



ACCU-SCOPE®

MANUAL



EXC-500
MICROSCOPE SERIES

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SAFETY NOTES

1. Open the shipping carton carefully to prevent any accessory, i.e. objectives or eyepieces, from dropping and being damaged.
2. Do not discard the molded foam container; the container should be retained should the microscope ever require reshipment.
3. Keep the instrument out of direct sunlight, high temperature or humidity, and dusty environments. Ensure the microscope is located on a smooth, level and firm surface.
4. If any specimen solutions or other liquids splash onto the stage, objective or any other component, disconnect the power cord immediately and wipe up the spillage. Otherwise, the instrument may be damaged.
5. All electrical connectors (power cord) should be inserted into an electrical surge suppressor to prevent damage due to voltage fluctuations.
6. For safety when replacing the LED bulb or fuse, be sure the main switch is off ("O"), remove the power cord, and replace the LED bulb after the bulb and the lamp house has completely cooled.
7. Confirm that the input voltage indicated on your microscope corresponds to your line voltage. The use of a different input voltage other than indicated will cause severe damage to the microscope.

CARE AND MAINTENANCE

1. Do not attempt to disassemble any component including eyepieces, objectives or focusing assembly.
2. Keep the instrument clean; remove dirt and debris regularly. Accumulated dirt on metal surfaces should be cleaned with a damp cloth. More persistent dirt should be removed using a mild soap solution. Do not use organic solvents for cleansing.
3. The outer surface of the optics should be inspected and cleaned periodically using an air stream from an air bulb. If dirt remains on the optical surface, use a soft cloth or cotton swab dampened with a lens cleaning solution (available at camera stores). All optical lenses should be swabbed using a circular motion. A small amount of absorbent cotton wound on the end of a tapered stick such as cotton swabs or Q-tips, makes a useful tool for cleaning recessed optical surfaces. Avoid using an excessive amount of solvents as this may cause problems with optical coatings or cemented optics or the flowing solvent may pick up grease making cleaning more difficult. Oil immersion objectives should be cleaned immediately after use by removing the oil with lens tissue or a clean, soft cloth.
4. Store the instrument in a cool, dry environment. Cover the microscope with the dust cover when not in use.
5. ACCU-SCOPE[®] microscopes are precision instruments which require periodic preventative maintenance to maintain proper performance and to compensate for normal wear. An annual schedule of preventative maintenance by qualified personnel is highly recommended. Your authorized ACCU-SCOPE[®] distributor can arrange for this service.

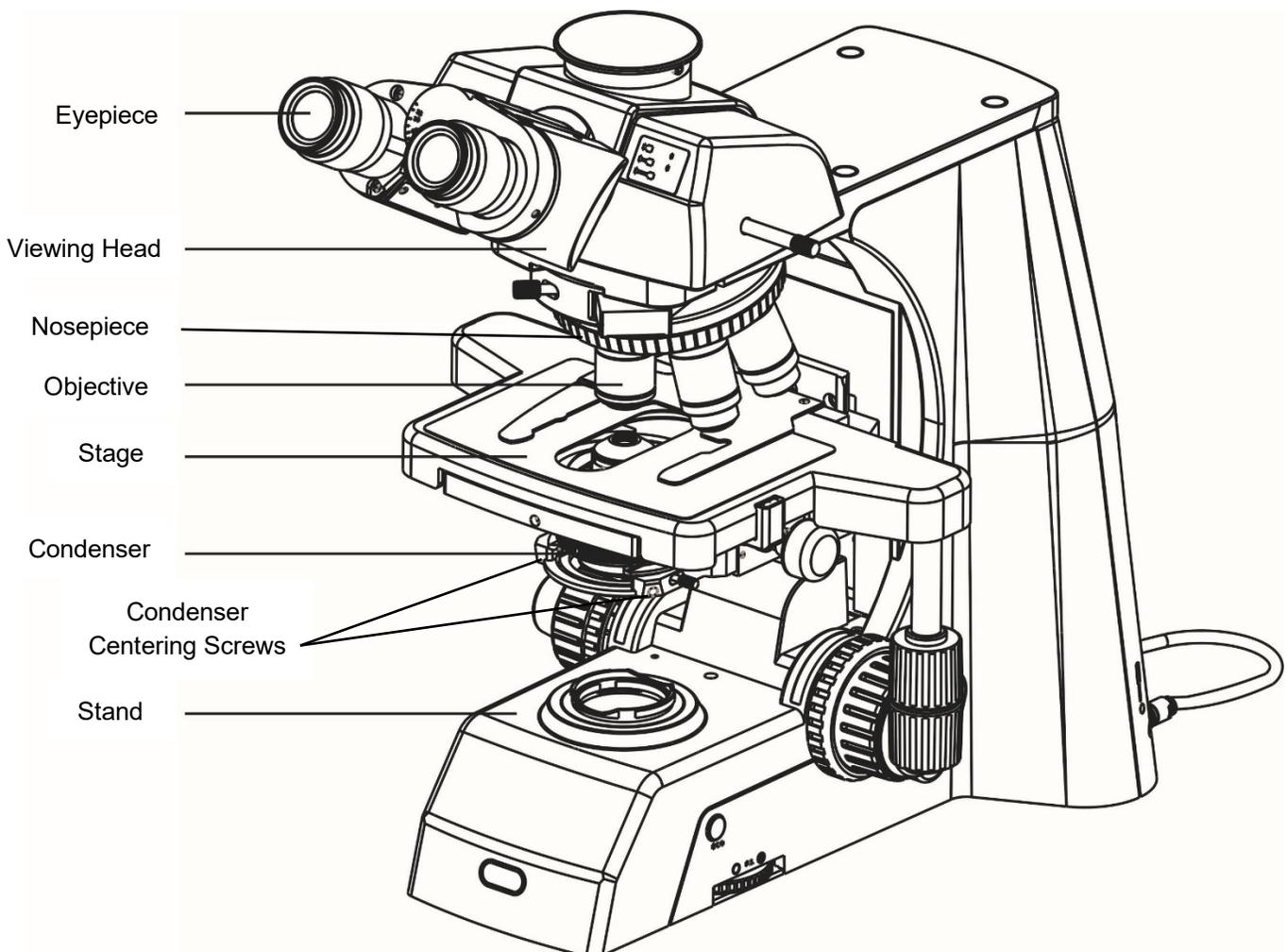
INTRODUCTION

Congratulations on the purchase of your new ACCU-SCOPE[®] microscope. ACCU-SCOPE[®] microscopes are engineered and manufactured to the highest quality standards. Your microscope will last a lifetime if used and maintained properly. ACCU-SCOPE[®] microscopes are carefully assembled, inspected and tested by our staff of trained technicians in our New York facility. Careful quality control procedures ensure each microscope is of the highest quality prior to shipment.

