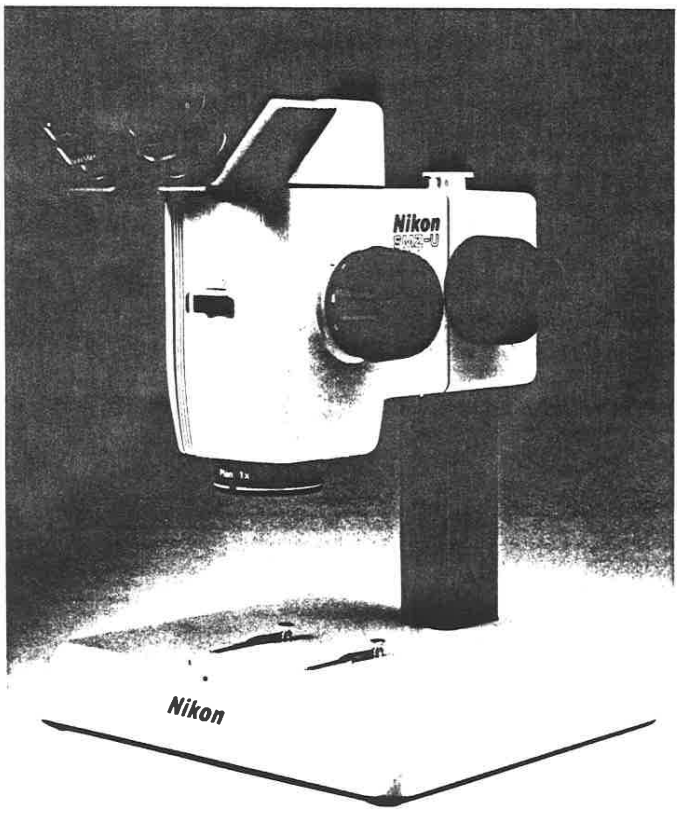
Nikon

STEREOSCOPIC MICROSCOPE SMZ-U

Basic Set / Instructions



NIKON CORPORATION
FUJI BUILDING 2-3, MARUNOUCHI 3-CHOME, CHIYODA-KU, TOKYO 100, JAPAN
PHONE 03-214-5311 TELEX J22601 NIKON, FAX 03-214-1780

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M025(90.1.e)H•E-1N

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CAUTIONS

① Avoid Strong Shocks!
Handle the microscope gently, taking care to **avoid strong shocks.**

② Place of Use
Avoid the use of the microscope in a dusty place, or where it may be subject to **vibrations,** or exposed to temperatures, moisture, or direct sunlight.

③ Power Source Voltage and Fuse
Check the power source voltage and fuse referring to p.5.

④ Changing the Fuse
Before replacing the fuse, turn OFF the power switch and **disconnect the power source plug.**

⑤ Dirt on the Lens
Do not leave **dust, dirt, or finger marks** on the lenses. They will prevent you from clearly observing the specimen image.

CARE AND MAINTENANCE

① Cleaning the Lenses
To clean the lens surfaces, remove dust using a soft brush or gauze. Only when removing finger marks or grease, use a soft cotton cloth, lens tissue, or gauze lightly moistened with **pure alcohol** (methyl alcohol or ethyl alcohol). Observe sufficient caution in handling alcohol and xylene, as they are inflammable.

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

③ Never Attempt to Dismantle!
Never attempt to dismantle the instrument because you may impair the functions.

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 Periodic Checking
To maintain the best performance of the instrument, we recommend that the instrument be periodically checked. (For details of this check, contact your authorized Nikon distributor.)

★ Please note 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.

Thank you very much for purchasing a Nikon microscope.
This instructions describe the main components of Nikon stereoscopic microscope model SMZ-U.
For information regarding accessory parts, please refer to a separate instruction manual.

Contents

I. Nomenclature and Functio..

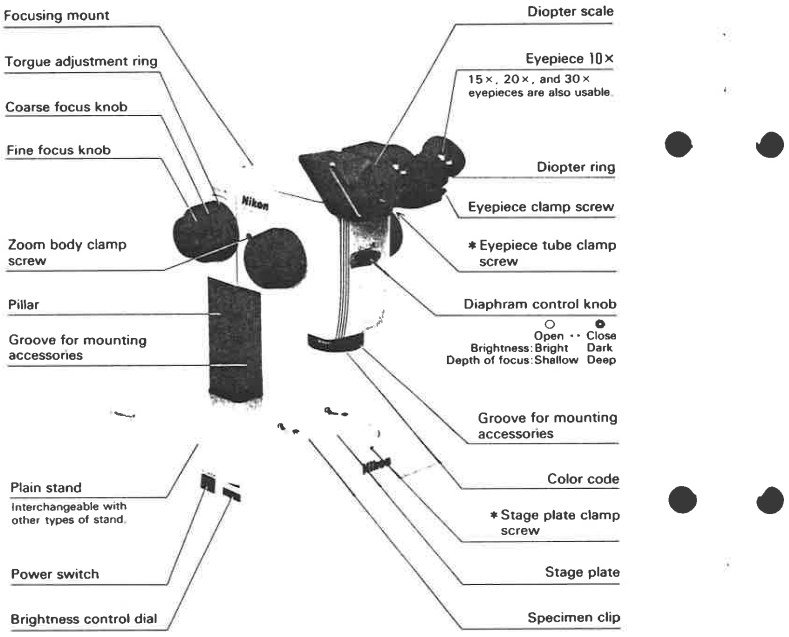


Fig. 1

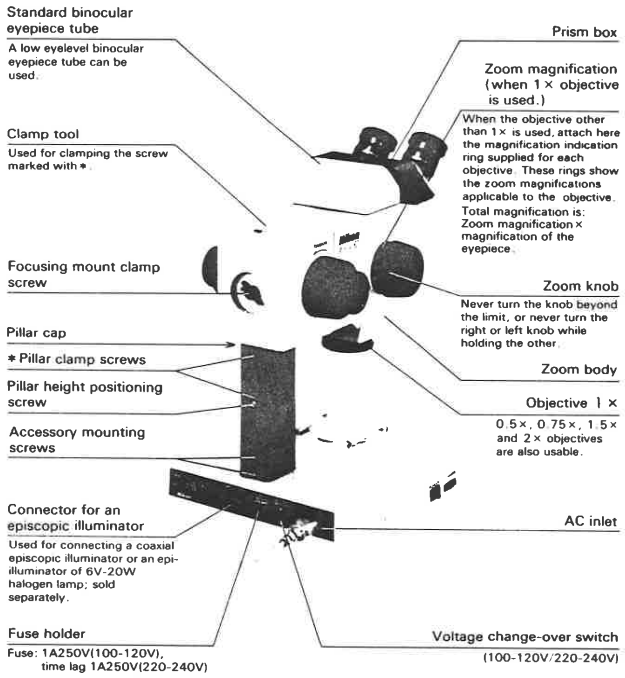
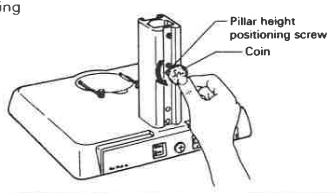


