
UNITRON®

Wafer Inspection Microscope MANUAL



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USER NOTICE

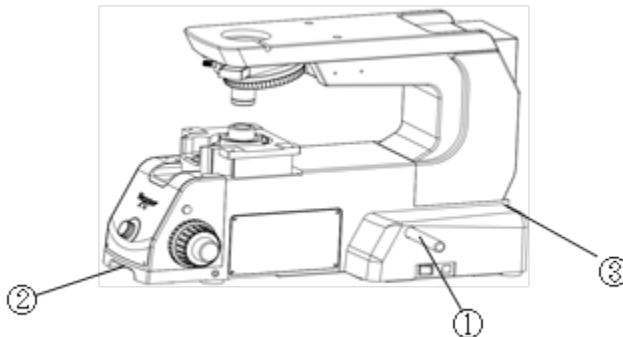
I. Safety Symbols

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

Symbol	Description
■	Main power switch is On
○	Main power switch is Off
○ F.S. ⊗	F.S means Field Iris Diaphragm, ○ Iris diaphragm opening direction, ⊗ Iris diaphragm stopping down (closing) direction
⤴	Light intensity direction, weaken to the small end, strengthen to the large end
CE	Received CE certification

II. Safety Note

1. Open the box carefully to avoid accessories, like lens, being contaminated by fingerprints, etc., or falling and being damaged.
2. Keep the microscope out of direct sunlight, high temperature or humidity, dusty and vibrating environment. Make sure the bench for installation is flat, horizontal and firm.
3. Never attempt to rotate the motorized revolving nosepiece by hand, otherwise the gear or other parts may be damaged.
4. When moving the microscope, detach the observation tube, stage and metallographic device to reduce the total system weight, and then insert the two provided carrying rods firmly into the left and right-side panels. Two people are required to carry the microscope; one should hold the front holding section and a carrying rod and the other person should hold the rear holding section and the other carrying rod.



- **After placing the microscope, remove the carrying rods, and either store them safely or attach them to the two screw holes on the rear of the microscope. Attach the rear screw hole caps to the left and right-side panels.**

5. If a biological solution or water splashes the stage, objective or observation tube, pull out the power cord at once, and wipe the microscope. Otherwise, the instrument will be damaged.
6. Be sure to keep a clear space at least 10cm away from all sides of the microscope to permit natural convection air to cool the microscope, and to permit free operation without obstruction.
7. Make sure the instrument is grounded to avoid electrical damage e.g., lightning strike.
8. For safety, be sure the main switch is in "O"(off) state before replacing the fuse. Confirm the input voltage. Ensure the input voltage which signed in the back of the microscope is consistent with the power supply voltage, or it may cause serious damage to the instrument.
9. Use the factory supplied power cord.

III. Maintenance

1. All lenses have been examined and adjusted. It is forbidden to disassemble them yourself.
2. The nosepiece, coarse and fine focusing parts are very delicate. It is forbidden to disassemble them by yourself.
3. Keep the instrument clean, wiping off dust regularly, and be attentive to avoid contaminating the optical elements. The objective lenses should be cleaned every other month by a professional.
4. Contamination on the prisms such as fingerprints and oil smudges can be cleaned using lens tissue paper and solution consisting of ether(70%) and alcohol(30%).



Note that alcohol and ether are highly flammable. Keep them away from fire or potential sources of electrical sparks. Always use them only in a well-ventilated room.

5. Don't use organic solvent to wipe the non-optical elements, when you need to clean, use the soft detergent, please.
6. When using, if the microscope is splash by liquid, cut off the power at once, and wipe up the moisture.
7. Do not disassemble any parts of the microscope. That could result in malfunctions or reduced performance.
8. Place the instrument in a cool, dry position. When not using the microscope, keep it covered with a dust cover. Make sure the lamp housing is cool before covering the microscope.
9. Working environmental requirements:
 - a. Indoor use only
 - b. Temperature range: 10°C~35°C
 - c. Maximum relative humidity: when the temperature reaches 31°C, max RH is 80%; at 34°C, max RH is 70%; at 37°C, max RH is 60%, and at 40°C, max RH is 50%.

Caution:

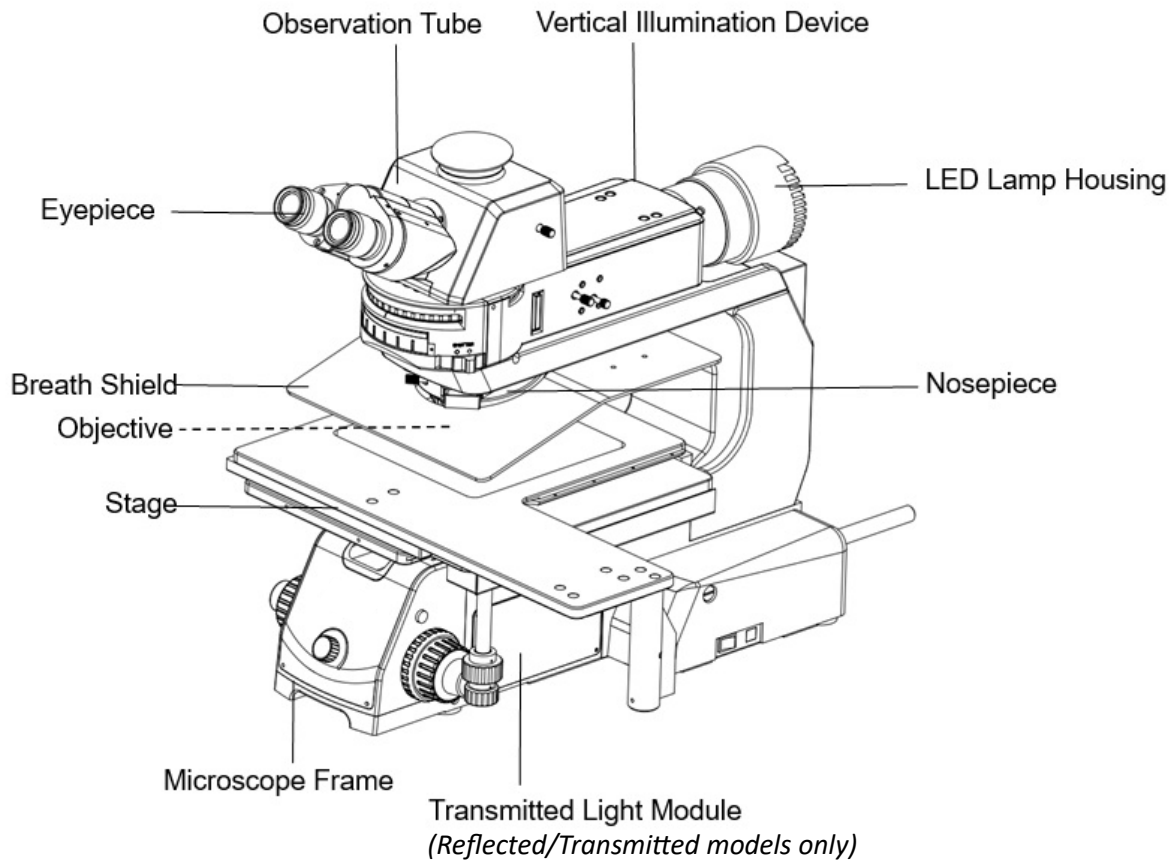
If the microscope is used in a manner not specified by this manual, the safety of the user may be compromised. In addition, the equipment may also be damaged. Always use the equipment as outlined in this instruction manual.

