



*User's Manual*

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## Introduction

Congratulations on the purchase of your new AmScope microscope!

This manual is designed for the ME520 series microscopes.

Please take a few minutes to familiarize yourself with the features and functions of your new microscope.

If you'd like more information on microscopes, parts, or accessories, please visit our website at:

**[www.iScopeCorp.com](http://www.iScopeCorp.com)**

We highly recommend you study this manual thoroughly before operating the microscope and that you keep it on hand for future reference.

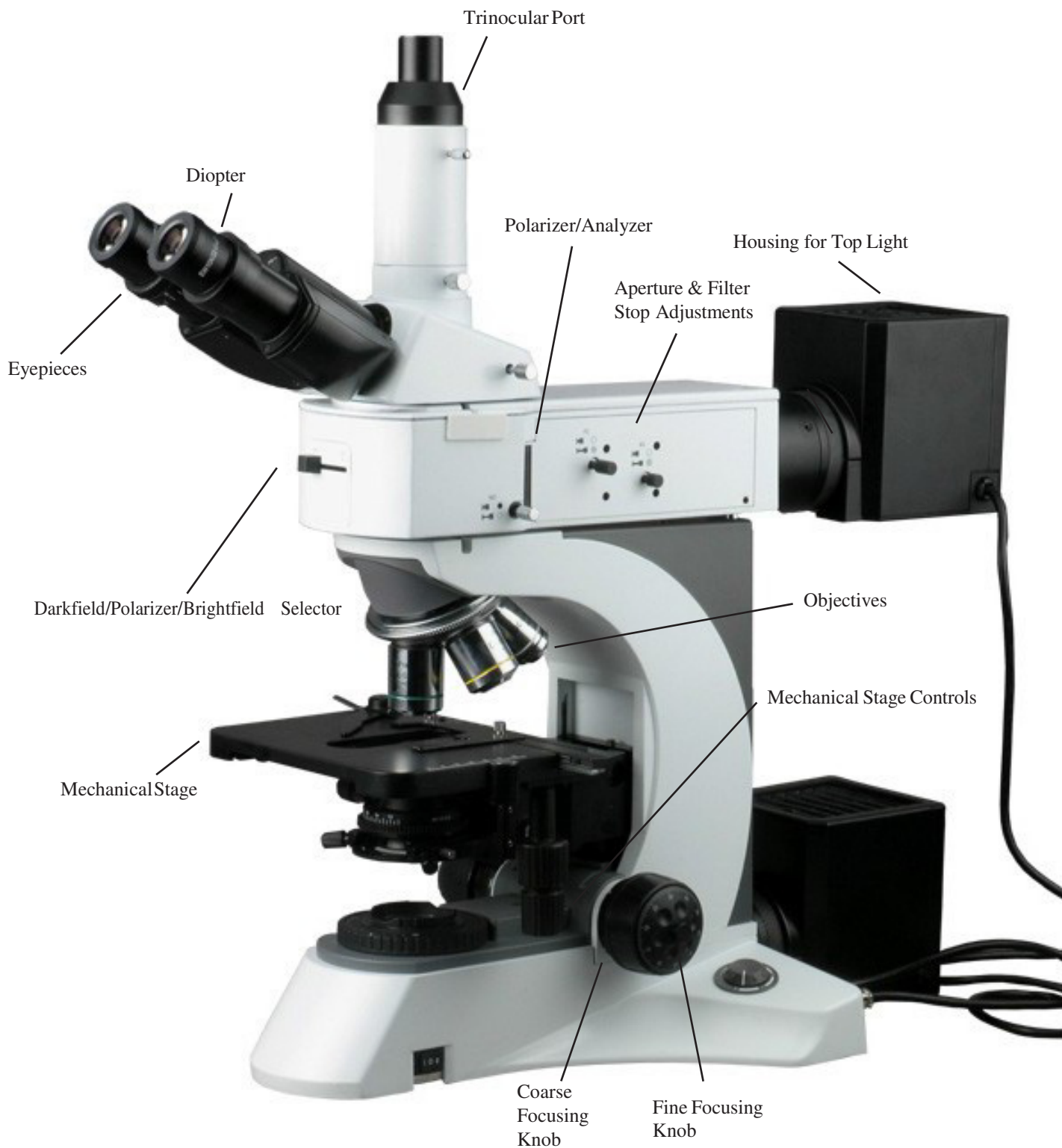
If you have additional questions or need assistance, please send us an email at:

