

Nikon

UNIVERSAL EPI-ILLUMINATOR

INSTRUCTIONS

NIKON CORPORATION

PRECAUTIONS

- 1 Avoid sharp knocks !**
Handle the illuminator gently, taking care to avoid sharp knocks.
- 2 Power source voltage**
Make sure of the power source voltage, seeing the indication on the transformer:

LINE 115V LAMP 12V — 50W

LINE 220V LAMP 12V — 50W

- 3 Lighting the lamp**
Take care not to touch the lamp housing, nor to handle inflammable substances such as gasoline, thinner or alcohol in its close proximity, as some parts of the lamp housing may take a high temperature.

- 4 Lamp and fuse replacement**
Before replacing the lamp bulb or fuse, be sure to turn OFF the power switch and disconnect the plug from the power source.

As the lamp bulb immediately after turned OFF is very hot, wait until it cools enough for replacement. During replacement, do not touch the glass part of the lamp bulb with bare hands.

If touched, clean with alcohol immediately.

- 5 Dirt on the lens**
Do not leave dust, dirt or finger marks on the lens surfaces. They will prevent you from clear observation of the specimen image.

CARE AND MAINTENANCE

- 1 Cleaning the lenses**
To clean the lens surfaces, remove dust using a soft brush or gauze. Only for removing finger marks or grease, should soft cotton cloth, lens tissue or gauze lightly moistened with absolute alcohol (ethyl or methyl alcohol) be used.
Observe sufficient caution in handling alcohol and xylene.

- 2 Cleaning the painted surfaces**
Avoid the use of any organic solvent (for example, thinner, ether, alcohol, xylene etc.) for cleaning the painted surfaces and plastic parts of the instrument.

- 3 Never attempt to dismantle !**
Never attempt to dismantle the instrument so as to avoid the possibility of impairing the operational efficiency and accuracy.

- 4 When not in use**
When not in use, cover the instrument with the accessory vinyl cover, and store it in a place free from moisture and fungus.

- 5 Periodical checking**
To maintain the performance of the instrument, we recommend the customers to check the instruments periodically. (For details of this check, contact your authorized Nikon distributor.)

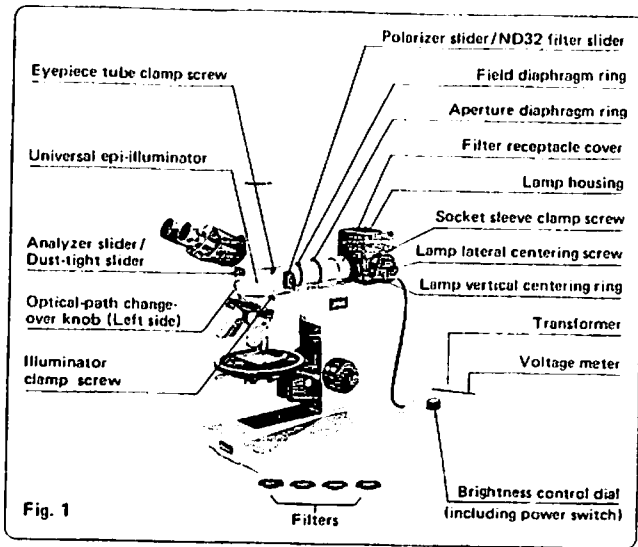
★ Please note as per your Nikon warranty, "Any defects or damage directly or indirectly caused by the use of unauthorized replacement parts and/or performed by unauthorized personnel" will void the warranty.

Nikon reserves the right to make such alterations in design as may be considered necessary in the light of experience. For this reason, particulars and illustrations in this handbook may not conform in every detail to models in current production.

CONTENTS

I. NOMENCLATURE AND ASSEMBLY	1
II. CENTERING THE LAMP	3
III. MANIPULATION OF EACH PART	4
1. Use of filters	4
2. Manipulation of each slider	4
3. Changing-over of illuminating light	8
4. Use of aperture diaphragm	8
5. Use of field diaphragm	8

I. NOMENCLATURE AND ASSEMBLY



< Caution before using the high-intensity light source >

When the high-intensity light source (halogen lamp 100W, mercury lamp Hg100W or xenon lamp Xe100W) is used for universal epi-illuminator, be sure to attach the correct collector lens and U-epi adapter referring to the instructions provided for each light source.