- **This microscope will not cause radiation, electromagnetic interference and other phenomena to the surrounding environment. It meets all CE certification standards.**

The following symbols are used to highlight text in this instruction manual:

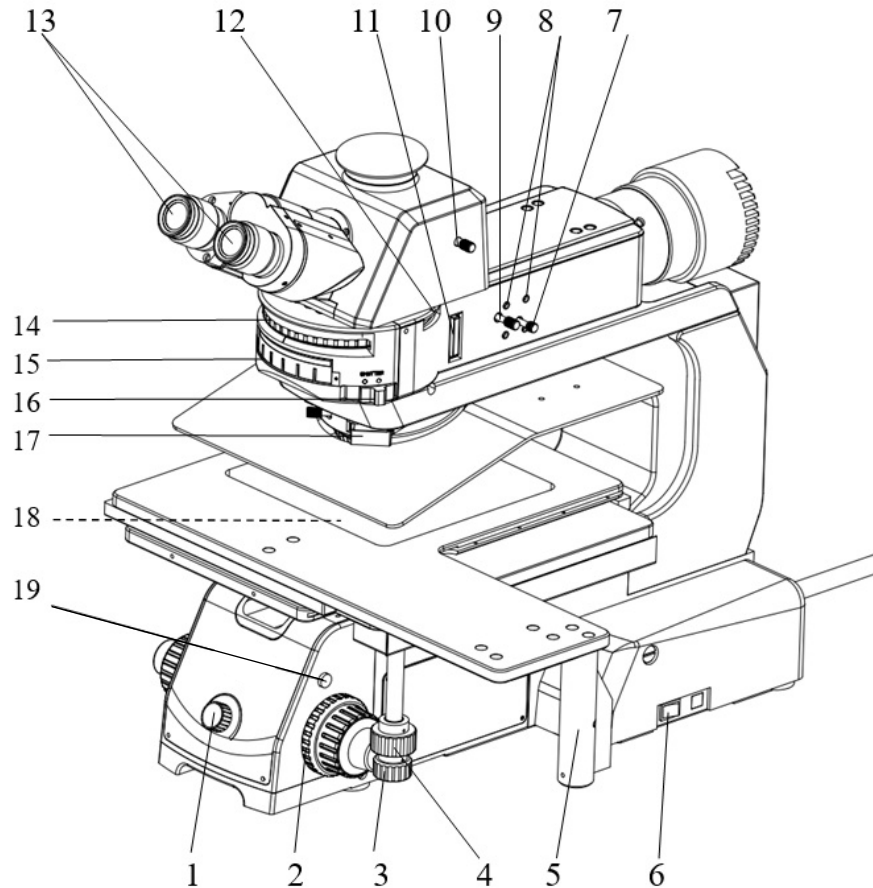
- △ Indicates that failure to follow the instructions in the warning could result in bodily harm to the user and/or damage to equipment (including objects in the vicinity of the equipment).
- ★ Indicates that failure to follow the instructions could result in damage to equipment.
- Indicates commentary (for ease of operation and maintenance).

1. COMPONENT NAMES

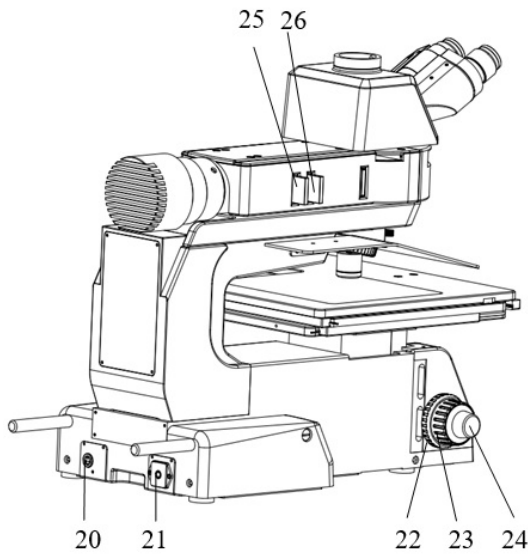


2. OPERATIONAL OVERVIEW

- The following diagram identifies the functional components for operation.

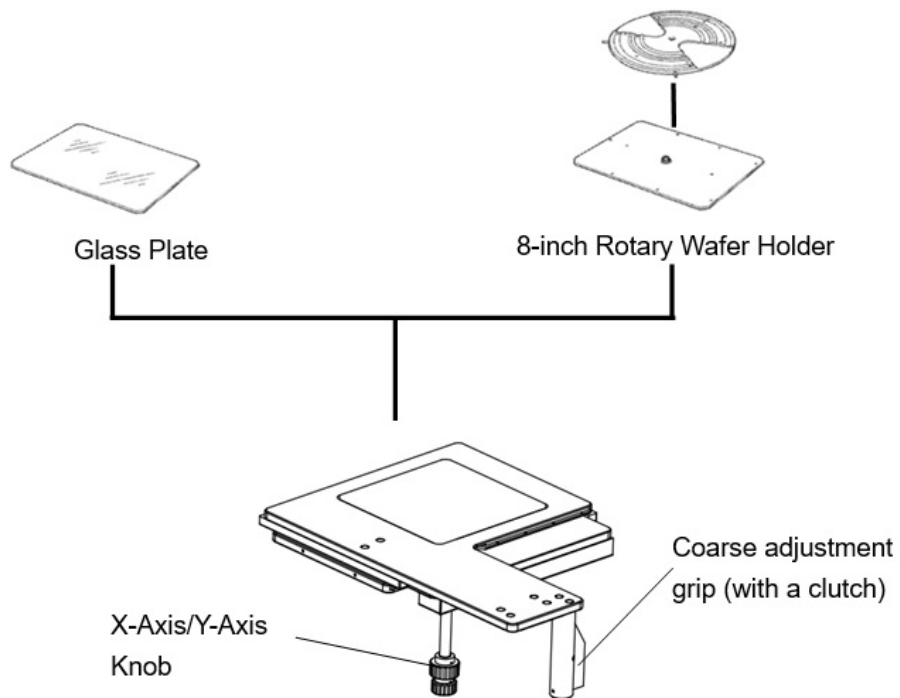


- | | |
|---|---|
| 1. Brightness adjustment knob | 10. Light path selector knob |
| 2. Tension adjustment ring | 11. Polarizer insertion slots |
| 3. X-axis knob | 12. Analyzer insertion slots |
| 4. Y-axis knob | 13. Binocular tube |
| 5. Clutch grip | 14. Brightfield and darkfield rotation dial |
| 6. Main switch | 15. Label |
| 7. Aperture iris diaphragm adjustment lever | 16. Light shutter button |
| 8. Iris diaphragm centering screws | 17. Extended function slider |
| 9. Field iris diaphragm adjustment lever | 18. Aperture iris diaphragm adjustment ring
(Reflected/Transmitted units only) |
| | 19. Up or down light toggle button
(Reflected/Transmitted units only) |

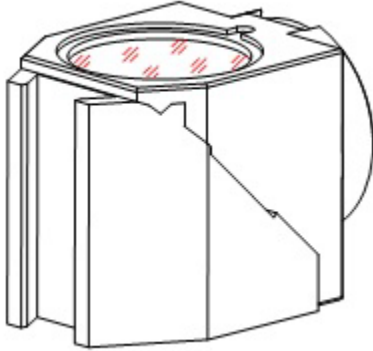


- 20. Reflected (Down) light source socket
- 21. Power cord connector
- 22. Locking knob
- 23. Coarse focus adjustment knob
- 24. Fine focus adjustment knob
- 25. ND Filter insertion slot
- 26. Oblique lighting

Stage and Bracket



Mirror Units

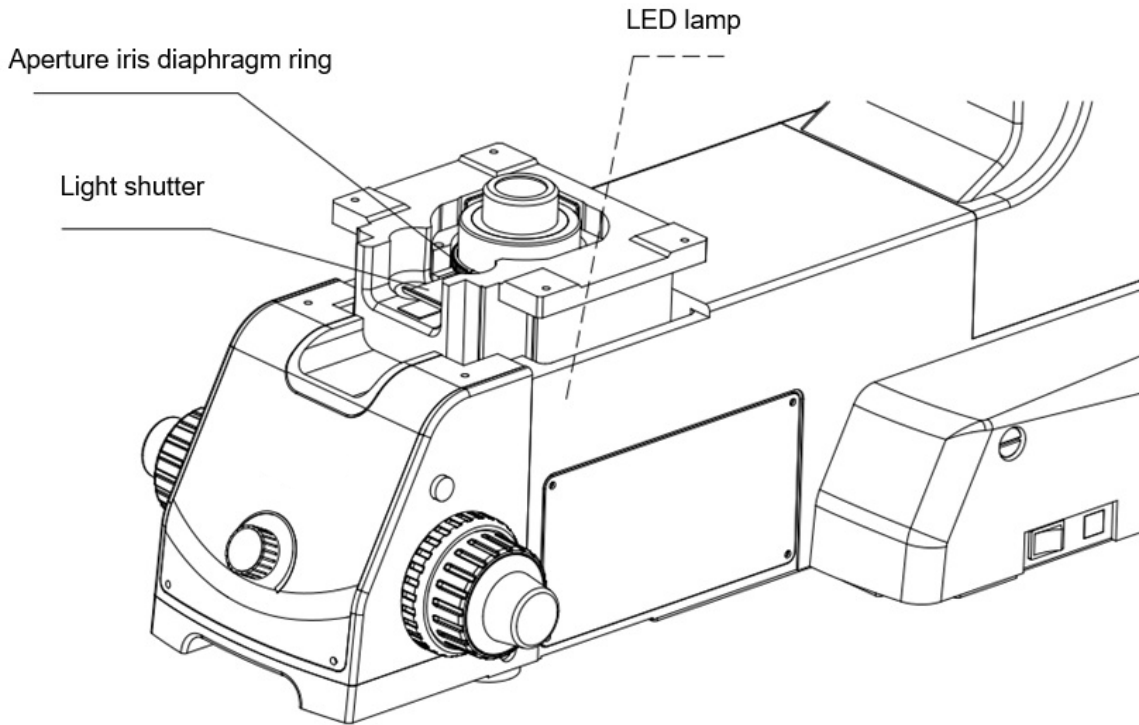


Various mirror units are available for use depending on the application and need.

