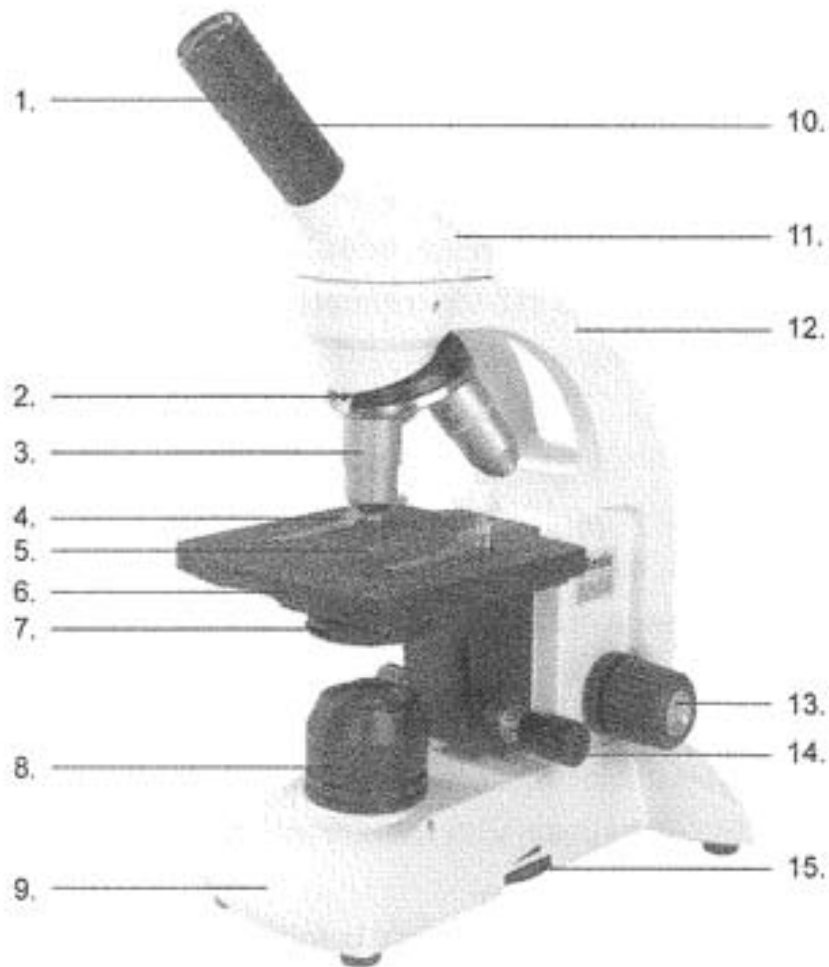


## Name of Components



**BA80 (Monocular)**

1. Eyepiece	9. Base
2. Revolving nosepiece	10. Eyepiece tube
3. Objectives	11. Head
4. Fixed stage clip	12. Arm
5. Diaphragm	13. Knobs controlling movement
6. Stage	14. Fine focus knob
7. Condenser	15. Light intensity control
8. Illuminator	

## Introduction

Thank you for your purchase of a Motic microscope. Motic microscopes are precision instruments, subjected to stringent quality control 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. Some models incorporate a mechanical stage which provides a travel range of 75mm x 35mm in X and Y directions with a graduation of up to 0.1 mm, thus permitting the perfect positioning of the specimen. Also included are objectives located in a nosepiece allowing movement in both directions; a precision coarse and fine focusing system; accurate condensers with a numerical aperture of 0.65 N.A. or 1.25 N.A. and LED illumination with variable intensity control.

These instructions should be read carefully before operating the microscope. They will permit you to use your new microscope to its fullest capabilities.

**These instructions are based on the assembly and use of the BA80 model with additional notes applying specifically to other models in the series.**

## Unpacking

All components of the microscope have been carefully packed to ensure they reach you in perfect condition. We recommend that you do not discard any packing containers in case you need to return the microscope, 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:

- A microscope assembled with a monocular head, an eyepiece, a fixed stage, 0.65 N.A. condenser or 1.25 N.A. Abbe condenser and three objectives or four objectives.

Additional components are: a blue filter, a dust cover, and two hexagonal keys measuring 2mm and 0.85mm.

**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 flat, stable and clean surface.
- B. Remove the rest of the components from the box.

