

# INSTRUCTIONS

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# U-DA

## DRAWING ATTACHMENT

This instruction manual is for the Olympus Drawing Attachment Model U-DA. To ensure the safety, obtain optimum performance and to familiarize yourself fully with the use of this attachment, we recommend that you study this manual thoroughly before operating the microscope. Retain this instruction manual in an easily accessible place near the work desk for future reference.



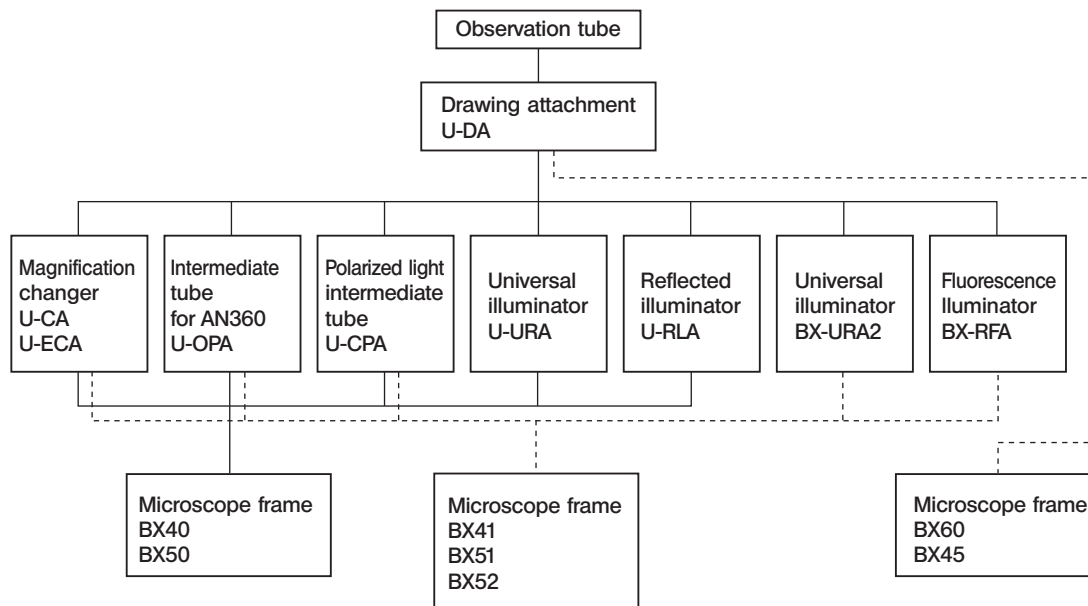
# IMPORTANT

This attachment employs a UIS (Universal Infinity System) optical design, and should be used only with UIS microscopes, eyepieces, objectives and condensers for the BX2 series and BX series. Less than optimum performance may result if inappropriate accessories are used.

- The U-DA drawing attachment allows the observer to see the paper sheet on the desk top and the specimen image in a superimposed image so that the specimen image can be drawn easily.
- Only the specimen image can be observed by attaching the light excluding cap.
- The construction for superimposing the sketched image on the specimen image allows the drawing unit to be used in bright indoors.
- The drawing field diameter can be increased to 220 mm by attaching the optional U-DAL10X drawing lens.

## 1 Getting Ready

1. The drawing attachment is a precision instrument. Handle it with care and avoid subjecting it to sudden or severe impact.
2. Do not use the drawing attachment where it is subjected to direct sunlight, high temperature and humidity, dust or vibrations. (The operating temperature range is from 0 to 40°C and the operating humidity range is from 30% to 85%.)
3. Applicable microscopes: BX40, BX50, BX60, BX41, BX45, BX51, BX52.
4. Applicable observation tubes: UIS widefield binocular or trinocular tubes.  
**★ When using a UIS super widefield trinocular tube, there will be no problem in the observed image. Outside the range of field number 22, however, the tip of the pen tip will not be visible or the sketched image will look distorted.**
5. Applicable stages (BX series): When drawing on the right side of the microscope with a right-hand drive control stage mounted, the rack will enter the field of view when the rack is moved all the way to the right and drawing will be made difficult. It is recommended to use a stage with drive controls placed on the opposite side to the side of the drawing attachment direction.
6. When used with the BX40, BX50, BX41, BX51 or BX52, this attachment another intermediate attachment can be used with one additional intermediate tube. The eyepoint adjuster (U-EPA or U-EPA2), magnification changer (U-CA or U-ECA), dual-viewing attachment (U-DO or U-DO3), multi-viewing attachment (U-MDO or U-MDO3) or side-by-side viewing attachment (U-SDO or U-SDO3) may be mounted above the drawing attachment. The intermediate tubes which can be installed below are indicated in the figure on the next page.



