

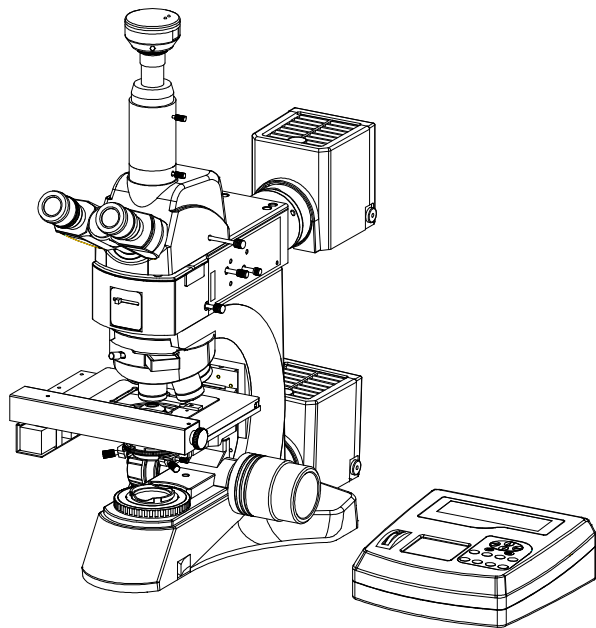


Metallurgical Motorized Microscope

With Auto-Focus System

BS-6020DRF/DTRF

User Manual



It is recommended strongly that you study this manual thoroughly before using the microscope. Retain this manual in an easily accessible place near the work desk for future reference.

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User Notice

I. Safety note

The microscope has been adjusted at the factory according to the standard slide, and all components are in the right initial position. If you want to use non-standard slide, please refer to Chapter 6, "Control Box Menu setting ", and section 6-2-6 to re-adjust. Otherwise, it will have serious consequences.





1. Carefully open the box, avoid the accessories, like lens, dropping to ground and being damaged.
2. Do keep the instrument out of direct sunlight, high temperature or humidity, dusty and easy shaking environment. Make sure the stage is smooth, horizontal and firm enough.
3. When moving the instrument, please use two hands to grip with the two sides of the microscope body.
4. When running, the lamp house and nearby parts will be very hot. Please ensure there is enough cooling room for them.
5. Make sure the instrument is earthed, to avoid lighting strike.
6. For safety, be sure the main switch is in "O"(off) state before replace the halogen lamp or the fuse, then cut off the power, and do the operation after the lamp bulb and the lamp house completely cool.
7. Use the factory supplied power cord, please.

II. Maintenance

1. All the lenses have been well checked and adjusted. It is forbidden to disassemble them yourself.
2. The nosepiece and coarse/fine focus unit have a compact and precise frame, please don't disassemble them as possible as you can.
3. Keep the instrument clean, wipe dust regularly, and be attention to avoid contaminating the optical elements especially.
4. The contaminations on the prism, as finger mark and oil, could be gently wiped with a piece of soft cloth or tissue paper, gauze which has been immersed in pure alcohol or xylene. **(Note that the alcohol and the xylene are all burned easily, do not let them near the fire, and use them in a drafty room as possible as you can.)**
5. Don't use organic solvent to wipe the non-optical elements, when you need to clean, use the soft detergent, please.

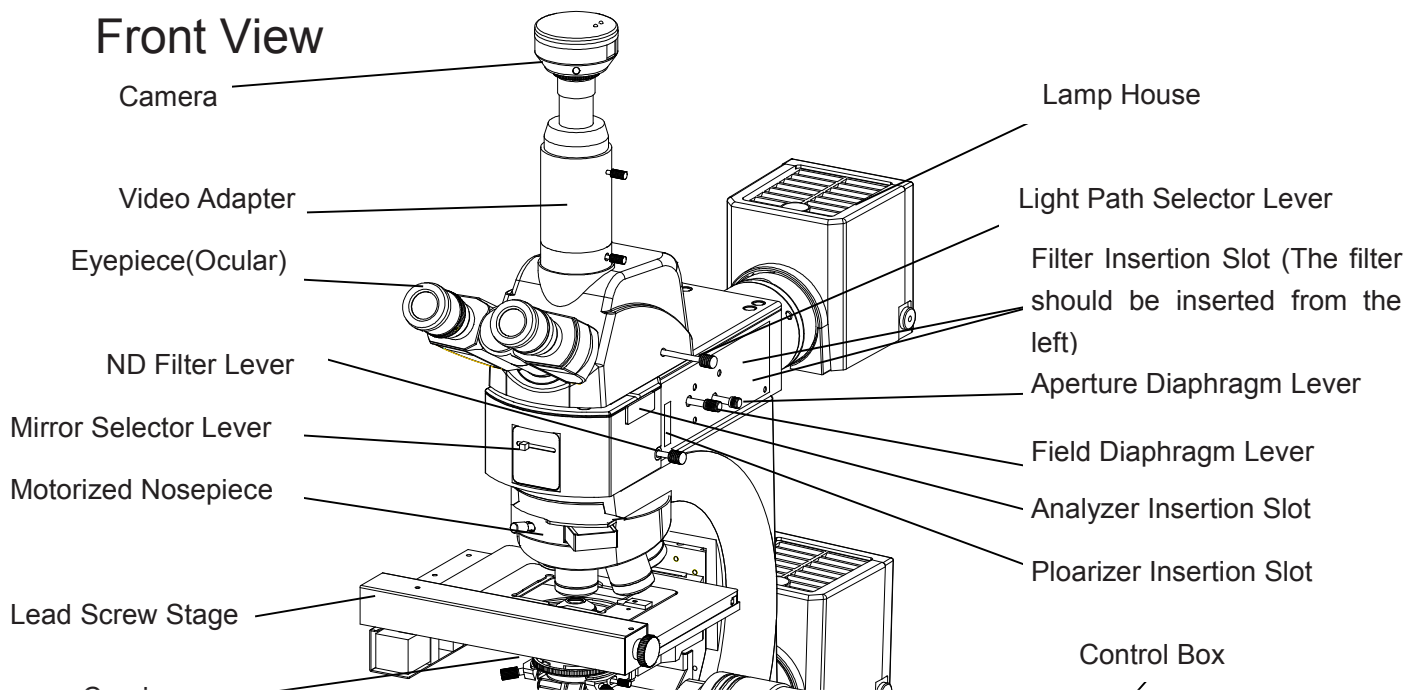
6. When using, if the microscope is splash by liquid, cut off the power at once, and wipe up the moisture.
7. Do not disassemble any parts of the microscope. That will affect the function or decline the performance of the microscope.
8. Place the instrument in a cool, dry position. After using the microscope, remember to cover it with dust helmet. Do wait for the lamp house cooling completely before cover.

III. Warning symbols

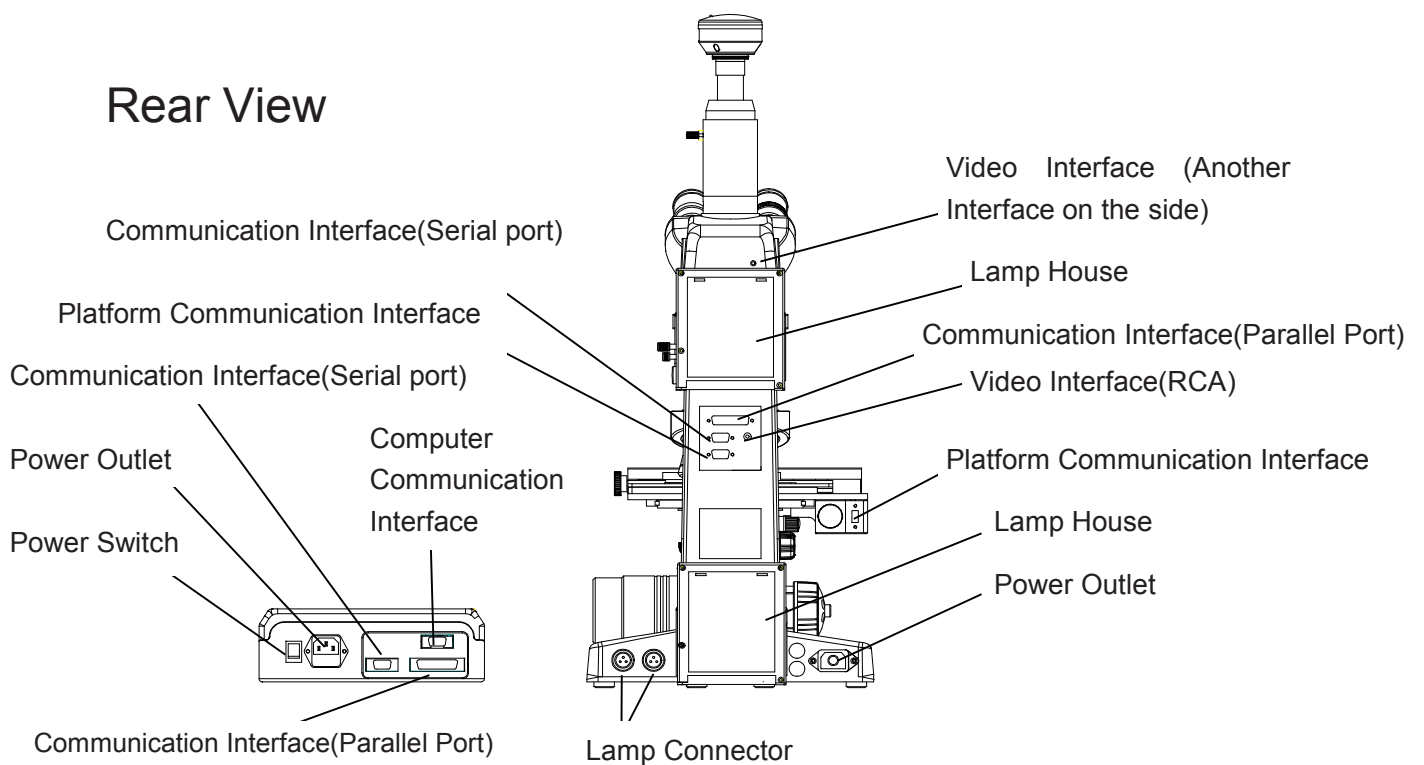
symbols	meaning
	Surface is hot, not touch with bare hands
	Carefully read the user manual before use. Improper use may cause personal injury or microscope damage .
	Main Switch on
	Main Switch off

