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OPERATION MANUAL

Inverted Microscope
MSC-I403

I. Application

The MSC-I403 inverted microscope has characteristic of microscope observation in the culture bottle or the culture dish. The instrument has the long working distance plan achromatic objective, the wide field eyepiece and binocular observation, meantime has phase contrast device and phase contrast objective, may be observed transparent living speciment after not dyeing. The long working distance condenser can contain higher vessels or sample. Model MSC-I403 inverted microscope with its excellent optical capability, wide application firm body frame and skillful figure design. It is widely used in the field of biology, medicine, histology, microbiology, immunology material and food.

II. Specification

1. Eyepiece

Type	Magnification	Focal distance (mm)	Diameter of field (mm)
Wide field eyepiece	10×	25	Φ22

2. Objective

Type	Magnification	Numerical aperture (N.A.)	Working distance (mm)	Thickness of the cover slip (mm)
Long working distance infinite plan achromatic objective	4×	0.1	25	—
	10×	0.25	12	0.17
	20×	0.40	10	0.17
	40×(S)	0.65	7	0.17

3. Total magnification

Objective / Eyepiece	4×	10×	20×	40×
10×	40×	100×	200×	400×

4. Long working distance condenser (with phase contrast device) : Working distance 75 mm.

5. Double layers mechanical stage

Stage size: 242mm×172mm; Central stage: Ø110mm

Moving range: 75mm×50mm

6. Coaxial coarse & fine focusing adjustment with tension adjusting device

Fine focusing scale value: 0.002mm

7. Interpupillary distance : 50mm~75mm

8. Illumination

Transmission illumination: Halogen bulb 12V/30W (adjustable brightness).

9. Power voltage: 220V or 110V

10. Exciting filter group

Exciting form	Wavelength (nm)	Applicable range	Observing effect
U	Exciting 330~380 Dichroism 400 Cut-off 420	1.DAPI: DNA 2.Hoechest 33358, 33342	Green
V	Exciting 380~420 Dichroism 445 Cut-off 460	1.Catecholamine 2.Serotonin 3.Fetracyline	Green
B	Exciting 420~490 Dichroism 505 cut-off 520	1.FITC 2.Acridine Orange: DNA，RNA 3.Auramine O	Yellow green
G	Exciting 500~550 Dichroism 575 Cut-off 590	1.TRITC 2.Rhodamine B200 3.Propidium Iodide : DNA	Red

Note: "U","V"exciting filter group is selective part.

