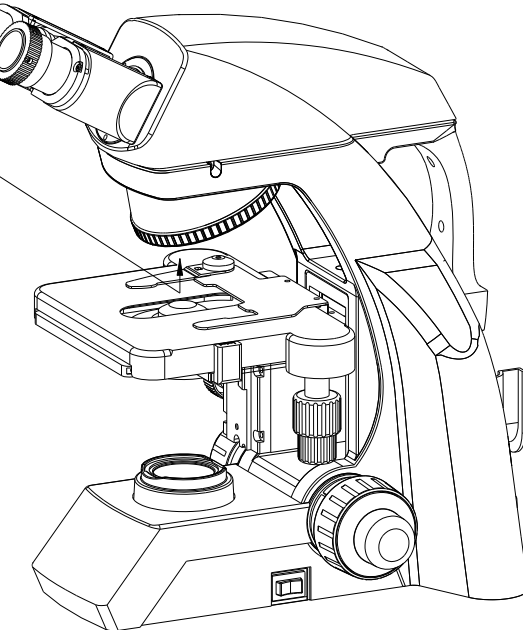
Taking BS-2053 for example, the following figure shows the installation sequence of the components. The number in the figure shows the assembly steps. The installation method of BS-2054 is the same as that of BS-2053.

- ★ Before installing, be sure every components is clean, do not scratch any parts or glass surface.
- ★ Keep well with hexagon wrench provided. When changing the components, you will need it again.

10x Eyepiece

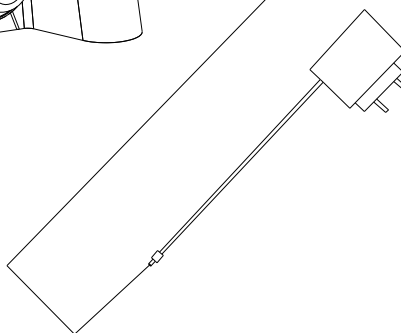


Objective lens



Main body

③ Power Adaptor



## 2.2 Assembly procedure

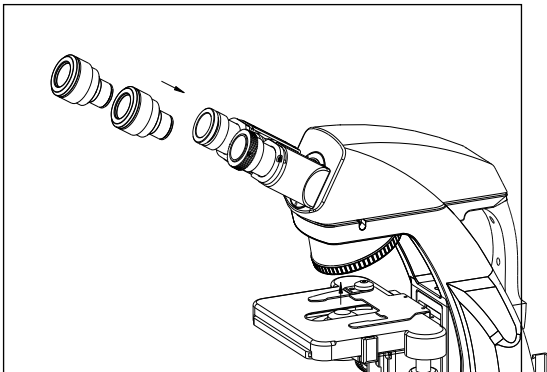


Fig.1

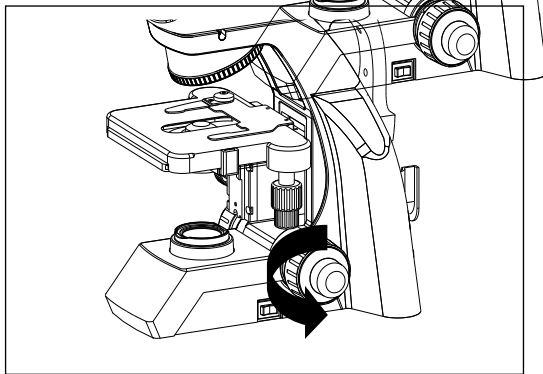
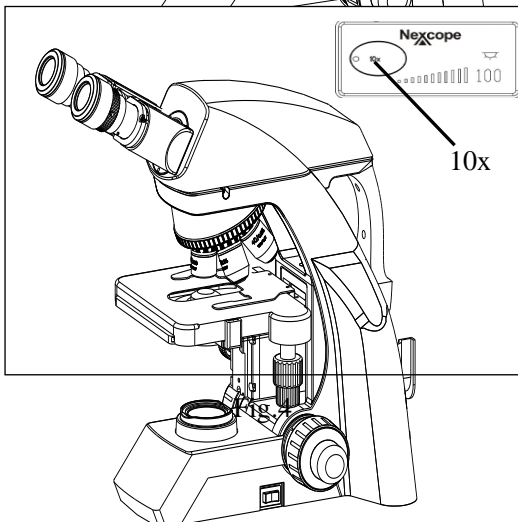
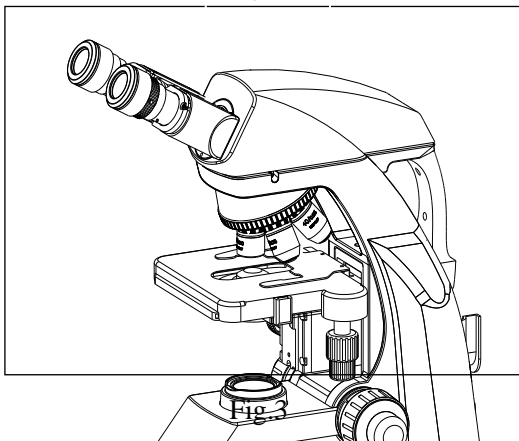


Fig.2



### 2.2.1 Installing the eyepiece (Fig1)

Insert the eyepiece into the eyepiece tube until they are against each other, as shown in Fig1.

### 2.2.2 Installing the objective lens (Fig.2-4)

1. Adjusting the coarse focus knob until the support device of the mechanical stage reaches its stop limit position.
2. Screw the lowest magnification objective into the nosepiece from the left or the right side, then revolve the nosepiece clockwise and mount other objectives by the sequence of low to high magnification

◇Installing objective this way will make the change of magnification to be easier during using.

★Clean the objective regularly, for lens is susceptible to dust.

★When operating, use 10×magnification objective to search and focus specimen firstly, then replace with higher magnification objective if necessary.

★When replacing the objective, slowly turn the nosepiece until you hear “clicked”, that means the objective is in place.

★BS-2054 Model: Turn on the power supply. The corresponding objective magnification on the LCD screen will be highlighted (as shown in figure 4) when the nosepiece moves to a certain position. Then install the corresponding objective at this location.