Observation Method	Mirror Units
Brightfield (BF)	Brightfield parts
Darkfield (DF)	Darkfield parts

- Brightfield units contain ND6 neutral density filter.

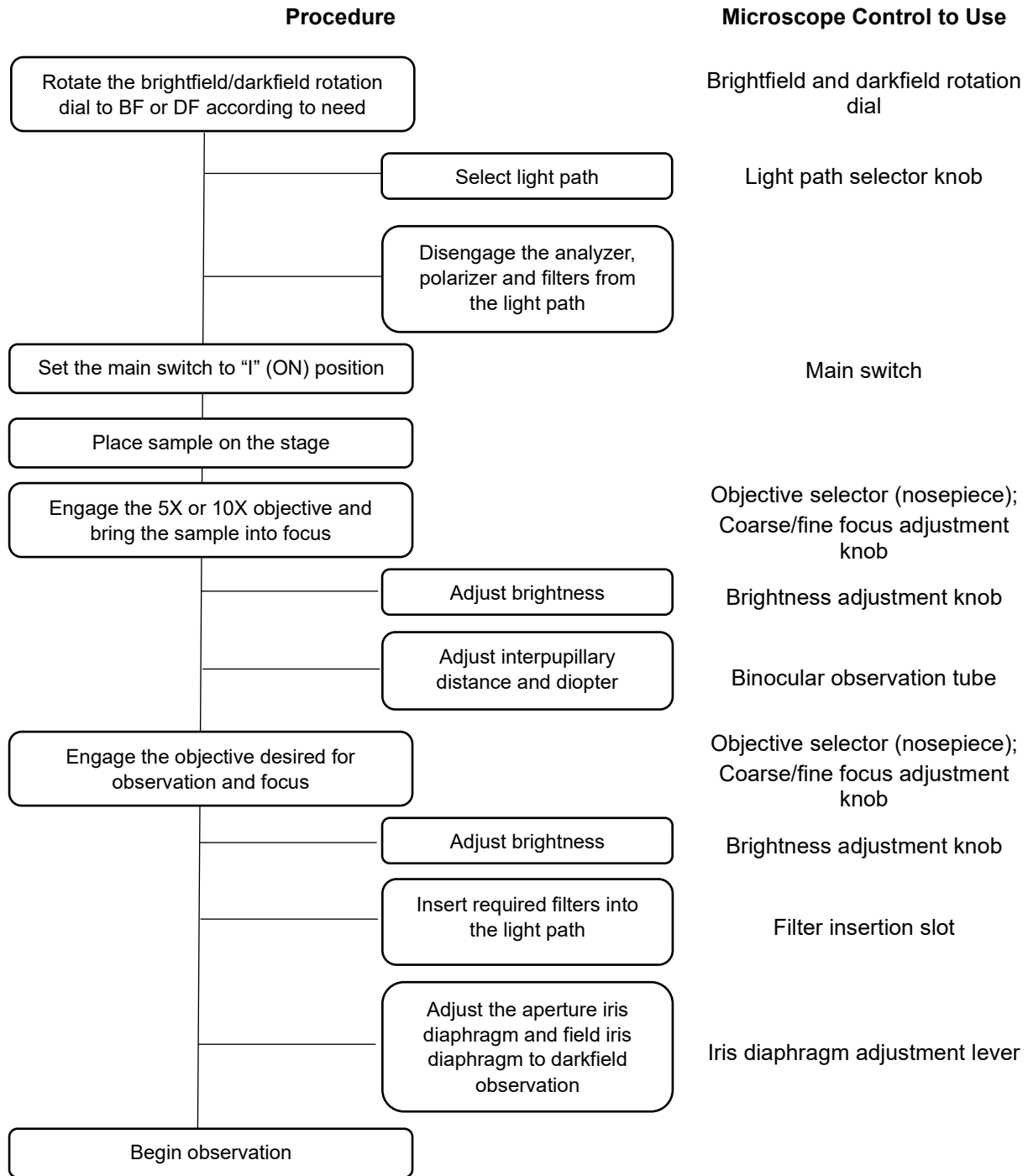
Transmitted Light Components *(optional; Reflected/Transmitted models only)*



3. OBSERVATION METHOD OVERVIEW

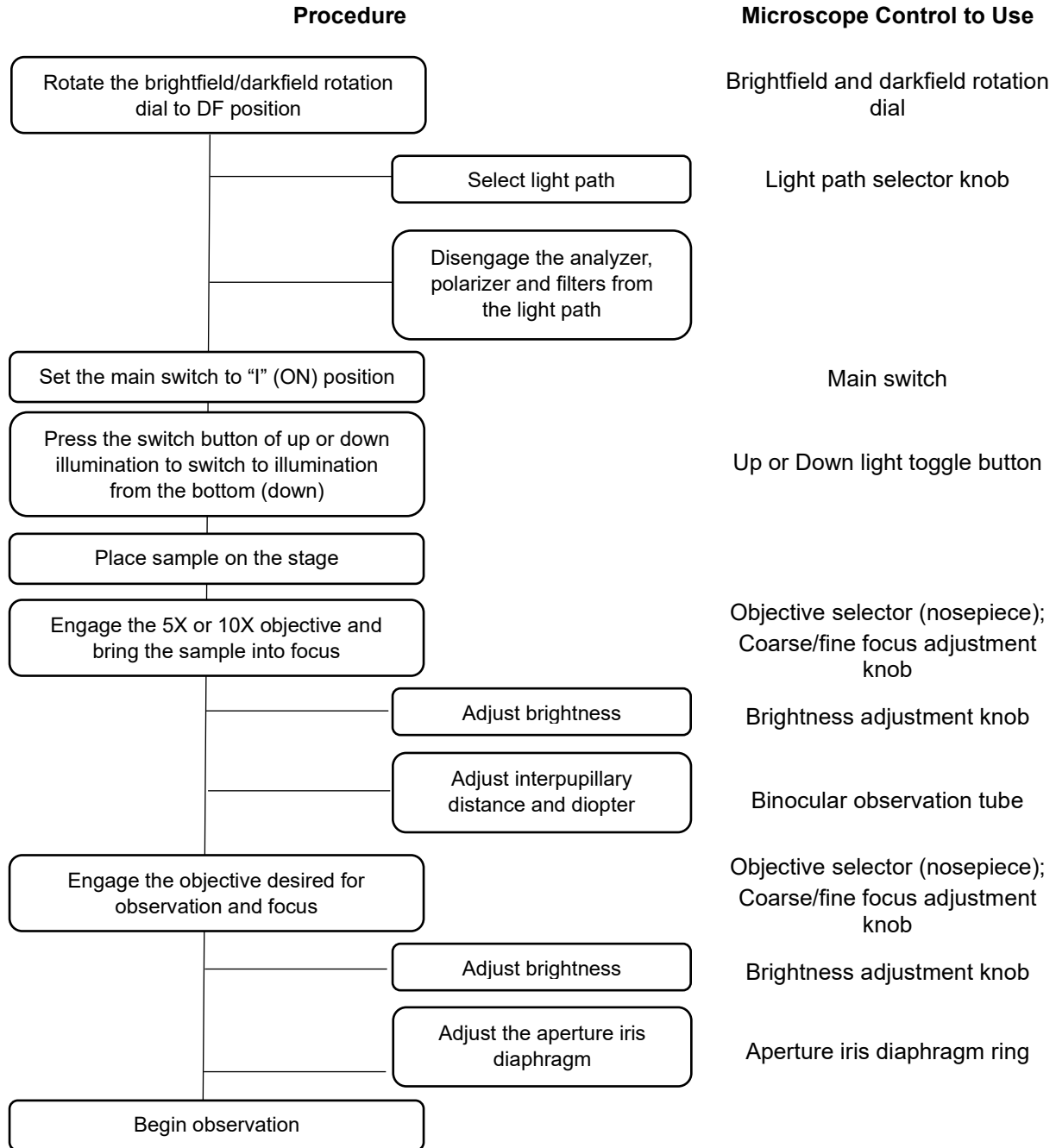
3.1. Reflected light brightfield and darkfield observation

This chapter outlines the operational procedure when the microscope is used for reflected light brightfield and darkfield observation. Simple polarized light and differential interference contrast (DIC) observation are explained in separate sections later in this manual.



