



# A13.2604-A

Metallurgical Microscope, Reflect

## Instruction Manual



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

# Attentions ! !

## 1. Purpose

This series microscope is used only for microscopic observation , not available for other purpose, otherwise result in equipment damage.



## 2. Disassembly only by the professionals

The microscope has been adjusted before shipping, Unprofessional-person should not disassemble and remove any other parts. Disassemble and remove any other parts will result in equipment damage .

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

## 3. Note the input voltage if correspond.

This instrument designed for wide input voltage (100V~240V, 50/60HZ), applicable to most area .But if the supply voltage exceeds this range, the instrument will be seriously damaged.

## 4. Prevent Burns And Fire

When using power equipment, bulbs and collecting mirror and other nearby parts of the set will rise sharply in temperature until it reaches a thermal equilibrium state. Pay attention to anti-hot logo, they should be careful not be burn when in use.

**Alcohol, gasoline, paper and other flammable materials can't near the lamp in case of fire.**



## 5. Notes On Replacing The Bulb.

Replacement should be based on the identity of the instrument using the same specifications of the bulb, otherwise it may cause equipment damage.

The power supply must be cut off before bulb replacement, the bulb must be cooled off completely before proceeding! !



## 6. Carry

Power must be cut off 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 equipment-related parts.

## 7. Installation

Please refer to the installation instruction in order to avoid to damage the instrument .

## 8. Operation Environment

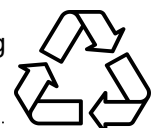
The required available environment for using of the equipment:

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, and make the instrument not work.

## 9. Packing Waste Disposal

For the protection of the environment, please properly handle the microscope packing waste or send to salvage station(such as: cardboard, foam, etc. )!



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## Purpose:

MIT upright / transmitting & reflecting metallurgical microscope with ergonomic design, equip with metallurgical infinity plan objective ,polarizing unit and 1X ,0.57X C-mount , also provide digital camera for CCD, SLR digital camera or special designing camera by our company. It has many advantages, for example, fine appearance, stable performance, excellent image, convenient usage etc. Widely used in factories, universities and relative research institutes, This series microscope is suitable for observing various metallurgical specimens ,casting quality and identification ,metallographic structure analysis, and play important role in IT chip, LCD basal plate detection, etc.

# 1. Specifications

## 1.1 Total magnifications

| Objective \ Eyepiece | 5X  | 10X  | 20X  | 50X  | 80X  | 100X  |
|----------------------|-----|------|------|------|------|-------|
| 10X                  | 50X | 100X | 200X | 500X | 800X | 1000X |

## 1.2 Objectives

| Objective | Type                                | Numerical Aperture (N.A.) | Working Distance (mm) | System | Spring |
|-----------|-------------------------------------|---------------------------|-----------------------|--------|--------|
| 5X        | Infinity Long Working Distance Plan | 0.13                      | 16.04                 | Dry    | No     |
| 10X       |                                     | 0.25                      | 18.48                 | Dry    | No     |
| 20X       |                                     | 0.40                      | 8.35                  | Dry    | No     |
| 50X       |                                     | 0.70                      | 1.95                  | Dry    | Spring |
| 80X       |                                     | 0.80                      | 0.85                  | Dry    | Spring |
| 100X      |                                     | 0.9                       | 1.10                  | Dry    | Spring |

## 1.3 Eyepiece

| Magnification | Eyepiece Type    | Field Diameter(mm) |
|---------------|------------------|--------------------|
| 10X           | High eye point   | φ 22               |
| 10X           | Reticule (0.1mm) | φ 22               |

1.4 Mechanical tube length: ∞

1.5 Head: Seidentopf binocular or trinocular , Inclined 30° , Rotatable 360° .

Anti-fungal Systems, Interpupillary adjustable distance : 48-76mm .

Diopter adjustable range ± 5. Seidentopf trinocular head with output connector for CCD, Camera , SLR Digital Camera.

1.6 Nosepiece: Quintuple.

1.7 Mechanical stage:

For Reflecting Illumination: Size 200mm×150mm , Travel range: 77mm×52mm

For Transmitting Illumination:Size175mm×145mm , Travel range: 77mm×52mm ,Two slid holder.

