Nikon

Inverted Microscope
EPIPHOT-TME

Instructions

1-800-526-4566

NIPPON KOGAKU K.K.

CAUTIONS

1 Avoid sharp knocks!
Handle the microscope gently, taking care to avoid sharp knocks.

2 When carrying the microscope
When carrying the microscope, remove beforehand the lamp housing, stage and dark box for 35mm film, and support its base inserting both hands into the hollows on the right and left sides of the base.
(The instrument weighs about 30kg.)

3 Locations of microscope
Avoid the following conditions: dust, vibration and exposure to high temperature, moisture or direct sunlight.

4 Power source voltage
In every case, make sure of the power source voltage for microscope stand and control box; for the former, by means of the input voltage change-over device (fuse holder) on the rear of the base, and for the latter, by means of the power source voltage switch in the battery chamber on the bottom of the control box.

5 Light source
Halogen lamp bulb to be used is 12V-50W.
Do not use 12V-100W halogen lamp bulb.
If the lamp bulb of over-rated wattage is used, light adjusting circuit will damage.

6 In lighting the lamp
Take care not to touch the lamp housing, and don't bring inflammable substances such as gasoline, thinner or alcohol near to the lamp housing, as some parts of the lamp housing may take a high temperature.

7 Replacing the halogen lamp or fuse
Beforehand, turn OFF the power switch and disconnect the plug from the power source.
In such cases as of replacement, do not touch the glass part of the lamp bulb with bare hands.
If touched, clean with alcohol immediately.

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

9 Combination
Microscope stand and control box that are used in a combination must have the specified same serial numbers because they are adjusted to work most efficiently each other in such a combination.

10 Focus knobs
Never attempt to adjust the tension by turning the one focus knob, while holding the other.
Adjustment is internal and can only be done by authorized Nikon Repair Personnel.

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 (methanol or ethanol) be used.

For cleaning the objectives use only xylene.

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 Maintenance of the battery

If the control box is not in use for a long time, the battery is to be fully charged and stored separately in a cool and dark place (such as refrigerator).

The battery will be in need of recharging when it is brought out again, when the battery is in connection.

The recharge begins by turning the control box power switch on.

By charging 3~4 hours the battery is charged in full and can be used for about 1000 hours.

4 Never attempt to dismantle!

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

5 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.

it is especially recommended that the objectives and eyepieces be kept in an airtight container containing desiccant.

6 Periodical checking

To maintain the performance of the instrument, we recommend to check the instruments periodically. (For details of this check, contact our agency.)

CONTENTS

I. NOMENCLATURE

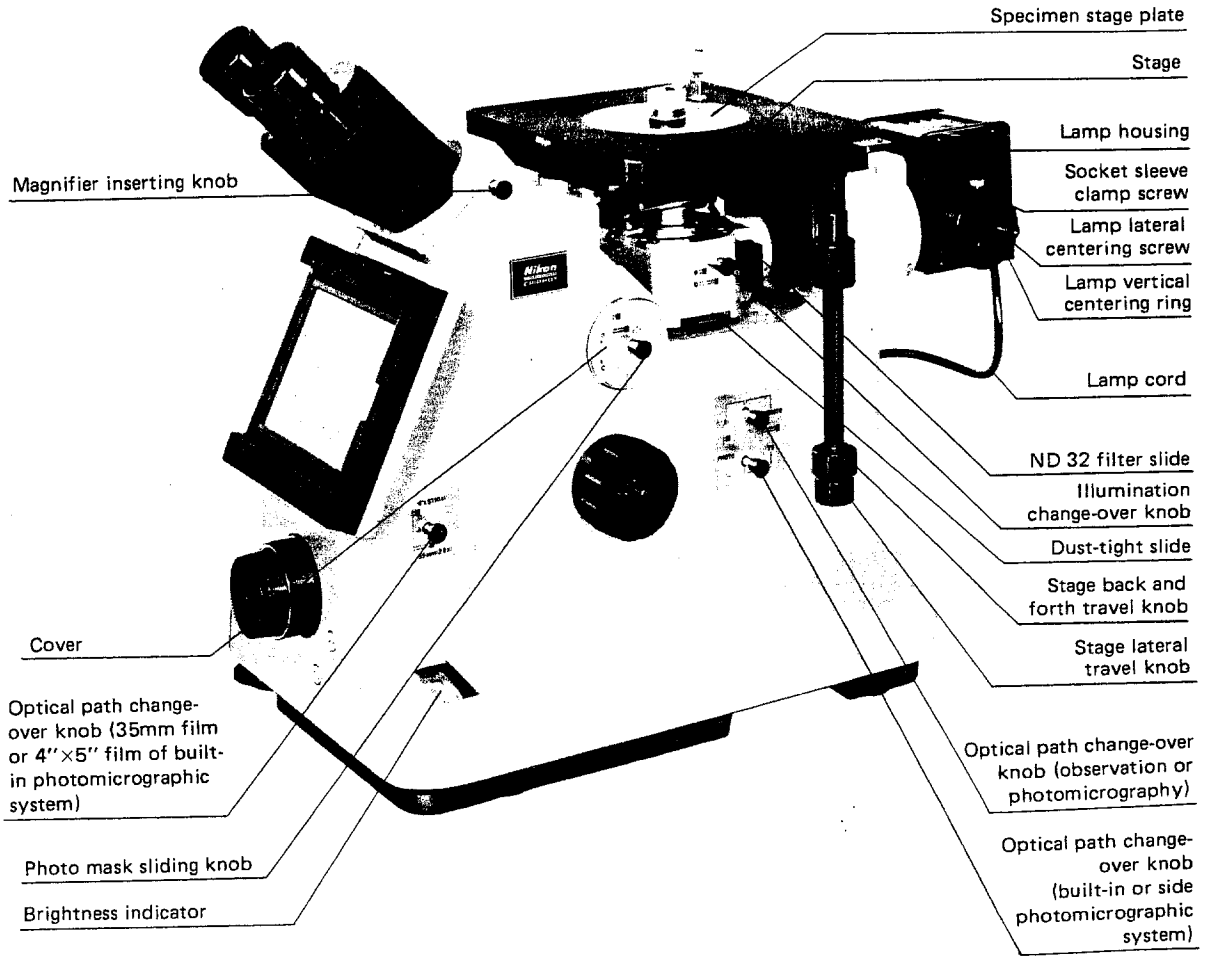


Fig. 1

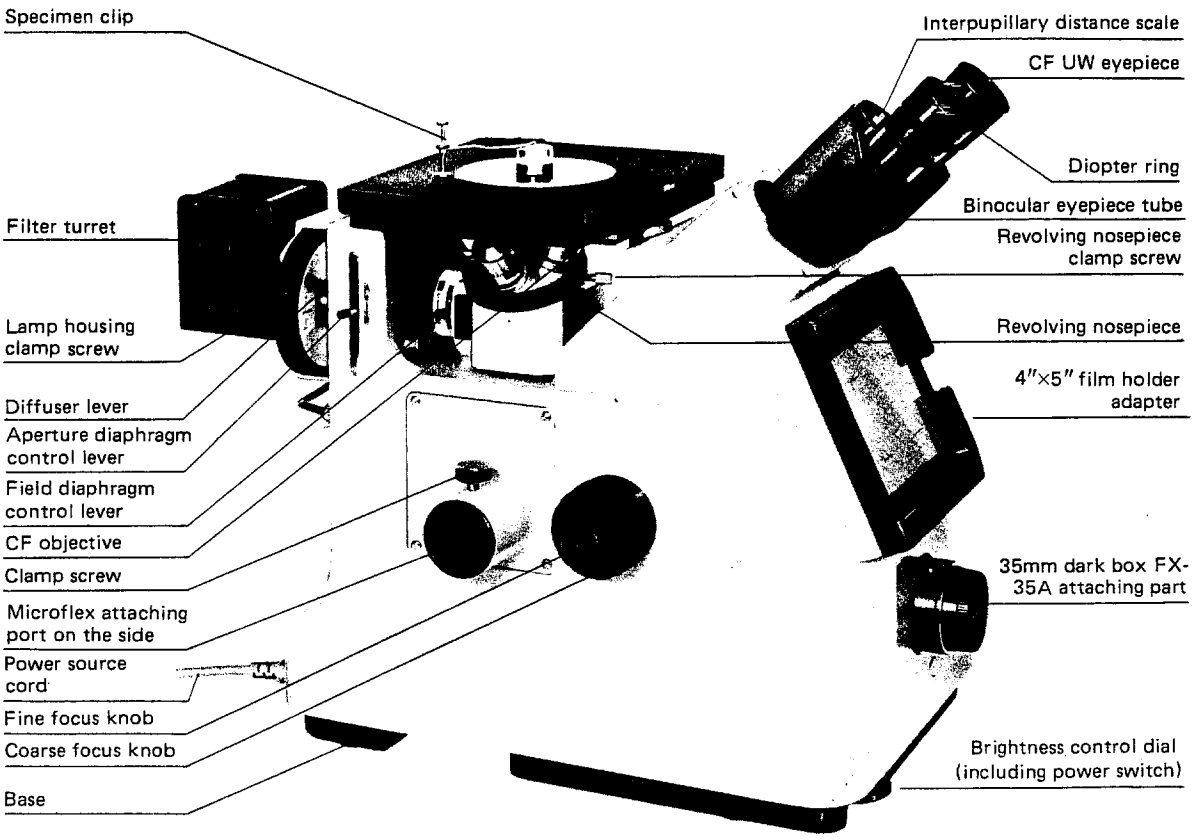

Specimen clip
Filter turret
Lamp housing clamp screw
Diffuser lever
Aperture diaphragm control lever
Field diaphragm control lever
CF objective
Clamp screw
Microflex attaching port on the side
Power source cord
Fine focus knob
Coarse focus knob
Base
Interpupillary distance scale
CF UW eyepiece
Diopter ring
Binocular eyepiece tube
Revolving nosepiece clamp screw
Revolving nosepiece
4″×5″ film holder adapter
35mm dark box FX-35A attaching part
Brightness control dial (including power switch)

Fig. 2

II. ASSEMBLY

Assemble the following units in the order of their numbers given as below:
For the methods of attaching the unit, refer to the accounts on P.7.

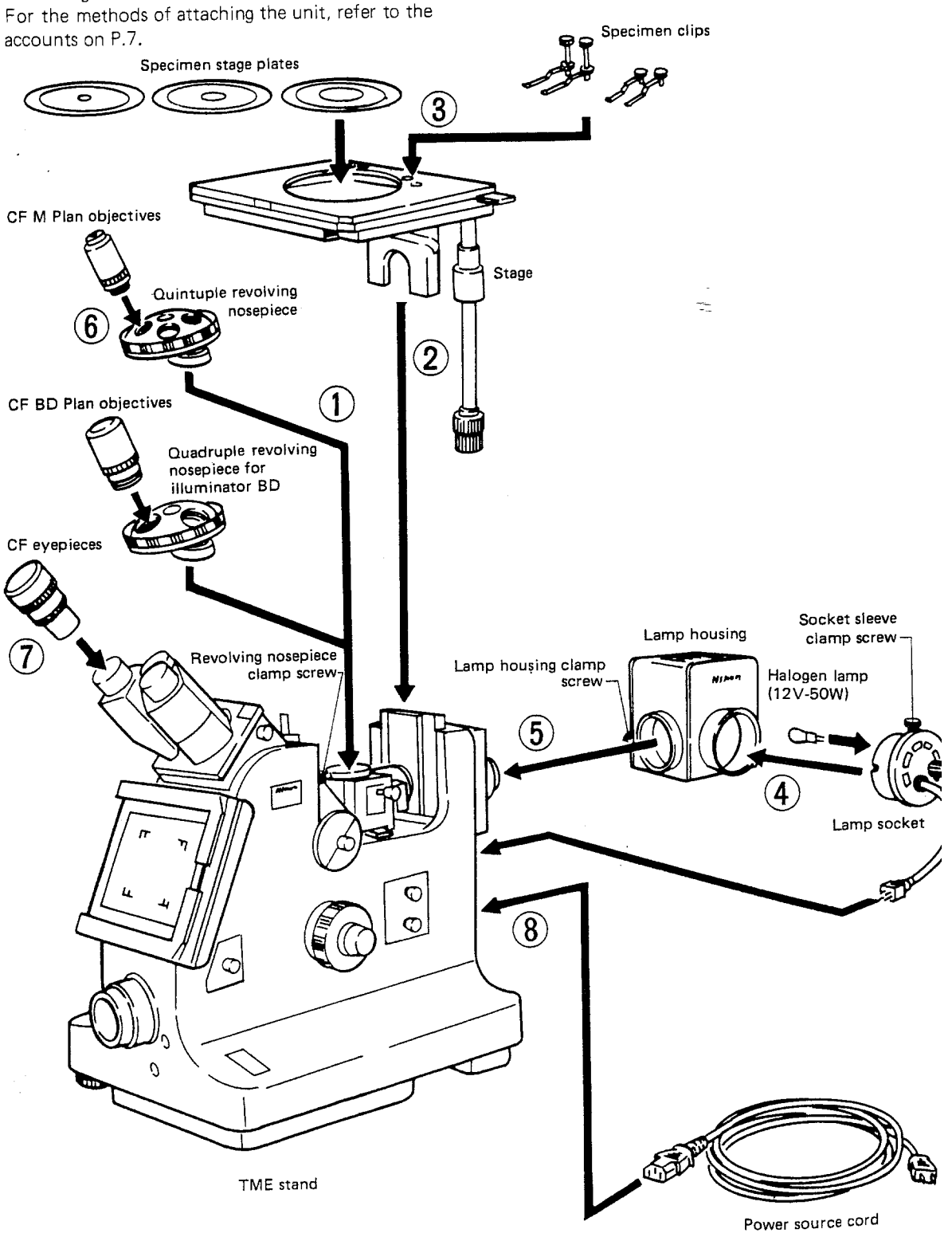


Fig.

① Revolving nosepiece (Fig. 3–1)
To attach the nosepiece, fitting its attaching groove to the positioning pin, fasten it firmly with the clamp screw.

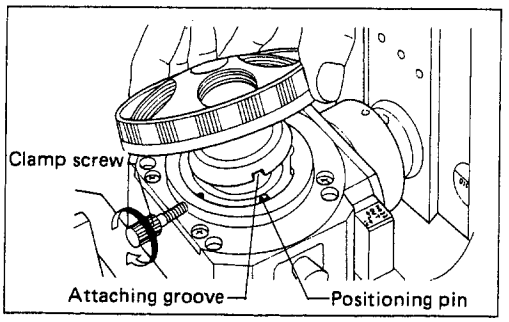


Fig. 3–1

② Stage (Fig. 3–2)
Fitting the dovetail groove on the stage to the dovetail on the microscope stand, slide in the stage gently to the limit.
Fasten the stage clamp screw and the stage supporting pin clamp screw firmly by means of a screw driver.

