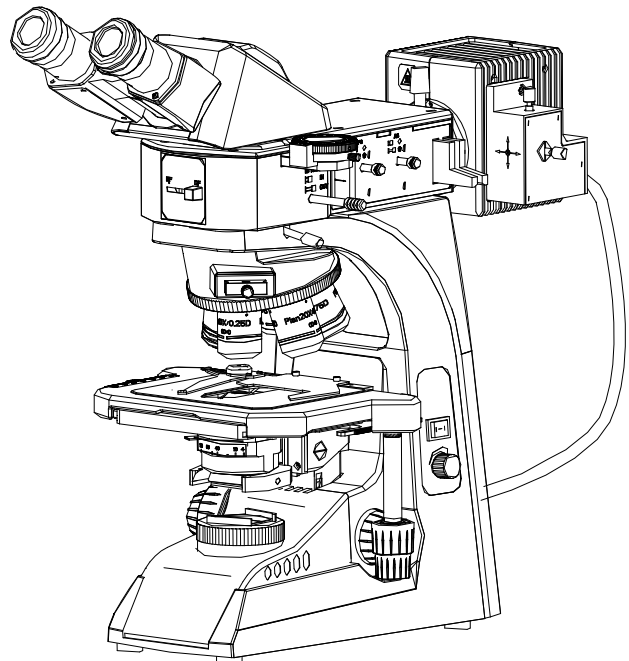




BS-6010 (R/TR)
Reflection (R) / Transmission Reflection (TR)
Metallurgic Microscope
Instruction Manual



This manual is written for Metallurgical Microscope BS-6010 series. To ensure the safety, obtain optimum performance and to familiarize yourself fully with the microscope, it is strongly recommended that you read this manual carefully before operating the microscope.

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INSTRUCTIONS BEFORE USE:

1. SAFETY PRECAUTIONS





1. Be careful when unpacking, to prevent accessories such as lens fall cause damage.
2. Do not use the microscope where it is subjected to direct sunlight, high temperature and humidity, dust or vibrations. To ensure the objective table flat, level and sturdy enough(Weight: approx. 7 kg).
3. When moving the microscope, Always hold the body frame on both sides of the microscope with hands.
4. The surface of microscope lamp housing will be extremely hot during use. Be sure to leave enough distance around the lamp housing.
5. Connect the power cord correctly, to ensure that the instrument grounding, to avoid lightning strike.
6. To ensure safety when replacing the light bulb, set the main switch to “O ” (OFF) then disconnect the power cord from the wall outlet in advance. Allow the lamp housing and bulb to cool before touching(**Designated bulbs: 12V/50W halogen bulbs PHILIP 7027(R), 12V/20W halogen bulbs(T).**
7. Use the power cord provided by our company.

2. Maintenance and Storage

1. All lenses are adjusted, please do not disassemble.
2. Instruments should be kept clean, often clean the dust, should be particularly careful not to touch the optical parts.
3. To remove lens stains such as fingerprints or oil smudges, wipe with clean soft cotton cloth, lens paper or gauze slightly moistened with No water (pure) alcohol (ethanol), xylene and ether.**(Since solvents such as ether, xylene and alcohol are highly flammable, they must be handled carefully. Be sure to keep these chemicals away from open flames or potential sources of electrical sparks -tr for example, electrical equipment that is being switched on or off. Also remember to always use these chemicals only in a well-ventilated room.)**
4. 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.

5. If the microscope was liquid wet during using, immediately cut off the power and wipe dry.
6. Never attempt to disassemble any part of the microscope, it will affect the function of the microscope or degrade the performance of the microscope.
7. Instruments should be placed in a cool, dry place, with a dust cover on the microscope when not in use. when applied on the dust cap. Make sure the lamp housing fully cooled down before covering.

3. Safety Symbols

Symbol	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.
	Indicates that the main switch is ON.
	Indicates that the main switch is OFF.