1. Components

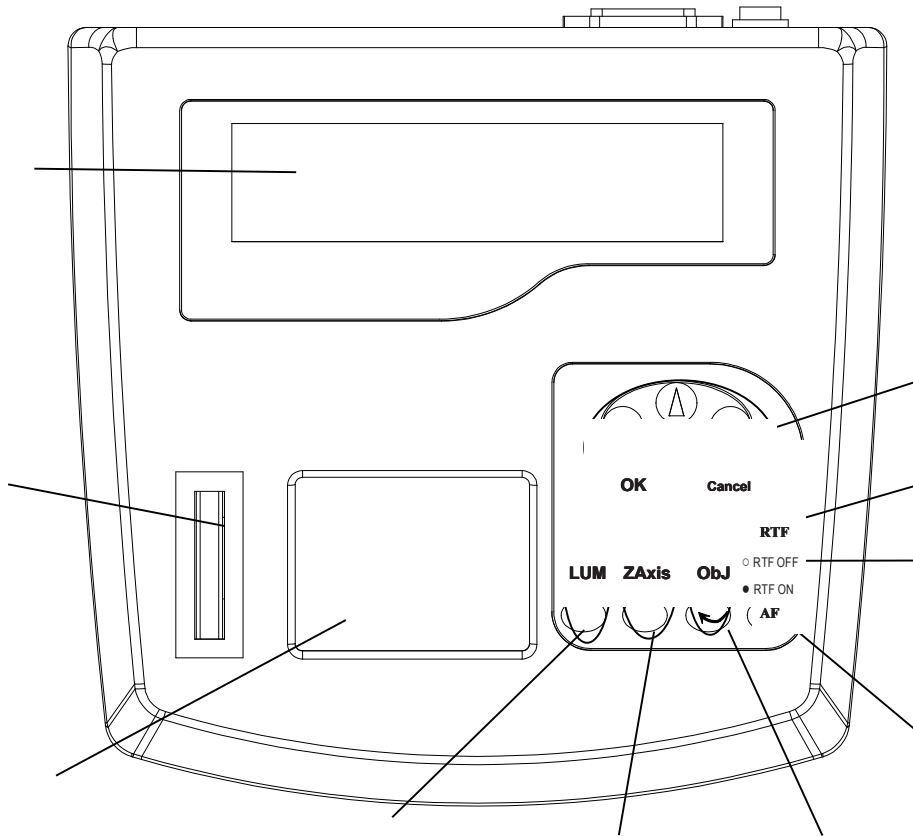
Front View



Rear View



1. Name Of Components



Adjust Button

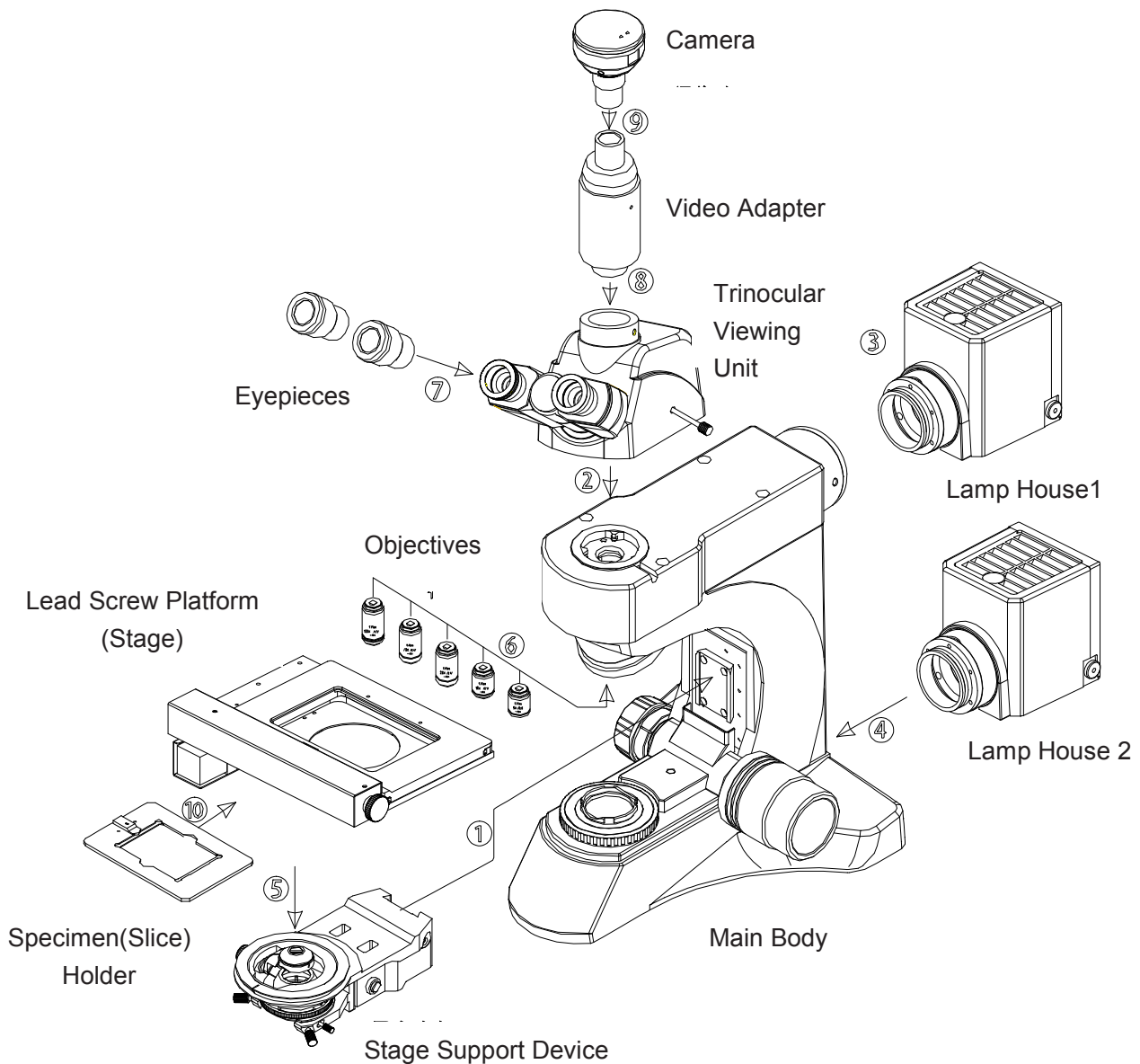
- ① Display Panel: Displays the current status of the platform and the information of the microscope System, the current platform position, lens position and the system brightness. When insert the system setting status, it displays system setup parameters.
- ② Z-axis Lift Wheel: roll the wheel to control the Lead screw platform top and down (Z-axis Movement).
- ③ Platform Control TouchPad: Use your fingertip moving on the Touchpad. Simultaneously, the Microscope stage will be moving as your fingertip doing (X-axis and Y-axis movement).
- ④ Brightness Adjust Button: Adjust the brightness.
- ⑤ Z-axis Lift button: Z-axis's up and down.
- ⑥ Objectives Change Button: Change the objectives at clockwise or counter clockwise
- ⑦ Auto-Focus Button: Focus automatically once.
- ⑧ Real-time Focus Button: Control the real-time focus control function ON or OFF. If ON, when moving specimens, microscope automatically focuses the specimens all the whole time.
- ⑨ RTF Status Indicator: Displays the current state of real-time focus function.
- ⑩ Function Buttons: Menu settings buttons.

2. Assembly

2.1 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 components is clean, do not score any parts or glass surface.
- * Keep well with hexagon wrench provided. When replacing the components, you will need it again.



2. Assembly

2.2 Assembly Step

2.2.1 Installing Stage Support Device

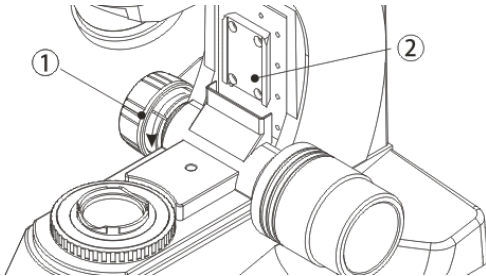


Fig.1

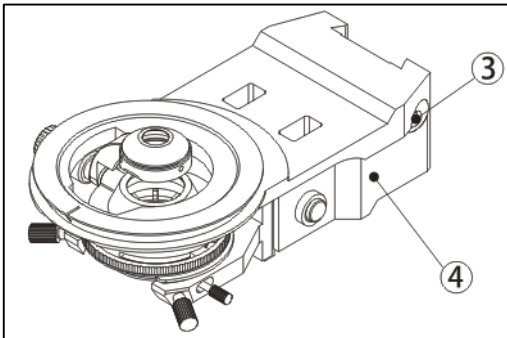


Fig.2

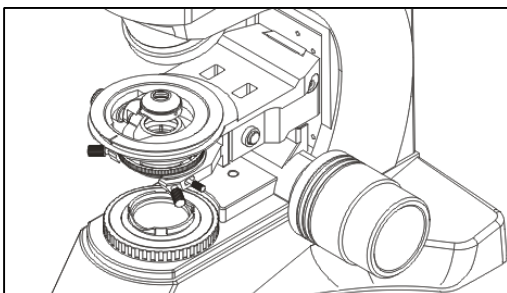


Fig.3

Before installing the device, be sure to adjust the coarse focus knob. Make the guide board (see figure 1) down to the limit position, so you can install the mechanical stage support device easily.

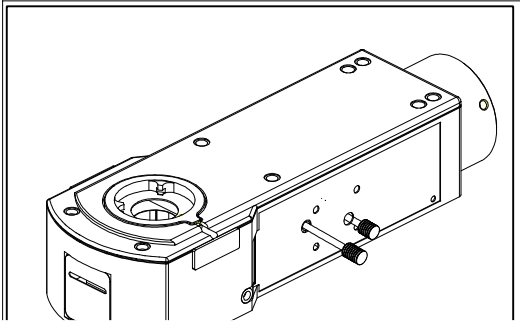
Hold on the stage support device (figure 2), place it from the top of the guide board (figure 1), let the device (figure2) falling free until it reach the limit position. Use the hexagon wrench to screw down the screw and locking block , make the stage support device (figure1) and the guide board fixed together. (See figure 3)

⚠ Attention : The stage support device must be installed to the limit position, otherwise, when the controller initializing, the objectives will hit the device and be damaged badly.

