



Biological Microscopes Model 3000A-B-C LED

Cod. 5901981 - 5901982 - 5901983

Instructions Manual

3000-A, 3000-B & 3000-C LED

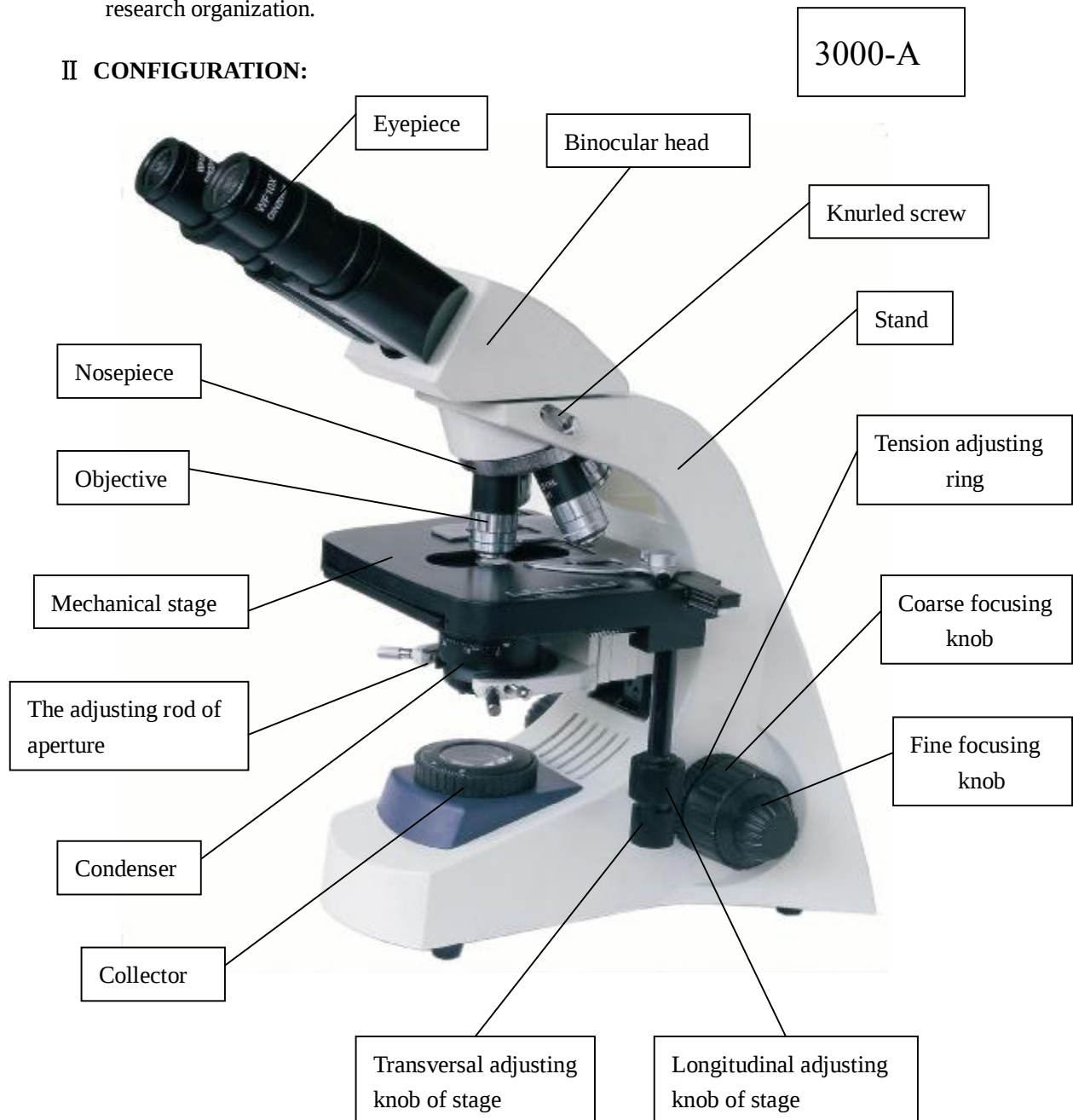
Operating Instruction For Biological Microscope

In order to exert performance of this microscope and to ensure the safety, please read the operating instruction carefully before use.