## Description of Components

1. **Head** — Monocular head rotating 360° to avoid the necessity of moving the microscope, should another user wish to use it.
2. **Eyepiece** — The group of lenses closest to the eye, magnifying the image formed by the objectives. In the monocular models, the eyepiece contains a pointer to single out any particular element of the sample to another user.
3. **Revolving nosepiece** — 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** — The group of lenses closest to the sample, or microscopic specimen forming the primary magnified image.
5. **Stage** — Platform of the microscope where the specimen is placed. Models with plain stage where specimen slide is held in place by specimen holder clips. In other models, a mechanical stage replaces the clips, and permits precise, mechanical manipulation of the specimen slide.
6. **Condenser** — Optimises illumination for enhanced resolution and image contrast.
7. **Focusing Knobs** — 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** — LED illumination with intensity control knob.



## Setting up the instrument

Avoid placing the instrument in locations exposed to direct sunlight, dust, vibration, high temperature and high humidity

### 1 Operating Environment

- Indoor use.
- Altitude : Max 2000 meters
- Ambient temperature : 15°C to 35°C
- Maximum relative humidity : 75% for temperature up to 31°C decreasing linearly to 50% relative humidity at 40°C
- Supply voltage fluctuations : Not to exceed  $\pm 10\%$  of the normal voltage
- Pollution degree : 2 (in according with IEC60664)
- Installation / Overvoltage category : 2 (in according with IEC60664)
- Air Pressure of 75kPa to 106kPa
- No hoar frost, dew, percolating water, rain

### 2 Verifying Input voltage

- The automatic voltage selection works with a broad range of settings. However, always use a power cord that is rated for the voltage used in your area and that has been approved to meet local safety standards. Using the wrong power cord could cause fire or equipment damage.
- In case of using the extension cord, use only a power supply cord with a
- protective earth (PE) wire.
- In order to prevent electric shock, always turn the power switch on the
- power supply off before connecting the power cord.

Input : 110V~ 60Hz

Lamp: 3.1V 60mW LED

Fuse : 125V T0.5A

OR

Input : 220V~ 50Hz

Lamp: 3.1V 60mW LED

Fuse : 250V T0.25A

## Assembly

All the steps described for the assembly of the microscope must be undertaken with extreme care, and without forcing the placement of the distinct parts and elements of the microscope.

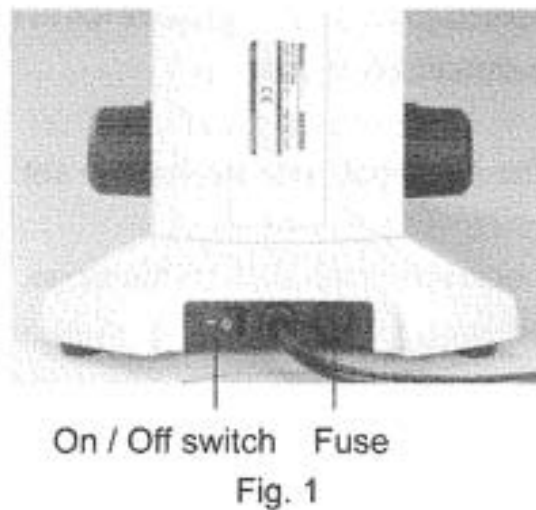
- A. Specimen holder mechanism for models with built in mechanical stage:  
Rotate the coarse focusing knob to move the stage to its lowest position.  
Remove the two knurled screws of the specimen holder mechanism. Place the mechanism on the stage with the moveable clip lever facing outwards, and making sure that the holes of the mechanism, and the knurled locking screws coincide, screw down firmly.

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

## Operation

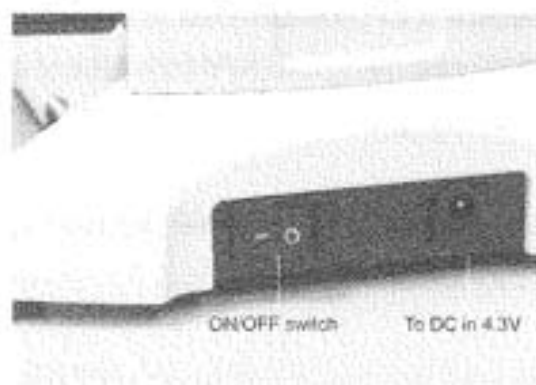
### A. Starting Up

1. Before using the microscope, adjust the light intensity control to minimum position. This should be repeated every time the microscope is switched on or off to prolong the use of the bulb.
2. Press switch to position ON. (Fig. 1)



3. Rotate light intensity dial until the image is illuminated.
4. Light intensity should be adjusted in accordance with the objective used, or the type of specimen examined.

