



Biological Microscope

FM-BM-A102

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1. Safety tips:

1. This microscope is only used for microscopic observation and cannot be used for other purposes, otherwise it may cause damage to the instrument.
2. Except for the removable parts mentioned in this manual, it is strictly forbidden to disassemble any other parts. Otherwise, it may reduce the performance of the instrument, cause electric shock, injury and damage to the instrument. If there is any malfunction, please contact the nearest sales agent.
3. The input voltage is indicated on the sign on the back of the microscope. Confirm that the input voltage is consistent with the output voltage of the charging adapter used. If they are inconsistent, please do not use the microscope and contact the nearest sales agent. If the microscope uses the wrong input voltage, it will cause electrical damage and damage the microscope.
4. Using improper light source accessories may cause damage to the instrument or fire.
5. In order to prevent electric shock or fire, the power switch must be turned off before installing the microscope, replacing the light source accessories, and plugging in or unplugging the power supply. Turn off the power switch, just turn the switch to "○".
6. To prevent short circuit or other failures, please do not place the microscope in a humid place.
 - * If water splashes on the microscope, please turn off the power switch immediately (turn the switch to "○"), unplug the power cord, and wipe off the water with a dry cloth.
 - * When foreign matter enters or drips into the microscope, please stop using it and contact the nearest sales agent.
7. When moving the stage, the rack of the stage will extend outward. When operating the microscope, be careful not to hurt your hands or other parts of your body by the rack.
8. This microscope is a precision optical instrument. If used or kept improperly, the instrument will be damaged or its accuracy will be adversely affected. Please consider the following conditions when choosing a place of use, otherwise, it may cause the instrument function to decline or malfunction.
 - * Avoid placing the microscope in the following places: direct sunlight, vertically below indoor lighting, and other bright places.
 - * The room temperature of the operating environment and place is 0°C~40°C, and the maximum relative humidity is 85%. Do not place the microscope in a place with high temperature and high humidity. Otherwise, the lens will be fogged or moldy, which will damage the microscope and shorten its service life.
 - * Impurities and dust will reduce the optical performance of the microscope,

should be avoided as far as possible in this kind of environment.

* Strong electromagnetic noise will interfere with the output signal of the microscope. Avoid getting close to the instruments and equipment that emit electromagnetic waves.

* Place the microscope on a sturdy table that can bear the weight of the instrument and level it.

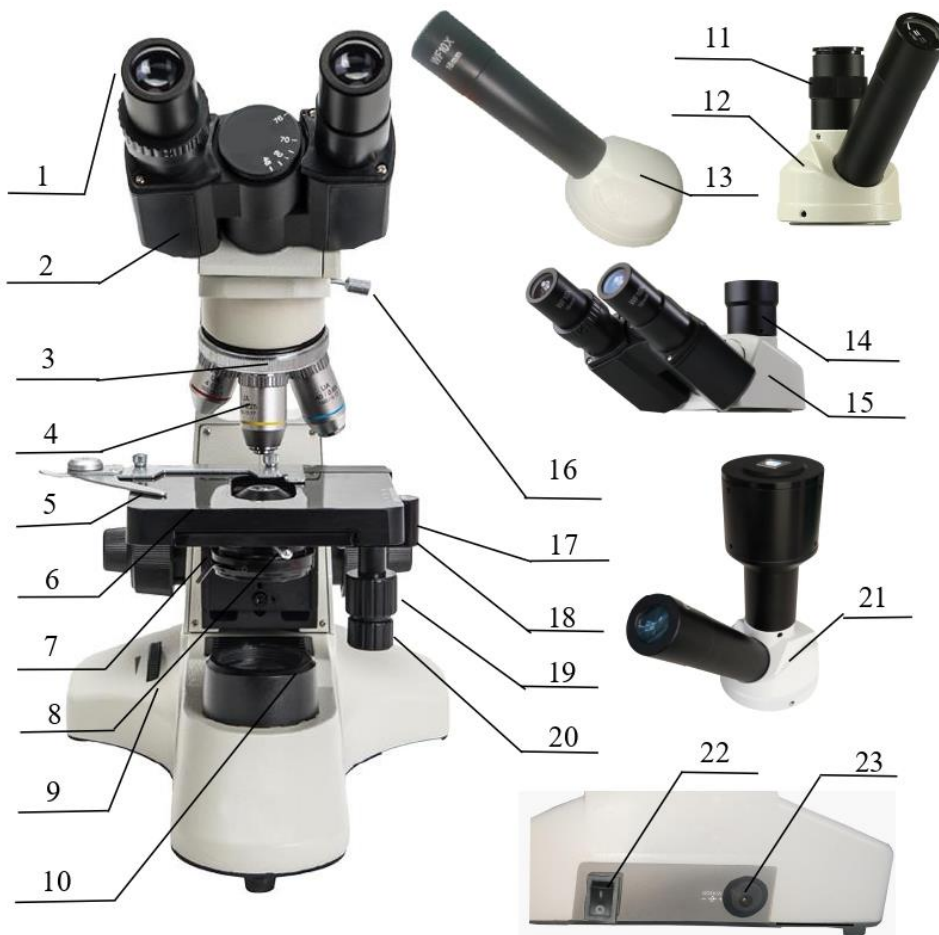
9. This microscope is a precision optical instrument, so be careful when handling it. Violent impact and rough operation will cause damage to the instrument. Vibrating the objective lens will reduce the imaging accuracy.