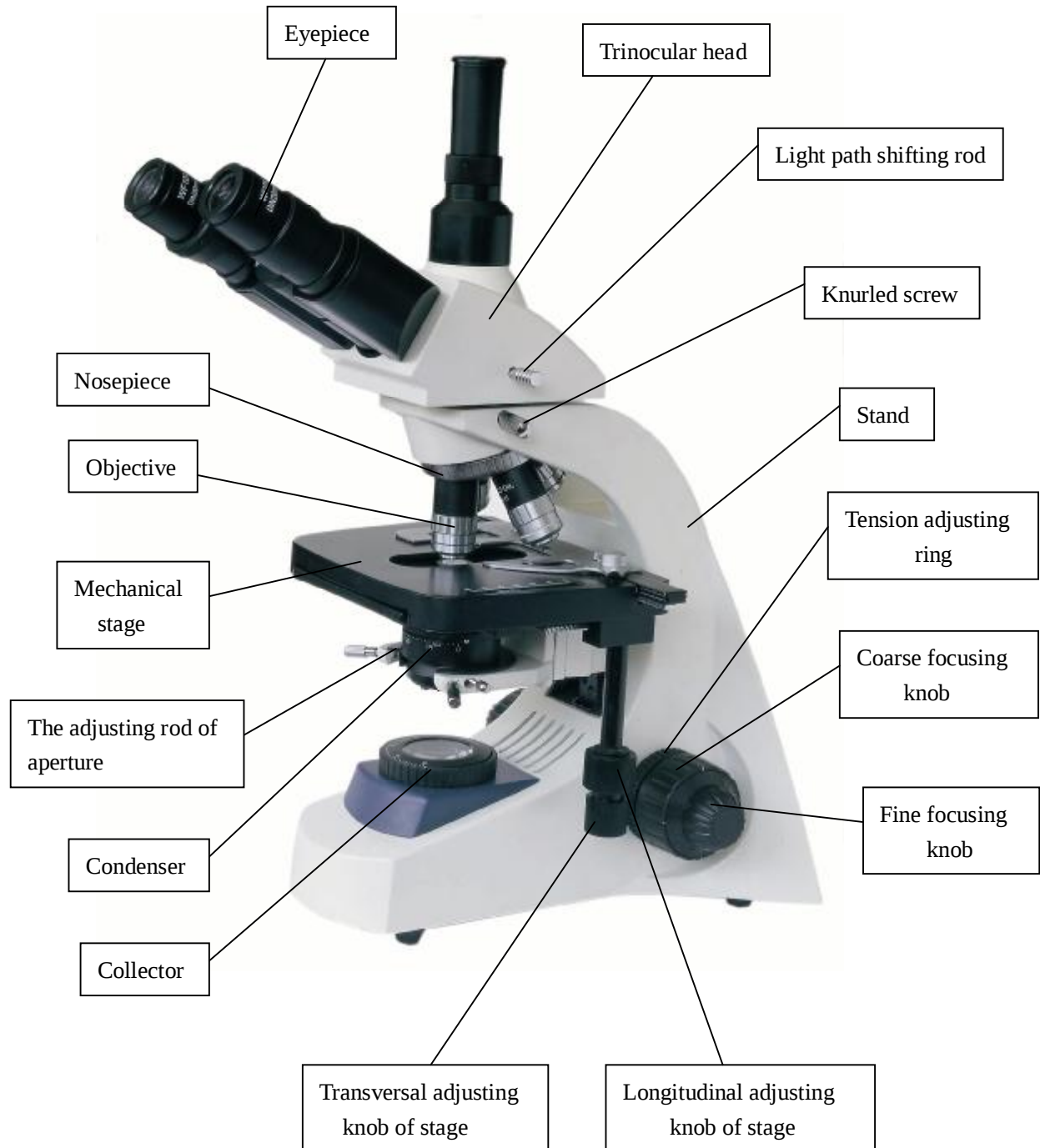
I APPLICATION:

Model 3000 - LED series biological microscopes are specially designed for clinical examination and teaching demonstrations in laboratories, colleges and medical fields. They are also ideal instruments for biological, bacteriological, pathological, and pharmaceutical research. Because of higher capability with lower price and humanized configuration design, it also becomes the first choice of individual, schools and scientific research organization.

