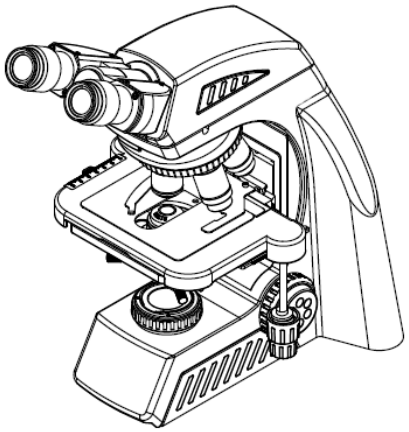
STALWART

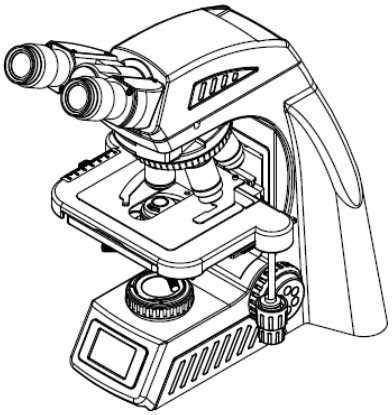
Biological Microscope

STM-2073, STM-2074 Series

Instruction Manual



STM-2073B



STM-2074B

This manual is for the biological microscope Model STM-2073, STM-2074. 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 .

CONTENTS **STM-2073,STM-2074**

Ⅰ. Configuration Instruction

1. STM-2073 is the basic model and uses NIS45 system;

2. STM-2074 is coding model, using NIS60 system, with brightness memory, wire resistance stage and other configurations.

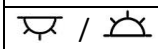
Ⅱ. Principle and Application

Principle: Using the appropriate adjustment combination of two lens sets, the specimen is magnified and observed. The inverted real image is obtained through objective, then the image is further magnified by the eyepiece.

Application: Biological microscope is used by medical and health units, colleges and universities, research institutes for the observation of microorganism, cell, bacteria, tissue culture, suspension, sediment,etc.

Ⅲ. 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
	Up Lighting/Down Lighting
	F.S.: Field Stop, :Expanding F.S. :Narrowing F.S.
	Direction of light intensity. When turning to the tip, the intensity decreases from strong to weak
SLEEP	Dormant State
LOCK	Light intensity is locked

Ⅳ. Safety Note

1. Open the box carefully to avoid the accessories, like lens, being polluted by fingerprint or sweat strain, dropping to ground and being damaged.
2. Do keep the microscope 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. If the bacterium solution or the water splash to the stage, objective or viewing tube, pull out the power cord at once, and wipe up the microscope. Otherwise, the instrument will be damaged.
5. To keep at least 10cm distance all around between the microscope and other objects for ventilating and cooling.
6. Make sure the instrument is earthed, to avoid lighting strike.
7. ⚠For safety, be sure the main switch is in “O” (off) state and cut off the power supply before replacing the fuse. 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.
8. Always use the power cord provided by us.

Ⅴ. 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, wipe dust every day, and do not pollute the optical element when wiping away the dust on the instrument. Clean the Objective by professional staff once a month.
4. The contaminations on the prism, as finger mark and oil, could be gently wiped with a piece of lens tissue which has been immersed in a small amount of the mixture of xylene(70%) and alcohol(30%). ⚠Note that the xylene and the alcohol are all burned easily. When in use, do not operate the power switch of various electrical equipment, and do not let them near the fire. Please make sure the room is ventilation.
5. Don't use organic solvent to wipe the non-optical elements, when you need to clean, use the soft detergent, please.
6. When using, if the microscope is splash by liquid, cut off the power at once, and wipe up the moisture.
7. Do not disassemble any parts of the microscope. That will affect the function or decline the performance of the microscope.
8. Place the instrument in a cool, dry position. After using the microscope, remember to cover it with dust helmet. Do wait for the lamp house cooling completely before cover.
9. Using environment:
   a) Use indoor;
   b) Working temperature: 0℃~40℃;
   c) Maximum relative humidity: it is 80% for temperature of 31℃, the following is the linear decrease, 70% for 34℃, 60% for 37℃, 50% for 40℃;
   d) The highest elevation is 2000m。
10. Storage and transport environment:
   a) Range of working temperature: -25℃~+65℃
   b) Range of relative humidity: 0%~90%

Warnings:

It may harm the safety of the users if not operating in accordance with the instructions. In addition, it may damage the microscope. Please operate the microscope strictly according to this instruction.

Transmitted light sources (condenser or collector) may produce harmful optical radiation. Do not look directly at the transmitted light, which may cause eye damage

◎ **This microscope will not cause radiation and the electromagnetic interference to the surrounding environment, totally accordance with the EMC certification standards.**

This instruction uses these symbols to mark prominent words:

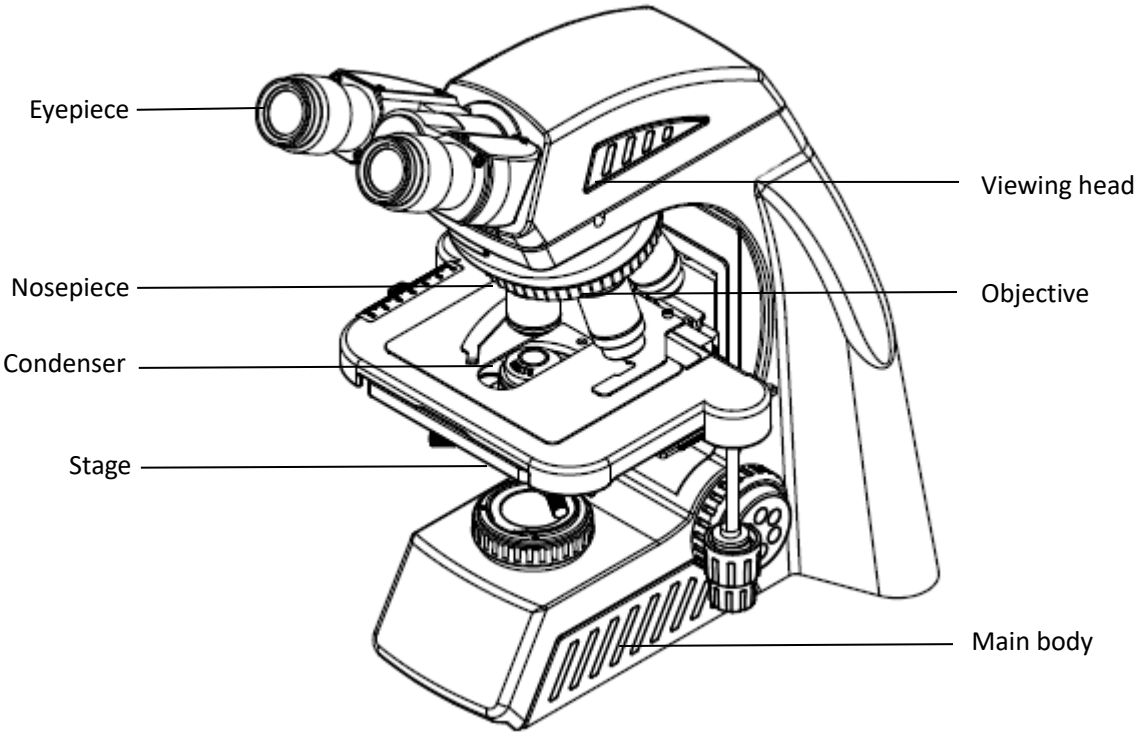
⚠ means it will hurt the operator or damage the equipment (objects around included) without paying attention to the warnings in this instruction.

★ means it will damage the equipment if not following the instruction.

