

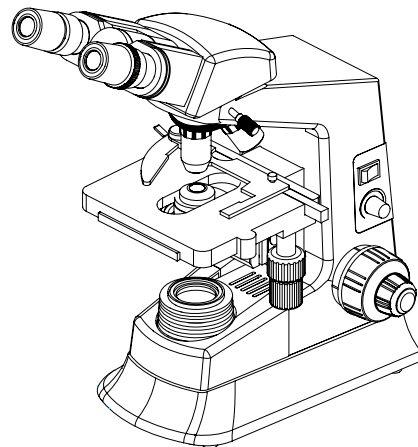
# Biological Microscope

**Model: STM-2035 Series**

## Instruction Manual




**STM-2035DA1**

**STM-2035DA2**



This manual is written for biological microscope STM-2035 series. To ensure the safety, obtain optimum performance and to familiarize you fully with the use of this microscope, it is recommended strongly that you study this manual thoroughly before using the microscope and retain this manual in an easily accessible place near the work desk for future reference.

## I . Safety Notes

1. Carefully open the box, avoid the accessories, like lens, dropping to ground and 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 smooth, horizontal and firm enough.
3. When moving the instrument, please use two hands to grip with the two sides of the microscope body.
4. During use, if the microscope is splashed by liquid, cut off the power at once, and wipe away the splash.
5. When running, the lamp house and nearby parts will be very hot. Please ensure there is enough cooling room for them.
6. Make sure the instrument is earthed, to avoid lighting strike.
7. For safety, be sure the main switch is in “O”(off) state before replacing the halogen lamp or the fuse, then cut off the power, and do the operation after the lamp bulb and the lamp house completely cool down.( **Specified: Halogen Lamp 6V/20W or LED 3W**)
8. Check the input voltage: be sure the input voltage which signed in the back of the microscope is consistent with the power supply voltage, or it will bring a serious damage to the instrument.
9.  Warning against high temperature
10.  Warning against electric shock.
11.  Warning: before use, carefully read the manual .improper use could result in personal injury to the user and/or damage to the equipment
12. When disposing the microscope, check the regulations and rules of your local government and be sure to observe them.

## II . Maintenance

1. All the lenses have been well checked and adjusted. It is forbidden to disassemble them yourself.
2. The nosepiece and coarse/fine focus unit have a compact and precise frame, so please don't disassemble them as possibly as you can.
3. Keep the instrument clean, wipe dust regularly, and be attention to avoid contaminating the optical elements especially.

4. The contaminations on the prism, as finger mark and oil, could be gently wiped with a piece of soft cloth or tissue paper, gauze which has been immersed in pure alcohol or aether. **(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 up the moisture.
7. Do not disassemble any parts of the microscope, which will affect the function or decline 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.

## 2. Specifications

STM-2035

2.1 Mechanical tube: 160mm

2.2 CF high-contrast objectives:

Magnification	Numerical Aperture (NA)	Thickness of coverslip (mm)	Focal length f (mm)	Working distance (mm)	Type
4×	0.10	0.17	28.902	17.912	Dry
10×	0.25	0.17	16.6	5.6	Dry
40×	0.65	0.17	4.28	0.6	Dry
100×	1.25	0.17	1.82	0.14	Oil

2.3 Eyepieces:

Category	Magnification	Focal length f (mm)	Field of view (mm)
Wide field eyepieces	10×	24.86	φ20
Plan eyepieces	16×	15.58	φ11

2.4 Total Magnification:

Eyepieces	10×	16×	10×	16×	10×	16×	10×	16×
Objectives	4×		10×		40×		100×	
Total magnification	40×	64×	100×	160×	400×	640×	1000×	1600×

