

# **User Manual**

## **Trinocular Compound Microscope**

**Model M837E Series**



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, 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. **Important:** the lamp, lamp housing and adjacent parts will become very hot. Do not touch these parts until they have completely cooled. Never attempt to handle a hot halogen bulb.
6. All electrical connectors (power cord) should be inserted into an electrical surge suppressor to prevent damage due to voltage fluctuations.
7. Confirm that the input voltage 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.

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

# 1 Components Illustration



- |   |                  |    |                        |    |                           |
|---|------------------|----|------------------------|----|---------------------------|
| 1 | Eyepiece         | 9  | Microscope Base        | 17 | Brightness Intensity Dial |
| 2 | Diopter Ring     | 10 | Viewing Head           | 18 | Power Switch              |
| 3 | Eyepiece Tube    | 11 | Head Thumb Lock Screw  | 19 | Condenser Lock Thumb Knob |
| 4 | Nosepiece        | 12 | Microscope Body        | 20 | Condenser Focus Knob      |
| 5 | Objective        | 13 | Focus Tension Ring     | 21 | Focus Stop Lever          |
| 6 | Slide Holder     | 14 | Coarse Focus Knob      | 22 | Abbe Condenser            |
| 7 | Mechanical Stage | 15 | Fine Focus Knob        | 23 | Color Filter Holder       |
| 8 | Light Collector  | 16 | X-Y Stage Moving Knobs | 24 | Iris Diaphragm Lever      |

## 2 Installation

### 2.1 Installation of the trinocular viewing head

- 1) Loosen the head thumb lock 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 trinocular viewing head.
- 3) Seat the dovetail completely of the viewing head into the socket on the top of the microscope body and tighten the head thumb lock 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**.

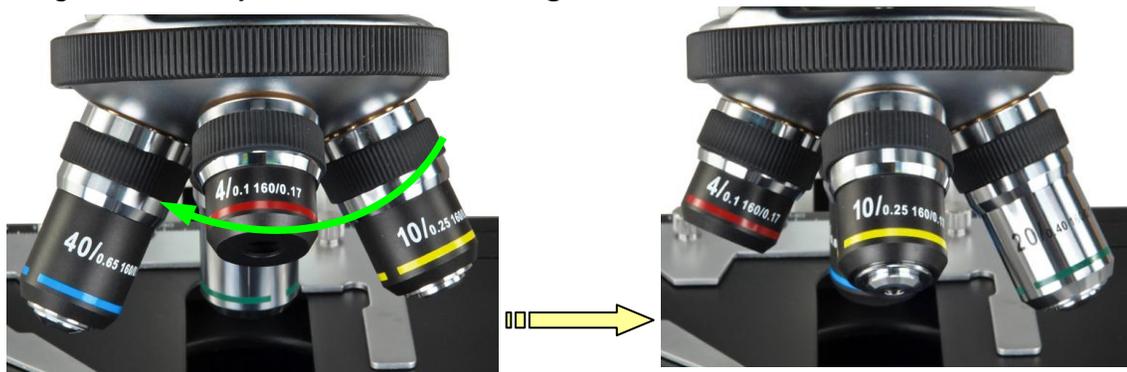


Fig.1

#### 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 glass filter

- 1) Swing out the color filter holder under the condenser.
- 2) Place the filter into the holder as shown in **Fig. 2**, swing the holder in.

