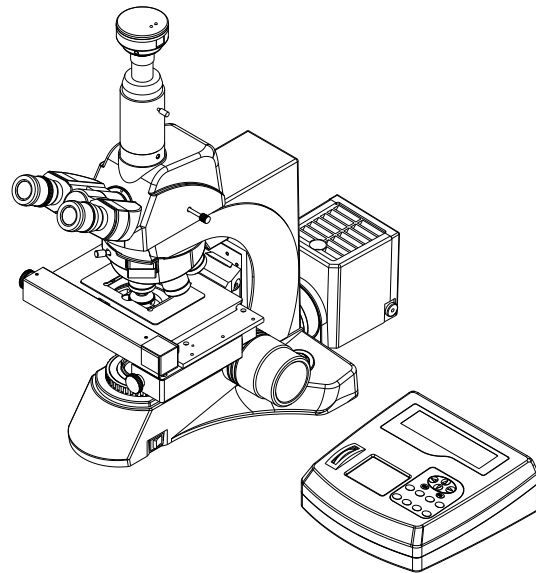




Motorized Microscope With Auto-Focus System

User Manual



BestScope International Limited

This manual is for BS-2080D microscope. To ensure the safety, obtain optimum performance and to familiarize yourself fully with the use of this microscope, it is recommended strongly that you study this manual thoroughly before operating the microscope.

Safety Precautions

The product designed is conformation of the requirements about safety. Incorrect operation is dangerous, maybe cause fire, electric shock or other serious personal injury

To avoid such accidents, please follow the instructions

Observe safety precautions

please read the warning notes on page 2 carefully

Periodic inspection

For the long-term safety , regular inspection is strongly recommended . Contact your product supplier for detail

Not use when the microscope breaks down

Contact your product supplier for help.

Disposal of abnormal situation

Abnormal noise, heat, smoke, or a burning odor → (1) Shutdown the power.
(2)Unplug all power cords and cables
(3) Contact your product supplier for help

Warning symbols

These symbols will be used on the microscope and throughout the whole manual . So fully understand the meaning of the signs is necessary before you continue to read the manual. Make sure that you observe all warnings given.



Indicates that errors in operation may lead to death or serious injury



Indicates that errors in operation may lead to fire, shock, or equipment damage

Warning symbols



FIRE



ELECTRIC SHOCK



CAUTION

Prohibition symbols



PROHIBITION



NO HUMIDITY



NO WET HANDS



NOT DISMANTLING

Designation Symbol



INSTRUCTION



PULL THE PLUG



FIRE ELECTRIC SHOCK

Not take the following precautions may result in fire, electric shock, other serious injury or even death



PULL THE PLUG

Any of the following exception occurs , please cut off the electricity supply at once

when the following exceptions occur, please shutdown the power at once and pull the plug from the AC outlet:

- (1) abnormal noise, heat, smoke or a burning odor
- (2) water inside into the equipment
- (3) foreign body inside into the microscope
- (4) the microscope is dropped or the cabinet damaged



INSTRUCTION

CHECK THE ELECTRICAL SOURCE

Please use the special power adapter provided, use other power adapter will not ensure the safety of persons and equipment.



NO HUMIDITY

Don't let the water inside into the equipment or stain the surface of the equipment

Doing so may cause fire, electric shock or damage microscope



PROHIBITION

Do not use the microscope under humidity and dusty environment

Doing so may cause fire, electric shock or damage microscope



PROHIBITION

Prevent damage to power cord

When disconnect the AC power cord, do not pull the power cord, please grasp the plug and pull it out



INSTRUCTION

Clean up the impurity attached to the pin of the power plug

If the surface of the power plug pins and nearby parts have dust or metal Particles, please pull the plug from the AC outlet, then wipe them with a dry cloth



INSTRUCTION

Do cut off the power before cleaning the microscope

Before cleaning the lamp or the microscope, Be sure that you had turned off the power and disconnected the AC power cord.



NOT DISMANTLING

Do not refit the microscope

Doing so may cause fire, electric shock or damage microscope



NOT DISMANTLING

Do not disassemble the microscope

Inspection, maintenance or repair of microscopes require specialized technicians, if you want, please contact the product supplier.

All the lenses have been well checked and adjusted. It is forbidden to disassemble them yourself.

The nosepiece and coarse/fine focus unit have a compact and precise mechanical structure; please don't disassemble them by yourself.



INSTRUCTION

Do pull the power plug from the AC wall outlet when not use the microscope for a long time

To connect the power plug and the AC power outlet too long time will lead to fire.



INSTRUCTION

Do cut off the power before replacing the lamp

For safety, be sure the main switch is in "O"(off) state before replacing 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 down.(Specified: Halogen Lamp24V/100W)



Not take the following precautions will lead to electric shock, personal injure or the surrounding objects damage



NO WET HANDS

Do not plug the power plug with wet hands

Otherwise will cause electric shock.



PROHIBITION

Do not put too much pressure on the microscope.

Doing so may cause the product to overturn or fall, causing personal injury.



PROHIBITION

Do not place the product in an inclined or unstable place

Doing so may cause the product to overturn or fall, causing personal injury.



INSTRUCTION

Keep the microscope clean, wipe dust regularly

Do not use organic solvents to clean the non-optical microscope parts. To clean them, use a neutral detergent. Lens stains such as fingerprints, grease, use a clean soft cotton cloth, lens paper or cloth dipped in pure alcohol (ethanol), xylene or ethyl to gently wipe away. (Note that xylene and alcohol are highly flammable, do keep them away from the fire or potential sources of electrical sparks, and use them in a drafty room as possible as you can.)



PROHIBITION

Do not place the power cord near heat sources

Doing so may lead to power lines cover melted, causing fire or electric shock.



INSTRUCTION

Push the power plug into the socket completely.

If the plug is not fully inserted into the socket, it likely to generate heat or the accumulation of dust between them, that may cause a fire and Contacting the plug pins may cause electric shock.



INSTRUCTION

Place the microscope in a good working environment

Do keep the microscope out of direct sunlight, high temperature or humidity, dusty, and easy shaking environment. Make sure that the loading platform is smooth, horizontal and firm enough. When running, the lamp house and nearby parts will be very hot. Please ensure there is enough cooling room for them.



INSTRUCTION

Open the box and move the microscope carefully

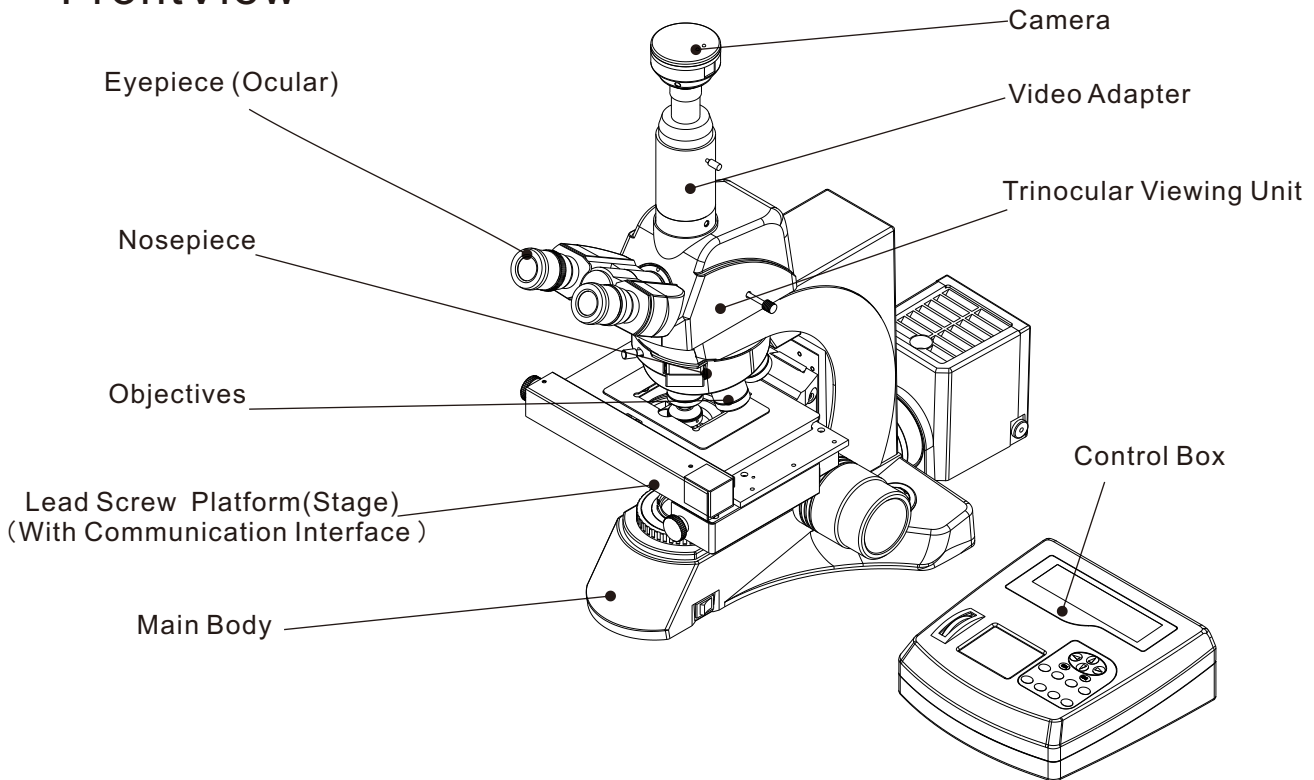
Open the box carefully to prevent the lens and other accessories dropping to ground and being damaged. When moving the microscope, please use two hands to grip with the two sides of the microscope body. Otherwise, the main body may fall, causing personal injury.

