User Manual

Transmitted / Reflected Polarizing Microscope

Model K83PTR

MicroscopeNet.com

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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 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 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. 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.

ii. Care and Maintenance

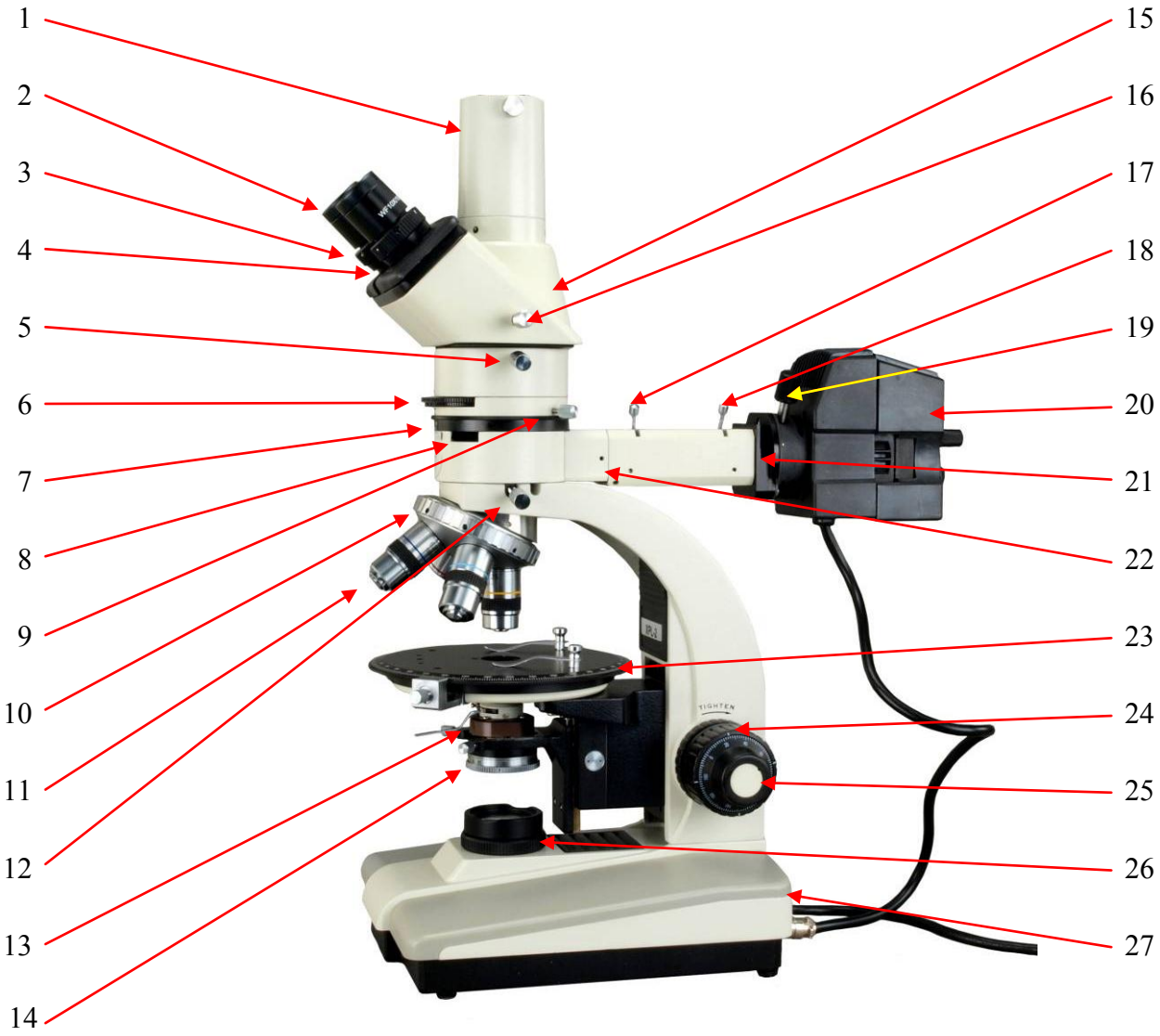
1. Do not attempt to disassemble any component including eyepieces, objectives or focusing assembly.