⚠ Attention: The lead Screw platform and the stage support device have been adjusted horizontally and fixed together before leaving factory. Please don't disassembly it unless necessary, otherwise, it will affect the observation precision of the microscopy.

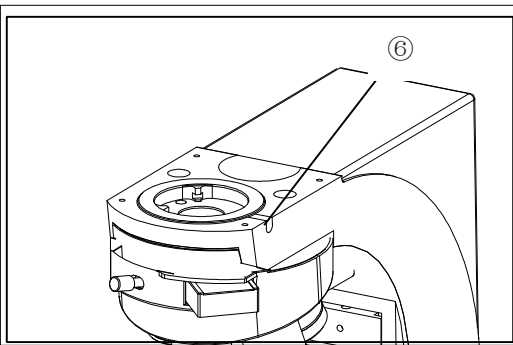
2. Assembly

2.2 Assembly Step



2.2.2 Installing the reflected light brightfield / darkfield illuminator

Installing the reflected light illuminator (fig.4) on the head of microscope body (fig.5), and turn to a proper position, then screw down the bolt⑥ to fix it.



2.2.3 Installing the Trinocular Viewing Unit

1. Loosen the fixed bolt ⑦ on the microscope main body, but do not let it ⑦ fall out.
2. Insert the trinocular viewing unit into the microscope head(fig.6), turn to a proper position, let the two eyepiece tubes toward the front, then use the hexagon wrench screw down the fixed bolt ⑦ to fix(See fig.6).

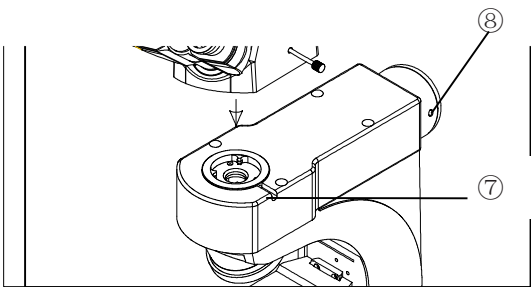
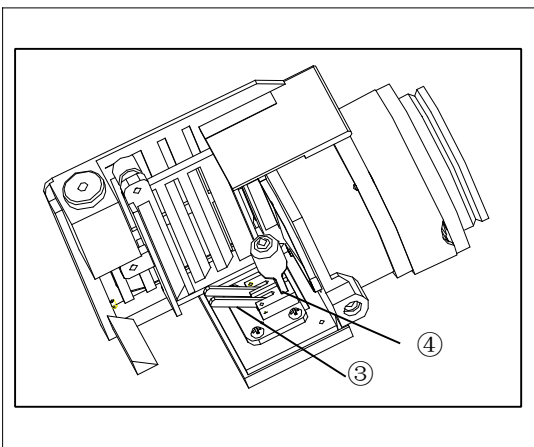
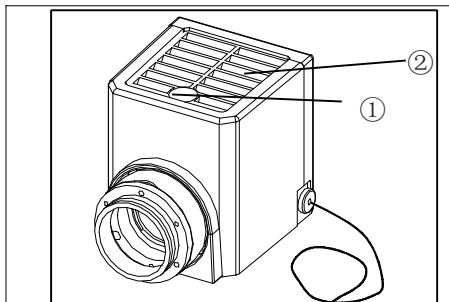
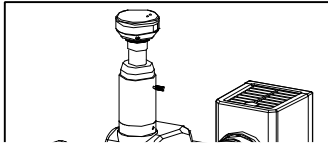


Fig.6

2. Assembly

2.2 Assembly Step



2.2.5 Replacing the the Lamp

★ **The specified halogen Lamp is the 24V 100W .**

1. Loosen the fixed bolt ⑦ of the lamp house cover by the hex wrench.
2. Pull up the lamp house cover (Fig.11 ②) and remove it.
3. Turn the lamp holder 90 degree to a side (Fig.12).
4. Hold the bulb with gauze or other protection materials. Press down the bulb deadlever (Fig.12 ③). Insert the bulb's pins fully into the jack of the lamp house (Fig.12 ④) . Then back the bulb deadlever into its original position to fix the bulb.

Caution for Bulb Replacement Durlig or Right After Use

When using, or soon after it is turned off the lamp, the lamp house and nearby parts will be serious burns. Please "off", pull out power bulb, the lamp room and then, you can do your

up gently, or it will be trusion.

gen bulb with your bare service life or cause it to marks on the surface dry soft cloth.

perature of the lamp very hot, please pay attention to the warning written on the Warning board.

2. Assembly

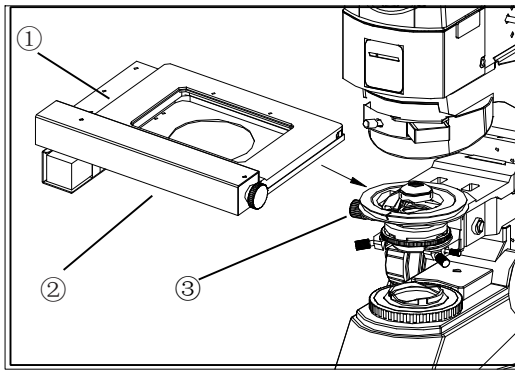
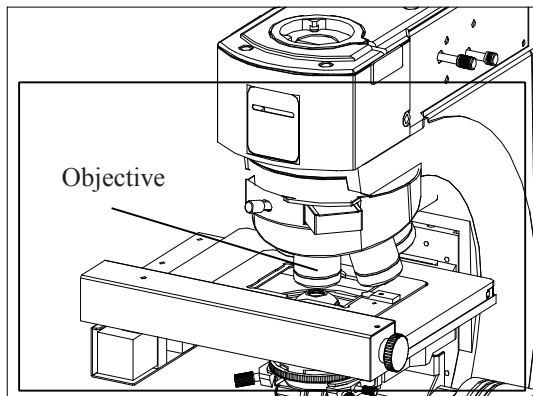


Fig 13

Lead screw platform

1. Adjust the coarse focus knob. Make the stage support device (Fig.13 ③) down to the lowest position, so you can install the lead screw platform easily.
2. Hold on the lead screw platform (Fig.13 ①), place it from the top of the stage support device (Fig.13 ③). Push the lead screw platform gently until it reaches the limit position, with keeping the stage support device (Fig.13 ①) in screw down rework platform ether. screw platform work, then the



2.2.7 Installing the Objectives

1. Adjusting the coarse focus knob until the support device of the mechanical stage reach its low limit position.
2. Wreting the 5X objective onto the position "5" on the nosepiece, then push the nosepiece clockwise, place other objectives by the sequence of low to high magnification .

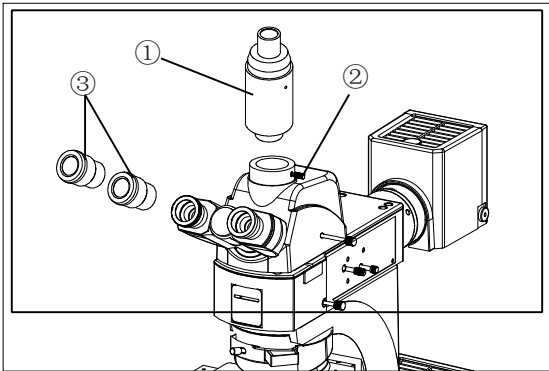
✧ **When operating, you need to use the 10X objective to adjust and focus the specimen at first. Then you can change the required manification to have a observation freely .**

Clean the objective regularly, the objective of the inversed microscope is very sensitive to dust.

When replacing the objective, slowly turning the nosepiece until you hear "clicked", that means the objective enter the required position--the light path center.

2. Assembly

2.2 Assembly Step

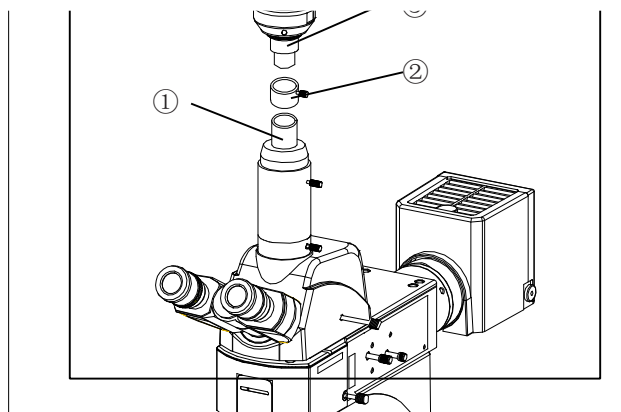


Installing the Video Adapter

Insert the video adapter (Fig.15 ①) into the trinocular viewing unit, then screw down the bolt ② to fix them.(as shown in fig.15).

