



MANUAL

EXC-360 **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.

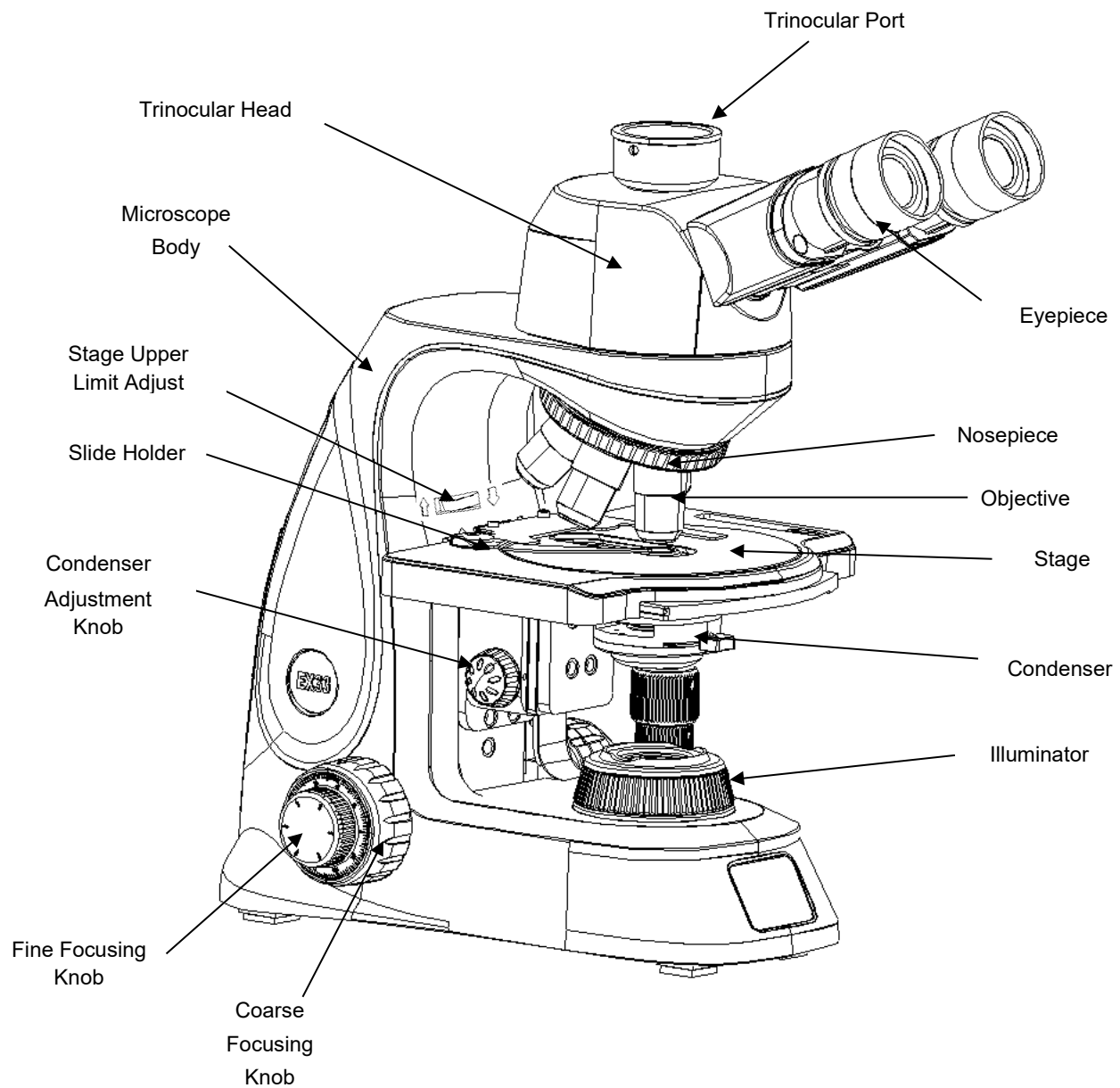
INTRODUCTION

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.

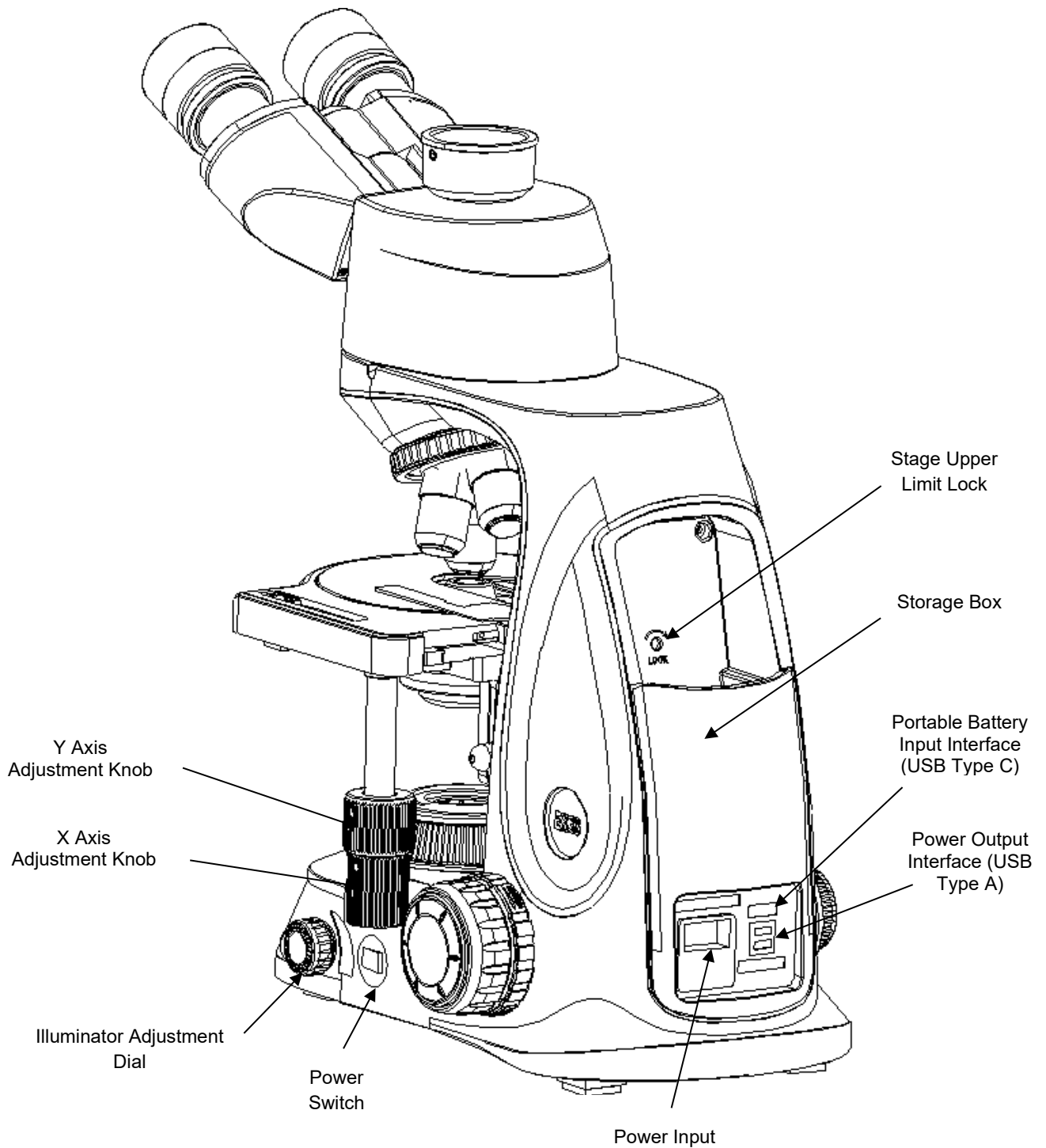
UNPACKING AND COMPONENTS

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.