1. NOMENCLATURE

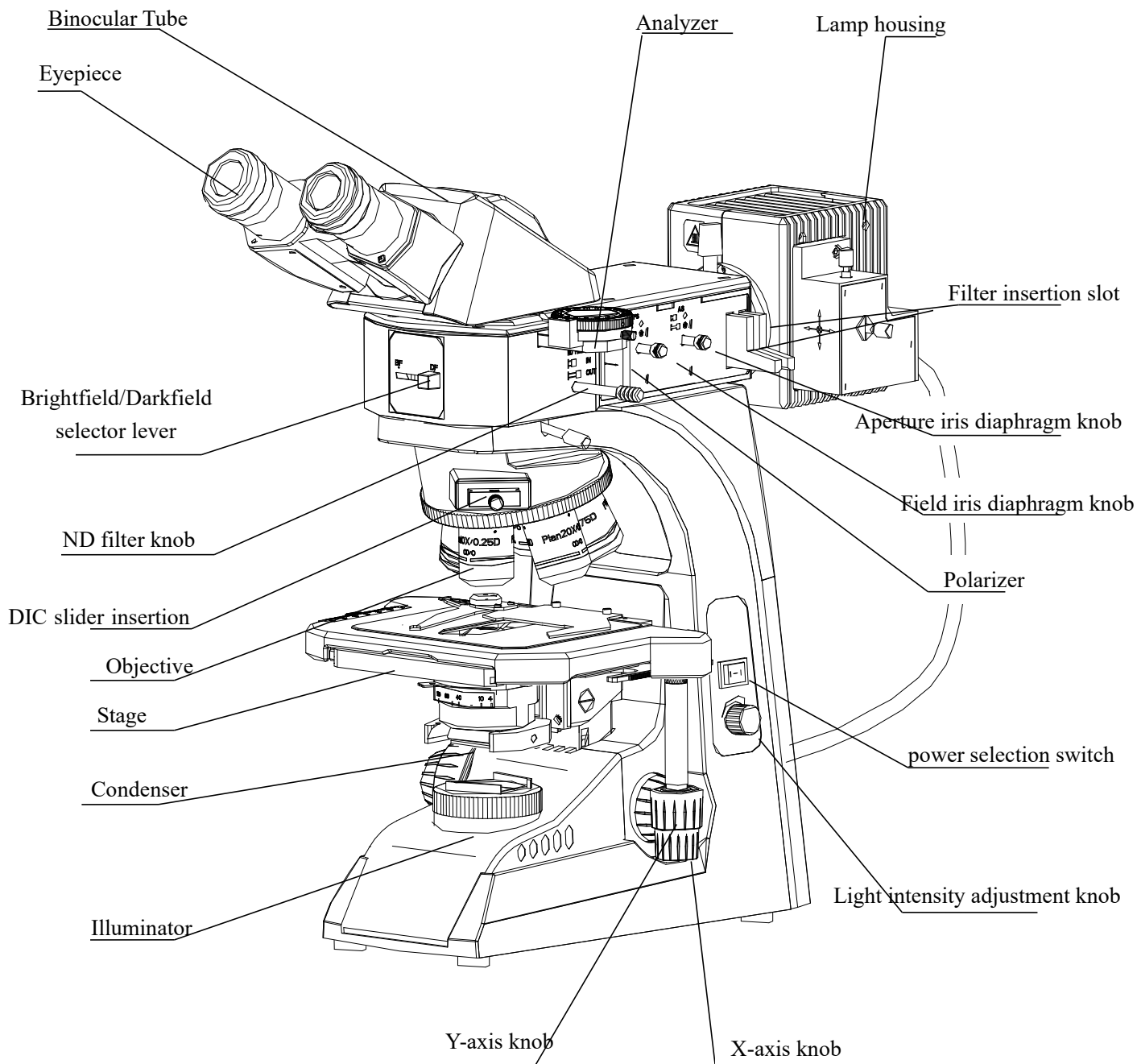


Fig.1
BS-6010(TR) NOMENCLATURE

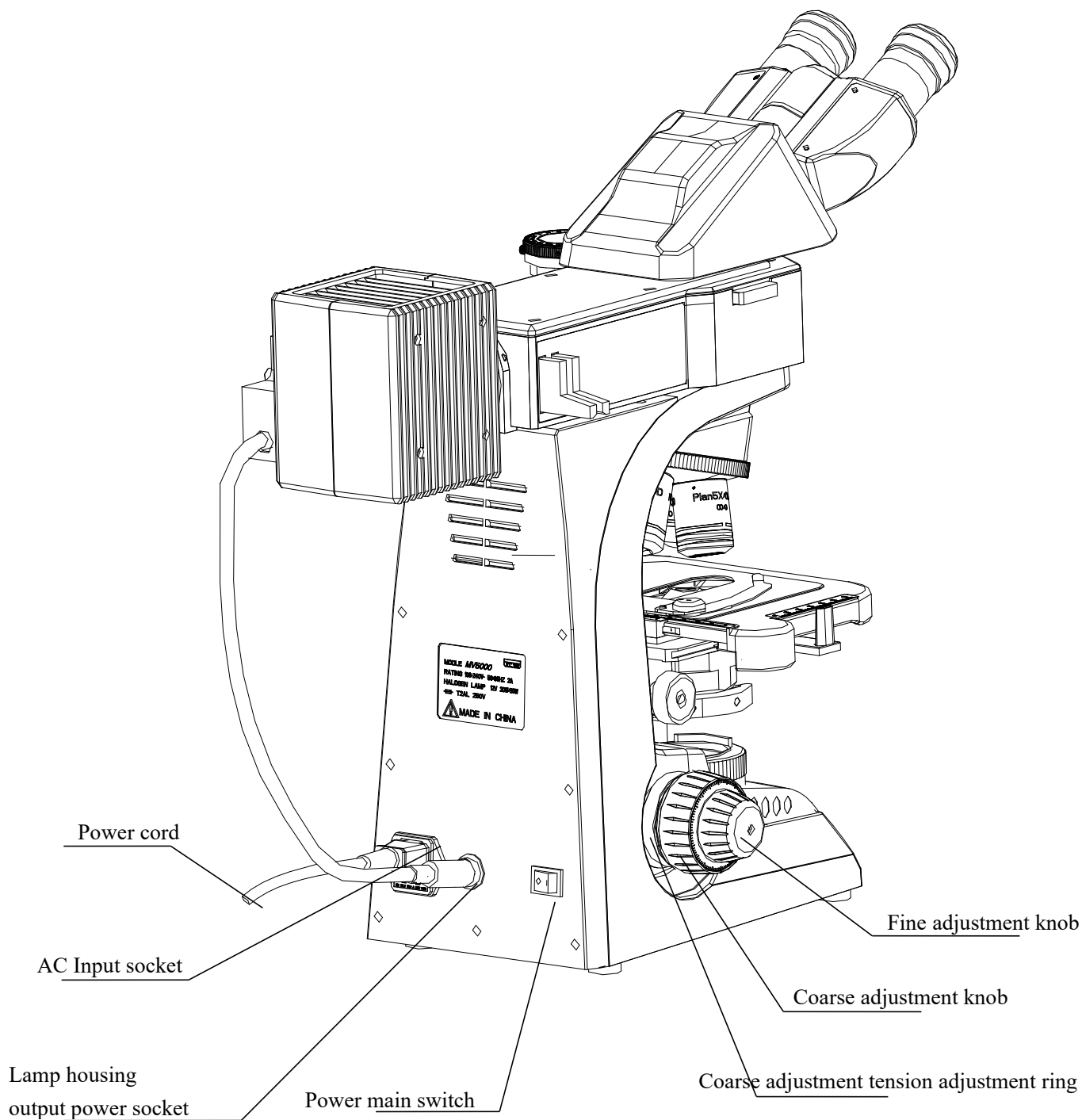


Fig.2

BS-6010(TR) NOMENCLATURE

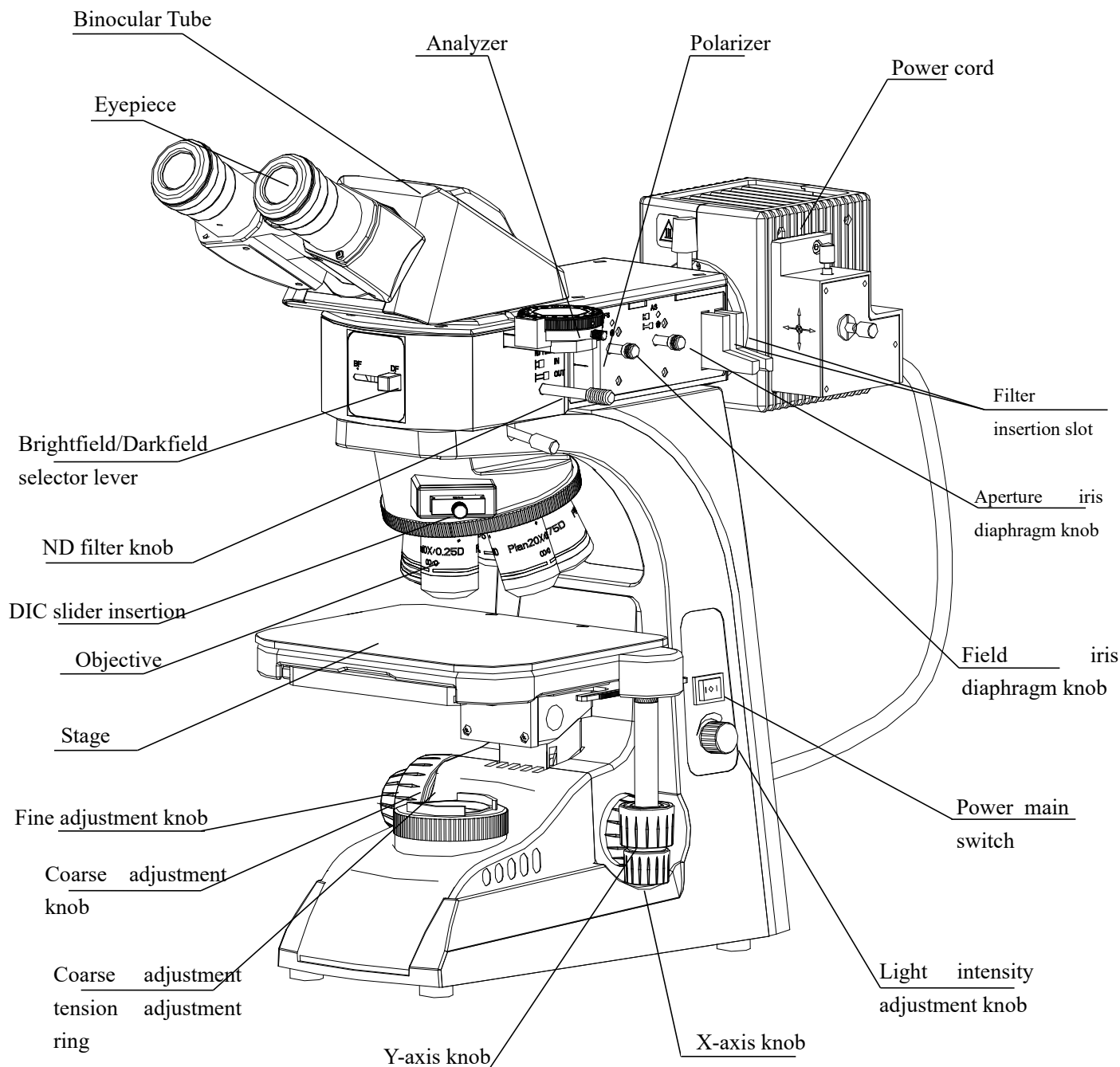


Fig.3
BS-6010(R) NOMENCLATURE

2. APPLICATION

BS-6010(R)/(TR)metallurgic microscope configuration flat field achromatic lens, it has the function of bright and dark field, polarized, differential interference, etc, also has excellent image quality. Appearance design fully consider the ergonomics, easy to use, it becomes one of the favorite microscopes of metallurgical microscope workers.