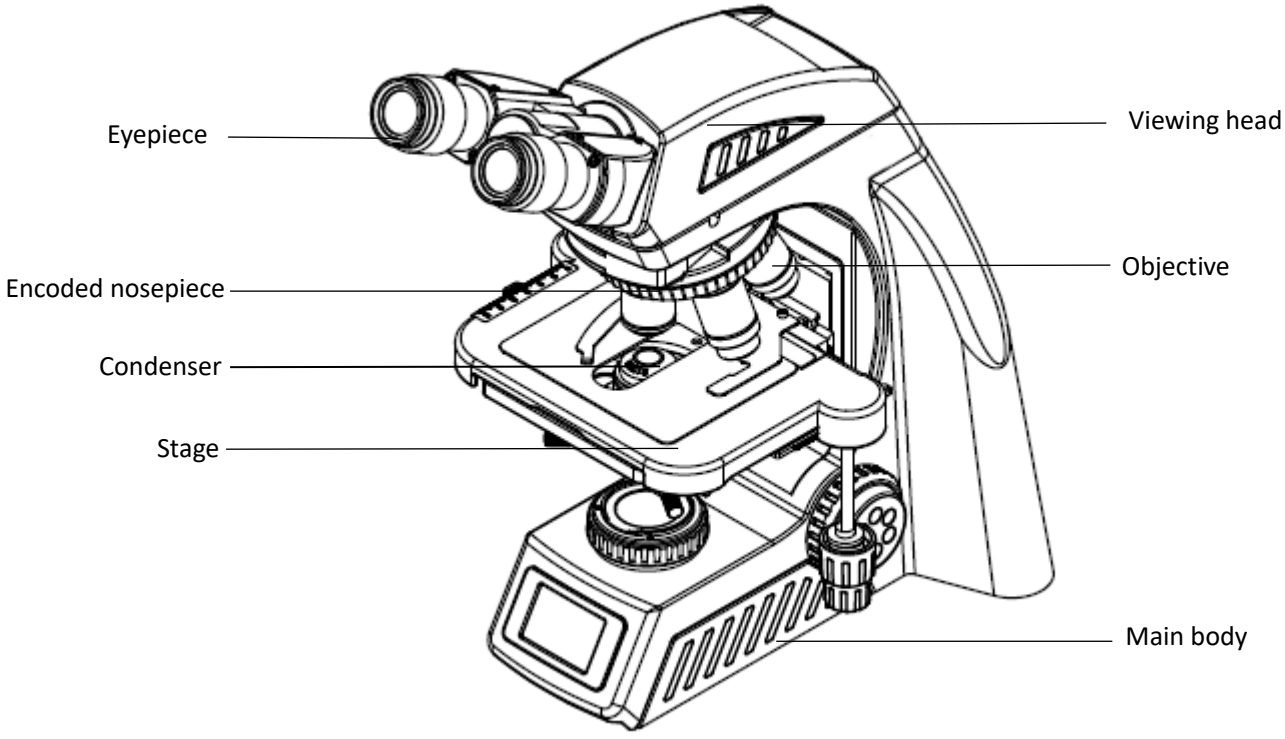
◎ means comments **(for operating and maintenance)**

1.Components Name STM-2073,STM-2074

Model STM-2073



Model STM-2074



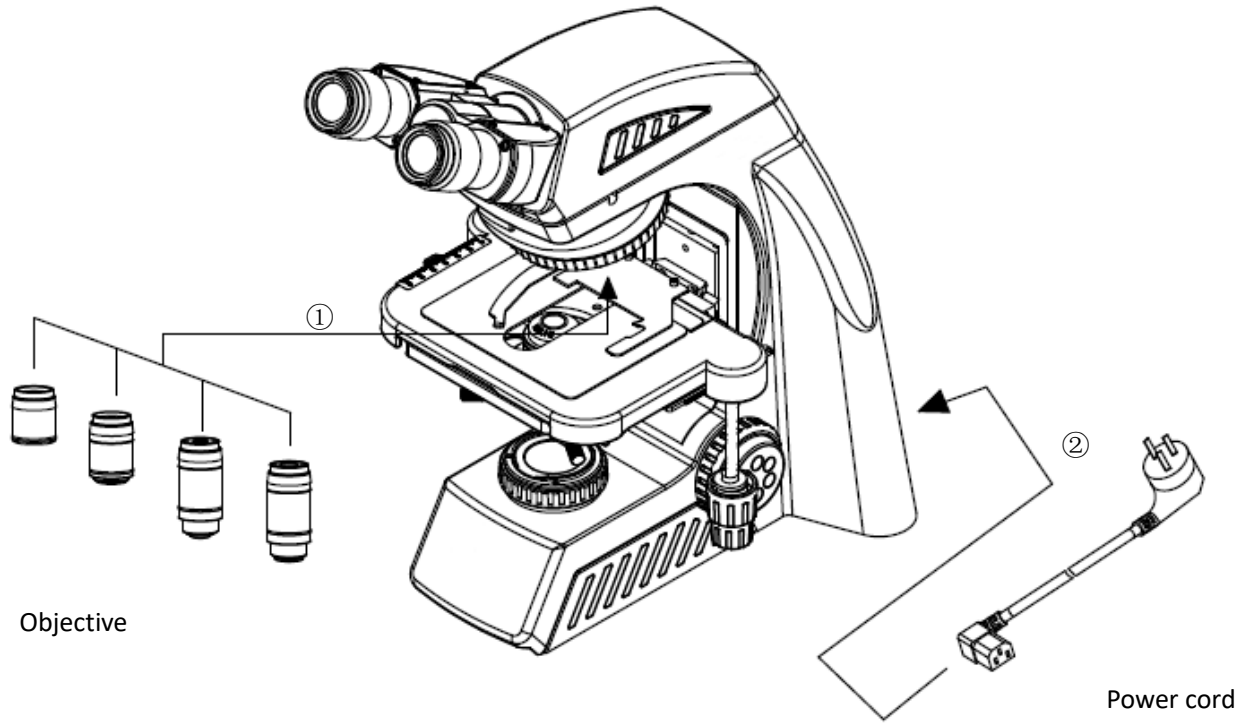
2.Assembly STM-2073,STM-2074

2.1 Assembly Diagram

The diagram below shows how to assemble the various components. The numbers indicate the order of assembly.

★ **When assembling the components, make sure that all parts are free of dust and dirt, and avoid scratching any parts or touching glass surfaces.**

★ **Keeping the hexagon- spanner well, when change the spare parts, you will use it.**



2.2 Assembly Procedure

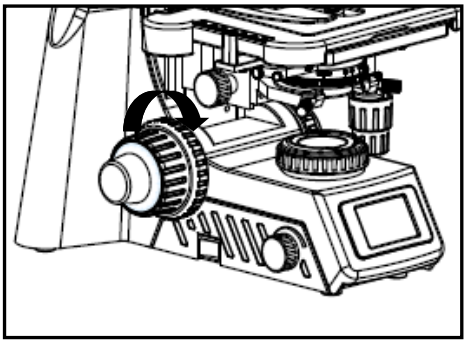


Fig.1

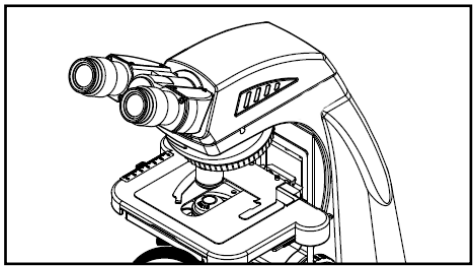
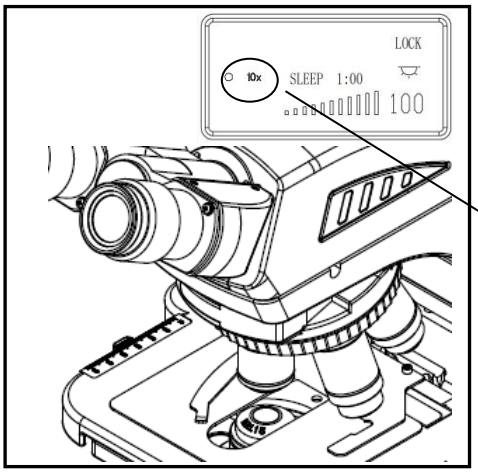


Fig.2



10X

Fig.3

2.2.1 Installing the Objective (Fig.1-2)

1. Adjust the coarse focus knob until the support device of the mechanical stage reach its low limit position.
2. Screw the lowest magnification objective into the nosepiece from the left or the right side, then revolve the nosepiece clockwise/counterclockwise 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.

★ **STM -2074 Model : Turn on the power supply . The corresponding objective magnification on the LCD screen will be highlighted (as shown in figure 3) when the nosepiece moves to a certain position . Then install the corresponding objective at this location.**

★ **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 enter the required position--the light path center.**

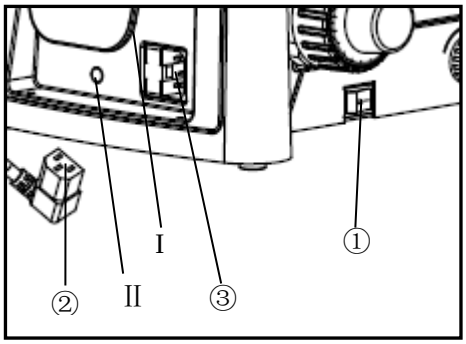


Fig.4

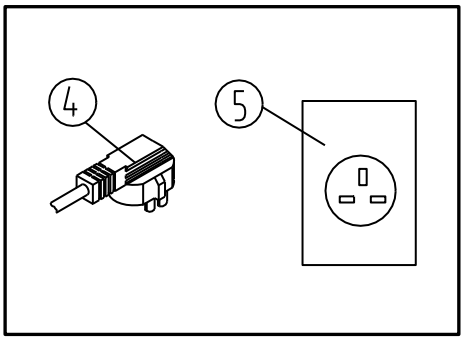


Fig.5

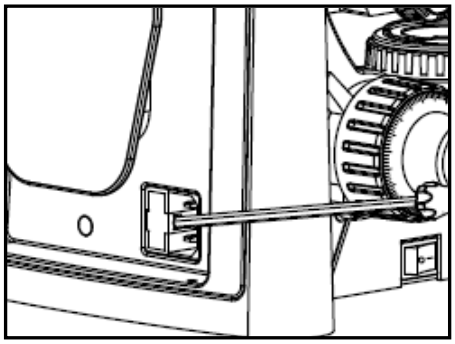


Fig.6

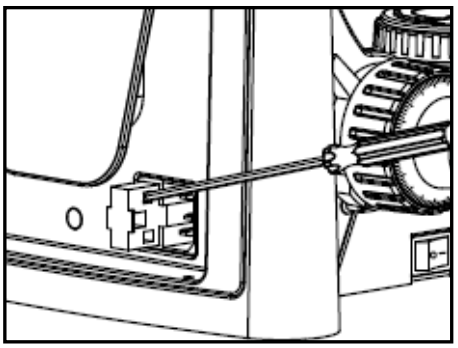


Fig.7

2.2.2 Connecting the power cord (Fig.4-5)

★ **The cable and cords are vulnerable when bent or twisted, never subject the power cord to excessive force.**

1. Set the main switch① to "O" (off) state before connecting the power cord.
2. Insert the plug② into the power socket ③of the microscope safely. Make sure the connection is well.
3. Insert the plug④ on the other end of the power cord into the power supply receptacle⑤ safely. Make sure the connection is well.

