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INSTRUCTIONS FOR STEREOSCOPIC MICROSCOPES

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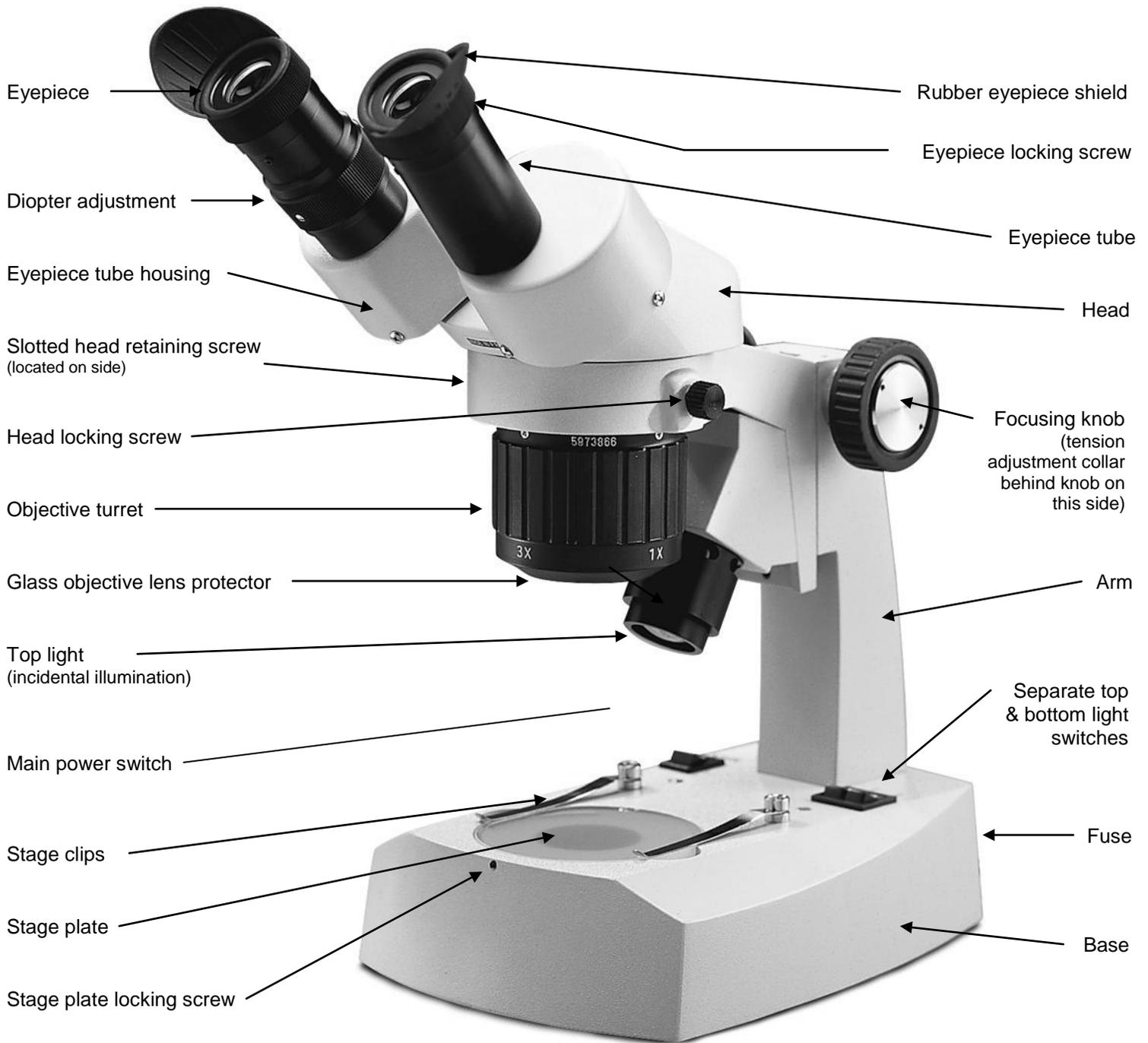
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Stereoscopic microscopes are used for viewing 3-dimensional objects, inspection or assembly of small parts, and for dissection of biological specimen. They provide an upright, unreversed image which permits easy manipulation of the object being viewed while looking through the microscope. They are designed for viewing solid objects at low magnification, but they will also permit viewing of some transparent specimen slides.

