User Manual

Trinocular Metallurgical Microscope

Model M83MPTR

MicroscopeNet.com

Table of Contents

i. Caution

1. 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 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. 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.

8. 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.

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ii. Care and Maintenance

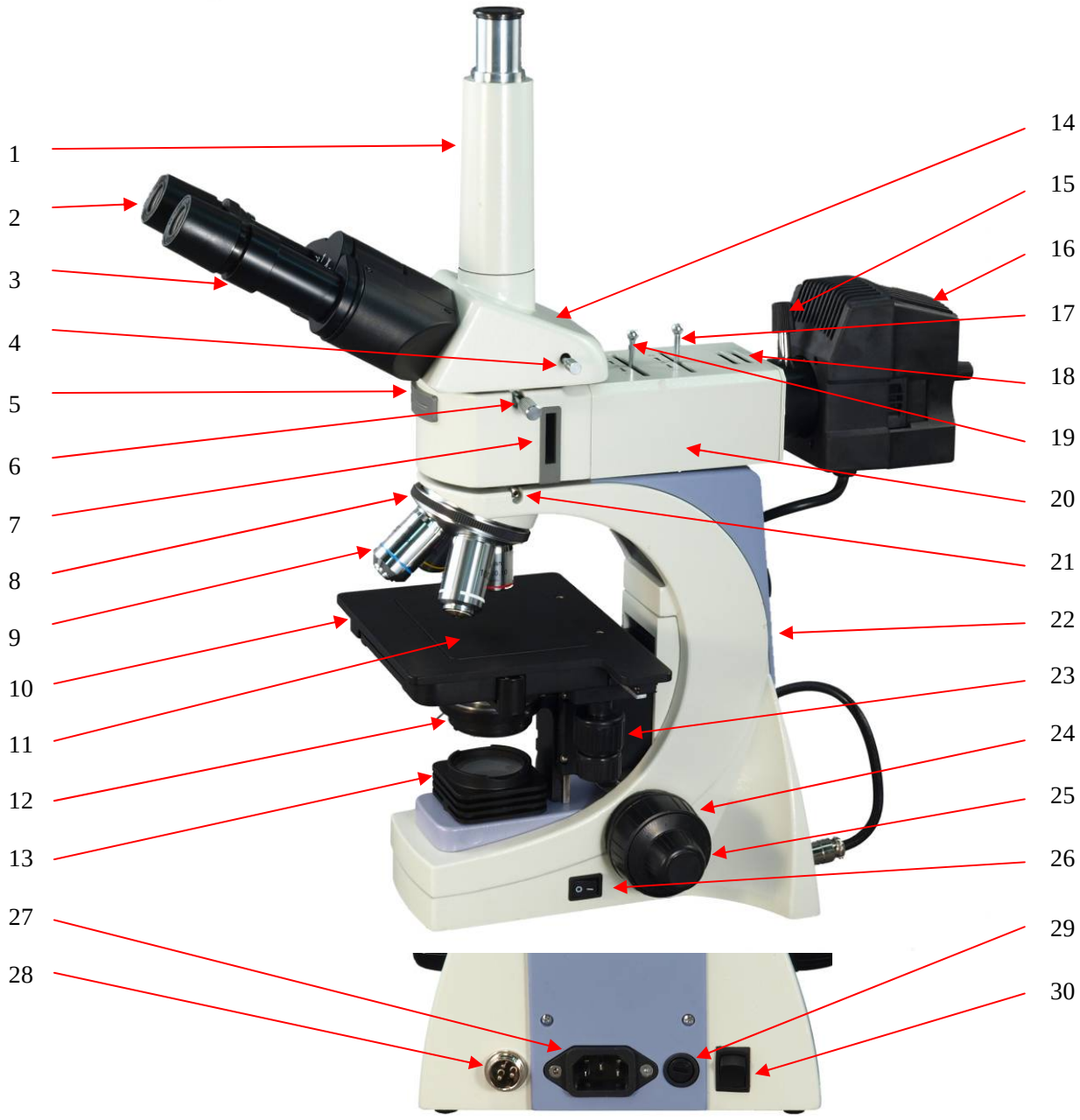
1. Do not attempt to disassemble any component including eyepieces, objectives or focusing assembly.

