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INSTRUCTIONS FOR
#460TBL-10
STEREOSCOPIC ZOOM MICROSCOPES

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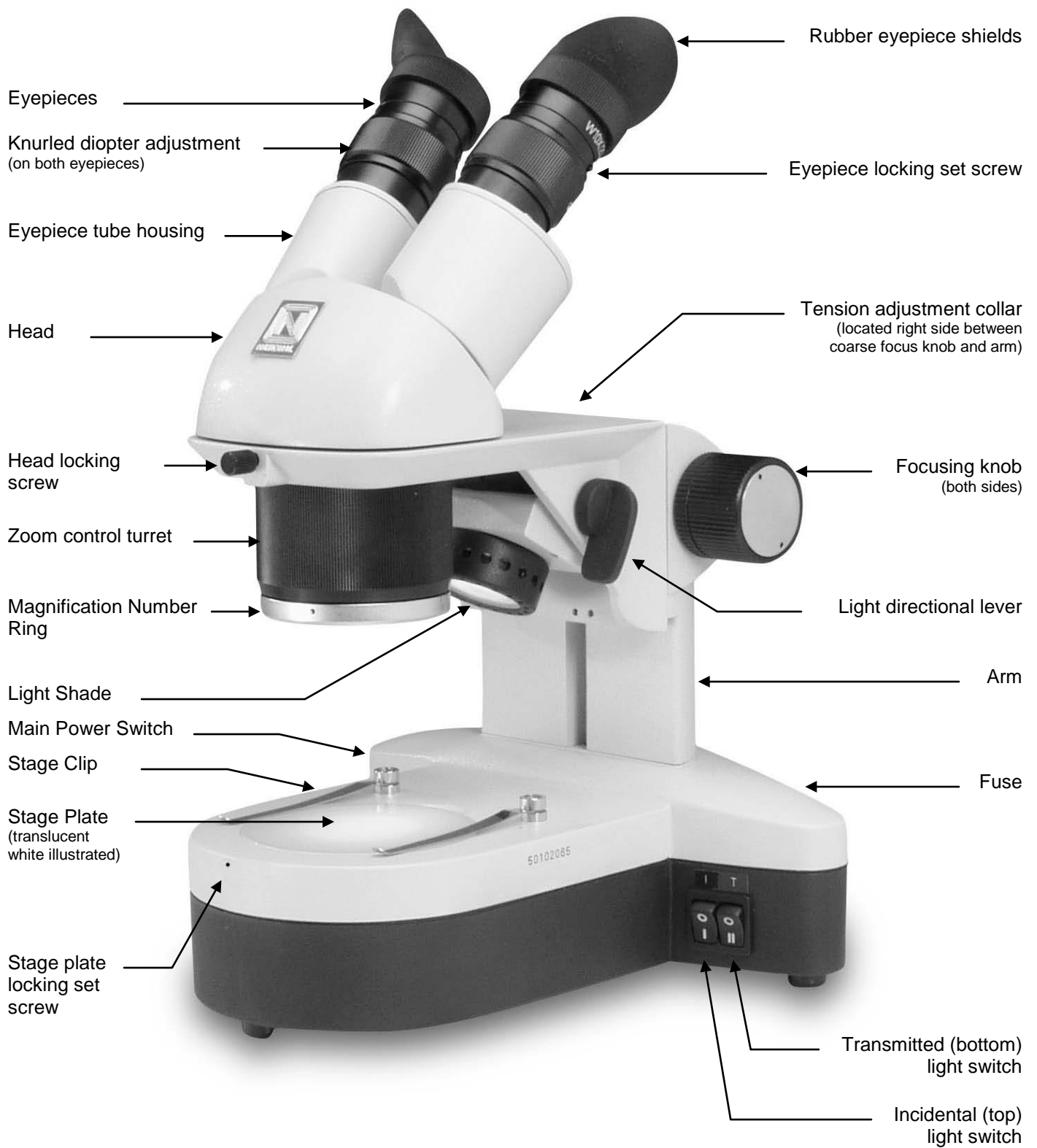
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Stereoscopic microscopes are used for viewing 3-dimensional objects, inspection or assembly of small parts, and for dissection of biological specimen. They provide an upright, unreversed image which permits easy manipulation of the object being viewed 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

Do not touch any of the lens surfaces while handling the microscope. Dust, dirt, fingerprints can damage the delicate lens surfaces or adversely affect image quality.

Remove microscope stand and head assembly from carton. Remove rubber eyeshields, dustcover and warranty card. Remove tension adjustment rod (used to adjust focusing tension), "L hex wrench" (used to remove locking set screw on stage plates), and 2 contrast plates one white and one black (80mm diameter). Your microscope is also supplied with a translucent white stage plate (80mm diameter), which is already mounted in the microscope base.

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.

ASSEMBLY & OPERATION

1. Install rubber eyepiece shields over top of eyepieces, with the flared portion of the shields positioned at the outside edge of eyepieces. These help block out undesired light reflections, and to position your eyes at the proper point above the eyepieces.
2. Please observe that the head rotates 360 degrees. To position the binocular head in stand, loosen knurled head locking screw. Rotate head to face either forward or backward, whichever suits your preference or needs. Then, tighten knurled head locking screw.
3. This model is furnished with three stage plates. The translucent white plastic plate is used when viewing transparent specimen slides or for viewing some specimen thin enough through which light can pass (insect wings, etc.). The black or white contrast plate can be used when viewing opaque objects or for dissecting. Choose plate providing best contrast with specimen.

