

M609 E 18.5.NF.7 (1/2)



Nikon

Stereo Microscope
SMZ800N/SMZ1270/SMZ1270i
Instruction Manual

Introduction

Thank you for purchasing a Nikon product.

This instruction manual is written for users of the Nikon stereo microscopes SMZ800N/SMZ1270/SMZ1270i. To ensure correct usage, read this manual carefully before operating this product.

- No part of this manual may be reproduced or transmitted in any form without prior written permission from Nikon.
- The contents of this manual are subject to change without notice.
- The equipment described in this manual may differ from the actual product in its appearance.
- Although every effort has been made to ensure the accuracy of this manual, errors or inconsistencies may remain. If you note any points that are unclear or incorrect, please contact your nearest Nikon representative.
- Some of the equipment described in this manual may not be included in the set you have purchased.
- If you intend to use any other equipment with this product, read the manual for that equipment too.
- If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Symbols Used in This Manual

The following symbols are used in this manual.

◆ Symbols for Safety



WARNING

Highlights important information that should be noted for safety. Read "Safety Precautions" for details.



CAUTION

◆ Other Symbols



Indicates information you should note or comply with to prevent defects or malfunction of this product.



Indicates information you should be aware of in using this product, as well as other useful information.

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Safety Precautions

To ensure correct and safe operation, read this manual before using this product.

WARNING and CAUTION Symbols

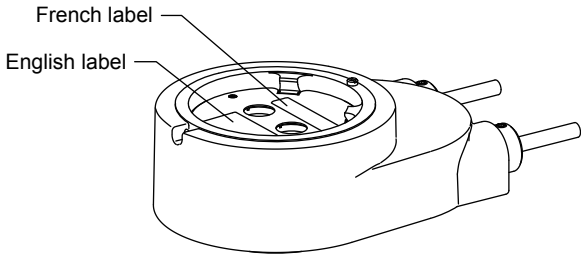
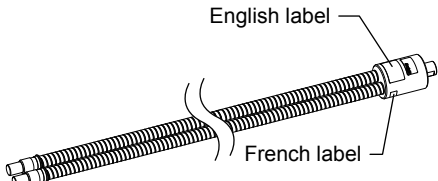
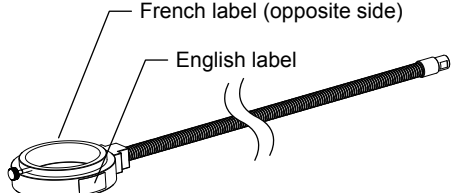
Although this product is designed and manufactured to be completely safe during use, incorrect usage or failure to follow the safety instructions provided may cause personal injury or property damage. To ensure correct usage, read this manual carefully before using this product. Do not discard this manual and keep it handy for easy reference.


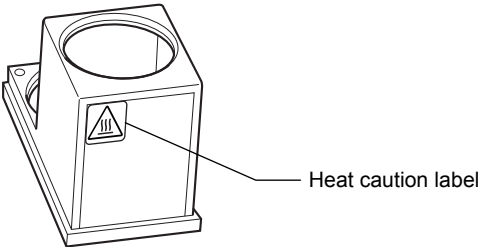

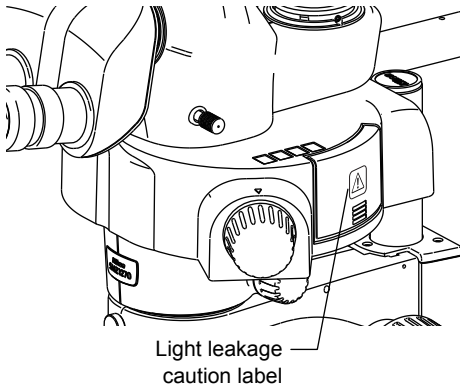

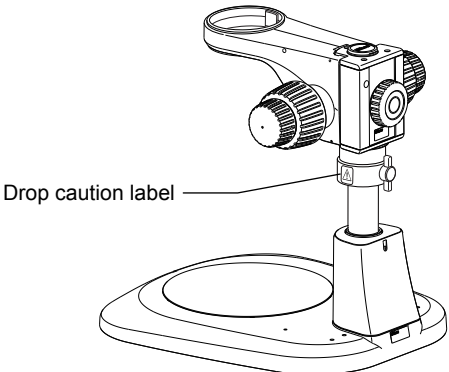
Safety instructions in this manual are marked with the following symbols to indicate their importance. For your safety, always follow the instructions marked with these symbols.


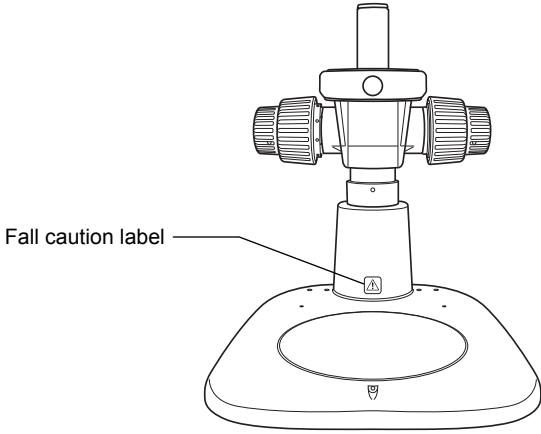

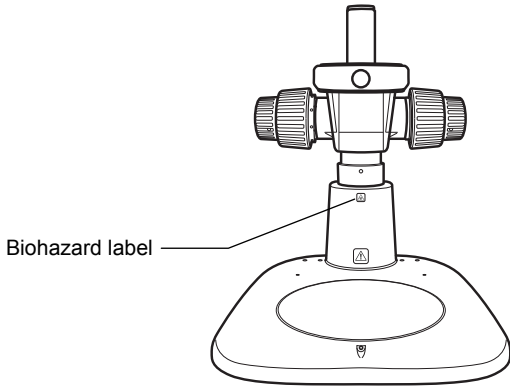
Symbol	Description
 WARNING	Disregarding instructions marked with this symbol may lead to serious injury or death.
 CAUTION	Disregarding instructions marked with this symbol may lead to injury or property damage.

Label Attached to the Product

The label attached to the products shown below indicates that attention should be paid to use of these products. Before using a product with the label attached, be sure to carefully read the manual.

<p>Photobiological safety label</p> <div style="border: 1px solid black; padding: 2px; margin: 5px 0;"> <p>IEC62471 RISK GROUP2 CAUTION Possibly hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to the eyes.</p> </div> <p>English label</p> <div style="border: 1px solid black; padding: 2px; margin: 5px 0;"> <p>Groupe de risque 2 ATTENTION: possibles émissions de rayonnements optiques de cet appareil. Ne regardez pas la source de lumière, peut endommager vos yeux.</p> </div> <p>French label</p>	<p>Caution: Do not look into the LED light. Possibly hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to the eyes. RISK GROUP 2 IEC62471: 2006</p> <p style="text-align: center;">Label Position</p> <div style="text-align: center;">  <p>P-CI Coaxial Epi Illuminator</p> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="text-align: center;">  <p>C-FDF Flexible Double Arm Fiber Illumination Unit</p> </div> <div style="text-align: center;">  <p>C-FIR Ring Fiber Illumination Unit</p> </div> </div>
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<p>Heat caution label</p> 	<p>Caution: Heat of the empty cube</p> <p>Immediately after diascopic observation using an epi-fluorescence attachment, the front face of the empty cube may become hot, resulting in burns. Do not touch the front face of the empty cube. Replace the empty cube several minutes after finishing the diascopic observation.</p> <p style="text-align: center;">Label Position</p>  <p style="text-align: center;">Empty cube for the epi-fluorescence attachment</p>
<p>Light leakage caution label</p> 	<p>Caution: Light leakage</p> <p>Do not use the epi-fluorescence attachment while the filter cube replacement cover is open. Harmful light including ultraviolet light may leak and affect fluorescence observation.</p> <p style="text-align: center;">Label Position</p>  <p style="text-align: center;">P-EFL Epi Fluorescence Attachment</p>
<p>Drop caution label</p> 	<p>Caution: Use of anti-drop collar</p> <p>When using a C-FMCN Focus Mount attached in the middle of the support pillar, be sure to use the anti-drop collar. Otherwise the zooming body may slide down when the focus mount fixing screw is loosened. This may result in injury such as pinching fingers between the objective and sample, or damage to the sample on the stage plate by the objective.</p> <p style="text-align: center;">Label Position</p>  <p style="text-align: center;">Anti-drop collar for the C-FMCN Focus Mount</p>

<p>Fall caution label</p> 	<p>Caution: C-FMCN Focus Mount attachment orientation</p> <p>Attach the C-FMCN Focus Mount to the stand so that the focus mount faces the front of the stand as shown in the figure.</p> <p>If the focus mount is attached in the incorrect orientation, the stand may fall over. This may result in damage to the device or unexpected injury.</p> <p style="text-align: center;">Label Position</p>  <p style="text-align: center;">P-PS32 Plain Stand, P-DSL32 LED Diascopic Illumination Stand, or P-DSF32 Fiber Diascopic Illumination Stand</p>
<p>Biohazard label</p> 	<p>Caution: Biohazard</p> <p>This symbol calls your attention to the following:</p> <ul style="list-style-type: none"> • The product may become biohazardous if a sample is spilled onto the product. • To avoid exposure to biohazard, do not touch contaminated parts with your bare hands. • Decontaminate the contaminated parts according to the standard procedures for your facility. <p style="text-align: center;">Label Position</p>  <p style="text-align: center;">P-PS32 Plain Stand, P-DSL32 LED Diascopic Illumination Stand, or P-DSF32 Fiber Diascopic Illumination Stand</p>



WARNING

1 Do not disassemble.

Disassembling this product may result in electric shock or malfunction. Malfunction and damage due to disassembling or modification are unwarranted.

Do not disassemble parts other than those described in this manual. If you experience problems with this product, contact your nearest Nikon representative.

2 Read the instruction manuals carefully.

To ensure safety, carefully read this manual and the manuals for other equipment to be used with this product. Particularly, all warnings and cautions given at the beginning of each manual must be observed.

Safety is a top design priority for Nikon products. Safety is ensured as long as the user observes all of the warnings and cautions given in the manuals, and uses the system only for its intended purpose. However, failure to heed the warnings and cautions given in the manuals, subjecting the system to shock or impact, or attempting to disassemble the system may result in unexpected accidents and injury.

Product with an epi-fluorescence attachment:

The light source used for epi-fluorescence microscopy (HG Precentered Fiber Illuminator) requires special care during handling because of its characteristics. Be sure to refer to the manual for the light source being used.

3 Check the input rating

For devices that use a power supply, check that the rating of the power supplied to the device matches the power used by the device. If the input rating does not match, do not use the power supply and contact your local representative. Using an incorrect power supply may damage the device.

4 Notes on the power cord

Be sure to use the specified power cord. Use of other power cords may result in malfunction or fire. This product is classified as having Class I protection against electric shock. Make sure this product is connected to an appropriate protective earth terminal.

See Chapter 8, "2 Performance Properties" for the specified power cords.

- To prevent electric shock, always turn off the power switch (Press to the "O" position.) for the device before connecting or disconnecting the power cord.

5 Heat from the light source

During and immediately after a period of illumination, the lamp and surrounding areas (including the lamp house) are very hot when the light source of the illuminator is a mercury lamp.

- Do not touch the lamp or surrounding areas during or immediately after a period of illumination. There is a risk of burn if you touch the hot area.
- Always attach the lamp house cover when using this product.
- Make sure the lamp and surrounding areas have cooled sufficiently (which may take approximately 30 minutes) before attempting to replace the lamp.
- Do not place fabric, paper, or highly flammable volatile materials (i.e. gasoline, petroleum benzine, paint thinner, and alcohol) near the lamp house during and for about thirty minutes after a period of illumination. Because the lamp is very hot, ignition or fire may be induced.

**WARNING****6 Hazards of mercury lamps
(when using the epi-fluorescence attachment)**

The light source used with the epi-fluorescence attachment (HG Precentered Fiber Illuminator) requires special care during handling because of its characteristics. For safe and correct use of this system, carefully read the warnings below. Keep in mind all potential hazards. Additionally, carefully read the manual for the illuminator and the manual from the lamp manufacturer (if provided), then follow the instructions given therein. Failure to heed the warnings and cautions given in the manuals, subjecting the illuminator to shock or impact, or attempting to disassemble the illuminator may result in unexpected accidents and injury.

• Ultraviolet light

When lit, mercury lamps radiate ultraviolet light that can damage the eyes and skin. Do not directly look at the light of the lamp. Doing so may cause your eyesight to be lost.

When changing filter cubes, always turn off the light source. Leaving the lamp turned on during filter cube replacement may result in ultraviolet exposure.

• High-pressure gas

The lamps contain sealed gas under very high pressure. And the pressure increases when the lamp is on. Crack or dirt of the lamp tube, strong external force or impact, or use beyond the tube's life may cause the encapsulated gas to leak or the lamp to blow up. If this happens, an accident such as gas inhalation or injury with glass may take place.

• Heat

When the lamp is lit, the lamp and surrounding areas will become extremely hot. Do not touch the lamp with bare hands or place flammable materials near the lamp. Failure to comply may result in burns or fire.

• Designated lamp

Be sure to use the designated lamp. Using other types of lamps may result in accidents, including bursting of the lamp.

7 Hazardous sample handling

This product can also be used for microscopy and imaging of biological samples (cells/tissues) in a petri dish.

Check to determine whether a sample is hazardous before handling. If the sample is hazardous, handle it in accordance with the standard procedure specified for your laboratory. If the sample is potentially infectious, wear rubber gloves and avoid direct contact with the samples. If such a sample is spilled onto this product, the portion must be decontaminated in a safe manner. Consult your safety supervisor or the safety standards of your facility.



