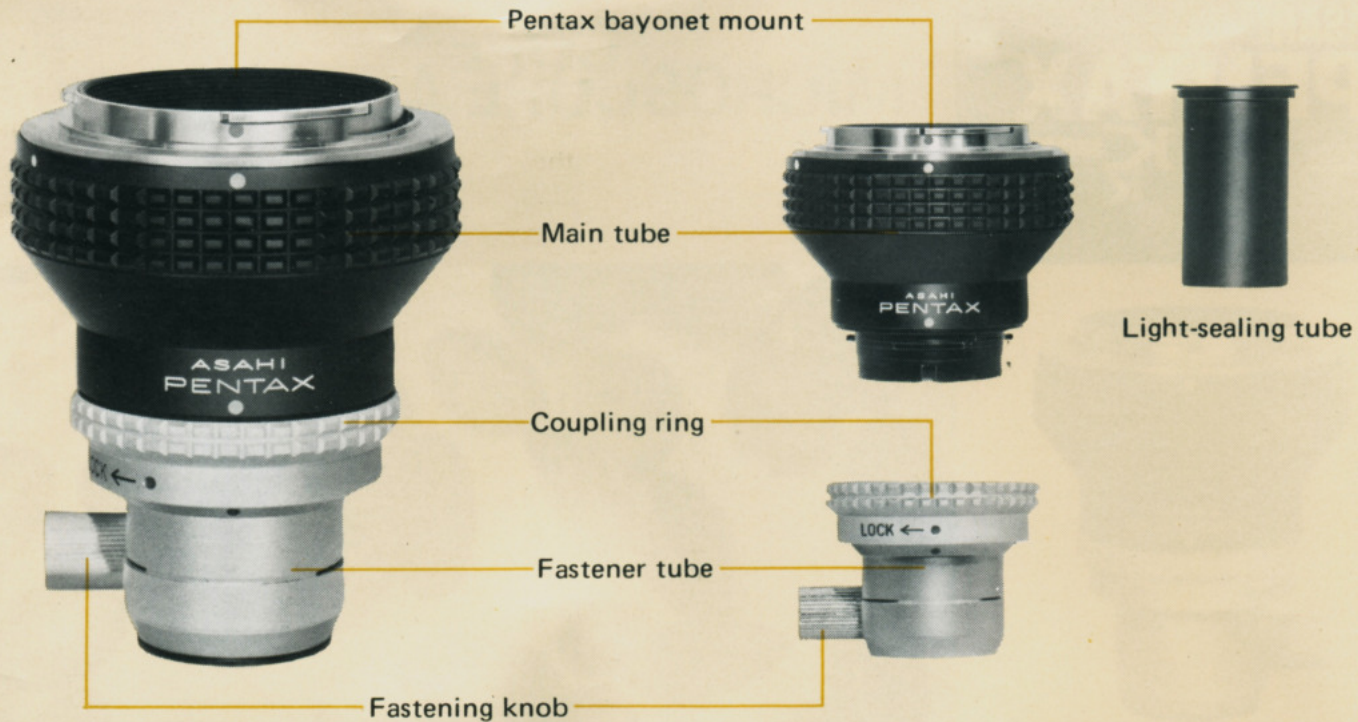


ASAHI
PENTAX
K series

MICROSCOPE ADAPTOR **K**





Features and Specifications

By means of the Microscope Adaptor, your Pentax K Series camera will open up for you the whole world of photomicrography. And because the TTL light meter is built-in, it's as easy as it is rewarding. However, the following three points should be noted:

If the microscope's total magnification is greater than 600x, the microscope camera – which is designed exclusively for photomicrography and is not usable for regular photography – is better than a 35mm SLR. This

is because with such a high magnification, the mechanical vibration must be eliminated completely.

The Microscope Adaptor K cannot be used on microscopes whose eyepiece tube diameter is other than 25mm ϕ .

As a binocular microscope has two lens barrels slanted toward the object, no camera, even a microscope camera, can take photographs through it because the resulting images will be blurred.

