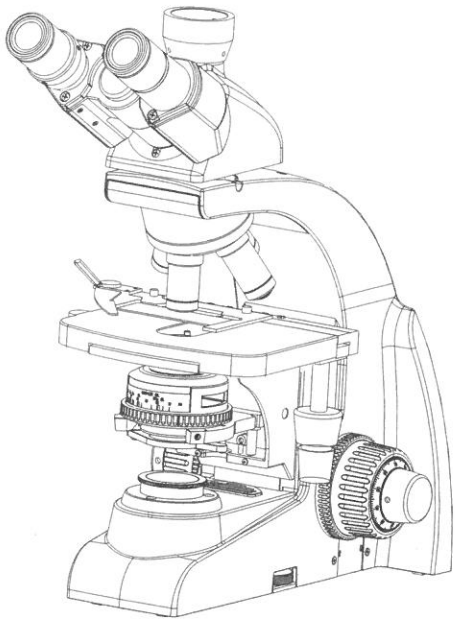


INSTRUCTIONS

Biological Microscope

This instruction manual is for this Biological Microscopes. To ensure the safety, obtain optimum performance and to familiarize yourself fully with the use of this microscope, we recommend that you study this manual thoroughly before operating the microscope. Retain this instruction manual in an easily accessible place near the work desk for future reference.

CONTENTS

Correct assembly and adjustments are critical for the microscope to exhibit its full performance. If you are going to assemble the microscope yourself, please read Chapter2, "ASSEMBLY" carefully. For the modules provided with instruction manuals, also read the assembly procedures in their instruction manuals.

IMPORTANT

SAFETY PRECAUTIONS

1. After the equipment has been used in an observation of a specimen that is accompanied with a potential of infection, clean the parts coming in contact with the specimen to prevent infection.
   - Moving this product is accompanied with the risk of dropping the specimen. Be sure to remove the specimen before moving this product.
   - In case the specimen is damaged by erroneous, promptly take the infection prevention measures.
2. To avoid potential shock hazards and burns when replacing the light bulb, set the main switch to "O" (OFF) then disconnect the power cord from the wall outlet in advance. Whenever you replace the bulb during use or right after use, allow the lamp housing and bulb to cool before touching.
3. Install the microscope on a sturdy, level table or bench so as not to block the air vents on the underside of the base. Do not place the microscope on a soft surface into which the microscope may sink, as this could result in blocking the air vents and cause overheating or a fire.
4. The microscope is provided with a simplified waterproof mechanism. Therefore, if culture liquid or water is split on the stage, revolving nosepiece or microscope frame, damage to the equipment or an electrical shock may result. Immediately wipe the liquid or water off if it is spilt on them.
5. The surfaces of the lamp housing will become extremely hot during long-time operation. Be sure to keep the flammable stuffs such as paper, alcohol, oil away from the lamp house to avoid fire.
6. Always be sure the power cord provided by the supplier. If the proper power cord is not used, product safety performance cannot be warranted.
7. When installing the microscope, route the power cord away from the lamp housing. Should the power cord come in contact with the hot lamp housing, the power cord could melt and cause electric shock.
8. Always ensure that the grounding terminal of the microscope and that of the wall outlet are properly connected. If the equipment is not grounded, the supplier can no longer warrant the electrical safety performance of the equipment.
9. Never set the main switch to " I " (ON) while a metallic object is present in the air vents of the microscope, as this could result in electrical shock, personal injury and equipment damage.
10. After operation or in case of abnormality, be sure to disconnect the power cord from the connector on the microscope or from the wall power outlet.

SAFETY SYMBOLS

The following symbols are found on the microscope. Study the meaning of the symbols and always use the equipment in the safest possible manner.

Symbols	Explanation
	Indicates that the surface becomes hot, and should not be touched with bare hands.
	Before use, carefully read the instruction manual. Improper use could result in personal injury to the user and/or damage to the equipment.
I	Indicates that the main switch is ON.
○	Indicates that the main switch is OFF.

CAUTIONS

If the microscope is used in a manner not specified by this manual, the safety of the user may be imperiled. In addition, the equipment may also be damaged. Always use the equipment as outlined in this instruction manual.

The following symbols are used to set off text in this instruction manual.

Symbols	Explanation
◎	Indicates commentary (for ease of operation and maintenance).
★	Indicates that failure to follow the instructions could result in damage to equipment.

Getting Ready

1. A microscope is a precision instrument. Handle it with care and avoid subjecting it to sudden or severe impact.
2. Do not use the microscope where it is subjected to direct sunlight, high temperature and humidity, dust or vibrations.
3. Always use the tension adjustment ring to adjust the rotation tension of the coarse adjustment knob.
4. The microscope is ventilated by natural convection. Be sure to leave enough spaces (10 cm or more) around it when installing it.
5. When carrying the microscope, hold it by the bottom of the base and finger hook on the rear as shown on the left and carry carefully.

★ To prevent damage, do not hold the microscope by the stage or observation tube. Before carrying, remove the specimen and filters to prevent them from dropping.

★ If the microscope is displaced by sliding on the desktop, the rubber feet may be damaged or separated from the bottom.