Fig. 2

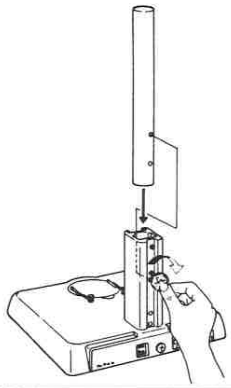
II. Assembly

1. Plain stand

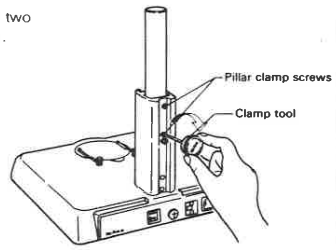
① Release the pillar height positioning screw.



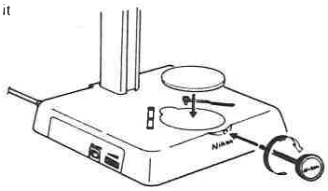
② Insert the pillar to its limit and tighten the pillar height positioning screw fitted into the hole of the pillar.



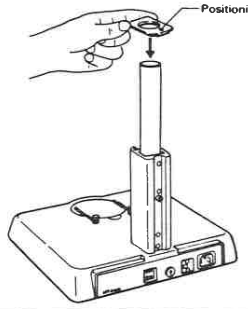
③ Fasten the pillar by tightening the two clamp screws with the clamp tool.



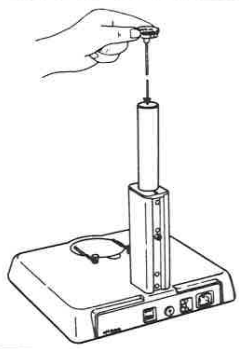
④ Mount the stage plate and fasten it using the clamp tool.



⑤ Mount the pillar cap so that the positioning hole is at the rear.

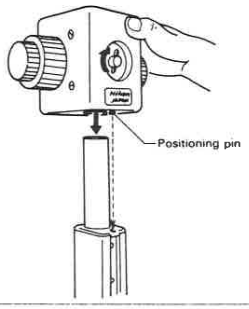


Note: As the clamp tool is used for assembling accessories, such as, the eyepiece tube, always store the tool in the pillar to avoid loss.



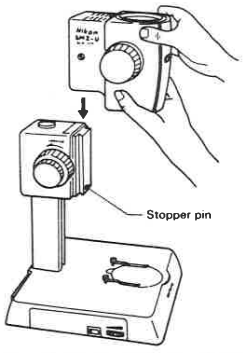
2. Focusing mount

Mount the focusing mount to the pillar so that the positioning pin on the bottom can be inserted into the positioning hole of the pillar cap and fasten it whit the clamp screw.



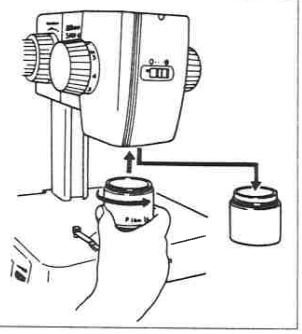
3. Zoom body

Mount the zoon body along the dovetail of the focusing mount until it reaches the stopper pin and fasten it with the clamp screw.



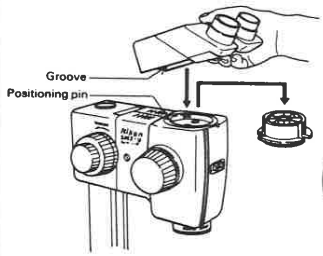
4. Objective

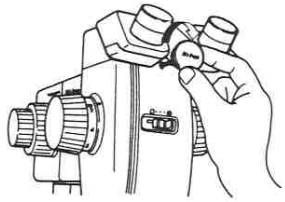
After removing the packaging cap from the zoom body, screw in the desired objective.



5. Binocular eyepiece tube

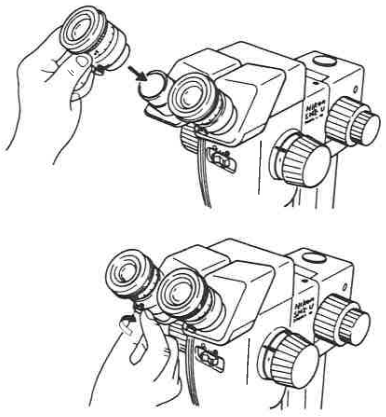
Remove the packaging cap from the zoom body. Tilt and mount the binocular eyepiece tube on the zoom body so that its groove fits to the positioning pin on the zoom body.
Fasten it with the clamp tool.





6. Eyepiece

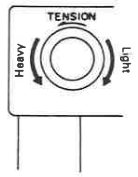
Insert the eyepiece, with its clamp screw positioned at the bottom, into the eyepiece tube sleeve and tighten the clamp screw.



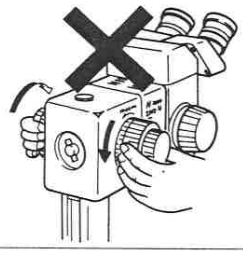
III. Use

1. Focusing mount

Adjust the tension of the focus knobs so that the zoom body does not slip.



Note: Do not twist the coarse or fine focus knobs that are located on the left and right sides or rotate beyond their limit. Do not rotate the fine or coarse focus knob when holding the other. This will cause damage.

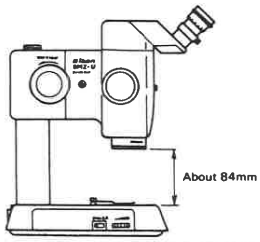


2. Diopter Adjustment····· (A change of magnification should not cause the defocus.)

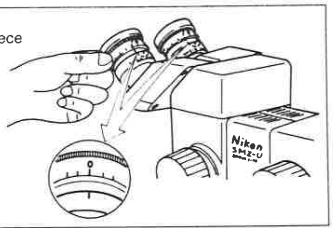
Instructions using 1× objective is shown below :

(1) Adjust the distance between the specimen and the objective to about 84 mm by turning the coarse fous knob. (See note.)

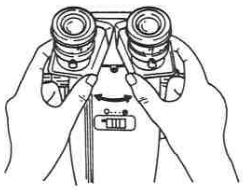
Note: This distance is called the "working distance". See Table 1 (p.17) for the working distance of each objective.