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. Diopter Ring
4. Eyepiece Tube
5. Head Secure Screw
6. Bertrand Lens Dial
7. Analyzer Adjustment
8. Test Plate Slot
9. B-Lens Centering Screw
10. Nosepiece
11. Objective
12. EPI Secure Screw
13. Condenser
14. Polarizer
15. Viewing Head
16. Phototube Switch
17. Field Diaphragm
18. Aperture Diaphragm
19. Collector Lens Lever
20. EPI Light Housing
21. Filter Slot
22. EPI Assembly
23. Rotating Stage
24. Coarse Focus Knob
25. Fine Focus Knob
26. Collector Lens
27. Microscope Base

2 Installation

2.1 Install the EPI illuminator assembly

2.1.1 Loosen the thumb screw (12) and a set screw on the top of the stand; remove the plastic cover on the top.

2.1.2 Remove the cover on the dovetail at the bottom of the EPI assembly (22).

2.1.3 Insert the dovetail of the assembly (22) into the socket on the top of the microscope stand. Ensure that it completely seats in, tighten the thumb screw (12).

2.1.4 Connect the power cord to the socket at the rear of the base (27)

2.2 Install the trinocular viewing head

2.2.1 Loosen the thumb screw (5) on top of the EPI Assembly (22); remove the plastic cover on the top.

2.2.2 Remove the cap on the dovetail of the trinocular viewing head (15).

2.2.3 Insert the trinocular viewing (15) head into the socket on the top of the EPI assembly (22); ensure that the dovetail is completely seated into the body; tighten the thumb screw (5).

2.3 Install the eyepieces

2.3.1 Remove the protective caps from the eyepiece tubes (4).

2.3.2 Insert the eyepieces (2) into the eyepiece tubes (4).

2.4 Install the objectives

2.4.1 Adjust the coarse focus knob (24) until the stage (23) is at its lowest position.

2.4.2 Remove all the caps of the openings on the nosepiece.

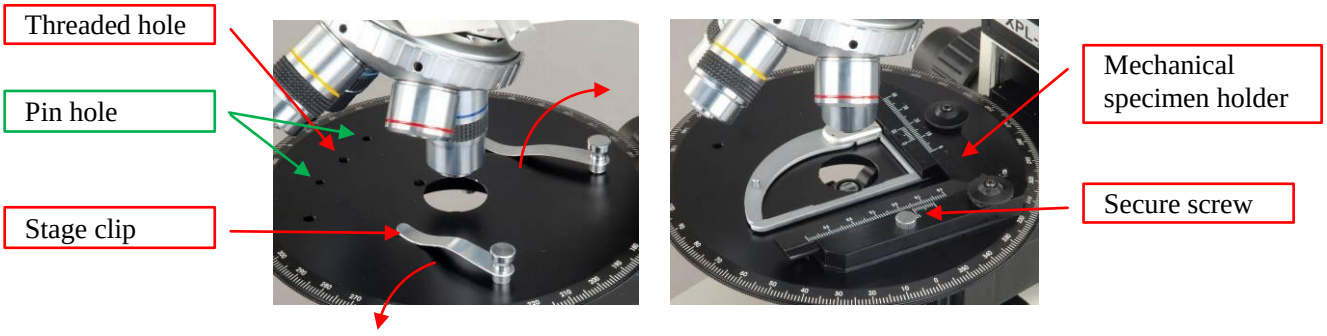
2.4.3 Install the 4X objective into the nosepiece. Then in a clock-wise direction, rotate the nosepiece and install each succeeding higher power objective.

Note: 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 Install the mechanical specimen holder

2.5.1 Turn the 2 stage clips in the direction as shown in the following image till they leave the surface of stage, and then remove the 2 stage clips.

2.5.2 Align the 2 pins under the mechanical specimen holder with the 2 pin holes on the stage and then tighten the secure screw on the mechanical specimen holder.



2.6 Replace the halogen bulb

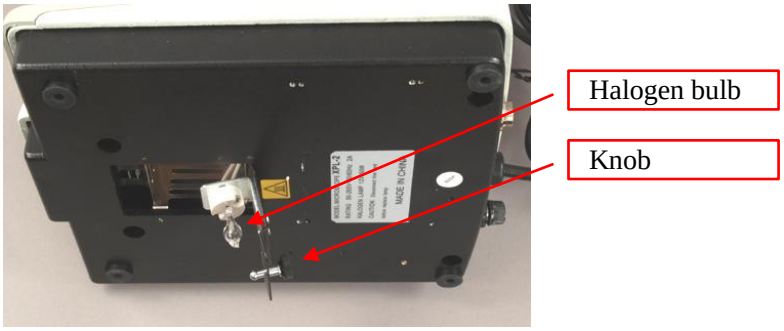
2.6.1 Turn the power off and unplug the power cord. Wait for a while till the lamp and light housing cools down.

