

# User Manual

## Phase Contrast Inverted Compound Microscope

Model K832INV



[MicroscopeNet.com](http://MicroscopeNet.com)

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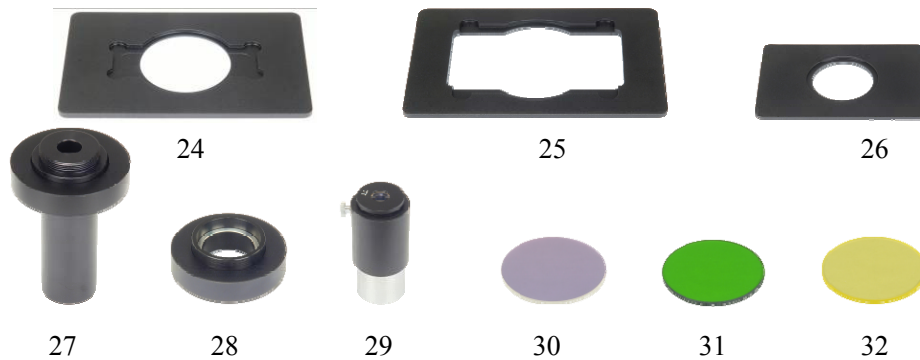
## i. Caution

1. Do not discard the molded Styrofoam container. The container should be retained should the microscope ever requires reshipment.
2. Keep the instrument out of direct sunlight, high temperature or humidity, and dusty environments. Ensure that the microscope is located on a smooth, level and firm surface.
3. If any specimen solutions or other liquids splash onto the stage, objective or any other component, disconnect the power cord immediately and wipe up the spillage. Otherwise, the instrument may be damaged.
4. **Important:** the light, light housing and adjacent parts will become very hot. Do not touch these parts until they have completely cooled. Never attempt to handle a hot halogen bulb.
5. All electrical connectors (power cord) should be inserted into an electrical surge suppressor to prevent damage due to voltage fluctuations.
6. For safety when replacing the halogen lamp or fuse, be sure the main switch is off, unplug the power cord, and only replace the halogen bulb after the bulb and the light housing has completely cooled.
7. Confirm that the input voltage indicated on your microscope corresponds to your line voltage. The use of a different input voltage other than that as indicated will cause severe damage to the microscope.
8. **Important:** It is important to protect your eyes from hurt by the bright light. Make sure the intensity is adjusted to the comfortable level before you look into the eyepiece.

## ii. Care and Maintenance

1. Do not attempt to disassemble any component including eyepieces, objectives or focusing assembly.
2. Keep the instrument clean; remove dirt and debris regularly. Accumulated dirt on metal surfaces should be cleaned with a damp cloth. More persistent dirt should be removed using a mild soap solution. **Do not use organic solvents for cleansing.**
3. The outer surface of the optics should be inspected and cleaned periodically using an air stream from an air bulb. If dirt remains on the optical surface, use a soft cloth or cotton swab dampened with a lens cleaning solution (available at camera stores). All optical lenses should be swabbed using a circular motion. A small amount of absorbent cotton wound on the end of a tapered stick makes a useful tool for cleaning recessed optical surfaces. Avoid using an excessive amount of solvents as this may cause problems with optical coatings or cemented optics or the flowing solvent may pick up grease making cleaning more difficult. Oil immersion objectives should be cleaned immediately after use by removing the oil with lens tissue or a clean, soft cloth.
4. Store the instrument in a cool, dry environment. Cover the microscope with the dust cover when not in use.

# 1. Components Illustration



- |                             |                              |                                 |
|-----------------------------|------------------------------|---------------------------------|
| 1. Light Housing            | 12. Coarse Focus Knob        | 23. Power Switch                |
| 2. Filter Holder            | 13. Fine Focus Knob          | 24. Slide Holder                |
| 3. Light Bracket            | 14. Aperture Diaphragm Lever | 25. Terasaki Holder             |
| 4. Phase Contrast Slider    | 15. Top Camera Port          | 26. Petri Dish Holder           |
| 5. Condenser                | 16. Eyepiece                 | 27. C-mount Camera Adapter      |
| 6. Mechanical Stage         | 17. Eyepiece Tube            | 28. Camera Adapter 23.2mm       |
| 7. Stage Extension Plate    | 18. Viewing Head             | 29. Centering Telescope         |
| 8. Glass Stage Insert Plate | 19. Photo Tube               | 30. LBD Light Balancing Filter  |
| 9. Stage                    | 20. Microscope Frame         | 31. IF550 Interference Filter   |
| 10. Objective               | 21. Bottom Camera Port       | 32. Infrared-eliminating Filter |
| 11. Nosepiece               | 22. Light Intensity Knob     |                                 |

## 2. Installation

### 2.1 Installation of the eyepieces

- 1) Loosen the set screws on each eyepiece tube with the Allen key.
- 2) Remove the protective caps from the eyepiece tubes.
- 3) Insert the eyepieces into the eyepiece tubes.
- 4) Tighten the set screws.