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

★ **Insert the power adapter into the hole II to charge for charging model.**

★ **Wrap the power cord around the back cover I when not in use.**

★ **Make sure that used voltage is consistent with the required input voltage of instrument. If it is inconsistent, please contact the supplier.**

2.2.3 Replace the fuse (Fig.6-7)

The main switch must be set to the state "O" (OFF) before replacing the fuse. Open the drawer of the fuse box by Allen wrench at first. Then as shown in the figure 7, push the fuse out gently through square hole under the fuse drawer with Allen wrench.

★ **The middle of the fuse is thin glass. Please be careful when you open the fuse drawer and push out the fuse.**

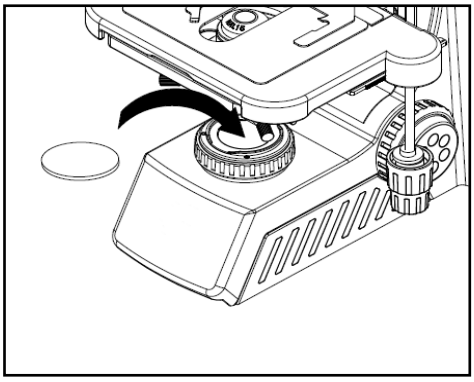


Fig.8

2.2.4 Mounting the filters (Fig.8)

Place the required filter into the appropriate hole of the collector.

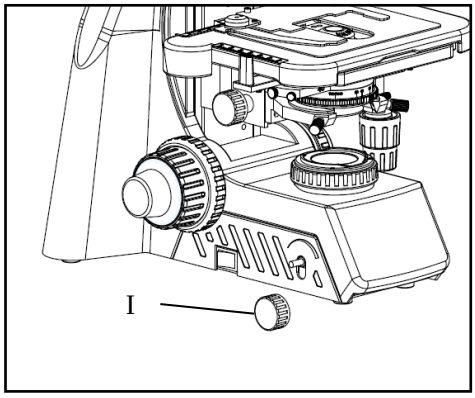


Fig.9

2.2.5 LED lamp replacement (Fig.9-11)

◎ Generally, LED lamp is very durable, so it is not easy to damage. If it is unfortunately damaged, please purchase the LED (Fig.11) from your vendors.

1. Loosen the screw "I" of brightness adjustment knob to take the brightness adjustment knob down. Loosen six screws of the bottom plate to open the bottom plate①;

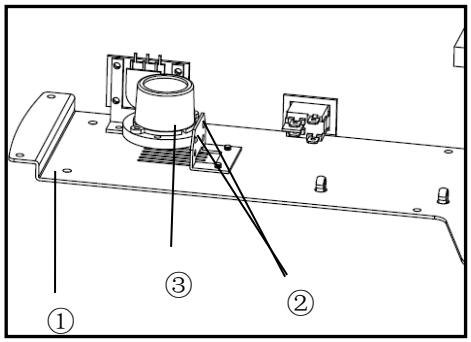


Fig.10

2. Loosen screw② to take the LED lamp③ down and unplug the connector④ from the breadboard. Mount new LED lamp, tighten screw② 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.**

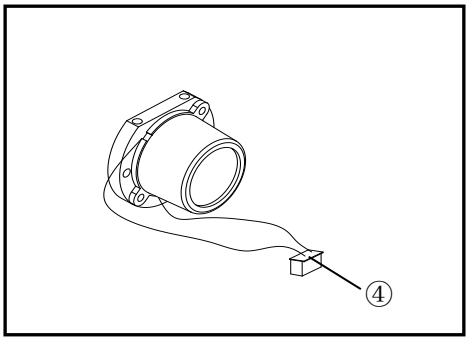
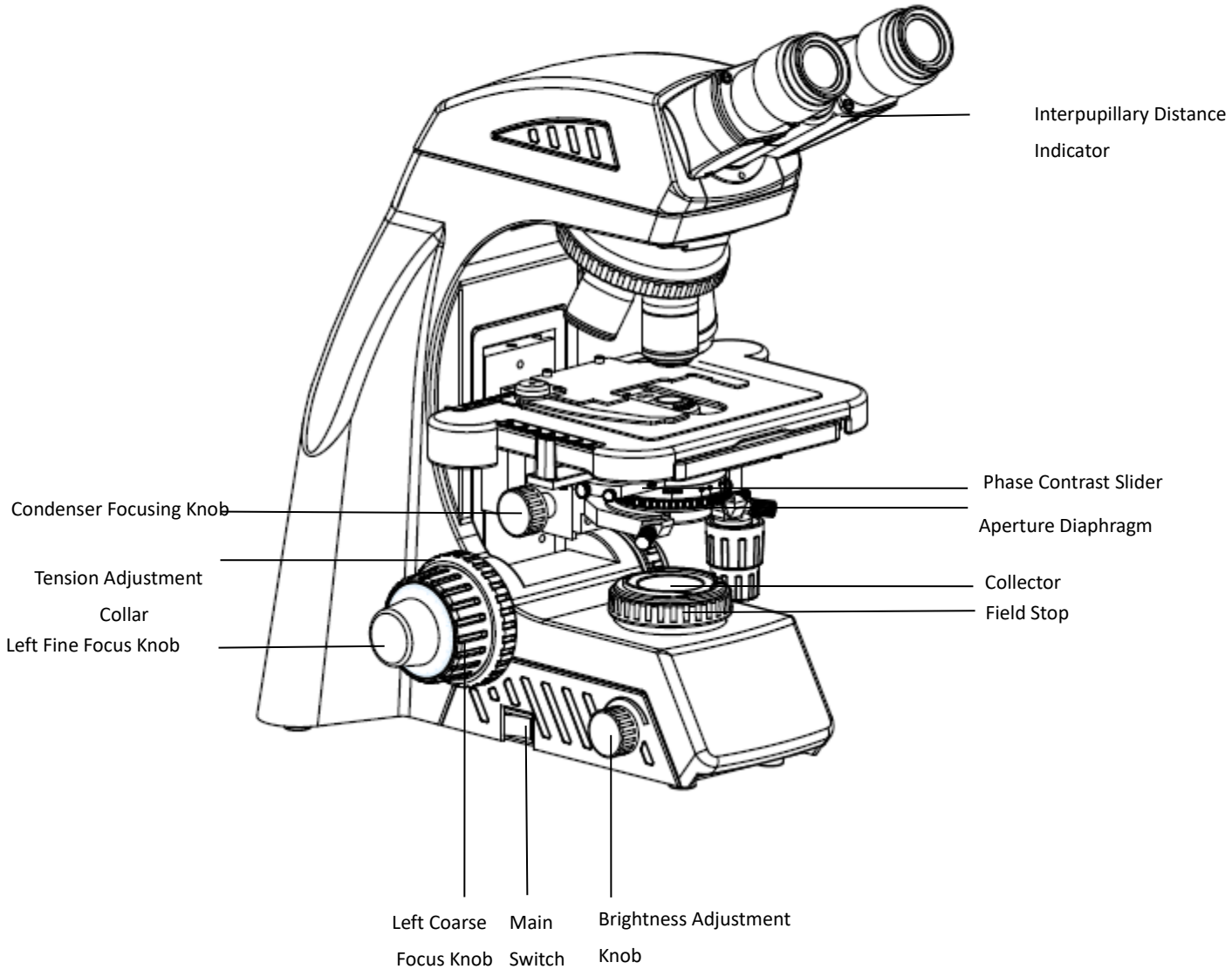


