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Digital Biological Microscope

Instruction Manual



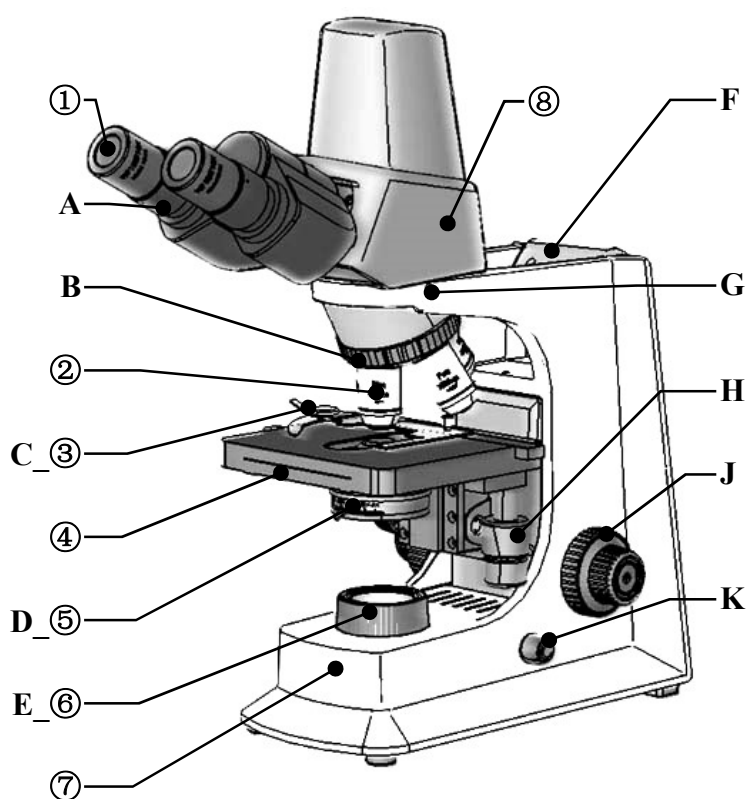
To ensure the safety and obtain satisfactory performance, please study this instruction manual thoroughly before start to use the instrument.

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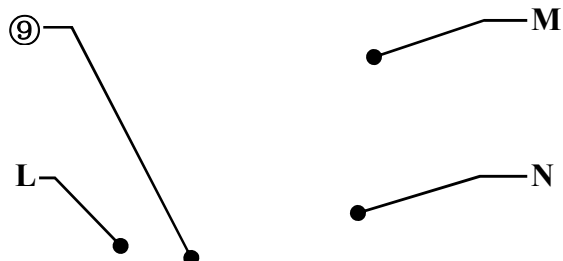
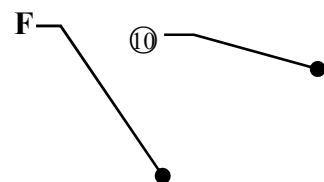
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Please read the CD instruction about the digital camera device and installation .

1 Parts Name



- ① Eyepiece
- ② Objective
- ③ Double Clamps
- ④ Mechanical Stage
- ⑤ Condenser
- ⑥ Light Collector
- ⑦ Main Body
- ⑧ Integrative Trinocular Head
- ⑨ { Power Input
Fuse
- ⑩ USB2.0



- A Diopter adjusting ring
- B Nosepiece
- C Clamp handle
- D Handle of Iris Aperture Diaphragm
- E Field Diaphragm Ring (model with Field Diaphragm)
- F Body Handle
- G Head lock Screw(or knurled thumb screw)
- H Mechanical Stage Moving vertically and horizontally Knob
- J Right Coarse & Fine Focusing Knobs
- K Brightness control knob
- F Body handle
- L Power switch
- M Condenser Focusing Knob
- N { Tension Adjusting Knob
Left Coarse & Fine Focusing Knobs

Number is microscope component
Letter is operational adjusting parts.