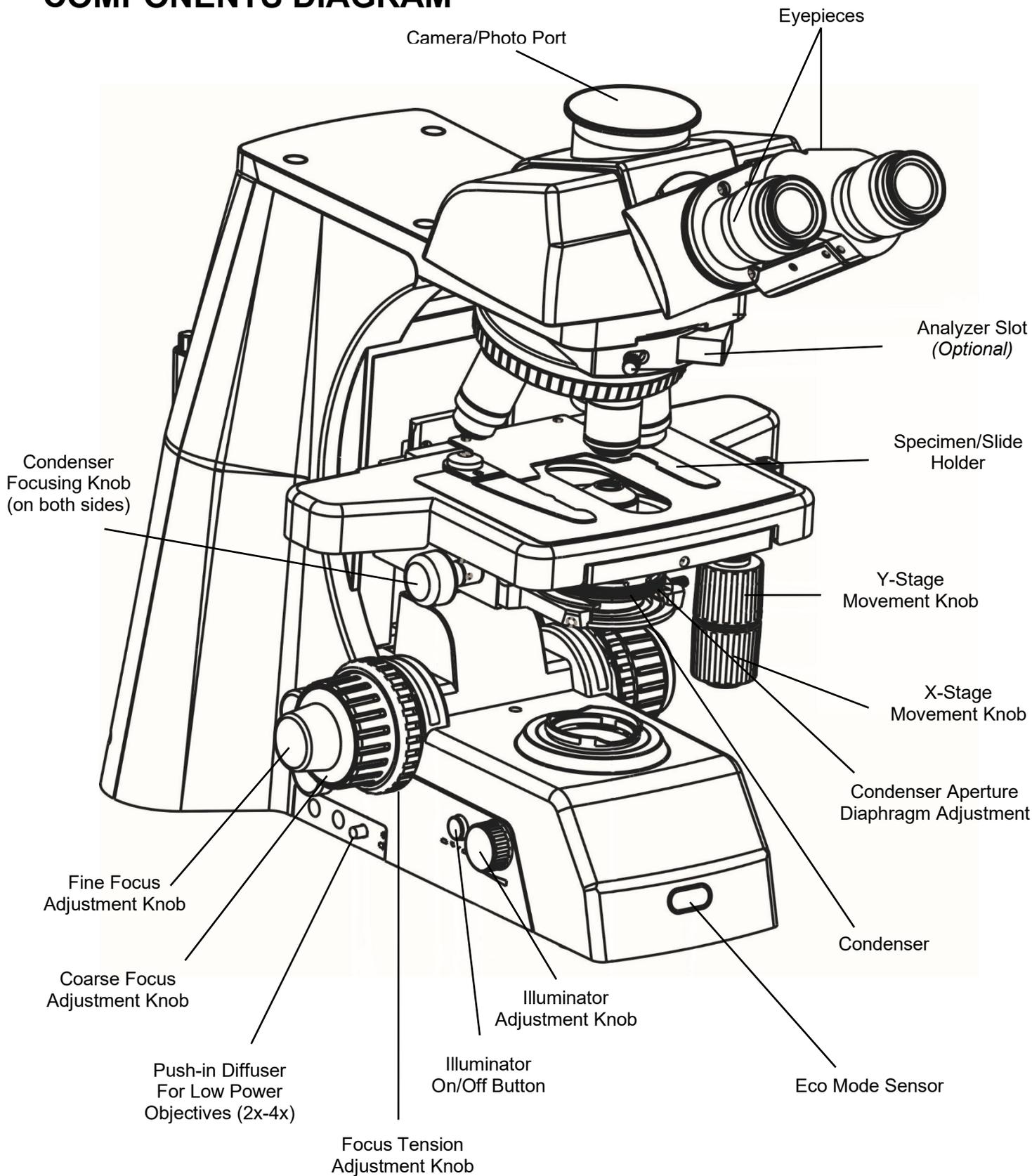
UNPACKING AND COMPONENTS

Your microscope arrived packed in a molded EPE foam container. ***Do not discard the container:*** the EPE foam container should be retained for reshipment of your microscope if needed. Avoid placing the microscope in dusty surroundings or in high temperature or humid areas as mold and mildew will form. Carefully remove the microscope from the container by its arm and base and place the microscope on a flat, vibration-free surface.