Using LED illuminating microscope (Rechargeable batteries)



1. Charge the rechargeable batteries before using. Even if the rechargeable batteries are not charged, you can use the microscopes as long as the charger is connected and turned on.
  2. To maintain a longer life span of the rechargeable batteries and to save energy, switch off the power supply if not in use.
- \* *For optional accessories only.*

## **B. Focusing the microscope**

1. Revolve the nosepiece to place the objective 4X in the optical path, checking that it is clicked into place.
2. Turn the coarse focusing knob until the stage is set to its lowest position.
3. Place the microscopic specimen slide on the stage, making sure that the cover slip is raised.
  - Swing out the moveable stage clip on the mechanical specimen holder, support the specimen slide against the fixed stage clip and gently release the moveable clip until the preparation is well fixed into place.
  - For models with plain stage: Raise the specimen holder clips by putting downward pressure on the back part, slide the specimen slide under the clips, and release pressure so that the slide is well fixed into place.
4. Insure that the specimen to be examined is in the optical path. To do so, adjust the knobs controlling the X/Y movement of the stage or manually for models with plain stage.
5. Looking through the eyepiece, adjust the coarse focus knob until the specimen appears in focus.
6. Readjust the focus with the fine focus knob until the image appears in sharp focus.



### C. Adjusting the aperture of the diaphragm

The diaphragm 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 method to obtain the correct aperture of the diaphragm is to experiment. Suggested apertures for each objective are as follows:

<b>OBJECTIVE</b>	<b>APERTURE OF IRIS</b>
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 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.
3. When changing to the 40X and 100X objectives (optional), it must be done with great care, making sure that the objectives do not scratch with the specimen slide causing damage to the front lens.
4. In order to obtain maximum resolution of the 100X (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 back and forth.

- c. When viewing is complete, all parts that have come into contact with the oil must be cleaned using a soft cotton cloth, lightly dampened with Xilene. 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.***

#### **E. Critical illumination for models with focusable 1.25 N.A.**

##### **Abbe condenser**

The ideal level of illumination is when all illumination elements are brought into proportion, basically, by the condenser. To achieve critical illumination an object over the illuminator must be in focus.

1. Focus on slide with the 10X objective.
2. Place a flat object on the illuminator. The object must be one that lets light through, a slide for example.
3. Without letting go of slide, focus, using the other hand to turn the collar to move the condenser.
4. When critical illumination is achieved, the slide can be removed. If any irregularity appears in the field of view, i.e. an optical element from the focussed illuminator, move the condenser just enough to take it out of focus, thus obtaining the best level of illumination possible, and closest to critical illumination.

## 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 from eyepiece tube.
  - 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 are easy to scratch.
  
2. Cleaning the objectives.
  - a. Do not remove the objectives 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. Illumination maintenance

### 1. Replacing the LED

- a. To open the LED lamp housing, please use the Allen key provided as shown in Fig.2 to loosen the screw on the side of the lamp housing and pull the housing up Fig.3.



Fig.3

- b. The LED lamp comes with its holder, as shown in Fig.4, which should be plugged onto the electrical connector, as shown in Fig.5

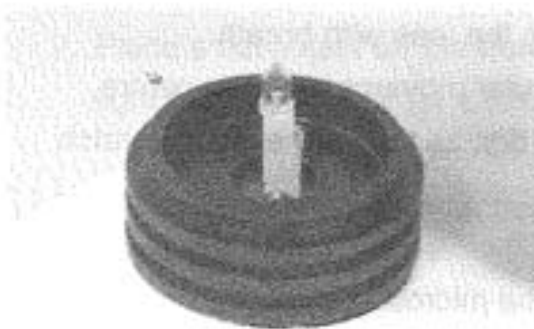


Fig.4



Fig.5

- c. After opening the lamp housing, pull out the LED lamp with its socket, replace with a new one, as shown in Fig.6