3.2. Transmitted Light Observation *(optional; Reflected/Transmitted models only)*

This chapter outlines the operational procedure when the microscope is used for transmitted light observation. The transmitted light polarized light observation method is explained in a separate section later in this manual.

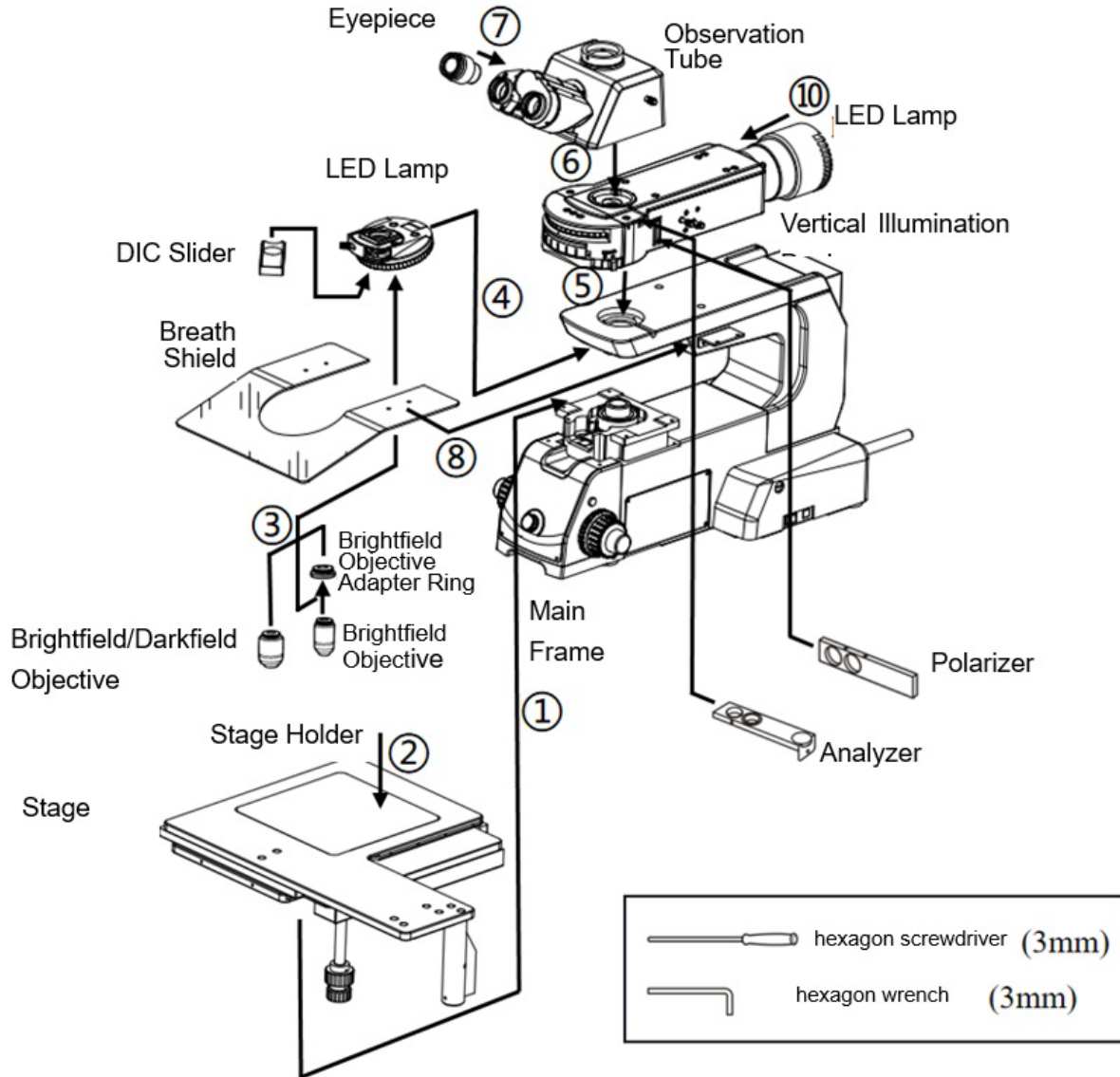


4. ASSEMBLY

4.1. Assembly Diagram

The following figure shows the installation sequence of the components. The number in the figure shows the assembly steps.

- ★ Before installing, be sure every component is clean, do not scratch any parts or glass surface.
- Safely keep the hexagon wrench and screwdriver provided. When replacing the components, they will be needed.



4.2. Assembly Steps

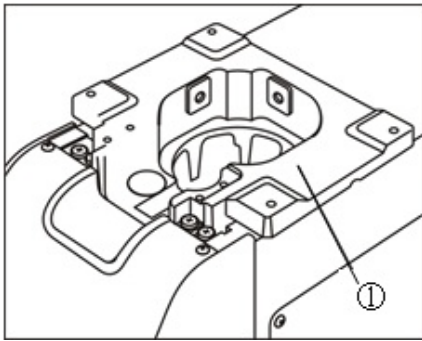


Fig. 1

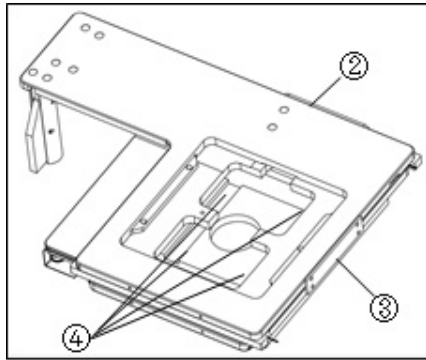


Fig. 2

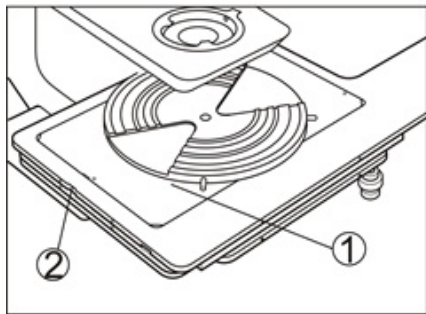


Fig. 3

4.2.1. Installing the Stage (Fig. 1-2)

1. Remove the transport protection plate ① behind the stage with a 4mm Allen wrench (Fig. 2). It is recommended that the screws remain in the corresponding holes of the stage for next use.
2. Place the stage gently on the bracket ① of the main frame (Fig. 1). Make sure the adjustment knob is on the right side. Screw the screw ④ without tightening.(Fig. 2)
3. Remove the side protection plate ③ and front protection plate ②. Move the upper plate of the stage to the last position of the stroke to ensure that the stage and the main frame will not interfere. Then tighten the screws ④ to ensure the stage is firm.

