

**MICROSCOPIOS BIOLÓGICOS PROFESIONALES
BIOLOGICAL PROFESSIONAL MICROSCOPES
MICROSCOPES BIOLOGIQUES PROFESSIONNELS**



Ref. HBC021 - HBC022



Este manual es parte inseparable del aparato por lo que debe estar disponible a todos los usuarios del equipo. Le recomendamos leer atentamente el presente manual y seguir rigurosamente los procedimientos de uso para obtener las máximas prestaciones y una mayor duración del mismo.

This manual should be available for all users of these equipments. To get the best results and a higher duration of this equipment it is advisable to read carefully this manual and follow the processes of use.

Ce manuel est une partie indissociable de l'appareil et doit être mis à la disposition de tous les utilisateurs de l'équipement. Nous vous recommandons de lire attentivement ce manuel et de suivre scrupuleusement les procédures d'utilisation afin d'obtenir des performances maximales et une plus longue durée de vie de l'appareil.

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1. Parts name

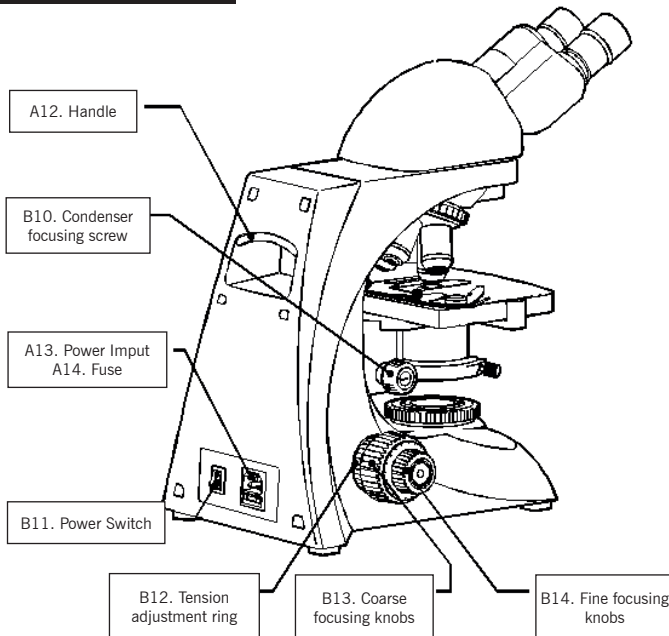


Fig.1-2

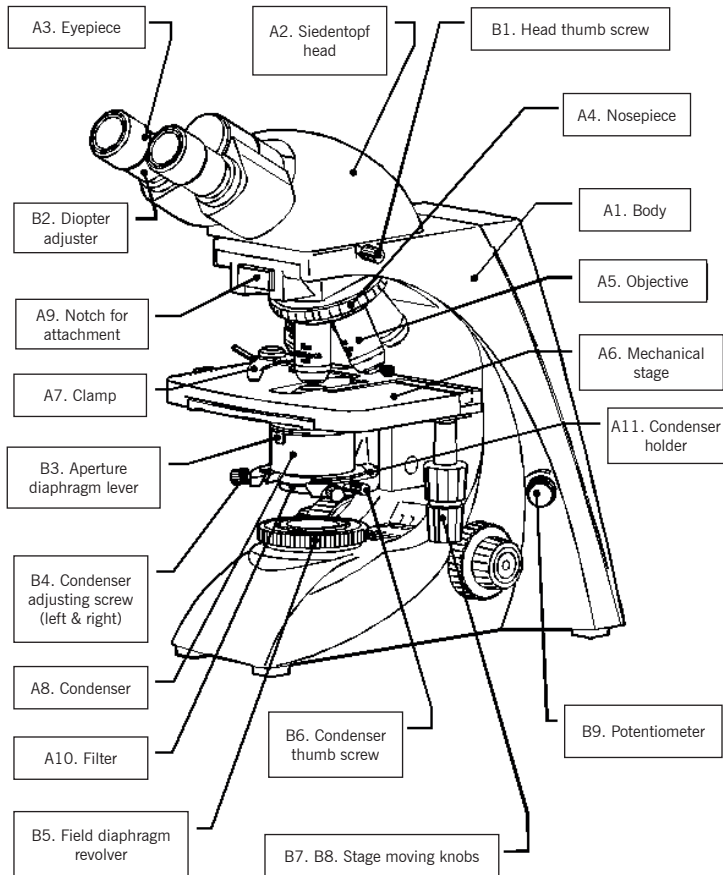


Fig.1-1

A1.Body A2.Siedentopf 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 (left & right) 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. Technical specifications

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)

Infinity Plan Achromatic Objective	Numerical Aperture (N.A.)	Field Number ϕ 20	Resolving Power	Working Distance