For optimum viewing satisfaction, follow these simple procedures. Nomenclature used to describe components and controls can be identified by referring to the diagram at left.

UNPACKING

1. Your microscope is packed with the following components, all of which have been checked at the factory. Carefully remove all components and check against this list. Make certain not to touch any of the lens surfaces while handling the microscope. Dust, dirt or fingerprints can damage the delicate lens surfaces or adversely affect image quality. Retain Styrofoam container in case microscope must be transported or returned to factory for any reason.
 - A. Microscope, with pair of eyepieces.
 - B. Instruction manual.
 - C. Rubber eyecups (pair).
 - D. Two 80mm O.D. stage plates: plastic black/white & frosted glass (one installed).
 - E. Frosted 35.6mm blue filter.
 - F. "L" hex wrench (for changing stage plate).
 - G. Dustcover.
2. Examine packing material before you discard it. Retain the styrofoam container in case you need to transport, store, or return the microscope for service. If it becomes necessary to ship the microscope for any reason, pack it in the styrofoam container, and then pack the styrofoam in another corrugated shipping container for optimum protection. Use of the styrofoam alone will not provide adequate protection in transit, and will void your warranty.

DESCRIPTION OF COMPONENTS

1. EYEPIECE: Group of lenses closest to the eye, they magnify image formed by the objectives.
2. RUBBER EYEPIECE SHIELDS: These help block out undesired light reflections, and to position your eyes at the proper point above the eyepieces.
3. DIOPTER: Knurled diopter adjustment permits user to adjust for differences in eyesight between left and right eyes.
4. EYEPIECE TUBE HOUSING: Permits each user to adjust spacing between eyepieces in order to accommodate distance between their eyes. Adjusts interpupillary distance from 55mm to 75mm.
5. OBJECTIVE TURRET: Changes objective magnification by rotating objective turret 90 degrees.
6. LENS COVER: Glass protective cover protects objective lenses from damage. Glass cover can be removed so that model no. 932-409 ring-light adapter can be installed.
7. LIGHT SHADE: Helps block out undesired light from incidental illuminator.
8. MAIN POWER SWITCH: Main power switch supplies power to incidental and transmitted control switches.

9. STAGE CLIPS: Two locked-on clips hold specimen slide in place on stage plate.
10. STAGE PLATES: Frosted stage is generally used for viewing transparent specimen and the black and white stage plate for viewing opaque specimens.
11. STAGE PLATE LOCKING SET SCREW: Locks 80mm stage plate into recesses of microscope base.
12. HEAD: Viewing head with 45 degree inclined eyepieces.
13. FOCUSING KNOBS: Coarse focusing knobs located on each side of arm moves head up or down to bring specimen into focus.
14. TENSION ADJUSTMENT COLLAR: Used to adjust tension of focusing mechanism.
15. SELECTOR SWITCHES: Individual switches allow user to select between incidental (top lighting) or transmitted (bottom lighting) or both.

ASSEMBLY

1. Eyepieces:
 - A. Microscope is shipped with eyepieces already installed. Eyepieces will turn freely, but locking set screws prevent removal.
 - a) If you need to remove eyepieces for any reason, observe small Phillips head locking screws located just below top edge of both left and right eyepiece tube. Using a small jewelers type Phillips screwdriver, loosen set screws just enough to permit removal of eyepieces.
 - b) Note that locking the eyepieces into place is not necessary for the operation of your microscope, but will help to secure them against loss.
 - B. Install rubber eyepiece shields by slipping over top of eyepieces, flared side outward.

OPERATION

1. ILLUMINATION
 - A. Before operating microscope, **make certain that the main voltage of your microscope corresponds to the voltage of your power outlet, either 120v or 220v. Insert microscope plug into matching voltage outlet.**
 - B. The microscope is furnished with two stage plates. The frosted glass plate is used when viewing transparent specimen slides or for viewing some specimen thin enough through which light can pass (insect wings, etc.) The plastic black/white contrast plate can be used when viewing opaque objects or for dissecting. Choose side of plate providing best contrast with specimen.
 - C. There are three rocker type light controls located on top surface of microscope base.