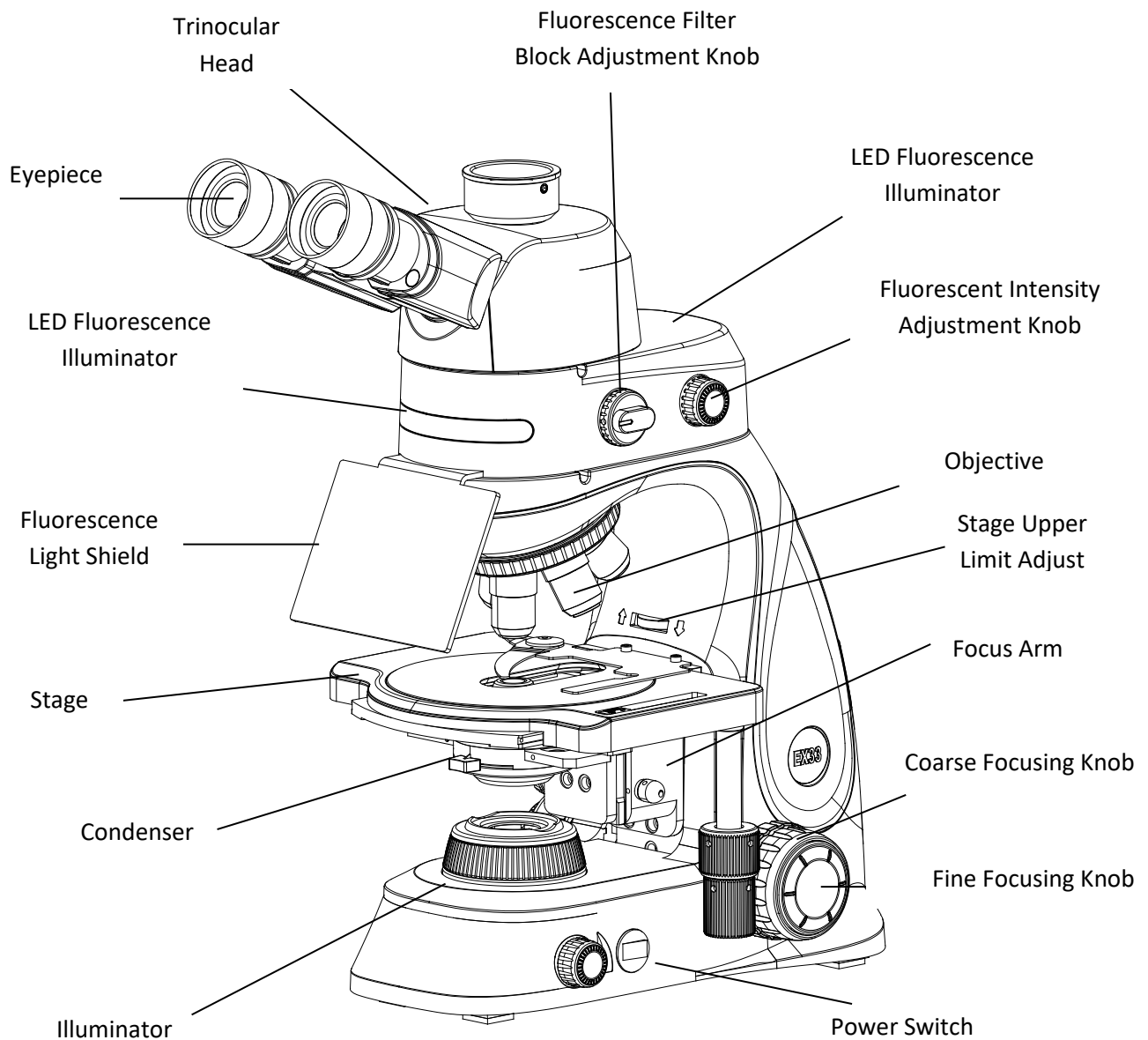
COMPONENTS DIAGRAM



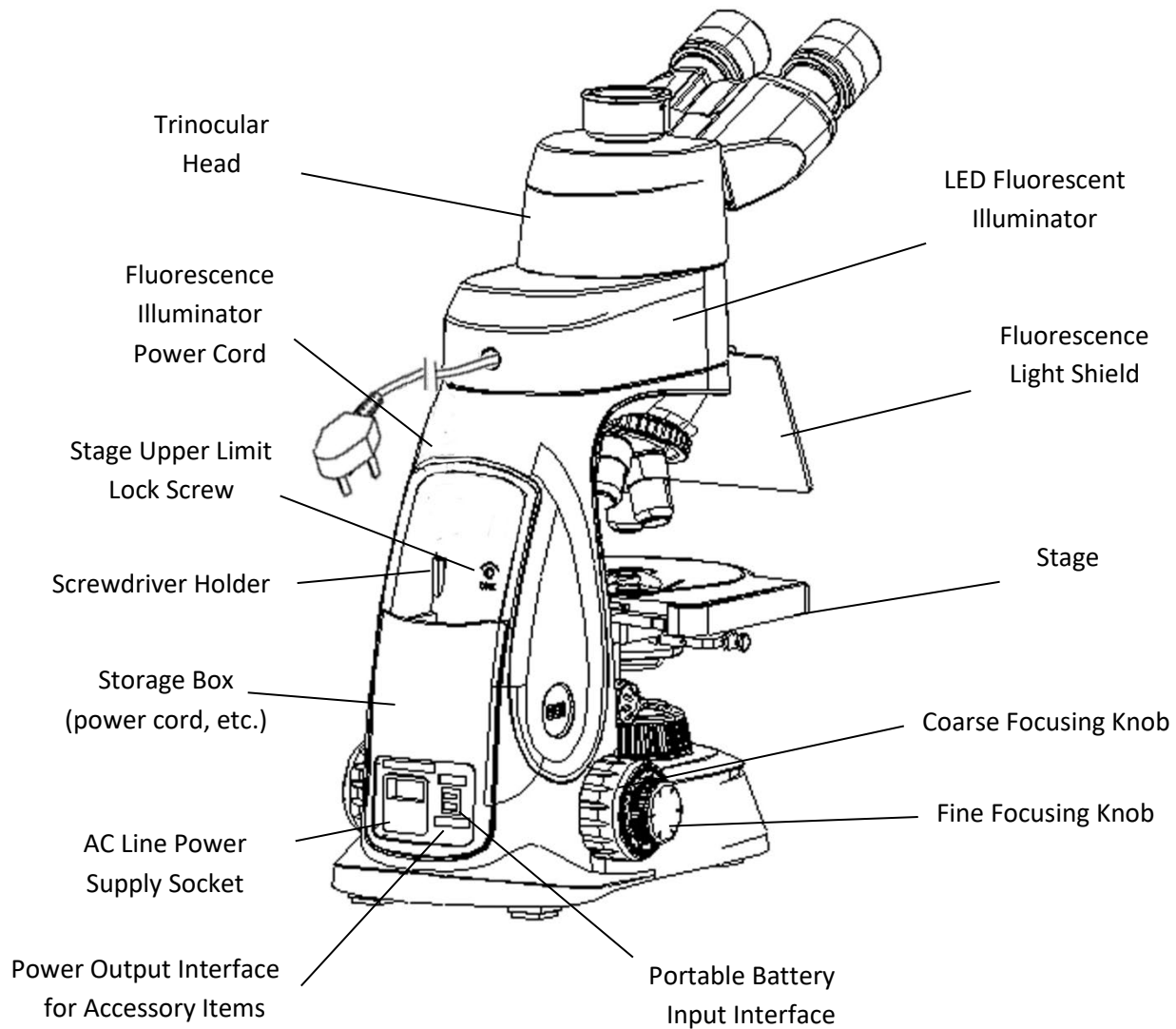
COMPONENTS DIAGRAM



Fluorescence Microscope (front)



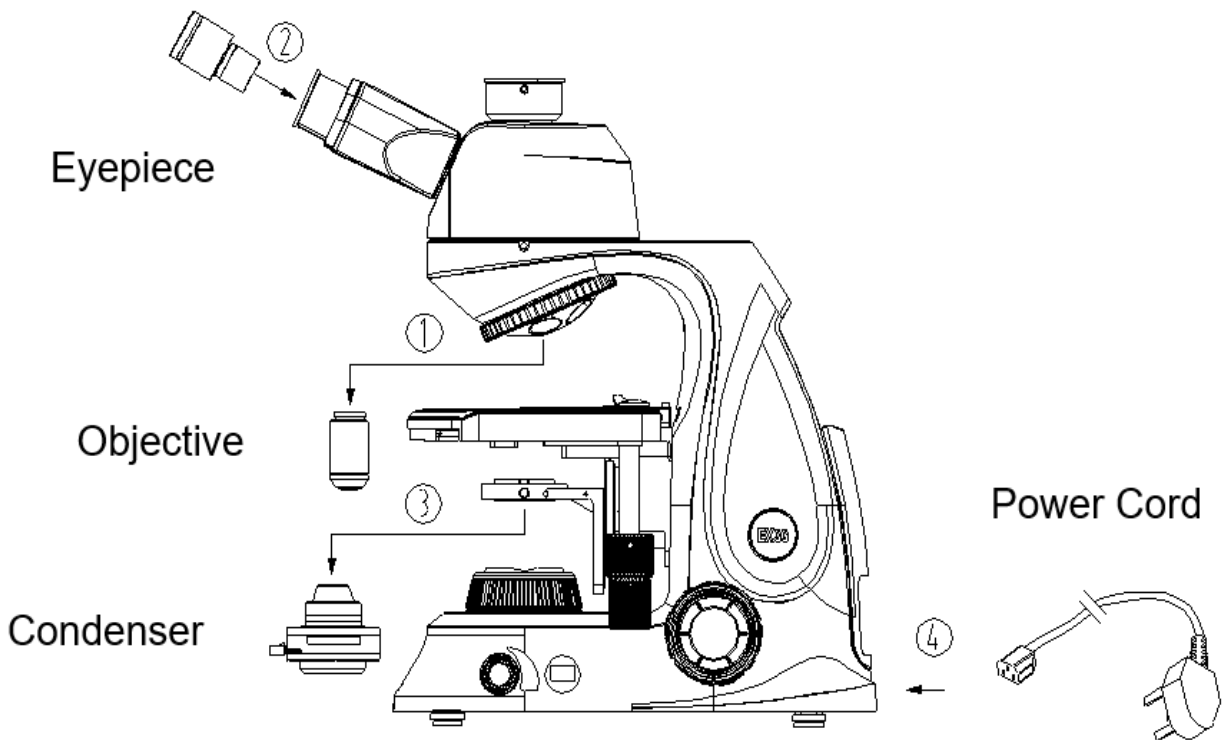
Fluorescence Microscope (back)



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.



