# User Manual

# Digital Binocular Infinity Compound LED Microscope

## Model MD8233S50


MicroscopeNet.com

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# i. Caution

1. Open the carton carefully with a knife or paper cutter. Find the “UP” sign and place the Styrofoam container on the side that makes the arrow upward. If the “UP” sign is missing, please open the Styrofoam container gently to prevent any accessory items (i.e. objectives or eyepieces) from dropping and being damaged.

2. Do not discard the molded Styrofoam container. The container should be retained should the microscope ever requires reshipment.

3. Keep the instrument out of direct sunlight, high temperature or humidity, and dusty environments. Ensure that the microscope is located on a smooth, level and firm surface.

4. If any specimen solutions or other liquids splash onto the stage, objective or any other component, disconnect the power cord immediately and wipe up the spillage. Otherwise, the instrument may be damaged.

5. All electrical connectors (power cord) should be inserted into an electrical surge suppressor to prevent damage due to voltage fluctuations.

6. For safety when replacing the LED light and the fuse, be sure the main switch is off, unplug the power cord, and replace the LED light and the fuse.

7. **Important:** confirm that the input voltage ***(230V version available)*** indicated on your microscope corresponds to your line voltage. The use of a different input voltage other than that as indicated will cause severe damage to the microscope.

8. **Note:** please read the instruction of the operation of camera in manual **3.9** below and the CD in the package before you start to use it.

# ii. Care and Maintenance

1. Do not attempt to disassemble any component including eyepieces, objectives or focusing assembly.

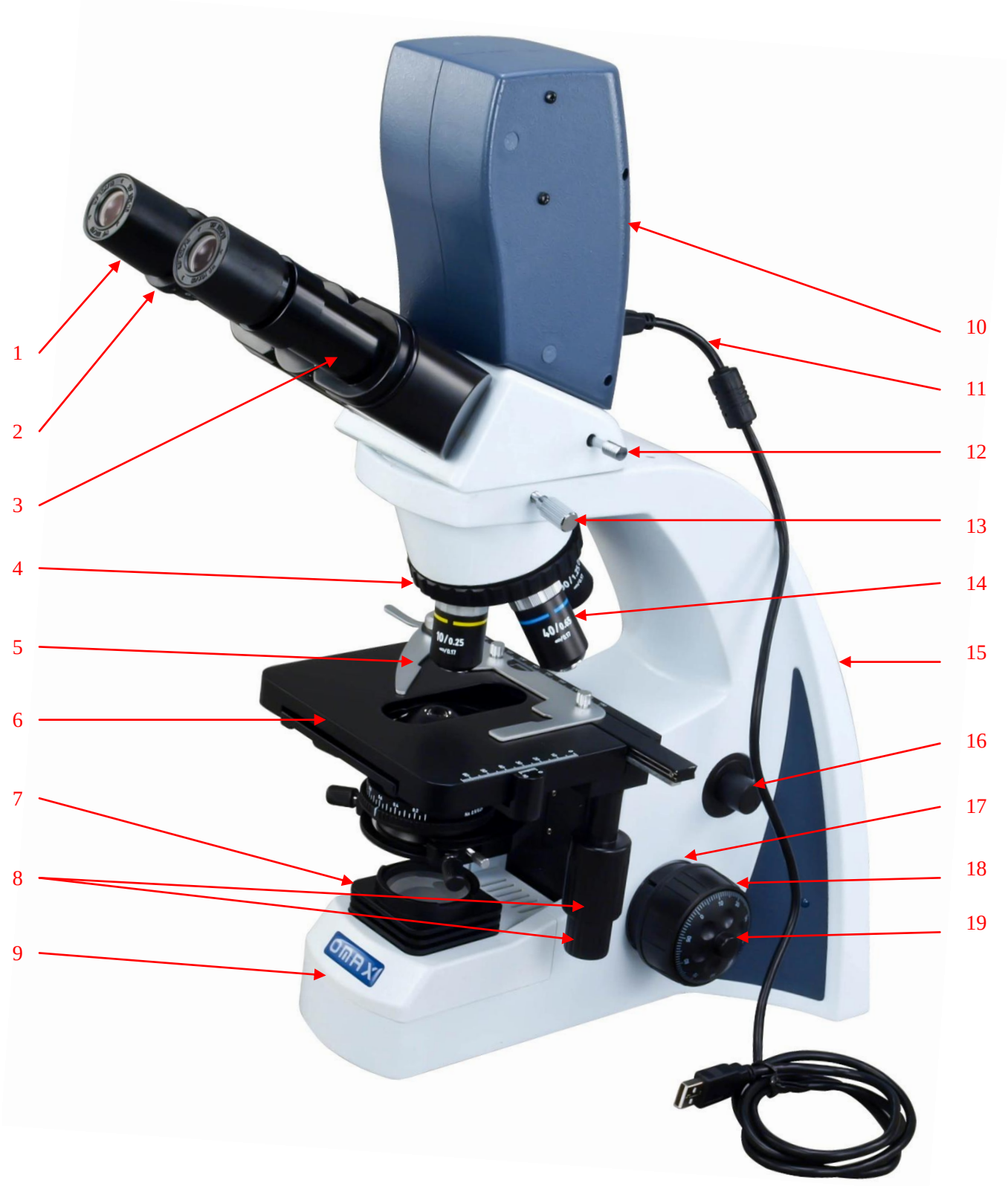
2. Keep the instrument clean; remove dirt and debris regularly. Accumulated dirt on metal surfaces should be cleaned with a damp cloth. More persistent dirt should be removed using a mild soap solution. **Do not use organic solvents for cleansing**.

