



**Fisher Science
Education**

Microscope Instruction Manual

INTRODUCTION

Thank you for your purchase of a Fisher Science Education microscope. Your new microscope is a precision instrument carefully checked to assure that it reaches you in good condition. It is designed for ease of operation and years of carefree use. The information in this manual probably far exceeds what you will need to know in order to operate, troubleshoot and maintain your microscope. However, it is provided to answer questions that might arise, and to help you avoid any maintenance expense that may be unnecessary.

TYPES OF MICROSCOPES COVERED IN THIS MANUAL

The compound microscope combines two optical lens systems. The lens closest to the specimen slide, the objective, magnifies the primary image and the top lens, called the eyepiece, further magnifies the image. Magnification of the objective times the magnification of the eyepiece is the total magnification produced by this combination of lenses. The image produced by the compound microscope is upside down and reversed. Compounds are used for viewing standard 1" by 3" 1mm thick transparent specimen slides with cover slips. Prepared specimen slides can be purchased to fit the classroom subject matter or user can make his own specimen slides.

The stereo microscope is an instrument that incorporates two separate optical system aligned to produce three-dimensional images. Primary uses of the stereo microscope are the inspection and assembly of small parts, examining plants and insects, dissecting of biological specimen. Stereo microscopes provide an upright, unreversed image that permits easy manipulation of the object being viewed while looking through the microscope. Stereos are designed for viewing solid objects at low magnification, but they will also permit viewing of some transparent specimen slides.

Digital microscopes have all of the features of a compound microscope or stereo microscope but are enhanced with the addition of a built-in digital camera. With software included with these digital microscopes, they become real time learning tools.

FISHER SCIENCE EDUCATION MICROSCOPES

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MICROSCOPE TERMINOLOGY

- **ABBE CONDENSER:** The 1.25 N. A. Abbe condenser lens positioned under center of stage is required when using 100x objective lenses. In addition the Abbe condenser is focusable by one of two methods, a spiral mount condenser with lever to lower or raise the assembly or else a rack and pinion mount with a knob to provide movement in the up and down direction
- **ARM:** Main support for microscope components.
- **BASE:** Housing and platform of the instrument to which the arm is attached in addition it usually contains an illumination system for the microscope.
- **BODY TUBE:** On simple vertical tube models it holds the eyepiece tube and objective, on advanced models it holds nosepiece, objectives and head.
- **COAXIAL FOCUSING KNOBS:** Coaxial focusing system combines both the coarse and fine focus into one set of knobs located on the same axis. The control is designed for a continuous operation over the range of stage movement.
- **COARSE FOCUSING KNOBS:** Large knobs located on each side of arm, raise or lower stage to bring specimen image into focus.
- **CONDENSER LENS (0.65):** Condenses light rays from sub stage illumination and fills the back element of objective lens to improve image resolution. A 0.65 condenser lens fixed in center of stage is provided on microscopes with objectives up to 40x (400 times magnification).
- **DIOPTRER ADJUSTMENT:** Adjustable eyepiece diopter permits focusing adjustment of image for any difference in vision between users eyes.
- **DISC DIAPHRAGM:** Disc located below stage with holes of various apertures, designed to help achieve optimum resolution of the objective lens. Larger apertures used for higher magnifications, and smaller apertures used for lower magnifications.
- **EYEPIECE (ocular lens):** Lens closest to the eye magnifies the primary image formed by the objective lens.
- **EYEPIECE TUBE:** This is the component that holds the eyepieces in place. Elementary, student and high school models have set screws in the eyepiece tube used to lock eyepieces in place.
- **FIELD OF VIEW:** View area that is seen through the lens system of the microscope.
- **FILTER:** Daylight blue filter designed to make incandescent illumination appear white.
- **FILTER HOLDER:** Attached to bottom of iris diaphragm that swings out allowing user to insert filter of choice. If a built in neutral filter is provided it should be removed from the optical path when using 40x and 100x objectives.
- **FINE FOCUSING KNOBS:** Smaller knobs, located close to the coarse focusing knobs, permit more precise adjustment of the image.
- **FOCUSING EYEPIECE TUBE BINOCULAR HEAD:** Focusing eyepiece tube models, (two diopters) used to adjusting parfocality and focusing adjustment of image for any difference in vision between eyes.
- **HEAD:** Upper portion of the microscope which contain prisms and eyepiece tube or tubes.
- **INCIDENTAL ILLUMINATION:** Primarily used on stereo type microscopes to provide illumination from above the specimen.
- **INTERPUPILLARY DISTANCE:** Interpupillary distance (IPD) is the distance between the center of the pupils of the two eyes. Interpupillary distance is critical for the design of binocular viewing heads so that the left and right image can blend into one image.

- **IRIS DIAPHRAGM:** Iris Diaphragm, opening and closing of iris is controlled by lever. It is designed to help achieve optimum resolution of the objective lens. Larger apertures used for higher magnifications, and smaller apertures used for lower magnifications.
- **MAGNIFICATION:** Total magnification obtained with each objective lens is determined by multiplying the magnification of the eyepiece times the magnification of the objective. Keep in mind that as magnification increases, field of view (area of the specimen seen when looking through microscope) decreases.
- **MECHANICAL STAGE:** Permits precise, mechanical manipulation of the specimen slide.
- **MECHANICAL TUBE LENGTH:** Distance between the top of eyepiece tube to mounting face of nosepiece. (On more advanced models, above elementary type, the tube length is 160mm).
- **NEUTRAL DENSITY FILTER:** Neutral colored frosted filter designed to soften illumination hot spots.
- **NUMERICAL APERTURE (NA):** Mathematical formula devised by Ernst Abbe for the direct comparison of objective lens to resolving power.
- **NOSEPIECE (REVOLVING TURRET):** Designed to hold objective lenses permitting changes of magnification by rotating different powered objective lenses into optical path. Forward facing position used on elementary and high school models. Reverse facing nosepiece position used on more advanced models permits easier access to stage when positioning specimen slides.
- **OBJECTIVE LENS:** Lens closest to the object being viewed, forms first image of the specimen.
- **OIL IMMERSION LENS:** High power (100x) objective lens which requires a medium of immersion oil between the lens and the slide
- **RESOLVING POWER:** Ability of the optical system to distinguish and separate fine structural details in a specimen. The resolving power is limited by the NA of the objective, and it also depends upon the working NA of the sub-stage condenser, the higher the effective NA of the system the greater will be the resolving power.
- **RHEOSTAT:** Variable potentiometer that adjusts the light intensity of the illuminator.
- **SEIDENTOPF BINOCULAR HEAD:** Seidentopf heads remain parfocality when changing interpupillary distances and are supplied with one adjustable diopter adjustment to adjust image for any difference in vision between left and right eyes.
- **SPECIMEN SLIDE:** Typically a 3 by 1 inch by 1mm thick glass with a specimen held for observation covered by a .01mm thick cover glass.
- **STAGE CLIPS:** Two locked-on clips hold specimen slide in place on stage.
- **STAGE:** Platform of the microscope where the specimen slide is placed.
- **SAFETY RACK STOP:** Prevents higher power objectives from breaking specimen slides, and prevents damage to objective lens. Stop has been pre-adjusted at the factory.
- **TENSION ADJUSTMENT COLLAR:** The tension collar is used to adjust and control “body tube” or “stage” drift (Instrument not remaining in focus).
- **TRANSMITTED ILLUMINATION:** Used to illumination both compound and stereo microscopes providing illumination from below specimen.
- **WORKING DISTANCE:** Distance between the top of specimen slide and the front of the objective lens.