CAUTION

<p>1 Power shutdown To prevent electric shock and/or malfunction, always turn off the power switch(es) for this product and the peripheral devices (press to the “O” position) and unplug the power cord from the wall outlet before assembling this product, connecting or disconnecting cables, replacing lamps, or cleaning the zooming body and the objective.</p> <p>2 Do not look into the LED light The P-CI Coaxial Epi Illuminator, C-FDF Flexible Double Arm Fiber Illumination Unit and C-FIR Ring Fiber Illumination Unit use LEDs as the light source. A label indicating photobiological safety is attached to these illuminators in order to bring attention to the following. (For details about the label attachment position, see “Label Attached to the Product” on page v.) “Possibly hazardous optical radiation emitted from this product. Do not stare at operating lamp. May be harmful to the eyes. RISK GROUP 2 IEC62471: 2006”</p> <p>3 Be careful of the heat of the empty cube Immediately after diascope observation using an epi-fluorescence attachment, the front face of the empty cube may become hot, resulting in burns. Do not touch the front face of the empty cube. Replace the empty cube several minutes after diascope observation.</p> <p>4 Caution on light leakage Do not use the epi-fluorescence attachment while the filter cube replacement cover is open. Harmful light including ultraviolet light may leak and affect fluorescence observation.</p> <p>5 Anti-drop collar for the C-FMCN Focus Mount When using a C-FMCN Focus Mount attached in the middle of the support pillar, be sure to use the anti-drop collar. Otherwise the zooming body may slide down when the focus mount fixing screw is loosened. This may result in injury such as pinching fingers between the objective and sample, or damage to the sample on the stage plate by the objective.</p> <p>6 C-FMCN Focus mount attachment orientation Attach the C-FMCN focus mount to the stand so that the focus mount faces the front of the stand. If the focus mount is attached in the incorrect orientation, the stand may fall over. This may result in damage to the device or unexpected injury.</p>	<p>7 Specification of a light source Be sure to use the specified light source for an illuminator. Using a light source not specified can cause malfunction and induce an accident. For the specified light source, see Chapter 8, “2 Performance Properties” or the instruction manual for the light source.</p> <p>8 Avoid contact with water or chemical solutions. Never expose this product to water or chemical solutions, and avoid using this product in circumstances where there is risk of exposure to water or chemical solutions. Exposure of electric parts (such as the HG Precentered Fiber Illuminator) to liquids may cause a short circuit, resulting in malfunction or abnormal heating. If water or a chemical solution is splashed onto a device, immediately turn off the power switch for the device (press to the “O” position) and remove the power cord from the receptacle. Then wipe off moisture with a piece of dry cloth or something similar. If water or a chemical solution enters this product, stop using the product, and contact your nearest Nikon representative.</p> <p>9 Remove any covers from the system before switching on. Do not use the system while it is covered with a piece of cloth, etc., Especially for a light source, which is heated, the disturbance of heat release may cause abnormal heat generation, causing ignition or fire. Do not cover the system with a piece of cloth or similar while in use.</p> <p>10 Notes on routing cables Connect and route the cables in accordance with the specified methods. If the cables are not routed and connected properly, the system may not function correctly.</p> <p>11 Do not place any object on top of the product. Do not place any object on top of this product.</p> <p>12 Cautions on assembling and installing the product</p> <ul style="list-style-type: none"> ● Take care to avoid pinching your fingers or hands during system assembly and installation. ● Scratches or fingerprints, etc. on optical components (such as lens and filters) will degrade microscope images. Be careful to avoid scratches or direct contact with the lens and filters during system assembly.
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**CAUTION**

- The total mass of the microscope system can be as high as approx. 17 kg. When moving the system to another location, temporarily remove any removable devices and carry the system by firmly holding the hand holding portions of the base (several people are needed). Do not lift the system by holding the binocular part of the tube or placing hands on the bottom of the objective.
- Do not place this system in a locker or cabinet.

13 Cautions on sustained observation

To relieve fatigue resulting from long observation sessions, limit continuous observations to one hour. Take at least a 10 to 15-minute break between observation sessions. Adjust the layout of other instrument used and the height of your chair.

14 Cautions on use, transportation, and storage

This product must be operated, transported, and stored in accordance with the following conditions. If the product is installed in a location with high temperature and high humidity, mold and/or condensation may form on the lenses. This may result in performance deterioration or malfunction.

- Operating conditions:
temperature: 0 to +40°C, humidity:
60% RH max. at 40°C (no
condensation)
- Transporting/storage conditions:
temperature: -20 to +60°C,
humidity: 90% RH max. (no
condensation)

15 Caution on the disposal of the product

When disposing of this product, follow the rules of the facility. To avoid exposure to biohazard, dispose of a P-PS32 Plain Stand, a P-DSL32 LED Diascopic Illumination Stand and P-DSF32 Fiber Diascopic Illumination stand as contaminated devices in accordance with the xstandard procedures of your facility.

Notes on Handling the Product

1 Handle the product carefully.

This product is a precision instrument. Avoid subjecting it to sudden impacts and shocks.

Even relatively minor impacts are capable of affecting the precision of the objective.

2 Electromagnetic Environment

Before using this product, Nikon recommends evaluating the electromagnetic environment of the installation site.

Do not use this product close to strong electromagnetic radiation sources (example: unshielded intentional RF sources). They may interfere with the proper operation of this product.

This product emits low-level electromagnetic radiation. Do not install this product near precision electronic devices. Otherwise, the performance of such devices might be degraded. If TV or radio reception is affected, move the TV or radio farther away from this product.

3 Scratches, dirt, and foreign particles on the lens

Scratches or fingerprints on optical components (such as lens and filters), etc. will degrade microscope images.

If these parts become dirty, clean them as described in Chapter 7, "1.1 Cleaning Lenses."

4 Installation location

This product is a precision optical instrument. Usage or storage of this product in an inappropriate environment may result in malfunction or a degradation in precision. Consider the following factors when selecting an installation location:

- Select a location free of vibration. Install this product on a level surface.
- Install this product at least 10 cm away from walls.
- Select a location less exposed to hazards in the event of collisions, earthquakes, or other potential disasters. To keep this product from falling, use a strong rope or other means if necessary to secure it to the working desk or other heavy, stable item.
- Select a layout that allows easy removal of the power cord from the device's AC inlet in the event of an emergency.
- Do not use a desk mat or similar.
- Avoid locations exposed to direct sunlight, locations immediately under room lights, and other bright locations.

- Light from room lights directly above this product may enter the objective as extraneous light. If possible, switch off the room lights directly above this product when observing samples.
- Select a location with minimal dust.
- To avoid splashes, do not use this product near water.
- Make sure the ambient temperature is 0 to + 40°C and humidity is 60% RH max. at 40°C (with no condensation). When transporting or storing this product, the ambient temperature must be -20 to +60°C, with the humidity at 90% RH max (with no condensation). If the product is installed in a location with high temperature and high humidity, mold and/or condensation may be generated on the lenses. Furthermore, performance deterioration and malfunction may occur.
- Do not place this product in a locker or cabinet.

5 Handling a focus knob

Never turn the focus knobs in opposite directions at the same time. Doing so may damage the product depending on the model. For details on how to use the knobs correctly, see Chapter 4, "Functions and Operations of the Devices."

6 Protect the ports from dust and extraneous light

If not using the vertical tube part of the tube, be sure to attach the supplied cap. Otherwise, extraneous light and dust may be trapped inside the product.

7 Handling of filters (when using the epi-fluorescence attachment)

- Excitation filters inside a filter cube are exposed to strong light and degrade over time. Replace them after the appropriate number of hours of use.
- Filter characteristics may alter if the filter is exposed to high humidity. To prevent changes or degradation of filter characteristics, avoid using or storing the filters under conditions of high humidity or high temperature. Avoid subjecting filters to rapid temperature changes. When a filter is not in use, store in a desiccator or hermetically sealed container with a drying agent.
- Especially the filters in GFP type filter cubes offer sharp, high-resolution waveform characteristics superior to normal filters. However, due to their sophisticated coatings, they must be handled with special care. Be sure to handle the filters carefully. Take care to avoid abrasion from cleaning. Follow the description in Chapter 7, "1.1 Cleaning Lenses."

Chapter

1

Components

This stereo microscope system can be composed of a combination of the SMZ800N, SMZ1270 or SMZ1270i Zooming Body attached to the focus mount and devices such as stands, objectives, tubes and episcopic illuminators that can be arbitrarily selected.

This chapter introduces the names of the devices and components of the following basic types of system configuration as examples:

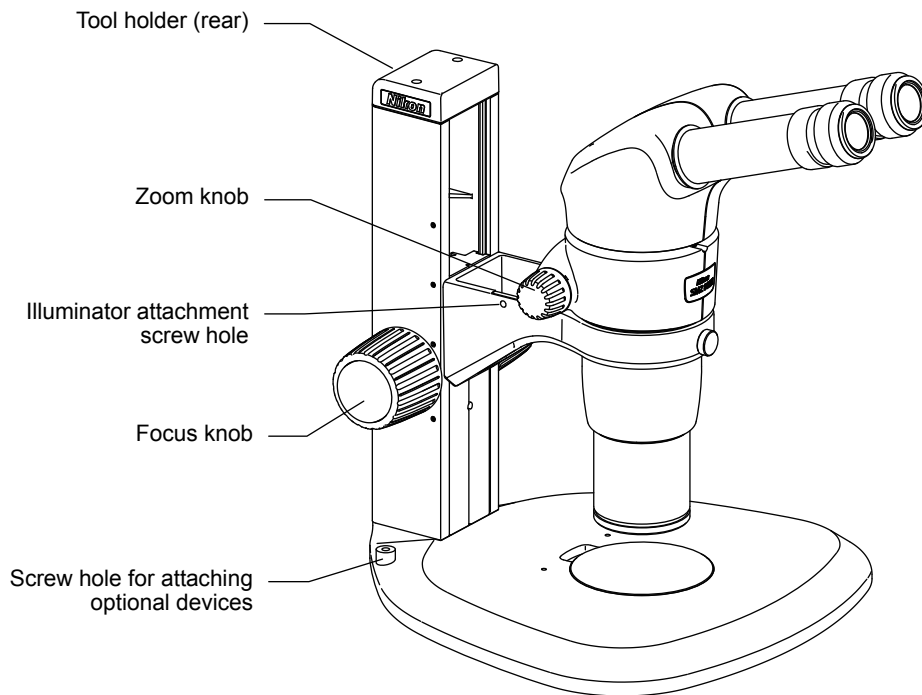
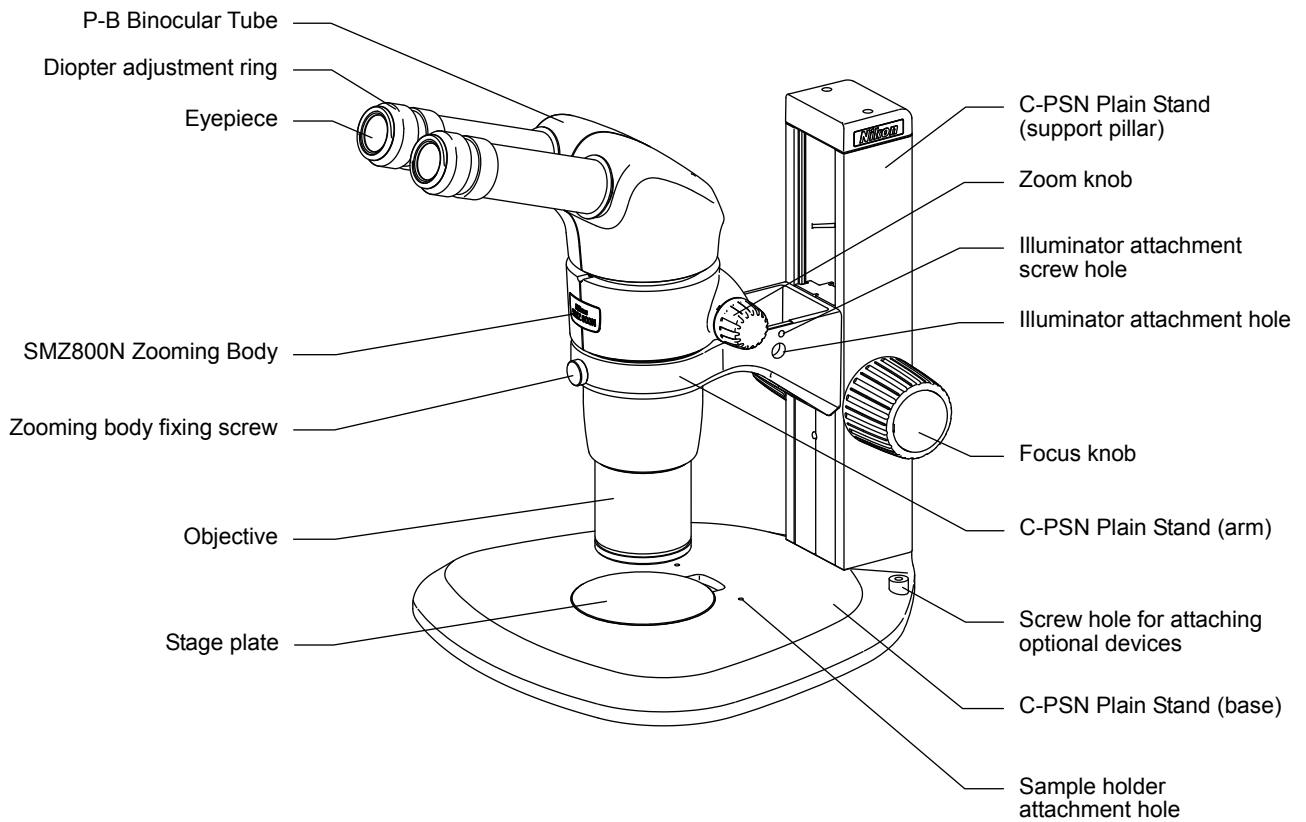
- 1 System of an SMZ800N Zooming Body with a C-PSN Plain Stand
- 2 System of an SMZ1270 Zooming Body with a P-PS32 Plain Stand

For details on the names of the devices in the system combined with an episcopic illuminator or diascope illumination stand, see Chapter 3, "Specific Operations" and Chapter 4, "Functions and Operations of the Devices."

For details on the overall system configuration, see Chapter 5, "1 System Configuration."

