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Metallurgical 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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ATTENTIONS

1. Disassembly only by the professionals.

The microscope has been adjusted before shipping, Unprofessional-person should not disassemble and remove any other parts.

If you have any questions, please contact with manufacturer or local distributor.

2. Note the input voltage if identical with operating voltage of instruction.

This instrument designed for wide input voltage (100V~240V,47~63HZ), applicable to most area .But if the supply voltage exceeds this range, the instrument will be seriously damaged.

3. Use in safe way, prevent burns and fire.

When the Instrument power in working, temperature of bulb and lamp house will rise sharply to meet the heat balance, so pay attention to anti-hot logo in case of be burned. Bulb should be replace after cool down .

Do not use alcohol, gasoline, paper and other combustibles near the instrument, to prevent a fire! !

4. Notes on replacing the bulb.

The instrument used with 12V /20W imported halogen lamp of G4, replacement should be used the same specifications of the bulb, or it may cause equipment damage.

Before replacing the lamp, must turn off power switch, and unplug it in case of electric shock.!

Please don't put finger mark、 dust or oil strain etc on the bulb when In replacement.

5. Requirements for handling and using environment

Please cut off the power and unplug the power plug before moving. Be careful not to crush your finger when placed.

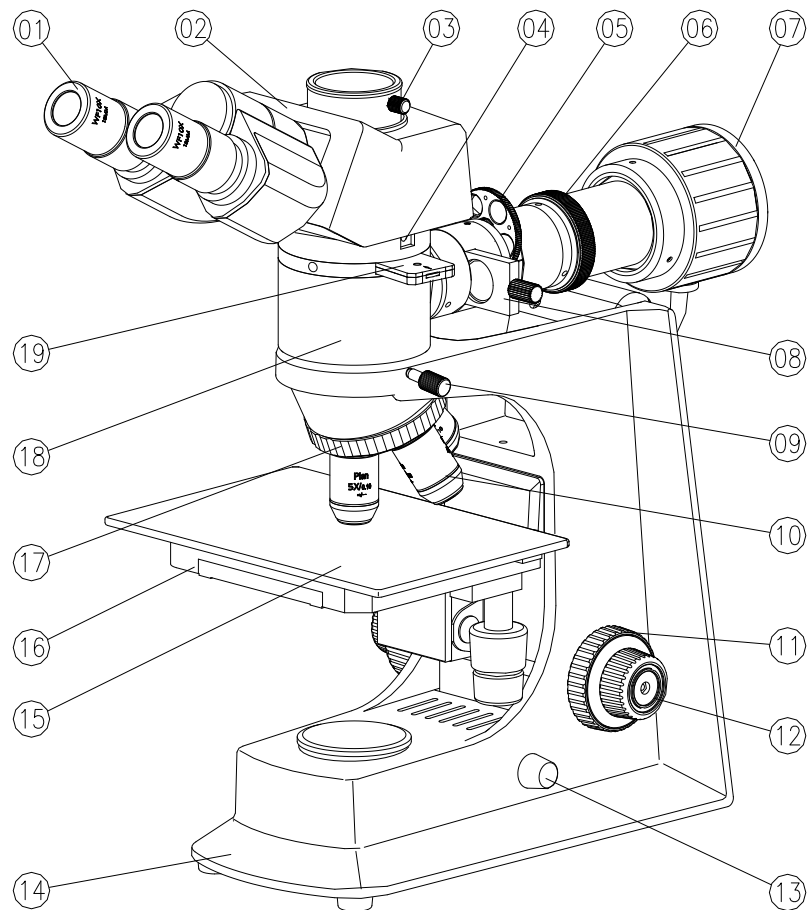
This instrument is a precision instrument, and it should be handle with care, severe shock can cause serious damage to the inner related parts.

The required available environment for using of the equipment:

Indoor temperature: 0 °C ~ 40 °C Maximum relative humidity: 85%

High temperature or high humidity may cause mildew, fog or dew of the optical components, will result in the instrument not work.

