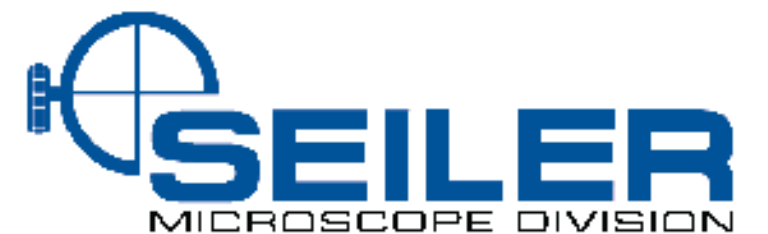


# Microlux IV

## Operations Manual





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Trouble	Cause	Remedy
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 a 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 the 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

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1. Parts Name

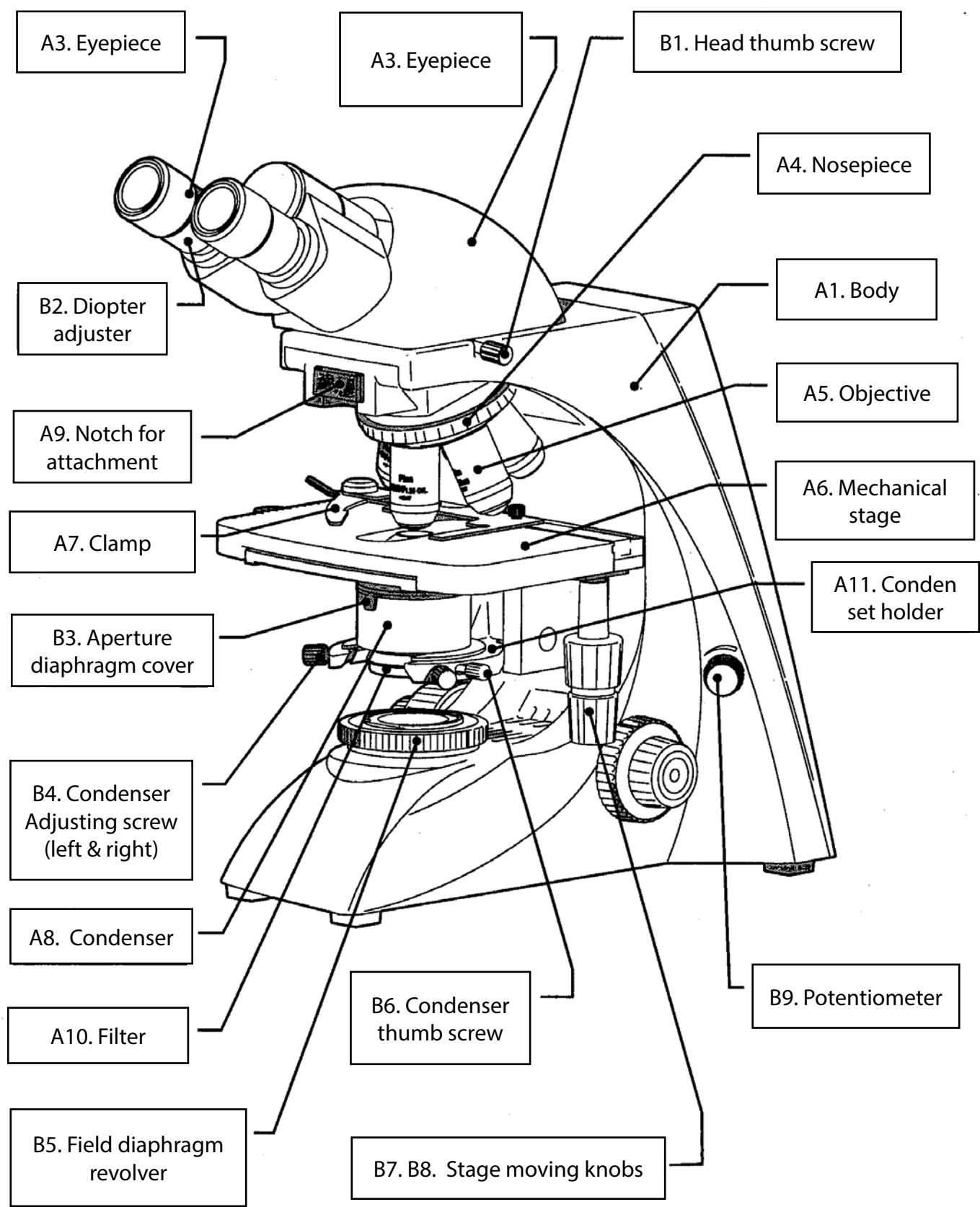


Fig. 1-1

- 6.3.6 Close the lamp housing cover and screw the knurled thumb screw.  
\* after working for 10 hours or more, it's best to turn off the microscope for 30 minutes.
- 6.4 Replacement of fuse (shown in Fig. 8)
  - 6.4.1 Cut off power of microscope and pull out th plug.
  - 6.4.2 Unscrew fuse cap in the back of the base. Remove old fuse.
  - 6.4.3 Replace with a new fuse and screw on fuse cap.

7. Troubleshooting

In the period of using, if any trouble occurs, please refer to the following chart for some common resolutions.

Trouble	Cause	Remedy
Power on but no light	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	Replace bulb
Brightness of view field isn't enough or uneven	Bulb specifcaiton doesn't meet the requirement	Replace bulb
	Brightness isn't adjusted correctly	Adjust rotation potentiometer
	Objective isn't in correct position	Put the objective in correct position
	The size of iris aperture is too small	Adjust the size of iris aperture

- u After immersion oil is used, the oil of specimen and the microscope surface should be cleaned by absorbent cotton, lens paper, gauze or soft cotton cloth with moderate mixture of pure industrial alcohol and ether (proportion 1:4)
  - u Standard thickness 0.17mm cover glass should be chosen when high times objective used, and thickness error should be within 0.01mm, otherwise, image definition would be affected.
- 4.4 Points of attention after using
- 4.4.1 Power of microscope should be turned off after using and the plug should be pulled out. If immersion oil used, clean objective and specimen. Finally, cover the microscope with dust cover.
- 4.4.2 Please take eyepiece and objectives out of microscope if not being used for a long period of time. Place eyepiece and objectives into drier with drying agent. Cover microscope with dust cover.