BS-6010(R/TR)microscope can be widely used to study the metallographic microstructure and some opaque objects, also can provide metallographic analysis and research of metal, heat treatment, material testing, steel and casting processes for research units, metallurgy, machinery manufacturing plants and micro electronics enterprises and institutions of higher learning. BS-6010(TR)microscope not only can be used to observe the opaque objects, but also transparent objects.

3. INSTALLATION

3-1 Installation Diagram

The following figure shows the the various components' installation location of BS-6010 (TR) **When assembling the microscope, make sure that all parts are free of dust and dirt, and avoid scratching any parts or touching glass surfaces.**

★ Keep the provided hexagon wrench.You will use it when replacing components.

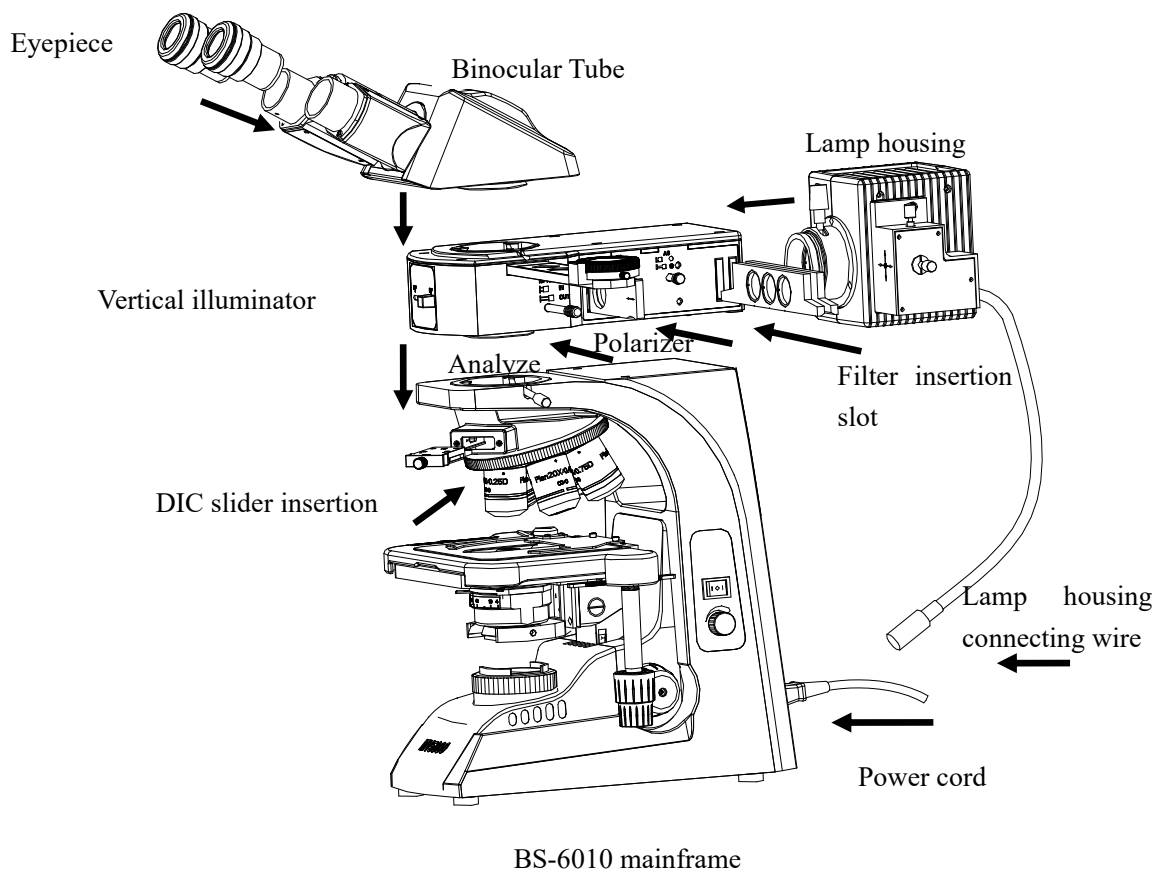


Fig.4 Installation Diagram

3-2 Installation Procedure

3-2-1 Disassembly of Transport Pressure Plate(fig.5)

To prevent vibration during transportation, focusing mechanism have been fixed.Hold grooves on both sides of condenser,pull it out,Use hexagon wrench to remove the pressure plate.

Pressure plate

★Focusing mechanism

Pull out the condenser,the lifting mechanism is fixed by a clamp, remove the screw and the pressure plate.

3-2-2 Installation of Reflective Brightfield/Darkfield Illuminator

Place the illumination device (Fig. 6) on the head of the Microscope, rotate to the proper position, tight the vertical illuminator with the screw (1 in figure 6).

3-2-3 Installation of Binocular and Trinocular Tube

Install the binocular or trinocular tube in the illumination(Fig.6 rotate to the proper position, use hexagon wrench to tight the screw (2 in figure 6) to fix it.

3-2-4 Installation of Objective

- 1.Adjust the coarse focusing handwheel, untill the stage holder reach to the lower limit.
2. Wrest the minimum magnification objective on the nosepiece from the left or right side, then rotate the nosepiece in the clockwise direction, install other objectives in the order of low to high magnification. This method will make it easy to change the magnification while using.

★ Reflective objective has been installed on the revolving nosepiece at the factory, if you need to replace the reflective objective, follow the procedures above (For BS-6010TR)

★Clean the lens regularly, the lens is very sensitive to dust

★ Replace the objectives, rotate the nosepiece, until a click is heard, in order to ensure that the required objective engage the light path.

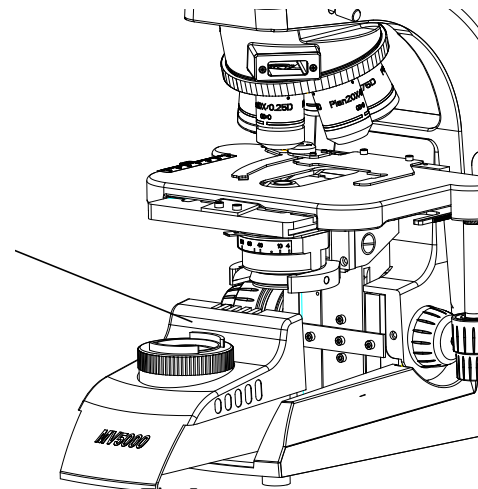


Fig.5

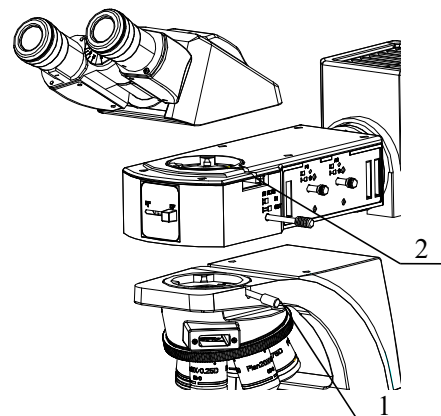


Fig.6

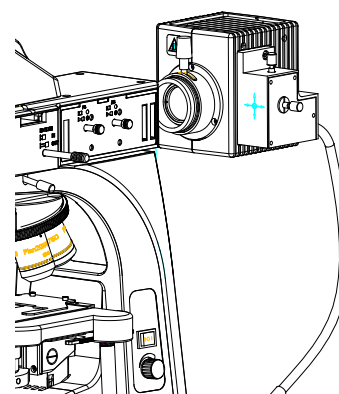


Fig. 7

3-2-5 Installation of Lamp Housing

1. Loosen the 3 screws on the Brightfield/Darkfield illuminator using S2 inner six angle screwdriver. Plug the axis of the lamp housing into the hole of the illuminator, then tighten the 3 screws until the lamp housing can not rotate.(Fig.7)

3-2-6 Installation of Eyepiece

1. Remove the covers of the left and right eyepiece Tube.
2. Insert the eyepiece into the eyepiece tube.
3. Using S2 inner six angle screwdriver to screw up the tight screw of eyepiece gently, to ensure the eyepiece can be adjusted properly without be pulled out(Fig.8).

