# User Manual

# Industrial Inspection Microscope

## Model M836L


MicroscopeNet.com

# Table of Contents

# i. Caution

1. Do not discard the microscope container. The container should be retained should the microscope ever requires reshipment.

2. 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.

3. If any specimen solutions or other liquids splash onto the stage, objective or any other component, turn the power off and disconnect the power cord immediately and wipe up the spillage. Otherwise, the instrument may be damaged.

4. **Important**: the lamp, lamp housing and adjacent parts will become very hot during or short after the running. Do not touch these parts until they have completely cooled. Never attempt to touch a hot halogen bulb.

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

6. 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 housing has been completely cooled.

7. Confirm that the input voltage labeled on your microscope matches 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

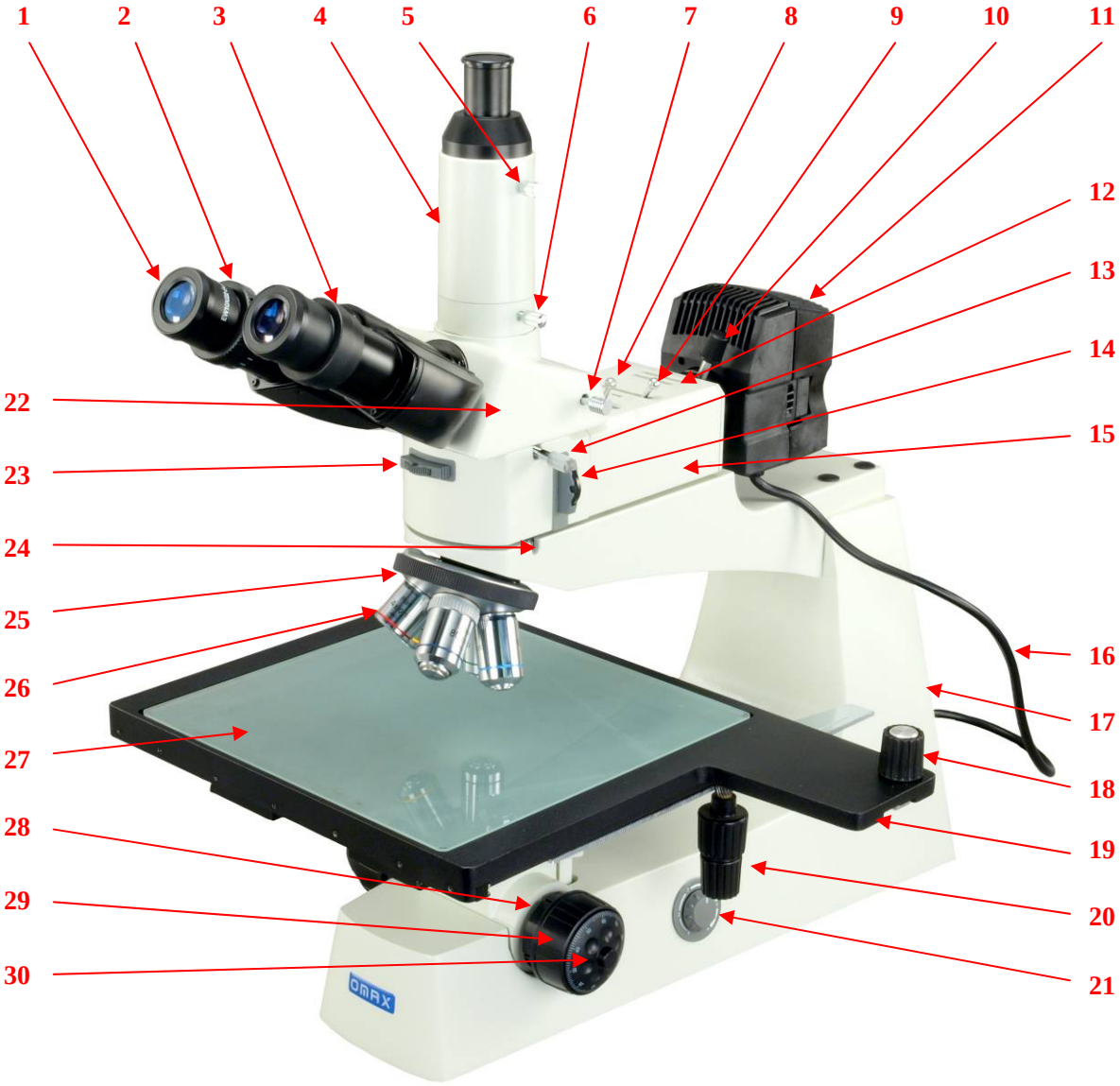
1. Do not attempt to disassemble any component including eyepieces, objectives or focusing assembly.

