

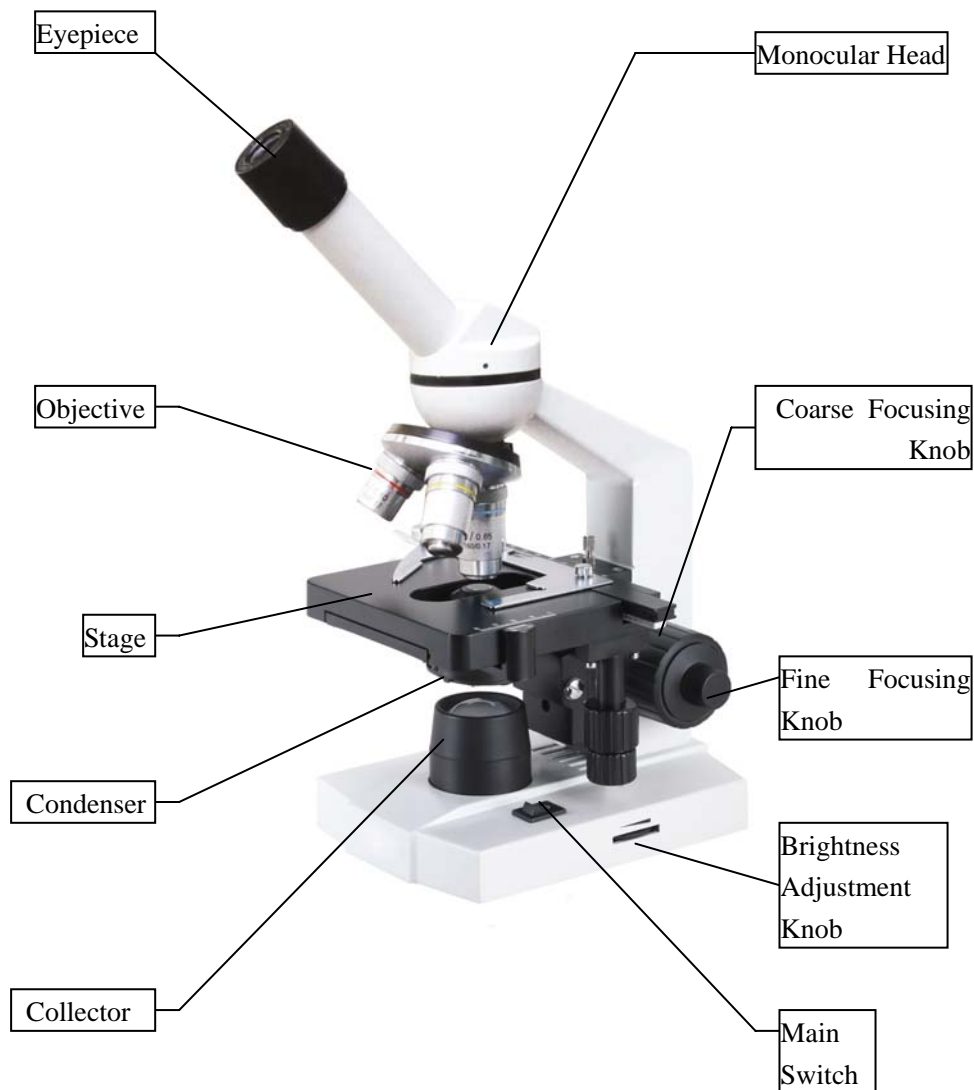
# Biological Microscope

## BS-2010E

### User Manual

This manual is for users of biological microscope BS-2010E. 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. Retain this instruction manual in an easily accessible place near the microscope for further reference

### BestScope International Limited





## 1 Appliance

BS-2010E biological microscope is widely used in medical and hygienic establishments for conventional microscopic examination, general biologic, pathologic and bacteriological studies, clinical investigations and classroom demonstrations. Designed in a very modern way what can take convenient and safe to your operations.