Maintenance and Storage

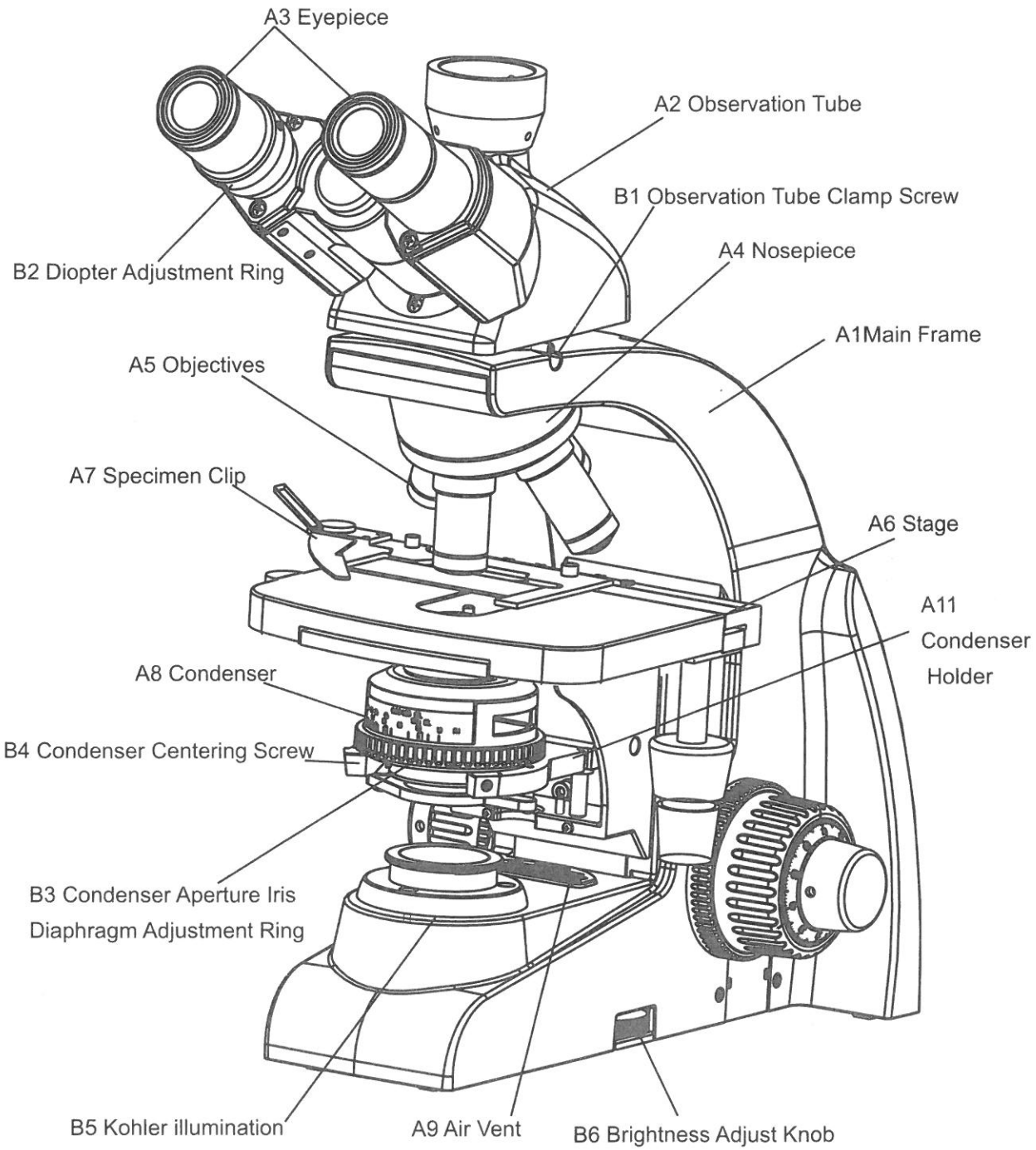
1. Clean all glass components by wiping gently with gauze. To remove fingerprints of oil smudges, wipe with gauze slightly moistened with a mixture of ether (70%) and alcohol (30%).
   Since solvents such as ether and alcohol are highly flammable, they must be handled carefully. Be sure to keep these chemicals always from open lames, or potential sources of electrical sparks—for example, electrical equipment that is being switched on or off. Also remember to always use these chemicals only in a well-ventilated room.
2. Do not attempt to use organic solvents to clean the microscope components other than the glass components. To clean them, use a lint-free, soft cloth slightly moistened with a diluted neutral detergent.
3. Do not disassemble any part of the microscope as this could result in malfunction or reduced performance.
4. When not using the microscope, ensure that the frame is cooled down and store it in a dry locker or cover it with a dust cover.