2.5 Conjugate Distance: 195mm

2.6 Compensation free binocular head: inclined at 30°

2.7 double layers mechanical stage: 140mm×140mm

Moving Range: 75mm×50mm

2.8 Coaxial coarse & fine focusing system, Adjustment Range: 20mm

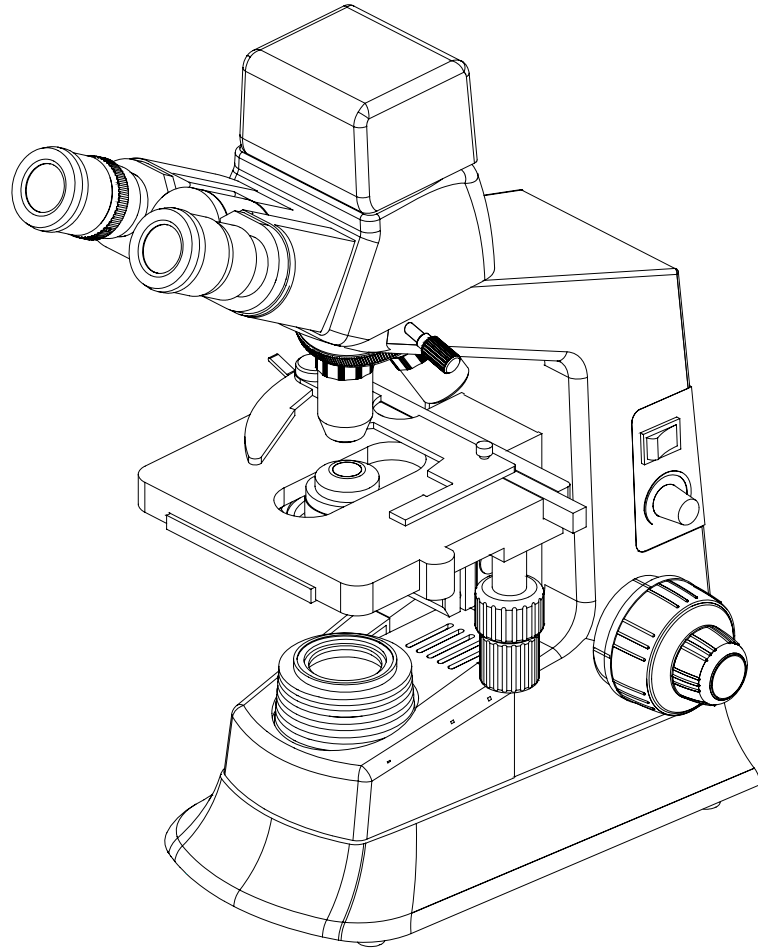
Fine Division: 0.002mm

2.9 Condenser: NA=1.25 Abbe condenser with iris Diaphragm,

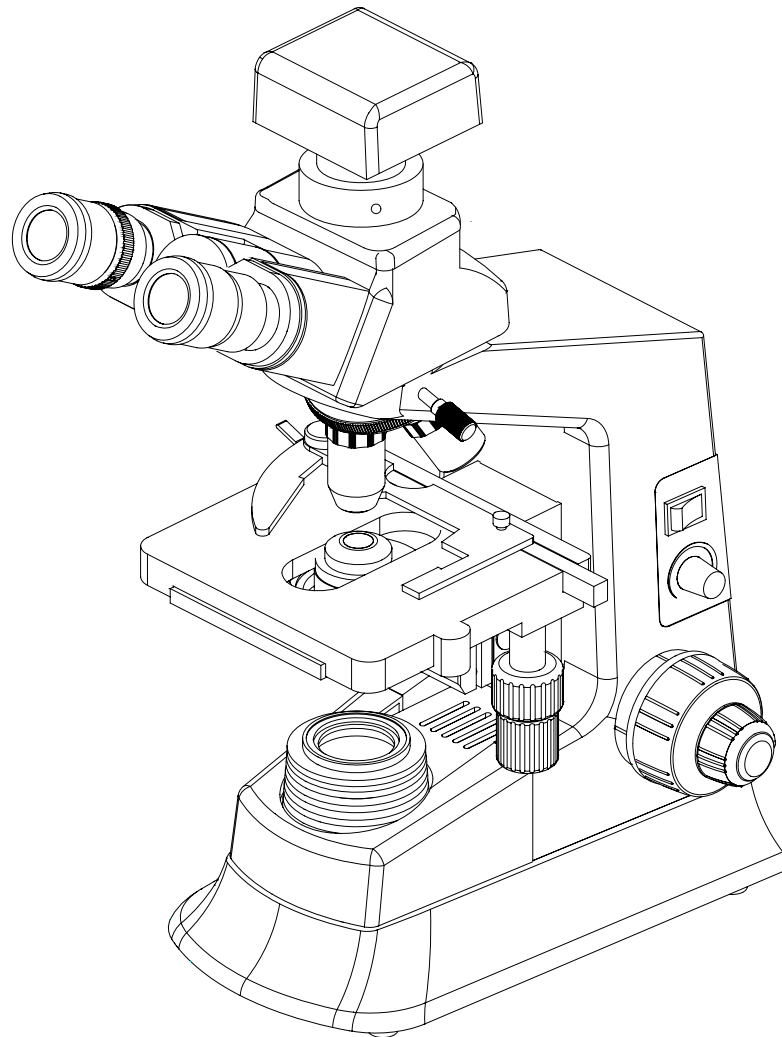
Adjustment Range: 20mm

2.10 Illumination system: halogen lamp 6V/20W 或 3W LED, Brightness Adjustable, Voltage

Rating: 110V or 220V



**STM-2035 DA1 Digital Biological Microscope**



## **STM-2035 DA2 Digital Biological Microscope**

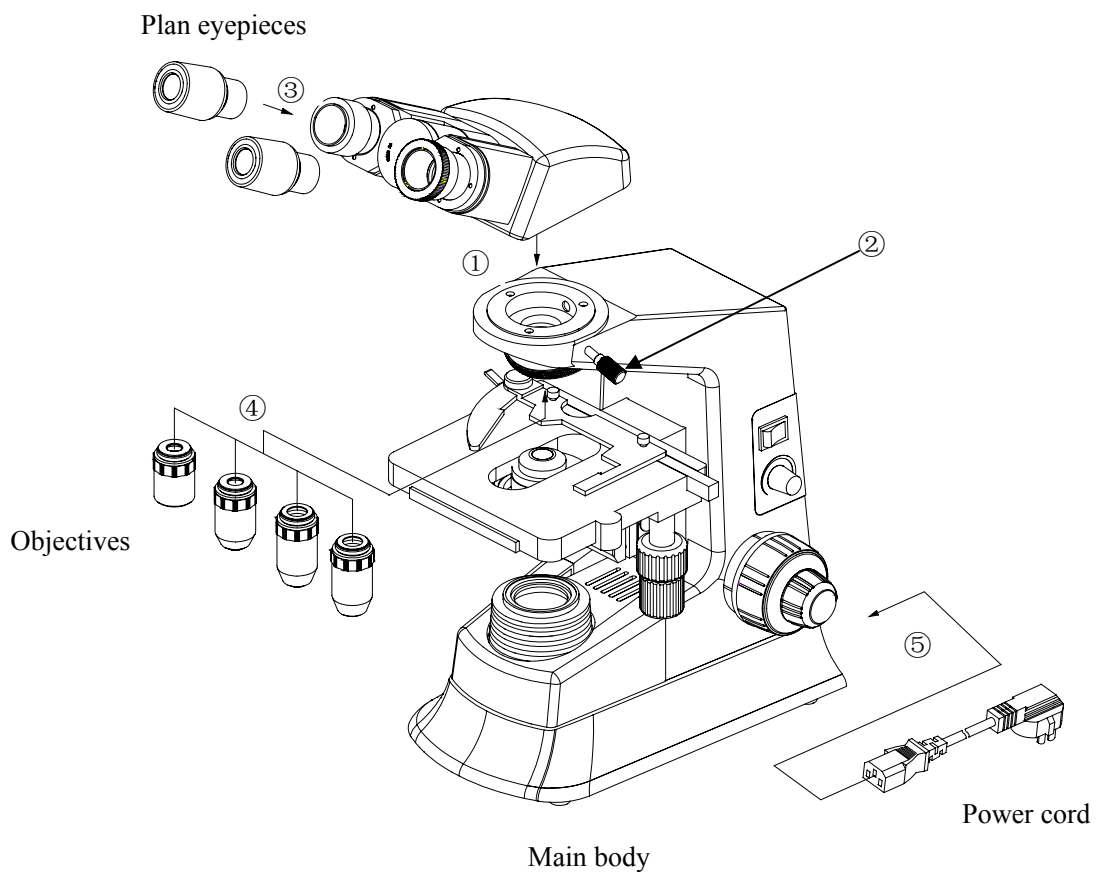
**Viewing head :** Compensation free binocular viewing head, inclined at  $30^\circ$  ,interpupillary distance:48-75mm.