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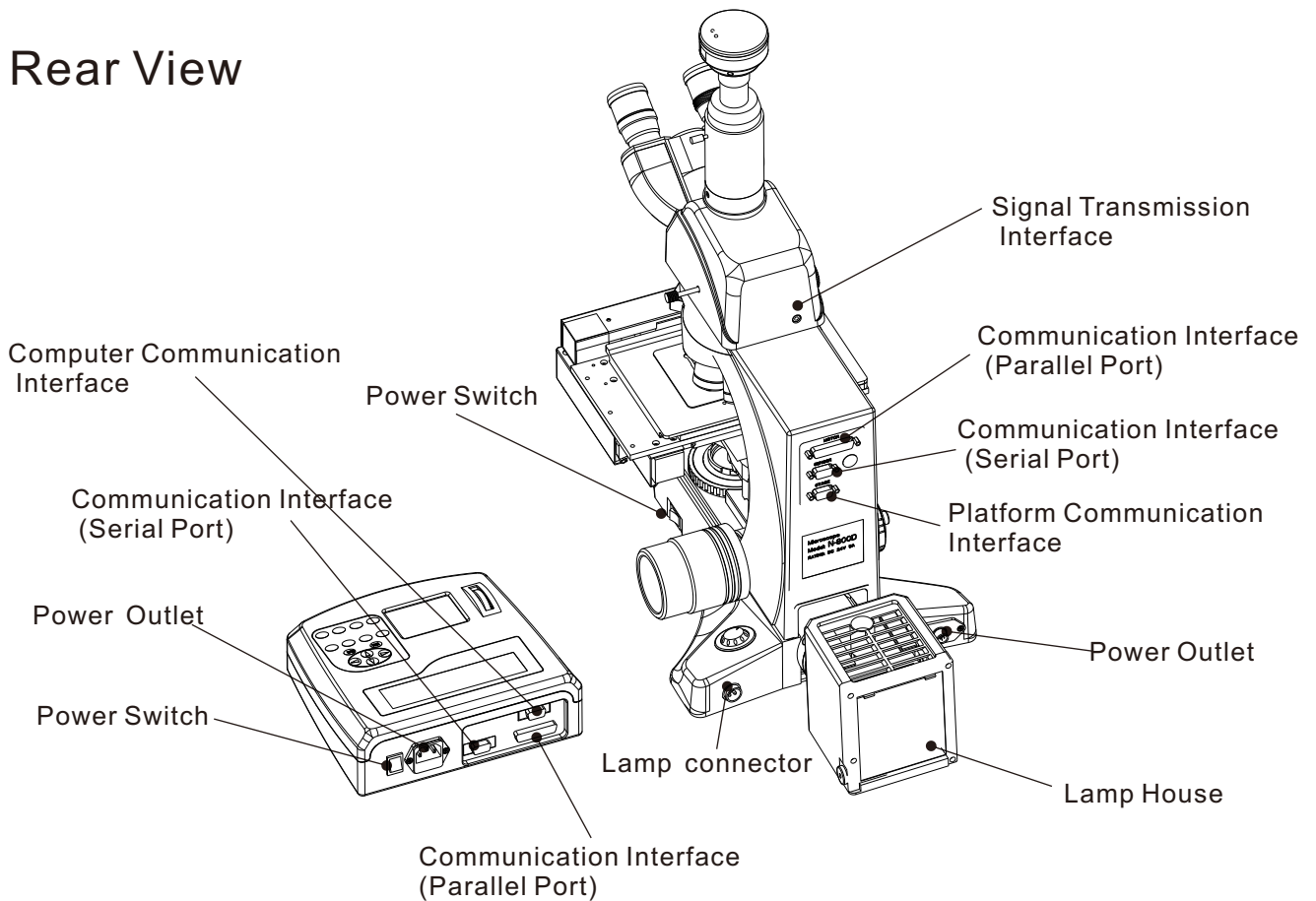
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1. Name of Components

FrontView

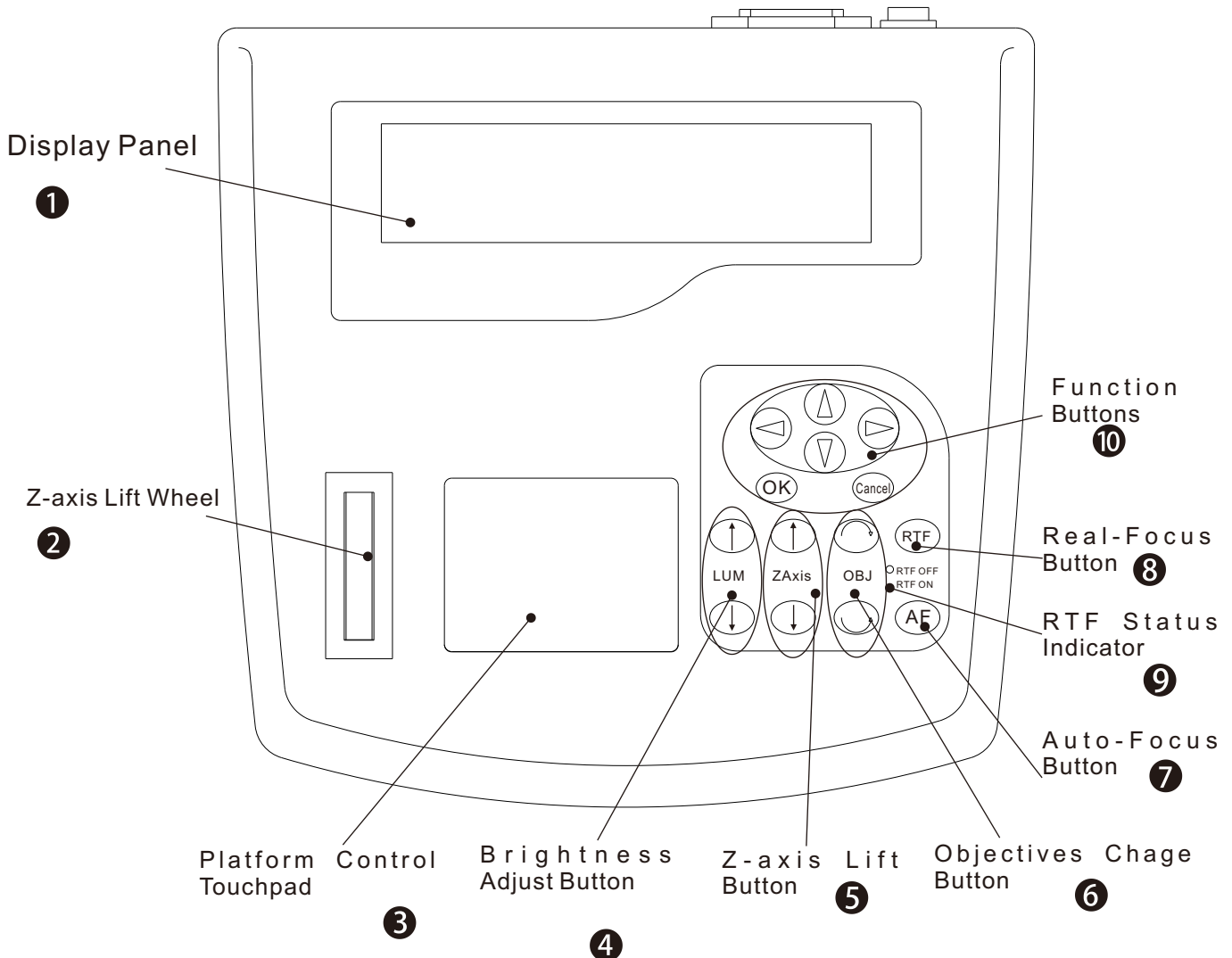


Rear View



1. Name of Components

Control Panel



- 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 up and down. (Z-axis Movement). Platform
- 3** Control TouchPad: Use your fingertip moving on the Touchpad. Simultaneously, the Microscope stage will be moving as your fingertip do. (X-axis and Y axis movement).
- 4** Brightness adjustment Button: Adjust the brightness .
- 5** Z-axis Lift button: Z-axis's up and
- 6** Lens Change Button: change the objectives at clockwise or counterclockwise . down
- 7** Auto-Focus Button: Focus automatically once.
- 8** Real-time Focus Button: Control the real-time focus control function ON or OFF. IF ON, moving specimens, microscope automatically focus 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.