II CONFIGURATION:



3000-B



III SPECIFICATION:

Specification		Model		
		3000-A	3000-B	3000-C
Viewing head	Compensation free binocular head, inclined at 30°(55mm-75mm)	•		•
	Compensation free trinocular head, inclined at 30°(55mm-75mm)		•	
Eyepiece	WF10×	•	•	•
Nosepiece	Quadruple nosepiece	•	•	•
Objective	Plan Achr. objectives: 4×、10×、40×(S)、 100×(S)Oil (phase contrast in 3000-C)	•	•	•
Stage	Double layers mechanical stage Stage size: 180mm×150mm Moving range: 75mm×50mm	•	•	•
Condenser	N.A1.25Abbe condenser with iris diaphragm & filter	•	•	•
Focusing	Coaxial coarse & fine focusing adjustment with rack and pinion mechanism Fine focusing scale value 0.002mm	•	•	•
Light Source	Halogen bulb 12V/20W AC 85V-230V Adjustable brightness	•	•	•
Collector	High brightness Kohler illumination	•	•	•

Objective

Type	Magnification	Numerical Aperture (N.A)	Working Distance (mm)	Thickness of the cover slip (mm)
Planachromatic objective	4×	0.1	37.5	0.17
	10×	0.25	6.54	0.17
	40×(S)	0.65	0.63	0.17
	100×(S) Oil	1.25	0.195	0.17

IV OPERATION:

1. Instrument installation

- (1) Remove microscope with both hands hold stand and bottom from box and styrofoam packing, put it on a stable work table carefully .
- (2) Remove plastic bags and dustproof cover of each adapter.
- (3) Put the binocular head or the trinocular head into the adapter of stand in place , tighten the knurled screw with finger.
- (4) Familiarize yourself the mechanical parts of your microscope .Gently operate each part by hand to see how it behaves and what result it produces.
- (5) Insert the plug in to the socket in back of microscope .Insert another end of the power wire to the supply socket.

Note: 1) The microscope must be earthed.

2) Make sure the power voltage in accordance with the marked voltage.

2. Using the instrument

- (1) Turn on the power switch, adjust the brightness knob to make the brightness 70% of the full load.
- (2) Place the specimen (slide) to be viewed smoothly onto the stage, cover slip to face to the objective. Clamp specimen (slide) carefully with the movable spring clip.
- (3) The magnitude of incident beam of light can be changed when adjusting the aperture

diaphragm. The highest resolution of the objectives can reach when the fitted aperture diaphragm is adjusted. When the objectives is changed, in order to get the best resolution

of the objective, please take off the eyepiece to observe the size of aperture diaphragm in the eyepiece tube. It is better to adjust aperture diaphragm till it is a little smaller than the aperture of the objective.

Note: Aperture diaphragm is not for adjusting the brightness, the brightness is adjusted through brightness adjusting knob.

- (4) Swing out the filter holder, according to user's needs put filter in the filter holder and then backtrack.
- (5) Turn the nosepiece when changing the objective 4×or 10×, and make sure the objective is shift in the light path until hear a "click".
- (6) When adjusting the focus, in order to prevent objective touch the specimen, turn the coarse focusing knob until the specimen is approximately 1/8"from the objective. Slowly turn the coarse focusing knob until a clear image is obtained, then use the fine focusing knob to enhance the observation of the specimen to it's clearest image. If the magnification is increased, here you can obtain clear image under other higher magnification objectives with a little fine adjustment.
- (7) When using objective 100× to observe, lift the condenser to the highest position, then drop a little cedar oil on surface of objective 100×and specimen (cover slip).If there's air bulb in oil, it will influence observation. Take out air bulb by swinging nosepiece several times. The 100× oil immersion objective and specimen should be wiped off with a piece of soft clean cloth or lens tissue to remove the cedar oil with xylene immediately after using.
- (8) If you find to lift the mechanical stage too tension or loosen in use. Turn the tension adjusting ring. Coarse focusing knob would be tightening if it turns in the clockwise direction, on the other hand it would be loosen.
- (9) Turn transversal and longitudinal direction adjustable knobs located just below the stage, the specimen may be moved to the center of the eyepiece's viewing field for

observation.