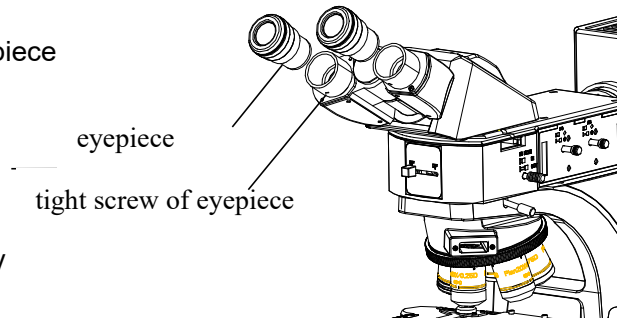


Fig.8

3-2-7 Installation of the Analyzer and Polarizer

When using simple polarized function, inserte the components of the analyzer and polarizer into the groove of the vertical illuminator device, when the second click is heard, the analyzer and polarizer engaged in the light path.(Fig.9).

3-2-8 Installation of DIC Attachment

Insert the DIC Attachment into the groove of the nosepiece until reach the bottom(Fig9).

- ★ The digital mark on the DIC Attachment must be matched with the same magnification objective.

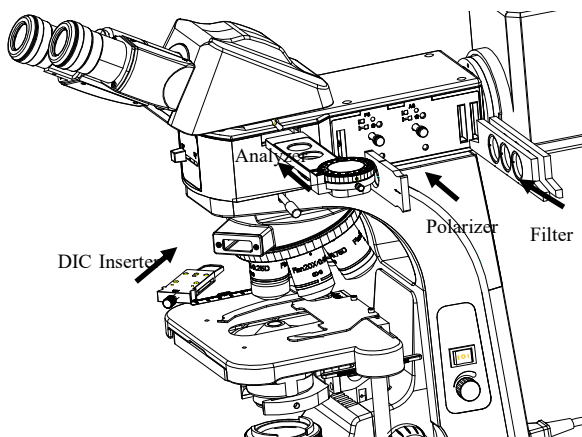


Fig.9

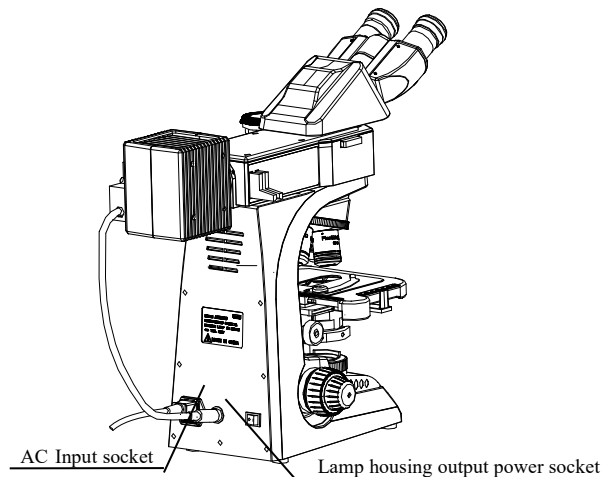


Fig.10

3-2-8 Installation of Filter

Insert the filter into the groove of the vertical illuminator device, when the second click is heard, the filter disengaged in the light path.

3-2-9 Connect the power cord

- ★ **The power cord is vulnerable when bent or twisted. Never subject it to excessive force.**

The electrical nameplate at the back of the microscope marked with input voltage, make sure that the indicated input voltage is in accordance with your local power supply voltage. Otherwise, it will cause a fire or serious damage to the microscope.

Turn off the power of microscope (the power main switch is set to "O"). Insert one end of the provided power cord (socket) into the AC Input socket at the back of the microscope, the other end (plug) into the grounding of the AC socket, to ensure the safety of the power connection (as shown in Figure 10).

Insert the power cord plug of the lamp housing into the power socket of the body in the right direction, and make sure the contact is good.

- ★ **Always use the power cord provided by our company, if lost or damaged, please select the same specifications of power supply cord.**
- ★ **Connect the power cord correctly, to ensure that the instrument is grounded**

BS-6010(R)/ (TR)

3-2-10 Replacement of Consumable

1)Replacement of Bulbs(Reflection)

★ Please use the specified 12V50W(PHILIP 7027) Halogen Bulb.

1. Using S3 Allen wrench, fully loosening the fixing screw on the cover of the lamp housing(1 in Fig11).
2. Pull the lamp socket component(2 in Fig11) out and remove it.

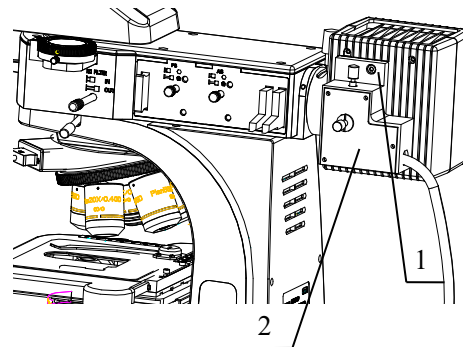


Fig.11

- 3.While pushing down the bulb clamping levers(1 in Fig12) down, hold the halogen bulb with gloves or a piece of gauze, insert the bulb pins into the sections(2 in Fig12) as far as they will go. Then return the lamp clamping lever gently back to the original position to clamp the bulb. (as shown in Figure 12)

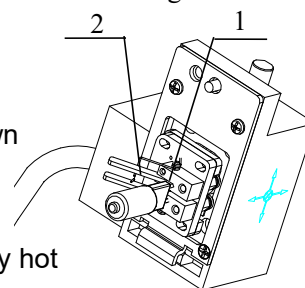


Fig.12

Bulb Replacement During or Right After Use

The bulb, lamp housing and areas near these will be extremely hot during and right after use.

Set the main switch to "O" (OFF), disconnect the power cord from the wall outlet, allow the old bulb and lamp housing to cool, then follow the procedures above to operate.

★ **Please insert the bulb gently, excessive squeeze will damage the bulb.**

★ **To prevent reduced bulb life or cracking, do not touch the bulb with bare hands. If fingerprints are accidentally left on the bulb, wipe the bulb with a soft cloth.**

The surface of the bulb will be extremely hot during use, the operator must pay attention to the warning signs.

2)Replacement of Bulbs(Transmission)

★ Please use the specified 12V50W Halogen Bulb.

Shut off the power (power switch to "O") and remove the AC plug. Waiting for 30 minutes, until the bulb and the surrounding is cool enough. Holding grooves on both sides of the illuminator, pull it out. Wear gloves or wrapped in the new bulb, completely insert the pin into the lamp socket. Then set the illuminator back in situ. Plug in the power cord.

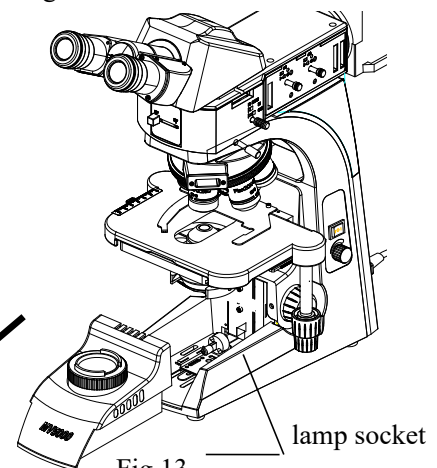


Fig.13

3) Replacement of Fuse(Fig14)

★ Fuse rating: 250V, 2A

Shut off the power (power switch to "O") and pull the plug out

Remove the fuse box with a screwdriver.

Replace the fuse.

Confirm the window display voltage of the fuse box in accordance with your local power supply voltage.

Press the fuse box into the home position.

