User Manual

Trinocular Compound EPI-Fluorescence Microscope

Model M837FLR

OMAX

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 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.

IMPORTANT:

6. Confirm that the input voltage labeled 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.
7. Slide the *voltage* switch (115V/230V) and *frequency* switch (50Hz/60Hz) on the back of fluorescence power supply to the correct position.
8. Before connect the power cords to the power outlets, make sure the power switches on the microscope base and fluorescence power supply are on the “off” position.
9. The lamp, lamphouse and adjacent parts will become very hot during or short after operation. Do not touch these parts until they have completely cooled. Never attempt to handle a hot halogen bulb or mercury bulb.
10. Make sure there is sufficient room around the microscope base and the fluorescence lamphouse and power supply for heat elimination.
11. For safety when replacing the lamps or fuses, be sure the main switch is off, unplug the power cord, and only replace the bulb after the bulb and the lamphouse has completely cooled.
12. Do not touch the surface of mercury or halogen bulbs with bare fingers. If so, clean the surface with soft cloth.
13. Only use low auto-fluorescence immersion oil during fluorescence observation.
14. To prolong the lifetime of mercury lamp, don’t turn the light off after less than 15 min of turning it on.
15. The time between you turn the mercury lamp off and turn it on again should be at least 10 min.

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

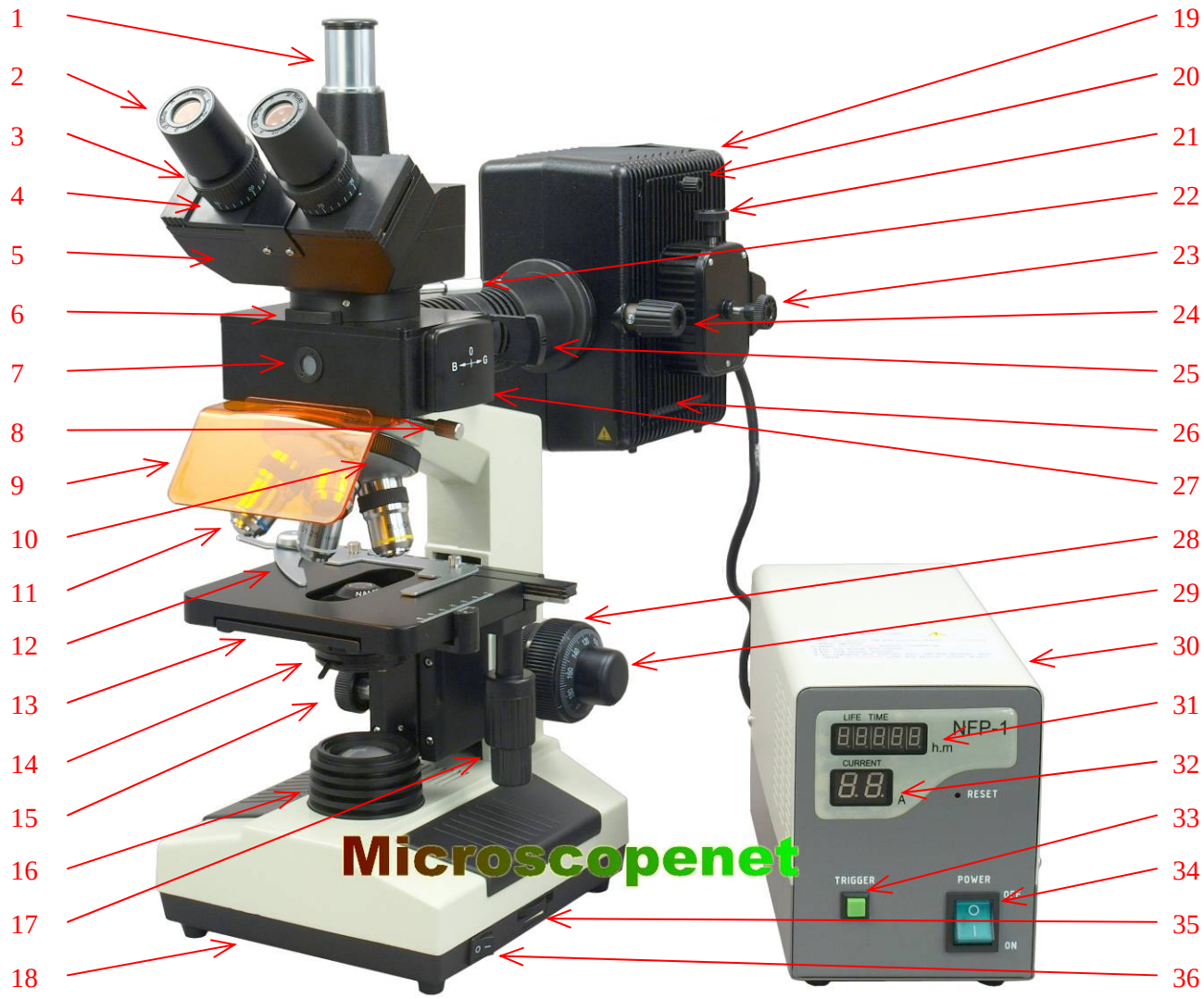

Fig. 1

1. Photo Tube
2. Eyepiece
3. Diopter Ring
4. Eyepiece Tube
5. Viewing Head
6. Auxiliary Barrier Filter
7. Light Centering Window
8. Thumb Screw
9. UV Shield
10. Nosepiece
11. Objective
12. Slide Holder
13. Mechanical Stage
14. Condenser
15. Condenser Focus Knob
16. Bottom Light Collector
17. Stage Translational Knobs
18. Microscope Base
19. Reflected Lamphouse
20. Screw
21. Bulb Vertical Control
22. Thumb Screw
23. Bulb Horizontal Control
24. Collector Control
25. Auxiliary Excitation Filter
26. Light House Door
27. Filter Cube
28. Coarse Focus Knob
29. Fine Focus Knob
30. Power Supply
31. Life Time Display
32. Electric Current Display
33. Trigger Button
34. Power Switch
35. Intensity Dial
36. Power Switch

2. Installation