10. Please do not rotate the left and right focusing handwheels in opposite directions at the same time; when the stage has reached the limit of movement, please do not continue to rotate the coarse adjustment handwheel. These operations will cause damage to the focusing mechanism.

11. During oil immersion observation, only a small amount of oil immersion is required. Prevent excess oil from contaminating the stage and condenser, causing performance degradation.

When replacing the objective lens and the end of the observation, the immersion oil should be wiped off in time to avoid staining other lenses and difficult to remove after the immersion oil is dry.

2. Instrument structure and working characteristics



(1) Eyepiece: Perform secondary magnification on the specimen for observation;
 (2) Binocular viewing head: observe the specimen;
 (3) Nosepiece: select the desired objective lens (sound location);
 (4) Objective lens: first magnify the specimen;
 (5) Slice clip: fixed slice;
 (6) Stage: Place specimens;
 (7) Condenser diaphragm lever: adjust the size of the condenser diaphragm;
 (8) Condenser lifter lever: adjust the lift of the condenser;
 (9) Brightness adjustment dial: adjust the brightness of the lamp to make the field of view moderately bright and dark;
 (10) Condenser: converge light to illuminate the specimen;

(11) Adjustable diopter connection tube: adjust the definition of video image;
 (12) Monocular TV viewing head: visual and video observation specimens;
 (13) Monocular viewing head: observe the specimen;
 (14) Trinocular connection tube: used to connect additional lens and CCD for trinocular observation;
 (15) Trinocular viewing head: visual and video observation of specimens;
 (16) Fixing screw: fix the observation head;
 (17) Coarse adjustment handwheel: to adjust the focus of the specimen;
 (18) Fine adjustment hand wheel: fine focus of the specimen;
 (19) Y-direction moving handwheel: adjust the longitudinal movement of the stage;
 (20) X-direction moving handwheel: adjust the lateral movement of the stage;
 (21) Monocular digital observation body: visual and video observation;
 (22) Power switch: the main power switch of the instrument;
 (23) Power socket: connect to external power supply;

3. Technical specifications

The Main Parameters	Total Magnification	40X-640X, 40X-1600X		
	Mechanical Tube Length	160mm	Conjugate Distance of Objective Lens	195mm
Viewing Head	Monocular Head	Observation Angle: 45° inclined, 360° rotation		
	Monocular TV Tube	Observation Angle: 45° inclined, 360° rotation		
	Digital Viewing head	Observation Angle: 45° inclined, 360° rotation		
	Compensation Binocular Head	Observation Angle: 30° inclined	Interpupillary distance: 48-76mm	
	Compensation Trinocular Head	Observation Angle: 45° inclined	Interpupillary distance: 48-76mm	
Eyepiece	Wide field: WF10×/18mm		Eyepiece interface: 23.2mm, Parfocal distance: 10mm	
	Wide field: WF16×/13mm			
Objective	Magnification	N.A.		Remark
	4X Objective	0.1		
	10X Objective	0.25		
	40X(S) Objective	0.65		
	100X(S, O) Objective	1.25		
	Objective lens interface: WJ 4/5"×1/36"			
Condenser	Abbe Condenser	NA: 1.25, with iris diaphragm, lever up and down		
Focusing system	Coaxial coarse and fine adjustment Coarse adjustment: 20mm, fine movement accuracy: 0.002mm			
Working Stage	Double-layer mechanical moving stage, Size: 115mm×125mm, 140mm×132mm(Optional) Moving Range 76mm×50mm			
Illumination	Upper light source	1W LED Cool light source (Optional)		
	Bottom light source	3W LED (Brightness adjustable)		
Power	Input	AC100V-240V		
	Output	DC 5V/2A		
Battery	Single 1600mAH rechargeable lithium battery (Optional)			
Digital signal (Optional)	0.47MP CCD, 0.48MP-3.1MP CMOS			
	Signal output port: USB2.0、HDMI、AV、VGA、WIFI			
	Display screen: 9.7 inch, 10.1 inch, 7 inch			

Note: Configure according to customer requirements, and the specific order and contract shall prevail!

