EPI-FLUORESCENT MICROSCOPE

SERVICE MANUAL

Read it carefully before operating and keep it with the microscope

Attention

Dear Sir or Madam:

Thank you for using Epi-fluorescent microscopes. As one of the professional designers, manufacturers and distributors for optical instruments in China, since 1978, we have been working for supplying the new or old customers worldwide with high-quality and low-cost products. We wish that our products could bring you success and satisfaction. We enjoy offering you the most suitable products and the best service.

This manual gives a minute description of the structure, principle, configuration operating guide, troubleshooting, maintenance and some attention for Epi-fluorescent microscopes. Please read it carefully before you use, and keep it for long time.

In particular, the following notes must be understood thoroughly and obeyed strictly:

1. Permitted use:

Being high-precision laboratory apparatus, it is combined perfectly by an Epi-fluorescence device and an ordinary microscope. It is not only used for fluorescent microscopy observation, but also used for general biological microscopy observation.

2. No dismantle the equipment:

Unless you are a microscopic expert, or there is a special guide about doing so in the manual, please don't dismantle your microscope. Otherwise, it will damage the microscope seriously, and reduce greatly its accuracy and using-life. When you identify some troubles, and can't troubleshoot them by yourself according the manual, please contact us or our representative in you area.

3. Safety:

----The lamp-house of the Epi-fluorescence device and the base near the illuminator will be very hot to burn your fingers. Don't worry about it, but it must be treated carefully. Please take care of yourself and take the combustible material (such as gasoline, paper, plastic and cloth) far away from the microscope.

----Before change the mercury lamp in lamp-house or the halogen lamp in base, ensure that it has been disconnected with the power source. The new bulb must be the same specifications as the old one. At same time, ensure the lamp cool enough; otherwise the hot

bulb will burn your fingers.

----After fluorescent microscopy observation is over, the first turn off the switch of the power supply box; the second disconnect the box with the power source; the third disconnect the lamp house with the box. Ensure to not unplug the connecting line from the power supply box before its switch is turned off.

----The mercury lamp should be restarted ten minutes later after it is turned off.

4. Use the correct power supply voltage:

The power supply voltage must be fitted to the microscope; otherwise it will damage the circuit and bulb, even lead to insecurity.

5. Protecting optical parts:

Never try to contact directly the optical surface of objectives, eyepieces and other optical parts with your finger. Fingerprints will seriously affect your observation results.

6. Don't leave any dust and fingerprints on the bulb, otherwise it may affect its life and illuminating efficiency.

7. Working surroundings requirements:

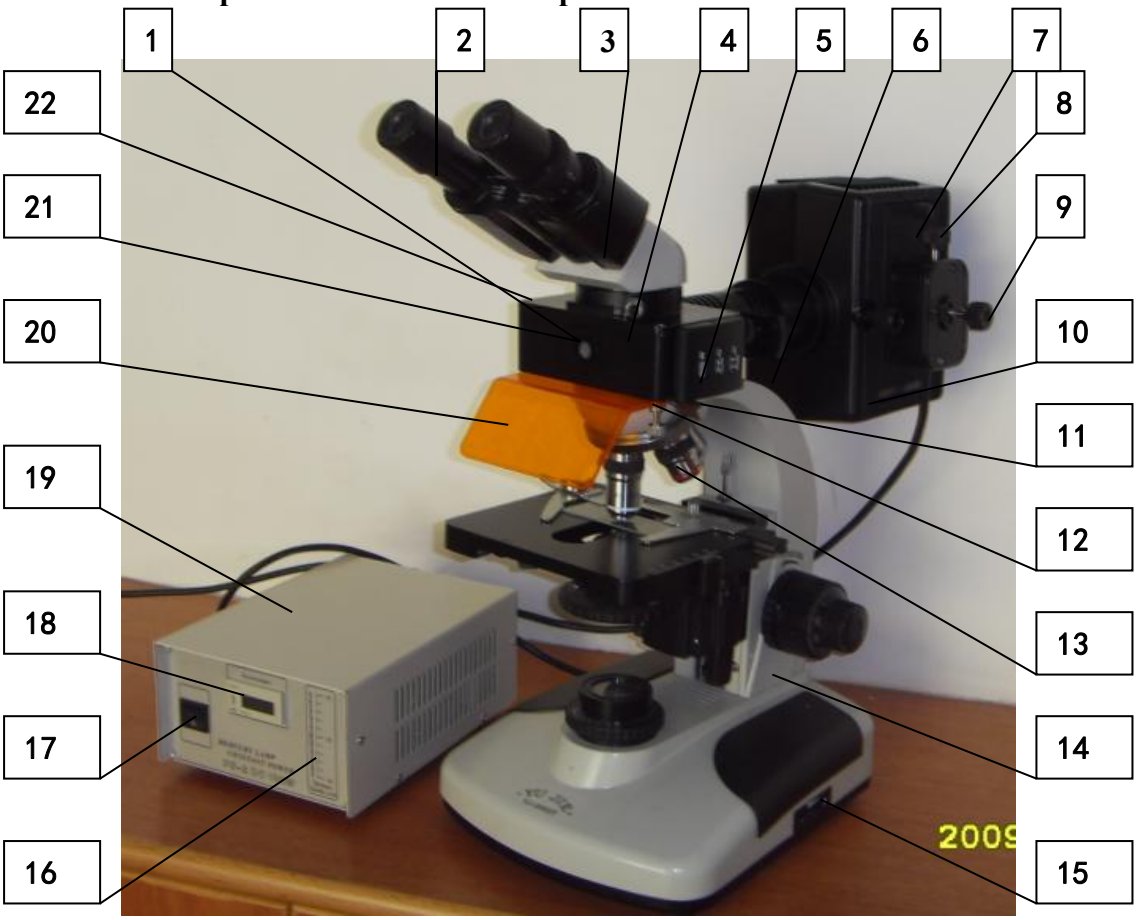
Room temperature: 0°C-40°C; The highest relative humidity: 85%