**[info@amscope.com](mailto:info@amscope.com)**

## Safety Precautions

1. As the microscope is a precision instrument, always handle it with care, avoiding impact or abrupt movement during transportation. Do not shake the package.
2. Do not place the microscope in direct sunlight or in high heat. Keep it indoors in a dry and clean place with temperatures between 32-100 degrees F (0-40 degrees C), and in maximum relative humidity of 85%.
3. Avoid touching the lenses on the objectives and the eyepieces so that oil and dirt from your fingerprints do not obstruct your view.
4. Before turning the power on, make sure that the power supply voltage is consistent with the voltage of your microscope.

ME520T



## Definition of Parts

### **Adjustable Trinocular Port**

*Threaded port with adjustable length of attachment of digital or video camera*

### **Base Lens**

*Directs the light source towards the slide*

### **Coarse Focusing Knob**

*Used to initially bring the slide into the sight and focus*

### **Condenser & Iris Diaphragm**

*Controls the amount of light that hits the sample*

### **Dimmer**

*Controls the amount of light that escapes from the base lens*

### **Diopter**

*Allows the focus to be perfected for both eyes, independent of each other*

### **Fine Focusing Knob**

*Used to refine focus to clear image*

### **Head Lock Screw**

*Screws the microscope head into place*

### **Limit Stop Knob**

*Limits the upward movement of the mechanical stage in order to avoid damaging the slide and objective*

### **Mechanical Stage**

*Mechanically moves the slide along an X and Y axis for optimal positioning*

### **Nosepiece**

*Houses the objective lenses*

### **Objective**

*The lower lenses that determine the strength of magnification and the resolution of your image*

### **Tension Knob**

*Adjusts the tension of the focusing knobs*

## Assembly

1. First, take the styrofoam container out of the cardboard carton and lay it on its side, paying attention to which side is labeled up. Remove the tape and open the container carefully so as to avoid dropping and damaging the optical items. Check carefully to ensure that all parts and accessories are intact.
2. Check the packing list to ensure that you've received all items:
  - One Microscope Body
  - One Trinocular Head
  - One Trinocular Photo Port
  - Five Infinity Plan Objectives (5x, 10x, 20x, 50x, 100x)
  - 10x Widefield Eyepieces
  - 15x Widefield Eyepieces (for -A)
  - 20x Widefield Eyepieces (for -B)
  - One Color Filter (Blue) & Two Filter Frames
  - One Polarizer/Analyzer
  - One EPI Light Box and Tube
  - Two Spare Fuses
  - Two Spare Bulbs
  - One Dust Cover
3. Remove the microscope body from the box and remove the plastic protective covering. The body of the microscope is composed of the base, the stage, the arm, and the nosepiece.
4. Loosen the metal knob located directly above the nosepiece (the head-lock screw) completely. Place the light box and channel (flat, circular side down) into the circular opening on top of the base of the microscope. Tighten the head-lock screw to secure the head in place.
5. Attach the head of the microscope in the same fashion as the light box and channel. For the ME520T model, screw the photo port onto the top of the microscope head (trinocular C-mount port).
6. Remove the eyetube caps and drop the desired eyepieces into the eyepiece ocular tubes. Be sure to avoid touching the lens to ensure no artifacts appear in your image.
7. Screw the objectives into the microscope nosepiece from the lowest magnification to the highest, again avoiding touching the lenses.
8. Plug in the microscope and turn it on. If no light emerges from the light source, adjust the dimmer knob on the side of the base.

## Setting Up

1. Loosen the head lock screw and adjust the microscope head so that it is in a comfortable position for observation. Lock the head-lock screw.
2. With both eyes open, look into the eyepieces. Adjust the interpupillary distance by holding the eyepieces and rotating the eyepiece tubes either towards or away from each other until only one circle of light is seen by both eyes.
3. Place the specimen to be studied on a glass slide (or use a prepared slide). Place it on the stage, holding it snugly in place with the metal slide holders (clips) of the mechanical stage.
4. Using the slide controls, center the specimen over the stage opening, lining it up with the light and the objective lens.
5. To adjust the illumination, slowly turn the dimmer on the right side of the base until the desired intensity of light is achieved.