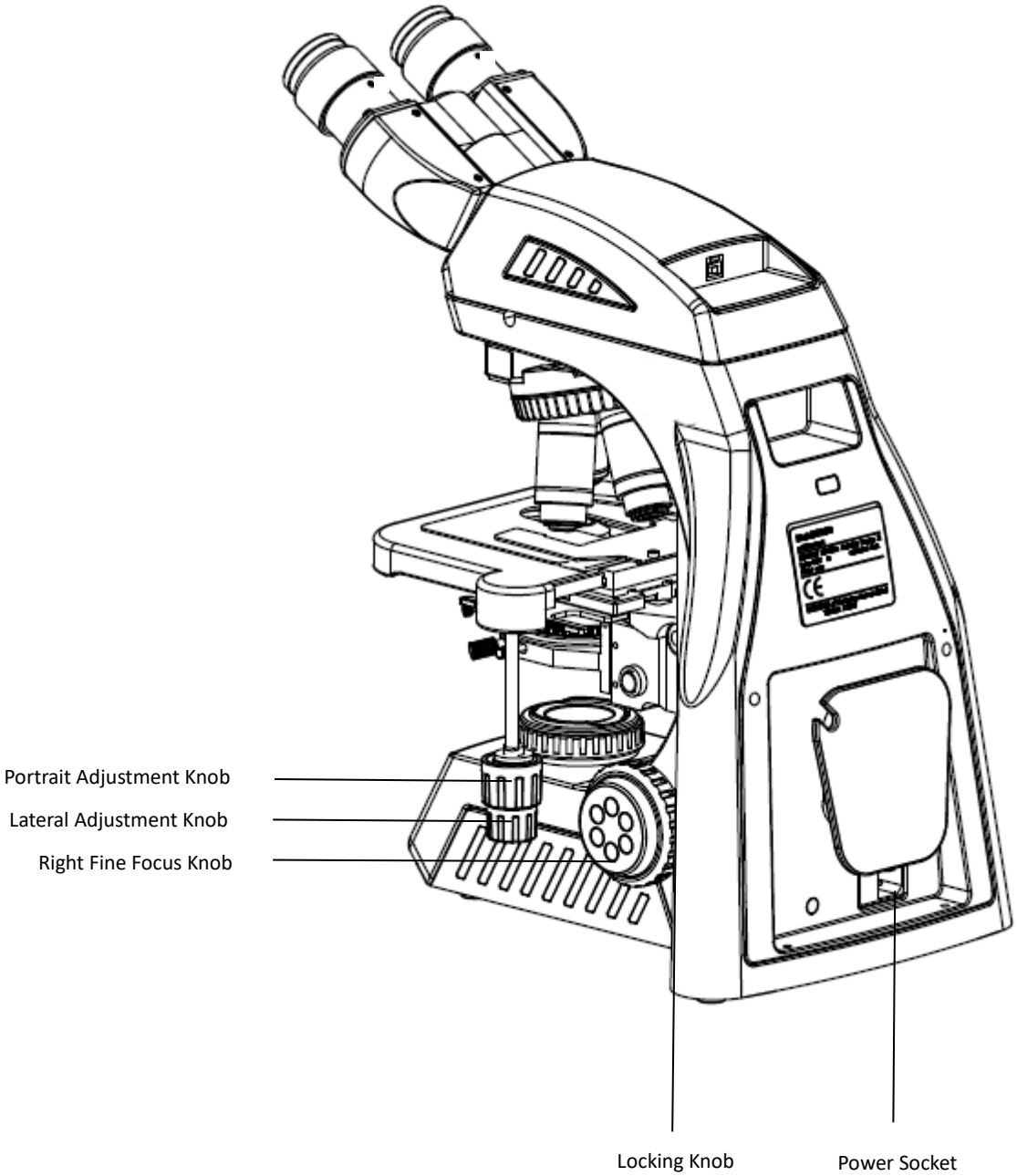
Fig.11

3.Adjustment And Operation STM-2073,STM-2074

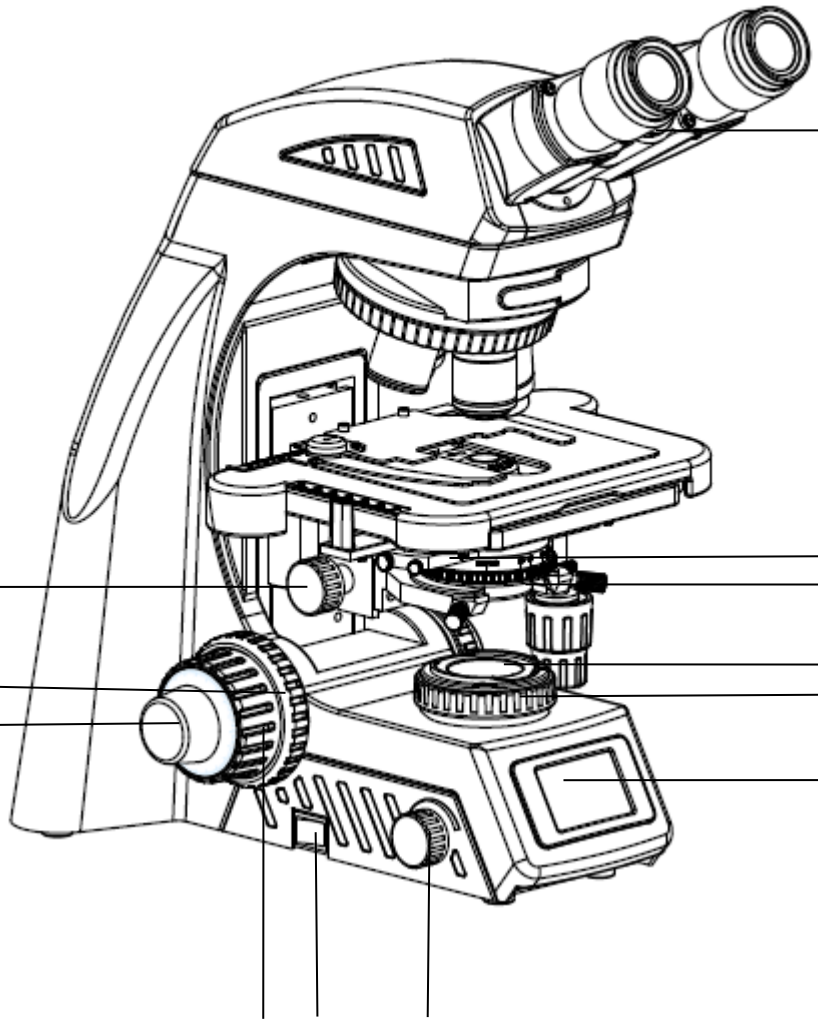
3.1 Adjustment Set Diagram

Model STM-2073

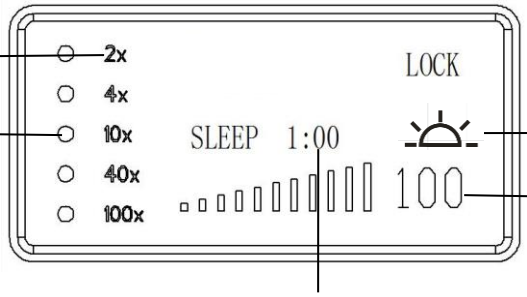


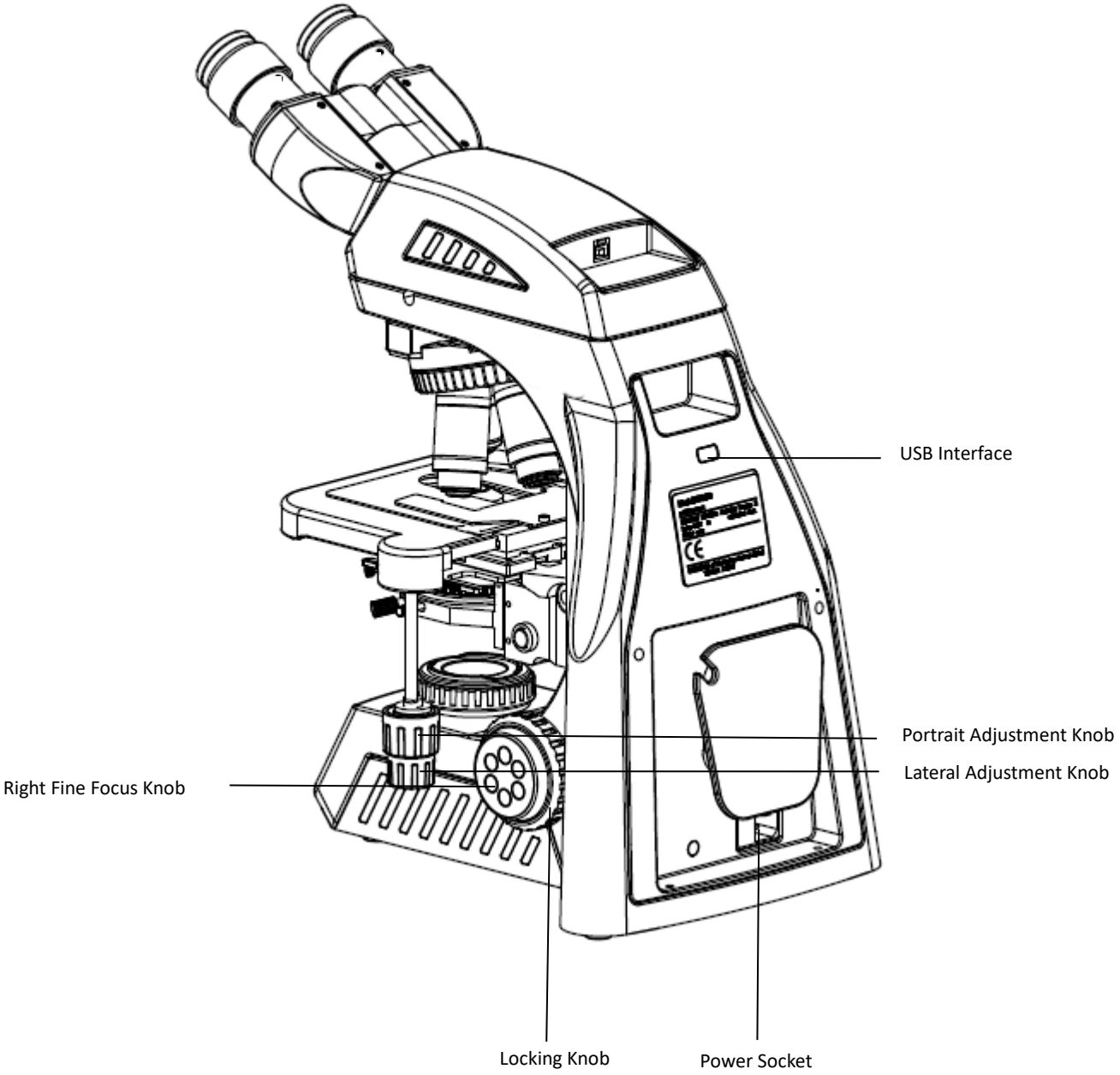

Portrait Adjustment Knob
Lateral Adjustment Knob
Right Fine Focus Knob
Locking Knob
Power Socket

Model STM-2074



LCD Screen




USB Interface
Portrait Adjustment Knob
Lateral Adjustment Knob
Right Fine Focus Knob
Locking Knob
Power Socket

3.2 Operation

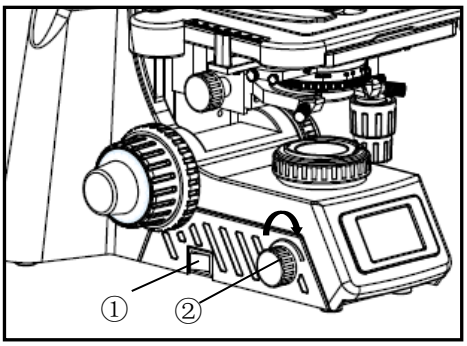


Fig.12

3.2.1 Brightness Adjustment (Fig.12-15)

1. Connect the power cord and set the main switch① on the right side of microscope to "—"state (ON).
2. Turning the brightness adjustment knob② in the direction shown in the figure, the voltage raise, and the brightness strengthen; whereas turning at the contrast direction, the voltage decline, and the brightness weaken.

Fig.13

◎ **Other operation of brightness adjustment knob for STM-2074 model**

1. **Click Knob: enter the standby state and "SLEEP" appears on the screen,as shown in figure 13. Click again to eliminate the state, the "SLEEP" on the screen disappears and the normal working state is displayed;**
2. **Long press the knob for 3s: choose to set sleep after the fixed time, 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;

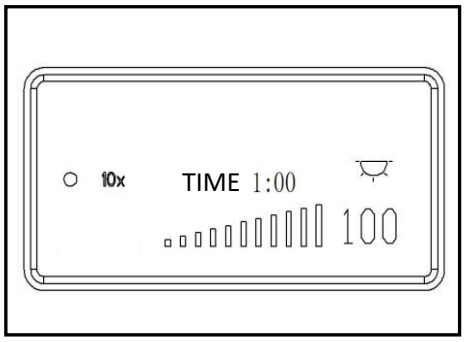


Fig.14

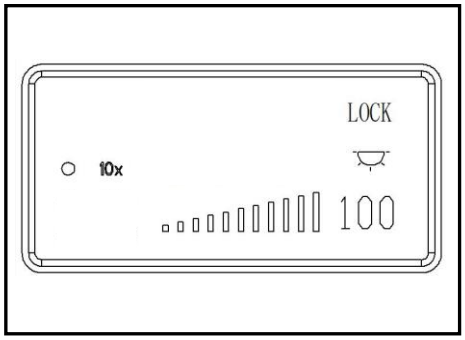


Fig.15

3. Double-click Knob: lock brightness or unlock (Fig.15). 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;

1. **Press+upward rotation: switch to up lighting;**

5. **Press+downward rotation: switch to down lighting.**

★ ”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, the brightness automatically change to the brightness of the corresponding magnification, but the brightness adjustment knob fails.

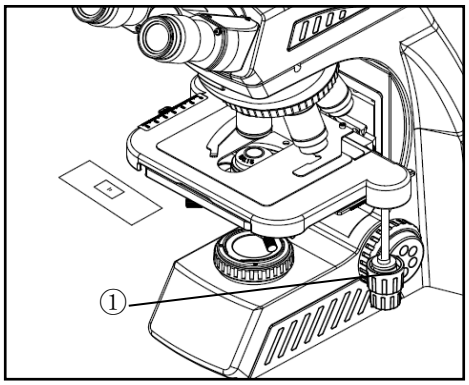


