

INSTRUCTIONS

SZH-ILLK **SZH-ILLB** **SZH-ILLD**

ILLUMINATION BASES



This instruction manual has been written for use of the illumination bases in conjunction with Olympus zoom stereo microscope SZH.

Before assembly of your illumination base with the SZH microscope, read the instruction manual for the microscope as well as this manual carefully in order to familiarize yourself fully with the integral use of these instruments so that you may obtain optimum performance.

OLYMPUS

BEFORE USE

This manual gives explanations of the illumination bases SZH-ILLK, -ILLB and -ILLD. It is recommended that you also read the manual for the microscope SZH, and in the case of photomicrography, the manual for the photomicrographic attachments in use, in order to obtain maximum performance.

Observe the following procedures carefully:

1. Operation

- ① Avoid exposure of the illumination base to direct sunlight, high temperature and humidity, dust and vibration. (Ambient temperature for operation: 0°C ~ 40°C)
- ② Always handle the illumination base with care and avoid abrupt motions and shock. Specially do not expose the illumination base SZH-ILLD to vertical shock in order to protect the built-in cooling fan.
- ③ Use the microscope on a desk surface of no more than 3° inclination.
- ④ When using the pillar S-P400 (pillar length: 400mm) in conjunction with the objective 0.5X and 0.75X, both optionally available, check the stability of the microscope after assembly of these units.

Precautions for Safe Operation

1. Mounting the zoom microscope body:

- ① Mount the zoom microscope body on the illumination base in front of the pillar as shown in Fig. 1, left (marked with a circle); to prevent the microscope body from overturning. (Fig. 1)
- ② Securely clamp the drop prevention collar next to the microscope body. (Fig. 2)

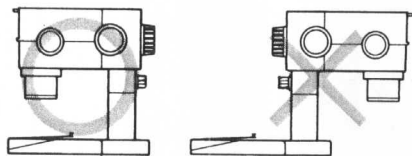


Fig. 1

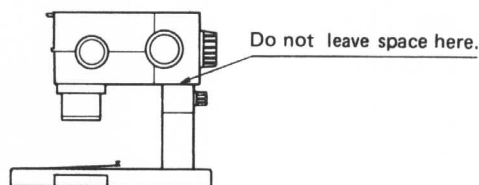


Fig. 2

2. If liquid is spilled on the illumination base:

- ① Disconnect the power cord from the AC outlet.
- ② Wipe off spilled liquid with a dry cloth or a towel.
- ③ Wipe the light exit window lens evenly with dry cotton gauze.
- ④ If liquid spills into the base, contact your Olympus dealer.

3. Use of the auxiliary output jack provided on each illumination base:

Do not use this auxiliary output jack for any attachment other than the coaxial vertical illuminator SZH-ILLC or the simple illuminator LSGA (Max. 6V 20W).

2. Maintenance and Storage

- ① Optical glass surfaces must always be kept clean. Dust on lens surfaces should be blown off by means of a hand blower. Carefully wipe oil or fingerprints off the glass surfaces with gauze moistened with a small amount of xylene or a 3:7 mixture of alcohol and ether.
- ② Do not use organic solution to wipe the surfaces of non-optical components. Plastic parts, especially, should be cleaned with a neutral detergent.
- ③ Do not disassemble any part of the instrument.
- ④ When not in use, the instrument should be covered with the dust cover provided.
- ⑤ Do not leave smudges or fingerprints on the bulb portion of the halogen lamp. If necessary, it should be wiped clean with cotton gauze slightly moistened with a 3:7 mixture of alcohol and ether, or benzene.
- ⑥ Before replacement of the burned bulb, let it cool completely.

illumination base	Replacement bulb
SZH-ILLK SZH-ILLB	6V 20W halogen bulb (6V 20WHAL) (Philips 7388) Average life (at rated condition): 100 hrs.
SZH-ILLD	12V 50W halogen bulb (12V 50WHAL-L) (Philips 13512) Average life (at rated condition): 2000 hrs.

★ High intensity halogen bulb compatible:

12V 50W halogen bulb (12V 50WHAL)
(Philips 7027) Average life: 50 hrs.

★ Use the bulbs at the rated conditions.

- ⑦ If the surface of the waterproof glass or stage glass for the illumination base SZH-ILLD is smudged, the effect of darkfield illumination will be impaired. Take care to avoid smudges, especially at the time of filter insertion or removal. If smudged, wipe it clean.

CONTENTS

1. SPECIFICATIONS	1	1
[A] Illumination Base SZH-ILLK	1	
[B] Illumination Base SZH-ILLB	1	
[C] Illumination Base SZH-ILLD	2	
2. CONFIGURATION	3	2
[A] Illumination Base SZH-ILLK	3	
[B] Illumination Base SZH-ILLB	4	
[C] Illumination Base SZH-ILLD	5	
3. COMPONENTS	6	3
4. ASSEMBLY	7	4
5. DESCRIPTION OF VARIOUS COMPONENTS	12	5
6. OPERATION	15	6
7. TROUBLE SHOOTING	24	7
8. OPTIONAL ACCESSORIES	26	8
[A] Spring-clip Specimen Holder SZH-CLJ	26	
[B] Polarizing Filter Set SZH-KPO	27	
[C] Stage Adapter SZH-STAD-1	29	
[D] Gliding Stage SZH-SG	31	

SPECIFICATIONS

[A] Illumination Base SZH-ILLK

Item	Description
Light source	6V 20W halogen bulb.
Light intensity adjustment	Continuously variable transformer, built-in.
Effective illuminated area	40 mm diameter.
Filters	Light balancing filter 45-LBD2-N and frosted filter 45LP. Accommodation for mounting an additional 45mm diameter filter.
Illumination mode	Oblique illumination, as well as transmitted illumination is available.
Pillar height	250 mm (extendable up to 400mm with optional 400 mm pillar)
Weight	About 6.2 kg.
Power consumption	40 VA max.
Others	<ul style="list-style-type: none"> • Base surface is water-sealed. • Drop prevention collar can be used to mount an optional illuminator LSGA on it. • Compatible with various stages, optionally available. • Polarizing filter set (SZH-KPO) can be mounted.

[B] Illumination Base SZH-ILLB

Item	Description
Light source	6V 20W halogen bulb.
Light intensity adjustment	Continuously variable transformer, built-in.
Effective illuminated area	40 mm diameter.
Filters	Light balancing filter 45-LBD2-N and frosted filter 45LP provided. Accommodation for mounting up to 3 additional 45 mm diameter filters at the same time. Two built-in sliders for additional filters.
Illumination mode selection	High/low contrast, oblique and special illumination modes are possible.
Illumination selector lenses	Built into the base to adjust light intensity according to observation magnification, in 2 steps.
Auxiliary output	Variable in 4 steps: 3-4-5-6V (built-in transformer 6V 20W max.)
Pillar height	250mm (extendable up to 400 mm with optional 400 mm pillar)
Weight	About 7.1 kg.
Power consumption	70 VA max.
Others	<ul style="list-style-type: none"> • Base surface is water-sealed. • Drop prevention collar can be used to mount an optional illuminator LSGA. • Compatible with various stages, optionally available. • Polarizing filter set (SZH-KPO) can be mounted.

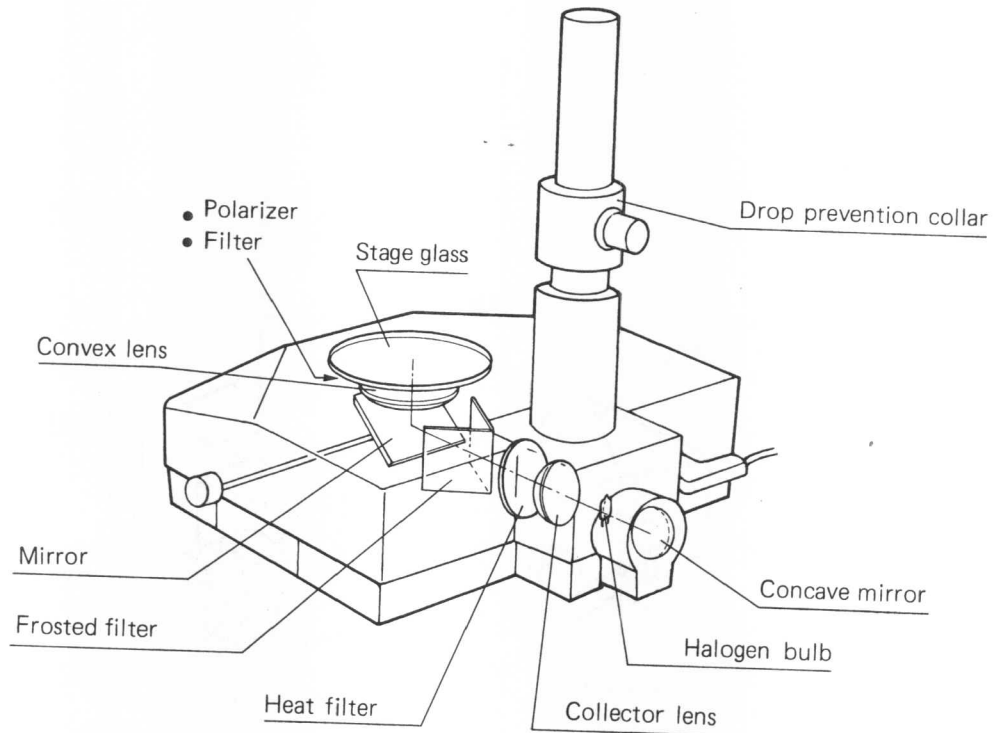
[C] Illumination Base SZH-ILLD

Item	Description
Light source	12V 50W halogen bulb.
Light intensity adjustment	Continuously variable transformer, built-in.
Effective illuminated area	34mm diameter.
Filters	Light balancing filter 45-LBD2-N and adapter for 45 mm diameter filter provided. Accommodation for mounting additional 45 mm diameter and 50 mm X 50 mm filters.
Illumination selector	Lever operation between transmitted light brightfield and darkfield.
Auxiliary output	Variable in 4 steps: 3-4-5-6V (with built-in transformer 6V 20W max.)
Pillar height	250mm (extendable up to 400mm with an optional 400mm pillar)
Weight	About 7.6 kg.
Power consumption	120 VA max.
Others	<ul style="list-style-type: none"> • Base surface is water-sealed. • Drop prevention collar can be used to mount an optional illuminator LSGA. • Compatible with various stages, optionally available. (Darkfield effect can be maintained with the stage surface up to 15mm from the base.) • Polarizing filter set (SZH-KPO) can be mounted. (However, no other filter can be used simultaneously.)

