



# MANUAL

## EXC-100 MICROSCOPE SERIES



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## SAFETY NOTES

1. Open the shipping carton carefully to avoid damage to any accessory, e.g., 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.

## Operation Notice

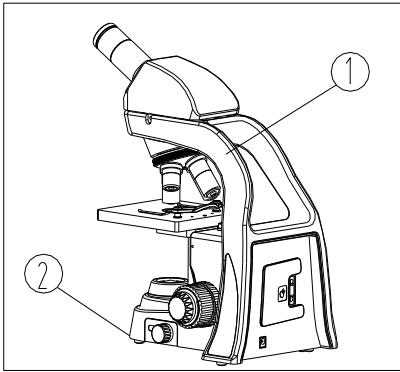


Fig. 1

1. As the microscope is a high precision instrument, always operate it with care, and avoid physical vibrations.
2. Do not expose the microscope in the sun directly, either not in the high temperature, damp, dust or acute shake. Make sure the worktable is flat and horizontal.
3. When moving the microscope, keep holding the rear cover hand clasp① and the front end of microscope body② with each hand. Handle with care. (See Fig. 1)

★ It will damage the microscope by holding the stage, focusing knob or head when moving.

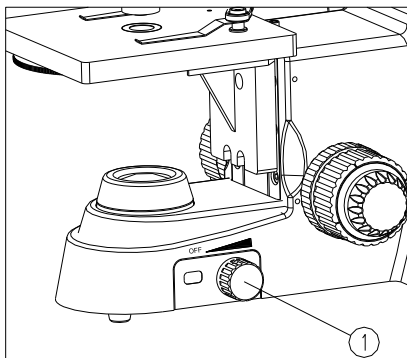
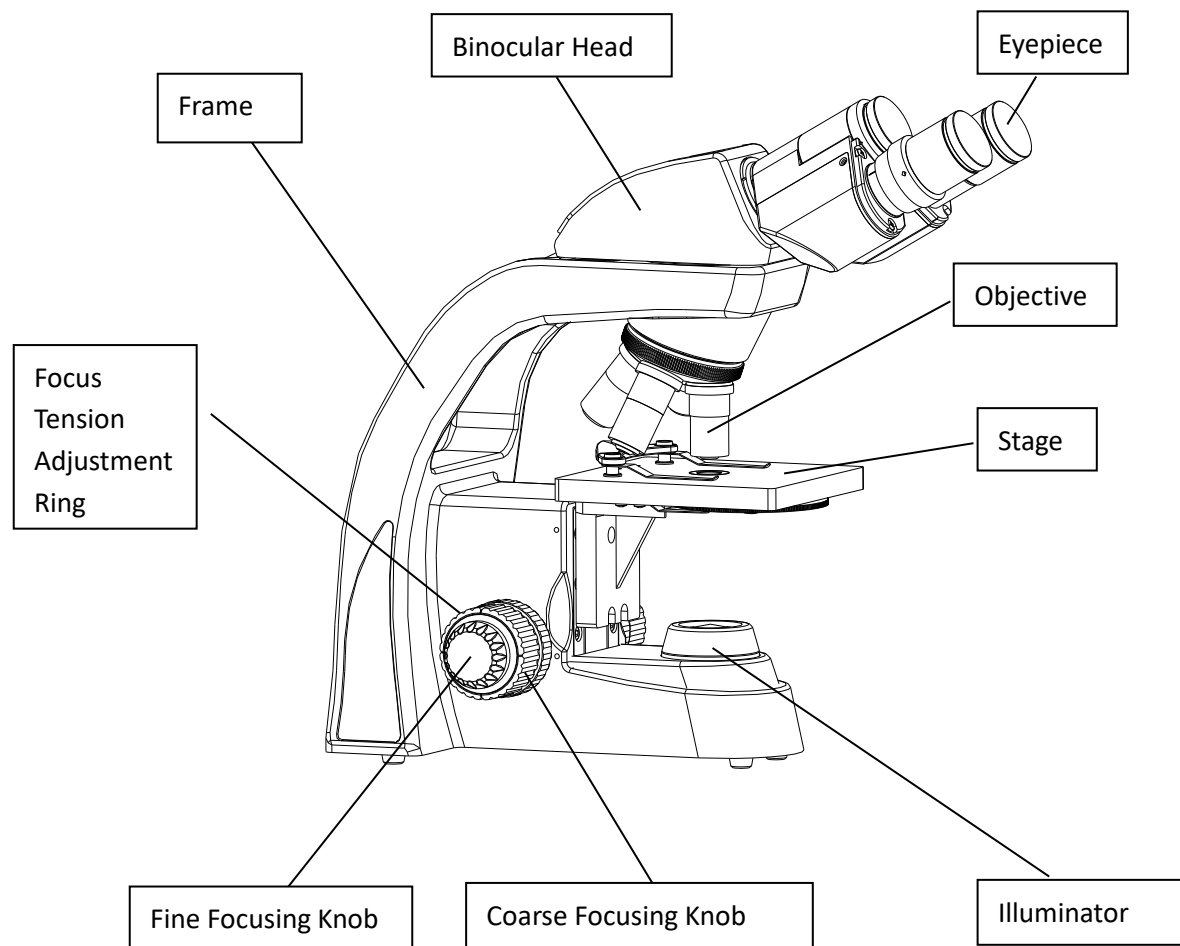
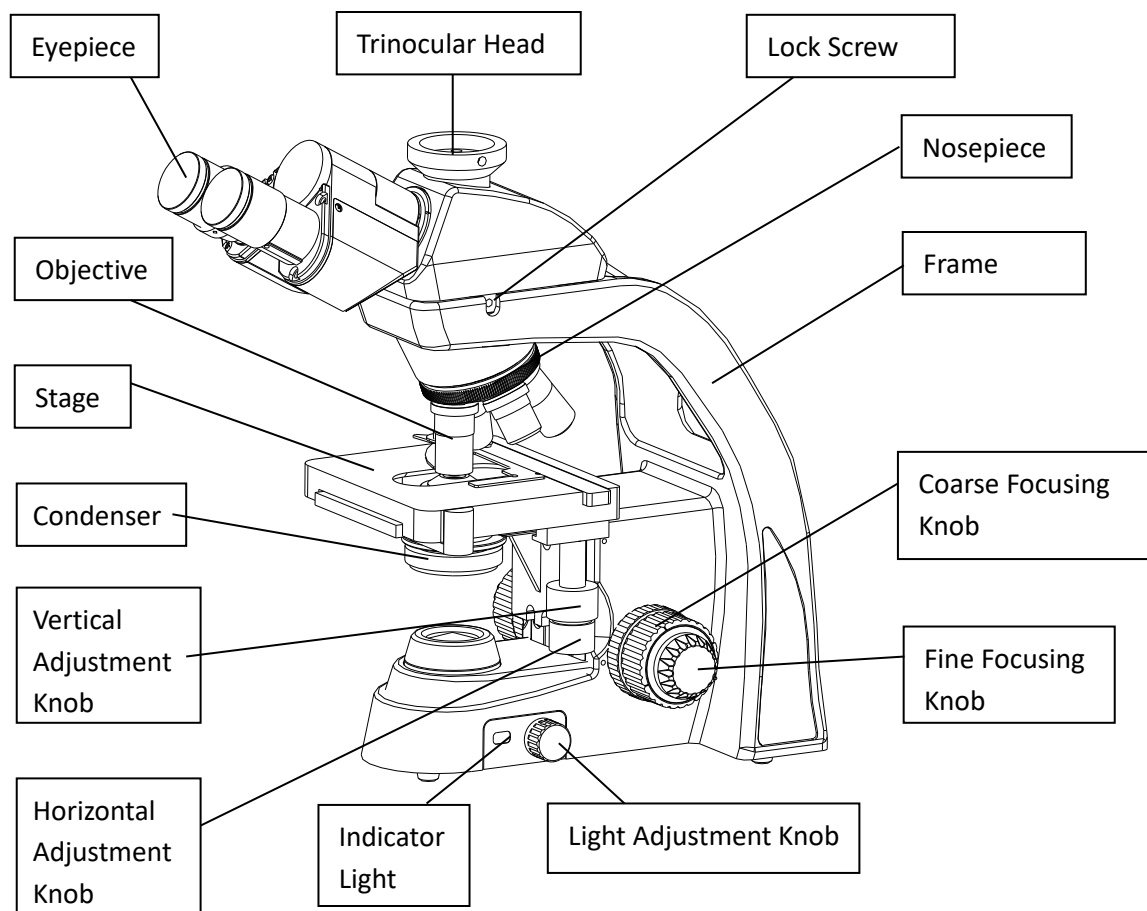