**Camera system:** External digital camera system with C mount, 1.3M pixel CMOS image sensor

## 4.1 Assembly Diagram

The following figure shows the installation sequence of the components. The number in the figure shows the assembly steps.

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



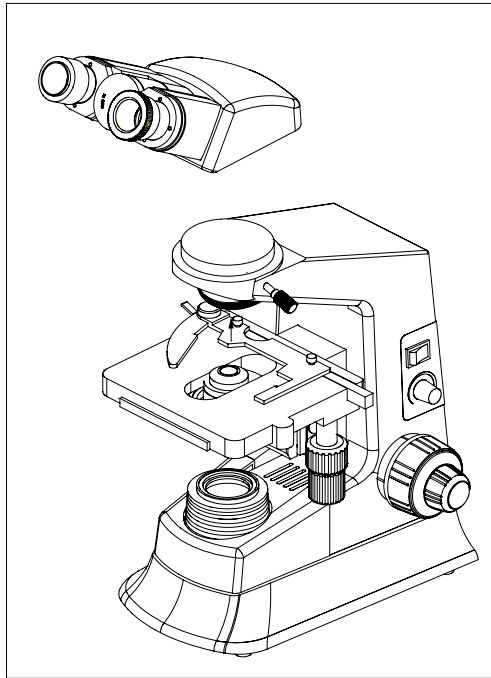
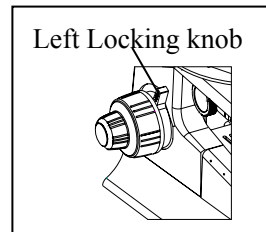


Fig.1

#### 4.2.1 Preparation (Fig.1)

For protecting the microscope in shipping, we took some protect measures, so you need to finish the things listed below before installation: ①move away the plastic cap on the binocular viewing head; ②move away the plastic cap on the microscope body; ③ move away the plastic envelop of the stage; ④ revolve the adjustment knob upwards ( firstly, please revolve the leftward knob up to loosen),remove the fixed block which used to prevent the stage slipping.



#### 4.2.2 Installing binocular viewing head (Fig.2、 Fig.3)

Insert the compensation free binocular head into the microscope head, turn into the right position, then screw down the bolt⑤to fix it.

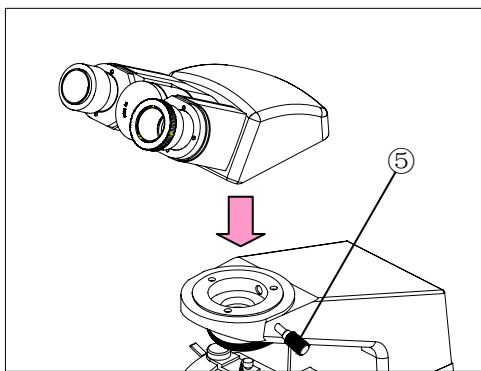


Fig.2

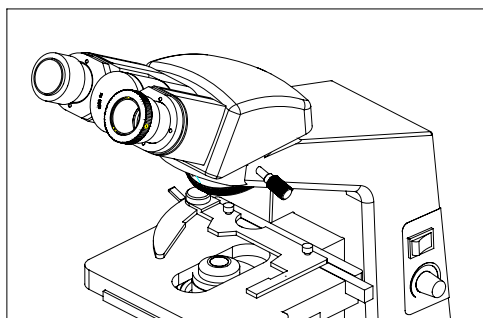


Fig.3

#### NOTE:

Operation Conditions:

1. Temperature: 0 °C ~ 40 °C ,Maximum Relative Humidity: 85%.
2. High Temperature: High Temperature and humidity will result in a mildewing, dew and even ruinous instrument.
3. Avoid placing the instrument in a dusty environment. When ending your microscope operation, please cover it with the dust cap.
4. Lay the microscope in a plan and stable position, please.



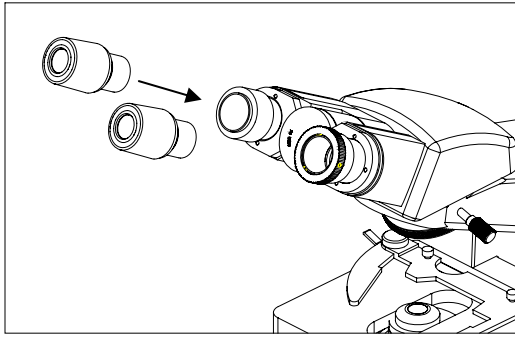


Fig.4

#### 4.2.3 Installing the eyepieces (Fig.4, Fig.5)

Insert the eyepieces into the eyepiece tube until they are against each other as shown in Fig.5.

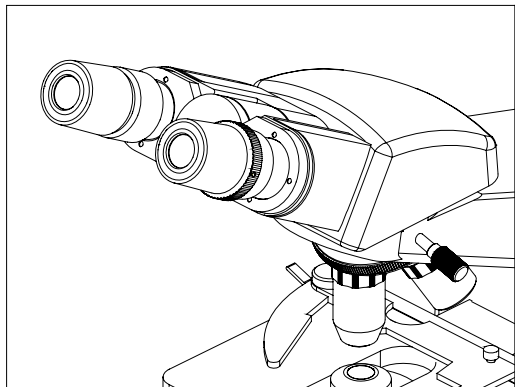


Fig.5

#### 4.2.4 Installing objectives (Fig.6& 7)

1. Adjusting the coarse focus knob until the support device of the mechanical stage reaches its low limit position.

2. Screw the lowest magnification objective into the nosepiece① from the left or the right side, then revolve the nosepiece clockwise and mount other objectives by the sequence of low to high magnification

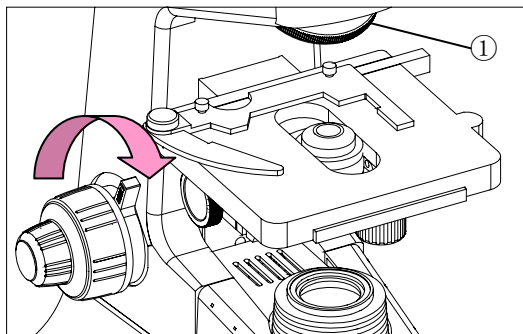


Fig.6

★ Clean the objectives 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”, which means the objective is in the required position—center of the light path.