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 solvent as this may cause problems with optical coatings or cemented optics or the flowing solvent may pick up grease making cleaning more difficult.

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

# 1. Components Illustration




1. Eyepiece
2. Diopter Ring
3. Eyepiece Tube
4. Photo Tube
5. Tube Height Lock Screw
6. Photo Tube Secure screw
7. Light Path Switch
8. Field Diaphragm
9. Aperture Diaphragm
10. Light Collector Position lever
11. Lamp Housing
12. Filter Slots
13. Head Secure Screw
14. Polarizer
15. EPI Illumination Assembly
16. Electric Cord
17. Frame
18. Stage Fast Moving Knob
19. Stage
20. Stage X-Y Translational Control Knobs
21. Light Intensity Dial
22. Viewing Head
23. Analyzer
24. Secure Set Screw
25. Nosepiece
26. Objective
27. Glass Stage Plate
28. Focus Tension Collar
29. Coarse Focus Knob
30. Fine Focus Knob

# 2. Installation

## 2.1 Installation of the stage (Fig.1 - Fig.2)

1) Loosen the thumbscrew ②.
2) Find the dovetail at the stage bottom. Align it to the dovetail grooves ① and push it in till it touches the limit block ③.
3) Tighten the thumbscrew ②.
4) Place glass plate (27) on the stage frame.
5) Fig.2 shows the stage after installation.

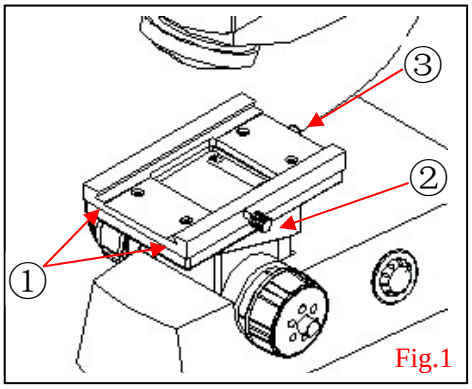


Fig.1

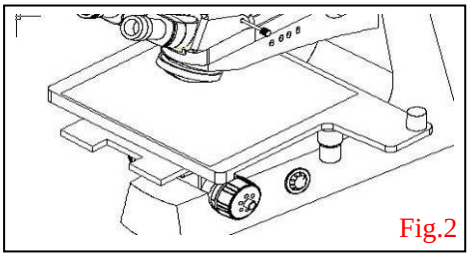


Fig.2

## 2.2 Installation of the EPI illumination assembly (Fig.3)

1) Loosen the secure set screw (24) on the top of the microscope frame (17) with the Allen key and remove the plastic lid.
2) Remove the cap on the dovetail of the EPI illumination assembly (15).
3) Seat the dovetail into the socket on the top of the frame securely, and then tighten the set screw (24).
4) Connect the electric cord (16) to the 6V20W socket at the back of the frame.

Fig.3

## 2.3 Installation of the trinocular viewing head

1) Loosen the head secure thumbscrew (13) on the EPI illumination assembly (15).
2) Find the dovetail at the bottom of viewing head. Sink the head bottom into the

dovetail groove on the top of EPI illumination assembly (15).

3) Tighten the secure thumb screw (13).

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

### 2.4 Installation of the eyepieces (Fig.4)

1) Remove the protective lids from the eyepiece tubes (3).
2) Insert the eyepieces (1) into the eyepiece tubes (3).

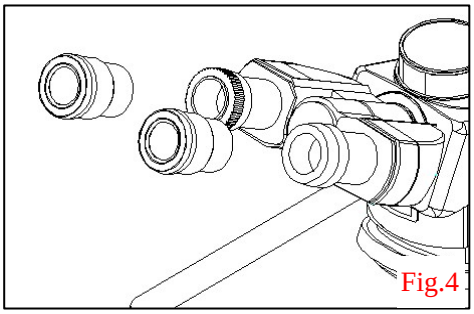


Fig.4

### 2.5 Installation of the objectives

1) Adjust the coarse focus knob (29) until the stage is at its lowest position.
2) Remove the 5 lids from nosepiece (25).
3) Install the 4X objective into the nosepiece (25). Then rotate the nosepiece and install each succeeding higher magnification objective in a clock-wise direction.

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

### 2.6 Installation of the photo tube

1) Insert the photo tube (4) into the photo tube port of trinocular viewing head (22).
2) Tighten the secure thumbscrew (6).

### 2.7 Installation of the filters (Fig.5)

Insert the filter into one of the filter slots.