Fig.16

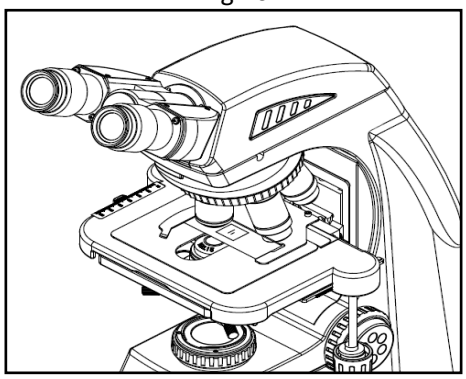


Fig.17

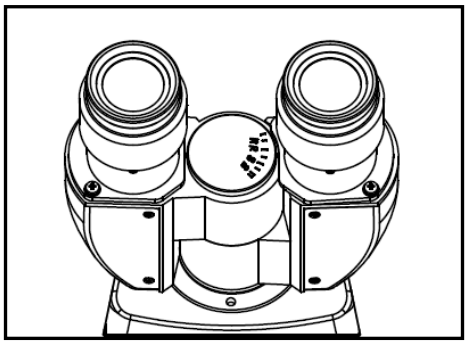


Fig.18

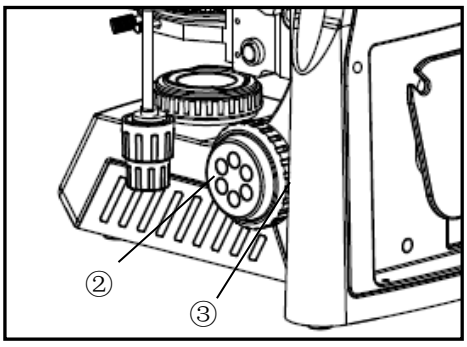


Fig.19

3.2.2 Placing the Specimen (Fig.16-17)

1. Place the specimen in the center of the mechanical stage and use the stage clips to clamp it.
2. Turn the portrait and lateral adjustment knob① 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 Adjusting the Interpupillary Distance (Fig.18)

The interpupillary distance range:47mm～78mm. While looking through the eyepieces, move both eyepieces until the left and right fields of view coincide completely.

3.2.4 Focusing the Specimen (Fig.19)

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.
2. Turn the coarse focus knob conversely to lower the specimen and search images in the 10×ocular simultaneously, and then use the fine knob② to focus. After that, you can replace with other magnification objectives safely, and focus without the risk of damaging the specimen.

★ To make the observation more convenient, you can use the locking set③ to fix the stage in a vertical direction.

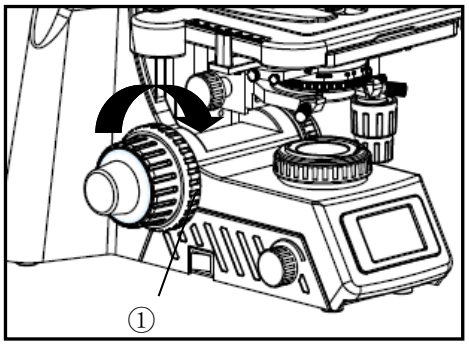


Fig.20

3.2.5 Adjusting the tension adjustment collar (Fig.20)

★ The tension of the coarse focus knob had already adjusted before leaving factory. If it is too loose(the mechanical stage slides down because of its own weight), please turn the tension adjustment collar① until the tightness is appropriate. When the collar is turned in the direction of the arrow, tension of the coarse adjustment knob increases. Turning the collar in the opposite direction decreases the tension.

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

3.2.6 Aperture Iris Diaphragm Adjustment (Fig.21)

Turn the aperture iris diaphragm collar② to adjust the aperture iris diaphragm. Turn the scale mark of aperture iris diaphragm collar to the same number as the objective magnification.