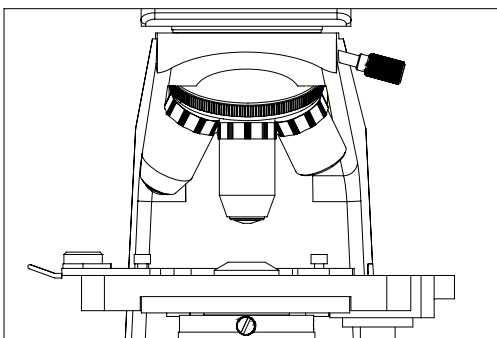


Fig.7

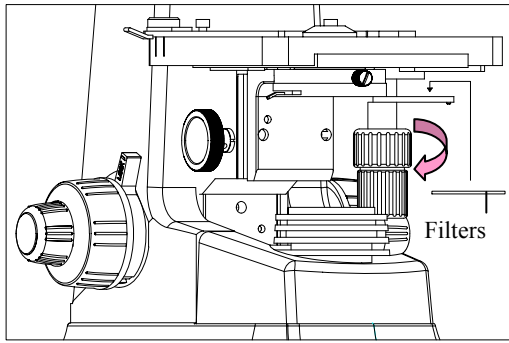


Fig.8

#### 4.2.5 Installing the color filters (Fig.8)

1. Pressing the salient point under the condenser bracket, turn the condenser bracket① out at the direction of arrow in Fig.8
2. Put the required filters into the holder on the bracket, and then turn the bracket back to the right position.

★ Baby blue and green filters are available in standard outfit.

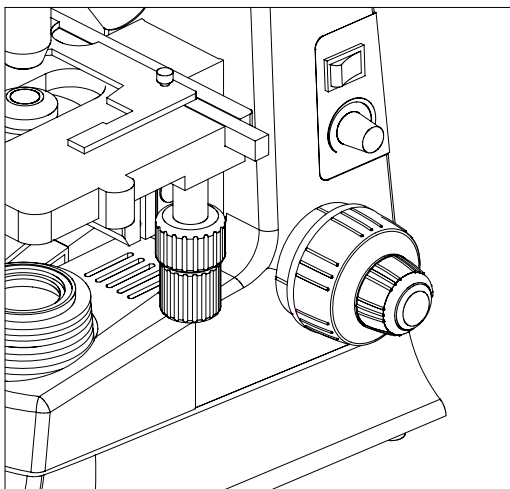


Fig.9

#### 4.2.6 Connecting the power cord (Fig.9、 Fig.10)

1. Turn the main switch① to “O” (off) state before connecting the power cord.
2. Insert the power plugs② into the power jack⑤of the microscope; Make sure the connection is well.
1. Plug the power cord③ into the power supply receptacle safely. Make sure the connection is well.

★ **Make sure to check the input voltage, see whether or not same as the nameplate indicates. Using the wrong input voltage would result a short circuit or fire, and destroy the instrument.**

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

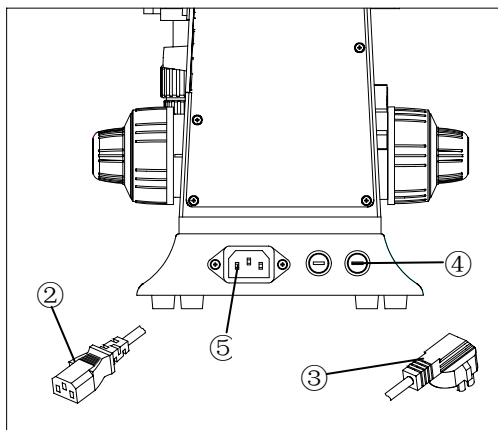


Fig.10

#### 4.2.7 Replacing the fuse (Fig.9&10)

Do remember to turn the main switch① on the state of “O” (off) before replacing the fuse, and unplug the power cord. Rotate the fuse kits④out of the holder by the “—”type screwdriver, replace a new fuse, then rotate back to the holder again.

★ This instrument have two Fuses, the rating is: 250V, 500mA.