## Focusing

1. Turn the nosepiece to choose an objective. It is easiest to use the lowest magnification first (4x objective) to locate and focus on the specimen. As you move up in magnification you may need to refocus the image a little each time.
2. Begin focusing by first looking with one eye through the eyepiece without the diopter. Close your other eye. Use the coarse focusing knob to adjust the height of the stage until the sample comes into clear focus.

Note: You may loosen the limit-stop knob (located on the inside of the coarse focusing knob on the left side of the microscope) in order to give yourself the full range of motion for fine tuning the focus.

4. Once the image is clear in your field of view, you will want to use the fine focusing knob to tune it for best results.

Note: Please be careful when moving the mechanical stage if you need to re-center the sample, or if moving the stage very close to the objectives. The limit stop is designed to prevent impact between objective and slide, so when it is off you will be able to damage the microscope. For safety, when using the 40x objective, engage the limit stop once you have it close or in contact with the objective.

## Adjusting the Condenser & Diaphragm

1. Using the condenser-adjustment knob, you can change the distance between the light condenser and the stage. This allows you to control the concentration of the light hitting your slide.
2. By changing the aperture (hole size) of the iris diaphragm, you can adjust the background brightness. Adjust the aperture of the iris diaphragm using the iris adjustment slider located directly under the stage.
3. If you want to use a color filter, swivel the filter holder out, towards you. You can now place the desired color filter into the circular opening. Slide the filter holder back to original position before observation.

Note: The filter holder is placed in from the factory in a manner in which it swings out and hits the arm of the microscope (backwards). If this happens, simply grip the condenser assembly and rotate it. It may take a small amount of force to rotate it, but after doing so, you will be able to swing the filter holder out towards the front of the unit for easier operation.

## Using the Trinocular Port

The AmScope ME520T model is uniquely designed so that you can view the image through the eyepieces and the trinocular port simultaneously, as well as fine tune the focus of the camera with a C-mount focus adjustment.

This “parfocal” feature allows the images through the microscope’s eyepieces, and those displayed on your computer screen or television be viewed at the same time. You do not need an adapter to attach your AmScope camera to the trinocular port, however you may need one if you have a non-AmScope camera. Our photo port is a 23mm size.

## Attaching a Camera

1. If your camera has a C-mount, simply screw the camera onto the trinocular port.
2. If your camera has a 23mm mounting size, remove the C-mount from the top of the trinocular port by loosening the screw. Then, drop the camera directly into the trinocular port. It should slide in without issue.
3. To focus through the trinocular port, simply turn middle portion of the tube.

## Adjusting Focusing Tension

1. To adjust the tension of the focusing knobs, first locate the black ridged tension knob on the inside of the coarse focusing knob.
2. To decrease tension, rotate the adjustment forward, towards the stage (counterclockwise). To increase, rotate away from the stage (clockwise).

Note: If your stage is slipping down after setting the focus, you need to increase the tension.

## Changing the Bulb

1. Before changing the light bulb, first pull the plug out of the electrical socket and wait for the lamp to cool down. The light can get hot when a halogen system is in use, so please be careful to avoid being burned.
2. There is a door on the front of the microscope near the base lens that slides forward. Remove to access the bulb on the unit.
3. Reinstall the door prior to use to avoid hurting your eyes with the brightness of the bulb's illumination.

## Maintenance/Precautions

- All glass surfaces must be kept clean. Fine dust on the optical surface should be blown off using a hand blower or gently wiped off with a soft lens paper tissue/nonabrasive lint free cloth.
- Carefully wipe off oil or fingerprints on the lens surfaces using tissue moistened with a small amount of lens cleaner (we recommend Sparkle brand optical cleaner).
- Do not use Sparkle to clean other elements of the microscope. Use a neutral detergent on any plastic or painted surfaces.
- Do not assemble or disassemble the microscope's electrical components yourself without advisement from one of our technicians. Doing so will void your warranty unless by advisement of one of our technicians to do so.
- After use, cover the microscope with the provided dust cover.
- Keep your AmScope microscope in a dry, clean location in order to prevent rust or other damages.