5. Installing and using camera and CCD attachment

- 5.1 Installing  
Connect the C-mount with CCD camera or connect with camera adapter, then connect it with c-mount, finally put it into microscope.
- 5.2 Using  
First get a clear image from eyepiece, then pull out lever on the side of trinocular head and collect image with camera. Clear image should be in screen. Adjust B14 fine focusing knobs to get it clear if image isn't clear.

6. Maintenance

- 6.1 Clean microscope
- 6.1.1 Do not touch the lens with hand. Dust on lens should be cleaned by soft brush, absorbent cotton or lens paper with a mixture of alcohol and ether (proportion 1:4)
- 6.1.2 Alcohol and ether are flammable, please keep them away from fire. Be careful when turning power on and off.
- 6.1.3 Don't clean painted metal and galvanizing metal with organic solvent such as alcohol, ether or the mixture of both. Silicon cloth or soft cleaning preparation is suggested to clean it.
- 6.1.4 Plastic should be cleaned by soft cloth with clear water.
- 6.2 Environment of using and placing
- 6.2.1 Microscope should be used and placed in a cool, dry, non-dust, non-shake and non-corrosive environment.
- 6.2.2 Microscope should be used in environment of indoor temperature 0° – 40° C and maximum relative humidity of 85%.
- 6.2.3 Removing equipment is suggested to be installed when microscope is used in heavy humidity area to avoid fungus and mist damage.
- 6.2.4 Please pay attention to prevent the microscope from violent shaking and vibration in applications and carrying. Don't drag it on the surface of worktable to avoid damage to microscope and worktable.
- 6.3 Replacement of bulb
- 6.3.1 Turn off power and pull out plug.
- 6.3.2 Wait for the bulb to completely cool.
- 6.3.3 Lay aside microscope reliably, unscrew the knurled thumb screw of the lamp housing cover on the underside of base.
- 6.3.4 Pull over the lamp housing cover.
- 6.3.5 Pull out the bulb, hold the new bulb with a silk cloth to avoid fingerprints and dust that can affect bulb brightness and service life. Fully insert the contact pins into the bulb socket.