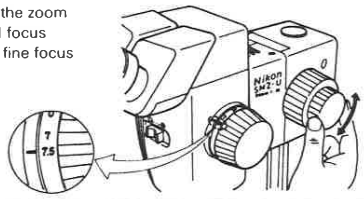
② Set the diopter scale of the eyepiece to "0".



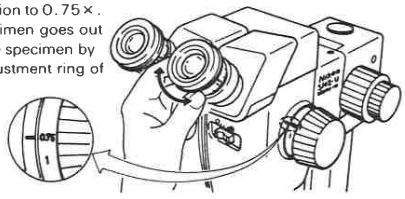
③ Move the prism box to adjust the interpupillary distance.



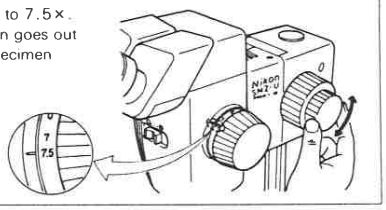
④ Turn the zoom knob to set the zoom magnification to 7.5× and focus on the specimen using the fine focus knob.



⑤ Set the zoom magnification to 0.75×. If the image of the specimen goes out of focus, refocus on the specimen by rotating the diopter adjustment ring of the eyepiece.



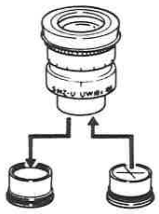
⑥ Set the zoom magnification to 7.5×. If the image of the specimen goes out of focus, refocus on the specimen using the fine focus knob.



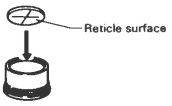
⑦ Repeat the procedures in ⑤ and ⑥ until the focusing with 0.75× and 7.5× will coincide.

3. Eyepiece

A separately sold reticle for SMZ-U can be used in place of the viewfield ring.



Note: When using the reticle in your hand, place it into the viewfield ring with the reticle surface faced down. See Table 1 for the size of the reticle to be mounted.

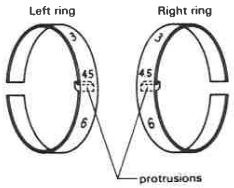


4. Objective

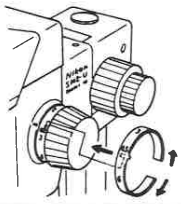
●Attaching the magnification indication ring

All objectives, except 1×, have their own pair of magnification indication rings.

① Each magnification ring is attached to the right and left zoom knobs. Confirm the right or left ring referring to the figure before attaching.



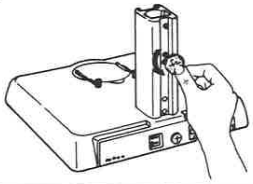
② Spread the magnification indication ring as shown in the figure. Put the indication ring on the zoom knob so that the protrusion fits in the groove of the zoom knob.



●0.75× Objective

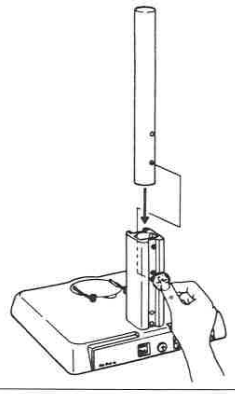
When the specimen is thick and the stroke for the focusing mount is short, the pillar should be extended.

① Loosen the height positioning screw.



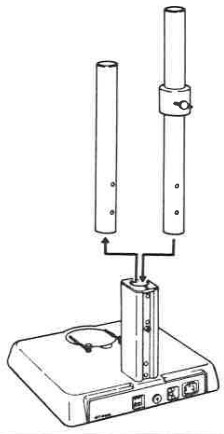
② Fit the height positioning screw in the lower hole of the pillar and tighten the screw, then clamp the two clamp screws.
The pillar can be extended further by screwing in the height positioning screw before inserting the pillar.

Note: Be careful for the focusing mount not to slip when it is fastened in the middle of the pillar.

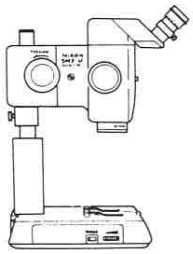


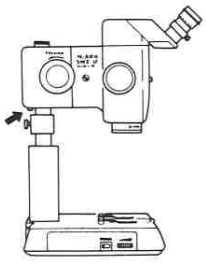
●0.5× Objective

Replace the pillar of the stand with an extension pillar sold separately.



Note: Bring the stopper ring of the extension pillar in close contact with the bottom surface of the focusing mount.





Teble 1. Objective ／Eyepiece

			Objective ※1 Working distance (Color code)				
			Plan 0.5× 155(Red)	Plan 0.75× 117(Yellow)	Plan 1× 84(White)	Plan 1.5× 50.5(Green)	Plan 2× 40(Blue)
Eyepiece Field number ※2 (Reticle)	UW10× 24 (φ25)	Total mgf.	3.75× ∖ 37.5×	5.63× ∖ 56.3×	7.5× ∖ 75×	11.25× ∖ 112.5×	15× ∖ 150×
		Real field	64.0 ∖ 6.4	42.63 ∖ 4.263	32.0 ∖ 3.2	21.33 ∖ 2.133	16.0 ∖ 1.6
	UW15× 17 (φ25)	Total mgf.	5.63× ∖ 56.3×	8.44× ∖ 84.4×	11.25× ∖ 112.5×	16.9× ∖ 169×	22.5× ∖ 225×
		Real field	45.3 ∖ 4.53	30.2 ∖ 3.02	22.7 ∖ 2.27	15.11 ∖ 1.511	11.33 ∖ 1.133
	UW20× 15 (φ21)	Total mgf.	7.5× ∖ 75×	11.25× ∖ 112.5×	15× ∖ 150×	22.5× ∖ 225×	30× ∖ 300×
		Real field	40.0 ∖ 4.0	26.64 ∖ 2.664	20.0 ∖ 2.0	13.33 ∖ 1.333	10.0 ∖ 1.0
	UW30× 7 (※3)	Total mgf.	11.25 ∖ 112.5×	16.9× ∖ 169×	22.5× ∖ 225×	33.75× ∖ 337.5×	45× ∖ 450×
		Real field	18.6 ∖ 1.86	12.43 ∖ 1.243	9.3 ∖ 0.93	6.22 ∖ 0.622	4.67 ∖ 0.467

Unit : mm

※1:The color code and the color of the number on the magnification indication ring are the same.

※2:Use the reticle of 1.5mm or thinner in thickness.

※3:Consult your dealer how to attach the reticle to 30× eyepiece.