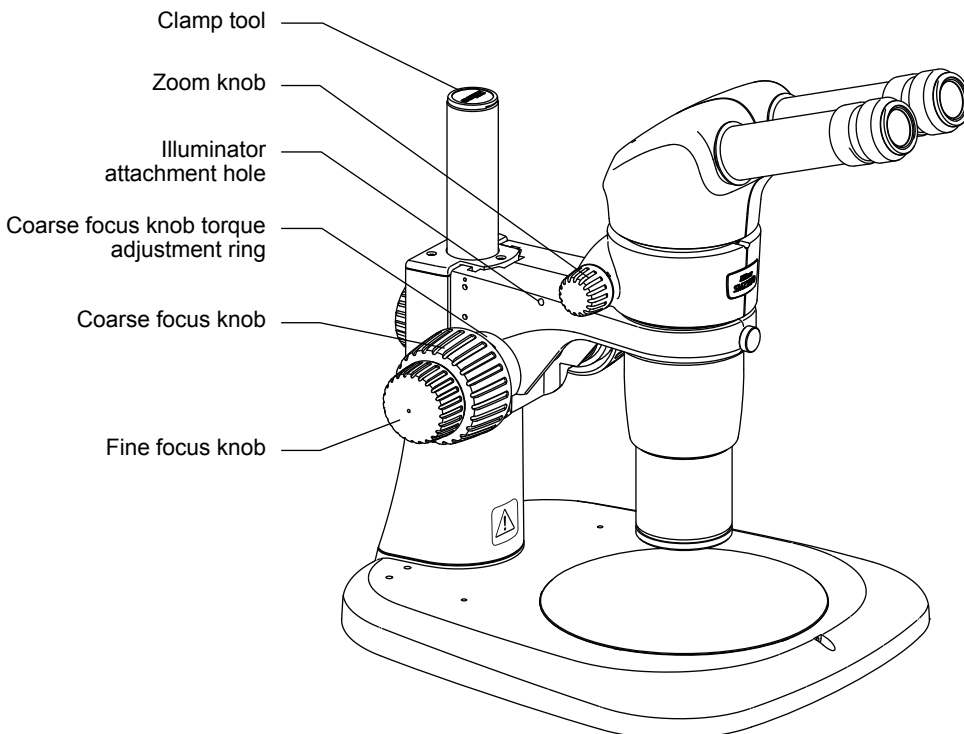
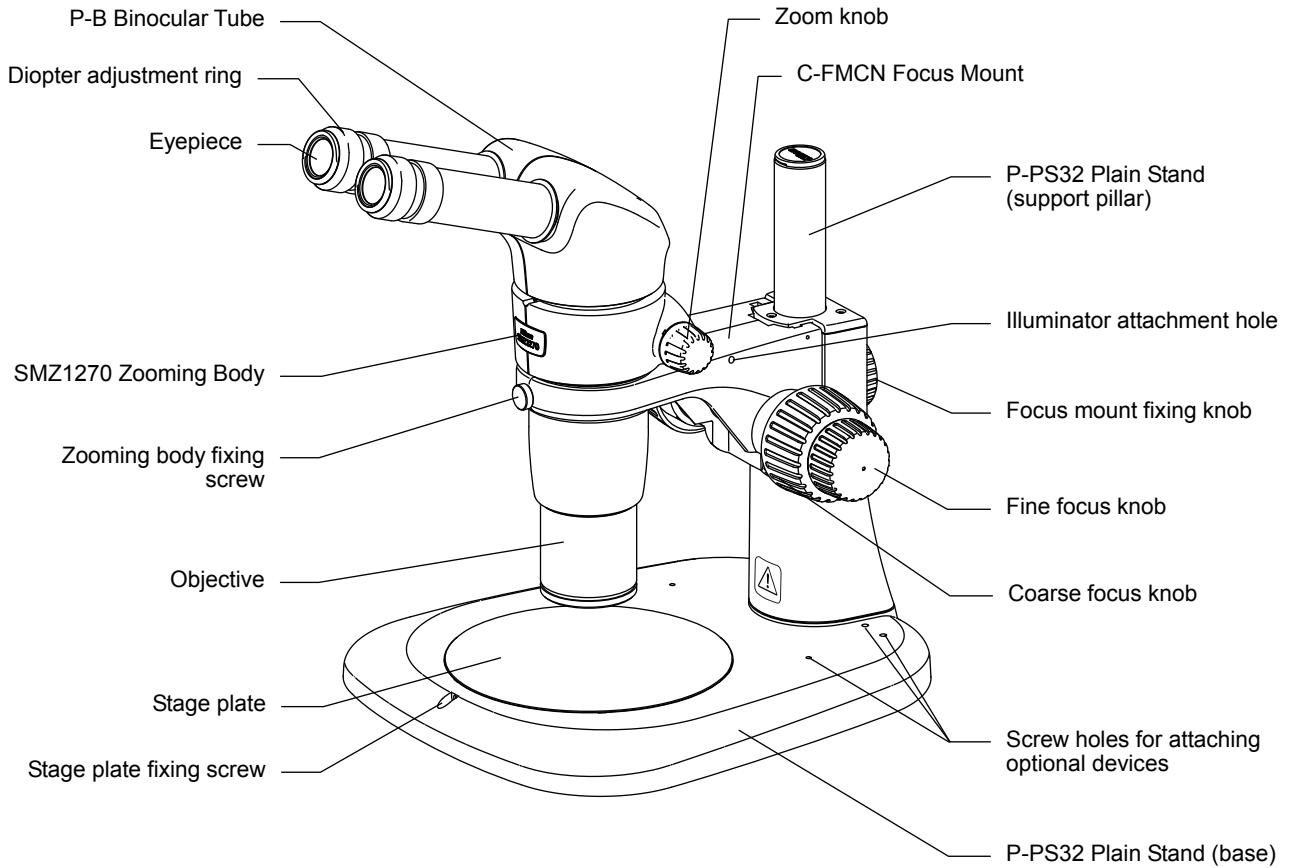
1

SMZ800N Zooming Body Systems



2

SMZ1270 Zooming Body Systems



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Chapter

2

Microscopy Procedures

This chapter describes the basic microscopy procedures for using the SMZ800N Zooming Body system introduced in Chapter 1, “Components.”

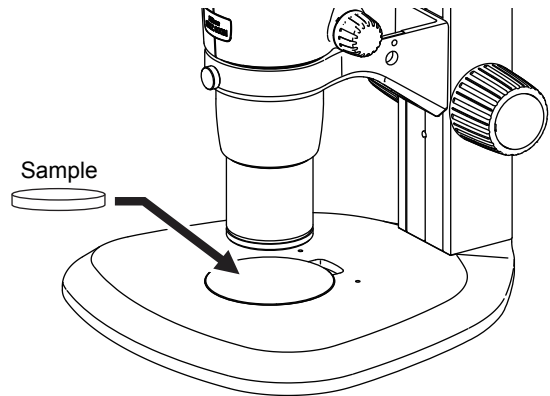
For details on the procedure for using the system combined with other devices, see Chapter 3, “Specific Operations” and Chapter 4 “Functions and Operations of the Devices.”

It is assumed that all required devices are attached to the microscope.

If assembly of the microscopy system has not yet been completed, complete assembly as described in Chapter 5, “3 Assembly Procedures.”

1 Set a sample.

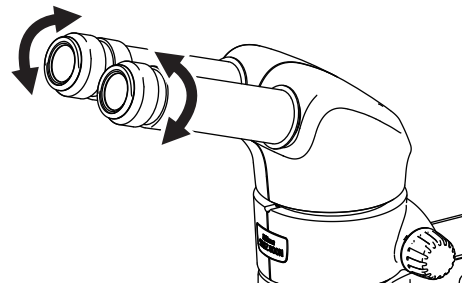
Place a sample on the stage plate immediately under the objective.



Setting a sample

2 Adjust the diopter.

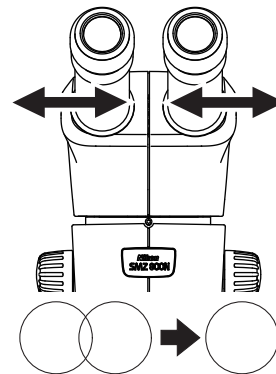
Adjust the diopter to match your eyesight. For details, see Chapter 3, "5 Adjusting the Diopter."
This adjustment is required for each observer.



Adjusting the diopter

3 Adjust the interpupillary.

Adjust the interpupillary to match the distance between your right and left eyes. Look into both eyepieces and move the binocular part of the tube so that the right and left fields of view merge into a single circle.
This adjustment is required for each observer.



Adjusting the interpupillary distance

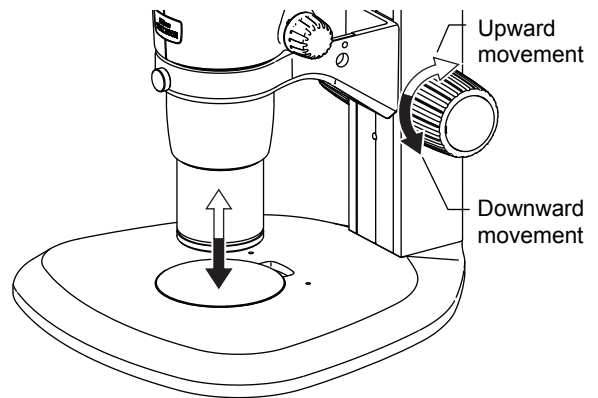
4 Focus on the sample.

Turn the focus knob on the right and left of the stand's support pillar to move the zooming body vertically and focus on the sample.

The figure shows the knob turning direction and the corresponding vertical movement of the zooming body.

- **Turning the knob backward: Upward movement**
- **Turning the knob forward: Downward movement**

(See Chapter 3, "7 Focusing on the Sample.")



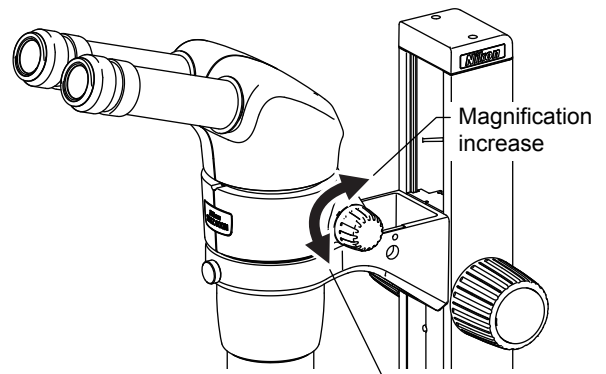
Focusing on the sample

5 Change the magnification using the zoom knobs.

Turn the zoom knobs on the right and left of the SMZ800N Zooming Body to change the magnification. The figure shows the knob turning direction and the corresponding changes in magnification.

- **Turning the knob backward: Magnification increase**
- **Turning the knob forward: Magnification decrease**

The magnification continuously changes from 1x to 8x. Zoom magnification values are indicated on the zoom knobs.



Zooming in/out

✔ Click stop during image zooming

It is also possible to use click stops at predetermined magnification positions during image zooming.

(See Chapter 4, "1.1 SMZ800N Zooming Body.")

Notes on microscopy procedures when using other system configurations

- With a system configuration where the illuminator uses the power supply, turn the power on and then adjust the brightness. When microscopy is finished, turn the power off.
- With a system configuration that includes a nosepiece, bring the objective to be used into the optical path.
- With a system configuration that includes a trinocular tube, set the optical path for the binocular tube to 100%.
- With a system configuration that includes a tilting trinocular tube, adjust the angle of the binocular to one suitable for microscopy.

☆☆☆

Chapter

3

Specific Operations

This chapter describes how to use the microscope system to observe samples.

For details about using the individual devices, see Chapter 4.

1

Turning On the Power

This section lists the devices of the microscope system that require a power supply.

Connect the device to the relevant power source before turning on the power. For details on the power supply required by each device, see Chapter 4, “Functions and Operations of the Devices” or the instruction manual supplied with the relevant device.

Press the power switch to the “I” position to turn the power on and to the “O” position to turn the power off.

- P-DSL32 LED Diascopic Illumination Stand

✔ **Power supply (P2-CTLB Control Box/12 V AC adapter)**

Power to the P-DSL32 LED Diascopic Illumination Stand is supplied by connecting a P2-CTLB Control Box or a 12 V AC adapter. To provide diascope illumination without using a control box, connect a 12 V AC adapter.

✔ **LED power on/off and illumination control**

Turn on or off the LED diascope illuminator using the LED power ON/OFF switch on the P-DSL32 LED Diascopic Illumination Stand.

Adjust illumination using the LED brightness control dial on the stand. To enable adjustment using the LED brightness control dial on the stand, the LED brightness control selection switch must be turned off.

When a P2-CTLB Control Box is connected to the stand, turn on the LED brightness control selection switch. In this state, diascope illumination can be turned on or off, brightness can be controlled, and light intensity can be monitored from the control box. Note that illumination cannot be controlled from the control box, even if the LED brightness control selection switch is turned on, unless the LED power ON/OFF switch on the stand is turned on.

- P2-CTLB Control Box
- P-DSF32 Fiber Diascopic Illumination Stand (Refer to the instruction manual supplied with the C-FLED2 LED Light source for fiber illuminator.)
- C-LEDS Hybrid LED Stand (Refer to the instruction manual supplied with the C-LEDS Hybrid LED Stand.)
- C-DS Dia Illumination Stand (Refer to the instruction manual supplied with the C-DSLU2 LED Unit for Dia Illumination Stand 2.)
- C-DSLU2 LED Unit for Dia Illumination Stand 2 (Refer to the instruction manual supplied with the C-DSLU2 LED Unit for Dia Illumination Stand 2.)
- C-LSL2 LED Epi Illuminator 2 (Refer to the instruction manual supplied with the C-LSL2 LED Epi Illuminator 2.)
- P-DF2 LED Dark Field Unit 2 (Refer to the instruction manual supplied with the P-DF2 LED Dark Field Unit 2.)
- C-FDF Flexible Double Arm Fiber Illumination Unit (Refer to the instruction manual supplied with the C-FLED2 LED Light source for fiber illuminator.)
- C-FID2 Double Arm Fiber Illuminator (Refer to the instruction manual supplied with the C-FLED2 LED Light source for fiber illuminator.)
- C-FIR Ring Fiber Illumination Unit (Refer to the instruction manual supplied with the C-FLED2 LED Light source for fiber illuminator.)
- P-CI Coaxial Epi Illuminator (Refer to the instruction manual supplied with the C-FLED2 LED Light source for fiber illuminator.)
- P-EFL Epi Fluorescence Attachment (Refer to the instruction manual supplied with the C-HGFI/C-HGFIE HG Precentered Fiber Illuminator.)

Power does not need to be turned on in any specific order, except when a camera control unit is used to capture images. In that case, turn the power to the camera control unit on last.

2 Adjusting the Brightness

The illumination brightness can be adjusted on the following devices. Turn the brightness control dial to adjust the brightness to a comfortable level.

Depending on the system configuration, some devices support remote control of the brightness.

For details, see Chapter 4, “Functions and Operations of the Devices.”

- Adjust the brightness using the LED brightness control dial on the base of the stand.
 - P-DSL32 LED Diascopic Illumination Stand
 - C-LEDS Hybrid LED Stand

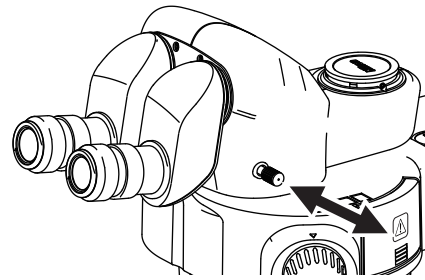
- Adjust the brightness using the C-FLED2 LED Light source for fiber illuminator.
(Refer to the instruction manual supplied with the C-FLED2 for details.)
 - P-CI Coaxial Epi Illuminator
 - C-FDF Flexible Double Arm Fiber Illumination Unit
 - C-FID2 Double Arm Fiber Illuminator
 - C-FIR Ring Fiber Illumination Unit
 - P-DSF32 Fiber Diascopic Illumination Stand

- Adjust the brightness using the C-HGFI/C-HGFIE HG Precentered Fiber Illuminator.
(Refer to the instruction manual supplied with the C-HGFI/C-HGFIE for details.)
 - P-EFL Epi Fluorescence Attachment

- Adjust the brightness using the power supply section of each unit.
(Refer to the instruction manual supplied with the units for details.)
 - P-DF2 LED Dark Field Unit 2
 - C-LSL2 LED Epi Illuminator 2
 - C-DSLU2 LED Unit for Dia Illumination Stand 2

3 Switching the Optical Path of the Tube

The trinocular tubes in this microscope system are equipped with an optical path switching lever. To observe a sample using the eyepiece, switch the optical path to the binocular part. To capture images using a DS camera head, switch the optical path to the vertical tube. Push or pull the lever to make the desired selection. Be sure that the lever is fully pushed in or pulled out. Do not leave the lever stopped partway.



Switching the optical path

Distribution of Light with Optical Path Switching (%)

Tube	Lever position	Binocular part (BINO)		Vertical tube (PHOTO)*
		Left	Right	
P-TERG100 Trinocular Tilting Tube	Pulled out	100	100	0
	Pushed in	100	0	100
P-TERG50 Trinocular Tilting Tube	Pulled out	100	100	0
	Pushed in	100	50	50
P-T100 Trinocular Tube	Pulled out	100	100	0
	Pushed in	100	0	100

* The light intensity of the left eye is always 100%. The light from the optical path of the right eye is diverted to the vertical tube. (Images of the right eye's optical path are captured.)

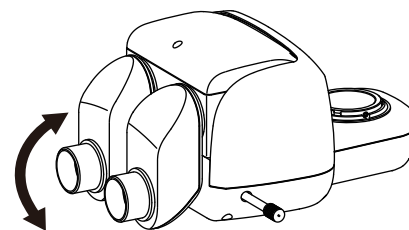
4 Adjusting the Angle of Depression (Changing the Eye Level)

When a trinocular tilting tube P-TERG100 or P-TERG50 is used, the angle of the binocular part can be changed and adjusted to facilitate microscopy.