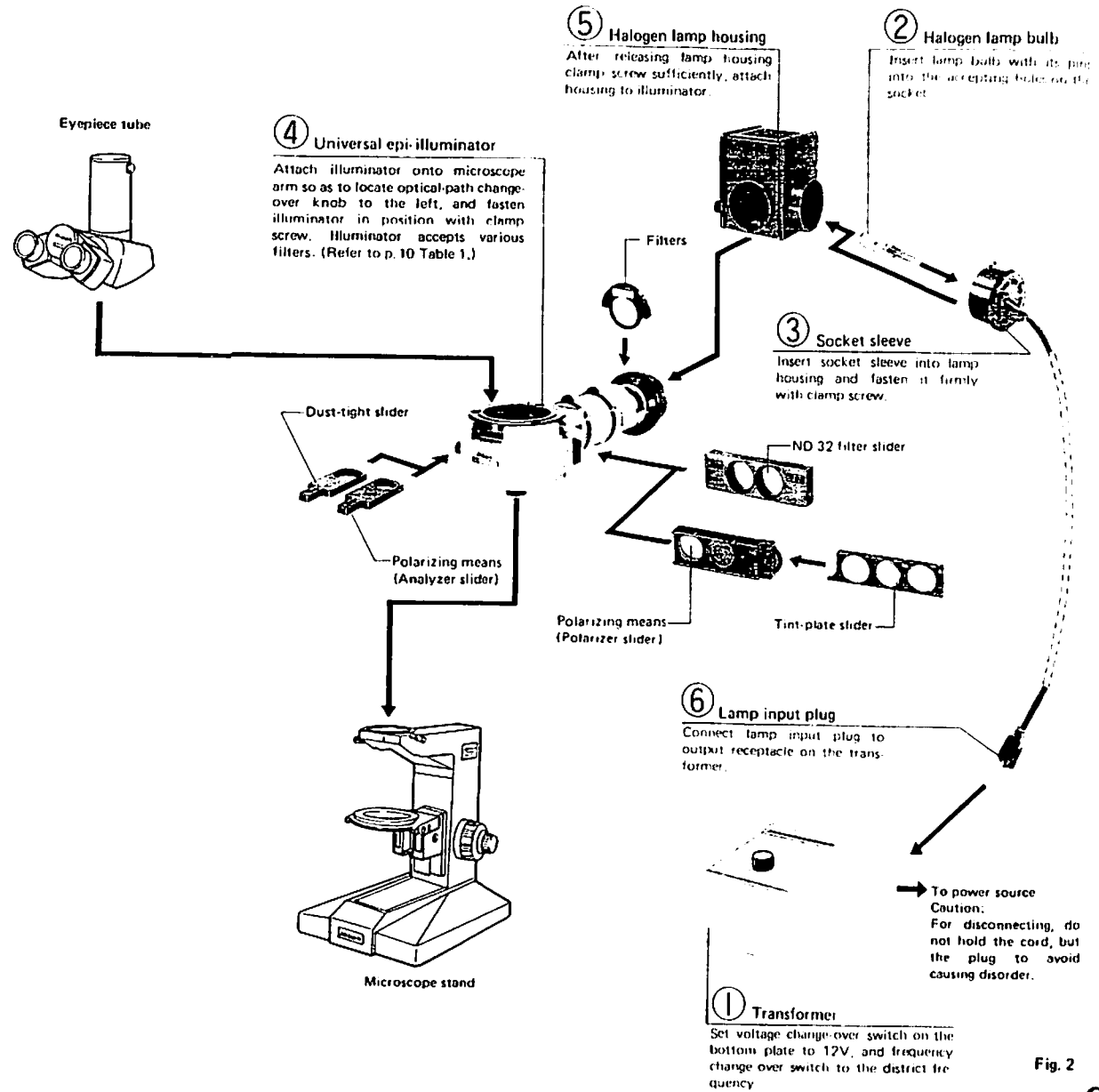


Fig. 2

II. CENTERING THE LAMP

12V-50W halogen lamp

- (1) Push in the optical-path change-over knob for brightfield illumination.
- (2) Turn ON the power switch on the transformer to light the lamp. Set the voltage meter to approximately 6V.
- (3) If the Nomarski prism in the universal revolving nosepiece, polarizer, analyzer and tilt-plate sliders are in the optical path, pull them all out.

- (4) Fully open the aperture diaphragm.
- (5) Place a high reflection specimen on the stage, and swing in the objective 10X. (ND16 filter may be used in place of the specimen.)
- (6) Focus on the specimen. For facilitating the focusing, close the field diaphragm and obtain the clear image of the diaphragm.
- (7) Draw out an eyepiece from either of the observation tubes on the trinocular eyepiece tube. Look into the tube, and the image of the exit pupil of the diffuser built in the illuminator.