1.8 Focusing systems: Coaxial Coarse and Fine Focusing Knobs, Coarse stroke 22mm,

Fine division 2μm, Condenser up-down range 25mm

1.9 Condenser: Abbe condenser, N.A. 1.25, Adjustable aperture, Aperture center can be adjustable.

1.10 Illumination: Transmitting: Input voltage AC100-240V, 50/60Hz

Output voltage DC3-12V

12V/20W halogen lamp

Rotation potentiometer with power switch.

Reflection: Input voltage AC100-240V, 50/60Hz

Output voltage DC3-12V

12V/50W halogen lamp

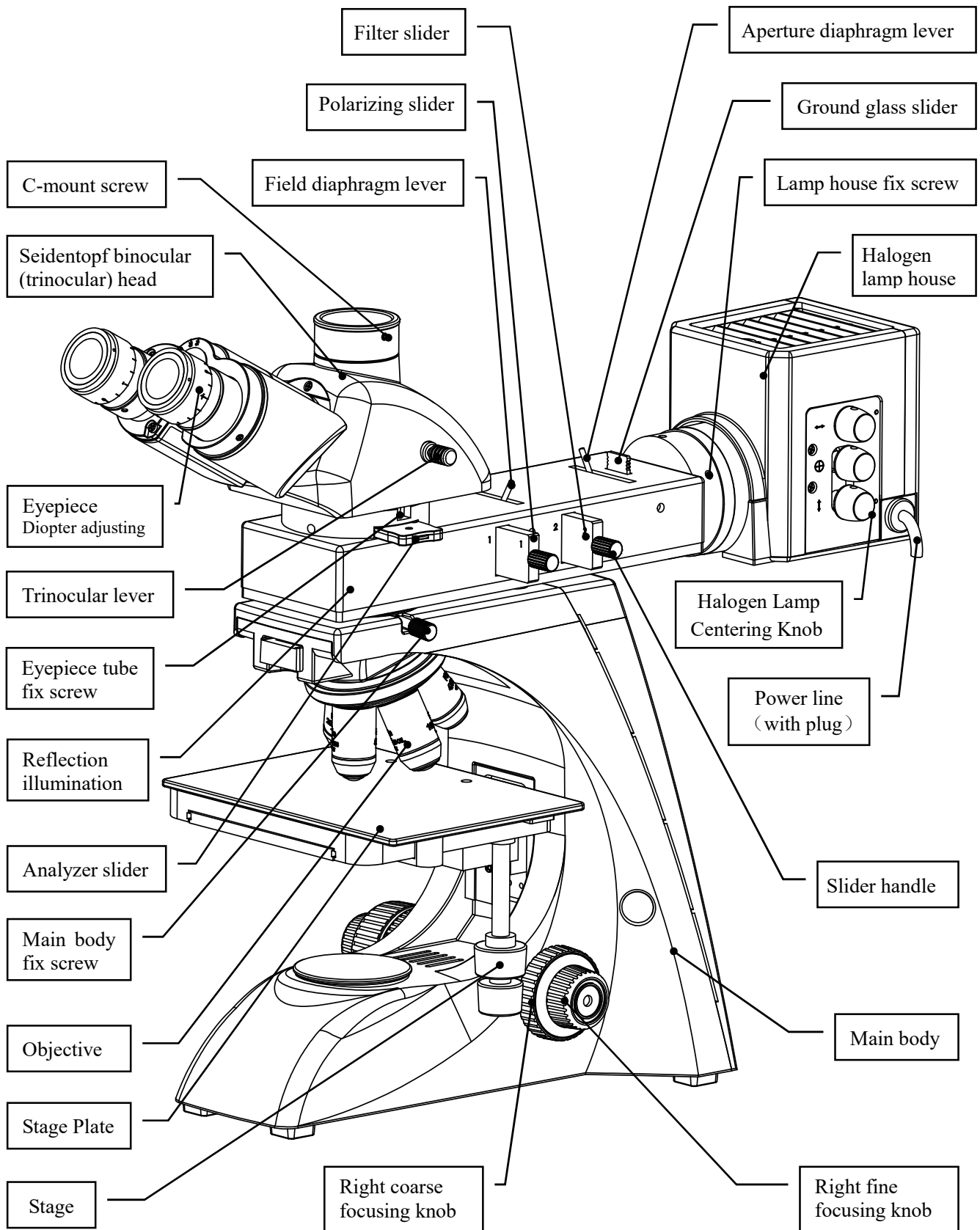
Rotation potentiometer with power switch.