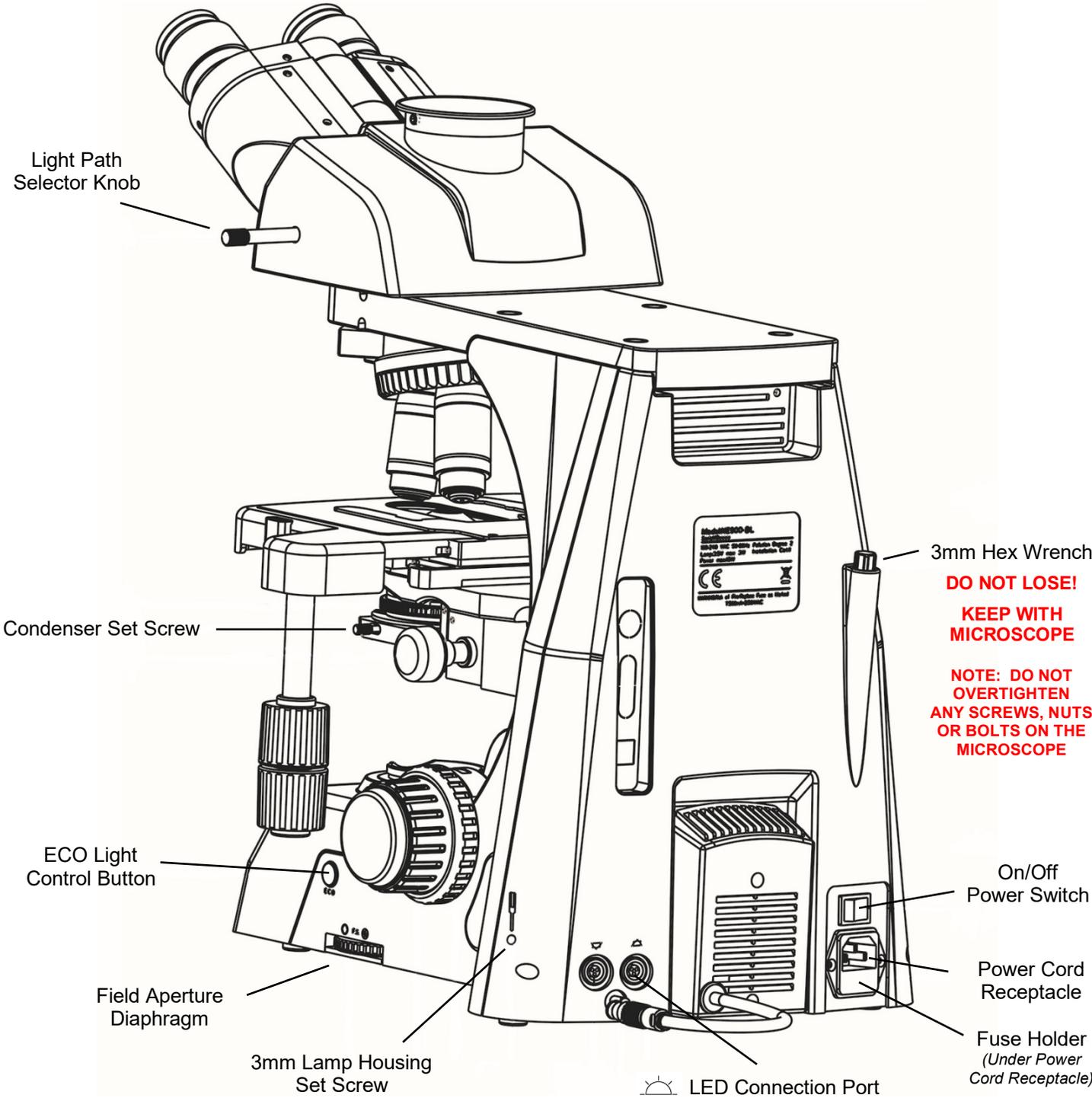
COMPONENTS DIAGRAM



COMPONENTS DIAGRAM



COMPONENTS DIAGRAM

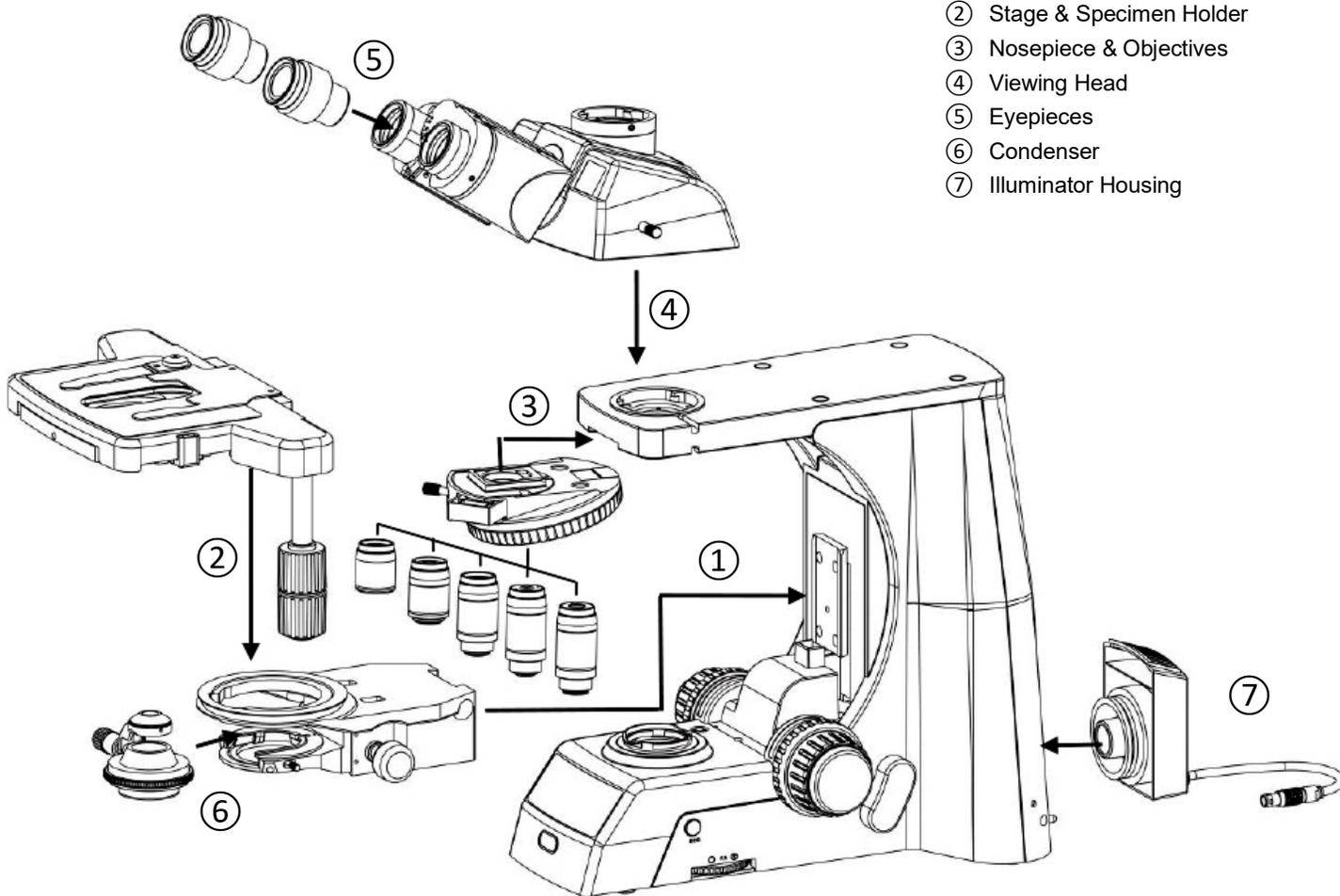


ASSEMBLY DIAGRAM

The diagram below shows how to assemble the various modules. The numbers indicate the order of assembly. Your microscope was preassembled by our factory technicians at our New York facility prior to shipment. Should you need to disassemble/assemble your microscope in the future, please follow the instructions outlined below.

When assembling the microscope, make sure that all parts are free of dust and dirt, and avoid scratching any parts or touching glass surfaces.

- ① Condenser & Stage Carrier
- ② Stage & Specimen Holder
- ③ Nosepiece & Objectives
- ④ Viewing Head
- ⑤ Eyepieces
- ⑥ Condenser
- ⑦ Illuminator Housing



DETAILED ASSEMBLY

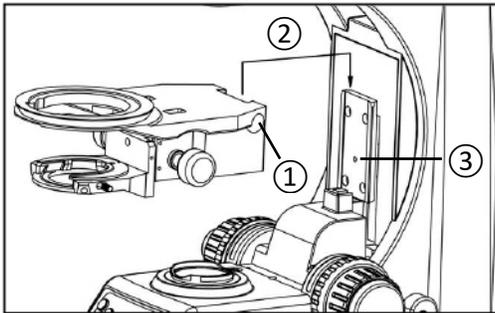


Fig. 1

Installing the Condenser & Stage Carrier - (Fig. 1 & 2)

Using the 3mm Hex wrench that was provided with your microscope, loosen the lock screw (1).