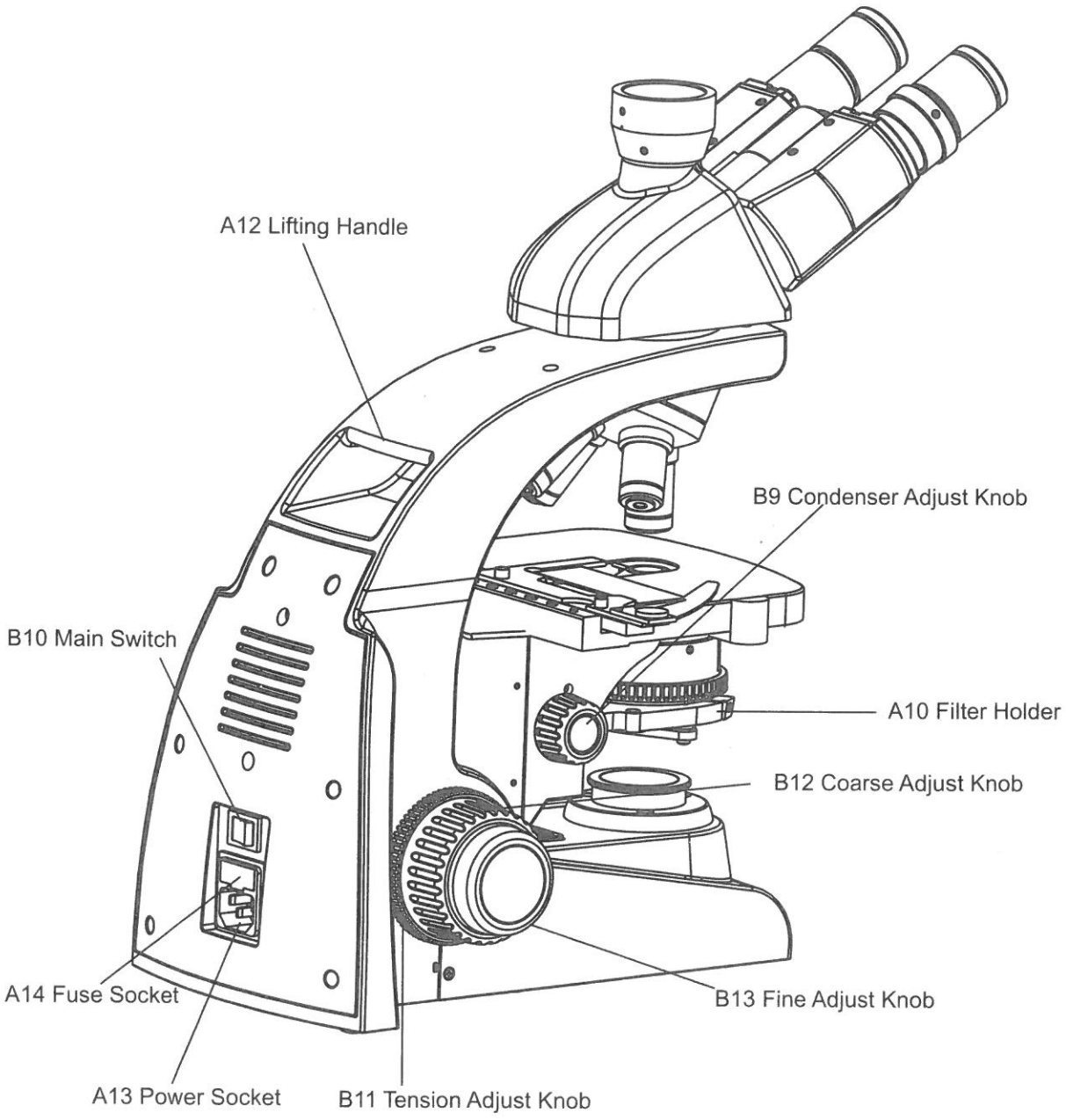
1. MODULES & CONTROLS NOMENCLATURE

◎ The modules shown below are merely the typical examples. For other applicable modules that are not shown, please consult the latest catalogues or local dealer.

◎ If you have not yet assembled the microscope, read Chapter 2, "Assembly".