- **If the stage is not moved for a long time, the clutch and the belt will stick together and the clutch function will not work smoothly. In this case, please follow the instructions 5-3.**

- ★ **Be sure to install the transport protection plates ② ③ and pack the stage carefully when transporting. Please do not install the stage on the main frame for transportation or arbitrary packaging, otherwise the stage is easy to damage.**

4.2.2. Installing the Sample Holder (Fig. 3-4)

Installing the Wafer Holder Plate (Fig. 3)

1. Insert the wafer holder plate ① along one side of the stage.
 2. Push the wafer holder plate from front to back to make sure it is installed properly and doesn't tilt.
 3. Tighten the screw ② on the side of the stage with the Allen wrench to secure the wafer holder plate.(Fig.3)
- ★ **The level of the wafer holder plate can be adjusted by three adjustment screws on the back of the stage. Don't touch the area near the wafer holder plate, otherwise the wafer holder plate will tilt.**

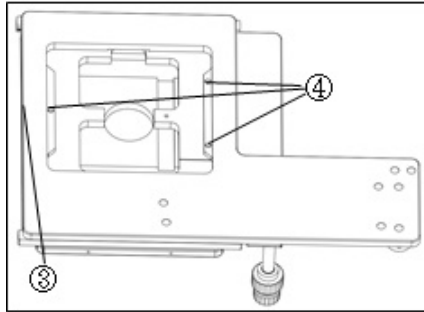


Fig. 4

Installing Vessel Holder Plate

1. Place the vessel holder plate on the stage carefully and make sure it will not tilt.
2. Tighten the screw ③ on the side of the stage with the Allen wrench to secure the vessel holder plate.(Fig.4)

Adjusting the Level of Vessel Holder Plate

The moving parallelism of the stage and the flatness of the surface of the holder plate have been adjusted before leaving the factory. If unevenness is found, drop some alcohol on the screw ④ to loosen the screw and adjust the height of the three screws from below with a screwdriver.(Fig.4)

★ **The maximum load of the stage is 3.5kg**

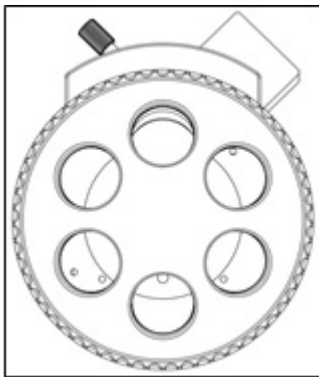


Fig. 5

4.2.3. Installing the Objectives (Fig. 5)

1. Clean the objectives carefully and regularly. Deposits on the objectives will negatively impact image quality.
2. When operating, use the 10x magnification objective first to search and focus on the sample, then rotate in a higher magnification objective if desired.

★ **In order to rotate the motorized revolving nosepiece smoothly, it is recommended to install all the objectives on the nosepiece.**

Objective adapter ring

When using a brightfield objective, it is necessary to screw the objective adapter ring into the objective hole on the nosepiece and then install the objective in the adapter ring.

4.2.4. Installing the Nosepiece (Fig. 6)

1. Turn the coarse adjustment knob until the stage reaches its low limit position.
2. Loosen the screw ① and slide the nosepiece into the microscope along the dovetail until it touches the locating surface. Then tighten the screw ①.

★ **The nosepiece is heavy, be careful not to drop.**

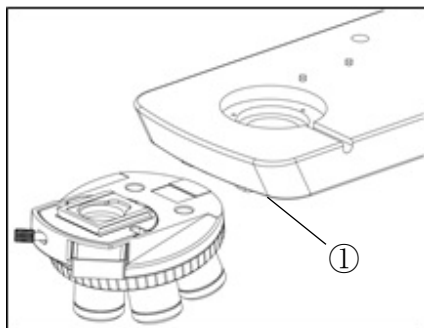


Fig. 6

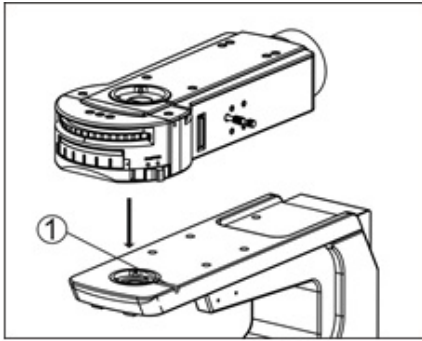


Fig. 7

4.2.5. Installing the Reflected Light Module (Fig. 7)

1. Loosen the screw ① and insert the reflected light module into the dovetail groove of the microscope. Then adjust the reflected light module so that it is parallel to the horizontal plate of microscope.
2. Tighten the screw.

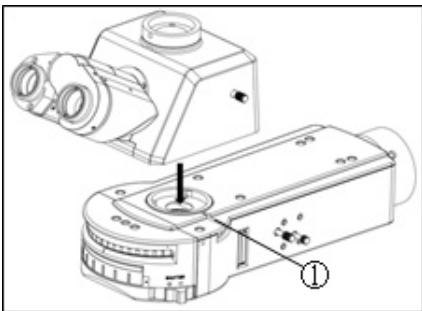


Fig. 8

4.2.6. Installing the Trinocular Head (Fig. 8)

1. Loosen the screw ①
2. Insert the dovetail of trinocular head into the dovetail groove of the microscope and adjust its direction.
3. Tighten the screw ①.

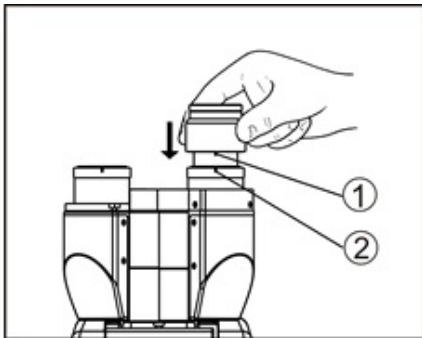


Fig. 9

4.2.7. Installing the Eyepiece

Insert the eyepieces into the eyepiece tube, gently.

- ★ **When using a polarizing eyepiece or micrometer eyepiece, align the pin ① on the eyepiece to the slot ② on the eyepiece tube and insert it.**

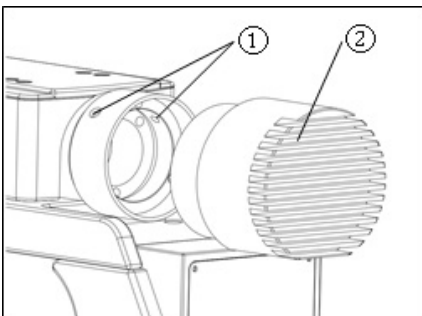


Fig. 10

4.2.8. Installing the LED Lamp House (Fig. 10)

1. Insert the lamp house ② into the position shown in Fig. 10 at the rear of the vertical illumination attachment.
 2. Tighten the screw ① with the Allen wrench.
- **If the lamp housing is damaged, please contact manufacturer for replacement**

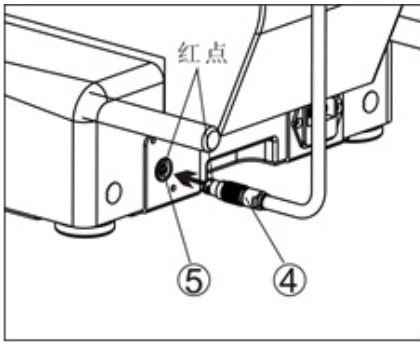


Fig. 11

4.2.9. Connecting the LED Lamp Housing Wire (Fig. 11)

Insert the aviation plug ① of the lamp housing into the aviation socket ② of the base. You will feel and/or may hear a “click” when the connection is engaged.

- As shown in Fig.11, there are red dots in the aviation socket and plug. Before the plug is inserted into the socket, ensure that the red dots on each are aligned.

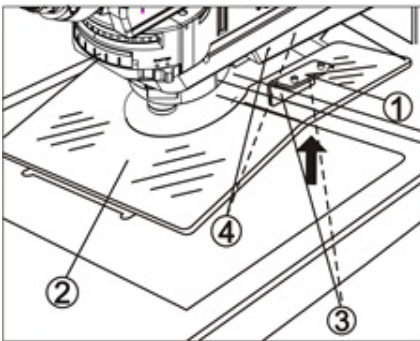


Fig. 12

4.2.10. Installing the Breath Shield (Fig. 12)

1. Connect one side of the mounting plate ① and the breath shield ② with the provided short screw. The screw needs only a little tightening. (ensure the adjustment is possible)
2. Connect the holes ③ on the mounting plate and the screw holes ④ on the frame with the provided long screws, and tighten the screws after appropriate adjustment.
3. Tighten the short screw in step one.

- ★ Be careful not to screw the short screw too tight in case the breath shield is broken.

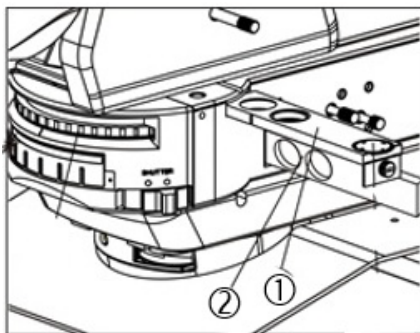


Fig. 13

4.2.11. Installing the Polarizer and Analyzer (Fig. 13)

1. Remove the dust plugs from the reflected light illuminator for the analyzer and polarizer.
2. Insert the analyzer into the horizontal slot in the reflected light illuminator. The analyzer rotation wheel should be oriented in the up position.
3. Insert the polarizer into the vertical slot in the reflected light illuminator.