Camera:	Asahi Pentax K2, KX or KM without lens
Microscope:	With 25mm ϕ eyepiece tube (eyepiece sleeve diameter 25.0mm ϕ , eyepiece internal diameter 23.2mm ϕ)
Magnification:	About 1/3x of the total magnification (magnification of objective lens x magnification of eyepiece lens)
Size & Weight.	Maximum diameter 64mm, length 79mm. 216 grams

Setting up the Unit

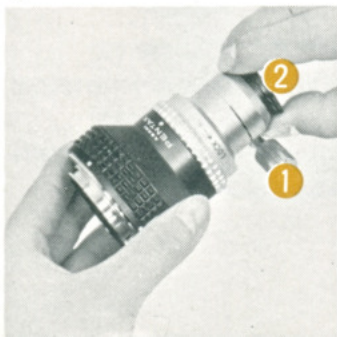
As shown in Fig. 1, loosen the fastening knob (1) and pull out the light-shielding tube (2). (The light-shielding tube is used only for special occasions when the picture is to be shot only with the object lens.)

As shown in Fig. 2, turn the coupling ring (3) clockwise until it stops. Now remove the main tube (4).

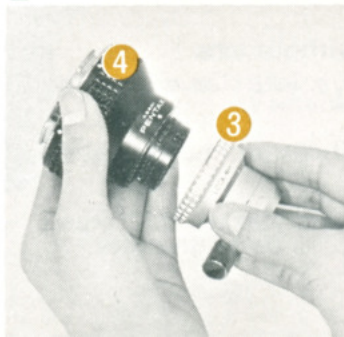
Detach the lens from the camera as shown in Fig. 3. (The camera lens is not necessary for photomicrography.)

Attach the main tube (4) to the Pentax K2, KX or KM camera exactly as you would a lens.

1



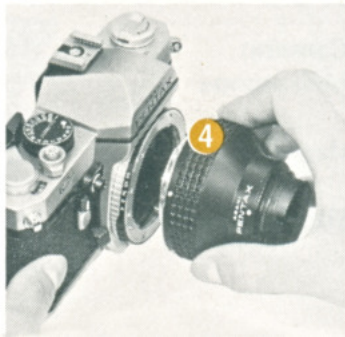
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3



4



Pull out the eyepiece lens from the microscope as shown in Fig. 5.

Then, as shown in Fig. 6, attach the fastener tube (5) into the eyepiece tube. Clamp it with the fastening knob (1) by setting the red dot (shown toward the front) onto the fastener tube.

Then, put the eyepiece lens of the microscope into the fastener tube as shown in Fig. 7.

As shown in Fig. 8, match the red dot (7) of the main tube (4) with the red dot (6) of the fastener tube and the red dot (8) of the coupling ring, and put the main tube into the fastener tube. Now turn the coupling ring in the direction of the arrow to lock it.

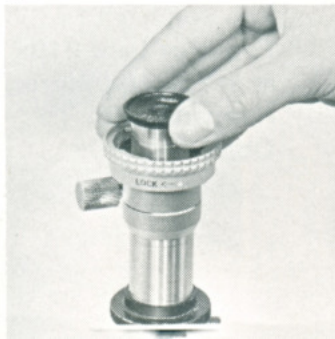
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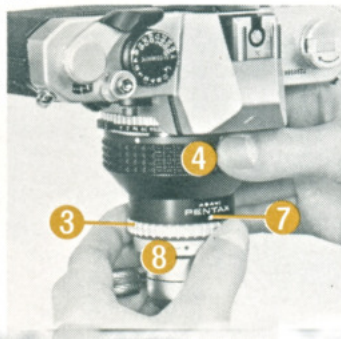
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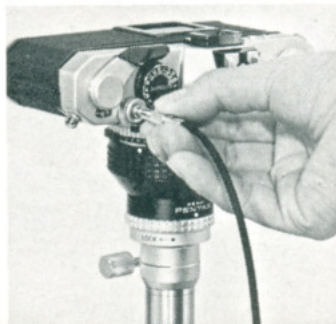


