ACCU-SCOPE®

MANUAL

3002-CB Forensic Comparison

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 Styrofoam 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.

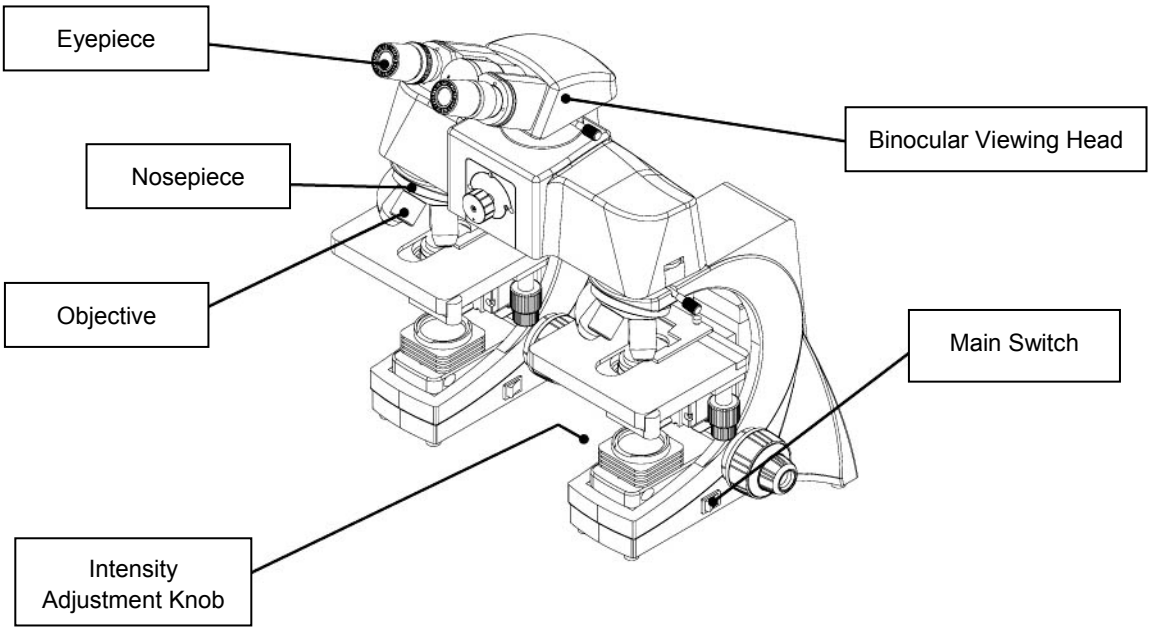
INTRODUCTION

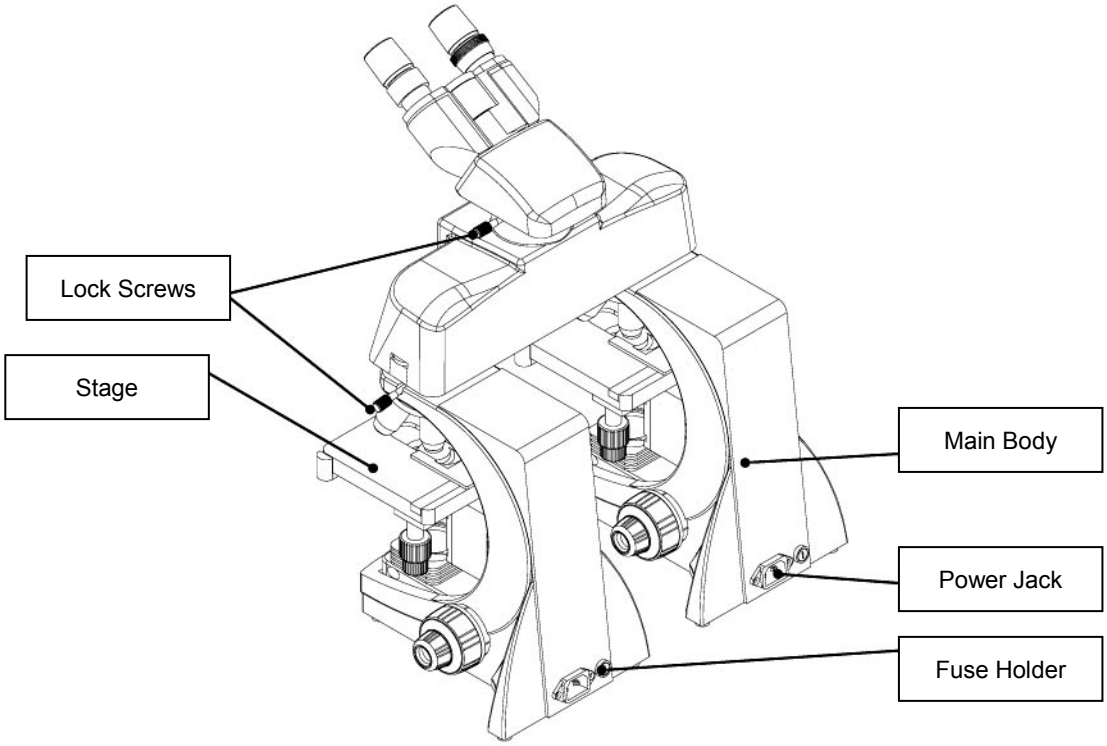
Congratulations on the purchase of your new ACCU-SCOPE ® microscope. ACCU-SCOPE ® microscopes are engineered and manufactured to the highest quality standards. Your microscope will last a lifetime if used and maintained properly. ACCU-SCOPE ® microscopes are carefully assembled, inspected and tested 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 Styrofoam container. ***Do not discard the container*:** the Styrofoam 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 Styrofoam container by its arm and base and place the microscope on a flat, vibration-free surface.