2 CONFIGURATION

Each SZH illumination base is configured as illustrated below, with its unique illumination system that offers increased intensity, even illumination and a variety of illumination modes. Its wide range of applications covers not only the medical and biological fields but also metallurgical and industrial applications.

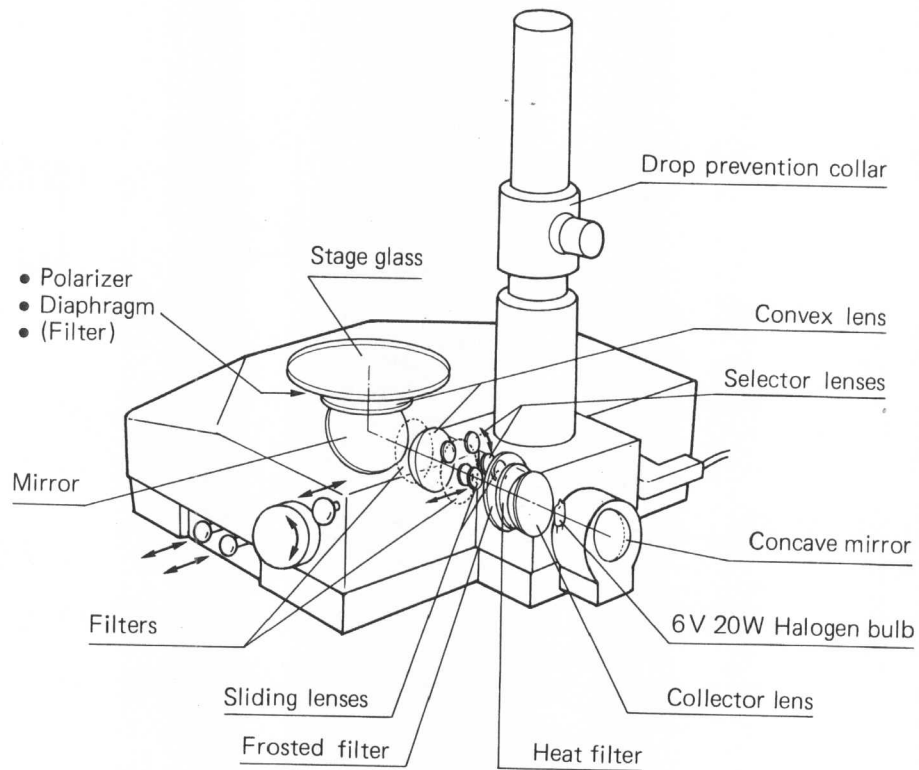
[A] Illumination Base SZH-ILLK



The light beam emitted from the halogen bulb goes through the collector lens and heat filter to remove heat radiation. It then passes through the frosted filter and is diffused to evenly illuminate the specimen.

By tilting the mirror, the specimen can be illuminated obliquely to facilitate observation with a shadow effect.

[B] Illumination Base SZH-ILLB



The light beam emitted from the halogen bulb goes through the collector lens and heat filter for elimination of heat radiation. Then the beam is split into 2 ray bundles by the paired sliding lenses and selector lenses, and, in Koehler mode, illuminates the specimen. The illumination selector lenses are designed to provide optimum intensity at any zoom magnification. Moving the sliding lenses permits selection of optimum illumination among oblique, darkfield, low contrast (critical) illumination, etc.

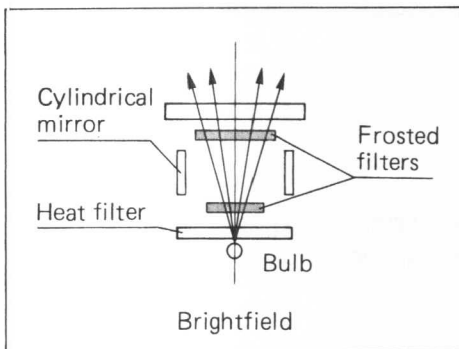
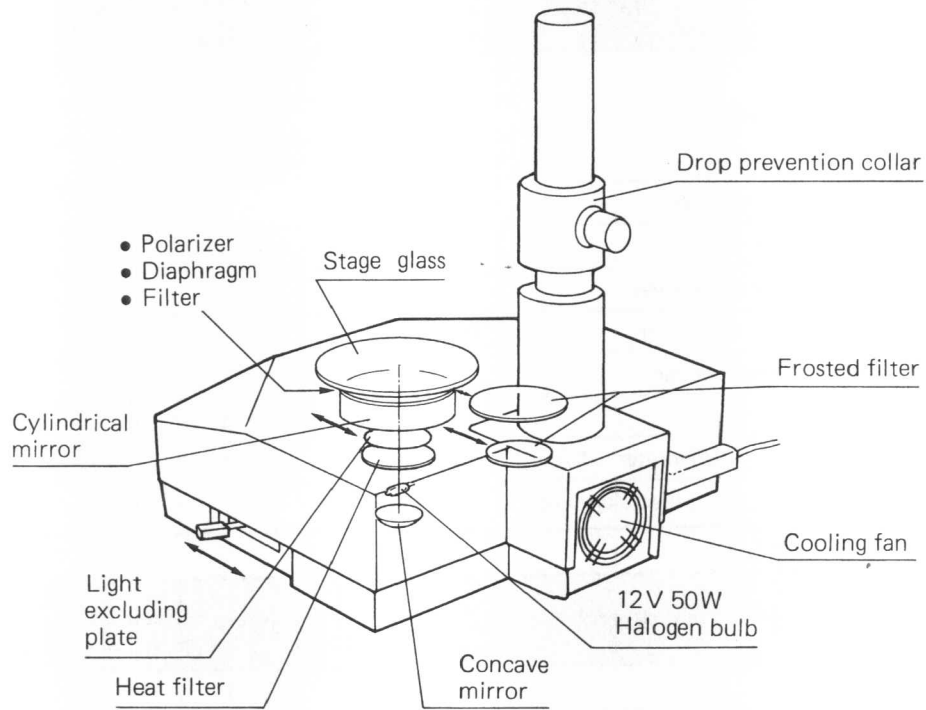


Fig. 3

■ Brightfield

The light beam emitted from the halogen bulb goes through the heat filter, which removes the heat radiation. Then the beam is diffused by the frosted filter to evenly illuminate the specimen surface. (Fig. 3)

■ Darkfield

After the heat radiation is removed by the heat filter, part of the light beam that proceeds toward the specimen directly is cut off by the light excluding plate. The rest of the light is reflected by the cylindrical mirror and illuminates the specimen at an oblique angle, larger than the constant angle (α).

Therefore, only the light that is reflected from the specimen passes through the objective, to be observed through the eyepieces, while the rest of the light is not visible (darkfield effect). (Fig. 4)

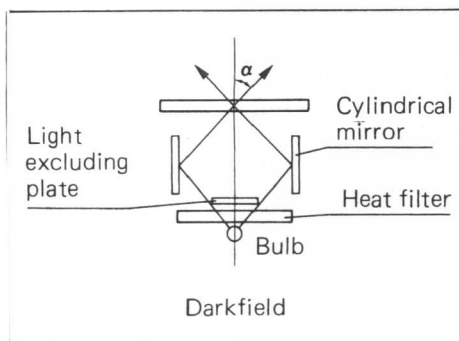


Fig. 4

3 COMPONENTS

Standard component			SZH-		
			ILLK	ILLB	ILLD
Illumination bases	S-ILLK	1	○		
	S-ILLB	1		○	
	S-ILLD	1			○
Light balancing filter	45-LBD2-N	1	○	○	○
Frosted filter	45-LP	1	○	○	○
45-mm dia. filter adapter		1			○
Pillar (height: 250mm)	S-P250	1	○	○	○
Drop prevention collar	S-R	1	○	○	○
Stage clips, paired	S-CL	1	○	○	○
Diaphragm unit (diameter: 40mm)		1			○
Allen wrench (for pillar clamping)		1	○	○	○

Essential components, depending on various illumination bases			SZH-		
			ILLK	ILLB	ILLD
Stage glass	SP-C	1	○	○	○
6V 20W halogen bulbs	6V20WHAL	2	○	○	
Bulb socket	LS20H-M	1	○	○	
12V 50W halogen bulb	12V50WHAL-L	1			○
Power cord	UYCP	1	○	○	○

Optional accessories:

Simple polarizing attachment	SZH-KPO
Pillar (height: 400mm)	S-P400
Gliding stage	SZH-SG
Adapter for mechanical stage	SZH-STAD1 (for BH2-SRG and BH2-SH)
Epi-illuminator	LSGA (plus arm IHA or IHB)
Spring clip specimen holder	SZH-CLJ

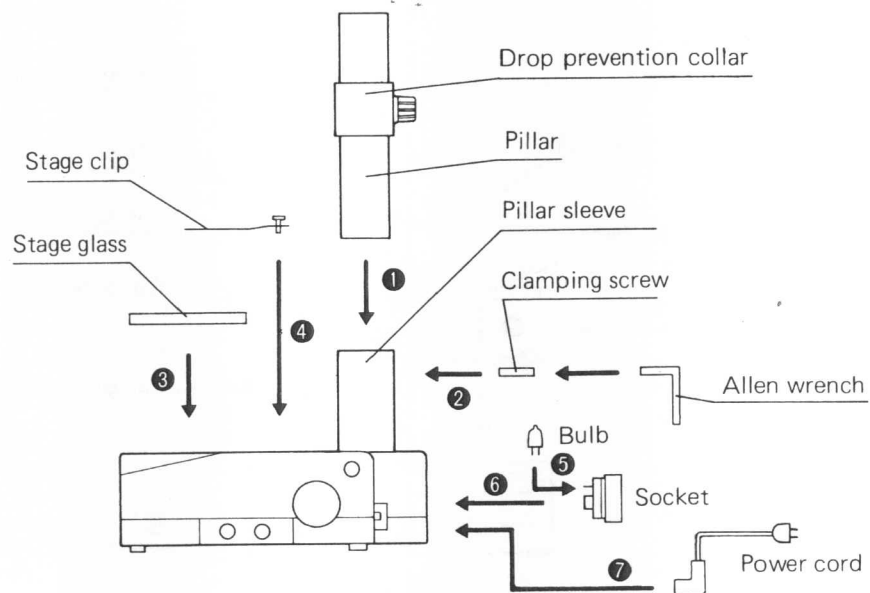
4 ASSEMBLY

Each section in this manual is indexed with the model names of the illumination bases. Please refer to the section pertaining to your illumination base.

The diagram below illustrates the sequential procedure of assembly. The numbers indicate the assembly order of each component.