Gently slide the dovetail of the condenser/stage carrier onto the dovetail slide mount (2) as shown until it sits firmly on the resting bolt (3).

Retighten the lock screw with the Hex wrench.

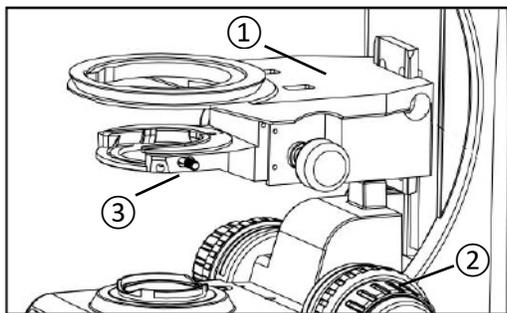


Fig. 2

Installing the Condenser - (Fig. 2 & 3)

Lower the condenser/stage carrier (1) to its lowest position by turning the condenser knob counter clockwise (2).

Loosen the condenser lock screw with the Hex wrench (3).

Position the condenser (4) with the centering pin facing toward the back of the dovetail slider. Slide the condenser into place and wiggle it to ensure the positioning pin is engaged.

Gently retighten the lock screw (3).

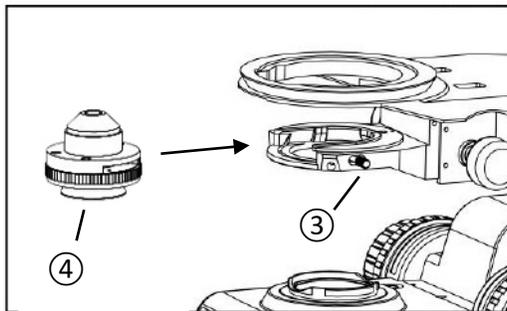


Fig. 3

Installing the Stage - (Fig. 4 & 5)

With the condenser/stage carrier at its lowest position, remove protective tape and bag from stage and specimen holder (1). (The stage comes with the specimen holder pre-mounted to the top of the stage).

Using the 3mm Hex wrench, loosen the lock screw (2) on the front of the stage.

Position the X-Y movement knobs to the right (3). Align the circular mount on the bottom of the stage with the circular bracket on the condenser/stage carrier and set the stage in place so that it is centered over the condenser below.

Retighten the lock screw (2) on the front of the stage.

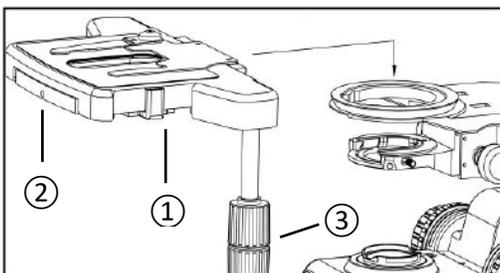


Fig. 4

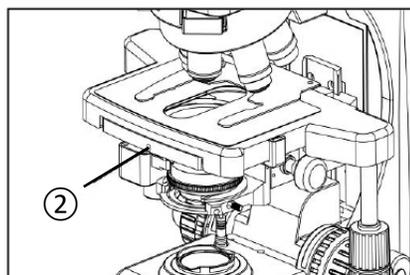


Fig. 5

DETAILED ASSEMBLY *(continued)*

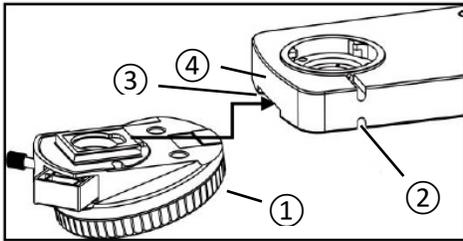


Fig. 6

Installing the Nosepiece - (Fig. 6)

Unscrew the dust plugs from the nosepiece ① for the number of objectives you will be installing.

Using the Hex wrench, loosen the lock screw ② enough so that the nosepiece can easily slide into the notch ③ on the front of the dovetail mount ④, then slide the nosepiece onto the mount.

Retighten the lock screw ② with the Hex wrench.

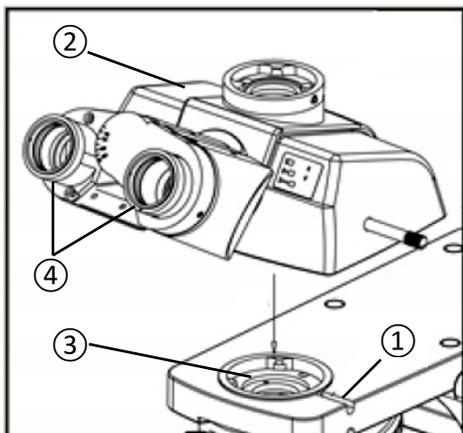


Fig. 7

Installing the Viewing Head - (Fig. 7)

Using the Hex wrench loosen the lock screw ①.

Position the viewing head ② above the dovetail opening ③ as shown and with it tilted slightly down on the right, slide the dovetail under the notches in the dovetail hole and set it into place with the two eyepiece tubes ④ facing forward.

Retighten the lock screw ①.

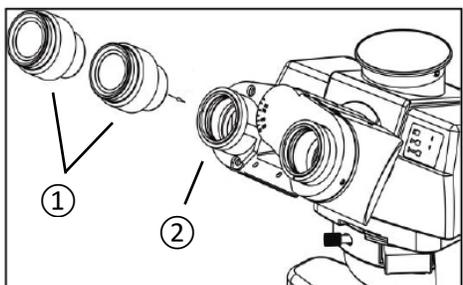


Fig. 8

Installing the Eyepieces - (Fig. 8 & 9)

Carefully remove the eyepieces ① from the protective packaging – be sure not to touch any optical (glass) surfaces. Remove the dust caps.

Insert an eyepiece ① into one of the eyepiece tubes ② and gently twist and push the eyepiece in until it is flush with the top surface of the eyepiece tube.

Repeat above for the other eyepiece.