III. Configuration

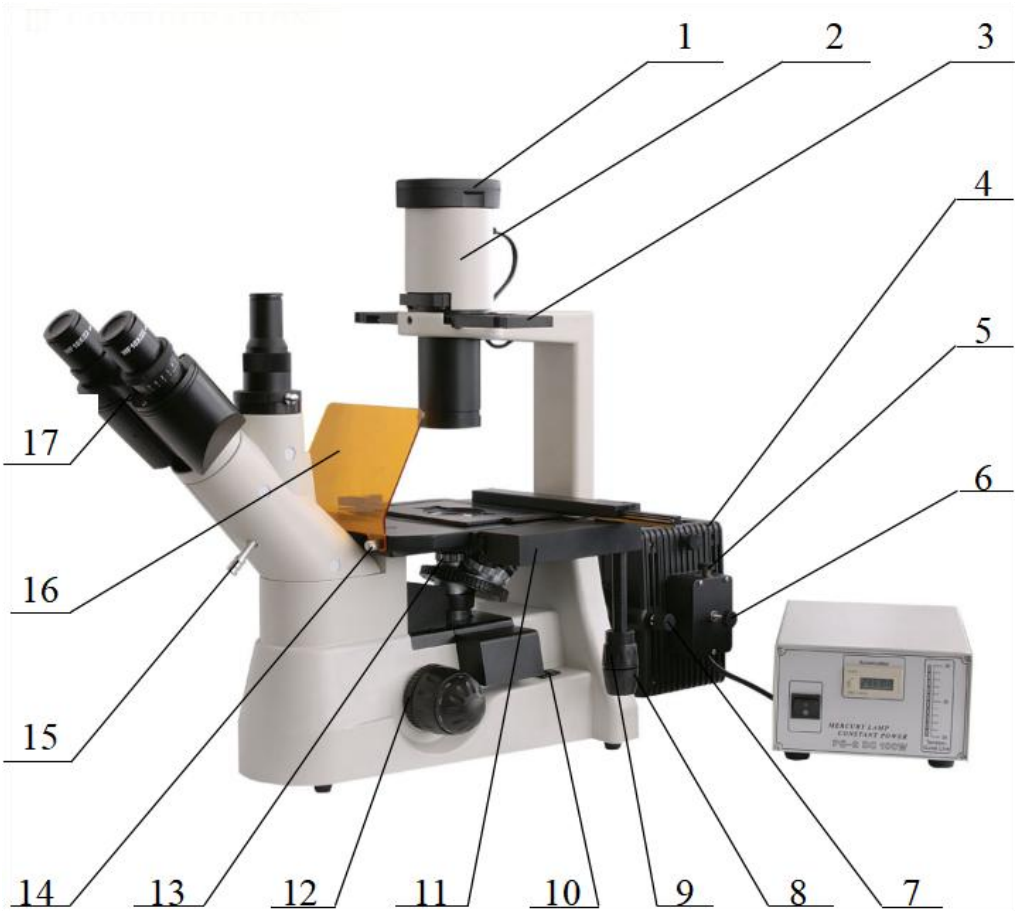

Fig.1

1.Inverted lamp source; 2.Collector; 3.Phase contrast device; 4.Mercury lamp house

5.Up & down adjusting knob; 6.Left & right adjusting knob;

7.Mercury lamp focusing knob; 8.Transversal adjusting knob

9.Longitudinal adjusting knob; 10.Power switch; 11.Attachable mechanical stage

12.Tension adjusting ring; 13.Fixing screw of attachable mechanical stage

14.Fixing screw of protector; 15.Light path shifting rod; 16.Protector; 17.Eyepiece

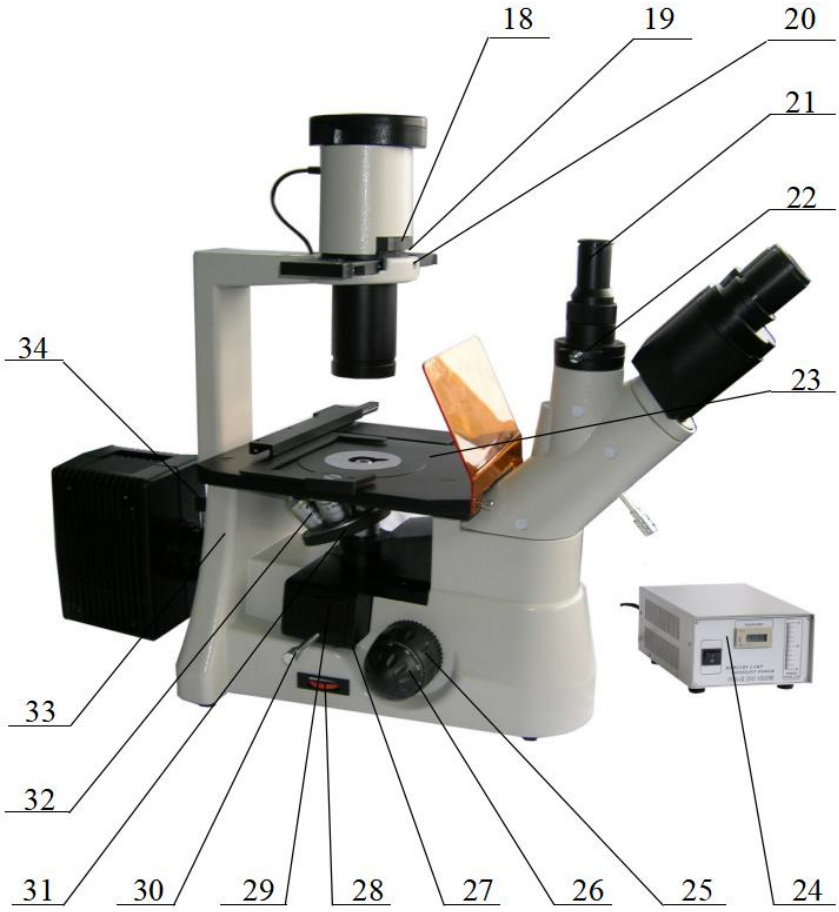

Fig.2

18.Filter holder; 19.The adjusting ring of aperture diaphragm

20.Fixing screw of collector; 21.Trinocular head; 22.Light reducer

23.Mechanical stage; 24.Mercury lamp power device; 25 .Coarse focusing knob

26.Fine focusing knob; 27. Stopper set of the exciting filter group;