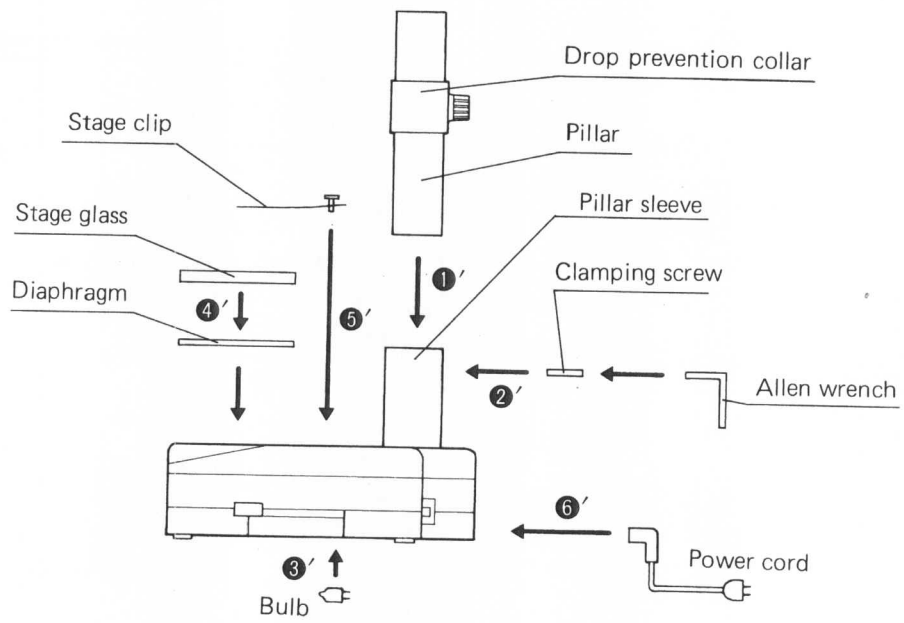
★ Keep all connecting surfaces clean, and avoid scratching the component surfaces.

■ Illumination bases SZH-ILLK and -ILLB



★ Be certain to set the line voltage selector switch to match the local line voltage.

■ Illumination base SZH-ILLD



★ Be certain to set the line voltage selector switch to match the local line voltage.

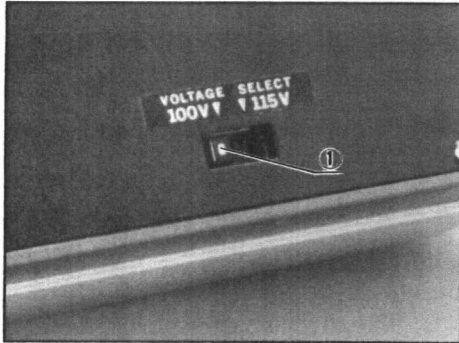


Fig. 5

■ **Illumination bases SZH-ILLK, -ILLB and -ILLD**

★ **Line voltage selector switch setting**

The line voltage selector switch ① should be set to match the local line voltage. Fig. 5 shows the switch set at 100V.

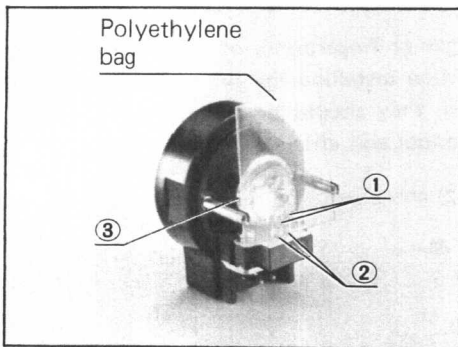


Fig. 6

■ **SZH-ILLK, -ILLB**

⑤ **Bulb Replacement**

★ Before bulb replacement, be certain the defective bulb is cool.

1) Pull the contact pins ① of a halogen bulb from its polyethylene bag. (Fig. 6)

★ Be careful not to leave fingerprints or smudges on the bulb portion.

2) Insert the contact pins fully into the socket ②.

★ Do not exert force to twist or bend the bulb, but gently push the pins into position.

★ Do not tilt the bulb when inserting it into the socket.

★ Take care not to smudge the mirror surface ③ with fingerprints, etc. If smudged, the mirror should be wiped clean with cotton gauze slightly moistened with a 3:7 mixture of alcohol and ether.

3) Looking at the bulb from the front, confirm that the filament image covers the lower half of the screw head on the mirror surface. (Fig. 7)

★ If the filament image is deviated horizontally from the center (since the bulb tilts in either direction), adjust the bulb position correctly.

★ If the filament image is deviated vertically, the contact pins are not inserted completely. Push them in completely.

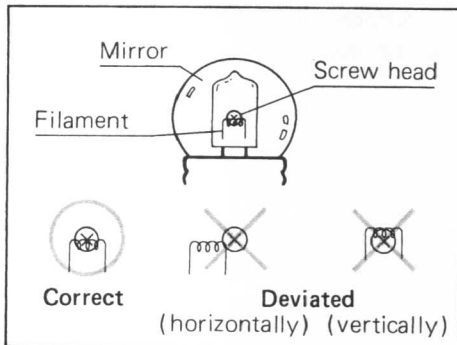


Fig. 7

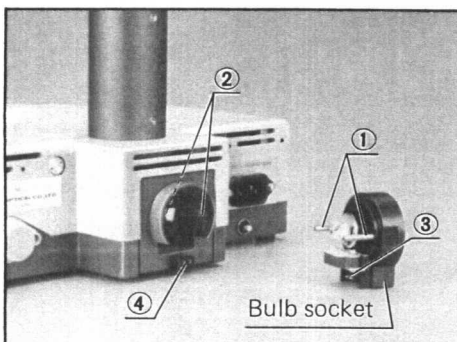


Fig. 8

4) Align the guide pins ① with the guide holes ②, and insert the plug ③ into the receptacle ④ all the way without tilting the bulb socket. (Fig. 8)

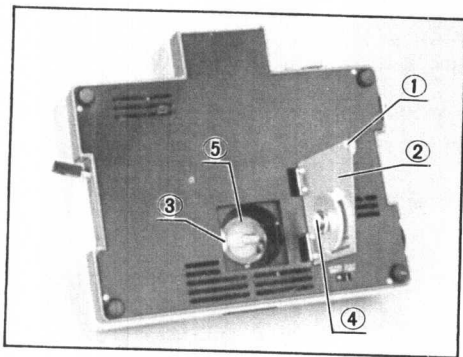


Fig. 9

■ SZH-ILLD

③' Bulb Replacement

★ Before bulb replacement, take time to cool the burned bulb and socket.

- 1) Loosening the clamping knob ①, open the bulb cover ②. (Fig. 9)
- 2) Pull the contact pins of a halogen bulb from its polyethylene bag. Insert the contact pins into the socket ③ without touching the bulb portion with your hands. (Fig. 9)
 - ★ Do not bend or twist the bulb while inserting the contact pins all the way.
 - ★ Make sure that the contact pins are completely inserted; otherwise uneven illumination may result or the effective life of the bulb will be reduced.
 - ★ Do not leave smudges or fingerprints on the mirror surface ④ or the heat filter ⑤ when installing the bulb and socket in the lamp housing. If smudged, they should be wiped clean with gauze and a 3:7 mixture of alcohol and ether.
- 3) Close the bulb cover ② and clamp the cover with clamping knob ①.

■ SZH-ILLD

④' Attaching the stage glass

- 1) Ascertain that the water-repellent glass is clean.
- 2) Clean the stage glass on both sides and place it on the base.
 - ★ Ascertain that the glass surfaces are clean; otherwise dust and dirt on the glass surfaces affect observation, especially in the case of darkfield illumination.

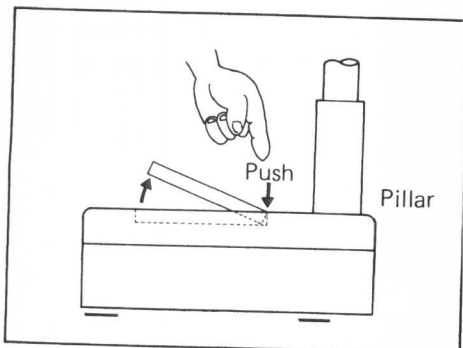


Fig. 10

■ SZH-ILLK, -ILLB, -ILLD

Removal of the stage glass

Depress the stage glass at the edge closest to the pillar, and the other edge of the glass will rise from the base. (Fig. 10)

Raise the microscope body to the upper limit.

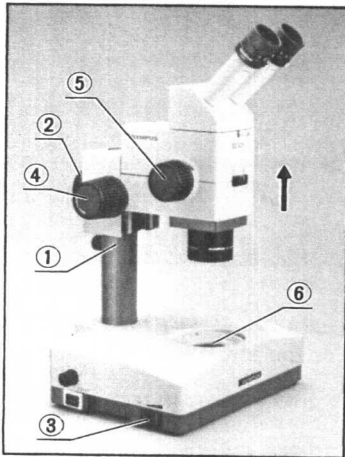


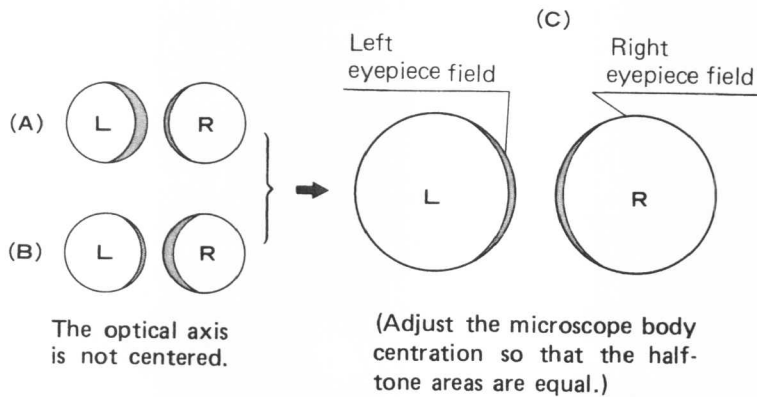
Fig. 11

■ SZH-ILLK, -ILLB and -ILLD

■ Optical alignment

★ This optical alignment is necessary to prevent uneven illumination.

- 1) Ascertain that the drop prevention collar ① is clamped, and then loosen the microscope body clamping knob ② (Fig. 11)
- 2) Rotate the light intensity control switch ③ to the Min. position, and switch the light source "on".
- 3) Raise the microscope body to the upper limit of the focusing range by means of the focusing knobs ④.
- 4) Rotate the zoom magnification knob ⑤ to the lowest magnification position (7.5X), and look at the image of the window lens (light exit) mount ⑥ through the eyepieces.
- 5) If the image of the window lens mount is seen as (A) or (B) in Fig. 12, move the microscope body slightly to the right or to the left so that the image of the lens mount may be seen as (C); then clamp the microscope body by means of the clamping knob ②.