2.1 Installation of the epi-fluorescence attachment

1) Loosen the thumb screw (8) on the top of the microscope body and remove the plastic cover.
2) Remove the cap on the dovetail of the fluorescence attachment.
3) Seat the dovetail completely into the socket on the top of microscope body and tighten the thumb screw (8).

2.2 Installation of the trinocular viewing head

1) Loosen the thumb screw (22) on the top of the epi-fluorescence attachment; remove the plastic cover.
2) Remove the cap on the dovetail of the trinocular viewing head (5).
3) Seat the trinocular viewing head into the socket completely and tighten the thumb screw (22).

2.3 Installation of the mercury lamp (Fig. 2)

1) Loosen the screw (20) on lamphouse (19). Remove the part.
2) Loosen the set screws (b) and remove the plastic rod (a) from the lamp holders.
3) Insert the positive end (thick end) of mercury lamp (c) into the bottom holder. Then press down slightly to insert the negative end (thin end) into the upper holder.
4) Tighten the set screws (b).

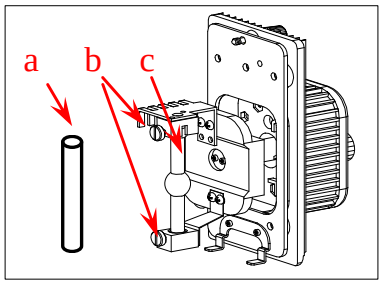

Fig. 2

Caution:

- Don't touch the glass surface of lamp with bare fingers.
- When replacing the lamp, make sure the power cord is disconnected and the power switch is turned off.
- The lamp and lamphouse are very hot during and short after operation. Don't try to replace the mercury lamp or open the lamphouse until the lamphouse is cool down.
- After installing/replacing a mercury lamp, press the "RESET" on the front panel of power supply to start the lifetime from zero on the lifetime meter.

2.4 Installation (replacement) of the filter cubes (Fig. 3)

1) Take off the screw at the bottom of the fluorescent kit.
2) Slide out the filter cubes and input filter cubes desired.
3) Thread on the screw.

Fig. 3

2.5 Installation of the UV shield (Fig.4)

Install the UV shield (9) onto the fluorescence attachment with the screw (a) which is coming with the shield.

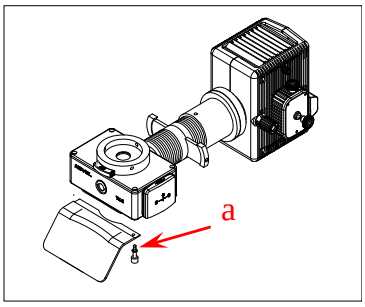

Fig. 4

2.6 Installation of the eyepieces

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

2.7 Installation of the objectives

1) Adjust the coarse focus knob until the mechanical 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 magnification 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.
- Replace the conventional objectives with the fluorescence objectives for fluorescence observation.

