



BS-6002 Series
Upright Metallurgical Microscope
Instruction Manual

To ensure the safety and obtain satisfactory performance, please study this operation instruction thoroughly before your operation.

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Purpose:

BS-6002 series upright metallurgical microscope is designed for factories, universities and relative research institutes. The series microscope with original style, steady structure, convenient operation and clear image is suitable for observing various metallurgical specimens and IT material.

1. Specifications

1.1 Total magnifications

Eyepiece \ Objective	2.5X	4X	10X	20X	40X	100X
	5X	12.5X	20X	50X	100X	200X
10X	25X	40X	100X	200X	400X	1000X
12.5X	31X	50X	125X	250X	500X	1250X
16X	40X	64X	160X	320X	640X	1600X

1.2 Objectives

Objective	Type	Numerical Aperture (N.A.)	Working Distance (mm)	System	Spring
4X	Infinity Long Working Distance Plan	0.10	27.24	Dry	No
10X		0.25	18.48	Dry	No
20X		0.40	8.35	Dry	No
40X		0.65	3.90	Dry	No
50X		0.70	1.95	Dry	Spring
80X		0.80	0.85	Dry	Spring
20X	Infinity Plan	0.40	2.14	Dry	Spring
40X		0.65	0.45	Dry	Spring
100X		1.25	0.12	Oil	Spring

1.3 Eyepiece

Magnification	Eyepiece Type	Field Diameter(mm)	Focus Distance(mm)
10X	WF	φ 20	25
10X	Reticule (0.1mm)	φ 18	25
16X	WF	φ 13	15.6
12.5X	WF	φ 14	20
5X	Huyenian	φ 20	50

1.4 Mechanical tube length: 160mm, Conjugate distance: Infinity

1.5 Head: Seidentopf Binocular or Trinocular, Inclined 30° , Rotable 360° ,
Anti-fungal systems. Interpupillary Adjustable Distance Is 50-75mm,
Diopter adjustable range ±5.

1.6 Nosepiece: Quadplex nosepiece (Quintuple is optional)

1.7 Mechanical stage: Size 190mm×140mm

X-Y travel 55mm×78mm

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 Electric components: Transmitting: Input voltage AC100-240V, 50/60Hz