COMPONENTS DIAGRAM

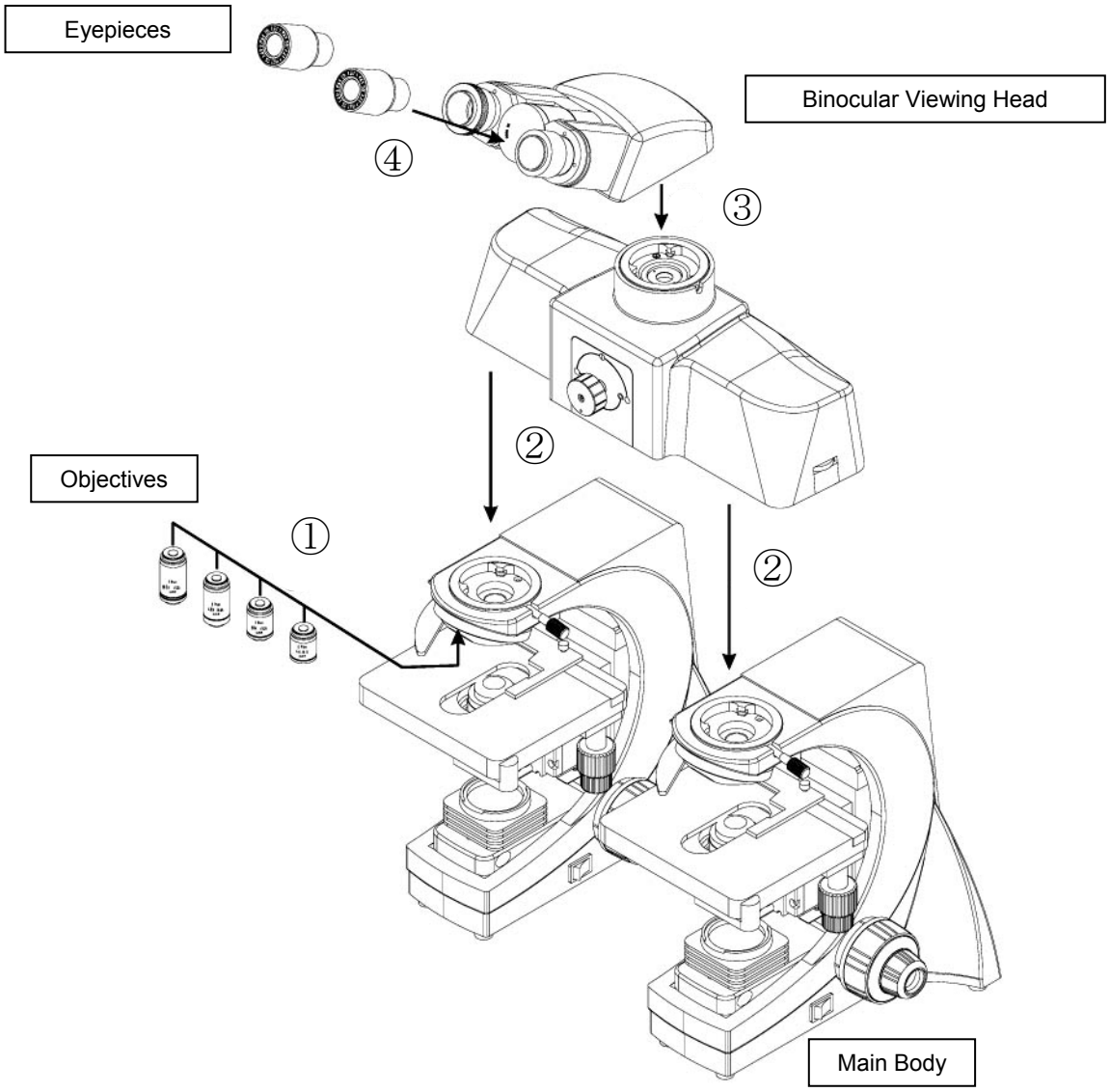




ASSEMBLY DIAGRAM

The diagram below shows how to assemble the various components. 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.



ASSEMBLY *(continued)*

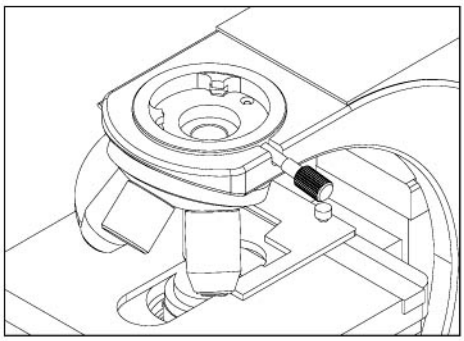


Fig. 1

Installing the Objectives

Adjust the coarse focus knob until the mechanical stage reaches its lowest limit position.

Screw the 4×objective into the nosepiece from the left or the right side, then rotate the nosepiece clockwise and mount other objectives by the sequence of low to high magnification as shown in Fig. 1.

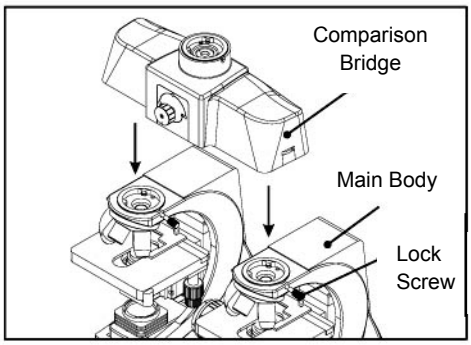


Fig. 2

Installing the Comparison Bridge

Position the two microscope bodies the appropriate distance apart and mount the comparison bridge onto the two bodies. Tighten the lock screws for each as shown in Fig. 2 and Fig. 3.