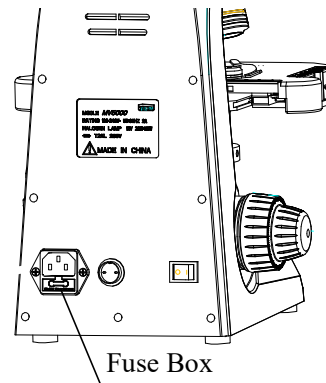


Fig.14

4. Operation

4-1 Open the Light Source

1). BS-6010(TR)

Connect the power supply, set the main switch (Figure 15, 1) to " | " (connected), then set the selective switch (Figure 15, 2) to "II" (on state). If you are using the transmission type lighting, set the main power switch (Figure 15, 1) to " | " (connected), then set the power switch to " | " (on state).

2). BS-6010(R)

Connect the power supply, set the main switch to " | " (on state).

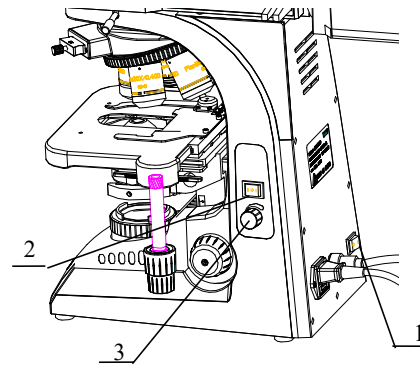


Fig.15

4-2 Adjusting the Light Intensity

- Turn the brightness adjustment knob(Figure 15, 3) clockwise to increase the voltage and make illumination bright; Turn the brightness adjustment knob anticlockwise to reduce the voltage and make illumination weaken.

- ★ Using the bulb in a low voltage state can extend the service life of the bulb.

4-3 Adjusting the Coarse Adjustment Knob Tension

- ★ The coarse adjustment knob tension is pre-adjusted at the factory, if too loosen (the mechanical stage automatic decline because of weight), please rotate the hand wheel anticlockwise to locking (Figure 16, 1), until the tightness is proper.

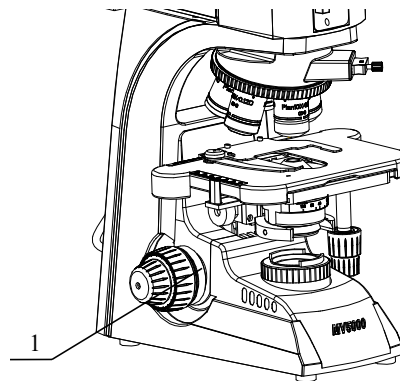


Fig.16

4-4 Adjusting the Reflection lighting filament center and Condenser

1. Open the reflection light source.
2. Remove any eyepiece from the eyepiece tube, rotate the adjustment screw 1, 2 to make it possible to see the filament image in the center of the whole field of view from the eyepiece tube (without eyepiece).
3. Front-back adjustment of condenser by moving sequence 3 forward and backward, it can make field illumination uniformity, filament image can't be observed in the field of view of eyepiece (figure 17).

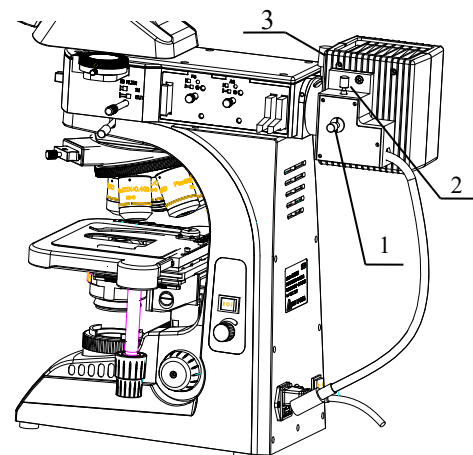


Fig.17

4-5 The Placement of the Specimen in the Observation of Reflected Light

1. Fix the specimen (Fig. 18, ②) in the sample board (Fig. 18, ①) with the rubber(Fig. 18, ③), to ensure that the specimen plane parallel to the sample board. Choose the flattening machine to flatten specimen (Fig. 19).
 2. Installing the sample board with fixed specimens in mechanical stage, the activity model gently clamp the sample board.
 3. Rotating the horizontal and vertical regulating handwheel of the mechanical moving ruler, moves the specimen to the desired position.
- ★ **Be careful when changing the objective. After observing the specimen in the objective with short working distance, objectives may encounter with specimen when replacing the objective.**

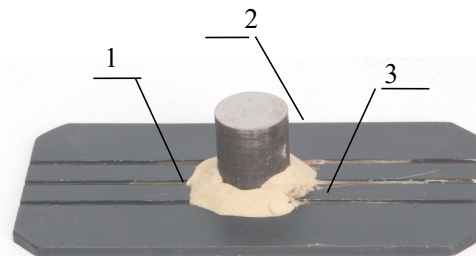


Fig.18



Flattening Machine

Fig.19

4-6 Adjusting the Interpupillary Distance

1. Scope of interpupillary distance is 48mm-75mm. While looking through the eyepieces, holding the left and right prism table and rotating around the axis(Fig. 20), adjusting the interpupillary distance until the left and right fields of view coincide completely.

4-7 Adjusting the Diopter(Fig.20)

1. Rotating the coarse and fine adjustment knobs to bring the specimen into focus with 10X objective .
2. Then rotate to 5X objective, if the focus can't be found, adjusting the diopter adjustment ring on the left and right objective respectively to focus on the specimen.
3. Repeat steps 1 and 2 until the image of the sample appears on both eyes.

★ **The eyepiece diopter adjustment ring is provided with a ± 5 diopter reticle and a zero visibility scribed line on the nosepiece, the dioptrvalue of the eyes is depending on the alignment of numerical value.**

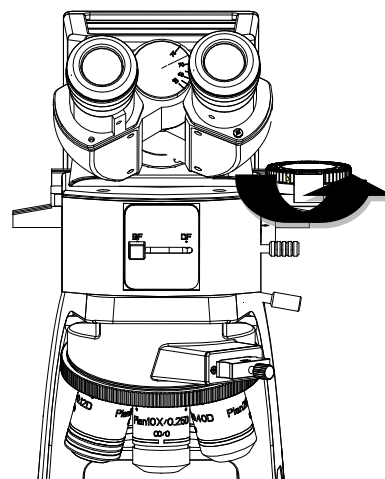


Fig.20

4-8 Adjusting the Focus

Engage the 10X objective by rotating the revolving nosepiece(A click will be heard when the revolving nosepiece rotated to the correct position), rotate the coarse and fine adjustment knobs to bring the specimen into focus.

In the observation, it is difficult to focus on the image by rotating of the adjustment knobs randomly. Use high power objective may cause damage to slides, samples or objectives, please read the following method carefully before focusing:

- 1) Engage the 5X or 10X objective into light path.
- 2) Make the stage dropped to lowest by rotating the coarse adjustment knob.
- 3) Looking into the eyepiece, rotate the coarse adjustment knob slowly, lifting the stage until the image of the specimen appears.
- 4) Bring the specimen into precision focus by rotating the fine adjustment knob.

When you want to use high power objective to observe, use 10X or 5X objective to bring the specimen into focus first, then replace the high power objective, rotate the fine adjustment knobs to bring the specimen into focus.

4-9 Using the ND Filter Knob

The ND filter is interlocked with the brightfield (BF) light path, it can reduce the glare when darkfield (DF)is switched to brightfield (BF).

- ★ The ND filter knob has been interlocked with the brightfield (BF) light path at the factory. If brightness is not enough during brightfield or other observation(except darkfield),the interlocking can be released. Pull The ND filter knob1 out to disengage the ND filter from the light path.

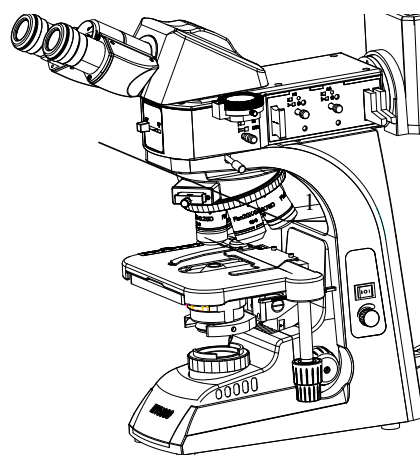


Fig.21

4-10 Using the Filters

According to the need to select the proper filter can be more effective to observe and photograph the samples.