4x	0.11	5 mm	3.35 μ m	12.1 mm
10x	0.25	2 mm	1.34 μ m	4.64 mm
20x (s)	0.40	1 mm	0.84 μ m	2.41 mm
40x (s)	0.66	0.5 mm	0.51 μ m	0.65 mm
100x (oil) (s)	1.25	0.2 mm	0.27 μ m	0.19 mm

2.3. Other

Mechanical tube length	160 mm
Conjugate distance	Infinite
Head	Siedentopf binocular (trinocular) 30°
Interpupillary distance	adjustable 48-75mm
Diopter range	adjustable \pm 5
Nosepiece	Quadruple or quintuple nosepiece
Mechanical Stage	Size 175mm \times 145mm X-Y travel 77mm \times 52mm
Focusing systems	Coaxial coarse and fine focusing knobs, Coarse stroke 25mm, fine division 2 μ m, Condenser up-down range 25mm
Condenser	Abbe condenser, N.A.1.25, Adjustable aperture, Aperture center is adjustable
Illumination	Koehler illumination system
Filter	Blue filter is for standard outfits, green and amber is optional
Electric components	Input voltage AC 100-240V, 50/60Hz Output voltage DC 3-12V/LED DC0.4-3.5V 12V/20W halogen lamp/3W LED Rotation potentiometer Fuse 5A ϕ 5 \times 20/2A ϕ 5 \times 20

3. Installation

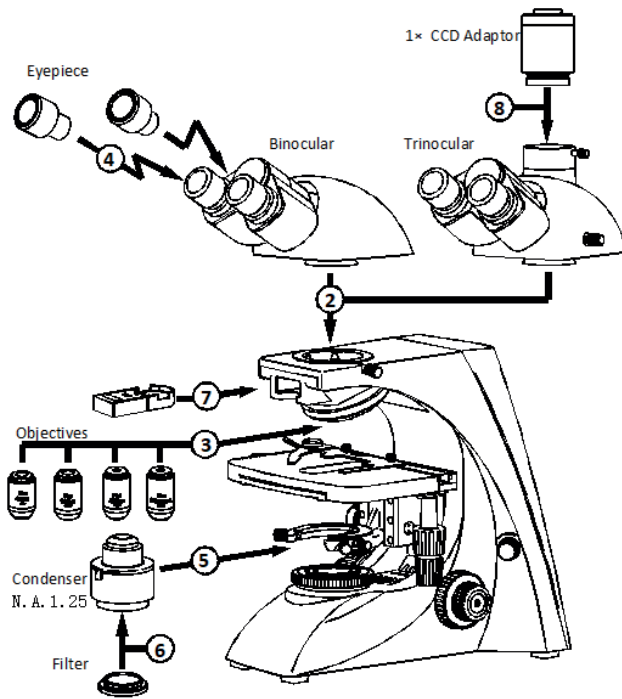
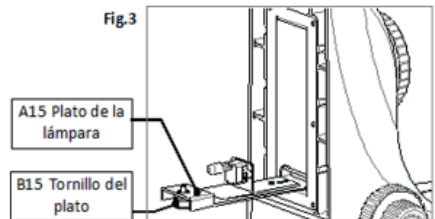


Fig.2

3.1. Installing Lamp (if the lamp is installed before purchase, please pass it).

1. Take down the base of microscope, Loose the screw B15, put out the lamp plate (Fig.3).
2. Take a new lamp from the lamp package and hold the lamp with the foam.
3. Insert the lamp into lamp holder as the picture, then put back A15 lamp plate and the screw.
4. Take the microscope up and take the power.