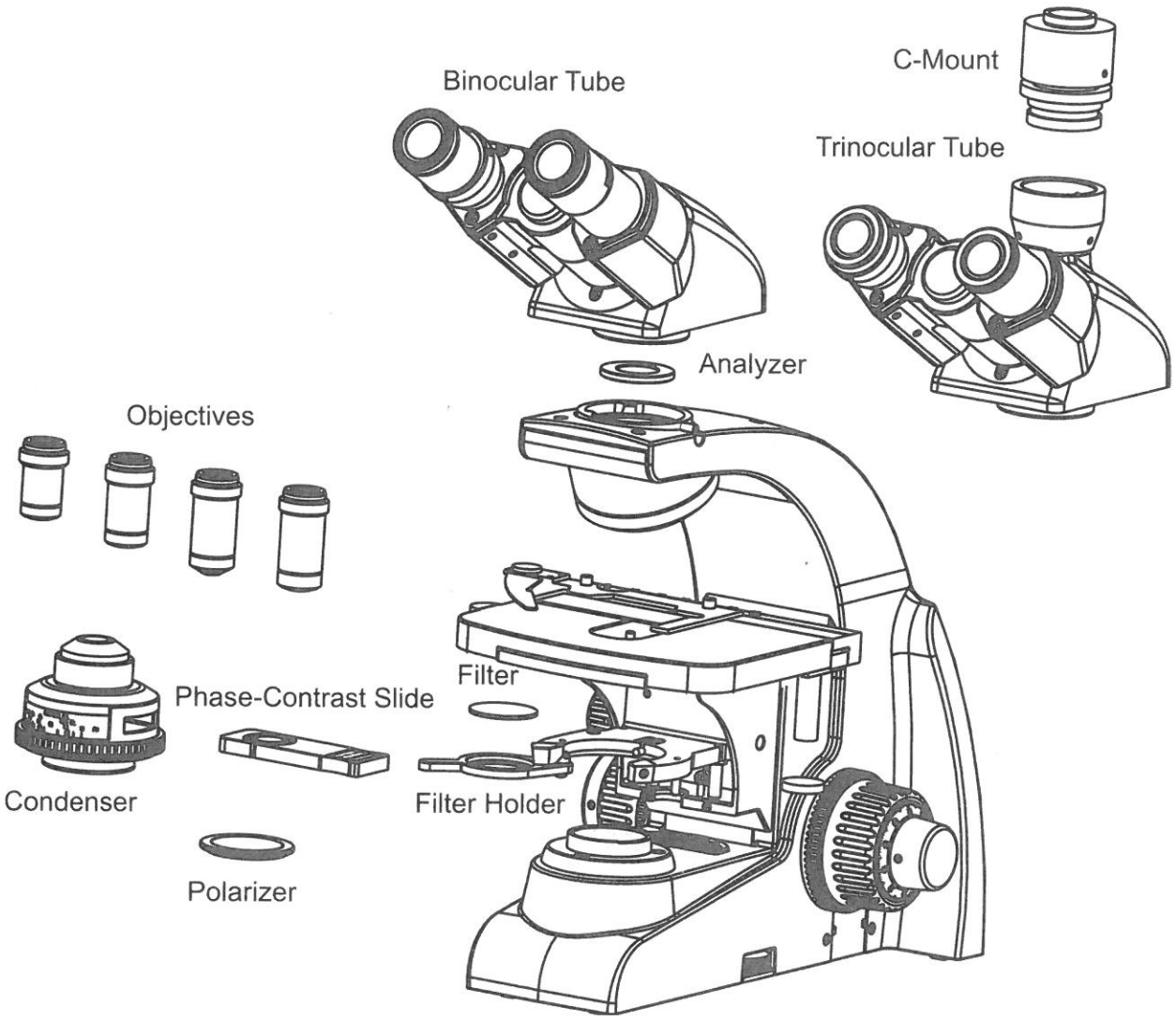
RIGHT SIDE VIEW OF MICROSCOPE




A12 Lifting Handle
B9 Condenser Adjust Knob
B10 Main Switch
A10 Filter Holder
B12 Coarse Adjust Knob
A14 Fuse Socket
B13 Fine Adjust Knob
A13 Power Socket
B11 Tension Adjust Knob

2. ASSEMBLY

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



2.1 Attaching the Observation Tube

1. Using the Allen screwdriver, loosen the observation tube clamping screw on the observation tube mount.
2. Attach the circular dovetail mount of the observation tube into the observation tube mount, placing the observation tube so that the interpupillary distance scale numbers are seen right side up. Then tighten the clamping screw to clamp the observation tube.

2.2 Attaching the Eyepieces

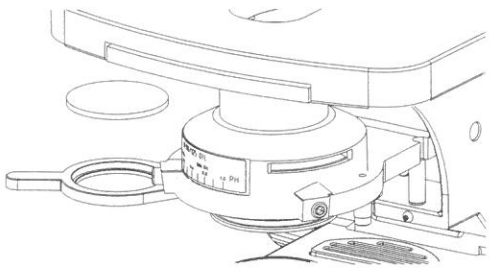
1. Remove the eyepieces' dust caps.
2. Insert the eyepiece into the eyepiece sleeve.

2.3 Attaching the Objectives

1. Be sure no specimen is on the stage before you attaching the objectives to prevent potential damageto the specimen-slide.
2. Lower the stage to the farthest position.
3. Screw the objectives into the nosepiece in the order from lower-power to higher-power.
4. Please cover the empty positions in the nosepiece with the dust cap to protect the optical parts from the dust.

2.4 Attaching the Condenser

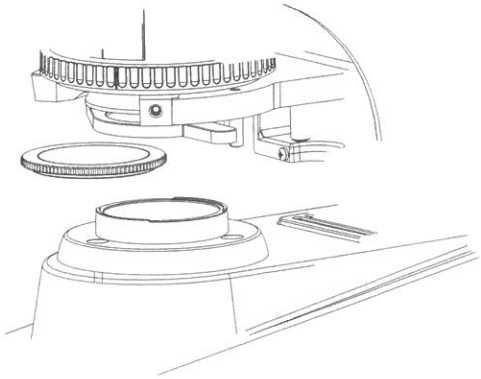
1. Raise the stage to the farthest position by rotating the coarse adjustment knob and lower the condenser holder to the farthest position by rotating the condenser height adjustment knob.
2. Loosen the condenser centering screws.
3. Fit the required condenser into the mount dovetail on the condenser holder, and push in the condenser until its positioning pin it into the positioning groove on the mount dovetail of the condenser holder.
4. Tighten the condenser centering screws.
5. Centering the condenser.



2.5 Mounting the Filter

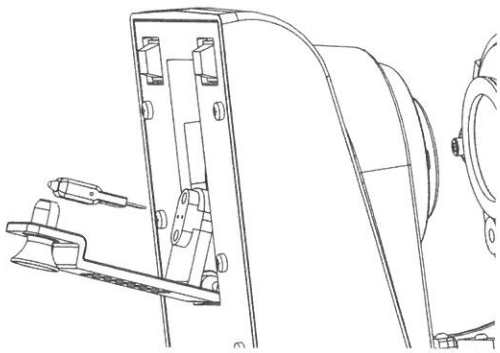
Movable filter holder (attached to the bottom of condenser holder) and direct filter are both available for the microscope.