High temperature and humidity can cause mildew and damage the instrument.

8. Microscope is a precision instrument, soft and gentle operation is necessary. Any rude action or hard shake may damage it.

CONTENT

A) Structure of the Epi-fluorescence Microscope:



1. Flashboard A **2. Eyepiece**
3. Viewing Head **4. Lock Screw for Head**
5. Excitation Type Selector **6. Flashboard B**
7. Door Screw for Lamp House **8. Adjusting Screw (up/down)**
9. Adjusting Screw (left/right) **10. Lamp House**
11. Lock Screw for Fluorescent Device **12. Lock Screw for Ultraviolet Bar**
13. Fluorescent Objective **14. Microscope Body**
15. Brightness Adjustor **16. Tension Guide Line**
17. Switch **18. Accumulator**
19. Power Supply Box **20. Ultraviolet Bar**
21. Observation Window **22. Epi-fluorescence Device**

Fig.1. Structure of the Epi-fluorescence Microscope:

B) How to Assemble the Epi-fluorescence Microscope:

The Epi-fluorescence Microscope is separated into several parts for transiting safety, as the following:

1）Microscope Body（14）;
2）Viewing Head（3）;

3）Power Supply Box（19）;
4）Epi-fluorescence Device（22）;
5）Eyepiece（2）;
6）Objective（13）;
7）Mercury Lamp;
8）Ultraviolet Bar（20）;
9）Other Parts。

Install all necessary parts together as Fig.1 before using.

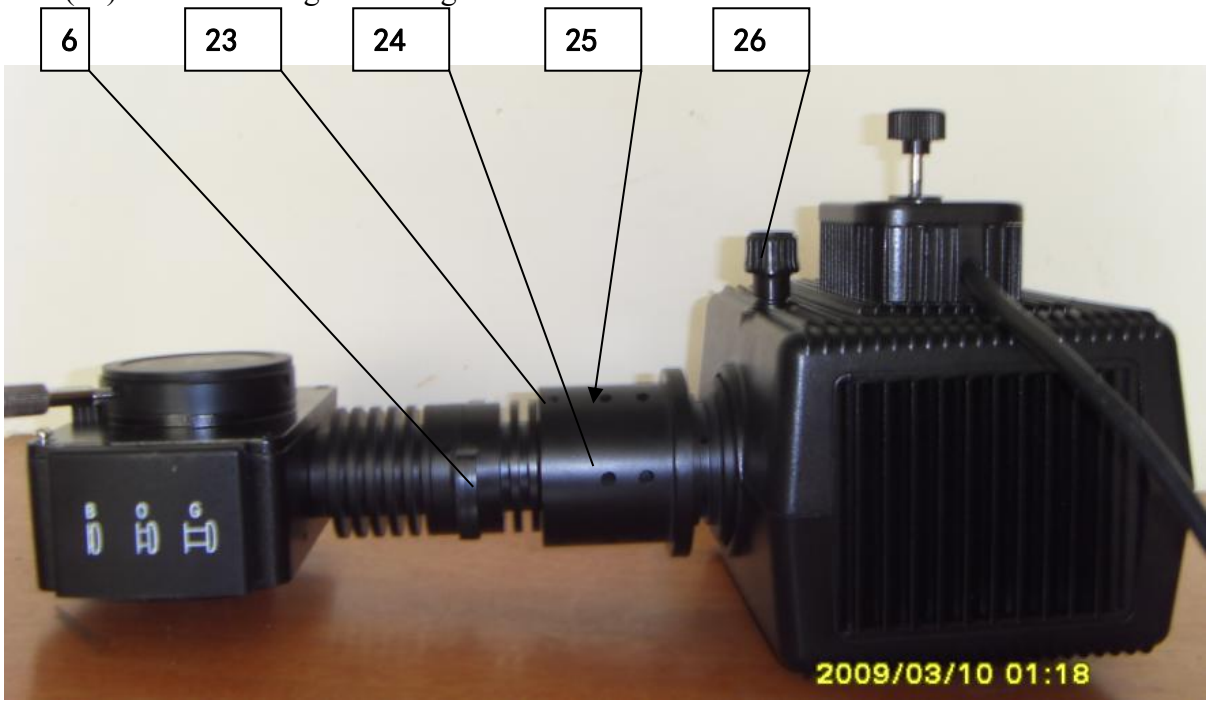
1. Unpack the microscope and its parts carefully, check and sort out all parts according to the packing list。

