



## M150i Instruction Manual

---



**Note**

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

WWW.MOTIC.COM

---

Motic China Group Co.,Ltd

# 1.SAFETY INSTRUCTIONS

## 1.1 General safety instructions

Please be sure to read these instructions before using the digital microscope.

Additional information is available upon request from our maintenance department or authorized agency.

To ensure safe operation and guarantee good performance of the digital microscope please pay attention to the precautions and warnings specified in the *Operation Instructions*.

In this *Operation Instructions* manual, the following symbols indicate:



**Caution!** Electric shock hazard!



**Caution!** Danger!

## 1.2 Instrument safety

The M150i series digital microscope has been designed, manufactured and inspected according to the EN 61010-1:2001 *Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use*.

## 1.3 Unpacking, transportation & storage

The original shipping container, a foam box in a fiberboard carton, should be kept for use in long term storage or return shipment.

When unpacking, please check the components according to the packing list.

Please comply with the temperature requirements for transport and storage specified in the appendix of this manual.

Set up, use and store the unpacked digital microscope on a firm and flat workbench.

Please do not touch the optical lens surfaces.

## 1.4 Waste disposal

- Important: Any damaged digital microscope must not be treated as general waste; it should be disposed of according to relevant regulations.

## 1.5 Operation

When using digital Microscope, please pay attention to the following safety instructions:

- If it is used for any purpose other than the specified ones, including any individual component or part, the manufacturer will not take any responsibility.
- After-sales service or repair done by unauthorized personnel will void the warranty.
- Anyone who uses the instrument should receive instruction on the proper handling of the instrument and safety practices for digital Microscope. The digital Microscope shall be placed only on a firm, flat workbench for operation.
- Since the digital Microscope is a precision instrument, improper operation will impair or spoil its performance.
- The power unit is integrated in the main unit of the digital Microscope the grid supply voltage is within 100-240V~50Hz.



The digital Microscope must be connected only to the normal power socket with a grounding terminal. Any extension cord without ground protection is not allowed to avoid failure of the protection function.



If there is any electrical failure (of the fuse system, ground protection or transformer), turn off and unplug the unit immediately. Make sure

Make sure the digital microscope is set aside so it will not be used again and contact the Motic service department or a Motic digital microscope repair agency to have it repaired.



Please be sure to turn off the power before opening the instrument to replace LED illuminator or replace the fuse! Only use a fuse for the rated current.



Safety instructions for the use of immersion oil.

- Immersion oil is irritating to skin; avoid contact with skin, eyes and clothing.
- Skin contact: wash with soap and plenty of water until the immersion oil is completely removed.
- Eye contact: flush immediately with plenty of water for at least 5 minutes. If irritation persists, seek medical advice.
- Dispose of immersion oil properly. Do not discharge into surface water or sewage.

The digital Microscope is not equipped with any special device to protect against corrosive, latent infective, toxic, radioactive or other hazardous samples. Therefore, when examining any such sample you must comply with the relevant laws and regulations, in particular the provisions related to accident prevention.

## **1.6 Quality warranty**

The M150i series digital Microscope and the attached accessories are only allowed to be used for digital microscope examination as described in this manual. The manufacturer takes no responsibility for any other use.

- The manufacturer guarantees that the product is free from any defect in material or workmanship on the date of delivery.
- If any defect is found, notify the manufacturer immediately.
- Upon receipt of the Notification of Defect as described above, the manufacturer is responsible to solve the problem either by repairing the defective instrument or replacing it with a new instrument of the same model.
- The manufacturer provides no warranty for any failure or defect due to normal wear and tear or improper use of the product.
- The manufacturer takes no responsibility for any damage caused by operation error, negligence or unauthorized dismantling of the instrument, or the use of spare parts from other manufacturers.

## 2.DIGITAL MICROSCOPE COMPONENTS

**HEAD** - the top portion of the digital microscope that contains the refracting prisms and the eyepiece tube. The eyepiece is locked onto the eyepiece tube with a set screw. The head rotates allowing operation of the digital microscope from the front or the back, and allows the digital microscope to be shared by simply rotating the head. (The head does not rotate on digital camera models).

**SIEDENTOPF** – a binocular head design where the interpupillary adjustment (increasing or decreasing the distance between the eyepieces) is achieved by twisting the eyepiece tubes in an up and down arc motion similar to binoculars.

**EYEPIECES** – the upper optical element that further magnifies the primary image of the specimen and brings the light rays in focus at the eyepoint.

**DIOPTER ADJUSTMENT** – located on the left eyepiece of the binocular head and is designed to help compensate the difference between the user's eyes.