2.2.9 Installing the Eyepiece

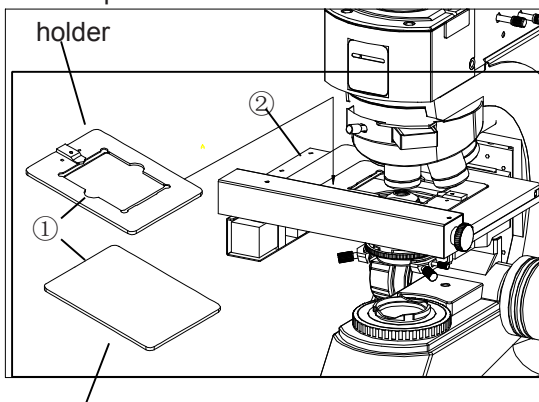
Insert the eyepiece (Fig.15 ③) into the eyepiece tube until they are against each other. (as shown in Fig.15)



2.2.10 Installing the Camera

Insert the camera ③ and the C adapter ② into the video adapter ①, then screw down the bolt to fix the camera stable. (as shown in Fig.16)

Transmitted specimen



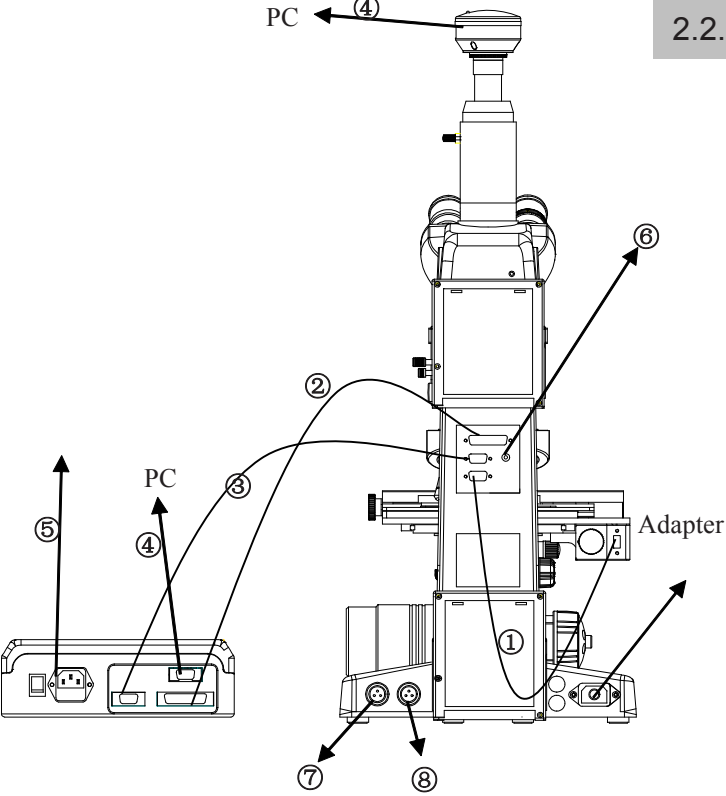
Reflected specimen holder

2.2.11 Installing the Specimen Holder

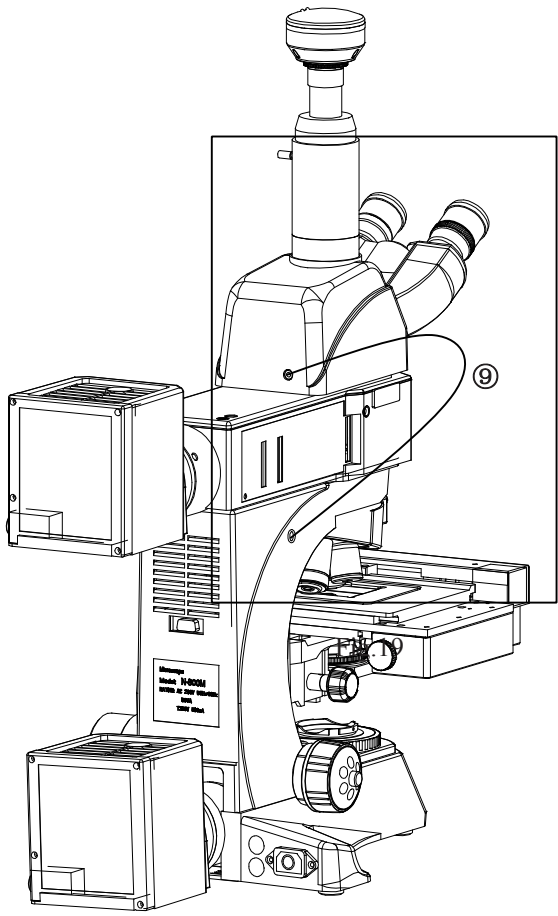
Place the specimen holder ① on the opening of the lead screw platform ② (Fig.17)

There are two types of the Specimen holder: the transmitted specimen holder is used in transmission observation, and the reflected specimen holder is used in reflective observation.

2.2.12 Connection Cable and Power Cord



1. Use the specified cable to connect the platform communication interface as shown in ①.
2. Use the specified cable to connect the communication interface (parallel port) as shown in ②.
3. Use the specified cable to connect the communication interface (serial port) as shown in ③.
4. Use the specified cable to connect the camera and the control box into the computer separately as shown in ④.
5. Plug the power cord firmly into the socket of the main body and the control box as shown in ⑤ .
6. Use the RCA video cable to connect the microscope and the monitor as shown in ⑥ (Observe the microscope image on the monitor directly without the computer).
7. Insert the lamp house 1 and lamp house 2 firmly into the house holder on the main body as shown in ⑦⑧.
8. Fixed the trinocular viewing unit into the main body as shown in ⑨ (Fig.19).



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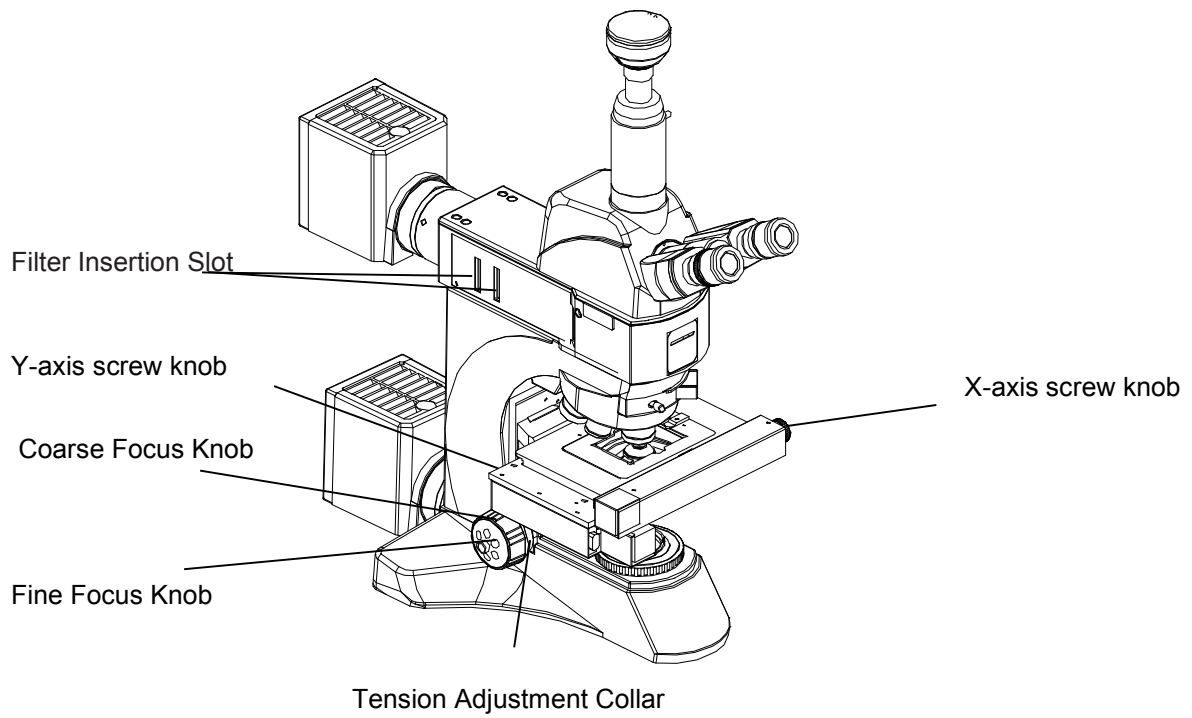
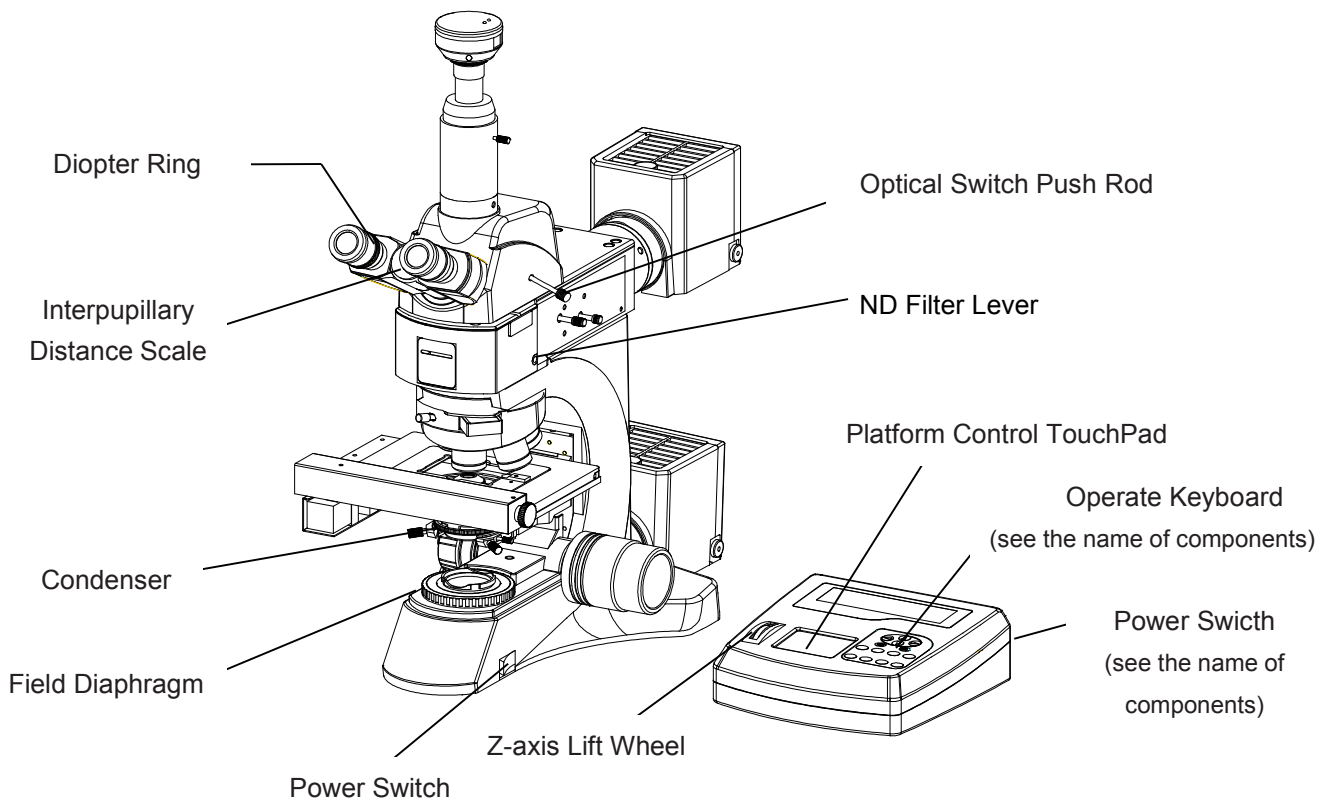
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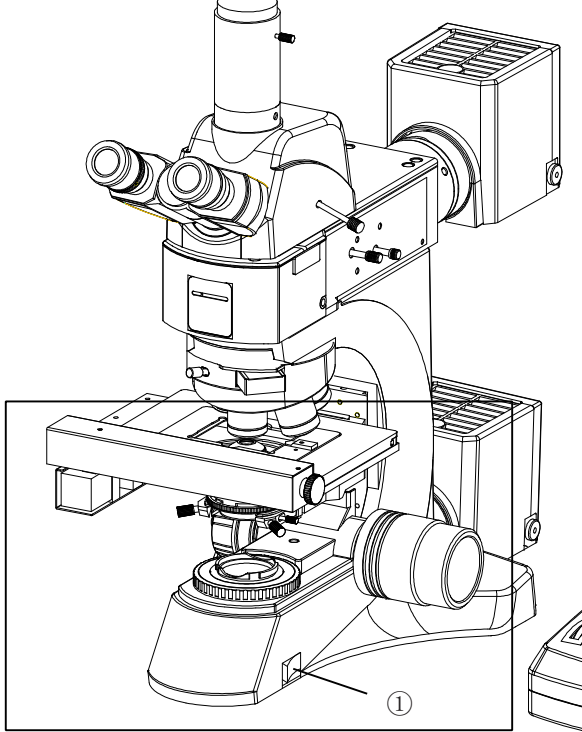
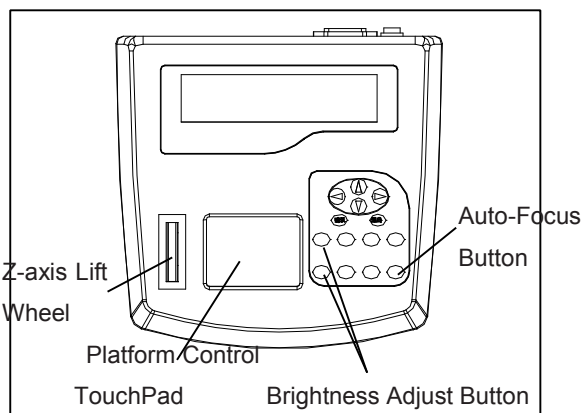
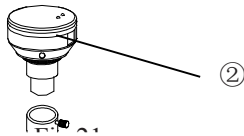
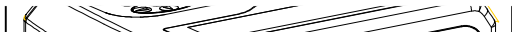