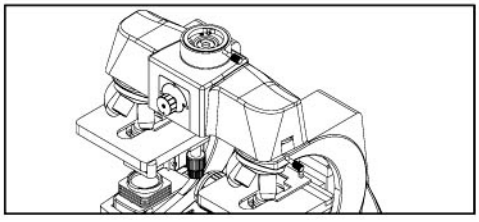


Fig. 3

ASSEMBLY *(continued)*

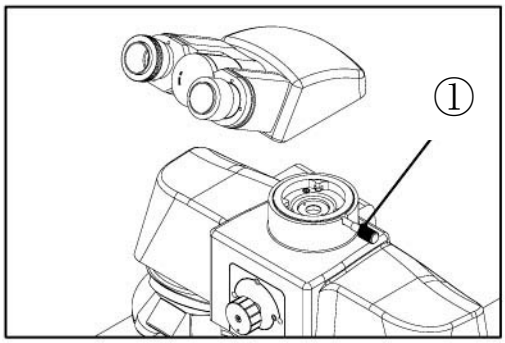


Fig. 4

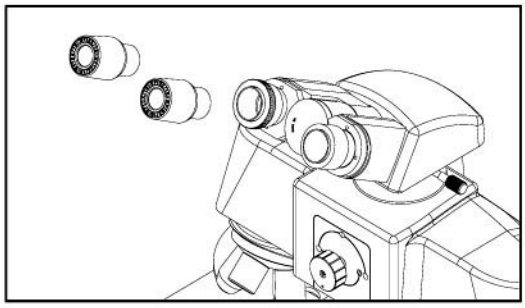


Fig. 5

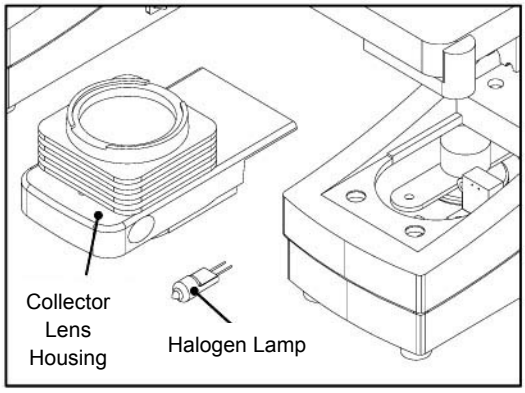


Fig. 6

Installing the Binocular Viewing Head

Loosen the lock screw ①, and carefully insert the binocular viewing head into the main body. Rotate the head so it is facing forward, then tighten the lock screw ①, as shown in Fig. 4.

Installing the Eyepieces

Remove the protective caps from the eyepiece tubes. Insert the eyepieces into the eyepiece tubes as shown in Fig. 5.

Installing & Replacing the Lamp

USE ONLY the specified halogen 6 volt 20 watt lamp (CAT #3256)**.**

DO NOT TOUCH the halogen bulb with bare hands as it may shorten the lamp life. Wrap it with gauze, a soft piece of lint-free cloth, or handle with cotton gloves.

Ensure the power switch is off and the lamp is cooled before handling.

Pull out and remove the collector lens housing as shown in Fig. 6, and insert the pin side of the lamp completely into the lamp socket.

Reinstall the collector lens housing.

ASSEMBLY *(continued)*

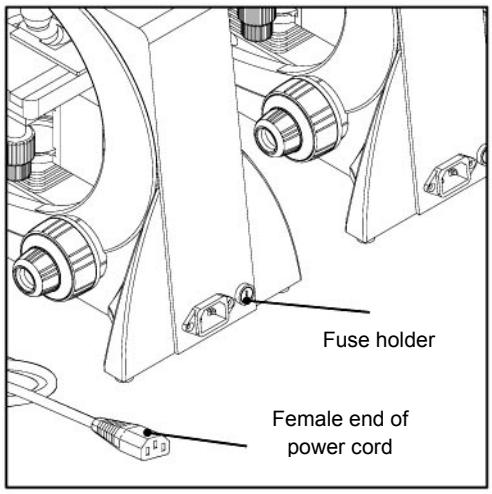


Fig. 7

Connecting the Power Cord

Do not bend or twist the power cord.

Before connecting the power cord, make sure the switch is off (O).

Insert the female end of the power cord plug securely into the power cord socket on the back of the microscope Fig. 7.