CARE AND MAINTENANCE OF MICROSCOPES

- I. **WARNING:** For your own safety, turn switch off and remove plug from power source before maintaining your microscope. If the power-cord, AC power converter, recharger, or any of the supply cords are worn, cut or damaged in any way, have it replaced immediately to avoid shock or fire hazard.
- II. **OPTICAL MAINTENANCE**
- A. Do not attempt Do not attempt to disassemble any lens components. Consult a microscope service technician when any repairs not covered by instructions are needed. Prior to cleaning any lens surface, brush dust or dirt off lens surfaces using a camel hair- brush. Or use air to blow dust and lint off surfaces. Use of compressed air in a can, available at any computer supply store, is a good source of clean air.
- B. Do not remove eyepieces or objective lenses to clean. Clean only the outer lens surface. Breath on lens to dampen surface, then wipe with lens paper or tissue or use a cotton swab moistened with distilled water. Wipe lenses with a circular motion, applying as little pressure as possible. Avoid wiping dry lens surface as lenses are scratched easily. If excessive dirt or grease gets on lens surfaces, a small amount of distilled water or Eyeglass lens cleaner can be used on a lens tissue. To clean objective lenses, do not remove objectives from microscope. Clean front lens element only, following same procedure. NOTE: Fingerprints or other matter on the front lens element of the objective lens is the single most common reason that you will have difficulty in focusing the microscope. Before having costly servicing done, or before returning for “warranty repair”, make certain to examine the front lens element with a magnifying glass or eye loupe for the presence of such contaminants. If a microscope is returned for warranty repair, and it is determined that such contaminants are the problem, this is not covered under warranty and an estimate for cleaning will be submitted for cleaning.
- III. **MECHANICAL MAINTENANCE**
- A. Rack Stop (compound microscopes only): Rack stop screw has been pre-adjusted at the factory and should not require re-adjustment. However, if you do attempt re-adjustment of rack stop use the following procedure. Locate rack stop as shown on drawing of your particular model. Loosen locking nut by turning counter clockwise that should allow you to loosen rack stop screw by rotating counter clockwise.
- a. Models with fine focus adjustment require setting it at mid-range, then using coarse focus knobs focus on standard slide until sharp image is obtained.
- B. Rotate rack stop screw in clockwise direction until tight. Lock into position with the locking nut.
- IV. **VIEWING BODY OR STAGE DRIFT:** Coarse focus tension adjustment collar prevents the viewing body or stage from drifting down from its own weight and causing the image to move out of focus. This has been adjusted at the factory, but over the course of time it may require adjustment. It is recommended that you leave the tension adjustment as loose as possible for ease of focusing, yet not so loose that it permits viewing body or stage to drift out of focus on its own weight.
- A. Mid range focusing Models S71000A and S71000B do not require adjustments for stage drift.
- B. Coarse focus only and coarse focus with fine focus models have a tension adjustment collar located between arm and coarse focus knob on left side of microscope. Use a small jewelers screwdriver or use supplied 0.90 “L” hex wrench, loosen the setscrew located in only one of the four holes on tension adjustment collar. Turn collar clockwise to tighten tension, counter-clockwise to loosen tension. Use of a wide rubber band will provide a better grip on the tension adjustment collar. After adjusting, tighten the setscrew to lock collar in place.
- C. Coaxial coarse and fine focus models have the tension adjustment knob located between stand and coarse focus knob of microscope (on right side with arm facing user). Tighten tension of coarse focus knobs by turning tension adjustment knob in a counter clockwise direction.

V. METAL PARTS

- A. Clean metal parts using a damp cloth to remove dust and dirt from all metal and painted surfaces, followed by a dry cloth.

VI. ELECTRICAL MAINTENANCE: The extent of electrical maintenance, by other than a qualified technician should be bulb, battery or fuse. Be certain to turn switches to the off position and remove power plug from power source outlet before changing bulbs or fuses.

- A. Replacing Incandescent Lamps on Elementary Model S71000A:
 - a. Replace the lamp by laying microscope on side to reveal base plate located on bottom of illuminator base.
 - b. Locate screws securing rubber feet. Using a screwdriver, remove the rubber feet and base plate to expose bulb.
 - c. Remove bulb by depressing lamp slightly and rotating in a counter-clockwise direction until it pops up.
 - d. Using Fisher Science Education replacement lamp no. S74015 (15 watt 120 volt double contact base) insert new bulb, gently depress into socket and rotate clockwise. Wipe bulb to insure that it is clean and free of all fingerprints.
 - e. Replace base plate and rubber feet.
- B. Replacing Incandescent Lamp on Elementary Models S71000C and S71000E:
 - a. Replace the incandescent lamp by locating the locking screw on bottom of illuminator housing shaft and remove screw. Pull shaft with lamp out of main illuminator housing.
 - b. Remove by depressing lamp slightly; rotate in counter-clockwise direction until it pops up.
 - c. Using Fisher Science Education replacement lamp no. S74015 (15watt 120volt double contact base) gently depress lamp into socket and rotate clockwise. Wipe bulb to insure that it is clean and free of fingerprints.
 - d. Replace lamp socket assembly into main lamp housing and replace locking screw.
- C. Replacing Incandescent Lamps on Middle/High School Models S71001 and S71001A:
 - a. Make sure that the illuminator field lens housing and lamp are cool before attempting to remove. Take off illuminator field lens housing by rotating in a counter-clockwise direction. This housing is secured tightly, to prevent easy removal by students, so a very firm grip and some strength will be required.
 - b. Remove lamp by depressing lamp slightly and rotate in a counter-clockwise direction until it pops up slightly.
 - c. Using Fisher Science Education replacement lamp no. S74017 (20watt 120 volt double contact base) replace lamp by gently depressing lamp into socket and rotate clockwise. Wipe bulb to insure that it is clean and free of all fingerprints.
 - d. Replace illuminator field lens housing by rotating in a clockwise direction and tighten.
- D. Replacing LED bulbs on Models S7100B, S71001B, S71001C, S71001D, S71001E, S71001F, S71001G, S71002, S71002A, S71002B, S71002C, S71002D, S71002E, S71002F, S71002G, S71011, S71014, S71014A, and S71014B:
 - a. To replace LED bulb remove the illuminator field lens housing by loosening the hex screws located on the bottom edge of housing (Use the 0.90 "L" type hex key wrench supplied with your microscope). Remove lens housing to expose LED bulb.
 - b. Remove LED bulb by grasping the plastic base of bulb and gently pulling straight up.
 - c. Using Fisher Science Education replacement lamp no S74018 (LED bulb with lamp base) insert the new LED "bulb" making sure to align the lamp base with lamp socket. Wipe bulb to insure that it is clean and free of fingerprints.
 - d. Replace illuminator field lens housing and tighten hex screw to secure lens housing to illuminator base.
- E. Replacing Led bulbs on Elementary Models S71000D and S71000F:
 - a. **Do not attempt to replace LED bulb on these two models.** LED bulb is not replaceable by end user.

- F. Replacing the Incidental (Top) Illuminator LED bulb on Middle/High School Stereo Models S71005A and S71005C:
- To replace top light replace top light, remove two chrome crosshead screws securing top lighthouse to light bracket and the two chrome crosshead screws securing coiled cord clamp to arm.
 - Remove front lens from lighthouse by rotating in a counter clockwise direction. Holding top lighthouse in one hand, remove silver spacer then feed coiled cord through bottom of lighthouse, pushing LED lamp assembly out of lighthouse.
 - Unplug connector located on bottom of LED lamp mount and remove from housing.
 - Using Fisher Science Education replacement lamp no S74022 (LED bulb with special base) plug the connector to supply cord. Wipe bulb to insure that it is clean and free of fingerprints.
 - Reassemble lamp assembly in reverse order
- G. Replacing the Transmitted (Bottom) Illuminator LED bulb on Middle/High School Stereo Models S71005A and S71005C:
- To replace transmitted (bottom light), loosen setscrew located at side of base and remove stage plate. Removing stage plate will expose the bottom LED bulb.
 - Grasp LED bulb and pull straight up and out of socket.
 - Using Fisher Science Education replacement lamp no S74023 (LED bulb with special base) insert the new LED bulb making sure to align the lamp base with lamp socket. Wipe bulb to insure that it is clean and free of fingerprints.
 - Replace the stage plate and tighten locking setscrew.
- H. Replacing Halogen Lamps on College/Laboratory Models S71003, S71003A, S71003B, S71003C, S71003D, S71003E, S71003F, S71003G, S71003H, S71003J, S71012 and S71012A:
- Carefully lay instrument on its side, taking care to avoid damage to specimen slide holder located on top of mechanical stage.
 - Loosen large chrome screw located on hinged door of illuminator base.
 - Swing door open to expose the halogen lamp.
 - Using a tissue or cloth, gently grasp the halogen bulb and pull lamp straight out of lamp socket.
 - Using Fisher Science Education replacement lamp no S74020 hold lamp with tissue paper and insert bulb base pins straight into lamp socket. Wipe bulb to insure that it is clean and free of fingerprints.
 - Make sure to use the proper 12-volt bulb in order to prevent serious damage to the electrical system of the microscope.
 - Close hinged door and tighten the chrome locking screw
- I. Replacing the Transmitted (Bottom) Lamp on High School/College Stereo Models S71007 and S71007A:
- Gently lay microscope on its side to reveal base plate on bottom of illuminator base.
 - Observe screws located in rubber feet. Using a screwdriver, remove the rubber feet and base plate to expose bulb.
 - Remove bulb by depressing lamp slightly and rotating in a counter-clockwise direction until it pops up.
 - Using Fisher Science Education replacement lamp no S74015 (120volt 15watt double contact base) insert new lamp by gently pressing into socket and rotate in a clockwise direction until it snaps into place. Wipe bulb to insure that it is clean and free of all fingerprints.
 - Replace base plate and secure rubber feet.
- J. Replacing the Incidental (Top) Lamp on High School/College Stereo Models S71007 and S71007A:
- Remove top lamp housing by grasping it and rotating in a counter-clockwise direction to expose the lamp.