Table 2. Depth of focus on the object side

(Diaphragm size: Min. ~ Max., Eyepiece: UW 10×)

Objective / Zoom magnification	Plan 0.5×	Plan 0.75×	Plan 1×	Plan 1.5×	Plan 2×
0.75×	5.46 \ 69.6	2.43 \ 30.9	1.36 \ 17.4	0.61 \ 7.7	0.34 \ 4.4
4×	0.39 \ 5.0	0.15 \ 2.2	0.09 \ 1.2	0.03 \ 0.6	0.02 \ 0.3
7.5×	0.22 \ 3.8	0.1 \ 1.7	0.06 \ 0.1	0.02 \ 0.4	0.01 \ 0.2

Unit : mm

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.

Nikon

STEREOSCOPIC MICROSCOPE
SMZ-U

Coaxial Episcopic Illuminator

Instructions

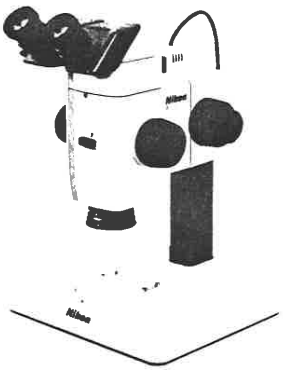
NIKON CORPORATION
FUJI BUILDING 2-3, MARUNOUCHI 3-CHOME, CHIYODA-KU, TOKYO 100, JAPAN
PHONE 03-214-5311 TELEX J22601 NIKON, FAX 03-214-1780

Printed in Japan

M030690-1cOH-E 1N

NIKON CORPORATION

The following instructions are for the coaxial episcopic illuminator for the SMZ-U stereoscopic microscope. Before using the illuminator, please also read the manuals for the basic unit and other relevant accessories.



CAUTIONS

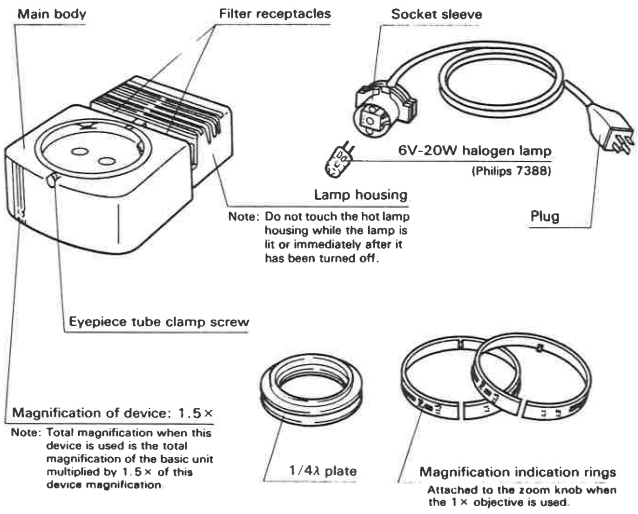
(1) **Turning on the Lamp**
Take care **not to touch the lamp housing when it is lit, and don't bring inflammable substances** such as gasoline, thinner and alcohol near it, as some parts of the lamp housing may become very hot while the lamp is on.

(2) **Changing the Bulb**
Before replacing the bulb, turn OFF the power switch and **disconnect the power source plug.** Replace the halogen lamp(6V 20W), making sure that it is cool enough. **Do not touch the glass part with your bare hands.**

Read also the "CAUTIONS" of the SMZ U Basic Unit Instructions.

Contents

I .Name and Function of Eac Section



–Note–

Usable magnification range when the coaxial episcopic illuminator is mounted on the unit is shown below. If used with the magnification lower than that specified, it will cause uneven illumination.

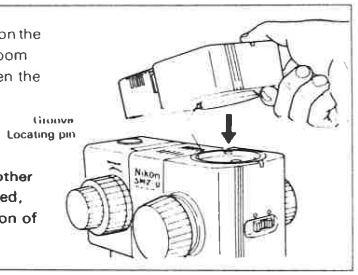
Objective		0.5×	0.75×	1×	1.5×	2×
Zoom magnification	Without magnification indication ring	3× or higher	2× or higher	1.5× or higher	3× or higher	N/A
	With magnification indication ring*	1.5× or higher	1.5× or higher	Within the range of white band	4.5× or higher	

*Coaxial Episcopic Illuminator is provided with the magnification indication rings exclusively used for 1× objective. (Refer to the illustration above.) Other magnification objectives have their own rings.

II .A sembly

1.Illuminator Main Body

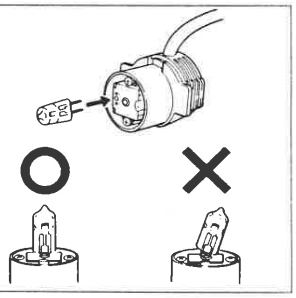
Tilt the illuminator slightly and position the groove at the locating pin of the zoom body. Fit the illuminator and tighten the clamp.



Note: If the beam splitter or any other intermediate tube is also used, attach it in the upper position of the illuminator.

2.Lamp

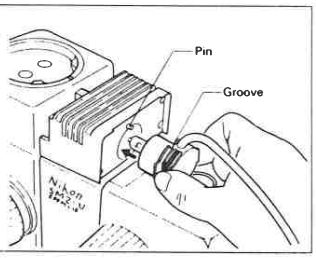
Insert the lamp straight into the socket sleeve without touching the glass surface. Use gloves or the like.



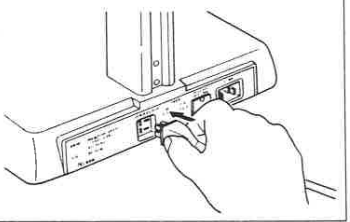
Note: 1) Use only a 6V-20W Halogen lamp (Philips 7388). No other type can be used.
2) Before replacing the lamp, allow it to cool.

3.Lamp Socket

① Insert the socket sleeve into the lamp housing aligning the groove of the sleeve with the pin of the lamp housing.

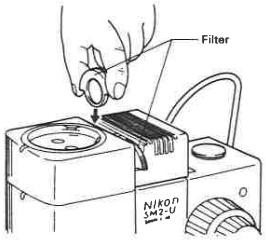


② For the power supply, use the outlet on the plain stand or the XN transformer(available separately).



4. Filter

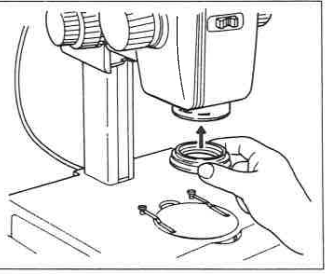
Attach the filter if necessary.



Note: If the beam splitter is also used, insert the filter before attaching it.

5. 1/4λ Plate

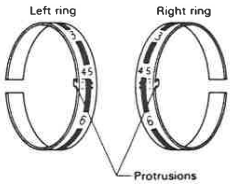
Attach the 1/4λ plate to the top of the objective by screwing.