Filters	Applications
Color temperature conversion filter	Turns the illumination light into daylight. Used in general observations and color photography.
Green filter	Enhanced contrast in monochrome observation. Used in monochrome photography.
Yellow filter	Contrast filter for observation of semicon ductor wafers.
Frost filter	Reduces irregularity in the illumination field, but also reduces the brightness.
ND6	Adjusts the brightness of the light source. (Transmittance: 6%)

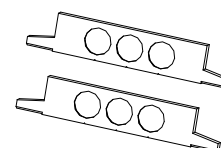


Fig.22

4-11 Selecting the Light Path

Slide the mirror selector lever (Figure 23,1) toward the indication of the location for the desired observation light path.

BF: Reflected light brightfield observation

DF: Reflected light darkfield observation

- ★ Be sure to slide the mirror selector lever until it contacts the stopper position.

4-12 Using the Field Iris Diaphragm

Centering the Field Iris Diaphragm (FS)

- 1) Slide the mirror selector lever (Figure 23,1) to "BF".
- 2) Engage the 10X objective by rotating the revolving nosepiece, place the specimen on the stage and adjust approximate focusing.
- 3) Pull out the FS knob (Figure 23,4) on the reflected light illuminator to reduce the aperture iris diaphragm a little.
- 4) Rotate the two FS centering screws (Figure 23,2), using the Allen screwdriver to adjust so that the field iris image becomes concentric with the field of view.
- 5) Pushing in the FS knob (Figure 23,4), open the field iris diaphragm until the field iris image inscribes the field of view. If the image is found to be eccentric, adjust the centering again.
- 6) Open the field iris so that its image is almost the same size (Figure 24) as the field of view.

★ In reflected light brightfield observation

The field iris diaphragm adjusts the illuminated area to obtain an image with high contrast.

According to the objective in use, adjust the FS knob (Figure 23,4) of the reflected light illuminator until the iris image circumscribes the field of view to block unnecessary light.

★ In reflected light darkfield observation

The field iris diaphragm must be opened by pushing in the FS knob.

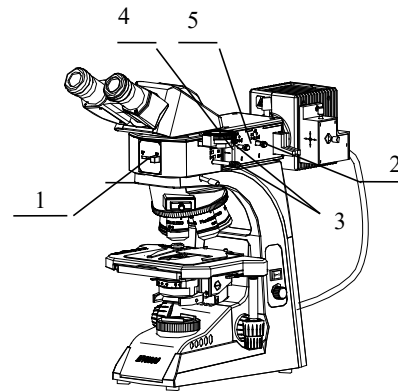


Fig.23

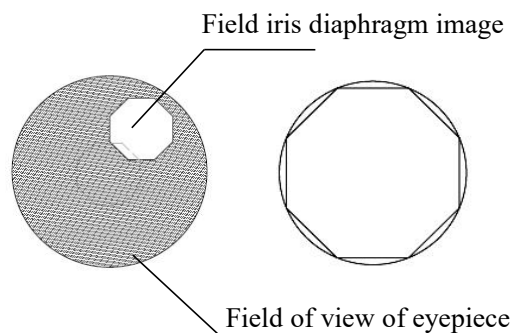


Fig.24

**4-13 Using the Aperture Iris Diaphragm
Centering the Aperture Iris Diaphragm
(AS)**

- 1). Slide the mirror selector lever(Fig.23,1) to “BF”.
- 2) Engage the 10X objective by rotating the revolving nosepiece, place the specimen on the stage and adjust approximate focusing.
- 3) Remove the eyepiece, look into the eyepiece sleeve and pull the AS knob(Fig.23,5) so that the aperture is about 70%.
- 4) If the center of the iris diaphragm is deviated, center it by rotating the two AS centering screws(Fig.23,3) using the Allen screwdriver.

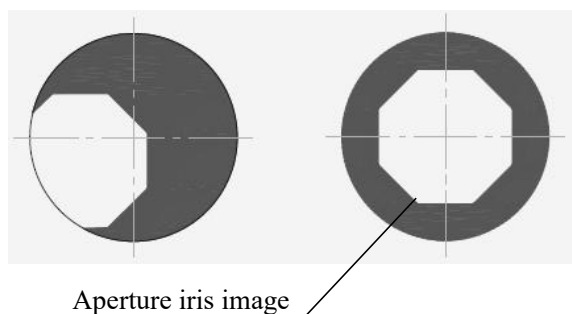


Fig.25

★ **In reflected light brightfield observation**

Optimum observation is generally possible by setting the aperture to between 70% and 80% of the aperture number of the objective.

★ **In reflected light darkfield observation**

The aperture must be fully opened by pushing in the AS knob(Fig.23,5)

With some specimens, an image with high contrast and little flare may sometimes be obtained when the aperture is slightly closed. It is therefore recommended to also try a slightly closed aperture.

4-14 Using the 0.01mm Objective Micrometer(For Reflection Objective)

Confirm each scale interval on the eyepiece scale of the object plane before measuring samples.

Put the objective micrometer on the stage with scale value up.

Put the 10 x eyepiece with scale into the right tube of binocular camera lens, look into the eyepiece, rotate the diopter adjustment ring to obtain a image with clear scale.

Show the image with clear scale on the objective micrometer, rotating the eyepiece so that the two scale value parallel.

Confirm the scale number of objective micrometer on the eyepiece scale(medium and large magnification objective) or the scale number of the whole objective micrometer (in small magnification objective) occupies the eyepiece scale.

Calculate the scale interval of eyepiece scale according to the formula:

$$E=TL/A \quad (1)$$

In the formula L- Scale interval of Objects micrometer;

T- equal to 0.01mm Scale interval of micrometer;

A- scale interval of eyepiece scale.

Record the data obtained in table 1

Table 1

objective magnification	scale interval of eyepiece scale(mm)
5	
10	
20	
50	
100	

Using these data: When confirming the real object linear value, calculate the scale interval of eyepiece scale which added to the object measured segment, multiply this number by the specified scale interval of scale in Table 1.

4-15 Micrography and Television Microscopy

Common microscope image recording equipments: cameras, digital cameras, digital webcams.

1) Installation and operation of trinocular tube and webcams:

a Installation

The same with the installation of binoculars tube, tighten the fixed screw.

Rotate the minifier and digital webcam, insert into the trinocular eyepiece, adjust the orientation of the image, tighten the screw.

Insert one end of USB2.0 cable into the slot at the back of the digital webcam, the other end insert into the corresponding slot of computer (About image processing please read the operation method of image processing software).

b Operation

While ready to video or photograph, observe by the 10X eyepiece(binocular) first, according to the focusing method above, focusing on the specimen, output the clear image directly without adjusting the configured camera system.

You can adjust the light intensity adjustment knob if the light of output image is too strong or too weak, then the clearer and softer image will appear on the screen for image observation and analysis.

If you want to get the clearer output image, you can adjust the fine adjustment knob of microscope, make the microscope located in the focal plane accurately, then rotate the eyepiece adjustment knob slightly to focus.

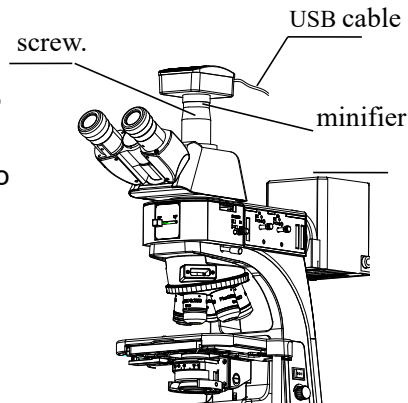


Fig.26

2) Installation of SLR Cameras

Insert SLR camera adapter ring which connect with SLR camera into SLR camera interface, then insert into the trinocular tube, tighten the screw after adjusting the orientation. Image adjustment method is the same as above.