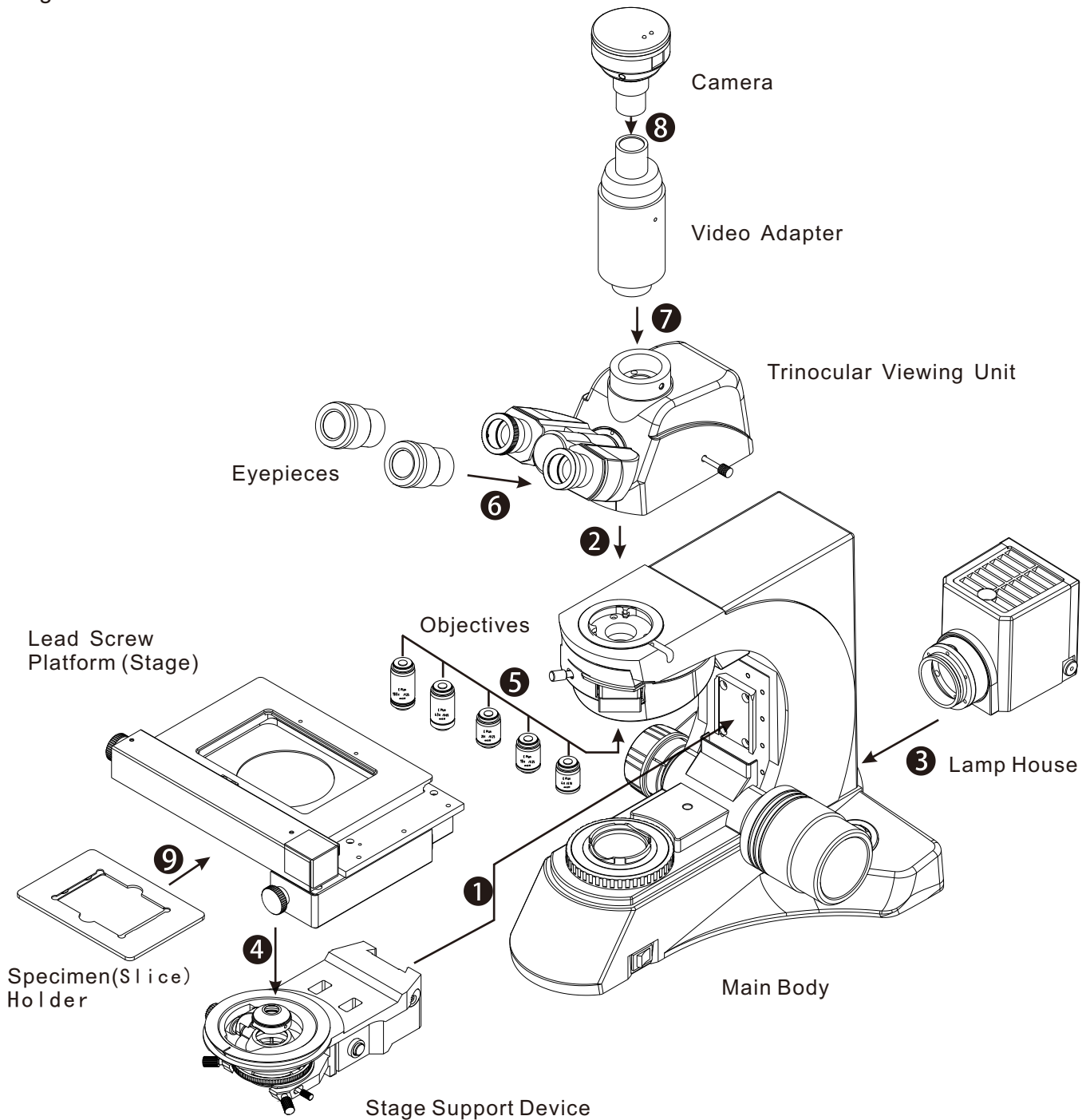
2. Assembly

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 Steps

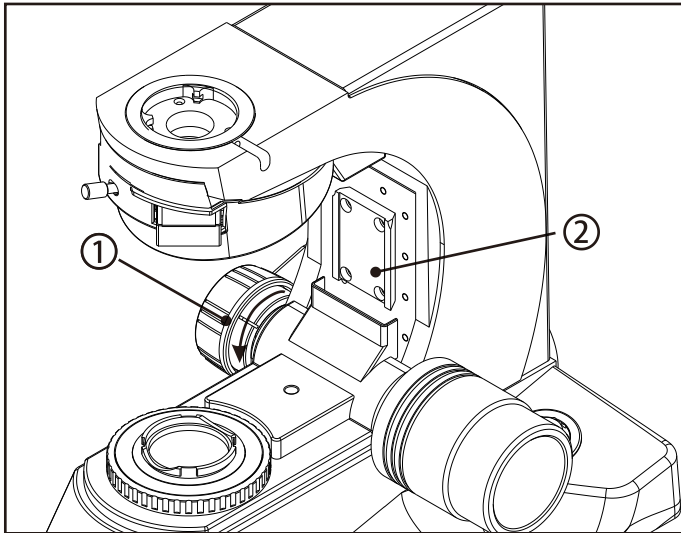


fig. 1

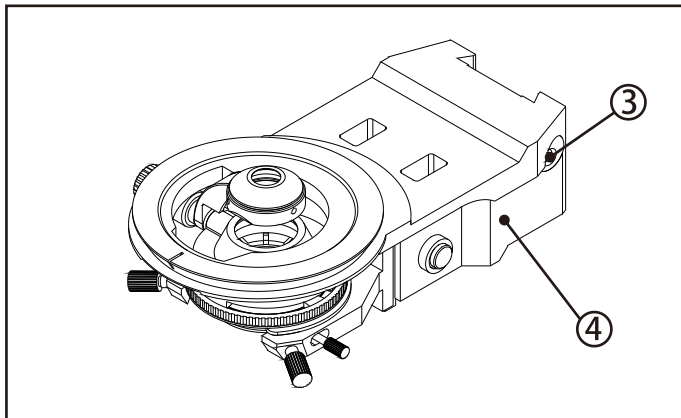


fig. 2

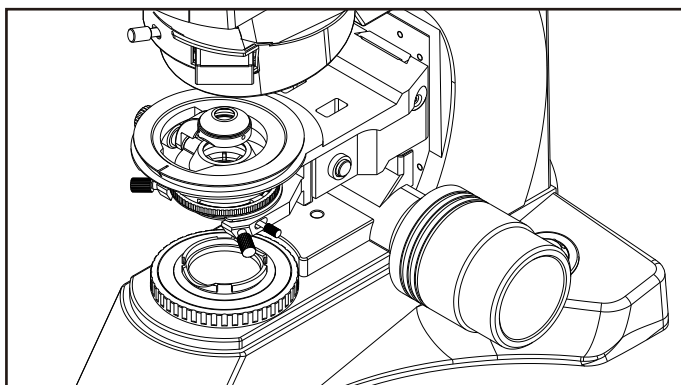


fig. 3

2.2.1 Installing Stage Support Device

Before installing the device, be sure to adjust the coarse focus knob. ① Make the guide board ② (see figure 1) down to the limit position, so you can install the 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 (figure 2) falling free until it reach the limit position. Use the hexagon wrench to screw down the screw and locking block ③, make the stage support device (figure 1) and the guide board fixed together. (see figure 3)

⚠The lead screw platform and the stage support device ④ 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 Steps

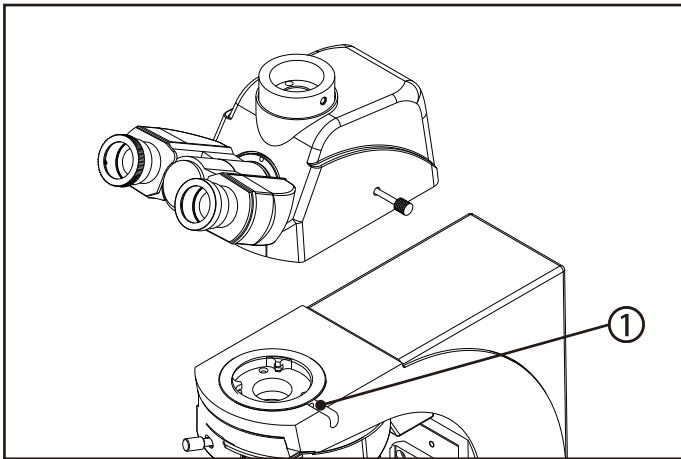


fig. 4

2.2.2 Installing the Trinocular Viewing Unit

1. Loosen the fixed bolt ① on the microscope main body, but do not let it ① fall out.
2. Insert the trinocular viewing unit into the microscope head (Figure 4), turn to a proper position, let the two eyepiece tubes toward the front, then use the hexagon wrench screw down the fixed bolt ① to fix (See Figure 4).

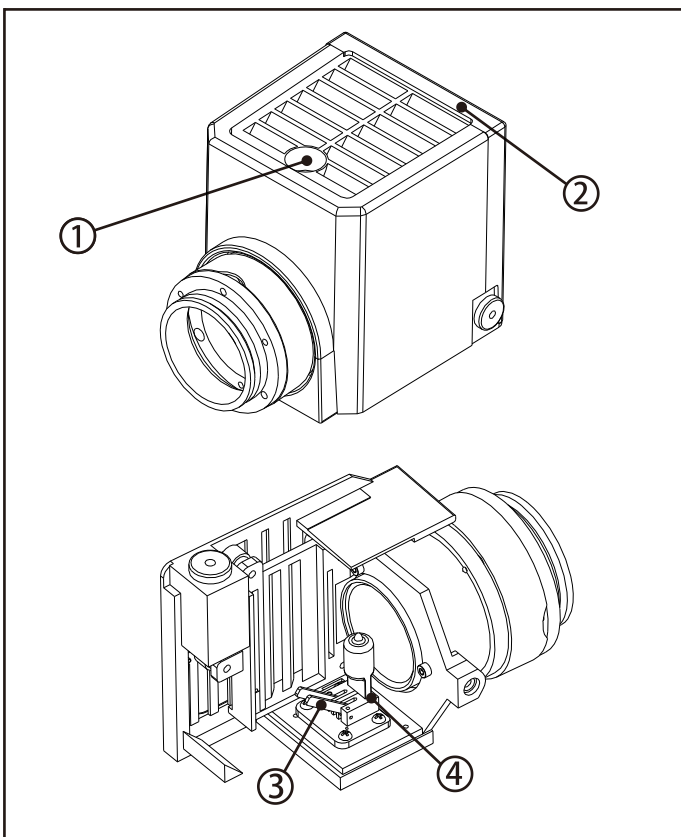


fig. 5

2.2.3 Installing and Replacing the Lamp

⚠ Only allow to use the specified halogen Lamp 24V100W ①.