Fig. 5

2.8 Installation of the glass filter (Fig.5)

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

2.9 Installing (or changing) halogen bulb (Fig.6)

1) Turn the power off 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. Take out the dead bulb and insert the new 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. Screw the cover on.

Fig. 6

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.

2.10 Connecting the power cord of fluorescence power (Fig.7)

1) Turn the power switch (34) to the off position.
2) Insert the plug (a) into the socket that labeled “OUT” at the back of power supply (30).
3) Connect the power cord (comes with the fluorescence attachment) to the fluorescence power supply (30) and plug the other end into a power outlet.

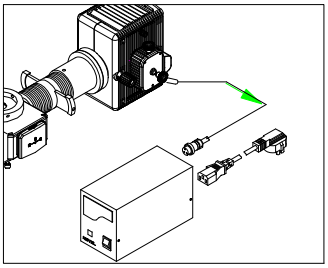

Fig. 7

Caution: Before connect the cord to the power outlet; make sure the voltage switch (d) in Fig.8 is slide to the correct

position for the right voltage.

2.11 Replacing the fuse of fluorescence power supply (Fig.8)

1) Turn the power switch (34) to the off position. Disconnected the power cord.
2) Turn the fuse holders (c) in Fig.7 out.
3) Replace the broken fuses and turn the holders back.

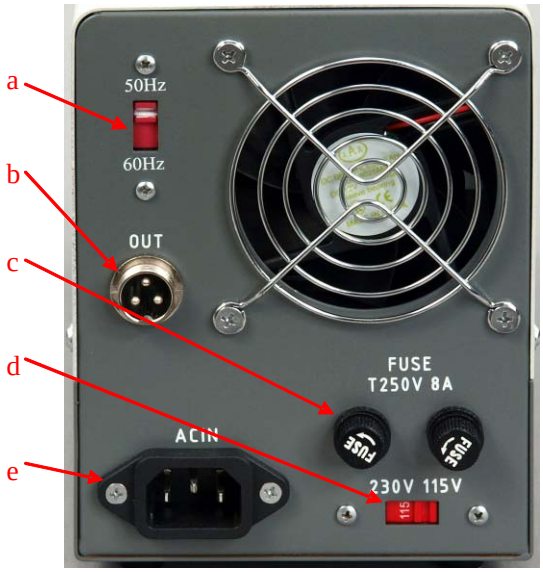

Fig. 8

2.12 Replacing the fuse of bottom light power supply

1) Turn off the power and disconnect the AC power cord.
2) Turn over the microscope on its side; find the fuse at the bottom of the base.
3) Turn the fuse holder counter-clockwise to take it off, insert new fuse, and then turn it on clockwise.

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.

2.13 Installing the mirror (Fig. 9)

1) Unplug the power cord.
2) Turn off the light collector (16) on the base.
3) Screw the black disc onto the base and then insert the mirror into the hole at the center of the black disc. You may try to get reflected ambient light on either side of the mirror with different angles for best result.

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

Fig. 9

2.14 Installing the photo tube

1) Remove the plastic photo tube port cover on the top of the viewing head (5).
2) Thread the photo tube (1) on to the trinocular viewing head (5).

3. Operation

3.1 Transmitted illumination

1) Connect the power cord to the power outlet and the microscope.
2) Turn on the power switch (36).
3) Rotate the variable intensity dial (35) to increase or decrease the brightness.

3.2 Fluorescence illumination (Fig.7)

1) Check if the frequency switch (a) and the voltage switch (d) at the back of power supply are correct. If not, slide them to the right position.(see Fig.7)
2) Turn the power switch (34) to “O” (off) position. Plug the power cord to the power outlet.
3) Turn the power switch (34) to “I” (on) position to light the mercury lamp. The mercury lamp will be steady condition after 5-10min.
4) For first time use, some of the new mercury lamp may not work after you turn the power on. Keep the power switch at “I” (on) position and press the trigger button (33) less then 4 seconds. If it still doesn’t work, repeat the procedures again.

Caution:

- To prolong the lifetime of mercury lamp, don’t turn the light off after less than 15 min of turning it on.
- The time between you turn the mercury lamp off and turn it on again should be at least 10 min.

3.3 Fluorescence illumination centering

1) Put the auxiliary excitation filter slider (25) at the middle position.
2) Put the filter cube (27) at the middle position.
3) Look at the light centering window (7), Turn the screw (21) and screw (23) to adjust the position of mercury lamp and turn the collector control knob (24) to adjust the position of collector lens, till the light path is centered.