4. Instrument installation

4.1 Place the microscope on a stable workbench. When moving the instrument parts, especially the optical parts, avoid touching the surface of the lens with your hands or oily objects. Fingerprints or oil stains on the surface of the lens will affect the image quality.

4.2 During transportation, a protective film will be attached to the surface of the working stage. The protective film should be removed before use (see Figure 1).



Fig. 1

4.3 Gently place the required observation head (2)/ (12)/ (13)/ (15)/ (21) into the mounting hole of the rack, lightly press the upper part of the viewing head with one hand, use the other hand to tighten the fixing screws on the upper part of the rack, make sure that the viewing head is secured and there is no looseness during installation (see Figure 2).



Fig.2

4.4 After the microscope is installed, confirm that the power supply voltage is consistent with the rated voltage of the instrument, insert the DC plug into the power socket (23) of the base and connect it to the external power supply, as shown in Figure 3.



Fig.3

4.5 Finally, insert the eyepiece (1) into the eyepiece tube of the microscope

5. Method of operation

5.1 Turn on the lighting

5.1.1 Turn on the power, turn on the light source

Turn on the power switch (22) and turn it to " I ", (If it is configured with upper light source, turn the switch to "—" to turn on the bottom light source, and turn the switch to " = " to turn on the upper light source) to make the bottom light source bright , As shown in Figure 4.

Fig.4

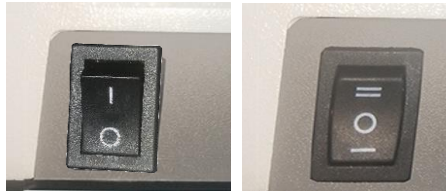


Fig.5



5.1.2 Adjust the brightness of the light source

Turn the brightness adjustment dial (9) to adjust the brightness of the field of view, as shown in Figure 5.

5.2 Place specimen slices

5.2.1 Gently open the slice holder (5) with your fingers, put the slices in, with the cover glass upward, release your fingers to fix the slices.

5.2.2 Adjust the moving handwheels (19) and (20) of the stage so that the observed area is directly below the objective lens (4) to facilitate observation and adjustment, as shown in Figure 6.



Fig. 6

5.3 Focus with 10X objective lens

* Rotate the objective lens converter (3) to move the 10X objective lens into the optical path (when it rotates in place, there will be a sound to indicate it).

* Rotate the coarse adjustment handwheel (17) to move the stage (6) to the highest position (see Figure 7).

* Observe through the eyepiece (1) and slowly rotate the coarse adjustment handwheel (17) to lower the stage.

Stop rotating when the specimen image appears (see Figure 7).

5.4 Rotate the fine-tuning handwheel (18) for precise focusing (see Figure. 7)



Fig. 7



* When you want to observe with a high magnification objective lens, first use a 10X or 4X objective lens to focus, then replace the high magnification objective lens, and rotate the fine focusing handwheel for precise focusing.

* When using the coarse adjustment handwheel to raise the stage, please pay attention to the distance between the upper surface of the specimen and the lower end surface of the objective lens.

* Since the working distance of 10X and 4X objective lenses is relatively large, as long as the standard thickness of the slide and cover glass are used (the standard thickness of the slide and cover glass are 1.2mm and 0.17mm respectively), even if the stage moves to the highest position, the objective lens will not touch the specimen.