1.11 Potentiometer: with rotational switch.

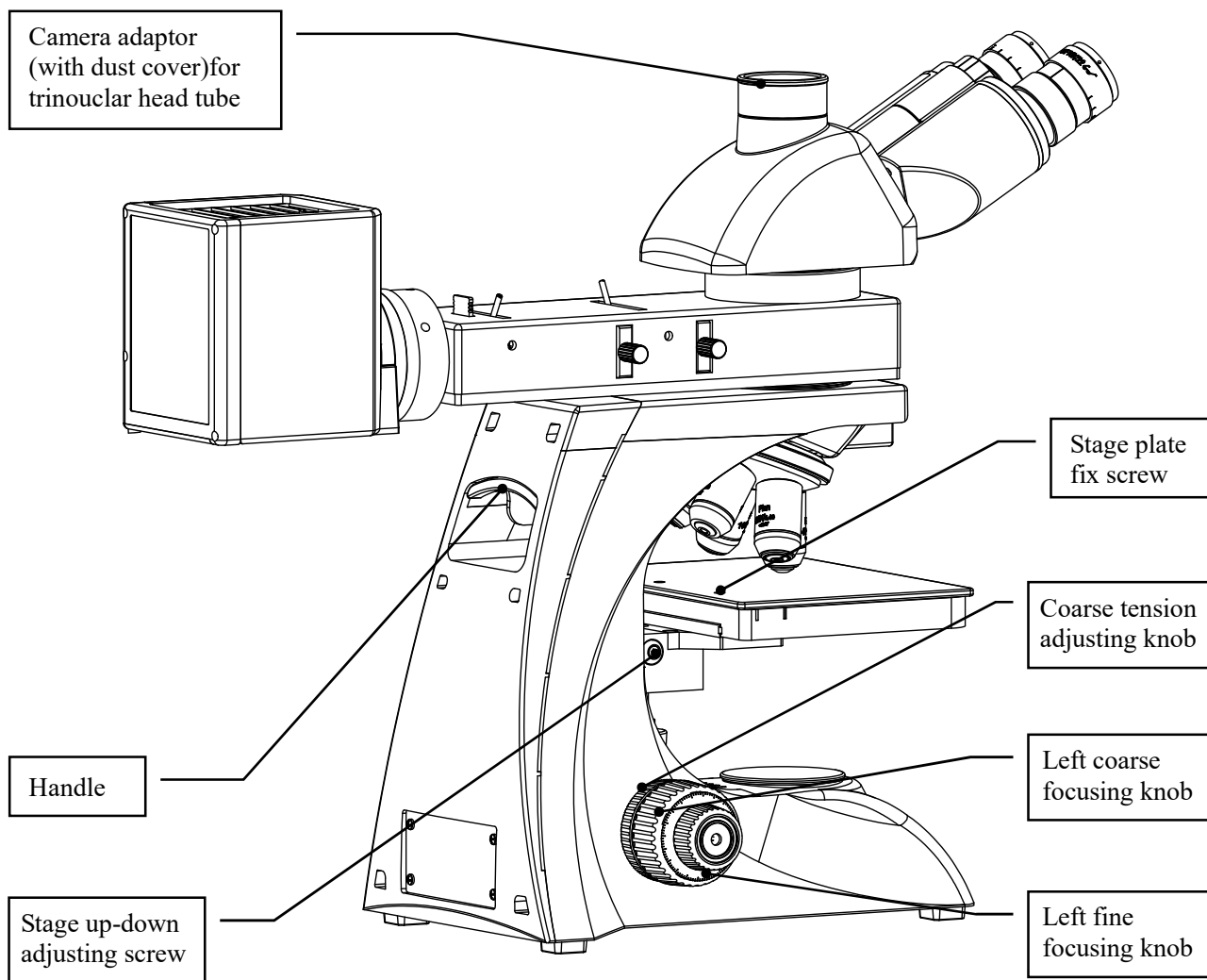
1.12 Fuse: 5A φ 5×20