Fig. 2

4. Connect the microscope to the ground to avoid lightning strike.
5. For safety, make sure the power knob① is rotated counterclockwise to the minimum before replacing the bulb, and wait until the bulb and base cool down completely (see Fig. 2).
- ★ Bulb selected only: single 5050 LED
6. Wide voltage range is supported as 100~240V. Additional transformer is not necessary. Make sure the power supply voltage is in this range.
7. Use only the power cord supplied by ACCU-SCOPE.

## COMPONENTS DIAGRAM



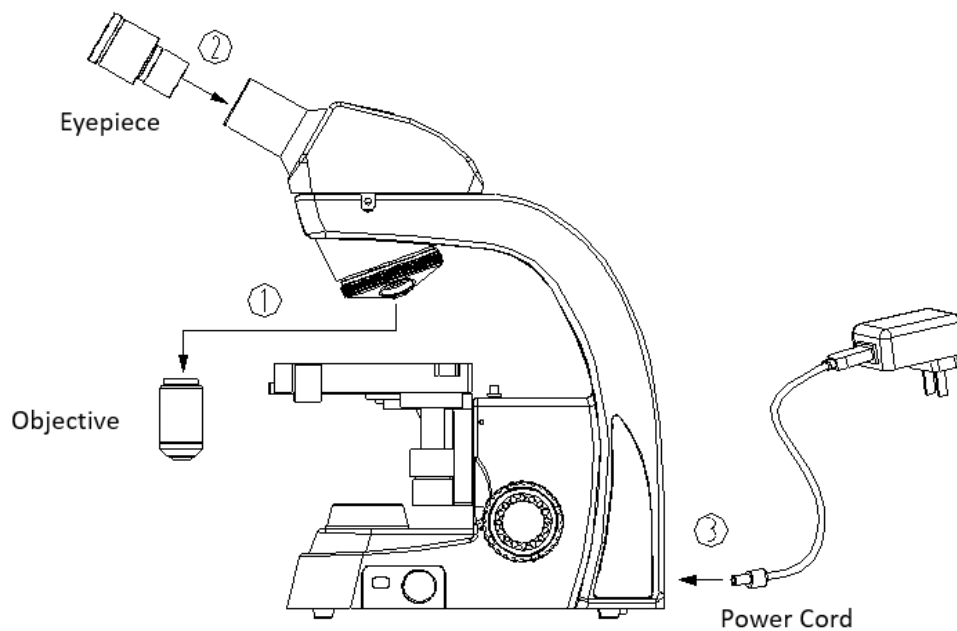


**ASSEMBLY DIAGRAM**

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.

- ★ Before assembling, make sure there is no dust, dirt or other materials which will disturb it. Assemble carefully and do not scrap any part or touch the glass surface.



# DETAILED ASSEMBLY

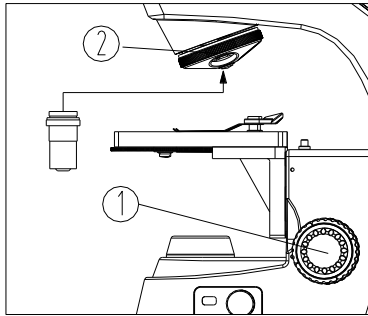


Fig. 3

## Installing the Objectives

1. Rotate the coarse focusing knob ① to lower the stage to a suitable position (see Fig.3).
  2. Install the objectives into the nosepiece ② from the lowest magnification to the highest in clockwise direction.
- ★ When operating, first use the low magnification objective (4X or 10X) to search for specimen and focus, and then rotate in the high magnification objective to observe.
  - ★ When replacing the objective, rotate the objective nosepiece until it sounds “ka-da”, to make sure the desired objective is in the center of optical path.