3.2. Installing binocular head

Loose B1 binocular head thumb screw, put out A2 head, put it on the top of body as Fig.1, tighten the screw.

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 the times.

3.4 Installing eyepiece

Take out the eyepiece tube cover, then get the eyepiece from the packing bag, and insert it into the tubes.

3.5 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. Loose B6 condenser thumb screw, put the condenser to the holder, tighten B6 condenser thumb screw.
- d. Turn B10 condenser focusing screw and rise the condenser to working position.

3.6 Installing blue filter or the other attachment

If blue filter would be used, the installing 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.

3.7 Installing the module attachment

The microscope can be with A9 module attachment, and it 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.

3.8 Installing CCD adaptor

Loose the thumb screw in trinocular tube, put the CCD adaptor into trinocular tube, then tighten the screw.

4. Operation

4.1. Operation process instruction

- 1. Turn power switch, adjust light:** Turn on B11 power switch, and turn B9 potentiometer
- 2. Put the sample:** Put the sample on A6 stage,(open the clamp, and put the sample in it), turn B7, B8 stage knobs to put the sample into light path
- 3. Put 10X objective into light path, and focus the sample:** Turn A4 nosepiece, put 10X objective into light path, turn B13,B14 coarse and fine focus knobs
- 4. Adjust interpupillary distance and diopter:** Adjust A2 head to make two fields into one; adjust B2 diopter adjuster to make diopter for two eyes same.

5. Adjust condenser aperture diaphragm: Adjust A8 condenser (B10. condenser focusing screw) and aperture (B3. Aperture diaphragm lever)

6. Adjust and center field diaphragm: Adjust field diaphragm (B5 field diaphragm revolver), adjust center screw B4 to center field diaphragm

7. Put the objective into light path, and focus

8. Observing

4.2. Operation

4.2.1. Illumination

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

4.2.2. Sample placing

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

- Two samples can be placed on the stage together

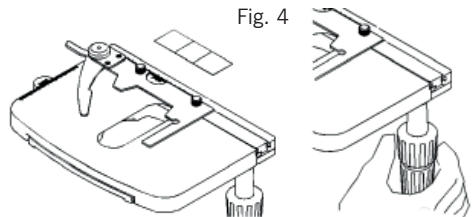


Fig. 4

4.2.3. 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.



Fig. 5

- 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. Rotation clockwise makes tension decrease, and by contraries, rotation counterclockwise makes tension increase.
- Do not turn left and right coarse and fine focusing knobs with different direction with power at the same time, if so, the focusing system will be damaged.(Fig.6)

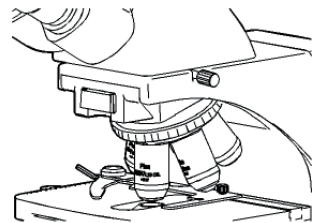
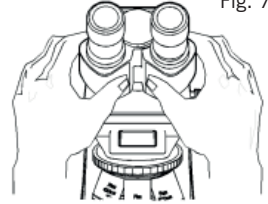


Fig. 6

4.2.4. Interpupillary distance and diopter adjustment

Fig. 7

- **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)



- **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 left eyepiece clear as same as the right eyepiece.

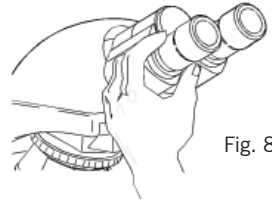


Fig. 8

4.2.5. Condenser and aperture diaphragm adjustment

- **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.
- **Aperture diaphragm adjustment**
Stir the handle of iris aperture of condenser to adjust size of iris aperture for adjusting the contrast of the specimen.