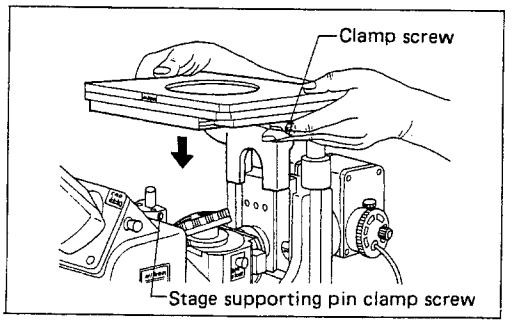


Fig. 3–2

③ Specimen stage plate and specimen clip
Place the plate into the stage at the center.
Attach the clip to the clip hole on the stage.

④ Halogen lamp and socket
Insert fully the halogen lamp (12V-50W) with its pins into the holes on the socket. At this time, do not touch the glass part with bare hands. Use gloves or cloth.
Then put the socket into the lamp housing, and fasten it in position with the clamp screw.

⑤ Lamp housing
Once release the clamp screw on the lamp housing.
Insert the housing to the collector lens on the rear side of the stand, and fasten the clamp screw.
Connect the plug for the socket to the receptacle on the rear side of the stand.

⑥ Objectives
Beforehand, rotate the coarse focus knob to move the revolving nosepiece to the lowest position.
Attach the objectives to the nosepiece from the left side one after another in such positions that the magnifying power increases, when the nosepiece is revolved clockwise, viewed from above.
Be careful not to let the tops of objective touch with the stage, etc.

⑦ Eyepieces
Insert the eyepiece into the eyepiece sleeve of the binocular eyepiece tube.

⑧ Power source cord and fuse (Fig. 3–3)
Connect the cord firmly.
The fuse reted 2A/250V or 1A/250V is used.
For replacement, remove the fuse cap by turning in the direction of the arrow. The fuse holder, embodying an input voltage change-over device, is to be pulled out with the cap removed and set so that the power source voltage being used shows up.

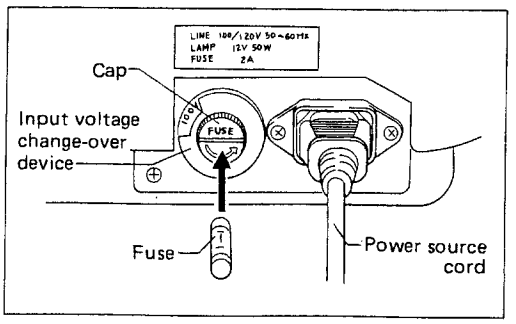


Fig. 3–3

III. PREPARATION

1. Switching ON the power source, and placing the specimen

① Connect the power source cord to the socket.
② Turn ON the power switch, and set the brightness indicator to 6.
③ Place the specimen onto the stage.

2. Adjusting the interpupillary distance

① Push the following knobs to the limit, magnifier inserting knob, illumination change-over knob, photo mask sliding knob and optical path change-over knobs.
② Turn the field diaphragm control lever and aperture diaphragm control lever to [O] to fully open the diaphragm.
③ Bring the specimen image into focus, using the 5× objective.
Adjust the interpupillary distance, as shown in Fig. 4, so that the right-and left eye viewfields come together into coincidence.

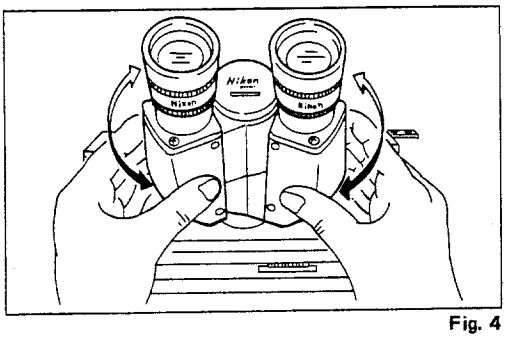


Fig. 4

3. Diopter adjustment

① Pull the photo mask sliding knob up to the limit to bring the photo mask into the optical path.

② Turning the diopter ring on each eyepiece, until the crossline image appears sharp. Do this adjustment for right- and lefthand eyepieces. (Fig. 5)

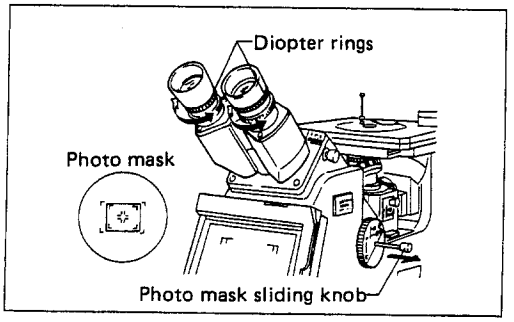


Fig. 5

* The CF eyepieces being of high eyepoint type, when the observer uses his eyeglasses, it will not be necessary to remove but only to bend the rubber eyeguards. (Fig. 6)

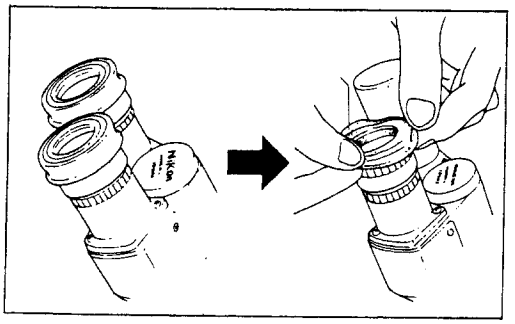


Fig. 6

4. Centering the lamp

① Push in the illumination change-over knob to the limit.

② Turn the diffuser lever to the position [OUT].

③ Place the specimen with high reflection on the stage.

④ Using the 10× objective, bring the specimen image into focus.

⑤ Draw out an eyepiece from either of the observation tubes.
Look into the tube, and the image of the exit pupil of the objective will be visible as a bright circle, together with the surface of the diffuser built in the illuminator.

⑥ Release the lamp housing clamp screw, and move the lamp housing back and forth (Fig. 7– 1), until the filament image is focused on the diffuser and the exit pupil.

⑦ Thereafter, releasing the socket sleeve clamp screw, rotate the lamp lateral centering screw and vertical centering ring (Fig. 7– 2) so that the filament image is centered to the exit pupil. (Fig. 8)

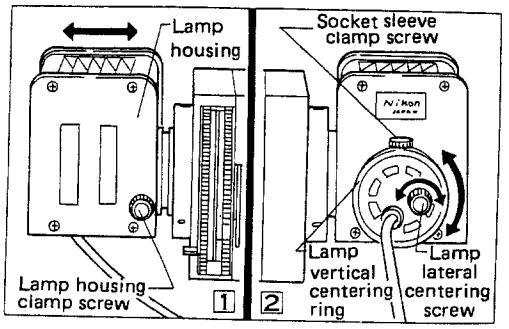


Fig. 7

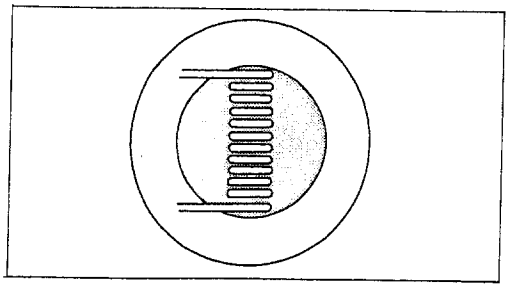


Fig. 8

IV. MICROSCOPY

1. Brightfield Microscopy

● Use the CF M Plan objectives or CF BD Plan objectives.

1. Turn on the power switch. Light the lamp, and set the brightness indicator to 6.
2. Place the specimen on the stage.
3. Make adjustment of interpupillary distance and diopter. **(Refer to P. 8 & 9)**
4. Perform centering of the lamp. **(Refer to P. 9)**
5. Turn the diffuser lever to [IN].
6. Turn the rear filter turret to [NCB 10].
7. Make sure that the illumination change-over knob is pushed in to the limit.
8. Swing in the objective to be used and focus on specimen. Though the BD 60× and BD 100× objectives are provided with a safety device, their top end lens surface being somewhat projected from the circumferential metal, be careful not to strike it against the specimen or others. **(Refer to P. 15)**
9. Adjust the field and aperture diaphragms. **(Refer to P. 16)**
10. Turn the brightness control dial to set the indicator to 9.
11. Adjust the brightness by the ND filter in the filter turret or of the ND 32 filter slide. **(Refer to P. 17)**

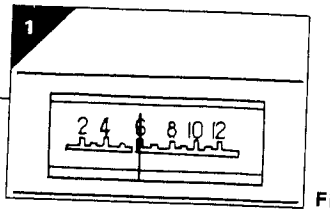


Fig. 9

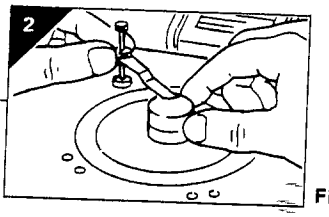


Fig. 10

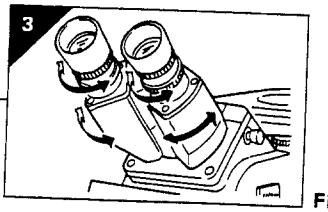


Fig. 11

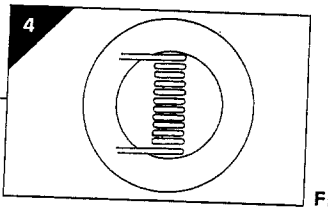


Fig. 12

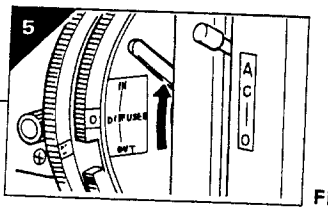


Fig. 13

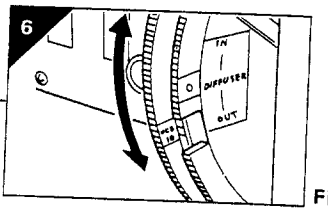


Fig. 14

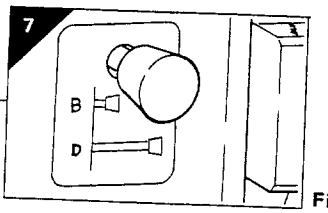


Fig. 15

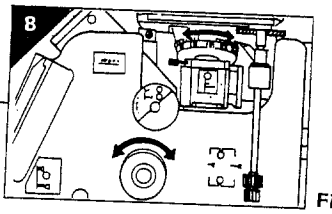


Fig. 16

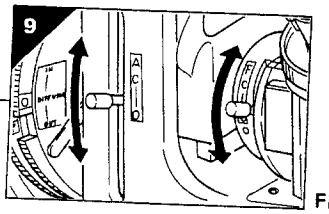


Fig. 17

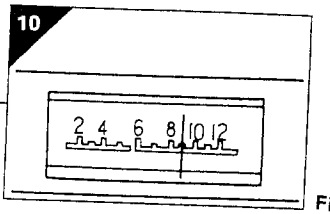


Fig. 18

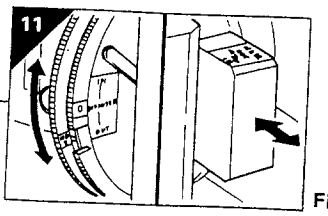


Fig. 19

2. Darkfield Microscopy

●Use the CF BD Plan objectives.

1. Turn on the power switch. Light the lamp, and set the brightness indicator to 6.
2. Place the specimen on the stage.
3. Make adjustment of interpupillary distance and diopter. **(Refer to P. 8 & 9)**
4. Perform centering of the lamp. **(Refer to P. 9)**
5. Turn the diffuser lever to [IN].
6. Turn the rear filter turret to [NCB 10].
7. Pull out the illumination change-over knob to the limit.
8. Open the field and aperture diaphragms.
9. Swing in the objective to be used and focus on specimen.
   Though the BD 60× and BD 100× objectives are provided with a safety device, their top end lens surface being somewhat projected from the circumferential metal, be careful not to strike it against the specimen or others. **(Refer to P. 15)**
   The characteristics (directionality, etc.) of the image produced by such objectives may be affected by the degree of centering of the lamp (light source). It is necessary to perform centering of the lamp, watching the image.
10. Turn the brightness control dial to set the indicator to 9.
11. Adjust the brightness by the ND filter in the turret.**(Refer to P.17)**

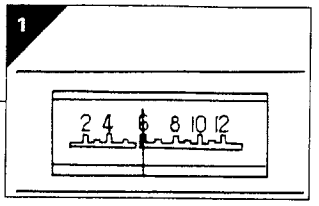


Fig. 20

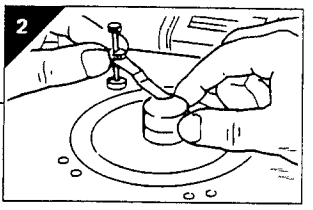


Fig. 21

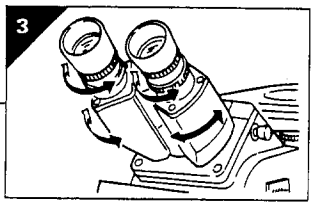
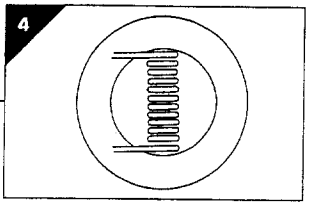


Fig. 22



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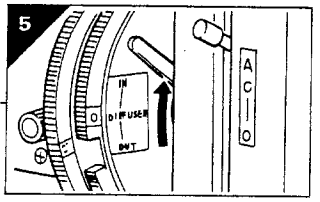


Fig. 24

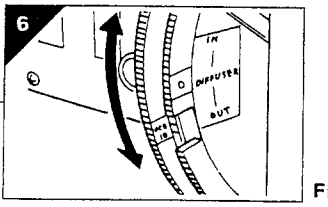


Fig. 25

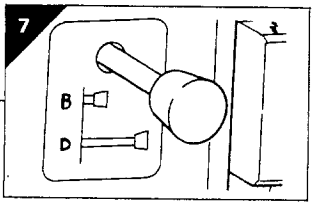


Fig. 26

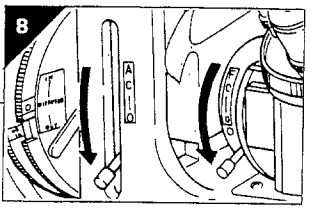


Fig. 27

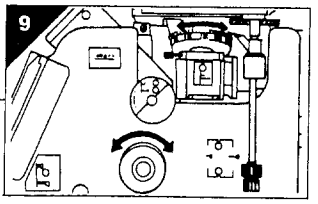


Fig. 28

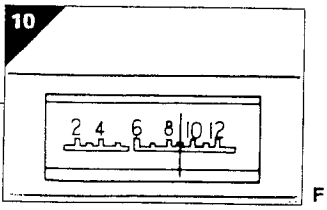


Fig. 29

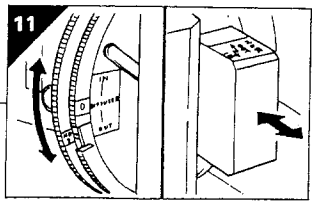


Fig. 30

3. Changing-over Brightfield/Darkfield Microscopy

- Use the CF BD Plan objectives.
- Pull out the ND 32 filter slide until it click-stops in position to bring the ND 32 filter into the optical path.