1. Mount the filter to the movable filter holder Stir the filter holder out to the left from the bottom of the condenser holder. Insert the filter down into thefilter holder without tilting. Move the holder back to the position right down the condenser into the light path.
2. Mount the filter directly Put the right filter horizontally on the illumination Kohler directly.



2.6 Attaching/Replacing the Halogen Bulb

Caution for Bulb Replacement during or Right after Use. To avoid potential shock hazards and burns when replacing the light bulb, set the main switch to "O" (OFF). Then disconnect the power cord from the wall outlet in advance. Whenever you replace the bulb during use or right after use, allow the lamp housing and bulb to cool before touching. To prevent reduced bulb life or cracking, do not touch the bulb with bare hands. If finger prints are accidentally left on the bulb, wipe the bulb with soft cloth.



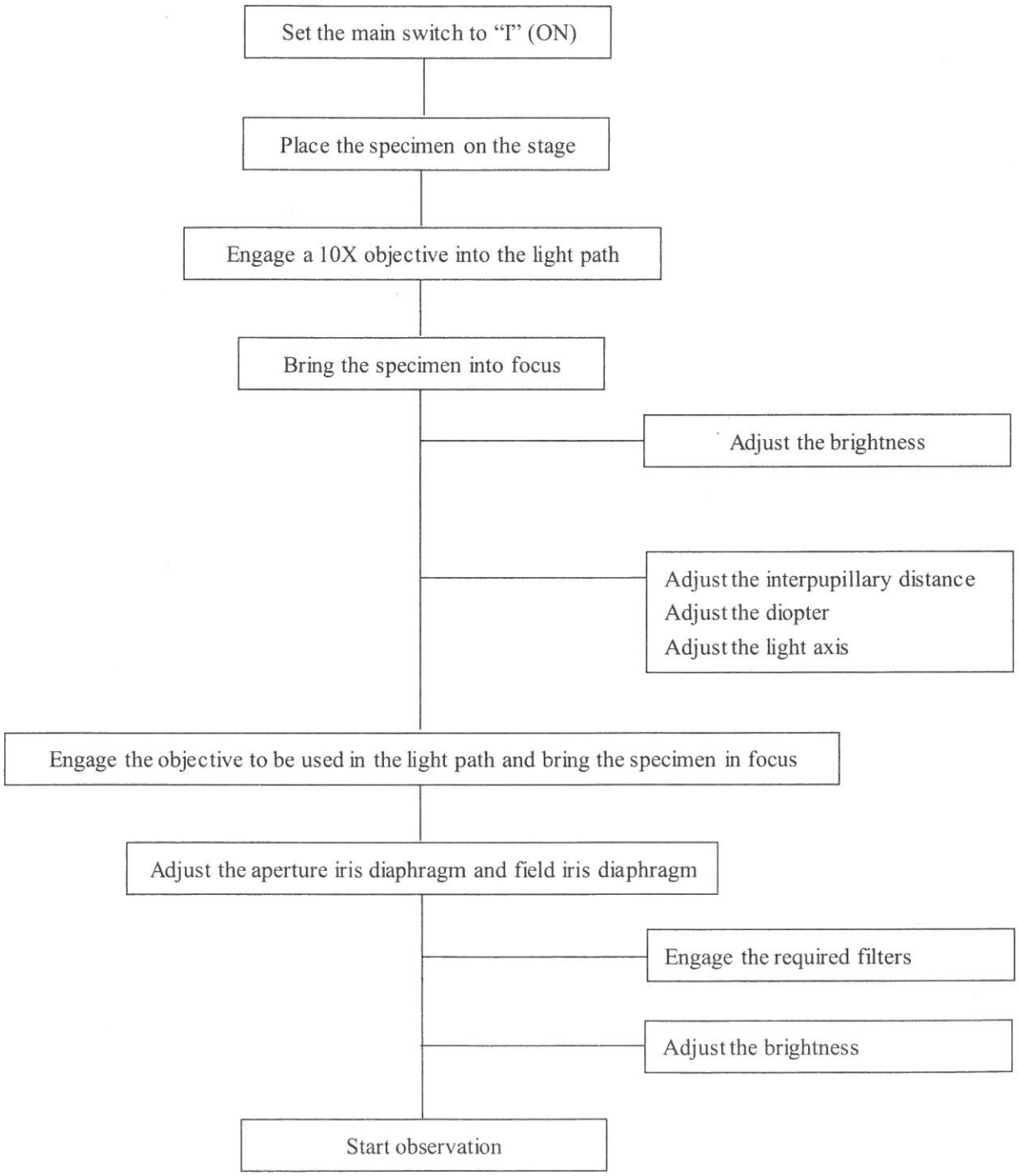
1. Turn over the microscope backwards, the bottom cover of the microscope faces to you and the front edge of the microscope faces upward.
2. Grip the button of the lamp house covers in the bottom of the microscope and pulls the lamp house cover open.
3. Pull out the un-workable bulb from the bulb socket if you want to replace it.
4. Hold the new bulb with gloves or a piece of gauze, insert the bulb pins and fully into the pin sections on the lamp socket.
5. Grip the lamp house cover button and push the lamp housing cover and close the lamp house.

◎ After working for above 10 hours continuously, cut off the instrument about 30 minutes to prolong the bulb life as possible.