4.2.6. Centering field diaphragm (for microscope with field diaphragm)

1. Put 10X objective into light path, turn B5 field diaphragm revolver counterclockwise, then close field diaphragm smaller.
2. Observe through eyepiece, turn B10 condenser focusing screw, adjust condenser up or down to get the image of field diaphragm
3. Turn B4 condenser adjusting screw to move the image to the center of field.
4. 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 if 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 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).
- Standard thickness 0.17 mm cover glass should be chosen when high times objective used, and thickness error should be within 0.01 mm, otherwise, image definition would be affected.

4.4. Points of attention after using

- Power of microscope should be turned off after using, and the plug should be pulled down. If immersion oil used, please clean objective and specimen soon. Finally, cover microscope with dust cover.
- Please take eyepiece and objectives out from microscope if user will stop using it for a long time, and place eyepiece and objectives into drier with drying agent. Cover microscope with dust cover.

5. Installation & Operation for Attachments

The microscope can be used with some accessories, for example, phase contrast unit, camera, dark-field unit, polarizing unit.

5.1. Polarizing Unit

Polarizing unit includes polarizer and analyzer.

- **Installation**

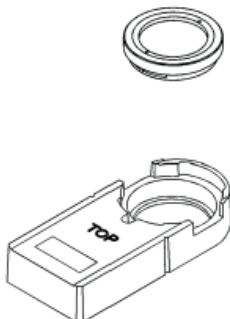
Put out A9 unit of the stand front and place the analyzer into the round groove of A9 unit steadily. Insert A9 unit into the groove as per step7.

Place the Polarizer on the collector.

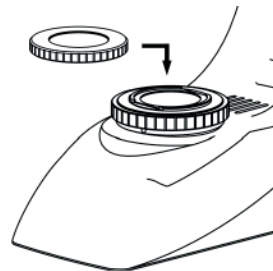
- **Use**

Enlarge diaphragm of condenser to PH position and revolve the polarizer to make the field of eyepiece darkest when there is no sample in stage. Put the sample to observe.

Installation of Analyzer



Installation of Polarizer



5.2. Installation of Phase Contrast Unit

The phase contrast unit includes simple phase contrast unit and aperture phase contrast unit.

- **Installation**

Put out objectives, condenser as per step 3, 5, and install phase contrast objective, simple phase contrast condenser or aperture phase contrast condenser.

- **Use**

10X, 20X, 40X and 100X phase slides are supplied for simple phase contrast unit, and there is mark in the slides.

Enlarge the diaphragm of condenser to PH position, put the phase contrast objective into optical path. Insert the slide into the groove of the condenser by right side.

- The spot of slide has been adjusted, and no need to center it.
- The face marked TOP is up when installing.

- **Use of Aperture phase contrast unit**

Move the turning disk of aperture phase contrast condenser to the location marked "0", adjust the instrument as per universal way. Move the turning disk of aperture phase contrast condenser to location marked "10×", then enlarge the aperture diaphragm to the maximum, and put the 10X PH objective into optical path.

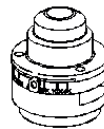
Replace eyepiece by the centering telescope, then loosen its stop screw and twitch telescope axially to make the phase ring (dark) and the annular diaphragm (bright ring) image clear (user can adjust slightly the condenser holder knob), tighten the stop screw again.

Put the two handles of back condenser to adjusting location, turn and adjust the center of spot to overlap the bright ring and dark ring, no leak light.

Replace the centering telescope by eyepiece to observe.