★ **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.**

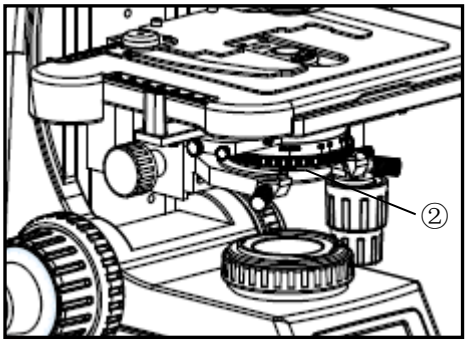


Fig.21

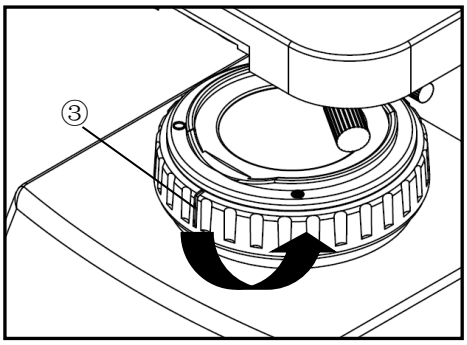


Fig.22

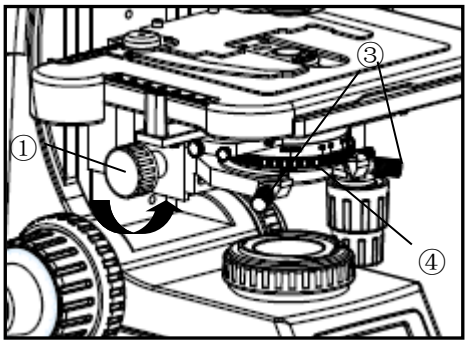


Fig.23

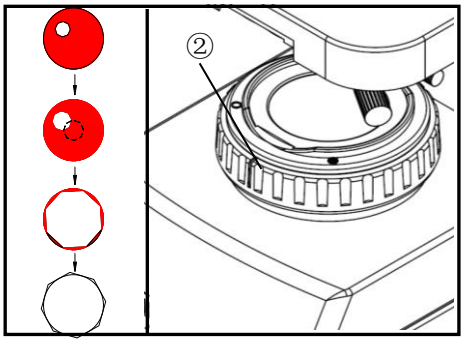


Fig.24

3.2.7 Adjustment of Field Stop (Fig.22)

Turn the field stop ring③ in the direction shown in the figure to close the filed stop. Turn the field stop ring in the opposite direction to increase the filed stop. According to the magnification of the objective, adjust the filed stop until filed stop is circumscribed with filed which will reduce the mixed light and improve the quality of the image.

3.2.8 Condenser Adjustment (Fig.23-24)

Turn the condenser focus knob① 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.

Centering the Condenser:

1. Adjust the condenser focus knob① to the highest position.
2. Focus the specimen with 10× objective.
3. Rotate field stop ring② until the image of field stop can be observed.
4. Adjust the condenser focusing knob① to focus the image of field stop.
5. Rotate the centering screw③ by Allen wrench to center the field stop.
6. Gradually open the field stop until the image of the field stop inscribed with the field of viewing. That means the condenser is centred correctly.
7. Slightly increase the field stop in reality operation to make the image circumscribed with the field.

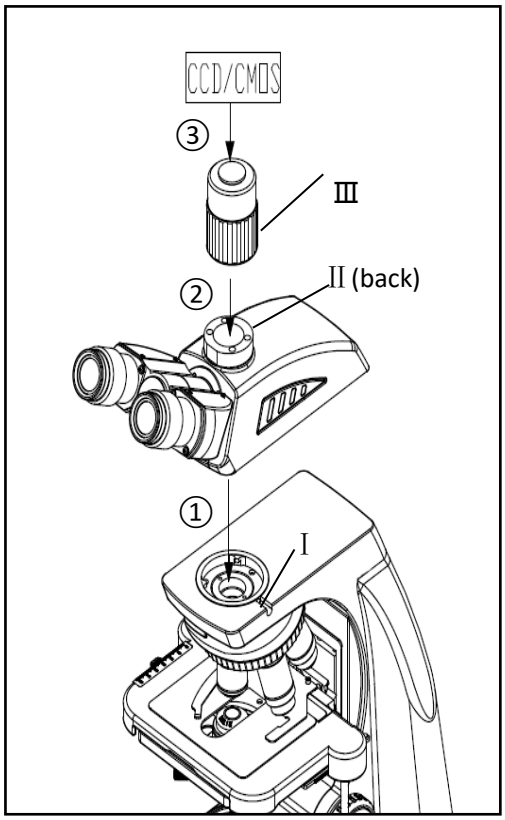


Fig.25

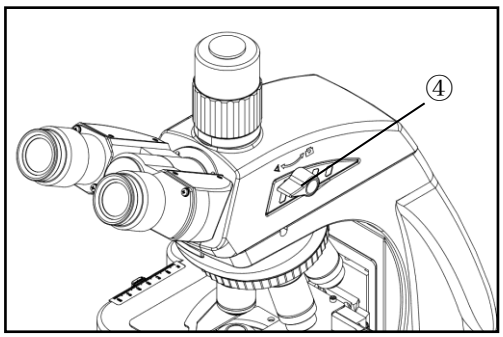


Fig.26

4.1 Installing Trinocular Viewing Head And Video Attachment (Fig.25)

1. Mount the trinocular viewing head according to the assembly path① in Fig.25 into the round dovetail of the microscope and tighten the screw Ⅰ to fix the viewing head;
2. Mount the video attachment according to the assembly path② into the connecting seat of the trinocular viewing head and tighten the screw Ⅱ;
3. Mount the thread interface of CCD or CMOS according to the path③ 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 Ⅲ on the video attachment until the image is sharp enough.

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

◎Binocular/Trinocular Switching Viewing Head (Fig.26)

Select the required optical path with optical path switching knob④

Sign	Eye: Camera (%)
◀	100:0
📷	0:100

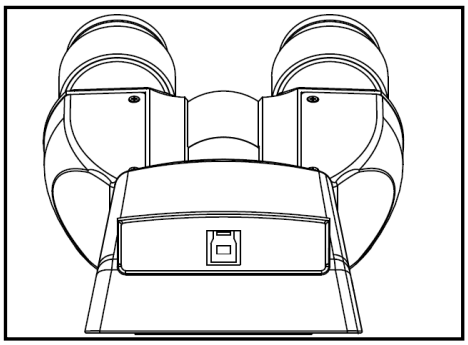


Fig.27

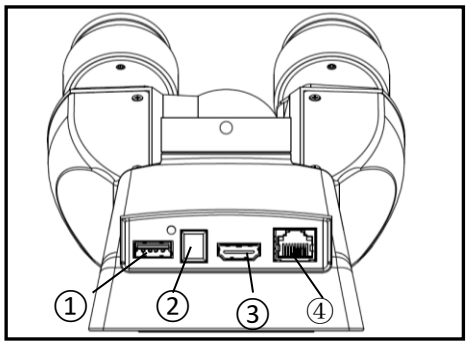


Fig.28

5.1 Digital Viewing Head (Fig.27-28)

There are two types of digital viewing heads to choose from: wired digital viewing head (Fig.27) and wireless digital viewing head(Fig.28).

1. The wired digital viewing head only has one interface. It is connected to the computer through the data line. The software ScopeImage 9.0 should be installed on the computer to process image;
2. On the wireless digital viewing head, ① is connected to the mouse; ②is the power socket, connected to the power supply; ③is the HDMI interface, the other end can be connected to the computer or mobile phone with Touchscope Pro software; ④ is connected to the network cable.

5.2 Installing (Fig.29)

Mount the digital viewing head according to the assembly path in Fig.29 into the round dovetail of the microscope and tighten the screw⑤ to fix the viewing head.