## ME520T Series Specifications

| Parts                   | Specifications                           | ME520TA | ME520TB |
|-------------------------|------------------------------------------|---------|---------|
| WF Eyepiece             | WF10X/18mm                               | x       | x       |
|                         | WF10X/18mm w/ Pointer                    |         |         |
|                         | WF10X/18mm w/ Reticle                    |         |         |
|                         | WF16X/13mm                               | x       |         |
|                         | WF20X/10mm                               |         | x       |
| Plan Eyepiece           | P5X                                      |         |         |
|                         | P10X                                     |         |         |
|                         | P16X                                     |         |         |
| DIN Infinity Objectives | 4X/0.10                                  | x       | x       |
|                         | 10X/0.25                                 | x       | x       |
|                         | 40X/0.65                                 | x       | x       |
|                         | 50X/0.85                                 | x       | x       |
|                         | 100X/1.25                                | x       | x       |
| Plan Objectives         | 4X                                       |         |         |
|                         | 10X                                      |         |         |
|                         | 40X(spring)                              |         |         |
|                         | 100X(spring, oil)                        |         |         |
| 30 Degree Viewing Head  | Binocular Sliding, 360 Degree Swiveling  |         |         |
|                         | Trinocular Sliding, 360 Degree Swiveling | x       | x       |
| Trinocular Port         | C-Mount Adjustable Photoport             | x       | x       |
|                         | 23mm Photo Port                          | x       | x       |
|                         | Simultaneous Viewing                     |         |         |
| Focusing Nosepiece      | Coaxial Focusing System                  | x       | x       |
|                         | Triple Nosepiece                         | x       | x       |
| Stage                   | 130mm x 122mm Mechanical Stage           | x       | x       |
|                         | Movement Range: 30mm x 70mm              | x       | x       |
| Condenser               | Abbe, NA= 1.25                           |         | x       |
| Diaphragm               | Iris Diaphragm                           |         | x       |
| Illumination            | Halogen Light w/ Dimmer                  | x       | x       |
|                         | LED Light w/ Dimmer                      |         |         |
| Lamp                    | 6V/20W                                   | x       | x       |
|                         | 6V/30W                                   |         |         |
|                         | LED                                      |         |         |
| Filter                  | Blue                                     | x       | x       |

## Optional Accessories

| Parts           | Description                        | Model #                                                                                                    | Purpose                                                                    |
|-----------------|------------------------------------|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| <b>Eyepiece</b> | 5X                                 | EP5X30                                                                                                     | Obtaining additional magnification powers                                  |
|                 | 20x                                | EP20X30                                                                                                    | Obtaining additional magnification powers                                  |
|                 | 25x                                | EP25X30                                                                                                    | For obtaining additional magnification powers                              |
|                 | 10x w/ Pointer                     | EP10X30P                                                                                                   | For easier identifying of objects                                          |
|                 | 10x w/ Reticle                     | EP10X30R                                                                                                   | For measuring objects                                                      |
| <b>Camera</b>   | CMOS Digital                       | MU035 (350k)<br>MU130 (1.3mp)<br>MU300 (3mp)<br>MU500 (5mp)<br>MU800 (8mp)<br>MU900 (9mp)<br>MU1000 (10mp) | To capture images, video, or view live display on a computer (PC/Mac OS X) |
|                 | Calibration Micrometer             | MR400                                                                                                      | To calibrate the camera software for on screen measurements                |
|                 | CCD Digital (VGA, Trinocular Only) | CCD-MT                                                                                                     | To view live display on a computer monitor (VGA)                           |
|                 | CCD TV/Video (Trinocular Only)     | CCD-NP                                                                                                     | To view live display on a television (RCA)                                 |

## Objectives

| Type                                  | Magnification | Numerical Aperture (N.A.) | Medium | Parfocal Distance (mm) | Magnification Marks (Color Ring) |
|---------------------------------------|---------------|---------------------------|--------|------------------------|----------------------------------|
| <b>DIN Infinity Objective (195mm)</b> | 4X            | IN4X                      | Air    | 45                     | Red                              |
|                                       | 10X           | IN10X                     | Air    | 45                     | Yellow                           |
|                                       | 20X           | IN20X                     | Air    | 45                     | Light Blue                       |
|                                       | <b>80X</b>    | IN50X                     | Air    | 45                     | Orange                           |
|                                       | <b>100X</b>   | IN100X                    | Air    | 45                     | White                            |