- Both the analyzer and polarizer have detents for two positions: “out” or idle position for observation without polarization, and the “in” position for observation with polarization (i.e., simple polarization and differential interference contrast). When in the “in” position, the dust plugs on the opposite side of the reflected light illuminator will need to be removed.
- A connecting bar and handle are provided to connect the ends of the analyzer and polarizer permitting simultaneous insertion or removal of these components.

5. ADJUSTMENT AND OPERATION

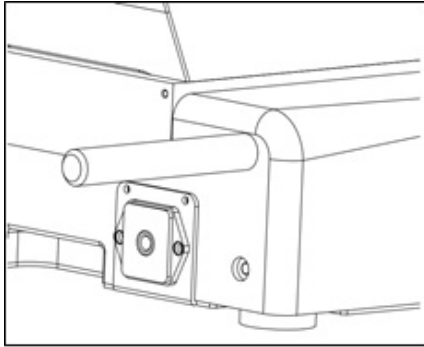


Fig. 14

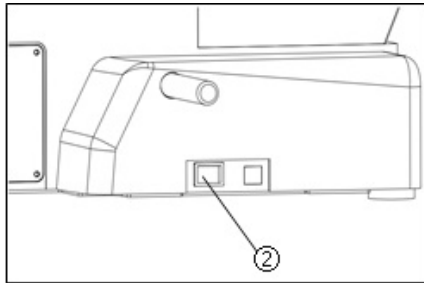


Fig. 15

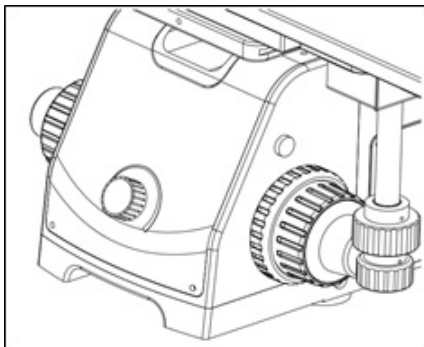


Fig. 16

5.1. Turn on the Power (Fig. 14-15)

1. Insert the power cord into the socket ① on the rear of the microscope safely. The other end plugs into the socket of wall or power strip.(Fig.14)
 2. Turn on the main switch ② on the side of microscope to “-”(on).(Fig.15)
- △ The cable and cords are vulnerable when bent or twisted. Never subject the power cord to excessive force.
 - △ Before connecting the power cord, set the main switch to “O”(off).
 - △ The power cord should be plugged into a grounded three-hole outlet. If the socket is not firmly grounded, we cannot guarantee electrical safety nor performance of the device.

5.2. Adjusting Brightness and Switching Between Upper and Lower Illumination (Fig. 16)

The knob ① in Fig. 16 is the brightness adjustment knob. When rotating counterclockwise, the light intensity decreases. The upper and lower lights switch button ② is used to switch between the upper and lower lights (lower illumination is only available on Reflected/Transmitted models).

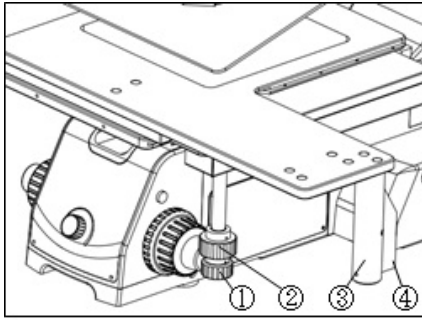


Fig. 17

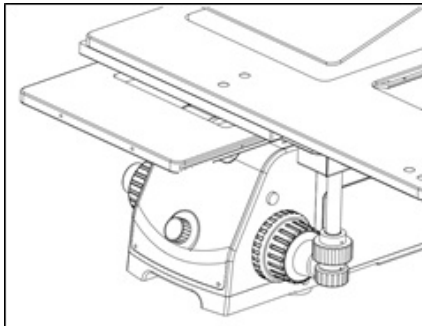


Fig. 18

5.3. Moving the Stage (Fig. 17-18)

1. Rotate the X-axis knob ① and Y-axis knob ② below right of the stage to move the stage. (Fig.17)
2. By fully depressing the clutch ④ of the grip ③, the X-axis and Y-axis knobs are bypassed and the stage can be freely while continuing to depress the grip clutch.(Fig. 17)

★ **The clutch should be fully depressed. Neglecting this will cause the X-axis and Y-axis knobs to rotate abruptly and result in damage.**

★ **Handle the grip gently without applying excessive downward force to it. Otherwise, the stage may be deformed causing the stage plates to come under pressure.**

△ **When moving the stage, be careful not to catch a finger or other body part in the holes ⑤ provided for reducing the weight of middle and lower stage plates. (Fig. 18)**

● **If the stage is not moved for a long tome, the clutch and the belt will stick together and the clutch function will not work smoothly. In this case, hold the X-axis and Y-axis knobs by hand to prevent them from rotating. Then fully depress the grip clutch and move the stage back and forth, left and right to remove the stickiness and get clutch function to work again.**

5.4. Adjusting the Interpupillary Distance (Fig. 19)

The interpupillary distance range: 47mm~78mm. While looking through the eyepieces, adjust for binocular vision until the left and right fields of view coincide completely.

● **Note your interpupillary distance so that it can be quickly adjusted.**

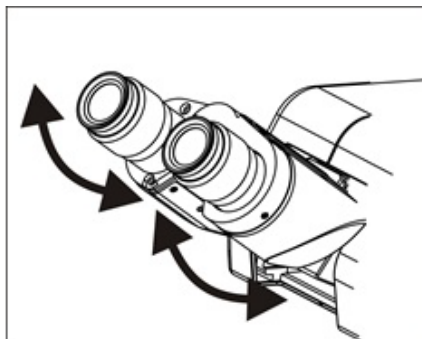


Fig. 19

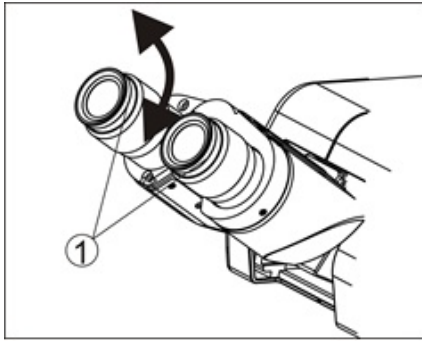


Fig. 20

5.5. Parfocality Adjustment (Fig. 20)

1. Align the diopter adjustment ring ① of the eyepieces to the “0” mark.
2. Engage the 40x objective into the light path and turn the coarse and fine focus knob to bring the specimen into focus.
3. Engage the 4x objective into the light path and turn the diopter adjustment ring of eyepieces to bring the specimen into focus.

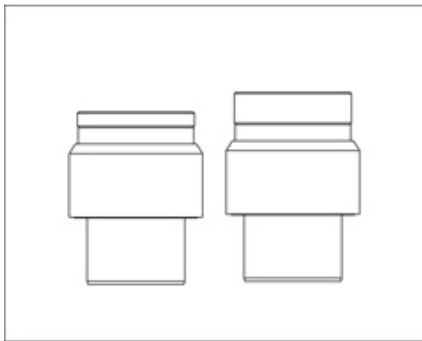


Fig. 21

5.6. Using the Eye Shades (Fig. 21)

1. If wearing eyeglasses (including safety goggles), use the eye shades rolled down to prevent the eyeglasses from contacting and scratching the eyepieces. This also allows the user to get close enough to the eyepieces to form an image.
2. If you are not wearing eyeglasses, use the eye shades extended to prevent extraneous light from entering between the eyepieces and eyes.

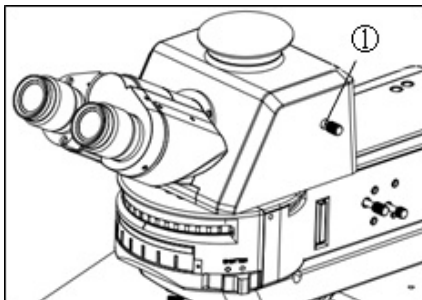


Fig. 22

5.7. Selecting the Light Path of Binocular Observation Tube (Fig. 22)

Select the desired light path as shown in Fig. 22.