- b. Remove light bulb by firmly grasping and depressing lamp slightly and rotating in a counter-clockwise direction until it pops up.
 - c. Using Fisher Science Education replacement lamp no S74024 (12volt 10watt double contact base) insert new lamp by gently pushing into socket and rotate in a clockwise direction until it pops into place. Wipe bulb to insure that it is clean and free of all fingerprints.
 - d. Replace light housing by rotating in a clock-wise direction until tight.
- K. Replacing the Incidental (Top) Lamp on Middle/High School Stereo Models S71004, S71004A, S71005, S1005B, S71006, S71006A and S71006B:
- a. Remove the knurled light housing locking screw located on side of rectangular shaped lamp housing.
 - b. Remove the rectangular shaped light housing and expose top bulb.
 - c. Gently grasp bulb and pull bulb from two tension clips, which hold it in place.
 - d. Using Fisher Science Education replacement lamp no S74021 (12volt 10watt) holding new bulb with tissue (to avoid getting body oil on surface of bulb), push bulb into tension clips until it slips into position.
 - e. Replace light housing and lock in place with knurled locking screw.
- L. Replacing the Transmitted (Bottom) Lamp on Middle/High School Stereo Models S71004, S71000A, S71005, S71005B, S71006, S71006A, S71006B and S71012B:
- a. To replace transmitted (bottom light), loosen setscrew located at side of base and remove stage plate. Removing stage plate will expose the bottom bulb.
 - b. Gently grasp bulb and pull bulb from two tension clips, which hold it in place.
 - c. Using Fisher Science Education replacement lamp no S74021 (12volt 10watt) holding new bulb with tissue (to avoid getting body oil on surface of bulb), push bulb into tension clips until it slips into position.
 - d. Replace stage plate and secure with locking setscrew.
- M. Replacing the Incidental (Top) Illuminator Halogen Bulb on Digital Stereo Model S71012B:
- a. Remove front lens housing from microscope by rotating in a counter clockwise direction.
 - b. Remove light bulb by firmly grasping and pulling straight out from bi-pin socket
 - c. Using Fisher Science Education replacement lamp no S74027 (12 volt 10 watt bi pin halogen) orientate the two pins with the socket and firmly push pins into socket.
 - d. Replace top lens housing by rotating in a clock-wise direction until tight.
- N. Replacing the Transmitted (Bottom) Lamp on Digital Stereo Model S71013:
- a. Gently lay microscope on its side to reveal base plate on bottom of illuminator base.
 - b. Observe screws located in rubber feet. Using a screwdriver, remove the rubber feet and base plate to expose bulb.
 - c. Remove light bulb by firmly grasping and pulling straight out from bi-pin socket
 - d. Using Fisher Science Education replacement lamp no S74028 (12volt 10watt Halogen bi-pin base) orientate the two pins with the socket and firmly push pins into socket.
 - e. Replace base plate and secure rubber feet.
- O. Replacing the Transmitted (Bottom) Lamp on College Stereo Models S71008, S71008A, S71009, S71009A and S71010:
- a. Gently lay microscope on its side to reveal base plate on bottom of illuminator base.
 - b. Observe screws located in rubber feet. Using a screwdriver, remove the rubber feet and base plate to expose bulb.
 - c. Grasp fluorescent lamp and pull bulb from socket.
 - d. Using Fisher Science Education replacement lamp no S74019 (5watt fluorescent) holding push bulb into tension clips until it slips into position.
 - e. Replace base plate and secure rubber feet.
- P. Replacing the Incidental (Top) Lamp on College Stereo Models S71008, S71008A, S71009, S71009A and S71013:
- a. Remove top lampshade by grasping it and rotating in a counter clockwise direction

- exposing top lens housing.
 - b. Remove top lamp lens housing by grasping it and rotating in a counter-clockwise direction to expose the lamp.
 - c. Remove light bulb by firmly grasping and pulling straight out from bi-pin socket.
 - d. Using Fisher Science Education replacement lamp no S74025 (12volt 15watt Halogen bi-pin base) hold lamp with tissue paper, orientate the two pins with the socket and firmly push into socket. Wipe bulb to insure that it is clean and free of all fingerprints.
 - e. Replace top lens housing by rotating in a clock-wise direction until tight.
 - f. Replace top lampshade by rotating in a clock-wise direction until tight.
- Q. Replacing the Incidental (Top) Lamp on College Stereo Model S71010:
- a. Remove top lampshade by grasping it and rotating in a counter clockwise direction exposing halogen reflector lamp.
 - b. Remove light bulb by firmly grasping and pulling straight out from bi-pin socket.
 - c. Using Fisher Science Education replacement lamp no S74026 (12volt 10watt Halogen Reflector) orientate the two pins with the socket and firmly push pins into socket.
 - d. Replace top lens housing by rotating in a clock-wise direction until tight.
- R. Replacing Fuses on Models Requiring a Fuse:
- a. Fuse is located at the rear side of microscope base.
 - b. To remove fuse from holder, insert a 6mm screwdriver blade into slot located in rear of fuse holder cap. Slightly depress and rotate screwdriver $\frac{1}{4}$ turn in direction of arrow, release pressure on screwdriver to release fuse.
 - c. Pull cap and fuse out of fuse holder.
 - d. Insert proper fuse into fuse cap. Insert fuse cap into fuse holder.
 - e. Using screwdriver, rotate fuse cap assembly in opposite direction of arrow until slot engages, depress fuse cap and rotate $\frac{1}{4}$ turn to lock into fuse holder.
- S. Recharging Batteries on Cordless Models:
- a. Must use the supplied Automatic Switching Recharger when charging batteries.
 - b. It is recommended that you charge the batteries before initial use and after prolonged storage as the batteries may have discharged.
 - c. Plug output cord from battery charger into DC recharging socket located on LED illuminator. Your automatic switching recharger operates on 100 to 240 volts AC 50/60 Hz. Plug recharger into your AC wall outlet.
 - d. Battery recharger is also equipped with an automatic “trickle charge” feature; the red LED indicator lamp located on recharger will be illuminated when batteries are receiving maximum charge. After batteries are charged, the red LED indicator lamp will turn to green and charger automatically switches to “trickle charge”.
 - e. The charger can be left plugged in, but for safety reasons it is a good idea to disconnect the charger from the AC wall outlet and the output cord from recharging socket after 12 hours. Batteries and charger may feel warm when charging, and unplugging the recharger is a safety precaution.
- T. Replacing Batteries on All Rechargeable LED Microscopes, except Models S71000C and S71000F:
- a. Gently lay microscope on its side. Remove the rubber feet located on bottom of base and remove base plate. Observe battery compartment inside of illuminator base.
 - b. Remove the screw securing battery cover to bottom of illuminator. Slide cover back to expose and remove batteries. Remove “ALL” 3 batteries and replace with new rechargeable AA nickel hydride batteries, insert with correct polarity according to markings on battery holder.
 - c. Replace battery cover and secure screw.
 - d. Replace base plate and the rubber feet.
 - e. Recharge batteries as described in Care and Maintenance of Microscopes located on page 10 (S).