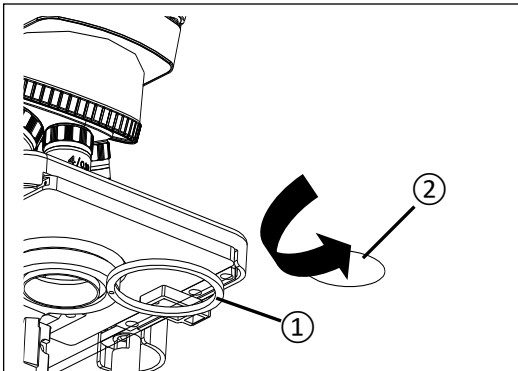


Fig.5

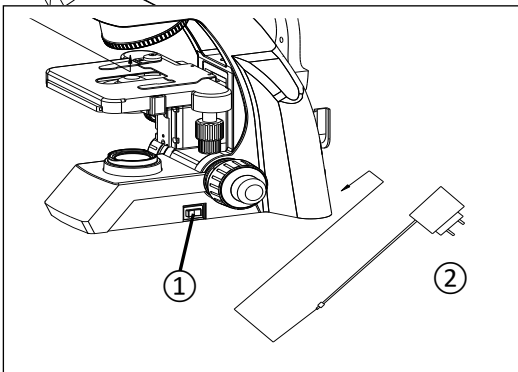


Fig.6

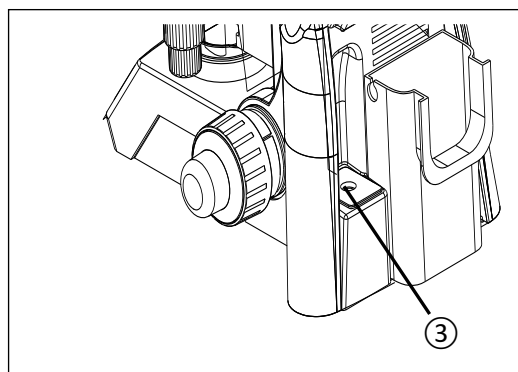


Fig.7

### 2.2.3 Mounting the filters (Fig.5)

1. Open the condenser carriage①;
2. Place the required filter②into the condenser, then close the condenser carriage.

★ The filter of the standard outfit is green and baby blue.

### 2.2.4 Connecting the Power Cord (Fig.6-7)

1. Set the main switch① “O” (off) state before connecting the power cord.
2. Insert a section of the adapter plug② DC socket connector ③of the microscope safely to ensure good contact.
3. Insert the other end of the adapter plug into the common power socket to ensure good contact.

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

★ A wide range of voltage, like 100V ~ 240V, is acceptable for this microscope.

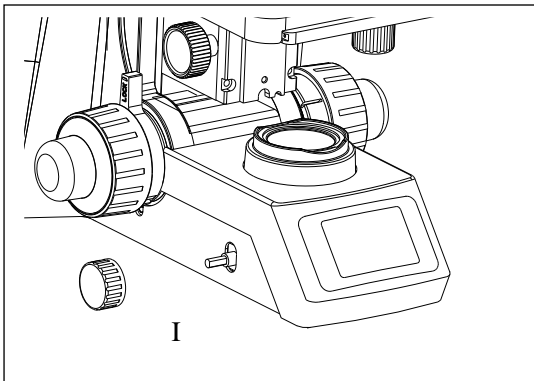


Fig.8

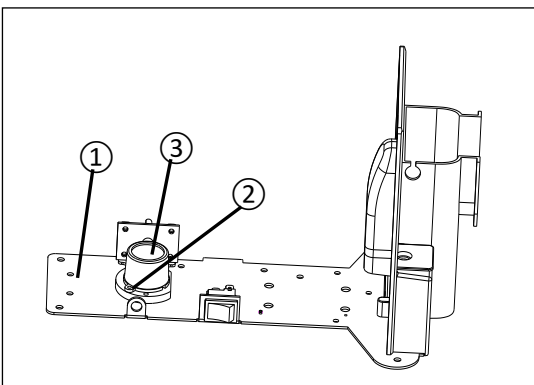


Fig.9

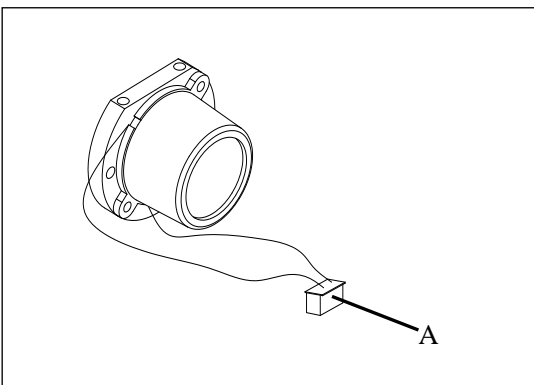


Fig.10

### 2.2.5 LED lamp replacement (Fig.8-10)

◎ Generally, LED lamp is very durable, so it is not easy to damage. If it is unfortunately damaged, please purchase the LED (Fig.10) from your vendors.

1. Loosen the screw I of brightness adjustment knob to take the brightness adjustment knob down (Ignore this note for BS-2053 model). Loosen six screws of the bottom plate to open the bottom plate ①;
2. Loosen screw ② to take the LED lamp ③ down and unplug the connector A from the breadboard. Mount new LED lamp, tighten screw ② and insert the connector fully into the breadboard.

★ **Note:** Be careful to take the bottom plate down slowly in case that the wire inside the microscope is pulled apart.