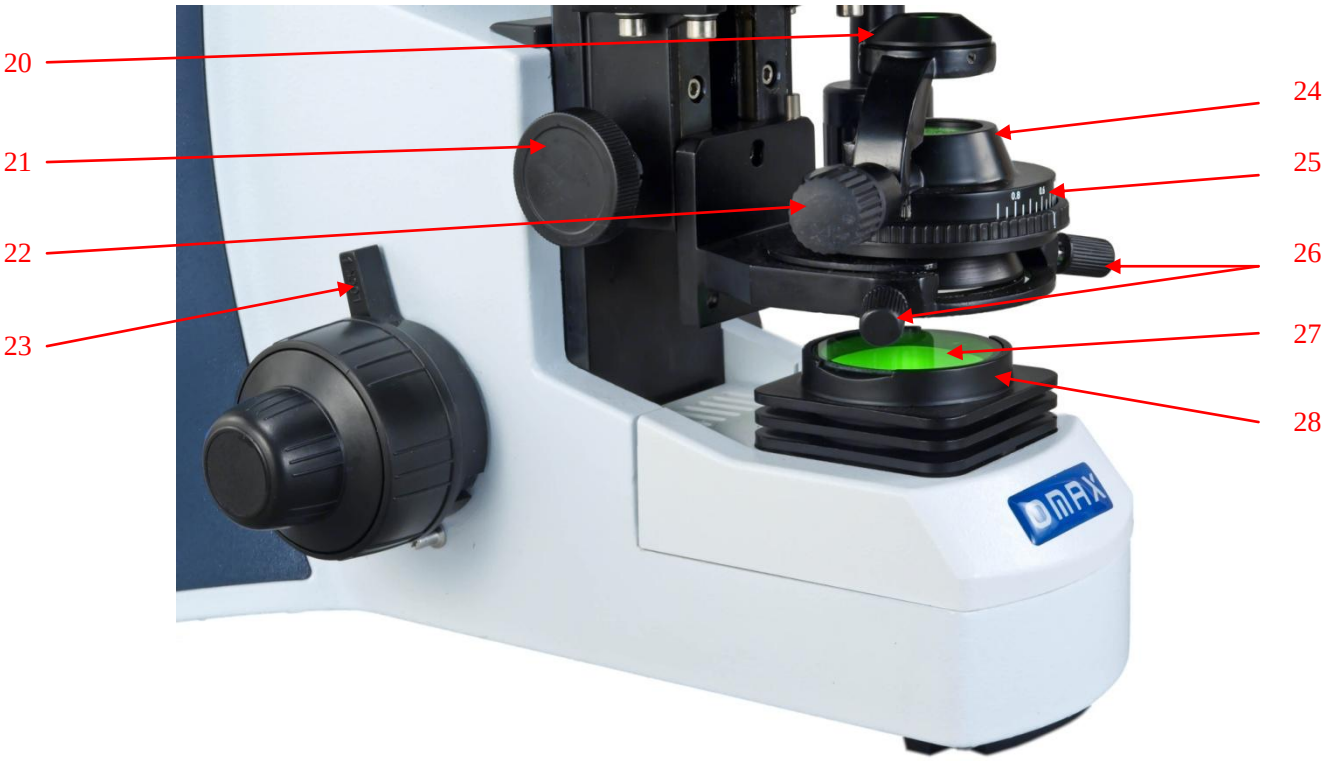
3. The outer surface of the optics should be inspected and cleaned periodically using an air stream from an air bulb. If dirt remains on the optical surface, use a soft cloth or cotton swab dampened with a lens cleaning solution (available at camera stores). All optical lenses should be swabbed using a circular motion. A small amount of absorbent cotton wound on the end of a tapered stick makes a useful tool for cleaning recessed optical surfaces. Avoid using an excessive amount of solvents as this may cause problems with optical coatings or cemented optics or the flowing solvent may pick up grease making cleaning more difficult. Oil immersion objectives should be cleaned immediately after use by removing the oil with lens tissue or a clean, soft cloth.

