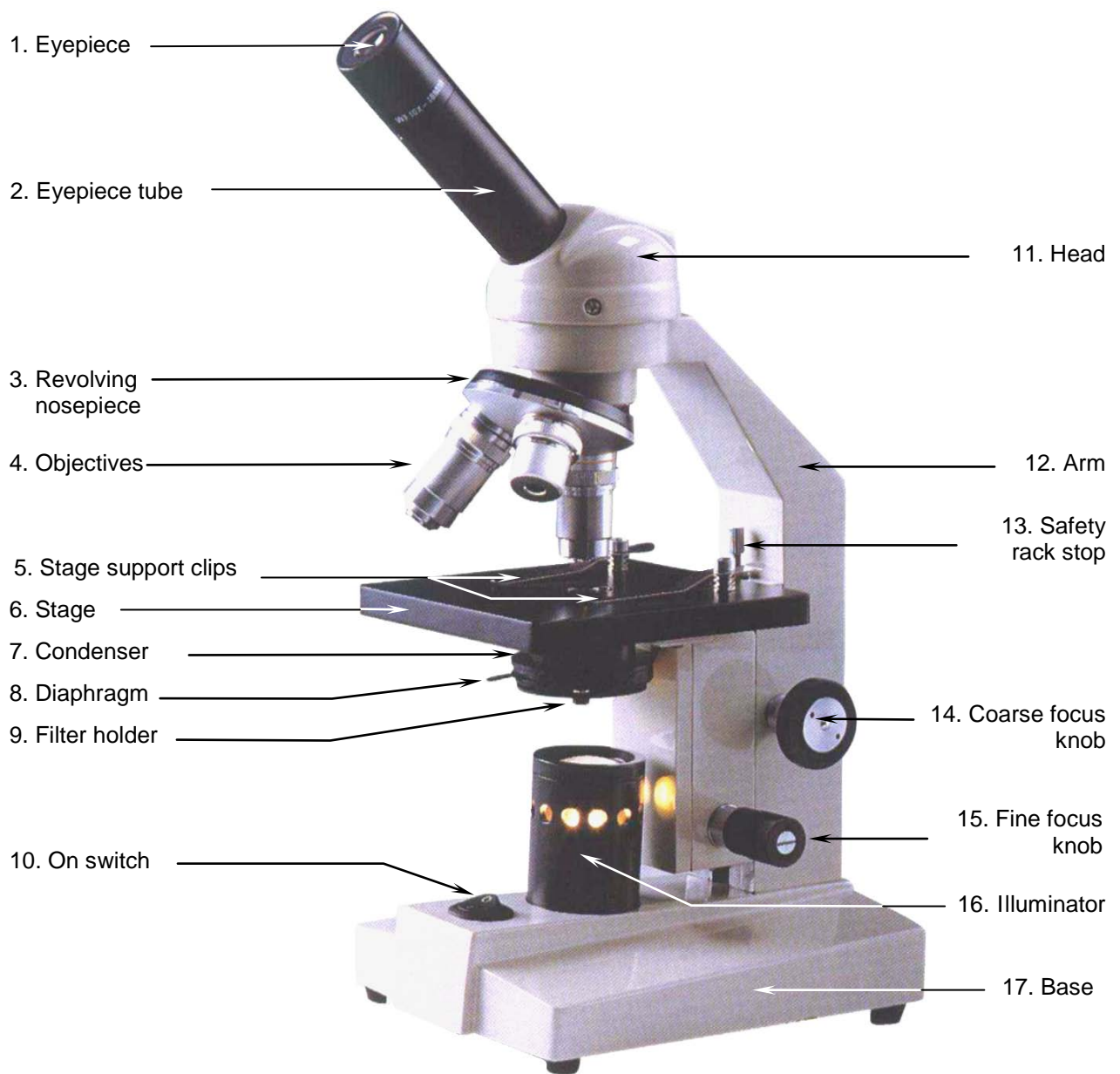


**Motic<sup>®</sup> Microscopes**

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*Instruction Manual*

*SFC-100 Series*



Model SFC-100FL

## **Introduction**

Thank you for your purchase of a Motic microscope. Motic microscopes are precision instruments, subjected to meticulous examination in order to reach you in perfect condition. Their design combines easy management and optimum functioning with minimum maintenance.