2 Technical Parameter

1) Total Magnification

objective eyepiece	4×	10×	20×◎	40×	100×
10×	40×	100×	200×	400×	1000×
16×	64×	160×	320×	640×	1600×

◎is optional.

2) Objective (with 10× eyepiece)

Infinity plan achromatic Objective	Numerical Aperture (N. A.)	Objective Field (mm)	Resolution Power (μ m)	Working distance (mm)
		Field φ 20		
4×	0.10	5	3.35	12.1
10×	0.25	2	1.34	4.64
20×(S) ◎	0.40	1	0.84	2.14
40×(S)	0.66	0.5	0.51	0.65
100×(Oil, S)	1.25	0.2	0.27	0.19

◎is optional.

3)The Other Specification

- (1) Mechanical Tube Length: 160mm.
- (2) Conjugate distance : Infinity .
- (3) Head: Inclined 30° Seidentopf Binocular , Interpupillary Adjustable Distance Is 48-75mm,
Diopter adjustable range ±5, with anti-fungal device.
- (4) Nosepiece: Quadplex nosepiece
- (5) Mechanical stage: Size 145mm×140mm; Y-X travel 52mm×76mm
- (6) Focusing system: Coaxial Coarse And Fine Focusing Knobs,
Coarse stroke maximum 26mm, up position is optional,
Fine division 2μm, Condenser up-down range 26mm.
- (7) Condenser : Abbe condenser, N.A. 1.25, Adjustable aperture, Aperture center can be adjustable.
- (8) Illumination: Non-spherical illumination System, Field Diaphragm is optional.
- (9) Filter: Standard built in blue filter, other color is optional.
- (10) LED Light Source: Input voltage AC100V~240V, 50/60Hz
Output voltage DC0.4~3.4V
LED 3.4V/3W, MAX 750mA
- (11) Halogen Lamp Light Source: Input voltage AC100V~240V, 50/60Hz.
output voltage DC 3~12V
halogen lamp 12V/20W
- (12) Potentiometer: with independent knob.
- (13) Fuse : 2A φ5×20/5A φ5×20

3 Installation and handling

Please clean the operation desk before installation, for example paper, cotton or packing waste, avoiding any interference in installation.

Put the microscope from the foam and put it on the desk. Make sure the power switch is off at “○” and the supply voltage meets the instrument’s requirement .

1) Installation Process:

(1) Integrative head :

Loose G slightly (use attached wrench except knurled thumb screw), put ⑥ into ⑦ main body’s joint, adjust position, tight G again.

(2) Put out the dust cover for reservation .

(3) Eyepiece: pull out and plug in eyepiece tube.

(4) Condenser :

Pull out from package ,swift condenser focusing knob M slightly, lower condenser installing ring to proper position. Loosing condenser screw, install condenser, make scale toward front operator position, Then tighten condenser screw , raising condenser installing ring to the top.

Electrical Equipment Checking :

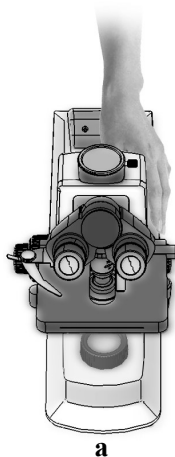
Plug power line in power input ⑨, turn on power switch L, observe brightness of light collector ⑥ , then continue the next step. Otherwise, please check the process according to appendix “common malfunction and troubleshooting”.

▲ Please don’t touch eyepiece or optical lens during installation, otherwise will effect the common observation.

2) Handling

Microscope is a precision instrument, careful in carry. Shut down power supply, pull out power line. Lock the eyepiece tube and condenser etc, no slice left on stage. Don't move nosepiece , focusing knob, mechanical stage and eyepiece tube etc, don't make the eyepiece off. Avoid stumble into the chair, violent shocks and collision can cause damage.

a. Single hand carry way: with one hand holding the body, the microscope will be hold by thumb buttoned filed from inside.