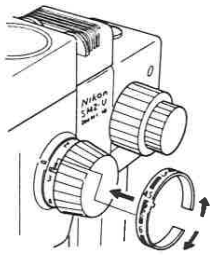
6. Magnification Indication Ring for 1× Objective

Mount the magnification indication rings to the left and right zoom knobs only when the 1× objective is used.

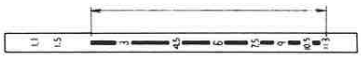
- Confirm the right or left ring referring to the figure before attaching.



- Spread the magnification indication ring as shown in the figure. Put the indication ring on the zoom knob so that the protrusion fits in the groove of the zoom knob.



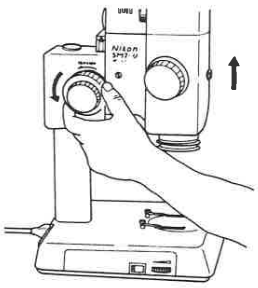
Note: Use the zoom knob within the range of white band indicated on the magnification indication ring.



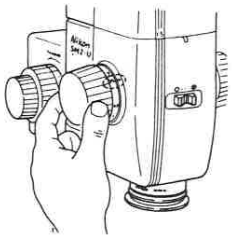
III. Operation

1. Centering the Lamp

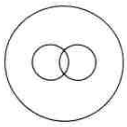
(1) Move the zoom body up to the highest position using the coarse focus knob.

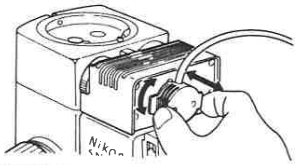


② Set the zoom magnification to the maximum level.



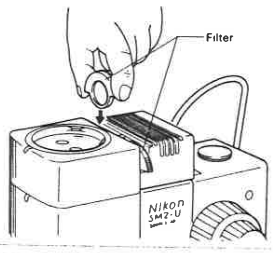
③ Place a sheet of white paper on the stage plate(or use the white face of the stage plate) and move the lamp socket in or out, or rotate it so that both the right and left illuminating light are of maximum, uniform brightness at the same level.



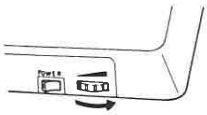


2. Color Photomicrographing

(1) Place the NCB filter (available as option) in the filter receptacle.

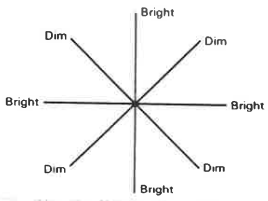


② Turn the brightness control dial to the maximum setting.

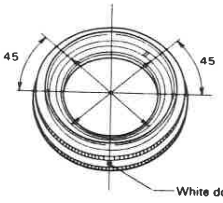


3. 1/4λ Plate

(1) When the white dot on the milled ring is located in the front position, maximum brightness is obtained. The brightness varies every 45°.



(2) The optical axis of the 1/4λ plate is in the direction of 45° against the white dot.



Specfications

Light source : 6V-20W Halogen lamp
(PHILIPS 7388)
Average life 100 hours
Power source: Power source built in the stand for
SMZ-U, or XN transformer
Intermediate magnification : 1.5×
Effective illumination field : Refer to table on p.4

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.

Nikon

STEREOSCOPIC MICROSCOPE
SMZ-U

DIASCOPIC STAND

Instructions

NIKON CORPORATION
FUJI BUILDING 2-3, MARUNOUCHI 3-CHOME, CHIYODA-KU, TOKYO 100, JAPAN
PHONE 03-214-5311 TELEX: J22601 NIKON, FAX: 03-214-1780

Printed in Japan

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NIKON CORPORATION

This instruction manual describes the diascopic stand of the SMZ-U Stereoscopic Microscope. You are also requested to read the manuals for the basic set and accessories which are used along with this stand.

CAUTIONS

① Turning on the Lamp
Take care **not to touch the lamp housing when it is lit, and don't bring inflammable substances** such as gasoline, thinner and alcohol near it, as some parts of the lamp housing may become very hot while the lamp is on.

② Changing the Bulb and Fuse
Before replacing the bulb or fuse, turn OFF the power switch and **disconnect the power source plug.** Replace the halogen lamp (6V-30W), making sure that it is cool enough. **Do not touch the glass part with your bare hands.**

Read also the"CAUTIONS"of the SMZ-U Basic Unit Instructions.

Contents

I .Name and Function of Each Section

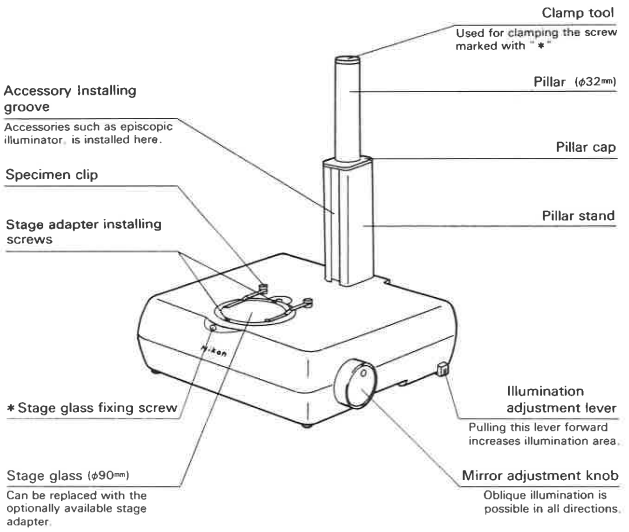


Fig. 1-1

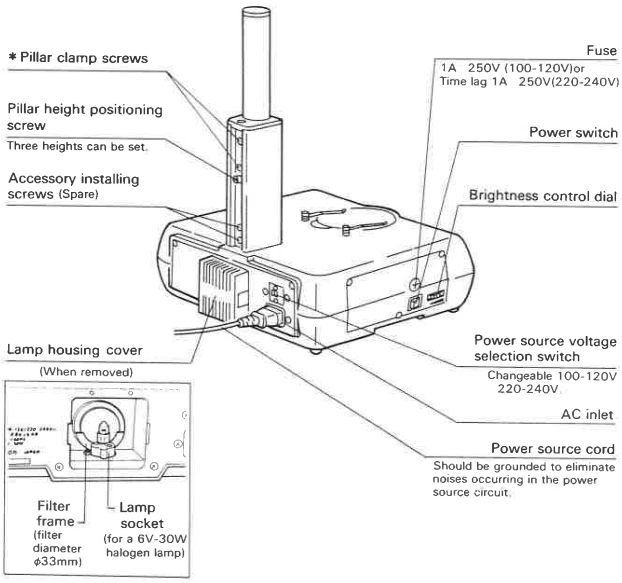
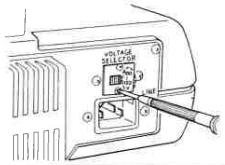


Fig. 1-2

II. Assembly

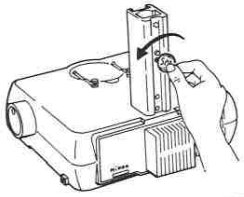
1. Setting of Power Source Voltage·····IMPORTANT

● **Important····· This procedure must be carried out.**
If the voltage indication on the display board does not match the line voltage to be used, remove the display board with a driver, reverse the switch setting, and then replace the display board.