2.6.2 Take the eyepieces (22) off and check if the viewing head is securely locked by the thumb screw (5). Lay the microscope down on its side gently.

2.6.3 Open the cover on the bottom of the base (27) by pull the knob on the cover. Take out the dead bulb and insert the new bulb. Be sure the pins on the bulb are completely inserted into the lamp sockets. Push the cover close.

2.6.4 You may also loosen the two screws on the cover to adjust the position of the bulb to get centered and even brightness.

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



2.7 Replace the fuse

2.7.1 Turn off the power and disconnect the power cord.

2.7.2 Find the fuse at the back of the base.

2.7.3 Turn the fuse holder counter-clockwise with a screw driver to take it out.

2.7.4 Replace the fuse, and then turn the holder back on in clockwise direction.

2.8 Center the objective

Adjust the center of the objective by turning the 2 centering screws of each objective with the 2 Allen keys provided.

3 Operation

3.1 Turn on the light

3.1.1 Connect the power cord to the power outlet.

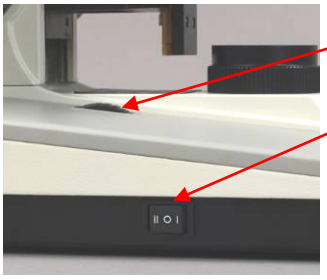
3.1.2 Press the power switch to choose the light source.

I – For transmitted illumination

II – For EPI reflected illumination

3.1.3 Turn the intensity dial to turn on the light and adjust the brightness.

Note: Avoid from turning the intensity dial to the highest position, otherwise the bulb lifetime will be shortened.



3.2 Put specimen

3.2.1 For transmitted light, put slide on the stage and hold it with the stage clips. Make sure the part to be inspected is in the center of the opening.

3.2.2 For reflected light, put the stage plate on the stage and hold it with the stage clips.

3.2.3 Slide base might be used when necessary.

3.2.4 Mechanical slide holder might be used when the specimen need to be moved accurately.

Slide Base

Stage Plate

3.3 Adjust interpupillary distance

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

3.3.2 The interpupillary distance is correct when the left and right field of view converge completely into one image.

3.4 Adjust eyepiece diopter

3.4.1 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.

3.4.2 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.

3.4.3 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.

3.5 Focus

3.5.1 With the 10x objective in position, raise the stage (23) using the coarse focus knob (24) until the specimen is close to the objective.

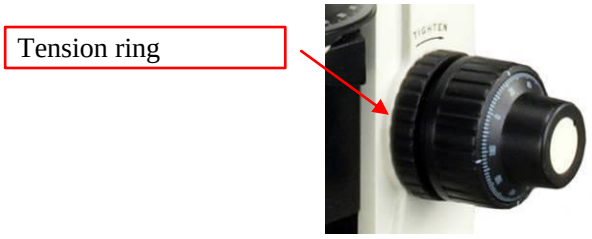
3.5.2 Turn the coarse focus knob (24) until the specimen is in focus. Then use the fine focus knob (25) to obtain a sharp image.

3.5.3 Turn the 4X objective into the light path to find the spot to be inspect in the field of view when necessary.

3.5.4 Use other objective to get the desired magnification.

3.6 Adjust focus tension

The focus tension has been pre-set at the factory. If the stage drops by itself, rotate the tension ring until the stage is in maintained.