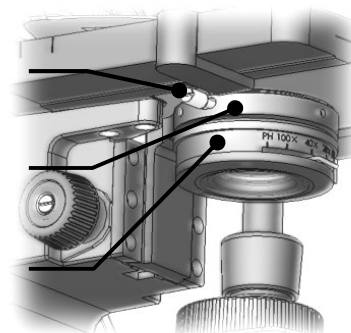
a

b. Two hands lift way: one hand turn back the microscope slightly by holding body handle F ,the another hand holding the microscope’s forepiece.

b

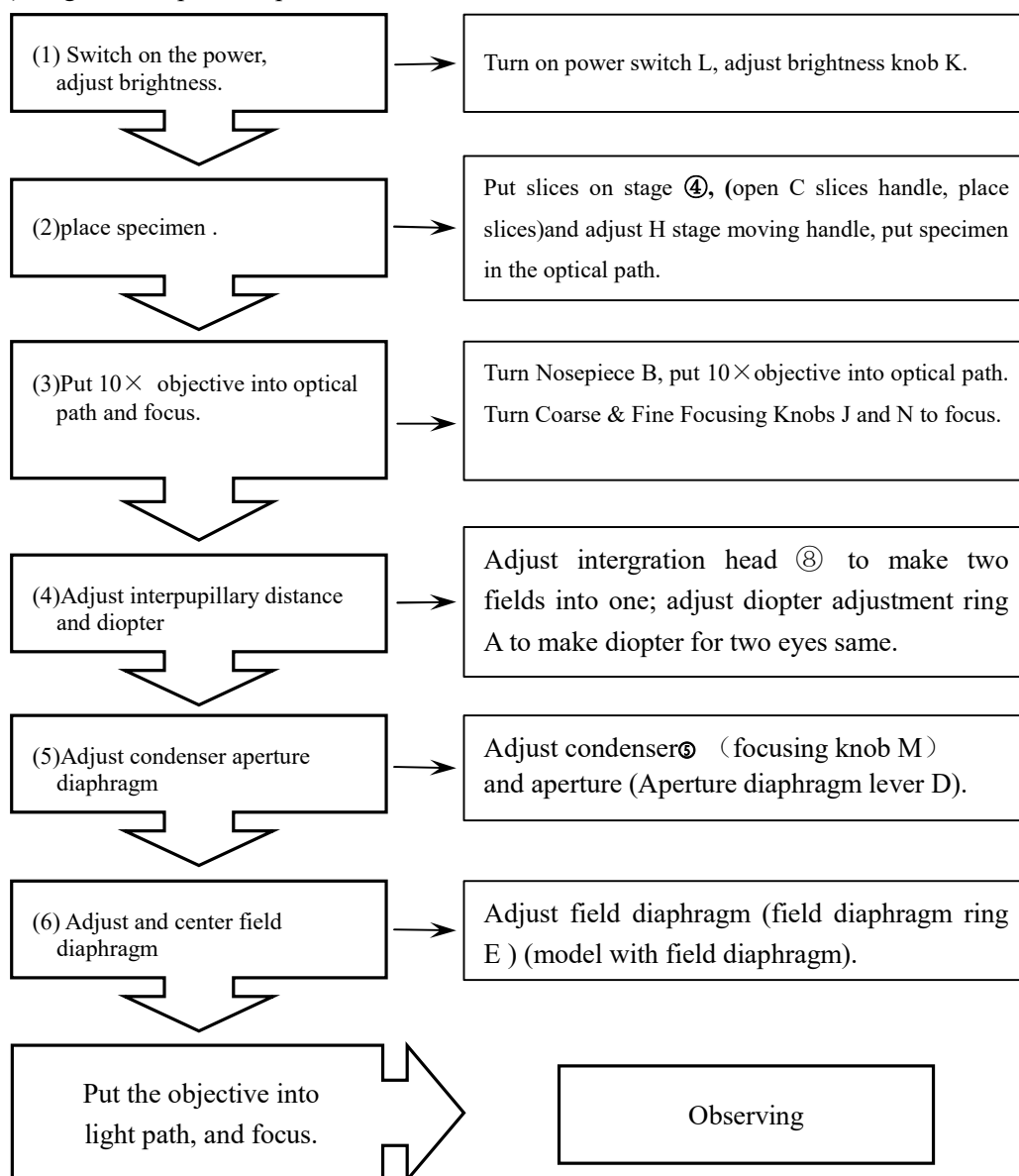


Condenser screw
Condenser Installing ring
Condenser



4 Operation And Use

1) Bright field operation process instruction



- ▲ Cover slip: using cover slip of thickness 0.17mm can get ideal working environment for objective and reach design performance.
- ▲ Slide glass: using slide glass of thickness 1.2mm(0.9~1.4mm) for better image.
- ▲ Avoid reverse rotating left and right coarse & fine focusing knob together, otherwise it will damage focusing unit.
- ▲ Don't switch objective directly when changing objective, should rotate the tooth ripple on nosepiece to put objective in optical path.
- ▲ Interpupillary distance is different from person to person, so readjustment each time.
- ▲ Phenomena of automatic mechanical stage moving downward may occur after long-term use . Tension adjustment ring can adjust firmness and comfortable sensation of the coarse and fine focusing knob, prevent moving downward. Clockwise, can relax, instead, can lock.

(1) Adjustment of Condenser and Aperture diaphragm

- ① Rotate condenser focusing knob M to adjusting distance between condenser ⑤ and specimen, will change the uniform illumination to obtain the best brightness.
- ② Slide handle of iris aperture diaphragm D to change iris aperture's size , will change the specimen's contrast. Narrow diaphragm , lower brightness and resolution, higher contrast and depth of field ; widen diaphragm, higher brightness and resolution, lower contrast and depth of field. Numerical aperture(N/A) is decided by iris aperture diaphragm . Illumination N/A is match with objective N/A, can provide excellent resolution and contrast , increase depth of field.