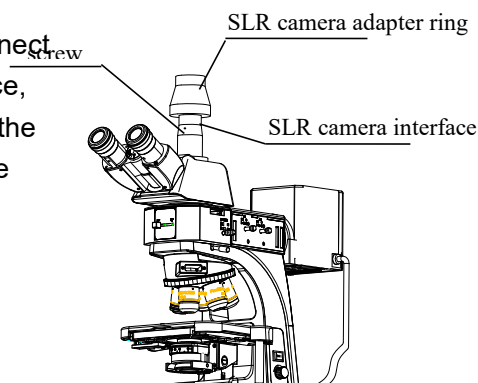
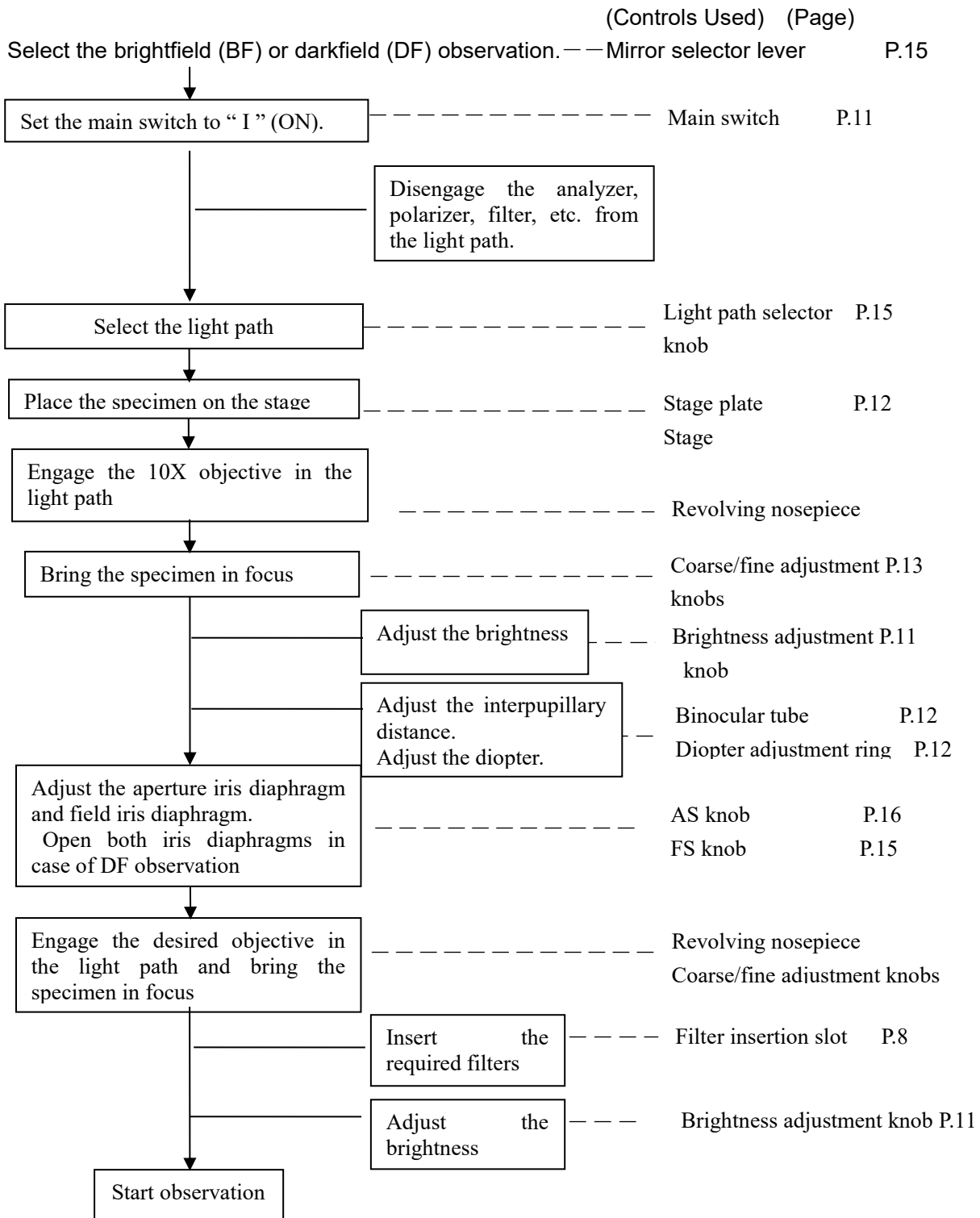


Fig.27

5. Observation Procedure

5-1 Reflected Light Brightfield/Darkfield Observation

The following flow shows the basic operating procedure for reflected light brightfield or darkfield observation.



5-2 Reflected Light Simplified Polarized Light Observation

- 1). Setting the Analyzer and Polarizer(On P.8).
- 2). Place the specimen on the stage and adjust the focus by moving the stage up or down. Now simplified polarized light observation can be started.
- 3). Adjust the field iris diaphragm so that its image circumscribes the field of view.
- 4). The contrast may sometimes be enhanced by closing the aperture iris diaphragm slightly.

5-3 Reflected Light Nomarski DIC Observation

- 1). The Analyzer and Polarizer are orthogonal in the condition of simplified polarized light observation.
- 2). Install the differential interference components on the instrument .
- 3). Adjust the field iris diaphragm so that its image inscribes the field of view.
- 4). The contrast may sometimes be enhanced by closing the aperture iris diaphragm slightly.
- 5). Rotate the knob of differential interference component to change the background color of the sample so that the small particles are more obvious.

5-4 Transmission Observation

- 1). Install the objective(40X, 100X).
- 2). Set the vertical illuminator light path selector knob to the position of darkfield(DF).
- 3). Place the slide on the stage and adjust the focus by moving the stage up or down. Now transmission observation can be started.
- 4). Adjusting the aperture iris diaphragm.

Set the AS knob to the position that the number is in accordance with the objective magnification in the light path.

★ Aperture iris diaphragm adjustment

- a Change the aperture diaphragm size by rotating AS knob. When the aperture diaphragm lessen, the brightness and resolution will reduce, however the contrast and depth of field will increase. On the contrary, when the aperture diaphragm enlarge, the brightness and resolution will increase, however the contrast and depth of field will reduce.
- b Usually, set the aperture to between 70% and 80% of the aperture number of the objective to obtain an image with proper contrast.
- c AS knob controls the numerical aperture of condenser, don't use it to adjust the brightness, brightness adjustment knob can adjust the brightness.
- d Numerical aperture marked on the sleeve of each objective.
Eg: Marker 40X/0.65 indicates that magnification is 40X, numerical aperture is 0.65.
- e Remove the eyepiece while observe the image of aperture diaphragm, observe with the binocular tube directly.

The numerical aperture of condenser shows the position of the AS knob under the corresponding objective multiples (The aperture diaphragm size is between 70% and 80% of the aperture number of the objective when the AS knob move to a certain position).In order to get the image with proper contrast, each time you replace the objective, set the AS knob to the position that the number is in accordance with the objective magnification in the light path.

- 5). Install the blue filter

Take out the filter holder from the bottom of the condenser, replace the filter holder after putting the blue filter on it (According to personal need to install filters).

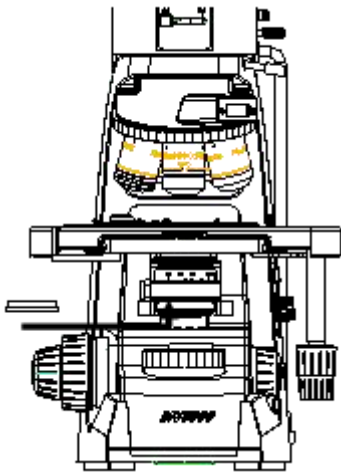


Fig.28

6). Oiled observation

Immersion objective marked “oil”. Immersion oil for microscope is needed between the objective and the cover glass when using oil immersion lens.