## 2 Specification

2.1 Mechanical tube length: 160mm

2.2 Objective:

Magnification	Numerical Aperture (NA)	Focus Distance (mm)	Working Distance (mm)	Remark
4X	0.10	31.05	18	
10X	0.25	17.13	7	

40X	0.65	4.65	0.53	
100X	1.25	2.906	0.13	

**2.3 Eyepiece**

TYPE	Magnification	Focus Distance(mm)	Field of view (mm)
Plan Eyepiece	10X	25	Ø18

**2.4 Total Magnification**

Eyepiece	10X	10X	10X	10X
Objective	4X	10X	40X	100X
Total	40X	100X	400X	1000X

**2.5 Conjugate Distance: 195mm**

**2.6 Stage:**

BS-2010 D、 E: Double Layers Mechanical Stage 116mmX125mm

BS-2010 A、 B: Attachable Mechanical Stage 110mmX120mm

BS-2010 C: Plain Stage with Slide Clips 110mmX120mm

**2.7 Coarse Focusing range: 10mm**

**2.8 Condenser:**

BS-2010 D、 E: Abbe NA=1.2with Iris Diaphragm,Rack and Pinion Adjustment

BS-2010 A: Single Lens NA 0.65 with Disc Diaphragm

BS-2010 B: Single Lens NA 0.65 with Iris Diaphragm

BS-2010 C: Abbe NA=1.2with Iris Diaphragm,Spiral Adjustment

**2.9 Diameter of Color Filter: Ø32mm**

**2.11 Illumination :**

BS-2010 A、 B、 C、 D:Incandescent Lamp Illumination 15W,  
Brightness Adjustable

BS-2010 E: LED Lamp Illumination 1W, Brightness Adjustable

**3 Outfits**

Component Name	Specification	BS-2010A	BS-2010B	BS-2010C	BS-2010D	BS-2010E
Viewing Head	Monocular Head, inclined at 45°	●	●	●	●	○
	Sliding Binocular Head,Inclined at	○	○	○	○	●

	45°					
Eyepiece	Wide Field Eyepiece WF10X	●	●	●	●	●
	Eyepiece WF5X,P16X	○	○	○	○	○
	Eyepiece WF10X with Pointer	○	○	○	○	○
Objective (Achromatic)	4X,10X ,40X(S)	●	●	●	●	●
	20X,60X	○	○	○	○	○
	100X	○	○	○	○	●
Condenser	Single Lens NA 0.65 with Disc Diaphragm	●	○	○	○	○
	Single Lens NA 0.65 with Iris Diaphragm	○	●	○	○	○
	Abbe NA=1.2with Iris Diaphragm,Spiral Adjustment	○	○	●	○	○
	Abbe NA=1.2with Iris Diaphragm,Rack and Pinion Adjustment	○	○	○	●	●
Nosepiece	Triple Nosepiece	●	●	●	●	○
	Quadruple Nosepiece	○	○	○	○	●
Stage	Plain Stage with Slide Clips 110 × 120mm	●	●	○	○	○
	Attachable Mechanical Stage 110 × 120mm / 60 × 30mm	○	○	●	○	○
	Double Layers Mechanical Stage 125 × 115mm / 70 × 20mm	○	○	○	●	●

Illumination	Incandescent Lamp 15W Brightness Adjustment	●	●	●	●	○
	LED Lamp 1W Brightness Adjustment	○	○	○	○	●
Mirror		○	○	○	○	○
Focusing System	Caaxial Coarse and Fine Adjustment, Movin g Range 10mm	●	●	●	●	●
Filter	Green	○	○	●	●	●
	Blue	○	○	●	●	●

Note: ● Standard Outfit, ○ Optional

## 4 Configuration

- a) Eyepiece, Objective and Nosepiece  
The monocular microscope has wide field eyepiece 10X and achromatic objective 4X, 10X, 40X and 100X. The nosepiece is small structured, and located stably and exactly. It has a large and sharp image, with 360° rotatable monocular or sliding binocular head.
- b) Bend arm and Coarse and fine focusing knob  
The curved arm use C-shaped ,has sprightly lines.Also, with upper focus stop.the coarse focusing adjustment adopts dovetail guide which make focusing adjustment smooth and comfortable.
- c) Base:  
The base is designed to the instrument, which having a streamlined shaped circular,and it harmonized the aim's shape slinky, Electrical components and lamp built inside it as the illuminator.
- d) Stage:  
Fixed stage or moveable stage
- e) Illumination  
The system consists of illuminator which contains collector / mirror, iris aperture diaphragm and condenser. And the condenser can be lift up and down.

## 5 Assembly

- a) Working environment requirement:
  - 1) Room temperature: 0-40°C.  
Maximum comparatively humidity: 85%.
  - 2) High temperature will result in mildew, dew and even ruinous instrument.