28.Brightness adjusting knob; 29.Door; 30. Exciting filter group; 31.Nosepiece

32.Objective; 33. Main body; 34.Fixing screw of Mercury lamp house

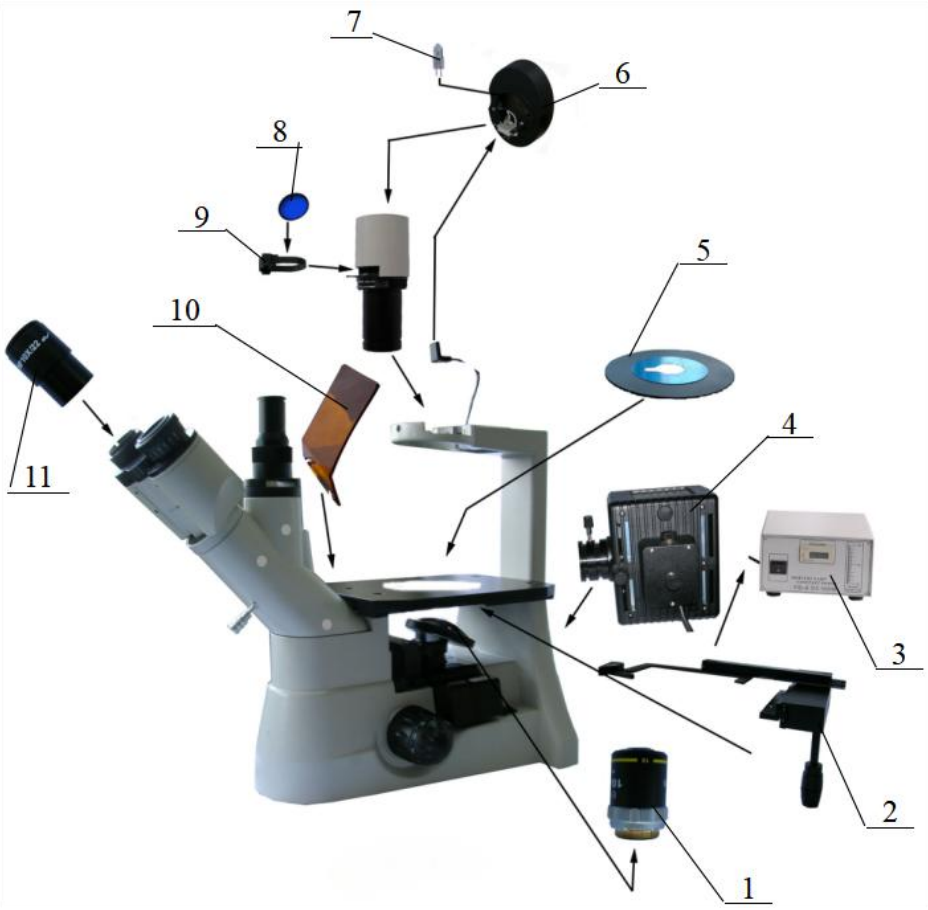

Fig.3

1.Objective; 2. Attachable mechanical stage; 3. Mercury lamp power device

4.Mercury lamp house; 5.Metal stage; 6.Lamp holder; 7.Halogen bulb; 8.Filter

9 Filter holder; 10 .Protector; 11.Eyepiece

IV. Operation

Installing required part according to Fig.3, insert the plug into 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 microscope's marking voltage.

1. Operating step of inverted observation

(1) Shift the rod of exciting filter group 30 into the middle position (Fig.2)

(2) Turn on the power switch ⑩ to "I" (connected) (Fig.1). Adjust the brightness adjusting knob ① to make the brightness 70% of the full load. (Fig.4)

Fig.4

(3) The magnitude of incident beam of light can be changed when adjusting. The aperture diaphragm 19 (Fig.2). 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) Sliding out the filter holder 18 (Fig.2), according to user's needs put filter in the filter holder and then backtrack.