1.13 Filter: Blue filer (Amber, Green ,Grey is optional).

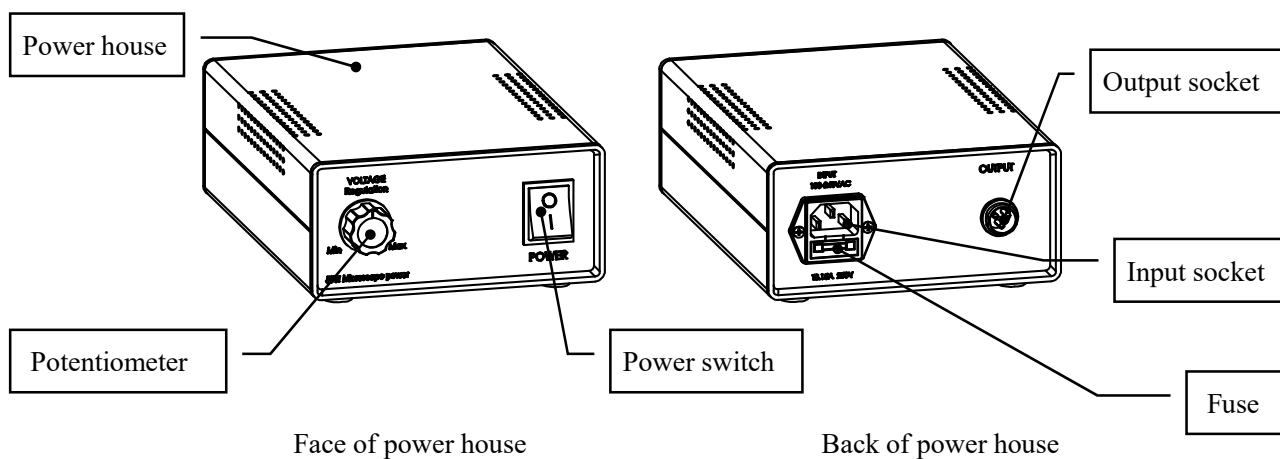