1) Changing-over from brightfield microscopy to darkfield microscopy

① Pull out the illumination change-over knob to the limit.
② Open the field and aperture diaphragms.
③ Adjust the brightness by the ND filter in the filter turret.

2) Changing-over from darkfield microscopy to brightfield microscopy

① Push in the illumination change-over knob to the limit.
② Adjust the field and aperture diaphragms.
③ Adjust the brightness by the ND filter in the filter turret or of the ND 32 filter slide.

[Note] ND 32 filter is for dazzle-prevention when the microscopy is changed-over from darkfield to brightfield.
When only the brightfield observation is to be made or the use of such a filter is not necessary on account of the type of specimen, push in the ND 32 filter side until it click-stops in position to bring the ND 32 filter out of the optical path.

4. Manipulation of each part

1) Focusing device

- The arrows in Fig. 31 show the relation between the direction of rotation of the focus knobs and that of vertical movement of the objective nosepiece.

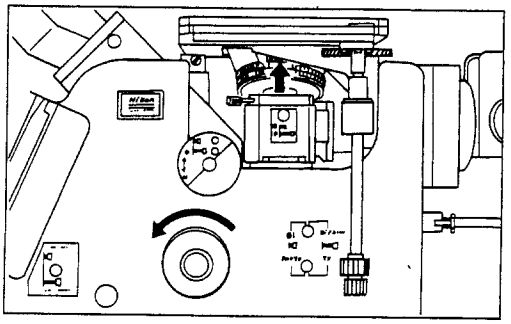


Fig. 31

- One rotation of the fine focus knob moves the objective 0.1mm vertically, the minimum reading of the scale on the knob being 1 μm.
  One rotation of the coarse focus knob moves the objective 4.7mm.
- Tension of rotation of the coarse and fine focus knobs having been properly adjusted by the manufacturer, it should not be readjusted by the user. Never attempt to turn the one knob while holding the other because of causing disorder.

2) Optical path change-over knob

- For changing over the optical path, push or pull the change-over knob. The distribution of brightness between the observation and photomicrographic systems, depending upon the position of the knob is given below:
- For changing-over the optical path of the photomicrographic systems, refer to P. 29 & P.33.

Table 1

Brightness ratio					
	For observation	100%	100%	20%	20%
	For photomicrography	0	0	Built-in photomicrographic system 80%	Side photomicrographic system 80%

3) Illumination change-over knob

- For changing over the illumination, push or pull the change-over knob.
- For brightfield illumination, push in the knob to the limit.
- For darkfield illumination, pull out the knob to the limit.

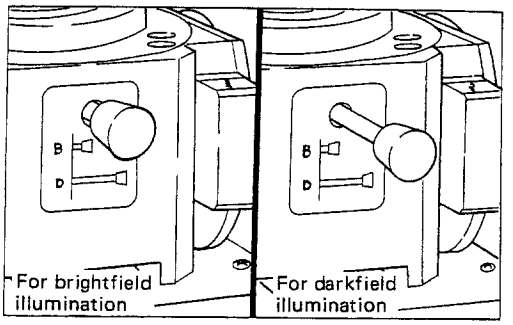


Fig. 32

4) Observation magnifier

- By pulling the magnifier inserting knob, three index lines on the knob will show up one after another. These index lines, from the right, correspond to the markings [O], [M] and [C], respectively.
- When the knob is set to [O], the optical path will be opened.
- When it is set to [M], the magnifier lens will be put into the optical path to multiply the magnification of eyepiece by 4×.
  For the use of magnifier lens, refer to P. 30 & 34.
- When it is set to [C], the light blocking plate, which prevents extraneous light from entering the eyepiece, will be inserted into the optical path, thus being utilized for photomicrography.

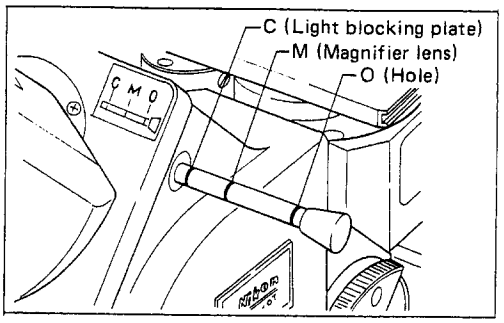


Fig. 33

5) Photo mask

- To put the photo mask into the optical path pull the photo mask sliding knob up to the limit. **(Fig. 34)**
- It is used in photomicrography, when focusing is to be done with the binocular eyepiece tube of microscope (Refer to P. 30), or when diopter adjustment of the eyepieces is to be made.

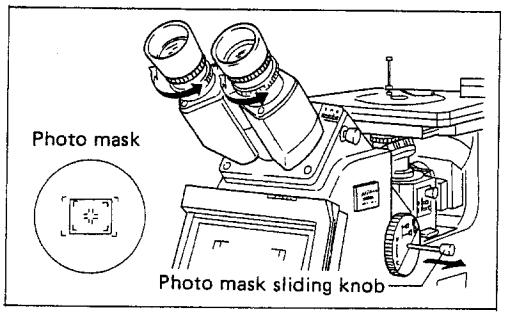


Fig. 34

6) Objectives

- For the EPIPHOT-TME microscope, in all cases use the CF objectives in combination with the CF eyepieces, both of which have been designed on the basis of our CF (Chromatic Aberration Free) system.
- For brightfield microscopy, use CF M Plan Achromat or CF M Plan Apochromat objectives.
- For darkfield microscopy, use CF BD Plan Achromat objectives.
- Observe directly the specimen with neither a coverglass nor any other material. Because they will deteriorate the resolution and image contrast.

7) Eyepieces

- The CF eyepieces will produce the highest quality of image, when used in combination with the CF objectives.
- The eyepieces are provided with a diopter ring and rubber eyeguard.

8) Viewfield diaphragm

- The diaphragm, permitting the user to limit the illuminated area to such an extent as to be observed, is generally closed so that its circumference circumscribes that of the eyepiece viewfield.
  If the illuminated area be larger than the eyepiece viewfield, stray light will enter the field of view, causing flare in the image and lowering the contrast.

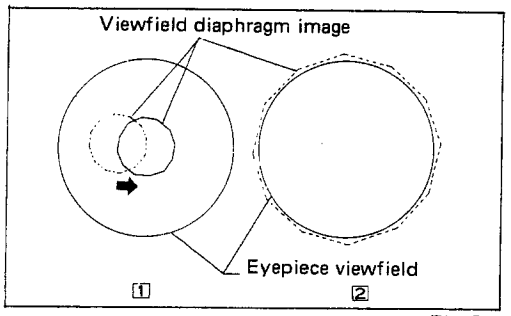


Fig. 35

- To change the opening of the viewfield diaphragm manipulate its control lever. In the position [O] it will be fully opened, and in the position [C], closed to the smallest opening. **(Fig. 36)**
- When the darkfield microscopy is made, fully open the viewfield diaphragm.

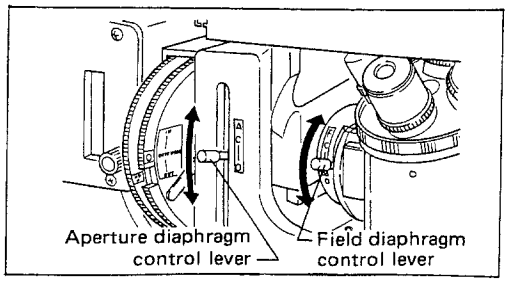


Fig. 36

9) Condenser aperture diaphragm

- The diaphram is provided for adjusting the numerical aperture of the illumination 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.

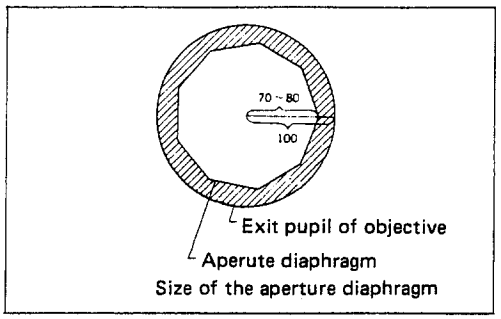


Fig. 37

- For adjusting the aperture diaphragm, manipulate the aperture diaphragm control lever. By turning the lever to the mark [O], the aperture diaphragm will be opened, and to the mark [C] closed. (Fig. 36)
  After removing an eyepiece from either of the observation tubes, 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.
- When the darkfield microscopy is made, fully open the aperture diaphragm.

10) Filters

(1) Filters built in the turret

Filters are built in two turrets, as shown in Table 2.
Turn the turret so as to show the indication of the filter to be used.

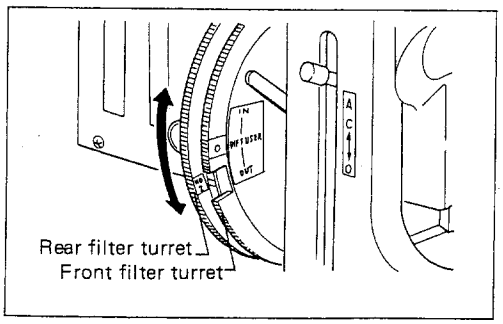


Fig. 38

Table 2

Position of the turret	Indication	Type of filter	Use
	O	Hole	
Front	NCB 10	Color balancing (NCB 10)	For color photomicrography and general microscopy
	GIF	Green interference	For contrast adjustment
Rear	ND 32	ND 32 (T ≒ 50%)	Brightness adjustment for general microscopy and photomicrography
	ND 16	ND 16 (T ≒ 6.3%)	
	O	Hole	
	O	Hole	

(2) ND 32 filter slide

The ND 32 filter (T ≒ 3%) is provided for protecting the eyes against glare, when the darkfield microscopy is changed over to the brightfield microscopy.
When only brightfield microscopy is performed, or when the use of such a filter is not necessary depending on the type of specimen, push in the slide to the limit to bring the filter out of the optical path.

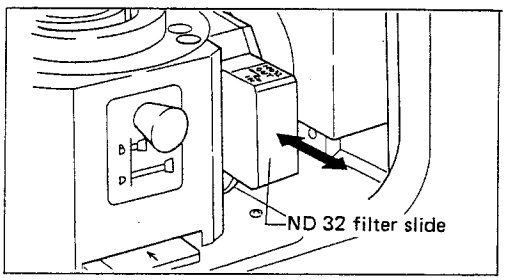


Fig. 39

(3) Addition of filters

A filter of 25mm in diameter and thinner than 5mm in thickness is attachable to the holes of the rear turret, as shown in Fig. 40.

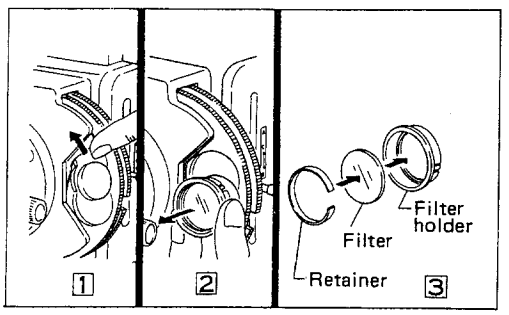
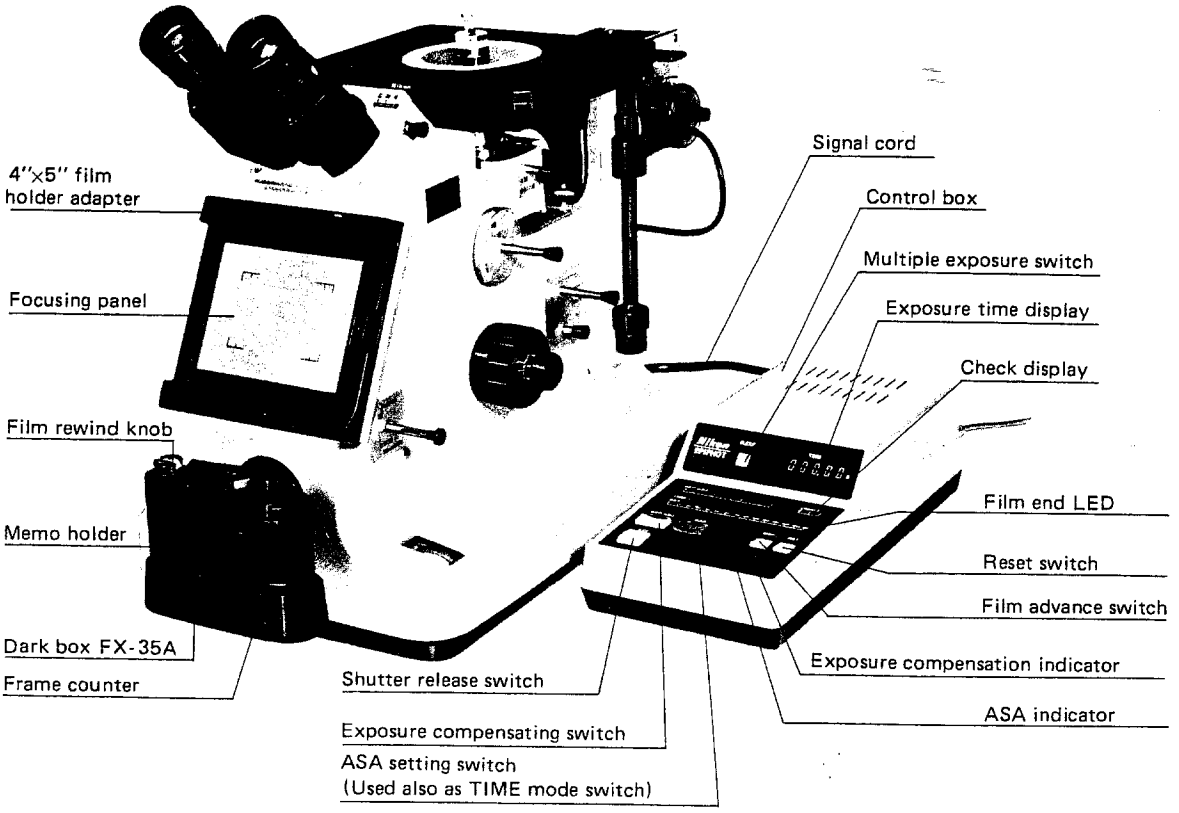