- (8) Releasing the lamp housing clamp screw, move the lamp housing back and forth **□**, until the filament image is focused on the diffuser and the exit pupil. Lock the lamp housing in this position. Thereafter, releasing the socket sleeve clamp screw, rotate the lamp lateral centering screw and vertical centering ring **□**, so that the filament image is centered to the exit pupil **□**.

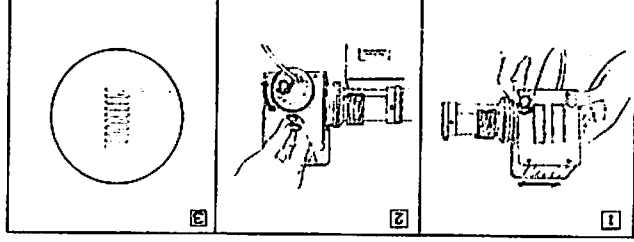


Fig. 3

[Note] When the high-intensity light source is used, center the lamp referring to the procedures given in the instructions provided for each light source.

III. MANIPULATION OF EACH PART

1. Use of filters

Use of the filters is as shown in Table 1:

Cover the filter receptacle with its hood while the illumination lamp is being lighted.

Table 1

Indication	Type of filter	Use
Color	Color balancing filter	For general microcopy and color photography
ND2	ND 2 filter (T=50%)	Brightness adjustment for general microcopy and photography
ND16	ND 16 filter (T=6.25%)	Green interference filter for contrast adjustment
GIF	Green interference filter	For contrast adjustment

2. Manipulation of each slider

- (1) ND 32 filter slider

The ND 32 filter, provided in the illuminator, is used for protecting the eye from glare likely caused by much difference of brightness at the time of changing over to bright- or darkfield illumination. In the position of the slider as shown in Fig. 4-1, the ND 32 filter is put in the optical path. When the filter slider is pushed forward in, until it stops once with a click, the transparent glass will be put into the optical path. (Fig. 4-2) The filter is effective as an ND 32 under the brightfield illumination, but as a transparent glass under the darkfield illumination. When the use of the ND 32 filter is not necessary, interpose the transparent glass. The slider should be inserted always to prevent dust from entering the inside of the illuminator.

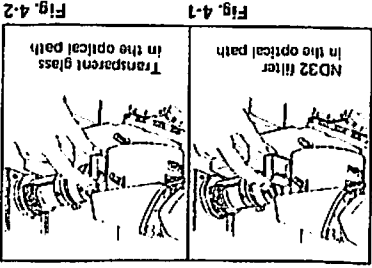


Fig. 4-1

- (2) Polarizer slider (with ND32 filter slider)
The polarizer is to be used in conjunction with the analyzer for simplified polarizing observation. The polarizer slider in the illuminator, accompanying an ND32 filter slider, permits preventing glare at the time of changing over to bright- or darkfield observation. (Fig. 5)

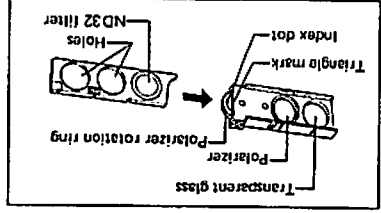


Fig. 5

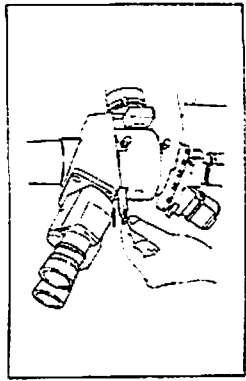


Fig. 7

(3) Analyzer slider
 The analyzer slider is used in place of the dust-tight slider provided in the illuminator, for simplified polarizing, sensitive color polarizing and differential interference observation. (Fig. 7)
 For changing over to bright- or darkfield observation, pull the analyzer slider out toward the operator, until it stops once with a click. For other types of observation, push it in until it comes to the limit.
 For protecting the inside of the illuminator from dust, the dust-tight slider or analyzer slider should be pushed in at all times.