DETAILED ASSEMBLY

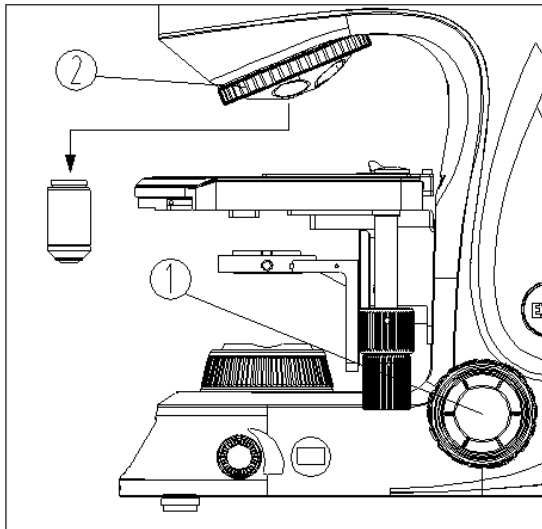


Fig. 1

Installing the Objectives - (Fig. 1)

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

Install each objective ② into the nosepiece ③ 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.

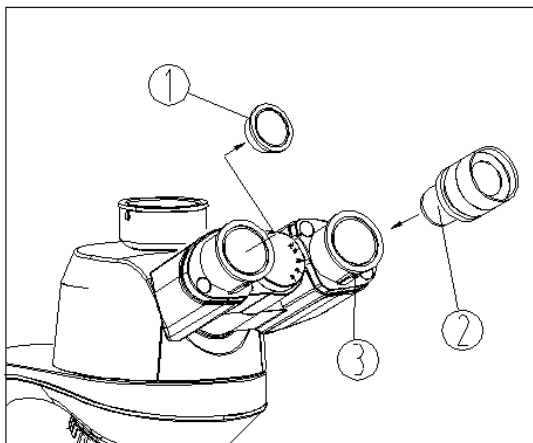


Fig. 2

Installing the Eyepieces - (Fig. 2)

Carefully remove the eyepieces ② from the protective packaging – be sure not to touch any optical (glass) surfaces. Remove the dust caps ① from the ends of the eyepiece tubes ③.

Insert an eyepiece ② into one of the eyepiece tubes ③ and gently twist and push the eyepiece in until it is flush with the top surface of the eyepiece tube.

Lock the eyepiece into place by tightening the lock screw (small hex screw) on the eyetube.

Repeat above for the other eyepiece.

DETAILED ASSEMBLY *(continued)*

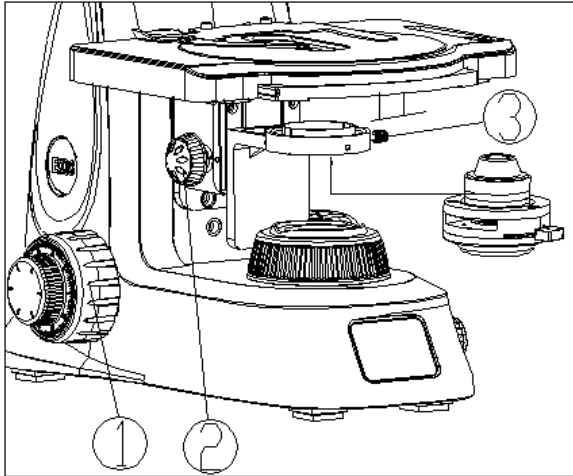


Fig. 3

Installing the Condenser - (Fig. 3)

Rotate the coarse focusing knob ① to raise the stage to the highest position.

Rotate the condenser adjustment knob ② to lower the condenser bracket to allow the condenser to slide on without striking the stage.

Loosen the condenser lock-screw ③.

Insert the condenser into the condenser bracket from the bottom until the condenser is aligned with the base. Rotate the condenser so the condenser aperture diaphragm handle faces forward.

Tighten the condenser lock-screw ③, then raise the condenser with the condenser adjustment knob to the highest position. (See Fig. 3)

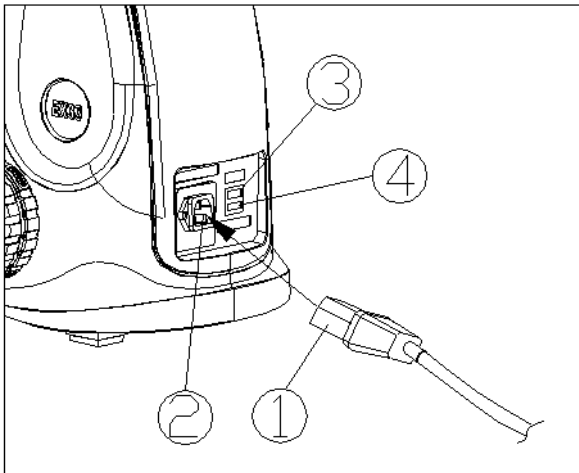


Fig. 4

Connect the Power Cord - (Fig. 4)

Make sure the power switch is off (O).

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

Plug the other end into a grounded outlet.

Input interface ③ accepts a charging bank with PD protocol and a fast-charging line to power the microscope. **Requires power bank with a minimum 20W output, 10,000 mAh and PD protocol.**

The output interface ④ can be connected to a USB Type A cable to power a mobile phone or tablet.

NOTE: Modern low-voltage power cords appear very similar. **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

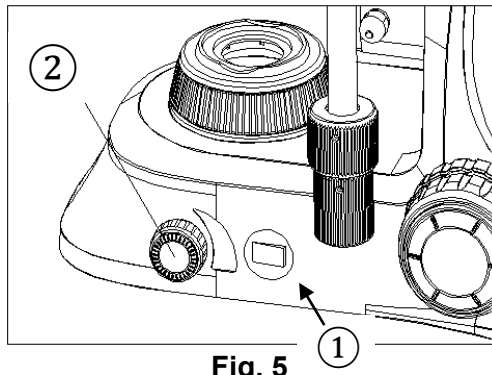


Fig. 5

Illumination - (Fig. 5)

Turn the power switch to On (I) to turn on the transmitted light ①. The toggle switch will illuminate green.

Adjust the brightness by turning the Illuminator Adjustment Dial ②.

★ NOTE: The EXC-360 is equipped with an ECO auto-off feature and the illumination will automatically turn off after approximately 10 minutes of inactivity. To restart the illumination, simply press or turn the illuminator adjustment dial ① to wake up the illumination.

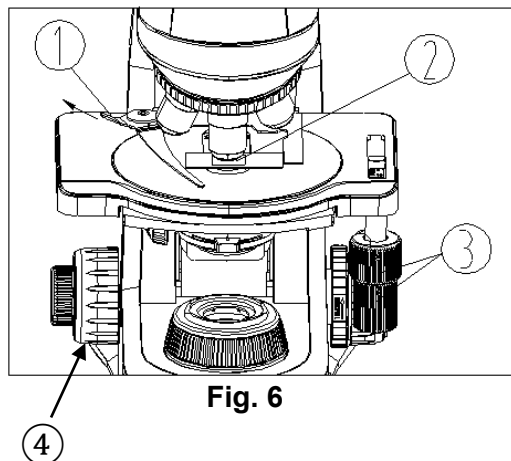


Fig. 6

Placing A Specimen - (Fig. 6)

★ The optics of the EXC-360 are designed to observe specimen slides with a 0.17mm thick cover glass (No. 1 ½ or 1.5). Using no cover glass or thinner/thicker cover glass will result in lower image quality and, in the case of the 100X oil immersion objective, the possible inability to achieve focus.