Fig. 40

V. BUILT-IN PHOTOMICROGRAPHIC SYSTEM

1. Nomenclature of photomicrographic attachment

- Magnification on the 35mm film surface: Magnifying power of objective ×2.5
- Magnification on the 4"×5" film surface: Magnifying power of objective ×10



Rear view of control box

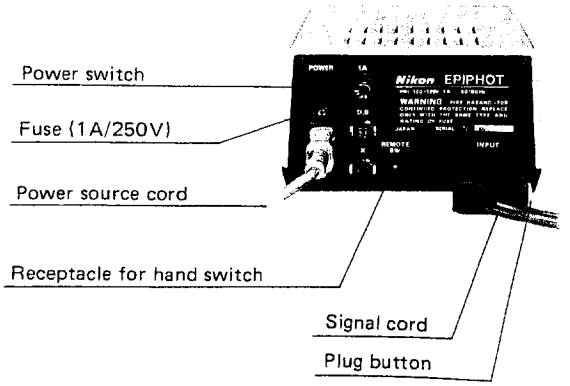


Fig. 41

2. Assembling the 35mm film photomicrographic attachment

1) Dark box FX-35A

Align the index of the dark box with that of the TME stand then rotate the dark box in the arrow direction until it stops. (Fig. 42)

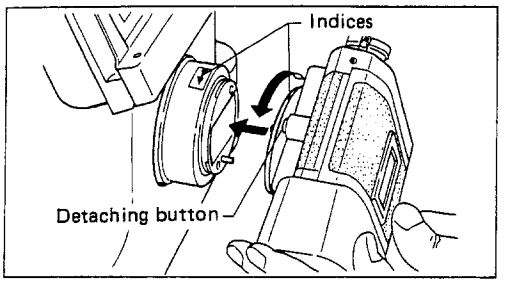


Fig. 42

To detach the dark box, rotate it in the counter-arrow direction pushing the detaching button.

2) Voltage exchange switch

Remove the cover of the battery chamber drawing out in the arrow direction from the control box bottom and set the inside switch at the power source voltage in use. (Fig. 43)

3) Ni-Cd battery (3.6V 50mAH)

Load the battery in accordance with the polarity indication (+, –) without fail. (Fig. 43)

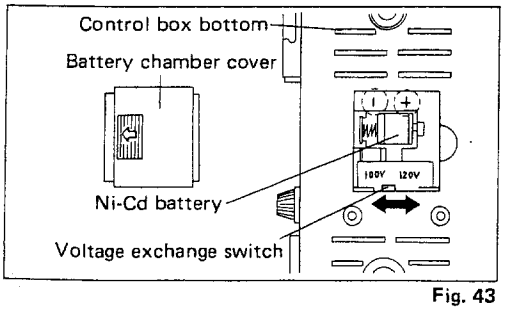


Fig. 43

[Note] The fully charged battery can be used for about 1000 hours. Once it is exhausted, it can be recharged by turning the control box power switch on.
Do not throw the disused batteries away but return them to your dealer or a nearest Sales Dept. of ours.

4) Control box

Connect the control box with the microscope stand by the signal cord. (Fig. 44)
For connecting the signal cord, insert straightly into the receptacle pushing the plug button and aligning the plug with the receptacle. Afterwards connect the power cord.

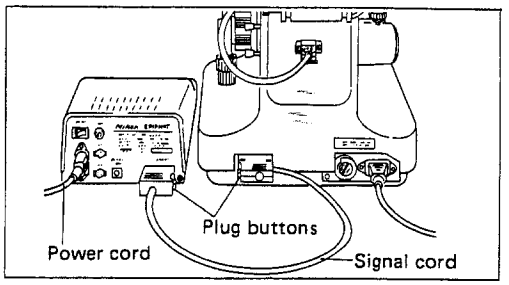


Fig. 44

5) Film loading

① Pull up the dark box back lock knob and open the back.
② Put the film cassette into the dark box and push down the knob.
③ Insert the film leader tip into the slot on the spool which is to be rotated a little so as its protrusions catch the perforations of film. (Fig. 45) The film is to be wound the emulsion side out.

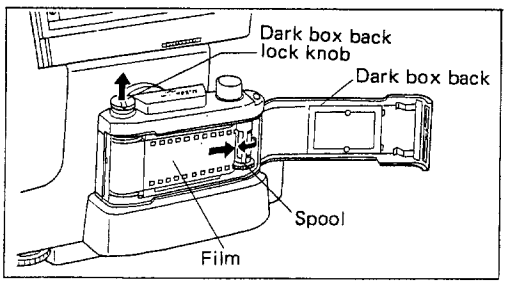


Fig. 45

④ Advance the film by rotaing the wind spool a little so as the sprocket teeth engage the perforations on both ends of the film width.
⑤ Close the dark box back making sure that film positions correctly between the outside guide rails and the perforations properly engaging the sprocket teeth.
⑥ Eliminate looseness in the film roll by

rotating the rewind crank in the arrow direction until it stops.

⑦ Advance the film by pushing the film advance (WIND) switch on the control box until the frame counter indicates "1". (Fig. 46)

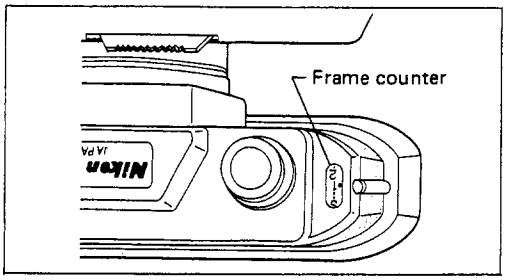


Fig. 46

⑧ Make sure that the film end display LED on the control box is not lighting. If the LED is lighting, push the film advance (WIND) switch again to complete the advance.

[Note] The film advance can be assured of its proper function by watching the rewind rotation that is effected while the film is advancing.
If the rewind knob (dark box back lock knob) fails to rotate, the film must be checked and reloaded.
However, when a short strip such as 12-exposure of film is loaded, the film rewind knob may fail to rotate even if the film is properly winded.
This is because there is looseness of film in the dark box. In this case, before opening the dark box back, rotate the rewind crank in the arrow direction so as to eliminate the looseness in the film roll. Then, make sure that the film rewind knob rotates by advancing the film again.

6) Film rewinding

① By finishing final exposure on the loaded film, end display LED begins to flicker. Then press the rewind button and rotate the rewind knob in the arrow direction by means of the flipped up crank to rewind the film. (Fig. 47)

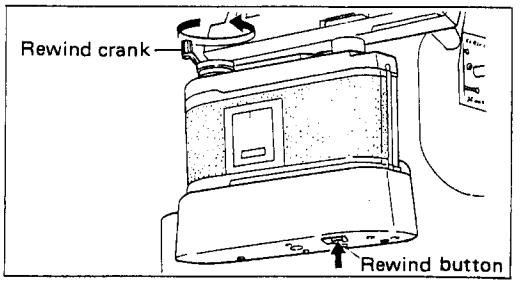


Fig. 47

② When the film is wound, open the dark box back by pulling up the dark box back lock knob (rewind knob) and take out the film cassette but do not left it under brightness.

[Note] It is recommended that the dark box is reloaded with a new roll while the film end LED is still flickering. The LED flickering will be counted to 20 times.
When the film is reloaded, make sure of the frame counter indicaiton.

3. Assembling the 4"×5" film photomicrographic attachment

1) Attaching the film holder

Lift up the focusing panel, and insert the film holder as far as it goes. (Fig. 48)

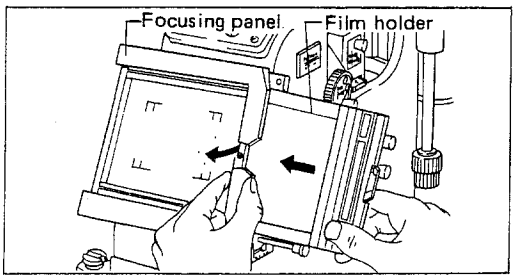


Fig. 48

2) Control box

For setting the voltage exchange switch, attaching the Ni-Cd battery and connecting with the microscope stand, refer to "2. Assembling the 35mm film photomicrographic attachment" on P. 19.

4. Photomicrographic operation

In order to use this system most effectively for any kind of photomicrography, the following procedures and operational mode are provided for your selection to be picked to suit your purpose in consideration of specimen state and environment. Make use of the standard operation chart for each mode which is given on P.22 ~P.27.

★ AUTOMATIC EXPOSURE

Operational mode	Used for	Measurement relative to exposure	Procedure
General mode	Normal photomicrography	Shutter speed is determined by measurement instantly before releasing shutter.	Refer to P. 22.
Multiple exposure mode	Imposing micrometer scale on picture.	Shutter speed is determined by measurement instantly before releasing shutter for each exposure.	Refer to P. 26.