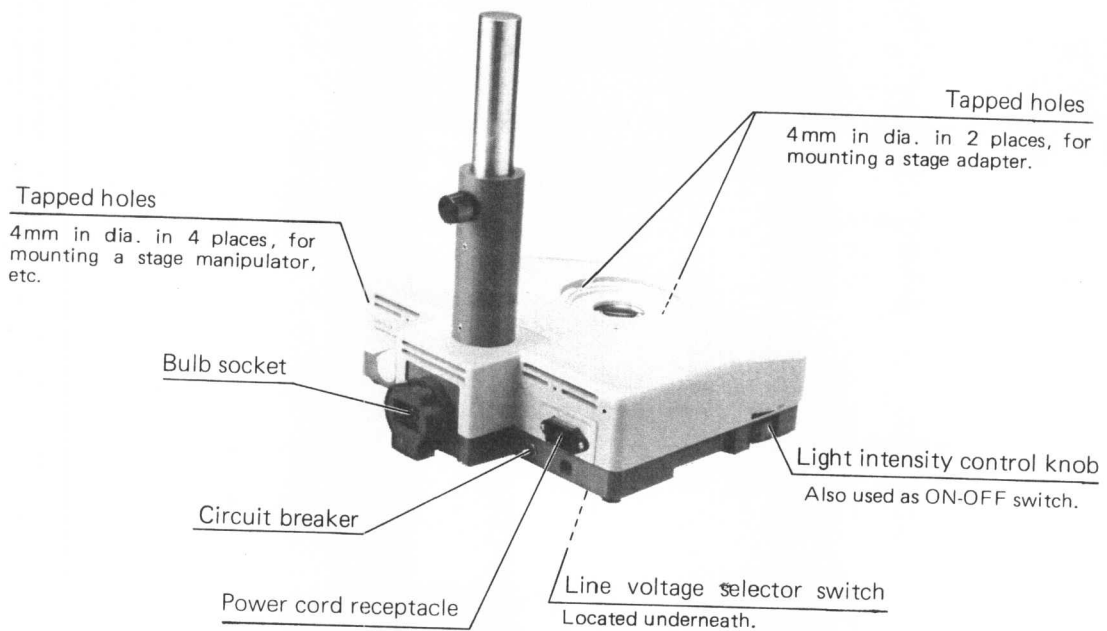
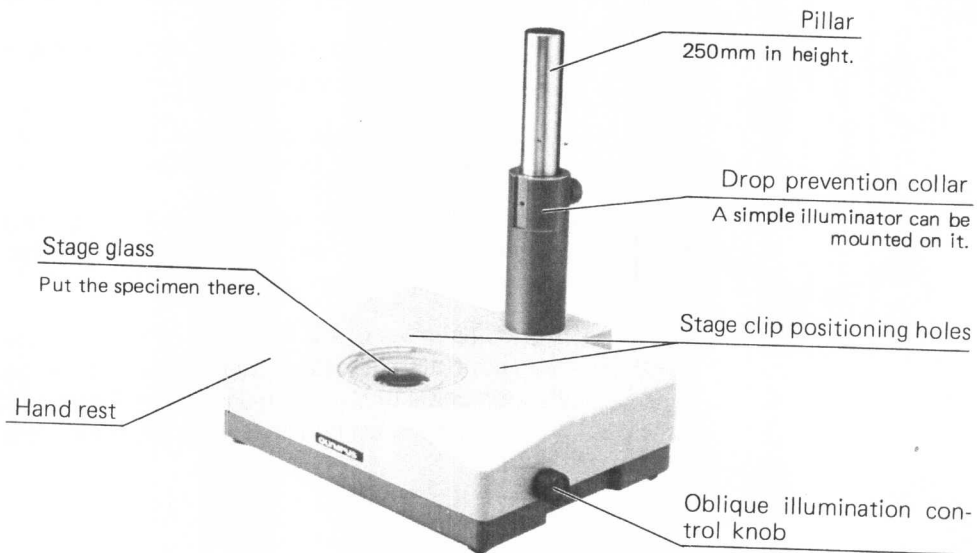


(Half-tone areas caused by the window lens mount are not equal between the left and right eyepiece fields.)

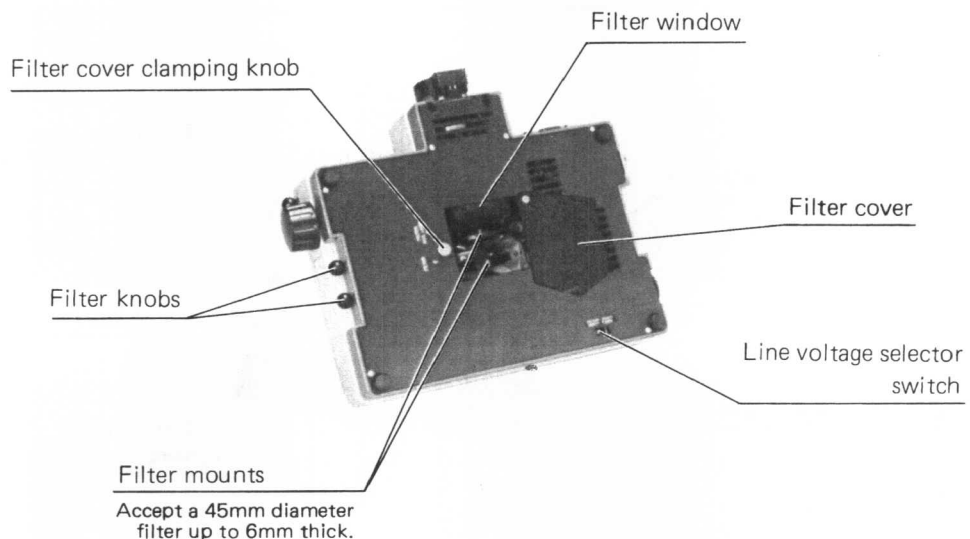
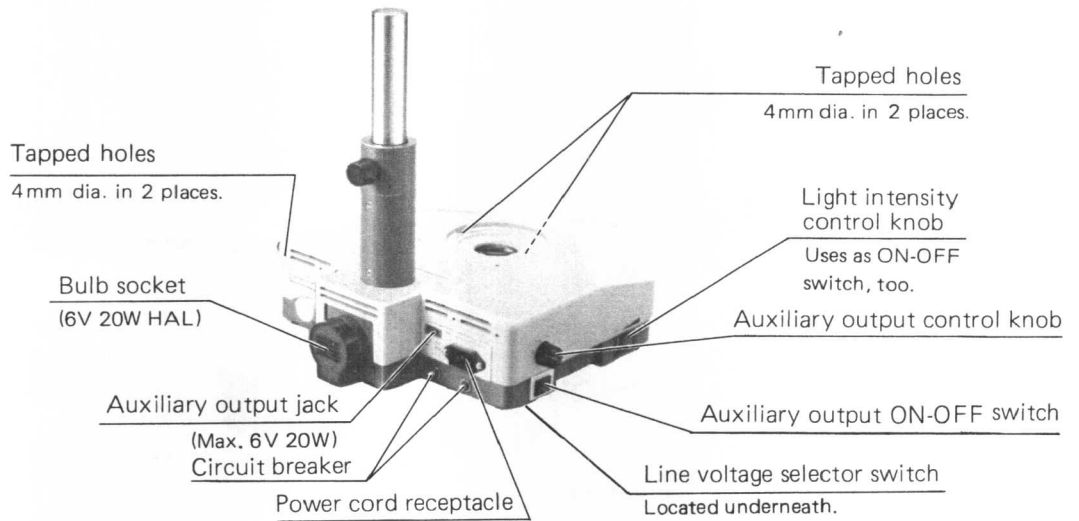
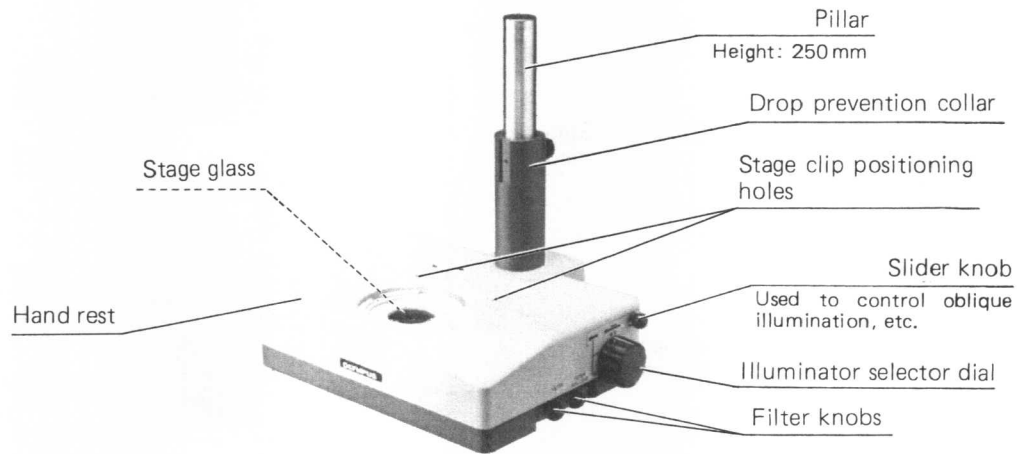
Fig. 12