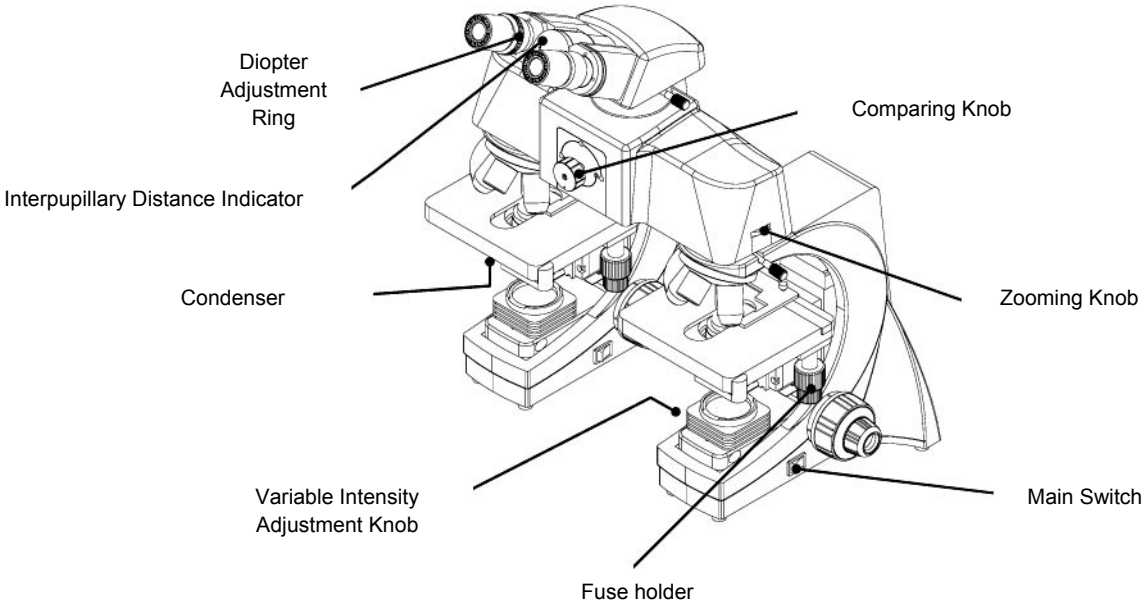
Connect the other end into a 110v/220v outlet.

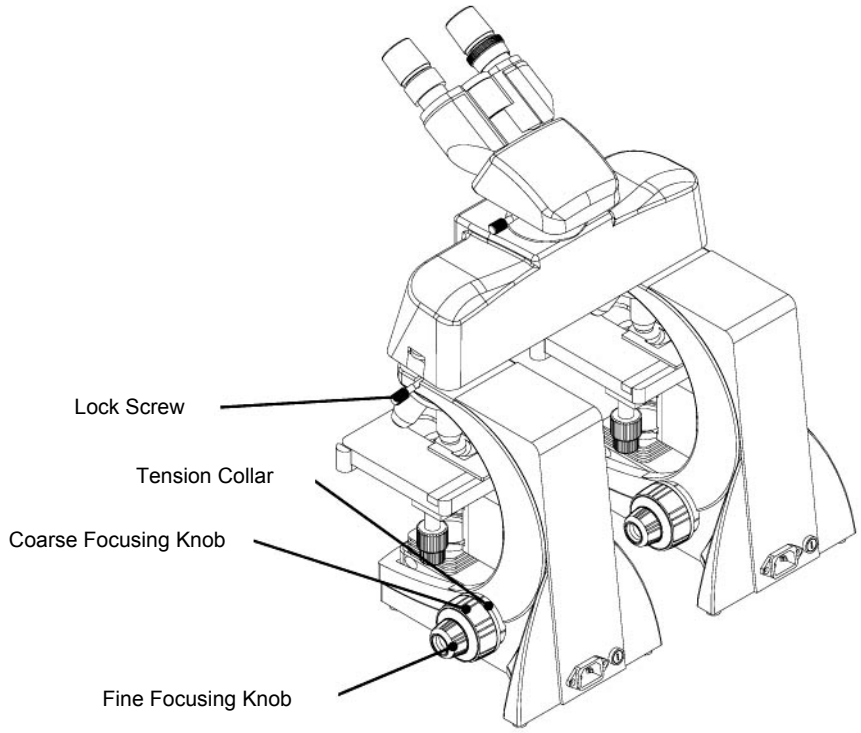
Replacing the Fuse

Before replacing the fuse, make sure the switch is off (O) and unplug the power cord from outlet.

Using a flat head screwdriver, remove the fuse holder (see Fig. 7), and unscrew the old fuse and insert the new fuse. Replace the fuse holder and retighten with the screwdriver.

CONTROLS DIAGRAM





ADJUSTMENT & OPERATION

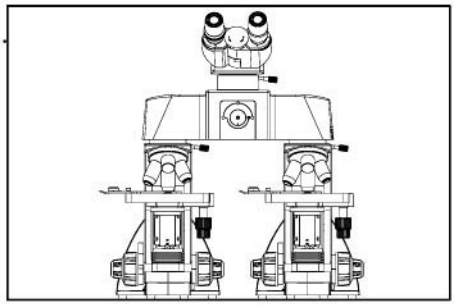


Fig. 8

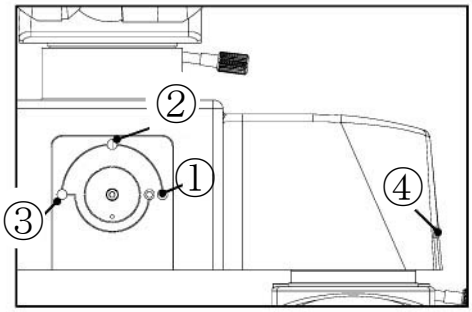


Fig. 9

Using the Comparison Microscope

Turn on both microscopes.