Note:

The eyepieces may be preinstalled already.

### 2.2 Installation of the objectives

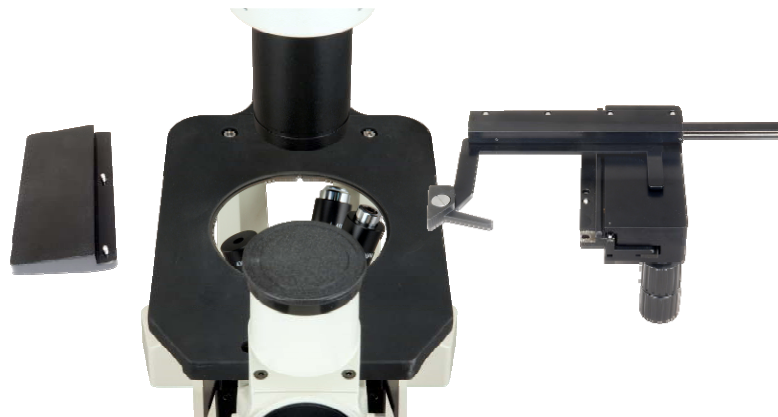
- 1) Adjust the coarse focus knob until the nosepiece is at its lowest position.
- 2) Remove black plastic lids from the nosepiece.
- 3) Install the lowest magnification objective into the nosepiece. Then in a clock-wise direction, rotate the nosepiece and install each succeeding higher magnification objective into the openings of the nosepiece.

Note:

- Use the 10x objective to initially focus the image of your specimen.
- When changing the objective magnification, rotate the objective nosepiece until you hear a "click" sound. This ensures the objective is centered in the optical light path.
- The objectives may be preinstalled.
- The nosepiece opening lids may not be included in this model.

### 2.3 Installation of mechanical stage and extension plate

- 1) Find 2 thumb screws at the bottom of the mechanical stage and find 2 threaded holes on the bottom of stage right side.
- 2) Align the 2 screws with the 2 holes on the stage and tighten them.
- 3) Install the extension plate with the same way on the left side of the stage.



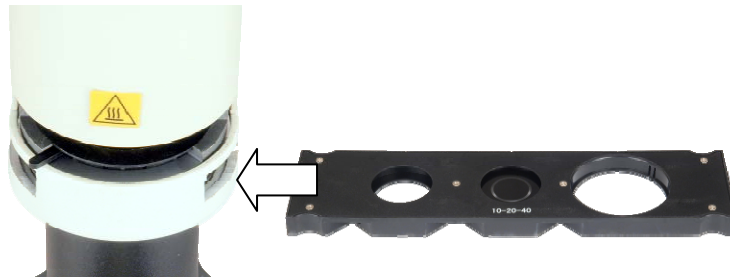
## 2.4 Installation of the light filter

- 1) Pull out the filter holder and put one or more than one filters inside the holder.
- 2) Insert the filter holder back to the slot.



## 2.5 Installation of the phase contrast slider

Insert the phase contrast slider into the slider slot from right to left, till a “click” is heard.



## 2.6 Replacement of the light bulb

- 1) Turn power off and unplug power cord from wall outlet.
- 2) Take off the light housing by pulling it up from the microscope.
- 3) Replace the light bulb. The filament of light bulb should be at the level of locating pins.
- 4) Insert the power pins on the light housing into the power socket.
- 5) Insert the locating pins into the locating holes on the frame.

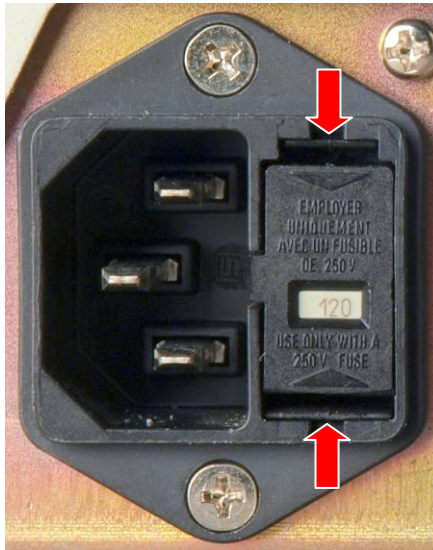


### Caution:

- Make sure the bulb is cooled down before you start to work.
- Avoid from touching the light bulb with bare fingers.