Because the microscopic specimens usually has low contrast, so in use, recommend the condenser aperture diaphragm set to objective numerical aperture's 70% ~ 80%, when necessary, unload the eyepiece in direct observations from eyepiece tube, readjust again.

Another in condenser ⑤ ,the D subscript corresponding scale with objective. According to the scale position and D's the basic line ,should be adjusted relatively.

▲ If iris aperture diaphragm is too narrow, will get double image.

(2) Centering field diaphragm (only model with field diaphragm)

- ① Put 10× objective in optical path, anticlockwise rotate E, narrow the field diaphragm.
- ② Observation through eyepiece, rotate M to adjust condenser's height , focusing on specimen's surface. Rotate condenser focusing knob until in the middle of the field.
- ③ Put 40× Objective in optical path, rotate E will make field image slightly bigger than field. Please readjust if field image isn't in middle.

2) Use of Oil objective

This microscope with 100× objective can observe specimen without immersion oil. But little non-synthetic resin immersion oil between the objective and specimens will fully grasp the objective function and bubbles and impurities can't in immersion oil which will affect image.

First pull out 40× objective after focusing, apply a drop of oil will then baptized into light objective 100×. This should gently turning telescope converter or slightly rotation handle and mobile platform of small, at the same time, slightly turn the handle, micro focus to exclude the bubbles, otherwise immersed will seriously affect imaging results.

▲ Immediately after observing with absorbent cotton, lens paper, gauze or soft cloth dips in with industrial ethyl alcohol (proportion 1:4) to wipe the oil on instrument and slices.

▲ Although immersion oil is non-toxic, please thoroughly flush with soap and water if touching skin, such as thoroughly flush eyes with water for fifteen minutes, if the eye and skin appearance changes or pain, please immediately go to the hospital.