The information contained in this manual is likely to go beyond what the average user needs to know to use the microscope, however, it is provided to answer any queries that may arise.

Your new microscope combines high performance features, with an excellent degree of optical resolution and clarity of image. It incorporates a 120mm x 110mm stage with objectives located on a ball bearing nosepiece; a precision coarse and fine focusing system; coarse and fine focus knobs, a fixed Abbe condenser with a numerical aperture of 0.65 N.A. and a built-in 220V/ 20W tungsten illumination. The SFC-100FL(H) model incorporates 12V/10W halogen illumination.

These instructions should be read carefully before operating the microscope. They will permit you to use your new microscope to its fullest capabilities. Terminology used to describe components and controls can be found in the diagram on page 2.

**These instructions are based on the assembly and use of the SFC-100FL model with additional notes applying specifically to models SFC-100FL(H) and SFC-100FLED.**

## **Unpacking**

All components of the microscope have been carefully packed to make sure they reach you in perfect condition. We recommend that you do not discard any packing containers in case you need to return the microscope or store it for long periods of time; or should it become necessary to transport it to a technical service for any repair, or maintenance procedure.

The box should contain the following components, depending on the model:

- SFC-100FL: A microscope with a monocular head, eyepiece, fixed stage, 0.65 A.N. condenser and three objectives. A blue filter and a protective dust cover are also included.
- SFC-100FL(H): A microscope with a monocular head, eyepiece, fixed stage, 0.65 A.N. condenser and three objectives. A blue filter and a protective dust cover are also included.
- SFC-100FLED: A microscope with a monocular head, eyepiece, fixed stage, 0.65 A.N. condenser and three objectives. A protective dust cover is also included.

**Remove and handle the microscope and all its components with extreme care.**

**Avoid touching the lenses of the optical elements and keep clear of contact with dust, water or other contaminating agents, as they could stain, or damage the lens surface and affect the quality of the image.**

- A. Place the microscope in an upright position on a clean flat and stable surface.
- B. Remove the rest of the components from the box.

## Description of components

1. Head (11). Monocular 360° rotating head, allows user to observe, without necessity of moving the microscope.
2. Eyepiece (1). The lenses closest to the eye, they magnify the image formed by the objectives. The eyepiece includes a pointer to signal out any particular element to another user.
3. Revolving nosepiece (3). The revolving action permits the user to change the degree of magnification, the correct positioning of the objectives is marked by a “click” in the optical path.
4. Objectives (4). The group of lenses closest to the sample, or microscopic specimen forming the first magnified image.
5. Stage (6). Platform of the microscope where the specimen is placed. The specimen slide is held in place by specimen holder clips.
6. Condenser (7). Optimises illumination for enhanced resolution and image contrast.
7. Focusing Knobs (14-15). Situated on both sides of the arm of the microscope, the larger, or coarse focusing knob initially brings the specimen into focus, and the smaller, fine focusing knob permits a precise adjustment of the image.
8. Illumination (10-16). The SFC-100FL comes with a 220V/20W tungsten bulb, the SFC-100FL(H) with a halogen 12V/10W bulb and the SFC-100FLED with a LED 3.5V/70mW.

**Warning:** Before connecting the microscope to an electrical source, always check that the voltage coincides with that of the microscope.

## Operation

### A. Starting Up

1. Connect the microscope to a power source.
2. Press the ON switch (10).

**Note:** The LED illuminating microscope comes with 3 “AA” size 1.2V Nickel Metal Hydride (NiMH) batteries. The batteries are not charged, but there may be enough power to turn the LED light on. We recommend that you charge the batteries for 12 hours before you use this microscope for the first time.

### B. Focussing the microscope.

1. Turn the revolving nosepiece (3) and place the 4X objective (4) in the optical path, clicking well into place.
2. Turn the coarse focus knob (14) until the stage (6) has been moved to its lowest position.
3. Place the microscopic specimen slide on the stage, making sure that the cover slip is raised. Lift the specimen holder clips (5) pressing downwards on the lower part, and slide the specimen slide under the clips. Release pressure so that the slide is firmly held in place.
4. Make sure that the specimen on the slide is in the optical path.
5. Looking through the eyepiece (1), turn the coarse focus knob until the sample appears in focus.
6. Readjust the focus with the fine focus knob (15) until the image appears sharp.