4. Observe the specimen with the 4X, 10X and 40X objectives in order, then observe the specimen with the 100X objective. Apply the immersion oil on the slide cover with the 100X objective. Do not let the immersion oil to contact with the dry objectives lens (especially the 40X). Clean the dry objective lens using the lens cleaning paper if the immersion oil is on the dry objectives lens. Clean the 100X objective lens first using the lens cleaning paper after observing the specimen with the 100X objective, then clean the specimen. More persistent dirt should be removed using a little bit alcohol. **Do not use organic solvents for cleansing**.

5. Store the instrument in a cool, dry environment. Cover the microscope with the dust cover when not in use.

# 1. Components Illustration






| | | | | | |
|---|---|---|---|---|---|
| 1 | Eyepiece | 11 | USB Cable | 21 | Condenser Focus Knob |
| 2 | Diopter Ring | 12 | Swapping Lever | 22 | Top Lens Knob |
| 3 | Eyepiece Tube | 13 | Head Lock Thumb Screw | 23 | Stage Upward Stopper |
| 4 | Nosepiece | 14 | Objectives | 24 | Condenser |
| 5 | Slide Holder | 15 | Microscope Body | 25 | Aperture Diaphragm Ring |
| 6 | Mechanical Stage | 16 | Brightness Intensity Dial | 26 | Condenser Centering Screws |
| 7 | Light Collector | 17 | Focus Tension Ring | 27 | Filter |
| 8 | X-Y Stage Moving Knobs | 18 | Coarse Focus Knob | 28 | Color Filter Holder |
| 9 | Microscope Base | 19 | Fine Focus Knob | | |
| 10 | Viewing Head w Built-in Camera | 20 | Condenser Top Lens | | |

# 2. Installation

## 2.1 Installation of the digital binocular viewing head

1) Loosen the head lock thumb screw on the top of the microscope body and remove the plastic cover on the top.
2) Remove the cap on the dovetail of the digital binocular viewing head.
3) Seat the dovetail of the viewing head into the socket on the top of the microscope body and tighten the head lock thumb screw.

**Caution**:

Do not release the viewing head from your hand grip until you are sure the viewing head is installed securely.

## 2.2 Installation of the eyepieces

1) Remove the protective caps from the eyepiece tubes.
2) Insert the eyepieces into the eyepiece tubes.

## 2.3 Installation of the objectives

1) Adjust the coarse focus knob until the mechanical stage is at its lowest position.
2) Turn the caps counter-clockwise to remove them from the nosepiece.
3) Take the objectives out from the plastic cases and turn each one clock-wise into the holes on the nosepiece. Install the 4X objective into the nosepiece first. Then in a counter-clockwise direction, rotate the nosepiece and install each succeeding higher magnification objective as shown in ***Fig. 1***.