Caution: Don’t look into the centering window (7) when using B or G filters to prevent your eyes from hurt.

3.4 Placing specimen

1) Place the slide on the mechanical stage. Use the slide holder to gently secure the slide.
2) Turn the X and Y adjustment knobs to position the specimen for viewing.

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

3.5 Adjusting interpupillary distance

While observing with both eyes, hold the left and right eyepiece tubes (4) then slowly slide the tubes (4) in and out. The interpupillary distance is correct when the left and right fields of view converge completely with one image.

3.6 Adjusting eyepiece diopter

1) Rotate the 10x objective into position.
2) Rotate the diopter ring on the right eyepiece tube until its numerical value is the

same as your interpupillary distance, for example, 65 in Figure 10.

3) Close your left eye and bring the specimen into focus following the focusing procedures in 3.7.
4) Close your right eye and bring the same specimen into clear sharp focus by adjusting only the diopter ring (3) on left eyepiece tube (4). Don't 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.

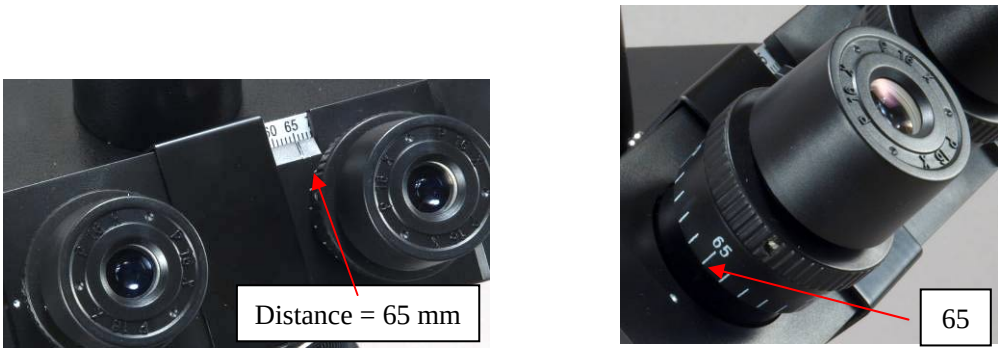

Fig. 10

3.7 Focusing

1) With the 10x objective in position, raise the mechanical stage (13) using the coarse focus knob (28) until the specimen is close to the objective.
2) Turn the coarse focus knob (28) until the specimen is in focus.
3) Use the fine focus knob (29) to obtain a sharp image.
4) 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 upper limit mechanical stage lever.

3.8 Adjusting substage condenser

1) Turn the condenser focus knob (15) 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.

3.9 Adjusting aperture iris diaphragm

Move the iris diaphragm lever left or right to adjust the aperture size.

Note: The iris diaphragm is designed to adjust the aperture size, not to adjust brightness. Generally, opening the diaphragm

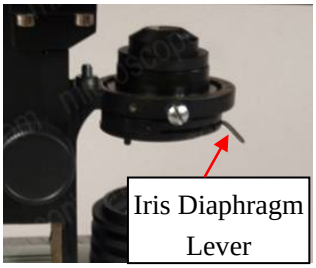

Fig. 11

to 70-80% of the N.A. value of the respective objective will provide an image of acceptable quality. If you want to observe the image of the iris diaphragm, remove one eyepiece and look through the tube. You will see a dark circle encroaching on the bottom of the tube.

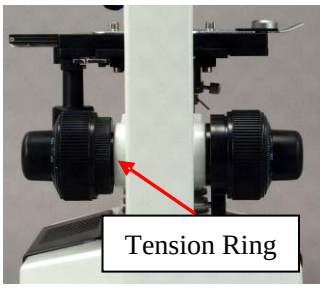

Fig. 12

3.10 Adjusting focus tension (Fig.12)

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

3.11 Photo/video observing, capturing and recording

1) Install the photo tube and camera following the steps in 2.14.
2) Turn on the computer; launch the observing software to examine.
3) If necessary, adjust the height by loosening the 2 set screws on the photo tube and turn the upper part in order to make the camera parfocal with the eyepieces.
4) You also can capture images or record live videos through the software.

Fig. 13

Note: Camera sold separately.

3.12 Fluorescence observation

1) Make sure the fluorescence objective is in the light path.
2) Turn on the mercury lamp following the procedures in 3.2.
3) Put the middle hole of auxiliary excitation filter slider (25) in the light path.
4) Put the B or G filter block in the light path as required.
5) Adjust the focusing following the procedures in 3.7.