## 2.7 Fuses replacement

- 1) Turn off the power and disconnect the power cord.
- 2) Find the fuse holder at the back bottom of the base.
- 3) Press down at the top side with a small flat head screwdriver as shown in the figure, then the top side will pop out.
- 4) Press up at the bottom side with a small flat head screwdriver as shown in the figure, then the bottom side will pop out.
- 5) Take out the fuse holder.
- 6) Replace the old fuse with a new one, and then insert fuse holder back.





### 3. Operation

#### 3.1 Adjusting illumination

- 1) Connect the power cord to microscope and a wall outlet.
- 2) Press the power switch to turn the light on.
- 3) Turn the intensity knob to adjust the light brightness.

Note:

Working at low intensity can extend the bulb's service life.

#### 3.2 Placing specimen

- 1) The specimen, slide or Petri dish can be put on the glass stage insert plate directly. Position the desired spot at the center of the stage insert plate.
- 2) Mechanical stage can be used to move the specimen precisely.
- 3) Adjust the stage X/Y translational knobs to move the desired spot to the light path.



Note:

- For the best observations, the thickness of the Petri dish bottom and the slide should be 1.2mm.
- Choose proper holder plate for Petri dish and slide.
  - Choose Slide Holder for slide or 54mm Petri dish.
  - Choose Terasaki Holder for Terasaki plate or 65mm Petri dish.
  - Choose Petri Dish Holder for 35mm Petri dish.
- 96 well microplate and 24 well microplate can be secured by the specimen holder directly.

Caution:

Be sure not to allow an objective to touch a specimen or stage insert when changing objectives.

### 3.3 Focusing

- 1) Turn the nosepiece till the desired objective in the light path.
- 2) Raise the objective using the coarse focus knob until the specimen is in focus. Then use the fine focus knob to obtain a sharp image.

### 3.4 Adjusting interpupillary distance

While observing with both eyes, hold the left and right eyepiece tubes (3) and swing them.

The interpupillary distance is correct when the left and right fields of view converge completely into one image.

### 3.5 Adjusting eyepiece diopter

- 1) Adjust the diopter of both eyepieces to “0” position.
- 2) Rotate the 10x objective into position.
- 3) Observe the specimen through the right eyepiece and bring it into focus by adjusting the focus knobs
- 4) Then observe the specimen with your left eye only through the left eyepiece. If the specimen is not in focus, rotate the upper portion of eyepiece until a sharp image is obtained in left eyepiece. Don't use focus knobs at this step.



Note:

Since both eyepieces are adjustable, you may also do the above in the opposite way, in other words, left eye first and right eye second.

### 3.1 Adjusting iris aperture diaphragm

Move the aperture diaphragm lever to adjust the aperture size.



### 3.6 Adjusting tension

The tension of the focusing mechanism has been pre-set at the factory.

If the specimen goes out of focus caused by the nosepiece drifting down, or the focusing mechanism is too tight or too loose, rotate the focus tension adjustment ring until the tension is maintained.



### 3.7 Phase contrast observing

- 1) Put a specimen on the stage and bring it into focus.
- 2) Insert the phase contrast slider into the slot and place it in the middle position. The annular ring plate is installed in the middle position only and it works with 10X, 20X and 40X objectives.
- 3) Remove an eyepiece and insert the centering telescope (CT eyepiece).
- 4) Turn one of the phase contrast objective (10X, 20X or 40X) into the light path.
- 5) Observe with the centering telescope. Loosen the set screw and slide the top lens up and down to bring the bright ring and dark ring into focus. Then tighten the set screw.
- 6) The bright ring and dark ring should be concentric and superimposed when observing through the centering telescope. If it is not, adjust the position of the annular ring plate on the phase contrast slider with Allen keys till the two rings are concentric and superimposed.
- 7) Remove the centering telescope and put back the eyepiece.
- 8) Perform the phase contrast observation.

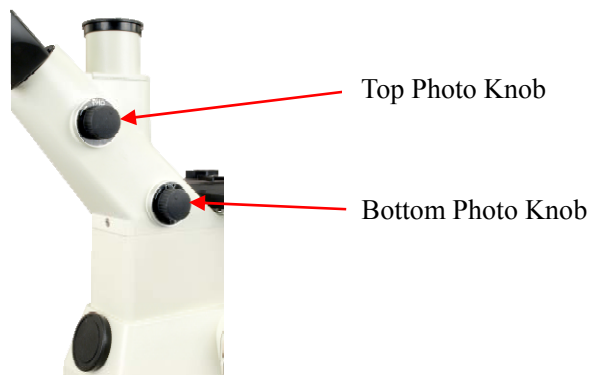
Note: The centering adjustment might be repeated when change the objective or specimen changed.