## Eyepieces

| Type                 | Widefield Eyepiece Medium |     |     | Plan Eyepiece |     |     |
|----------------------|---------------------------|-----|-----|---------------|-----|-----|
| <b>Magnification</b> | 10X                       | 15X | 20X | 5X            | 10X | 16X |
| <b>Field of View</b> | Φ18                       | Φ13 | Φ11 | Φ18           | Φ18 | Φ15 |

## Electrical System

There are two options for electrical systems for this series of microscope. The light source is dependent on which model you have, but can either be a 6V/20W halogen, a 6V/30W halogen, or an LED system.

1. 220V~240V power supply: 220V~240V  $\pm 10\%$ , 50Hz

This electrical system is CE and GS certified

2. 100V~120V power supply: 100V~120V  $\pm 10\%$ , 60Hz

This electrical system is UL certified.

All units come standard as 110V units unless an upgrade to a 220V system is requested. Upgrade fee is dependent on which unit is purchased.

## Parameters

|                                         |                                             |
|-----------------------------------------|---------------------------------------------|
| <b>Magnification</b>                    | Base Model: 40x-400x<br>-Y Model: 40x-1008x |
| <b>Field of View</b>                    | $\Phi 0.8\text{mm} \sim \Phi 4.5\text{mm}$  |
| <b>Mechanical Tube Length</b>           | 165mm                                       |
| <b>Object to Primary Image Distance</b> | 195mm                                       |
| <b>Fine Focusing Sensitivity</b>        | 0.002mm                                     |

## Technical Terms & Concepts

### **Total Magnification**

Total magnification of a microscope is calculated by the magnification of the objective multiplied by the magnification of the eyepieces.

-Ex: (10x Eyepieces) x (4x Objective) = 40x Total Magnification

### **Field of View**

Linear field of view of the eyepiece divided by the magnification of the objective

### **Numerical Aperture (N.A)**

Calculated by  $n \sin \alpha$  (max), the Numerical Aperture (N.A) is an important parameter that marks the features of the objective and condenser's image quality and resolution. The "n" is a refractive index of the medium (air or immersion cedar oil) between the objective lens and the specimen. The " $\alpha$ " is 1/2 of the angle between the aperture on the objective and path of light. The larger the N.A, the higher the resolution of the objective (and better quality of the image) is.

### **Object to Primary Image Distance**

The distance between the object plane and the primary image plane. The conjugate distance is fixed.

### **Mechanical Tube Length**

The distance between the objective shoulder and the ocular shoulder

## Common Issues

| Symptom                                                                        | Cause                                                                                      | Remedy                                                                                                                               |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <b>OPTICAL ISSUES</b>                                                          |                                                                                            |                                                                                                                                      |
| <b>One side of the field of view is darker</b>                                 | The nosepiece is misaligned                                                                | Turn the nosepiece until it clicks into place                                                                                        |
|                                                                                | Stains or dust has accumulated on the condenser, objective, eyepieces, or base lens        | Clean all lenses with lens cleaner or a lint free non-abrasive cloth                                                                 |
| <b>Obstructions are observed in the field of view</b>                          | Stains, dust, or dirt has accumulated on the specimen                                      | Clean the slide or use a new specimen if sample is destroyed                                                                         |
|                                                                                | Stains, dust, or dirt have accumulated on the lens                                         | Clean the lens                                                                                                                       |
| <b>Unclear Image</b>                                                           | There is no cover slip on the slide (2L model, biological sample only)                     | Add a cover slip. The objectives are designed for use with a 0.17mm cover slip, so it is a requirement to use one for proper images. |
|                                                                                | The cover slip is not standard sized (2L model, biological sample only)                    | Replace the cover slip with the appropriate 0.17mm thickness slip                                                                    |
|                                                                                | The sample is not properly in focus                                                        | Adjust the focusing knobs until the sample is in better focus. Coarse first, fine after to adjust.                                   |
|                                                                                | The aperture is not open to an appropriate diameter                                        | Adjust the aperture to have the light just larger than the size of the condenser or field of view                                    |
|                                                                                | Stain or dust has accumulated on the lens in the inlet of the head                         | Clean the lens with lens cleaner or a nonabrasive lint free cloth, as well as spray with compressed air                              |
|                                                                                | The condenser is not in the right position (2L models only)                                | Adjust condenser height to the top of the travel range, then adjust down to focus image                                              |
| <b>One side of the field of view is dark or the image moves while focusing</b> | The specimen slide is not fixed                                                            | Secure the slide to the stage with clips                                                                                             |
|                                                                                | The nosepiece is not in the right position                                                 | Turn the nosepiece until it clicks into place                                                                                        |
| <b>The field of view is not bright enough</b>                                  | The iris diaphragm is not big enough                                                       | Adjust the iris diaphragm to allow the light to be just larger than the condenser                                                    |
|                                                                                | The condenser is not in the right position                                                 | Adjust condenser height to the top of the travel range, then adjust down to focus image                                              |
|                                                                                | Stains, dust, or dirt has accumulated on the condenser, objective, eyepieces, or base lens | Thoroughly clean all lenses with lens cleaner or a lint free nonabrasive cloth                                                       |