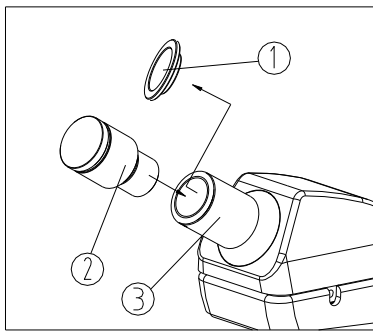


Fig. 4

## Installing the Eyepiece(s)

1. Remove the cover from the eyepiece tube ①.
2. Insert the eyepiece ② into the eyepiece tube, until it is completely inserted.
3. Tighten eyepiece with M2.5 inner hexagon lock-screw ③ (see Fig.4).

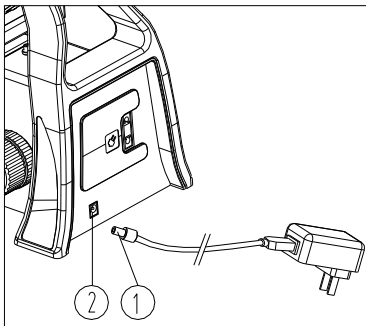


Fig. 5

## Connecting the Power Cord

- ★ To avoid damage to the power cord, to not use strong force when the power cord is bent or twisted.
1. Make sure the light adjustment knob is at “O”(OFF) before connecting the power cord.
  2. Fully insert the connector ① of power cord into the power socket ②, and make sure it connects well (see Fig.5).
  3. Fully insert the other connector into the socket of power supply, and make sure it connects well.



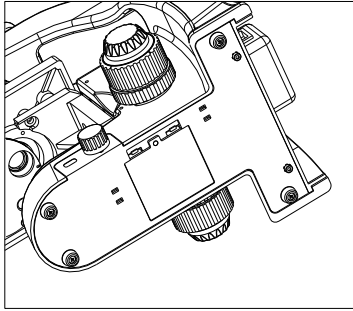


Fig. 6

### Rechargeable Batteries

There are rechargeable batteries at the bottom of the microscope. Open the battery box to replace the battery (see Fig.6) .

- ★ Use the power cord provided with your microscope by ACCU-SCOPE. If it is lost or damaged, a replacement can be purchased from ACCU-SCOPE. Always choose a power cord with the same specifications as the original.
- ★ Wide voltage range is supported from 100~240V.
- ★ Connect the power cord appropriately to make sure the instrument is connected to ground.

## ADJUSTMENT & OPERATION

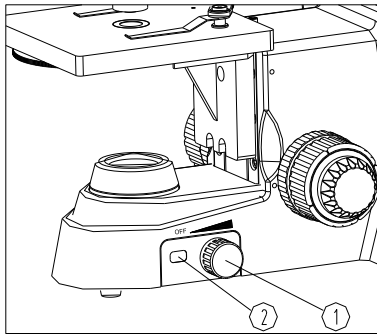


Fig. 7

### Illumination

1. Turn on the power by rotating the light adjustment knob① and adjust light intensity by rotating the knob until the illumination is comfortable for observation.  
Rotate the light adjustment knob in clockwise direction to raise the voltage and brightness.  
Rotate the light adjustment knob in counterclockwise direction to lower the voltage and brightness (see Fig.7).
2. Indicator light is light green when normal use (and batteries are fully charged), orange light when charging.