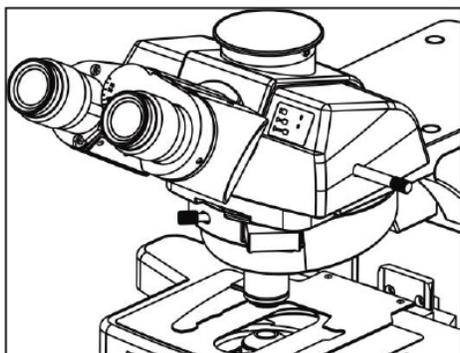


Fig. 9

DETAILED ASSEMBLY *(continued)*

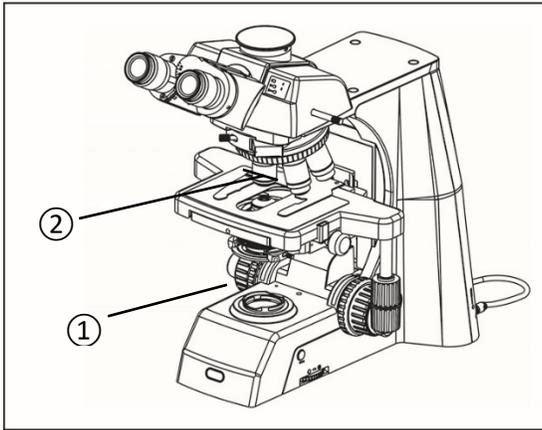


Fig. 10

Installing the Objectives - (Fig. 10)

Rotate the coarse focusing knob ① to lower the stage to its lowest position.

Install the objectives into the nosepiece ② from the lowest magnification to the highest in a clockwise direction beginning with the first empty objective receptacle in front. Install each objective by using two hands to position and gently screw in the objective in a clockwise direction into the threads of the nosepiece receptacle.

NOTE: Never force any objectives onto the threads of the nosepiece, and do not over-tighten.

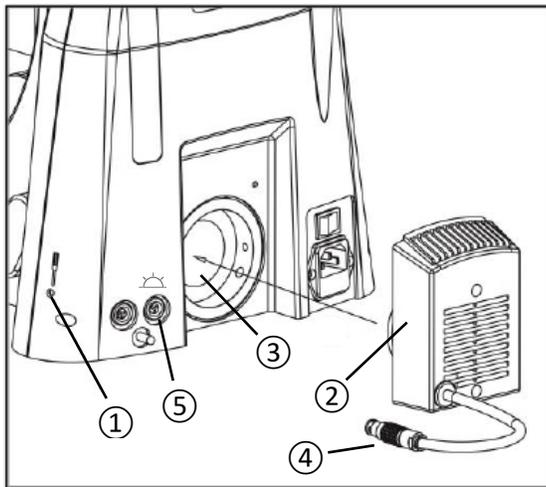


Fig. 11

Installing the LED Lamp Housing - (Fig. 11)

Using the Hex wrench loosen the lock screw ① for the LED lamp housing.

Align and install the lamp housing ② with the opening ③ in the back of the stand as shown.

Retighten the lock screw ①.

Align the red dot on the LED lamp housing cable plug ④ with the red dot on the top of the lamp housing port ⑤ on the back of the microscope and slide the plug into the port for transmitted illumination (☀).

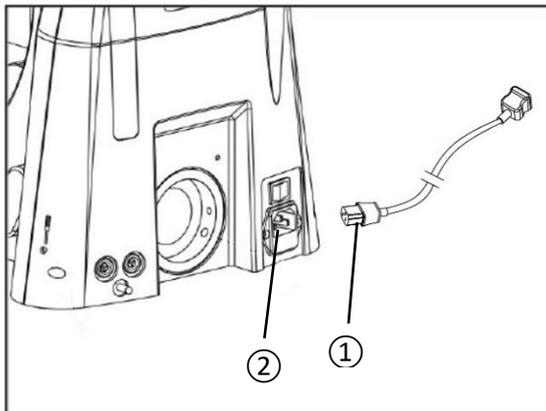


Fig. 12

Installing the Power Cord - (Fig. 12)

Align and plug the female end ① of the power cord into the power cord socket ② on the back of the microscope.

Plug the other end into a grounded (3-prong) outlet.

NOTE: Always use the power cord that is provided with your microscope; using a different power cord may damage your microscope. Should you need a replacement, contact your authorized ACCU-SCOPE dealer or call ACCU-SCOPE at 1-631-864-1000 for a dealer nearest you.

ADJUSTMENT & OPERATION

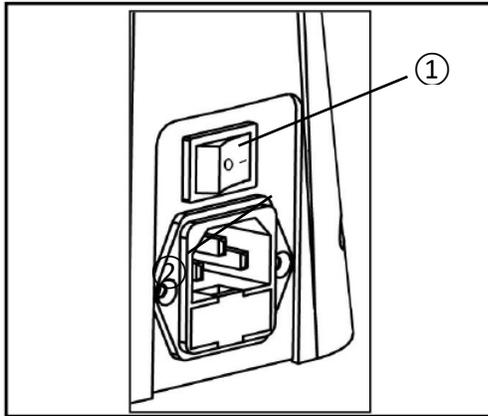


Fig. 13

Powering On - (Fig. 13)

With the microscope plugged in, locate and push the I/O toggle button ① on the back of the microscope to the ON (I) position.

Powering On LED Illuminator & Adjusting Brightness - (Fig. 14)

Push the illuminator On/Off button to turn on the transmitted light ①.

Adjust the brightness by turning the Illuminator Adjustment Knob ② clockwise for brighter illumination, counter clockwise for less illumination.

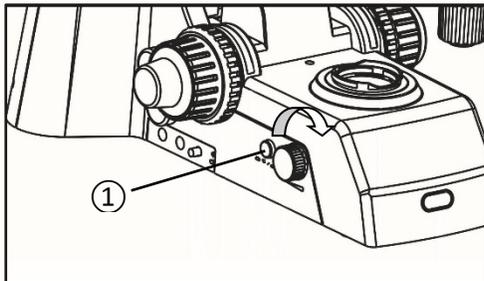


Fig. 14

Placing A Specimen - (Fig. 15)

Push the left side of the Specimen Holder ① on the top of the stage place to open the holder. Place your slide in and release the holder to allow it to close firmly against the slide.

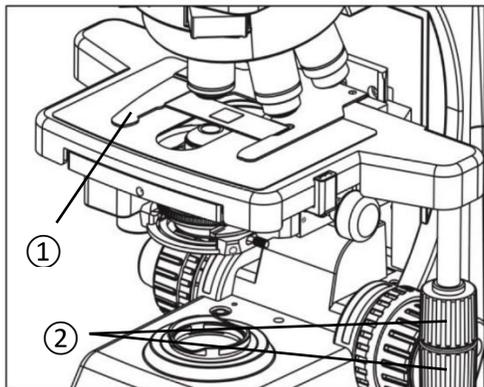


Fig. 15

Adjusting the Stage - (Fig. 15)

The stage has a coaxial X-Y Stage Movement Knob ① which allows you to move your specimen in any direction: top knob - forward/back (Y), and bottom knob - left/right (X).

Adjusting the Stage Tension - (Fig. 16)

The stage control tension can be adjusted according to user preference. To adjust the tension, pull the bottom Stage Movement Knob ① down to expose the tension adjustment rings ② for the X-Y direction.

To loosen, turn each ring counter-clockwise, or clockwise to tighten.