To avoid the objective touching the specimen, lower the stage to its lowest position by turning the coarse adjustment knob ④ counterclockwise.

Push the left side of the specimen holder ① on the top of the stage plate to open position (out to left). Place slide ② into the specimen holder and allow the holder to close slowly against the slide.

Adjusting the Stage

The stage has a coaxial X-Y Stage Movement Knobs ③ which allows you to move your specimen in any direction: top knob - forward/back (Y), and bottom knob - left/right (X).

ADJUSTMENT & OPERATION *(continued)*

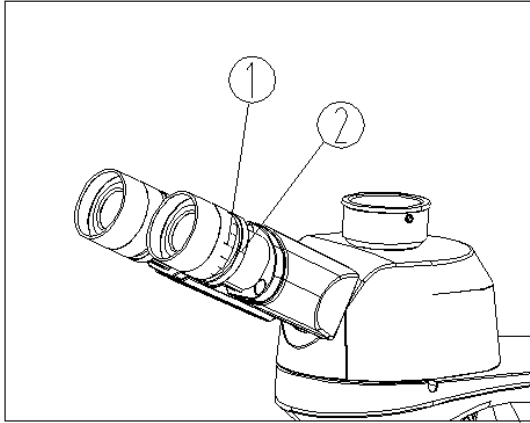


Fig. 7

Focusing - (Fig. 7-8)

Set the left diopter collar scale ① to "0" (Fig. 7).

Using your left eye only and the 10X objective, focus your specimen by adjusting the coarse focusing adjustment knob ① (Fig. 8), then refine the image to its sharpest focus by turning the fine focusing adjustment knob ③ (Fig. 8)

Rotate the diopter collar ① to obtain the sharpest focus of the right eyepiece compared to the left eyepiece. Do not adjust focus with the coarse or fine focus knobs. The diopter range is + or – 5. The number aligned to the white dot on the viewing head is the diopter in use.

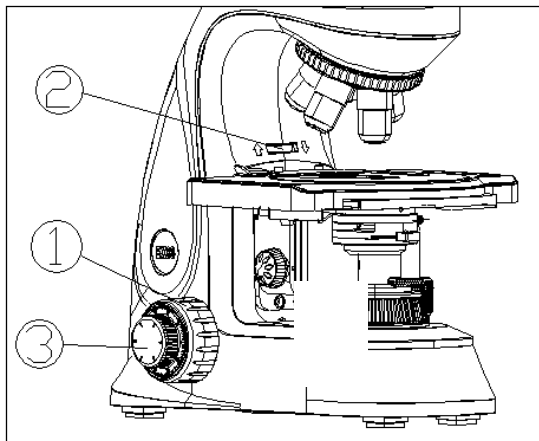


Fig. 8

★ A stage upper limit adjustment wheel ② (Fig. 8) can be used to prevent the objective from touching (breaking) the slide when focusing. With a sample on the stage, focus on the specimen. To adjust the upper stage limit, loosen the stage upper limit locking screw on the back of the frame (see page 5 or 7), rotate stage upper limit adjustment wheel to increase or decrease stage upper limit, then retighten the locking screw on the back.

NOTE: do not counter rotate the focusing knob as this will damage the focusing system.

ADJUSTMENT & OPERATION *(continued)*

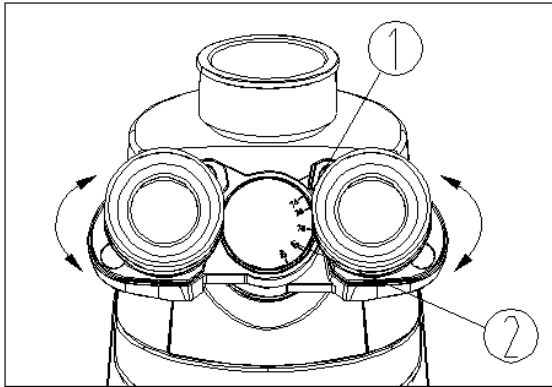


Fig. 9

Adjusting the Interpupillary Distance - (Fig. 9-10)

To adjust the interpupillary distance (IPD; width of the eyepieces for comfortable viewing), hold the left and right eyetubes while observing a specimen.

Rotate the eyetubes up or down as shown by arrows on 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. Improper IPD adjustment causes operator fatigue and can affect parfocality between objectives.

Refer to the “.” mark on the eyetube ① and the lines on the central axis ② to indicate your IPD.

Range: 48~76mm

Remember your IPD for future operation.

★ This gemel eyepiece tube can be rotated 360° (see Fig. 10). Users can set their IPD, then rotate the eyetube 180° to increase the eyepoint by 34mm. This feature accommodates more users of varying heights.

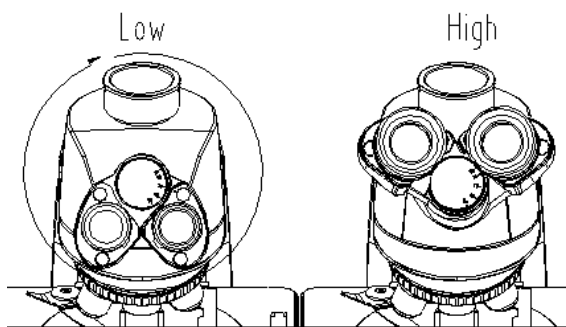


Fig. 10

ADJUSTMENT & OPERATION *(continued)*

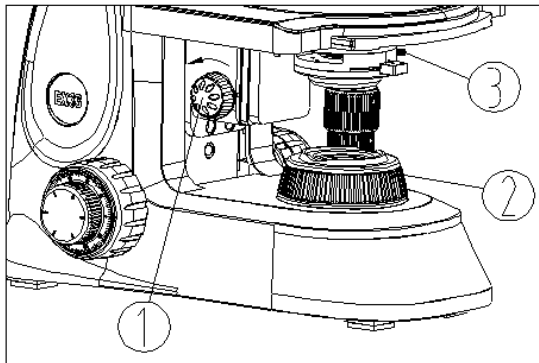


Fig. 11

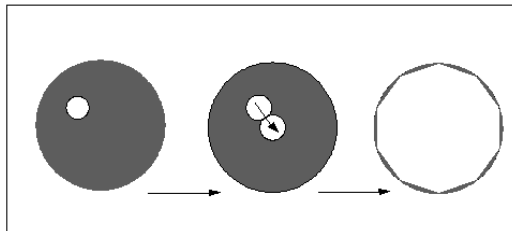


Fig. 12

Adjusting the Condenser - (Fig. 11-12)

The condenser of your EXC-360 was pre-centered at our NY facility before shipping to you. No centering adjustment should be necessary.

Rotate the condenser adjusting knob ① to raise it to the highest position (see Fig. 11).

Rotate the objective 10X to the light path and focus the specimen.

Rotate the field diaphragm adjustment ring ② to put the field diaphragm to the smallest position. An image of the field diaphragm is seen in the eyepiece.

Turn the condenser adjusting knob ① to adjust the image of the field diaphragm until it is sharpest.

Adjust the center adjustment screw ③ and center the image of the field diaphragm in the center of the field of view (see Fig.12).

Open the field diaphragm gradually. If the image is in the center all the time, it shows the condenser has been centered correctly.

Enlarge the field diaphragm until it is outside of the field of view.

ADJUSTMENT & OPERATION *(continued)*

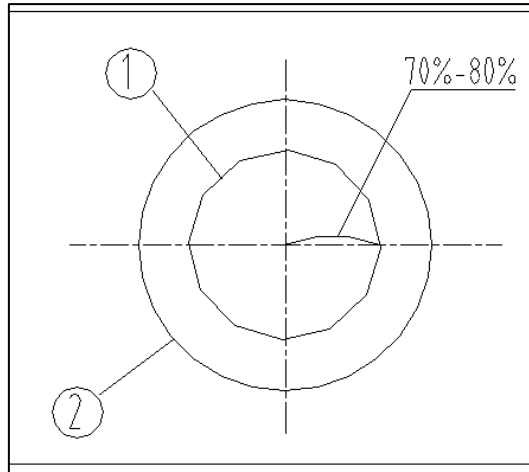


Fig. 13

Adjusting the Condenser Diaphragm - (Fig. 13-14)

The condenser aperture diaphragm determines the numerical aperture of the illumination system. For optimal resolution, the N.A. of illumination system should match the N.A. of the objective. The N.A. of the objective is printed on the objective barrel next to the magnification. The N.A. of the condenser is adjusted using the aperture lever – higher N.A. to the left, lower N.A. to the right.

To adjust the condenser, turn the condenser adjusting knob ① (Fig. 11) to raise or lower the condenser. The condenser is typically used in its highest position.