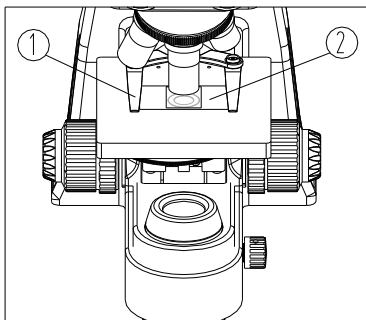


Fig. 8

### Placing a Specimen

1. Place the slide on the stage with the cover glass of slide② facing upwards and move the specimen to the center (aligned with the center of objective). Hold the slide in place using the slide-holder① (see Fig.8).

## ADJUSTMENT & OPERATION *(continued)*

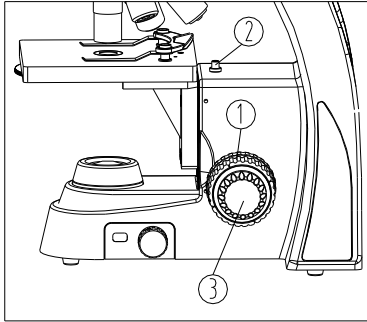


Fig. 9

### Adjusting Focus

★ Start with low magnification.

1. Move the 4x objective into the optical path.
2. Observe with your left eye and the left eyepiece (binocular and trinocular heads only). Rotate the coarse focusing knob ① until the specimen outline appears in the view field (see Fig. 9).
3. Rotate the fine focusing knob ③ until clear details are observed.
4. Rotate a higher power objective into the light path. While observing with your left eye, focus again using the coarse and then fine focus knobs.
5. With your right eye and without changing the coarse or fine focus knobs, adjust the diopter (eyepiece focus ring) – located just below the right eyepiece – until the image seen in the right eyepiece matches the left eyepiece.

★ The focus travel locking screw ② sets the maximum height that the stage can move when focusing, thereby avoiding high magnification objectives from touching the slide (prevents slide breakage and damage to objectives). The maximum stage height is preset at the factory.

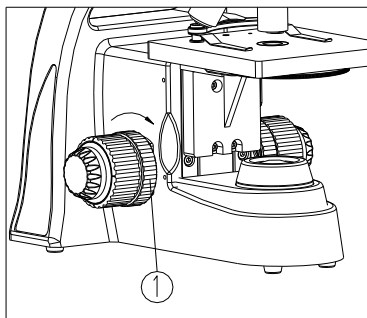


Fig. 10

### Adjusting Focus Tension

If the coarse focus knobs turn with difficulty when focusing, the specimen falls out of focus, or the stage drifts down by itself, the focus tension must be adjusted (see Fig. 10).

1. To increase focus tension, rotate the tension adjustment ring ① according to the arrowhead pointed (top rotating toward the operator; rotate in the reverse direction to loosen the focus tension (i.e., make it easier to turn the coarse focus knob).

★ Note that the fine focus tension is not affected by the focus tension adjustment ring.

## ADJUSTMENT & OPERATION *(continued)*

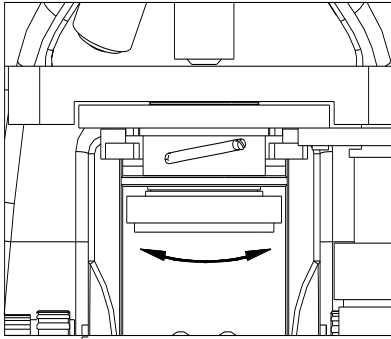


Fig. 11

### Adjusting the Condenser (Aperture Diaphragm)

1. The aperture diaphragm determines the Numerical Aperture (N.A.) of the illumination system. When the N.A. of illumination system matches the N.A. of the objective, resolution and contrast are optimized. The aperture diaphragm can also increase the depth of field by closing it down from the optimal position (resolution is sacrificed by doing this).
2. Turn the condenser lever right or left to change the height of the condenser and the N.A. of the illumination system (see Fig. 11). The condenser should be in its highest position during operation.
3. Move the aperture diaphragm lever to the value that is close to the magnification of the objective (e.g., 10 for the 10x objective). Repeat for each time a different objective is rotated into the light path.