C. Adjusting the aperture of the diaphragm.

The diaphragm (8) should not be used to regulate the light intensity, its function is to obtain a high resolution of the specimen and to provide contrast in the image. Smaller apertures will deliver higher contrast to image, although closing the aperture too much will reduce resolution. The best way to obtain the correct aperture of the diaphragm is to experiment. Suggested apertures for each objective are as follows:

OBJECTIVE	APERTURE OF IRIS
4X	From fully closed to 1/8 open.
10X	From 1/8 to 1/4
40X	From 1/4 to 1/2
100X (optional)	From 1/2 to 3/4

D. Changing magnification.

1. Position the objective 10X (4) in the optical path.
2. This microscope has already been parfocalised, although it is possible that small differences exist between the objectives. It may then be necessary to adjust the focus slightly with the fine focus knob (15).
3. When changing to the 40X and 100X objectives (optional), it must be done with great care, ensuring that the objectives do not cause damage to the front lens.
4. In order to obtain maximum resolution of the 100X objective (optional), it is necessary to apply immersion oil between the cover slip of the slide and the front lens of the objective.
  - a. Only a very small amount of immersion oil is needed, a drop should be enough.
  - b. If air bubbles appear they can be removed by gently rotating the nosepiece (3) back and forth.
  - c. After viewing, all parts that have come into contact with the oil must be cleaned using a soft cotton cloth, lightly dampened with Xylene. If the 100X objective is not cleaned, the oil will dry, and it will not be possible to see through it; permanent damage could also occur.

**NB. Immersion oil must ONLY be used with the 100X objective, as it is the only one specially prepared for it. If any other objective comes into contact with the oil, it must be cleaned immediately.**

## **Maintenance**

**WARNING:** FOR YOUR OWN SAFETY SWITCH OFF AND DISCONNECT THE MICROSCOPE FROM ANY ELECTRICAL SOURCE, BEFORE ATTEMPTING ANY MAINTENANCE PROCEDURE TO AVOID THE RISK OF ELECTROCUTION.

IF THE MICROSCOPE REQUIRES ANY MAINTENANCE OR REPAIR NOT APPEARING IN THIS MANUAL, CONSULT YOUR DISTRIBUTOR.

A. Optical maintenance

Do not attempt to disassemble any optical component.

Prior to cleaning any of the lens surfaces, remove dust particles using a fine brush, specifically for cleaning lenses. Alternatively, use low pressure compressed air, available in shops selling photography equipment.

1. Cleaning the eyepiece
  - a. Do not remove eyepiece (1) from eyepiece tube (2).
  - b. Clean only the outer surface, misting the lens with breath.
  - c. Dry by wiping with lens paper in circular movements, from centre, outwards. Do not wipe lenses when dry, as they can easily be scratched.
2. Cleaning the objectives.
  - a. Do not remove the objectives (4) from the microscope.
  - b. Only clean the outer surface, dampening a soft cotton cloth slightly with Xylene then drying the lens with the same cloth.
3. Cleaning the condenser.
  - a. Clean only the top lens surface using either of the above methods, as for the eyepiece, or the objectives.
4. Cleaning the illuminator lens.
  - a. Use any of the above methods, as for eyepiece, or the objectives.

B. Electrical maintenance.

**WARNING:** FOR YOUR OWN SAFETY SWITCH OFF AND DISCONNECT THE MICROSCOPE FROM ANY ELECTRICAL SOURCE, BEFORE ATTEMPTING ANY MAINTENANCE PROCEDURE TO AVOID THE RISK OF ELECTROCUTION.