- 3) Avoid from the dust room. When it is not in use, please cover the microscope with dust cover.
  - 4) Please place the microscope in a stable situation without any surging.
- b) Check the Input voltage: be sure the power supply voltage is accordant with the nominal input voltage which is signed outside the microscope, or it will bring a serious damage to the microscope.
- c) Lamp
1. The lamp has been well adjusted and checked before the microscope leaves factory.
  2. The lamp housing parts become extremely hot during operation. Take care not to burn yourself.
  3. Lamp replacement: The lamp has its standard service life. When it has expired, a lamp replacement is necessary. set the main switch to off state, disconnect the power cord from the wall outlet, then allow the old bulb to cool before replacing the bulb with a new of the designated type. Open the lamp holder on the bottom of microscope to do the replacement, the surface of the new lamp bulb should be clean and free of fingerprint or dirt, which will decrease the brightness or even explode the bulb.
- Note: Must not missing the grounded screw
- Donot touch the lamp`s glass part with your hands, when sitting should take gloves or cover the lamp with protector. Fingerprint or dirt on the surface of the lamp should be cleaned with the clean cloth with dipping alcohol, which will decrease the brightness or even explode the bulb.
- d) Eyepiece:  
Please insert the eyepieces into the eyepiece tubes. (There is small screw in the eyepiece, which can make the eyepiece can not be pull out arbitrarily when be screwed down.
- e) Objective:  
Lower the stage to its lower limit, then screw down the objectives into the nosepiece (from low to high).
- f) Condenser:  
The condenser has been adjusted well before delivery.
- g) Collector:  
The collector has been adjusted well before delivery. Frame of the collector`s pedestal is screw thread can taken by contrarotate  
Note: It cannot be taken down when the outfit is LED.
- h) Color filter:  
Lay the filter into the iris diaphragm bracket under the condenser if necessary.

## 6 Operation

- 1、 Insert the eyepiece into the inclined eyepiece tube, then rotate the objectives

in sequence, according to their magnifications, into the threaded holes of the nosepiece. Place the specimen in the center of the field of view, first use low power objective to find the specimen image and then observe it with high power objective, at the same time, adjust fine focusing knob until the image is clear. When using 100X oil-immersion objective, the space between the front of objective and specimen surface should be full of cedar oil. Drops of cedar oil must be strictly free from air bubble, and the objective should be cleaned immediately after using, otherwise it may solidify and make cleaning difficult.

- 2、 In order to get a sharp and clear image, you must adjust the illumination system. When using objectives of different magnification, please adjust the iris diaphragm of the condenser to bring its numerical aperture and objective's numerical aperture into coincidence. Generally speaking, the rate of objective increase, the location of the condenser need to move up. Aperture is design for adjust NA and not for adjust brightness. Usually, aperture is open to 70~80% of the objective's exit pupil, until can see clearly image in the view.
- 3、 When to watch the same type of specimens, can adjust limit screw to proper position and lock it up with nut. Then directly make coarse focusing knob up to the position where the first specimen can focusing clearly. That can simplify the operation and reduce the working intensity.

Note: The same type of specimen refer to the thickness of the slice ,the coverslip and the carry slip are uniform.

## **7 Maintenance and storage**

- 1、 When you open the carton, please be careful not to make the lens dropping
- 2、 All the lens has been adjusted by manufacturer already, please do not disassemble by yourself.
- 3、 Nosepiece, coarse and fine focus is installed precisely, please do not disassemble by yourself.
- 4、 You should make the instrument clean, and often wipe the dusts.
- 5、 Place the instrument in a shady, cool and dry place, when finishing the operation, always use the dust cover for protection.

## **8 Troubleshooting Guide**

If problems occur during use, please review the following list and take remedial action as needed. If you cannot solve the problem after checking the entire list, please contact the service department for assistance.

- 1、 Optical Part

Problem	Cause	Solution
the edge of the field of view has shadow or the brightness is uneven	The nosepiece is not in the located position(objective is not in the center of the optical path)	Turn to the right position(Turn objective to 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 ( including 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, then screw down.
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
	The specimen is placed inversely	Reverse it back
	There was oil on the dry objective(easily happened in 40X objective)	Clean it up
	There are stains on the lens ( including condenser, objective, eyepiece and collector)	Clean it up
	The oil objective didn't immerse oil	Use immerse oil
	There was bubbles in the oil	Eliminate the bubbles
	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 shifts during 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

## 2、 Mechanical Part

Problem	Cause	Solution
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 (0.17 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 eyes is too tired	No diopter adjustment	Adjust the diopter correctly
	The brightness is not suitable	Adjust the voltage of the lamp

**3、Electrical Part**

Problem	Cause	Solution
The lamp can't light when turning on the switch	No power	Check the connection of the power cord
	The bulb is not inserted	Insert it correctly
	The bulb burns out	Replace it
The lamp burns out suddenly	Use an 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	Use the specified lamp
	The voltage is too low	Add the voltage
The bulb flickers or the brightness is vertiginous	The bulb is going to burn out	Replace it