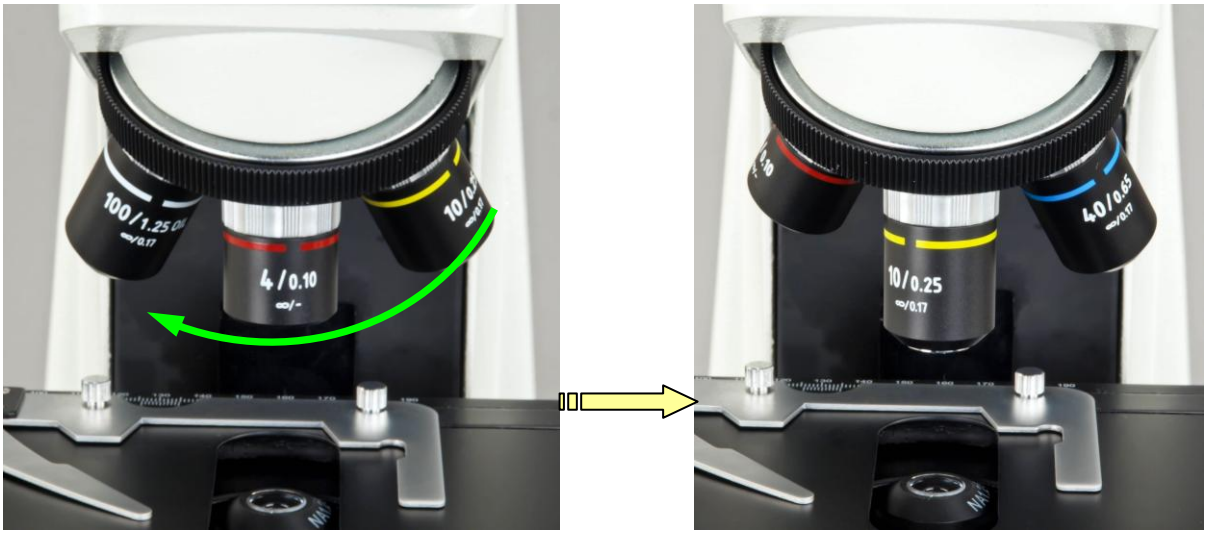



**Fig.1**

**Note:**

- Inspect the objectives frequently for dirt or oil; clean if necessary.
- Use the 10X objective to initially focus the image of your specimen.
- When changing the objective magnification, rotate the objective nosepiece until you hear a “click” sound or have a clear "in position" feeling. This ensures the objective is centered in the optical light path.

## 2.4 Installation of the color filters

The color filter is simply put into the filter holder

## 2.5 Connecting the power cord

1) Turn the power switch to the off position.
2) Connect the power cord to the socket at the back of microscope body and plug the other end into a wall outlet.

**Caution:**

Before connect the cord to the wall outlet; make sure the voltage switch is slide to the correct position for the right power source.

## 2.6 Replacing the fuse

1) Turn off the power switch and disconnect the power cord.
2) Find the fuse holder at the back of the microscope body.
3) With a flat-head screwdriver, press and turn the fuse holder counter clock wise to remove it.
4) Replace the old fuse with a new one,
5) Put the fuse holder back, press and turn it clock wise. See ***Fig. 2***.

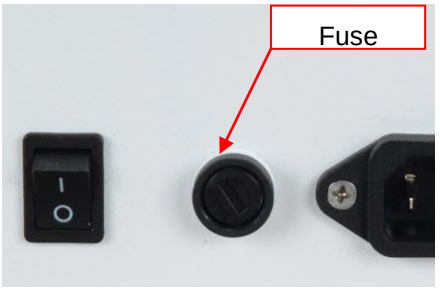



**Fig.2**

## 2.7 Switching the power voltage

**The power voltage can be switched between 115V and 230V.**

1) Turn off the power switch and disconnect the power cord.
2) Find the voltage switch on the back board. See ***Fig 3***
3) Push the switch down, the microscope will be work at 115V.
4) Push the switch up, the microscope will be work at 230V

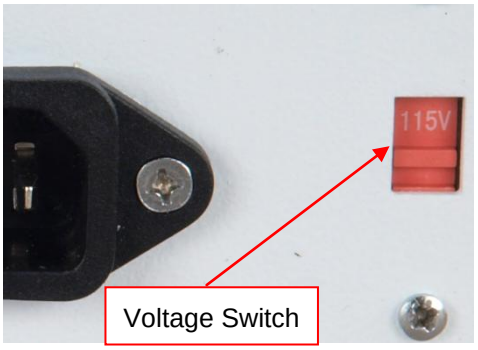



**Fig.3**

# 3. Operation

## 3.1 Adjusting illumination

1) Plug the power cord into the power socket on the microscope and connect it to the power outlet.
2) Turn on the power switch.
3) Rotate the brightness intensity dial to increase or decrease the brightness of the illuminator.