The angle can be steplessly changed by moving the binocular part as indicated by the arrow in the figure. The eye level varies between 25 mm and 115 mm depending on the angle of the binocular part. Additionally, turning the binocular part 180° will raise the eye level by an extra 106 mm.

Turning the binocular part of the P-T100 Trinocular tube 180° will raise the eye level 106 mm.

* The depression angle of the P-B Binocular Tube cannot be changed and its binocular part cannot be turned 180°.



Adjusting the angle of depression

Notes on adjusting the angle of depression

- Do not apply excessive force to the binocular part during depression angle adjustment. Doing so may cause unexpected failure or malfunction.
- When moving the binocular part, be careful not to catch your fingers in the rotary section at the bottom of the binocular part.

5 Adjusting the Diopter

Adjust the diopter to match your eyesight. This adjustment is required for each observer.

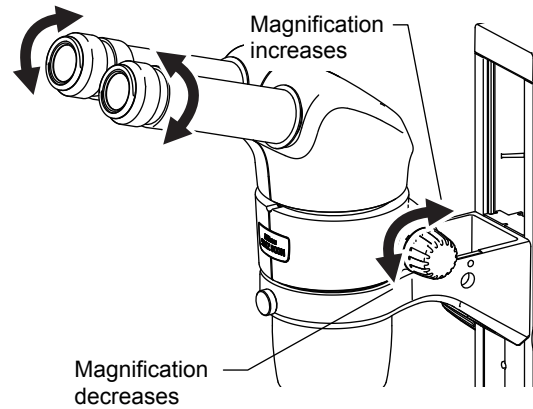
- 1 Position the diopter adjustment rings of the right and left eyepieces to 0.
- 2 Maximize the magnification, and then focus on the sample using the focus knobs.
(See “7 Focusing on the Sample.”)
- 3 Turn the zoom knob to minimize the magnification, and then turn the diopter adjustment rings of the right and left eyepieces to bring them into focus separately.

[Zoom magnification]

SMZ800N Zooming Body: 1x to 8x

SMZ1270/SMZ1270i Zooming Body: 0.63x to 8x

- 4 Repeat steps 2 and 3 to check the focus, so that changing the magnification does not affect the focus and clear images can be captured.

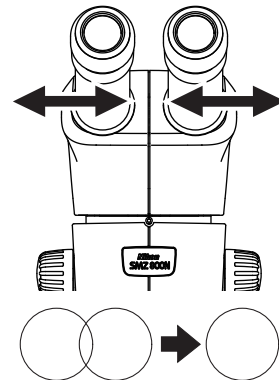


Adjusting the diopter

6 Adjusting the Interpupillary Distance

Adjust the interpupillary distance to match the distance between your right and left eyes. This adjustment is required for each observer.

Look into both eyepieces and move the binocular part of the tube so that the right and left fields of view merge into a single circle.



Adjusting the interpupillary distance

⚠ Note on adjusting the interpupillary distance

Do not apply excessive force to the binocular part during interpupillary distance adjustment. Doing so may cause unexpected failure or malfunction.

7

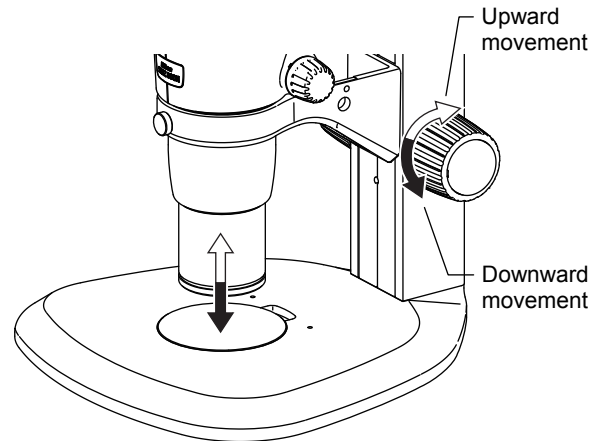
Focusing on the Sample

Focus on the sample by turning the focus knobs on the focus mount or stand to move the zooming body (objective) up or down.

The coarse knob and fine knob are on the same axis on the C-FMCN Focus Mount. First, use the coarse knob to move the zooming body downward to a position close to the working distance, and then use the fine knob to bring the sample into focus. (For details on the working distance of objectives, see Chapter 4, “4 Objectives.”)

The figure shows the turning direction of the focus knobs and the corresponding vertical movement of the zooming body.

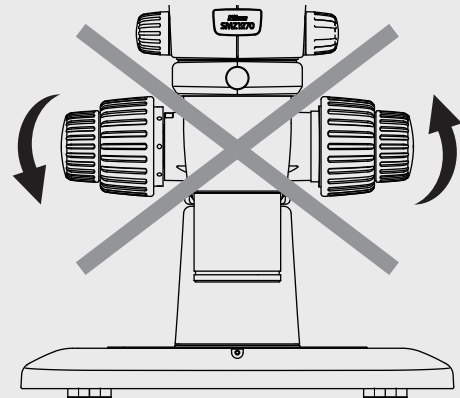
- **Turning the knob backward: Upward movement**
- **Turning the knob forward: Downward movement**



Focusing on the sample

⚠ Notes on turning the focus knobs

- When using the focus knobs on the C-FMCN Focus Mount, do not turn (or twist) the right and left focus knobs in opposite directions at the same time. Doing so may cause malfunction.
- When a focus knob on the focus mount or the stand reaches its rotational limit for the unit's vertical movement, do not forcibly turn it further. Doing so may cause malfunction.



Do not turn the C-FMCN's focus knobs in opposite directions!

■ **Torque of the focus knobs**

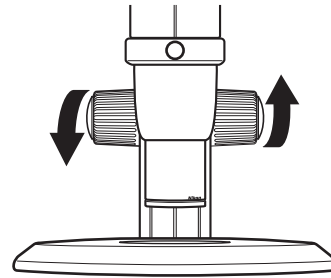
The torque of the focus knobs can be adjusted. How the torque is adjusted differs depending on the device. Adjust the torque to an appropriate level with the corresponding procedure.

❗ **Notes on the torque adjustment**

When the torque is too low, the zooming body may slide down due to the various loads it carries, such as its own weight or the load of the counterbalance spring inside the focus unit. This may result in injury, such as pinching fingers between the objective and sample, or cause damage to the sample or objective. Be sure to adjust the torque to an appropriate level.

[Torque adjustment by turning the right and left focus knobs in opposite directions]

- C-PSN/C-PSCN Plain Stand
- C-DS Dia Illumination Stand
- C-LEDS Hybrid LED Stand
- C-FMAN Focus Mount
- C-FMBN Focus Mount



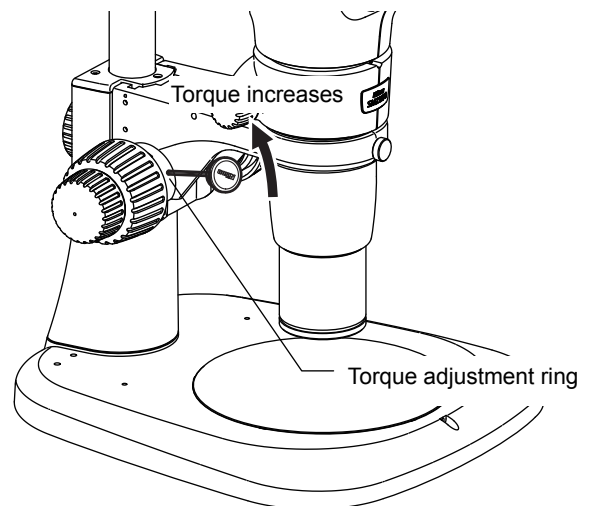
Adjusting the torque of the C-PSN focus knobs
(The torque is increased by turning the knobs as shown in the figure.)

[Torque adjustment by turning the torque adjustment ring at the base of the left coarse focus knob]

- C-FMCN Focus Mount

Turn the torque adjustment ring using a hex driver (nominal designation: 2). Turn the adjustment ring toward the back to increase the torque. In the C-FMCN, turning the fine control knob will cause the coarse control knob to also turn and change the torque of the fine control knob.

A hex driver is fitted on top of each support pillar of the P-PS32 Plain Stand, the P-DSL32 LED Diascopic Illumination Stand or the P-DSF32 Fiber Diascopic Illumination Stand.



Adjusting the torque of the C-FMCN focus knobs

■ **Focusing stroke**

- C-FMAN Focus Mount
 - Focusing stroke: 40 mm
 - Stroke per focus knob rotation: 18.7 mm
- C-FMBN Focus Mount
 - Focusing stroke: 50 mm
 - Stroke per focus knob rotation: 18.7 mm
- C-FMCN Focus Mount
 - Focusing stroke: 50 mm (35 mm when attached to the stand's support pillar without an anti-drop collar)
 - Stroke per focus knob rotation: Coarse control, 18.50 mm
Fine control, 3.27 mm
- C-PSN/C-PSCN Plain Stand, C-DS Dia Illumination Stand, C-LEDS Hybrid LED Stand
 - Focusing stroke: 100 mm
 - Stroke per focus knob rotation: 21.7 mm

✔ **Focusing on a sample by vertically moving the stand's support pillar**

The P-DSL32 LED Diascopic Illumination Stand and P-DSF32 Fiber Diascopic Illumination Stand have a focus dial at the base front. Turn the dial to move the stand's support pillar vertically and focus on a sample with height variations.

8

Changing the Magnification

Besides changing the magnification with the zooming body, this microscope system enables the magnification to be changed by switching the objectives when used with a nosepiece and equipped with two objectives of different magnification ratios.

8.1

Image Zooming

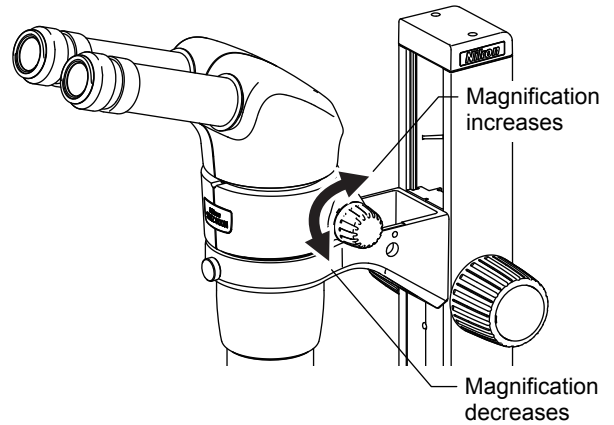
The magnification of the zooming body can be changed by turning the zoom knobs.

The figure shows the knob turning direction and the corresponding changes in magnification.

- **Turning the knob backward: Magnification increase**
- **Turning the knob forward: Magnification decrease**

■ **Magnification and zoom ratio**

SMZ800N:	1x to 8x, 8:1
SMZ1270/SMZ1270i:	0.63x to 8x, 12.7:1



✔ **Total magnification**

The total magnification of the microscope is determined by the formula below:

Total magnification = zoom magnification x object's magnification x eyepiece's magnification

- When using a vertical tube, replace the eyepiece's magnification with the C mount adapter lens' magnification to calculate the total magnification.

8.2 Switching Objectives (Using a Nosepiece)

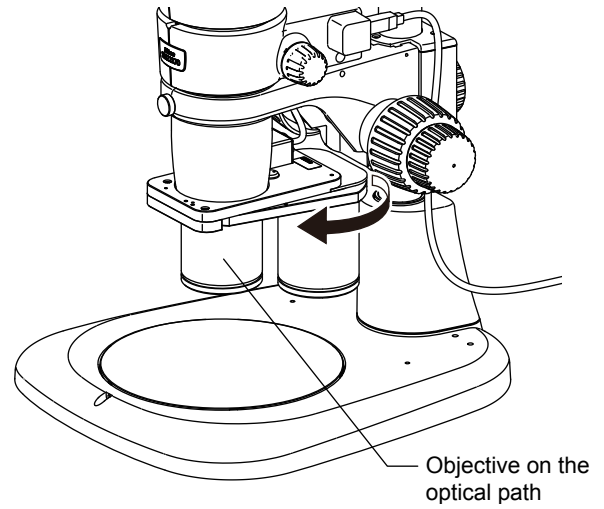
Turn the nosepiece to switch objectives. Check that the nosepiece stops at a click position when turned. There are two types of nosepieces: a standard type and a type with the status detection function. For details, see Chapter 4, “3 Nosepieces.” For details on the attachable objectives, see Chapter 4, “4 Objectives.”

■ Stereoscopic view and vertical view

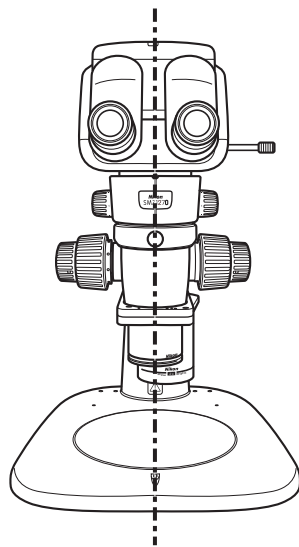
A nosepiece has two click positions for each objective.

The view state can be changed between stereoscopic view and vertical view according to the click position. Microscopy can be performed in the vertical position when needed, such as when taking images of the sample.

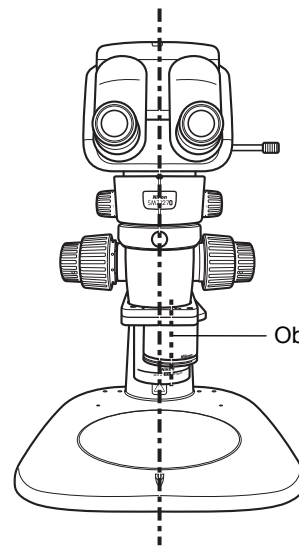
The click position that an objective is in can be checked by viewing the position of the objective from the front.



Switching objectives



Stereoscopic view



Vertical view

Objective position (stereoscopic view and vertical view)

9

Shifting a Sample

To view another part of a sample during microscopy, use the following procedure to shift the sample.

9.1

Sliding the Stage Plate

Loosen the stage plate fixing screw of the P-PS32 Plain Stand, the P-DSL32 LED Diascopic Illumination Stand or the P-DSF32 Fiber Diascopic Illumination Stand to slide the stage plate. The stage plate can be smoothly and finely moved within the 3 mm range. This mechanism is useful for positioning, especially for high-magnification observation.

Securely fix the stage plate in place using the fixing screw when this mechanism does not need to be used.

9.2

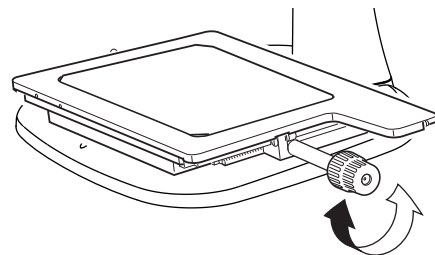
Shifting the Stage in the X and Y Directions (P-SXY64 XY Stage)

Turn the XY shift knob of the P-SXY64 XY Stage mounted in place instead of the stage plate to shift the sample on the glass plate and change the part to be observed.

■ **XY stroke of the stage with the X/Y shift knob and stroke per knob rotation**

X: 150 mm; 37.5 mm per rotation

Y: 65 mm (from the optical path, 50 mm towards the front, 15 mm towards the rear); 24.1 mm per rotation



Shift using the P-SXY64 XY Stage

* Also see Chapter 4, "8.1 P-SXY64 XY Stage."