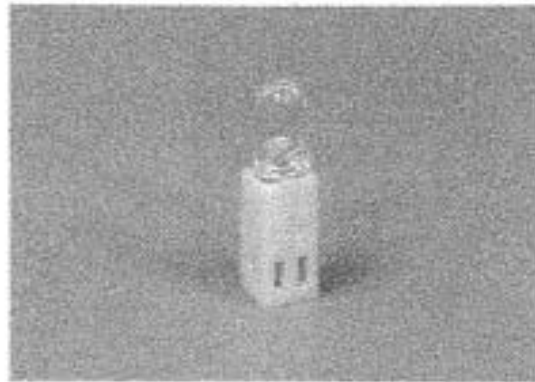


Fig.6

- d. Put back the lamp housing on its holder and secure it with the original Allen screw and Allen key provided.

### C. Mechanical maintenance

1. Adjusting the tension of the coarse focus knob.

The collar to adjust coarse focus tension (Fig.7) is situated between the coarse focus knob and the arm. Coarse focus tension is adjusted by the factory. The optimum point of tension is that which permits the lightest movement of the coarse focusing knob possible, without the stage sinking from its own weight.

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



Fig.7

2. Adjusting the rack stop.

40X and 100X(optional) objectives use 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 or for using polarising equipment (optional), adjustment may be necessary.

- a. Loosen the rack stop screw (Fig. 3) with the 2mm key.
- b. With the fine focus adjustment at mid-range, focus on specimen slide, using only the coarse focus knob, firstly with the 4X objective, then with the 10X.
- c. Rotate the rack stop screw until tight enough to prevent the stage rising further.

## Troubleshooting

### ELECTRICAL PROBLEMS

Problem	Cause	Solution
The bulb does not work	Outlet inoperative.	Repair through a qualified technician.
	Cable not connected.	Connect.
	Bulb burned out.	Replace bulb.
The bulb burns out in a short time	Very high voltage.	Reduce light to minimum before turning microscope on or off.
The bulb burns out immediately	Wrong bulb.	Replace with the correct bulb.
The bulb flickers	The bulb is not inserted correctly in the socket.	Insert it correctly.
	The bulb is at the point of burning out.	Replace bulb.
	The fuse cap is not closed properly.	Close correctly.
	Bad outlet connection.	Repair through a qualified technician.

### IMAGE QUALITY

Problem	Cause	Solution
No image.	Nosepiece badly positioned.	Turn, until it clicks into position.
	Image too bright.	Reduce light intensity.
Poor resolution.	Objective lens dirty.	Clean objective.
	Eyepiece lens dirty.	Clean eyepiece.
	Specimen slide up side down.	Place slide with slip facing up.
	Cover slip on specimen slides wrong thickness.	Use 0.17mm thick cover slip.
	Light too bright.	Reduce light intensity or adjust diaphragm aperture.
	Condenser dirty.	Clean condenser.
Spots in field of view	Dirty eyepiece.	Clean eyepiece.
	Dirty slide.	Clean slide.
	Dirty condenser.	Clean condenser.
Uneven illumination of field	Nosepiece not properly positioned.	Turn until clicks into position.
	Diaphragm not properly positioned.	Adjust accordingly.



## MECHANICAL PROBLEMS

Problem	Cause	Solution
Does not stay in focus.	The stage drops down.	Adjust coarse focus tension.
Does not stay in focus.	The rack stop of the ascending movement of the stage is badly adjusted.	Readjust rack stop screw.

## Moving the microscope

- If possible, avoid moving the microscope.
- Carry the microscope in both hands. One hand should hold the microscope arm, and the other should support it under the base.
- Maintain the microscope in a vertical position.

## Repair





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.

### Note:

If equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

## Warning Label

The following warning labels (or symbols) are found on the microscope, Study the meaning of the warning labels (or symbols) and always use the equipment in the safest possible manner.

Warning Label / Symbol	Explanation
	Indicates that the surface becomes hot, and should not be touched with bare
	Indicates that the main switch is ON.
	Indicates that the main switch is OFF.
	Indicates alternating current.

## 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 free of charge when returned to Motic, or one of its distributors. Transport costs will be covered by the purchaser.

Proper handling of the microscope will ensure years of trouble free service. If repair become necessary, please contact your Motic agency or our Technical Service directly.