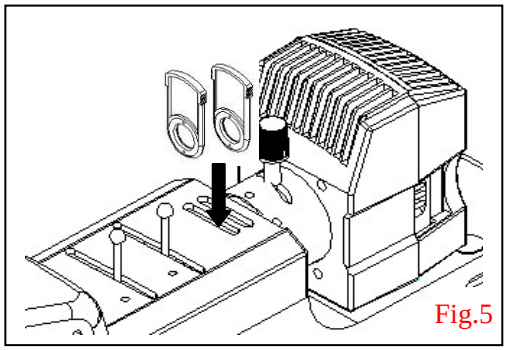


Fig.5

## 2.8 Installation of the analyzer and polarizer (Fig.6)

Insert the analyzer into the analyzer slot.
Insert the polarizer into the polarizer slot.


Fig. 6

Note: The analyzer and polarizer may have been installed in factory.

## 2.9 Replacement of the fuse (Fig.7 – Fig.8)

1) Turn off the power switch ① and disconnect the power cord.
2) Find the fuse holder ② at the rear of the microscope frame (17).
3) Turn the fuse holder ② counter-clockwise with a flat screwdriver to take it off.
4) Insert a new fuse, and then turn it back.

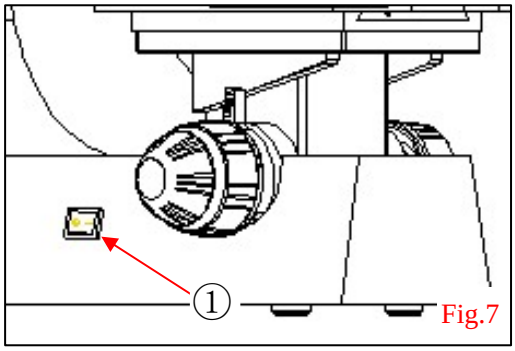



Fig.7

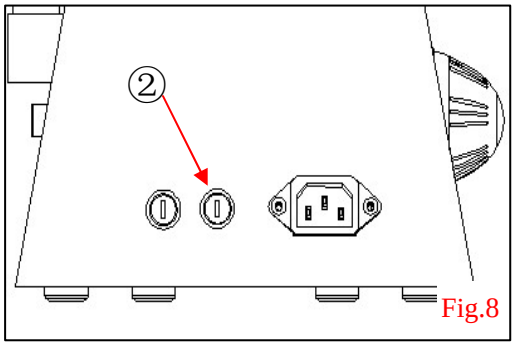



Fig.8

## 2.10 Installation (or replacement) of the halogen lamp (Fig.9 – Fig.10)

1) Turn the power off and disconnect the power cord.
2) Allow some time to cool down the lamp.
3) Hold the half of lamp housing ① and pull as shown in Fig.9.
4) Pull the dead bulb straight out and insert the new bulb into the jack ③, as shown in Fig. 10.
5) Push the half lamp housing back ①. Make sure the pins and jacks are aligned.

**Caution:**

- Do not touch the Halogen bulb with your bare hands. Wear gloves or wrap the bulb with a cloth or soft paper when you perform this operation.
- If fingerprint left on the bulb surface, clean it right away.

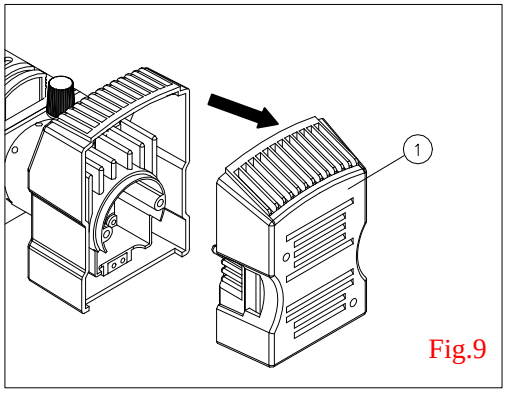


Fig.9

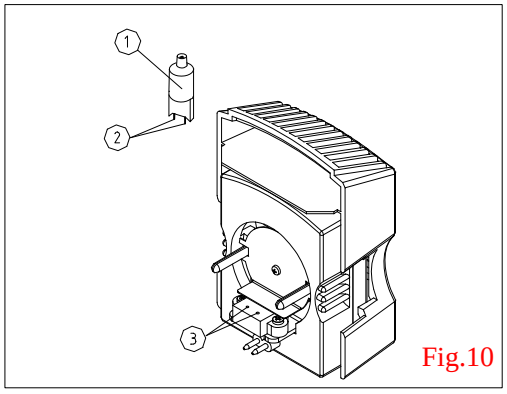


Fig.10

# 3. Operation

### 3.1 Adjust the brightness

1) Turn the power switch on.
2) Turn the light intensity dial (21) to increase or decrease the brightness.