6. For the protection of the environment, please properly handle the microscope packing waste (such as: cardboard, foam, etc)。



MIT200 Epi Metallurgical Microscope

- | | | |
|--------------------------------------|--|-----------------------------|
| 01-Eyepiece | 02-Binocular (Trinocular) Observing Tube | 03-Locking screw for Camera |
| 04-Locking screw for Observing Tube | 05-Filter turret | |
| 06-Aperture diaphragm adjusting ring | 07-Light Box | 08-Polarizer |
| 09-Locking screw for main body | 10-Objective | |
| 11-Right coarse focusing hand wheel | 12-Right fine focusing hand wheel | |
| 13-Dimming potentiometer | 14-Main body | 15-Stage |
| 16-Mechanical stage | 17-Nosepiece | 18-Epi illumination device |
| 19-Analyzer | | |

1. Purpose

MIT200 series metallurgical microscope use infinity optical system, equip with LWD plan metallurgical objective and plan big field eyepiece, high definition image, high resolution, widely apply to metallographic analysis and research of other opaque specimen, is necessary instrument in metallurgy, machine manufacture, geology mineral resources, electron device industry etc.

2. Performance Parameter

2.1 Total Magnification

Objective Eyepiece	5×	10×	20×	40×	50×	80×
WF5×	25×	50×	100×	200×	250×	400×
WF10×/20	50×	100×	200×	400×	500×	800×
WF10×/20(reticule)	50×	100×	200×	400×	500×	800×
WF12.5×(optional)	62.5×	125×	250×	500×	625×	1000×
WF16×(optional)	80×	160×	320×	640×	900×	1280×

2.2 Objective (with 10× Eyepiece)

Infinity Plan	N.A.	Objective Field (fieldφ18)	Resolution (μm)	Working Distance (mm)
5×(L.W.D)	0.13	3.6mm	2.158μm	16.07
10×(L.W.D)	0.25	1.8mm	1.34μm	18.48
20×(L.W.D)	0.40	0.9mm	0.84μm	8.35
50×(L.W.D, S)	0.70	0.36mm	0.48μm	1.95
80×(L.W.D,S, Optional)	0.80	0.225mm	0.42μm	0.85

2.3 Other parameters

1. Mechanical tube length: 160mm
2. Conjugate distance: Infinity ∞
3. Observing Tube:
 - 30°Seidentopf binocular head, 360°rotate, interpupillary distance 48 ~ 75mm; ± 5 diopter adjustable.
 - 30°Seidentopf trinocular, 360°rotate, interpupillary distance 48 ~ 75mm; ± 5 diopter adjustable; light distribution 20: 80 (80% is binocular vision) .
4. Nosepiece: Quadplex
5. Mechanical stage: Stage 200mm×140mm
Moving range: X 76mm, Y 52mm
6. Focusing unit: Coaxial coarse and fine focusing knobs, Coarse stroke 26mm with loosen adjusting device, Fine focusing knob division 2 μ m, circle 0.2mm
7. Filter: five-hole turret(blue, green, amber, grey, empty).
8. Polarizer device: polarizer, analyzer (rotate 360°) .
9. Variable Aperture Diaphragm: can adjust field brightness or contrast.
10. Anti-Fungus device: Objective, Eyepiece all with anti-fungus device, anti-fungus piece installed in the observing tube .
11. Electricity:
 - wide working voltage input: AC100~240V, 47-63Hz
 - Output: voltage DC1.2~6V
 - Bulb: 5WLED Warm Lamp
 - Fuse: 5A 250V $\phi 5 \times 20$
 - Dimming diopter potentiometer