2. Loose the screw(7) in the Epi-fluorescence device, and open the door of the lamp house。Remove the nylon rod, and instead of mercury lamp. **Caution: Ensure the mercury lamp in correct position.** Finally, shut the door, and fix the screw (7).

Caution: Don't leave any dust and fingerprints on the mercury lamp to affect its life and illuminating efficiency. Clean it with soft cloth and gasoline promptly.

Remove the plastic cover away from the Epi-fluorescence device (22), and install it on the microscope body (14) with the screw (11)。

Usually, the lamp house in the Epi-fluorescence device (22) is vertical, showed in Fig.1. To suit for some microscope body sometimes, it is necessary to readjust the lamp house horizontal by yourself, showed as Fig.2. It is very easily: Loose 4 screws (23) remove the insulated pipe (24) to the left and rotate it to find 3 screws through the cooling holes (25) and loose them. Then turn the lamp house 90°and fix it with 3 screws. Finally replace the insulated pipe (24) and fix it with the screws (23). Showed in Fig. 2 and Fig. 3



23. Screws to Fix the Insulated Pipe **24. Insulated Pipe**
25. Cooling Holes **26. Focusing Rod for Condenser**

Fig.2 Epi-fluorescence Device（Lamp house is turned 90°）

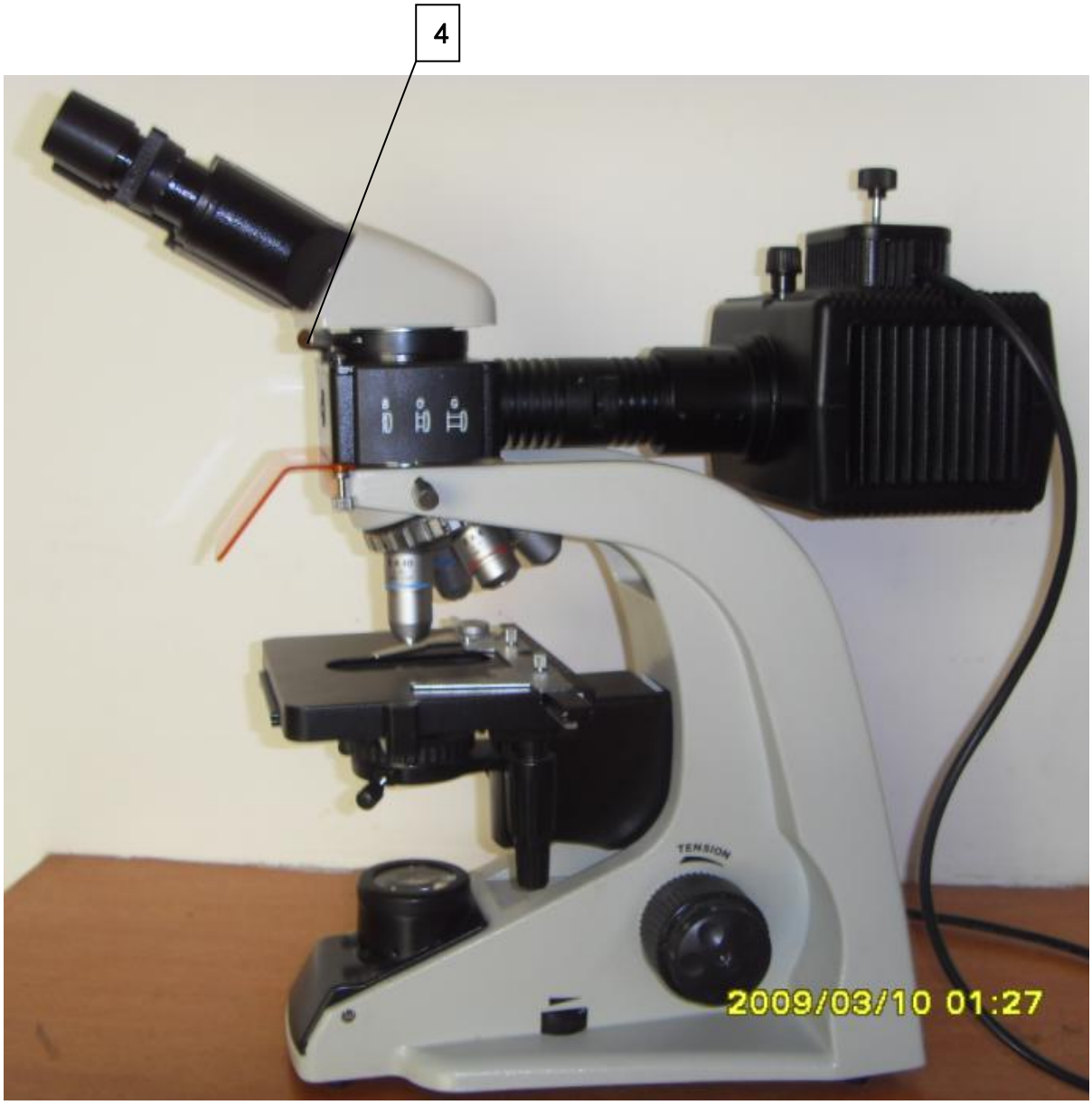


Fig.3 Epi-fluorescence Microscope（Lamp house is horizontal）

3. Install the ultraviolet bar（20）in the Epi-fluorescence device with the screw (12) and gaskets.

4. Plug the power cord of the Epi-fluorescence device into the socket (OUT) of the power supply box (19) and fix it.

5. If the objectives are packed in plastic bottles, please take them out and spin them in the nosepiece.

6. Install the viewing head (3) on the Epi-fluorescence device (22) with the screw (4).

7. Insert the eyepieces (2) into the tubes of the viewing head (3).

8. Connect the power supply box (19) with the power source.

C) The Principle, Function and Main Technical Parameters of the Fluorescence Microscope:

1. The Principle:

The light source of the Epi-fluorescence device will eradiate light with specific wavelengths. It will be transmitted on the sample and excite the sample to produce fluorescence. You may have a high brightness and high contrast image to achieve fluorescence observation and analyze.

2. Function:

The range of the spectrum excited: 350nm ～ 580nm

The range of the fluorescence spectrum: 420nm ～ 650nm

3. Technical Parameters and Outfit:

Name	Specification		Quantity
Epi-fluorescence device	B （blue）	EX490； DM510； BA515	1Set
	G （green）	EX545； DM580； BA590	
	O（ordinary transmission light）		
Microscope body	Coaxial coarse and fine focusing mechanism; Double layers mechanical stage; ABBE condenser; Built –in halogen lamp with brightness adjustor. Koehler illuminating system.		1Set
Viewing head	Articulated free binocular head; or Articulated free trinocular head; or sliding binocular head; or sliding trinocular head.		1Set
Eyepiece	Wide field plane-scope eyepiece : WF10X/18； WF16X/13		1Pair/each
Objective	Achromatic objective for fluorescence device： 4X； 10X； 40X(s)； 100X(s, oil)		1Set
Power supply box	In: AC90-254V； Out: 100W DC； Fuse: 5A		1Set
Light source	Mercury lamp	HBO Ultra-high pressure mercury spherical lamp: 100W	2Pcs
	Halogen lamp	6V/20W Halogen lamp; Fuse: 1A	2Pcs
Power cord			1Pcs
Immersion oil	Special immersion oil for fluorescence device		1bottle
Ultraviolet bar			1Pcs
Service manual			1Copy

D) How to Use the Fluorescence Microscope:

1. Turn on the switch (17) of the power supply box (19). It will be in full working condition after 10 minutes. The tension-guide line (16) will show the state of the mercury lamp.

2. Adjusting the center of the mercury lamp：

Push the excitation type selector (5) to the position “o”, and push the flashboard B (6) in a middle position. You will find a light shadow on the observation window (21). If the light shadow is not in the middle of the window, rotate the screw (8) to move the shadow up/down, rotate the screw (9) left/right.