## 2 Maintenance and Storage

- To clean the lenses and other glass components, simply blow dirty away using a commercially available blower and wipe gently using a piece of cleaning paper (or clean gauze).  
If a lens is stained with fingerprints or oil smudges, wipe it gauze slightly moistened with commercially available absolute alcohol.  
**▲ Since the absolute alcohol is highly flammable, it must be handled carefully.**  
**Be sure to keep it away from open flames or potential sources of electrical sparks — for example, electrical equipment that is being switched on or off.**  
**Also remember to always use it only in a well-ventilated room.**
- Never wipe the mirror with gauze, etc. Fine dust accumulated on the surface should be blown off with a blower.
- When not using the attachment, attach the light excluding cap to the mirror housing and keep the attachment covered with a dust cover.

## 3 Caution

If the equipment is used in a manner not specified by this manual, the safety of the user may be imperiled. In addition, the equipment may also be damaged. Always use the equipment as outlined in this instruction manual.

The following symbols are used to set off text in this instruction manual.

- ▲ : Indicates that failure to follow the instructions in the warning could result in bodily harm to the user and/or damage to equipment (including objects in the vicinity of the equipment).
- ★ : Indicates that failure to follow the instructions could result in damage to the equipment.
- ◎ : Indicates commentary (for ease of operation and maintenance).

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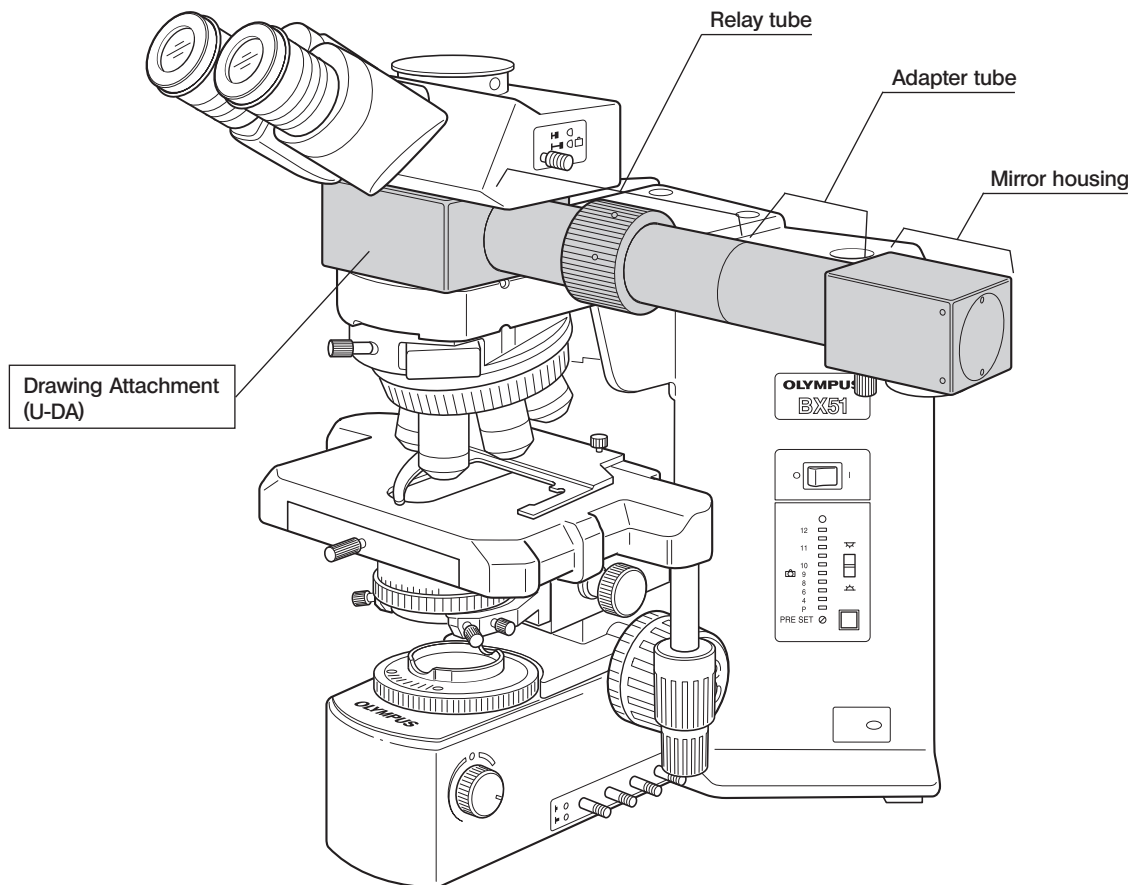
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# 1 NOMENCLATURE