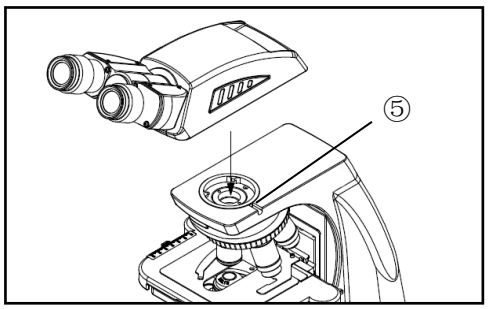


Fig.29

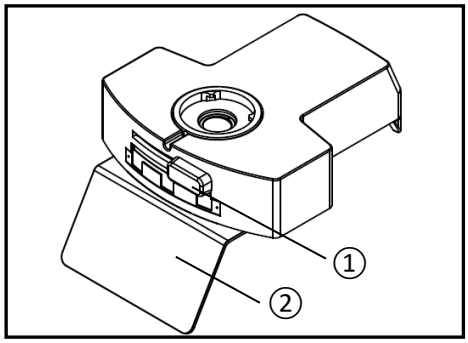


Fig.30

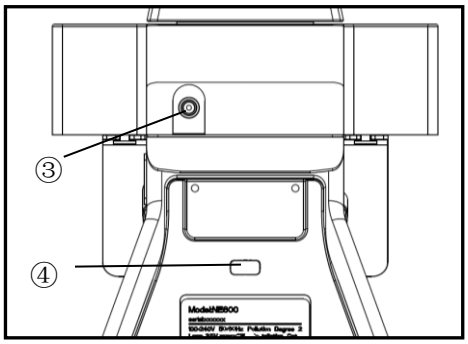


Fig.31

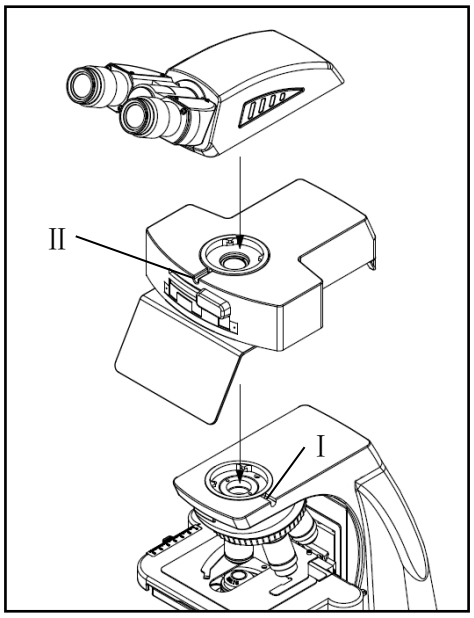


Fig.32

6.1 Fluorescent Set (Fig.30-31)

The fluorescent set uses 3W LED as illuminant and has two fluorescence modules: B band fluorescence module and G band fluorescence module or U band fluorescence module. When the lever① is adjusted to the leftmost end, it is B band fluorescence module. When the lever is adjusted to the middle, it is bright filed observation state and adjusted to the right is G band fluorescence module or U band fluorescence module.

- Use mask② to prevent ultraviolet light from damaging the retina.
- The power cord③ behind the fluorescent set is connected to the USB interface④ on the back of microscope, which is powered by the microscope.

6.2 Installing (Fig.32)

1. Mount the fluorescent set according to the assembly path in Fig.32 into the round dovetail of the microscope and tighten the screw Ⅰ;
2. Mount the viewing head according to the assembly path in the figure into the dovetail of the fluorescent set and tighten the screwⅡto fix the viewing head.

6.3 Method of Application

1. After connecting the power supply, turn on the main switch. Connect the power cord of fluorescent set (back) to the USB interface on the back of microscope;
2. Press the brightness adjustment knob and spin up to switch to the up lighting
3. Adjust the lever to the desired fluorescence module position for observation.

7.1 Components Name

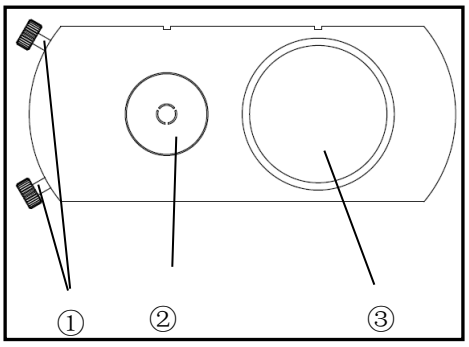


Fig.33

7.2 Installation and Use

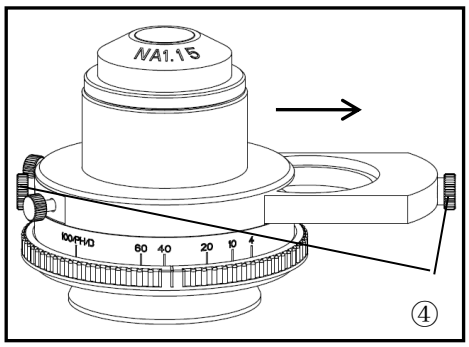


Fig.34

7.1.1 Phase Contrast Objective

The optional objective magnification of the phase contrast is: 10×, 20×, 40×, 100×.

If you want to know how to mount the phase contrast objective, please see **2.2.2**. You ought to mount it on the nosepiece.

7.1.2 Phase Contrast Slider (Fig.33)

The diaphragm has been centered beforehand, so it needn't to adjust in the use process. If the diaphragm is not in the center, it can be adjusted by the centering screw①.

The 10×/20×/40×diaphragm② matches the 10×/20×/40×phase contrast objective, and 100x diaphragm matches 100× phase contrast objective, while the opening③ is used for bright field.

7.2.1 Installing the Phase Contrast Slider (Fig.34)

◎ The phase contrast slider has been installed before leaving factory, so the user needn't to install it by self.

1. Keep the lettering face of phase contrast slider forward, then insert it into the corresponding hole of condenser from left to right. After inserting, tighten the screws④ on the left and right sides
2. Every diaphragm or opening has its own located position, so you need to move them until you heard the "clicked" to ensure the diaphragm or the opening reach the center of the light path.
3. The aperture iris diaphragm must be opened to maximum for phase contrast observation.

★ **The screws④ on the left and right sides have positioning effect to prevent the phase contrast slider from being pulled out.**

7.2.2 Centering Diaphragm (Fig.35)

Generally do not need to center. If necessary, please adjust the diaphragm according to the following steps:

1. Place the specimen on the stage and focus it.
2. Take out a eyepiece and replace it with the centering telescope(CT).
3. Make sure the matched phase contrast objective and diaphragm (in the phase contrast slider) have been in the light path.
4. Observe the image of bright ring ⑤on the slider and dark ring⑥ on the objective with the CT. If the bright ring's image is not clear, shift the CT's ocular until the image of the bright ring⑤ is clear.
5. Adjust the centering screw④ on the left side of phase contrast slider with screwdriver until the center of bright ring and the dark ring are coincided.
6. The 10×, the 20× and 40× phase contrast objective use the same diaphragm on the phase contrast slider. the center of the bright ring and the dark ring should coincide when changing the objective. If having deviation, you ought to center again.

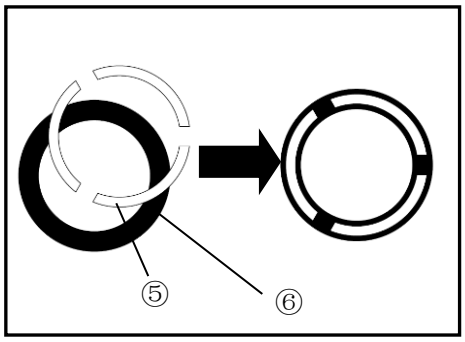


Fig.35

★ **If the diaphragm is centering incorrectly, the best viewing effect of the phase contrast microscopy will not be obtained.**

★ **After removing or replacing a thick specimen, the bright ring and the dark ring are likely to deviate each other, which will result in a decline of the image contrast. So if happened, please repeat the steps as above.**

★ **If the specimen is not flat, it maybe need to repeat the centering steps for obtaining greater effect. Use the phase contrast objective to center the diaphragm, according to the sequence of low to high magnification.**

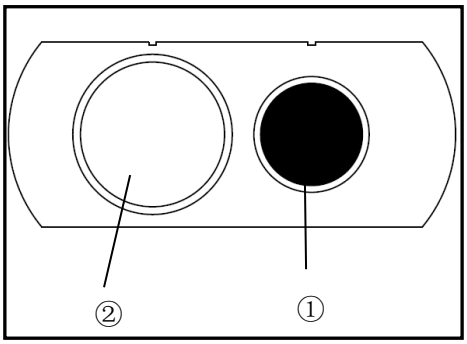


Fig.36

8.1 Bright and Dark Filed Components (Fig.36)

The halo① used in the dark filed observation is dark filed illumination board, while the opening② is used for bright filed.