**Note:** The bulb life is affected by the brightness. Avoid the bulb working at its brightest condition to prolong the bulb life.

### 3.2 Adjust the illumination set

1) Turn the power on.
2) Make sure the light in the view filed is even and there is no filament image. If the filament image shows, adjust the light collector lens to a proper position by moving the lever (10). If a 4X objective is used, insert the frosted glass plate into one of the filter plots (12).
3) Adjust the field diaphragm (8) and aperture diaphragm (9) till you get a clear image with proper contrast.

### 3.3 Placing specimen

1) Place the specimen or slide on the center of mechanical stage (19).
2) Turn the X and Y translational control knobs (20) to position the specimen/slide for viewing. Or you can hold the fast moving knob (18) and push/pull to get the specimen or slide in the position faster.

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

### 3.4 Focusing (Fig.11)

1) With the 10X objective in position, raise the mechanical stage using the coarse focus knob until the specimen is very close to the objective.
2) Turn the coarse focus knob to move down the stage 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 80X objective, then tighten the mechanical stage moving lock ①.

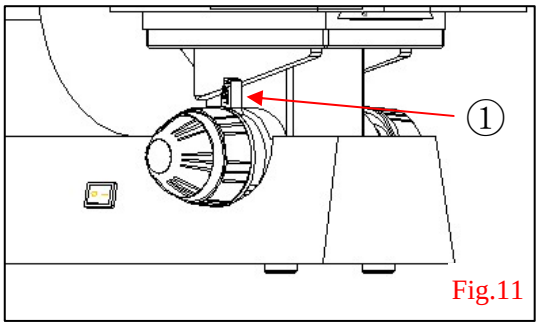


Fig.11

### 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 (2) until a sharp image is obtained.

### 3.6 Adjusting interpupillary distance (Fig.12)

While observing with both eyes, hold the left and right eyepiece tubes then swing them up or down around the axis. The interpupillary distance is correct when the left and right fields of view converge completely into one image.

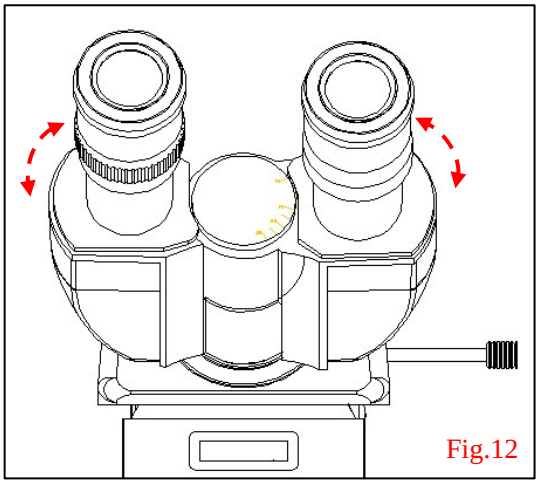


Fig.12

### 3.7 Adjusting tension knob (Fig.13)

The tension has been pre-set at the factory. If the mechanical stage drops by itself, rotate the tension adjustment collar ① counter – clockwise with the tension wrench, until the stage is in maintained.

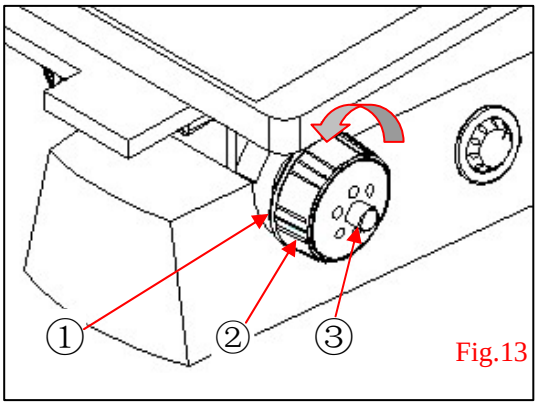



Fig.13

### 3.8 Photo/video observing, capturing and recording

1) Attach the photo tube onto the trinocular viewing head.
2) Mount microscope camera (electronic eyepiece) onto the photo tube and connect the USB cable from camera to computer.
3) Focus the specimen through the eyepieces. Then pull the light path switch (7) out.
4) Open image observing software to examine.
5) If the image is not clear, loosen the photo tube height adjustment thumbscrew (5), turn the black upper part to lower down or raise the camera mounted on the top, till the image is clear. Then tighten the thumbscrew (5).
6) You also can capture images or record live videos through the software, depending on the functions provided by the software.
7) If a conventional camera used, you may need an adapter to connect your camera to the photo tube.