## 3.2 Placing specimen

1) Place the slide on the mechanical stage.
2) Use the slide holder to gently secure the slide.
3) Turn the X and Y stage moving knobs to position the specimen in the center of viewing field.

**Caution:**

Be sure not to allow an objective to touch a specimen slide when changing objectives.

## 3.3 Focusing

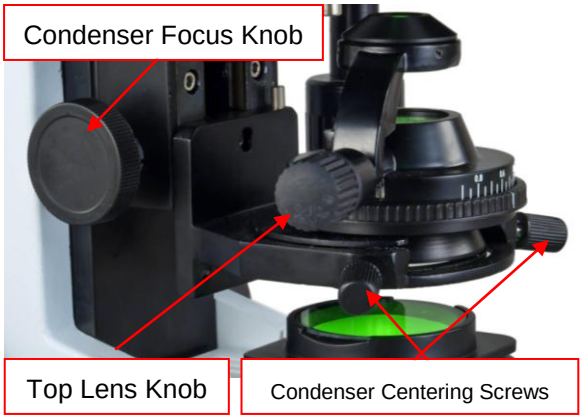



**Fig.4**

1) With the 10X objective in position, raise the mechanical stage using the coarse focus knob until the specimen is close to the objective.
2) Turn the condenser top lens into light path.
3) Turn the coarse focus knob until the specimen is in focus.
4) Use the fine focus knob to obtain a sharp image.
5) Turn the condenser focus knob (***Fig. 4***) to raise or lower the condenser till the image of field is focused.
6) Turn the condenser centering screws (***Fig. 4***) to move the image of the field into the center of the viewing field.
7) To get a good focused image, you may need to combine the focus knob adjustment and interpupillary distance adjustment, along with eyepiece diopter adjustment stated in **3.4** and **3.5**.
8) You may now switch to another magnification objective.

**Tips:**

a) The condenser is raised when using high power objectives and lowered when using low power objectives.
b) The top lens is flipped up by turning the top lens knob when using high power objectives.
c) To prevent your specimen slide from making contact with an objective, raise the stage to its highest position without contacting the 100X objective; then tighten the stage upward stopper (***Fig. 5***). Give the stage a tiny extra moving space to ensure the objective can be focused every time.

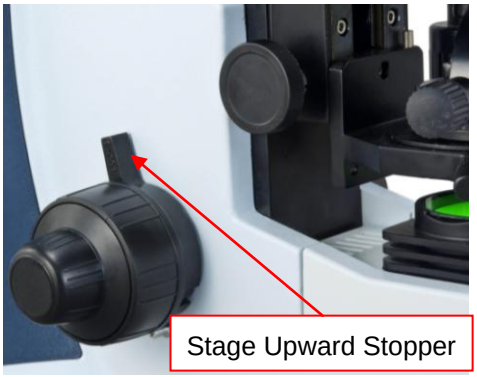



**Fig.5**

### 3.4 Adjusting interpupillary distance

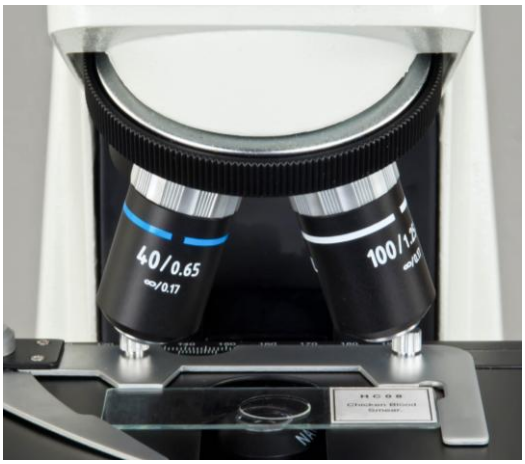
While observing with both eyes, hold the left and right eyepiece tubes then swing them around the center axis. The interpupillary distance is correct when the left and right fields of view converge completely into one image.