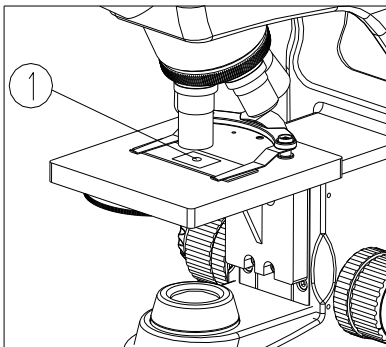


Fig. 12

### Using the 100x Oil Immersion Objective

1. Use the 4X objective to focus the specimen.
2. Place a drop of oil① on the specimen observed (see Fig. 12)
3. Rotate the nosepiece counterclockwise and rotate the oil objective (100X) into the light path. Then use the fine focusing knob to focus.
  - ★ Make sure there is no air bubble in the oil.
  - A. Move the eyepiece to examine the air bubble. Open the aperture diaphragm and field diaphragm fully and observe the edge of the objective from the tube (It seems round and bright).
  - B. Rotate nosepiece slightly and swing the oil objective for some times to remove the air bubble.
4. After using, wipe the front lens of the objective with a tissue moistened with a small amount of 3:7 mixture of alcohol and ether or with dimethylbenzene. Wipe off the oil on the specimen (cover glass).
  - ★ DO NOT change objectives in the light path before the oil is wiped off from the slide to avoid getting oil on a non-oil objective and causing damage to it.
  - ★ Be careful not to use too much solvent to clean the lens as this may also damage the lens in the long term.

# ADJUSTMENT & OPERATION *(continued)*

## Using Binocular and Trinocular Heads

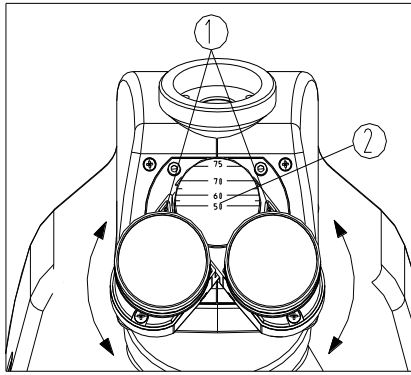


Fig. 13

### Adjusting Interpupillary Distance

1. When observing with two eyes, hold the base of the eyetubes and rotate them around the axis until there is only one field of view. "0" mark ① on the eyetube base points to the scale ② of interpupillary indication, means the value of interpupillary distance (see Fig. 13).

The adjustable range is 50~75mm.

★ Remember your interpupillary distance for fast setting in future operation. Your interpupillary distance can be used with other microscopes, too.

Fig. 14

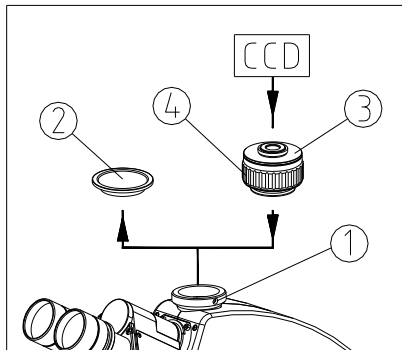


Fig. 14

### Assembling and Using the Trinocular Port and Camera *(trinocular model only)*

1. Loosen the lock screw ① of trinocular head and remove the dustcover ② (See Fig. 14).
2. Remove the dustcovers from the camera adapter assembly ③. Thread the top of the camera adapter into the C-mount of the camera. Place the assembly into the trinocular head (flange side towards microscope; camera end points up) as shown in the figure and screw down the lock screw ①.
3. For binocular observation, focus through the eyepieces until the image is sharp. Observe the image from the camera. If the image is out of focus, rotate the focus ring on the camera adapter ③ to adjust the focus in the camera image until it is sharp.
4. If the image from the camera is rotated compared to the eyepieces, loosen the lock screw ④ and rotate the camera until the images have the same alignment. Retighten the lock screw.

