User Manual

Trinocular Polarizing Microscope

Model M834PL

MicroscopeNet.com

Table of Contents

i. Caution

- Find the “UP” sign and place the Styrofoam container on your table or bench so that the arrow is pointing upward. Open the shipping carton carefully to prevent any accessory items (i.e. objectives and eyepieces) from dropping and being damaged.

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

- 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.

- 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.

- **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.

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

- For safety, when replacing the halogen lamp or fuse, be sure the main switch is off; unplug the power cord, and only replace the halogen bulb after the bulb and the lamp house has completely cooled down.

- 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

- All the lenses have been calibrated and adjusted. It is forbidden to disassembly them yourself.

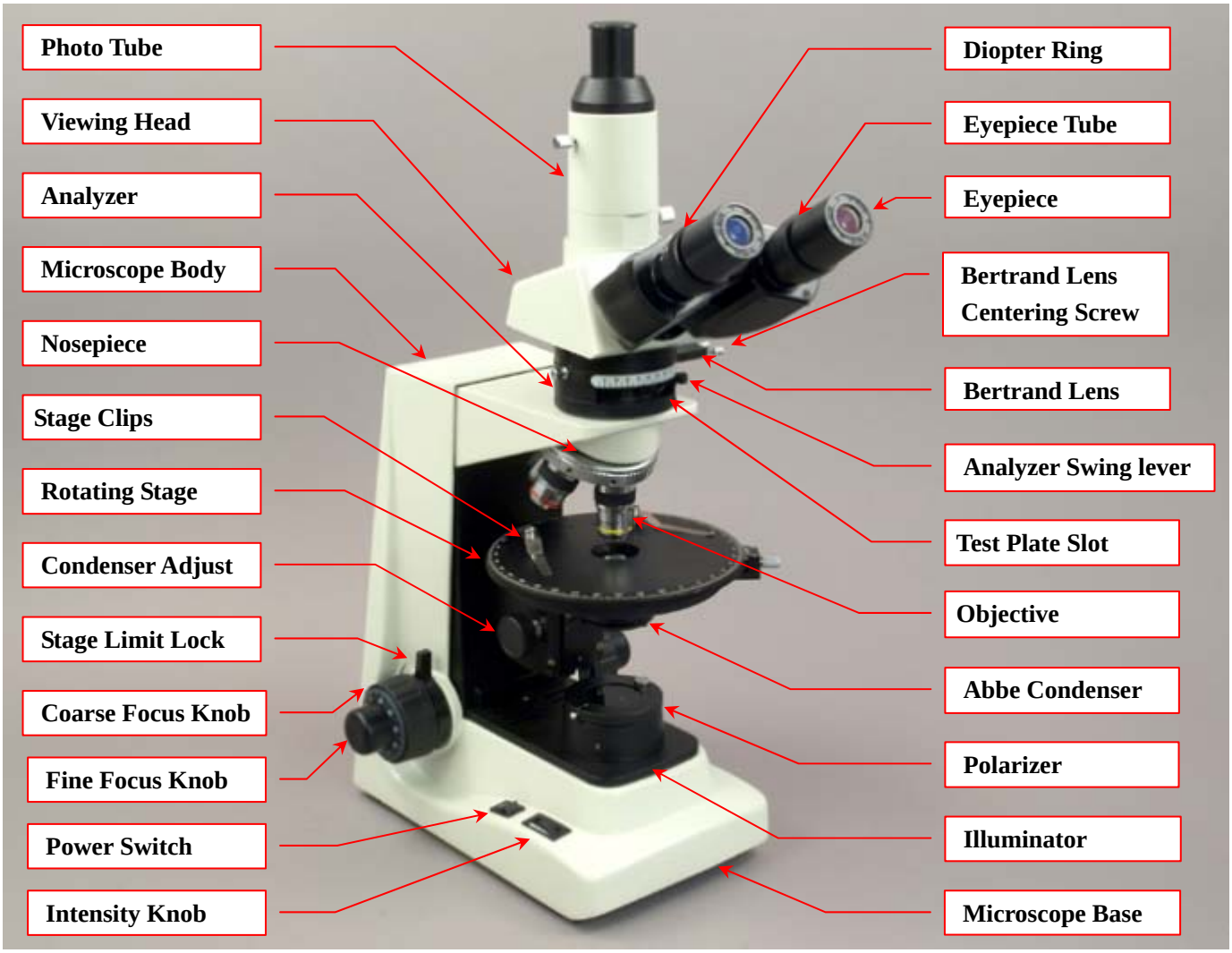
- The nosepiece and the coarse/fine focus unit have a compact and precise structure, don't try to disassemble them.

- Keep the instrument clean, dust regularly. Not to contaminate the optical elements during operation.