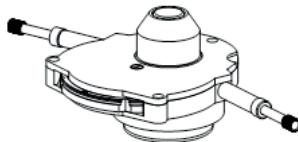
Phase Contrast Objectives



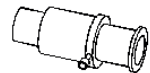
Simple PH. Condenser



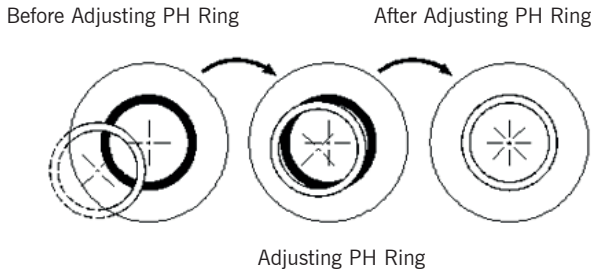
PH. Slide



Aperture PH. Condenser

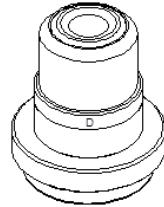


Centering Telescope



5.3. Dark Field Condenser

Reference to bright field observation method to adjust equipment, replace the bright field condenser with dark field condenser, slightly adjust the height of condenser bracket, and adjust condenser center with condenser adjusting screw B4 for best observation effect ,and then begin the dark field observations.



Dark Field Condenser

5.4 Installing and using of camera and CCD attachment

- **Installing**

Connect the C-mount with CCD camera or connect camera with camera adaptor, then connect it with c-mount, finally put it into microscope.

- **Using**

First get a clear image from eyepiece, then put 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 is not clear.

6. Maintenance

6.1. Clean microscope

1. Do not 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 with turning on and off power.
3. Do not clean painted metal and galvanizing metal with organic solvent such as alcohol, ether or the mixture of both. Silicone cloth or soft cleaning preparation is suggested to clean it.
4. Plastic should be cleaned by soft cloth with clear water.

6.2. 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. Microscope should be used in environment of indoor temperature 0°-40°C and maximum relative humidity 85%.
3. Removing equipment 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. Do not drag it on the surface of worktable to avoid damage to microscope and worktable.

6.3. Replacement of bulb

1. Turn off power and pull out plug.
2. Wait 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 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.
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.

6.4. Replacement of fuse

1. Cut off power of microscope and pull out the plug.
2. Unscrew fuse cap in the back of base, take out old fuse.
3. Replace a new fuse, then screw the fuse cap.



Instructions on environmental protection

Do not dispose of this equipment with normal household waste at the end of its life cycle; take it to a collection point for the recycling of electrical and electronic equipment.

It does not contain elements that are hazardous or toxic to humans but improper disposal will harm the environment.

The materials are recyclable as indicated by the marking. By recycling materials or other forms of reuse of old equipment, you are making an important contribution to the protection of the environment. Please contact your local authority for advice on where to collect your waste.

7. Troubleshooting

Trouble	Cause	Solution
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 is not enough or is uneven	Bulb specification does not meet the requirement	Replacing bulb
	Brightness is not adjusted correctly	Adjust rotation potentiometer
	Objective is not in correct position	Make the objective in correct position
	The size of iris aperture is too small	Adjust the size of iris aperture
	Lens (objective, eyepiece, condenser, light collector) has dust	Clean it
	Position of condenser is too low	Higher condenser
Image is not clear (contrast or definition is not enough)	Cover glass of specimen does not meet the requirement	Use required thickness cover glass (0.17mm)
	Cover glass of specimen is not 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 is not used for 100X objective (oil)	Use immersion oil
	Immersion oil does not meet the requirement	Use immersion oil supplied by us
	There is bubble in immersion oil	Clear the bubble way
	Size of iris aperture is not proper	Adjust the size of iris aperture
	Position of condenser is too low	Readjust the position of condenser

Problem	Cause	Solution
One side of image is dark or image is moving as focusing	Objective is not in correct position	Make the objective in correct position
	Specimen is not 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 is not in up direction	Place specimen correctly
	Cover glass does not meet the requirement	Use required thickness cover glass (0.17mm)
Images observed by two eyes are not in superposition entirely.	Interpupillary distance is not adjusted correctly	Adjust interpupillary distance according to two eyes
It is easy for eyes to be tired during observing	Diopter is not adjusted correctly	Readjust diopter