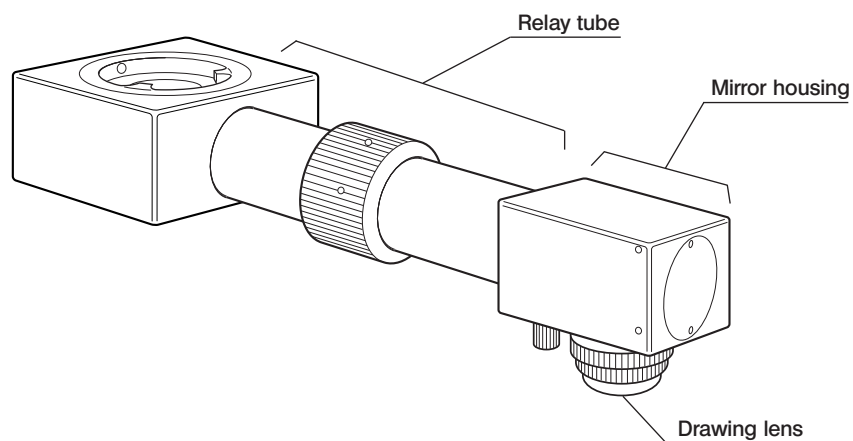
© Depending on the mounting position of the U-DA, the adapter tube may become unnecessary, in which case the drawing lens has to be remounted.

## 1. When only the U-DA is mounted on the microscope frame

© The configuration is identical even when another intermediate is mounted above the U-DA.



## 2. When the U-DA is mounted above another intermediate tube



## 2 ASSEMBLY

### 2-1 Mounting the Drawing Attachment on the Microscope

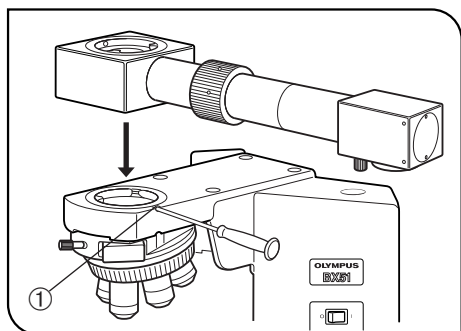


Fig. 1

#### 1 When only the U-DA is mounted on the microscope frame (Fig. 1)

1. Using the Allen screwdriver provided with the microscope frame, fully loosen the clamping screw ① on the microscope frame.
2. Insert the circular dovetail mount at the bottom of the drawing attachment into the mount on the microscope frame.
3. Rotate the dovetail so the drawing attachment's mirror housing is pointing either to the left or right side when looking at the microscope from the front. (Fig. 1 shows the right-hand installation.)
4. Using the Allen screwdriver, fully tighten the clamping screw ①.

★ The lens adapter frame (⑤ in Fig. 2) should not be used as it will cause vignetting of the sketched image.