1. Changing the bulb

- For the SFC-100FL
  - a. Unscrew the illuminator (16) in a clockwise direction. If the bulb has been used, make sure that it has cooled down.
  - b. Carefully take hold of the bulb, push down, and turn  $\frac{1}{4}$  in an anti-clockwise direction. Release pressure and the bulb will be freed from the socket.
  - c. Insert new bulb by pushing down and turning  $\frac{1}{4}$  turn in a clockwise direction.
  - d. Clean bulb if it has been touched, as this could leave traces and affect the transmission of light.
  - e. Screw down the illuminator.
- For the SFC-100FL(H)
  - a. Lay the microscope down on its side taking extren (1).
  - b. Completely unscrew the 4 screws indicated (Fig. 1)
  - c. Open the cap on the base.
  - d. With a cloth carefully take hold of the bulb and pull



Fig.1

- e. Do not touch bulb with fingers, use a clean cloth and insert pins of bulb into socket.
  - f. If bulb has been touched, clean it as this could affect light transmission.
  - g. Close the cap, and screw down firmly.
- For the SFC-100FLED
    - a. Lift up the stage using the focusing knobs.
    - b. Unscrew the screws indicated. (Fig. 2)
    - c. Take out the top part of the illuminator carefully without damage the bulb, the condenser or the illuminator.
    - d. With carefully take out of the bulb and pull outwards to disconnect it from the socket.
    - e. Do not touch the new bulb with bare hands. Use a clean cloth to insert the bulb pins into the socket.
    - f. If the bulb is touched with bare hands, it must be cleaned, as the transmission of light could be affected.
    - g. Put on again the top part of the illuminator and tight the screws.

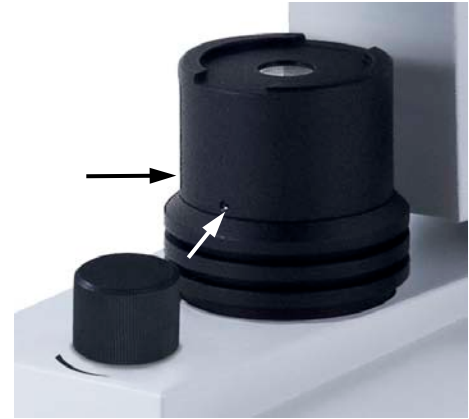


Fig. 2

## 2. Changing the fuse (Fig. 3).

- a. With a flat screwdriver, press lightly on the slot on the fuse holder cap and turn  $\frac{1}{4}$  way in the direction of the arrow indicated.
- b. Release pressure and remove cap.
- c. Remove the fuse from the cap by pulling it out, and insert a new one, ensuring that it is 0.5 Amps.
- d. Insert cap with fuse.
- e. Repeat (a.) turning  $\frac{1}{4}$  in the opposite direction to the arrow indicated. The cap should be firmly closed.



Fig. 3

3. Changing the batteries.

- a. Unplug the charger.
- b. Remove the screws from the bottom plate of the microscope base, and move away the bottom plate carefully, (as referred to Fig.1)
- c. Release the screw from the battery chamber (Fig.4), then slide off the lid.
- d. Insert the batteries to the battery chamber according to the indications on the chamber (Fig.4).
- e. Slide back in the lid carefully and tighten firmly with the original screw.
- f. Replace back the bottom plate of the microscope and tighten it with the screws as shown in Fig. 1.



Fig. 4

E. Mechanical maintenance.

1. Adjusting the tension of the coarse focus knob.

The collar to adjust the coarse focus tension (Fig. 5) is situated between the coarse focus knob (14) and the arm (12).

The tension of the coarse focus knob comes pre adjusted by the manufacturer. The optimum tension point is that which permits fluid movement of the knobs, without the stage (6) sliding down on its own.

- a. To adjust the tension, first loosen the screw situated in one of the collar holes, with a 2mm hexagonal key.
- b. To tighten the tension of the coarse focus knobs, turn the collar anti-clockwise; or to loosen it, turn clockwise.
- c. Tighten the hexagonal screw.