8.2 Installation and Use (Fig.37)

1. Before installing the bright and dark filed component, pull out the phase contrast slider in the reverse order of **7.2.1** .
2. Keep the lettering face of bright and dark filed component forward, then insert it into the corresponding hole of condenser. After inserting, tighten the screws③ on the left and right sides

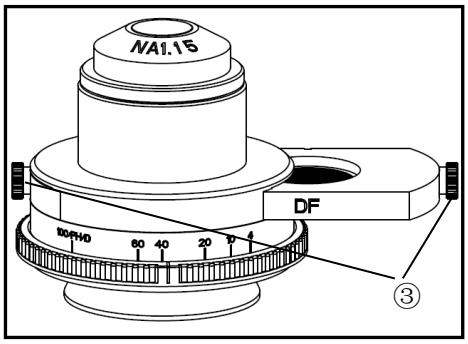


Fig.37

★ **When observation in the dark filed, a drop of cedar oil between the condenser and specimen should be filled. Otherwise the light will be completely reflected on the condenser and cannot reach the inspected object, so that the dark filed illumination is not obtained.**

★ **Before observing specimens in dark field, the center adjustment and focus of the condenser must be carried out to make the focus consistent with the inspected object.**

9.1 Components Name

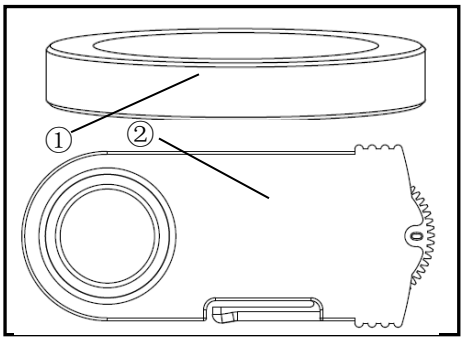


Fig.38

9.2 Installation and Use

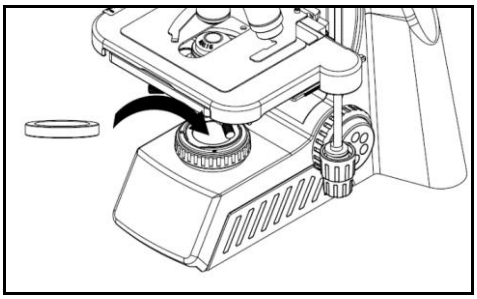


Fig.39

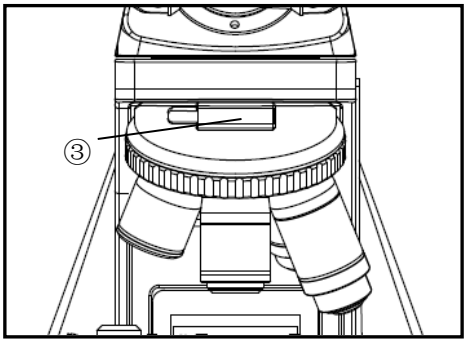


Fig.40

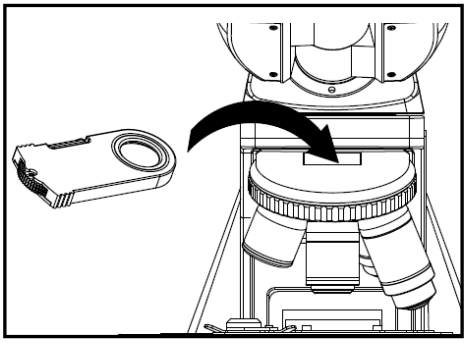


Fig.41

9.1.1 Polarization Set (Fig.38)

Polarization observation has two necessary components: polarizer① and analyzer②. The analyzer can be rotated at 0-90°. In orthogonal polarization observation, it is necessary to turn the analyzer to make the vibration directions of the polarizer and the analyzer perpendicular to each other and the filed of view is darkest.

9.2.1Installing Polarization Set (Fig.39-41)

1. Place the polarizer directly over the collector, as shown in figure 39;
2. Open the stopple on the nosepiece and insert the analyzer, as shown in figure 41.

9.2.2 Process of Observation

◎ When the polarizer and the analyzer enter the optical path, the specimens can be detected by turning the analyzer to the darkest field of view(completely extinct state).

2. Place the specimen on the stage and focus it;
3. Adjust the filed stop until the filed stop is circumscribed with filed;
4. Contrast can be increased by reducing the aperture iris diaphragm.

◎ Remove the entire polarization set after use.

10. Technical Specifications STM-2073,STM-2074

(1). Main Specifications

Components Name	Specification		STM-2073B	STM-2074B
Optical System	Infinite optical system		Standard	Standard
Viewing Head	Seidentopf Binocular Head, 30° Inclined, Interpupillary 47-78mm		Standard	Standard
	Seidentopf Trinocular Head (5:5)		Optional	Optional
	Seidentopf Trinocular Head (0:100/100:0)		Optional	Optional
	Digital Viewing Head		Optional	Optional
	Wireless Digital Viewing Head		Optional	Optional
Eyepiece	Wide Field Eyepiece EW10X/22		Standard	Standard
Nosepiece	Backward Quintuple Nosepiece		Standard	-
	Encoded Quintuple Nosepiece		-	Standard
Objective	Infinite Plan Achromatic Objective (NIS45)20×		Optional	-
	Infinite Plan Achromatic Objective (NIS45)4×, 10×, 40×, 100×		Standard	-
	Infinite Plan Achromatic Objective (NIS60)	2×	-	Optional
		20×	-	Optional
	Infinite Plan Achromatic Objective (NIS60) 4×, 10×, 40×, 100×		-	Standard
	Plan Phase Contrast Objective10×, 20×, 40×, 100×		Optional	Optional
Focusing	Coaxial Coarse and Fine Adjustment, Fine Division 0.002mm, Moving Range 28mm		Standard	Standard
Condenser	Abbe Condenser (Insert), NA 1.25		Standard	Standard
	Phase Contrast Slider(10×-40×universal),100×Phase Contrast Slider, Dark Filed Slider		Optional	Optional
Stage	Synchronous Belt Stage185×142mm, Moving Range78×54mm		Standard	Optional
	Synchronous Belt Stage185×142mm, Moving Range78×54mm, Dural Platform		Optional	Standard
Illumination	1W LED		Standard	-
	3W LED		-	Standard
Filter	Green		Standard	Standard
APP	Camera Operating System And All Functions of Brightness Adjustment Knob		-	Optional
Simple Polarization Set			Optional	Optional
Florescent Attachment	2 Fluorescence Modules And Bright Filed, 3W LED		Optional	Optional
Photographic Interface	C Mount 1×, 0.5×		Optional	Optional

(2). Objective Parameters

Type	Magnification	Numerical Aperture (N.A)	Working Distance (mm)	Conjugate Distance
Plan Achromatic Objective (NIS45)	4×	0.10	20.6	∞
	10×	0.25	17.9	∞
	20×	0.40	6.4	∞
	40×	0.65	1.5	∞
	100× (Water)	1.1	0.16	∞
Plan Achromatic Objective (NIS60)	2×	0.06	7.5	∞
	4×	0.10	30	∞
	10×	0.25	10.2	∞
	20×	0.40	4.8	∞
	40×	0.65	1.5	∞
	100× (Water)	1.10	0.2	∞
Plan Phase Contrast Objective	10×	0.25	10.2	∞
	20×	0.40	4.8	∞
	40×	0.65	1.5	∞
	100× (Oil)	1.25	0.2	∞

11. Trouble Shooting STM-2073,STM-2074

(1). Optical Part

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)	Turn to the location (the objective enter the optical path correctly)
	The phase contrast slider is not located in the proper position	Turn the slider into the correct position where you can hear “clicked”
	A lens (the objective, condenser, eyepiece or collector) is dirty.	Clean it thoroughly
2. Dirt or dust is visible in the field of view	A lens (the objective, condenser, eyepiece or collector) is dirty.	Clean it thoroughly
	Dirt/dust on the specimen	Clean it thoroughly
	The condenser is too low	Adjust the height of condenser
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)	Clean it thoroughly
	A lens (the objective, condenser, eyepiece or collector) is dirty.	Clean it thoroughly
	Water/Immersion oil is not used with the 100x objective	Use water/immersion oil
	Air bubbles existed in the water or immersion oil	Turn the nosepiece to eliminate the bubbles
	Immersion oil is unspecified	Use specified oil
	The aperture iris diaphragm is stopped down too far	Adjust the aperture iris diaphragm properly
	Dirt or dust on the eyepiece	Clean it thoroughly
	Diaphragm of the phase contrast slider is not centered	Adjust the screw to center
	The objective used is not fit to the phase contrast observation	Use the compatible objective
	The diaphragm of phase contrast slider is not coincident with the objective phase ring	Adjust the diaphragm to match the objective phase ring
	The condenser is too low	Adjust it properly

4. One side of image is blurred	Condenser is not properly centered or inclined	Reinstall the condenser and center the condenser with the centering screw
	The nosepiece is not properly engaged	Engage the nosepiece properly
	The specimen is not clamped	Clamp it with stage clips
5. The image shift during focusing	The specimen slips on the stage	Fix it
	The nosepiece is not properly engaged	Engage the nosepiece properly
6. The brightness is not enough	Then lighting is not properly engaged	Adjust the brightness control knob
	The condenser is too low	Adjust it properly
	Condenser is not properly centered	Center the condenser

(2). Mechanical Part

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 touches 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

(3). Electrical Part

TROUBLE	CAUSE	SOLUTION
1. The lamp cannot light when the switch is turned on	No power supply	check the connection of the power cord
	The connector of LED lamp is not properly inserted into the circuit board	Insert it correctly
	The lamp is broken	Replace it
2. The lamp burns out suddenly	Use a unspecified lamp The voltage is too high	Use the specified lamp to replace, if the problem is not solved, contact with maintenance department
3. The brightness is not enough	Use a unspecified lamp The voltage is too low	Use the Specified lamp Increase the voltage
4. The lamp flickers or the brightness is vertiginous	The lamp is going to burn out	Replace it
	The connector of LED lamp is not properly inserted into the circuit board	Check and insert it firmly