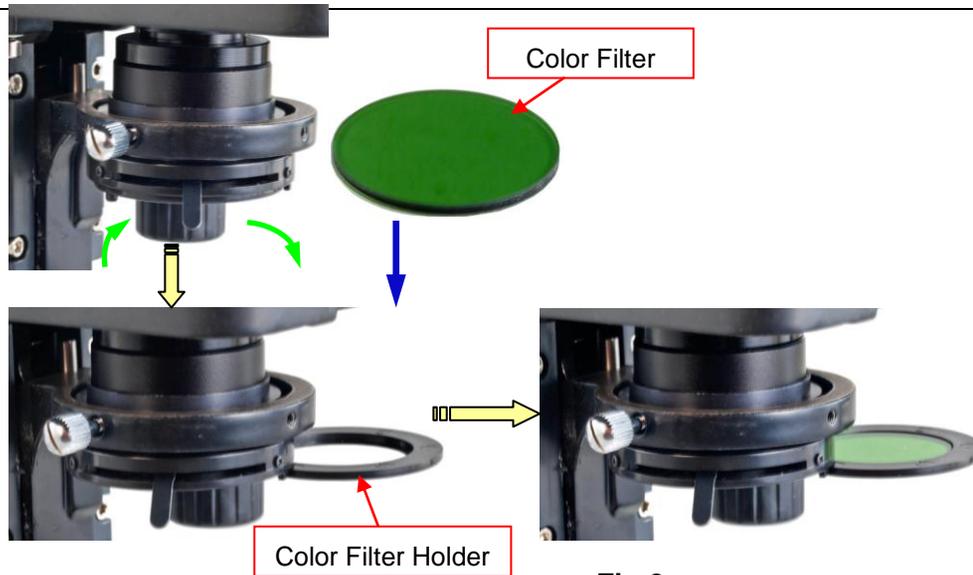


Fig.2

## 2.5 Installing (or changing) the halogen bulb

- 1) Turn off the power switch and disconnect the power cord.
- 2) Allow some time to cool down the lamp.
- 3) Turn over the microscope on its side; find the bulb compartment at the bottom.
- 4) Open the cover of the bulb compartment by loosening the thumb screw.
- 5) Take out the dead halogen bulb and insert the new halogen bulb.

Be sure the pins on the bulb are completely inserted into the lamp socket. You may also loosen the two screws on the cover to adjust the position of the bulb to get centered and even brightness. See **Fig. 3**.

- 6) Screw the cover on.

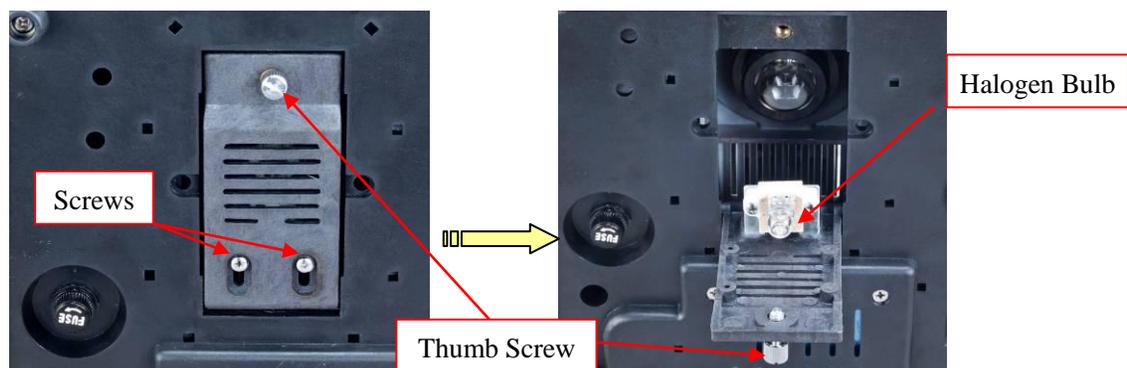


Fig.3

### Caution:

Before you turn over the microscope, be sure to take the eyepieces off and be certain that the head is securely locked by the thumb screw.

## 2.6 Replacing the fuse

- 1) Turn off the power switch and disconnect the power cord.
- 2) Turn over the microscope on its side; find the fuse holder at the bottom of the base.
- 3) Turn the fuse holder counter-clockwise to take it off, replace the fuse, and then turn it on clockwise. See **Fig. 4**.

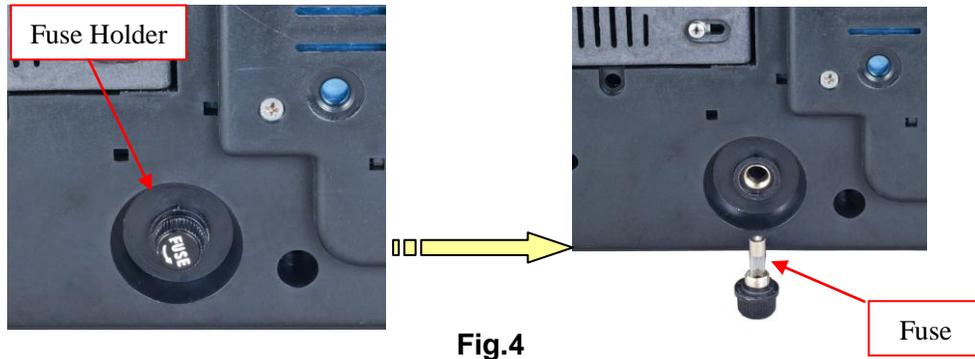


Fig.4

**Caution:**

Before you turn over the microscope, be sure to take the eyepieces off and be certain that the head is securely locked by the thumb screw.