U. Replacing Batteries on Models S71000C and S71000F:

- a. **Do not use** regular AA alkaline batteries. Use of other Use of other than rechargeable AA nickel metal hydride batteries could result in batteries exploding during recharging.
- b. Carefully lay the microscope on its side.
- c. Locate battery compartment cover on bottom of illuminator. Carefully remove the two screws securing battery cover to bottom of illuminator. Slide cover back to expose batteries.
- d. Remove all 3 batteries and replace with new rechargeable AA nickel hydride batteries, making certain to insert with correct polarity according to markings on battery holder. Replace cover and secure screws.
- e. Recharge batteries as described in Care and Maintenance of microscopes located on page 10 (S).

TROUBLESHOOTING

ELECTRICAL

PROBLEM	REASON FOR PROBLEM	SOLUTION
Lights fail to operate	AC power cord not connected	Connect outlet plug to outlet
	Outlet inoperative	Have qualified service repair outlet
	Lamp burned out	Replace lamp
	Fuse is blown	Replace fuse
Fuse burns out too soon	Improper fuse	Replace with proper fuse
	Fuse blows instantly when replaced	Short in electrical system - have qualified technician repair
Light bulb burns out too soon or immediately	Incorrect bulb, voltage or lamp base used	Replace with specified lamp
Light flickers	Lamp not properly inserted into socket	Properly insert lamp
	Loose connection at AC outlet	Have qualified service technician repair outlet
	Electrical short	Properly install fuse holder

FOCUSING

PROBLEM	REASON FOR PROBLEM	SOLUTION
Image does not remain in focus	Stage or body of microscope drops from its own weight	Adjust tension control
Image will not focus (compound models)	Rack stop not set at proper position	Adjust rack stop
	Slide is upside down	Place slide on stage with cover slip up
	Slide cover slip is too thick	Use 0.17mm thick cover slip

IMAGE CONCERNS

PROBLEM	REASON FOR PROBLEM	SOLUTION
No image	Nosepiece not indexed properly	Move revolving nosepiece until objective lens clicks into position
Poor resolution (Image not sharp)	Diaphragm improperly adjusted	Adjust disc diaphragm or iris diaphragm
	Too much light	Adjust light intensity control to a lower position
	Objective lenses dirty	Clean objective lenses
	Eyepiece lens dirty	Clean eyepiece lenses
	Washed out image	Adjust disc or iris diaphragm
	Specimen slide dirty	Clean slide
	Spots on field of view (Eyepiece or condenser lens dirty)	Have qualified service technician clean inside of lens
	No immersion oil used on 100X objective lens	Use small amount of immersion oil between the objective and the slide
	Bubbles (air) in immersion oils	Remove bubbles by carefully moving nosepiece back and forth

GENERAL INSTRUCTIONS FOR COMPOUND MICROSCOPES

- I. Remove microscope, vinyl dustcover and any components from Styrofoam lined carton. Retain the container, and use it for extended storage, for transporting, or in case the microscope ever needs to be shipped. Always carry microscope by grasping arm with one hand and placing other hand under base. Place the microscope directly in front of you in a manner, which permits you to comfortably look into the eyepiece. On models with a rotating head, note that the head of the microscope rotates 360°, permitting you to operate the microscope from the front or the back, whichever is most convenient. Most users will position the microscope with the arm facing you so that focusing knobs are most convenient to reach.
- II. Turn illuminator on in order to illuminate the specimen.
 - A. Models supplied with a variable rheostat knob or dial for controlling light levels.
 - B. Before operating microscope, adjust intensity (rheostat) control knob or dial to its minimum position. (This will help extend the life of the light bulb).
 - C. Turn illuminator switch to the “on” position.
 - D. Rotate intensity knob until image is illuminated.
 - E. As different magnifications are selected it will be necessary to adjust the intensity of light to match requirements of objective and specimen slide.
- III. Focusing your compound microscopes.
- IV. Rotate coarse focus knobs in a direction that stage moves “away” from the objective lenses as far as possible.
- V. Positioning specimen slide.
 - A. Stages with standard stage clips. Place specimen slide cover slip facing up, under the two stage clips located on stage. Move specimen slide until it is centered over lens in center condenser lens located in middle of stage.
 - B. Mechanical Stage Models: Swing movable finger on holder outward, place specimen slide (cover slip facing up) on top of slide against fixed side of slide holder. Slowly release movable finger until it makes contact with specimen slide. Using mechanical X and Y controls move specimen slide until it is centered over the condenser lens.
- VI. Initial diaphragm adjustments.
 - A. Models with rotating disc diaphragm turn until largest aperture is positioned beneath condenser lens.
 - B. Models that are supplied with iris diaphragm, move lever until iris is close to largest opening.
- VII. Positioning Objective: Rotate the nosepiece (revolving turret) until the 4x (smallest) objective lens clicks into position in the optical path. Note that each time you change from one objective lens to another you should turn the turret until you hear the click, which indicates that the lens is properly indexed in the optical path.
- VIII. While looking through the eyepiece, rotate coarse focusing knobs until specimen comes into focus. If image does not appear in field of view, move specimen slide slightly until image appears in field of view.
- IX. Models equipped with fine focus adjustment knobs, adjust these controls until specimen is in sharp focus.
- X. Adjusting the Diaphragm: Diaphragms are designed to help achieve high resolution of specimen and provide contrast in the image. Listed below are a few suggested starting points for adjusting the aperture. Smaller apertures will deliver higher contrast to image. However, closing aperture too much will reduce resolution. Experimentation is the best method of determining the correct opening of diaphragm.
 - A. Disc diaphragm
 - 4x diaphragm disc close to smallest opening.
 - 10x diaphragm disc at medium opening
 - 40X diaphragm disc close to largest opening

B. Iris Diaphragm suggested openings:

- 4x objective-iris open $\frac{1}{8}$,
- 10x objective-iris open $\frac{1}{8}$ to $\frac{1}{4}$,
- 40x objective, iris open $\frac{1}{4}$ to $\frac{1}{2}$,
- 100x objective-iris open $\frac{1}{2}$ to $\frac{3}{4}$

XI. Changing magnification is accomplished by rotating by rotating objective turret until different objective lens is moved into optical path. Always turn turret until you hear the “click”, indicating that lens is properly indexed. Otherwise, you will not be able to see anything when looking through the microscope. A slight adjustment of focus and diaphragm openings will be needed to sharpen the image when changing objective magnification.

A. Models supplied with 100x oil immersion lens. To obtain the maximum resolution of the 100x oil immersion lens it is necessary to apply immersion oil between cover glass of slide and front lens of objective. Use a very small amount of immersion oil. Air bubbles must be removed from between lens and slide by gently moving nosepiece back and forth.

B. Each time immersion oil is used on the 100x it is essential that you clean front of lens after use.

MODEL S71000

To view transparent specimen slides, place slide over the aperture in the middle of the stage, with the specimen and cover slip on the slide facing upward. The distance between the specimen and the bottom of the objective lens will about 1 inch. Grasping the eyepiece tube, gently slide it down until the objective lens is fairly close to the slide surface. Note that there is a small-flanged rivet in the eyepiece tube that will stop the downward movement of the eyepiece tube before it reaches the slide surface. Looking through eyepiece, gently pull up on eyepiece tube until image comes into sharp focus.

To view solid objects such as rocks, plants, insects, or opaque specimen such as stamps, fabric, etc.: The focusing procedure is same as described under above. The only difference is that you will want adequate ambient light in order to illuminate your opaque specimen from the top. If the specimen is small and falls through the aperture at center of stage, place a small piece of paper under the stage clips on the stage surface. Center the opaque specimen on the paper. When viewing solid objects, maximum specimen height is 30mm. Anything taller than 30mm will not come into focus.



MODEL S71000A and S71000B

These models utilize a mid range focusing system and require only one set of knobs to focus the specimen slide. Optics supplied are elementary type 4X, 10X and 40X objectives and a WF10x eyepiece with pointer.

To operate these models see General Instructions for Compound Microscopes located on pages 14 and 15 of this manual.

Lamp replacement on model S71000A: For incandescent lamp replacement see page 7 (A).