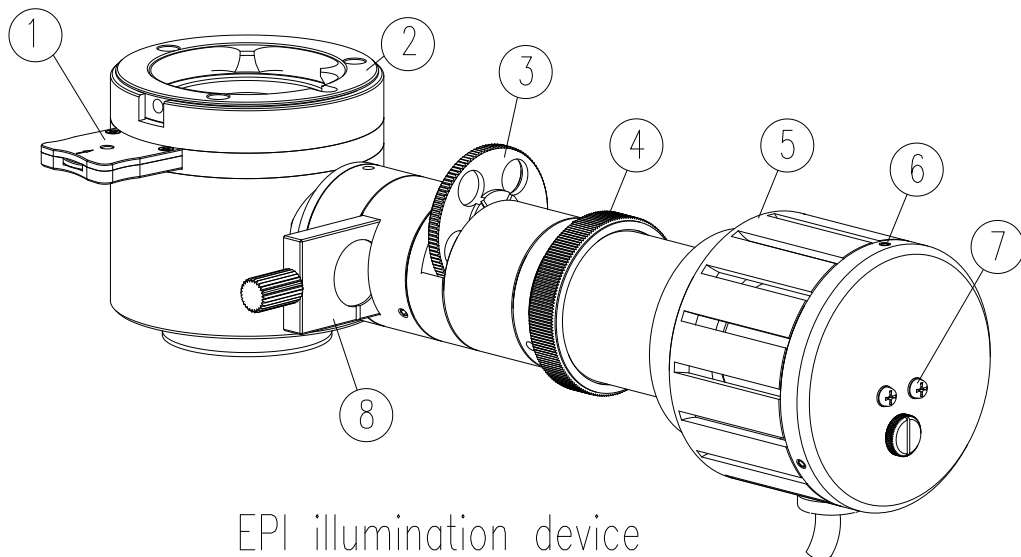
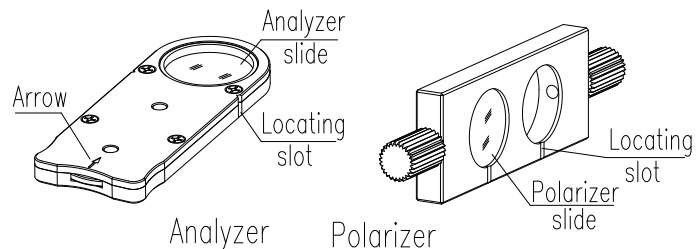
3. Installation and Use

3.1 Installation

- ▲ Please check the instrument according to packing list after the carton is opened. If lack of quantity, please immediately connect with dealers .
- ▲ Please dispose the package after goods are completely taken out.
- ▲ Recommend keep partial packing case in reserve use.
- ▲ For the protection of the environment ,properly handle the microscope packing waste.

- a) Put the main body on the working desk, loose the body fixed screw and take the dust cover.
- b) Connect the Epi-illumination device with main body jointer ,light box is in right behind of the main body, tightening main body locking screw, then insert aviation plug which under the light box into aviation socket which in back side of main body, tightening locking screw in socket, connecting main body with power line.

- c) Connecting binocular or trinocular observing tube with Epi illumination device jointer and tightening the screw with socket head wrench .
- d) Take off the eyepiece dust cover, insert a pair of eyepiece with same power in eyepiece tube.
- e) If objectives aren't connected with main body before delivery, first should lower stage by rotating coarse focusing hand wheel, take off the nosepiece dust cover .According to the objectives magnification to screwing in the nosepiece hole.
- f) Take out the polarizer, screw off knurled screw and insert it into the slot of Epi-illumination device.



EPI illumination device

1- Analyzer 2- Jointer 3- Filter Wheel 4- Aperture Diaphragm Adjusting Ring
5-Round Light Box 6-Fastening screw 7- Adjusting screw 8- Polarizer

The side of location slot must be in backward position(in the direction of light box),screw on the knurled screw. Analyzer is lay up for standby.

3.2 Operation

- a) Confirm the service voltage in input voltage range, then plug in power socket , then rotate potentiometer knob to make it in lowest position of brightness in case of starting up current surge to bulb. Turn on the power switch, light the lamp box, form uniform Epi illumination to the sample and it brightness can be adjust by rotatable potentiometer.
- b) Put sample gently on the stage, rotate moving handle until into light path.
- c) Put 10X objective into light path by holding nosepiece insection, rotating it.
- d)Slowly rotate coarse focusing hand wheel to observe with right eye until getting rough image ,then change with fine focusing hand wheel until getting clear image.

e) To swift objective into light path.

f) Binocular interpupillary distance adjustment:

Interpupillary distance is different for everyone, so interpupillary distance should be adjusted before using binocular microscope. Please take the two eyepiece tubes to turn until the bright rings observed by two eyes are in superposition entirely.

Binocular vision focus, should based on fixed tube (MIT200 is in right tube) . The right eye to observation is from the right tube until getting clear image ,then observe with left eye through left tube, and at the same time, adjust the diopter adjustment ring which on the right tube to compensate for two eye diopter differences.

g) Epi-illumination device with five-hole filter unit (standard configuration: blue, green, amber, grey),can select and use according to the requirement.

h) Use of polarizer unit

Polarizer slide and analyzer must use at the same time for polarizing observation. It has been adjusted before deliver ,putting it in light path when in use. Analyzer slide can rotate 360° , insert in the right side slot which under the observing tube, arrow sign is up .Slowly rotate the slide of analyzer and polarizer to reach orthogonal each other ,then can make polarizing observation. .

i) Epi-illumination device is designed with variable aperture diaphragm, can adjust the diaphragm size by rotating adjusting ring, also adjust brightness or field contrast .