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. Photo Tube
2. Eyepiece
3. Eyepiece Tube
4. Photo/Eyepiece Switch
5. Analyzer Slot
6. Secure Thumb Screw
7. Polarizer Slot
8. Nosepiece
9. Objective
10. Stage
11. Stage Plate
12. Condenser
13. Light Collector
14. Viewing Head
15. Condenser Focus Adjust
16. Lamp Housing
17. Aperture Diaphragm
18. Color Filter Slots
19. Field Diaphragm
20. EPI Light Assembly
21. Secure Set Screw
22. Stand
23. Stage Translation Knobs
24. Coarse Focus Knob
25. Fine Focus Knob
26. Power Switch
27. AC Power Socket
28. DC Power Port
29. Fuse
30. T/R Switch

2 Installation

2.1 Installation of the EPI lamp housing assembly

1) Loosen the secure set screw on the top of the stand with a screwdriver and remove the plastic cover.
2) Remove the cap on the dovetail of the EPI light assembly.
3) Seat the dovetail into the socket on the top of the stand securely, and then tighten the set screw.
4) Connect the electrical cord to the DC power port at the back of the stand.
5) The halogen bulb has been installed in the lamp housing already. Don't try to disassemble it.

2.2 Installation of the trinocular viewing head

1) Loosen the head secure thumb screw on EPI light assembly and remove the plastic cover.
2) Remove the cap on the dovetail of the trinocular viewing head.
3) Seat the dovetail into the socket on the top of the stand securely, and then tighten the head secure thumb screw.

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

2.3 Installation of the eyepieces

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

2.4 Installation of the objectives

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

Note:

- 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. This ensures the objective is centered in the optical light path.

2.5 Installation of the color filters

For reflected illumination, insert the selected color filter into the filter slot on the EPI light assembly.

For transmitted illumination, swing out the filter holder, which is located at the bottom of the Abbe condenser and put the filter on the holder, and then swing the filter holder back.

2.6 Installation of the polarizing plates

For reflected illumination, insert the polarizer and analyzer separately into the

analyzer slot and polarizer slot on the EPI light assembly.

For transmitted illumination, put the polarizer on the top of the transmitted light collector. Put the analyzer into the light path, in between the EPI light assembly and the microscope stand.

Analyzer

Polarizer

2.7 Fuse replacement

1) With a flat-head screwdriver, press and turn the fuse holder counter clock wise to remove it.
2) Replace the fuse with a new one.
3) Put the fuse holder back, press and turn it clock wise.

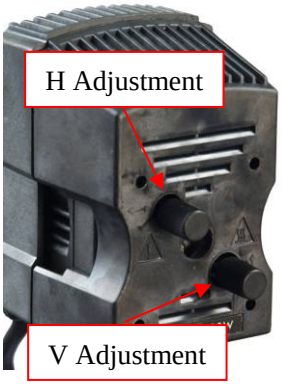
2.8 Lamp bulb replacement

1) Unplug the power cord from the wall outlet.
2) Take off the 4 screws from the lamp housing.
3) Remove the half of the lamp housing.
4) Make sure the bulb is cooled down before pulling out the bulb. Insert the new bulb into the sockets.
5) Put the half lamp housing back and tighten the 4 screws.

3 Operation (**Reflected illumination)**

3.1 Adjusting illumination

1) Connect the power cord of microscope to a wall outlet, and turn on the power switch.
2) Press the T/R switch to choose the reflected illumination.
3) Rotate the intensity dial to increase or decrease the brightness.
4) Turn the lamp H knob and V knob to adjust it's horizontal and vertical positions until the light in the field of view is even and bright.



3.2 Placing specimen

1) Place the metal stage plate on the mechanical stage.
2) Place the specimen on the stage plate.
3) Turn the X and Y translation knobs to position the specimen for viewing.

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

3.3 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. 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 100x objective, then tighten the focus stop lever.

3.4 Adjusting interpupillary distance

While observing with both eyes, hold the left and right eyepiece tubes and turn.

The interpupillary distance is correct when the left and right fields of view coincide completely with each other.

3.5 Adjusting eyepiece diopter

1) Using the 10x objective and your right eye only, observe your specimen through the right 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, rotate the diopter ring until a sharp image is obtained.