(5) Use color filter

1) Use color filter to increase the accuracy of the observation and photomicrography. Suggest user to adopt LB6 color filter to get more neutral hue when observing bright-field and taking photo.

2) Color filters could overlay on the filter holder, make sure lay them level, and the maximum of the thickness is 8mm.

Color filter	Purpose
LB6	Monochromatic contrast color filter (green) (Use in phase-contrast observation)
JB2	Color temperature transition color filter (Use in bright-field observation and photomicrograph)
QB22	De-infrared color filter (Use in photomicrograph to compensate the exposure time)

(6) 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 ".

(7) 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.

Fig.5

(8) If you find to lift the nosepiece too tension or loosen in use. Turn the tension adjusting ring ② Coarse focusing knob ① would be tightening if it turns in the clockwise direction, on the other hand it would be loosen.(Fig.5)

Fig.6&Fig.7

(9) Place sample (Fig.6&Fig.7)

Place the sample in the center of the stage.

Note: Please select the container like Petri dish, culture flask and specimen slide with the thickness of 1.5mm to get the best observe effects.)

1) Place the Ø35mm Petri dish holder (attached) on the circular central stage , and put Ø35mm Petri dish in its center.

2) Slip the whole Perti dish holder to move Petri dish.

3) Lengthen the sample clip ② to clip the microtitration plate when using microtitration plate.

4) In order to clip board of any type tightly, please use holder and attachable mechanical stage as follows:

a) Use Terasaki holder ③ which to place Terasaki board.

b) Use Ø35mm petri dish holder ④ which to place Ø35mm petri dish.

c) Use specimen slide holder ⑤ which to place Ø54 Petri dish and specimen slide.

5) Turn transversal ⑥ and longitudinal ⑦ direction adjusting knob to shift the specimen to proper place.

Fig.8

(10) Adjust interpupillary distance (Fig.8)

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. The " • " ① on the side has a function for marking ②.The number is the interpupillary distance .

Adjusting range: 50~75mm

(Remember your interpupillary distance, so that you could use next time.)

Fig.9

(11) Adjust diopter (Fig.9)

1) Turn coarse focusing knob and fine focusing knob to focus the specimen when

observing the left eyepiece with left eye .

2) Then rotate the diopter adjustment ring ① if the image is unclear when observing the right eyepiece with right eye .There is ±5 diopter on the ring. The number level to the number on the base is your eye's diopter. The " • "on the side has a function for marking.(Remember your eye's diopter, so that you could Use next time.)

Fig.10

(12) Use the eye-cap (Fig.10)

1) If the customer wears glasses, turn over the eye-cap ①. It can prevent the glasses touching the eyepiece and avoid damaging the glasses and the eyepiece.

2) If the customer doesn't wear glasses, open the eye-cap ②. It can prevent stray light disturbing the observation.

Fig.11

(13) Trinocular observation (Fig.11)

1) Shift the light path by moving the rod ① when use the trinoclar observation tube .

2) Shift the rod to up until hearing a click when doing normal observation. Shift the rod to the down until hearing a click when taking photo or recording video.

Rod of shifting the light path	Brightness distribution rate	Apply
Shift to up	100% use in binocular observation	Dark specimen observation
Shift to down	40% use in binocular observation , 60% use in photo or video	Light specimen observation and TV, photo or digital video

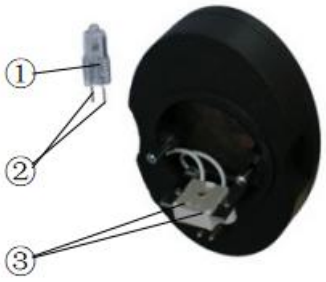

Fig.12

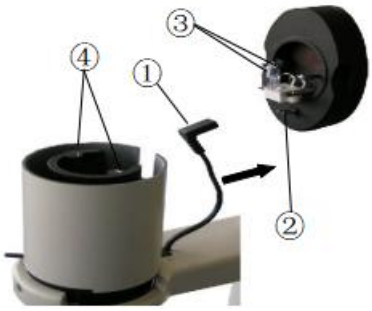

Fig.13

(14) Replace the bulb

1) Hold the bulb ① with clean glove or gauze and insert the pins ② to the jack ③. Make sure the bulb is vertical. (Fig.12)

Note: Don't touch the bulb with finger. If there is a fingerprint, wipe it with clean and soft cloth.