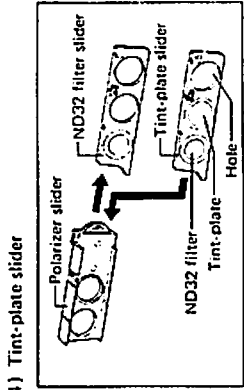


Fig. 8

(4) Tint-plate slider

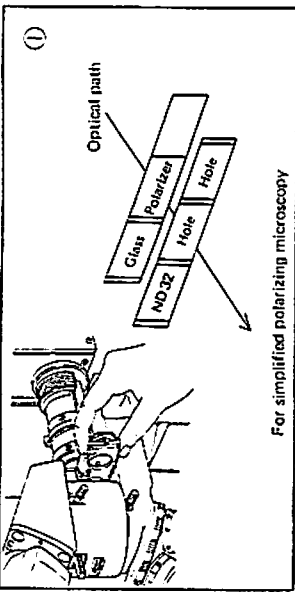


Fig. 6-1

(1) In the case of simplified polarizing observation, push the polarizer slider leftward in together with the accompanied ND slider, so that the position of polarizer coincides with the empty hole in the ND filter slider. (Fig. 6-1)

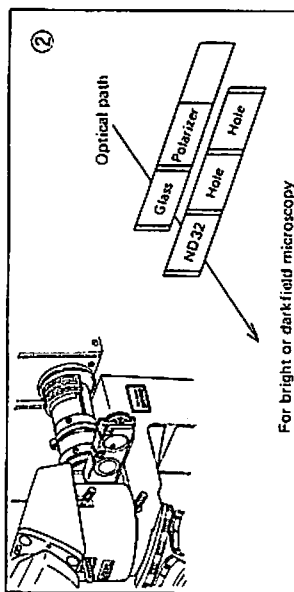


Fig. 6-2

(2) When changing over to bright- or darkfield observation, pull the polarizer slider rightward out together with the ND filter slider, until the slider stops once with a click. (Fig. 6-2)

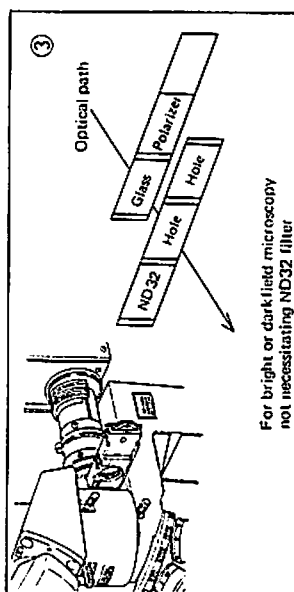


Fig. 6-3

(3) If no use of the ND 32 filter is necessary under bright- or darkfield illumination, push only the ND filter slider leftward in, until it stops with a click. (Fig. 6-3)

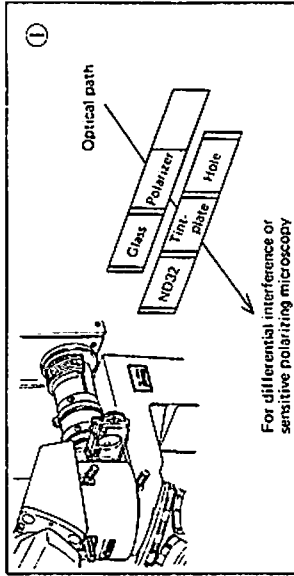


Fig. 9-1

(1) In the case of differential interference and sensitive color polarizing observation, insert the tint-plate slider in place of the ND filter slider accompanied by the polarizer slider, in addition to the polarizing slider. (Fig. 8 & Fig. 9-1)

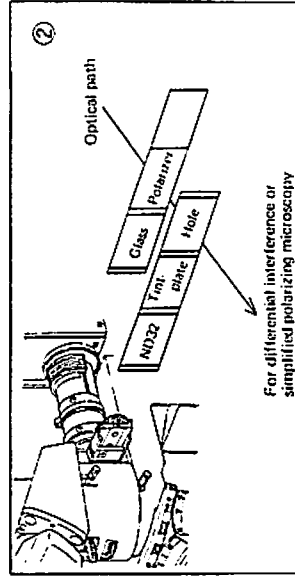


Fig. 9-2

(2) In the differential interference method, when changing the compensation range or in the case of changing over from the sensitive color polarizing to the simplified polarizing observation, push only the tint-plate slider leftward in, until it stops once with a click, thus the tint-plate being replaced by the empty hole. (Fig. 9-2)

5. Use of field diaphragm

The field diaphragm is used for determining the illuminated area on the specimen surface in relation to the field of view of the microscope. (Fig. 13)

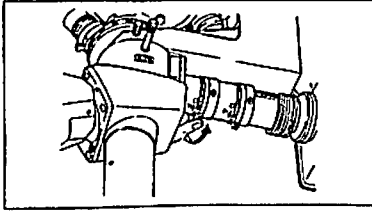


Fig. 13

Generally, it is stopped down to such an extent that the circumference of the illuminated area circumscribes or inscribes that of the eyepiece field of view. If the former be larger than the latter, extraneous light will enter the field of view, causing flare in the image and lowering the contrast. Therefore, especially in photomicrography, the proper adjustment of the field diaphragm is very important. Generally, good results will be achieved when the diaphragm is stopped down to such an extent that the diameter of illumination area is slightly larger than the diagonal of film format.