Fig.20



1. Install the microscope by following the assembly steps.

2. Turn on the power switches on the main body and the control boxes separately (as shown as ① in Fig.20 and ② in Fig.21).

❶ To use reflected light illumination, turn the main switch (Figure 20 ①) to "I" state.

❷ To use transmitted light illumination, turn the main switch (Figure 20 ①) to "II" state.

❸ Attention: if the power of the main body connecting ,the nosepiece began initialization. it will switch the 10X objective into the optical path automatically.

❹ Attention: After the power of control boxes connecting ,the control boxes will automatically carry out a series of device initialization, which will take some time. It's length determined by the position of each axis(including the screw platforms, Z-axis and converter) before the initialization. In generally, the initialization will complete within a minute, be patient please.

❺ If the power of the control boxes was connected before the main body, the 10x objective will be also switched into the optical path by the control boxes after its initialization, but the brightness adjustment is not include.

3. Adjust the brightness adjust button to obtain an appropriate brightness.

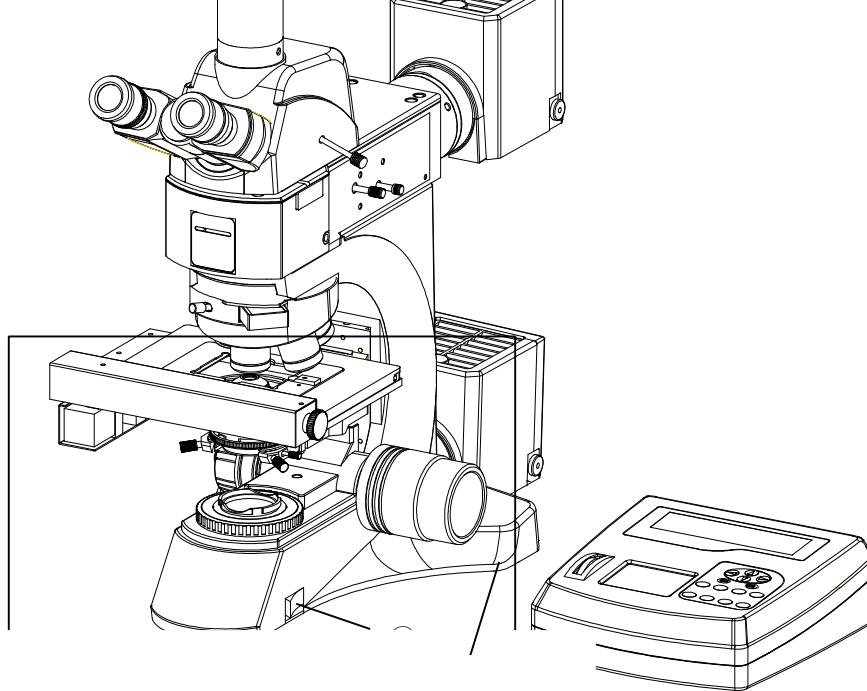
4. Place the specimen on the specimen holder.

5. Turn the eyepiece tube of trinocular viewing unit to adjust the interpupillary distance (see Fig.22)

6. Adjust diopter adjustment ring as shown in Fig.22.

7. Slide on the platform control touchpad gently , control the platform to move, let the specimen go to the desired position.(see Fig.23).

8. Press the auto-focus button to focus automatically (see Fig.23).



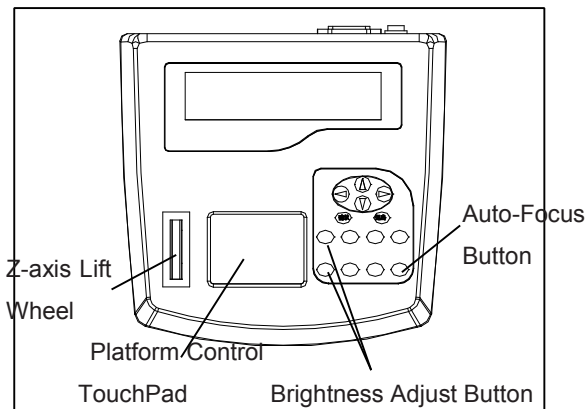
5.2 Adjust the Brightness

By Mechanical control

Rotate the light intensity knob (fig.20 ③) at clockwise, the voltage is higher, and the brightness increase. Rotate the knob at counterclockwise, the voltage is lower and the brightness decrease.

By Control boxes

Pressing the "brightness adjustment button" gently : " ↑ " to make light brighter and " ↓ " to make light dim. please adjust the light to an appropriate brightness. (Fig.23).



5.3 Adjust the Tension Adjustment Collar

The tightness of the tension adjustment collar has been adjusted at the factory, if too losing (that means the lead screw stage will glide down automatically by its own weight), turn the tension adjustment collar turn with a wrench in an anticlockwise direction until the tightness is in order (Fig.24).

⚠ To make the lead screw platform stay in a specified position. first, up or down the platform to the place by turning the coarse focus knob, then fixing the platform by the tension adjustment collar. now you can do your observation freely.