**Note:** Camera, digital camera, camera adapter and software sold separately.

### 3.9 Polarizing observation

1) Mounting the polarizer and analyzer
2) The analyzer can be rotated from 0°to 90° by rolling the dial. When the field of view becomes the darkest, the orthogonal polarization position is reached and polarization observation can be performed.

# 4. Specifications

## General

| | |
|---|---|
| Model | M836L |
| Total Magnification | 40X, 100X, 200X, 400X, 800X |
| Optical System | Infinite Optical System |
| Viewing Head | Seidentopf trinocular, inclined 30º, swiveling 360º<br>Interpupillary distance 48-75mm<br>Adjustable diopter on left eyepiece tube |
| Eyepiece | 1 pair of super widefield eyepieces EW10X/22 |
| Nosepiece | Revolving quintuple |
| Objectives | Infinite plan field achromatic: 4X, 10X, 20X, 40X(spring), 80X(spring) |
| Focusing Mechanism | Coaxial coarse and fine focusing knobs on both sides<br>With moving up limit lock and tension adjustment collar<br>Adjust range 24 mm |
| Mechanical Stage | Dimension: 300mm x 268mm (11-3/4” x 10-1/2”)<br>Translational range: 250mm x 250mm (10” x 10”) |
| Photo Tube | C-mount and 23.2mm port, height adjustable |
| Illumination | Reflected, variable intensity<br>With adjustable field diaphragm and aperture diaphragm<br>Halogen bulb: 6V/20W |
| Filter Plate | Blue, yellow, green, and white frosted glass |
| Power Supply | AC 110V, 60HZ (US and Canada plug) |
| Dimension | 56cm x 40cm x 56cm (22” x 15-1/2” x 22”) |
| Net weight | 16 kg (35 lb 6 oz) |
| Package weight | 36 kg (70 lb) |

## Objectives

| Magnification | NA | Slide Cover Thickness | Field of View | Working Distance | Working Mode |
|---|---|---|---|---|---|
| 4X | 0.10 | - | 6 mm | 25.4 mm | Dry |
| 10X | 0.25 | - | 2 mm | 11 mm | Dry |
| 20X | 0.40 | 0 | 1.06 mm | 6 mm | Dry |
| 40X(S) | 0.60 | 0 | 0.53 mm | 3.7 mm | Dry |
| 80X(S) | 0.90 | 0 | 0.35 mm | 0.2 mm | Dry |

# 5. Troubleshooting Guide

**OPTICAL PROBLEMS**

| Problem | Cause | Solution |
|---|---|---|
| Lamp is light but the field of view is dark | The connection between the lamp housing and illumination system is not properly | Check and make sure the lamp housing is mounted properly |
| | The objective is not in the center of light path | Turn the nosepiece to the “click” position |
| | The intensity dial is turned to the lowest | Adjust the brightness |
| | Not use the specified halogen bulb | Use the halogen bulb supplied with the microscope |
| Darkness at the periphery or uneven brightness in the field of view | The objective is not in the center of light path | Turn the nosepiece to the “click” position |
| | The bulb is not at the center | Adjust the position of the bulb |
| | The filament image shows | Move the condenser adjustment lever (12) to eliminate the filament image |
| | The lens surface is moldy or contaminated | Clean the lens |
| Dirt or dust on the view | Dirt or dust on the eyepiece, condenser, or objective lens | Clean the lens with a camera cleaning kit |
| | Dirt or dust on the specimen | Clean the specimen |
| Poor image quality | The objective damaged | Replace the objective |
| | The objective and/or eyepiece lenses are molded or contaminated | Clean the lenses |
| | The filed and aperture diaphragms are not open properly | Adjust the diaphragms |
| | The objective is not in the center of light path | Turn the nosepiece to the “click” position |

## ELECTRICAL PROBLEMS

| Problem | Cause | Solution |
|---|---|---|
| Lamp does not light when switched on | No electrical power | Check the power outlet |
| | | Check power cord connection |
| | Lamp bulb burnt out | Replace bulb |
| | Fuse blown out | Replace fuse |

## IMAGE PROBLEMS

| Problem | Cause | Solution |
|---|---|---|
| Image moves while focusing | 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 |
| | Not use the right bulb | Use the halogen bulb supplied with the microscope |

## MECHANICAL PROBLEMS

| Problem | Cause | Solution |
|---|---|---|
| The coarse focus knob is hard to turn | The tension is set too tight | Loosen tension collar properly |
| Slippage of focus when using the coarse focusing knob | Tension is set too loose | Increase the tension on the focusing knobs |