**3. Adjustment and Operation**

**BS-2053, 2054**

**3.1 Adjustment set diagram (Fig.11-13)**

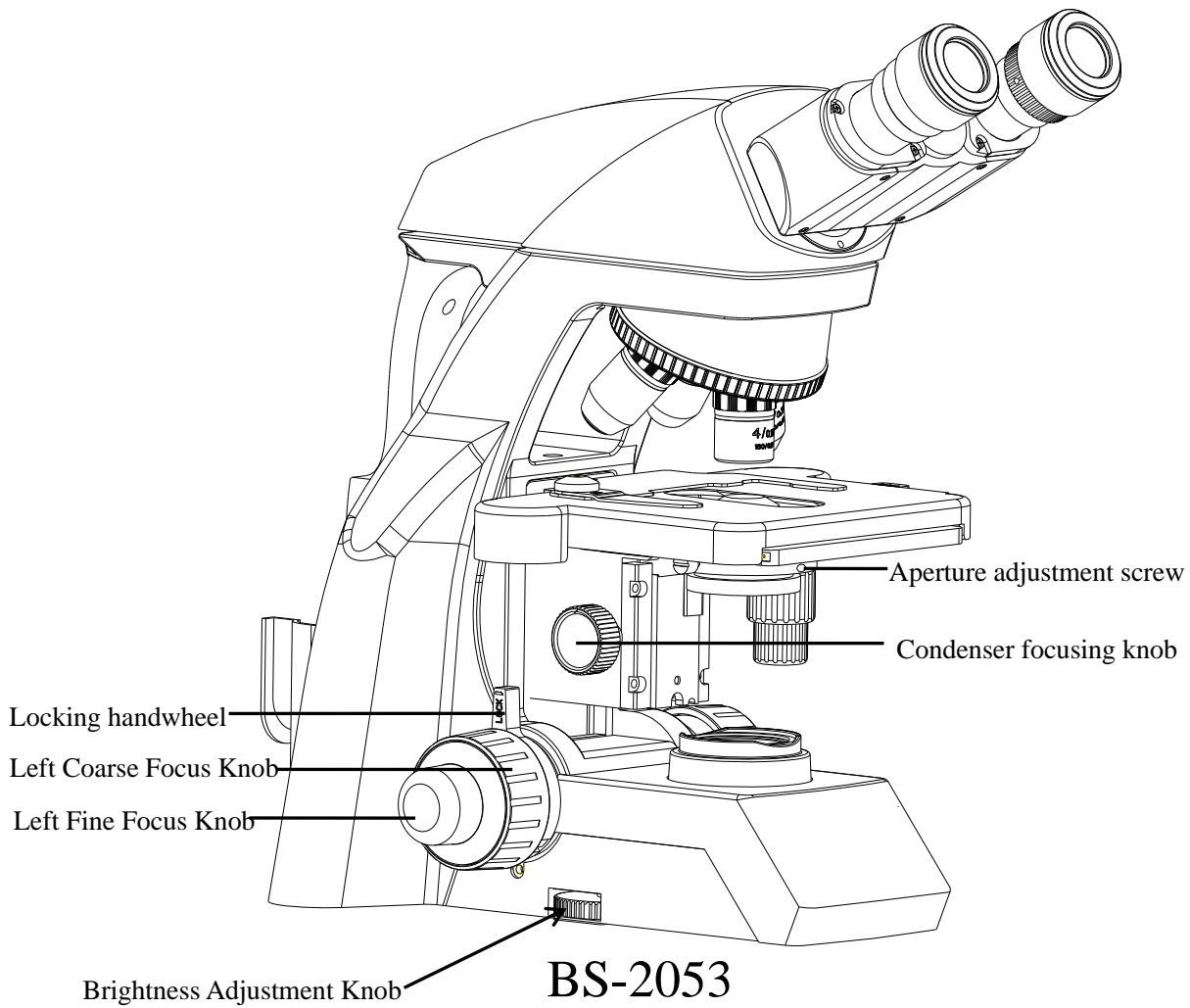