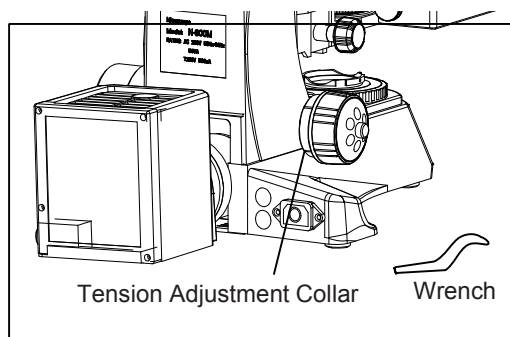


Fig.24

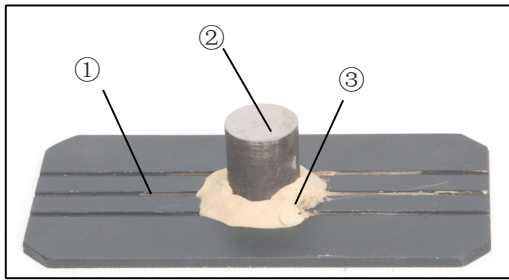


Fig.25

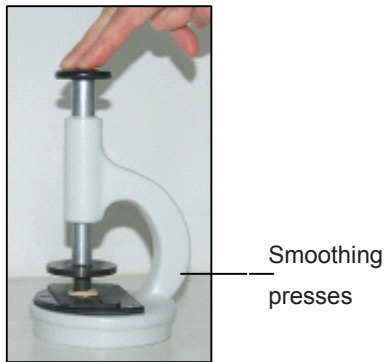


Fig.26

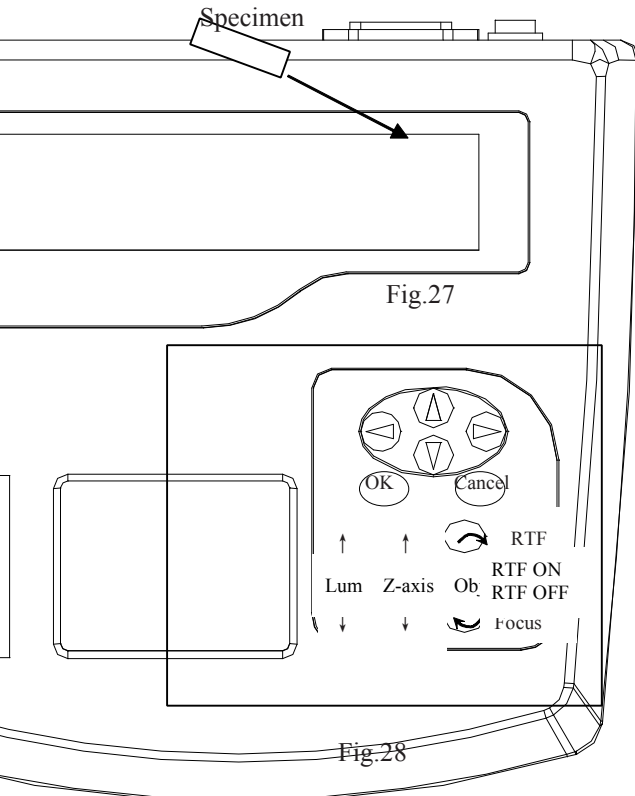


Fig.27

Fig.28

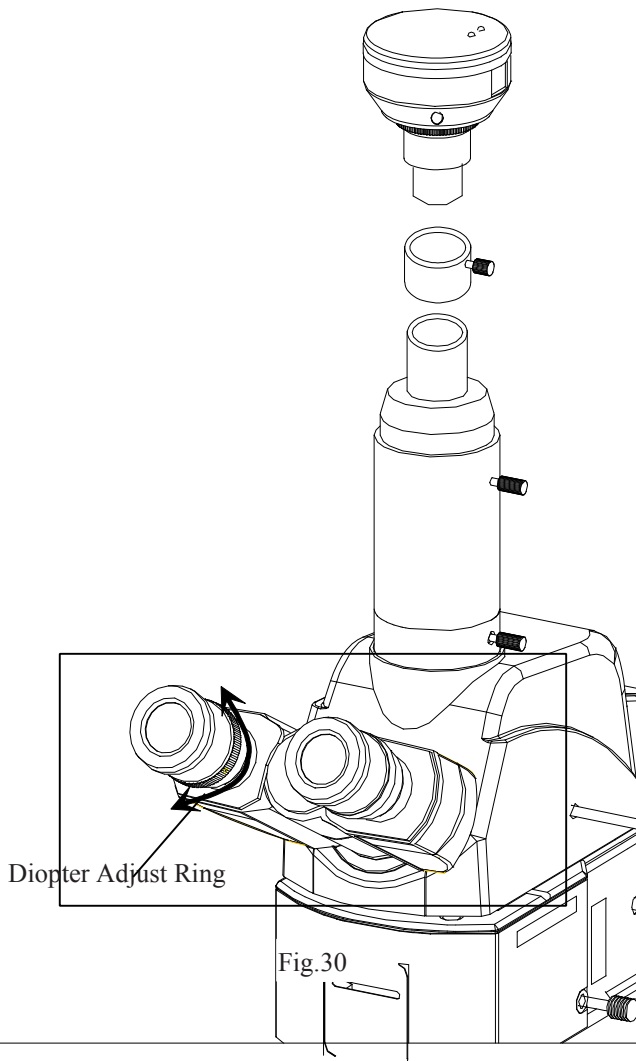
5.4 Place the Specimen

1. Fix the specimen (fig.25②) to the sample board (fig.25①) by plasticine (fig.25③), be sure that the specimen surface is parallel to the sample board. It is conveniently to use smoothing presses to flatten the specimen. (Fig.26).
2. Put the fixed specimen on to the specimen holder on the lead screw platform.
3. After the initialization, the specimen holder should be in the center of the optical path or nearby. If not find in the center, or place the specimen inconveniently, please slide the "platform control touchpad" (see Fig.23) and scroll "Z-axis scroll down" (see Fig.23) to move the holder into a suitable position, then input the specimen (see Fig.27).

❗ If the control not open, you can use the coarse and fine focus knob to adjust the platform lift, turn the X-axis and Y-axis screw knobs to move the platform.

❗ Press the "Z-axis lift button" gently to adjust the Z-axis: "↑" to make Z-axis up, "↓" to make Z-axis down. Press the "Objectives change button" to switch the magnification of the objectives. There two buttons, both they can switch the objectives, just in different direction. (see Fig.28).

Be careful when switching the objectives. Especially after a short working distance observation, the objective may collide with the specimen.



The interpupillary distance range: 48mm ~ 75mm. When observing with two eyes, hold on the left and right prism holder, turn the axis, adjust the interpupillary distance until the left and right fields of view coincide completely.

5.6 Adjust the Diopter

The right ocular tube is fixed. So by turning the left diopter ring after the right ocular focus on the specimen, the operator who's left and right eye has different eyesight can obtain a comfortable focus position with both eyes.

5.7 Focus

This microscope has automatic focus function. Press the "auto-focus button" gently, the microscope will focus on the specimens automatically.

The "RTF status indication" shows the work state of the "Realtime focus on the button". "RTF ON" means features real-time focus is working, the microscope can do the auto-focus in real time (See fig.31).

⚠ After the initialization, the specimen should be around in the image plane. If you have lift the Z-axis during the operation, please do a 10X focus again to ensure the microscope working normally. Now you can use the microscope to do observation with any magnification.

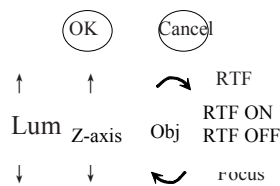


Fig.31

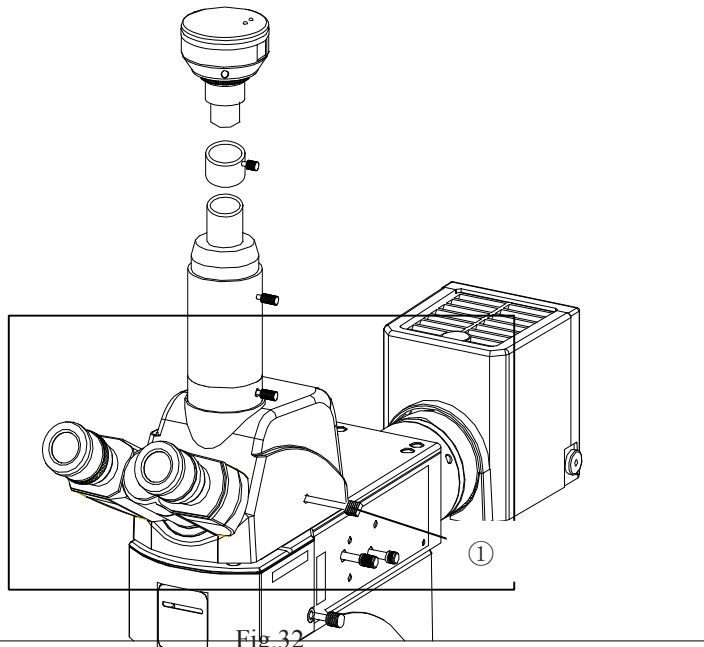


Fig.32

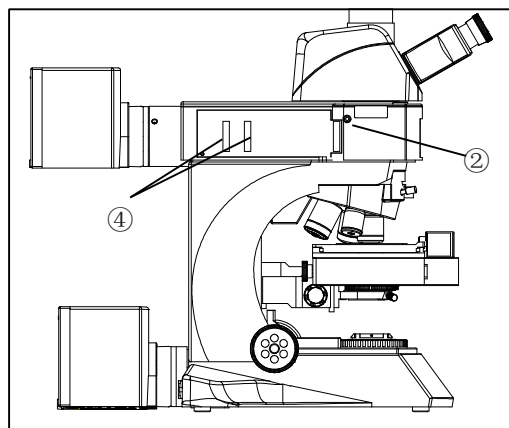
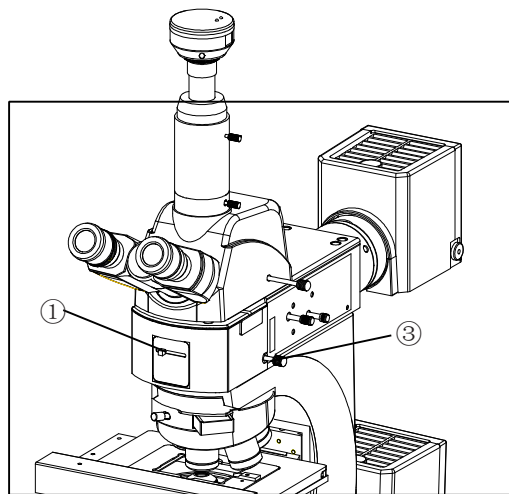


Fig.35

5.9 Use the ND Filter Knob

1. The ND Filter is interlocked with brightfield (BF) light path switching, so it can be engaged or disengaged according to the mirror selector lever (fig.34 ①).The ND filter makes it possible to reduce the glare when darkfield (DF) is switch to brightfield (BF).

Releasing interlocking

The ND filter knob has been interlocked at the factory. If brightness is not enough during brightfield, DIC or other observation, the interlocking can be released.

1. Loosen the screw interlocking the ND filter by inserting the Allen screwdriver into the hole (fig.35 ②) on the left side of the reflected light illuminator.
2. Now the interlocking is released and the ND filter knob (Fig.34 ③) is active. Pull the lever out to disengage the ND filter from the light path.

5.10 Use the Filters

1. Engage the optimum filter sliders for the purpose of observation in the two filter insertion slots (Fig.35 ④). Be sure to engage from the left side.
2. The first click position is the idle position and the second click engages the filter in the light path.