Take off eyepiece to observe through eyepiece tube, adjust aperture diaphragm size to make image full 70% ~ 80% of objective pupil diameter can obtain relatively good image.

This Epi illumination device field diaphragm is fixed and is adjusted before delivery.

j) Tension adjusting hand wheel:

Stage may automatically decline after long term operation. tension adjusting handle can be used to adjust tension in case this phenomenon. meanwhile adjust the thick budge on the operation of comfort. Clockwise can lock, counterclockwise rotation can relax.

▲ Avoid counterclockwise rotating left、right coarse and fine focusing knob or may result in damage for focusing unit

▲ Change different objective with different power. Don't directly switch objective and shift nosepiece by holding its excircle insection to moving objective into the light path at right position.

4. Maintenance

4.1Clean

4.1.1 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).

4.1.2 Alcohol and ether all are burnt early, please take them away from fire.

4.1.3 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.

4.1.4 Engineering plastic should be cleaned by soft cloth with clear water.

4.2 Environment of use.

4.2.1 Microscope should be used and placed in a cool, dry, non-dust, non-shake and non-corrosive gases environment.

4.2.2 Environment of indoor temperature 0°~40°C ,and maximum relative humidity 85%.

4.2.3 Dehumidifier is suggested to be installed when microscope used in heavy humidity area to avoid fungus and mist damage instrument.

4.2.4 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.

4.3 Replacement of bulb

▲ Please use specified bulb 6V 30W G4.

▲ Please replace the bulb after complete cool.

▲ Turn off power, unplug power socket.

- (1) Turn off power, unplug power socket.
- (2) After about 30 minutes, bulb and relative parts completely cool down ,then unscrew the screw.
- (3) Please be sure that the bulb is cool, pull out the bulb.
- (4) Hold a new bulb with silk cloth to avoid fingerprint and dust affect bulb brightness and service life, and carefully insert the contact pins into the bulb socket.
- (5) Close rear cover and screw up the fastening screw.
- (6) The bulb's center can be adjusted within limits by three screws which in rear cover.

After working for above 8 hours continuously, better cut off the microscope about 30 minutes.

4.4 Replacement of fuse

- (1) Turn off the power, pull out the power socket.
- (2) Screw off the fuse in the bottom, take out the broken fuse .
- (3) Replace new fuse with same size.

4.5 Not in use

- (1) Please cut off power when not in use, pull out plug and put on dust cover .
- (2) If not in use for long time, Suggest to place eyepiece ,objective in the dry containers (such as moisture-proof cylinder), and place desiccant. At the same time put on dust cover.

4.6 Periodic check

▲ To maintain the instrument's performance, suggest to check it regularly. If any trouble, please contact with the manufacturer or agency.

Non-professionals should not disassemble it.

5. Troubleshooting

In the period of operation, if there are any malfunction, please referring to the following sheet listed some common troubleshooting resolve them.

Trouble	Cause	Solution
Switch on but bulb dark.	Plug is unreliable	Recheck connection
	Bulb is broken	Replace
	Fuse is broken	Replace
Bulb is flickering or brightness is unsteady.	Bulb is unstable	Plug again.
	Bulb is broken	Replace
Brightness isn't enough or is uneven.	Bulb specification doesn't meet the requirement.	Replace
	Bulb brightness is too low.	Rotate potentiometer to adjusting brightness.
	Objective isn't in correct position for light path.	Rotate the objective to correct position.
	Diaphragm isn't in good position.	Readjust.
	Misuse with light diffusion glass.	Move out from light path
	Surface of lens is dirty (objective 、 eyepiece 、 condenser、 collector).	Clean it.
	Bulb is in bad installation position	Readjust again.
Image isn't clear (contrast or definition isn't enough).	Sample surface is oxidized.	Polish again.
	Sample surface isn't enough smooth .	Make new sample.
	Brightness isn't enough .	Readjust
	Diaphragm size isn't suitable.	Readjust
	Sample surface isn't parallel with installation surface.	Make new sample.
Eyes often have a feeling of fatigue.	Binocular interpupillary distance adjustment isn't in good position.	Readjust again.
	Wrong diopter regulation.	Readjust again.
	Brightness isn't comfortable.	Readjust again.



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