9.3

Using Other Stages

Remove the stage plate from the base and attach the C-SSL DIA Sliding Stage or C-TRS Tilting Stage in place so that the sample can be tilted or moved slightly.

10

Using Episcopic Illumination

The microscope system enables episcopic illumination when used with the devices listed below. All of these devices use LEDs as the light source and provide uniform illumination.

Illumination emitted from the light source is passed through the objective or directly onto the sample by the fiber and the image created by the light reflected by the sample is observed.

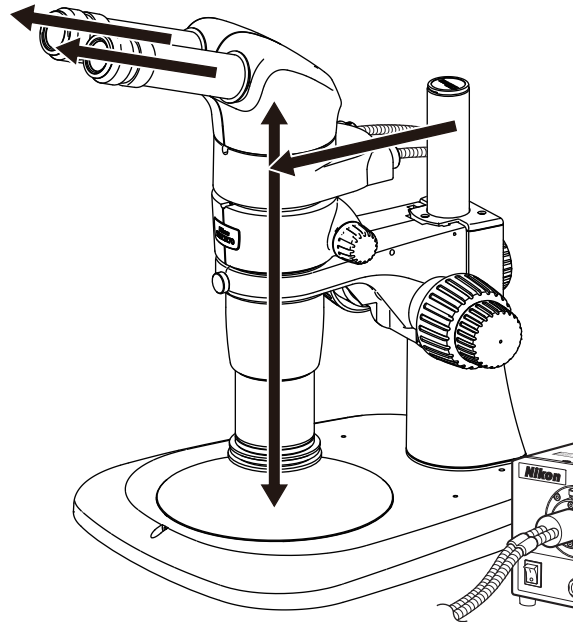
Episcopic illumination is used for observing samples which do not transmit light such as metal and mineral sections.

In addition, if a P-CI Coaxial Epi Illuminator is attached, illumination can be emitted along the optical axis, and this gives good results when observing samples such as metallic mirrors, resins with smooth surfaces, and semiconductor wafers.

See Chapter 4, "10 Episcopic Illuminators" and select the appropriate device based on the objective of the microscopy to be performed.

- P-CI Coaxial Epi Illuminator
- C-FDF Flexible Double Arm Fiber Illumination Unit
- C-FID2 Double Arm Fiber Illuminator
- C-FIR Ring Fiber Illumination Unit
- C-LSL2 LED Epi Illuminator 2
- C-LEDS Hybrid LED Stand

For operations related to light sources such as brightness adjustment, refer to the instruction manual for the light sources.



Episcopic illumination with the P-CI Coaxial Epi Illuminator

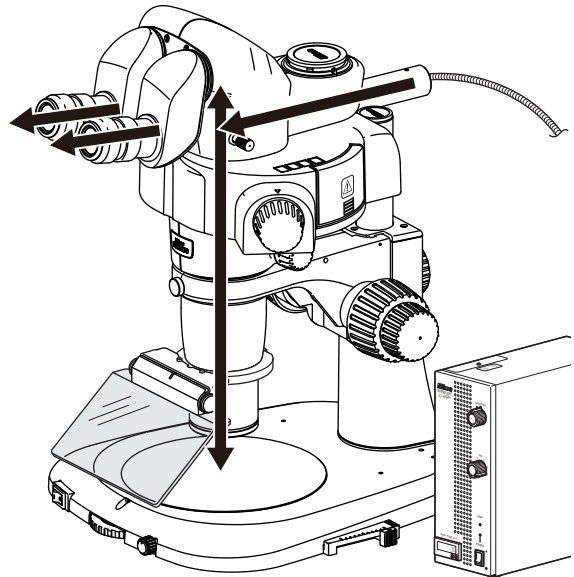
11 Using Epi-Fluorescence Illumination

Epi-fluorescence microscopy used for observing fluorescence images requires an optical element such as a fluorescence filter and a bright light source such as mercury lamp.

With a filter cube attached to the turret inside the device, the filter cube is brought into the optical path by the rotation of the turret, resulting in the generation of epi-fluorescence illumination. The light source is a precentered high-intensity mercury lamp.

Illumination led from the light source to the device by the HG fiber passes through a fluorescence filter and emits excitation light to the sample so that fluorescent images can be observed.

For operations related to light sources such as brightness adjustment, refer to the instruction manuals of the light sources.



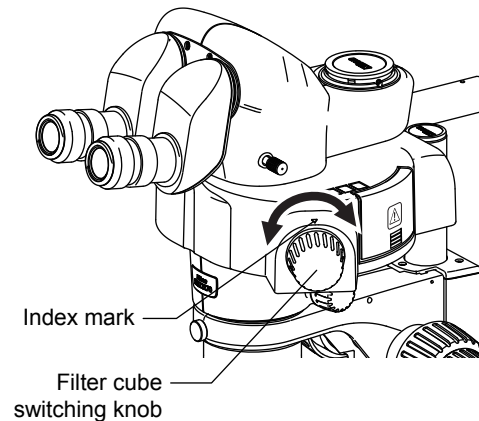
Epi-fluorescence illumination with the epi fluorescence attachment

! WARNING

The light source used with the epi fluorescence attachment (mercury lamp) requires special care during handling because of its characteristics. Make sure you are familiar with and observe all warnings and cautions described at the beginning of this instruction manual.

11.1 Switching Filter Cubes

Up to four filter cubes can be attached to the turret of the epi fluorescence attachment. Turn the turret using the filter cube switching knob. Select a turret address number (1 to 4) indicated on the knob to bring the filter cube corresponding to the address number into the optical path.



Switching filter cubes

11.2 Selecting a Filter Cube

The epi fluorescence attachment can be equipped with the following filter cubes:

- P-EFL GFP-B Filter Cube and P-EFL GFP-L Filter Cube: Used for fluorescence observation at a given wavelength.
- P-EFLC Filter Cube: Used for fluorescence observation at an arbitrary wavelength when combined with arbitrary filters, for example.
- P-EFLBF Filter Cube (Bright Field): Used for episcopic bright-field observation.
- Empty cubes (three cubes supplied with an epi-fluorescence attachment): Used when performing diascope illumination observation using the epi-fluorescence attachment.

11.3 Important Notes for Epi-Fluorescence Microscopy

■ Using non-fluorescent slide glass and cover glass

When performing fluorescence observation of samples with a slide glass or cover glass, be sure to use non-fluorescent slide glass or cover glass to obtain a high-contrast image.

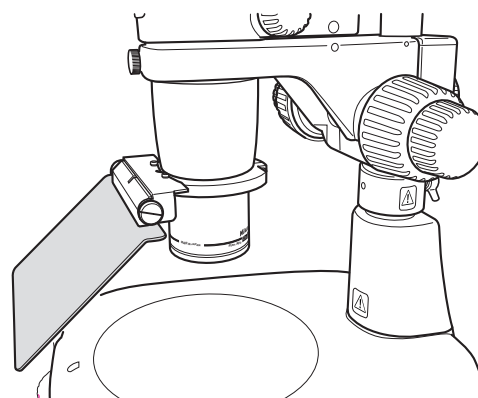
■ Locating a target in the sample

For epi-fluorescence microscopy, Nikon recommends locating a target using bright-field diascope illumination (OCC illumination) and then switching to epi-fluorescence, rather than emitting strong excitation light to the sample from the beginning. When doing so, follow the operational tips below:

- Start with low magnification under bright-field diascope illumination.
- If the sample is not transparent, use the P-EFLBF Filter Cube (Bright Field) to obtain the entire image by reflected light.
- Gradually increase the magnification. When the target becomes difficult to locate, switch to epi-fluorescence and use low excitation light.

■ Protection from ultraviolet light (light shielding plate)

The light shielding plate is used to prevent ultraviolet light reflected by the sample, which is originally emitted through the objective, from entering the observer's eyes.



Using the light shielding plate

12 Using Diascopic Illumination

The microscope system enables diascopic illumination when used with the diascopic illumination stand. Diascopic illumination stands that use LEDs as the light source provide bright and uniform illumination.

Observe an image visible by diascopic illumination that passes through the sample and enters the objective. Diascopic illumination is used for observing transparent substances such as macromolecular compounds, fibers, and glass and tissue sections and biological specimens in petri dishes.

In addition, a P-DF2 LED Dark Field Unit 2 or a C-POL Simple Polarizing Attachment can be attached to enable dark-field diascopic illumination and diascopic simplified/polarized illumination. This enables observation of samples that are difficult to observe using ordinary bright-field diascopic illumination such as transparent materials and crystals and tissues and minute organisms in culture solutions.

When performing microscopy using diascopic illumination with a C-FMCN Focus Mount attached, match the observation axis with the optical axis of the diascopic illumination stand as follows:

- (1) Set the zoom magnification to the smallest.
- (2) Loosen the fixing knob of the C-FMCN Focus Mount.
- (3) Move the C-FMCN Focus Mount to align the observation axis with the optical axis of the diascopic illumination stand. Be careful not to make the periphery dark.
- (4) Tighten the fixing knob of the C-FMCN Focus Mount.

! Loosen the fixing knob of the C-FMCN Focus Mount before aligning the optical axes.

Do not move the C-FMCN Focus Mount before loosening the fixing knob of the C-FMCN Focus Mount. Doing so may cause failure or malfunction.

See Chapter 4, “12 Diascopic Illuminators” and select the appropriate device based on the objective of microscopy.

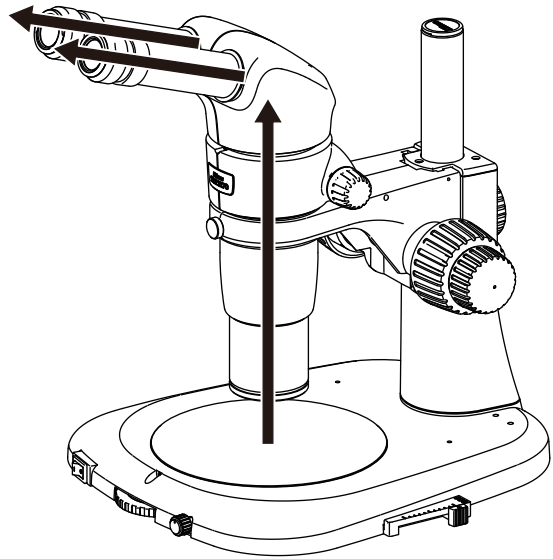
- C-DS Dia Illumination Stand
- C-LEDS Hybrid LED Stand
- P-DSL32 LED Diascopic Illumination Stand
- P-DSF32 Fiber Diascopic Illumination Stand
- P-DF2 LED Dark Field Unit 2
- C-POL Simple Polarizing Attachment

! Empty cube

When an epi-fluorescence attachment is mounted, check that the empty cube of the attachment is in the optical path.

✓ OCC illumination

The P-DSL32 LED Diascopic Illumination Stand and the P-DSF32 Fiber Diascopic Illumination Stand support OCC illumination (oblique illumination). OCC illumination, which offers high contrast, is appropriate for microscopy of phase objects.



Diascopic illumination with the P-DSL32 LED Diascopic Illumination Stand

13 Capturing Images

The microscope system can capture images of the sample being observed when a camera such as a DS camera head is attached to the vertical tube via a TV tube adapter or C-mount adapter.

13.1 Procedure for Capturing Images

Follow the procedure below to capture images. For the camera settings, refer to the instruction manual for the DS-L3/DS-L4 or DS-U3.

✔ Using the DS-L3/DS-L4

Specify the following items beforehand.

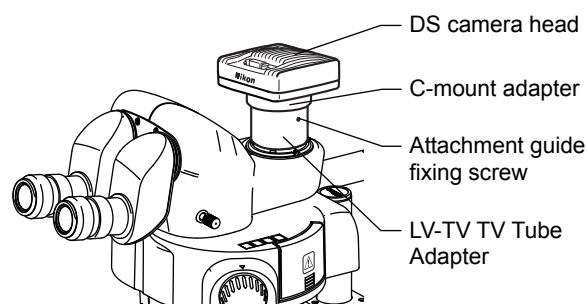
- Folder to save
- Name of the save file (or select Auto.)
- File format and file size of the save file
- Date and destination of the data

(1) **Adjust the illumination of the microscope correctly and focus the sample image.**

(2) **Adjust the mounting orientation of the DS camera head.**

For details on attaching a camera head, see [12] Attach a camera in Chapter 5, “3.2 Assembly of Other Devices (Optional).”

Since shifting a sample horizontally causes the image on the monitor to move horizontally, loosen the attachment guide fixing screw and adjust the orientation of the camera. After making the appropriate adjustments, tighten the screw.



Adjusting the camera orientation

(3) **Select the camera scene mode suitable for the microscopy type.**

(4) **Adjust the camera's white balance.**

When using diasopic illumination, first capture an image of the top surface of the stage plate. When using episcopic illumination, first capture an image of any white subject. Then, press the WB button to execute white balance adjustment. (For fluorescent photomicrography, Nikon recommends adjusting the white balance under normal bright-field microscopy conditions before capturing images.)

(5) **Adjust the position of the sample.**

(6) **Readjust the focus on the target.**

(7) **Adjust the image brightness using the camera exposure compensation function.**

(8) **Press the Pause button on the DS-L3/DS-L4 to check the image.**

(9) **Save the image if acceptable.**

To save the image, press the capture button on the DS-L3/DS-L4.

■ **Confirming the photomicrographic range**

The image on the monitor represents the photomicrographic range.

■ **Adjusting to eliminate extraneous light**

Cover the eyepiece with a piece of cloth or similar item.

■ **Protecting fluorescent images from decoloration**

The fluorescence of specimens may fade during exposure. To prevent this, do the following:

• **Adjusting the excitation light**

Excessively bright excitation light will accelerate the decoloration of the sample making it more difficult to obtain suitable fluorescent images. Use the ND filter of the light source to perform adjustment.

• **Sample**

Photomicrography of the color-fading portion requires a prolonged exposure time resulting in poor color reproduction and low-quality images. Move the sample so that an image of the portion that has not been exposed to excitation light can be captured. To obtain the best results, use the diasopic illumination method to select a specimen section for photomicrography, and then switch to the fluorescent method to capture the image.

• **Using the shutter**

When not performing observation, close the shutter.

■ **Adjusting the brightness of the image on the monitor**

When observing images on the monitor via a camera, the brightness can be changed also by making an adjustment on the camera side, for example, by changing the display mode, exposure mode and photometry mode, by compensating the exposure or by adjusting the image level.

For details, refer to the instruction manual for the DS-L3/DS-L4 or DS-U3.

Chapter

4

Functions and Operations of the Devices

This chapter describes the main functions and procedure for using the devices.

1 Zooming Bodies

There are two types of zoom bodies: the SMZ800N Zooming Body with a zoom magnification of 1x to 8x and the SMZ1270/SMZ1270i Zooming Body with a zoom magnification of 0.63x to 8x. The SMZ1270i zooming body is equipped with a magnification detection function.

1.1 SMZ800N Zooming Body

The SMZ800N Zooming Body is for parallel-optics stereo microscopes. Attach it to various types of focus mounts or stands with focus knobs.

Attach an objective to the objective mount. Up to two objectives can be attached if a P-RN2 Nosepiece is attached between the zooming body and objectives.

For information on usable objectives, see “4 Objectives.”

Attach a tube to the tube mount round dovetail. Microscope system functions can be extended by assembling a device such as a coaxial epi illuminator or an epi fluorescence attachment between the zooming body and the tube.