**CONDENSER** – the condenser is mounted in the stage and it is used in conjunction with the iris diaphragm. The function of the condenser is to provide full illumination to the specimen plane and to enhance the resolution and contrast of the object being viewed. The condenser can be raised and lowered for precise light control.

**COAXIAL CONTROLS** – the focusing mechanism moves the stage up and down to bring the specimen into focus. The coaxial focusing system combines both the coarse and fine focus into one knob located on both sides of the microscope. The control is designed for a continuous operation over the range of the stage movement.

**FINE FOCUS CONTROL** – the fine focusing knobs, located on either side of the digital microscope, are used for precise focusing adjustments once the specimen has been brought into view with the coarse focus controls.

**COARSE FOCUS CONTROL** – the larger focus control knob located on either side of the digital microscope which facilitates rapid and heavy movement of the focusing mechanism. In order to prevent gear damage, the focus control is equipped with a slip clutch that allows slippage at both ends of the focusing range.

**MECHANICAL STAGE** – an alternative to stage clips is a mechanical stage. A mechanical stage holds the slide in place, allowing the user to move the slide on any x/y axis through the manipulation of two control knobs or a co-axial control mechanism.

**STAGE CLIPS** – a pair of flexible metal clips attached by spring screws that hold the slide in position on the stage.

**NOSEPIECE** – the revolving turret that holds the objective lenses, permitting changes in magnification by rotating different powered objective lenses into the optical path. The nosepiece must “click” into place for the objectives to be in proper alignment.

**OBJECTIVES** – the DIN objectives are standard in the industry, with large numerical aperture (N.A.) to permit maximum resolution. All objectives are color-coded and parfocaled at a 45mm distance. The 40X and the 100X are sealed to keep oil residue from seeping into the objective. These two objectives have a spring loaded tip to prevent accidental breakage of either the slide or front lens of the objective if they should come into contact with each other.

**IRIS DIAPHRAGM** – a round multi-leaf device mounted below the condenser which is controlled by a lever. It is similar to a camera shutter and controls the amount of light entering the condenser, allowing the user to control contrast.

**ILLUMINATOR** – the built-in light source which provides the optical system with light. M150i series uses an energy efficient LED which can last up to 50,000 hours of use before replacement.

**ILLUMINATOR RHEOSTAT** – Controls the illuminator's brightness.

**ON/ OFF SWITCH** - turns the illuminator on or off.

**ARM** - the vertical column (attached to the base) which supports the stage and contains the coarse and fine adjusting knobs and focusing mechanism.

**BASE** - the housing and platform of the instrument to which the arm is attached. The base stands on rubber feet and contains the illuminator assembly. The bulb replacement part number is printed on the underside of the base.

### 3.IMPORTANT MICROSCOPY TERMS

**APERTURE, ANGULAR** - the angle (or cone) of light rays capable of entering the front lens of the objective from a point in the object. By increasing the angular aperture of an objective, more light rays from the specimen can be taken in by the lens; hence the resolving power is increased.

**COMPOUND MICROSCOPE** - a digital microscope having a primary magnifier(the objective) and a second (the eyepiece) to both conduct light, amplify magnification and convert the image into a field of view easily seen by the human eye.

**COVER GLASS** - thin glass cut in circles, rectangles or squares, for covering the specimen, usually a thickness of 0.15 to 0.17mm. The majority of specimens should be protected by a cover glass, and must be covered when using 40X or 100X objectives.

**DEPTH OF FOCUS** - the ability of a lens to furnish a distinct image above and below the focal plane. Depth of focus decreases with the increase of numerical aperture or with the increase of magnification.

**EYE POINT or EYE RELIEF** – the distance from the eyepiece lens to your eye where a full field of view can be seen.

**FIELD OF VIEW** - the area of the object seen when the image is observed. It may range in diameter from several millimeters to less than 0.1mm.

**FOCAL LENGTH** - parallel rays of light after refraction through a lens will converge to a focus at the focal point. The distance from the optical center of the lens to the focal point is the focal length.



**NUMERICAL APERTURE (NA)** – a measure of an objective's light gathering capabilities. The concept may be compared to the F-value in photographic lenses. Generally speaking, objectives with N.A. values of less than 1.00 are "Dry" objectives. Values of 1.00 or greater require oil as a medium. Please note that condensers are part of the optical system and are also assigned an N.A. value. That value must be at least as high as that of the highest objective used.

**PARFOCAL** - a term applied to objectives and eyepieces when practically no change in focus has to be made when an objective of one power is substituted for another. The DIN objectives on your M150i Series digital microscope are parfocaled at the factory to a standard 45mm distance, so that only a slight turn of the fine adjustment is required when a change is made from a lower to higher power.

**WORKING DISTANCE** – the distance from the lens of the objective to the cover slip on the slide, when the specimen is in focus.