3. BRIGHTFIELD OBSERVATION PROCEDURE

3.1 LIGHT BRIGHTFIELD OBSERVATION PROCEDURE

◎ The following flow shows the operating procedure for the transmitted light bright field observation which is the basic observation method of this microscope. The operating procedures for phase contrast observation, dark field and Polarization observation will be described separately in Chapter4, "OTHER OBSERVATION METHODS".



3.2 USING THE CONTROLS

3.2.1 Turning Power On, Adjusting the Brightness

1. Make sure that the light intensity control is in the MIN (minimum intensity) position and set the main switch to "I" (ON).
2. Rotate the Light intensity control toward MAX (maximum intensity) to increase the intensity and the illumination brightness.

3.2.2 Focusing Block

1. Rotation Direction of the Coarse/Fine Adjustment Knobs

◎ Rotating the coarse or fine focus adjustment knob toward the front lowers the stage and toward the rear raises the stage.

★ Never rotating the right and left coarse adjustment knobs reversely at the same time, this will damage the focusing block.

2. Adjusting the Coarse Adjustment Knob Tension

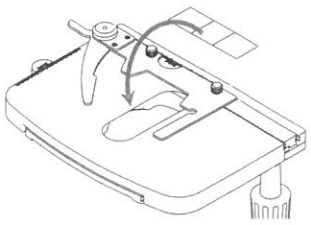
★ Always use the rotation tension adjustment ring in to control the rotation tension of the coarse a djustment knob. The tension of the coarse adjustment knob has been pre-adjusted to optimum tension, but this can be changed as required. Turn the rotation tension adjustment ring toward the rear to increase or toward the front to decrease the knob's tension.

If the stage lowers by its own weight or the focusing obtained with the fine adjustment knob is lost soon, the tension is set too low. In this case, turn the rotation tension adjustment ring toward the rear to increase the tension.

3.2.3 Mechanical Stage

1. Placing the Specimen on the stage.

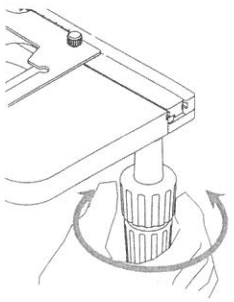
Place the specimen on the center of the stage. Attach the stage clips and clamp the specimen.



2. Moving the Specimen

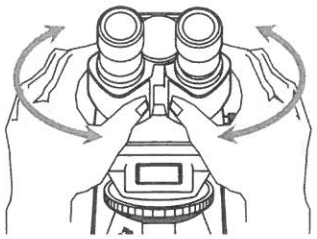
To move the specimen to a desired position, rotate the X-axis knob and Y-axis knob to move the stage.

The travel area is 76mm(X-axis) x 52mm(Y-axis).



3. Raise and lower the stage.

3.2.4 Observation Tube

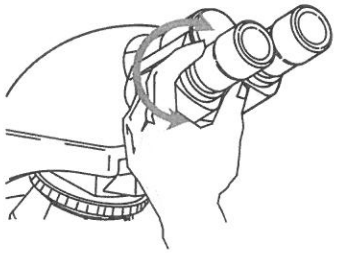


1. Adjusting the interpupillary Distance

   While looking through the eyepieces, adjust the binocular vision until the left and right fields of view coincide completely.

◎ The interpupillary Distance is 52-74mm.

2. Adjusting the Diopter.



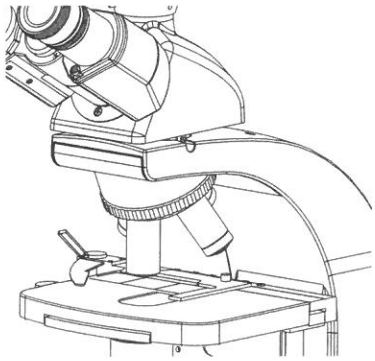
◎ The diopter adjustment accuracy can be improved by using an objective with as high power as possible.

1). While looking through the right eyepiece, rotate the coarse/fine adjustment knobs to bring the specimen into focus.

2). Look through the left eyepiece and rotate only the diopter adjustment ring on the left eyepiece sleeve to bring the specimen into focus.

★ When rotating the diopter adjustment ring of the left eyepiece, hold the lower part of the left eyepiece with the other hand.

3.2.5 Objectives



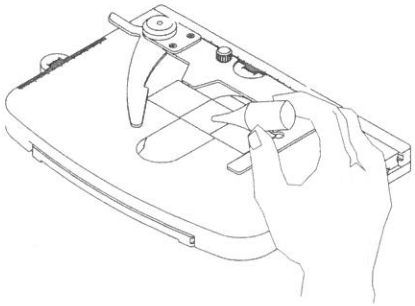
1. Rotate the revolving nosepiece by its rim to engage the required objective into the light path and stop at the "click" position.
2. Do not rotate the nosepiece by pushing the objectives this will damage the positioning accuracy of the objectives.
3. Using 100X Immersion objectives

   1). Using a 40X objective, bring the specimen into focus.

   2). Rotate the revolving nosepiece counterclockwise; stop down in the position where the specimen is just between the 40X objective and 100X objective.

   3). Apply a drop of the provided immersion oil to the specimen cover, and then rotate the revolving nosepiece to engage the oil immersion objective into then light path.

★ Please remove the oil immediately after use.



★ If the oil contains air bubbles, the image will be degraded.

Make sure the oil is free of air bubbles. To remove air bubbles, slightly rock the revolving nosepiece manually to engage and disengage the oil immersion objective once or twice.

