

# INSTRUCTIONS

# BH2-DA

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## DRAWING ATTACHMENT

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This instruction manual has been written for use of the drawing attachment Model BH2-DA in conjunction with Olympus LB series microscopes.

It is recommended to carefully read this instruction manual as well as the manual for the microscope in use, so that you can fully understand and obtain the optimal combination performance.

### Observe the following points:

#### □ Operation

1. Always handle the instrument with as much care as you would a microscope, avoiding abrupt motions and shocks!
2. Avoid exposure of the instrument to direct sunlight, high temperature and humidity, dust and vibrations.
3. Never touch the mirror and lens surfaces with fingers!

#### ■ Maintenance

1. Lenses must always be kept clean. Carefully wipe off oil or fingerprints, deposited on the lens surfaces with gauze moistened with a small amount of alcohol or ether.
2. Never wipe the mirror surface with gauze. Fine dust on the surface should be blown off by means of an air blower. If stains cannot be removed from the surface, take it to the Olympus repair service.
3. After use, close the mirror with a sliding light shield tube provided on the drawing attachment, then cover the entire attachment with the vinyl dust cover.

## 1. ABSTRACT

The Model BH2-DA is used to visually superimpose the image of a specimen over the surface image of a drawing paper placed beside the microscope so that the specimen image can be traced on the paper. Different from the ordinary microprojection system where an image is projected on a screen, the Model BH2-DA permits drawing in a bright room without any more light intensity than required by ordinary microscopy.

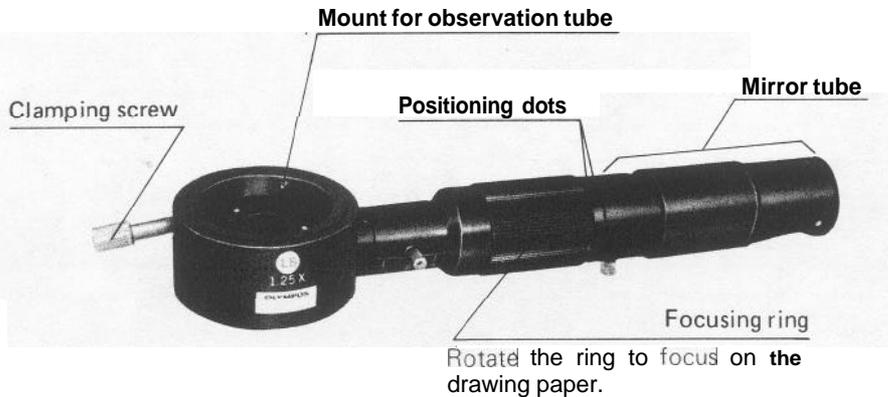
## II. STANDARD EQUIPMENT

Component	Q'ty	Remark
Drawing attachment BH2-DAI	1	
Photo eyepiece NF K5X	1	For drawing

### ■ Optional accessories

Photo eyepieces: NFK2.5X and NFK3.3X

## III. NOMENCLATURE

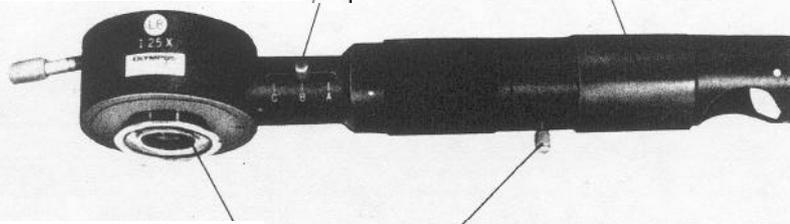


### Magnification adjustment screw

Loosen the screw and move it to adjust drawing magnification.

### Light shield tube

Close the mirror with this tube when not in use.



### Mounting dovetail

### Mirror tube clamping screw

Loosen the screw and the mirror tube can be removed for NFK eyepiece replacement.

## IV] ASSEMBLY AND OPERATION

### 1. Mount the drawing attachment on the microscope.

#### a. In case of BHS, BHT and BHTU microscopes:

1) Remove the binocular observation tube from the microscope.

#### 2] Mount the drawing attachment on the microscope.

3) Remount the observation tube on the drawing attachment.

#### b. In case of AHB-LB microscope:

1] Remove the revolving nosepiece and binocular observation tube from the microscope and turn the selector turret on top of the microscope stand to position "F.C".

2) Reinsert the tube dovetail slide of the observation tube into the dovetail mount on the microscope stand and lower the tube as far as possible, and clamp.

3) Attach the drawing attachment to the lower end of the observation tube and then attach the nosepiece to the drawing attachment.

### 2. Insert the finder eyepieces WHK 10X paired into the observation tube, and the photo eyepiece NFK5X into the drawing attachment.

★ The finder eyepieces WHK10X are used for observation, and the NFK photo eyepieces for drawing.

1) Loosen the clamping screw ①, remove the mirror tube ②, and insert the NFK eyepiece ③.

2) Aligning the positioning dots, reinsert the mirror tube and clamp with the clamping screw ①.