5 DESCRIPTION OF VARIOUS COMPONENTS

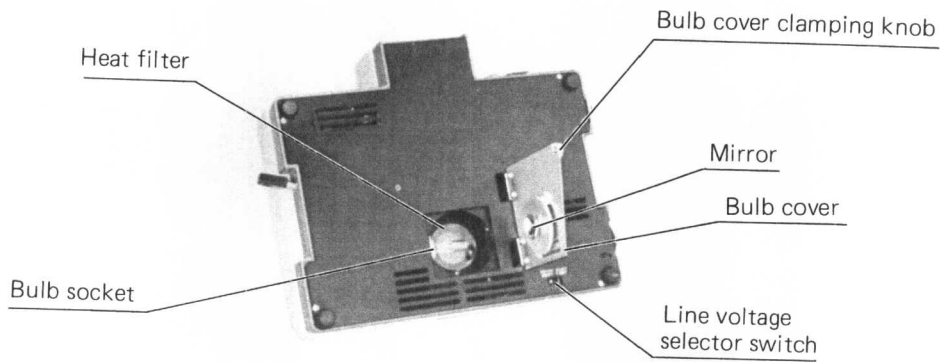
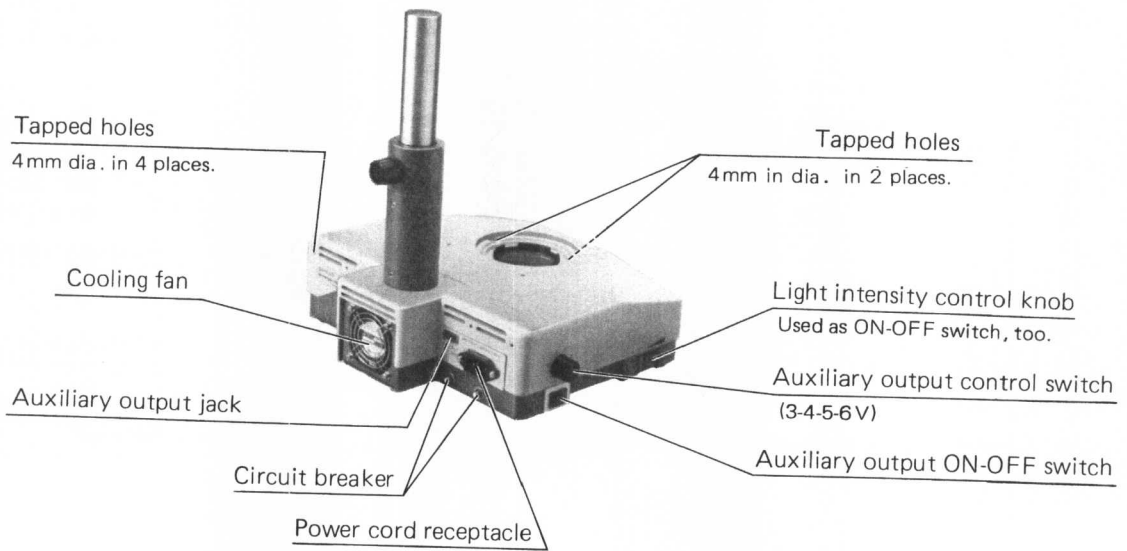
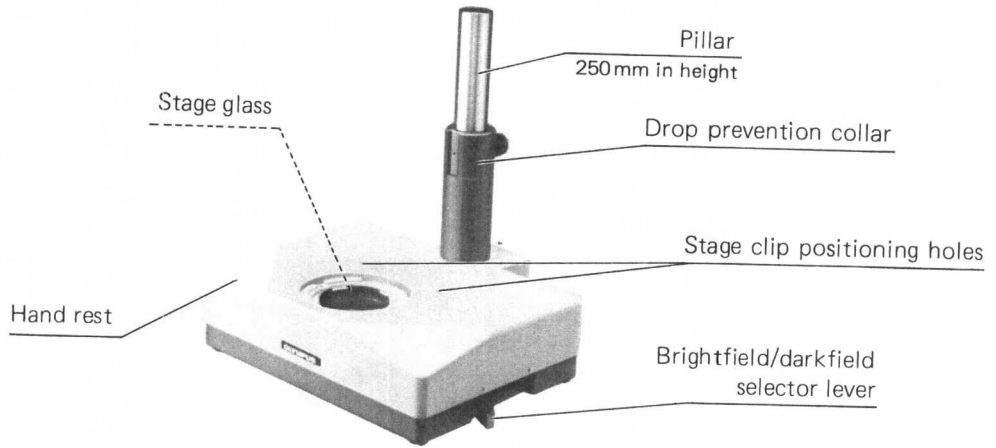
[A] Illumination Base SZH-ILLK



[B] Illumination Base SZH-ILLB



[C] Illumination Base SZH-ILLD



6 OPERATION

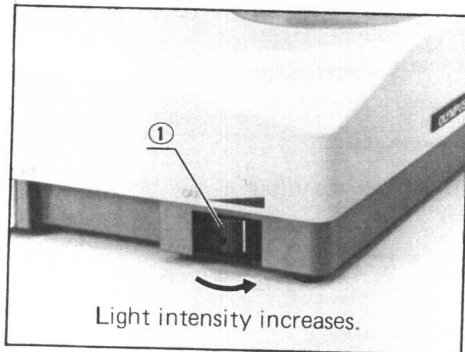


Fig. 13

■ SZH-ILLK, -ILLB, -ILLD

1. Light Intensity Adjustment by means of:

1. Voltage control

- 1) Rotate the light intensity control knob ① in the direction of arrow to switch bulb "on". (Fig. 13)
- 2) Further rotation of the knob in the same direction will increase intensity.

2. Filter control

To reduce excessive intensity of the light source without changing spectral characteristics, use one of the following filters:

43ND-6-W45, 43ND-12-W45, 43ND-25-W45, 43ND-50-W45.

★ These filters are optionally available.

6 OPERATION

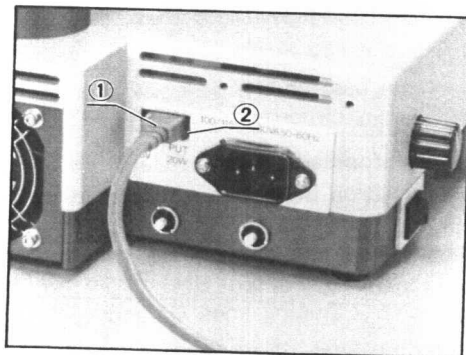


Fig. 14

■ SZH-ILLB, -ILLD

2. Use of the Auxiliary Output Jack

The auxiliary output jack is provided as power source for the illuminator LSGA or SZH-ILLC (6V20W max.) only.

- 1) Connect the cord plug ① of the illuminator to the output jack ② (Fig. 14)

★ Avoid connecting a plug of different type by force.

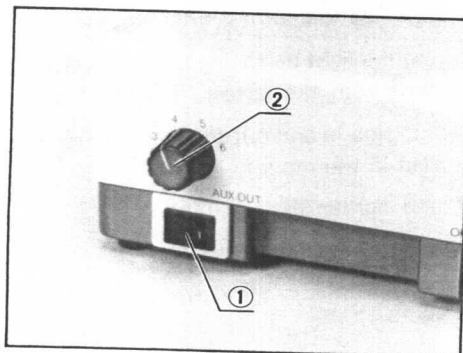


Fig. 15

2) Adjust light intensity.

- a) Activate the ON-OFF switch ① of the auxiliary output. (Fig. 15)
- b) Turn on the illuminator by means of the aux. output knob ②.
- c) After use, turn off the aux. output ON-OFF switch ①.

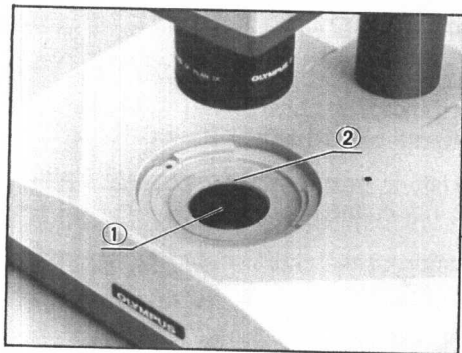


Fig. 16

3. Use of Filters

[A] SZH-ILLK

(Use a 45 mm-dia. filter.)

- 1) Keep the filter surfaces clean. If smudged with fingerprints, etc., wipe them clean.
- 2) Remove the stage glass.
- 3) Insert the filter into the filter mount ② just above the light exit glass ①. (Fig. 16)

[B] SZH-ILLB

(Use a 45 mm-dia. filter.)

When using filters which are not frequently used, or when experimenting with various test filters, place a filter in the filter mount as in case of the illuminator SZH-ILLK.

The filters and auxiliary lenses that are frequently used should be mounted as follows:

a. Filter insertion (Fig. 17)

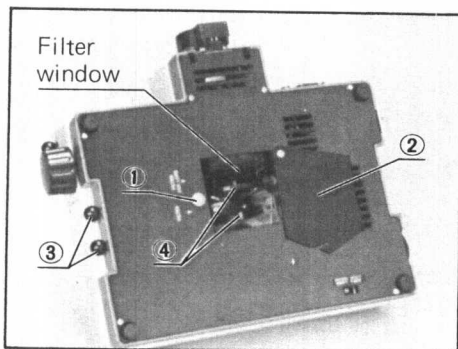


Fig. 17

- 1) Remove the microscope body from the pillar, and slowly place the body on a desk or table.
- 2) Remove the stage glass and stage clips.
- 3) Disconnect the plug of the power cord from the microscope receptacle.
- 4) Place the illumination base on the desk with the base bottom facing upward.
 - ★ We recommend you spread a piece of cloth over the desk before placing the illumination base on it, to avoid scratching the desk surface.
- 5) Keep the filter surface clean.
- 6) Loosen the filter cover clamping knob ① and open the cover ②.
- 7) Ascertain that the filter knob ③ is pushed in.
- 8) Be sure the filter mount ④ is visible in the position indicated by the arrow on the bottom plate.
- 9) Insert the filter into the filter mount ④, holding it at the edge so that no fingerprints will be left on the filter surfaces.
- 10) It is convenient to use the light balancing filter 45-LBD2-N provided at the position marked with the letters "FILTER" and a triangle.
- 11) Slide the filter mount knob in and out several times so that the filter will be securely settled in the mount.
- 12) Close the cover ② and tighten the clamping knob ①.
- 13) To remove the filter, pull the filter knob out and the filter can be easily removed.

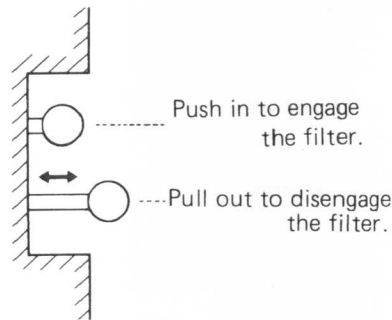
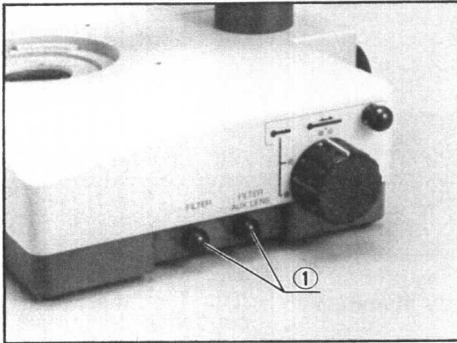


Fig. 18

b. How to slide the filter (Fig. 18)

1) Slide the filter knob ① in or out of position:

Push the knob in to engage the filter.

Pull the knob out to disengage the filter.

★ Slowly slide the filter knob in or out all the way, until it stops. If it is stopped midway, the illumination is partially cut off.