5.5 Adjust the condenser diaphragm adjustment lever (7) to make the aperture diaphragm meet the observation requirements. (See Figure 8)

5.6 Adjust the condenser lift lever (8) (see Figure 8) to make the condenser meet the observation requirements.

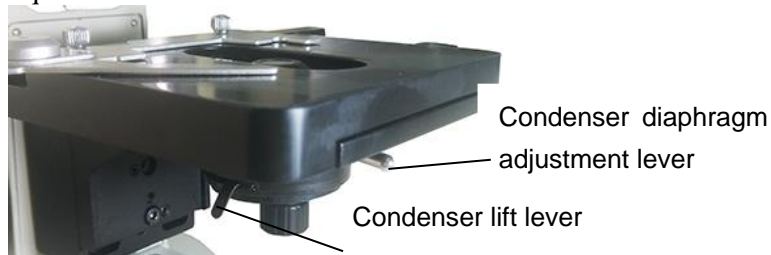


Fig.8

5.7 When using a 100X objective lens for observation, it is necessary to drop an appropriate amount of cedar oil on the slides so that the front end of the 100X objective lens is in full contact with the cedar oil for observation. After the observation, please wipe the cedar oil with a clean lint-free cloth.

5.8 After using the microscope, turn off the power switch (22).

6. Installation and use of accessories (optional)

6.1 Installation of external CCD camera accessories

6.1.1 Monocular TV viewing head: Take out the



camera end onto the front the interface into the (11), and use the connect the VIDEO OUT the video input of TV. of the microscope and microscope and the TV clearly according to the d in the operation method e trinocular connection ige appears on TV, video med (see Figure 9).

viewing head: Remove the d of the USB cable into viewing head, insert the 's USB interface, plug plug, open the microscope l follow the operation ing method, clarifying, rs on the computer



Hint

For the parameters and methods of use of CCD cameras and digital observation heads, please refer to the instruction manual in the CCD camera or digital viewing head.

6.1.3 Trinocular viewing head: Take out the CCD camera, rotate the CCD adapter to the camera, then insert the camera into the trinocular head (14), connect the video output of the camera and the video input of the computer, plug in the microscope power plug. Open the microscope and computer switch, according to the operation method 5.3 and 5.4 focusing method, find the image under the visual observation, then adjust the CCD adapter to get a clear image on the computer screen, rotate the CCD camera and the CCD adapter, so that the image direction on the display is consistent with the visual observation, tighten the screws on the trinocular tube, then the video observation can be performed (see Figure 11).

CCD simple
adapter



Fig.9



Fig.10

CCD Camera

CCD Adapter

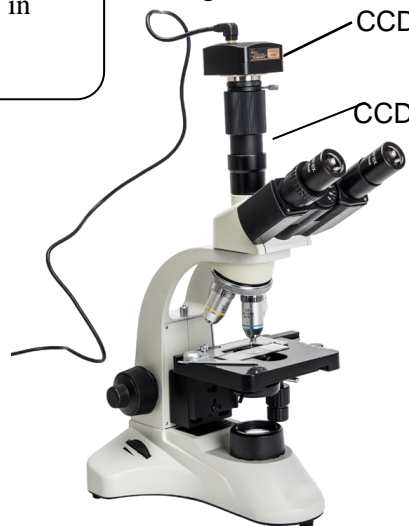
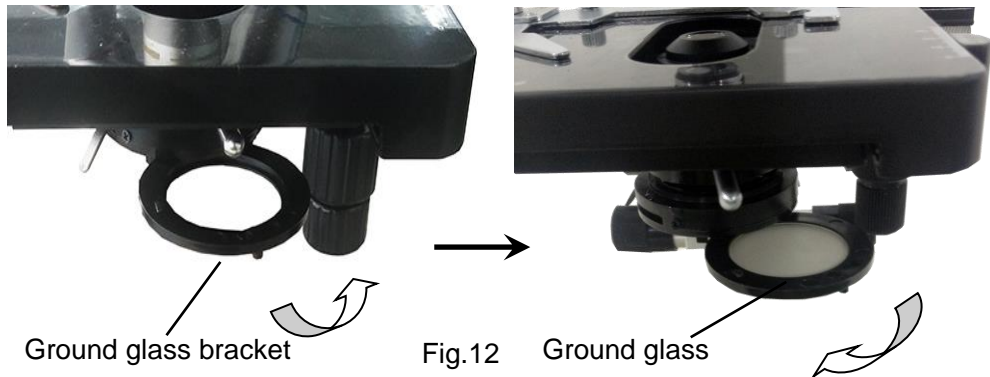


Fig.11

6.2 Install ground glass

When the illumination method is LED lighting, we need to add ground glass, first transfer the ground glass bracket, put the ground glass smoothly in the bracket, and then turn the ground glass bracket back into place. (See Figure 12)



Notice

When using 4X objective lens for observation, frosted glass should be installed, and frosted glass should also be used for 10x observation to ensure uniform illumination.