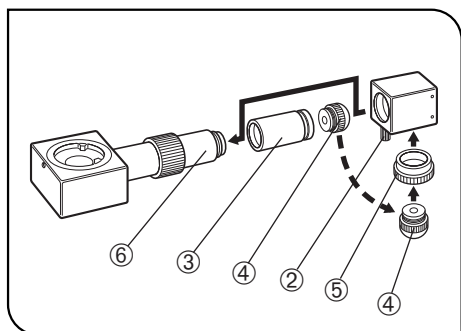


Fig. 2

#### 2 When the U-DA is mounted above another intermediate tube (Fig. 2)

1. Fully loosen the mirror housing clamping knob ② and detach the mirror housing.
2. Remove the drawing lens ④ screwed into the adapter tube ③.
3. Unscrew and remove the adapter tube ③.
- ★ The removed adapter tube ③ is not used in this mounting procedure.
4. Screw the lens adapter frame ⑤, provided with the U-DA, into the threaded hole at the bottom of the mirror housing.
5. Screw the drawing lens ④ removed in step 2 above, into the lens adapter frame ⑤.
6. Attach the drawing attachment on the existing intermediate tube.
7. Insert the mirror housing into the relay tube ⑥ and tighten the mirror housing clamping knob ②.

### 2-2 Mounting the Observation Tube

(Fig. 3)

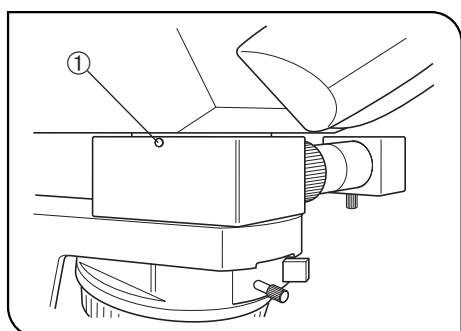


Fig. 3

1. Using the Allen screwdriver, fully loosen the clamping screw ① of the drawing attachment (or another intermediate tube).
2. Insert the circular dovetail mount at the observation tube into the mount on the drawing attachment.
3. Using the Allen screwdriver, securely tighten the clamping screw ① again.

# 3 OPERATION

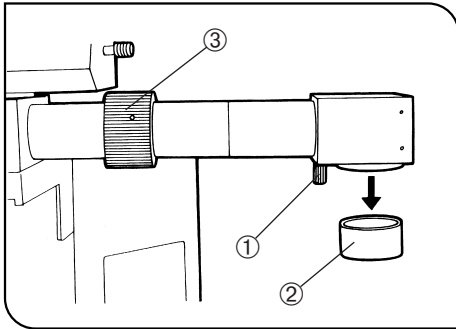


Fig. 4

## 1 Positioning the Drawing Paper

Place drawing paper horizontally on the desktop exactly below the mirror in the mirror housing. The paper should be secured after alignment.

## 2 Adjusting the Mirror Housing

(Fig. 4)

1. Loosen the mirror housing clamping knob ① and rotate the mirror housing until it is positioned perpendicularly to the drawing paper.
2. Clamp the mirror tube by tightening the clamping knob ①.

## 3 Focusing on the Specimen

Operate the coarse and fine adjustment knobs on the microscope to focus on the specimen.

## 4 Removing the Light Excluding Cap

(Fig. 4)

When drawing, detach the light excluding cap ② from the mirror tube bottom.

## 5 Focusing the Drawing Paper

(Fig. 4)

Rotate the focusing collar ③ on the drawing attachment to focus on the drawing paper.

## 6 Determining the Drawing Projection Magnification

1. Place an objective micrometer on the stage and a scale on the drawing paper surface. While looking through the eyepiece, find the place where the objective micrometer graduations and scale graduations match precisely.

$$\text{Drawing projection magnification} = \frac{\text{Scale reading}}{\text{Objective micrometer reading}}$$

★ Match the units.

2. When an objective micrometer is not available, place a scale on the drawing paper as in step 1 and read the diameter of the drawing field.

$$\text{Drawing projection magnification} = \frac{\text{Drawing field diameter (mm)}}{\text{Eyepiece field number}} \times \text{Objective magnification}$$

The specimen sketch drawn on the paper will conform to this magnification.

- Ⓢ After using either of the methods described in steps 1 and 2 to find the drawing projection magnification, it is recommended to draw a scale on the drawing paper so that the specimen size can always be determined with ease. If an objective micrometer is available, drawing its scale on the paper will further simplify the procedure.