## ADJUSTMENT & OPERATION *(continued)*

### Using Mechanical Stage

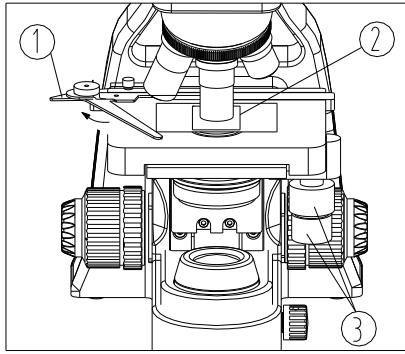


Fig. 15

#### Place the Specimen Slide

1. Push the lever① of the specimen holder backwards.
2. Place the slide on the stage with the cover glass② facing upwards. Gently release the lever① and allow the clip to slowly close onto the slide and clamp the slide firmly(see Fig.15).
- ★ Do not let go of the lever as the clamp will close too fast. This may result in slide breakage and flying glass pieces.
3. Rotate the X and Y-axis knob③ of the stage, and move the specimen to the center (aligned with the center of objective).

### Adjusting the Condenser – Installing a Filter

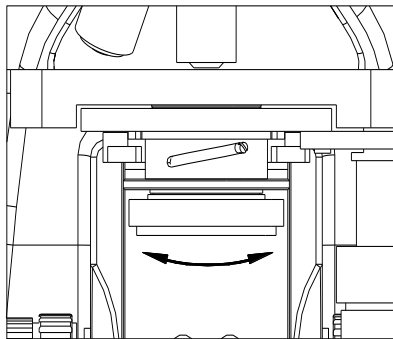


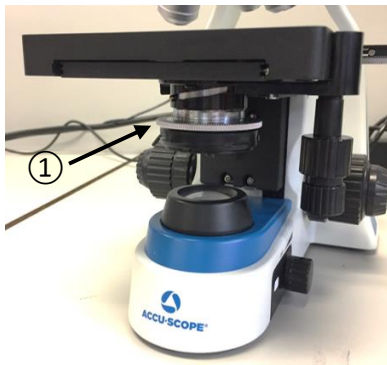
Fig. 16

1. Before installing the filter, rotate the condenser to the bottom and then open the filter holder.
- ★ Place the filter with the rough side downward.

## ADJUSTMENT & OPERATION *(continued)*



Darkfield stop in closed position

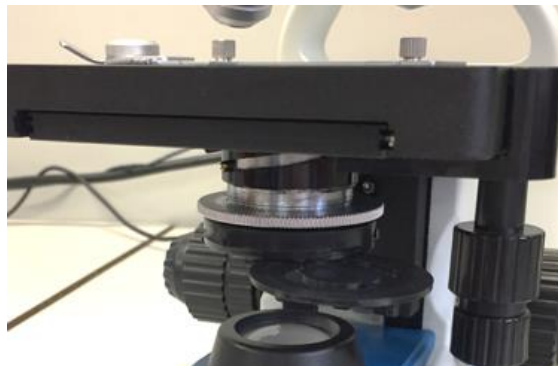


Condenser in lower position

### Using the Darkfield Stop (optional)

1. To view specimens using the Darkfield Stop, rotate the stop into the closed position.
2. While viewing a specimen, adjust the iris diaphragm open or closed to optimize the image. The specimen should appear mostly white on a dark background.
3. To view the specimen in brightfield mode, rotate the darkfield stop into the open position.

★ **NOTE:** To move the darkfield stop in or out of the light path, you may need to lower the condenser. To lower the condenser, grasp the metal ring ① on the condenser and rotate counterclockwise (to the left). After changing the position of the darkfield stop, raise the condenser back to the upper limit just below the stage.



2. Darkfield stop in open position

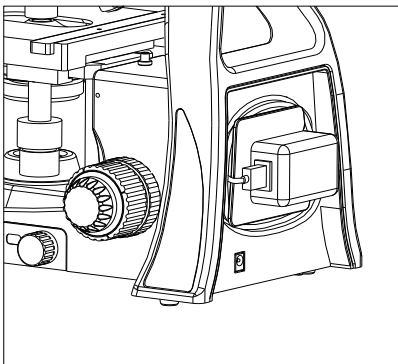


Fig. 17

### Storing the Power Cord

When the microscope is not in use, the power cord can be wrapped around the cord wrap on the back of the microscope, and the power charger can be plugged into the socket on the back of the microscope to avoid being lost. (See Fig. 17)

- ★ Do not use strong force when the power cord is bent or twisted, otherwise it will be damaged.
- ★ Use the power cord provided with your microscope by ACCU-SCOPE. If it is lost or damaged, a replacement can be purchased from ACCU-SCOPE. Always choose a power cord with the same specifications as the original.