OPERATION 6

50mm x 50mm filter (commercially available on the market)

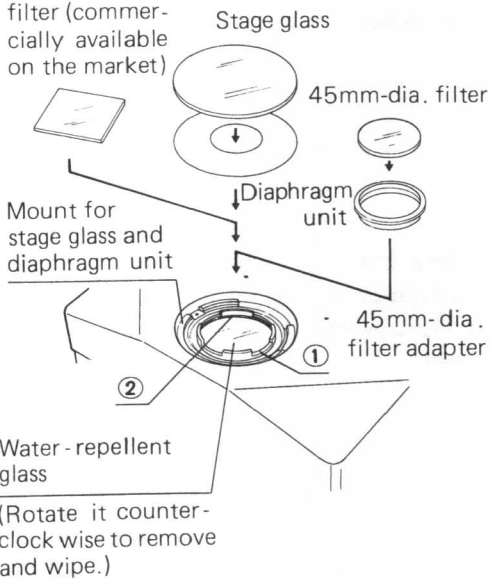


Fig. 19

[C] SZH-ILLD (Fig. 19)

- 1) Remove the stage glass.
- 2) Remove the diaphragm unit.
- 3) Keep the filter surfaces clean.

4) a. In case of a 50 mm x 50 mm filter:

Place the filter in the 4 cut-outs ① of the filter mount above the water-repellent glass.

b. In case of a 45 mm-dia. filter:

Drop the filter into the 45 mm-dia. filter adapter, and insert the combination filter and adapter into the mount ② above the water-repellent glass.

★ Removal of the filter:

Grasping the filter edges on the cut-outs ① of the filter mount, pick up the filter in the reverse order of the steps mentioned above.

★ Be careful not to leave fingerprints, etc. on the filter surfaces.

- 5) Mount the diaphragm unit.
- 6) Insert the stage glass.

4. Use of the Illumination Bases

[A] SZH-ILLK

1) Objectives and frosted filter 45LP

	Objective	Frosted filter 45LP	Illumination effect	Remarks
When Adapter STAD1 is not used.	1X	No	Evenly illuminated	Compatible with all zoom magnifications.
	0.5X 0.75X	Yes	Evenly illuminated	Periphery is cut off partially at low magnifications.
	1.5X 2X	Yes	Evenly illuminated	Compatible with all magnifications.
When Adapter STAD1 is used.	1X	Yes	Evenly illuminated	Compatible with all magnifications.
	0.5X 0.75X	Yes	Evenly illuminated	Periphery is cut off partially at low magnifications.
	1.5X 2X	Yes	Evenly illuminated	Compatible with all zoom magnifications.

2) Oblique illumination

This illumination is employed to improve visual contrast of a transparent specimen floating in liquid or similar applications.

Operating procedure:

Looking through the eyepieces, gradually tilt the oblique illuminator knob until the specimen image can be observed in good contrast.

- ★ Oblique illumination is obtained without the frosted filter 45LP engaged when the objective magnification is 1X, without the adapter SZH-STAD1 for mechanical stage or round stage.
- ★ If the frosted filter 45LP is used, however, oblique illumination can be obtained at objective magnifications other than 1X, although the illumination might be uneven.
- ★ Uneven illumination may be expected at low magnifications.

3) Low contrast illumination

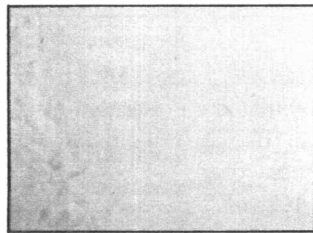
This illumination is employed when it is necessary to observe stained tissues in detail with flat lighting.

Operating procedure:

- Place the frosted filter 45LP under the stage glass.
- Turn the oblique illuminator knob until it reaches the stop position.

★ At this position, no oblique illumination can be obtained.

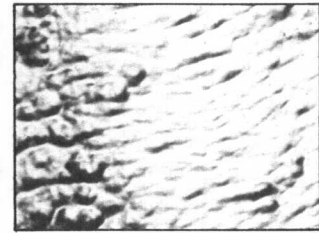
Photographs in comparison:



Low contrast



Normal illumination



Oblique illumination

[B] SZH-ILLB

1) Objectives and frosted filter 45LP

Objective	0.75X	1X	1.5X	2X
Frosted filter (45LP)	Needed	No	Needed	Needed
Illumination effect	Somewhat unevenly illuminated (Cut off at the periphery with 10X magnification or lower)	Evenly illuminated	Evenly illuminated	Evenly illuminated
Illumination effect (Adapter SZH-STAD1 used in conjunction with aux. lens)	Somewhat unevenly illuminated (Cut off at the periphery with 15X magnification or lower)	Evenly illuminated (Cut off in the periphery with zoom magnification 10X or lower)	Evenly illuminated	Evenly illuminated

★ Vignetting at the periphery and uneven illumination are increased with SZH-DF Plan 0.5X objective.

2) Other illumination modes

When the 1X objective is used (or the SZH-Aux. lens and adapter SZH-STAD1 are used with a cross-movement stage or a rotatable stage), various illumination modes including high contrast, low contrast, oblique illumination, etc. are available as follows:

a) When high contrast is required;

- ① Push the illuminator selector knob ① in. (Fig. 20)
- ② Match the index line on the illuminator selector dial ② to the color-coded zoom magnification indication on the microscope body ③. (e.g. When the zoom magnification indication is 25, set the index line to the green dot.)

★ At high magnification observation, the contour of a specimen sometimes shows with excessive contrast. In such a case, the low contrast illumination is recommended.

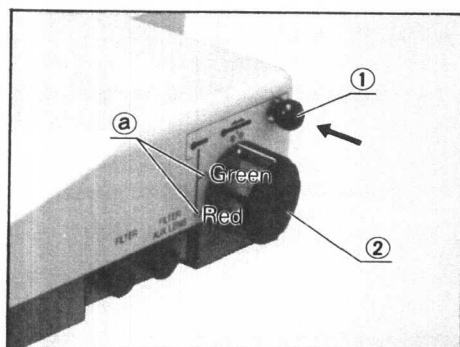


Fig. 20

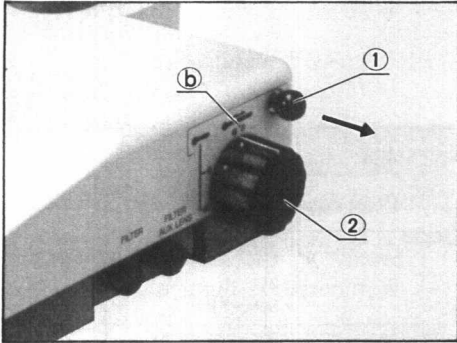


Fig. 21

b) When low contrast is required; (Fig. 21)

- ① Pull the illuminator selector knob ① all the way out.
- ② Regardless of the zoom magnification in use, align the illuminator selector dial ② to the red-green dots at position (b).

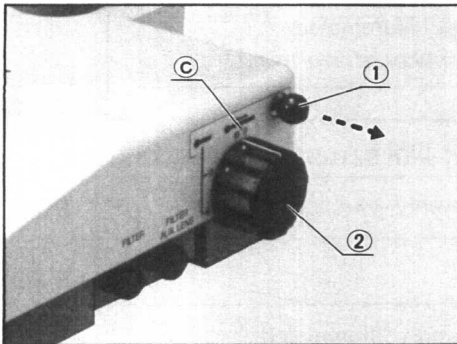


Fig. 22

c) When oblique illumination is required;

- ① Align the illuminator selector dial ① to the red-green dots at position (c) regardless of the zoom magnification. (Fig. 22)
- ② Slowly pull the illuminator selector knob ② out, until optimum illumination is obtained for observation.
- ★ Slowly rotate the illuminator selector knob in this operation.

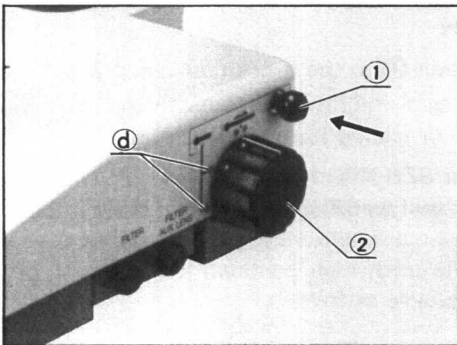


Fig. 23

d) For use of objectives other than 1X; (Fig. 23)

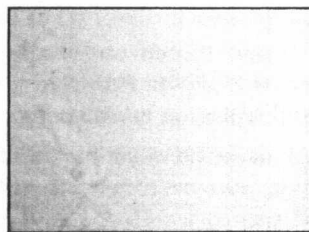
(This is the same as with the cross-movement stage or the rotatable stage in conjunction with the SZH-Aux. lens and adapter SZH-STAD1.)

- ① Place the frosted filter 45LP in the filter mount on the window lens. Push the illuminator selector knob ① all the way in. Match the illuminator selector dial ② at position (d) to the color corresponding to the zoom magnification.

Example:



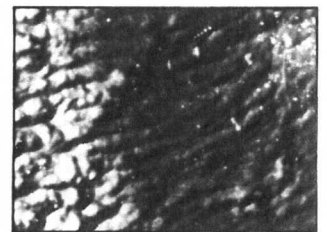
a) High contrast



b) Low contrast



c) Oblique light



d) Darkfield

[C] SZH-ILLD

1) Objectives and illumination effects

Objective	Illumination effect (Brightfield/Darkfield)		Gliding stage SZH-SG	Adapter SZH-STAD1
1X	B	Good	Good	Good (cut-off around the periphery with zoom mag. 1X or lower)
	D	Good	Somewhat unevenly illuminated (cut-off around the periphery at low zoom mag.)	
0.5X 0.75X	B	Somewhat unevenly illuminated (cut-off at the periphery at low mag.)		
	D	Somewhat unevenly illuminated (cut-off at the periphery at low mag.)		
1.5X	B	Somewhat unevenly illuminated		
	D	Good		
2X	B	Somewhat unevenly illuminated		
	D	Good		

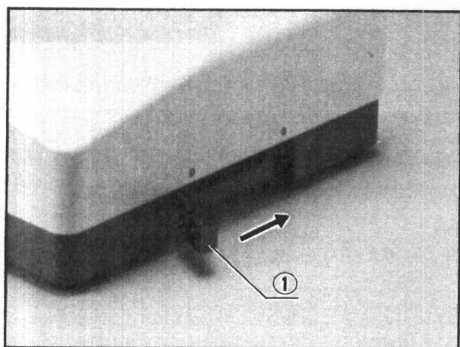


Fig. 24

2) Brightfield illumination

- ① Slide the selector lever ① to the B position. (Fig. 24)
 - ② Remove the diaphragm unit from underneath the stage glass when the adapter STAD1 or gliding stage SZH-SG is used.
- ★ If the illuminator SZH-KPO is used, remove the waterproof glass with care not to spill water underneath the stage glass.