⚠ Do not touch the Halogen bulb with your bare hands. It will shorten the service life or cause it to burst. If you leave finger marks on the surface carelessly, clean it with a dry soft cloth.

1. Remove the lamp House cover

Loosen the fixed bolt ① of the lamp house cover by hex wrench. Pull up and remove the Lamp House cover as shown by ②.

2. Install the bulb

Hold the bulb with gauze or other protection materials. Press down the bulb deadlever ③ . Insert the bulb's pins fully into the jack of the lamp house ④ . Then back the bulb deadlever into its original position to fix the bulb.

3. Replacing Lamp when using or soon after

⚠ When using, or soon after it is turned off, the lamp, the lamp house and nearby parts will be very hot and will cause serious burns. Please turn the main switch on "O" (off), pull out power plug, and make sure the bulb, the lamp room and periphery are all cool. Then, you can do your replacing.

2. Assembly

2.2 Assembly Steps

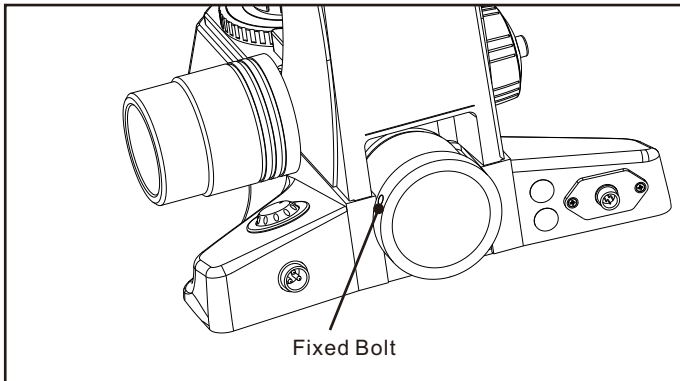


fig. 6

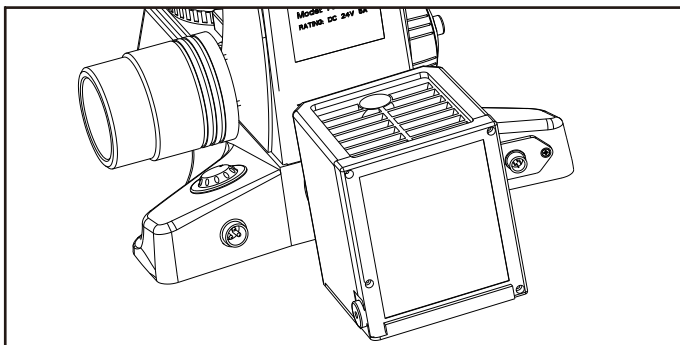


fig. 7

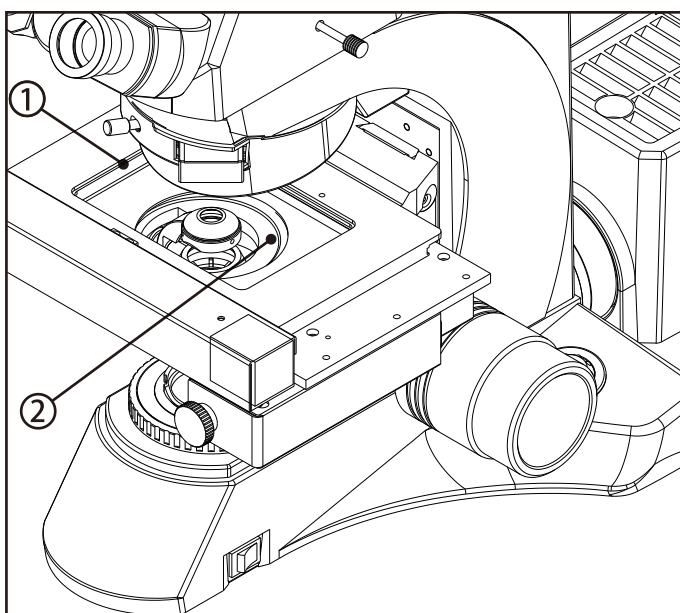


fig. 8

2.2.4 Installing the Lamp House

Keep the lamp house in line with the jack on the back of the microscope, then pushing the lamp holder into the illumination kits gently until they are against each other. Use the hexagon wrench screw down the fixed bolt (see figure 6), then the installation is finished (figure 7).

2.2.5 Installation the lead screw platform

Adjust the coarse focus knob. Make the stage support device (see figure 2) down to the lowest position, so you can install the lead screw platform ① easily.

Hold on the lead screw platform ① (figure 8), place it from the top of the Stage Support Device (figure 2). push the lead screw platform gently until it reaches the limit position with Keeping the stage support device (figure 2) in level. Use the hexagon wrench screw down the fixed bolt ②, make the lead screw platform and the stage support device fixed together (see Figure 8).

2. Assembly

2.2 Assembly Steps

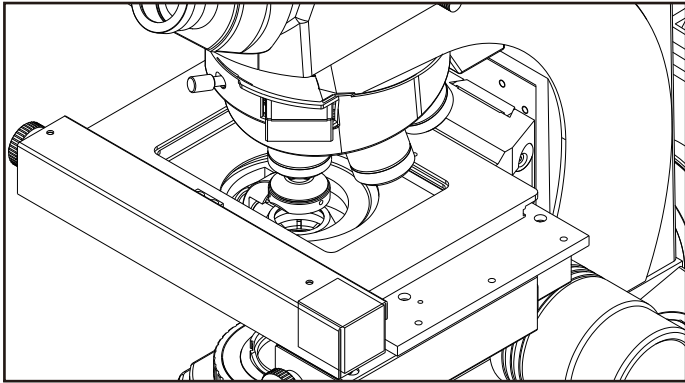


fig. 9

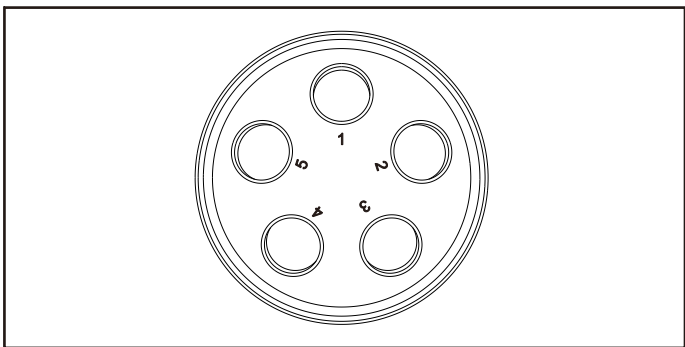


fig. 10

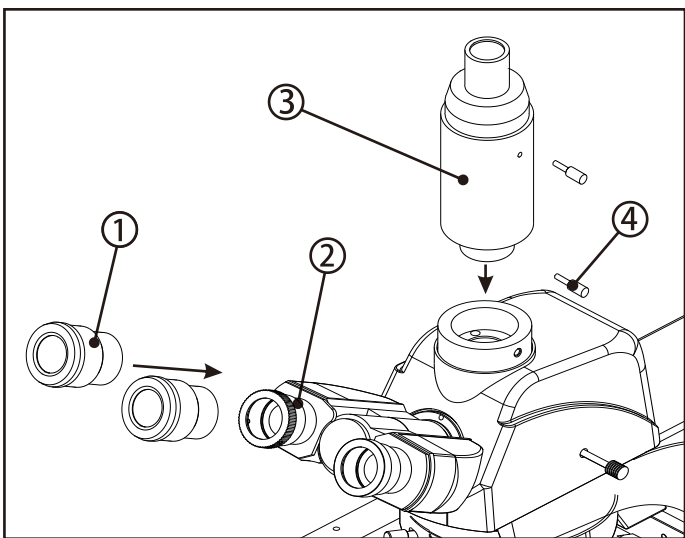


fig. 11

2.2.6 Installing objectives

1. Adjusting the coarse focus knob until the support device of the stage reaches its low limit position.
2. Mount the objectives in the right place as the label shows.

Installing objective this way will make the change of magnification to be easier during using.

Clean the objective regularly, for lens is susceptible to dust.

When operating, use 10 × magnification objective to search and focus specimen firstly, then replace with higher magnification objective if necessary.

1-4X 2-10X 3-20X 4-40X 5-100X

❗ If the objective mounted holes on the nosepiece is not in use, please cover them by the lens cap to prevent dust or dirt into the internal.

❗ 100 × objective is a oil lens, when use, please drop some cedar oil on the specimen first, so you can achieve the best observation

2.2.7 Installing the Eyepieces

Insert the eyepiece ① into the eyepiece tube ② of the trinocular viewing unit until they are against each other as shown in Fig.11.

2.2.8 Installing the Video Adapter

Insert the video adapter ③ into the trinocular viewing unit, then screw down the bolt ④ to fix it. The result is showing in figure 11.