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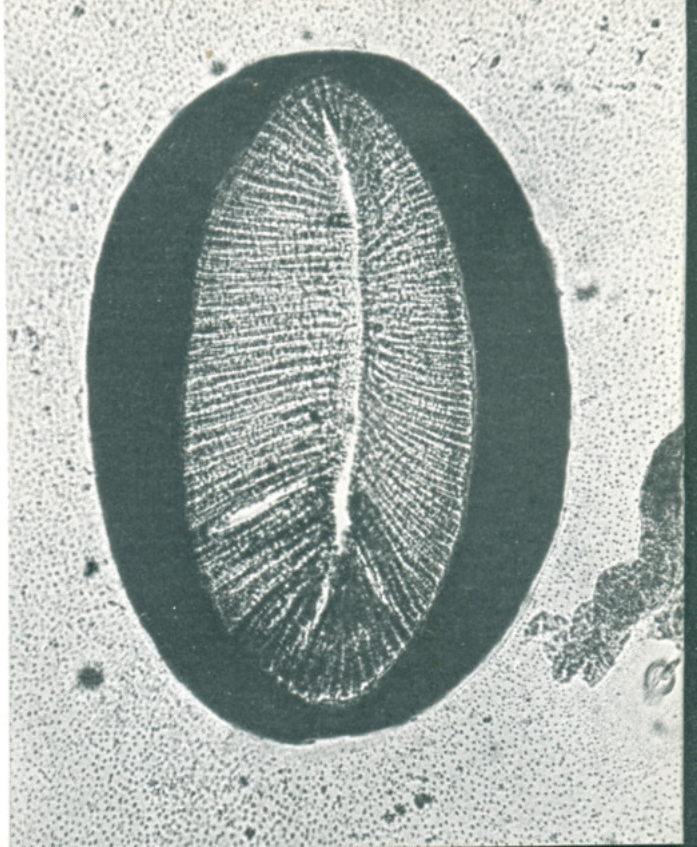
Screw the cable release into the shutter release button as shown in Fig. 9.

9



The Spiracle of a Silkworm

Eyeiece Lens P10x
at 1/2 sec exposure
Neopan F film
Object lens 10x



How to Detach

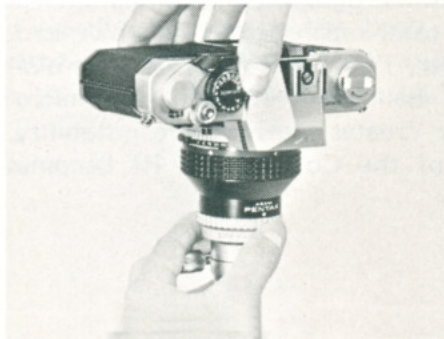
As shown in Fig. 10, turn the coupling ring counterclockwise to detach the main tube from the camera. (This should be done carefully: if the fastener tube is completely detached, the eyepiece lens may slip out and fall against the camera's reflex mirror.)

Then, as shown in Fig. 11, loosen the fastening knob to detach the fastener tube.

How to Change Eyepiece Lenses

After completing the steps shown in Figs. 10, 11 and 12, turn the fastener tube to separate it from the eyepiece. Then, continue with the steps outlined in Figs. 6 – 8.

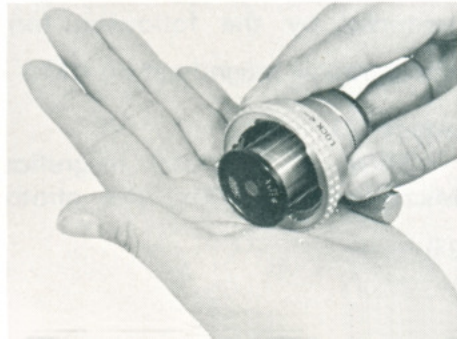
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Microscope Magnification and Photomicrographic Magnification

The total magnification of a microscope (M) is the magnification of the virtual image (Y'), instead of the real image of the object P (Y), when the mechanical tube length * is set at a length designated by the manufacturer, as shown in Fig. 13. (The eye is situated at the position of "O.")

When the Microscope Adaptor K is mounted on a Pentax camera, the length "D" becomes 84.3mm.

The photomicrographic magnification is determined by the following formula: Photomicrographic magnification = $M \times \frac{84.3}{250}$ = M x about 1/3

Thus, if the total magnification of the Microscope is 400x, the photomicrographic

magnification is $400 \times \frac{84.3}{250} = 135x$.