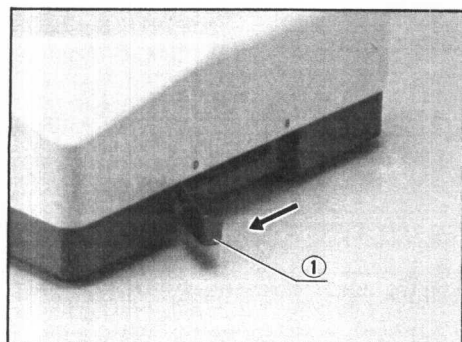


Fig. 25

3) Darkfield illumination

- ① Slide the selector lever ① to the D position. (Fig. 25)
 - ② To obtain a better effect of darkfield illumination, remove the waterproof glass, rotating it counterclockwise, with care not to permit water to infiltrate the base.
- ★ In darkfield illumination, dust and dirt on the stage glass or filter surfaces affect the darkfield effect.
If such defect is found, wipe these components clean.

■ SZH-ILLK, -ILLB, -ILLD

5. Photomicrography

- A. Take the following steps for color temperature adjustment;
- 1) Use the 45-LBD2-N filter.
 - 2) Set the light intensity control knob at Max.
- B. Selection of the illumination bases for photomicrography
- To enhance the effect of even illumination, the illumination base SZH-ILLB and -ILLD are recommended.

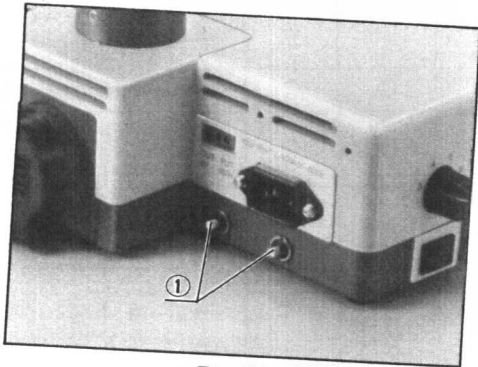


Fig. 26

■ SZH-ILLK, -ILLB, -ILLD

6. Use of the circuit breaker

If the bulb fails to light due to the change of the input voltage, etc., press the circuit breaker button ① at the back of the illumination base. (Fig. 26)



TROUBLE SHOOTING

If you are unable to obtain full performance from your instruments, please consult the table below for trouble shooting.

Trouble	Cause	SZH-			Remedy (page)
		ILLK	ILLB	ILLD	
1. Optical system					
a) Illumination is too bright (or too dark).	Light intensity control knob is not set in correct position.	○	○	○	Adjust knob correctly. (15)
	ND filter is not properly selected.	○	○	○	Select ND filter correctly. (15)
b) Illumination is too uneven.	Halogen bulb is not correctly mounted.	○	○	○	Mount bulb correctly. (9, 10)
	Bulb is not centered.	○	○	○	Center bulb. (11)
	Illuminator selector lever is not correctly set.		○	○	Set lever correctly. (20 ~ 22)
	Frosted filter is not correctly used according to objective in use.	○	○		Use filter correctly. (18, 20)
	Oblique illuminator tilts too much.	○			Reset illuminator correctly. (18)
	Filter knob is stopped midway.		○		Slide knob in or out completely. (17)
	Stage glass is dirty.	○	○	○	Wipe glass clean.
c) Dust or dirt is visible in field of view.	Stage glass is dirty.	○	○	○	Wipe glass clean.
	Window lens is dirty.	○	○		Wipe glass clean.
	Waterproof glass is dirty.			○	Wipe glass clean.
	Dust or dirt on eyepiece surface.	○	○	○	Clean eyepiece.
d) Excessive image contrast.	Aperture iris diaphragm is stopped down too much.	○	○	○	Set it correctly. (Use frosted filter.) (20)
	Illuminator selector dial is not set in correct position.		○		Set diaphragm correctly. Use frosted filter 45 LP. (20)
e) Poor color reproduction.	Light intensity control knob is not set at MAX.	○	○	○	Set knob at MAX. (15)
	45-LBD2-N filter is not engaged.	○	○	○	Engage filter. (16, 17)



Trouble	Cause	SZH-			Remedy (page)
		ILLK	ILLB	ILLD	
2. Electrical system					
a) Bulb does not light.	Bulb is burned out.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Replace bulb. (9, 10)
	Circuit breaker trips.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	After removal of trouble cause, press circuit breaker knob. (23)
b) Bulb burns out frequently.	Line voltage is too high.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Reduce line voltage by means of transformer.
	Line voltage selector knob is not matched with local mains voltage.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Match selector knob to mains voltage. (9)
	Bulb is not standard.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Use standard bulb.
	Bulb filament overlaps its reflected image.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Adjust bulb position correctly. (9)
c) Circuit breaker trips frequently.	Line voltage is too high.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Lower line voltage by means of transformer.
	Aux. output is overloaded.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Reduce load to lower than 20 W.
d) Bulb goes on and off.	Bulb filament is likely to burn out.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Replace bulb. (9, 10)
	Loose electrical connections.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Check and tighten all connections.

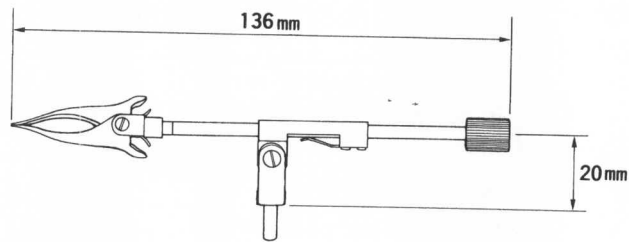
8 OPTIONAL ACCESSORIES

[A] Spring-clip Specimen Holder SZH-CLJ

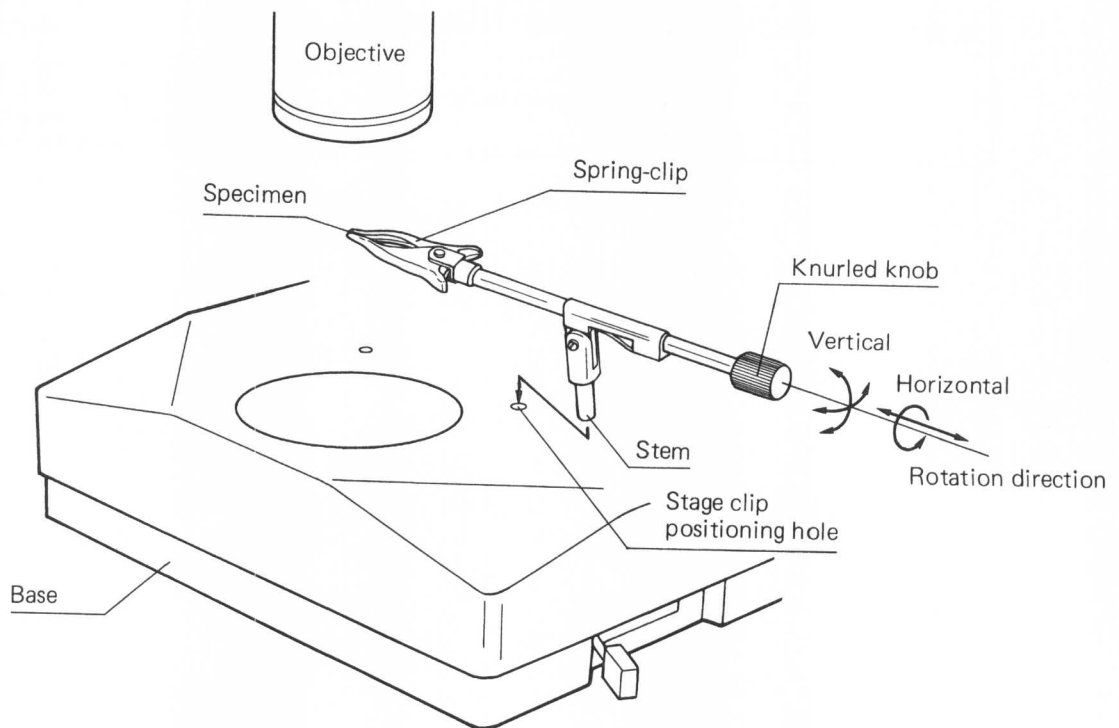
★ This instrument is specially recommended for use with the illuminator base SZH-ILLD.

1. Outline

This movable spring-clip specimen holder is convenient to hold a gemstone or similar specimens in optimum position for examination with darkfield illumination.



2. Nomenclature



Operate the specimen holder as you like by means of the knurled knob.

[B] Simple Polarizing Attachment SZH-KPO

1. Outline

This polarizing attachment is composed of an analyzer and a polarizer, to be used in conjunction with the illuminator base for examination of the specimen qualities (birefringence, polarization, etc.).

2. Care in handling

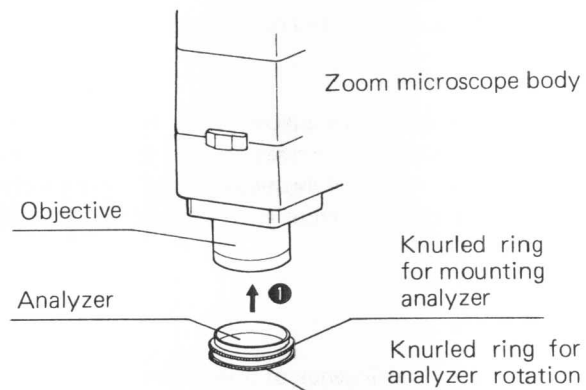
- Ambient temperature for use: 0°C to 40°C (temperature for storage: 50°C max.)
- The frosted filter 45LP cannot be used with this set.
- ★ For polarized light observation, this set can be used with all objectives except a 2X objective, which tends to vignette.

3. Components

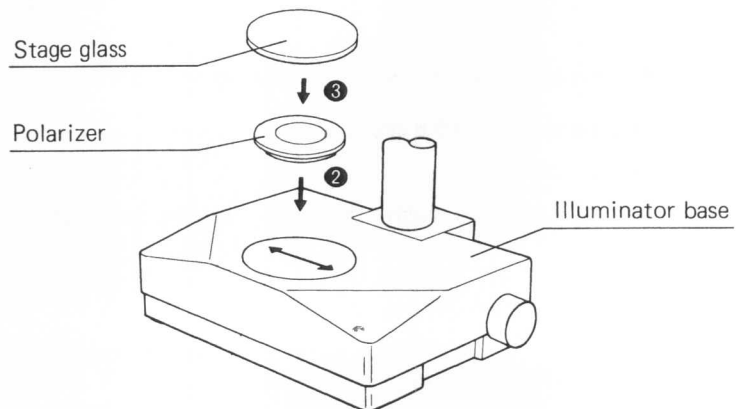
Analyzer	SZH-AN	1 pc.
Polarizer	SZH-PO	1 pc.