3.6 Diaphragm adjustment

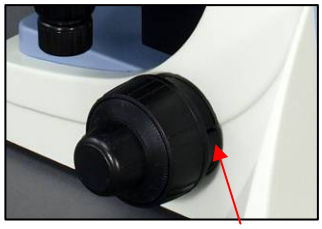
1) Aperture diaphragm: It controls the aperture angle of incident light. The aperture diaphragm should be adjusted according to different objectives.
2) Field diaphragm: It controls the size of field of view and reduces the inner incident light to make the high contrast. Normally the field diaphragm is set at the same size of the viewing field of the observing eyepiece.

3.7 Condenser focus adjusting

Adjust the condenser focus lever close to the lamp housing to move the condenser forward or backward.

3.8 Adjusting tension

The tightness of the tension adjustment collar has been pre-set at the factory. If the mechanical stage drops by itself, rotate the tension adjustment collar located inside of the coarse focus knob on the power switch side until the tension is in maintained.

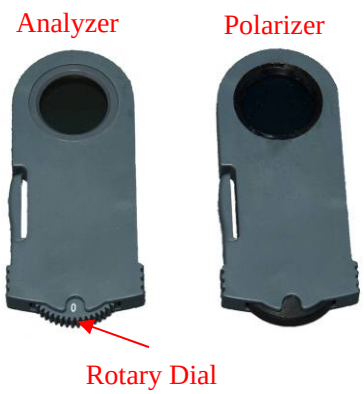


3.9 Brightfield observing

1) Make sure the polarizer and analyzer are not in the slots.
2) Turn the nosepiece so that the 10X objective at working position.
3) Put specimen on the stage.
4) Adjust the coarse and fine focusing knobs to get sharp image.
5) Adjust the stage translation knobs to move the interesting spot of the specimen in the field of view.
6) Turn the required magnification objective into light path and observe.

3.10 Polarization observing

1) Insert the analyzer plate into the analyzer slot, and the polarizer plate into the polarizer slot.
2) Operate following the steps in **3.9**.
3) Turn the analyzer rotary dial from 0° to 90° to observe



the polarized light image.

3.11 Photo/video observing, capturing and recording

1) Attach the photo tube onto the trinocular viewing head.
2) Pull the photo/ocular switch bar to the photo position.
3) Mount microscope camera (electronic eyepiece) onto the photo tube and connect the USB cable from camera to computer.
4) Open image observing software to examine. You also can capture images or record live videos through the software, depending on the functions provided by the software.
5) If a conventional camera used, you may need an adapter to connect your camera to the photo tube.

Note: Camera is not included. Electronic eyepieces are sold separately.

4 Operation (**Transmitted illumination)**

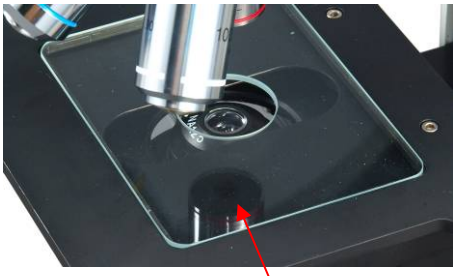
4.1 Adjusting illumination

1) Connect the power cord of microscope to a wall outlet, and turn on the power switch.
2) Press the T/R switch to choose the transmitted illumination.
3) Rotate the intensity dial to increase or decrease the brightness.

4.2 Placing specimen

1) Place the glass stage plate on the mechanical stage.
2) Place the specimen on the stage plate.
3) Turn the X and Y translation knobs to position the specimen for viewing.

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



4.3 Focusing

Please refer to **3.3** in this manual.

4.4 Adjusting interpupillary distance

Please refer to **3.4** in this manual.

4.5 Adjusting eyepiece diopter

Please refer to **3.5** in this manual.

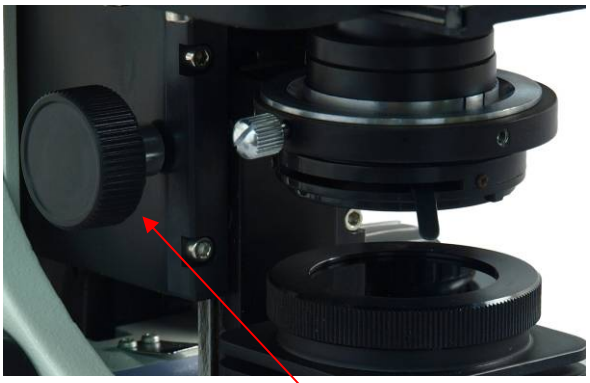
4.6 Aperture diaphragm adjustment

Slide the iris aperture diaphragm lever to adjust the size of the center opening. The aperture diaphragm should be adjusted according to different objectives.