## 2. Parts Name

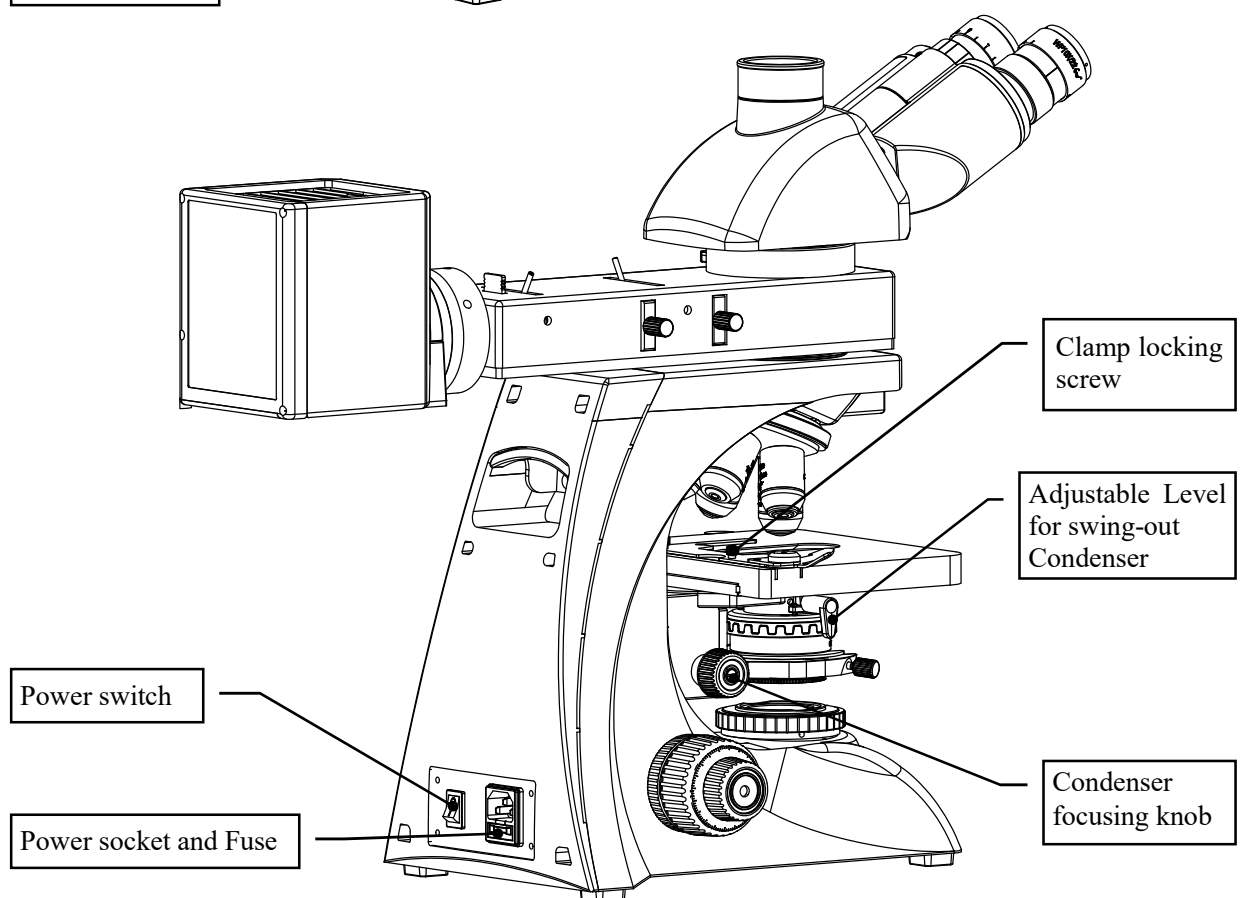
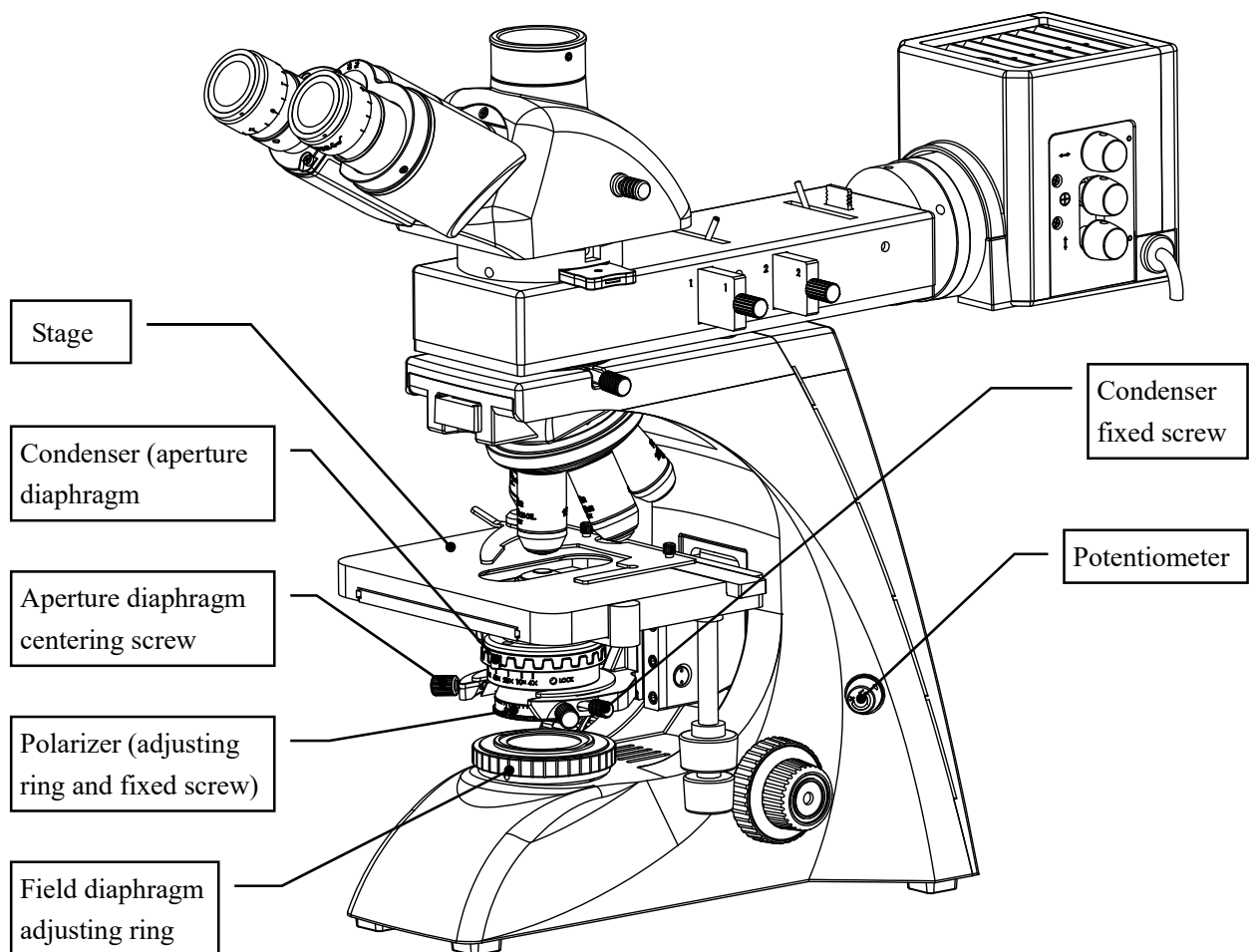