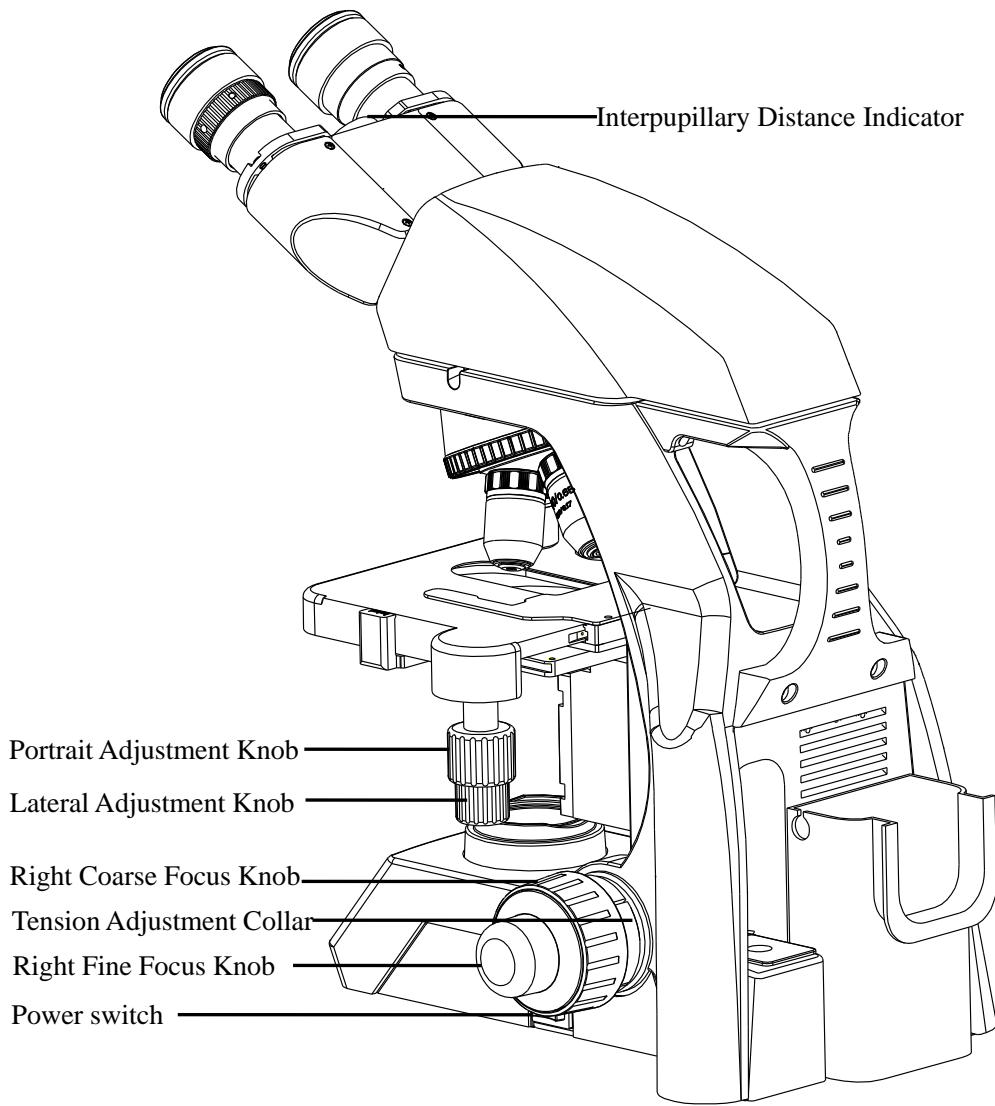
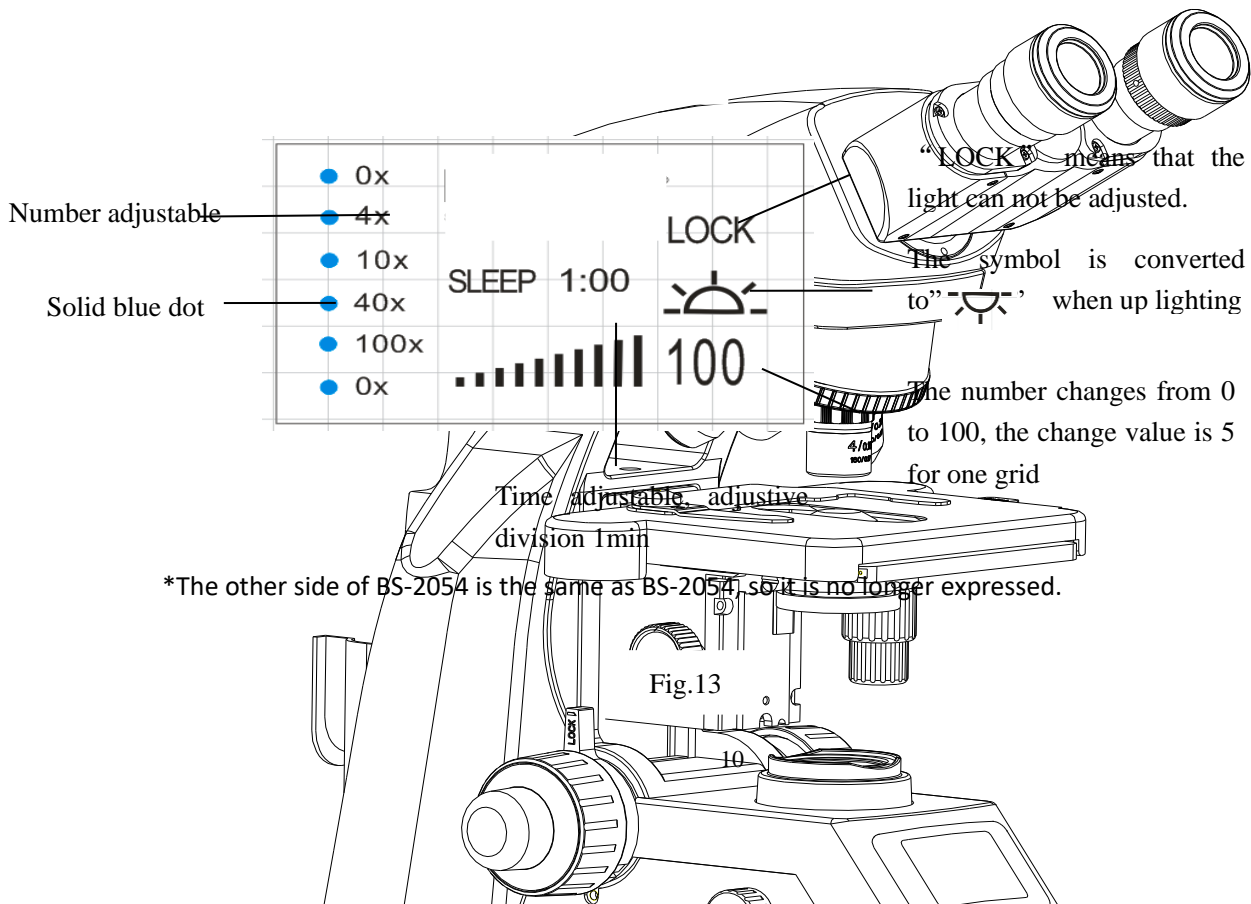
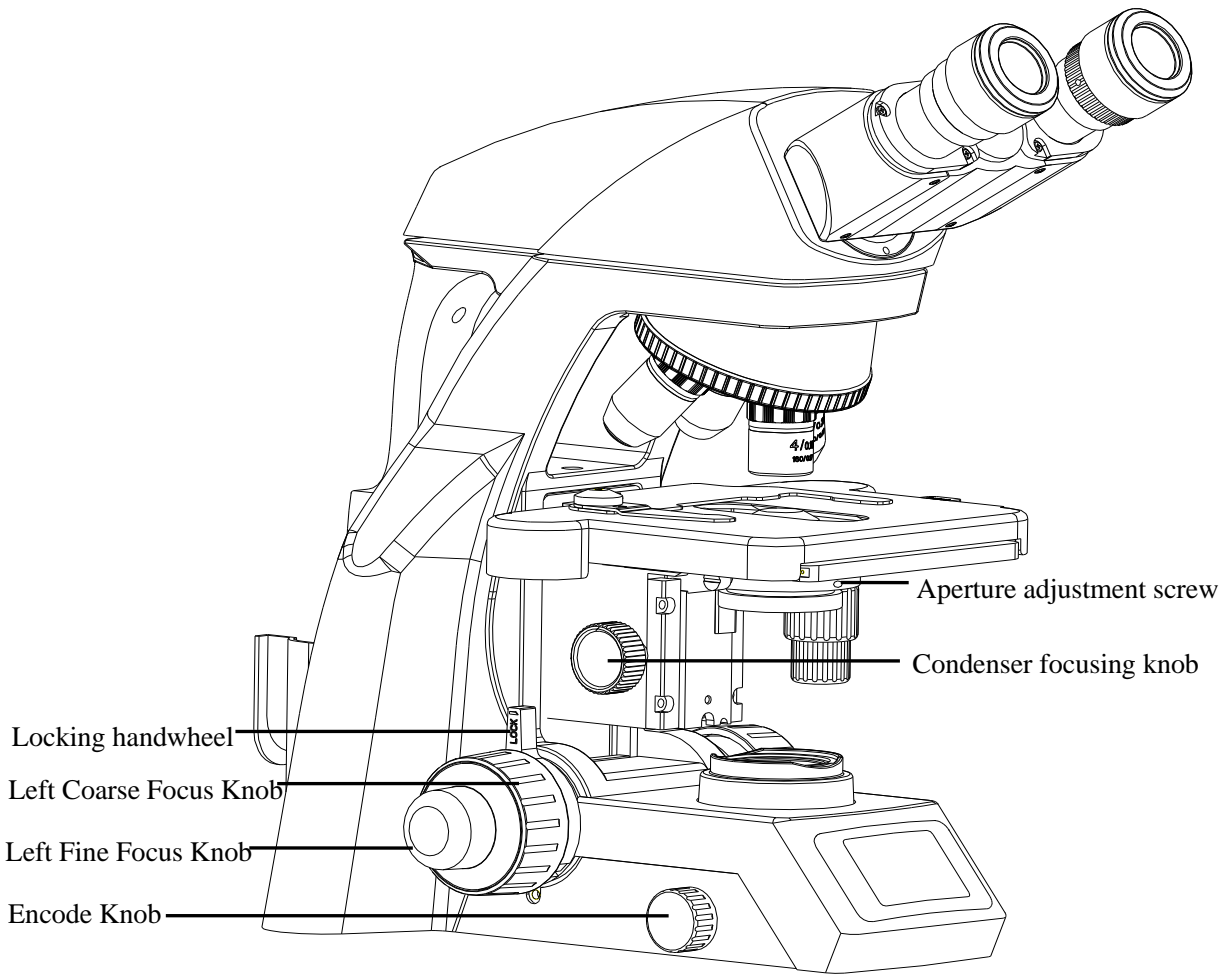