2. Assembly

2.2 Assembly Steps

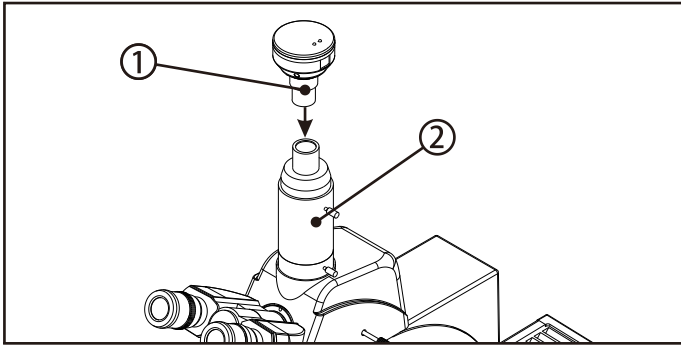


fig. 12

2.2.10 Installing Camera

Insert the Camera ① into the video adapter ② (see Figure 12)

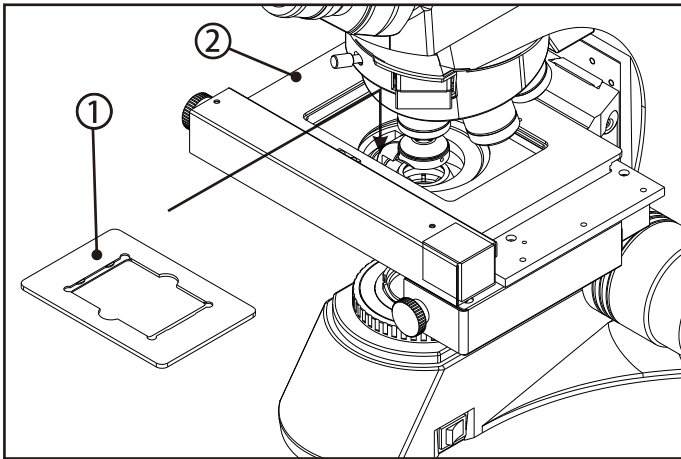


fig. 13

2.2.11 Installing Specimen Bracket

Place the specimen Bracket ① on the opening of the lead screw platform ② (Figure 13).

2. Assembly

2.2 Assembly Steps

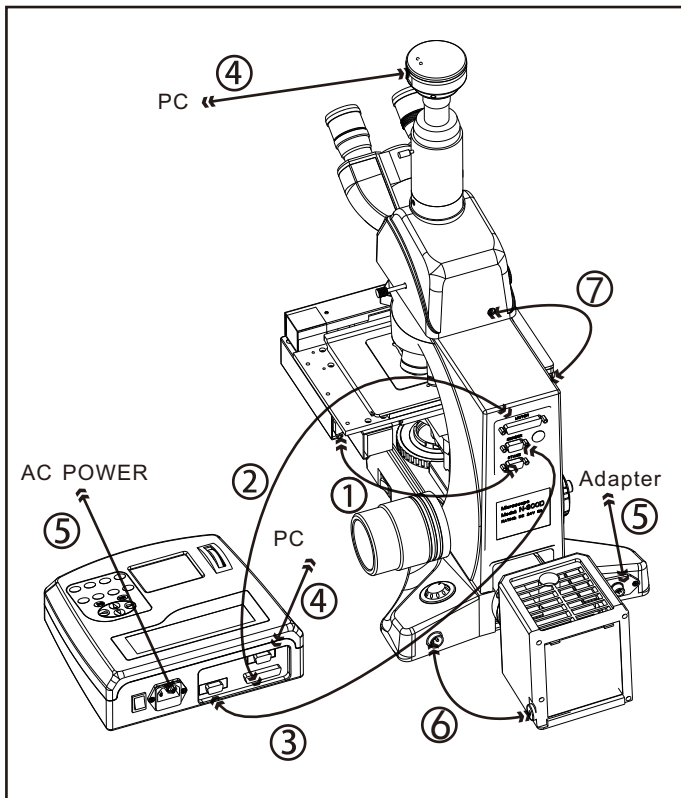


fig. 14

2.2.12 Connection Cable and Power Cord

- ⚠ The cable and cords are vulnerable when bending or winding, never subject the power cord to excessive force.
- ⚠ Turn the main switches of the main body and the control box ① to "O" (off) state before connecting the 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.

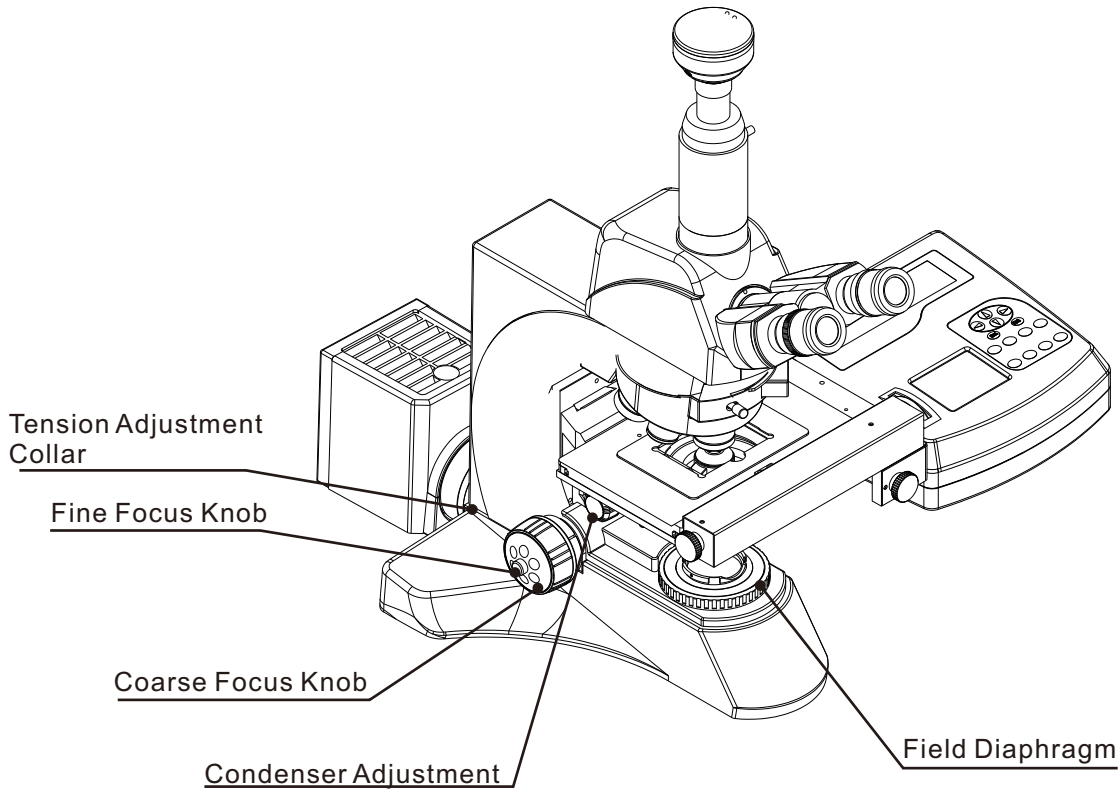
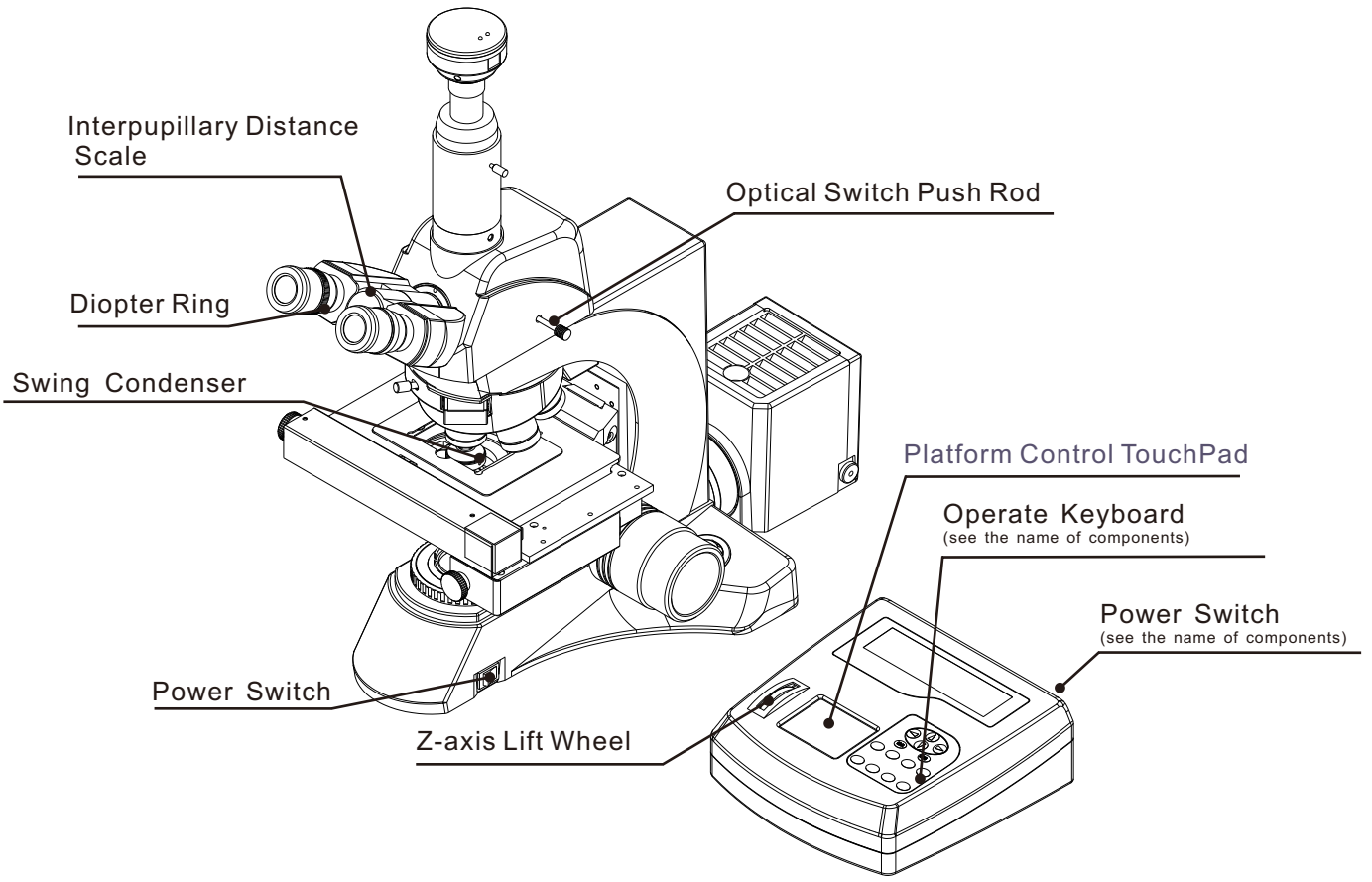
5. Plug the power cord firmly into the socket of the main body and the control box as shown in ⑤.