LED bulb replacement on model S71000B: See bulb replacement located on page 7 (D).

Fuse replacement on models S71000A and S71000B: See Replacing Fuses located on Page 10 (R).



MODEL S71000C and S71000D

These two models have an inclination joint that allows you to tilt the arm to provide a comfortable viewing angle. They are provided with coarse focusing mechanism only therefore there are only two knobs. Optics supplied are elementary type 4X, 10X and 40X objectives and a WF10x eyepiece with pointer

You must charge batteries prior to using model S71000D. See Recharging Batteries page located on page 10 (S).

To operate this microscope see General Instructions for Compound Microscopes located on page 14 and 15 of this manual.

Replacing Lamp on Incandescent model S71000C: See Replacing Incandescent Lamps located on page 7 (B).

LED bulb NOT replaceable on model S71000D.

Battery replacement for models S71000D: See Replacing Batteries located on page 10 (U).



MODEL S71000E and S71000F

These two models have a special inclined eyepiece tube so that it is not necessary to tilt microscope at inclination joint. They are also provided with separate coarse and fine focusing mechanisms for ease in focusing. Optics supplied are elementary type 4X, 10X and 40X objectives and a WF10x eyepiece with pointer

On model S71000F you must charge batteries prior to using. See Recharging Batteries page 10 (S).

To operate this microscope see Instructions for Compound Microscopes located on pages 14 and 15 of this manual.

Replacing Lamp on incandescent model S71000E: See Replacing Incandescent Lamps located on page 7 (B).

LED bulb "NOT" replaceable on model S71000F.

Battery replacement for models S71000F: See Replacing Batteries located on page 10 (U).



MODEL S71001, S71001A, S71001B, S71001C, S71001D

The head of microscope rotates 360°, permitting you to operate the microscope from the front or from the back, whichever is most convenient.

On model S71001D you must charge batteries prior to using, see Recharging Batteries page 10 (S).

To operate these models see General Instructions for Compound Microscopes located on pages 14 and 15.

Lamp replacement for incandescent models S71001 and S71001A: For Incandescent lamp replacement see page 7 (C).

LED bulb replacement for models S71001B, S71001C, S71001D: For LED bulb replacement see page 7 (D).

Battery replacement for models S7001D: Replacing batteries see page 10 (T).

Fuse replacement on models S71001 and S71000A: See Replacing Fuses located on page 10 (R).



MODEL S71001E, S71001F AND S71001G

Dual viewing head permits simultaneous viewing by student and teacher, and is also ideal for video microscopy. Vertical and 30 degree inclined tubes mounted on a 360 degree rotating head for ease in use. Vertical tube has diopter adjustment, positioned low for easier camera mounting. Head of microscope rotates 360°, permitting you to operate the microscope from the front or from the back.

To operate these models see General Instructions For Use Of A Compound Microscope located on pages 14 and 15.

LED bulb replacement for models S71001E, S71001F AND S71001G: See Replacing LED bulbs located on page 7 (D).

Fuse replacement: See Replacing Fuses located on Page 10 (R).



S71002 STUDENT MODEL

This model features separate coarse and fine focusing knobs, 4X, 10X and 40X objectives and a WF10X eyepiece with pointer.

You must charge batteries prior to using this instrument. See Recharging Batteries page 10 (S).

To operate this model see General Instructions for Compound Microscopes located on pages 14 and 15.

LED bulb replacement: See Replacing LED bulb located on page 7 (D).

Battery replacement: See Replacing Batteries located on page 10 (T).



S71002A AND S71002B STUDENT MODEL

These models feature coarse and fine focusing mechanisms, full sized DIN 4X, 10X and 40X objectives, widefield 10X eyepiece and a 0.65 condenser with iris diaphragm.

On model 71002B you must charge batteries prior to using this instrument. See Recharging Batteries page 10 (S).

To operate these models see General Instructions for Compound Microscopes located on pages 14 and 15.

LED bulb replacement: See LED Bulb Replacement located on page 7 (D).

Battery replacement on model S71002B: See Replacing Batteries located on page 10 (T).

Fuse replacement on model S7102A: See Replacing Fuses located on pages 10 (R).



S71002C, S71002D, S71002E and S71002F

These models feature coarse and fine focusing mechanisms, spiral focusing mounted Abbe 1.25NA condenser with iris diaphragm, and widefield 10X eyepiece. Models S71002C, S71002D supplied with DIN 4X, 10X and 40X objectives, models S71002E and S71002F also include a 100X oil immersion objective lens.

Models S71002D and S71002F require charging batteries prior to using these models. See Recharging Batteries page 10 (S).

To operate these models see General Instructions for Compound Microscopes located on pages 14 and 15.

LED bulb replacement on these models: See LED bulb replacement located on page 7 (D).

Battery replacement on models S71002D and S71002F: See Replacing Batteries located on page 10 (T).

Fuse replacement on models S71002C and S71002E: See Replacing Fuses located on pages 10 (R).



S71002G HIGH SCHOOL AND COLLEGE

This model features a Seidentopf binocular head, coaxial coarse and fine focusing mechanism with full sized DIN 4X, 10X, 40X and 100X optics, Abbe 1.25NA spiral mounted condenser with iris.

This model requires charging batteries prior to using. See Recharging Batteries page 10 (S).

Adjust interpupillary distance (spacing between the eyes). While viewing through the eyepieces, move the Eyepiece holder tube assemblies by rotating them on their axis. When a full field of view is observed through both tubes and images blend into one-eyepiece tubes are correctly adjusted.

To operate these models see General Instructions for Compound Microscopes located on page 14 and 15.

LED bulb replacement: See LED bulb replacement located on page 7 (D).

Battery replacement on models 71002G: See Replacing Batteries located on page 10 (T).



MODEL S71003 and S71003A

Model S71003 is supplied with DIN standard 4X (0.10N.A.), 10X (0.25 N.A.) 40X (0.65N.A.) retractable, and 100X (1.25 N.A.) retractable oil immersion objective lenses. Model S71003A is supplied with ASC DIN 4X (0.10N.A.), 10X (0.25 N.A.), retractable 40X (0.65N.A.), and retractable 100X (1.25 N.A.) oil immersion lens.

Filters: Insert 32mm diameter filter into condenser swing out filter holder, then insert 45mm neutral filter into the recess located on top of illuminator condenser lens.

Illumination: Insert power plug into 12 volt DC switching power converter, then insert plug on other end of converter into power jack on back of microscope base. Plug AC cord into either a 120v or 240v outlet and converter automatically switches to proper output voltage.

To operate this series of microscopes see General Instructions for use of a Compound Microscope located on pages 14 and 15.

Lamp replacement: For Halogen lamp replacement see page 8 (H).

Fuse replacement: See Replacing Fuses located on page 10 (R).



Model S71003B and S71003C

Objectives on Model S71003B same as S71003, and objectives on Model S71003C same as S71003A as shown at the top of this page.

Follow instructions for models S71003 and S71003A at top of this page with the following exceptions.

These Dual viewing heads, with 30° inclined eyepieces, providing comfortable viewing for primary viewer. Also includes is a vertical eyepiece so that a second viewer can observe the image simultaneously. Primary viewer focus microscope with coarse and fine focus knobs then second viewer adjusts the diopter to adjust for differences in eyesight.

Lamp replacement: For Halogen lamp replacement see page 8 (H).

Fuse replacement: See Replacing Fuses located on page 10 (R).



MODEL S71003D, S71003E and S71003F

Objectives on Model S71003D same as S71003, and objectives on Model S71003E same as S71003A as shown on page 21.

Model S71003F is supplied with Plan Achromat DIN 4X (0.10 N.A.), 10X (0.25 N.A.), retractable 40X (0.65N.A.); retractable 100X (1.25 N.A.) oil immersion objective lenses.

Follow instructions for models S71003 and S71003A located on page 21 with the following exceptions:

- Adjust interpupillary distance (spacing between the eyes). While viewing through the eyepieces, slide the eyepiece tubes in or out until images blend into one. Check interpupillary scale and note index the reading.
- Adjust the diopter scales, located on left and right each adjustable eyepiece tubes to the same numerical value as indicated on the interpupillary index scale. This is required to maintain parfocality of objective lenses. After properly focusing instrument adjust ocular tube diopters to compensate for the difference between left and right eyes.