The focal point of the microscope alone will differ from the focal point of the microscope plus the camera.

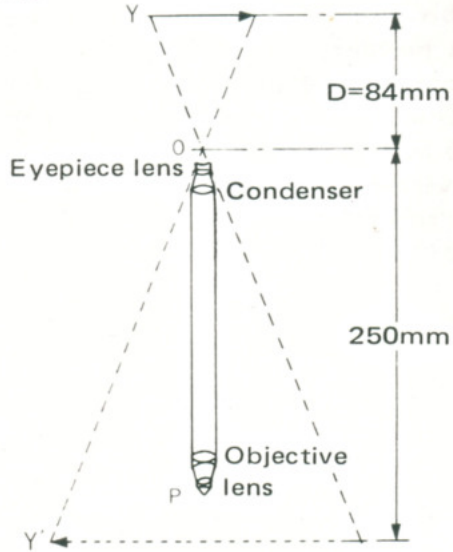
If the Extension Tubes K and/or the Bellows Unit K are used with the Microscope Adaptor K, "D" approaches the actual tube length of the microscope (Fig. 13). Because of this, vignetting at the edges is eliminated and the photomicrographic magnification approaches the total magnification of the microscope. However, the combination of extension tubes and/or bellows unit with the microscope adaptor creates considerable instability, and the use of the Copy Stand III becomes necessary.

The photomicrographic magnification is simply the magnification as it will appear on the film. Naturally, magnification can be further increased through enlarging. For example, a 3x enlargement is the equivalent of the total magnification achieved when the picture is shown at a 0.25-meter distance.

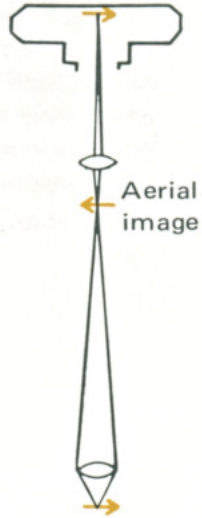
* The mechanical tube length is the distance between the flange of the object lens and the upper end of the eyepiece lens barrel. If the microscope has both internal and external lens barrels, an indication scale will be shown on the internal barrel.

When the eyepiece lens is put into the Microscope Adaptor K, the position of the eyepiece lens becomes 4mm higher than the position of the normal eyepiece lens of the microscope. This should be taken into account when you are setting the length of the barrel. With non-adjustable microscopes, the photomicrographic magnification becomes slightly larger than $1/3 M$.

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Eyepiece Lens and Object Lens

As shown in Fig. 14, the inverted real image (aerial image) produced by the object lens is magnified by the eyepiece lens. Thus, with the microscope alone, the image is both upside down and reversed left and right. However, when viewed through the Pentax finder, the image is shown correctly.

Object Lens Alone

As the object lens of a microscope is not designed to be used alone, the lens has a distortion aberration and the focal points at the lens center and of the edges are different. Thus, it is not suitable for photomicrographic purposes. Moreover, as the inner diameter of the eyepiece lens barrel is only 23mm as shown on Page 3, the picture edges will be vignetted.

However, you can use the light-shielding tube in the microscope, instead of the eyepiece lens, to eliminate the reflection inside the eyepiece lens barrel.

Film

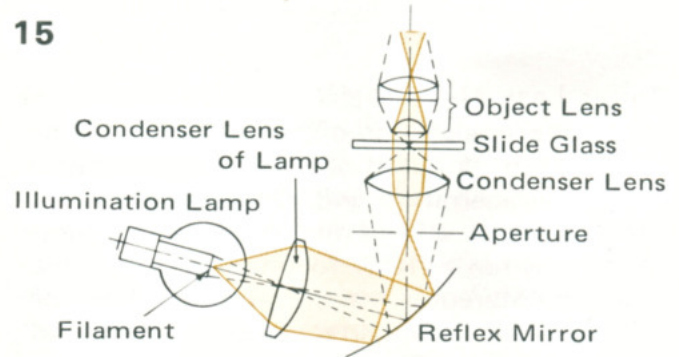
Generally, photomicrographic subjects are stationary. Thus, a low-speed, ultra-fine grain and high-resolution film is recommended. For example, Neopan F and Panatomic-X films are good for medium-contrast B & W photographs; Minicopy and Koni-Micro films are good for high-contrast B & W photographs; and Kodachrome II is good for color slides.