After use, wipe away the immersion oil at the objective front lens and the specimen with a piece of gauze lightly moistened with a mixture of ether(70%) and alcohol(30%) .

3.2.6 Condenser (N.A.1.25 oil)

1. Centering the Condenser

◎ Your microscope illumination Kohler is with field diaphragm or without field diaphragm as you required. The center of condenser had been accurately centered.

1). If you have to re-center the condenser when the microscope illumination Kohler is with field diaphragm.

- Slide the field diaphragm adjustment ring to the left to open the diaphragm.
- Slide the field iris diaphragm ring to the fully open position.
- Engage the 10X objective and bring the specimen into focus.
- Using the field iris diaphragm ring, stop down the field iris diaphragm until its image is just inside the field of view.
- Rotate the condenser height adjustment knob to bring the field iris diaphragm image into focus.
- While gradually opening the field iris diaphragm, rotate the condenser centering Screws on the condenser holder to adjust so that the field iris diaphragm image is centered in the field of view of the eyepieces.
- To check centration, open the field iris diaphragm until its image inscribed the field of view. Now the condenser is centered.

◎ In actual observation, open the field iris diaphragm until its image circumscribed the field of view.

2). If you have to re-center the condenser when the microscope illumination Kohler is without field diaphragm.

- Stop down the condenser aperture iris diaphragm to correspond with a 10x objective.
- Engage a 10x objective into the light path and bring the specimen into focus.
- Rotate the condenser centering screws on the condenser holder to adjust so that the specimen image is lat, evenly bright, and full in the field of view of the 10x eyepiece.
- Now the condenser is centered.

2. Using the Aperture Iris Diaphragm

◎ In general, the potential resolving power of an objective is fully utilized if the diaphragm is stopped down to correspond with the numerical aperture (N.A.) of the objective.

◎ Depending on the specimen, image contras of focal depth in observation or photomicrography may be improved by keeping the aperture iris diaphragm stopped down a little. In general, a good image is obtained if the diaphragm is stopped down to between 70% and 80% of the N.A. of the objective. Stop further down for less contrasty specimens.

◎ To check the position of the perimeter of the aperture iris diaphragm, remove the eyepieces and look into the eyepiece sleeves to view the aperture iris diaphragm image and the objective's exit pupil. Slide the field iris diaphragm ring to the right to open the diaphragm, and slide the aperture iris diaphragm ring to the left to shut the diaphragm.

◎ There is color coded mark on the condenser. The magnification of the objectives, the PH objective and the N.A. of the condenser are cleared coded with different color in the mark.

For different objective observation, the white line on the iris stop at the corresponding position can bring you best observation.

3. Condenser Height Adjustment: Rotate the condenser height adjustment knob toward the front to lower the condenser, toward the rear to raise the condenser. Adjust the height of the condenser and to bring the field diaphragm image into focus.

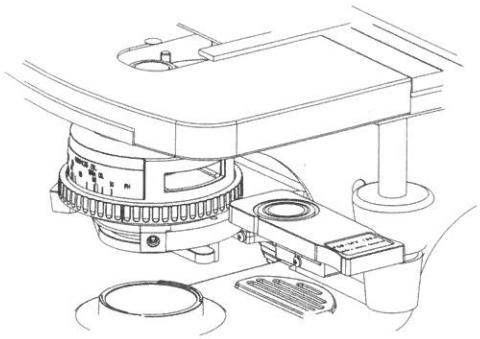
3.2.7 Filters

1. Filters of different colors are required according to different tinct specimens.
2. If there is no need of the filter or requiring enhancing the light intensity in the view field while the plan achromatic objective 100X (oil) is being employed, stir the movable filter holder towards the left side out from the light path.

4. OTHER OBSERVATION METHODS

4.1 Phase Contrast Observation

1. Conduct the preparation according to the brightfield observation procedure.
2. Slide the aperture iris diaphragm ring toward far right to the PH position.
3. Rotate the revolving nosepiece and engage the applied PH objective into the light path.
4. Slowly slide the corresponding Phase slide into the socket on the right side of the condenser. (be sure the side of the slide with marks facing upside).
5. Then you are ready to start your phase contrast observation.

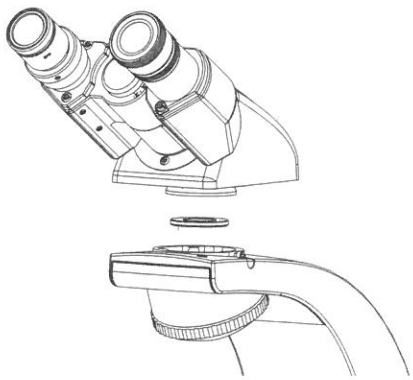


4.2 Simplified Polarized Light Observation

◎ An analyzer and polarizer are required for simplified polarized light observation.

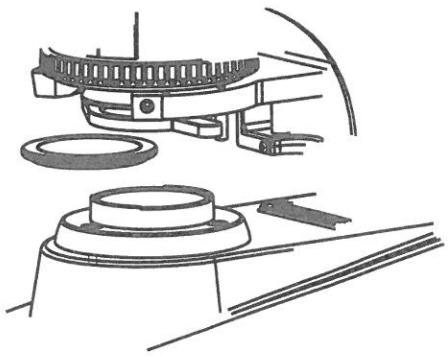
4.2.1 Attaching the Analyzer and Polarizer.

