



Biological Microscope FM-BM-A102

www.fison.com | info@fison.com

Index

Sr.no	Title	Page no
1.	Safety Measures	2
2.	Introduction	4
3.	Features	4
4.	Specifications	5
5.	Applications	5
6.	Instrument Introduction	6
7.	Installation	8
8.	Operations	10
9.	Maintenance	13
10.	Troubleshooting	14
11.	Accessories	16

1. Safety Measures

- 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 an electric shock, injury, or damage to the instrument. If there is any malfunction.
- 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 to the microscope.
- 4) Using improper light source accessories may cause damage to the instrument or fire.
- 5) 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 " \bigcirc ".
- 6) To prevent short circuits 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, stop using it and contact your personnel service 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's 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 $0^{\circ}C \sim 40^{\circ}C$,
 - 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, and 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) 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, 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.
- 12) 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. Introduction

Biological Microscope FM-BM-A102 comes with trinocular 30° inclined viewing head, 40 to 1600X zoom magnification range, with camera attachment for microscopic observation. With ergonomic design, high quality 195 achromatic objectives are used to reduce strain on eyes during observation.

3. Features

- 1. Finite optical system
- 2. High zoom magnification range
- 3. Trinocular (30° inclined) viewing head
- 4. Built-in handle for easy access
- 5. CCD camera attachment for digital photography

4. Specifications

Model No.	FM-BM-A102	
Optical System	Finite Optical System	
Viewing Head	Trinocular viewing head, 30° inclined, 360° rotation, interpupillary distance 48 to 75 mm	
Magnification	40X to 1600X	
Objectives	195 Achromatic objectives 4x, 10x, 40x (Spring), 100x (Spring, oil)	
Eyepiece	Wide field WF10X/18mm and Wide field WF16X/15mm	
Nosepiece	Inward, Quadruple revolving nosepiece	
Focusing system	Coaxial coarse & fine focusing knob, coarse focusing range 20 mm, fine focusing graduation 0.002 mm	
Stage	Double layer mechanical stage size: 115 × 125 mm, range: 76 × 52 mm	
Condenser	Abbe condenser N.A.1.25, with iris diaphragm, and height adjustment knob	
Illumination	3W LED lamp, brightness adjustable	
Power	External power supply (adapter), AC 100V-240V, DC 5V/2A	
Voltage	220 V, 50 Hz	
Weight	14 kg	

5. Applications

Used for microscopic examination across medical, tissue culture industries, geneology, metallurgy, as well as inspection of electrical board, and others.

6. Instrument Introduction



Figure-1

- 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

7. Installation

- 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.
- 2) During transportation, a protective film will be attached to the surface of the working stage. The protective film should be removed before use.



3) Gently place the required observation head 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.



Figure-3

- 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.
- 5) Finally, insert the eyepiece into the eyepiece tube of the microscope.

8. Operations

8.1 Turn on the lighting

1) Turn on the power, turn on the light source

Turn on the power switch 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.





Figure-4

2) Adjust the brightness of the light source

Turn the brightness adjustment dial to adjust the brightness of the field of view,

8.2 Place specimen slices

- 1) Gently open the slice holder with your fingers, put the slices in, with the cover glass upward, release your fingers to fix the slices.
- 2) Adjust the moving handwheels and of the stage so that the observed area is directly below the objective lens to facilitate observation and adjustment.



Figure-5

8.3 Focus with 10X objective lens

- 1) Rotate the objective lens converter to move the 10X objective lens into the optical path (when it rotates in place, there will be a sound to indicate it).
- 2) Rotate the coarse adjustment handwheel to move the stage to the highest position.

- 3) Observe through the eyepiece and slowly rotate the coarse adjustment handwheel to lower the stage.
- 4) Stop rotating when the specimen image appears



Figure-6

8.4 Rotate the fine-tuning handwheel

- 1) 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.
 - 2) 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.
 - 3) 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.

8.5 Adjust the condenser diaphragm, lift lever

- 1) Adjust the condenser diaphragm adjustment lever to make the aperture diaphragm meet the observation requirements.
- 2) Adjust the condenser lift lever to make the condenser meet the observation requirements.



Figure-7

- 3) When using a 100X objective lens for observation, it is necessary to drop an appropriate amount of cedar oil on the slices so that the front end of the 100X objective lens is in full contact with the cedar oil for observation. After the observation, wipe the cedar oil with a clean lint-free cloth.
- 4) After using the microscope, turn off the power switch.

9. Maintenance

- 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.
- 2) When not in use for a long time, unplug the adapter from the power socket and keep all transmission wires properly.
- 3) 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%).
- 4) Clean the surface of the instrument by wiping with a clean, soft cloth; heavy dirt can be wiped with a neutral detergent.
- 5) When the microscope is not used for a long time, 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.

10. Troubleshooting

Common Malfunctions	Cause	Handling
The field of view is	Bad nosepiece positioning (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)
blurred or the	Condenser is not centered	Adjust the center of the condenser
brightness of the field of view is uneven, and cannot see the complete field of view.	Incorrect bulb installation	Check whether the bulb is inserted in the correct position
	Dust on the condenser, objective, light collector, eyepiece, or specimen	Wipe the relevant parts
	The aperture diaphragm is too small	Properly open bigger
	The lens surface is not clean	Wipe clean
Unclean field of view	The surface of the slide is not clean	Wipe clean
	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 sharpness is not	The top and bottom of the specimen are reversed	Flip the slide
good, and the image is	Immersion oil on dry objective	Wipe clean
not clear	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	Bad nosepiece positioning	Rotate the nosepiece until the objective is positioned correctly
one side	Specimen is higher than the stage	The slide clamp should clamp the specimen on the stage
Cannot adjust the focus when using high magnification	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
objectives	Objective lens is not fastened	Tighten the objective lens
The left and right images do not overlap	Unadjusted interpupillary distance	Adjust interpupillary distance
when using the binocular tube to observe	Unadjusted diopter	Adjust diopter

Light hulk doog not	No power	Check whether the power switch is turned on and whether the voltage of the charger matches the voltage marked by the instrument
Light bulb does not light up	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	Plug in the power adapter to
	low (If it is rechargeable)	charge
The light source	Poor bulb contact	Plug the bulb
flickers and the brightness is unstable	Poor socket contact	Check if the socket connection is reliable

11. Accessories

Accessories no.	Name
1	Upper light source
2	Digital Eyepiece 2 MP
3	Digital Eyepiece 3 MP
4	Phone Adapter
5	Digital Camera 3 MP for Trinocular
6	Digital Camera 5 MP for Trinocular



Fison Instruments Ltd 272 Bath Street Glasgow G2 4JR UK Email: info@fison.com | Website: www.fison.com