Output voltage DC1.2-6V

6V/20W halogen lamp

Rotation potentiometer with power switch

Fuse 2A φ 5×20

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

Output voltage DC6-12V

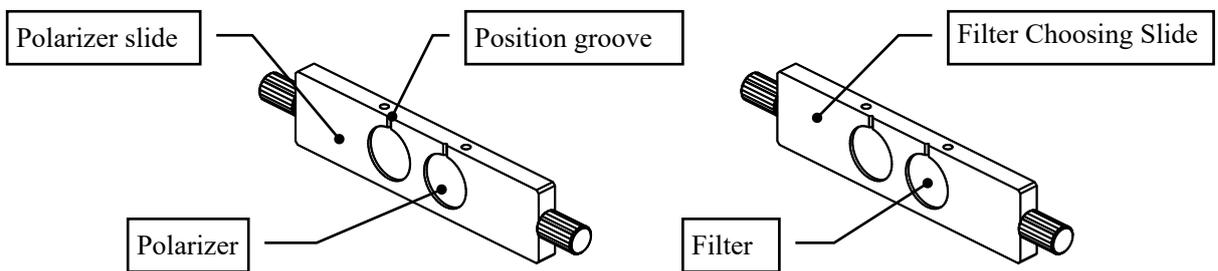
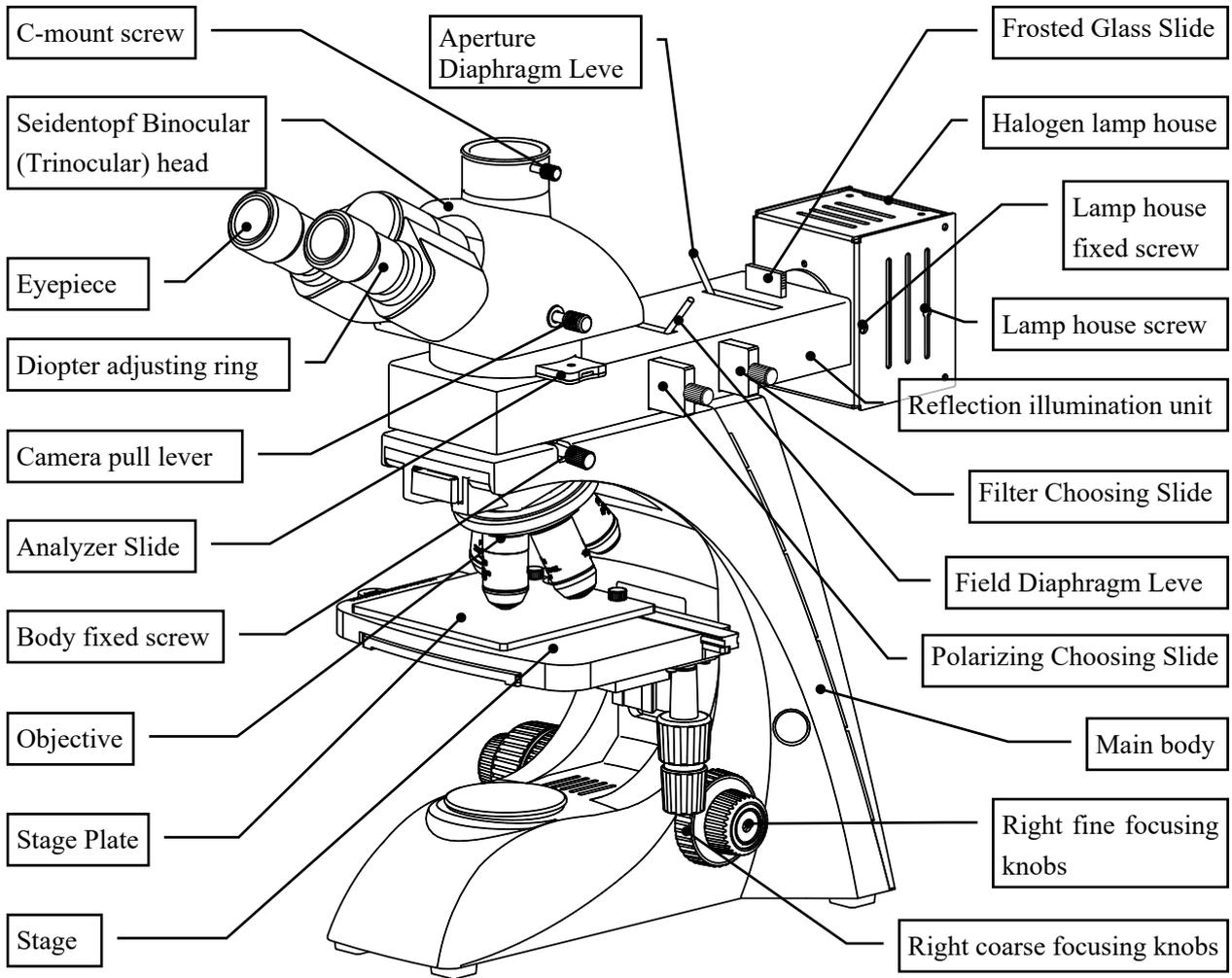
12V/50W halogen lamp