Diaphragm Lever

4.7 Condenser focus adjusting

Adjust the condenser focus knob to move the condenser up or down.



Condenser Focus Knob

4.8 Adjusting tension

Please refer to **3.8** in this manual.

4.9 Brightfield observing

1) Make sure the polarizer and analyzer are not put in the light path.
2) Turn the nosepiece so that the 10X objective at working position.
3) Put specimen on the stage.
4) Adjust the coarse and fine focusing knobs to get sharp image.
5) Adjust the stage translation knobs to move the interesting spot of the specimen in the field of view.
6) Turn the required magnification objective into light path and observe.

4.10 Polarization observing

1) Put the analyzer and polarizer into the light path (refer to **2.6**).
2) Operate following the steps in **4.9**.
3) Turn the polarizer to observe the polarized light image.

4.11 Photo/video observing, capturing and recording

Please refer to **3.11** in this manual.

5 Specifications

General

Model	M83MPTR
Total Magnification	40X, 80X, 100X, 200X, 400X, 800X, 1000X, 2000X
Eyepiece	WF10X/18, WF20X
Objective	Infinity-corrected plan field achromatic, DIN 4X, 10X, 40X(S), 100X(S,Dry)
Viewing Head	Siedentopf trinocular, 30º inclined, 360º swiveling , hinge interpupillary distance adjustment, adjustable diopter on left ocular tube
Nosepiece	Revolving, quadruple
Reflected Illumination	Reflected illumination: EPI illuminator, 6V/30W halogen, H/V position adjustable, intensity adjustable, with built-in condenser, iris aperture diaphragm, iris field diaphragm, 2 color filter slots and polarizer/analyzer slots Transmitted illumination: 6V/30W halogen, intensity adjustable
Condenser	Reflected illumination: Spiral adjustment, built in the EPI illuminator assembly Transmitted illumination: Abbe NA 1.25, with built-in iris aperture diaphragm and color filter holder
Stage	Triple layer mechanical stage, size 15cm X14cm, translation range 75mm X 50mm, glass and metal stage plate replaceable
Focus system	Coaxial coarse and fine focus knobs on both side with stop lever, Tension adjustable
Power supply	AC 110V 50/60Hz
Dimension	18-7/8” x 7-5/8” x 20-5/8” (48cm x 19.5cm x 52.5cm)
Net weight	19 lb 3 oz (8.7kg)

Eyepieces

Designation	Magnification	Field of View
Wide Field	10X	18mm
Wide Field	20X	9.5mm

Objectives

Magnification	Numerical Aperture	Thickness of slide cover	Working Distance	Other
4X	0.10	-	25.4mm	Infinity-corrected, achromatic, dry
10X	0.25	-	11.0mm	Infinity-corrected, achromatic, dry
40X	0.60	-	2.8mm	Infinity-corrected, achromatic, retractable, dry
100X	0.90	0	0.7mm	Infinity-corrected, achromatic, retractable, dry

6 Troubleshooting Guide

Problem	Cause	Solution
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 bulb is not at the center	Adjust the position of the bulb
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	Immersion oil is on a dry objective (especially the 40x and 100x)	Check the objectives, clean if necessary
	Condenser aperture is closed or open too much	Open or close properly
	Condenser is positioned not correct	Adjust the condenser
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
Image moves while focusing	Specimen rises from stage surface	Secure the specimen
	Revolving nosepiece is not in the click-stop position	Revolve 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 rotating the intensity control dial
Image is too bright	Lamp intensity is too high	Adjust the light intensity by rotating the intensity control dial
Insufficient brightness	Lamp intensity is too low	Adjust the light intensity by rotating the intensity control dial
	Aperture diaphragm closed too far	Open to the proper setting
	Condenser position is not correct	Adjust the condenser
High power objective contacts specimen when changed from low power 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