Tension  
adjustment  
collar

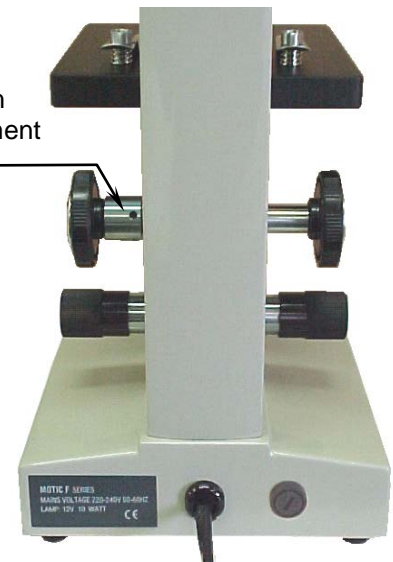


Fig. 5

2. Adjusting the rack stop.

The 40X objective uses a retractable security system to avoid damage to the specimen slide or to the front of the lens, should the two come into contact. Additionally as a security measure, the microscope includes a rack stop screw that regulates the upward movement of the stage. The rack stop screw comes pre-adjusted by the factory for standard slides with a 0.17mm thick cover slip. However, for observing other types of slides adjustment may be necessary.

- a. Loosen the rack stop screw. (13)
- b. Unscrew the knurled screw. (13)
- c. With the fine focus knob at mid-range, focus on specimen slide, using only the coarse focus knob (12), firstly with the 4X objective (4), then with the 10X.
- d. Tighten the rack stop screw just until the stage (6) can not ascend.
- e. Tighten screw.



## Troubleshooter

### ELECTRICAL

PROBLEM	CAUSE	SOLUCIÓN
Bulb does not work.	Plug outlet does not work.  Cable not connected. Discharged batteries (LED) Bulb burned out. Fuse blown. Wrong bulb.	Repair by a qualified specialised technician. Connect cable. Charge the batteries Replace bulb. Replace fuse. Replace by the correct bulb.
Bulb burns out in short time.	Voltage too high.	Reduce light intensity to a minimum before turning the microscope on or off.
Bulb burns out immediately.	Wrong bulb.	Replace with the correct bulb.
Bulb flickers.	The bulb is not correctly inserted into the socket. Bulb about to burn out. Fuse holder not locked into proper position.. Loose connection at plug outlet.	Insert correctly.  Replace bulb. Close correctly.  Repair by a qualified specialised technician.
Fuse blows in short time.	Wrong fuse.	Replace with the appropriate fuse.
Fuse blows immediately.	Short circuit.	Repair by a qualified technician.

### IMAGE QUALITY

PROBLEM	CAUSE	SOLUCIÓN
No image.	Nosepiece not positioned properly. Image too bright.	Turn until clicks into place. Reduce the intensity of the light.
Poor resolution.	Dirty objective. Dirty eyepiece. Slide upside down.  Wrong cover slip used with slide. Light too bright. Dirty condenser.	Clean objective. Clean eyepiece. Replace the slide with the cover slip facing upwards. Use 0.17mm thick cover slips.  Reduce light intensity or adjust the diaphragm aperture. Clean condenser.
Spots in field of view.	Dirty eyepiece. Dirty slide. Dirty condenser.	Clean eyepiece. Clean preparation. Clean condenser.
Uneven illumination of field.	Nosepiece not positioned properly. Diaphragm aperture not sufficiently open.	Turn until clicks into place. Adjust appropriately.

### MECHANICAL

PROBLEM	CAUSE	SOLUCIÓN
Does not stay in focus.	The stage is sliding down on its own.	Adjust the tension of the coarse focus knob.
Does not focus.	The stopper on the ascending movement of the stage needs adjusting.	Readjust the stopper.

### **Moving the microscope**

- Avoid moving the microscope if possible.
- Carry the microscope in both hands, with one hand holding the arm (12), and the other supporting the base (17).
- Keep the microscope in an upright position.

### **Repairs**

If the microscope needs repairing, or revision by authorised personnel, we would recommend that it be stored in its polystyrene box and returned to the distributor. Attach a note with a description of the problem, or details of the required revision.

### **Warranty**

All MOTIC microscopes are warranted against any manufacturing defect for a 5 year period. Damage occurring by any unauthorised repair work, or occurring through misuse or modification of the microscope will not be included under the conditions of the warranty. Bulbs and fuses are not under warranty.

The warranty service is provided by MOTIC, or its authorised distributors. Defective products will be repaired without charge when returned to MOTIC, or one of its distributors. Transport costs will be covered by the purchaser.

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