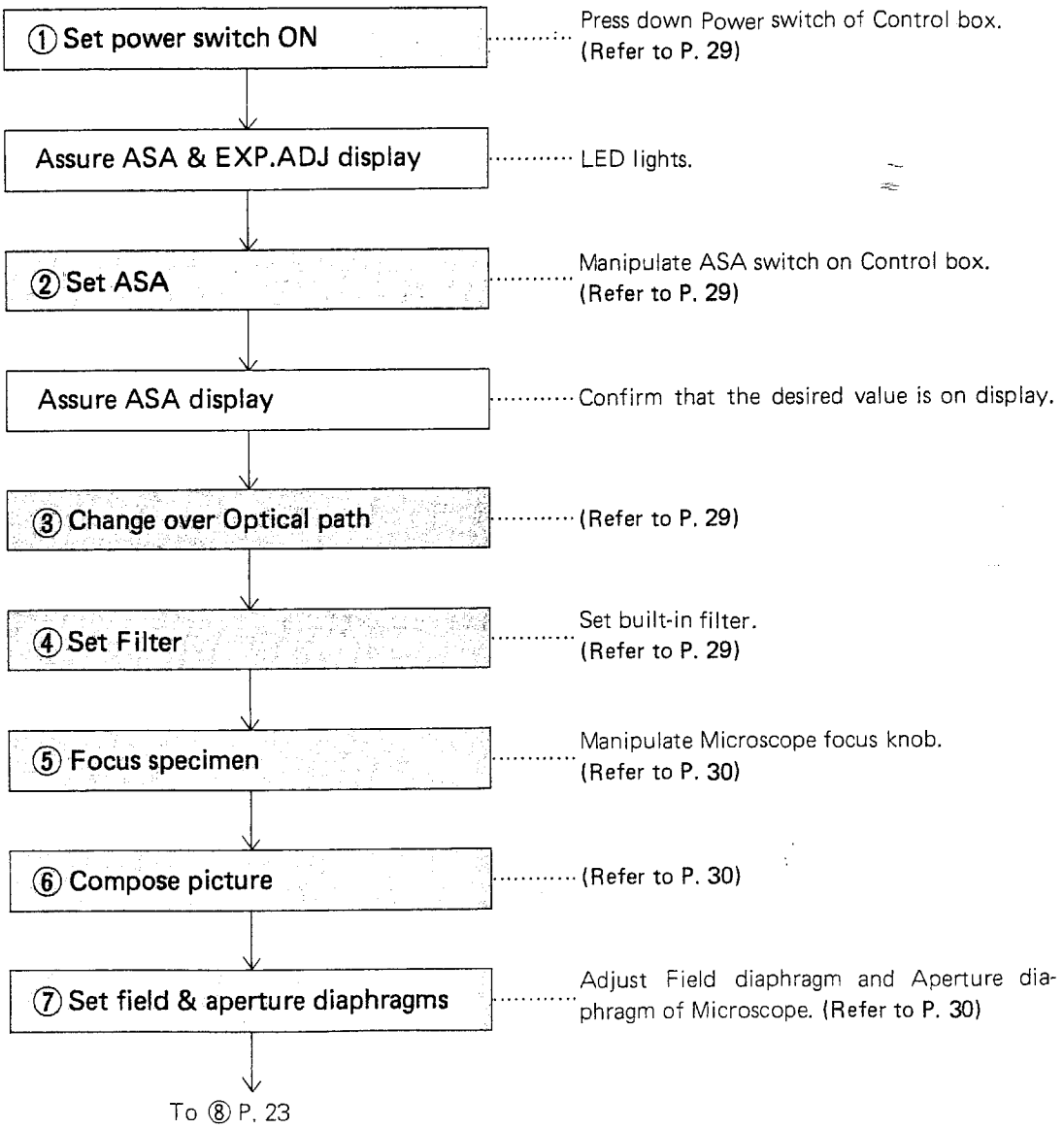
★ TIME EXPOSURE

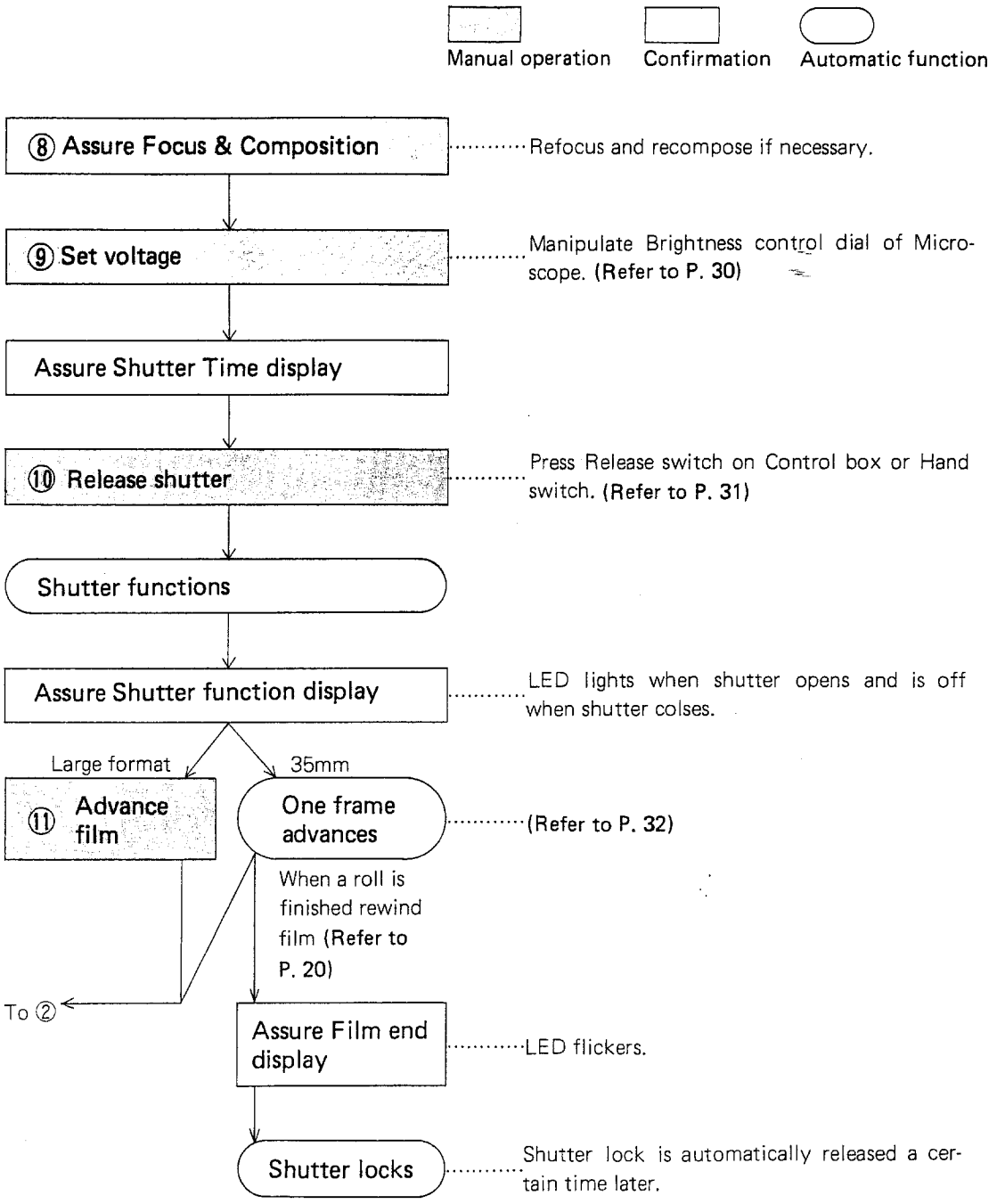
Operational mode	Used for	Exposure	Procedure
TIME exposure mode	Manual exposure	Shutter time is not determined by measurement but assumed specifically ("999.99" is displayed).	Refer to P. 24.
Multiple exposure mode	Imposing micrometer scale on picture.		———

1) Operation chart

After the operation for each microscopy (refer to P.10 ~ P.17), proceed the following photomicrographic operation modes (refer to P.22 ~ P.27).

(1) General mode exposure




Manual operation
Confirmation
Automatic function
⑧ Assure Focus & Composition
Refocus and recompose if necessary.
⑨ Set voltage
Manipulate Brightness control dial of Microscope. (Refer to P. 30)
Assure Shutter Time display
⑩ Release shutter
Press Release switch on Control box or Hand switch. (Refer to P. 31)
Shutter functions
Assure Shutter function display
LED lights when shutter opens and is off when shutter colses.
Large format
35mm
⑪ Advance film
One frame advances
(Refer to P. 32)
When a roll is finished rewind film (Refer to P. 20)
To ②
Assure Film end display
LED flickers.
Shutter locks
Shutter lock is automatically released a certain time later.

(2) TIME mode exposure

① Set Power switch ON ..... Push down Power switch of Control box. (Refer to P. 29)

↓

Assure ASA & EXP.ADJ display ..... LED lights.

↓

② Change over Optical path ..... (Refer to P. 29)

↓

③ Set Filter ..... Set built-in filter. (Refer ot P. 29)

↓

④ Focus specimen ..... Manipulate Microscope focus knob. (Refer to P. 30)

↓

⑤ Compose picture ..... (Refer to P. 30)

↓

⑥ Set field & aperture diaphragms ..... Adjust Field diaphragm and Aperture diaphragm of Microscope. (Refer to P. 30)

↓

⑦ Assure Focus & Composition ..... Refocus and recompose if necessary.

↓

⑧ Set voltage ..... Manipulate Brightness control dial of Microscope. (Refer to P. 30)

↓

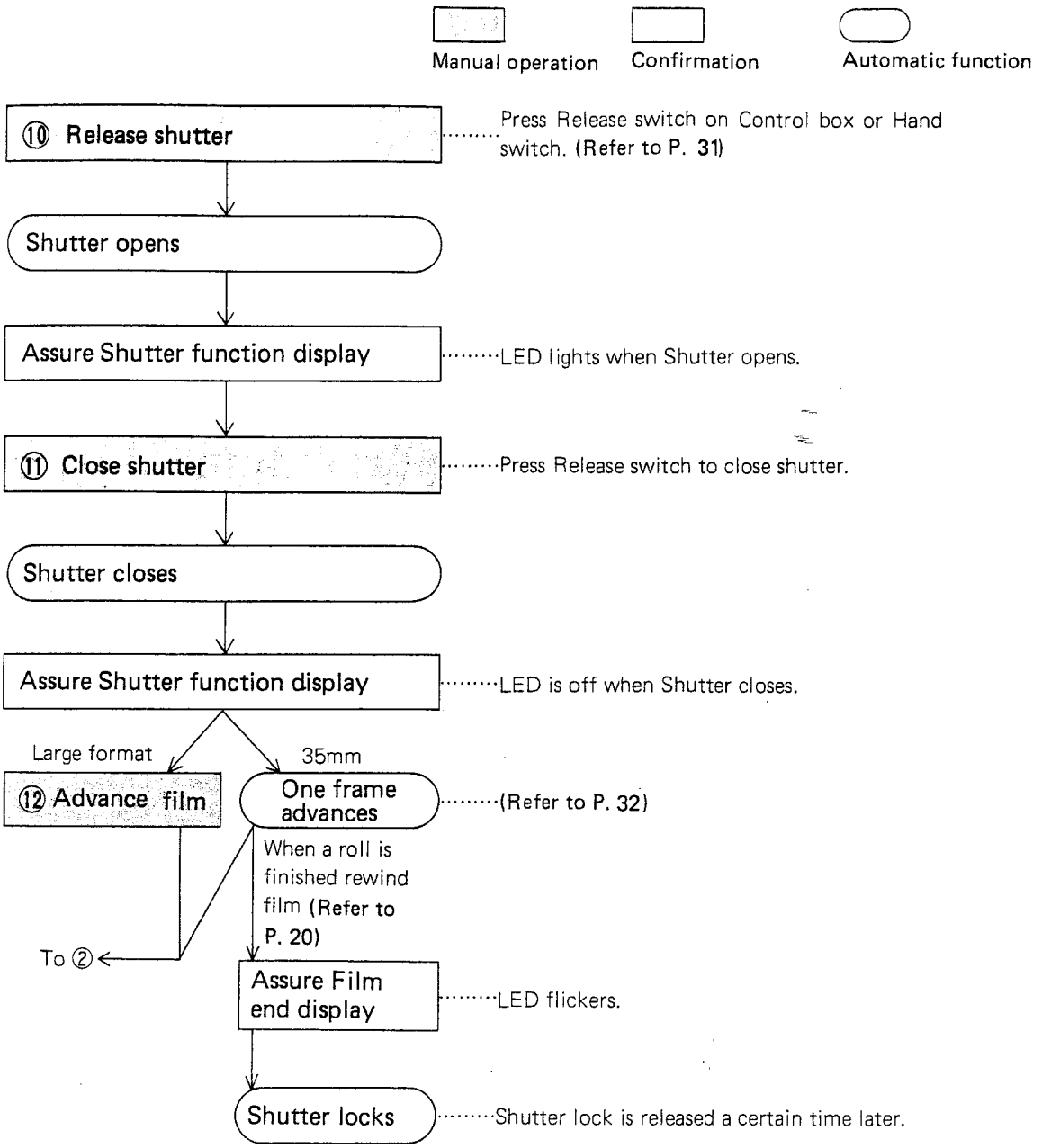
⑨ Set TIME mode ..... Time mode is set and displayed by manipulating ASA switch. Shutter time display and automatic exposure function are disengaged to make manual exposure possible. (Refer to P. 31)

↓

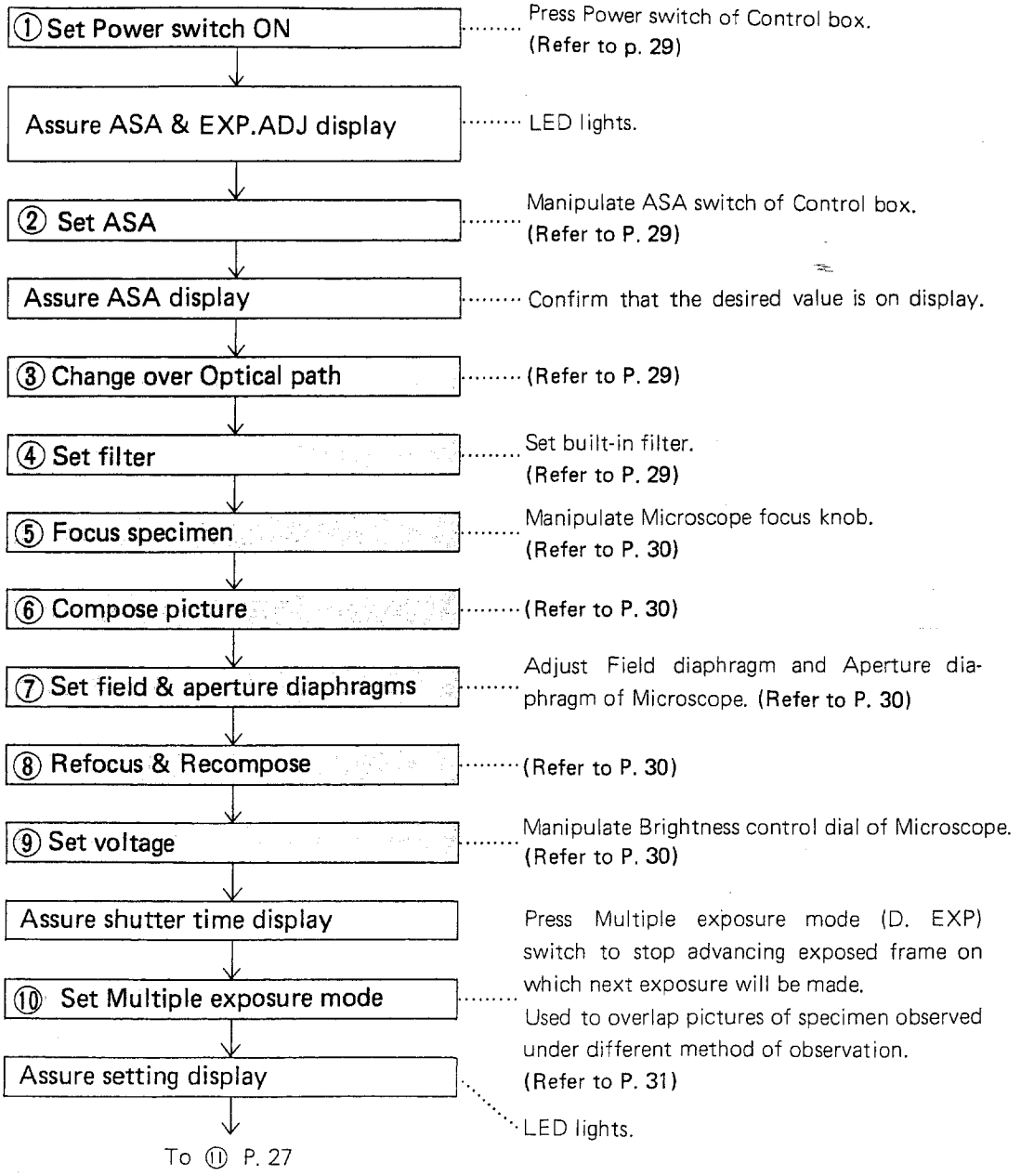
Assure TIME mode & Shutter time display ..... LED lights and shutter time display indicates 999.99s.