5. Adjustment Operation

Usable 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 semiconductor wafers
Frost filter	Reduces irregularity in the illumination field, but also reduces the brightness
ND25	Adjusts the brightness of the light source. (Transmittance: 25%)
ND6	Adjusts the brightness of the light source. (Transmittance: 6%)

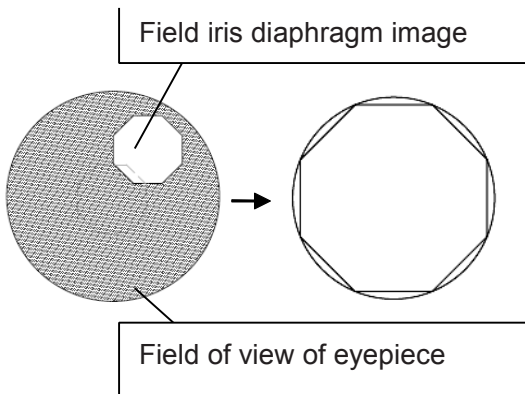
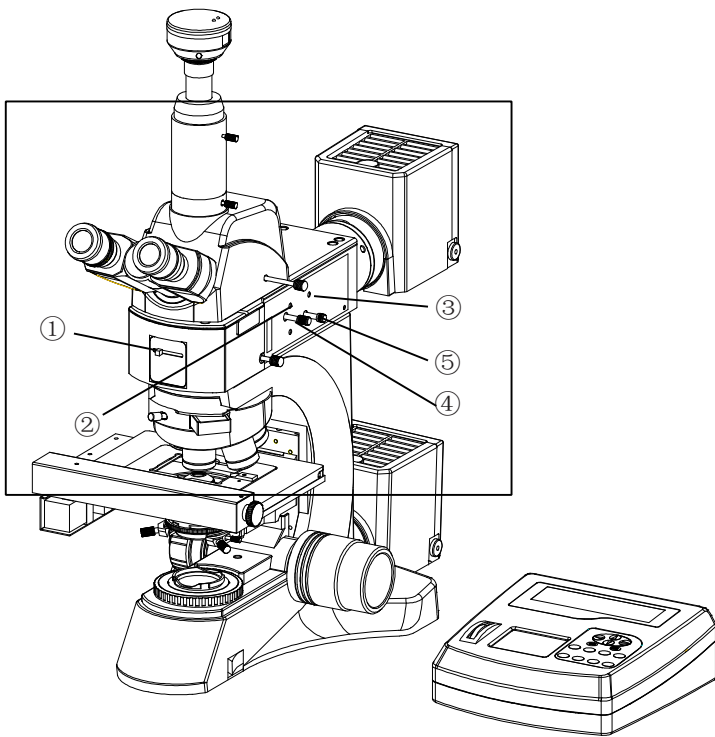


Fig.37

3. Pull out the FS knob (fig.36 ④) on the reflected light illuminator to reduce the aperture iris diaphragm a little.
4. Rotate the two FS centering screws(fig.36 ②) using the Allen screwdriver to adjust so that the field iris image becomes concentric with the field of view.
5. While pushing in the FS knob (fig.36 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 as the field of view(as shown in Fig. 37).

Using the Field Iris Diaphragm

- 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 (fig.36 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.

The Trinocular

Turn (fig.36 ①) for the desired

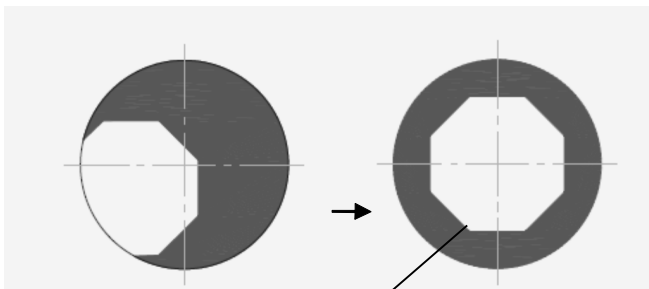
observation
rotation
selector lever until

Diaphragm (FS)

Turn (fig.36 ①) to

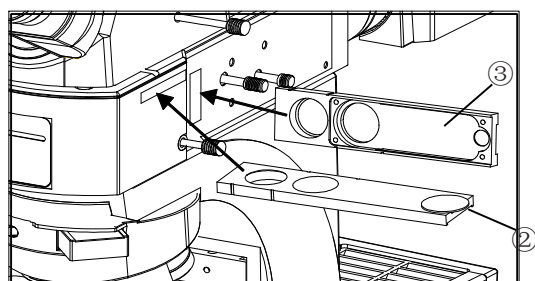
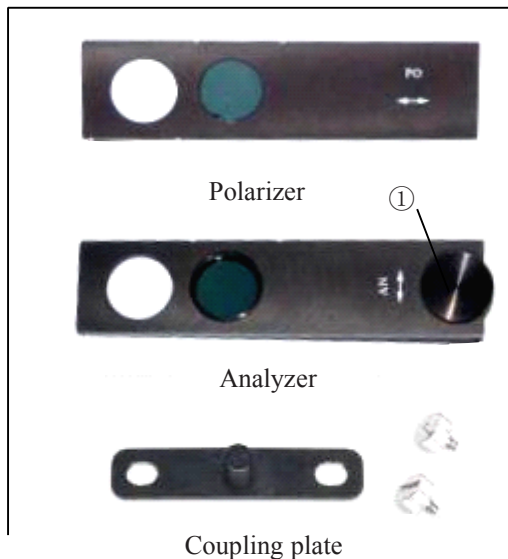
by rotating the
specimen on the
stage.

5. Adjustment Operation



The image of aperture iris diaphragm

Fig.38



5.13 Center the Aperture Iris Diaphragm (AS)

1. Slide the mirror selector lever (fig.36 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.36 ⑤), so that the aperture is about 70% as shown in Fig.38.
4. If the center of the iris diaphragm is deviated, center it by rotating the two AS centering screws(fig.36 ③) with the Allen screwdriver.

Using the Aperture Iris Diaphragm

- 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(fig.38).
 - In reflected light darkfield observation, the aperture must be fully opened by pushing in the AS knob (fig.36 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.

Analyzer and Polarizer

arizer(Fig. 39) into the polarizer (fig.40 ③) with the surface printing towards you, then push the light path.

cover, then put the analyzer in the light path (fig.40 ②).

alyzer rotating dial (fig.39 ①) to where the field of view is darkest.

alyzer and polarizer are coupled together by the coupling plate | provided with the clamping knobs on it,

the polarizer can be engaged or disengaged in the light path together.

6. Control Box Menu Setting

6.1 Main Menu

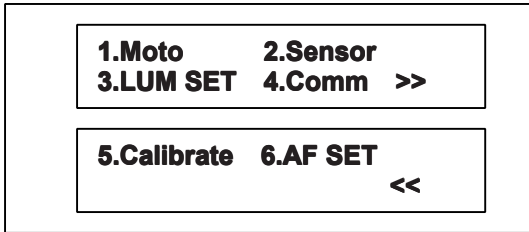


Fig.41

You can enter the Main Menu Setting by pressing the OK key. And the display panel will show as Fig.41. Use left and right arrow to select the Menu. Press OK key to enter Sub Menu.

1. Moto: stepper motor speed setting.
2. Sensor: limit switch enabled/disabled.
3. LUM SET: Initial brightness setting.
4. Comm: communication baud rate setting
5. Calibrate: system parameter setting
6. AF SET: Auto Focus reference position setting

6.2 Sub Menu

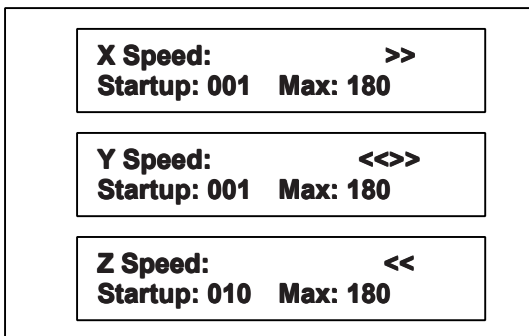


Fig.42

6.2.1 Moto(stepper motor speed setting)

Moto setting is used to set the stepper motor's start speed and maximum speed. Use left and right arrow to select the parameter. Use up and down arrow, or roll the Z-Axis Wheel to change the value. (Fig.42)

Press OK key to save and exit the Moto setting.

6.2.2 Sensor (limit switch enabled/disabled)

Sensor setting is used to enabled/disabled the limit switch. When the value set 1 which mean enabled the limit switch, the microscope will drive corresponding MOTO to the default setting position after power on. When the value set 0 which mean disabled the limit switch, the corresponding MOTO do nothing after power on. Use left and rightarrow to select the parameter. Use up and down arrow, or roll the Z-Axis Wheel to change the value.

Press OK key to save and exit the Sensor setting(see Fig.43).

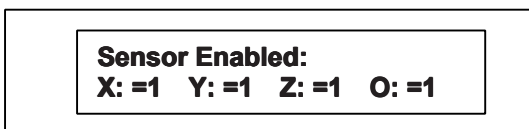


Fig.43

6.Control Box Menu Setting

6.2 Sub Menu

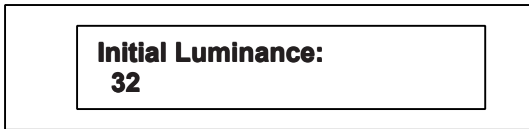


Fig.44



Fig.45

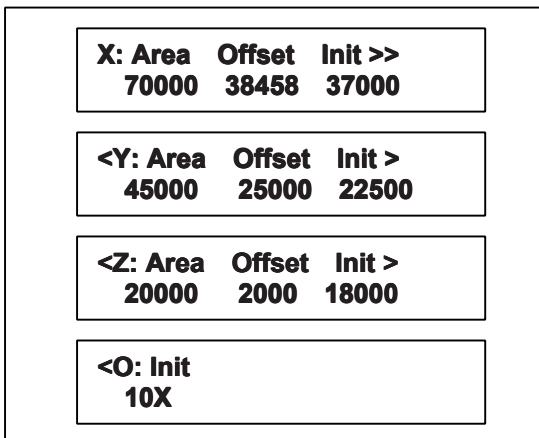


Fig.46

6.2.3 LUM SET(initial brightness setting)

LUM SET is used to set the startup Luminance value. The value can be set from 0 to 99. Use up and down arrow, or roll the Z-Axis Wheel to change the value. (Fig.44)

Press OK key to save and exit the LUM SET setting

6.2.4 Comm (communication baud rate setting)

Comm setting is used to set the communication baud rate. Use up and down arrow, or roll the Z-Axis Wheel to change the value. (Fig.45)

Press OK key to save and exit the Comm setting.

Comm port baud rate is set before leaving the factory ,the value is 19200, resetting is not recommended.

6.2.5 Calibrate (system parameter setting)

Calibrate setting is used to set the system parameter.

Area set: is used to set the stepper movingrange.

Offset: is used to rectify the startup position.

Init: is used to memorize the startup position.

Use left and right arrow to select the parameter.

Use up and down arrow, or roll the Z Axis Wheel to change the value. (Fig.46)

Press OK key to save and exit the Calibrate setting(Fig.46).