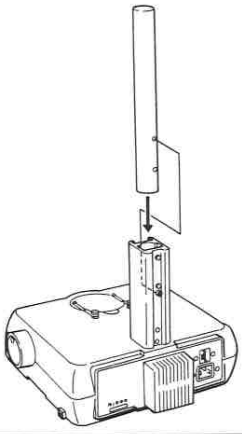
2. Pillar

① Loosen the pillar height positioning screw with a coin or similar object.

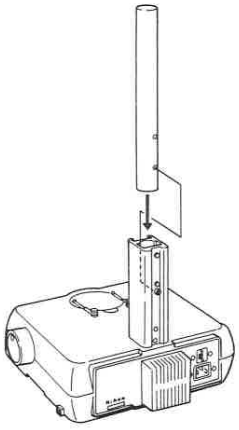


② Insert pillar to pillar stand.
When a taller specimen is observed, or an objective 0.75× or lower is used, set the pillar to a middle - or high position.

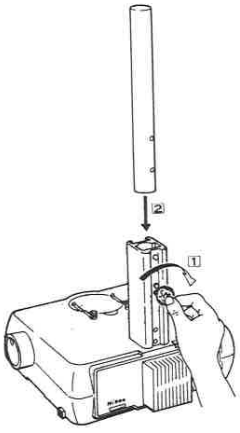
● **Standard position** ... Insert the pillar in the bottom, and match the hole of the pillar to the height positioning screw.



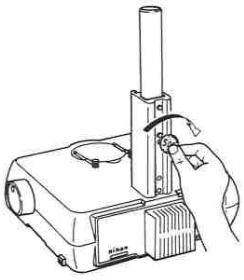
● **Middle position** ... Match the hole on the lower side of the pillar to the height positioning screw.



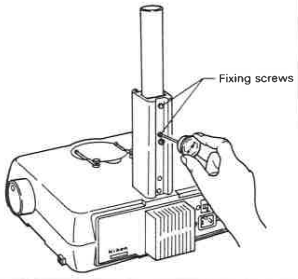
● **High position** ...Tighten the height positioning screw first [1], then insert the pillar [2].



③ Retighten the height positioning screw when the pillar is set to a standard- or middle position.



④ Fix the pillar with two fixing screws using the clamp tool.



⑤ Install the pillar cap.

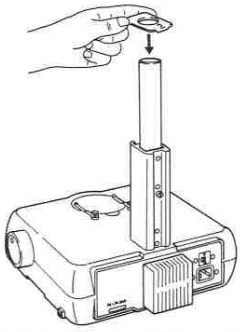


Table1 : Pillar Position and Observable Height of Specimen

Unit: mm

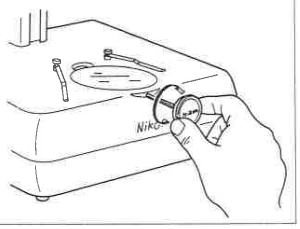
Pillar position \ Objective	0.5×	0.75×	1×	1.5×	2×
Standard position			0~40	0~50	0~50
Middle position		0~45	0~80	0~90	0~90
High position	0~40	0~90	0~125	0~135	0~135

Note: When a taller specimen is observed with an objective 0.5 ×, or an optionally available stage is used with an objective 0.75 × or lower, use extension pillar (available an option).

3. Stage Glass

Place the stage glass into the base and tighten slightly with a fixing screw using the clamp tool.

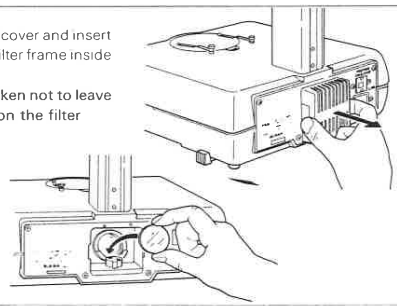
Note: ● Tighten the fixing screw holding the stage glass so as not to rise.
● Care should be taken not to soil the stage glass or the mirror surface inside the base. Eespecially do not leave the fingermarks etc. on the mirron surface. Brush off dust carefully only by means of a soft and clean feather or the like.



4. Filter

Remove the lamp housing cover and insert the attached filter into the filter frame inside the lamp housing.

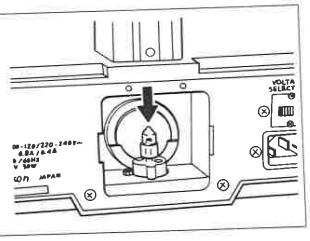
Note: ● Care should be taken not to leave fingermarks etc.on the filter surface.



5. Lamp

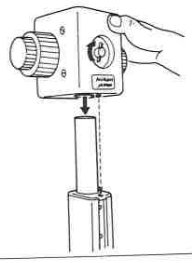
Insert the lamp in the socket vertically and securely to the limit.
Reattach the lamp housing cover.

Note: Care should be taken not to leave fingermarks etc. on the bulb surface. Any dirt should be wiped off prior to lighting.



6. Focusing Mount

Insert the focusing mount to the pillar and fix with the clamp screw.



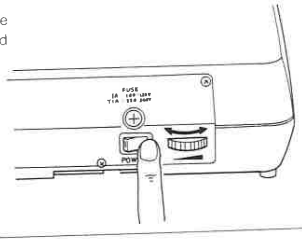
★ For zoom body and binocular eyepiece tube installation, see the instruction manual (p.8~10) of "Basic Unit" of SMZ-U.

III. Operation

Check that the voltage switch on the back has been set to the line voltage to be used.

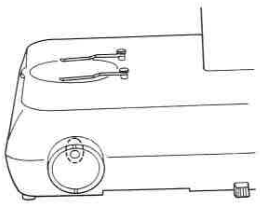
1. Lamp Lighting

● Turn on the power switch and adjust the brightness control dial to obtain desired brightness.



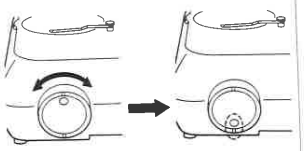
2. Mirror Adjustment

① For ordinary observation:
Align the concave of the internal knob and either notch of the outer knob, then rotate the outer knob so that the notch is in a vertical position.