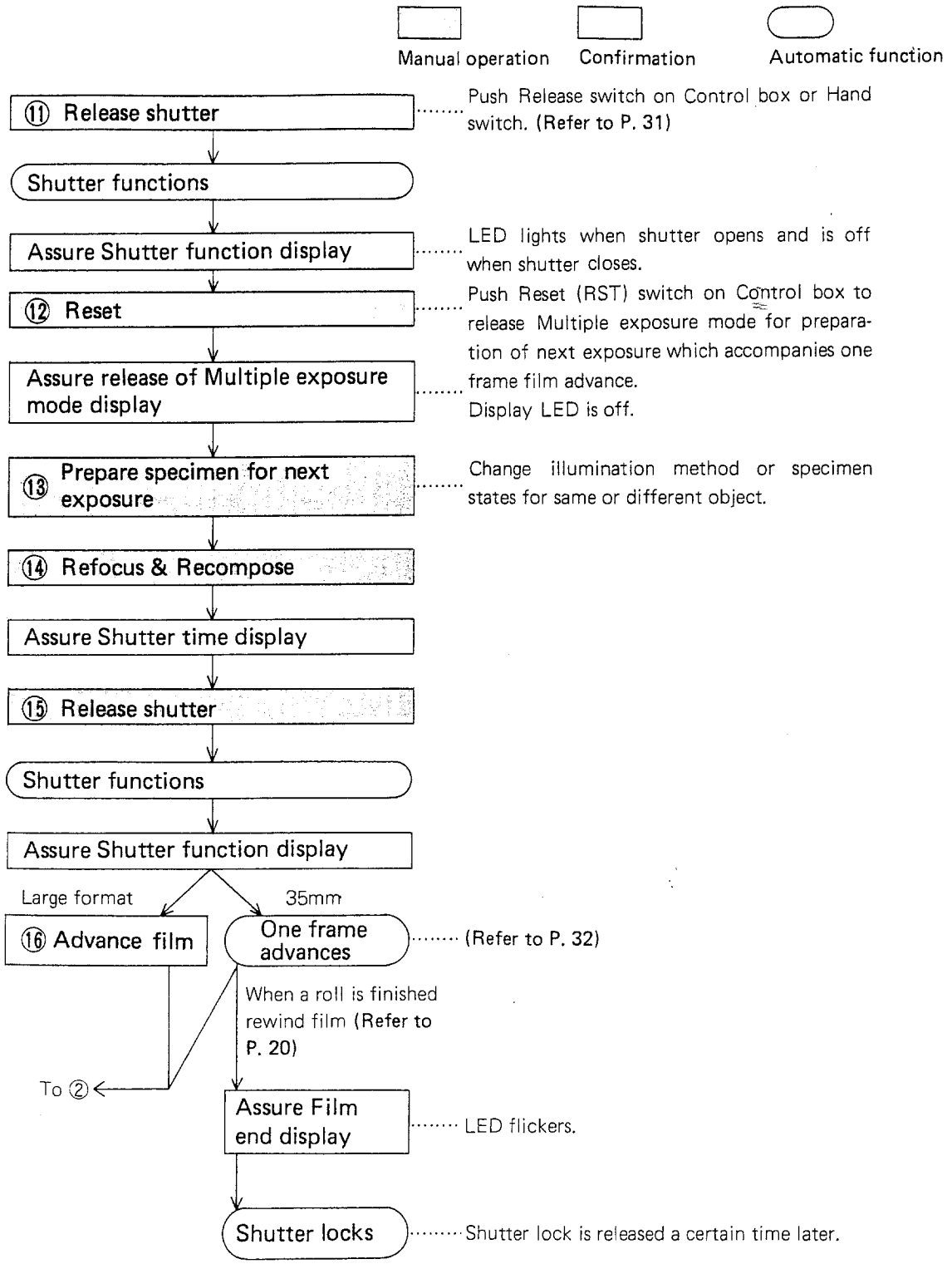
↓

To ⑩ P. 25


Manual operation
Confirmation
Automatic function
⑩ Release shutter
Press Release switch on Control box or Hand switch. (Refer to P. 31)
Shutter opens
Assure Shutter function display
LED lights when Shutter opens.
⑪ Close shutter
Press Release switch to close shutter.
Shutter closes
Assure Shutter function display
LED is off when Shutter closes.
Large format
35mm
⑫ Advance film
One frame advances
(Refer to P. 32)
When a roll is finished rewind film (Refer to P. 20)
To ②
Assure Film end display
LED flickers.
Shutter locks
Shutter lock is released a certain time later.

(3) Multiple mode exposure




Manual operation
Confirmation
Automatic function
⑪ Release shutter
Push Release switch on Control box or Hand switch. (Refer to P. 31)
Shutter functions
Assure Shutter function display
LED lights when shutter opens and is off when shutter closes.
⑫ Reset
Push Reset (RST) switch on Control box to release Multiple exposure mode for preparation of next exposure which accompanies one frame film advance.
Assure release of Multiple exposure mode display
Display LED is off.
⑬ Prepare specimen for next exposure
Change illumination method or specimen states for same or different object.
⑭ Refocus & Recompose
Assure Shutter time display
⑮ Release shutter
Shutter functions
Assure Shutter function display
Large format
35mm
⑯ Advance film
One frame advances
(Refer to P. 32)
When a roll is finished rewind film (Refer to P. 20)
To ②
Assure Film end display
LED flickers.
Shutter locks
Shutter lock is released a certain time later.

2) Care of photomicrography

① If the shutter time display does not indicate "000.00" for the first time when the power (POWER) switch is set ON: ➡ The prism in measuring system fails to function resulting shutter lock and if "000.00" is not displayed by pressing the reset switch, contact your dealer or a nearest Sales Dept. of ours.

② IF "▼" or "▲" LED lights on CHECK display for AUTO exposure: ➡ Shutter will be locked because the shutter time is under or over the measuring range. Adjust the voltage of the microscope illuminator or for color photomicrography use a proper ND filter.

③ If "E" (error) LED lights or flickers on CHECK display: ➡ Shutter will be locked because of failure in operation or in function. If LED does not go out by pressing the reset switch, contact your dealer or a nearest Sales Dept. of ours.

④ If previous setting of ASA or EXP.ADJ fails to appear in display when the power switch is set ON or if LED lighting of ASA display shifts to TIME display, or EXP.ADJ display LED goes away during operation: ➡ The battery might have been discharged and recharge is required. (Recharge starts by switching power ON and charging for 3 ~ 4 hours the battery capacity will be filled.)

⑤ Releasing the shutter with the eyes off the eyepieces: ➡ Push the magnifier inserting knob to the position [C] to bring the light blocking plate, which prevents the extraneous light from entering the eyepieces, into the optical path. A semi dark room is recommended for the photomicrography.

⑥ Exchanging film: ➡ Film is to be exchanged preferably during the film end display LED is flickering. For exchanging film after LED flickering stopped confirm the frame counter in advance.

⑦ Using the hand switch: ➡ Release switch does not function while the hand switch is in use.

3) Operations in detail

(1) Power switch

When the power (POWER) switch on the back of the control box is set ON, ASA and EXP.ADJ LEDs light and the shutter time display is "000.00" in beginning. **(Fig. 49)**

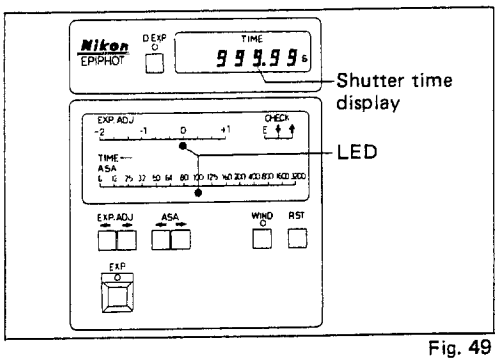


Fig. 49

At the same time it begins to charge the battery and after 3 ~ 4 hours the battery will charged in full capacity effective for about 1000 hours.

(2) ASA setting

The speed of film in use is set by ASA switch on the control box.

ASA display LED is moved by pressing ASA switch to indicate the desired value (ASA 6 ~ 3200).

The arrow marks above the switch indicate the direction of the LED movement (←: counterclockwise, →: clockwise). **(Fig. 50)**

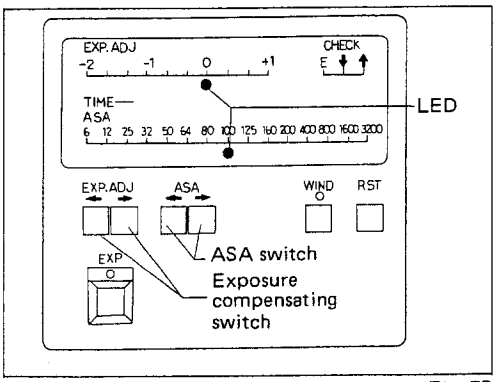


Fig. 50

★ **Exposure compensation**

Exposure compensation can be possible by pressing EXP.ADJ switch. **(Fig. 50)**

The compensation can be made by 1/3 EV step for the range of −2 ~ +1 EV.

Set plus compensation to extend the shutter time and vice versa.

The arrow marks above the switch indicate the direction of the display LED movement.

For example:

When the objects to be photographed are distributed uniformly in the picture frame, set the EXP.ADJ indicator to 0.

When the specimen area in the picture frame are extremely small, set the indicator to + (over).

When there is large brightness difference among details of specimen, set the indicator to − (under).

(3) Optical path change-over

Optical path can be changed over by means of the optical path change-over knobs.

The position of each optical path change-over knob in Fig. 51.

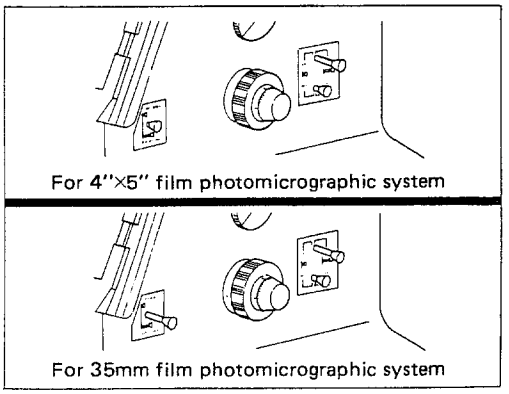


Fig. 51

(4) Filter set

For the color film of daylight type, set the NCB 10 filter, but for that of tungsten type, no filter is necessary.

Depending upon the make of the film, different color renditions may result.

It is recommended that in addition to the NCB 10 filter a color compensation filter (CC filter), available from the film manufacturer, be used.

For the monochrome film, using the GIF filter will improve the contrast.

(5) Focusing

Focusing is made with the observation tube in the following procedures.

① Pulling the photo mask sliding knob out to the limit to bring the photo mask into the optical path.

② Confirm the diopter adjustment.

(Refer to P. 9)

③ Make focus on the specimen by manipulating the coarse and fine focus knobs.

[Note] In case of using the 5× or 10× objective, pull the magnifier inserting knob out to the intermediate position to bring the magnifier lens into the optical path, thus constructing the eyepieces of higher magnification, to perform precise focusing.
Diopter adjustment of eyepieces is to be made with the optical path opened by pushing in the magnifier inserting knob to the limit.
After bringing the magnifier lens into the optical path, do not make the diopter adjustment.

(6) Picture composing

Compose the picture within the photo mask brought in the optical path corresponding to the film size in use by driving the stage laterally or longitudinally, or by rotating the specimen. (Fig. 52)

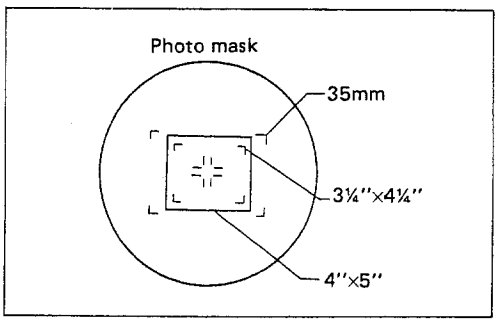


Fig. 52

(7) Field diaphragm and aperture diaphragm

- For photomicrography in brightfield

The field diaphragm is to be stopped down to cover a little beyond the picture field to prevent the stray light causing flare.

The adjustment of the aperture diaphragm controls depth of focus, contrast and resolution.

Make use of the aperture diaphragm according to the purpose.

The aperture diaphragm is usually stopped down to cover 70 ~ 80% of numerical aperture of the objective in use.

- For photomicrography in darkfield

Fully open both the field and aperture diaphragms.

(8) Voltage of power source

The color temperature of the light source will vary with the voltage being used.

Therefore, in color photomicrography, the setting of the power source voltage is essential for the result to be obtained.

Table 3 shows the standard combination of power source voltage and filter.

Table 3

Film		Voltage	Filter
Color film	Daylight type	9	NCB 10
	Tungsten type	8	
Monochrome film		6 or higher	(GIF)

★ Shutter time setting

The shutter time is automatically determined for the range of 0.01 ~ 999.99 sec. (1/100" ~ about 16').

The shutter time display changes in response to the reflection of specimen, ASA setting, aperture diaphragm, etc.

However, if the shutter time comes out of capacity of measuring circuit, the CHECK display indicates the mark "↓" (under exposure) or "↑" (over exposure) by lighting the LED and the shutter locks.

(Fig. 53)

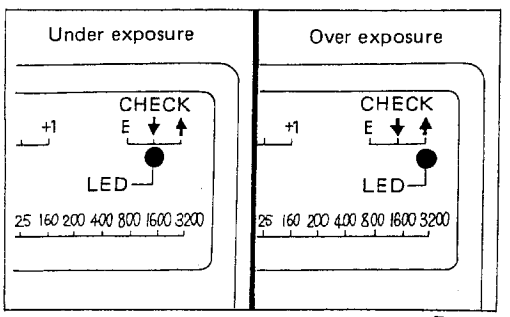


Fig. 53

- With color film
  The shutter time is to be adjusted by means of the ND filter and the diffuser.
  (Do not adjust the voltage of illumination light source to change the shutter time.)
- With monochrome film
  The shutter time is to be adjusted by changing the voltage of illumination light source and by means of the ND filter and the diffuser.

(9) Shutter release (EXP) switch

The shutter is released by pushing the shutter release switch on the control box or the hand switch connected to the back of the same. (Fig. 54)

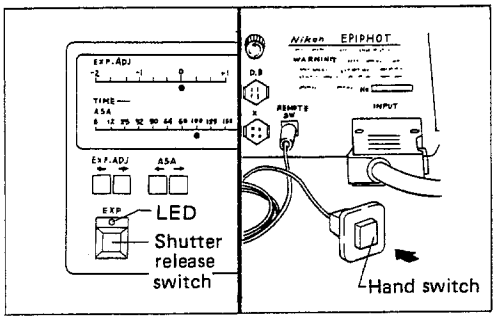


Fig. 54

With this operation, the film is exposed, one frame exposed is advanced and the shutter is charged automatically.
Shutter function display LED lights while the shutter is open.
When the hand switch is in use, the shutter release switch does not function.

(10) TIME mode

Beside Automatic mode, TIME mode is employed to control the shutter time in such a case that the exposure requires long shutter time or longer than 3 minutes.
In carrying on Time mode (Refer to P.24), after setting the voltage, set Time mode and bring display LED to TIME by pressing ASA switch (this switch is used to set ASA and TIME). (Fig. 55)

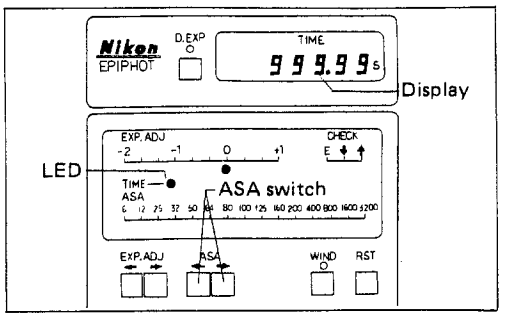


Fig. 55

For the exposure, push the release switch to open the shutter and keep it open for the desired time counting seconds by a stop watch etc. then, push the shutter release switch again to close the shutter.
When the shutter is closed, the film advances one frame and the shutter is recharged automatically for the next exposure.
To release Time mode setting press ASA switch and bring the display LED to ASA setting.