- (10) Turn coarse & fine focusing knob to focus the specimen till you see clear image of specimen when observing the fixed eyepiece with eye. Then rotate the diopter adjusting ring, if the image is unclear when observing the another eyepiece with another eye, also still you see clear image of specimen (Remember your eye's diopter, so that you could use next time). When using two eyes to observe, hold the base of the prism and rotate them around the axis until there is only one field of view.
- (11) Removed dustproof cover in used the trinocular head, the CMOS electronic eyepiece, Photo and CCD attachment put conveniently into the trinocular tube. You may be ready to begin working after shift the light path by moving the light path shifting rod into the working position.
- (12) Bulb and fuse replacement: (the power wire must be disconnected)
- 1) Bulb replacement: Loosen the knurled screw on the underside of microscope and open the panel to expose the bulb. Remove the old bulb after it becomes cool. (The bulb will become very hot when using or after using.) Don't touch the new bulb with finger, if there is a fingerprint and dirt, that will decrease the brightness and shorten the life of the bulb, wipe it with clean and soft cloth. Hold the new bulb with the same specification with clean gloves or gauze and vertically insert the pins to the jack. Close panel and tighten the knurled screw with finger.
 - 2) Fuse replacement: Open the fuse holder with a"—" screwdriver in the back of the microscope. Remove the old fuse and install a new fuse with the same specification. Replace fuse holder in place.

Structure of Phase Contrast Kit

Phase Contrast Kit is installed on microscopes and consisted by Turrent disc, Phase contrast objectives, Phase contrast condenser and Centering Telescope.

It's used for observing transparent specimen.

1. Phase contrast objectives and Centering telescope:

(See Fig.1)

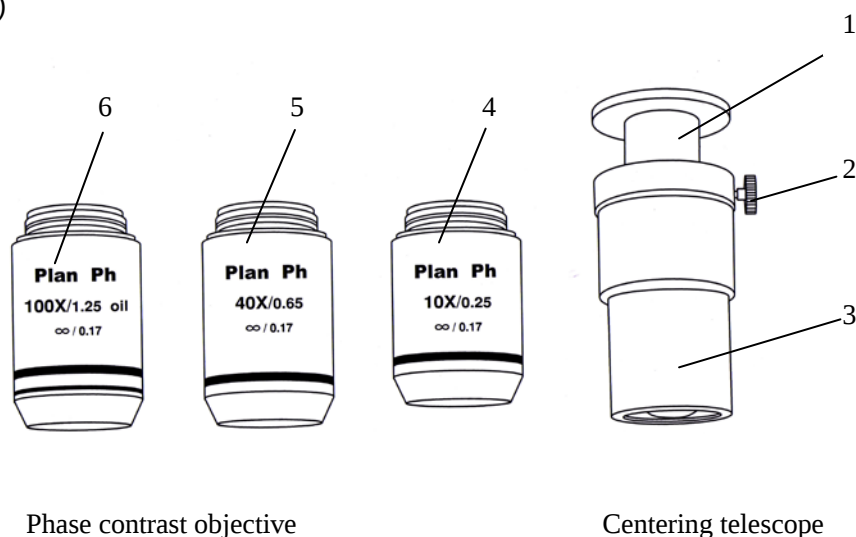


Fig. 1

1. Top eyepiece 2. Fixing screw 3. Down eyepiece
4. 10X Phase contrast objective
5. 40X Phase contrast objective 6. 100X Phase contrast objective

2. Phase contrast condenser (See Fig. 2)

Installing a Turrent disc under ABBE condenser (N.A.1.25), on the disc, there're Annular diaphragm and central shading dark field diaphragm which are matched phase contrast annular plates of objectives and adjustable aperture diaphragm is also mounted, for bright field observation (the same as normal microscope).