Fig.11



BS-2054

Fig.12



\*The other side of BS-2054 is the same as BS-2053, so it is no longer expressed.

### 3.2 Operation

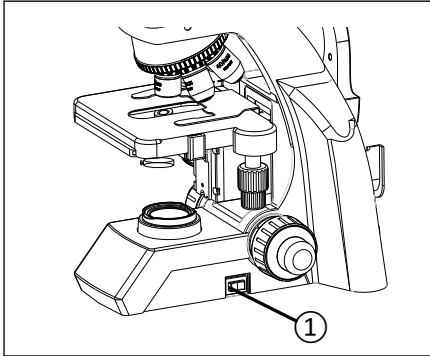


Fig.14

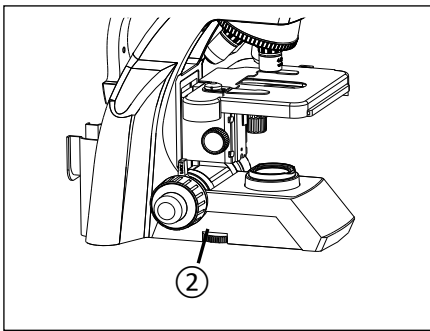


Fig.15

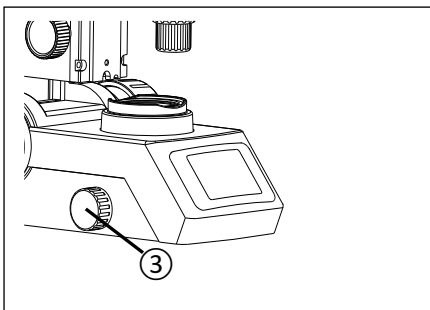


Fig.16

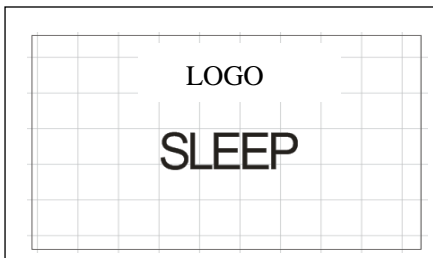


Fig.17

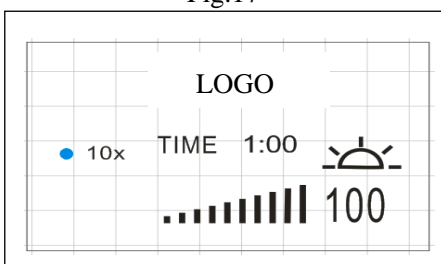


Fig.18

#### 3.2.1 Brightness Adjustment (Fig.14-20)

1. Connect the power cord and set the main switch ① to “—”state (ON).
2. Turning the brightness adjustment knob ②.

◎ Other operation of brightness adjustment knob for BS-2054 model

3. **Click Knob:** enter the standby state and “SLEEP” appears on the screen, as shown in figure 17. Click again to eliminate the state, the “SLEEP” on the screen disappears and the normal working state is displayed;
4. **Long press the knob for 3s :** choose to set sleep after the fixed time (Fig18), and the value of minute starts to beat. The value of hours tarts to beat after clicking the knob. The time can be increased or reduced by turning the knob. The increase or decrease of lattice value is 1 minute and the maximum value can be set to 8 hours. After setting to the required time, the time number beats three times and then stops beating, which meaning the setting is successful. Time begins to decrease by minute;
5. **Double-click Knob: lock brightness or unlock (Fig.19).** The brightness adjustment knob fails when locking, and “LOCK” appears on the LCD screen; Double-click the knob again to release the lock and the “LOCK” on the screen disappears;

★“LOCK” means that the user sets specific brightness when using a certain magnification objective, and uses the lock function to prevent it from being changed by another user. (In this case, when switching to another magnification objective,

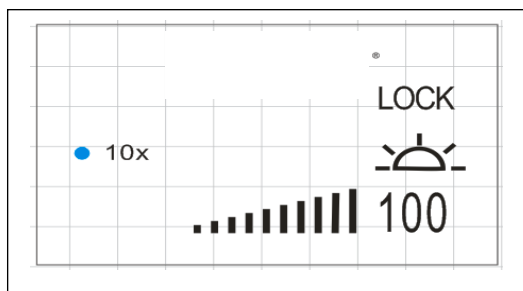


Fig. 19

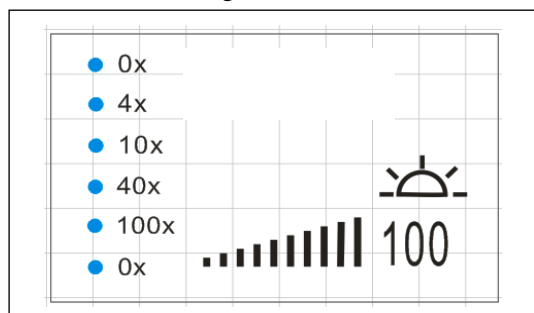


Fig. 20

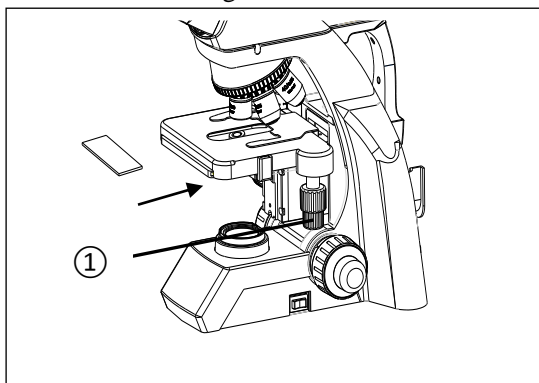


Fig. 21

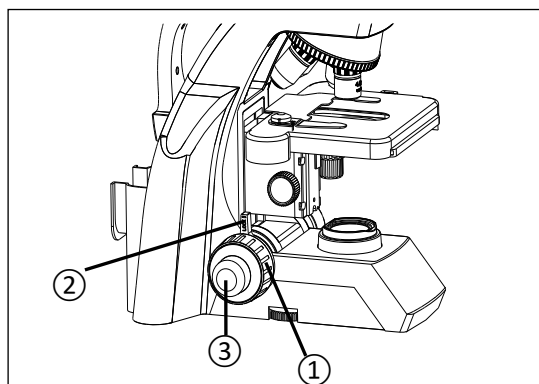


Fig.22

The brightness automatically changes to the brightness of the corresponding magnification, but the brightness adjustment knob fails.

6. Long press the knob and open the Power: Set up Objective Magnification. (Fig.20). All objective magnification are showed in the LCD Screen, the first number is jumpy. Rotating the knob and stop when the magnification shows which is your request. If you want to set up next magnification, please click knob. Long press the knob mean all magnification are set up.

### 3.2.2 Placing the Specimen (Fig.21)

1. Place the specimen the center of the mechanical stage and use the stage clips to clamp it.
2. Turn the portrait and lateral adjustment knob ① of the mechanical ruler, move the specimen to the required position.