Lamp replacement: For Halogen lamp replacement see page 8 (H).

Fuse replacement: See Replacing Fuses located on page 10 (R).

MODEL S71003G, S71003H and S71003J

Use instructions for Binocular versions S71003D, S71003E and S71003F located top of this page.

In addition, these models are equipped with a vertical port on top of head with a sliding 3 position sliding rod that permits user to select viewing required for his needs. Rod pushed completely into head allowing 100% of microscope image to be directed to binocular eyepieces. Pull rod out until you feel a gentle click (Mid-position) that directs 100% of image to be directed to vertical port. Pull rod to fully extended position and 30% of image is directed to binocular eyepieces, 70% directed to trinocular port.

Lamp replacement: For Halogen lamp replacement see page 8 (H).

Fuse replacement: See Replacing Fuses located on page 10 (R).



GENERAL INSTRUCTIONS FOR STEREO MICROSCOPES

- I. Remove microscope and all components from Styrofoam carton. Retain the container, and use it for extended storage, for transporting, or in case the microscope ever needs to be shipped. Always carry microscope by grasping focusing mechanism with one hand and placing other hand under base. Place the microscope directly in front of you in a manner, which permits you to comfortably look into the eyepieces.
- II. Install rubber eyepiece shields over top of eyepieces with the flared portion of the shield positioned at outside of eyepiece.
- III. Illuminate specimen according to specific instructions for your model.
- IV. Stage plate selection: Select the stage plate that best meets requirements of specimen being examined.
 - A. Frosted transparent plate is used when viewing transparent specimen slides or for viewing some specimen thin enough through which light can pass (insect wings, etc.)
 - B. Black contrast plate can be used when viewing light colored opaque objects or for dissecting.
 - C. White contrast plate can be used when viewing dark colored opaque objects or for dissecting.
 - D. To change stage plates loosen locking screw, used to secure plate to the base. (Use the "L" wrench supplied with microscope).
 - E. Remove stage plate and insert stage plate that best suits the needs of specimen that is being viewed, then secure plate with setscrew.
 - F. Models S71007, S71007A, S71008, S71008A, S71009, S71009A Supplied with a daylight blue filter. Insert filter into machined groove provided in center of base. Install frosted stage plate, and tighten locking setscrew to secure stage plate to base.
- V. Illumination: Select illumination that meets the requirements of specimen and turn ON illuminator.
 - A. There are three rocker type light controls located on microscope base.
 - a. MAIN = Turns power ON and OFF
 - b. "I" Turns incidental light on (top illumination)
 1. Incidental illumination can be used with either frosted, black or white stage plate.
 2. Models S71008, S71008A, S71009, S71009A, S71010 and S71013: Top light can also be centered on specimen by using the top light beam adjustment screw. This allows user to select the best spot illumination required for specimen being viewed.
 3. Models S71008, S71008A, S71009, S71009A, S71010 and S71013 are also provided with a rheostat to control the top light intensity. Rheostat intensity control knob is located on side of base.
 - c. "T" Turns transmitted light on for sub-stage illumination.
 1. NOTE: USE TRANSMITTED ILLUMINATION ONLY WITH FROSTED GLASS STAGE PLATE (AND BLUE FILTER IN PLACE ON MODELS SUPPLIED WITH FILTER). HEAT GENERATED IN BASE FROM BOTTOM LIGHT WILL WARP OR DAMAGE THE PLASTIC BLACK/WHITE PLATE. SUCH DAMAGE WILL NOT BE COVERED BY WARRANTY.
 - d. Transmitted and Incidental illumination combined can provide extra illumination for certain objects where additional top illumination will enhance the object being viewed.
- VI. INTERPUPILLARY ADJUSTMENT of viewing head.
 - A. Interpupillary adjustment is used to adjust spacing between eyepieces in order to accommodate varied distance between users eyes. While looking through the microscope eyepieces with both eyes, grasp eyepiece tube housings with both hands and rotate them on their axis, moving eyepieces apart or together until a full field of view is observed and images blend into one. Interpupillary distance is now corrected for your own inter-ocular distance and does not require further adjustment later unless another user changes this adjustment.

VII. FOCUSING STEREO MICROSCOPES

- A. Place object or specimen slide in center of stage plate.
 - B. Special instructions for viewing head that are mounted on a post, (Height of head can be adjusted up or down on post in order to focus on difference sized specimen).
 - a. Post models include models S71004, S71004A, S71006, S71006A, S71006B, S71009, S71009A and S71013.
 - b. Position focusing knobs in the center of the up and down travel of mechanical movement.
 - c. While firmly holding viewing head loosen the post locking knob located on back of focus block so that it can move freely up or down on post. Look through the eyepieces while moving head up and down and bring specimen into approximate focus.
 1. Models S71009, S71009A and S71013 require the loosening of the support collar allowing collar to slide to bottom of post. This allows head to move up and down to approximately focus the instrument.
 2. Holding viewing head move up or down on post, while looking through microscope, move viewing head until image is in approximate focus.
 3. Tighten post-locking knob. It is not necessary to make this adjustment every time you change objects being viewed, unless there is a significant difference in thickness or height of objects.
 4. For models S71009, S71009A and S71013, tighten focusing assembly locking knob then position the support collar under the focusing block and tighten locking knob on support collar.
 - C. Rotate focusing knobs with both hands until specimen comes into sharp focus.
 - D. DIOPTER ADJUSTMENT, since people have some difference in vision between the left and right eye, your microscope is equipped with a diopter adjustment located on the left eyepiece to compensate for this difference and assure that you will see one corrected image when looking through microscope.
 - a. Observe that the knurled diopter ring on the left eyepiece tube can be rotated to move the eyepiece up or down slightly. When a silver ring on the eyepiece tube is visible just below the diopter ring, the focus of both sides of microscope is matched for 20/20 vision. If you do not have 20/20 vision.
 - b. Look through the right eyepiece and make sure that the image is in sharp focus (if not make a slight adjustment using the focusing knobs)
 - c. Look through the left eyepiece and turn knurled diopter ring until left side of microscope is also in sharp focus. Left and right images should now blend into one focused image. The microscope is now adjusted for your vision, and no further adjustment of the diopter should be required. Only the focusing knobs will require further adjustment when viewing objects of different thickness.
 - E. Changing magnification on models provided with “Dual magnification” turrets.
 - a. Rotate objective turret until it clicks into position. (For proper focusing make sure that the turret has clicked into position.
 - F. Changing magnification on models provided with zoom objective lenses.
- VIII. It is necessary to “parfocal” the objectives on zoom models to individual users vision. (Models S71008, S71008A, S71010 and S71013)
- A. Adjust the zoom control knob located on side of viewing head to the lowest magnification by aligning the Number “1” on knob to black index dot on head. Lower magnifications have larger fields of view, making it easier to position and locate specimen to viewed.
 - B. Place a flat object or specimen slide (cover glass up) on stage plate and center in the field of view.
 1. Zoom models are provided with adjustable left and right eyepiece diopters. Rotate both left and right diopters in a clockwise direction to the lowest position.

2. Adjust zoom control knob to the highest magnification by aligning the number “3” located on the objective turret for model S71010; and by aligning the number “4” located on zoom control knobs to the black index dot on the viewing head for models S71008, S71008A and S71013.
3. While looking through the right eyepiece with one eye, rotate the focusing knob until the specimen comes into sharp focus.
4. Adjust the zoom control knob to the lowest magnification by aligning the number “1” located on the objective turret for model S71010; or by aligning the number “1” located on zoom control knobs to the index dot on the viewing head for models S71008, S71008A and S71013.
5. Adjust the right diopter until the image is sharp. Do not change the focusing knob position.
6. Without changing the position of the focusing knob, adjust the left eyepiece diopter until you obtain a sharp image in the left eyepiece. The image should now be sharp throughout the zoom power range.
7. Once you parfocal the instrument you can easily change magnification to suit your needs.

MODEL S71004

Features an adjustable post mounted viewing head with vertical eyepiece tubes.

Illuminated by incidental (top) and transmitted (bottom) lighting system.

Fixed 2X objectives and widefield 10X provides 20 times total magnification

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 9 (K).

Transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 9 (L).

Fuse replacement: See Replacing Fuses located on pages 10 (R).



MODEL S71004A

Features an adjustable post mounted viewing head with inclined eyepiece tubes for ease in viewing.

Illuminated by incidental (top) and transmitted (bottom) lighting system.

Fixed 2X objectives and widefield 10X provides 20 times total magnification

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 9 (K).

Transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 9 (L).

Fuse replacement: See Replacing Fuses located on pages 10 (R).



MODELS S71005, S71005A, S71005B and S71005C

Fixed arm with inclined viewing head allows for ease in viewing. Also includes incidental and transmitted built in illumination. Models S71005 and S71005B feature incandescent illumination, while S71005A and S71005C have LED illumination.

Models S71005 and S71005A supplied with rotating 1X and 3X objective turret providing 10X & 30X magnification. Models S71005B and S71005C supplied with rotating 2X and 4X objective turret providing 20X & 40X magnification.

Models S71005A and S71005C

You must charge batteries prior to using this instrument. See Recharging Batteries page 10 (Q).

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Models S71005 and S71005B

Incandescent incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 9 (K).

Incandescent transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 9 (L).

Models S71005A and AS71005C

LED incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 8 (F).

LED transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 8 (G).

Models S71005 and S71005B

Fuse replacement: See Replacing Fuses located on pages 10 (R).



MODELS S71006, S71006A and S71006B

Post mounted viewing head with inclined eyepiece tubes for ease in viewing. All models are supplied with widefield 10X eyepieces.

S71006 objectives are 1X & 2X (10X & 20X)
S71006A objectives are 1X & 3X (10X & 30X)
S71006B objectives are 2X & 4X (20X & 40X)

Illuminated by incidental (top) and a transmitted (bottom) lighting system.

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 9 (K).

Transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 9 (L).

Fuse replacement: See Replacing Fuses located on page 10 (R).



MODELS 71007 and S71007A

Features inclined viewing head mounted on fixed arm. Illuminated by incidental (top) and transmitted (bottom) lighting system.

S71007 objectives are 1X & 3X (10X & 30X)
S71007A objectives are 2X & 4X (20X & 40X)

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 8 (J).

Transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 8 (I).

Fuse replacement: See Replacing Fuses located on page 10 (R).



MODEL S71008

Fixed arm with inclined viewing head. Illuminated by a variable halogen incidental (top) and a fluorescent transmitted (bottom) lighting system.

Change magnification by rotating zoom control knobs located on each side of the viewing head from 1X to 4X. Zoom objective produces variable magnification from 10X to 40X.

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 9 (P).

Transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 9 (O).

Fuse replacement: See Replacing Fuses located on page 10 (R).



MODEL S71008A

Fixed arm with inclined viewing head. Illuminated by a variable halogen incidental (top) and a fluorescent transmitted (bottom) lighting system.

Change magnification by rotating zoom control knobs located on each side of the viewing head from 1X to 4X. The zoom objective produces continuously variable magnification from 10X to 40X.

Sliding the rod located on the side of the viewing head all the way out moves image from right eyepiece tube to the vertical tube.

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 9 (P).

Transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 9 (O).

Fuse replacement: See Replacing Fuses located on page 10 (R).



MODELS S71009 and S71009A

Post mounted inclined viewing head. Illuminated by a variable intensity halogen incidental (top) illuminator and a fluorescent transmitted (bottom) lighting system.

S71009 objectives are 1X & 3X (10X & 30X)
S71009A objectives are 2X & 4X (20X & 40X)

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 10 (P).

Transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 9 (O).

Fuse replacement: See Replacing Fuses located on page 10 (R).



MODEL S71010

Fixed arm with inclined viewing head.

Illuminated by a variable halogen incidental (top) and a fluorescent transmitted (bottom) lighting system.

Change magnification by rotating zoom objective turret from 1X through 3X. The zoom objective produces continuously variable magnification from 10X to 30X.

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 10 (Q).

Transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 9 (O).

Fuse replacement: See Replacing Fuses located on page 10 (R).



GENERAL INSTRUCTIONS FOR DIGITAL MICROSCOPES

The microscopes that are fitted with a built in camera are used in the same manner as the standard microscopes but with the additional feature of digital imaging. Your microscope is fully functional as a conventional compound or stereo microscope. The following instructions apply to operation of the microscope. Refer to the Quick Start Guide located on your CD for installation of the software and operation.

MODEL S71011

Built-in digital camera with 800x600 resolution. Supplied with Motic Images software, allowing the user to view, capture, label, manipulate and measure images. In order to achieve optimum results, it is important that you carefully read the instructions for software located on Motic Images CD.

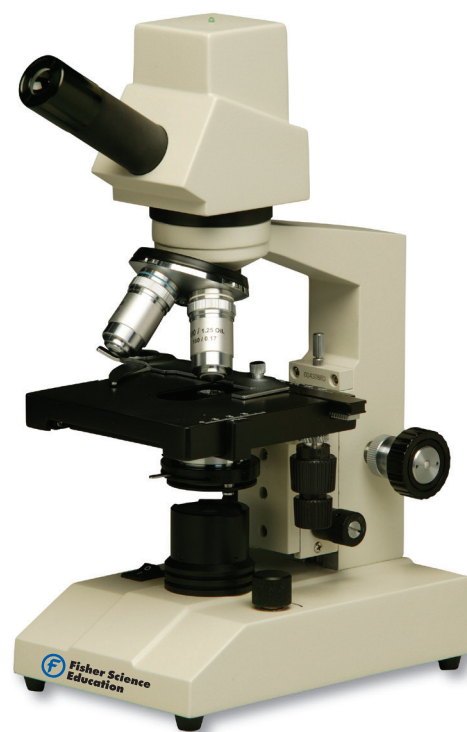
DIN 4X, 10X, sealed 40X and sealed S100X oil immersion lenses; widefield 10X eyepiece; sleeve mounted 1.25 Abbe condenser with iris diaphragm; and variable LED illuminating system included.

You must charge batteries prior to using this instrument. See Recharging Batteries on page 10 (S).

To use this microscope see General Instructions for Compound Microscopes located on pages 14 and 15.

LED lamp replacement: See Replacing LED bulbs located on page 7 (D).

Battery replacement: See Replacing batteries located on page 10 (T).



MODEL S71012

Built in high-resolution camera offers 3.0MP live image resolution. Supplied with Motic Images software, allowing the user to view, capture, label, manipulate and measure images. The built-in camera utilizes ultra high-speed data transmission made possible through a simple plug and play USB cable.

Model S71012 is supplied with DIN standard 4X (0.10N.A.), 10X (0.25 N.A.) 40X (0.65N.A.) retractable and 100X (1.25 N.A.) retractable oil immersion objective lenses.

Illumination: Insert power plug into 12VDC switching power converter, then insert plug on other end of converter into power jack on back of microscope base. Plug AC cord into a 120v or 240v outlet and converter automatically switches to proper output voltage.

Refer to Quick Start Guide located on your CD for installation of the software and operation of the camera.

The three-position sliding rod located on the side of the viewing head allows user to easily direct microscope image to desired path. Pushing rod completely into head directs 100% of microscope image into binocular eyepieces. Rod at mid-position (pull or push rod until you feel a gentle click stop) directs 100% of image to built-in camera. Rod pulled to fully extended position directs 30% of image to binocular eyepieces and 70% to built-in camera.

To operate this microscope see General Instructions for use of a Compound Microscope located on pages 14 and 15.

Lamp replacement: See Halogen lamp replacement on page 8 (H).

Fuse replacement: See Replacing Fuses located on page 10 (R).



MODEL S71012A

CAMERA SPECIFICATIONS

- Moticam 580
- HDMI 1080 output
- Capture images at 5.0MP directly onto an SD card
- Computer connection allows 800x600 resolution through included Motic Images Software
- Connect via RCA for 480 TV lines of resolution

Model S71012 is supplied with DIN standard 4X (0.10N.A.), 10X (0.25 N.A.) 40X (0.65N.A.) retractable and 100X (1.25 N.A.) retractable oil immersion objective lenses.

Illumination: Insert power plug into 12VDC switching power converter, then insert plug on other end of converter into power jack on back of microscope base. Plug AC cord into either a 120v or 240v outlet and converter automatically switches to proper output voltage.