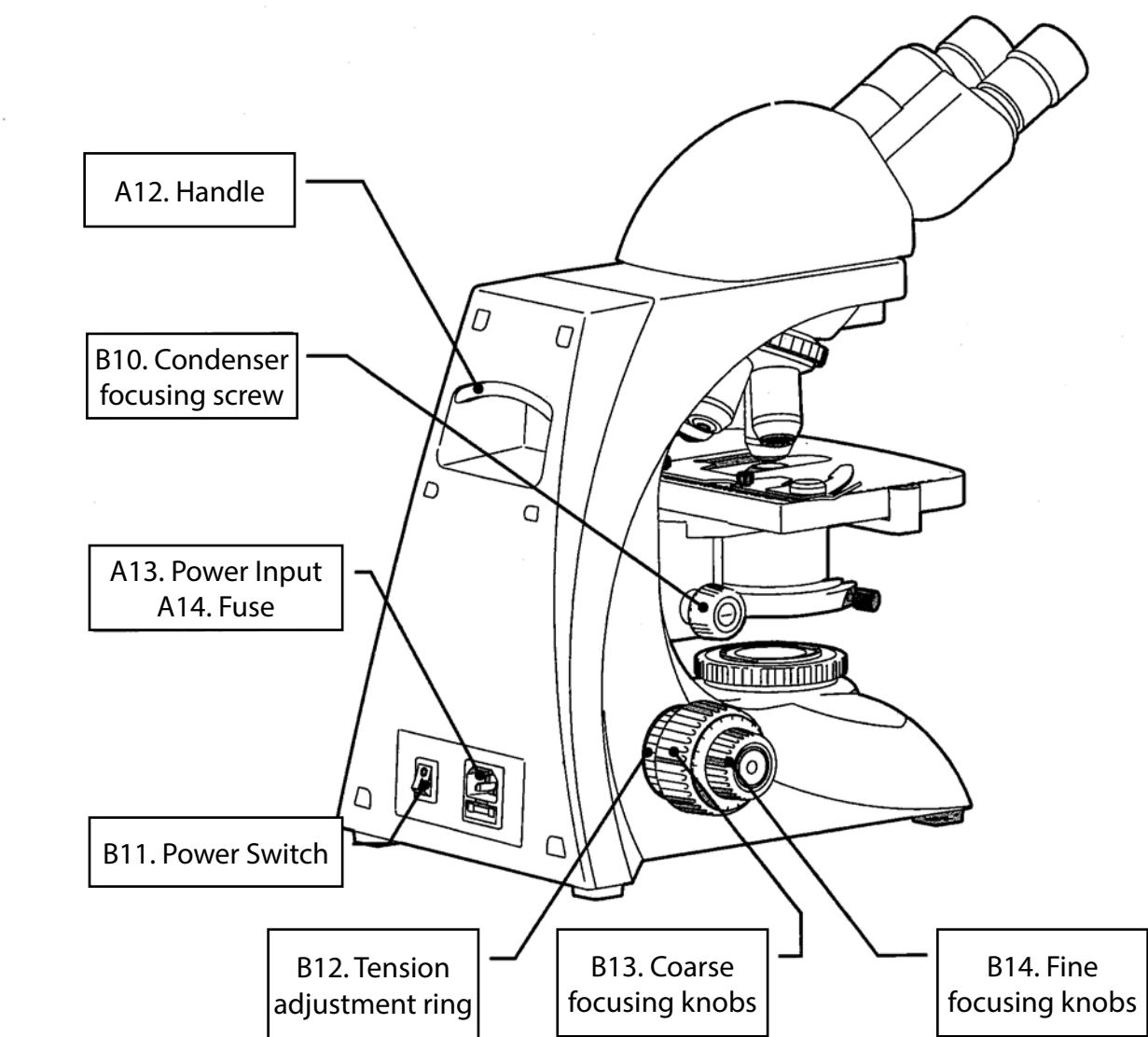


Fig. 1-2

- A1. Body A2. Seidentopf binocular head A3. Eyepiece A4. Nosepiece A5. Objective A6. Mechanical Stage A7. Clamp A8. Condenser A9. Notch for attachment A10. Filter A11. Condenser holder A12. Handle A13. Power Input A14. Fuse A15. Lamp Plate
- B1. Head thumb screw B2. Diopter adjuster B3. Aperture diaphragm lever B4. Condenser adjusting screw B5. Field diaphragm revolver B6. Condenser thumb screw B7. B8. Stage moving knobs B9. Potentiometer B10. Condenser focusing screw B11. Power switch B12. Tension adjustment ring B13. Coarse focusing knobs B14. Fine focusing knobs B15. Lamp plate thumb screw

2. Specification

2.1 Total magnifications

Objectives Eyepiece	4X	10X	20X	40X	100X
10X	40X	100X	200X	400X	1000X
16X	64X	160X	320X	640X	1600X



2.2 Objectives (with eyepiece 10x)

Objectives		N. A.	Objective Field (mm)	Resolving Power ( $\mu$ m)	Working Distance (mm)	
			Field Number $\phi$ 20		Achromatic objective	Plan objective
Finite	4 $\times$	0.10	5	2.8	/	16
	10 $\times$	0.25	2	1.1	/	2.1
	40 $\times$ (spring)	0.65	0.5	0.42	/	0.63
	100 $\times$ (oil, spring)	1.25	0.2	0.22	/	0.45
Infinite	4 $\times$	0.10	5	2.8	9.5	6.73
	10 $\times$	0.25	2	1.1	1.7	4.19
	20 $\times$ (spring)	0.40	1	0.69	/	2.14
	40 $\times$ (spring)	0.66	0.5	0.42	0.39	0.45
	100 $\times$ (oil, spring)	1.25	0.2	0.22	0.12	0.12

2.3 The other specification

2.3.1 Mechanical tube length: 160mm

2.3.2 Conjugate distance: Finite 195mm  
Infinite

2.3.3 Head: Seidentopf binocular (trinocular) 30°  
Interpupillary adjustable distance is 50-75mm  
Diopter adjustable range  $\pm 5$ ,  
Anti-fungal systems