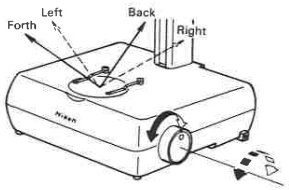
● A flat or scattering※ reflection surface of the mirror can be selected by turning the outer knob 180°.

※Although the brightness of the scattering reflection mirror decreases slightly, more uniform illumination is obtained.



② For obligue illumination:
Oblique illumination may be effective to observe a specimen which can not be easily observed through ordinary illumination.
The rotation of the outer knob allows the oblique illumination in back and forth directions, and the inner knob, oblique illumination in right and left directions.

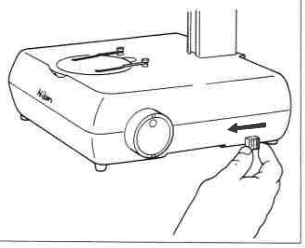
Note: ● The use of both knobs allows the oblique illumination in all directions.
● In the right and left directed oblique illumination, contrast differs depending on the right and left viewfields. Special care should therefore be taken when photomicrographing.



3. Illumination Adjustment

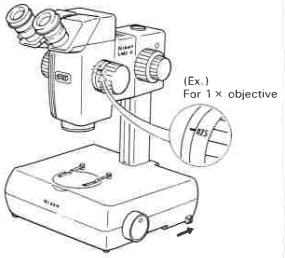
Brightness and illumination area can be adjusted using the illumination adjustment lever.

● Under ordinary observation, the illumination adjustment lever should be pulled to the operator's side (forward).
● When brightness becomes insufficient due to high-magnification observation, slide the illumination adjustment lever back.



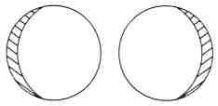
4. Microscope Base and Zoom Body Optical Axis Coincidence Check

① Slide the adjustment lever back to the limit and minimize zoom magnification.

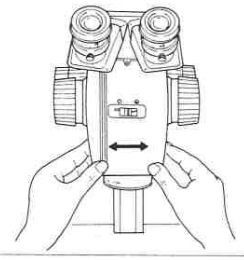


② Set the mirror inside the base to ordinary observation mode. (See 2-①on page 11.)

③ Look at the right and left viewfields separately to confirm that the illumination eclipses around them is bilaterally symmetrical.



④ If bilateral symmetry is not obtained, loosen the focusing mount fixing screw, then move the microscope right and left to render the eclipses in the viewfields symmetrical.



5. Lamp and Filter Replacement

Caution ! .....Do not attempt to replace a lamp or filter until it has sufficiently cooled.
● Use the designated lamp: Philips 5761 6V-30W.
● If it is necessary to use a filter other than that supplied, a ϕ33mm filter is recommended.
● For replacing method, see the "II. Assembly" on page 9 – 10.

Ⅳ. Observable Magnification Range Using Diascopic Base

1. When stage glass is used:

Observing method \ Objective	0.5×	0.75×	1×	1.5×	2×
Brightfield observation	Low High	○	○	○	○
Oblique illumination observation	Low High	Low High	○	Low High	○
Polarized observation	Low High	○	○	○	○

2. When an optional stage is used with a stage adapter:

Observing method \ Objective	0.5×	0.75×	1×	1.5×	2×
Brightfield observation	Low High	Low High	○	○	×
Oblique illumination observation	Low High	Low High	○	Low High	×
Polarized observation	Low High	Low High	○	○	×

"○" mark indicates the good observation can be performed throughout the zoom range.

Low High The shaded section indicates the good observation range.

Electrical Specifications

Power source	100-120V/220-240V 50/60Hz
Lamp	6V-30W halogen lamp (Philips 5761) Average life: 100 hours (rated use)
Fuse	Time lag 1A/250V (100-120V) 1A/250V (220-240V)

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Nikon

STEREOSCOPIC MICROSCOPE
SMZ-U

Accessories for Photomicrographing and TV Monitoring

Instructions

NIKON CORPORATION
FUJI BUILDING 2-3, MARUNOUCHI 3-CHOME, CHIYODA-KU, TOKYO 100, JAPAN
PHONE 03-214-5311 TELEX: J22601 NIKON, FAX: 03-214-1780

Printed in Japan

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NIKON CORPORATION

CAUTIONS

① Avoid Strong Shocks!
Handle the microscope gently, taking care to avoid strong shocks.
② Place of Use
Avoid the use of the microscope in a dusty place, or where it may be subject to vibrations, or exposed to high temperatures, moisture, or direct sunlight.
③ Dirt on the Lens
Do not leave dust, dirt, or finger marks on the lens surfaces. They will prevent you from clearly observing the specimen.

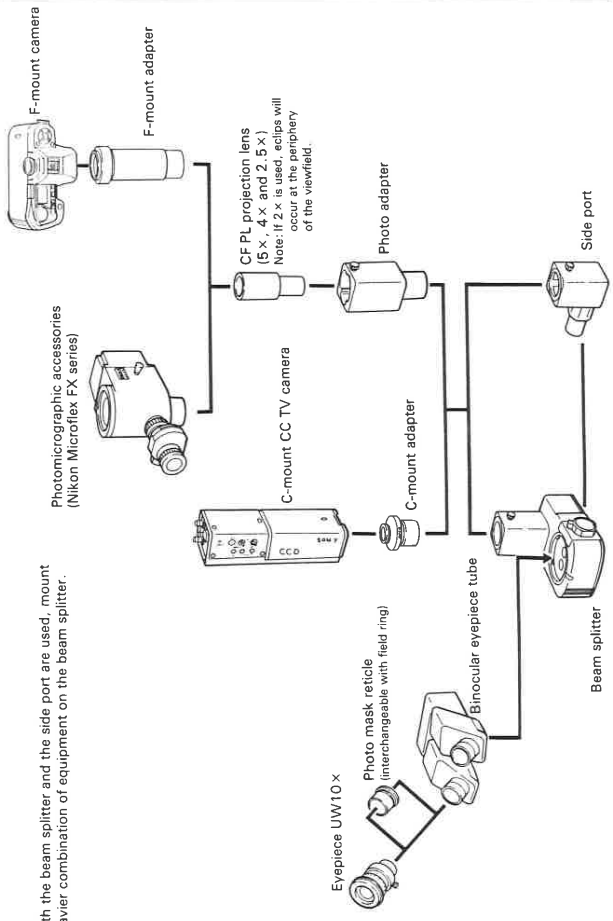
CARE AND MAINTENANCE

① Cleaning the Lenses
To clean the lens surfaces, remove dust using a soft brush or gauze. Only when removing finger marks or grease, use a soft cotton cloth, lens tissue, or gauze lightly moistened with pure alcohol (methyl alcohol or ethyl alcohol). Observe sufficient caution in handling alcohol and xylene, as they are inflammable.
② Cleaning the Painted Surfaces
Avoid the use of any organic solvent (for example, thinner, ether, alcohol) for cleaning the painted surfaces and plastic parts of the instrument.
③ Never Attempt to Dismantle!
Never attempt to dismantle the instrument because you may impair the functions.
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 Periodic Checking
To maintain the best performance of the instrument, we recommend that the instrument be periodically checked. (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.