**2.7 Installing the mirror (optional, may not included in your package)**

- 1) Turn off the power switch and disconnect the power cord.
- 2) Screw off the light collector on the microscope base.
- 3) Screw the black disc onto the base and then insert the mirror into the hole at the center of the black disc. See **Fig. 5**. You may try to get reflected ambient light on either side of the mirror with different angles for best result.



Fig.5

**Note:**

The mirror is only used when there is a power failure or you are in the field and no power is available.

**2.8 Installation of the camera (optional, may not included in your package)**

- 1) Take off the plastic cover on the photo tube.
- 2) Insert the camera into the photo tube, and then connect the camera to a computer via USB cable. See **Fig.6**.
- 3) The manual for the camera is on a CD (or mini CD). Refer to the manual to install the driver and software on to the computer.
- 4) The camera is optional and may have different color and shape from the one in the figure, depending on the model purchased.



Fig.6

### 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.

**Caution:**

A diffusion filter is attached beneath the condenser to get uniform light and protect your eyes from strong light when a low power objective applied. The diffusion filter can be swung out to make the view field brighter when observing with a high power objective, such as 40X objective.

#### 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:**

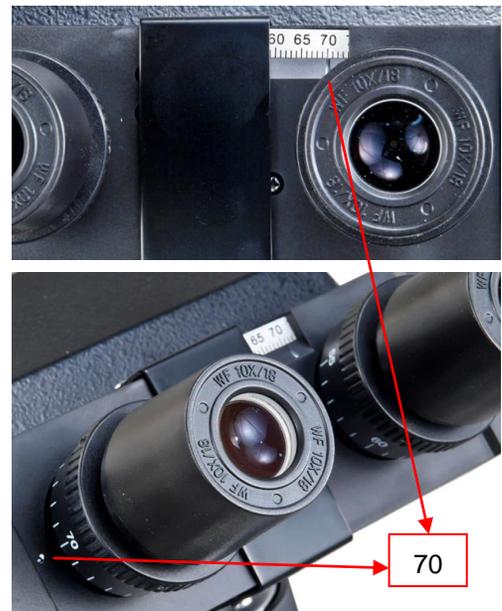
Be sure not to allow an objective to touch a specimen slide when changing objectives.

#### 3.3 Adjusting interpupillary distance

While observing with both eyes, hold the left and right eyepiece tubes then slide the tubes in and out. The interpupillary distance is correct when the left and right fields of view converge completely into one image.

#### 3.4 Adjusting eyepiece diopter

- 1) Rotate the 10X objective into position.
- 2) Rotate the diopter rings on the eyepiece tubes until its numerical value is the same as your interpupillary distance, for example, **70** in the figure (See **Fig. 7**).
- 3) Close your left eye and bring the specimen into focus following the focusing procedures in **3.5**.
- 4) Close your right eye and bring the same specimen into clear sharp focus by adjusting the diopter ring on left eyepiece tube only. Do not use focus knobs at this step.
- 5) Since both sides are adjustable, you may also do the above in the opposite way, in other words, left eye first and right eye second.



**Fig.7**

### 3.5 Focusing

- 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 coarse focus knob until the specimen is in focus.
- 3) Use the fine focus knob to obtain a sharp image.
- 4) 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 **3.3** and **3.4**.
- 5) You may now switch to another magnification objective.



**Fig.8**

#### Tips:

To prevent your specimen slide from making contact with an objective, raise the stage to its highest position without contacting the 40X objective, then tighten the focus stop lever (**Fig. 8**). Give the stage a tiny extra moving space to ensure the objective can be focused every time.

### 3.6 Adjusting condenser

- 1) Turn the condenser focus knob to raise or lower the condenser.
- 2) Raise the condenser when using high power objectives and lower it when using low power objectives.