Adjust the variable intensity knob to desired brightness.

Place a specimen on the stage.

Rotate the 10x objective into the light path.

Adjust the interpupillary distance.

Adjust the diopter ring.

When using the comparison knob, align the indicator point on the knob to the green dot ① (Fig. 9). The specimen image from the left microscope can be observed.

Turn the knob counterclockwise 90º -- when the indicator point on the knob aligns with the yellow and green dot ② , one half of the image is from the left microscope and the other half is from the right microscope.

Turning the knob counterclockwise by 180º, align the indicator point on the knob to the yellow dot ③ -- the specimen image from the right microscope can be observed.

Turning the knob counterclockwise by 360º, the indicator point returns to the dot ① position, and the images from the left and right microscopes overlap.

The zoom knob ④ is used to adjust the magnification of the right microscope to that of the left microscope. (NOTE: the magnification of the two microscopes may change independently because of variations caused by moving the microscope or environmental changes.

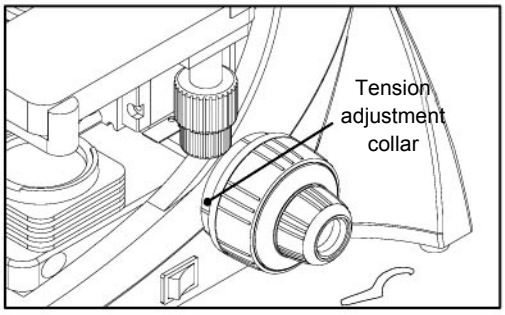


Fig. 10

Adjusting the Brightness

Connect the power supply and turn on the main switch.

Turn the brightness adjustment knob (see Controls Diagram, p. 10) counterclockwise to increase the brightness; turn it clockwise to decrease the brightness.

Adjusting the Focusing Tension

The tension of the coarse focusing knob has already been factory adjusted. If the handle is very heavy when focusing or the specimen leaves the focus plane after focusing or the stage lowers by itself, adjust the tension adjustment collar (Fig. 10).

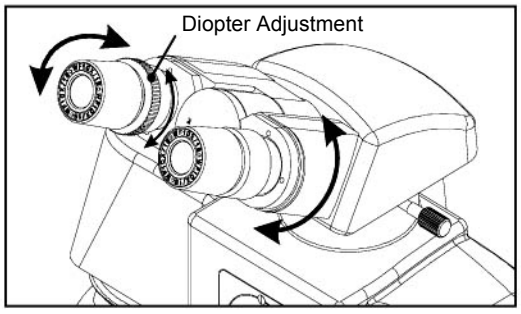


Fig. 11

Adjusting the Interpupillary Distance

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 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 **"·"**on the eyepiece tube lines up, then that is the number for the interpupillary distance (IPD). Range：52～75mm. (Fig. 11).

Remember your interpupillary for future operation.

Adjusting the Focus

To ensure that you obtain sharp images with both eyes (since individual 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 damage to the focusing system.

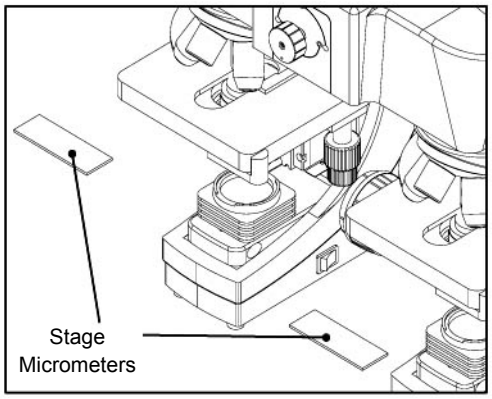


Fig. 12

Adjusting the Right Magnification

Although the magnification of the two microscopes has been factory adjusted, the magnification of the two microscopes may change independently because of variations caused by moving the microscope or environmental changes such as in temperature, air pressure or humidity.