Lighting

One of the most important factors in photomicrography is lighting. Usually lighting is done by the Köhler illumination method as shown in Fig. 15. According to this method, illumination is provided by a lamp specially designed for microscopes. You simply stop down the aperture below the condenser lens to a minimum, and make sure that the image of the lamp's filament is focused upon the aperture blades while looking from below. By this method, the rays of light passing through the condenser lens and hitting the slide glass become completely parallel – allowing for accurate focusing, illumination averaging and high image contrast.

Before shooting, check through the viewfinder to make sure that the light axis is

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straight. If not, adjust the position of the light source and the angle of the reflex mirror.

When using color film, put a color compensation filter which converts the color temperature from tungsten lamp values to daylight values (for example, the Pentax Photo-flood Filter) in front of the illumination lamp or below the condenser lens.

Focusing

At the start of focusing, adjust the object lens to a point as close to the slide as possible. Then, while looking through the viewfinder, move the main knob gradually upward for rough focusing. For precise and accurate focusing adjust the critical focusing knob of the microscope.

For focusing, the microprism or split-image rangefinder of the Pentax K2, KX or KM camera cannot be used. Focusing must be done through the groundglass section of the finder. If this is not sufficient, use the Magnifier optional accessory, or ask your local service center to exchange your focusing screen for a special photomicrographic screen.

Eyesight adjustment is explained in the operating manuals for the Pentax K2, KX

and KM cameras. In the case of photomicrography, this is particularly important because of the need for critical focusing. Usually, when using a microscope, the viewer moves the lens barrel up or down to adjust the focus. In photomicrography, however, the eyepiece itself must be adjusted according to individual vision requirements.

The focusing glass used in photomicrography is characterized by a shallow depth-of-field. However, the focusing screen is an aerial-image type. If the viewer's own eyesight does not match the finder diopter, focusing errors will be multiplied. If the edges of the cross-microprism are not sharp, adjust the camera eyepiece by using an eyesight correction lens.

Exposure

As the Pentax K Series cameras incorporate a TTL exposure meter, the correct exposure can be determined by the exposure meter. However, as color slide film, copying film and micro film have a narrow exposure latitude, it is recommended that you bracket your exposures by also shooting a half-stop under and a half-stop over the exposure given by the meter.

If the eyepiece lens of the microscope is 5x or 7x, the picture edges in the 24 x 36mm format will be vignetted. This results from an overexposure based on the TTL exposure meter. To correct the situation, cut down the exposure by a half or a full stop from the exposure indicated by the meter.

With full-automatic electronic metering cameras such as the Pentax K2, any stray light entering through the viewfinder eyepiece will cause underexposure. Thus, if you take your eye away from the eyepiece, either cover it or set the exposure by the needle-matching system.

With high-power, polarizing, and phase contrast microscopes, the brightness of the subject may become so low as to be out of the range of the meter. In such a case, bracket what you suspect is the correct exposure by exposures under and over. This bracketing will serve as reference data for the next time you find yourself in a similar situation.

Hints on Photomicrography

1. Difference Between Microscopy and Photomicrography

In usual microscopy, the object is simply set in the center of the field and carefully viewed through the eyepiece lens. In photomicrography, greater care is paid to selecting the exact eyepiece lens (the P 10x, the P 15x or the FK which was designed exclusively for photography) and the exact object lens which will produce the minimum of field curvature (such as the pan-achromatic lens).

2. To Reduce Camera Movement

Put the microscope on a sturdy baseboard and lock up the reflex mirror of the Pentax K2 or KX to eliminate the vibrations caused by the mirror's moving.

3. Main Focusing Knob of Microscope

As the main focusing knob of the microscope is burdened by the weight of the camera in addition to the weight of the microscope, the focusing knob should be tight. Otherwise, the microscope barrel may accidentally slip while the picture is being taken.

4. Spots on Microscope Lenses

As the microscope lenses are small, spots on them are not too conspicuous. In damp climates, the lenses are often spotted. Examine the lenses occasionally by holding them up to the light and wiping off the spots.



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