3. Adjusting the condenser of the Epi-fluorescence device：

Thrust the excitation type selector (5) into the limiting position “B”. And place a white paper on the stage. Turn the 10X objective in working. Then turn on the switch of the power supply box (19) and a light shadow will fall down on the paper. Adjust the focusing rod for condenser (26) and the focusing knob of the microscope to focus the shadow to be a dot.

4. Preparation of the sample:

The sample can not be too thick. Otherwise the judgment will be affected by the overlapping cells or impurity.

Thickness of cover glass: 0.17mm;

Seal carrier: no fluorescence and no color;

Immersion oil: Special immersion oil for fluorescence device.

5. Fluorescent microscopy observation:

Turn off the halogen in the base and turn on the mercury lamp.

For the best fluorescence observation effect, it is necessary to close the field diaphragm in the base or cover the collector with pressboard. Because the lenses in collector possibly reflect ambient light to disturbance the fluorescent observation.

Push the flashboard B (6) in the middle position to pass the light with specific wavelengths.

According to the different demands, select the different spectrum range:

Pull the selector (5) out to the limiting position for G (green light) exciting state;

Push the selector (5) into the limiting position for B (blue light) exciting state;

Put the selector (5) in the middle position for general biological microscopy observation with ordinary transmission light;

When the fluorescent microscopy observation is paused, please push the flashboard B (6) to the left limiting position to stop the stimulating light and reduce the fluorescence quenching.

6. General biological microscopy observation:

Turn off the switch (17) of the power supply box (19) and push the selector (5) to the middle position “O”. Turn on the switch in the base and adjust the brightness of the halogen lamp by turning the plate (15) for general biological microscopy observation.

E) Use Scope of the Fluorescent Filter:

Filter		Use		
		Fluorescent Dye	Lighting Color	Medicine Examination Project
B （Blue）	EX: 490 DM: 510 BA: 515	P1TC; Pyoktanin Yellow O; Alkalinity Fluorescein; Acridine Orange; Fluorescein Sodium; Tetracyclin Sodium;	Green, Yellow Orange; Red	Fluorescence Immune Body; Cell Nucleus of the Tubercidin Bacillus; Cancer Cell、Red Blood Cell Protozoan Venereal Diseases Series
G （Green）	EX: 545 DM: 580 BA: 590	Luo Daming; Luo Daming B200; Acridine Orange	Orange-red	Fluorescence immune body *DNA

F) How to Shoot the Troubles in the Fluorescence Microscope:

If there are some troubles in operating, please recheck the instrument carefully as the following describing before connect with us or our representative in your area.

1. Troubles in electric system:

Troubles	Cause	Remedies
The power supply box can not be started	Power cord is not be connected	Connect the box wit the power source correctly
	Fuse is broken	Change it.
The mercury can not work	The mercury lamp is not electrified	Connect the lamp house with the power supply box correctly.
	The mercury lamp is broken	Change it

2. Troubles in optical system：

Troubles	Cause	Remedies
Nothing or too dark in the field after turn on the mercury lamp.	Flashboard B (6) is not in its position	Push the flashboard B (6) in correct position
	the selector (5) is not in its position	Push the selector (5) in correct position
	The filter system is inconsequence	Select appropriate lens
The image is blurring and low contrast	Objective or filter is dirty	Clean it
	The filter system is inconsequence	Select appropriate lens
	Immersion oil produces the fluorescence	Use special immersion oil
	The lamp in base is not turned off	Turn off the lamp
	The lenses in collector reflect ambient light to disturbance the fluorescent observation	Close the field diaphragm in base or cover the collector with pressboard
The brightness of the image is not even	The nosepiece is not in its position	Turn the nosepiece in correct position
	Flashboard B (6) is not in its position	Push the flashboard B (6) in correct position
	Epi-beam is not in the optical path	Correct it.
	The mercury lamp is not centered, or the condenser is not in focus	Readjust it

G) Maintenance and Care of Microscope:

1. Unpack the microscope carefully to prevent the accessories such as lens from falling down and damaging.

2. All lens are calibrated, don’t try to dismantle then apart by yourself.

3. Nosepiece and focusing system are advanced and precise in construction. Don’t try to dismantle them apart by yourself. Please connect with an authorized technician when they are in trouble.

4. Keep the mechanical parts from dust, and add a few no-corrosiveness lubricating grease into the sliding sections at regular intervals. Keep the optical elements clean when

wipe the microscope.

5. Keep the microscope in dry and cool place. Disconnect it with the power source and put the dust cover over it after using. If it will be not used for a longer time, it is the best way to screw the objectives out and place them into the lens-bottles, and screw the dust covers on the nosepiece.