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

### 3.2.3 Focusing the Specimen (Fig.22)

1. Focus the specimen with 10X objective. To avoid the objective touching the specimen during focusing, you should raise the mechanical stage to let the specimen close to the objective at first, then slowly separate them to bring the specimen to focus. Turn the coarse focus knob ① conversely to lower the specimen and search images in the 10xocular simultaneously, and then use the fine knob ② to focus. After that, you can replace with other magnification objectives safely, and focus without the risk of damaging the specimen.

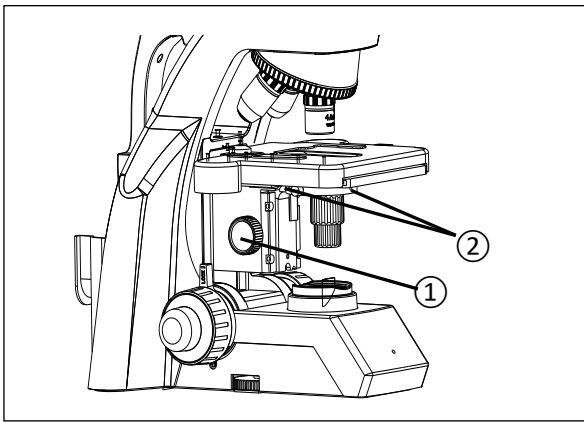


Fig.23

★ To make the observation more convenient, you can use the locking set (3) to fix the stage in a vertical direction.

### 3.2.4 Condenser Adjustment (Fig.23)

Turn the condenser focus knob (1) to move the condenser up and down. Raise the condenser when using the high magnification objective, and descend it when using the low magnification one.

- 1.Focus the specimen with 10× objective.
- 2.Adjust the condenser focus knob (1) to get a clear image of the field iris diaphragm.
- 3.Turn the condenser centering knobs (2) to center the image of field iris diaphragm in the field of view.

★The condenser and the objective are coaxial. It has been adjusted before leaving factory, so the user needn't to adjust them by self

★The highest position of the condenser has been adjusted too. It also needn't any user's operation. (The top surface of the condenser is 0.03mm-0.4mm lower than the stage top surface.)

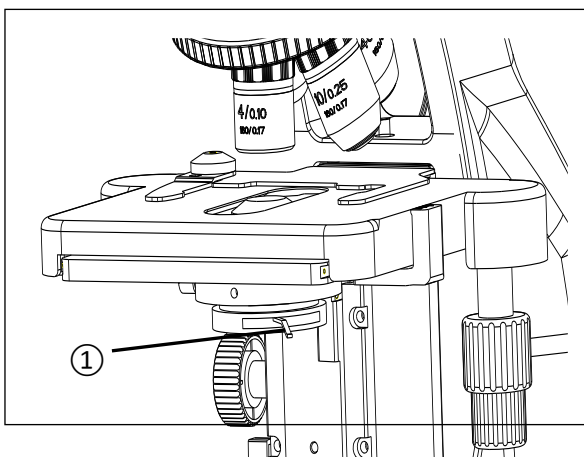


Fig.24

### 3.2.5 Aperture Iris Diaphragm Adjustment (Fig.24)

Turn the aperture iris diaphragm stick (1) to adjust the aperture iris diaphragm.

★The aperture iris diaphragm is designed for the adjustment of the numerical aperture, not for the brightness.

Generally, setting the aperture iris diaphragm to 70-80% of the N.A. of the objective in use will provide an image with good contrast. If you want to observe the image of the aperture iris diaphragm, remove one eyepiece and look through the tube. You will see a dark circle encroaching on the bottom of the tube.

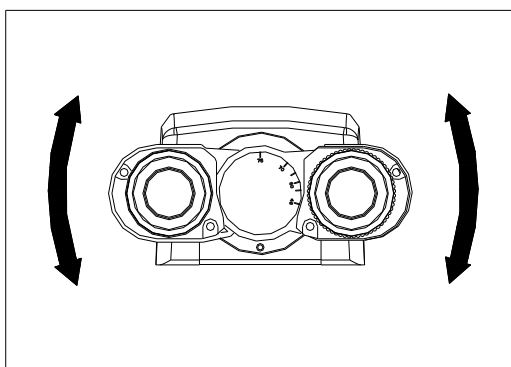


Fig.25

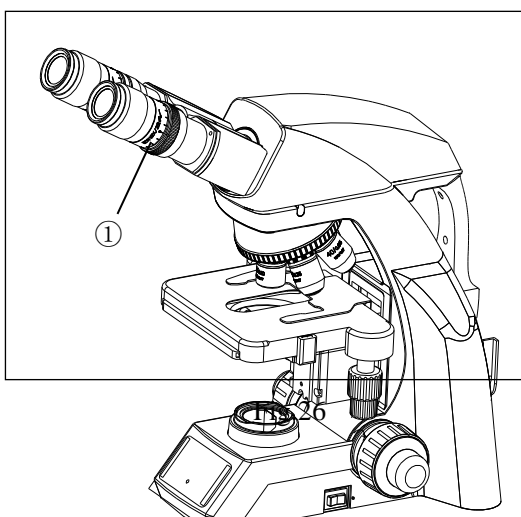
### 3.2.6 Adjusting the Interpupillary Distance (Fig.25)

The interpupillary distance range:48mm~75mm。 While looking through the eyepieces, move both eyepieces round until the left and right fields of view coincide completely.

### 3.2.7 Adjusting the Diopter (Fig.26)

Turn the eyepiece①to adjust the diopter while looking through it.

★The diopter range of the eyepiece is  $\pm 5$  diopter. The number aligned to the line on the viewing head is the diopter in use.



### 3.2.8 Adjusting the tension adjustment collar (Fig.27)

★Turn the tension adjustment collar① with your fingers. When the collar is turned in the direction of the arrow, the tension of the coarse adjustment knob ② increases. Turning the collar in the opposite direction decreases the tension.

If the nosepiece descends on its own or if the specimen gets out of focus quickly even when it is brought into focus using the fine adjustment knob③, it means the tension of the coarse adjustment knob ② is too low. Turn the collar in the direction of the arrow to increase the tension.