To switch plates, use the supplied "L hex wrench" to loosen set screw at front of base, only enough to permit removal of plate. Replace plate and tighten set screw.

4. **Observe that the main voltage of your microscope is labeled on the back of the base. Make certain that your voltage is 120v. Insert microscope plug into matching voltage outlet.**
5. There are three rocker type light controls located on front surface of microscope base.

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

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

This model is furnished with an adjustment for the incidental (top) light. To adjust, move light directional lever up or down to position the beam of light providing optimum illumination to specimen.

6. 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.

7. FOCUSING

- A. Rotate zoom control turret to the lowest magnification by aligning the number “1” on magnification number ring to the white index dot on zoom control turret. 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 glass up), on center of stage plate.
 - C. Turn focusing knobs until object being viewed is in focus.
 - D. Both eyepieces have knurled diopter adjustment rings. Rotate both left and right diopters in a clockwise direction to the lowest position.
 - E. Rotate zoom control turret to the highest magnification by aligning the number “4” on magnification number ring to the white index dot on zoom control turret.
 - F. While looking through right eyepiece with one eye, rotate focusing control knob until specimen comes into sharp focus through right eyepiece.
 - G. Rotate zoom control turret to the lowest magnification.
 - H. Adjust the right diopter until the image is sharp. Do not change the focusing knob position.
 - I. Without changing the position of the focusing knob, adjust the left eyepiece diopter until you obtain a sharp image in left eyepiece. the image should now be sharp throughout the zoom power range.
8. For optimum sharpness of image in the entire field of view, it is important to position your eyes at the correct point above the eyepieces. Looking through both eyepieces, slowly move your eyes towards eyepieces to a level where clarity of the entire field of view is achieved. After a brief period of viewing, you will easily find the best point for your vision.

Specification Chart

Zoom Objective Position	Eyepiece				Working Distance	Maximum Specimen Height
	WF10X Field No. 20 (supplied) (accepts reticle 23mm O.D.)		WF15X Field No. 13 (optional)			
	Total Magnification	Field Size	Total Magnification	Field Size		
1X	10X	20mm	15X	13mm	70mm	36mm
1.5X	15X	13.3mm	22.5X	8.7mm		
2X	20X	10mm	30X	6.5mm		
2.5X	25X	8mm	37.5X	5.2mm		
3X	30X	6.7mm	45X	4.3mm		

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 components. Consult a microscope service technician when any repairs not covered by instructions are needed.
- 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. To clean eyepiece lenses, do not remove from eyepiece tube. 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 Windex can be used on a cotton swab or lens tissue. To clean objective lenses. Clean front lens element only, following same procedure.

2. MECHANICAL MAINTENANCE

The only mechanical adjustment you might ever 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 knurled 6mm wide by 35mm diameter tension adjustment collar is located between arm and coarse focus knob on right side of microscope. With the supplied "L" hex wrench, loosen the set screw located in only one of the four holes on tension adjustment collar. Using supplied rod wrench turn tension adjustment collar clockwise to tighten tension, counterclockwise 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 replacement. **BE CERTAIN TO TURN SWITCHES OFF AND REMOVE PLUG FROM POWER SOURCE OUTLET BEFORE CHANGING BULBS.**

- A. To replace top bulb (National bulb #800-423)....remove light shade by rotating in a counter-clockwise direction. Remove light bulb by firmly grasping edge of reflector and pulling straight out from bi-pin socket. Note that the socket holds bulb securely, so you might have to pull rather firmly. Using a cloth, hold new reflector bulb and gently push new bulb in bi-pin socket. Replace light shade.
- B. To replace bottom bulb in stand (National bulb #800-138)....remove perforated lamp cover plate located on bottom of base by removing the large black knurled locking screw then push cover plate to the rear of base. It will be necessary to cut the white cable tie wrapped around base of lamp (this tie is used to secure lamp during shipment and it is not necessary to replace). Holding fluorescent lamp with a cloth, gently pull lamp straight out from socket. Push new lamp into place in same manner and replace cover plate and locking screw.

C. Replacement of fuse

The fuse is located at the right rear side of microscope base. To remove fuse 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 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)	Objective lenses dirty.	Clean objective lenses.
	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:

#615-400	WF15X Eyepieces (pair), increases magnification 50%
#800-138	Bottom replacement bulb, 115v 5 watt fluorescent
#800-423	Top replacement bulb, 12v 10 watt halogen w/reflector
#801-100	Replacement fuse for 117v version, 1.0 amp
#940-460	Transparent plastic stage plate, 80mm
#941-460B	Black plastic stage plate, 80mm
#941-460W	White plastic stage plate, 80mm
#965-400-05	Eyepiece reticle, 5mm/100 divisions, O.D. 23 mm (for use with WF10x eyepiece only)
#965-400-10	Eyepiece reticle, 10mm/100 divisions, O.D. 23 mm (for use with WF10x eyepiece only)

LIMITED LIFETIME WARRANTY

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



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