4. Nomenclature and assembly

[Mounting the analyzer]



[Mounting the polarizer]



■ Mounting the polarizing attachment components

1) Analyzer

- a) Clean the connecting portions of each component, especially the mounting threads of each objective and analyzer.
- b) Screw the analyzer into the objective front lens mount.

★ Holding the knurled ring, gently screw the analyzer; do not exert force to twist it.

2) Polarizer

- a) Press the stage glass at the edge closest to the pillar and remove it.
- b) Insert the polarizer in the opening in the stage, with the white dots facing upward.
- c) Align the white dots horizontally as shown at right.

3) Replace the stage glass.

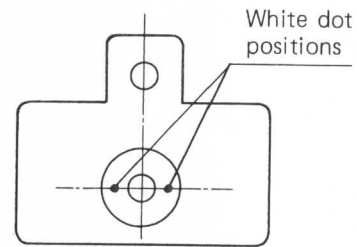


Fig. 27

5. Operation

1) Rotation of the analyzer

Rotate the analyzer with its knurled ring.

2) Crossed filter position

- a) Looking through the eyepieces, rotate the analyzer until the field of view is most darkened, with total extinction at the crossed (Nichol's) filter position.

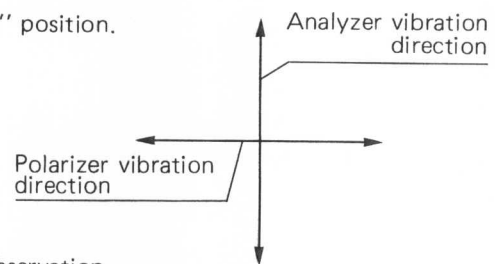
★ Looking through the eyepieces, remove the specimen to confirm this condition.

- b) At this position, the white dot on the analyzer is either closest to the operator or 180° rotated.

6. Observation

A. To observe the birefringence of a specimen:

- 1) Set the analyzer and polarizer to the "crossed filter" position.



- 2) Rotate the specimen on the stage, continuing the observation.

B. To examine polarization of a specimen:

- 1) Remove the polarizer.
- 2) Observing the specimen, rotate the analyzer or the specimen.

Fig. 28

[C] Stage Adapter SZH-STAD1

1. Outline

The adapter SZH-STAD1 is designed to connect the mechanical stage BH2-SH or the rotating stage BH2-SRG to the illumination base.

2. Mounting conditions for various illumination bases

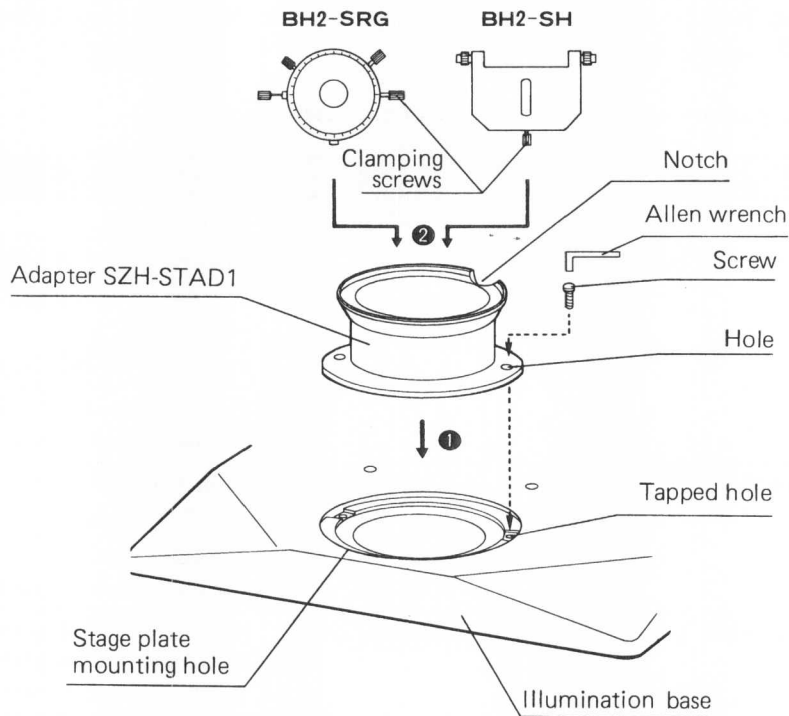
Stand and Base	Objective	Conditions
Standard stand SZH-ST	0.5X – 2X	No problems.
Illumination base SZH-ILLK	1X	Frosted filter is needed. Cut-off at the periphery with zoom magnification 1X or lower.
	1.5X, 2X	Frosted filter 45LP is needed.
	0.75X, 0.5X	Frosted filter 45LP is needed. Cut-off at the periphery at low zoom magnification.
Illumination base SZH-ILLB	1X	Aux. lens is needed. Cut-off at the periphery with zoom magnification 1X and lower.
	0.5X, 0.75X, 1.5X, 2X	Same as SZH-ILLK (Oblique illumination is incompatible)
Illumination base SZH-ILLD	0.5X – 2X	Brightfield illumination is same as with the illumination base SZH-ILLK (Darkfield illumination is incompatible.)

★ When the 45LP filter is mounted, the effect of even illumination is increased, but the light intensity is reduced to about 1/20.

3. Components

Adapter SZH-STAD1	1 pc.
Allen wrench (3 mm)	1 pc.
Set screws (AB4 X 8SA)	2 pcs.

4. Nomenclature and assembly



■ Assembly

1) Mounting the polarizer

The adapter SZH-STAD1 is also used for mounting the polarizing attachment SZH-KPO. Insert the polarizer into the upper opening of the adapter. (Fig. 28)

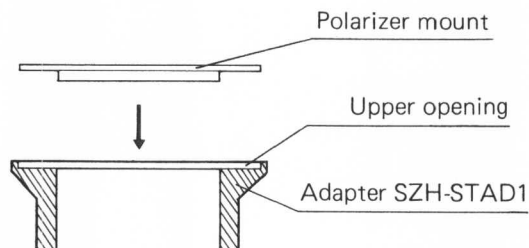


Fig. 28

2) Mounting the auxiliary lens (SZH-Aux. lens)

The SZH-Aux. lens is used with the illumination base SZH-ILLB and the objective 1X. Refer to the instruction manual of the illumination base SZH-ILLB (p.16) for mounting the auxiliary lens.

5. Operation

Refer to the instruction manual for the mechanical stage BH2-SH or the rotatable stage BH2-SRG.

[D] Gliding Stage SZH-SG

1. Outline

A specimen can be easily moved into desired position without directly touching it with hands, using this gliding stage.

2. Specifications

Illuminating area	40 mm dia.
Traverse area	40 mm dia.

3. Care in handling

- 1) Avoid placing the gliding stage on a desk with the gliding portion downward.
- 2) Before and after use, especially when sand or dust is deposited on the gliding surface, be certain to wipe the gliding surface clean with a cloth.

4. Component

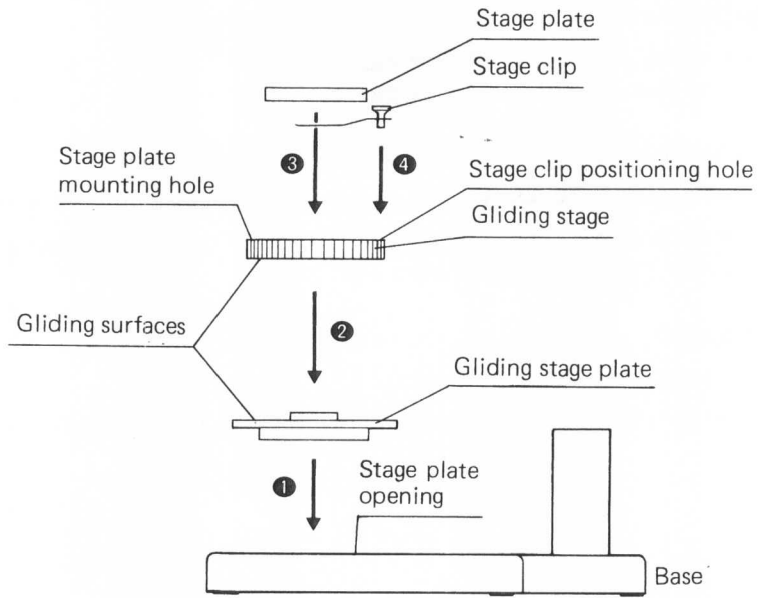
Gliding stage (composed of 2 parts)

- ★ Use the stage glass and stage clips provided with the illumination base.

5. Nomenclature and assembly

1) Assembly

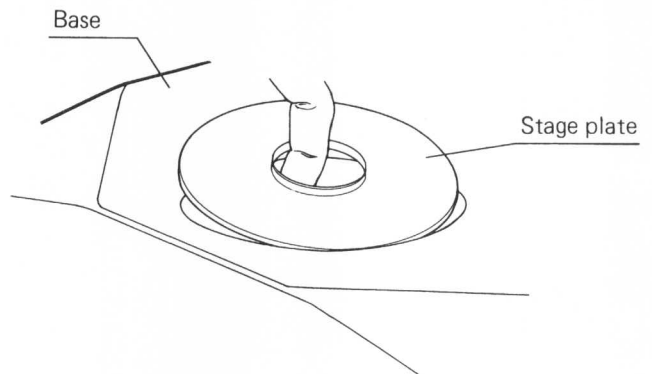
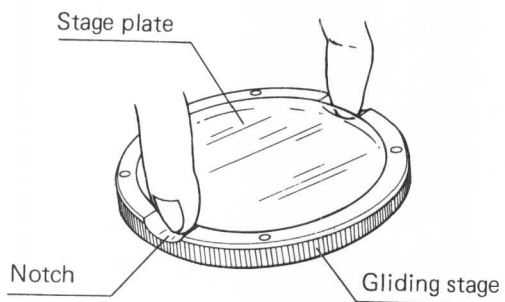
Before assembly, be certain the gliding surface is clean. If dust or metallic debris are present, wipe them off with a cloth.



2) Disassembly

Removal of the stage glass

Removal of the stage plate





OLYMPUS OPTICAL CO., LTD.



**SAN-EI BUILDING, 22-2, NISHISHINJUKU
1-CHOME, SHINJUKU-KU, TOKYO, JAPAN**