Push the bottom knob up when you reach the desired tension.

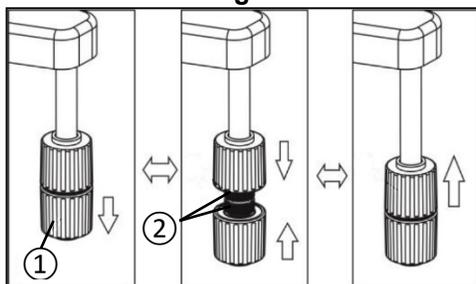


Fig. 16

ADJUSTMENT & OPERATION *(continued)*

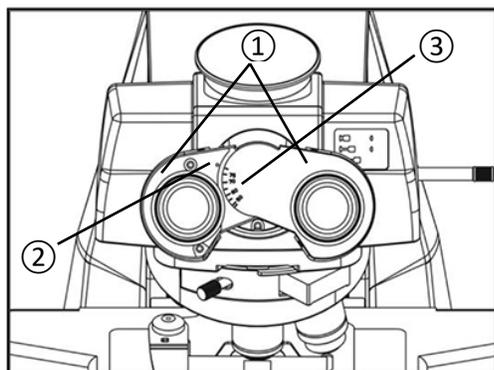


Fig. 17

Adjusting Interpupillary Distance - (Fig. 17)

To adjust the interpupillary distance, hold the left and right eyetubes while observing a specimen. Rotate the eyetubes around the central axis until the fields of view of both eyetubes ① coincide completely. A complete circle should be seen in the viewing field when viewing the specimen slide. An improper adjustment will cause operator fatigue and will disrupt the objective parfocality.

Where “●” ② on the eyepiece tube lines up to the interpupillary scale ③, then that is the number for the interpupillary distance. Range: 47~75mm.

Remember your interpupillary number for future operation.

NOTE: The eyepiece tubes can be rotated 180° to increase the eyepoint height by 34mm to accommodate the needs of different users.

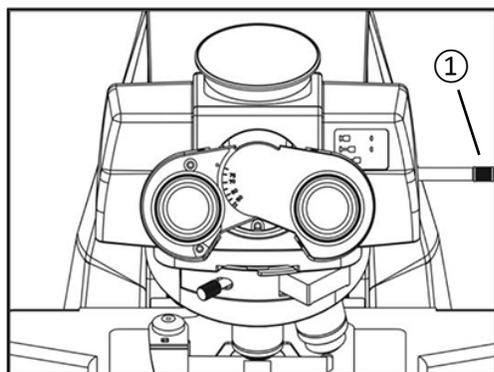


Fig. 18

Adjusting The Light Path - (Fig. 18)

(For Optional Trinocular Viewing Heads)

For trinocular viewing heads, your camera port allows you to view 100% through the eyepieces, 20/80% to eyepiece/camera, or 100% through the camera port.

To adjust the light path, push the Light Path Selector Knob ① in or out to select the desired viewing path.

Knob Position	Eyepiece Path	Camera Port Path
All the way in	100%	0%
Half-way in	20%	80%
All the way out	0%	100%

ADJUSTMENT & OPERATION *(continued)*

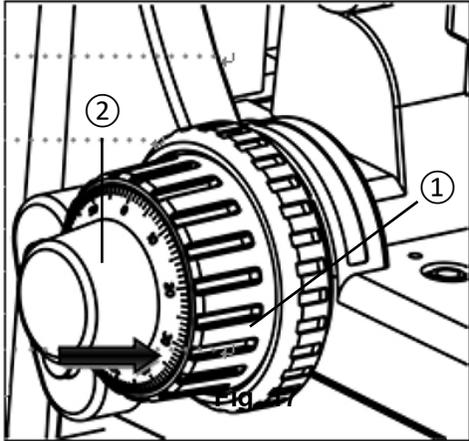


Fig. 19

Adjusting the Focus - (Fig. 19)

To ensure that you obtain sharp images with both eyes (since eyes vary, especially for those wearing glasses) any eyesight variation can be corrected in the following manner: set both diopter collars to "0". Using your left eye only and the 10X objective, focus your specimen by adjusting the coarse adjustment knob ①. When the image is in view, refine the image to its sharpest focus by turning the fine adjustment knob ②. Rotate the diopter collar to obtain the sharpest focus. To obtain the same sharp image using your right eye, do not touch the coarse or fine adjustments. Instead, rotate the right diopter collar until the sharpest image appears. Repeat several times to check.

NOTE: do not counter rotate the focusing knob as this will cause severe problems and damage to the focusing system.

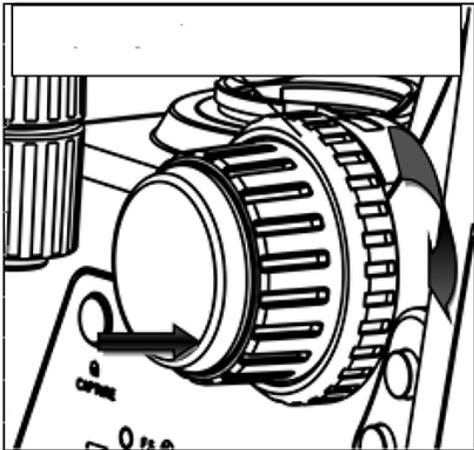


Fig. 20

Adjusting the Focus Stop - (Fig. 20)

Once you have adjusted the focus, turn the focus stop clockwise to set your objective levels to a stop position so they will not come into contact with your slide.