# 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   |

## IMAGE PROBLEMS

| Problem                    | Cause  | Corrective Measures   |
|----------------------------|--|---|
| Image moves while focusing | Specimen rises from stage surface<br><br>Revolving nosepiece is not in the click-stop position       | Secure the specimen in the slide holder<br><br>Revolve the nosepiece to the click-stop position   |
| 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<br><br>Aperture diaphragm closed too far<br><br>Condenser position too low | Adjust the light intensity by rotating the intensity control dial and/or iris diaphragm<br><br>Open to the proper setting<br><br>Position the condenser slightly lower than the upper limit |

## MECHANICAL PROBLEMS

|   |  |   |
|---|--|---|
| Image will not focus with high power objectives                           | Slide upside down<br><br>Cover glass is too thick  | Turn the slide over so the cover glass faces up<br><br>Use a 0.17mm cover glass   |
| High power objective contacts slide when changed from low power objective | Slide upside down<br><br>Cover glass is too thick<br><br>Diopter adjustment is not set properly<br><br>Focus travel set too high | Turn the slide over so the cover glass faces up<br><br>Use a 0.17mm cover glass<br><br>Readjust the diopter settings as outlined in section 4.3<br><br>Set the focus travel lower |
| Lamp does not light when switched on                                      | No electrical power<br><br>Lamp bulb burnt out<br><br>Fuse blown out   | Check power cord connection<br><br>Replace bulb<br><br>Replace fuse   |



|  |  |   |
|--|--|---|
| Slippage of focus when using the coarse focusing knob                        | Tension adjustment is set too low                    | Increase the tension on the focusing knobs                                |
| Stage drifts down by itself, cannot stay on the focal plane during observing | Focus tension knob is too loose                      | Tighten the focus tension   |
| Coarse focusing knob is too tight.   | Focus tension is too tight.                          | Loosen the focus tension until the coarse focusing knob turns comfortably |
| Coarse focusing knob can't rise.   | The focus travel limit is reached.                   | Adjust the focus travel limit position.                                   |
|  | The focus limit stop knob is locked.                 | Loosen the knob.  |
| Coarse focusing knob won't lower the stage.                                  | The base of the condenser is too low.                | Raise the condenser base.   |
| Slide does not move smoothly.  | The slide is not placed correctly.                   | Place the slide in the holder correctly.                                  |
|  | The movable specimen holder is not mounted properly. | Mount the specimen holder correctly.                                      |
| Fine focus is ineffective  | Tension adjustment is set too high                   | Loosen the tension on the focusing knobs                                  |
| The image moves obviously when touching the stage.                           | The stage is fastened incorrectly.                   | Fasten the stage correctly.   |

## ELECTRICAL PROBLEMS

| Problem                        | Cause                                    | Corrective Measures                     |
|--------------------------------|--|---|
| The LED light does not work.   | No power to the microscope.              | Check the connection of the power cord. |
|                                | The LED bulb is not installed correctly. | Install the LED correctly.              |
|                                | The LED bulb is burned out.              | Replace with a new LED.                 |
| The LED bulb burns out often.  | The wrong LED bulb is used.              | Replace LED with a correct one.         |
| The illumination is not bright | The wrong LED bulb is used.              | Replace the LED with a correct          |

|         |   |  |
|---------|---|--|
| enough. | <p>The light adjustment knob is set too low.</p> <p>The light adjustment knob is not working correctly.</p> | <p>one.</p> <p>Adjust the light intensity correctly.</p> <p>Replace light adjustment knob assembly (rheostat).</p> |
|---------|---|--|

# 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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