### 3.8 Photo/video observing, capturing and recording

- 1) Install the software of the camera into computer.
- 2) Install the camera adapter or C-mount camera adapter on the top camera port.
- 3) Connect the camera with the C-mount adapter or insert the camera into the adapter directly if the camera comes with a reduction lens.
- 4) Connect the USB cable from camera to computer.
- 5) Adjust and focus the microscope.
- 6) Turn the top photo knob to open the photo tube light path.
- 7) Launch image observing software to examine the specimen on the screen. You also can capture images or record live videos through the software, depending on the functions provided by the software.
- 8) The focusing may drift after switching, adjust the fine focus knob to get clear image.
- 9) If a conventional camera used, you may need an adapter to connect your camera to the phototube.
- 10) Perform the same procedures to use the bottom camera port.



**Note:**

- Camera is not included.
- Electronic eyepiece (USB camera) is sold separately.

## 4. Specifications

Magnification	40X, 100X, 200X, 400X
Eyepiece	WF10X, $\Phi$ 20mm field of view
Objective	- Plan achromatic 4X/0.10, $\infty$ /1.2, working distance 22.3mm - Plan achromatic 10X/0.25, $\infty$ /1.2, working distance 6.2mm phase contrast - Plan achromatic 20X/0.40, $\infty$ /1.2, working distance 3.1mm phase contrast - Plan achromatic 40X/0.55, $\infty$ /1.2, working distance 2.2mm phase contrast
Viewing Head	Binocular, inclined 45° Interpupillary distance 55 – 75 mm
Nosepiece	Revolving, quintuple
Focus system	Coaxial coarse and fine focus knobs on both side, Focus tension adjustable
Condenser	NA 0.3, working distance 72mm Built in, removable for large Petri dish
Stage	Plain stage, dimension 230mm x 170mm Attachable mechanical stage, translational range 80mm x 120mm Extension stage plate Glass stage insert plate Holder accessories: - Slide Holder for slide and 54mm Petri dish, dimension - Terasaki Holder for Terasaki plate and 65mm Petri dish. - Petri Dish Holder for 35mm Petri dish.
Illumination	Halogen lamp 6V/30W Intensity adjustable
Filter	LBD Light Balancing Filter IF550 Interference Filter (green) SIF800 Infrared-eliminating Filter (yellow)
Camera Port	Top port: 20% light for camera, 80% light for observation through eyepiece Bottom port: 100% light for camera
Power	AC120V

## 5. Troubleshooting Guide

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
It is dark in the field of view when switched on	The power pins not in the power socket	Insert the power pins into the socket.
	The bulb is burned out.	Replace the bulb with a new one.
	The fuse is blown out.	Replace fuse.
	The intensity is at the lowest position.	Adjust the intensity knob.
	Too many color filters in the filter holder.	Remove filters that not necessary.
	Wrong bulb installed.	Install a 6V30W halogen bulb.
Darkness at the periphery or uneven brightness in the field of view	Nosepiece is not in click stop position.	Adjust the nosepiece.
	The light bulb is not at the center.	Adjust the filament to the level of the locating pins.
	Filter holder is in the half way.	Adjust the holder to the right position.
	Phase contrast slider is not in the position.	Adjust the slider to the right position.
Dirt or dust on the view	Dirt or dust on the eyepieces.	Clean the lens
	Dirt or dust on the specimen.	Clean or replace the specimen.
Poor image quality	Slide is upside down	Turn slide over
	Nosepiece is not in click stop position.	Adjust the nosepiece.
	The iris aperture is too large or too small.	Adjust the aperture
	Lenses are dirty.	Clean the lenses
	Petri dish is dirty.	Clean the Petri dish.
	The thickness of Petri dish bottom is more than 1.2mm	Replace the Petri dish with a bottom that less than 1.2mm
	The phase contrast annular ring is not aligned up with the objective.	Center the annular ring with the centering telescope.
The field of views in the two eyepieces are different	The interpupillary distance not correct.	Adjust the interpupillary distance.
	Dioppter not correct.	Adjust the diopter.
Slippage of focus when using the coarse focusing knob	Tension adjustment is set too low	Increase the tension on the focusing knobs
Fine focus is ineffective	Tension adjustment is set too high	Loosen the tension on the focusing knobs