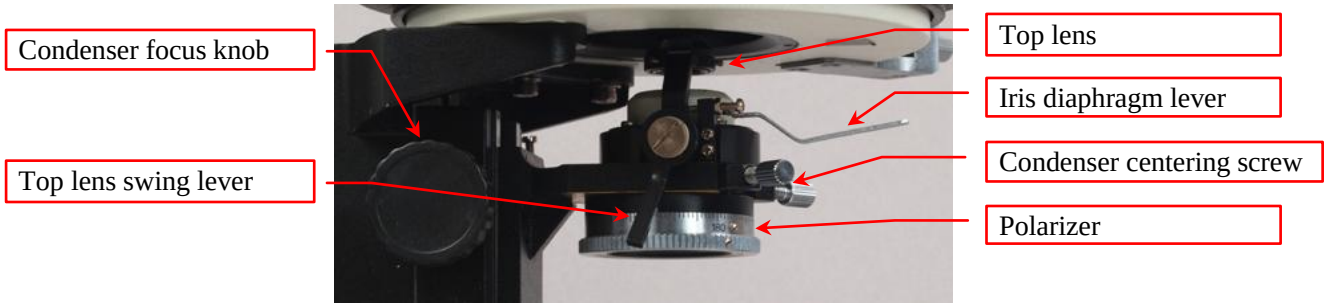
3.7 Adjust condenser focus

3.7.1 The highest position of the condenser has been set up in factory. No need to re-adjust.

3.7.2 The center of condenser can be adjusted by turning the two condenser centering screws.

3.7.3 Turn the condenser focus knob to raise or lower the condenser. The condenser is raised when using high power objectives and lowered when using low power objectives.

3.7.4 The top lens is flip up when using high power objective and/or in conoscopic observing mode.



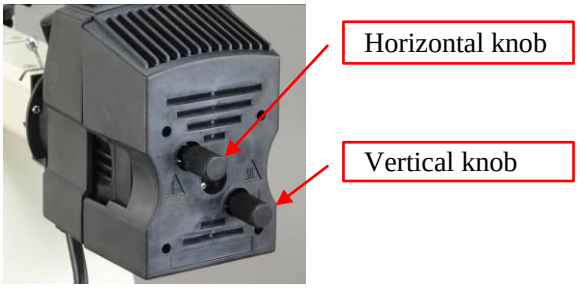
3.8 Adjust the reflected illumination

3.8.1 Adjust the light horizontal knob and vertical knob to center the light bulb.

3.8.2 Adjust the condenser lens lever (19) to adjust the illumination.

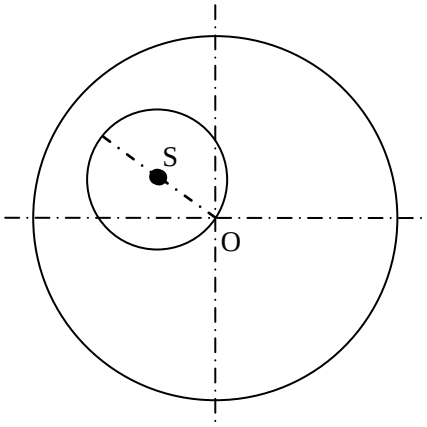
3.8.3 Move the field diaphragm lever (17) to adjust the field of view.

3.8.4 Move the aperture diaphragm lever (18) to adjust the intensity and contrast in the field of view.



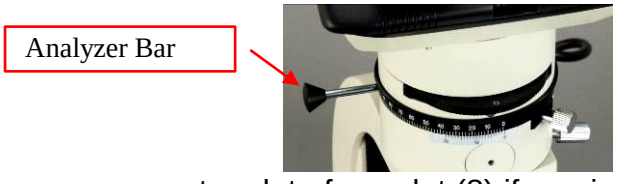
3.9 Co-center the stage and the objective

3.9.1 Use the eyepiece with cross-hair reticle.
3.9.2 Put a specimen on the stage and hold it with mechanical specimen holder.
3.9.3 Focus the specimen sharply.
3.9.4 Find a marked feature in the field of view, and move it to the center “O” of cross hairs in the field of view.
3.9.5 Rotate the stage ,if the optical axis of the objective not coincides with the center of the rotation of the stage, then, the target selected will rotate about certain center S (that is the rotating center of the stage), the trajectory of which is a circle.
3.9.6 Turn the target point to the “O”, and adjust the center of the objective and allow the point “O” to move toward the point “S” and coincide with it.
3.9.7 Turn the stage again, to view whether the two points coincide with each other, if any deviation exists, repeat the procedures again.



3.10 Bright field observing

3.10.1 Pull the analyzer bar out.
3.10.2 Turn the Bertrand lens dial (6) to “O” position.



3.10.3 Remove compensator plate from slot (8) if one inside.
3.10.4 Put the slide on the stage.

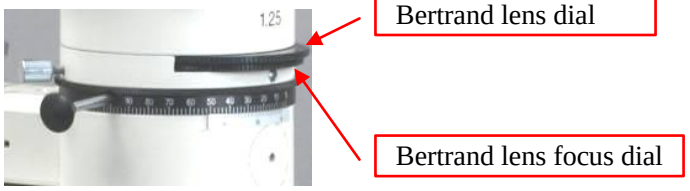
3.10.5 Turn the 10X objective into the light path.
3.10.6 Turn on the light, adjust the illumination.
3.10.7 Focus; Adjust the interpupillary distance and diopter ring.