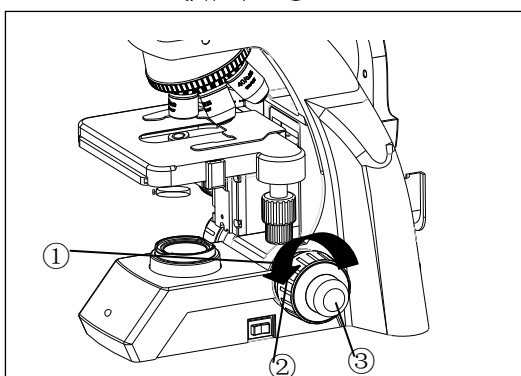


Fig.27

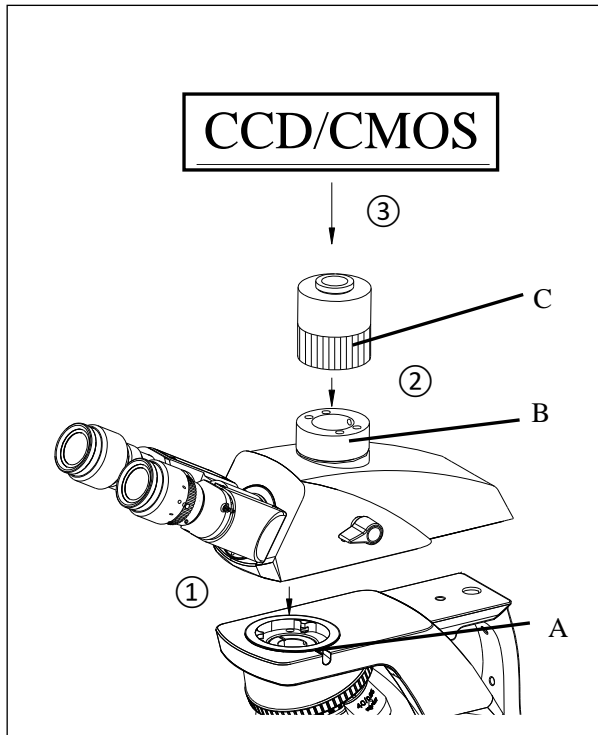


Fig.28

#### 4.1 Installing Trinocular Viewing Head And Video Attachment (Fig.28)

1. Mount the trinocular viewing head according to the assembly path ① in Fig.28 into the round dovetail of the microscope and tighten the screw in A position to fix the viewing head;
2. Mount the video attachment according to the assembly path ② into the connecting seat of the trinocular viewing head and tighten the screw in B position;
3. Mount the thread interface of CCD or CMOS according to the path ③ into the video attachment.

#### 4.2 Focusing the Specimen

After obtaining clear image by binocular observation, observe the image on the computer or the monitor. If it is not clear, please turn the focusing ring C on the video attachment until the image is sharp enough.

⊙ The CCD/CMOS will not rotate following the rotation of focusing ring C to avoid the entanglement of data line, which is more convenient.

⊙ Binocular/Trinocular Switching Viewing Head (Fig.29)

Select the required optical path with optical path switching knob ④

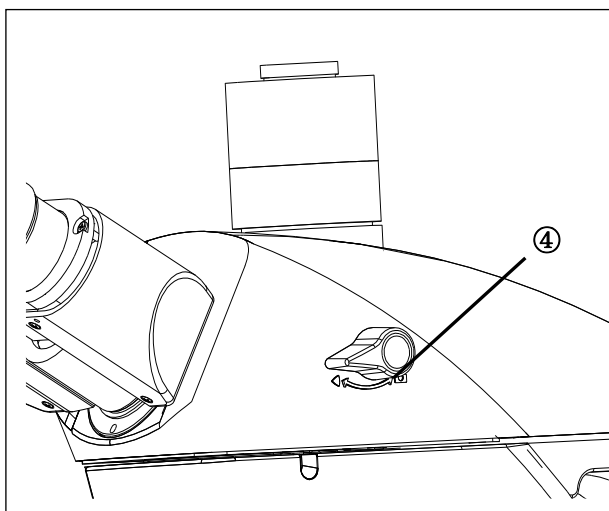


Fig.29

Sign	Eye: Camera (%)
	100:0
	0:100



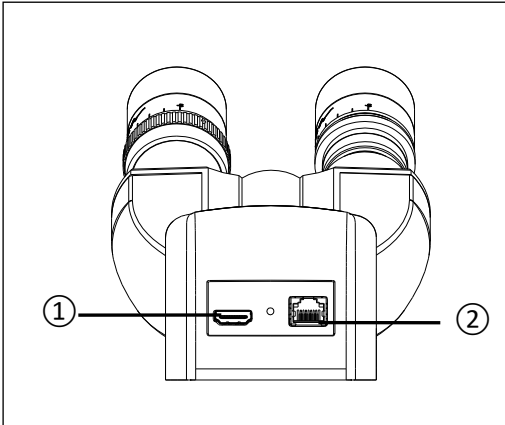


Fig.30

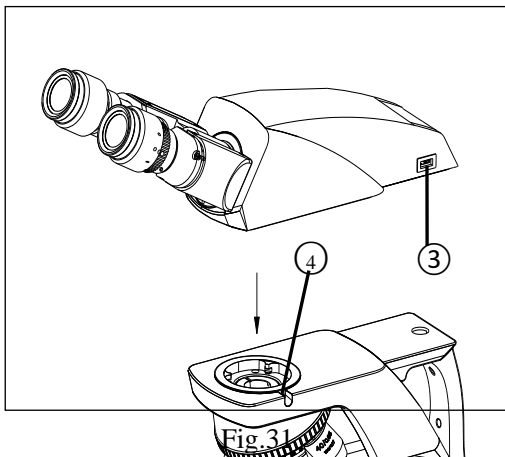


Fig.31

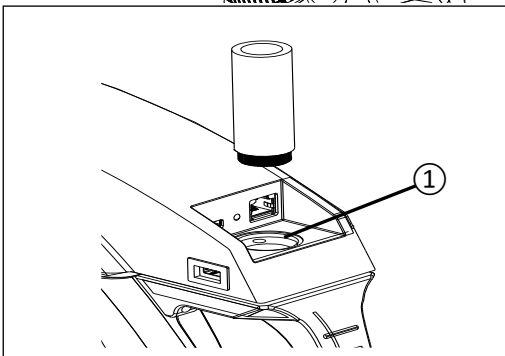


Fig.32

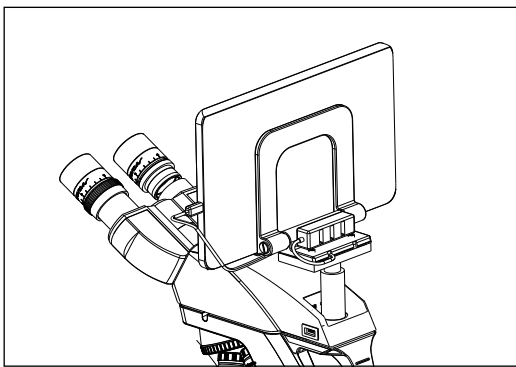


Fig.33

### 5.1.1 Digital Viewing Head (Fig.30-31)

- 1.The digital observation head is connected to the computer through the data line. Software ScopelImage 9.0 is installed on the computer to process images.
- 2.The digital viewing head ① is an HDMI interface, and the other end can be connected to a computer or mobile phone;② Connect the network cable, ③ is the mouse interface.
- 3.Install the digital viewing head into the circular dovetail of the microscope along the path shown in FIG. 31. Tighten the screw in ④ position to fix the digital viewing head.