To adjust, insert the eyepiece with reticle into the right eyepiece tube.

Place two stage micrometers onto the stages.

Adjust the comparison knob (shown in Fig. 9) and observe the images to check if the left and right magnifications match.

If the two magnifications don't match, turn the zooming knob to adjust the magnification of the right microscope until they match.

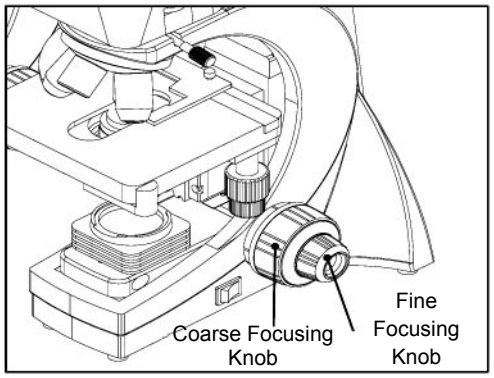


Fig. 13

Placing the Specimen

Place the specimen on the center of the stage and use the slide holder to gently secure the slide.

Rotate the X and Y adjustment knobs of the mechanical stage to position the specimen for viewing.

Use caution when changing objectives – do not allow the objective to touch the specimen slide.

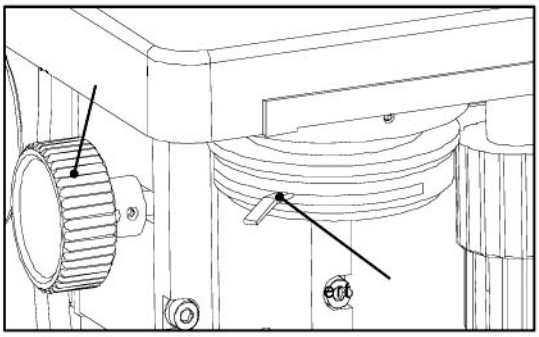


Fig. 14

Focusing the Specimen

With the 10X objective in position, raise the mechanical stage using the coarse focusing knob until the specimen is close to the objective.

Rotate the coarse focus knob unitl the specimen is in focus. Then use the fine focus knob to obtain a sharp image. You can then switch to another objective.

Adjusting the Condenser

Turn the condenser focus knob (Fig. 14) to raise or lower the condenser. The condenser is raised when using high magnification objectives and may be lowered when using the low magnification objectives.

NOTE: the centering of the condenser and the light axes of the objective are factory adjusted – DO NOT attempt to re-adjust.

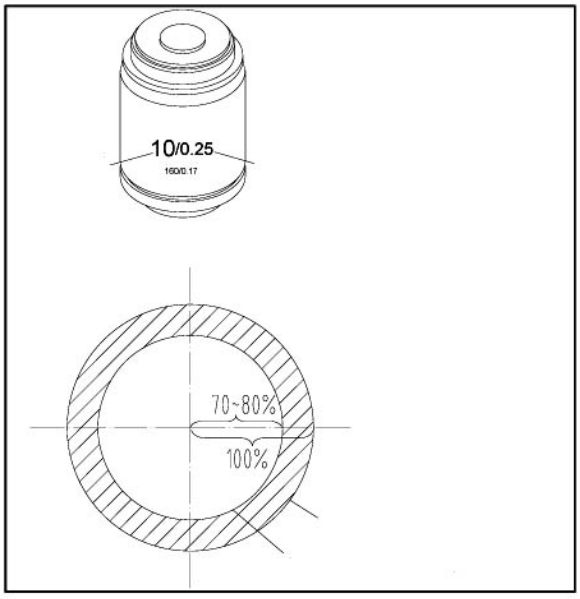


Fig. 15

Adjusting the Iris Diaphragm

Move the iris diaphragm lever (Fig. 14) left or right to adjust the aperture size.

The iris diaphragm is designed to adjust the aperture size, not to adjust brightness.

Generally, reducing the diaphragm opening to 70-80% of the N.A. value of the respective objective will provide an image of acceptable quality. If you want to observe the image of the iris diaphragm, remove one eyepiece and look through the tube. You will see a dark circle encroaching on the bottom of the tube.