3.11 Orthoscopic polarizing observing

3.11.1 Obtain a focused image following the procedures in 3.10.
3.11.2 Push the analyzer bar back to put the analyzer in the light path.
3.11.3 Maintain the Bertrand lens dial at the “O” position.
3.11.4 Move the analyzer bar slowly from 0º to 90º to find the crossing position with the polarizer.
3.11.5 Insert the compensator plate into the slot (8) when needed.

3.12 Conoscopic polarizing observing

3.12.1 Set the microscope to the Orthoscopic observing mode.
3.12.2 High power objective is used normally for Conoscope observing.
3.12.3 Turn the Bertrand lens dial to the “B” position.
3.12.4 Put the top lens of the sub stage condenser into the light path if needed when using transmitted light.
3.12.5 Turn the Bertrand lens centering screws (9) to center the Bertrand lens.
3.12.6 Turn the Bertrand lens focus dial to focus.



3.13 Photo/video observing, capturing and recording

3.13.1 Insert the reduction lens into the phototube of viewing head
3.13.2 Pull the phototube switch bar (16) out to the photo position.
3.13.3 Connect the digital camera to the computer with USB cable.
3.13.4 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.

Note: Camera is sold separately.

4 Specifications

Viewing Head	Trinocular, inclined 45º, swiveling 360º, slide interpupillary distance adjustment, adjustable diopter on both ocular tube
Magnification	50X, 125X, 312X, 500X, 787X
Eyepieces	2 WF10X/18 1 WF10X/18 with reticules, diopter adjustable 1 WF10X/18 with crosshair, diopter adjustable 1 WF10X/18 with grids, diopter adjustable
Objectives	DIN Strain free achromatic objectives 25X, 40X(s), 63X(s) for specimen with 0.17mm cover slip Plan 25X, 40X(s), 63X(s) for specimen with no cover slip 4X, 10X for specimen with or with no cover slip
Tube factor	1.25X
Nosepiece	Quadruple, objective center adjustable
Focus system	Coaxial coarse and fine focusing, minimum fine focusing adjustment at 0.002 mm, range 26 mm
Condenser	Abbe, NA=1.30, with iris diaphragm, center adjustable, top lens can be swing out of the light path
Rotating Stage	Circular rotating stage, diameter 160mm, 360º angle graduations, with stage clips and mechanical holder (range 30mm x 40mm)
Analyzer	Slide in and out of the light path, 0º - 90º graduation
Polarizer	For transmitted light: Mounted under the condenser, rotatable with 360º angle graduations For reflected light: Fixed in the intermediate tube
Bertrand Lens	Can be switch in and out of the light path, center adjustable, focus adjustable
Compensators	Quarter-wave plate (1/4 λ plate) Tint plate (1 λ plate) Quartz wedge (Q plate)
Illumination	Transmitted: Halogen lamp 12V/20W, brightness adjustable Reflected: Halogen lamp 12V/50W, brightness adjustable, center adjustable
Filters	Blue, green, cyan, and white for reflected illumination
Power	90V – 265V, 50Hz/60Hz
Dimension	38cm x 20cm x 52cm (15in x 8 in x 20-1/2in)

5 Troubleshooting Guide

5.1 OPTICAL PROBLEMS

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 (not included in the package)
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 of the appropriate thickness (0.17mm)
	Slide may be upside down	Turn slide over so the cover-glass faces up
	Wrong objective is used	Use the correct objective for specimens with or with no 0.17mm cover slip
	Condenser aperture is closed or open too much	Open or close properly
	Condenser is positioned too low	Position the condenser upward
	Needless lens in the light path	Check the Bertrand lens, analyzer, compensator plate, color filter and top lens of condenser, move the unwanted lens out off the light path
	Top lens of condenser is not in use	Move the top lens into light path when using high power objectives

5.2 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

5.3 IMAGE PROBLEMS

Problem	Cause	Solution
Image moves while focusing	Specimen rises from stage surface	Secure the specimen or specimen plate in the slide holder
	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 much	Open to the proper setting
	Condenser position too low	Position the condenser upward

5.4 MECHANICAL PROBLEMS

Problem	Cause	Solution
High power objective contacts slide when changed from low power objective	Slide upside down	Turn the slide over so the cover glass faces up
	Cover glass is too thick	Use a 0.17mm cover glass
	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