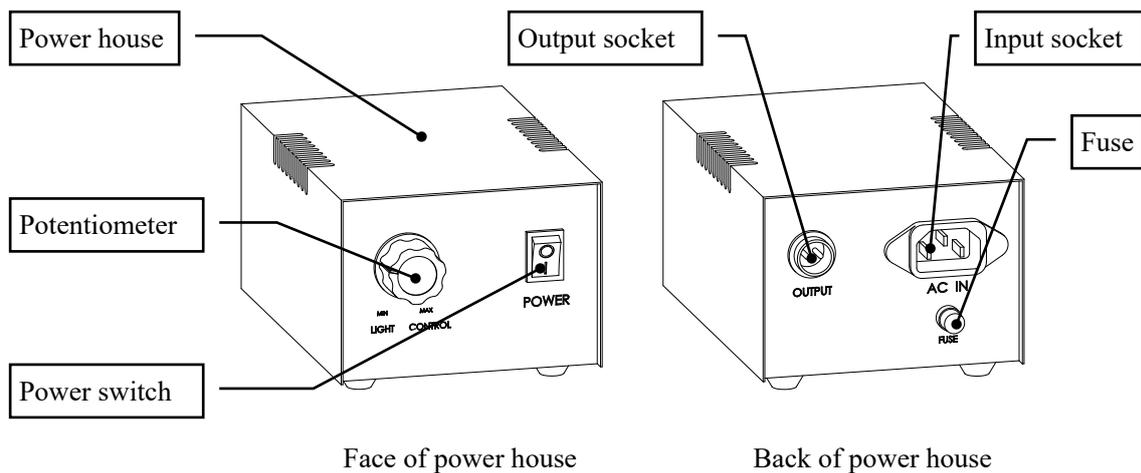
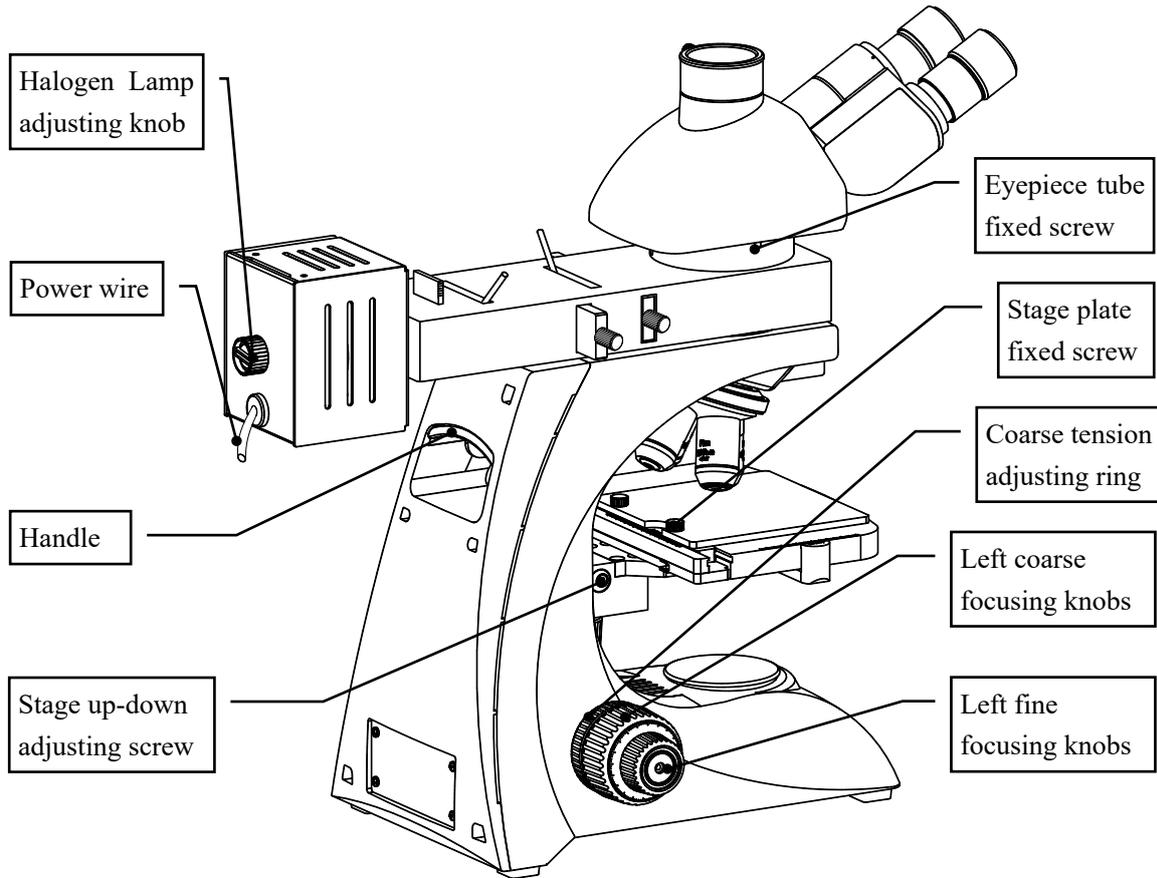
Rotation potentiometer with power switch