"10" means matching 10X phase contrast objective, "40" means matching 40X phase contrast objective, "100" means matching 100X phase contrast objective (oil). "DF" represents to use for Dark field observation. "BF" represents Bright field observation. The center of each annular diaphragm can be adjusted by 2 adjusting screws. (See Fig. 2)

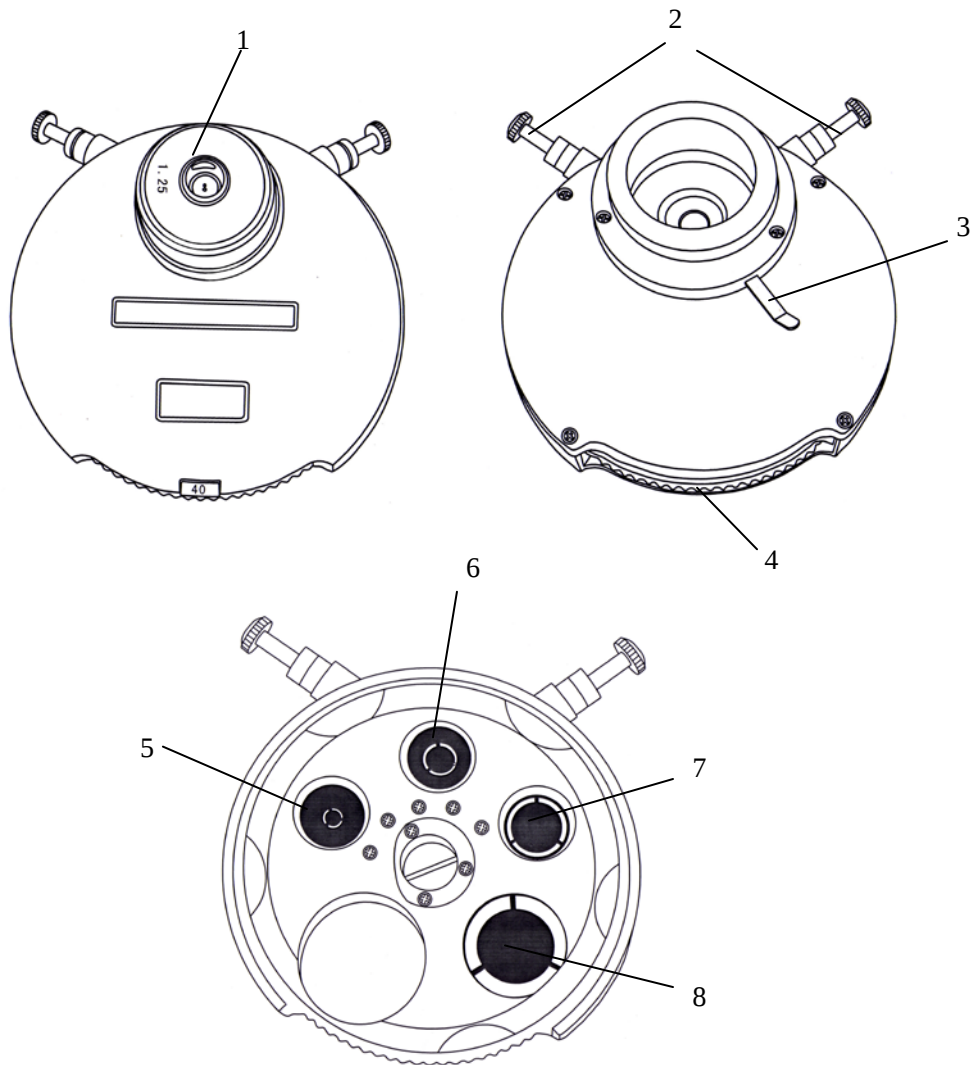


Fig. 2 Turrent Disc

- 1. Phase contrast condenser 2. Annular diaphragm centering knob
- 3. Aperture diaphragm adjusting rod 4. Turrent disc
- 5. 10X Annular diaphragm 6. 40X Annular diaphragm
- 7. 100X Annular diaphragm 8. Annular diaphragm for Dark field

II、Installing Phase contrast kit

1、Install Phase contast objectives

Screw on the phase contrast objectives 10X、40X、100X on the nosepiece of microscope one by one anti-clockwise.

All Phase contrast objectives are printed “Ph”.