ADJUSTMENT & OPERATION *(continued)*

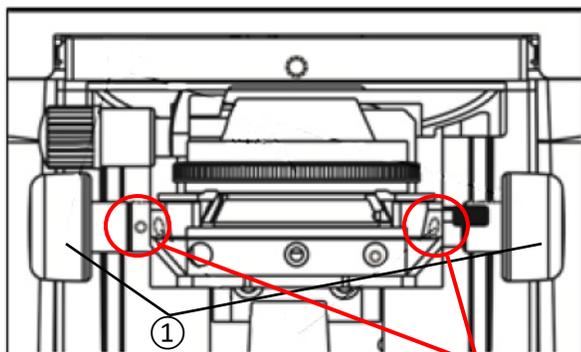


Fig. 21 ③

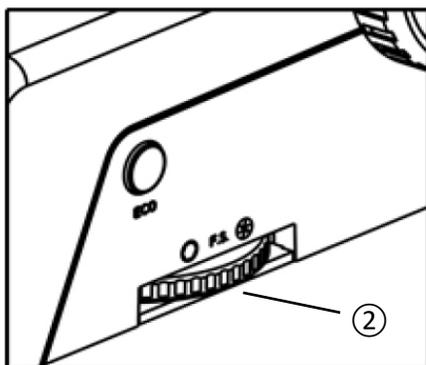


Fig. 22

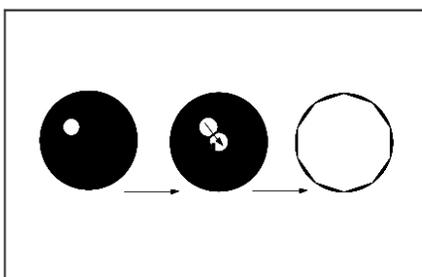


Fig. 23

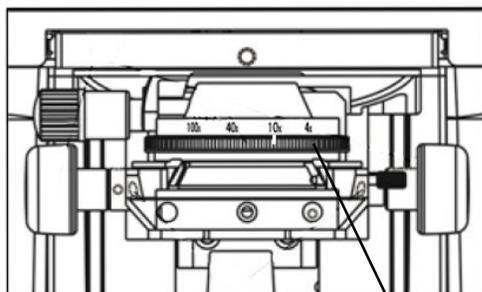


Fig. 24 ①

Centering the Condenser - (Fig. 21-23)

The top height of the condenser was pre-set at the factory. It is adjustable using the condenser adjustment knobs on either side of the condenser. To adjust, follow the steps below.

Rotate either of the condenser knobs ① to raise it to the highest position.

Rotate the 10x objective into the light path and focus the specimen.

Rotate the field iris diaphragm adjustment ring ② to put the field iris diaphragm to the smallest position.

Rotate the condenser knob and adjust the image to be its sharpest.

Using the Hex wrench provided, adjust the center adjustment screws ③ and move the specimen to the center of the field of view.

Open the field iris diaphragm gradually. If the image is in the center all the time and inscribed to the field of view, the condenser has been centered correctly.

On the front of the condenser, select the number that matches your objective lens.

Adjusting the Aperture Diaphragm – (Fig. 24)

The aperture size is increased or decreased by rotating the condenser aperture diaphragm ring ①. When the aperture is closed, the brightness and resolution are decreased but the contrast and range of focus are increased. If the aperture diaphragm is opened, the brightness and resolution are increased; however, the contrast and range of focus are diminished. For optimal viewing conditions set the condenser aperture diaphragm ring to match the magnification of the objective in the optical path.

ADJUSTMENT & OPERATION *(continued)*

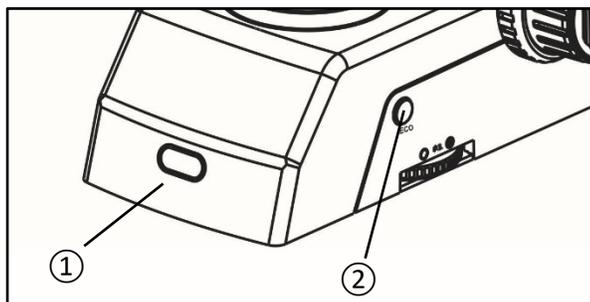


Fig. 25

“ECO” (Economy) Setting - (Fig. 25)

The EXC-500 Microscope is equipped with an auto shut-off feature, or “ECO” mode, to preserve the life of the bulb. ECO mode activates when the microscope is unattended for fifteen (15) minutes.

The ECO sensor (1) is located on the front of the microscope base. While in ECO mode the red light of the ECO sensor will flash once every three (3) seconds.

To reactivate the illumination, press the ECO button (2) once.

To **DISABLE** the ECO feature, PRESS and HOLD the ECO button for three (3) seconds.

To **REACTIVATE** the ECO feature, PRESS and HOLD the ECO button for three (3) seconds.

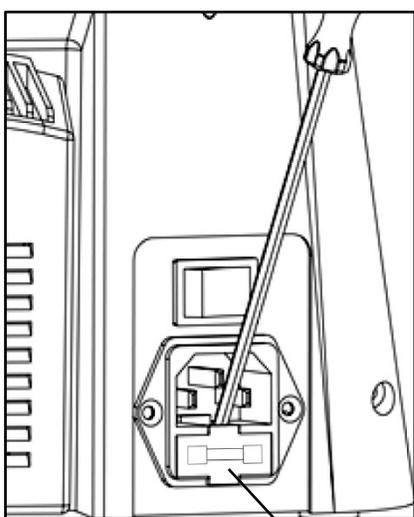


Fig. 26 (1)

Replacing the Fuses - (Fig. 26 & 27)

The fuse holder drawer is located underneath the AC power cord receptacle on the back of the microscope.

To replace the fuses, turn the power off and unplug the microscope from the wall outlet and then from the power cord receptacle on the back of the microscope.

Insert a small flat head (-) screwdriver into the top of the fuse holder drawer (1) and carefully slide it open to expose the two fuses.

(Fig. 27 shows the view looking up from the bottom of the microscope with the fuse holder drawer open.)

Being careful not to break the glass of either of the fuses, gently insert the screwdriver up through the bottom openings of the drawer as shown and push each fuse up to remove.

Replace the fuses with 250v T2.5A fuses, CAT# 500-3277

Slide the fuse holder drawer back in place.