MIT300 Upright Metallurgical Microscope



MIT300 Upright Metallurgical Microscope





MIT500 Transmitting & Reflecting Metallurgical Microscope

### 3. Installation & Operation

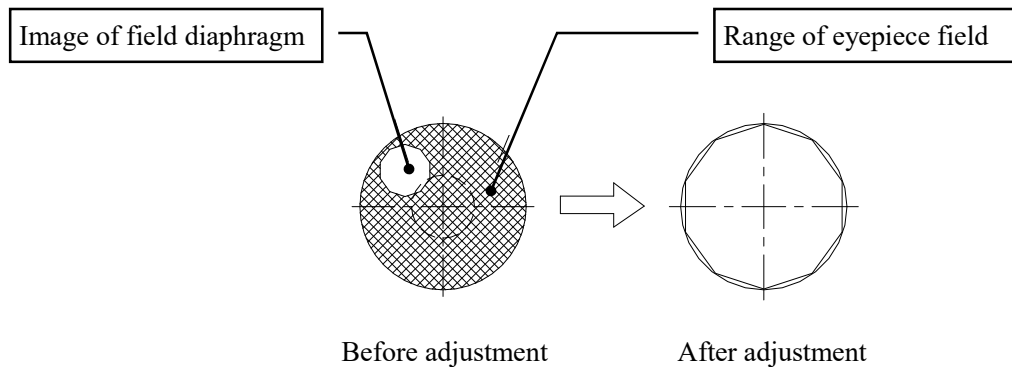
#### 3.1 Installation

- 1) Put out the main body, loose the body fixed screw.
- 2) Put out the reflection illumination unit and halogen lamp house, then fix the lamp house into the back of reflection illumination unit by the lamp house fixed screw. Insert the power wire of the lamp house into the power output socket of power house. Fix the reflection illumination unit to the main body, and tighten the body fixed screw.
- 3) Put out diaphragm slide and polarizer slide. Put down a handle of diaphragm slide, and insert it into the groove of the back of the reflection illumination, put up the handle. Put on the polarizer slide as the same (position groove face to front and insert into reflection illumination)
- 4) Put out binocular head (trinocular head), fix it onto the reflection illumination, and tighten the eyepiece tube fixed screw.
- 5) Put out the dust cover of the eyepiece tube, and insert eyepiece into the tubes.
- 6) Take out the objective from the packing box, and drive them into the holes of nosepiece orderly and tightly according to the times.
- 7) If it is transmitting and reflection microscope, please put out condenser, and put it on the condenser holder.
- 8) Put the glass plate stand on the stage, and fix it by the fixed screw, and place the glass plate to the stand.