This manual describes the accessories required for photomicrographing or TV monitoring with the SMZ-U stereoscopic microscope. Before using these accessories, please also read the manuals for the basic unit, accessories, Microflex FX series, and TV equipment.

Contents

I .Systematic Chart of Equipment Required for Photomicrographing and TV Monito. .ıg



Note: If both the beam splitter and the side port are used, mount a heavier combination of equipment on the beam splitter.

Fig. 1

II .Nam_ and Function of Each Section

● Beam splitter

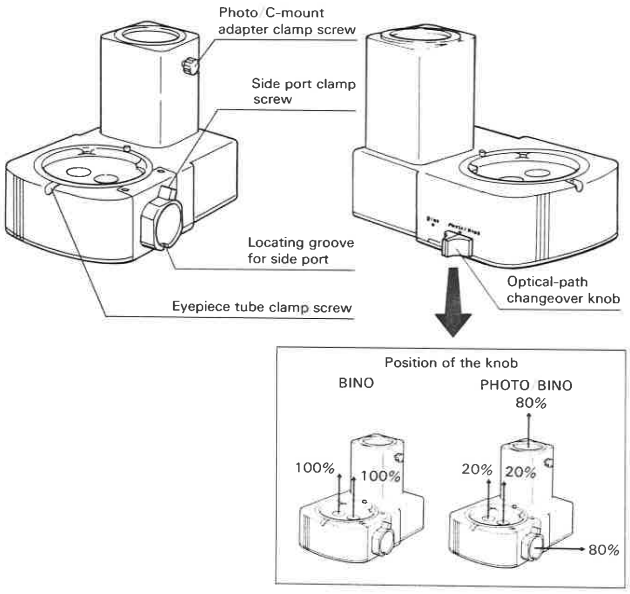


Fig. 2-1

● Side port

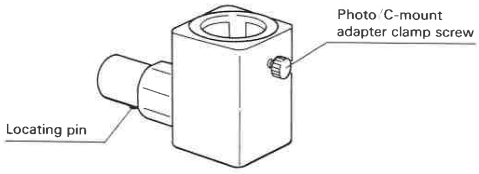


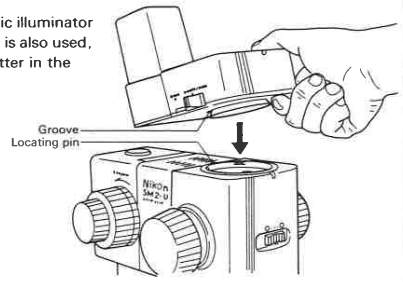
Fig. 2-2

III. Assembly

1. Beam splitter

● Tilt the beam splitter slightly as shown in the figure and position the groove at the locating pin of the zoom body. Fit the beam splitter and tighten the clamp.

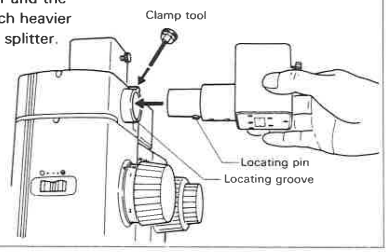
Note: If the coaxial episcopic illuminator (available separately) is also used, attach the beam splitter in the upper position.



2. Side port

● Fit the locating pin of the side port into the groove of the beam splitter. Insert the side port and fix it with the clamp.

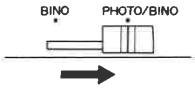
Note: If both the beam splitter and the side port are used, attach heavier equipment to the beam splitter.



IV. Operation (Photomicrographing)

1. Optical path changeover

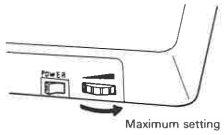
● Slide the optical-path changeover knob of the beam splitter to the position of PHOTO/BINO.



2. Brightness adjustment

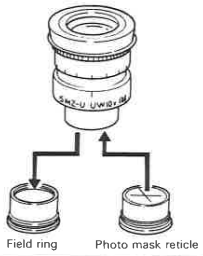
● For color photomicrographing, turn the brightness control dial of the stand to the maximum setting, and adjust the brightness using the color compensation filter.

Note: See the instructions provided separately for the illuminators.



3. Focusing through the binocular eyepiece tube

① Attach the photo mask reticle (available separately) to the eyepiece.

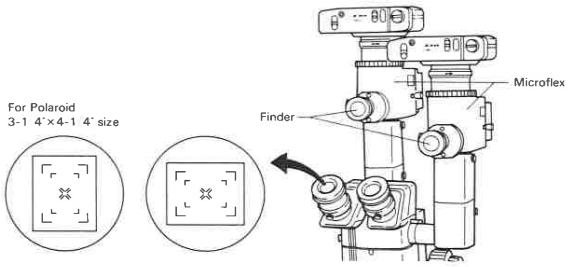


② Bring the mask into focus using the diopter ring.

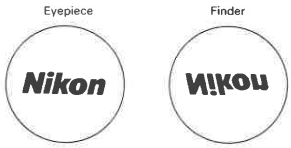
The double cross hair lines in the center of the reticle must be clearly distinguishable.

③ Turn the fine focus knob to bring both the mask and the image into sharp focus.

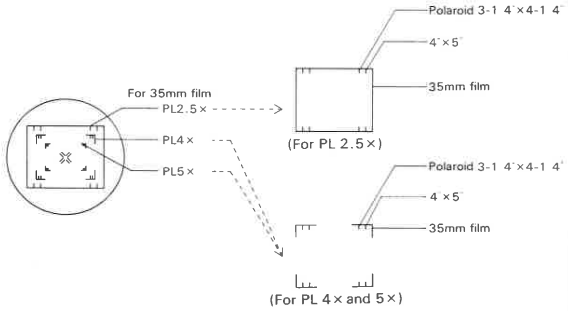
④ Rotate the eyepiece and align the mask's direction of the eyepiece with that of the Microflex finder.



● Images viewed through the eyepiece and finder.



● Photo mask reticle



Note: 1)For more accurate focusing, use the focusing magnifier (available separately).
2)Focusing can be also performed using the finder of the Microflex.
3)Use the finder to strictly check the framing for picture composition.

4. Photomicrographing magnification

● Photomicrographing magnification = Zoom magnification × CF PL projection lens magnification.

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