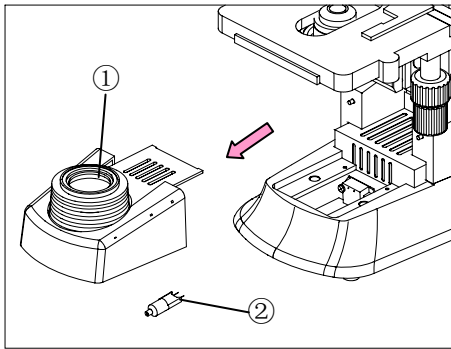


Fig.11

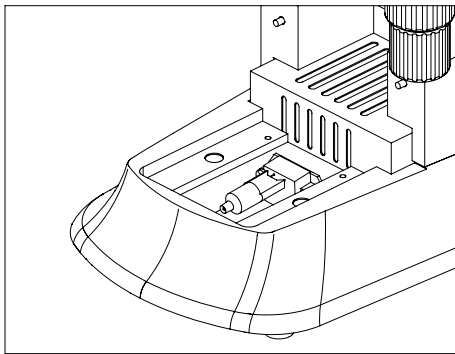


Fig.12

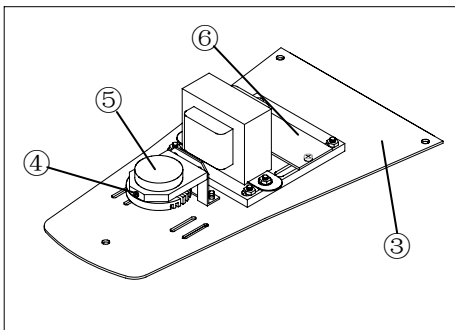


Fig.13

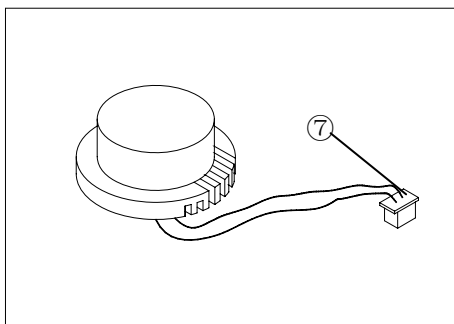


Fig.14

#### 4.2.8 Replacing the Lamp (Fig.11, Fig.12)

1. Please set the main switch to “O” state (off) before replacing, and make sure the bulb, the lamp room and periphery are all cool enough to carry no burn. Then, you can do your replacing.
2. Take up the collector holder① lightly, pull it out by the direction which the figure shown.
3. Pull out the old bulb②, hold the new bulb after you wrap it with gauze or other protection materials and insert its pin as deeply as possible into the jack in the lamp holder.
4. Insert the condenser holder back to the microscope body, pushing down to make sure the holder is holed stable enough.

★ Please insert the bulb gently, or it will be damaged by excessive extrusion.

★ Do not touch the halogen bulb with bare hands. It will shorten the service life or cause it to burst. If you leave fingerprints on the surface carelessly, clean it with a piece of dry soft cloth.

When replacing LED :

1. Generally, the LED has long service life and is not easy to damage, if unfortunately it damaged, purchase a new one from the supplier.(Fig.14)
2. Take the base plate③ down from the bottom side of the microscope base with screw driver, loose the bolt ④ to take the old LED off, pull out the other end of LED wire from the breadboard⑥,replace the old LED with a new one .
3. Put the new LED unit back onto the bracket with the bolt④ and insert the end of LED wire onto the breadboard⑥.
4. Install the base plate③ back onto the bottom side of the microscope with original bolts.

✧When you take down the base plate, please do it gently and slowly, to avoid damaging internal electrical wires.