2) The bulb will become very hot when using or after using. Whenever replace the bulb, cut off the main power (make sure the power switch is"O", disconnect the power wire) and wait until lamp holder and bulb is cool down.

3) Insert the plug ① to the socket ② on the lamp holder.

Then meet the bolt ③ to the bolt hole ④, and insert the lamp holder into the illumination groupware.(Fig.13).

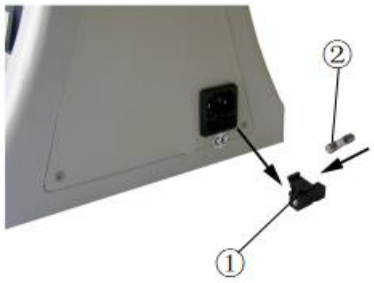

Fig.14

(15) Replace the fuse (Fig.14.)

Turn the power switch to "O" (off) before replacing the fuse. Pull out the power wire. Screw off the fuse group ② from the fuse base ① with a"—" screwdriver. Install a new fuse and screw on the fuse base.

Specification: 1A.

2. Operating step of phase-contrast observation

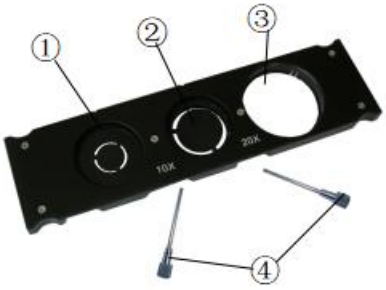

Fig.15

(1) Replace the objectives with phase-contrast objectives.

(2) Use phase center adjustable rod ④ to adjust light loop center of phase center adjustable slider.

Note: 1) 10×light loop ① for 10× phase-contrast objective.

2) 20×light loop ② for 20×phase-contrast objective. 3) Hole③ for Ø45mm color filter.(Fig.15)

(3) Keep the adjusting ring of aperture diaphragm (Fig.2) into the biggest when do the phase-contrast observation.

(4) Place specimen on the stage and focusing.

(5) Remove the eyepiece and replace it with centering telescope, insert in to the tube without diopter adjustment.

(6) Make sure the matched phase loop (in the phase-contrast objective) and the light loop (in the phase-contrast slider) is shifting into the light path.

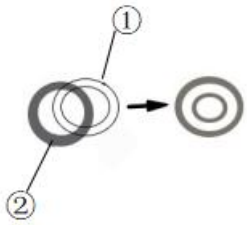

Fig.16

(7) While observe into the centering telescope, turn the fine focusing knob which corresponding to the light loop ① to focus the phase loop ② of the objective. (Fig.16)

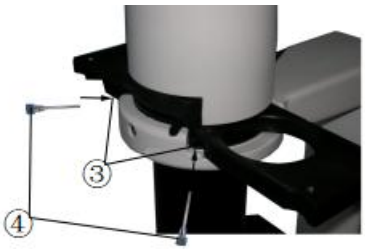

Fig.17

(8) Insert the phase center adjusting rod ④ into two holes ③ on the phase-contrast slider, then adjusting them until the light loop ① center overlay with phase loop ② center. (Fig.16& Fig.17)

(9) Repeat the steps to center the other phase-contrast. Remember to use the same phase-contrast slider with 10× and 20×. Shift the light path into the objective which is not centered to see, if the light loop ① is away from the phase loop ②. Repeat the centering steps if it is away. (Fig.16)

1) If the light loop is not centered the user will not get the best effect of phase-contrast observation.

2) Overlay the phase loop onto the most bright image when seeing double light loop.

3) Light loop will deviate away from phase loop after moving or replacing a piece of thick specimen. Repeat step (4)-(8) if it happens.

4) Repeat the centering steps if the bacteria hold is uneven to increase the contrast. Center the light loop by using phase-contrast objective in low to high magnification.

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℃~40℃.

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.