Fuse 2A φ 5×20

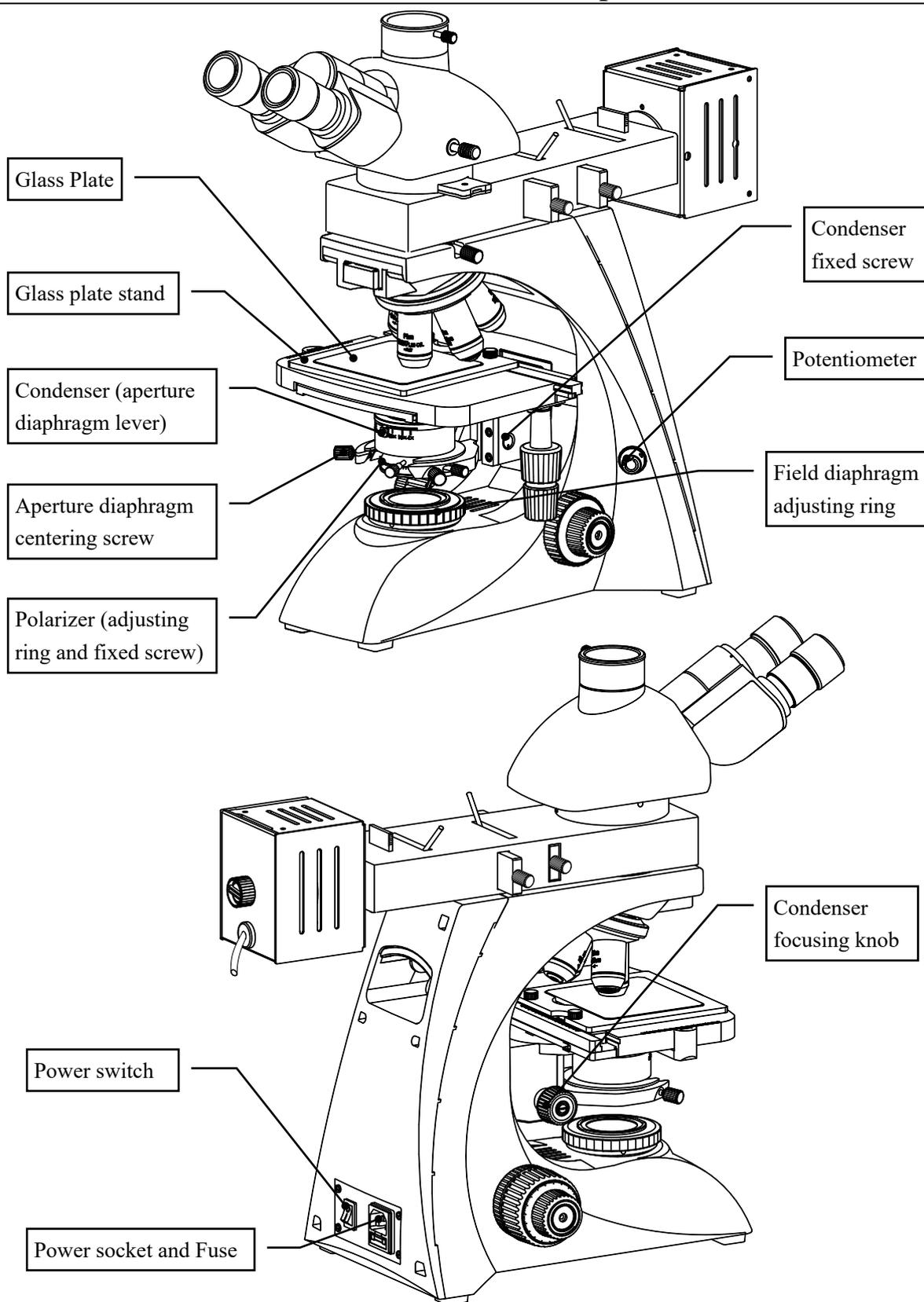
1.11 Filter: Blue filter (Yellow, Green is optional)