Symbol	Operation	Eye : Camera %
	Pushed in	100 : 0
	Pulled out	0 : 100

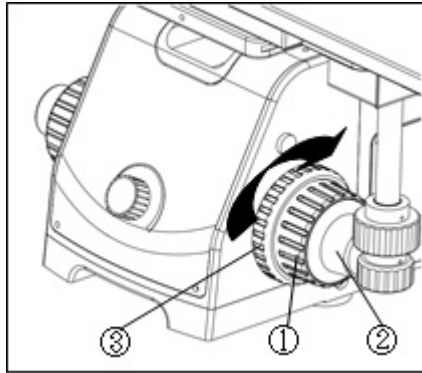


Fig. 23

5.8. Focusing (Fig. 23)

1. When turning the coarse adjustment knob ① and fine adjustment knob ② in the direction of the arrow, the stage raises.
2. Turning the tension adjustment ring ③ by the right-side coarse focus knob in the direction of arrow increases the tension of the coarse focus knob, and turning the collar in the opposite direction decreases the tension.

★ **If the tension seems too low (the stage drops by itself), turn the tension adjustment ring ③ in the direction of arrow to increase tension until the stage position is steady.**

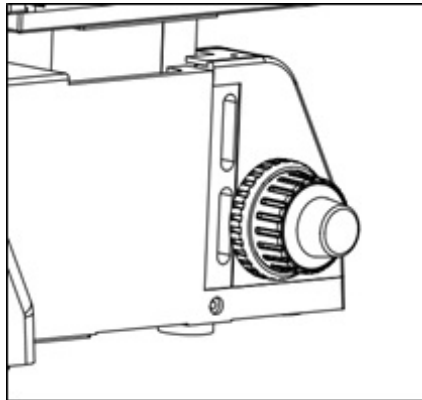


Fig. 24

5.9. Upper Focus Limit (Fig. 24)

In practice, if it is necessary to restrict and lock the stage height, that is, the upper limit position of focusing, according to the arrow direction, turn the locking knob ① by the left-side coarse focus knob to the bottom at the corresponding upper limit position.

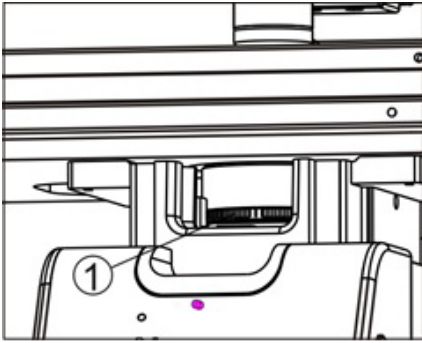


Fig. 25

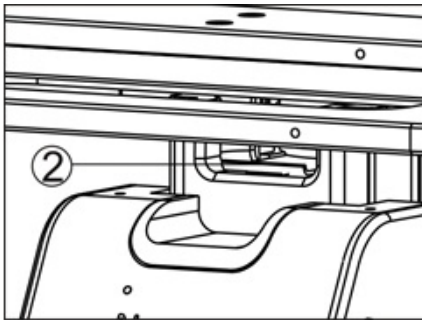


Fig. 26

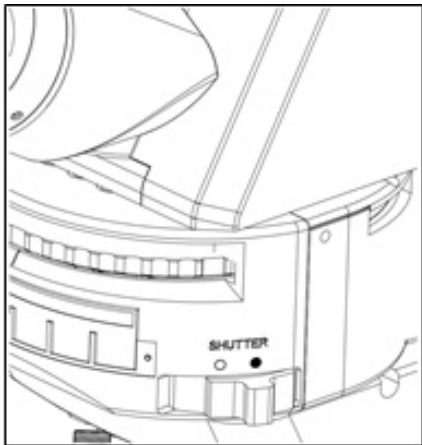


Fig. 27

5.10. Adjusting the Condenser, Reflected/Transmitted models only (Fig. 25-27)

- The condenser and the objective are coaxial. It has been adjusted before leaving factory, so the user should not need to adjust them.
- Generally, the aperture iris diaphragm is set to 70- 80% of the N.A. of the objective to provide an image with good contrast and detail.

Adjusting Aperture Iris Diaphragm ①

The aperture iris diaphragm can be adjusted by turning the ring ①. The aperture iris diaphragm is designed for the adjustment of the numerical aperture, not for the brightness.

- ★ When the lower (transmitted) illumination is not used, push the light shield ② in completely. Fig. 26)
- ★ When the upper (reflected) illumination is not used, change “SHUTTER” ③ position in Fig. 27 to the closed position “●”.

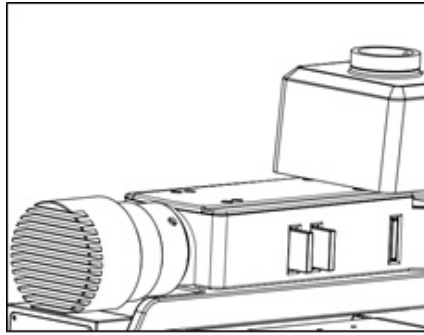


Fig. 28

5.11. Using Filters (Fig. 28)

- For transmitted light illumination, insert the filter required for the observation into the filter insertion slots ⑨. The first click position of the slider is the idle position and inserting the slider till the second click position engages the filter into the light path.

Filter	Application
Color temperature filter	Convert the light source to a daylight color temperature (~6500K). Not used often with LED illumination but may be used for general observation and when taking color photographs.
Green filter	Creates contrast in black and white observation. Used when taking black and white photographs.
Yellow filter	Contrast filter for use in semiconductor wafer observation.
Frosted filter	Eliminates uneven illumination, but brightness will decrease slightly.
ND6	Reduces brightness by 94% (filter is 6% Transmittance)
ND25	Reduces brightness by 75% (filter is 25% Transmittance)

6. OBSERVATION METHODS

6.1. Reflected Light Illumination

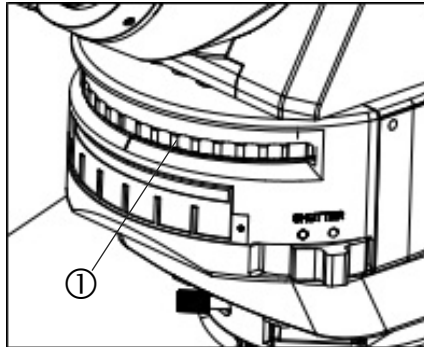


Fig. 29

6.1.1. Setting the Observation Light Path (Fig. 29)

Turn the brightfield and darkfield rotation dial ① for the desired reflected light observation mode.

BF1	Reflected light brightfield observation with ND6 neutral density filter
BF2	Reflected light brightfield observation
DF	Reflected light darkfield observation

- ★ In order to prevent the high brightness from damaging the eyes when switching from darkfield to brightfield observation, choose “BF1” position first.

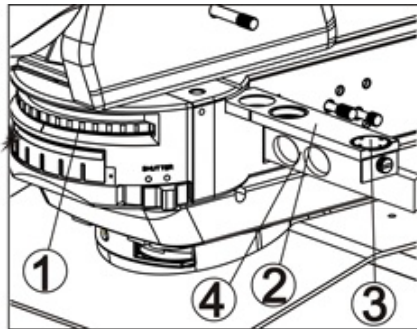


Fig. 30

6.1.2. Reflected Light Differential Interference Contrast (DIC) Observation (Fig. 30-31)

1. Rotate the brightfield and darkfield rotation dial ① to the BF state.
2. Adjust the focus using the 10x or 20x objective
3. Insert the analyzer ② and polarizer ④ into the insertion slot
4. Rotate the analyzer rotation dial ③ until the darkest field of view is obtained
5. Loosen the screw ⑤ on the nosepiece, pull out the standard idle slider. Then insert the DIC slider ⑥ in the insertion slot and clamp by tightening the screw ⑤. (Fig. 31)

- ★ Set the position of DIC slider ⑥ for required.

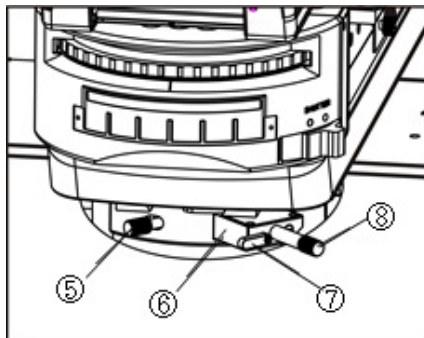


Fig. 31

DIC Observation Method:

1. Rotate the prism control knob ⑧ of the DIC prism to adjust the background contrast color.
2. Rotating the prism control knob will change the interference color of the background from gray to magenta (-100 to 600nm). Use the interference color with the best contrast for your sample and that meets your needs.