2.3.4 Nosepiece: Quadplex or quinplex nosepiece

2.3.5 Mechanical Stage: Size 190mm X 140mm  
X-Y travel 55mm X 78mm

2.3.6 Focusing systems: Coaxial coarse and fine focusing knobs  
Coarse stroke 25mm, fine division 2  $\mu$  m  
Condenser up-down range 25mm

2.3.7 Condenser: Abbe condenser, N.A. 1.25, Adjustable aperture  
Aperture center is ajustable

2.3.8 Illumination: Koehler illumination system

2.3.9 Filter: Blue filter is for standard outfits, green and amber is optional

2.3.10 Electric components: Input voltage AC 85-265V, 50/60Hz  
Output voltage DC1.2-12V  
12V/20W halogen lamp  
Rotation potentiometer  
Fuse 2A 5 X 20

5) Condenser and aperture diaphragm adjustment

a. Condenser up-down

Turn the condenser focusing screw B10 to adjust the distance between condenser front and the specimen, and change the equal illumination to obtain the best brightness.

b. Aperture diaphragm adjustment

Stir the handle of iris aperture of condenser to adjust size of iris aperture for ajusting the contrast of the specimen.

6) Centering field diaphragm (this process is for microscope with field diaphragm)

- a. Put 10x objective into light path, turn B5 condenser focusing screw, adjust condenser up or down to get the image of field diaphragm.
- b. Observe throught eyepiece, turn B10 condenser focusing screw, adjust condenser up or down to get image of field diaphragm.
- c. Turn B4 condenser adjusting screw to move the image to the center of field.
- d. Put 40x objective into light path, turn B5 field diaphragm revolver to make the field diaphragm image bigger than field diaphragm. Please center it again if the image is not in center.