2. Parts Name





BS-6002BR/TR



BS-6002BTR/TTR

3. Installation & Operation

3.1 Installation

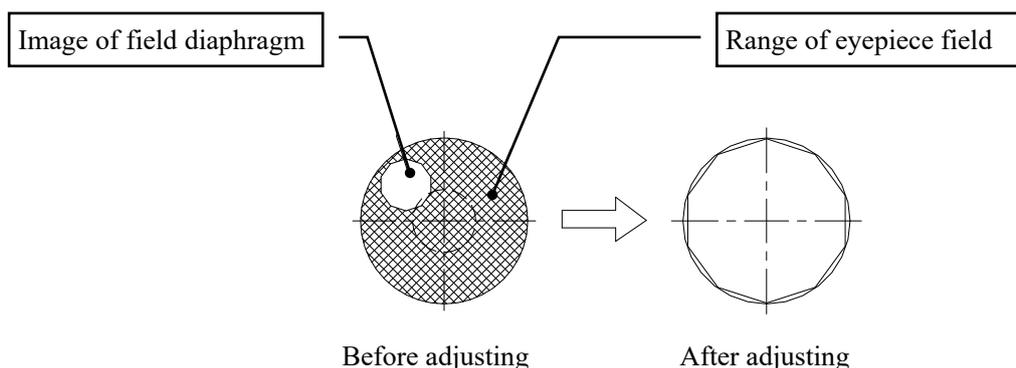
- 1) Put out the main body, loose the body fixed screw.
- 2) Put out the reflection illumination unit and halogen lamp house, then fix the lamp house into the back of reflection illumination unit by the lamp house fixed screw. Insert the power wire of the lamp house into the power output socket of power 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.
 - 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 using and placing

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.

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
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 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 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

Trouble	Causation	Remedy
It is easy for eyes to be tired during observing	Diopter isn't adjusted correctly	Readjust diopter

6.BS-6002 Series Metallurgical Microscope Outfits

Items	Specification	BS-6002BR/TR	BS-6002BTR/TTR
Eyepiece	WF 10X-20mm	●●	●●
	WF5X	○○	○○
	WF12.5X	○○	○○
	WF16X	○○	○○
	(Reticule 0.1mm) WF 10X-18 mm	○	○
Long working Distance Metallurgical Infinity Plan Objective	4X/0.1 W.D=27.24mm	●	●
	10X/0.25 W.D=18.48mm	●	●
	20X/0.4 W.D=8.35mm	●	●
	40X/0.65 (S) W.D=3.90mm	●	●
	50X/0.7 (S) W.D=1.95mm	○	○
	80X/0.8 (S) W.D=0.85mm	○	○
Infinity Plan Objective	20X/0.4 (S) W.D=2.14mm	○	○
	40X/0.65 (S) W.D=0.45mm	○	○
	100X/1.25 (Oil) (S) W.D=0.12mm	○	●
Seidentopf binocular Head	Inclined 30°, Rotatable 360°, Interpupillary Distance: 50-75mm	●	●
Seidentopf Trinocular Head	Inclined 30°, Rotatable 360°, Interpupillary Distance: 50-75mm Light Distribution: 0:100	○	○
Nosepiece	Quintuple	●	●
Mechanical Stage For Reflection Illumination System	Stage Size: 190X140mm Travel: 78mmX55mm Coaxial Coarse and Fine Focusing Knobs	●	
Mechanical Stage For Transmission Illumination System	Stage Size: 190X140mm Travel: 78mmX55mm Coaxial Coarse and Fine Focusing Knobs		●
Stage Plate		●	●
Clip			●
Glass Plate			○
Stage Micrometer	0.01mm	○	○
Polarizing Unit	Polarizing Slide Analyzer Slide	●	●
Condenser	Abbe N.A. 1.25 (Iris Diaphragm)		●
Illumination System	12V/50W Halogen Lamp (Reflection)	●	●
	6V/20W Halogen Lamp (Transmission)		●
	6V/30W Halogen Lamp		○
Field Diaphragm			●
Filter	Blue		●



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	Green		○
	Yellow		○
C-mount	1X	○	○
	0.5X	○	○

Note: “●” In Table Is Standard Attachment. “○” Is Optional Accessories

Packing Size: 750mm × 360mm × 450mm Gross Weight: 16 kgs Net Weight: 15 kgs