5.1 Assembly Diagram (Fig.15, 16, 17)

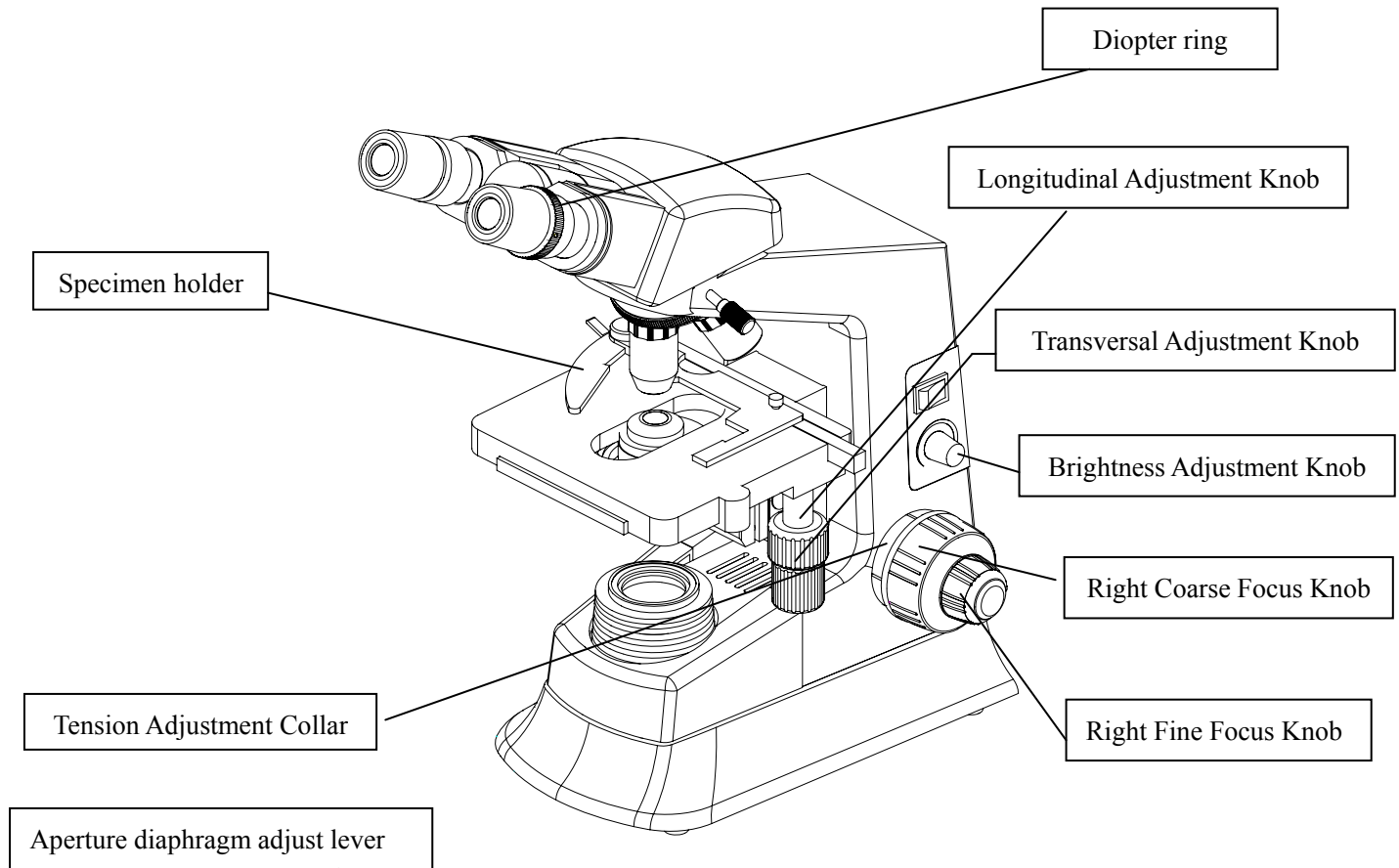


Fig.15

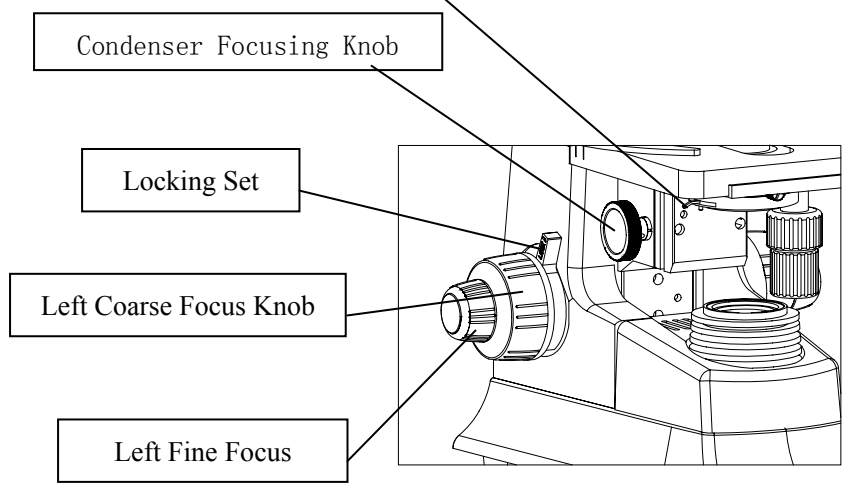


Fig.16

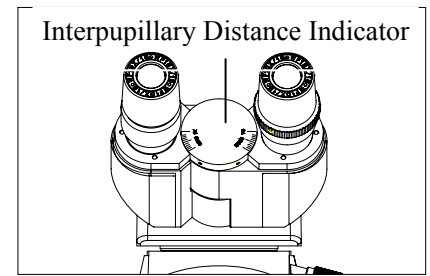


Fig.17

## 5.2 Operation

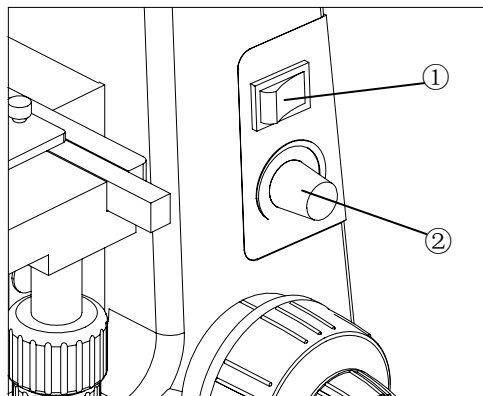


Fig.18

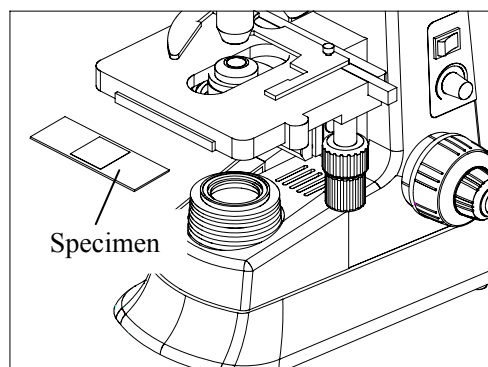


Fig.19

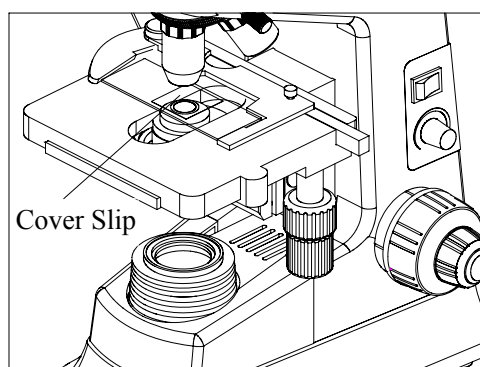


Fig.20

### 5.2.1 Adjusting the brightness (Fig.18)

1. Connect the power, turn on the main switch ① (shown on the figure) which on the bottom side of the base to “—”(on).
2. Turning the brightness adjustment knob ② clockwise, the voltage raise, and the brightness strengthen; whereas turning at the contra direction, the voltage decline, and the brightness weaken.

● **The brightness is affected by kinds conditions, like the phase contrast of the specimen, the magnification of the objective, the adjust ability of the eyes and so on. Too faint or too strong light is not suitable. So, generally you should not adjust the brightness to the highest intensity, or it will let the lamp working in a fully loaded state, and bring a shorten work life.**

### 5.2.2 Placing the specimen (Fig.19、20)

1. Place the specimen on the center of the stage, keeping the cover slip upward, and then nip it with the specimen holder.
2. Turn the longitudinal and transversal adjustment knobs which on the mechanical ruler to move the specimen onto 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.**

### 5.2.3 Oil spacing observation

The objective labeled “Oil” is oil immersion objective (100× objective). When use the oil-spaced lens, you need to add special oil only used for microscope between the objective and the cover slip. You should be aware of the cleaning procedures to be used after the use of oil. Wipe oil from the oil immersion objective, and from any other parts in need of cleaning. Clean lenses immediately after use. Leaving oil on the lens may allow oil to seep behind and harden on the inside of the lens

#### ● Immersing the oil

Add oil between the objective and the specimen, note that not all kinds oil are suitable, it is a special one, just supplied for microscope. (Cedar oil fig. 21)

#### ● Eliminating the bleb

The bleb in the oil will result in a bad effect on the image quality. So make sure there is no bleb when using the oil. You also can take the following steps to avoid this problem:

- Turn the nosepiece gently to move the oil immersion objective several times.
- Add more immersion oil
- Wipe away the oil, and add some other oil for replacement

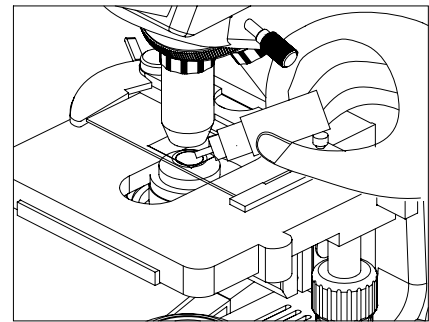


Fig.21

#### Note:

Only a little oil is needed. If too much, the residual oil will seep into the stage and the condenser and result in a decline of the performance.