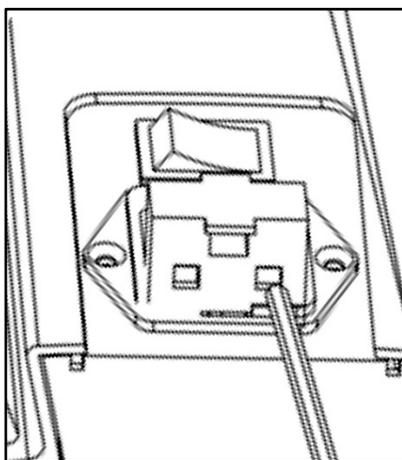


Fig. 27

LED BULB: 3w S-LED
INPUT: AV 100 ~ 240v 50/60Hz
FUSE: 250v T2.5A

SPECIFICATIONS

Viewing Bodies	Binocular or trinocular (0:100, 100:0, 80:20 split), 30° inclined Siedentopf or ergonomic (0° to 35° adjustment angle) type viewing head, rotatable 360°; interpupillary distance adjustment 47-78mm. <i>Optional multi-viewing platforms are available</i>
Optical System	Infinity optical system, f = 200mm, anti-mold
Objectives	Standard configurations include NIS Infinity Corrected Plan 4x, 10x, 40xR* and 100xR* oil (*spring-loaded)
Eyepieces	WF10x/22mm focusable eyepieces with eyeguards are locked-in to prevent tampering; eyepiece accepts a 26.5mm reticle. <i>Optional 15x and 20x eyepieces are available</i>
Nosepiece	Reversed sextuple ball bearing nosepiece with positive click stops to ensure parcentration
Focusing System	Coaxial focusing system with adjustable tension control and upper limit stop to prevent accidental damage to slides; all metal gears, brass for fine focus gear
Stand	Cast alloy aluminum
Stage	Mechanical stage with Gorilla™ glass insert and tension adjustable controls; size 302mm x 152mm with X-Y movement range of 78mm x 54mm
Condenser	Achromat swing-out condenser, N.A. 0.9/1.25 (2x—100x) on a rack and pinion with iris diaphragm
Illumination	3 watt LED Eco-illumination with variable intensity control; LED bulb is rated for over 25,000 hours of continued use; universal power supply 110-240v
Accessories	Dust cover, instruction manual included
Optional Accessories	Fluorescence attachments; Phase contrast attachments; NIS Plan achromat objectives, infinity corrected: 2x, 20x, 50xR oil, 60xR or 100xR oil with iris diaphragm; NIS S-Plan APO objectives: 4x, 10x, 20x, 40xR, 100xR oil; 6-position phase contrast turret condenser, BF & DF positions: 10x, 20x 40x & 100x phase annuli; condensers; reticles; gout kit; microscope carry case
Warranty	5 year limited warranty for parts, labor and electronic components; 1 year warranty on LED bulb

TROUBLESHOOTING

Under certain conditions, performance of this unit may be adversely affected by factors other than defects. If a problem occurs, please review the following list and take remedial action as needed. If you cannot solve the problem after checking the entire list, please contact your local dealer for assistance.

OPTICAL

Problem	Cause	Corrective Measure
Darkness at the periphery or uneven brightness of view field	Revolving nosepiece not in click stop position	Revolve the nosepiece to click stop position by swinging the objective correctly into the optical path
Dirt or dust on the view field	Dirt or dust on the lens - eyepiece, condenser, objective, collector lens or specimen	Clean the lens
Poor image quality	No cover glass attached to the slide	Attach a 0.17mm cover glass
	Cover glass is too thick or thin	Use a cover glass of the appropriate thickness (0.17mm)
	Slide maybe upside down	Turn slide over so the cover glass faces up
	Immersion oil is on a dry objective (especially the 40xR)	Check the objectives, clean if necessary
	No immersion oil used with 100xR objective	Use immersion oil
	Air bubbles in immersion oil	Remove bubbles
	Condenser aperture is closed or open too much	Open or close properly
	Condenser is positioned too low	Position the condenser slightly lower than the upper limit

TROUBLESHOOTING *(continued)*

IMAGE PROBLEMS

Problem	Cause	Corrective Measures
Image moves while focusing	Specimen rises from stage surface Revolving nosepiece is not in the click-stop position	Secure the specimen in the slide holder Revolve the nosepiece to the click-stop position
Image tinged yellow	Lamp intensity is too low Blue filter not used	Adjust the light intensity by rotating the intensity control dial and/or iris diaphragm Use daylight blue filter
Image is too bright	Lamp intensity is too high	Adjust the light intensity by rotating the intensity control dial and/or iris diaphragm
Insufficient brightness	Lamp intensity is too low Aperture diaphragm closed too far Condenser position too low	Adjust the light intensity by rotating the intensity control dial and/or iris diaphragm Open to the proper setting Position the condenser slightly lower than the upper limit

TROUBLESHOOTING *(continued)*

MECHANICAL PROBLEMS

Problem	Cause	Corrective Measures
Image will not focus with high power objectives	Slide upside down Cover glass is too thick	Turn the slide over so the cover glass faces up Use a 0.17mm cover glass
High power objective contacts slide when changed from low power objective	Slide upside down Cover glass is too thick Diopter adjustment is not set properly	Turn the slide over so the cover glass faces up Use a 0.17mm cover glass Readjust the diopter settings as outlined in section 4.3
Lamp does not light when switched on	No electrical power Lamp bulb burnt out Fuse blown out	Check power cord connection Replace bulb Replace fuse
Slippage of focus when using the coarse focusing knob	Tension adjustment is set too low	Increase the tension on the focusing knobs
Fine focus is ineffective	Tension adjustment is set too high	Loosen the tension on the focusing knobs

MAINTENANCE

Please remember to **never** leave the microscope with any of the objectives or eyepieces removed and always protect the microscope with the dust cover when not in use.

SERVICE

ACCU-SCOPE® microscopes are precision instruments which require periodic servicing to keep them performing properly and to compensate for normal wear. A regular schedule of preventative maintenance by qualified personnel is highly recommended. Your authorized ACCU-SCOPE® distributor can arrange for this service. Should unexpected problems be experienced with your instrument, proceed as follows:

1. Contact the ACCU-SCOPE® distributor from whom you purchased the microscope. Some problems can be resolved simply over the telephone.
2. If it is determined that the microscope should be returned to your ACCU-SCOPE® distributor or to ACCU-SCOPE® for warranty repair, pack the instrument in its original Styrofoam shipping carton. If you no longer have this carton, pack the microscope in a crush-resistant carton with a minimum of three inches of a shock absorbing material surrounding it to prevent in-transit damage. The microscope should be wrapped in a plastic bag to prevent Styrofoam dust from damaging the microscope. Always ship the microscope in an upright position; **NEVER SHIP A MICROSCOPE ON ITS SIDE**. The microscope or component should be shipped prepaid and insured.

LIMITED MICROSCOPE WARRANTY

This microscope and its electronic components are warranted to be free from defects in material and workmanship for a period of five years from the date of invoice to the original (end user) purchaser. The LED lamp is warranted for a period of one year from the date of invoice to the original (end user) purchaser. This warranty does not cover damage caused in-transit, misuse, neglect, abuse or damage resulting from improper servicing or modification by other than ACCU-SCOPE approved service personnel. This warranty does not cover any routine maintenance work or any other work, which is reasonably expected to be performed by the purchaser. Normal wear is excluded from this warranty. No responsibility is assumed for unsatisfactory operating performance due to environmental conditions such as humidity, dust, corrosive chemicals, deposition of oil or other foreign matter, spillage or other conditions beyond the control of ACCU-SCOPE INC. This warranty expressly excludes any liability by ACCU-SCOPE INC. for consequential loss or damage on any grounds, such as (but not limited to) the non-availability to the End User of the product(s) under warranty or the need to repair work processes. Should any defect in material, workmanship or electronic component occur under this warranty contact your ACCU-SCOPE distributor or ACCU-SCOPE at (631) 864-1000. This warranty is limited to the continental United States of America. All items returned for warranty repair must be sent freight prepaid and insured to ACCU-SCOPE INC., 73 Mall Drive, Commack, NY 11725 – USA. All warranty repairs will be returned freight prepaid to any destination within the continental United States of America, for all foreign warranty repairs return freight charges are the responsibility of the individual/company who returned the merchandise for repair.

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