(11) Multiple exposure mode

The mode is used to make double or multiple exposure on a single frame of the film.
For example, this mode is effectively used to take a picture of a specimen overlapping to another specimen, or a picture of a specimen with overlapping exposure under different kinds of illumination. In carrying out Multiple exposure mode (Refer to P.26), before pushing the release switch, press D.EXP switch so as the automatic film advance is stopped to function.
Thus, after the first exposure the exposed frame stays in the same position and the second exposure can be made on the same frame by pushing the release switch again. Then the second picture is overlapped or superimposed to the first one and the specimen status under different treatments are distinctively photographed on the same frame.

VI. SIDE PHOTOMIC

Multiple exposure mode is released by pressing the reset (RST) switch before making the next exposure if it is desired to be made under the usual mode with the automatic film advance.

(12) Reset (RST) switch

This switch is pushed to release the setting of Multiple exposure mode.

If the shutter time display fails to indicate "000.00" when the power switch is pushed ON, or CHECK display indicates "E", press the reset switch to check the circuit. If "000.00" still fails to appear or LED of "E" fails to disappear by the above checking, contact your dealer or a nearest Sales Dept. of ours.

(13) Film advance

The 35mm dark box attached to the TME stand is equipped with the automatic film advance device.

By pressing the release switch the shutter goes first, then the film advances one frame and the shutter is recharged.

However, as the advance of large format film is not automatic, it must be advanced manually.

For photomicrography with EPIPHOT-TME, apart from the the built-in photomicrographic system, which enables the 35mm film or 4"×5" film photomicrography, the side photomicrographic system is equipped for taking a photomicrograph by attaching any of the Nikon photomicrographic attachments (MICROFLEX) to the left side of the TME stand.

1. Assembling

1) CF PL projection lens

Remove the cap from the Microflex attaching port of the TME stand. Insert the CF PL projection lens until its thrusting surface positively contacts with the sleeve of the attaching port. (Fig. 56)

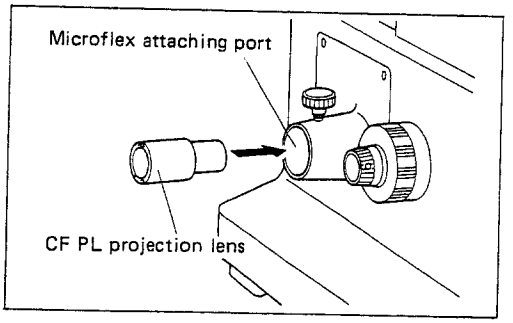


Fig. 56

2) Photomicrographic attachment (MICRO-FLEX)

Insert the connecting ring of the Microflex to the Microflex attaching port in such a position as the ocular finder attaching part on the Microflex body faces the user.

Confirm the positive contact of the thrusting surface with the sleeve, fasten the clamp screw.

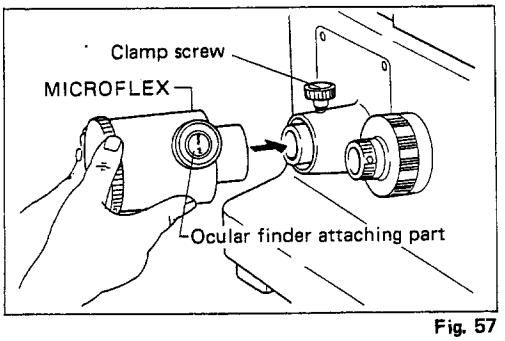


Fig. 57

[Note] For assembling the other parts of the Microflex, refer to the Instructions supplied for each photomicrographic attachment.

2. Photomicrographic operation

Before taking a photomicrograph, do the microscopy following the operating procedures for each microscopy.

1) Changing-over the optical path

Change over the optical path by means of the optical path change-over knobs.

The position of the knobs is as shown in Fig. 58.

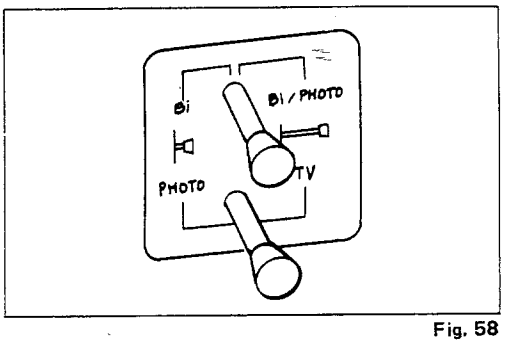


Fig. 58

2) Voltage and filter

Since the color temperature of the light source varies with the voltage being used, the selection of voltage and filter is essential in color photomicrography.

Standard combinations of voltage and filter will given in Table 4.

Table 4

Film		Voltage	Filter
Color film	Daylight type	9	NCB 10
	Tungsten type	8	
Monochrome film		6 or higher	(GIF)

The above table gives only the standard combination.

Depending upon the make of the film, different color renditions may result.

In some cases the additional use of a proper color compensation filter (CC filter) may be necessary.

For monochromatic film, the use of GIF filter will give a good contrast.

3) Focusing

Make focusing with the observation tube in the following procedures.

① Pull the photo mask sliding knob out to the limit to bring the photo mask into the optical path.

② Confirm the diopter adjustment.

(Refer to P. 9)

③ Manipulating the coarse and fine focus knobs, focus on the specimen.

[Note] In case of using the 5× or 10× objective, pull the magnifier inserting knob out to the inermediate position to bring the magnifier lens into the optical path, thus constructing the eyepieces of higher magnification, to perform precise focusing.
Diopter adjustment of eyepieces is to be made with the optical path opened by pushing in the magnifier inserting knob to the limit.
After bringing the magnifier lens into the optical path, do not make the diopter adjustment.

4) Picture composing

Compose the picture within the photo mask brought into the optical path corresponding to the film size in use by driving the stage laterally or longitudinally, or by rotating the specimen.

5) Field and aperture diaphragm

- For photomicrography in brightfield
  The field diaphragm is to be stopped down to cover a little beyond the picture field to prevent the stray light causing flare.
  The adjustment of the aperture diaphragm controls depth of focus, contrast and resolution. Make use of the aperture diaphragm according to the purpose.
  The aperture diaphragm is usually stopped down to cover 70 ~ 80% of numerical aperture of the objective in use.
- For photomicrography in darkfield
  Fully open both the field and aperture diaphragms.

3. Care of photomicrography

① If the shutter is released with the eyes off the eyepieces, in such a case as of long-time exposure, push the magnifier inserting knob to the position [C] to bring the light blocking plate, which prevents the extraneous light from entering the eyepieces, into the optical path.

② Always put the accessory finder cap on the ocular finder on the Microflex to protect the measurement from extraneous light, except when composing the picture.

③ For the practical photomicrographic operations, refer to the Instructions supplied for the photomicrographic attachment (Microflex) in use.

VII. ACCESSORIES AVAILABLE ON ORDER

1. Differential interference attachment for episcopic illumination

1) Nomenclature

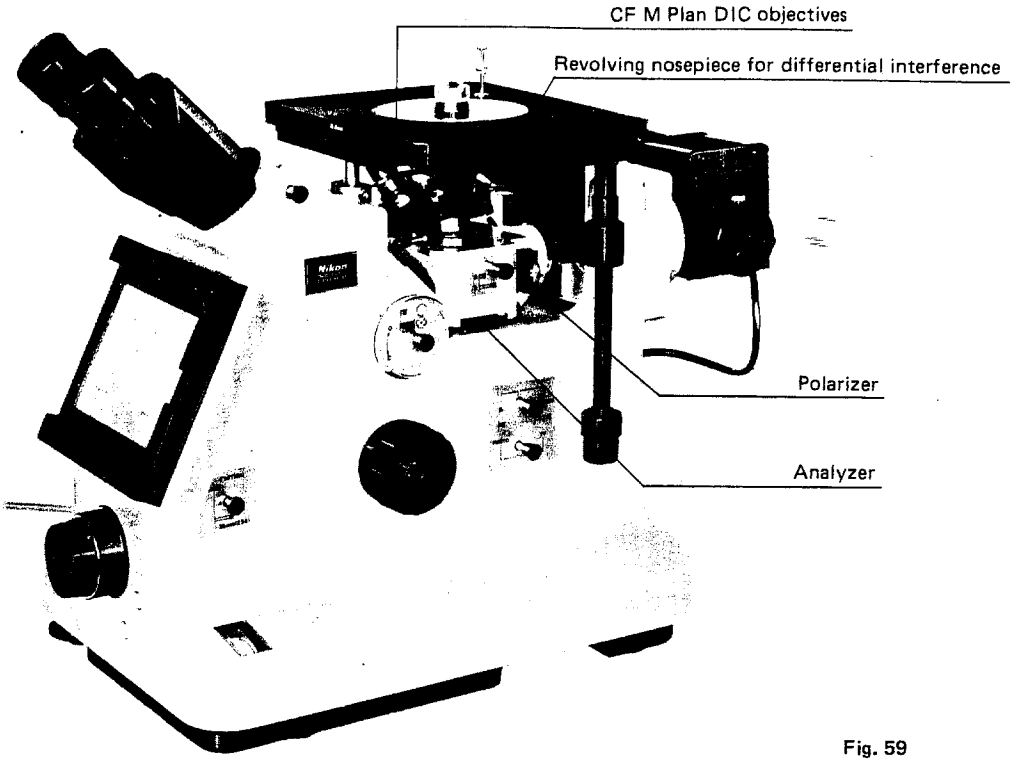


Fig. 59

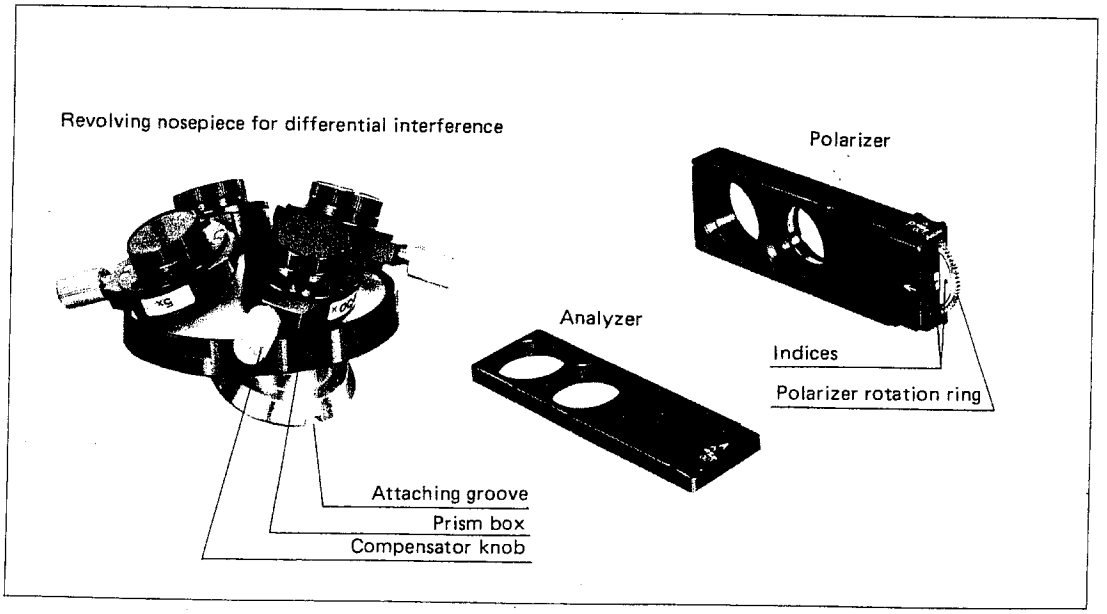


Fig. 60

2) Assembling

(1) Height adjustment of stage

Release the stage supporting pin clamp screw and the stage clamp screw by means of a screw driver. Bring the stage bottom surface into coincidence with the index line [DIC] on the stage attaching dovetail of the microscope stand. In this position positively clamp the stage clamp screw and the stage supporting pin clamp screw.

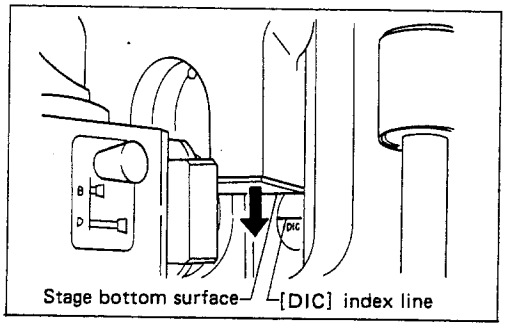


Fig. 61

(2) Attaching the revolving nosepiece for differential interference

If the ordinary revolving nosepiece has been attached to the microscope, remove it beforehand.

Fitting the attaching groove on the nosepiece for differential interference to the positioning pin on the microscope, attach the nosepiece and fasten tightly the clamp screw.

(3) Mounting the objectives

Attach the CF M Plan DIC objectives onto the respective prism boxes on the nosepiece, identified by the magnifying power indications.

For the combinations of indications on the prism boxes and objectives, refer to Table 5.

Table 5

Magnification indication on the prism box	Objective to be attached
5×	CF M Plan DIC 5×, exclusively
20×	CF M Plan DIC 20×, exclusively
10×, 40×, 100×	CF M Plan DIC 10×, 40×, 100×(Dry), commonly CF M Plan Apo 50× also attachable

(4) Inserting the polarizer and analyzer

Remove the ND 32 filter slide, and into the slot push the polarizer, facing the indication [P] up, until it click-stops twice.

Remove the dust-tight slide, and into the slot push the analyzer, facing the indication [A] up, until it click-stops twice.

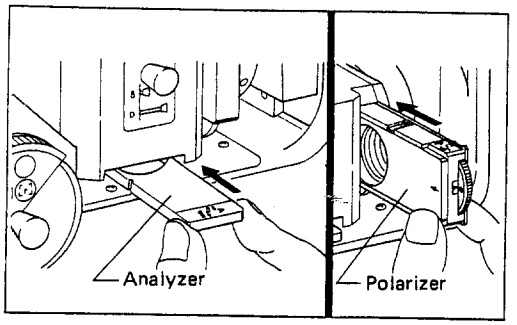


Fig. 62

3) Microscopy

① Pull out the polarizer slide and also the analyzer slide until they click-stop in position, respectively.
② Turn on the power switch to light the lamp of the illuminator, and set the brightness indicator to "6".
③ Place a specimen on the stage.
④ Adjust the interpupillary distance and diopter.
⑤ Carry out the centering of the lamp.
⑥ Turn the diffuser lever to the position [IN].
⑦ Turn the rear filter turret to show up the indication [NCB 10].
⑧ Make sure that the illumination changeover knob is pushed into the limit.
⑨ Swing in the objective 10× and focus on specimen.
⑩ Push in both polarizer slide and analyzer slide until they click-stop.
⑪ Turning the polarizer rotation ring, line up the index dot [●] with the arrow mark [▶]. (Fig. 63)

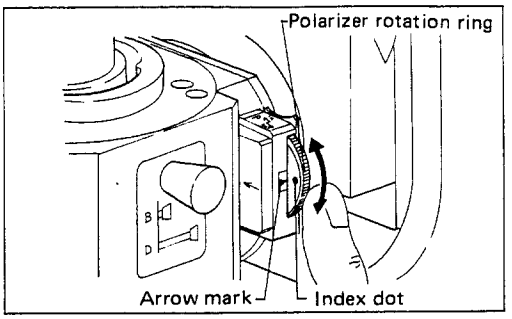


Fig. 63

⑫ Turn the compensator knob to make the background view dark.
⑬ Slightly turn the polarizer rotation ring so as to make the background view darkest.
⑭ Change over the objective to be used and focus on specimen.
⑮ Adjust the aperture and the field diaphragms.
⑯ Turn the compensator knob to make the background color to a desired contrast.
⑰ Adjust the brightness by means of the ND filters in the filter turret.
If it is dark, turn the diffuser lever to the position [OUT].