Oiled operation

Condenser:

Move the specimen back, bring down the condenser slightly, drop a drop of oil at the top of the condenser by the long hole of the stage.

Replace the specimen and lift the condenser slowly.

Objective:

Rotate the revolving nosepiece, disengage the objective from the light path, drop a drop of oil on the specimen, rotate the revolving nosepiece slowly, engage the objective in the light path.

② Eliminate air bubbles

a. Pay attention not to make the immersion oil into eyes, although non-toxic, once it enters the skin or eyes, please use the following urgent measures:

When touching the skin: wash thoroughly with soap and water.

When entering the eye: rinse thoroughly with water (at least 15 minutes) and ask the doctor to make a diagnosis and treatment.

b. Do not expose the immersion oil to the outdoor sunlight (or ultraviolet light)

The air bubbles in the immersion oil will have adverse effects on image observation, please confirm there is no air bubble formed when using the immersion oil. Remove the eyepiece when checking the air bubbles, fully open the field iris diaphragm and aperture iris diaphragm, observe the objective exit pupil in the eyepiece tube (bright and circle).

c. If there are air bubbles in the immersion oil, use one of the following method to remove:

Rotate the revolving nosepiece slightly, rotate the immersion objective back and forth once or twice. Move condenser slightly up and down by rotating the lifting knob of the condenser slightly.

Add the immersion oil; Remove and replace with new immersion oil

③ Treatment of Immersion Oil

Try to use the immersion oil less as far as possible. If add too much immersion oil, it will stick around the stage and condenser, reducing the performance of instrument. Wipe the objective, condenser and other part which may be traces of oil after the oiled observation. If the immersion oil residue on the oil immersion lens or other dry objective lens, it will have a bad effect on the observation. Wipe the immersion oil with ether, then use pure alcohol (ethanol or methanol) thoroughly clean, it is necessary to repeatedly wipe the surface (usually three or four times) to clean the lens.

④ Attention for Using the immersion oil

★ Be sure to tightly close the cover after using the immersion oil. After long term use, the cover may loose, so it is necessary for regular inspection and closing the cover tightly to prevent oil spill.

★ Don't squeeze container excessively, it may cause the immersion oil eject from the container suddenly.

★ Wipe the immersion oil on the external surface of the container during using.

6. Specifications

		BS-6010(R)	BS-6010(TR)
Optical system	Infinity system	●	●
Eyepiece	eyepiece WF10×/22, lens tubeΦ30	●	●
	eyepiece WF10×/20, lens tubeΦ30, with cross division	●	●
	eyepiece WF15×/16, lens tubeΦ30	○	○
Infinity Plan Achromat objective	5×/0.12/∞/0(Brightfield and darkfield share)	●	●
	10×/0.25/∞/0(Brightfield and darkfield share)	●	●
	20×/0.40/∞/0(Brightfield and darkfield share)	●	●
	50×/0.75/∞/0(Brightfield and darkfield share)	●	●
	100×/0.9/∞/0(Brightfield and darkfield share)	●	●
	40×/0.65/∞/0.17		●
	100×/1.25/∞/0.17		●
	40×/0.65/∞/0(Brightfield and darkfield share)	○	○
Maximum specimen height	28mm	●	●
Viewing head	Hinged binocular head, 30°inclination, interpupillary distance 48-75mm	●	●
	Hinged ternary observation head, 30°inclination, interpupillary distance 48-75mm	○	○
Reflected illumination	12V/50W halogen lamp(Adjustable center), Continuous adjustable brightness	●	●
	10W LED Lamp	○	○
	Kohler illumination system	●	●
	Polarizer、 analyzer	●	●
	DIC (matching 5X, 10X, 20X, 50X, 100X objective)	○	○
	Yellow, green filter, frosted glass and color temperature filter	●	●
Transparent illumination	12V/20W halogen lamp (preset centering), Continuous adjustable brightness		●
	5W LED lamp		○
	Blue filter		●
Focusing system	Coarse/fine coaxial adjustment, fine adjustment scale value 0.002mm, Coarse adjustment tension adjustment	●	●
Converter	Introverted five hole converter	●	●
Stage	Atreto-rectangular three layers of activity platform 180×150mm, 70mm×50mm	●	
	Rectangular double activity platform 188×140mm, 75mm×50mm		●
	slides	●	●

Micrometer	0.01 micrometer	●	●
DIC		○	○
flattening machine		○	○
Camera accessories	Standard C interface 1×, 0.4×	○	○

Note: ●For the standard configuration, ○For the optional accessories

7. Troubleshooting Guide

7-1 Optical System

Problem	Cause	Remedy
Bulb lights but the field of view is dark.	The aperture or field iris diaphragm is closed.	Open the aperture and field iris diaphragms.
	Analyzer and polarizer are engaged in light path.	Disengage them from light path.
	Mirror selector lever is in an incorrect position.	Set the knob correctly.
Field of view is not bright enough	Mirror selector lever is in an incorrect position.	Set the knob correctly.
	Revolving nosepiece is not in a click position.	Set it in a click position.
	Field iris diaphragm is not centered or closed too much.	Center the field iris diaphragm correctly and open it sufficiently.
	Filter is not in a click position.	Set it in a click position.
	Lamp bulb is not installed correctly.	Push halogen bulb terminals all the way into stop position.
	Analyzer and polarizer not installed correctly	Engage analyzer and polarizer in light path.
Dirt or dust is visible in the field of view.	Dirt/dust on eyepiece	Clean thoroughly.
	Dirt/dust on specimen	
Visibility of observed image is poor	Objective is not correctly engaged in light path	Make sure that revolving nosepiece clicks into place correctly.
	Dirt/dust on extremity of objective	Clean it thoroughly.
	Dirt/dust on specimen	
One side of image is blurred	Parallelism of specimen cannot be achieved.	Correct specimen to make it parallel or replace specimen.
Field of view of one eye does not	Interpupillary distance is incorrect.	Adjust interpupillary distance.
	Incorrect diopter adjustment.	Adjust diopter.

match that of the other.	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 eyepieces, look far off and look into eyepieces again.
Micrograph image out of focus	Focus is not correct	Adjust the focus so that the double cross line and the samples are clearly visible
Indoor window	The external light entering the eyepiece or viewfinder is reflected	Cover the eyepiece and viewfinder of the microscopic illuminating system

7-2 Mechanical System

Problem	Cause	Remedy
Coarse adjustment knob is too heavy to rotate.	Rotation tension adjustment ring is too tight.	Loosen ring to an optimum tightness
	Pre-focusing lever is locked	Release pre-focusing lever.
Stage drifts down by itself or focus is lost during observation.	Tension adjustment ring is too loose.	Tighten ring to an optimum tightness
Specimen movement is not smooth	The movable jaw is not securely fastened	securely fastened
Binocular images do not overlap	Interpupillary distance is incorrect	Readjustment
Excessive eye fatigue	Incorrect diopter adjustment	Adjust diopter correctly
	Illumination brightness is not appropriate	Adjust the lamp voltage

7-3 Electrical System

Problem	Cause	Remedy
The bulb does not light when the switch is turned on	No power	Check the connection of the wire
	Bulb is not inserted	Insert correctly
	Lamp bulb is burnt out	Replace
	The power cord connection of the lamp housing is incorrect	Reconnect according to the requirements of the specification
	The open mode of the switch is incorrect	Dial to the specified status according to the requirements of the specification.
Lamp bulb burns out suddenly.	The bulb in use is not the specified lamp.	Replace with a specified bulb, If the situation has not changed after changing the specified bulb, please contact the maintenance department.
Illumination brightness is not enough	The bulb in use is not the specified lamp	Replace with a standard bulb
Bulb flashing or brightness unstable	The bulb is going to broken	Replace
	The bulb is not correctly inserted into the socket	Check and firmly connect

The manufacturer keep the right to make certain improvements to the design as necessary, therefore, this manual may not fully reflect the detailed characteristics of the existing various products.