- 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 moistened by 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.

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

1. Components Illustration



2. Installation

2.1 Installing the analyzer/Bertrand lens module

1. Loosen the set screw on the top of the body and remove the plastic cover.
2. Remove the cover on the bottom end of the analyzer/Bertrand lens module.
3. Insert the bottom of the module into the head of the body; ensure that it completely seats in, tighten the set screw.

2.2 Installing the trinocular head

1. Loosen the set screw on the analyzer/Bertrand lens module and remove the plastic cover on the top;
2. Remove the cap on the bottom end of the trinocular head;
3. Insert the bottom of trinocular head into the top of the module, ensure that the bottom is completely seated into the module; tighten the set screw.

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

2.3 Installing the photo tube

1. Loosen the screw of the photo tube port and take off the cap.
2. Insert the photo tube on the port and tighten the screw.

2.4 Installing the eyepieces

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

2.5 Installing the objectives

1. Turn the coarse focus knob until the stage is at its lowest position.
2. Install the 4x objective into the nosepiece. Then in a clock-wise direction, rotate the nosepiece and install each succeeding higher power objective.

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 switching the objective, rotate the objective nosepiece until you hear a “click” sound. This ensures the objective is centered in the optical light path.

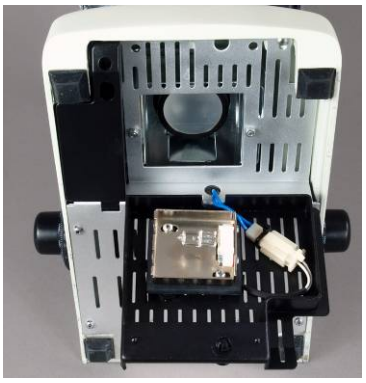
2.6 Installing the filter

1. Swing out the filter holder under the condenser.
2. Insert the filter into the holder, swing the holder in.

2.7 Replacing the fuse

1. Turn off the power and unplug the power cord.
2. Loosen the 5 screws on the back board and open the board.
3. Find the fuses on the board inside and take it (them) out.
4. Put in the new fuse(s) and put the board back its place.
5. Tighten the 5 screws.

2.8 Replacing the halogen bulb



1. Turn the power off and unplug the power cord. Wait for a while till the lamp and light housing cools down.
2. Take the eyepieces off and check if the view head is securely locked by the set screw. Put the microscope down on its back gently.
3. Open the cover on the bottom of the base by pull the knob. Take out the dead bulb and insert the new bulb. Be sure the legs on the bulb are completely inserted into the lamp socket.
4. Close the cover.

Caution: Don't touch the Halogen bulb with your bare fingers. The fingerprints left on the bulb will shorten the bulb's life.

3. Operation

3.1 Adjusting illumination

1. Connect the power cord and turn the power switch on.
2. Turn the intensity knob to increase or decrease the brightness.

3.2 Placing specimen

1. Place the slide on the rotating stage.
2. Use the slide clips to gently secure the slide.

Caution: Be sure the objective does not touch the slide when switching the objectives.

3.3 Focusing

1. With the 10X objective in the light path, raise the 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. Then use the fine focus knob to obtain a sharp image. You may now switch to another magnification objective.

Tips: To prevent your specimen slide from making contact with an objective, raise the stage to its highest position without contacting the 60X objective, then tighten the upper limit mechanical stage lever.

3.4 Adjusting condenser

1. Turn the condenser adjustment knob to raise or lower the condenser.
2. The condenser is raised when using high magnification objectives and lowered when using low magnification objectives.

Note:

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

3.5 Adjusting iris diaphragm

Turn the Iris Diaphragm Lever left or right to adjust the aperture size.

3.6 Adjusting interpupillary distance

While observing with both eyes, hold the left and right eye tubes then swing the tubes inwards and outwards. The interpupillary distance is correct when the left and right fields of view converge completely into one image.

3.7 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.

3.8 Orthogonal polarized light viewing：

When the polarizer is in the center of the light path, its polarizing direction is east-west at 0°.The analyzer is located in the center of the optical path all the time, and marked with 0°- 90° graduations. Turn the analyzer lever to the 90°, so that the polarized direction of the polarizer is east-west, and the direction of the analyzer is south-north.

When the polarizer is swung out of the light path, the analyzer will still stay in the center of the optical path. The instrument is in the single polarizing observation.

3.9 Centering the objective

1. Insert the Allen keys into the nosepiece centering holes.
2. Turn the Allen keys to center the objective as required.

3.10 Convergent light observation：

Normally, the high power objective is used when perform the convergent light observation. Under the orthogonal polarized light state, push in the Bertrand lens, and rise up the condenser, then you can observe the convergent light performance of the specimen.