#### Note:

- The centering of the condenser and the light axis of the objective are factory adjusted. Do not attempt to re-adjust.
- The highest position of the condenser has been factory adjusted. Do not attempt to re-adjust.

### 3.7 Adjusting iris aperture diaphragm

Swing the iris diaphragm lever (**Fig. 9**) left or right to adjust the aperture size.

#### Note:

The iris diaphragm is designed to adjust the aperture size, not to adjust the brightness although the brightness will be changed when it's adjusted. When aperture is adjusted to smaller size, the contrast will be increased and the depth of field will be increased as well. Turn up the intensity of the light if the image is too dim.



**Fig.9**

### 3.8 Adjusting focus tension

The focus tension has been pre-set at the factory. If the mechanical stage drops by itself, rotate the tension adjustment ring (**Fig. 10**) situated between the coarse focus knob and microscope body on the power switch side until the tension is maintained.



**Fig.10**

**3.9 Camera (*optional, may not included in your package*)**

- 1) Bring the microscope into focus by following the procedures in **3.5**.
- 2) Install the camera by following the procedures in **2.8**.
- 3) Open image observing software to examine (more details see camera's manual).
- 4) You also can capture images or record live videos through the software, depending on the functions provided by the software.

**Note:**

Please refer to the manuals in the camera's CD for the details of installation and operation of the camera.

## 4 Specifications

|                             |   |
|-----------------------------|---|
| <b>Model</b>                | <b>M837E series</b>   |
| Total Magnification         | 40X, 100X, 200X, 400X   |
| Viewing Head                | Trinocular, 45° inclined, 360° swiveling  |
| Interpupillary Distance     | Sliding adjustment, 2-3/16" ~ 2-15/16" (55mm~75mm)  |
| Diopter Adjustment          | On both eyepiece tubes  |
| Eyepieces                   | 1 pair of WF10X/18  |
| Objective Tube Length       | 160mm   |
| Nosepiece                   | Revolving quadruple   |
| Objectives                  | Achromatic DIN 4X, 10X, 20X(spring), 40X(spring)  |
| Condenser                   | Abbe, NA=1.25, w/ iris diaphragm and filter holder<br>Rack and pinion adjustment  |
| Focus Mechanism             | Coaxial coarse and fine focusing knobs on both sides with focus stop<br>Minimum fine focusing adjustment at 0.002mm, range 28mm |
| Mechanical Stage            | Double layer, dimension: 5-1/2" x 5-1/2" (140mm x 140mm)<br>Translational range: 3" x 2" (75mm x 50mm)                          |
| Cameras ( <i>optional</i> ) | Refer to the cameras specifications   |
| Illumination                | Transmitted, 6V/20W halogen bulb, variable intensity  |
| Power Supply                | AC 100V-240V, 50/60HZ (US and Canada plug)  |
| Dimension                   | 7-7/8" x 10-1/4" x 15-3/8" (20cm x 26cm x 39 cm)  |
| Net weight                  | 11 lb 11.5 oz (5.3 kg)  |

## 5 Optional Parts

*(The optional parts may be included in some models or sold separately.)*

### 1) Cameras

|   | <b>Model</b> | <b>Resolution</b>   | <b>Operating System</b>                                  | <b>Software</b> |
|---|--------------|---------------------|--|-----------------|
|  | A3530U       | 2048 x 1536 (3.0MP) | MS Windows<br>Mac OS 10.8 and up<br>Linux (2.6 or above) | Included        |

## 6 Troubleshooting Guide

### GENERAL PROBLEMS

| Problem   | Cause   | Solution   |
|---|---|--|
| Lamp does not light when switched on  | No electrical power   | Check power cord connection  |
|   | Lamp bulb burnt out   | Replace bulb   |
|   | 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 light source of the lamp is not at the center                                   | Adjust the position of the lamp  |
| Dirt or dust on the view  | Dirt or dust on the lens eyepiece, condenser, objective, collector lens or specimen | Clean the lens with a camera cleaning kit  |
| 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  |
|   | Condenser aperture is closed or open too much                                       | Open or close properly   |
|   | Condenser is positioned too low   | Position the condenser upward  |
|   | Specimen rises from stage surface   | Secure the specimen in the slide holder  |
|   | Blue filter not used  | Use daylight blue filter   |
|   | 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   |