### 5.2.4 Focus (Fig.22)

Place the specimen on the center of the stage, make sure the cover slip is upward, then, uses the 10× objective and the 10× ocular to perform the observation.

To avoid the objective touching against the specimen, you should rise the mechanical stage up to make the specimen near to the objective at first, then apart them slowly to make focus.

When focusing, please reversely turn the coarse focus knob ①, let the specimen falling slowly, and look into the ocular to search image at the same time. And at last, change the fine focus knob② to sharp the image. After done this, you could change other magnification objective freely with no risk of damaging the specimen.

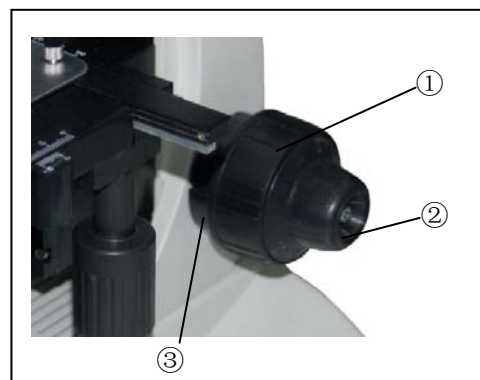


Fig.22

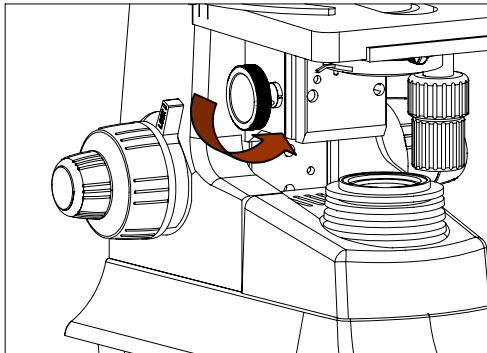
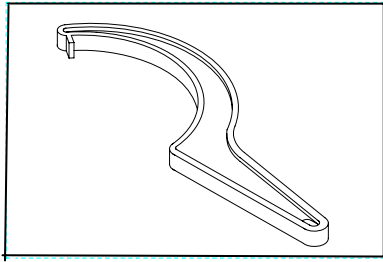


Fig.24

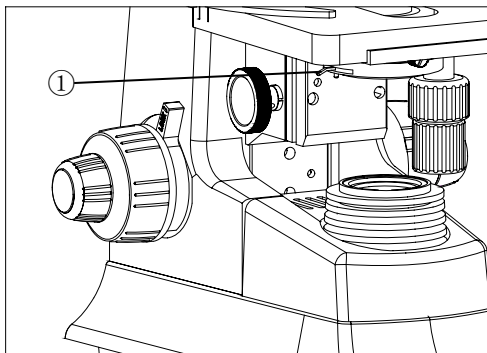


Fig.25

- The tight tension of the coarse focus knob has already been adjusted before leaving factory. If loosen (e.g. the stage slip down by its weight), please screw the intention adjustment collar③ to the right position by the supplied spanner.

### 5.2.5 Condenser Adjustment (Fig.23)

Turn the condenser focus knob 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.

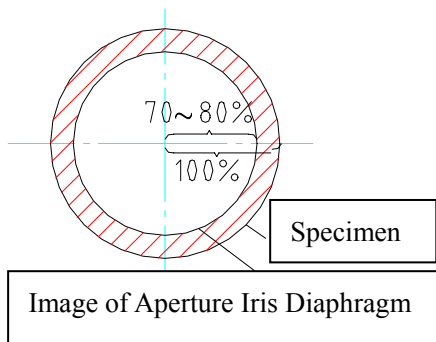
- ★ The condenser and the objective are coaxial. It has been adjusted well before leaving factory, so the user needn't to adjust them by self.
- ★ The highest position of the condenser has been adjusted too. It also needn't any user's operation.

### 5.2.6 Aperture Iris Diaphragm Adjustment (Fig.25)

Turn the aperture iris diaphragm lever① to adjust the aperture iris diaphragm.

- If the size of the aperture diaphragm minified, the brightness and the resolution declined, while the contrast and the depth of field increased; In other words, if the size largen, the brightness and the resolution improved, but the contrast and the depth of field declined.
- Generally, setting the size of the condenser aperture diaphragm at 70%~80% of the numerical aperture, you can obtain a clear image with enough contrast. If the open of the aperture diaphragm is too small, the resolution were very low, so please don't minify the aperture below 60% of the

- The numerical aperture is marked on the objective. For example, the mark “10/0.25” means the magnification is 10×, and the numerical aperture is 0.25.
- 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.



The right size of the aperture diaphragm

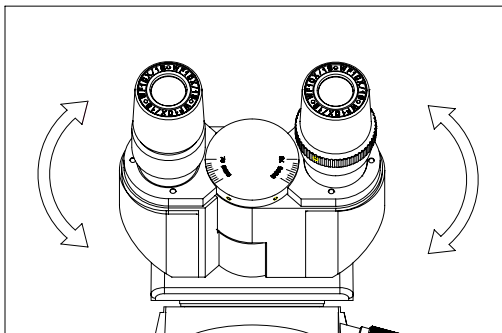


Fig.26

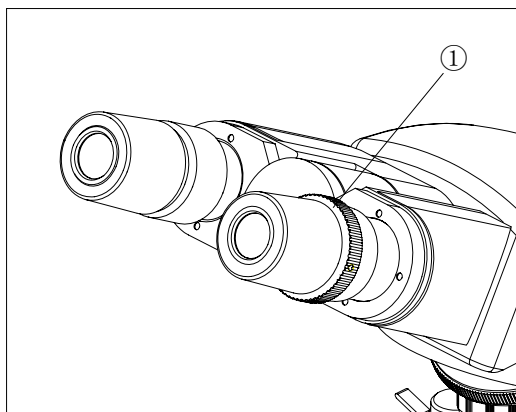


Fig.27

### 5.2.7 Adjusting the Interpupillary Distance (Fig.26)

The interpupillary distance range:  
55mm~75mm.