Turn the centering screws on the Bertrand lens plate to center the Bertrand lens.

3.11 Using the test plates and compensator:

The test plates, i.e. the 1/4λ plate, λ plate, and compensator, i.e. quartz wedge plate, are equipped. During the orthogonal polarized light observation, insert the required compensator plate into the slot beneath the analyzer on the Analyzer/Bertrand Lens module to observe the demanded images.

3.12 Adjusting tension

The tightness of the tension adjustment collar has been pre-set at the factory. If the stage drops by itself, rotate the tension adjustment collar located inside the focus knob on the no power switch side until the tension is in maintained.

3.13 Using camera

1. Put the photo tube onto the trinocular head.
2. Mount the camera onto the photo tube. (Camera sold separately).
3. Pull the bar on the viewing head out.
4. Set up the camera and its software according to camera's instruction.

4. Specifications

General:

Objective Tube Length	160mm
Total Magnification	40X, 100X, 400X, 600X
Viewing Head	Trinocular, inclined 30º, swiveling 360º, interpupillary distance 55-75mm, adjustable diopter
Eyepieces	2 WF10X/18 and 1 WF10X/18 with crosshair reticle
Nosepiece	Quadruple, objective center adjustable, reversed
Objectives	Strain free achromatic DIN 4X, 10X, 40X(spring), 60X(spring)
Focus system	Coaxial coarse and fine focusing, minimum fine focusing adjustment at 0.002mm, range 28mm
Condenser	Abbe, NA=1.25, with iris diaphragm and filter holder
Stage	Rotating stage, with 360° angle graduations and a vernier scale, accurate to 0.1°, diameter Φ160mm
Illumination	Halogen lamp, 6V/20W, brightness adjustable

Magnifications:

	Eyepiece	Objective
40X	10X	4X
100X	10X	10X
400X	10X	40X
600X	10X	60X

Eyepieces:

	WF10X/18	WF10X/18 with crosshair reticle
Magnification	10X	10X
Field of View	18mm	18mm

Objectives:

	4X	10X	40X	60X
Magnification	4	10	40	60
Numerical Aperture	0.1	0.25	0.65	0.85
Thickness of Slide cover	0.17mm	0.17mm	0.17mm	0.17mm
Working Mode	Dry	Dry	Dry	Dry
Spring	No	No	Yes	Yes

Polarized Light Components:

Polarizer	0°, swing in/out the light path
Analyzer	0° - 90° rotatable
Bertrand Lens	Push in and pull out of the light path, center adjustable by two screws
Compensator Plate	1/4λ plate, λ plate and quartz wedge plate

5. Troubleshooting Guide

OPTICAL PROBLEMS

Problem	Cause	Solution
Darkness at the periphery or uneven brightness in the field of view	The nosepiece not in click stop position	Revolve the nosepiece to click-stop position by swinging the objective correctly into the light path
	The light source is not at the center	Adjust the position of the bulb
Dirt or dust in the view	Dirt or dust on the lens of eyepiece, condenser, objective, light source cover or specimen	Clean the lens with a camera cleaning kit
Poor image quality	No slide cover attached to the slide	Attach a 0.17mm slide cover
	Slide cover is too thick or thin	Use a slide cover with the thickness designated by the objective
	Slide may be upside down	Turn slide over so the cover-glass faces up
	Immersion oil is put on a dry objective	Check the objective, clean if necessary
	Condenser aperture is closed or open too much	Open or close properly
	Condenser is too low	Adjust the condenser to the right position

IMAGE PROBLEMS

Problem	Cause	Solution
Image moves while focusing	Specimen rises from stage surface	Secure the specimen in the slide clip on the stage
	Nosepiece is not in the click-stop position	Turn the nosepiece to the click-stop position
Image tinged yellow	Blue filter not used	Use daylight blue filter
	Lamp intensity is too low	Adjust the light intensity by turning the intensity control knob
Image is too bright	Lamp intensity is too high	Adjust the light intensity by turning the intensity control knob
Insufficient brightness	Lamp intensity is too low	Adjust the light intensity by turning the intensity control knob
	Aperture diaphragm over closed	Open to the proper setting
	Condenser position too low	Adjust the condenser at the right position

ELECTRICAL 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

MECHANICAL PROBLEMS

Problem	Cause	Solution
Image does not focus with high power objective	Slide upside down	Turn the slide over so the cover glass faces up
	Cover glass is too thick	Use a right slide cover according to the objective
High power objective contacts slide when switch from low power objective	Slide upside down	Turn the slide over so the cover glass faces up
	Cover glass is too thick	Use a right slide cover according to the objective
	Diopter adjustment is not set properly	Readjust the diopter settings
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