TECHNICAL SPECIFICATIONS

Mechanical Tube Length	160mm
Viewing Head	Binocular Head, 30°Inclined; Interpupillary Distance 52-75 mm
Eyepiece	Field of view: φ18mm
Nosepiece	Backward Quadruple Nosepiece
Objective	DIN Achromatic objectives 4X, 10X, 40XR, 100XR oil
Focusing	Coaxial coarse and fine focusing knob; the minimum division of fine focusing: 0.002mm; focus adjustment range: 23mm
Condenser	Abbe Condenser NA=1.25 with Iris Diaphragm
Stage	Double Layers Mechanical Stage 140mm×140mm, Movement Range 74×50mm
Illumination	Halogen Lamp 6V/20W

Objectives

Magnification	Numerical Aperture（NA）	Thickness of cover slip (mm)	Working Distance（mm）	Type
4X	0.10	0.17	18	Dry
10X	0.25	0.17	6.5	Dry
40X	0.65	0.17	0.53	Dry
100X	1.25	0.17	0.13	Oil

Eyepieces

Category	Magnification	Field of view（mm）
Plan eyepiece	10×	Φ18

Total Magnification

Eyepiece	10×	10×	10×	10×
Objective	4×	10×	40×	100×
Total Magnification	40×	100×	400×	1000×

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.

IMAGE PROBLEMS

Problem	Cause	Corrective Measure
The edge of the field of view is dark or the brightness is not uniform	The nosepiece is not in the located position (objective and light path not coaxial)	Locate the nosepiece properly where it clicks
	The image of filament is not centered	Center the filament
	A lens (the objective, condenser, eyepiece or collector) is dirty.	Clean it thoroughly
Find dust and stain in the field of view	There are stains on the lens （including condenser, objective, eyepiece and collector）	Clean it
	There are stains on the specimen	Clean it
	The position of the condenser is too low	Loosen the condenser's locking bolt, adjust the condenser to the right position
The image is defocused (low resolution / contrast)	There is no cover slip on the specimen	Add cover slip
	The cover slip is too thick or too thin	Use the standard cover slip (0.17mm)
	The specimen is placed inversely	Reverse it back
	There was oil on the dry objective(easily happened in 40X objective)	Clean it
	There are stains on the lens （including condenser, objective, eyepiece and collector）	Clean it
	Didn't use oil for the oil objective	Use immersion oil
	There is an air bubble in the oil	Eliminate air bubble
	Use of non-recommended oil	Use manufacturer's recommended oil
	The size of the aperture diaphragm is wide open	Adjust it
	There are stains on the incident lens of the binocular tube	Clean it
	The size of the aperture diaphragm is too small	Adjust it
	The position of the condenser is too low	Adjust the position

One side of the image is dark	The condenser is not in the center of the field of view\the condenser inclines	Install the condenser again and adjust the center carefully by centering the bolt
	The nosepiece is not in the right position	Turning it until it reaches the “clicked” position
The image shift during focusing	The nosepiece is not in the right position	Turn it to the “clicked” position
The image is a little yellow	Blue filter not in holder	Use the blue filter
The brightness is not enough	The size of the aperture diaphragm is too small	Adjust
	The position of the condenser is too low	Adjust the position
	There are stains on the lens (including condenser, objective, eyepiece and collector)	Clean

MECHANICAL PROBLEMS

Problem	Cause	Corrective Measure
The image cannot focus when using high magnification objective	The coverslip is too thick	Use the standard coverslip（0.17 mm）
The objective touches the specimen when changed from low magnification to the higher magnification	The coverslip is too thick	Use the standard coverslip（0.17 mm）
The binocular image is not coincident	The interpupillary distance is not correct	Adjust
Eyes are too tired	No diopter adjustment	Adjust the diopter correctly

ILLUMINATION PROBLEMS

Problem	Cause	Corrective Measure
The lamp can't light when the switch is turned on	No power	Check the connection of the power cord
	The lamp burned out	Replace
The lamp burns out suddenly	Using a substandard lamp The voltage is too high	Use the specified lamp to replace; if the problem is not solved, contact service department

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 two years 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 then 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.