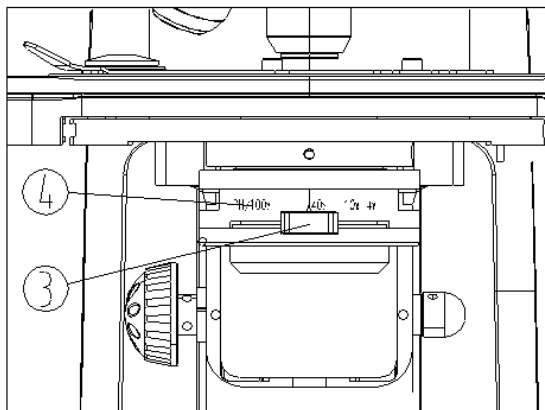


Fig. 14

As specimen contrast is usually low, it is recommended to adjust the condenser aperture diaphragm to be 70%-80% of the N.A. of objective. Rotate the aperture diaphragm adjusting lever ③ (Fig. 14). Remove an eyepiece to observe the aperture size down in the eyetube (Fig. 13). Adjust the aperture diaphragm adjusting lever ③ until the aperture ① (opening; Fig. 13) is approximately 70-80% of the entire field of view of the objective ②. The aperture should be opened more for objectives with higher N.A. and closed more for objectives with lower N.A.

Alternatively, adjust the condenser aperture diaphragm lever to the N.A. printed on the front of the condenser. These are approximate values.

For optimal resolution and contrast, it is recommended that the condenser diaphragm aperture be adjusted each time the objective is changed.

ADJUSTMENT & OPERATION *(continued)*

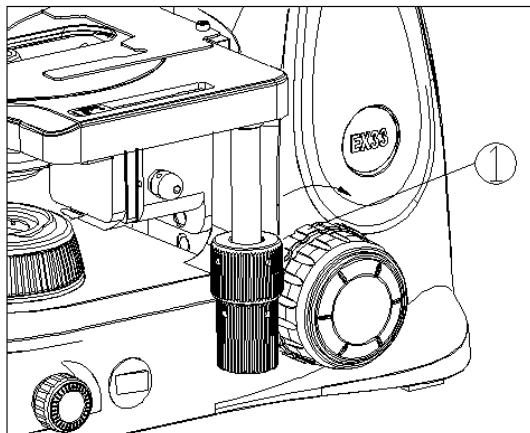


Fig. 15

Adjusting the Focus Tension - (Fig. 15)

If the coarse focus knob is difficult to turn or the specimen drifts out of focus after focusing, the focus tension can be adjusted using the tension adjustment collar ①.

Located on the right side of the stand between the coarse adjustment knob and the frame is an adjustable tension adjustment collar labeled "Tension" with an arrow pointing in the direction to increase focus tension.

To increase tension, rotate the focus tension adjustment collar in the direction of the arrow (clockwise, toward the back of the microscope).

If focus tension is too tight, rotate the tension adjustment collar in the counterclockwise direction (toward the front of the microscope) to loosen the tension.

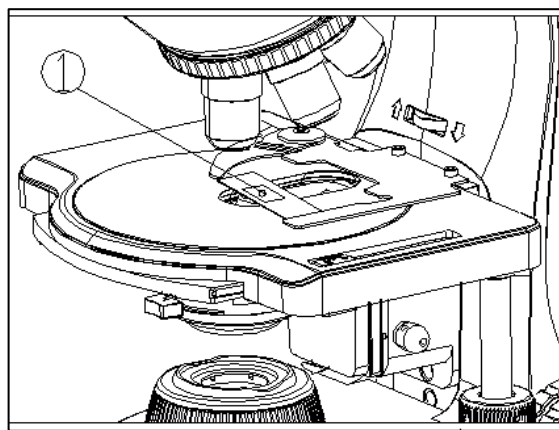


Fig. 16

Using the 100X Oil Immersion Objective – (Fig. 16)

Begin with the 4X objective to focus the specimen.

Place a drop of immersion oil ① on the specimen (see Fig. 16).

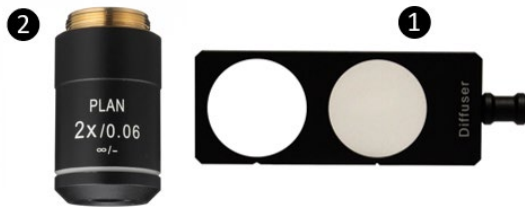
Rotate the 100X oil objective into the light path. Then use the **fine focusing knob** to focus.

★ Make sure there is no air bubble in the oil. An air bubble will severely degrade the image. To remove an air bubble, fold a piece of lens tissue into a pointed triangle and poke the bubble.

After using, wipe the front lens of the objective with a piece of lens tissue followed by a clean piece of lens tissue moistened with a small amount of rubbing alcohol. Wipe the oil off the specimen slide.

★ To avoid getting oil on a 40X dry objective, be sure to remove and clean the slide before moving the 40X objective into the light path.

ADJUSTMENT & OPERATION *(continued)*



Using the 2X Objective (optional)

A diffuser slider **1** (CAT #00-3222-2X) is recommended for use with the 2x objective **2** (CAT #00-3172-PL) for the EXC-360 microscope. The diffuser slider and 2x objective are sold separately and are only compatible with the Abbe condenser (not phase contrast turret condenser).

The diffuser aides to provide even specimen illumination across the entire field of view.

The diffuser slider slips into the filter slider slot of the Abbe condenser **3**. The condenser is provided with the EXC-360 microscope.



Install the 2x objective in the nosepiece, typically in the open position adjacent to the 4x objective.

Open the field diaphragm completely.

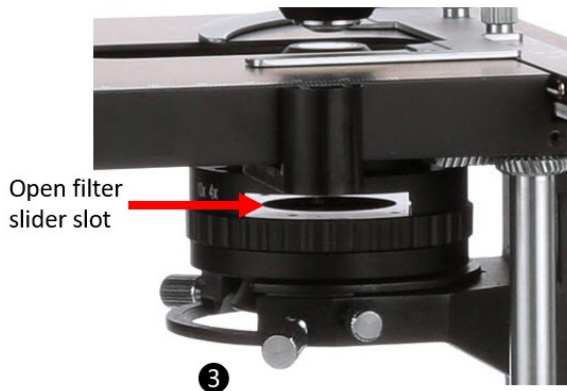
Turn the 2x objective into the light path.

Remove the slider blank **4** from the condenser slot.

Slide the diffuser slider into the condenser filter slider slot from the left side to the right side. The writing should be up, and the handle on the left.

When using the 2x objective for observation, slide the diffuser slider all the way in from the left side of the condenser to into place the diffuser in the light path. A positive detent on the slider will help to find the “in” position.

When using 4x and higher objectives, the diffuser slider can be pulled partially out until the open position is in the light path. A detent on the slider will help to find the “out” position. The slider does not need to be removed during most observations but is easily removed and reinserted as necessary.



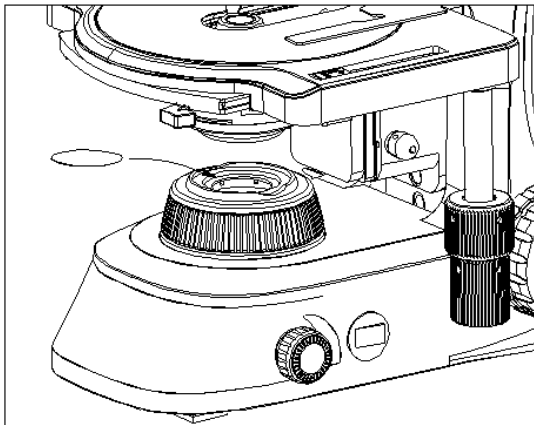


Fig. 17

Using a Filter - (Fig. 17)

Filters can improve contrast in the specimen image (see Fig. 17).

There are three color filters available: blue, green, and yellow.

★ Place the filter's rough side (frosted) down when installing it on the light well.

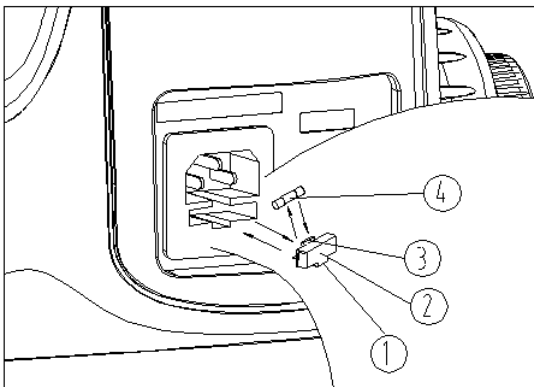


Fig. 18

Replacing the Fuse – (Fig. 18)

Turn the main switch to “O” (OFF) before replacing the fuse.