### 3.5 Adjusting eyepiece diopter

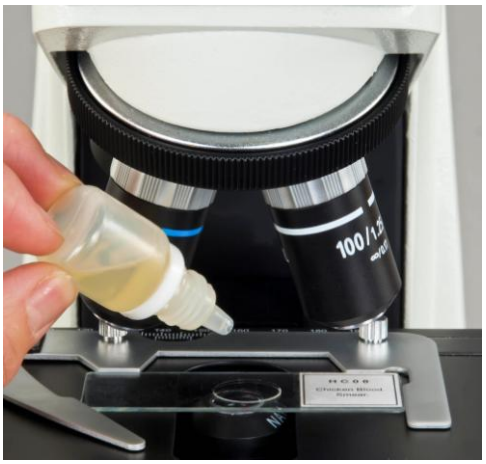
1) Using the 10X objective and your right eye only, observe your specimen through the eyepiece and bring it into focus by adjusting the focus knobs.
2) Then observe the specimen with your left eye only through the left eyepiece. If the specimen is not in focus, turn the diopter ring on the eyepiece tube until a sharp image is obtained.

### 3.6 Applying the immersion oil

1) Rotate the objective nosepiece to seat the observing position between the 40X and 100X objectives as shown in ***Fig. 6 (a)***.
2) Place a drop of immersion oil on the slide cover as shown in ***Fig. 6 (b)***.
3) Rotate the objective nosepiece to seat the 100X objective to the observing position until you hear a “click” sound.
4) After observing the specimen, use the lens cleaning paper to clean the 100X objective lens gently and the specimen in time.
5) If it is hard to clean, you need a little bit alcohol to clean the 100X objective lens and the specimen.




**(a)**



**(b)**

**Fig.6**

**Caution (*important*):**

- When you use the 100X objective to observe the specimen, you have to finish observing the specimen with the 4X, 10X, 40X objectives.
- When you use the 100X objective to observe the specimen, you have to apply the immersion oil on the top of the slide cover.
- When you apply the immersion oil with the 100X objective, do not let the immersion oil to contact with the dry objective lenses (especially the 40X). If the immersion oil is on the dry objectives lens, please use the lens cleaning paper to clean the objectives lens in time. The oil will damage the dry objective lenses.
- After observing the specimen with the 100X objective, clean the 100X objective lens first.

### 3.7 Adjusting iris aperture diaphragm

Turn the aperture diaphragm ring to adjust the aperture size.

### 3.8 Adjusting focus knob tension

The tightness of the focus knob tension has been pre-set at the factory. If the mechanical stage drops by itself, rotate the focus tension ring (***Fig. 7***) with the tension wrench situated between the coarse focus knob and microscope body until the tension is in maintained.


**Fig.7**

### 3.9 Photo/video observing, capturing and recording

1) Insert the USB cable into the USB port (***Fig. 8***) on the back of the viewing head, and the other end to the computer.
2) Turn on the computer, install the camera following the manual in the mini CD.
3) Bring the microscope into focus by following the procedures in **3.3**.
4) Pull the swapping lever out (***Fig. 9***)
5) Open image observing software to examine.
6) You also can capture images or record live videos through the software, depending on the functions provided by the software.


**Fig.8**

**Note:**

- The swapping lever to switch beam spilt for photo part and 100% to eyepieces when camera is not in use.
- For the details of installation and operation of the camera and its software, please refer to the manual in the mini CD