MAIN	=	Turns power on and off
"I"	=	Turns incidental light on (top illumination)
"T"	=	Turns transmitted light on (substage illumination)

NOTE: Use transmitted illumination only with frosted glass stage plate in place. HEAT GENERATED IN BASE FROM BOTTOM LIGHT WILL WARP OR DAMAGE THE PLASTIC BLACK/WHITE PLATE. SUCH DAMAGE WILL NOT BE COVERED BY WARRANTY.

Remove frosted stage plate by loosening locking set screw located on front of base with supplied "L" wrench. Insert daylight blue filter into machined groove provided in center of base. Install frosted glass stage plate with smooth side facing up. Tighten locking set screw.

Incidental illumination can be used with either frosted glass plate or black/white plastic stage plate.

Transmitted and incidental illumination combined can provide extra illumination for certain objects where additional top illumination will enhance the object being viewed.

NOTE: THE TRANSMITTED LIGHT POSITION REQUIRES USE OF BLUE FILTER AND FROSTED GLASS STAGE PLATE.

2. INTERPUPILLARY ADJUSTMENT

This permits each user to adjust spacing between eyepieces in order to accommodate distance between their 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.

3. FOCUSING

- A. Turn objective turret so that the lowest magnification number is positioned facing the front of the microscope. Make certain you turn turret until you hear a "click" which indicates the objective turret is properly indexed in position. Lower magnifications have larger fields of view, making it easier to position and locate area to be viewed.
- B. Place a flat object or specimen slide (cover slip up), on center of stage plate.
- C. Turn focusing knobs until object being viewed is in focus.
- D. Adjust diopter for difference in eyesight. Look into right eyepiece with right eye. Turn focusing knobs until sharp image is obtained in right side of microscope. Look into left eyepiece with left eye. Adjust sharpness of image by turning knurled diopter adjustment located on left eyepiece tube.

You have now adjusted the microscope to accommodate any difference between the vision in your left and right eyes. It should not be necessary for you to make this adjustment again as you change magnification setting of microscope or objects being viewed.

- E. Rotate objective turret so that highest number on turret is positioned facing the front of microscope. Be sure turret "clicks" into proper index position.

This microscope has been parfocalled, which allows changes from one magnification to another while requiring no or only slight adjustment of the focusing knobs.

Specification Chart

Objective	Eyepiece								Working Distance		Max. Specimen Height
	WF5X (optional)		WF10X (supplied)		WF15X (optional)		WF20X (optional)				
	Total Mag.	Field Size	Total Mag.	Field Size	Total Mag.	Field Size	Total Mag.	Field Size	Binoc. Version	Trinoc. Version	
1X	5X	22mm	10X	20mm	15X	13mm	20X	10mm	95mm	80mm	27mm
3X	15X	7.3mm	30X	6.7mm	45X	4.3mm	60X	3.3mm			
2X	10X	11mm	20X	10mm	30X	6.5mm	40X	5mm	95mm	80mm	27mm
4X	20X	5.5mm	40X	5mm	60X	3.2mm	80X	2.5mm			

MAINTENANCE

WARNING: For your own safety, turn switch off and remove plug from power source before maintaining your microscope. If the power cord is worn, cut or damaged in any way, have it replaced immediately to avoid shock or fire hazard.

1. OPTICAL MAINTENANCE

- A. Do not attempt to disassemble any lens component. Consult an expert technical service company when repairs not covered by these instructions are required.
- B. 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.

C. Cleaning eyepiece lenses.

Do not remove eyepiece from eyepiece tube. Clean only the outer surface. Breath on lens to dampen surface, then wipe with lens paper. Do not wipe lens surface while dry as lenses are scratched very easily. Wipe in a circular motion from center to outer edges.

D. Cleaning objective lenses.

Your microscope is supplied with a clear glass objective lens protector; do not remove this lens protector from microscope. Clean glass element only. Using a cotton swab saturated with distilled water, clean front surface. If specimen material of any kind is evident, use a cotton swab dipped in a small amount of distilled water or Windex to clean all foreign material from glass surface.

2. MECHANICAL MAINTENANCE

The only mechanical adjustment the microscope might require is the tension of the focusing mechanism. This has been adjusted at the factory, but over the course of time it may loosen and cause the head of the microscope to slip downward on the focusing block.