4.3 Usage of immersion oil objective

The 100x objective of B series microscope can be used for observation even without immersion oil. However, 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 bubbles and impurities cannot be in the immersion oil, otherwise, the image would be affected.

First, 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.

Fig. 7

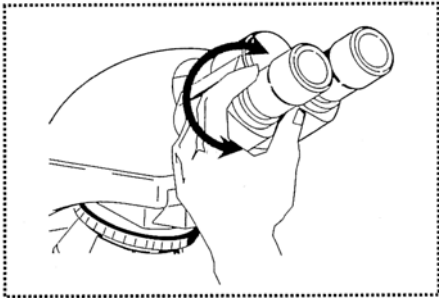
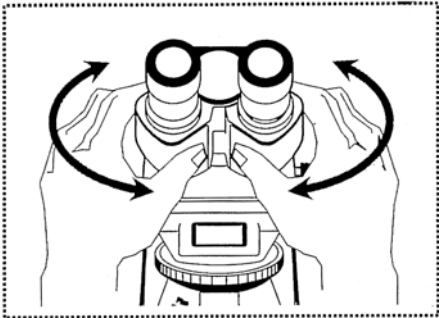


Fig. 8

2) Sample placing

Put the sample (cover is up) on stage A6 and fit it with clamp A7. Turn B7, B8 stage knobs to put the sample into the light path (Fig. 4).

- u Two samples can be placed on the stage together

Fig. 4

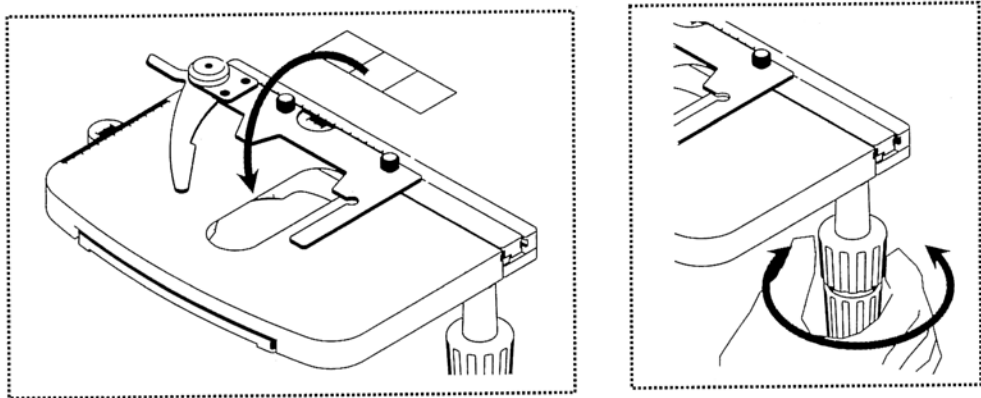
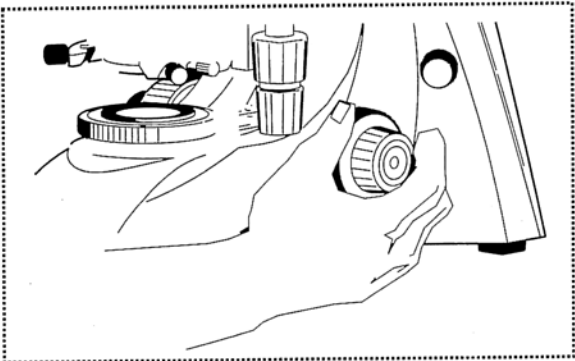


Fig. 5



3) Focusing (Fig. 5)

Put 10x objective into light path, turn coarse focusing knob B13, observe from right eyepiece with right eye, then turn slowly fine focusing knob B14 to make the image clear after finding image.