Zoom images in or out using the zoom knobs on the right and left sides of the zooming body.

Turning the knob backward: Magnification increase

Turning the knob forward: Magnification decrease

Turning the knob causes the magnification to continuously change in the range from 1x to 8x (zoom ratio: 8:1).

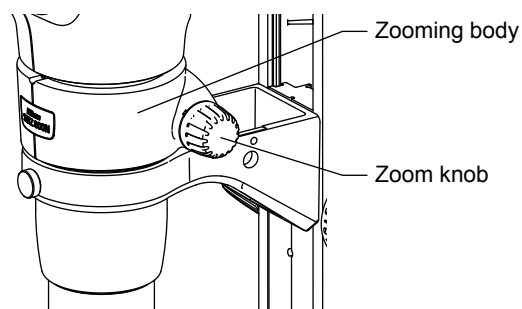
Magnification values are marked on the zoom knobs.

The zoom knob click stops operate at the 2x, 3x, 4x, 5x, 6x, and 7x positions. It is also possible to deactivate the click stop function.

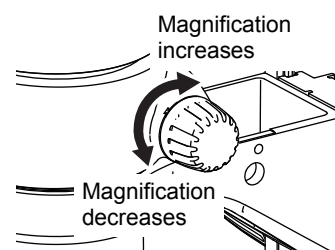
■ Activating and deactivating zoom click stops

Insert the hex wrench (nominal designation: 2) supplied with the zooming body into the hole on the rear side of the right zoom knob.

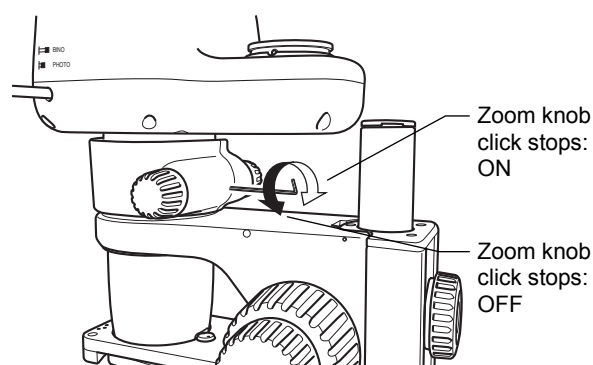
Turn the internal screw clockwise to activate click stops. Turn it counterclockwise to deactivate click stops.



SMZ800N Zooming Body



Zooming in/out



Activating and deactivating zoom click stops

1.2

SMZ1270 Zooming Body, SMZ1270i Zooming Body

The SMZ1270 Zooming Body is for parallel-optics stereo microscopes. Attach it to various types of focus mounts or stands with focus knobs.

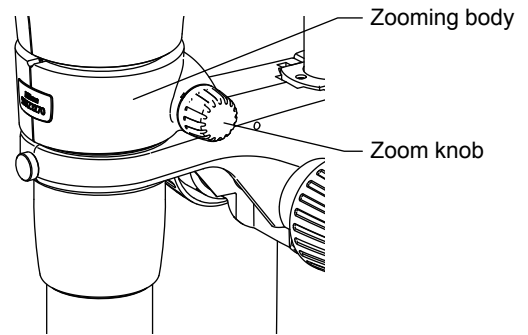
Attach an objective to the objective mount. Up to two objectives can be attached if a nosepiece is attached.

For information on usable objectives, see “4 Objectives.”

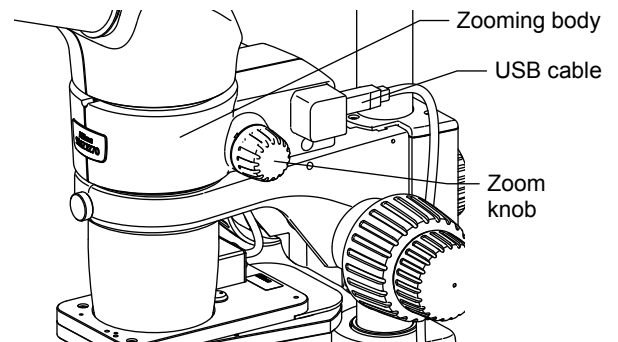
Use a P-RN2 Nosepiece with the SMZ1270 Zooming Body, and a P-RNI2 Intelligent Nosepiece with the SMZ1270i Zooming Body with a built-in magnification detection function.

The information on the P-RNI2 Intelligent Nosepiece status and the magnification is sent to the SMZ1270i via a nosepiece cable, and output to a DS-L3/DS-L4 camera control unit or a PC (NIS-Elements) via a USB.

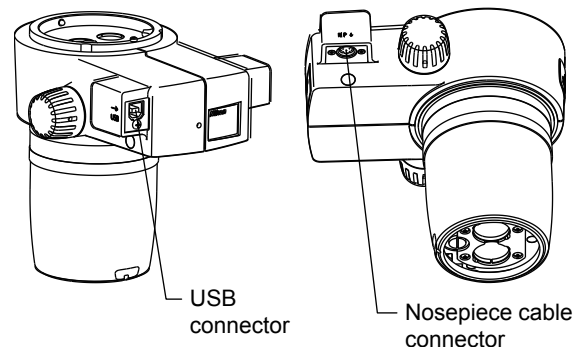
Attach a tube to the tube mount round dovetail. Microscope system functions can be expanded by assembling a device such as a coaxial epi illuminator or an epi fluorescence attachment between the zooming body and the tube.



SMZ1270 Zooming Body



SMZ1270i Zooming Body



SMZ1270i Zooming Body connectors

Zoom in or out images using the zoom knobs on the right and left sides of the zooming body.

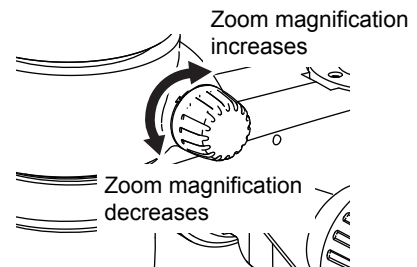
Turning the knob backward: Magnification increase

Turning the knob forward: Magnification decrease

Turning the knob causes the magnification to continuously change in the range from 0.63x to 8x (zoom ratio: 12.7:1).

Magnification values are marked on the zoom knobs.

The zoom knob click stops operate at the 1x, 2x, 3x, 4x and 6x positions. It is also possible to deactivate the click stop function.



Zooming in/out

■ **Activating and deactivating zoom click stops**

Insert the hex wrench (nominal designation: 2) supplied with the zooming body into the hole on the rear side of the right zoom knob.

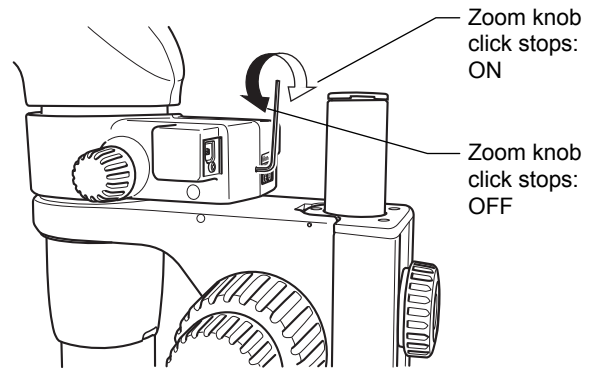
Turn the internal screw clockwise to activate click stops. Turn it counterclockwise to deactivate click stops.

✔ **If a hex wrench cannot be easily turned**

Loosen the zooming body fixing screw on the focus mount, turn the zooming body to the right and left, and then use the hex wrench if it cannot be used easily in the assembled state.

⚠ **Disconnect the cables connected to the SMZ1270i**

Before enabling or disabling the zoom click stops on the SMZ1270i Zooming Body, disconnect the USB cable and nosepiece cable connected to the zooming body. Reconnect the cables after the click stop setting.



**Activating and deactivating zoom click stops
(The SMZ1270i is used as an example.)**

2

Focus Mounts

A focus mount with a zooming body attached is used for focusing on a specimen by turning its focus knob. There are three kinds of focus mounts: C-FMAN, C-FMBN and C-FMCN focus mounts.

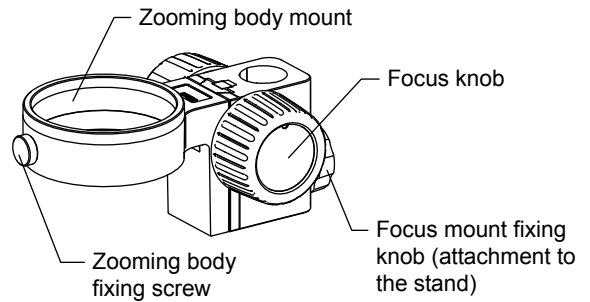
2.1

C-FMAN Focus Mount

The C-FMAN Focus Mount attaches to a US-3 Universal Stand with a support pillar of 24.5 mm dia.

Turn the right and left focus knobs to move the zooming body vertically and focus on samples.

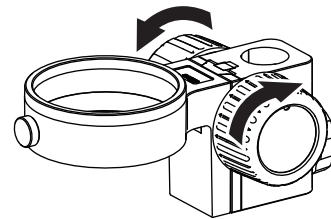
- Turning the focus knob backward: Upward movement
- Turning the focus knob forward: Downward movement
- Focusing stroke: 40 mm
- Stroke per focus knob rotation: 18.7 mm



C-FMAN Focus Mount

■ **Torque adjustment of the focus knobs**

To adjust the torque of the focus knobs, turn the right and left focus knobs in opposite directions. Adjust the torque to an appropriate level.



Adjusting the torque of the focus knobs
(The torque is increased by turning the focus knobs as shown in the figure.)

! Notes on the torque adjustment

When the torque is too low, the zooming body may slide down due to the various loads it carries, such as its own weight or the load of the counterbalance spring inside the focus unit. This may result in injury, such as pinching fingers between the objective and sample, or cause damage to the sample or objective. Be sure to adjust the torque to an appropriate level.

* A nosepiece cannot be used together with a zooming body combined with a C-FMAN Focus Mount.

2.2

C-FMBN Focus Mount

The C-FMBN Focus Mount attaches to a G-US1A Universal Table Clamp Stand or a G-US2 Universal Table Stand.

Turn the right and left focus knobs to move the zooming body vertically and to focus on samples.

- Turning the focus knob backward: Upward movement
- Turning the focus knob forward: Downward movement
- Focusing stroke: 50 mm
- Stroke per focus knob rotation: 18.7 mm

The zooming body mount can be inclined by loosening a set screw on the support pillar. This is useful when observing an inclined sample or using the focus mount on other devices such as a wire bonder.

- Angle of inclination at the mount: 180°

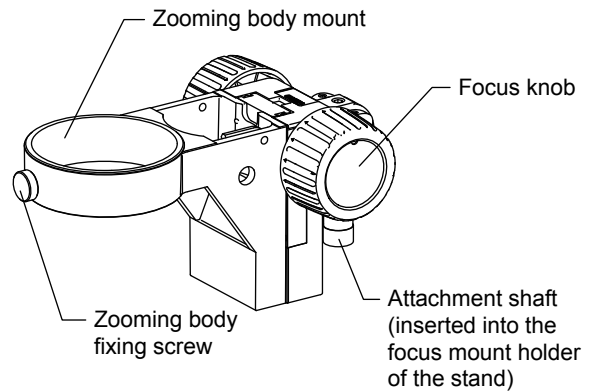
■ Torque adjustment of the focus knobs

To adjust the torque of the focus knobs, turn the right and left focus knobs in opposite directions. Adjust the torque to an appropriate level.

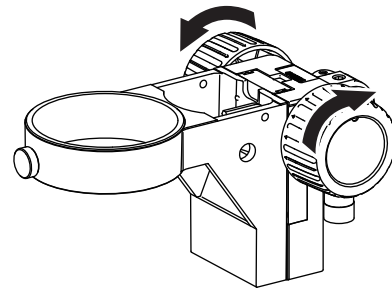
⚠ Notes on the torque adjustment

When the torque is too low, the zooming body may slide down due to the various loads it carries, such as its own weight or the load of the counterbalance spring inside the focus unit. This may result in injury, such as pinching fingers between the objective and sample, or cause damage to the sample or objective. Be sure to adjust the torque to an appropriate level.

- * A C-LSL2 LED Epi Illuminator 2 can be attached to the C-FMBN Focus Mount directly or via an SMZ-U Epi Arm or a G-EIA Flexible Arm.
- * A nosepiece cannot be used together with a zooming body combined with a FMBN Focus Mount.
- * The C-FMBN Focus Mount has an antistatic function.



C-FMBN Focus Mount



**Adjusting the torque of the focus knobs
(The torque is increased by turning the focus knobs as shown in the figure.)**

2.3

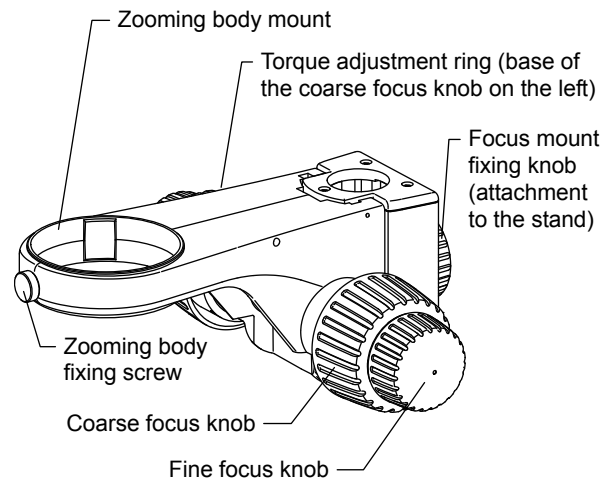
C-FMCN Focus Mount

The C-FMCN Focus Mount attaches to the following three types of stands with a support pillar of 32 mm dia.

- P-PS32 Plain Stand
- P-DSL32 LED Diascopic Illumination Stand
- P-DSF32 Fiber Diascopic Illumination Stand

Turn the single-axis coarse and fine knobs on both sides to move the zooming body vertically and focus on samples.

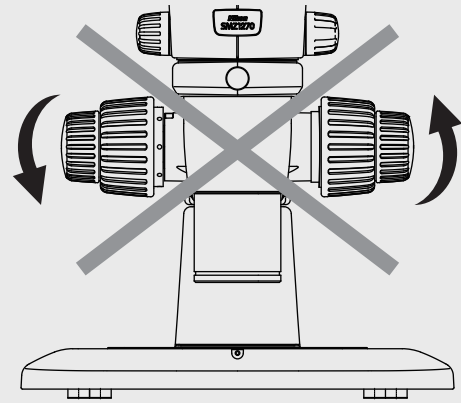
- Turning the focus knob backward: Upward movement
- Turning the focus knob forward: Downward movement
- Focusing stroke: 50 mm (35 mm when attached to the stand's support pillar without an anti-drop collar)
- Stroke per coarse focus knob rotation: 18.7 mm
- Stroke per fine focus knob rotation: 3.27 mm



C-FMCN Focus Mount

! Notes on turning the focus knobs

- Do not turn (or twist) the right and left focus knobs in opposite directions at the same time. Doing so may cause malfunction.
- When a focus knob reaches its rotational limit for the unit's vertical movement, do not forcibly turn it further. Doing so may cause malfunction.



Do not turn the knobs in opposite directions!