7. Care and maintenance

- 7.1 When the microscope observation is completed or the use is suspended, press the switch "O" to cut off the power supply to prevent the electrical components in the instrument from still working. When not in use for a long time, unplug the adapter from the power socket and keep all transmission wires properly.
- 7.2 To clean the lens: blow off with a blower or wipe off the dust on the lens with a soft brush; heavy dirt and fingerprints can be gently wiped with a mixture of alcohol and ether with lens paper or a soft cloth (the mixture ratio of the two is approximately: alcohol 20-30%, ether 70-80%).
- 7.3 Clean the surface of the instrument: Wipe with a clean soft cloth; heavy dirt can be wiped with a neutral detergent.



Notice

Do not use organic solvents (such as alcohol, ether and its diluent, etc.) to wipe, so as to prevent the paint on the surface of the instrument from peeling off.

- 7.4 Storage: When the microscope is not used for a long time, please turn off the power of the instrument, cool the bulb sufficiently, put the dust cover of the microscope and put it in the packing box; store in a dry, ventilated, clean place without acid and alkali steam, so as to avoid the lens from getting moldy.

8. Troubleshooting list

Common malfunctions	Cause	Handling
The field of view is blurred or the brightness of the field of view is uneven, and cannot see the complete field of view.	Bad nosepiece positioning (The objective lens is not coaxial with the optical path)	Rotate the nosepiece until the objective is positioned correctly (move the objective lens into the optical path correctly)
	Condenser is not centered	Adjust the center of the condenser
	Incorrect bulb installation	Check whether the bulb is inserted in the correct position
	Smudges or dust on the condenser, objective, light collector, eyepiece, or specimen	Wipe the relevant parts
	The aperture diaphragm is too small	Properly open bigger
Unclean field of view	The lens surface is not clean	Wipe clean
	The surface of the slide is not clean	Wipe clean
The sharpness is not good The image is not clear	Specimen without cover glass	Attach a cover glass
	The cover glass is too thick or too thin	Use standard thickness (0.17mm) cover glass
	The top and bottom of the specimen are reversed	Flip the slide
	Immersion oil on dry objective	Wipe clean
	The lens surface is not clean (objective\ eyepiece\ condenser\ light collector)	Wipe clean
	The aperture diaphragm is too small	Properly open bigger
The image is dark on one side	Bad nosepiece positioning	Rotate the nosepiece until the objective is positioned correctly
	Specimen is higher than the stage	The slide clamp should clamp the specimen on the stage

Cannot adjust the focus when using high magnification objectives	The top and bottom of the specimen are reversed	Flip the slide so that the cover glass is facing upwards
	Cover glass is too thick	Use standard thickness (0.17mm) cover glass
	The objective lens is not fastened	Tighten the objective lens
The left and right images do not overlap when using the binocular tube to observe	Unadjusted interpupillary distance	Adjust interpupillary distance
	Unadjusted diopter	Adjust diopter
Light bulb does not light up	No power	Check whether the power switch is turned on and whether the voltage of the charger matches the voltage marked by the instrument
	Poor contact between charger plug and socket	Check whether the connection between the charger and the socket is firm and reliable
	Rechargeable battery is too low (If it is rechargeable)	Plug in the power adapter to charge
The light source flickers and the brightness is unstable	Poor bulb contact	Plug the bulb
	Poor socket contact	Check if the socket connection is reliable

9. Warranty Policy

9.1 Warranty period

The company provides a one-year warranty service from the day the customer purchases the product.

9.2 Non-warranty policy

The following situations (but not limited to the following situations) are not covered by the warranty and need to be paid for maintenance:

- * The warranty period has expired
- * Damage caused by force majeure
- * Damage caused by man-made damage or improper use and storage
- * Any damage caused by use, maintenance and adjustment not in accordance with the requirements of the "Instruction Manual"

* Personnel who are not authorized by the company dismantle, repair, modify, misuse, abuse, enter liquid, accident, use non-original accessories to cause malfunction or damage, maliciously damage the content of the warranty card, tear up, tamper, etc.

* Other failures and damages that are not caused by the products own design, manufacturing, quality, etc.

9.3 Warranty Card

Model number Product code			
Fault phenomenon			
Purchase date			
Contact person		Contact number	
Contact address			
Note: This form is the receipt page of the warranty card. Please cut out this form and send it to the seller or manufacturer.			