- u The tension adjustment ring B12 can adjust the tension of the coarse and fine focusing unit to prevent the stage from sliding down automatically and to improve the comfort of operation. Rotate clockwise to decrease tension, rotate counter-clockwise to increase tension.
- u Don't turn left and right coarse and fine focusing knobs in different directions with power at the same time, if so, the focusing system will be damaged. (Fig. 6)

4) Interpupillary distance and diopter adjustment

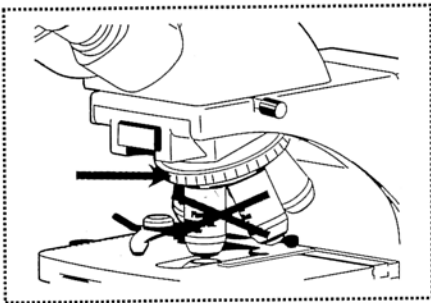
a. Interpupillary distance adjustment

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. (Fig. 7)

b. Diopter adjustment (Fig. 8)

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 the left eyepiece clear as same as the right eyepiece.

Fig. 6



3. Installation

Please install the microscope as follows:

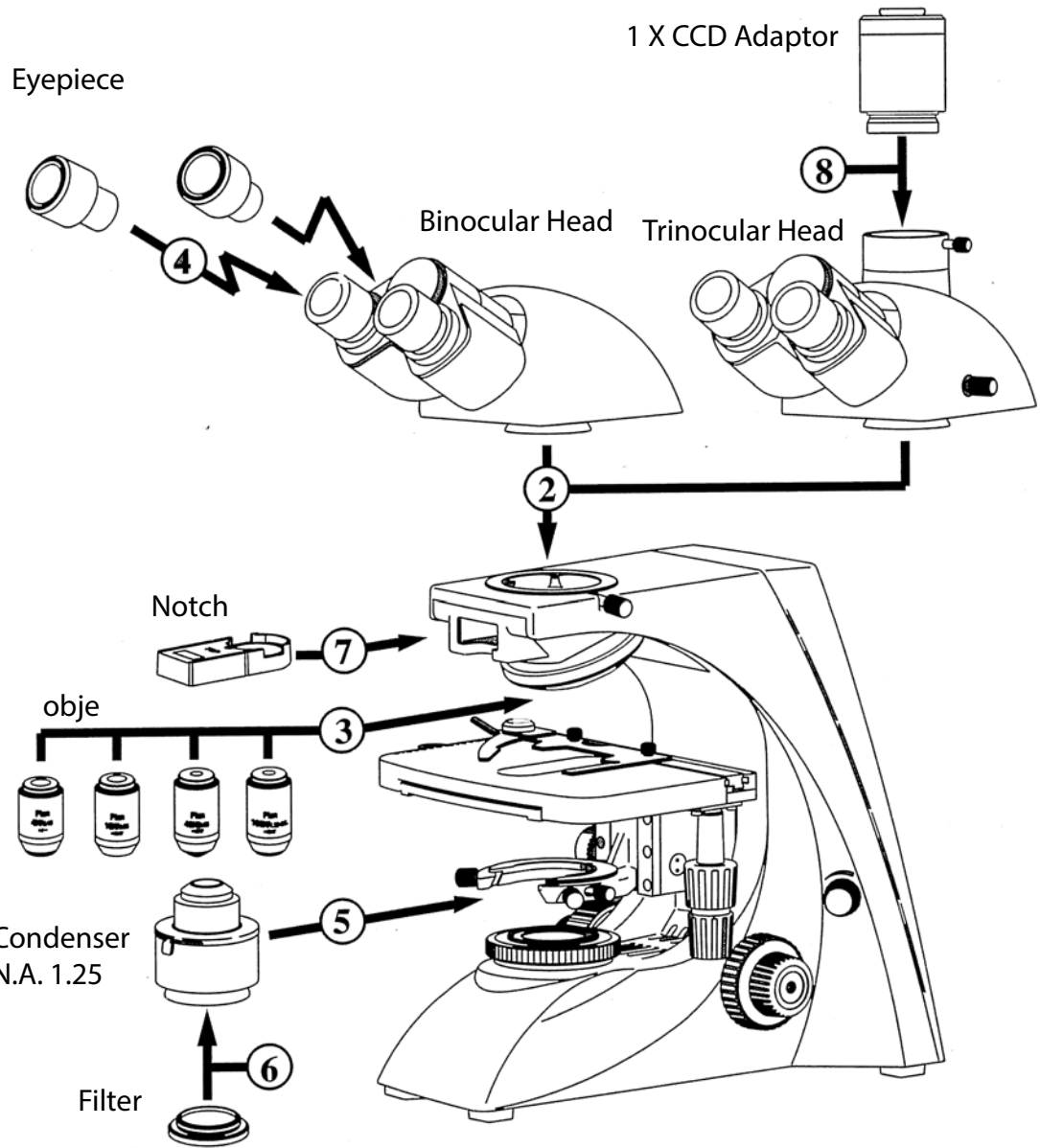
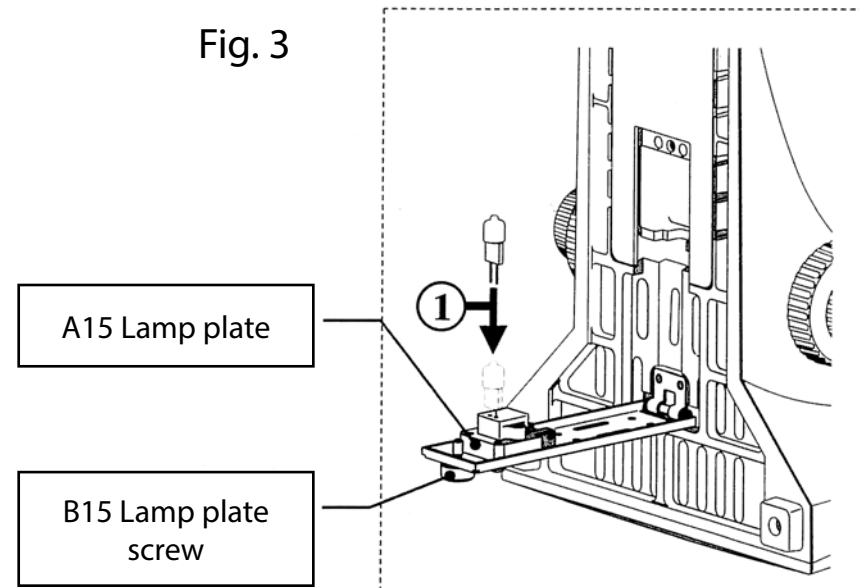