6. Insert the lamp house firmly into the main body as shown in ⑥.

7. Fixed the trinocular viewing unit into the main body as shown in ⑦.

- ⚠ Do not use the specified power cord all the time.
- ⚠ Do not plug anything but power cord into the outlet.
- ⚠ Do use the three-phase power with correct ground connecting. Or it will be dangerous.
- ⚠ Do not touch the cables and power cords to lamp house or nearby. Doing so may lead to their cover melted, causing fire or electric shock. please keep them away from the lamp house to avoid such accidents.

3. Adjustment



4. Observation Steps

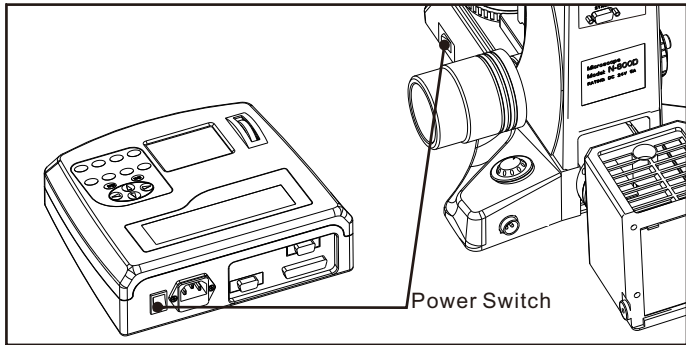


fig. 15

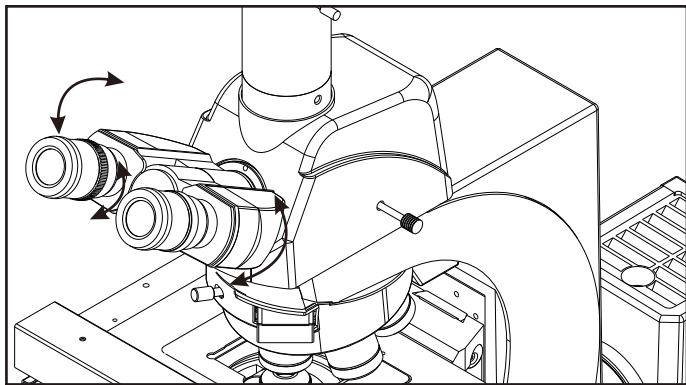


fig. 16

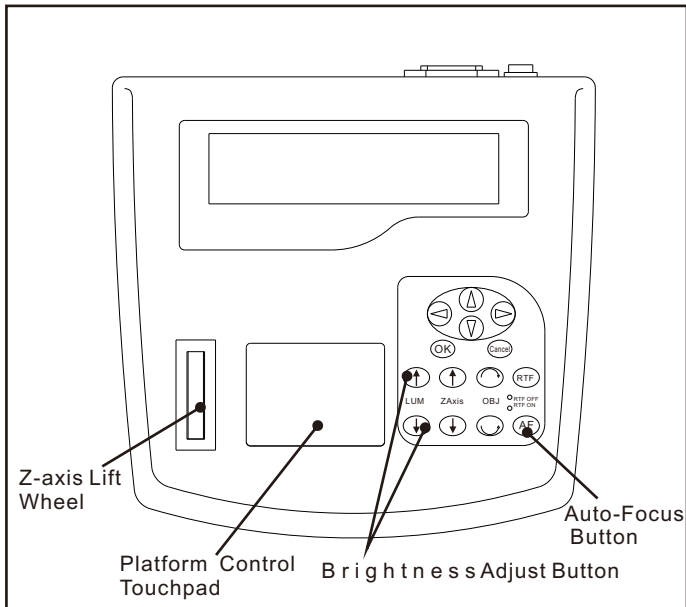


fig. 17

1. Install the microscope by following the assembly steps.
2. Turn on the power switches on the main body and the control box separately.

! Note: After the power connecting, the microscope 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, converter) before the initialization. In general, the initialization will complete within a minute, be patient please.

3. Adjust the brightness adjust button to obtain an appropriate brightness.
4. Place the specimen on the specimen holder.
5. After the initialization finished, the nosepiece switch the 10× objectives into the optical path automatically.
6. Turn the eyepiece tube of trinocular viewing unit to adjust the interpupillary distance (see Figure 16).
7. Adjust diopter adjustment ring as shown in Figure 16.
8. Slide on the platform control touchpad gently, control the platform to move, let the specimen go to the desired position. (see Figure 17).
9. Press the auto-focus button to focus automatically (see Figure 17).

5. Adjustment Operation

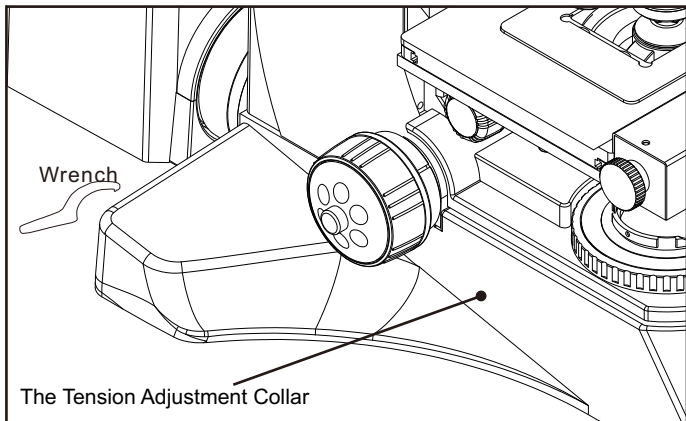


fig. 18

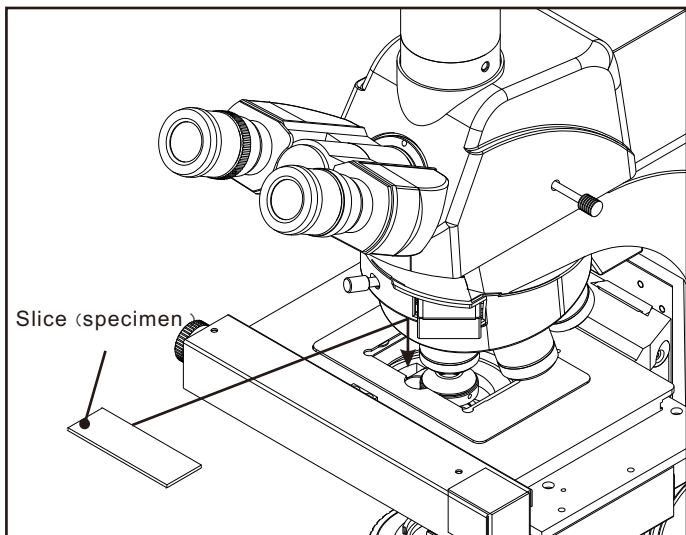


fig. 19

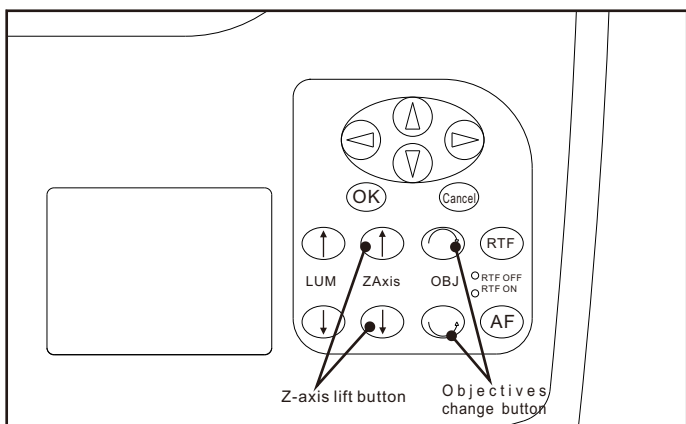


fig. 20

5.1 Turn on the power

Turn the power switch of main body and control box on to "I" (open) position separately, connect the power and wait the microscope to finish the initialization patiently as shown in figure 15.

5.2 Adjust The Brightness

Press the "brightness adjustment button" gently: "↑" to make light brighter and "↓" to make light dim. please adjust the light to an appropriate brightness. (Figure 17).

5.3 Adjust The Tension Adjustment Collar

The tightness of the tension adjustment collar has been adjusted at the factory, if too loosening (that means the lead strew stage will glid 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(Figure18).

5.4 Place The Specimen

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 Figure 17) and scroll "Z-axis scroll down" (see Figure 17) to move the holder into a suitable position,then input the specimen (see Figure 19).