### 5.1.2 Installing a tablet (Fig.32-33)

Open the hole cover plate at the back of Digital viewing head, screw the support rod sleeve into the threaded mouth ① as shown in FIG. 32, and then insert the plate attachment as shown in FIG. 33.

★Tablets are optional and only work with digital viewing heads.

## 4. Technical Specifications

**BS-2053, 2054**

### 4.1 Main Specifications

Optical System	Infinite optical system
Viewing Head	Binocular Head, Digital viewing head, Trinocular head 30°Inclined, Interpupillary Distance 48-75 mm
Eyepiece	WF 10X/20
Nosepiece	Medium five hole nosepiece/Encoding nosepiece
Objective	Infinite plan Objective 4×, 10×, 40×, 100×
Focusing	Coaxial Coarse and Fine Adjustment, Moving Range 20mm, Fine Division 0.002mm
Condenser	Abbe Condenser, NA 1.25
Stage	Synchronous belt platform 150×139mm, Moving Range 75×52mm
Illumination	S-LED(1W/3W)

### 4.2 Eyepiece and objectives

#### 4.2.1 Infinite plan Objective

Magnification	Numerical Aperture (NA)	Focal Length (mm)	Focal distance (mm)	Working Length (mm)	Objective
4×	0.10	0.17	45	28	dry
10×	0.25	0.17	18	7.4	dry
40×	0.65	0.17	4.5	0.7	dry
100×	1.25	0.17	1.8	0.14	oil

#### 4.2.2 Eyepiece

Eyepiece	Magnification	Focal Length (mm)	Field of View (mm)
Wide field eyepiece	10×	25	Φ20

#### 4.2.3 Total Magnification

Eyepiece	10×	10×	10×	10×
Objective	4×	10×	40×	100×
Total Magnification	40×	100×	400×	1000×

**5. Configuration table**
**BS-2053, 2054**

Item	Specification	Quantity	BS-2053B	BS-2054B
Main Body	Main frame (ordinary type without LCD )	1	●	/
	Main frame (digital type without LCD )	1	○	/
	Main frame (charging digital type without LCD )	1	○	/
	Main frame (ordinary type with LCD )	1	/	●
	Main frame (digital type with LCD )	1	/	○
	Synchronous belt platform	1	●	●
	Condenser bracket	1	●	●
Additional function	Brightness memory	1	/	●
	Adjustable color temperature	1	/	●
	LCD display	1	/	●
Viewing Head Infinite system	Hinged binocular viewing head	1	●	●
	Digital viewing head	1	○	○
	Trinocular viewing Head	1	○	○
Tablet computer	10.1 inch, 1920x1080 resolution ratio	1	○	○
Nosepiece	Middle 5-hole Nosepiece	1	●	/
	Middle 5-hole encoding Nosepiece	1	/	●
Illumination	1W SLED	1	●	/
	3W SLED	1	/	●
	Green Filter	1	○	○
Eyepiece	10xWide Field Plan Eyepiece	2	●	●
Objective	Infinite plan Objective 4x	1	●	●
	Infinite plan Objective10x	1	●	●
	Infinite plan Objective40x	1	●	●
	Infinite plan Objective100x ( Oil )	1	●	●

Note: “●” Standard Outfit, ○optional, BS-2054 without charge model

## 6. Troubleshooting Guide

BS-2053, 2054

### 6.1 Optical System

TROUBLE	CAUSE	SOLUTION
1. The edge of the field of view is dark or the brightness is not uniform	The nosepiece is not in the located position (objective and light path not coaxial)	Locate the nosepiece properly where it clicks
	The surface of the lamp becomes black	Change a new lamp bulb
	A lens (the objective, condenser, eyepiece or collector) is dirty.	Clean it thoroughly
2. Dirt or dust is visible in the field of view	Dirt/dust on the specimen	Replace with a clean specimen
	Dirt/dust on the eyepieces	Clean them
3. Visibility is poor Image is not sharp; Contrast is poor; Details are indistinct	Specimen is not covered	Add cover glass on it
	The thickness of the cover glass is not suitable	Use standard cover glass with thickness of 0.17mm
	Specimen is placed reversely	Turn it over
	Dry objective has oil on it. (especially for 40X objectives)	Wipe the oil
	A lens (the objective, condenser, eyepiece or collector) is dirty.	Clean it
	Immersion oil is not used with the 100x objective	Use specified oil
	Air bubbles existed in the immersion oil	Eliminate the bubble
	The aperture iris diaphragm is stopped down too far	Adjust the aperture iris diaphragm properly
4. One side of image is blurred	Dirt or dust on the eyepiece	Clean it
	Condenser is not properly centered	Center the condenser with the centering screw
	The nosepiece is not properly engaged	Engage the nosepiece properly
5. The brightness is not enough	The specimen is not clamped	Clamp it with stage clips
	The aperture iris diaphragm is too small	Adjust it properly
	The condenser is too low	Adjust it properly
5. The brightness is not enough	A lens (the objective, condenser, eyepiece or collector) is dirty.	Clean it

**6.2 Mechanical System**

TROUBLE	CAUSE	SOLUTION
1. The image can not focus when using high magnification objective	The specimen is placed inversely The coverslip is too thick	Turn inversely Use the standard coverslip (0.17mm)
2. The objective touch the specimen when changed from low magnification to high magnification	The specimen is placed inversely The coverslip is too thick	Turn inversely Use the standard coverslip (0.17mm)
3. The specimen can not be moved freely	The specimen holder is not fixed	Fix it
4. Field of view of one eye does not match that of the other	The interpupillary distance is not correct	Adjust again
5. Eyes are over strain	No diopter adjustment	Adjust the diopter correctly
	The brightness is not suitable	Adjust the voltage of lamp
6. The coarse focus knob is hard to run	The tension adjustment collar is too tight	Loose properly
7. Defocus during observation	The tension adjustment collar is too loose	Tighten properly

**6.3 Electrical System**

TROUBLE	CAUSE	SOLUTION
1. The LED cannot light when the switch is turned on	No power supply or the fuse cut off	check the connection of the power cord or fuse
	The connector of LED lamp is not properly inserted into the circuit board	Replace it
2. The brightness is not enough	After long time, the LED is damping	Replace it
3. The lamp flickers	The lamp is going to burn out	Replace it
4. Rotate the knob, the lamp is not change	The nosepiece is not correcting position	Rotating the nosepiece to the correcting position
	The knob is lock	Double click the knob or restart the microscope

5. The LCD Screen is dark	No power supply or the fuse cut off	check the connection of the power cord or fuse
6. The LCD Screen and objective magnification is not accordant	The objective is not assembly according the request	Assembly the objective exactly

**We reserve the right for any necessary improvement in product design, so this manual may not be suitable for all details of current microscopes.**