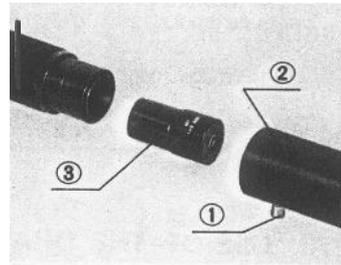


Fig. 1

### 3. Place a drawing paper.

Place a drawing paper horizontally on the desk just under the mirror.

#### 4. Set the magnification adjustment screw in position.

The setting position of the magnification adjustment screw varies depending on the microscope in use:

Setting position	Microscope
A	AHB-LB
B	BHS, BHT, BHTU
C	CHA, CHB

As the distance between the mirror and drawing surface changes, the drawing magnification and area are varied. If the magnification adjustment screw is set at position A, B or C, according to the microscope in use, you can obtain the drawing magnification and area as tabulated below:

Finder eyepiece	Photo eyepiece	*Drawing magnification	*Drawing area (diameter)
WHK 10X (Field number 20)	NFK2.5X	Objective power x approx. 5	80mm
	NFK3.3X	Objective power x approx. 6.6	105mm
	NFK5X	Objective power x approx. 10	160mm

\* These data are given as guidelines. Refer to the following page for accurate measurement of drawing magnifications.

#### 5. Focusing adjustment

- 1) Looking through the eyepieces, rotate the focusing ring until the drawing surface of paper is brought into focus.
- 2) Switch on the microscope light source.  
Gradually increase light intensity until it is balanced with the brightness of the drawing surface.

**NOTE:** If the drawing surface is dark, increase the brightness of the room by additional use of a fluorescent lamp, etc., to illuminate the drawing surface, which makes drawing easier.

- 3) Bring the specimen into focus by means of the microscope's focusing adjustments, until specimen image and drawing paper are in focus simultaneously.

## 6. Start drawing.

- 1) Place drawing paper steadily in position.
- 2) Now you can start drawing, occasionally touching up the light intensity of the microscope light source so that it can be well-balanced with the brightness of the drawing surface.

**NOTE:** Sometimes it is preferable to stop down the aperture diaphragm slightly more than indicated by the objective N.A., which will result in increased image contrast.

## 7. Use of the light shield tube

If you desire to cut off the light emitted from the microscope light source in the course of drawing, slide the light shield tube to close the mirror.

## V. SPECIAL APPLICATIONS

### 1. Use of finder eyepieces other than WHKIOX (field number 20):

Finder eyepieces of the field number less than 20 can be used in conjunction with the drawing attachment. The drawing magnification is just the same as with the WHKIOX, but the drawing area is varied as formulated below:

$$\text{drawing area (diameter in mm')} = \frac{\text{Eyepiece field number} \times \text{NFK power} \times 2}{1.25}$$

### 2. Use of drawing eyepieces other than NFK photo eyepieces:

If any eyepieces other than NFK photo eyepieces are used as drawing eyepieces, you are not only unable to obtain drawing magnification as formulated, but also the resolution may sometimes be deteriorated and part of the field of view may be cut off.

### 3. Accurate measurement of drawing magnification

- 1) Place an objective micrometer on the stage.
- 2) Superimpose the image of the objective micrometer on the image of a scale placed on the drawing surface, and bring both of the images into focus at a magnification as desired by means of the magnification adjustment screw and focusing knobs.
- 3) If a magnification cannot be obtained as desired within the working range of the magnification adjustment screw, it is recommended to change the height of the drawing paper.

4) In case a magnification changer is employed in a position beneath the drawing attachment, a drawing magnification can be changed by means of the magnification selection system built in the changer without varying the height of the drawing-paper.

★ The magnification changer Model BH2-CA is optionally available.

#### 4. Extension of the drawing area

The maximal drawing area is 160 mm in diameter (see the table in page 3). To additionally extend this area, however, it is recommended to slide the specimen and drawing paper so that you can obtain an extended area. For this use, it is convenient to place a microscope on a legged base under which a drawing paper can be inserted.

NOTE: As the drawing magnification is changed by the height of a legged base, it is necessary to compensate for it by means of the magnification adjustment screw if accurate magnification is required.

## VI. IMAGE MAGNIFICATION FOR OBSERVATION AND PHOTOMICROGRAPHY

As the drawing attachment is mounted on the microscope, the mechanical tube length is extended and image magnification is increased by 1.25X as follows:

$$\begin{aligned} \text{Image magnification (for observation)} &= \text{Obj. power} \times \text{Eyepiece power} \times 1.25 \\ \text{(for photomicrography)} &= \text{Obj. power} \times \text{Eyepiece power} \times 3 \times 1.25 \end{aligned}$$

## VII. USE OF THE DRAWING ATTACHMENT WITH OTHER INTERMEDIATE ATTACHMENTS

If the aperture iris diaphragm is stopped down to the minimum, the field of view may sometimes be cut off, depending on the combination of the attachments.