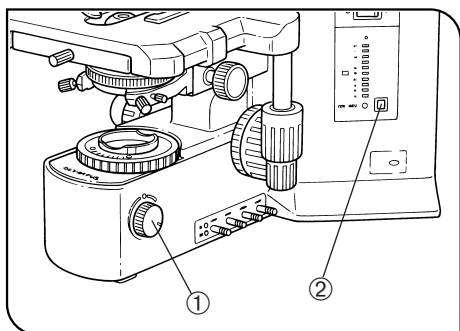


Fig. 5

## 7 Adjusting the Brightness Balance of Drawn Image and Specimen Image

(Fig. 5)

1. While looking through the eyepiece, place a pencil, etc. on the drawing paper surface.
  2. Using the microscope's brightness adjustment knob ①, adjust the brightness until the tip of the pencil and the specimen can be seen clearly at the same time.
- Ⓞ If the drawing paper surface is dark, drawing will be made easier by illuminating the paper with an electric lamp.
  - Ⓞ If the microscope's light preset button ② is set to the optimum brightness position for drawing and if, when the light preset button is OFF, the brightness is set to the darkest position, it will be possible to switch between the image of the superimposed specimen and drawing and the drawing image alone just by pressing the button.

### Options

#### Using the 10X Drawing Lens (U-DAL10X)

- Ⓞ When the optional 10X drawing lens is used in place of the standard drawing lens, the drawing field diameter can be expanded to 220 mm, which means that the image can be projected to almost fill an A4-size page.

#### How to Attach

##### 1. When only the U-DA is mounted on the microscope frame (Fig. 6)

1. Loosen the mirror housing clamping knob ① and detach the mirror housing.
2. Remove the standard drawing lens which is screwed into the adapter tube ②, and attach the 10X drawing lens ③ and the ring ④ provided with the 10X drawing lens in place.

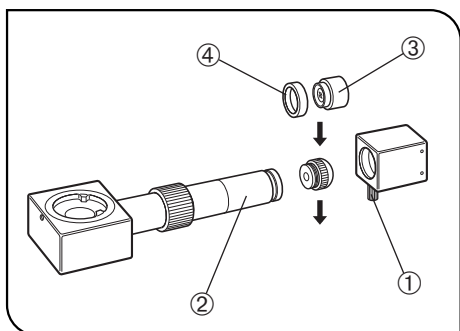


Fig. 6

##### 2. When the U-DA is mounted above another intermediate tube (Fig. 7)

1. Loosen the mirror housing clamping knob ① and detach the mirror housing.
2. Remove the adapter tube ② by screwing. The standard drawing lens attached to the adapter tube will not be used in the present procedure.
3. Attach the mirror housing directly to the relay tube ⑤.
4. Screw in the lens adapter frame ⑥, provided with the U-DA, into the threaded hole at the mirror housing bottom.
5. Screw in the 10X drawing lens ③.

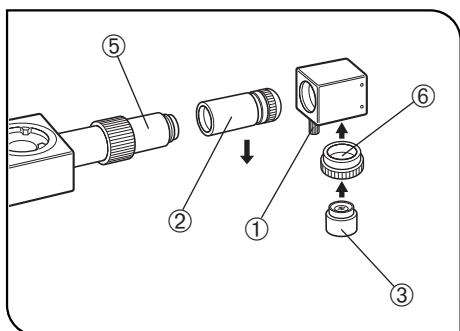


Fig. 7

#### How to Use

The same operation as with the standard drawing lens is possible.

# 4 SPECIFICATIONS

Item	Specification
(1) Tube magnification	1X
(2) Maximum field number	22 (mm $\phi$ )
(3) Drawing image magnification	16X (When there is an intermediate tube between the microscope and drawing attachment, the magnification may be variable by $\pm 3\%$ ) 10X (When the U-DAL10X is used)
(4) Drawing field	$\phi$ 352 mm ( $\phi$ 220 mm when the U-DAL10X is used)
(5) Focusing (on paper)	Focusing collar system
(6) Optical axis height	BX40, BX50: 330.5 mm (When an additional intermediate tube is combined, add the thickness of the intermediate tube.) BX41: 333.5 mm. BX51, BX52 (Transmitted light specification): 340.5 mm (When an additional intermediate tube is combined, add the thickness of the intermediate tube.)
(7) Focusing range	Below desktop surface: About 50 cm Above desktop surface: Up to near the mirror housing bottom. (The magnification is variable.)



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## **EVIDENT CORPORATION**

6666 Inatomi, Tatsuno-machi, Kamiina-gun, Nagano 399-0495, Japan

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