- If the background color is gray, a 3D looking image with maximum contrast can be obtained.
- If the background color is magenta, even a minor optical retardation can be observed as a color change.

6.1.3. Reflected Light Simplified Polarized Light Observation

1. Set the light path to "BF".
 2. Install the analyzer and polarizer in Section 4.2.11.
 3. Focus on the sample.
 4. Closing down the aperture iris diaphragm may increase the contrast somewhat.
- ★ **Polarizer performance may deteriorate exposed to light for a long period (about continuous 2000 hours). If extinction with the polarizer and analyzer cannot be achieved and the field is not dark, replace the polarizer.**
 - ★ **When using the high-intensity light source, be sure to use an IR cut filter to prevent polarizer burn.**

6.2. Transmitted Light Illumination (optional; Reflected/Transmitted Light models only)

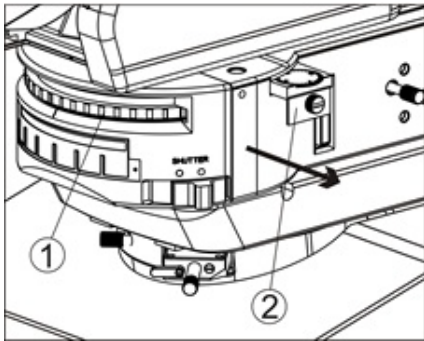


Fig. 32

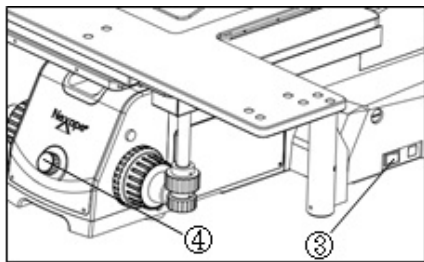


Fig. 33

6.2.1. Transmitted Light Bright Field Observation (Fig. 32-33)

1. Rotate the brightfield and darkfield rotation dial ① to the DF position.
 - **The DF light path eliminates the neutral density filter from the transmitted light illumination path so that the transmission is 100%.**
2. If the analyzer ② is engaged in the transmitted light illumination path, pull out the slider to the idle position so that the analyzer is not in the light path.
3. Set the main switch ③ of the microscope to "I" (ON) and rotate the brightness adjustment knob ④ to set the low-voltage position for the vertical illumination system.
4. Press the upper and lower light toggle switch ⑤ to switch to lower illumination.
5. Turn the brightness adjustment knob ④ to adjust the light intensity.

6.2.2. Transmitted Light Simplified Polarized Light Observation

1. Rotate the brightfield and darkfield rotation dial to the DF position.
2. Insert the analyzer.
3. Rotate the analyzer rotation dial so that the observation field is darkest.
4. Move the sample into the light path to start simplified polarized light observation.

7. TECHNICAL SPECIFICATIONS

	Description	Included
Optical System	Infinity Optical System (f = 200mm)	●
Reflected Illumination	5W LED Kohler lighting system Polarizer, Analyzer, Synchronous connector Blue, Green, Yellow and Frosted filters	●
Transmitted Illumination	10W LED Kohler alignment system Condenser (NA0.65/0.1) with aperture iris diaphragm	○
Observation Head	Trinocular head (FN25)	●
Eyepiece	Large field of view adjustable eyepiece EW10X/25mm, Eyepiece tube Φ30mm diameter	●
Nosepiece	Coded six-hole nosepiece, DIC slot	●
Objectives	5X Semi-Apochromatic Objective	●
	10X Semi-Apochromatic Objective	●
	20X Semi-Apochromatic Objective	●
	50X Apochromatic Objective	●
	100X Apochromatic Objective	●
	50X Long working distance Semi-Apochromatic Objective	○
	100X Long working distance Semi-Apochromatic Objective	○
Focus Mechanism	Coaxial coarse and fine focusing mechanism, fine adjustment value 0.001mm, focus range 33mm	●
Stage	Double-layer mechanical stage Movement range 210mm x 210mm Belt drive, Mechanical clutch	●
Camera Port	0.5X C-mount camera adapter	○

Legend: ● = standard; ○ = optional

8. TROUBLESHOOTING

8.1. Optical Parts

ISSUE	CAUSE	SOLUTION
Illumination is "on" but field is dark or invisible	The main switch of the light path matching the observation mode is not set to "on"	Turn on the light source required for the observation mode in use
	The light path selector knob on the trinocular tube is not in the proper position	Set the knob properly
	The bright field and dark field turret is not in the proper position	Turn the turret to the corresponding position according to the required observation
Field of view is obscured, or field of view is not evenly illumination	The filter or analyzer is not correctly inserted	Insert or remove the filter or analyzer completely into or from the light path
	The light path selector knob on the trinocular tube is in between positions	Set the knob properly
	The brightfield and darkfield turret is not in the proper position	Turn the turret to the corresponding position according to the required observation
	The aperture iris diaphragm is not centered	Adjusting the centering
Dirt or dust is visible in the field of view	A lens (the objective, condenser, eyepiece or collector) is dirty	Clean thoroughly
	Dirt/dust on the specimen	
	Dirt/dust on the bulb surface	
The image shows diffraction (coloration at the edge of features)	The aperture iris diaphragm is closed down too far	Set the aperture iris diaphragm to an appropriate position
Visibility is poor, image is not sharp, contrast is poor	The objective is not correctly engaged in the light path	Specify the objective again using the objective selector buttons on the front panel
	The condenser or the front lens of the objective is dirty	Clean thoroughly
	You are using a incorrect objective or eyepiece	Use the specified objective or eyepiece
Part of the image is blurry, and the image seems to waver	The sample is not mounted horizontally	Re-mount the sample
	The objective is not correctly engaged in the light path	Specify the objective again using the objective selector buttons on the front panel
No interference color in DIC	The analyzer is not engaged in the light path	Engage the analyzer in the light path
Interference color appears but is uneven or contrast is low	Incorrect objectives suitable for DIC observation	Use correct objective(s)

Field of view in one eye does not match the other.	The interpupillary distance is incorrect	Adjust the interpupillary distance
	Incorrect diopter adjustment	Adjust the diopter
	Left and right eyepieces are not the same	Change one eyepiece to match the other so that both sides are the same

8.2. Mechanical Parts

ISSUE	CAUSE	SOLUTION
The image shifts when you touch the stage	The stage and holders are not properly tightened	Check the installation of the stage and holders. Ensure they are flat and tightened.
The coarse adjustment knob is hard to turn	The tension adjustment ring is too tight	Loosen the focus tension ring
The stage drifts down by itself or focus drifts during observation	The tension adjustment ring is too loose	Tighten the focus tension ring

8.3. Electrical Parts

ISSUE	CAUSE	SOLUTION
The LED lamp does not light when the switch is on	There is no power supply, or the power cord from the LED lamphouse to the frame is not connected properly	Check the connection of the power cords and connect them correctly
	The bulb is not installed correctly	Install bulb correctly
	The bulb is broken	Replace the bulb
The bulb burns out often	The specified bulb is not used	Use specified bulb
The brightness is not sufficient	The wrong bulb is used	Replace with specified bulb
	The voltage is too low	Check external power supply
The bulb flickers or has unstable brightness	The bulb is nearly burned out	Replace the bulb
	There is no power supply	Check the connection of the power cord and connect it correctly
After the setting time, people has left and the light is always bright	The bulb is not installed correctly	Install bulb correctly
	The bulb is broken	Replacement

MAINTENANCE

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

SERVICE

UNITRON 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 UNITRON distributor can arrange for this service. Should unexpected problems be experienced with your instrument, proceed as follows:

1. Contact the UNITRON 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 UNITRON distributor or to UNITRON 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 is warranted to be free from defects in material and workmanship for a period of five (5) years for mechanical and optical components and one (1) year for LED bulb and electrical components 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 UNITRON 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 Unitron Ltd. This warranty expressly excludes any liability by Unitron Ltd. 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 UNITRON distributor or UNITRON® at (631) 543-2000. 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 Unitron Ltd., 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.