3) Use Of Filter Accessories

Model with non-built in blue filter can configure with multicolor filter. Please put filter in collector or ⑥ upper round slot .and clean it at all times for better observation effect.

If don't use it for long time , please bring it out and put away in case dirt too long to be clean .

4) Use the energy-saving illuminator LED biological microscope, also can choose charging machine, from power use, convenient operation. No charge configuration model, and the need to insert charging outlet, power supply for microscope directly.

(1) illuminator charge (except model with no charge configuration)

Plug power wire in ③ to charging and make synchronous observation through microscope in LED.

(2) Note

① Charging machine. please charge battery 12hours before using LED at first time .

② Don't charge or use, please be sure to pull out power wire from charging power socket, in order to prevent the backflow of discharge battery electric current

③ Charging machine, please replace 3 battery in same size when battery can't continue to use.

5) Notes after use

(1) After use, should shut off the power (switch to "o" side), unplug the power socket. If immersed in oil should be wiped clean objective and slide. Finally the instrument should be covered by dust cover.

(2) If instrument out of use for a long time, should pull the eyepiece、 objective out from the body, and add dry containers (such as moistureproof cylinder), desiccant and placed. At the same time, the body should cover the corresponding dust cover, then dust-proof covers will host closely covered.

5 Image System Operation

This product is equipped with various camera device, such as CMOS digital cameras, CCD camera device and VGA camera device etc, corresponding image output devices using the computer, LCD. And can choose by 0.5X or 1X optics cameras.

(1) Adaptor for Digital Camera

To CMOS digital cameras, for example, remove USB2.0 connection lines, insert the square plug in USB2.0 ⑩ behind the eyepiece head, insert another flat plug in USB2.0 , make sure solid and stable.

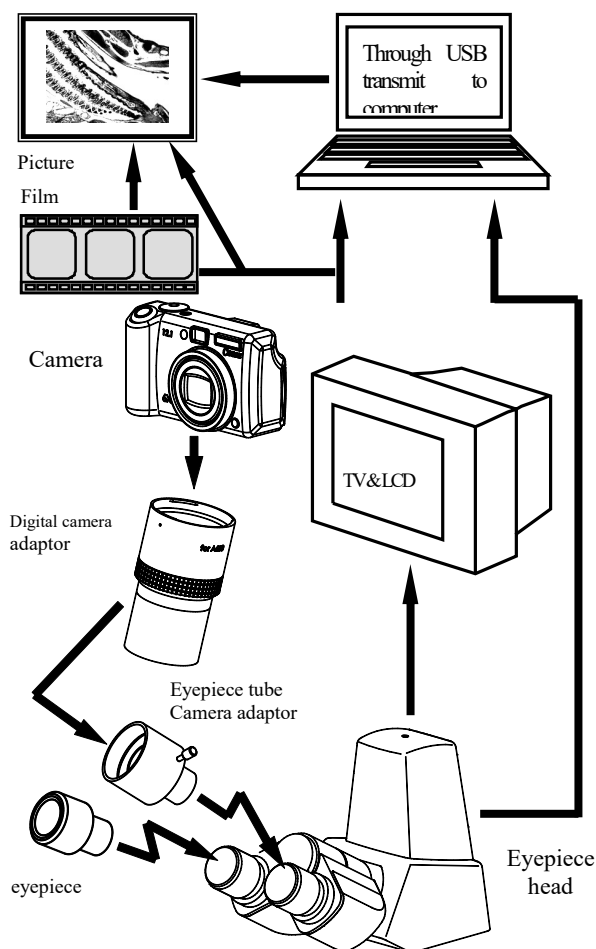
(2) Use Of Camera Device

After the connection, open image display equipment (such as computer and start image collector & analysis software). Adjust microscope, adjust the eyepiece until clear image. Then open software to browse image collector function, clear or basic clear image should also be on the screen (if isn't satisfied only slightly rotating J、N micro focusing hand wheel) , until get satisfactory imaging results.