Note: The Blue filter is in the light path when the filter cube is totally pushed in. The Green filter is in the light path when the filter cube is totally pulled out.

3.13 Switch the fluorescence observation to a brightfield observation

During a fluorescence observation, you can switch it to a conventional brightfield observation by:

1) Block the light from mercury lamp by put the left side of auxiliary excitation filter slider (25) in the light path.
2) Put the filter cube (27) in the middle position.
3) Put a conventional objective in the light path.

Note: It will shorten the mercury lamp life to turn the light on and off frequently. If you need brightfield observation for a short time, it will prolong the lamp life to apply the above procedures.

4. Specifications

General

Model	M837FLR
Total Magnification	40X, 64X, 100X, 160X, 400X, 640X, 1000X, 1600X
Viewing Head	Trinocular, inclined 45º, swiveling 360º Interpupillary distance 55-75mm Adjustable diopter on both eyepiece tubes
Eyepieces	1 pair of WF10X/18 1 pair of P16X/11
Objective Tube Length	160mm
Nosepiece	Revolving quadruple
Objectives	Achromatic 4X, 10X, 40X(spring), 100X(spring, oil)
Condenser	Abbe, NA=1.25, w/ iris diaphragm and filter holder Rack and pinion adjustment
Focus Mechanism	Coaxial coarse and fine focusing knobs on both sides w/focus stop Minimum fine focusing adjustment at 0.002mm, range 28mm
Stage	Double layer mechanical stage Dimension: 5-1/2" x 5-1/2" (140mmx140mm) Movement range: 3" x 2" (75mm X 50mm)
Photo Tube	Height adjustable, range 3/4" (18mm)
Illumination	Transmitted: 6V/20W, Halogen, Variable intensity
Power Supply	AC 100V-240V, 50/60HZ (US and Canada plug)
Dimension	11" x 7-1/2" x 17" (28cm x 19cm x 43 cm)
Net weight	11 lb (5 kg)
Package weight	13.8 lb (6.3 kg)

Fluorescence Microscope Attachment

Objective	Fluorescence 4X, 10X, 40X(s), 100X(s,o)
Filter Cube	Green excitation filter + Dichromatic mirror + Emission filter Blue excitation filter + Dichromatic mirror + Emission filter
EPI Illuminator	100W HBO Mercury Arc Lamp, center adjustable Collector, position adjustable
Power Supply	Input: AC 115V/230V, 50Hz/60Hz Run time display and reset Electronic current display Trigger button
Immersion Oil	Low auto-fluorescence immersion oil
Shield	UV Shield

5. Troubleshooting Guide

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
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
	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
	Condenser aperture is closed or open too much	Open or close properly
	Condenser is positioned too low	Position the condenser upward

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

IMAGE PROBLEMS

Problem	Cause	Solution
Image moves while focusing	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
Image tinged yellow	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 too low	Position the condenser upward

MECHANICAL PROBLEMS

Problem	Cause	Solution
Image will not focus with high power objectives	Slide upside down	Turn the slide over so the cover glass faces up
	Cover glass is too thick	Use a 0.17mm cover glass
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

FLUORESCENCE PROBLEMS

Problem	Cause	Solution
The mercury lamp is on, but image cannot be seen	The auxiliary excitation filter slider is not in the proper position	Put the hole of the slider in the light path properly.
	The filter cube is not in the proper position	Push or pull the filter cube to the end completely and let the filters in the light path.
Image is unclear or has not enough contrast	Filters or objectives are dirty	Clean the filters and objectives
	The filters is not suitable to the specimen	Change to a suitable filter cube
The image is unevenly illuminated or partially obscured	The objective is not in the light path	Rotate the revolving nosepiece until it clicks
	The filter cube is not in the proper position	Put the filter cube into light path correctly
	The auxiliary excitation filter slider is not in the proper position	Put the hole of the slider in the light path properly
	The mercury lamp bulb is not centered correctly	Adjust the lamp bulb to the center
Power switch is on, but mercury lamp doesn't light	Power cord or connectors are connected incorrectly	Connect the cord and connectors correctly
	The mercury bulb is not installed	Install the mercury bulb
The mercury bulb flickers or is dark	Not enough time after turning it on	Wait for 10min after turning it on
	The bulb life has expired	Replace the mercury bulb if the life meter reads close to 100 hours (life time of mercury bulb is 100 hours)