## 4. CORDLESS OPERATION (Cordless models)

The rechargeable battery should be fully charged for approximately 8 hours before the initial use. It can be charged by using the 4.5 volt A/C adapter included with the digital microscope. The battery can be used to power the illumination system for approximately 40 hours. If the digital microscope is used in the same location, the A/C adapter can remain plugged-in without damage to the battery or recharging system.

A battery power indicator meter is located in the front of the base. Each blue LED light indicates the level of remaining battery power. When the battery is fully charged, all 5 LED lights will be illuminated. The battery will need to be recharged when there is only 1 illuminated LED remaining on the meter.

## 5.USING THE M150i SERIES DIGITAL MICROSCOPE

### 5.1 FIRST TIME USE

Before installing and using the digital microscope, make sure to read carefully the Safety Instructions (See Chapter 1).

When unpacking and handling, please do not touch the optical surfaces.

- After unpacking, place the digital microscope on a flat workbench and remove any foam padding or spacer used to prevent vibration during transportation.
- Connect the cable/ charger to the power supply. Before plugging in, keep in mind that the working voltage of the digital microscope shall be the same as the supply voltage. (Fig.1)



Fig.1

- Turn on the power switch at the back of the arm. (Fig.2)

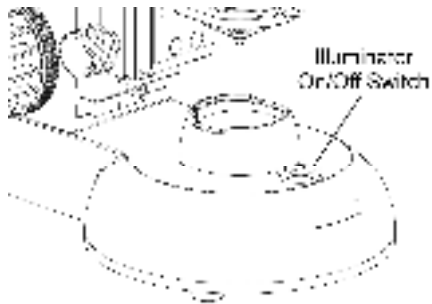


Fig.2

- Note: Make sure that the brightness control is in the minimum position before turning on or off the power switch.
- Rotate the brightness control to the desired illumination. (Fig.3)



Fig.3

- After use, turn the brightness control to the minimum position, and then turn off the power and put on the dustproof cover.
- The coarse focus tension (Fig.4) has been set at the factory, but can be readjusted as required (see Fig.4, number 1).

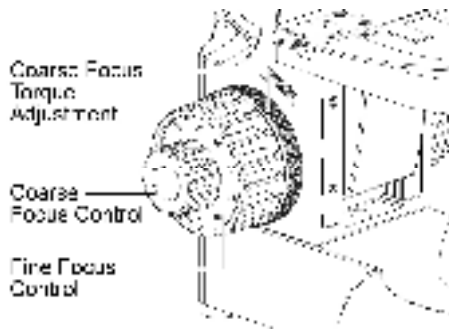


Fig.4

## 5.2 OPERATION OF THE DIGITAL MICROSCOPE

### 5.2.1 Interpupillary distance adjustment

- While looking through the digital microscope, grasp the eyetubes and move them on their hinges until the two circular fields in the observation field coincide with each other. (Fig.5)
- If several people will be using the same digital microscope each user can record the correct interpupillary distance for them from the scale. The digital microscope can then be quickly reset to the correct distance.



Fig.5

### 5.2.2 Setting bright field illumination

The M150i series digital microscope has been set already before delivery and can be adjusted as follows: (Fig.6)

- Put the specimen on the stage and fix it with the slide clips.  
Note: The thickness of the cover slip should be 0.17 mm.
- Open the condenser aperture diaphragm to the position matching the numerical aperture of the objective.
- Lower or raise the condenser to locate the best illumination for the field.
- Rotate the brightness control to the desired intensity.

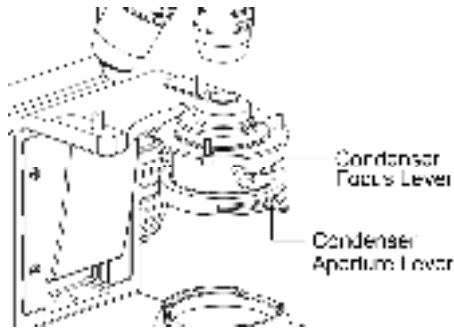


Fig.6

The M150i series digital microscope with adjustable condenser can do as follow:

- Raise the stage by turning the coarse focus knob.
- Completely lower the condenser carrier by turning the condenser focus knob.
- Turn the condenser focus knob to raise the condenser up to the working position.

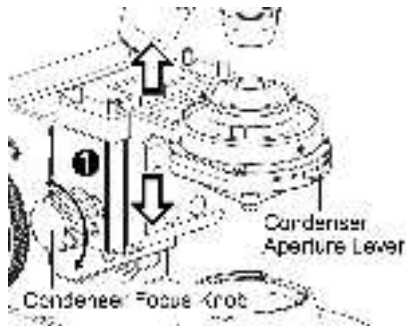


Fig.7