Then can browse through the image acquisition software mode, or take images from the screen directly observed

(3) Usage Of Photography Device

In addition, for the special needs, through the eyepiece tube photography, use a digital camera to get photos, and input computer or print photographs.



▲ The product has passed factory inspection that eyepiece observation and photographic camera device adopt with synchronous size. General adjustment synchronous with eyepiece fixed diopter (only for model with single diopter adjusting), but also result in slight error because the difference of the vision, can be adjusted depending on eyepiece diopter adjusting ring as benchmark. With double depending on the degree of adjustment, please circle one "0" scale line for the datum is conducted on the basis of regulating use.

6 Maintenance

1) Clean

- (1) Don't touch the lens with hand, Dust on lens should be cleaned by soft brush or absorbent cotton or cleaned by absorbent cotton, lens paper with the mixture of alcohol and ether (proportion 1:4).
- (2) Alcohol and ether all are burnt early, please take them away from fire. Be careful for turn on and off power.
- (3) Don't clean painted metal and galvanizing metal with organic solvent such as alcohol, ether or the mixture of the both. Silicon cloth or soft cleaning preparation is suggested to clean it. Plastic should be cleaned by soft cloth with clear water.

2) Environment Of Using And Placing.

- (1) Microscope should be used and placed in a cool, dry, non-dust, non-shake and non-corrosive gases environment.
- (2) environment of indoor temperature $0^{\circ}\sim 40^{\circ}\text{C}$,and maximum relative humidity 85%.
- (3) Dehumidifier is suggested to be installed when microscope used in heavy humidity area to avoid fungus and mist damage instrument.
- (4) Please pay attention to prevent microscope from violent shake and vibration in application and in carrying. Don't drag it on the surface of worktable to avoid damage to microscope and worktable.

3) Replacement of bulb

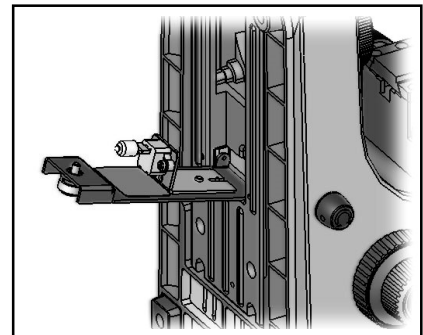
A Replacement of halogen.

▲ Please use specified bulbs. If use other light bulb will cause damage or fire。 Halogen:12V/20W, LED: 3.4V/3W。

- (1) Turn off power(switch to“○”), and pull out plug.
- (2) Wait about 30 minutes until the bulb become cool.

▲ Please be sure that the bulb is cool, then follow by the next operations.

- (3) Lay aside the microscope reliably, unscrew the knurled thumb screw of the lamp housing cover on the underside of base.
- (4) Pull over the lamp housing cover.
- (5) Pull out the old bulb .



- (6) Hold a new bulb with silk cloth to avoid fingerprint and dust affect bulb brightness and service life, and insert fully the contact pins into the bulb socket.

▲ Before installing new bulb, check whether the bulb and socket contact intact. If contact is bad, will affect illume.

▲ Insert bulb contacts completely in plug hole. Otherwise, bulb could loose contacts or contact undesirable and went for a short-circuit

- (7) Press back the lamp housing cover, and tighten the knurled thumb screw.

▲ After working for above 10 hours continuously, better cut off the microscope about 30 minutes.

B If the LED light source needs to be replaced, please contact the dealer or manufacturer in time.

4) Replacement of fuse

- (1) First cut off power of microscope, and pull out the power plug.
- (2) Take off fuse base in the back of base ⑨ , take out old fuse.
- (3) Replace a new fuse with same size, then plug fuse base in ⑨ .