The tension adjustment collar is located between arm and focus knob on left side of microscope. With a jewelers type screwdriver, loosen slotted set screw located on knurled surface of the tension adjustment collar. Turn collar clockwise to tighten tension, counter-clockwise to loosen tension. After adjusting, tighten the set screw to lock collar in place.

NOTE: It is recommended that you leave the tension as loose as possible for ease of focusing, yet not so loose that it permits the head of microscope to drift downward from its own weight and cause the microscope to “drift” out of focus.

3. ELECTRICAL MAINTENANCE

The extent of electrical maintenance, by other than a qualified technician, should be bulb or fuse replacement. **BE CERTAIN TO TURN SWITCHES OFF AND REMOVE PLUG FROM POWER SOURCE OUTLET BEFORE CHANGING BULBS.**

- A. To replace top bulb... remove black top light housing by rotating in a counter-clockwise direction. Remove lamp using a clean cloth by depressing and rotating lamp. Install new lamp using a clean cloth, gently depress into socket and turn clockwise. Replace light housing.

- B. To replace bottom bulb gently lay microscope on side. Remove cover plate located on bottom of base by removing four Phillips screws adjacent to corners and one Phillips screw at front of plate. Do not remove Phillips screw at center of plate. Slowly swing plate aside, making sure you don't yank loose the wire attaching plate to the base. Gently grasping bulb with a cloth, depress bulb in socket and then turn counter-clockwise to release bulb. Gently grasp new bulb, using a cloth, depress into socket and turn clockwise. Carefully replace base plate and resecure with Phillips screws.
- C. To replace fuse...locate the fuse at the right rear side of microscope base. To remove from holder, insert a 6mm screwdriver blade into slot located in rear of fuse holder cap. Slightly depress and rotate screwdriver ¼ turn in direction of arrow, release pressure on screwdriver to release the fuse. Pull cap and fuse out of fuse holder. Insert proper fuse into fuse cap. Insert fuse cap into fuse holder. Using screwdriver, rotate fuse cap assembly in opposite direction of arrow until guide slot engages, depress fuse cap and rotate ¼ turn to lock fuse into fuse holder.

TROUBLESHOOTING

PROBLEM	REASON FOR PROBLEM	SOLUTION
Light fails to operate.	Outlet inoperative.	Have qualified service technician repair outlet.
	AC power cord not connected.	Plug into outlet.
	Lamp burned out.	Replace lamp.
	Fuse blown.	Replace fuse.
Image does not remain in focus	Head of microscope drops from its own weight.	Adjust tension control.
Poor resolution (image not sharp)	Clear glass objective lens protector dirty	Clean glass protector.
	Eyepiece lens dirty.	Clean eyepiece lenses.
Spots in field of view.	Eyepiece lens dirty.	Clean eyepiece lenses. ***
***Spots in field of view can also result from dirt on inside of eyepiece. It is recommended that you have service technician clean inside of lens.		

OPTIONAL ACCESSORIES AND PARTS:

#605-400	WF5X Eyepieces, paired
#615-400	WF15X Eyepieces, paired
#620-400	WF20X Eyepieces, paired
#800-101	117v 15 watt replacement bulb (bottom light for 117v version)
#800-411	12v 10 watt replacement bulb (top light for 117v version & top/bottom light for 220v version)
#800-907	12 watt fluorescent bulb for #907
#801-050	Fuse for 220v version, 0.5 amp
#801-100	Fuse for 117v version, 1.0 amp
#907	Fluorescent add-on ring light (requires ring light adaptor #931-409)
#931-409	Ring light adaptor, O.D. 54.5mm (permits mounting of auxiliary ring light on objective pod)
#940-410	Frosted glass stage plate, 80mm
#941-410	Black/white plastic contrast plate, 80mm
#965-400-05	Eyepiece reticle, 5mm/100 divisions, O.D. 22.8 mm
#965-400-10	Eyepiece reticle, 10mm/100 divisions, O.D. 22.8 mm
#975-001	Carrying case, anodized aluminum, fabric lining, accessory pockets, Velcro straps, keyed lock. Note: Only "TBL" models fit this case. No case is available for "1105/1107" models.

LIMITED LIFETIME WARRANTY

Please see our website, www.nationaloptical.com, for complete warranty details and exclusions.

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