Pull out the power cord. Unscrew the fuse group (1) from the fuse base (2) with a “–” type screwdriver. Install a new fuse and screw the fuse group back into the fuse base (see Fig. 18).

★ Specification of the fuse: T250V, 3.15A.

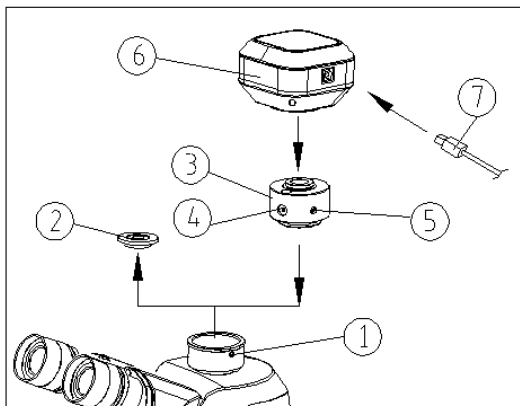


Fig. 19

Attaching a Camera – (Fig. 19)

Loosen the lock screw (1) of trinocular head and remove the dust cover (2).

Remove the dust cover(s) of the camera adapter (3) and screw the threaded end into the camera (6).

Place the bottom of the camera adapter (3) into the trinocular port of the viewing head and tighten the lock screw (1).

To adjust camera image focus to eyepieces, focus using the eyepieces first. Loosen the lock screw (5) of the camera adapter and rotate the focus screw (4) until the camera image is in focus. Retighten the lock screw (5).

ADJUSTMENT & OPERATION *(continued)*

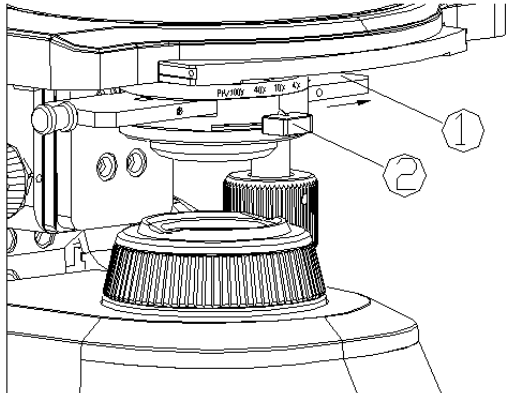


Fig. 20

Assembly and Operation of Phase Contrast Accessories (OPTIONAL) - (Fig. 20)

Slider Phase

Keep the phase contrast slider ① face up (the side with words should be oriented up), insert it from left to right into the condenser slider slot as the direction of the arrow pointed (see Fig. 20).

Every diaphragm or hole has its corresponding position, one diaphragm or hole is inserted into the center of optical path when it sounds “ka-da” during phase contrast slider rotating.

When observing phase contrast, keep the adjusting ring of the aperture diaphragm ② indicator to “PH” position.

★ Each magnification phase contrast objective is used with matched ring diaphragm (Like 10X phase contrast objective corresponding to 10X ring diaphragm).

★ As the ring diaphragm is pre-centered, it doesn't need to be adjusted during operation in most cases.

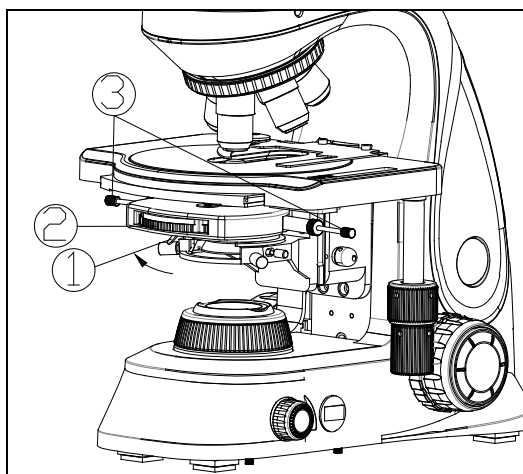


Fig. 21

Turret Phase Contrast

If you ordered your microscope with turret phase contrast, your microscope should arrive with the turret phase contrast condenser already installed, and the phase annuli were pre-centered at our factory.

Rotate the phase contrast ring ② to “BF” position for brightfield observation. When it sounds “ka-da” in rotating, it indicates that one diaphragm or hole is rotated into the center of optical path (see Fig. 21).

For phase contrast observation, rotate a phase contrast objective into the optical path. Then rotate the phase contrast ring into the position with the corresponding objective magnification.

NOTE: Ensure that the condenser diaphragm is wide open (“PH” position).

ADJUSTMENT & OPERATION *(continued)*

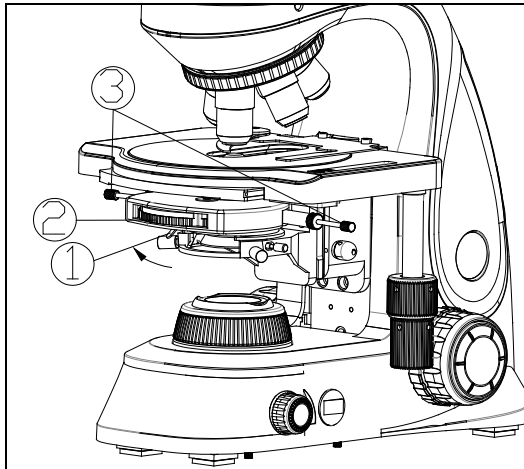


Fig. 22



Fig. 23

Turret Phase Contrast & Darkfield

If you ordered your microscope with turret phase contrast with darkfield, your microscope should arrive with the turret phase contrast/darkfield condenser already installed, and the phase and darkfield annuli were pre-centered at our factory.

Rotate the phase contrast ring ② to “BF” position for brightfield observation. When it sounds “ka-da” in rotating, it indicates that one diaphragm or hole is rotated into the center of optical path (see Fig. 22).

For phase contrast or darkfield (DF) observation, rotate a phase contrast objective into the optical path. Then rotate the condenser turret into the position with the corresponding objective magnification.

NOTE: Ensure that the condenser diaphragm is wide open (“PH” position).

For darkfield observation, rotate the condenser turret to the “DF” position. Turn an appropriate objective into the light path. Darkfield contrast works with objectives with Numerical Apertures (NA) of 0.65 or below. In most cases, this includes 4x, 10x, 20x and 40x Plan Achromat objectives. Confirm the NA on the barrel of your objectives (Fig. 23) – it is indicated after the magnification followed by a “/”.

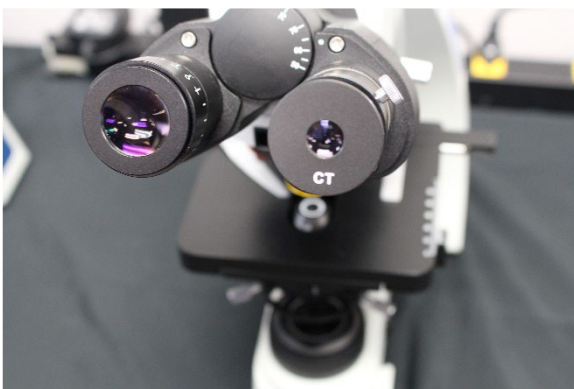


Fig. 24

Centering the Phase Annuli

To get optimal phase effect, the phase annuli in either the slider phase or turret phase accessories must be properly aligned.

The phase annuli in the phase contrast slider or turret phase condenser were pre-centered at the factory. Below are steps to perform centering yourself.

Centering Phase Annuli in Slider Phase

With the 10x objective in the light path, place a phase contrast specimen onto the stage.



Fig. 25

Remove one eyepiece and install the supplied centering telescope ("CT" in Fig. 24). You may need to loosen the set screw that secures the eyepiece in the eyetube. Focus the telescope on the phase ring inside the 10x Phase Contrast objective.

Insert the provided adjustment screwdrivers into the holes (red arrows) for the adjustment screws (Fig. 25). The correct holes are located on the end of slider (left or right), closest to the annuli you wish to adjust.

Looking through the centering telescope, turn the screwdrivers to move the phase annulus to overlap the brighter phase ring of the objective. Refer to Fig. 26 for the appearance of the phase annulus and phase ring.

Remove the screwdrivers when finished, and store.

Phase Plate and Light Annulus Alignment

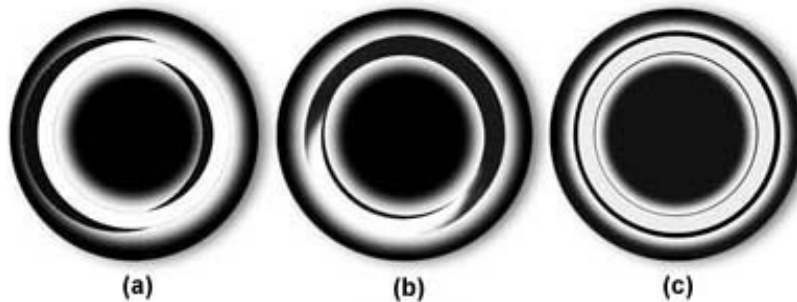


Fig. 26



Centering Phase Annuli in Turret Phase

The condenser-turret has two adjusting screws. These are used to align annular light rings ("annuli") in the condenser-turret to the corresponding phase ring in the objectives.