❗ 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, just in different direction.(see Figure 20).

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

5. Adjustment Operation

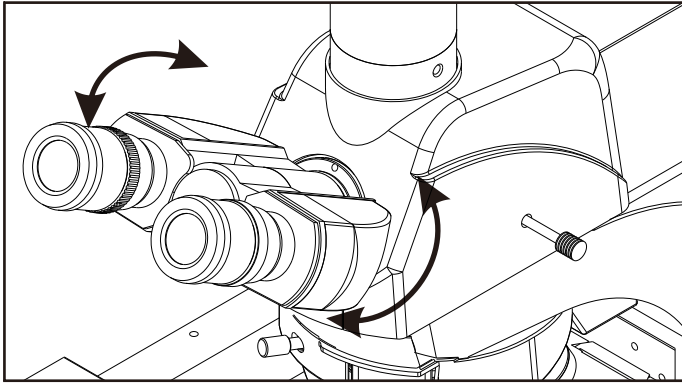


fig. 21

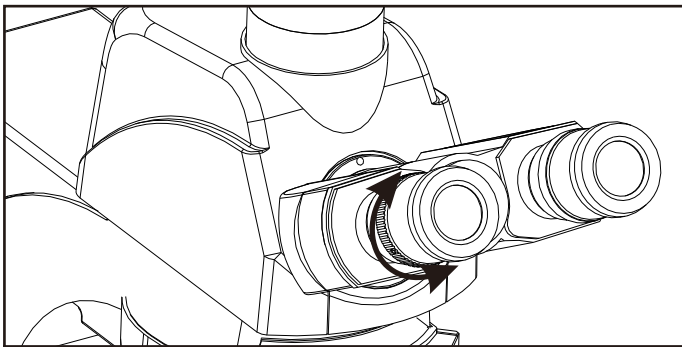


fig. 22

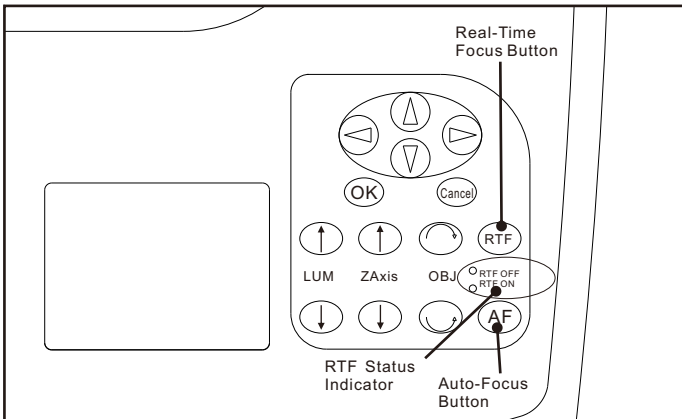


fig. 23

5.5 Adjusting the Interpupillary Distance

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 as shown in figure 21.

5.6 Adjusting 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 (see figure 22).

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 "Real-time focus on the button". "RTF ON" means features real-time focus is working, the microscope can do the auto-focus in real time (See figure 23).

! 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 4 X focus again to ensure the microscope working normally. Do the steps as follow: Press the "objectives change button" gently to switch the 4 × objective into the center of the optical path, then press the "Auto-focus button" to focus on the specimen again. Now you can use the microscope to do observation with any magnification.

5. Adjustment Operation

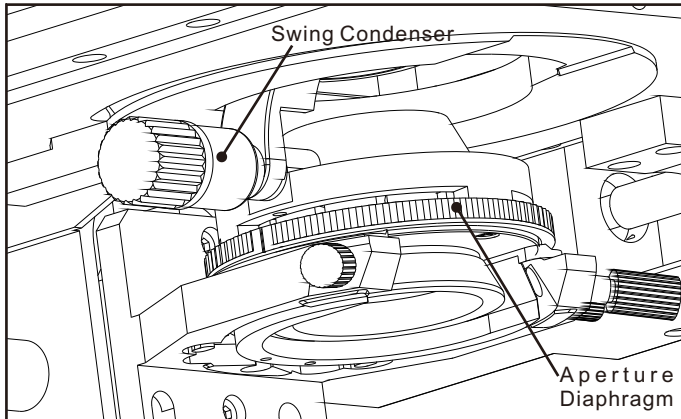


fig. 24

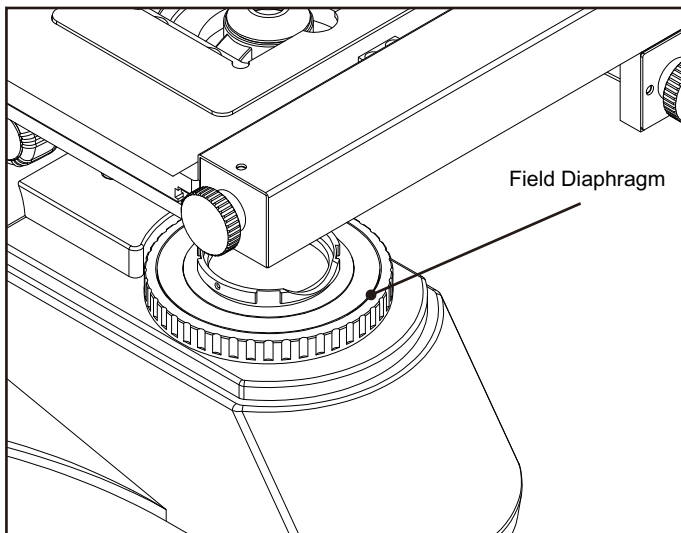


fig. 25

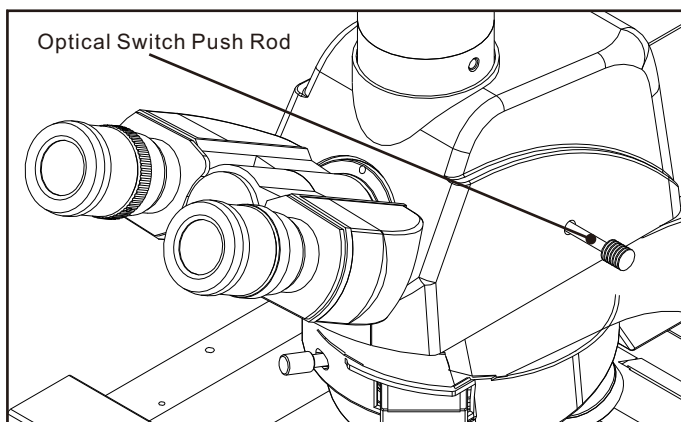


fig 26

5.8 Adjust the Swing Condenser

- ! The center of the condenser and the light axes of the objective are coaxial. It has been adjusted at the factory, so you needn't to adjust them by yourself.
- ! The highest position of the condenser has been adjusted too. It also needn't any user's operation.
- ! Turn the condenser focus knob to shift the condenser. It needs to raise the condenser when using the high magnification objective, and to decline when using the low magnification one.

1. Using the Swing Condenser

When using the low magnification objective, turn out the condenser, and let it away from the light path. While using the high magnification objective, turn it into the light path (Figure 24).

2. Adjusting the Aperture Diaphragm

The aperture diaphragm is designed for the adjustment of the numerical aperture, not for the brightness. Generally, reducing the diaphragm opening to 70- 80% of the N.A. value of the respective objective will provide an image of acceptable quality. If you want to observe the image of the aperture diaphragm, remove one eyepiece and look through the tube. You will see a dark circle encroaching on the bottom of the tube (Figure 24).

5.9 Adjusting the Field Diaphragm

The control for the field diaphragm is a ring used for adjusting the area of field diaphragm. When using, turn the ring to reduce the field diaphragm, look into the field, if the diaphragm image is faintness, do the follow steps: first, turn the condenser focus knob, shift the condenser holder to the position where the observed image of the field of view is sharp; then open the field diaphragm, let the image full of the field of view, reduce the mixed light, improving the quality of the image.

5.10 Switch The Optical Path

When the optical switch push rod of the trinocular viewing unit is pushed in, all the light enter the binocular tube, so you can do the binocular observation. While the lever pull out, some light still enter the binocular tube, and the left go up, enter the video tube, so you can observe the specimen with the video equipments.