■ Torque adjustment of the focus knobs

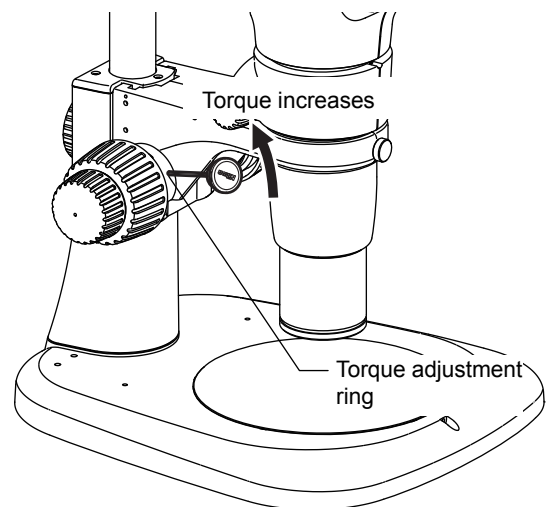
To change the torque of the focus knobs, turn the torque adjustment ring on the base of the left coarse focus knob using the tool supplied with the stand. Adjust the torque to an appropriate level.

The hex driver is fitted on top of each support pillar of the P-PS32, P-DSL32 or P-DSF32.

! Notes on the torque adjustment

When the torque is too low, the zooming body may slide down due to the various loads it carries, such as its own weight or the load of the counterbalance spring inside the focus unit. This may result in injury, such as pinching fingers between the objective and sample, or cause damage to the sample or objective. Be sure to adjust the torque to an appropriate level.

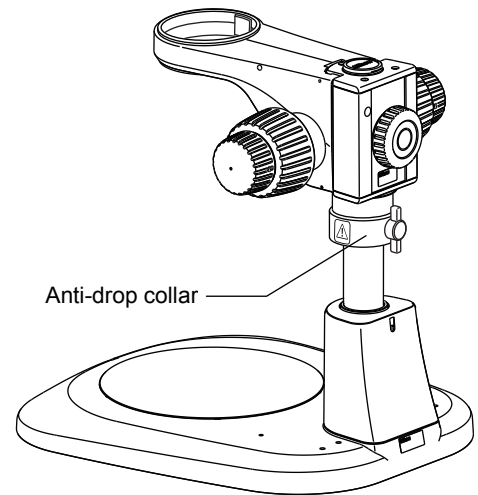
Note that turning the fine focus knob will cause the coarse focus knob to also turn, changing the torque of the fine focus knob.



Adjusting the torque of the focus knobs

■ **Anti-drop collar**

An anti-drop collar is supplied with the focus mount. When using a focus mount attached in the middle of the support pillar, be sure to attach the anti-drop collar under the focus mount so that it fits.



Anti-drop collar

- * A C-LSL2 LED Epi Illuminator 2 can be attached to the C-FMCN Focus Mount via an SMZ-U Epi Arm or a G-EIA Flexible Arm.
- * A nosepiece can be used together with a zooming body combined with a C-FMCN Focus Mount.

3

Nosepieces

There are two types of nosepieces: The standard P-RN2 Nosepiece and the P-RNI2 Intelligent Nosepiece equipped with the status detection function.

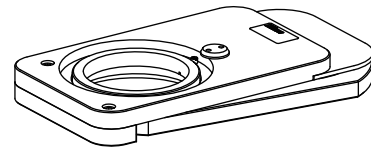
* The nosepieces cannot be used together with the microscope system that includes a C-FMAN/C-FMBN Focus Mount, or a C-LEDS Hybrid LED Stand.

3.1

P-RN2 Nosepiece

Attach the P-RN2 Nosepiece to the objective mount of the SMZ800N Zooming Body or the SMZ1270 Zooming Body.

Two objectives attached to the nosepiece can be switched by turning the nosepiece. Vertical observation with a single-side optical path is also possible.



P-RN2 Nosepiece

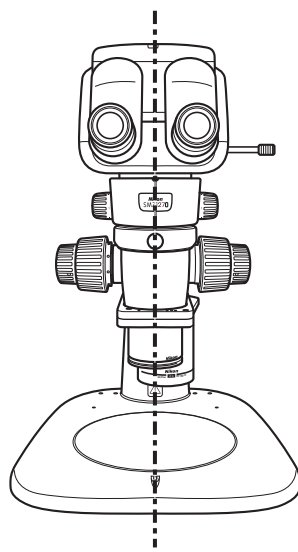
■ **Stereoscopic view and vertical view**

The nosepiece has two click positions for each objective.

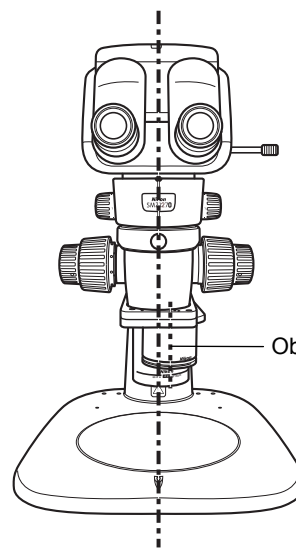
The view state can be changed between stereoscopic view and vertical view according to the click position.

Microscopy can be performed in the vertical position when needed, such as when taking images of the sample.

The click position that an objective is in can be checked by viewing the position of the objective from the front.



Stereoscopic view



Vertical view

Objective position (stereoscopic view and vertical view)

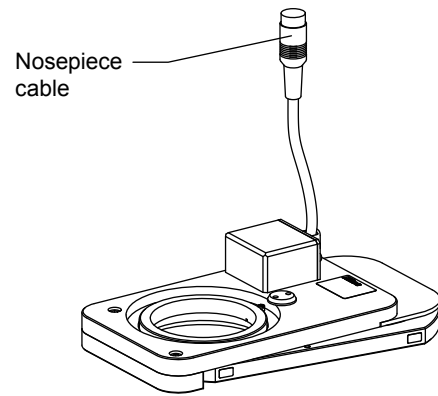
3.2 P-RNI2 Intelligent Nosepiece

This nosepiece has a function for detecting the address of an objective. Attach it to the objective mount on the SMZ1270i Zooming Body.

The two objectives attached to the nosepiece can be switched by turning the nosepiece. Vertical observation with a single-side optical path is also possible.

For details on vertical observation, see the previous section 3.1, "P-RN2 Nosepiece - ■ Stereoscopic view and vertical view."

Objective address, stereoscopic/vertical view information is sent to the SMZ1270i Zooming Body via a nosepiece cable, and then output to a DS-L3/DS-L4 camera control unit or a PC (NIS-Elements).



P-RNI2 Intelligent Nosepiece

4

Objectives

The microscope system supports the objectives in the following table.

Attach objectives to the zooming body or nosepiece.

Model	Magnification	NA (max.)	Working distance	Objective mount
P-Achro 0.5X *	0.5x	0.053	189 mm	M58 x 1.25
P-ED Plan 0.75X	0.75x	0.079	117 mm	
P-Plan 1X *	1x	0.105	78 mm	
P-ED Plan 1.5X/WF	1.5x	0.158	44 mm	
P-ED Plan 2X/WF	2x	0.21	35 mm	
P-Plan Apo 0.5X/WF	0.5x	0.053	82.5 mm	
P-Plan Apo 0.75X/WF	0.75x	0.079	107 mm	
P-Plan Apo 1X/WF	1x	0.105	70 mm	

⚠ Restriction

P-Achro 0.5X, P-ED Plan 0.75X and P-Plan 1X cannot be used with SMZ1270/SMZ1270i.

✓ Total magnification

The total magnification of the microscope is determined from the formula below:

Total magnification = zoom magnification x objective's magnification x eyepiece's magnification

- When using a vertical tube, replace the eyepiece's magnification with the C mount adapter lens' magnification to calculate the total magnification.

5 Stands (with Focus Knobs)

The stand is composed of a base, support pillar and arm.

To focus on the sample, vertically move the zooming body attached to the arm using a focus knob on the support pillar.

5.1 C-PSN/C-PSCN Plain Stand

The C-PSN and C-PSCN are plain stands with specifications nearly identical.

The only difference is the base size; the C-PSN with a standard sized base and the space saving C-PSCN with a small base.

Attach a zooming body, and turn the focus knobs on both sides of the support pillar in the same direction to focus on the sample.

The base has a stage plate with a black surface and a milky white surface. Select the surface appropriate for the sample.

The stands without the illumination mechanism have screw holes for attaching optional devices.

The hex wrench (nominal designation: 4) supplied with the stand and the hex wrench (nominal designation: 2) supplied with the zooming body can be stored in the tool holder on the rear side of the support pillar.

- Focusing stroke: 100 mm
- Stroke per focus knob rotation: 21.7 mm
- Stage plate size: 90 mm dia.

■ Arm position change

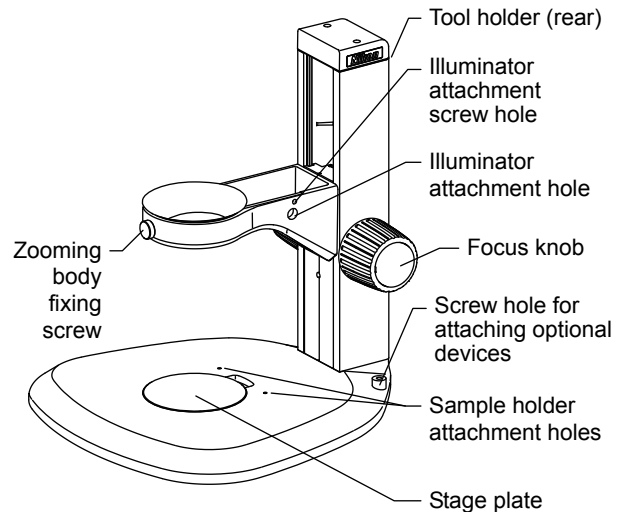
The arm can be attached to the position 55 mm lower than the standard (See Chapter 5, “3.1 Assembly of the Basic System - [1] Install a stand. - ■ C-PSN/C-PSCN Plain Stand’s arm position change.”)

■ Torque adjustment of the focus knobs

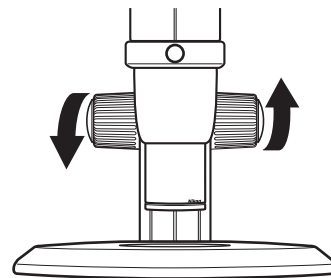
To adjust the torque of the focus knobs, turn the right and left focus knobs in opposite directions. Adjust the torque to an appropriate level.

⚠ Notes on the torque adjustment

When the torque is too low, the zooming body may slide down due to the various loads it carries, such as its own weight or the load of the counterbalance spring inside the focus unit. This may result in injury, such as pinching fingers between the objective and sample, or cause damage to the sample or objective. Be sure to adjust the torque to an appropriate level.



C-PSN Plain Stand



**Adjusting the torque of the C-PSN focus knobs
(The torque increases by turning the knobs as shown in the figure.)**

■ Attachable optional devices

- Stage clip (sample holder)
- C-LSL2 LED Epi Illuminator 2 (attached directly or via a G-EIA Flexible Arm or an SMZ-U Epi Arm)
- C-FID2 Double Arm Fiber Illuminator
- Circular Floating Stage 2
- C-TRS Tilting Stage
- * The standard plate is exchangeable for an antistatic plate (ESD stage plate).
- * Nosepieces can be used together with a zooming body combined with a C-PSN Plain Stand.
- * A P-TERG100/P-TERG50 trinocular tube or an epi fluorescence attachment cannot be used together with the microscope system that includes a C-PSN/C-PSCN Plain Stand.
- * The C-PSCN is a space-saving model with a small base. The C-PSCN is not suitable for a top-heavy system such as when a camera is attached to the tube.)

5.2 C-DS Dia Illumination Stand

This stand is equipped with a diascope illumination function that uses a 6V20W halogen lamp or a C-DSLU2 LED Unit for Dia Illumination Stand 2 as the light source.

For details, refer to the instruction manual supplied with the stand.

5.3 C-LEDS Hybrid LED Stand

This stand is equipped with diascope and episcopic illumination functions that use a white LED as the light source.

For details, refer to the instruction manual supplied with the stand.

6

Universal Stands

These stands are equipped with an arm that can be moved horizontally and vertically. Attach a focus mount to the arm when using a stand.

6.1

G-US1A Universal Table Clamp Stand

Clamp this stand to a table, etc. Attach a C-FMBN Focus Mount to the arm that can be moved horizontally and vertically. For details, refer to the instruction manual supplied with the stand.

6.2

G-US2 Universal Table Stand

This stand is equipped with a base. Attach a C-FMBN Focus Mount to the arm that can be moved horizontally and vertically. For details, refer to the instruction manual supplied with the stand.

6.3

US-3 Universal Stand

This stand is equipped with a base. Attach a C-FMAN Focus Mount to the arm that can be moved horizontally and vertically. For details, refer to the instruction manual supplied with the stand.

7

Stands (Exclusive Model)

The series of stands exclusive to this microscope system.

Attach a C-FMCN Focus Mount to the support pillar of the stand. The stand's base with a large glass plate enhances usability and enables easier observation of samples in a container such as a petri dish.

To expand the function of these stands, remove the stage plate from the base section and replace it with a stage with the XY shift knob or a sliding stage, or use a polarizing attachment.

7.1

P-PS32 Plain Stand

The P-PS32 is a standard model stand without illumination systems.

It is equipped with a stage plate (180 mm dia.) with black and milky white surfaces. Select the surface appropriate for the sample.

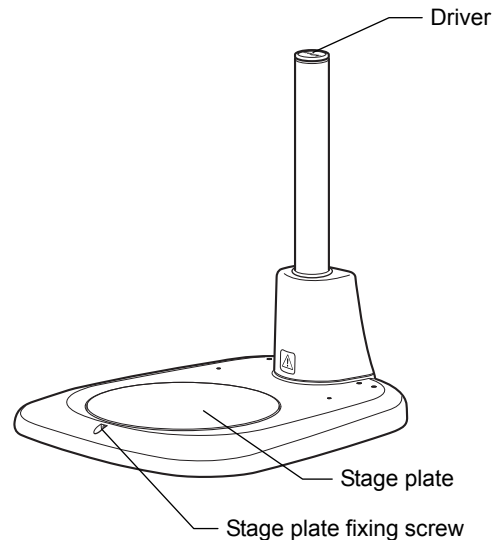
A dedicated hex driver is located at the top of the support pillar.

✔ **Sliding mechanism of the stage plate**

The sliding parts are mounted on the base part for mounting the stage plate, which can be slid by loosening the stage plate fixing screw. There is a clearance gap of approximately 3 mm around the stage plate when the stage is securely set. The stage plate can be smoothly and finely moved within the clearance gap by loosening the stage plate fixing screw.

This mechanism is useful for positioning, especially for high-magnification observation.

Securely fix the stage plate in place using the fixing screw when this mechanism does not need to be used.



P-PS32 Plain Stand

■ **Attachable optional devices**

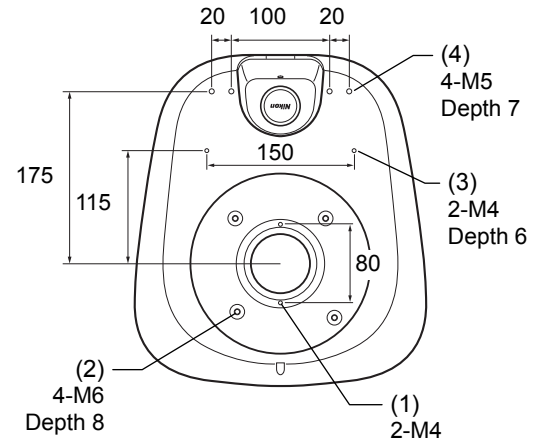
The following devices can be attached optionally to this stand.