Insert the provided adjustment screwdrivers into the holes for the adjustment screws. The correct holes are located toward the back of the condenser.

Note the incorrect placement indicated by the red "X". The 3rd photo to the right shows a close-up of an insertion hole for the adjustment screwdriver.

Turn the screwdrivers to move the 10 annulus so that it is aligned – see (c) in Fig. 26.



Remove the alignment screwdrivers when finished and store.

Repeat the above annulus alignment procedure for the remaining Phase objectives on the microscope. Be sure to change the phase turret to the position that matches the objective (i.e. 20 for 20x, 40 for 40x).

NOTE: You **MUST** remove the alignment screwdrivers from the turret condenser prior to rotating the turret. Return the adjustment screwdrivers to storage for safe keeping and future use.



ADJUSTMENT & OPERATION *(continued)*

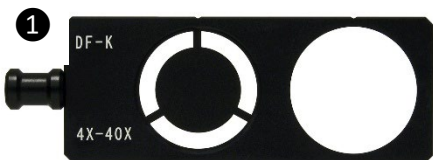


Fig. 27



Fig. 28

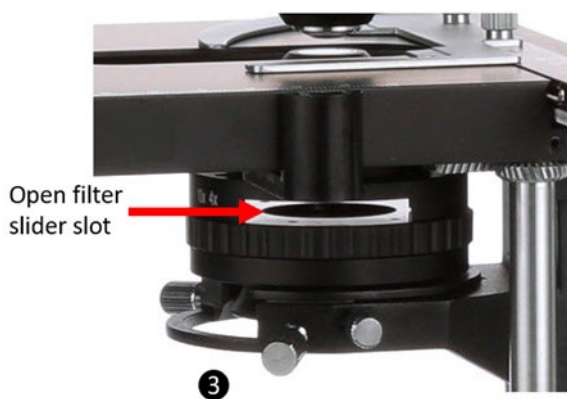


Fig. 29

Using the Darkfield Slider (optional) - (Fig. 27-30)

A darkfield (DF) slider **1** (CAT #360-3223-DF) is required for DF observation. The DF slider is for use with 4x – 40x objectives – it is not suitable for objectives with Numerical Apertures over 0.65. The DF slider is sold separately and is only compatible with the Abbe condenser (not phase contrast turret condenser).

The DF slider generates oblique illumination across the entire field of view and, in the absence of a specimen, the field will appear dark or black. Objects and particles in the field of view will scatter light, some of which is captured by the objective and can be observed.

The DF slider slips into the filter slider slot of the Abbe condenser **3**. The condenser is standard with the EXC-360 microscope.

Open the field diaphragm **2** completely (Fig. 30).

Turn the 4x objective into the light path.

Remove the slider blank **4** (Fig. 28) from the condenser slot.

Slide the DF slider into the condenser filter slider slot from the left side to the right side. The writing should be up, and the handle on the left.

Insert the DF slider all the way in from the left side of the condenser to position the DF annulus into the light path. A positive detent on the slider will help to find the “in” position.

Slight adjustment of the condenser up or down may improve the DF effect.

Change objectives as desired. A 40x objective is typically the maximum magnification that will produce an acceptable DF image (very dark or black background) and this is due to the Numerical Aperture.

Move the DF slider into the “out” position for brightfield observation. The slider does not need to be removed completely from the condenser.

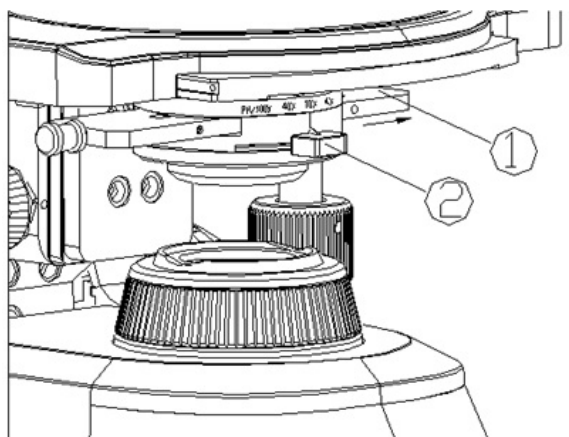


Fig. 30

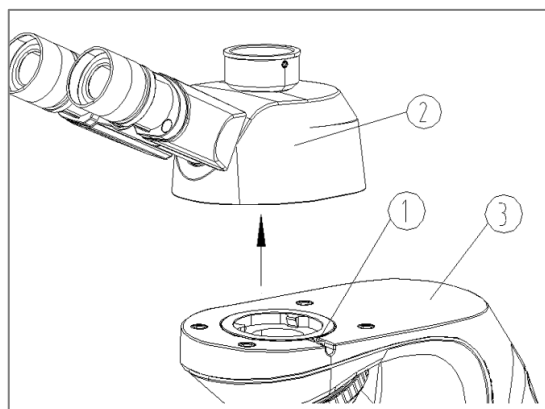


Fig. 31

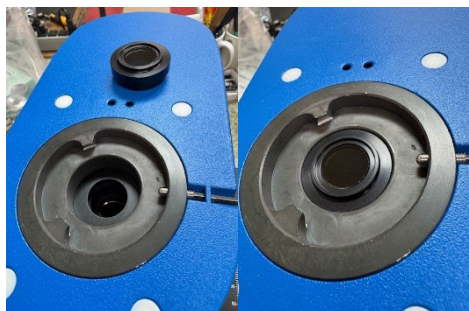


Fig. 32

Using Simple Polarization (optional) - (Fig. 31-34)

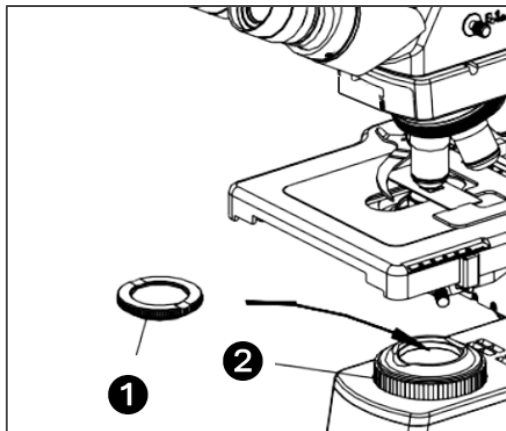
A polarizer and analyzer are required for simple polarization observation.

The analyzer installs in the top of the microscope frame below the viewing head.

1. To install the analyzer, remove the viewing head by loosening the locking screw ① with the included 3mm hex wrench. Do not remove the locking screw completely, rather loosen just enough that the head ② lifts off the frame ③.
2. Place the analyzer in the recess as shown in Fig. 32.
3. Reverse step 1 to reinstall the viewing head by aligning the dovetail in the flange, and gently tightening the locking screw with the 3mm hex wrench.

The polarizer installs on the top of the light well (Fig. 33). Simply set the polarizer ① onto the light well above the collector lens assembly ② (Fig. 33 and Fig. 34). The polarizer should rotate freely.

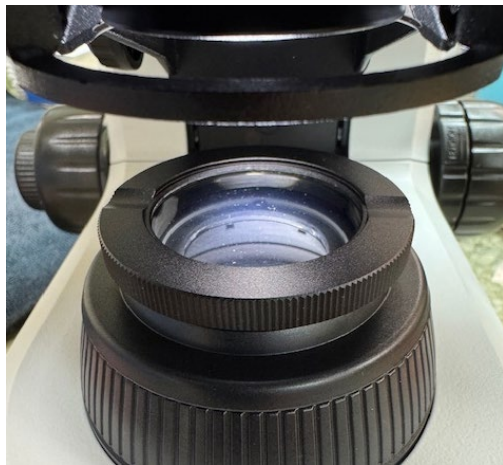
For optimal simple polarization, the polarizer and analyzer must be at extinction. This means that the polarization is crossed, resulting in a black or very dark background when observed through the eyepieces in the absence of a sample. To set extinction, remove the sample from the stage. While viewing through the eyepieces, rotate the polarizer until the background is at its darkest – this is extinction. Place a sample on the stage and observe.

**Fig. 33**

You may rotate the polarizer at any time to adjust effect of polarization.