## Common Issues (Continued)

| Symptom                                       | Cause                                                                   | Remedy                                                                                                                                                                                                                                                   |
|-----------------------------------------------|-------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OPTICAL ISSUES</b>                         |                                                                         |                                                                                                                                                                                                                                                          |
| <b>The color of the image is not accurate</b> | The brightness adjustment knob is not in the right position             | Adjust the brightness knob to a higher or lower setting for color clarity                                                                                                                                                                                |
|                                               | No filter is used or filter is in use                                   | Remove color filter if natural light is desired, or insert desired filter                                                                                                                                                                                |
| <b>MECHANICAL ISSUES</b>                      |                                                                         |                                                                                                                                                                                                                                                          |
| <b>The objective touches the cover slip</b>   | The cover slip is not standard sized (2L model, biological sample only) | Replace the cover slip with the appropriate 0.17mm thickness slip                                                                                                                                                                                        |
| <b>Unable to move the slide smoothly</b>      | The slide is not secured correctly                                      | Adjust the slide to use the stage clips and secure the sample                                                                                                                                                                                            |
|                                               | The mechanical stage is not properly secured                            | Tighten the mechanical stage screws to better secure the stage                                                                                                                                                                                           |
| <b>Focus knob does not turn</b>               | The tension knob is too tight                                           | Loosen it by adjusting the tension ring inside the coarse focus knob counterclockwise (close to the arm of the microscope on the right of the microscope)                                                                                                |
| <b>Stage declines by itself</b>               | The tension knob is too loose                                           | Tighten it by adjusting the tension ring inside the coarse focus knob clockwise (close to the arm of the microscope on the right of the microscope)                                                                                                      |
| <b>ELECTRICAL ISSUES</b>                      |                                                                         |                                                                                                                                                                                                                                                          |
| <b>The bulb/light source flickers</b>         | The bulb is close to burning out                                        | Replace the bulb.                                                                                                                                                                                                                                        |
| <b>The microscope does not light up</b>       | The microscope is unplugged                                             | Insert the plug into the wall socket to achieve electrical illumination                                                                                                                                                                                  |
|                                               | The bulb is not inserted correctly                                      | Check the bulb by unscrewing the base (remove eyepieces first to prevent falling out) and ensuring that the bulb is inserted                                                                                                                             |
|                                               | The bulb burned out                                                     | Replace the bulb. This unit uses our BH-6V20W with our 20w unit, or our BH-6V30W for the 30W unit.                                                                                                                                                       |
|                                               | The fuse burned out                                                     | Replace with fuse on the bottom of the microscope                                                                                                                                                                                                        |
| <b>The fuse burns out frequently</b>          | The voltage is too high                                                 | Use the correct power supply (110v if 110v unit, 220v if 220v unit), or get a voltage adapter to convert to the proper electrical system                                                                                                                 |
| <b>The bulb burns out frequently</b>          | The voltage is too high                                                 | Use the correct power supply (110v if 110v unit, 220v if 220v unit), or get a voltage adapter to convert to the proper electrical system                                                                                                                 |
|                                               | Used the wrong bulb                                                     | Use the correct wattage bulb for the unit. Using a higher wattage than it is rated for can damage your unit (melt components with additional heat), so please be sure to use the correct one. Damage from incorrect usage is not covered under warranty. |