Refer to Quick Start Guide located on your CD for Installation of the software and operation of the camera.

The three-position sliding rod located on the side of the viewing head allows user to easily direct microscope image to desired path. Pushing rod completely into head directs 100% of microscope image into binocular eyepieces. Rod at mid-position (pull or push rod until you feel a gentle click stop) directs 100% of image to built-in camera. Rod pulled to fully extended position directs 30% of image to binocular eyepieces and 70% to built-in camera.

To operate this microscope see General Instructions for use of a Compound Microscope located on pages 14 and 15.

Lamp replacement: See Halogen lamp replacement on page 8 (H).

Fuse replacement: See Replacing Fuses located on page 10 (R).



MODEL S71012B

Built in high-resolution camera offers 3.0MP live image resolution. Supplied with Motic Images software, allowing the user to view, capture, label, manipulate and measure images. The built-in camera utilizes ultra high-speed data transmission made possible through a simple plug and play USB cable.

Supplied with rotating 1X and 3X objective turret and widefield 10X eyepieces, providing 10X & 30X magnification.

Illumination: Insert power plug into 12VDC switching power converter, then insert plug on other end of converter into power jack on back of microscope base. Plug AC cord into either a 120v or 240v outlet and converter automatically switches to proper output voltage.

Refer to Quick Start Guide located on your CD for installation of software and operation of the camera.

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Incidental (top) incandescent lamp replacement: See Replacing the incidental (top) lamp located on page 9 (M).

Transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 9 (L).



MODEL S71013

Built in high-resolution camera offers 3.0MP live image resolution. Supplied with Motic Images software, allowing the user to view, capture, label, manipulate and measure images. The built-in camera utilizes ultra high-speed data transmission made possible through a simple plug and play USB cable.

Change magnification by rotating zoom control knobs located on each side of the viewing head from 1X to 4X. With widefield 10X eyepieces, the zoom objective produces continuously variable magnification from 10X to 40X.

Illumination: Insert power plug into 12VDC switching power converter, then insert plug on other end of converter into power jack on back of microscope base. Plug AC cord into either a 120v or 240v outlet and converter automatically switches to proper output voltage.

Refer to Quick Start Guide located on your CD for installation of software and operation of the camera.

To use and focus this microscope see General Instructions for Stereo Microscopes located on pages 23-25.

Incidental (top) lamp replacement: See Replacing the incidental (top) lamp located on page 9 (P).

Transmitted (bottom) lamp replacement: See Replacing the transmitted (bottom) lamp located on page 9 (N).



GENERAL USE OF WIFI MICROSCOPES

In preparation for using the S71014, S71014A and S71014B, you may wish to download and install the free MotiConnect app. The MotiConnect app can be downloaded from the Google Play Store or Apple App Store, depending on whether you are using an Android or iOS device.

Instructions for the MotiConnect app can be found within the application through the help button. Further instruction is available online from Motic and National Optical YouTube pages.

Your WiFi camera also has built-in software, which is accessible by typing the camera's IP address into your web browser. These instructions are covered in the WiFi Camera Operation section of this manual.

If you would like to connect the WiFi camera to a wireless enabled laptop or computer, install Motic Images software included with microscope. Instructions on connecting to your wireless enabled laptop or desktop are covered in the Wifi Camera Operation section of this manual.

MODEL S71014

This WiFi digital microscope transmits up to 1.3MP live images to iOS or Android devices and features built-in high-speed, full resolution imaging technology. Use it as a conventional microscope or share live images with your class using WiFi tablets or wireless laptops. View, capture, measure and edit images on iOS or Android devices with the free MotiConnect App, or through IP address using web browser and the camera's on-board software.

You must charge batteries prior to using this instrument. See Recharging Batteries on page 10 (S).

See WiFi camera operation instructions located on page 38.

To use and focus this microscope see General Instructions for Compound Microscopes located on pages 14 and 15.

LED bulb replacement: See LED Bulb Replacement located on page 7 (D).

Battery replacement: See Replacing Batteries located on page 10 (T).



MODELS S71014A and S71014B

This WiFi digital microscope transmits up to 1.3MP live images to iOS or Android devices and features built-in high-speed, full resolution imaging technology. Use it as a conventional microscope or share live images with your class using WiFi tablets or wireless laptops. View, capture, measure and edit images on iOS or Android devices with the free MotiConnect App, or through IP address using web browser and the camera's on-board software.

You must charge batteries prior to using this instrument. See Recharging Batteries page 10 (S).

See WiFi camera operation instructions located on page 38.

To use and focus this microscope see General Instructions for Compound Microscopes located on page 14 and 15.

LED bulb replacement: See LED Bulb Replacement located on page 7 (D).

Battery replacement: See Replacing Batteries located on page 10 (T).



WIFI CAMERA OPERATION

1. Powering the WiFi camera

- a. The built-in WiFi camera is powered through the USB port located behind the camera housing of the microscope. Supplied with your microscope is a USB (5V) wall plug power adapter and USB cable. First plug the adapter into the A/C wall power outlet. Then insert the flat end of the USB cord into the adapter and the other square end into the USB port behind the camera housing.
- b. As power is being established, you will notice a blue LED flashing, located in front of the camera housing. Once the blue LED remains solid, the WiFi camera is ready to be used.

2. Connecting to Android or Apple device

- a. The built-in WiFi camera in this unit performs much like a wireless router. You will first need to locate the wireless signal with your Android or Apple device. This is usually done through the settings feature of your device (please refer to your devices manual for further instructions). Once you have located the signal (usually labeled MC-WiFi-....), you will need to connect using the default password of 12345678. This password can only be changed by the factory. Any attempt to change the password yourself will render your WiFi camera inoperable and will void your warranty.
- b. Once the connection has been established, you can begin using the WiFi camera through the MotiConnect App (automatic) or through your web browser, using the following IP address: <http://192.168.1.151:8080>.
- c. For further help and instructions on using MotiConnect, please visit both the Motic and National Optical YouTube pages.

3. Connecting to a wireless enabled laptop or desktop

- a. You will first need to locate the wireless signal, the same way you would connect to any wireless router or signal. Once you have located the signal (usually labeled MC-WiFi-....), you will need to connect using the default password of 12345678. This password can only be changed by the factory. Any attempt to change the password yourself will render your WiFi camera inoperable and will void your warranty.
- a. Once connected, open your Motic Images software. If you are using a Windows based system, click on the capture button. This will open the Live Imaging Module. Locate the Video Device box. You will notice that by default the MotiCam X is selected. Click on the Open button and the software will enable the camera. If you are using an Apple based system, click on File at the top of the Motic Images tool bar. Select Capture or New and then Live Video, to enable the camera. Instructions on the Motic Images software are covered within the software under Help. You may also visit both the Motic and National Optical YouTube pages.

FISHER SCIENCE EDUCATION WARRANTY

The Fisher Science Education 5 Year Warranty assures that the microscope is guaranteed against defects in material and workmanship for 5 years from the purchase date of the product. Electrical components are covered for three years; video components are covered for one year after purchase. Normal wear, routine maintenance, light bulbs, power supplies, rechargers, batteries, fuses, cords, add-on accessories, damage resulting from repair by unauthorized parties, accident, alteration, shipping, misuse or abuse is not covered. Warranty service is provided by National Optical & Scientific Instruments, Inc.'s authorized technicians. Determination of warranty is at the technician's discretion.

Other than set forth above, Fisher Science Education hereby disclaims all warranties, expressed or implied, of fitness for a particular purpose.

Defective products covered by the warranty will be repaired free of charge when they are returned, postpaid, to:

Fisher Science Education
c/o National Optical & Scientific Instruments, Inc.
Attn: Warranty Repair
6508 Tri-County Parkway
Schertz, TX 78154

For all warranty repairs or service requests, please call Fisher Science Education repair department at (877) 967-9438 before anything is shipped. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

*For customers living outside the United States, Fisher Science Education will provide standard warranty service. However, inbound and outbound shipping cost is the responsibility of the consumer.

In the United States:

For customer service, call 1-800-955-1177

To fax an order, use 1-800-955-0740

To order online: www.fisheredu.com



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