1. Using the Allen screwdriver, loosen the observation tube clamping screws on the observation tube mount and remove the observation tube.
2. Hold the polarizer, insert the polarizer positioning pin fully into the pin section of the observation tube mount. Be sure the polarizer is tightly and evenly placed in the observation tube mount.
3. Reassembly the observation tube.
4. Insert the analyzer horizontally on the illumination Kohler directly with the symbolic side upward.



4.2.2 Polarized light observation

1. Before your polarized light observation, do your preparation as the bright light observation.
2. Rotate the analyzer and stop in the position when your eyepieces view field is of the darkest.
3. Place the required specimen on the stage and start your polarize light observation.



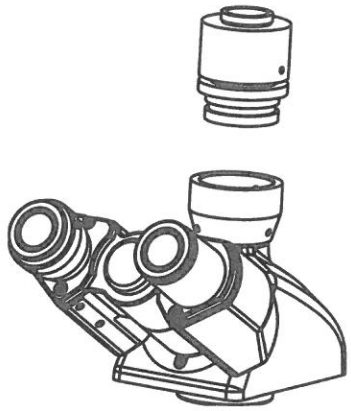
4.3 Dark-Field Light Observation

1. Conduct the preparation according to the brightfield observation procedure.
2. Attach the dark condenser into the condenser holder the same way as Abbe condenser.
3. Start your dark field observation.

4.4 Photography Observation

1. Firmly screw the C-mount into the digital camera.
2. Loosen the clamping on the trinocular observation tube.
3. Fit the C-mount into the trinocular observation tube and tighten the clamping screw.
4. Connect the digital camera and the computer by USB cord.

◎ For how to use the digital camera, please refer to the separate instruction manual.



5. TROUBLESHOOTING GUIDE

Under certain conditions, performance of the microscope may be adversely affected by factors other than defects. If problems occur, please review the following list and take remedial action as needed.

If you cannot solve the problem affter checking the entire list, please contact your local distributors for assistance.

Problem	Causes	Remedy
1) The bulb does not light.	Power cord of the power supply unit is unplugged.	Plug in the power cord into a power outlet.
	Main switch of the power supply unit is not ON.	Set the main switch to "I" (ON).
	The fuse is burnt out	Replace the fuse.
	The bulb is burnt out.	Replace the bulb.
2) The bulb lights but the field of view is dark.	The voltage is too low	Increase light intensity to an optimum voltage.
	Condenser is not well positioned.	Adjust the condenser height until the field iris diaphragm image is formed in the specimen plane.
	Condenser is not centered.	Center the condenser so that the field iris diaphragm image is centered in the field of view.
	Revolving nosepiece is not in a click position.	Make sure that the revolving nosepiece clicks properly into place.
	Field iris diaphragm is not opened wide enough.	Open the field iris diaphragm sufficiently.
	Too many filters are used.	Reduce the number of filters to the minimum required.
3) Field of view is obscured or not evenly illuminated.	The objective that falls outside the condenser's illumination range is used.	Use a condenser that matches the objective.
	Field iris diaphragm is not properly centered.	Center the field iris diaphragm correctly.
	Field iris diaphragm is stopped down too far.	Open the field iris diaphragm sufficiently.
	Revolving nosepiece is in an intermediate position	Engage the revolving nosepiece at a click stop.
	A filter is stopped in an intermediate position.	Set the filter at the appropriate position.
	The frost filter is not engaged.	Engage the frost filter.
4) The stage lowers by its own weight.	The rotation tension adjustment ring is too loose.	Tighten the ring optimally.

Problem	Causes	Remedy
5) Dirt or dust is visible in the field of view.	Dirt/dust on the specimen.	Clean thoroughly.
	Dirt/dust on the eyepieces.	
	Dirt/dust on a mirror unit.	
	Dirt/dust on the optical element.	
	Condenser is not correctly positioned and the frosted filter or filter is focused.	Adjust the condenser height until the field iris diaphragm image is formed in the specimen plane.
6)Image glares	Condenser is raised too high.	Lower to the proper position.
	Aperture iris diaphragm is stopped down too far.	Open the aperture iris diaphragm.
7) Visibility of observe image is poor. Image is not sharp. Contrast is poor. Details are poorly visible.	Objective in use is not designed for UCIS series.	Replace with an objective designed for UCIS optics.
	Front lens of the objective is dirty	Clean the objective.
	Immersion oil is not being used with an oil immersion objective.	Use immersion oil.
	Inappropriate slide or cover glass thickness.	Replace with glass of appropriate thickness.
	Dirt/dust on glass components (condenser, objective, eyepieces,)	Clean thoroughly.
	Phase plates are not centered.	Center it.
8) Image is blurred.	Objective is engaged incorrectly in the light path.	Make sure that revolving nosepiece clicks into place correctly.
	Specimen is tilted with respect to the stage.	Place the specimen correctly on the stage.
9) Field of view of one eye does not match that of the other.	The interpupillary distance is incorrect.	Adjust the interpupillary distance.
	Incorrect diopter adjustment.	Adjust the diopter.
	You are not accustomed to parallel optical axis.	When looking into eyepieces do not stare at image from the beginning but see the overall field of view. It is sometimes recommended to turn your eyes away from the eyepieces, look far off and look in to the eyepieces again.
10) The coarse/fine adjustment knobs will not rotate easily or at all.	The rotation tension adjustment ring is too tight.	Loosen the ring optimally.