6. Control Box Menu Setting

6.2 Sub Menu

5X-AF	10X-AF	20X-AF >
18138	18138	18138
< 50X-AF 100X-AF		
18166	18140	

Fig.47

6.2.6 AF SET (Auto Focus reference position setting)

AF SET is used to set the Auto-Focus reference position. This value is useful to Auto-Focus Module of Control Box. With this data it can save a lot of time to find focus. Use left and right arrow to select the parameter. Use up and down arrow, or roll the Z-Axis Wheel to change the value. Press OK key to save and exit the AF SET.

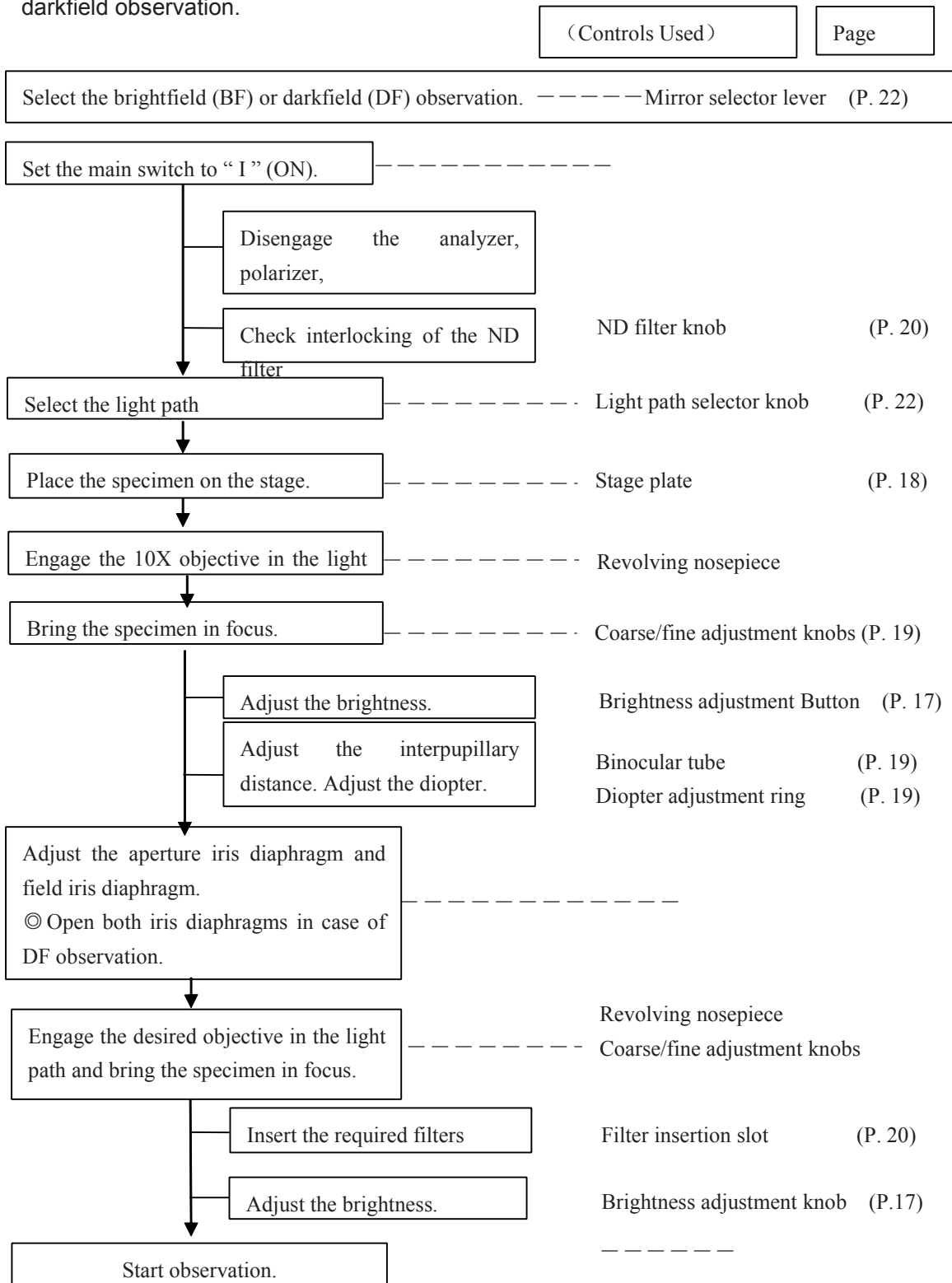
This parameter can be set as follow. First, put a common slice on the Stage. Then find the focus position by controlling the Z-Axis Wheel. Repeat this process with all the objectives and record the focus position's value. After that enter the AF SET menu and displace the value of 5X-AF, 10X-AF, 20X-AF, 50XAF and 100X-AF by the new recorded value. Finally enter the menu Calibrate (system parameter calibration), adjust the Offset of the Z-axis , make the stage 's initial position near the focal plane. Adjust the Z-axis' parameters , make them same as the 5X-AF initial parameters. If these parameters are setted correctly, the stage will be moved to the near position of focus. That will obviously reduce the time of auto-focus and real-time focus (Figure 47).

Metallographic specimen have different thickness, the suggestion is to select the commonly used one to set reference point.

7. Observation Methods

7.1 Reflected Light Brightfield/Darkfield Observation

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



7. Observation Methods

7.2 Reflected Light Simplified Polarized Light Observation

1. Setting the Analyzer and Polarizer (Fig. 15).
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.

7.3 Transmitted Light Observation

1. Installing the lamp housing . (see page 8 :Installing the lamp housing when using transmitted light illuminator) .
2. Installing objective.
3. Installing the swing out condenser.
4. Set the main switch to “ II ” (ON).
5. Fix the specimen on the stage, adjust the focus to begin observation.

© **At the Transmitted Light Observation, the method of condenser ,field iris diagram adjusting please refer to section 3-14 and 3-15.**

8. Specification

8.1 Configuration table of the microscope

		BS-6020DRF	BS-6020DTRF
Optical system	Infinite Optical System	●	●
Eyepiece (Ocular)	Exceed wide field ocular EW10X/22, tube Φ 30 matched	●	●
Infinite plan achromatic	5×/0.12/∞/-(BF)	●	●
	10×/0.25/∞/-(BF/DF)	●	●
	20×/0.4/∞/0(BF/DF)	●	●
	50×/0.75/∞/0(BF)	●	●
	100×/0.9/∞/0(BF)	●	●
	40×/0.65/∞/0.17		●
	100×/1.25/∞/0.17		●
	40×/0.6/∞/0(BF/DF)	○	○
Upper limit	30mm	○	○
	50mm	●	
Viewing head	Compensation Free Trinocular Head, Inclined at 30° , Interpupillar distance: 48-75mm	●	●
Reflected light illumination	24V, 100 W halogen bulb (pre-centered)	●	●
	Koehler Illumination, Aspheric collector	●	●
	Polarizer and analyzer	○	○
	coupling plate	○	○
	Blue, green, yellow filter and frosted glass	●	●
Transmitted light illumination,	Swing out condenser NA1.25		●
	24V/100W halogen bulb, Aspheric collector		●
	Blue filter		●
Filter	ND25、ND6	○	○
Focus system	Coaxial Coarse and Fine Focusing System, Sensitivity and Graduation of Fine Focus: 1 μ m,	●	●
Nosepiece	Backward Quintuple Nosepiece	●	●
Stage	Precision Lead Screw Platform (Stage)	●	
	Transmitted Specimen Holder		●
	Reflected Specimen Holder		●
	Slide glass		●
Smoothing presses		○	○
Video accessories		○	○
Video Mount	C Mount 1×, 0.5×	○	○

Note: ●Standard outfit, ○ Optional

9. Troubleshooting Guide

9.1 Optical Part

PROBLEM	REASON FOR PROBLEM	SOLUTION
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.
	Light path selector knob of trinocular tube is positioned halfway.	Fully pull out the light path selector knob .
	Mirror selector lever is in an intermediate position	Set the knob correctly.
Field of view is obscured or not evenly illuminated	Light path selector knob of trinocular tube is in positioned halfway.	Set the light path selector knob to a click position according to the purpose.
	Mirror selector lever is in an intermediate 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.	Center the field iris diaphragm correctly and open it sufficiently.
	ND 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/or 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	
The image is defocus \ low-resolution	Revolving nosepiece is not in a click position.	Set it in a click position.
	The surface of the objective lens is moldy or has contaminant	Clean thoroughly.
	Dirt/dust on specimen	
One side of image is blurred.	Objective is not correctly engaged in light path.	Make sure that revolving nosepiece clicks into place correctly.

9. Troubleshooting Guide

9.2 Mechanical Part

PROBLEM	REASON FOR PROBLEM	SOLUTION
The coarse focus knob is hard to run	The tension adjustment collar is too tight	Loose properly
	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 cannot be brought into focus.	Stage height adjustment is too low.	Raise stage holder height.
Image shifts when you touch stage	Stage is not properly mounted.	Clamp stage.
Specimen do not moving fluently	The slider holder do not fixed sufficiently,	Fix it sufficiently
Field of view of one eye does not match that of the other.	Interpupillary distance is incorrect.	Adjust it again.
The eyes overtire	Incorrect diopter adjustment.	Adjust diopter correctly
	Brightness uncomfortable.	Adjust the bulb voltage

9. Troubleshooting Guide

9.3 Electric Part

PROBLEM	REASON FOR PROBLEM	SOLUTION
The lamp can't light	No power supply	Check the power cord, and connect them exactly
	the installation of the bulb is wrong	Install the bulb correctly
	The bulb burn out	Change a new bulb
	The connection of lamp housing power plug is incorrect.	Connect again follow the instructions
	The power opened incorrectly.	Press it to the appointed position follow the instructions
The bulb burn out in a high frequency	Not use the specified lamp	Use the required lamp
The height of the brightness is not enough	Not use a appointed lamp	use a appointed lamp
The light glimpse	The bulb is going to spoil	Change the bulb
	The power cord have a poor contact	Check the power cord, and connect them exactly

BestScope International Limited company reserve the right to make a few improvements on the design if necessary, so this manual maybe not describe the product details completely. If you have questions, please contact our customer service.