Fig. 2

Installation Process: (see Figure 3 on page 5)

- 1) Installing Lamp (if the lamp is installed before purchase, skip this step)
  - a. Take down the base of microscope, loosen the screw B15, pull out the lamp plate (Fig. 3);
  - b. Take a new lamp from the lamp package, and hold the lamp with the foam;
  - c. Insert the lamp into lamp holder as the show in the picture, then put back A15 lamp plate and the screw.
  - d. Take the microscope up and turn on the power.
- 2) Installing binocular head  
Loosen B1 binocular head thumb screw, put out A2 head, put it on top of body as in Fig. 1, tighten the screw.

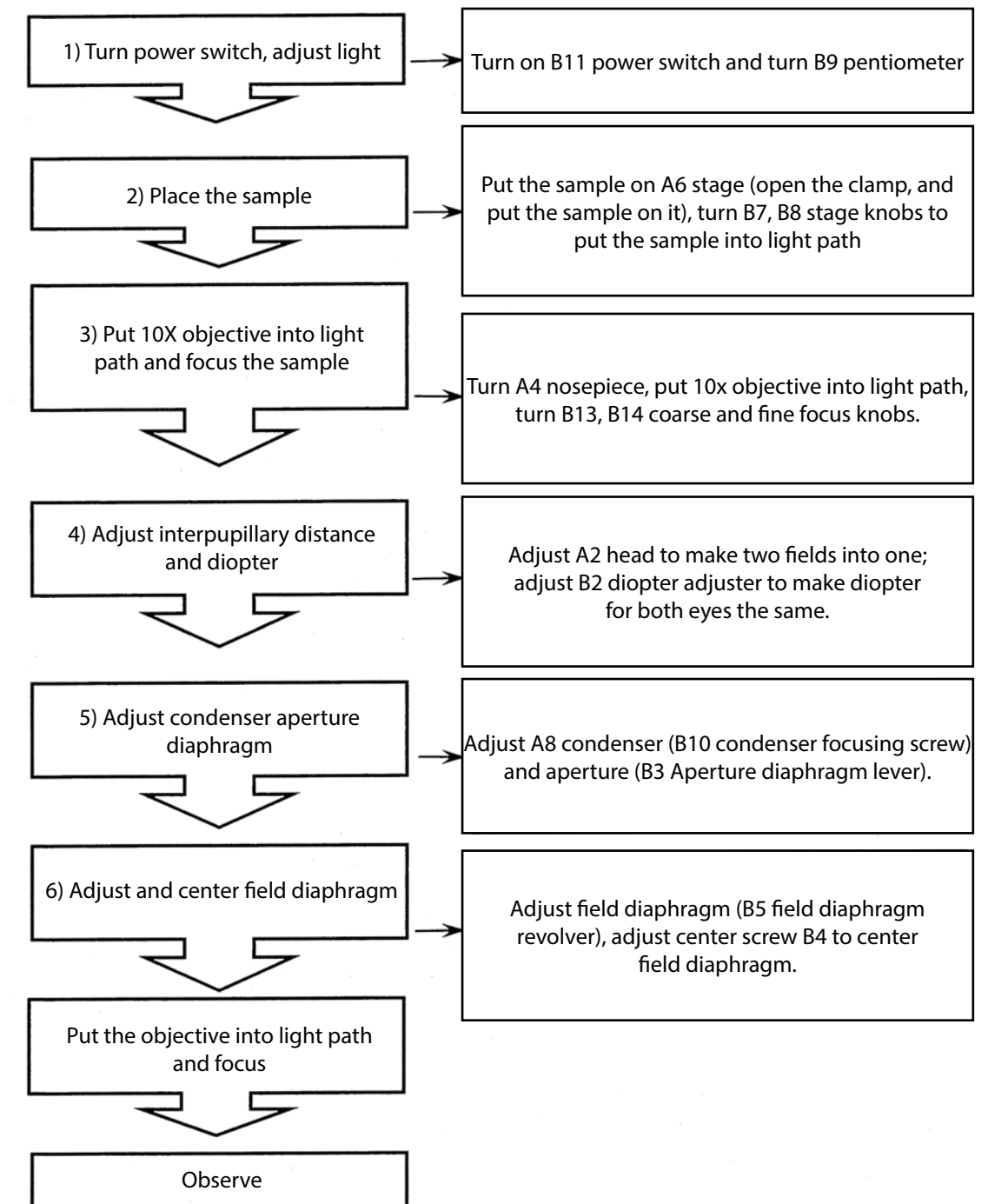
Fig. 3



- 3) Installing objectives  
Take out the objective from the packing box, and drive them into the holes of nosepiece orderly and tightly according to times.
- 4) Installing eyepiece  
Take out the eyepiece tube cover, then get the eyepiece from the packing bag, and insert into the tubes.
- 5) Installing condenser
  - a. Turn B13 coarse focusing knob, rise A6 mechanical stage to top;
  - b. Turn B10 condenser focusing screw, and take A11 condenser holder to the lowest position;
  - c. Loosen B6 condenser thumb screw, put the condenser to the holder, tighten B6 condenser thumb screw.
  - d. Turn B10 condenser focusing screw, and raise the condenser to working position.
- 6) Installing blue filter or the other attachment  
If blue filter will be used, the installation should be done before process 5, or do the installing during process 5-C, then put A10 blue filter or the other attachment to the bottom hole of A8 condenser.
- 7) Installing the module attachment  
The microscope can be with A9 module attachment and is multifunctional. Analyzer and wavelength plate can be installed in A9 notch. Polarizer is installed over field diaphragm or below the condenser. Filter can be installed in the notch if the other attachment is in the bottom hole of condenser.
- 8) Installing CCD adaptor  
Loosen the thumb screw in trinocular tube, put the CCD adaptor into trinocular tube, then tighten the screw.

## 4. Operation

### 4.1 Operation process instructions



### 4.2 Operation

#### 1) Illumination

1. Confirm the voltage is available, the take power
2. Turn on power switch B11
3. Turn B9 potentiometer to adjust light