Electric Specifications	
Power source	115V 50/60 Hz
(Transformer)	220V
Halogen lamp	12V - 50W (OSRAM 64610 or PHILIPS 7027)
Fuse	3A (250V) for 115V 1.5A (250V) for 220V

To diascopic microscopy using the microscope stand with the built-in diascopic illuminator (for observing such a specimen as IC mask or plastic), the darkfield illumination is to be applied.

For simultaneous dia-and-epi illumination, the brightfield observation is to be used.

4. Use of aperture diaphragm

The aperture diaphragm is provided for adjusting the numerical aperture (N.A.) of the illuminating system of microscope. It is important because it determines the resolution, contrast and depth of focus.

In general, when it is stopped down to 70 ~ 80% of the numerical aperture of the objective, a good image of appropriate contrast will be obtained. (Figs. 11 & 12) After removing the eyepiece from the eyepiece tube, adjust the size of the diaphragm, observing the image of the diaphragm which is visible on the bright circle of exit pupil of objective inside the eyepiece tube. Stopping down the aperture diaphragm too far will lower the resolving power. Therefore, it is not recommended to stop down the aperture to a size smaller than 50% of the N.A. of the objective in use except when observing special specimens.

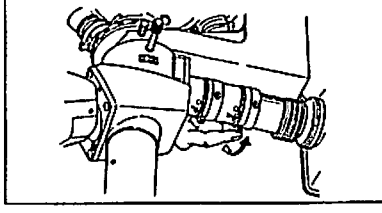


Fig. 11

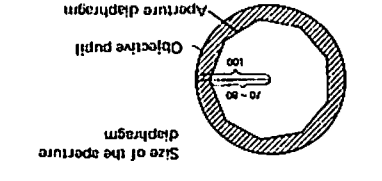


Fig. 12

3. Changing-over of illuminating light

③ For changing over from the differential interference or sensitive color polarizing observation to bright- or darkfield observation, pull the polarizer slider rightward out together with the tint-plate slider, until it stops with a click, thus the transparent glass and glare protection ND 32 filter being interposed in the optical path. (Fig. 9-3)

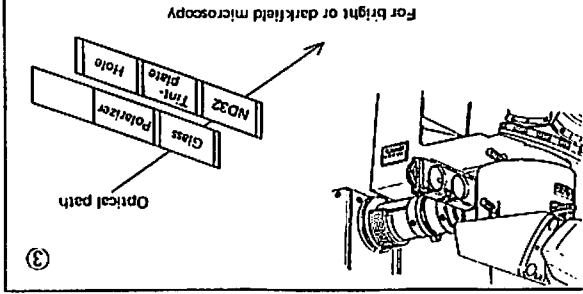


Fig. 9-3

④ If no use of ND 32 filter is necessary, pull slider rightward out, until it stops once with a click, thereby the tint-plate being removed from the optical path. (Fig. 9-4)

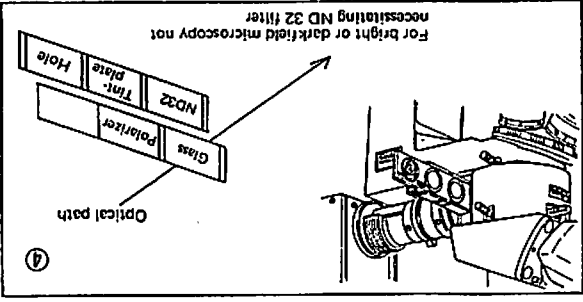


Fig. 9-4

The simplified polarizer slider having only the polarizer plate is used for simplified polarization in combination with the analyzer slider. Insert it in place of the ND32 filter slider provided in the illuminator. Its polarizer being fixed, it can be used also in combination with the intermediate tube of the polarizing microscope whose analyzer is rotatable.

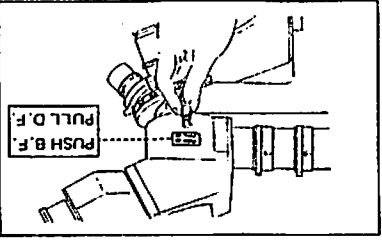


Fig. 10

Pushing in or pulling out of the optical path change-over knob to the limit permits bright- or darkfield observation, respectively. (Fig. 10)