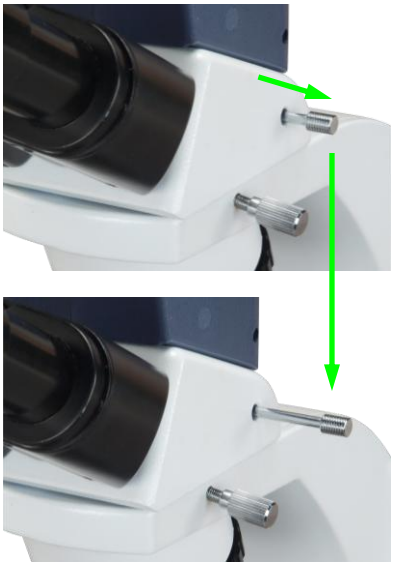


**Fig.9**

# 4. Specifications

| Model | MD8233S50 |
|---|---|
| Total Magnification | 40X, 80X, 100X, 200X, 400X, 800X, 1000X, 2000X |
| Eyepieces | 1 pair of WF10X/18<br>1 pair of WF20X |
| Objectives | Infinity objectives achromatic<br>4X/0.10 ∞/-<br>10X/0.25 ∞/0.17<br>40X/0.65 ∞/0.17 (spring)<br>100X/1.25 ∞/0.17 (spring, oil) |
| Viewing Head | 30º inclined, 360º swiveling siedentopf binocular viewing head with built-in 5.0MP camera<br>Hinge interpupillary distance adjustment, 2-3/16" ~ 2-5/16" (55mm ~ 75mm)<br>Diopter adjustment on left eyepiece tube<br>A lever to switch between beam spilt for photo part and 100% to eyepieces when camera is not in use |
| Nosepiece | Reversed revolving quadruple nosepiece |
| Stage | Double layer mechanical stage<br>Dimension: 5-1/2" x 4-1/4" (140mm x 110mm)<br>Translation range: 3" x 1-13/16" (78mm x 46mm) |
| Condenser | NA=0.9/0.25, with a flip up top lens, built-in aperture iris diaphragm<br>Center adjustable, rack and pinion adjustment |
| Focus Mechanism | Coaxial coarse and fine focusing knobs on both sides with focus stop and tension control |
| Collector | With color filter holder |
| Color filter | 45mm green filter in diameter |
| Illumination | Transmitted, 3W LED, intensity adjustable |
| Power Supply | AC 115V 50/60Hz (US and Canada plug)<br>***(230V version available)*** |
| Camera | Built-in USB2.0 2592 x 1944 pixel (5.0MP)<br>Driver and software included in the CD<br>Compatible with Windows 2000/XP/Vista/Windows7 (32/64-bit), Mac OS. |
| Dimension | 16-1/2" x 7-7/8" x 18-1/4" (42cm x 20cm x 47cm) |
| Net weight | 18 lbs (10 kg) |

# 5. Troubleshooting Guide

| Problem | Cause | Solution |
|---|---|---|
| Lamp does not light when switched on | No electrical power | Check power cord connection |
| | LED or power unit dead | Replace LED light |
| | Fuse blown out | Replace fuse |
| Darkness at the periphery or uneven brightness in the field of view | Revolving nosepiece not in click stop position | Revolve the nosepiece to click-stop position by swinging the objective correctly into the optical path |
| | The field iris diaphragm are not opened enough | Open field diaphragm |
| | The field diaphragm not in the center | Center the field iris diaphragm |
| Dirt or dust on the view | Dirt or dust on the eyepiece, condenser, objective, collector lens or specimen | Clean the lens with a lens cleaning paper |
| Poor image quality or not able to get focused image | No slide cover attached to the slide | Attach a 0.17mm slide cover |
| | Slide cover is too thick or thin | Use a slide cover of the appropriate thickness (0.17mm) |
| | Slide may be upside down (specimen at the bottom) | Turn slide over so the cover-glass faces up |
| | Diopter adjustment is not set properly | Readjust the diopter settings |
| | Immersion oil is on a dry objective (especially the 40X) | Check the objectives, clean if necessary |
| | No immersion oil used with 100X objective | Use immersion oil |
| | Air bubbles in immersion oil | Remove bubbles |
| | Aperture is closed or open too much | Open or close properly |
| | Condenser top lens not in use | Flip up the top lens when using high power objective |
| | Condenser is not in the right position | Adjust the condenser |
| | The field diaphragm not in the center | Center the field iris diaphragm |

| | | |
|---|---|---|
| | The aperture and field iris diaphragm are not opened enough | Open and adjust the aperture and field diaphragm |
| | Specimen rises from stage surface | Secure the specimen in the slide holder |
| | Revolving nosepiece is not in the click-stop position | Revolve the nosepiece to the click-stop position |
| | Lamp intensity is too high or low | Adjust the light intensity by rotating the intensity control dial |
| Slippage of focus when using the coarse focusing knob fine focus is ineffective | Tension adjustment is set too low | Increase the tension on the focusing knobs |
| | Tension adjustment is set too high | Loosen the tension on the focusing knobs |