6. Control Box Menu Setting

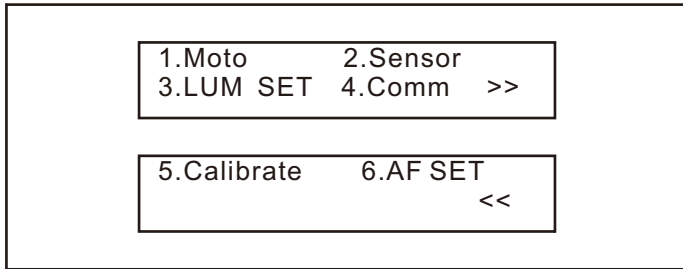


fig. 27

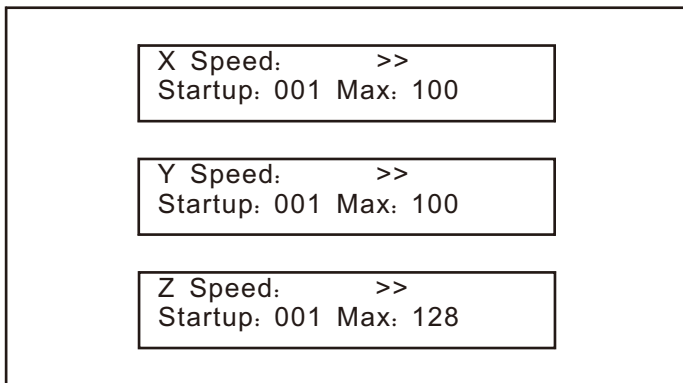


fig. 28

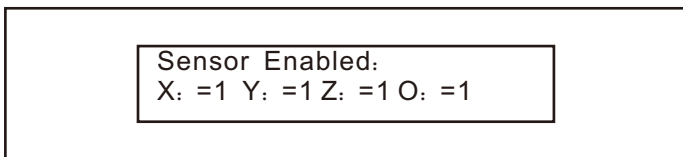


fig. 29

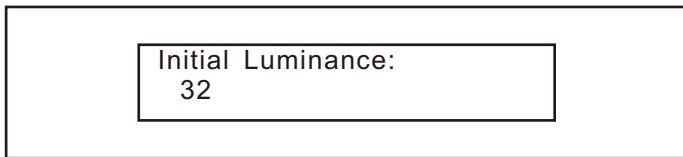


fig. 30

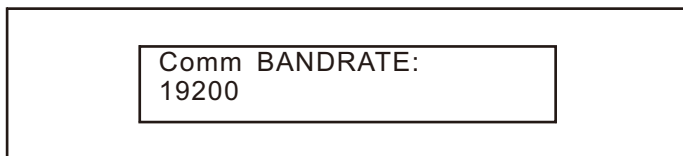


fig. 31

6.1 Main menu

You can enter the Main Menu Setting by pressing the OK key. And the display panel will show as Fig.27. 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

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. Press OK key to save and exit the Moto setting.

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 Figure 29).

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. Press OK key to save and exit the LUM SET setting.

4. Comm(communication baud rate setting)
Comm setting is used to set the communication baud rate. Recommend value is 19200. Use up and down arrow, or roll the Z Axis Wheel to change the value. Press OK key to save and exit the Comm setting.

6. Control Box Menu Setting

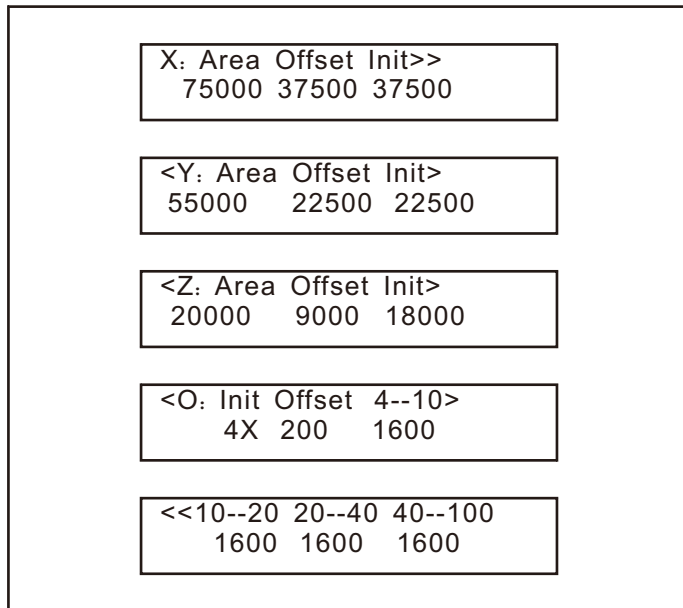


fig. 32

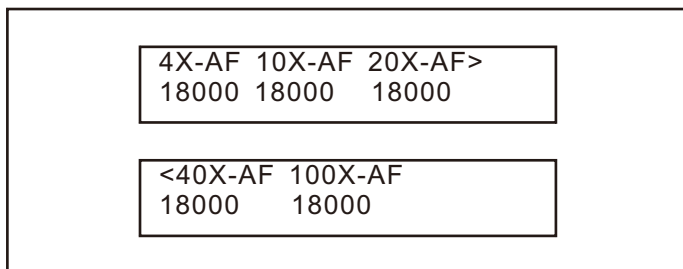


fig. 33

6.2 Sub Menu

5. Calibrate(system parameter setting)

Calibrate setting is used to set the system parameter.

Area set: is used to set the stepper moving range.

Offset: is used to rectify the startup position.

Init: is used to memorize the startup position.

4—10, 10—20,20—40,40—100: is used to set the stepper distance between neighbor Objective. 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 Calibrate setting(see Figure 32).

6. AF SET(Auto Focus reference position setting)

AF SET (Fig.10) 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 4X-AF, 10X-AF, 20X-AF, 40X-AF 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 4X-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 33).

7. Technical Specification

Optical System	Infinite Optical System	●
Eyepiece Tube	Seidentopf Type Trinocular Head Inclined at 30°, Interpupillary 48-75mm	●
Eyepiece	Extra Wide Field Eyepiece EW10×/22	●
Camera	1.3Mega Pixels CMOS Chip	●
	Resolution Ratio: 1280×1024	●
	Pixel Size: 5.2μm×5.2μm	●
	Maximum Frame Rate: 1280×1024 15f/s	
	1024×960 30f/s	
	600×480 30f/s	
	352×288 30f/s	
	320×240 30f/s	
	176×144 30f/s	
	160×120 30f/s	●
	Responsivity: 1.8V@550μm/lux/s	●
	Exposure: Manual or auto exposure, time adjustable (1~500ms)	●
	SNR: > 45dB	●
Nosepiece	Quintuple Nosepiece	●
Infinite Plan	4×	●
	10×	●
	20×	●
	40×	●
	100×	●
Illumination	Swing-out Condenser NA 0.9/0.25	●
	24V/100W Halogen Light	●
	Blue filter	●
Focusing	Auto Focus Resolution<1μm	●
Stage	Leading Screw Stage, Precision<1μm	●
	Specimen Holder	●
Hardware	USB2.0 Cable	●
	USB Dog	●
	Calibration Slide	○
	The Control Box of N-800D Motorized Auto-Focus Microscope	●
	9-PIN Control Port Cable (Serial)	●
	15-PIN Control Port Cable (VGA)	●
	25-PIN Control Port Cable	●
	3.5mm Signal Cable	●
	DC24V 5A Adapter	●
	Computer	○
	Software of Motorized Auto-Focus Microscope Control	●

Note: ● Standard Outfit, ○ Optional

8. Troubleshooting Guide

8.1 Optical System

TROUBLE	CAUSE	SOLUTION
The edge of the field of view is dark or the brightness is not uniform	The nosepiece is not in the located position (objective and light path not coaxial)	Locate the nosepiece properly where it clicks
	The image of filament is not centered	Center the filament
	A lens (the objective, condenser, eyepiece or collector) is dirty.	Clean it thoroughly
Find dust and stain in the field of view	There are stains on the lens (including condenser, objective, eyepiece and collector)	Clean it up
	There are stains on the specimen	Clean it up
	The position of the condenser is too low	Loosen the condenser's locking bolt, adjust the condenser to the right position
The image is defocused (low resolution \ contrast)	There is no cover slip on the specimen	Add coverslip
	The cover slip is too thick or too thin	Use the standard coverstip (0.17mm)
	The specimen is placed inversely	Reversal it back
	There was oil on the dry objective(easily happened in 40X objective)	Clean it up
	There are stains on the lens (including condenser, objective, eyepiece and collector)	Clean it up
	didn't use oil for the oil objective	Use immerse oil
	There was bleb in the oil	Eliminate the bleb
	Use a unsuitable oil	Change to the specified one
	The size of the aperture diaphragm is too big	Minify it
	There are stains on the incident lens of the binocular tube	Clean it up
	The size of the aperture diaphragm is too small	Open it up
	The position of the condenser is too low	Adjust the position
One side of the image is dark	The condenser is not in the center of the field of view\the condenser inclines	Install the condenser again and adjust the center carefully by centering the
	The nosepiece is not in the right position	Turning it until it reach the "clicked" position
	The specimen is floating	Fix it
The image shift during focusing	The specimen slips on the stage	Fix it
	The nosepiece is not in the right position	Turn it to the " clicked "position
The image is a little yellow	Not use the blue color filter	Use the blue filter
The brightness is not enough	The size of the aperture diaphragm is too small	Adjust again
	The position of the condenser is too low	Adjust the position
	There are stains on the lens (including condenser, objective, eyepiece and collector)	Clean it up

8. Troubleshooting Guide

8.2 Mechanical System

TROUBLE	CAUSE	SOLUTION
The image can not focus when using high magnification objective	The specimen is placed inversely	Turn inversely
	The coverslip is too thick	Use the standard coverslip (0.17 mm)
The objective touch the specimen when changed from low magnification to	The specimen is placed inversely	Turn inversely
	The coverslip is too thick	Use the standard coverslip (0.17 mm)
The specimen is not easy to move	The specimen holder is not fixed	Fix it
The binocular image is not coincident	The interpupillar distance is not correct	Adjust it
Eyes are too tired	No diopter adjustment	Adjust the diopter correctly
	The brightness is not suitable	Adjust the voltage of the lamp

8.3 Electrical System

TROUBLE	CAUSE	SOLUTION
The lamp can't light when the switch is turned on	No power	Check the connection of the power cord
	The bulb is not inserted	Insert it correctly
	The bulb burns out	Replace it
The lamp burns out suddenly	Use a substandard lamp	Use the specified lamp to replace, if the problem is not solved, contact with
	The voltage is too high	
The brightness is not enough	Use a substandard lamp	Use the specified lamp
	The voltage is too low	increase the voltage
The bulb flickers or the brightness is vertiginous	The bulb is going to burn out	Replace it
	The bulb is not entirely inserted into the holder	Check and insert it again