#### 3.2 Operation

Confirm the voltage is available, then take power

- 1) Turn potentiometer, and make the light to the lowest position. Open the power switch, and adjust the potentiometer to get the available light. If reflection observing, operate the potentiometer and power switch in the power house; if transmitting observing, operate the potentiometer and power switch in the microscope main body.
- 2) Sample placing  
Choose an available stage plate, put the sample onto it, turn the stage knob to put the sample into the light path. If reflection observing, stage plate and glass plate should be chosen; if transmitting observing, glass plate and clamp should be chosen.
- 3) Put 10X objective into light path, turn coarse focusing knob, observe from right eyepiece with right eye, then turn slowly fine focusing knob to make the image clear after finding image.
- 4) 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.
- 5) Diopter adjustment  
As focusing for binocular, user should observe right eyepiece with right eye, and make the right eyepiece clear by focusing adjustment, then observe the left eyepiece, at the same time, adjust the diopter ring of the left eyepiece tube to make the image of left eyepiece clear as same as the right eyepiece.
- 6) Field diaphragm adjustment
  - a. If reflection observing, the field diaphragm has been adjusted well in factory, and user doesn't need to adjust. Using field diaphragm lever to adjust it.
  - b. If transmitting observing, turn the field diaphragm ring to make the diaphragm smaller than the field of eyepiece, the image of field diaphragm can be gotten in field. Adjust the centering adjust screw to make the center of field diaphragm overlap with the center of eyepiece field. Make the image of field diaphragm smaller than eyepiece field to adjust again. Larger the field diaphragm to make it disappeared.



7) Aperture diaphragm adjustment

- a. If reflection observing, pull the diaphragm slide handle to choose the available diaphragm.
- b. If transmitting observing, adjust the condenser aperture diaphragm lever to change the size of aperture diaphragm to change the contrast of the image.

8) Polarizer unit using:

Polarizer and analyzer should be used together when polarizing observing. Put the polarizer slide into optical path, then insert the analyzer slide into the groove of the reflection illumination unit, turn slowly the lever of analyzer slide to polarizing observing.

9) Stage coarse range using:

When the size of sample is too large to adjust the coarse knob available, hold the stage by hand and loose the stage up-down adjusting screw to adjust the position of stage. Tighten the stage up-down adjusting screw after get the available position.

10) Usage of 100X immersion oil objective

Adding moderate immersion oil between the front lens of 100X objective and the cover glass of specimen can make the image clearer. Please pay attention that air bubble and impurity can't be in the immersion oil, otherwise, the image would be affected.

First of all, take 40X objective which has been focused well out from bright path, then take 100X objective into bright path. At this time, nosepiece or stage moving knob should be turned slightly, and also slightly turn fine focusing knob to clear away the air bubble of immersion oil, otherwise, the air bubble would affect the image badly.

- ▲ After immersion oil used, the oil of specimen and the microscope surface should be soon cleaned by absorbent cotton, lens paper, gauze or soft cotton cloth with moderate mixture of pure industrial alcohol and ether (proportion 1 : 4).

## 4. Maintenance

### 4.1 Clean microscope

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. Be careful for turn on and off power.

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 Plastic should be cleaned by soft cloth with clear water.

### 4.2 Environment of usage and storage

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 Microscope should be used in environment of indoor temperature 0° - 40° C and maximum relative humidity 85%.

4.2.3 Removing equipment 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

4.3.1 Turn off power, and pull out plug.

4.3.2 Wait the bulb become cool.

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

▲ Only use 6V20W or 12V50W halogen lamp bulb.

4.3.3 Lay aside the microscope reliably, unscrew the knurled thumb screw of the lamp housing cover on the underside of base.

4.3.4 Pull over the lamp housing cover.

4.3.5 Pull out the bulb should be replaced, 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.

4.3.6 Close the lamp housing cover, and screw the knurled thumb screw.

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

### 4.4 Replacement of fuse

4.4.1 Cut off power of microscope, and pull out the plug.

4.4.2 Unscrew fuse cap in the back of base, take out old fuse.

4.4.3 Replace a new fuse, then screw the fuse cap.

## 5. Troubleshooting

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

| Trouble                                                                             | Causation                                                                                                               | Remedy                                                  |
|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| Bulb is dark when switch on power.                                                  | 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 potentiometer .                                  |
|                                                                                     | Objective isn't in correct position.                                                                                    | Make the objective in correct position.                 |
|                                                                                     | The size of aperture diaphragm is too small.                                                                            | Readjust aperture diaphragm .                           |
| 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 40X objective to dip in immersion oil). | Clean it                                                |
|                                                                                     | Immersion oil isn't used for 100X 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 aperture diaphragm isn't right.                                                                                 | Readjust aperture diaphragm.                            |
|                                                                                     | 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.                                       |