2、Installing Phase contrast condenser

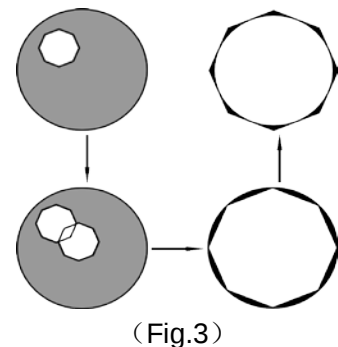
- (a) Rotating the coarse focusing wheel to lift the mechanical stage to top
(please note not to make the stage touching objective)
- (b) Adjusting the substage to low position to lower the ABBE condenser
- (c) Loose the fixing screw of ABBE condenser and take it off.
- (d) Installing Phase contrast condenser in the substage of ABBE condenser.
- (e) Fastening the fixing screw of condenser, then lifting the Phase contrast condenser to right position.

III、Debugging and operation

1. Debugging Phase contrast condenser

1) Centering the condenser (See Fig.3)

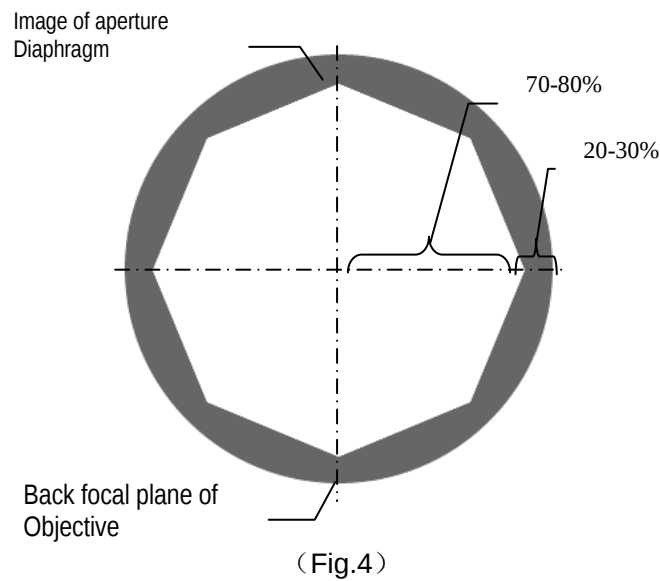
- a.. Adjusting the Phase contrast condenser to top position
- b. Dialing the Turrent disc to “BF”position
(Bright field observation)
- c. Focusing the specimen with 10X Phase contrast objective
- d. Drawing back the image of field diaphragm of the microscope into the viewing field.
- e. Focusing the image of field diaphragm by adujsting the height of condenser.
- f. Centering the image of field diaphragm to the center of viewing field
by adjusting the 2 centering screws of condenser.
- g. Open the field diaphragm gradually, if the image of field diaphragm is in the center and inscribe the eye viewing field, the condenser is centered.
- h. In pratical application, enlarge the field diaphragm slightly and make it circumscribed the eye viewing field. (see Fig.3)



2) Aperture diaphragm adjusting (see Fig.4)

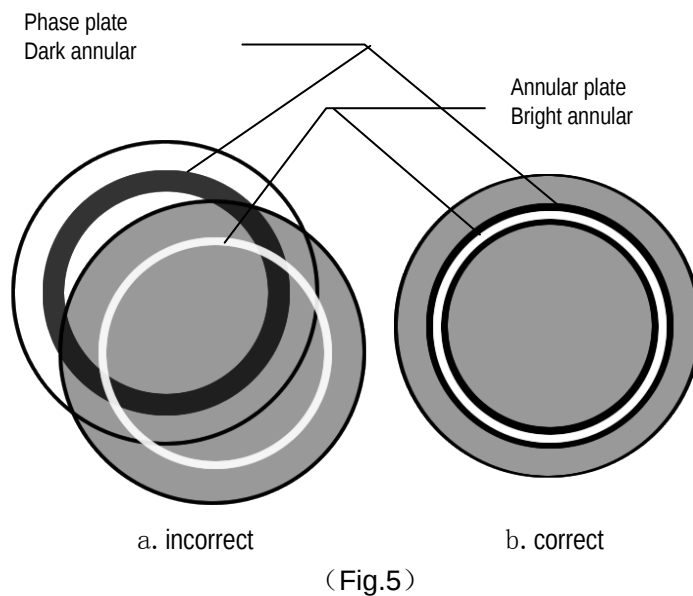
While observing in normal Bright field,in order to obtain the image resolution and contrast,increasing depth of field,adjusting the Aperture diaphragm adjusting rod (Fig.2), to set

the aperture diaphragm of condenser is 70% - 80% of numerical aperture of objective.(Fig. 4)



Note: In Bright field observation, the usage is the same as microscope's.