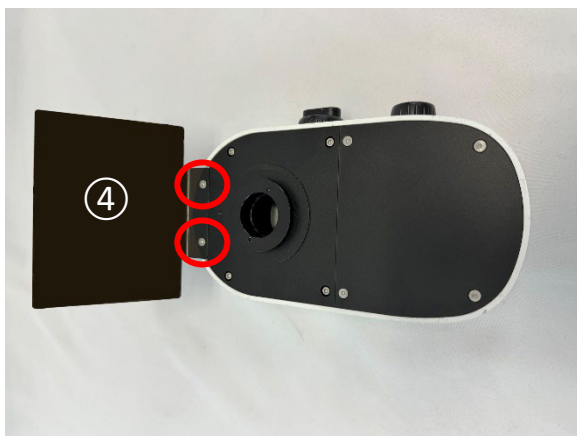
For brightfield observation, either rotate the polarizer 90° (right or left), or remove the polarizer from the light well.

NOTE: DO NOT SCRATCH THE POLARIZER. A scratch will negatively impact the polarizer's ability to generate polarized light.

**Fig. 34**

Assembly and Operation of Fluorescence Illuminator - (Fig. 35-40)

1. Install fluorescence light shield ④ onto bottom of fluorescence illuminator ②. Fasten with two screws, through the holes in the shield, and into the bottom of the fluorescence illuminator (red circles). When the fluorescence illuminator is on its back (black bottom is facing up), then the fluorescence light shield will as point upward.

**Fig. 35**

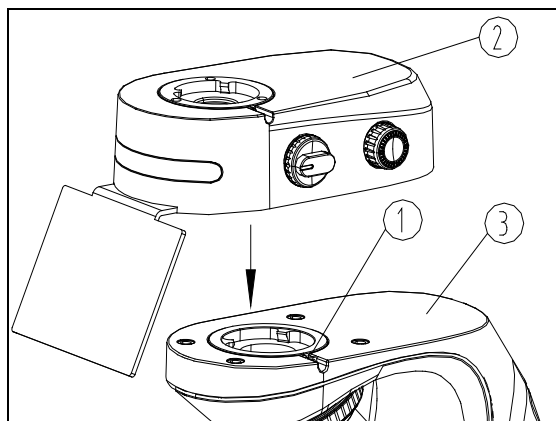


Fig. 36

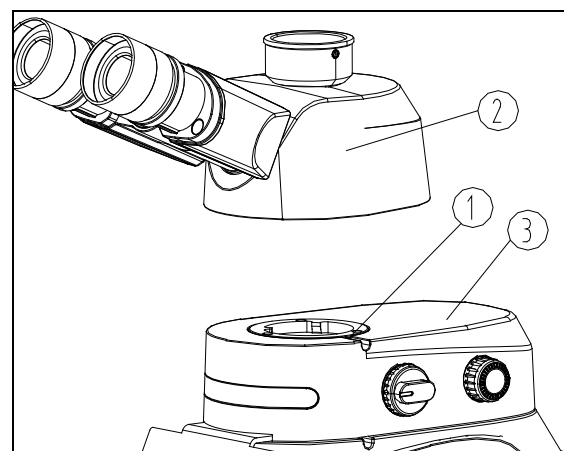


Fig. 37

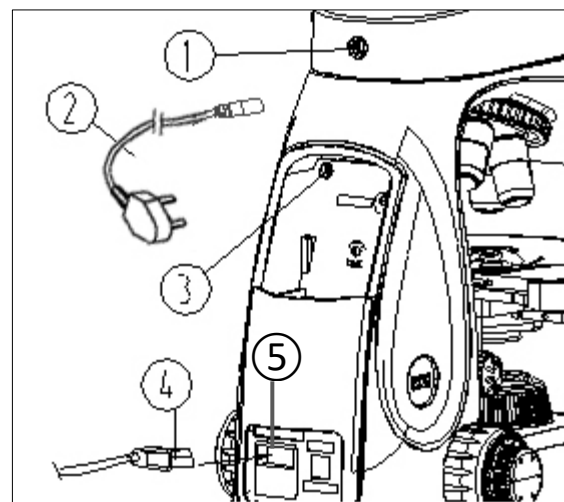


Fig. 38

2. Loosen the locking screw ① of the observation head with the provided hex wrench until the observation head can be removed. Remove the observation head and place on the bench.
3. Put the dovetail interface at the bottom of the LED fluorescence illuminator ② onto the microscope body ③ interface (see arrow), and tighten the locking screw ① with the hex wrench. (See Fig. 35)
4. Put the dovetail interface at the bottom of the binocular/ trinocular observation head ② into the interface on the LED fluorescent illuminator ③ interface seat, and tighten the locking screw ① with the hex wrench. (See Fig. 36)
5. Insert one end of the power cable ② into the power socket ① of the LED fluorescence illuminator back, and then insert the power adapter plug into a suitable electrical receptacle. Ensure both connections are secure. (See Fig. 38)
6. Insert one end of the external power cord ④ into the power socket ⑤ of the microscope back, and then insert the other end into the power supply receptacle. Ensure both connections are secure.

★ Before connecting the power, first rotate the transmission power switch and the reflection adjustment knob (with switch) to “Off” (turn off).

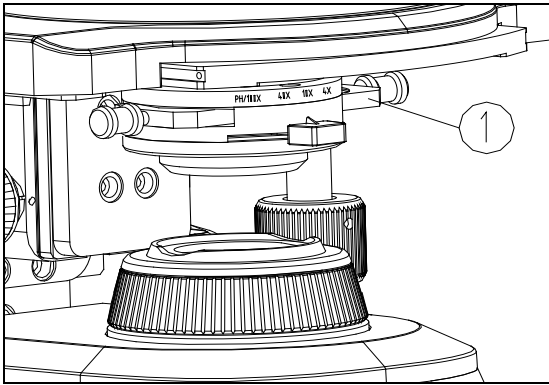


Fig. 39

7. The fluorescence shutter has an open position for observation with transmitted light and a closed position (fluorescence shutter) for fluorescence observation.

Refer to Diffuser Slider or Darkfield Slider section for installation of the fluorescence shutter.

When observing a fluorescence slide, pull or push the fluorescence shutter ① to the left until it connects with the detent indicating you have reached the fluorescence observation position (see Fig. 39). The transmitted illumination path is now totally blocked. Turn off the transmitted light adjustment knob.

- ★ For transmitted illumination observation, pull the fluorescence shutter ① to the right side to completely open the transmission illumination path.

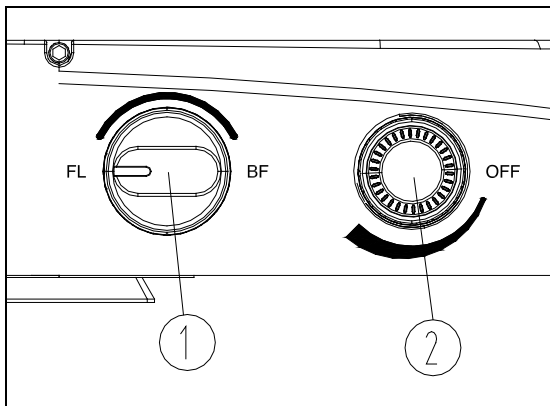


Fig. 40

8. The LED fluorescence filter block adjustment knob ① can be rotated 180° in the direction of the arrow to change between transmitted brightfield and LED fluorescence illumination and observation. FL means fluorescence observation, and BF means brightfield observation. (See Fig. 40)
9. Illumination Intensity: Rotate the adjustment knob ② in clockwise to turn on the LED fluorescence lamp is turned on – the knob will click when the LED lamp turns on. Rotate the knob clockwise to increase the FL LED intensity; Rotate the adjustment knob ② counterclockwise to reduce the brightness of the LED fluorescence lamp. To turn off the FL LED lamp, continue to turn the knob counterclockwise until it clicks. (See Fig. 40)

- ★ Ensure that the LED fluorescence block adjustment knob is in the BF position for brightfield observation. The BF position moves the fluorescence block out of the light path for clear BF observation. Otherwise if the fluorescence block is left in the optical path during brightfield observation, the field will have the color of the emission filter in the fluorescence block (e.g., the FITC/GFP fluorescence block would give a green color to the brightfield observation).

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	Turn the nosepiece to click stop position so the objective is seated correctly in 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; No. 1 ½ or 1.5)
	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 Revolving nosepiece is not in the click-stop position	Secure the specimen in the slide holder Turn 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 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

MECHANICAL PROBLEMS

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 (No. 1 ½ or 1.5)
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 (No. 1 ½ or 1.5) Readjust the diopter settings as outlined in section 4.3

MECHANICAL PROBLEMS *(continued)*

Problem	Cause	Corrective Measures
Lamp does not light when switched on	No electrical power	Check power cord connection
	Lamp bulb burnt out	Replace bulb
	Power adapter failure	Replace power adapter
Focus slips/drifts 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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