When observing with two eyes, hold on the left and right prism holders, turn them around the axis to adjust the interpupillary distance until the left and right fields of view coincide completely, as shown in Fig.26.

### 5.2.8 Adjusting the diopter (Fig.27)

1. Look into the left ocular by your left eye, then revolving the coarse focus knob to focus on the specimen.
2. Then use your right eye to look into the right ocular. If the image is not sharp, just use the diopter adjustment ring① to adjust please.



## 6. Outfit

STM-2035

Components	Specifications	Standard outfit	
		STM-2035 DA1	STM-2035 DA2
Main Body	Main body	Standard	Standard
	Double layers mechanical stage	Standard	Standard
	Condenser bracket	Standard	Standard
Viewing Head	Compensation Free Binocular Head , Inclined at 30°		
	Compensation Free Trinocular Head , Inclined at 30°		Standard
	1.3M Pixel CCD Camera System	Standard	
	300,000 pixel CCD Camera System		
	400,000 pixel CCD Camera System		
	USB Cable	Standard	Standard
	S-Video Cable		
Condenser	N=1.25 Abbe Condenser with iris diaphragm	Standard	Standard
Nosepiece	Quadruple	Standard	Standard
	Quintuple	Optional	Optional
Illumination System	6V20W halogen lamp or 3W LED	Optional	Standard
	Kohler illumination system	Optional	Optional
	Spare bulb(6V20W halogen lamp)	Standard	Standard
	Spare fuse, with rating:250mA ( 500mA for 110V)	Standard	Standard
Eyepieces	EW10× WF eyepieces	Standard	Standard
	WF16× WF	Optional	Optional

	eyepieces			
Objectives	CF high-contrast objectives	4×		
		10×		
		40×		
		100×		
	Plan achromatic objectives			
Filters	Baby blue			
	Green			
Video attachment				
Photography attachment	1×(C mount)			
	0.5×(C mount)			
Polarization Set	Simple Polarization Set			
Phase Contrast Kit	Simple Phase Contrast Kit			
	Sliding Phase Contrast Kit			
	Turret Phase Contrast Kit			
Dark Field Condenser	Dry dark field condenser NA0.9			
	Oil dark field condenser NA1.25-1.36			
Fluorescent attachment	Epi-fluorescent attachment			
Pointer system	LED Optical Point System			

## 7.1 Optical Part

PROBLEM	REASON	SOLUTION
The edge of the field of view has shadow or the brightness is asymmetry	The nosepiece is not in the located position (objective is not in the center of the optical path)	Turn objective to the right position(the optical light center)
	The image of the filament is not in the center	Center it
	The surface of the lens is moldy or has contaminant (include condenser, objective, eyepiece and collector)	Clean it up
Find dust and stain in the field of view	There are stains on the lens (include condenser, objective, eyepiece and collector)	Clean it up
	There are stains on the specimen	Clean it up
	The position of the condenser is too low	Loosen the condenser's locking bolt, adjust the condenser to the right position
The image is defocus ( low resolution \ contrast)	There is no coverslip on the specimen	Add coverslip
	The coverslip is too thick or too thin	Use the standard coverslip ( 0.17mm )
	The specimen is placed inversely	Reversal it back
	There was oil on the dry objective(easily happened in 40X objective)	Clean it up
	There are stains on the lens (include includ condenser, objective, eyepiece and collector)	Clean it up
	The oil objective didn't immerse oil	Use immerse oil
	There was bleb in the oil	Eliminate the bleb
	Use a unsuitable oil	Change to the specified one
	The size of the aperture diaphragm is too big	Minify it
	There are stains on the incident lens of the binocular tube	Clean it up
	The size of the aperture diaphragm is too small	Open it up
	The position of the condenser is too low	Adjust the position

One side of the image is dark	The condenser is not in the center of the field of view\the condenser inclines	Install the condenser again and adjust the center carefully by the centering bolt
	The nosepiece is not in the right position	Turning it until it reach the “clicked” position
	The specimen is floating	Fix it
The image shift in focusing	The specimen slips on the stage	Fix it
	The nosepiece is not in the right position	Turn it to the “ clicked ”position
The image is a little yellow	Not use the blue color filter	Use the blue filter
The brightness is not enough	The size of the aperture diaphragm is too small	Adjust again
	The position of the condenser is too low	Adjust the position
	There are stains on the lens (include condenser, objective, eyepiece and collector)	Clean it up

### 7.2 Mechanical Part

PROBLEM	REASON	SOLUTION
The image can focus when using high magnification objective	The specimen is placed inversely The coverslip is too thick	Turn inversely Use the standard coverslip (0.17 mm)
The objective and the specimen touch when change the low magnification to the higher magnification	The specimen is placed inversely The coverslip is too thick	Turn inversely Use the standard coverslip (0.17 mm)
The specimen is not easy to move	The specimen holder is not fixed	Fix it
The binocular image is not coincident	The interpupillar distance is not correct	Adjust it
The eyes is too tired	No diopter adjustment	Adjust the diopter correctly
	The brightness is not suitable	Adjust the voltage of the lamp

### 7.3 Electric Part

PROBLEM	REASON	SOLUTION
The lamp can't light when turning on the	No power	Check the connection of the power cord

switch	The bulb is not inserted	Insert it correctly
	The bulb burns out	Replace it
The lamp burns out suddenly	Use a unstandard lamp The voltage is too high	Use the specified lamp to replace, if the problem is not solved, contact with the service department
The brightness is not enough	Use a substandard lamp The voltage is too low	Use the specified lamp Add the voltage
The bulb flickers or the brightness is vertiginous	The bulb is going to burn out	Replace it
	The bulb is not entirely inserted into the holder	Check and insert it again