- The seeing of the differential interference image is directional, and in this instrument the shearing is realized in the direction shown in Fig. 64.
When the sloping direction of the specimen surface coincides with the shearing, the highest detectability will be attained, but when it is at right angles to the shearing direction, the poorest will result.

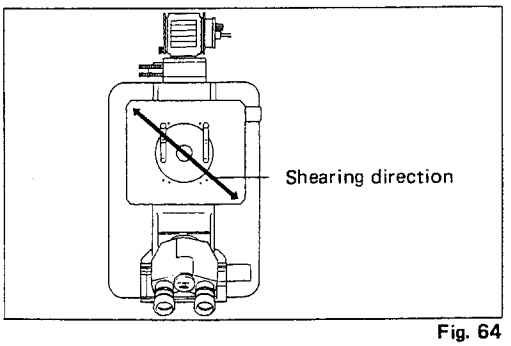


Fig. 64

- Using the compensator knob
To change the image contrast, turn the compensator knob.
The background view, made dark by manipulating the compensator knob, permits us the so-called darkfield observation, because an interference image is produced similar to the bright-contrast such as shown in the phase contrast microscope.
If the background color is changed slightly from dark to grey, a hypersensitive grey color will result, bringing about the best contrast, and offering an image in relief, just like the shadowing in the electron microscope, to afford a bird's-eye view of the phase contrast distribution (unevenness or relief) over the entire specimen.
If the background is turned to a sensitive color of red-violet, an interference color will appear according to the slope of the phase contrast change (unevenness or relief), so that the highest color contrast is obtainable.
Furthermore, if the compensator knob is turned to make the background color sky-blue, an interference image, similar to the dark contrast in the phase contrast microscope, will appear.
With a specimen with a large phase contrast change, in other words, with a surface uneven or in relief, the background can be changed to another color, whereby the desired color contrast will be obtained.

4) Photomicrography
Refer to V. BUILT-IN PHOTOMICROGRAPHIC SYSTEM and VI. SIDE PHOTOMICROGRAPHIC SYSTEM.

2. Simplified polarizing filter set

1) Nomenclature and assembling

(1) Inserting the polarizer

Remove the ND 32 filter slide, and push the polarizer slide, facing the indication [P] up, until it click-stops twice.

(2) Inserting the analyzer

Remove the dust-tight slide, and push the analyzer slide, facing the indication [A] up, until it click-stops twice.

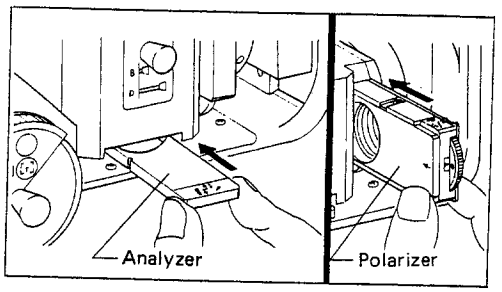


Fig. 65

2) Microscopy

① Pull out the polarizer slide and analyzer slide to the click-stop position.

② Turn on the power switch to light the lamp, and set the scale of the brightness indicator to "6".

③ Place a specimen on the stage.

④ Adjust the interpupillary distance and diopter.

⑤ Carry out the centering of the lamp.

⑥ Turn the diffuser lever to the position [IN].

⑦ Rotate the rear filter turret to show up the indication [NCB 10].

⑧ Make certain of the illumination change-over knob pushed into the limit.

⑨ Swing in the objective to be used, and focus on specimen.

⑩ Adjust the aperture and field diaphragms.

⑪ Push in both polarizer and analyzer slides to the click-stop position.

⑫ Rotating the polarizer rotation ring, bring into coincidence with the index dot [●] and the arrow mark [▶] to obtain the position of Crossed Nicols.

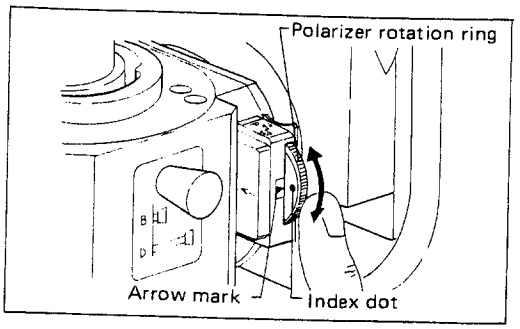


Fig. 66

⑬ Turn the brightness control dial to set the indicator scale to "9".

⑭ Adjust the brightness by means of the ND filters in the filter turret.

- Bringing the index line into coincidence with the arrow mark by turning the polarizer rotation ring, the position of Parallel Nicols will be obtained.

3. Sensitive polarizing filter set

1) Nomenclature

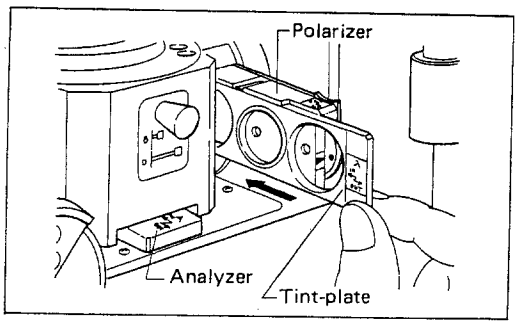


Fig. 67

2) Microscopy

① Referring to the assembling and microscopic procedures in VII. 2. Simplified polarizing filter set, adjust the polarizer slide and analyzer slide to the position of Crossed Nicols.

② Remove the dust-tight slide from the polarizer slide, and insert the tint-plate, facing the indication [λ] toward the user, until it click-stops twice. In this state, microscopy by a sensitive color of red-violet will be possible.

- If the tint-plate is pulled out to the click-stop position, tint-plate will be brought out of the optical path and the simplified polarizing microscopy will be effective.

4. TV lens

1) Nomenclature and assembling

① Remove the cap from the Microflex attaching port for side photomicrographic system of TME stand.

② Positively screw in the TV lens to the C-mount of TV camera.

③ Insert the TV lens into the sleeve of the Microflex attaching port until the thrusting surface of the TV lens positively comes in contact with the sleeve. Clamp the screw.

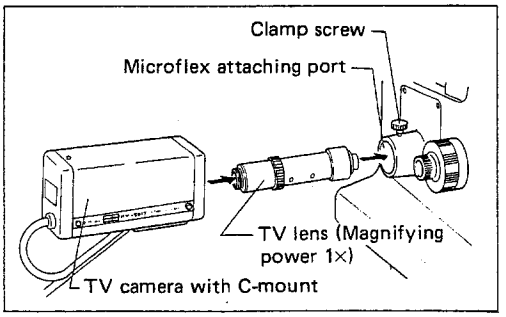


Fig. 68

3) Microscopy

① Observe the specimen following each microscopic procedures.

② Set the position of optical path change over knobs as shown in Fig. 69.

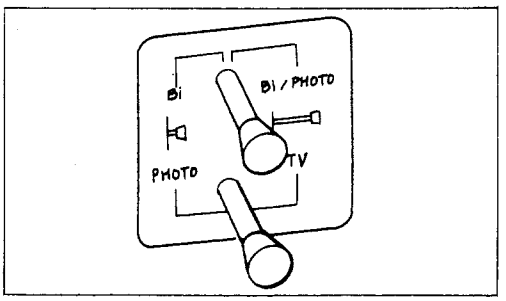


Fig. 69

③ Referring to the Instructions for TV camera and Monitor, adjust them to the state for observing the specimen.

④ Release the clamp screw on the Microflex attaching port, and turn the TV lens and TV camera so as to get the image through the eyepieces into coincidence with that on the monitor. In this position, fasten securely the TV lens with the clamp screw once released.

5. Focusing hood

1) Assembling

Attach the hood, inserting its attaching pins into the accepting holes on the 4"×5" film holder adapter as shown in Fig. 70.

2) Use

Push up the button on the hood, and the hood will open.

In photomicrography, after setting the TIME mode, push the optical path change-over knob for 35mm film or 4"×5" film photomicrography in to the limit, release the shutter, and the specimen image to be photographed can be observed on the focusing panel.

Magnification on the focusing panel surface is objective magnification ×10.

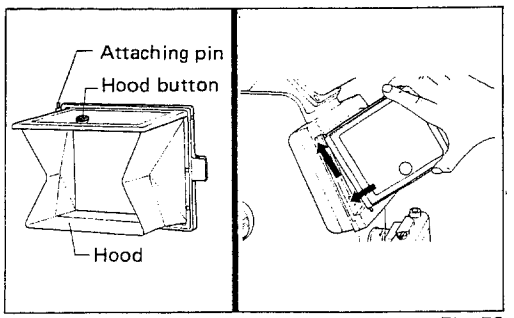


Fig. 70

VIII. TROUBLE SHOOTING TABLE

Although nowhere you can find any disorder or derangement in the instrument, if you encounter some difficulty or dissatisfaction, recheck the use, referring to the table below:

1. Optical

Failures	Causes → Actions
Darkness at the periphery or uneven brightness of viewfield (No appearance of viewfield)	● Each operation part such as revolving nosepiece, optical path change-over knobs, etc. not correctly positioned. → Correct positioning. ● Lamp bulb not sufficiently centered. → Correct centering.
Dirt or dust in the viewfield	● Grease, dirt, dust or finger marks on the optical surface. → Cleaning the eyepieces or specimen.
No good image obtained (low resolution or contrast)	● Grease, dirt, dust or finger marks on the optical surface. → Cleaning the objectives, eyepieces or specimen. ● Lamp bulb not sufficiently centered. → Correct centering. ● Size of annular diaphragm not adequately adjusted. → Adjust the size to 70 ~ 80% of the N.A. of the objective being used.
One side dimness of image	● Specimen tilts from the stage surface. → Correct the position of specimen on the stage.
Image tinged yellow	● NCB 10 filter not used. → Use NCB 10 filter. ● Too low power source voltage. → Raise the voltage up to "9" on the indicator.

2. Manipulation for microscope

Failures	Causes → Actions
No focusing attained, even though the objective moved to the upper limit	● Stage not correctly attached. → Correct the attaching. (Refer to P.6)
No fusion of binocular image	● Interpupillary distance not adjusted. → Adjustment. (Refer to P.8)
Fatigue of observing eyes	● Incorrect diopter adjustment. → Correct adjustment. (Refer to P.9) ● Inadequate brightness of illumination. → Use ND filter.

3. Electrical for microscope

Failures	Causes → Actions
Lamp does not light even though switched ON	● No electricity obtained. → Connect the cord to socket. ● No lamp bulb attached. → Attaching. ● Lamp bulb blown. → Replacement. ● Fuse blown. → Replacement. ● Input voltage change-over device (fuse holder) not set to house current voltage. → Change over the voltage correctly. ● Input plug for the lamp out of place. → Insert the plug into the socket on the rear side of microscope stand.
Fuse blown	● Not specified fuse used. → Use 2A/250V or 1A/250V.

4. Photomicrography

Failures	Causes → Actions
No sharp picture obtained	● Improper focusing. → Adjust diopter for eyepieces positively. For 5× or 10× objective bring the magnifier lens into the optical path. ● Out of focus by external vibration. (Especially with high power objective and long-exposure) → For preventing external vibration, use vibration-proof table or rigid desk. Select a place free from vibration, such as caused by traffic, passers-by or motors etc.
Fogging of image	● Grease, dust, dirt or finger marks on optical surfaces. → Clean the objective, eyepieces or specimen.
Illuminated image not uniformly	● Lamp bulb not sufficiently centered. → Correct centering.
Insufficient image contrast	● Aperture diaphragm opened too large. → Generally, good results will be achieved with aperture stopped down to 70 ~ 80% of N.A. of the objective being used. ● Field diaphragm opend too large. → Stop down field diaphragm to a diameter slightly larger than the diagonal of picture frame.

Failures	Causes → Actions
Ghosts or flare appears	● Extraneous light entering the eyepieces. → Push in the magnifier inserting knob to the position [C] to bring the light blocking plate into the optical path.
Poor photograph obtained	● Inadequate use of filter. → Use NCB 10 filter. ● Wrong power source voltage used. → Set the brightness indicator to "9". ● Reciprocity law failure of film. → Compensate by means of CC filters.
Not functioned even though switched ON	● Fuse blown. → Replacement. ● No electricity obtained. → Connect the cord to socket.
Fuse blown	● Not specified fuse used. → Use 1A/250V.

[Note] Refer also to "Care of photomicrography" on P.28.

5. Differential interference microscopy

Failures	Causes → Actions
No interference color appears	● Direction of polarizer not correctly set. → Line up the index dot on the polarizer rotation ring and the arrow mark.
Interference color appears but not uniform	● Objective in accordance with the magnification indication on the prism box not attached. → Attach correctly. ● No CF M Plan DIC objective used. → Used CF M Plan DIC objective.
Insufficient differential effect	● Inclination direction of specimen not coincided (at right angles) to shearing direction. → Rotate the specimen up to the coincidence position.

ELECTRIC SPECIFICATIONS

Microscope stand

Power source	100/120V 220/240V 50/60 Hz
Halogen lamp	12V – 50W Iwasaki Electric JC 12V-50W/G1 or B.L.V. No. 1418
Fuse	100/120V 2A/250V 220/240V 1A/250V

Control box

Power source	100/120V 220/240V 50/60 Hz
Fuse	1A/250V
Battery	Ni-Cd Battery 3.6V 50mAH

We reserve the right to make such alterations in design as we may consider 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.