5) when not in use

- (1) Please cut off power when instrument not in use, put on dust cover and place in a dry and cool environment.
 - (2) Suggest to place eyepiece 、 objective in the dry containers (such as moisture-proof cylinder), and place desiccant.
- ▲ To maintain the instrument's performance, suggest to instrument check regularly. If any trouble need to repair, please contact with the manufacturer or dealer

Appendix 1:Troubleshooting

1) In the period of using Smart series microscope, if there is any trouble occurs, please referring to the following sheet listed some common troubleshooting resolve them.

Trouble	Causation	Remedy
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Trouble	Causation	Remedy
Switch on but bulb dark	Plug is unreliable	Plug in again
	Bulb is broken	Change bulb
	Fuse is broken	Change fuse
Bulb is flickering or brightness is unsteady	Bulb is unstable	Insert it again
	Bulb is broken	Replacing bulb
Brightness of view field isn't enough or is uneven	Bulb specification doesn't meet the requirement	Replacing bulb
	Brightness isn't adjusted correctly	Adjust rotation potentiometer
	Objective isn't in correct position	Make the objective in correct position
	The size of iris aperture is too small	Adjust the size of iris aperture
Brightness of view field isn't enough or is uneven	Lens (objective, eyepiece, condenser, light collector) has dust	Clean it
	Position of condenser is too low	Higher condenser
Image isn't clear (contrast or definition isn't enough)	Cover glass of specimen doesn't meet the requirement	Use required thickness cover glass (0.17mm)
	Cover glass of specimen isn't in up direction	Place specimen correctly
	Surface of objective lens is dirty (especially it is easy for the front lens of 40× objective to dip in immersion oil)	Clean it
	Immersion oil isn't used for 100× objective (oil)	Use immersion oil
	Immersion oil doesn't meet the requirement	Use immersion oil supplied by us
	There is bubble in immersion oil	Clear the bubble way
	Size of iris aperture isn't proper	Adjust the size of iris aperture
	Position of condenser is too low	Readjust the position of condenser
One side of image is dark or image is moving as focusing	Objective isn't in correct position	Make the objective in correct position
	Specimen isn't placed correctly	Place specimen levelly on stage and clip it with clamp
Objective touches specimen as changing low times objective to high times objective	Cover glass of specimen isn't in up direction	Place specimen correctly
	Cover glass doesn't meet the requirement	Use required thickness cover glass (0.17mm)
Image observed by two eyes aren't in superposition entirely.	Interpupillary distance isn't adjusted correctly	Adjust interpupillary distance according to two eyes
It is easy for eyes to be tired during observing	Diopter isn't adjusted correctly	Readjust diopter

2) If there is any trouble occurs in digital system , please referring to the following sheet listed some common troubleshooting resolve them.

Trouble	Causation	Remedy
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Can't open software.	Plug soft dog again.	Check soft dog.
Can't browse image.	The data link or damage not, Driver files destroyed.	Check whether good or replace data interpolation, To install the driver.
Blank screen.	Microscope untapped or equipment photosensitive brightness not enough.	Added microscope brightness or equipment exposure value
Image corrugated flashing	Brightness too high.	Reduce brightness and appropriate supplementary equipment microscope exposure value.
Browse the image delay	computer system burden or hardware configuration is low.	Clean or replace computer computer system.
Image is not clear	No focusing, slice in improper position.	Adjusting fine focusing knob; moving slice's position or replace slice.
Images are not synchronous	Diopter adjusting position deviation	Adjusting diopter adjusting ring.
Software calibration error	Incorrect operation procedure	Please carefully reference manual procedure.
	Calibration select error	Among the image and to gauge calibration of multiple objective to correction.
When finding trouble , at first ,please confirm whether microscope in good condition, then further testing problems in digital system. If unable to dispose,please contact the agency or manufacturer to solve the problem with specific guidance.		