3) Phase contrast method Debugging and operation (see Fig.5)



a. After debugging the Bright field well,dial the current

disc (Fig.2) to "10"

b. Focusing the specimen with 10X phase contrast objective

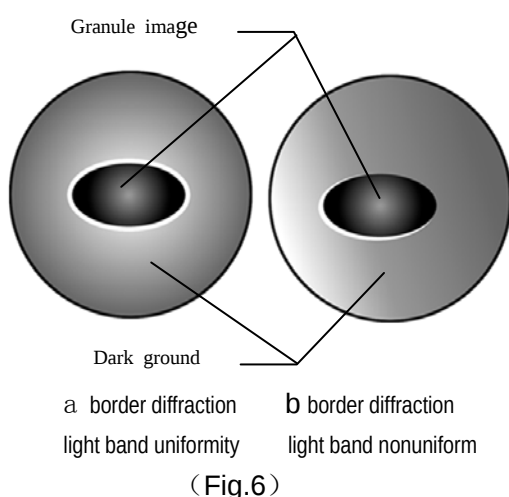
- c. Take out the eyepiece in right side, insert Centering telescope, release the fixing screw, adjusting the top eyepiece to make the image of phase contrast annular plate of objective back focal plane clear (dark annular)
- d. Adjusting the height of condenser slightly, make annular diaphragm of condenser (bright annular) clear as (Fig.5.a, bright annular misalign with dark annular at that time)
- e. Press annular diaphragm centering knob (Fig.2), rotating and make bright annular coincide with dark annular completely, light leak is not allowed. (see Fig. 5.b)
- f. Take out the Centering telescope, insert the eyepiece, gloomy background can be observed in the eye viewing field, the image of specimen is bright.

Note : After changing the objective magnification, you must turn the turret disc to match the phase contrast objective accordingly.

(10X matches "10", 40X matches "40", 100X matches "100") and check with Centering telescope, dark annular coincides with bright annular correctly. If there's light leak, adjusting as per steps above once again.

2. Dark field method Debugging and operation (see Fig.6)

Dark field method observation is suitable for observing living microorganism which can not be seen under normal microscope or microorganism specimen without staining, observe its shape and outline. It is one kind of ultramicroscopy to observe granule less than 0.1 micron.



- a. After phase contrast method adjusting, turn the turret disc (Fig.2) to "DF", make dark viewing field in eyepiece, then fine focusing the specimen to obtain the clear image of micro granule.
- b. Adjusting the height of the condenser properly to make diffraction light uniformity and strong contrast of viewing field, dark background & bright object, as the stars in night sky. (see Fig.6)

IV、Remarks

1. Microscope slides must be clear and cleaned
2. The thickness of microscope slide is required $1 \pm 0.1 \text{ mm}$.

3. Use specified Green filter to ensure the quality of phase contrast image.

V MAINTENANCE

1. The microscope must be placed in where is shady, dry, clean and there is no acid, alkaline & steam. Don't let it expose under sun light directly.
2. Working environment: Indoor temperature :0 °C~40 °C.
Maximum relative humidity: 85%.
3. The microscope has be calibrated and inspected strictly before leaving factory, the users must not knock down the instrument discretionally.
4. If there's dust on the lens, blow it by rubber ball blower, after that clean the lens gently with a soft brush pen, carefully wipe off oil or fingerprints on the lens surface with lens tissue or absorbent cotton moistened with a few organic solvent (mixture of ether and alcohol 7:3).
5. Don't wipe the lens surface regularly, or else the lens will be scraped, reduce the quality of the transmission and imaging. Please keep the instrument clean.
6. Keep the mechanical parts clean and wipe regularly.
7. Shut off the power and pull out the plug when the microscope is not used, adjust the brightness knob to the minimum, cover the microscope with a dust cover.