- P-SXY64 XY Stage
- Circular Floating Stage 2
- C-SSL DIA Sliding Stage
- P-DF2 LED Dark Field Unit 2
- C-TRS Tilting Stage
- C-LSL2 LED Epi Illuminator 2 (via an SMZ-U Epi Arm)
- C-FDF Flexible Double Arm Fiber Illumination Unit (via a C-FIDH Fiber Holder)
- C-FID2 Double Arm Fiber Illuminator

✔ **Screw holes for attaching optional devices**

The base's top board has screw holes for attaching various devices. Screw holes (2) to (4) do not go right the way through to prevent liquid penetrating into the base.

- (1) 2-M4: Positioned under the stage plate attachment part of the base. Usable for multiple purposes. Used for attaching a Circular Floating Stage 2 or a C-TRS Tilting Stage.
- (2) 4-M6: Positioned under the stage plate attachment part of the base. Used for attaching a P-SXY64 XY Stage.
- (3) 2-M4: Positioned at the center on the top surface of the base. Usable for multiple purposes.
- (4) 4-M5: Positioned at the rear on the top surface of the base. Used for attaching a C-FDF Flexible Double Arm Fiber Illumination Unit (via a C-FIDH Fiber Holder).



Screw holes for attaching optional devices

✔ **Exchange for a C-EP support**

The support pillar length is 100 mm longer than standard when the original support pillar for this stand is exchanged for a C-EP support. This is useful for attaching the focus mount to a high position.

7.2 P-DSL32 LED Diascopic Illumination Stand

See "12.1 P-DSL32 LED Diascopic Illumination Stand."

7.3 P-DSF32 Fiber Diascopic Illumination Stand

See "12.2 P-DSF32 Fiber Diascopic Illumination Stand."

8

Stages

8.1

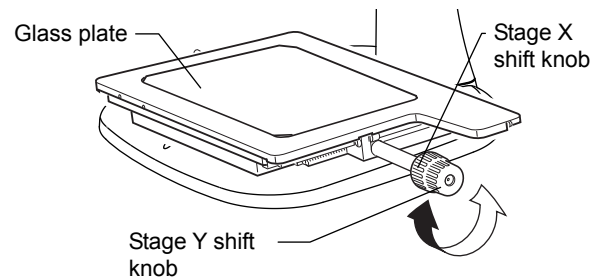
P-SXY64 XY Stage

This stage shifts the glass plate in the X and Y directions when the X/Y shift knobs are turned. Attach this stage instead of the base.

The height of the stage is 36.7 mm.

The glass plate measures 215 mm x 154 mm x 5 mm and is detachable.

Stage adapters for AZ are usable with the stage and a 45-mm dia. filter can be slotted into the optical-path hole on the lower board of the stage.



P-SXY64 XY Stage

[Usable stands]

- P-PS32 Plain Stand
- P-DSL32 LED Diascopic Illumination Stand
- P-DSF32 Fiber Diascopic Illumination Stand

■ **XY stroke of the stage with the X/Y shift knob and stroke per knob rotation**

X: 150 mm; 37.5 mm per rotation

Y: 65 mm (from the optical path, 50 mm towards the front, 15 mm towards the rear); 24.1 mm per rotation

■ **Load weight**

5 kg or less

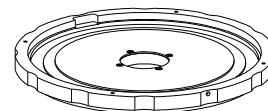
8.2

C-SSL DIA Sliding Stage

This stage is movable in the range of ± 19 mm in the radial direction by pressing the stage's side.

The height of the stage is 11.5 mm.

Attach the stage to the position where the stage plate was removed from the base. Attach the removed stage plate on the C-SSL DIA sliding stage.



C-SSL DIA Sliding Stage

[Usable stands]

- P-PS32 Plain Stand
- P-DSL32 LED Diascopic Illumination Stand
- P-DSF32 Fiber Diascopic Illumination Stand
- C-DS Dia Illumination Stand

8.3 Circular Floating Stage 2

This stage is movable in the range of ± 20 mm in the radial direction.

The height of the stage is 17.7 mm.

Attach the stage to the position where the stage plate was removed from the base. Attach the removed stage plate on the Circular Floating Stage 2.

When this stage is used with a P-PS32 Plain Stand, a 90-dia. SM Acrylic Plate (optional) is required separately. In this case, the height of the stage is 16.7 mm. The stage is securely attached to the P-PS32 using bolts. For details, see Chapter 5, "3.2 Assembly of Other Devices (Optional) - [8] Attach a Circular Floating Stage 2."

[Usable stands]

- C-PSN/C-PSCN Plain Stand
- P-PS32 Plain Stand



Circular Floating Stage 2

8.4 C-TRS Tilting Stage

This stage can be tilted within $\pm 30^\circ$ of the tilt range to observe samples. The rotation center of the tilt is positioned in the center on the upper plane of the stage.

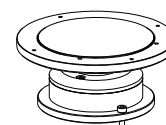
Attach the stage to the position where the stage plate was removed from the base. Attach the removed stage plate or a 90-dia. SM Acrylic Plate (optional) on the C-TRS Tilting Stage.

The height of the stage is 48 mm. (when horizontal)

For details, refer to the instruction manual for the C-TRS Tilting Stage.

[Usable stands]

- P-PS32 Plain Stand
- P-DSL32 LED Diascopic Illumination Stand
- P-DSF32 Fiber Diascopic Illumination Stand
- C-PSN/C-PSCN Plain Stand
- C-DS Dia Illumination Stand
- C-LEDS Hybrid LED Stand



C-TRS Tilting Stage

9

Tubes

This microscope system can be used with the following tubes.

9.1

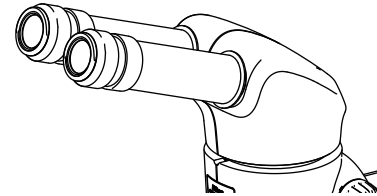
P-B Binocular Tube

This tube is the standard type for this microscope system.

Attach two eyepieces of the same magnification (10x, 15x, 20x or 30x) to the binocular eyepiece sleeve in order to observe erected images.

The depression angle of the binocular eyepiece tube is 20°.

- Eye-point height (when used with 10x eyepieces):
Approx. 121 mm from the mount joint
(interpupillary of 58 mm)
- Field of view number: 22



P-B Binocular Tube

⚠ Note on adjusting the interpupillary distance

Do not apply excessive force to the binocular part during interpupillary distance adjustment. Doing so may cause unexpected failure or malfunction.

✔ Combination with the P-IBSS2 Beam Splitter

When a P-B Binocular Tube is used in combination with a P-IBSS2 Beam Splitter², the periphery may become dark in the low zoom magnification range.

9.2 Trinocular Tubes

There are three types of trinocular tubes as follows:

- P-TERG100 Trinocular Tilting Tube
- P-TERG50 Trinocular Tilting Tube
- P-T100 Trinocular tube

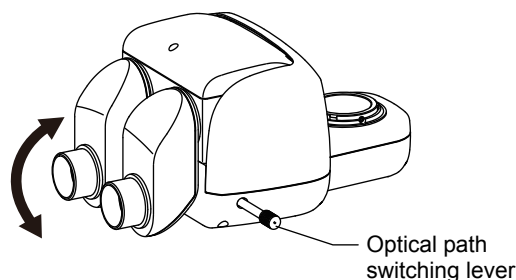
Attach two eyepieces of the same magnification (10x, 15x, 20x or 30x) to the binocular sleeves of the trinocular tube in order to observe erected images.

Attach a camera such as a DS camera to the vertical tube via an adapter.

Using the optical path switching lever on the trinocular tube, switch the optical path between sample observation using the eyepieces and image capturing using a DS camera. The distribution of light (%) varies depending on the tube type. (See the table on the next page.)

On the trinocular tilting tube, moving the binocular eyepiece tube in the direction shown in the figure changes the angle of depression continuously between 0° to 30°. Select the optimal angle for microscopy. The depression angle for the P-T100 Trinocular tube is 10° and cannot be changed.

- Eye point variation (trinocular tilting tube with 10x eyepieces attached):
Approx. 90 mm (25 to 115 mm from the mount joint)
- Eye-point height (P-T100 Trinocular tube with 10x eyepieces attached):
Approx. 48 mm from the mount joint
- Field of view number
(Binocular eyepiece tube): 22
(Vertical tube): 18



Adjusting the depression angle of the trinocular tilting tube

! Notes on adjusting the depression angle and interpupillary distance

- Do not apply excessive force to the binocular part during depression angle or interpupillary distance adjustment. Doing so may cause unexpected failure or malfunction.
- When moving the binocular part, be careful not to catch your fingers in the rotary section at the bottom of the binocular part.

Distribution of light with optical path switching (%)

Tube	Lever position	Binocular part (BINO)		Vertical tube ^(Note) (PHOTO)
		Left	Right	
P-TERG100 Trinocular Tilting Tube	Pulled out	100	100	0
	Pushed in	100	0	100
P-TERG50 Trinocular Tilting Tube	Pulled out	100	100	0
	Pushed in	100	50	50
P-T100 Trinocular tube	Pulled out	100	100	0
	Pushed in	100	0	100

(Note) The light intensity of the left eye is always 100%. The light from the optical path of the right eye is diverted to the vertical tube. (The image in the right eye's optical path is captured.)

* A P-TERG100 trinocular tube or a P-TERG50 trinocular tube cannot be used together with the microscope system that includes a C-PSN/C-PSCN Plain Stand, a C-DS Dia Illumination Stand or a C-LEDS Hybrid LED Stand.

10 Episcopic Illuminators

The episcopic illuminators which can be used with this microscope system are a coaxial episcopic illuminator, which is attached between the zooming body and tube, a ring fiber illuminator, which is attached to the tip of the objective, and an illuminator that has a flexible fiber for adjusting the illumination direction.

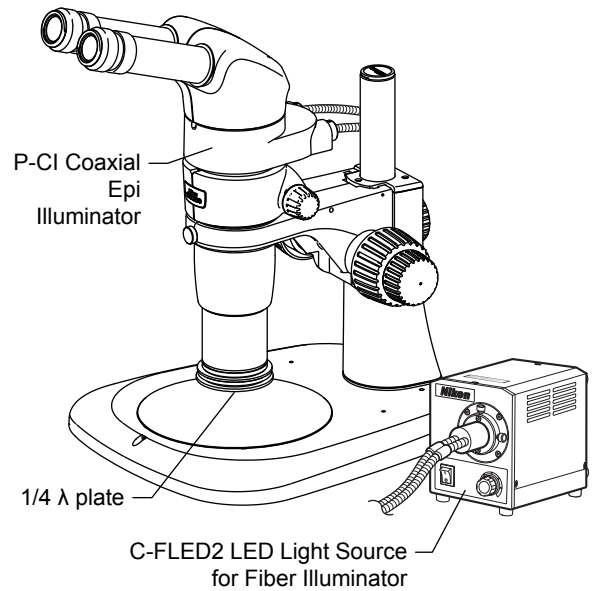
10.1 P-CI Coaxial Epi Illuminator

Attach this episcopic illuminator of 1.5x magnification to the position between the zooming body and the tube. The C-FLED2 LED Light Source for Fiber Illuminator is used as its light source. The light from the light source is led into the device by the two-branch fiber and episcopic illumination is generated along the optical axis. This illuminator is suitable for observing mirror-like samples.

A $1/4 \lambda$ plate (optional) is supplied to prevent flare in the imaging system due to light reflected into the optical system.

There are two types of $1/4 \lambda$ plates: a $1/4 \lambda$ plate for 1x or lower objective, and a $1/4 \lambda$ plate for 1.5x objective. Screw the plate in the tip of the corresponding objective.

The brightest illumination is generated when the yellow indication is at the front. Select the position that has the optimum brightness and contrast for observation.

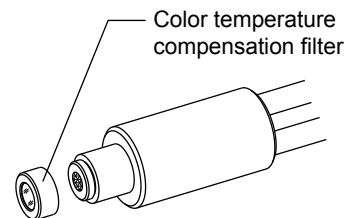


P-CI Coaxial Epi Illuminator

✔ Color temperature compensation filter

If the image appears yellowish during coaxial episcopic observation, color shade can be adjusted by screwing a color temperature compensation filter into the tip of the fiber on the light source side.

Note that the brightness will be reduced approx. 50% when a color temperature compensation filter is used.



Fiber tip on the light source side

⚠ Restriction

See the following table for the types of objectives usable with the coaxial epi illuminator and the recommended zoom magnifications.

Usable objectives and recommended zoom magnifications

Objective	Zoom magnification	
	SMZ800N Zooming Body	SMZ1270/1270i Zooming Body
0.5X	3x -	4x -
0.75X	2x	2x
1X	1.5x -	1.5x -
1.5X	3x -	3x -
2X	Unusable	Unusable

* Shading or vignetting may occur in the low zoom magnification range.

For details on using the light source, refer to the instruction manual for the light source.

10.2

C-FDF Flexible Double Arm Fiber Illumination Unit

The C-FDF for illuminating samples is a fiber connected to the C-FLED2 LED Light Source for Fiber Illuminator.

Two fibers are held by the C-FIDH Fiber Holder. The orientation of the holder's arm can be adjusted so that the tips of the fibers face the samples for illumination. For details on using the fiber holder, see "■ C-FIDH Fiber Holder."

⚠ Important note on handling fibers
Do not excessively bend or apply excess force to the fibers. Doing so may damage the fibers.

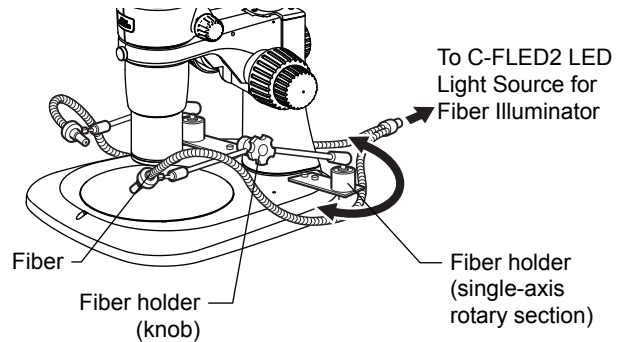
For details on the procedure for using a light source, refer to the instruction manual for the light source.

■ C-FIDH Fiber Holder

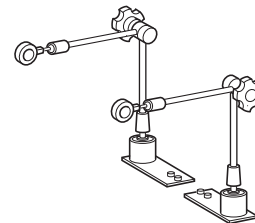
This holds the tip of the flexible double-arm fiber. Mount the base of the holder to the base (stand) of the microscope system. The holder holds the tips of the fibers with the two arms extending from its base. The arms can be freely positioned in any direction. The positions of the arms can be firmly locked by tightening the knobs at the joints of the arms. The arms are connected with a mechanism that enables the arms to be freely swung centered around a single axis (Z axis). This allows the arms to be pushed aside without having to unlock the arm joints. If the arm position is returned by rotating it on the same axis, the arm will stop at the first lock position.

The C-FIDH Fiber Holder can be attached to the following stands:

- P-PS32 Plain Stand
- P-DSL32 LED Diascopic Illumination Stand
- P-DSF32 Fiber Diascopic Illumination Stand



C-FDF Flexible Double Arm Fiber illumination Unit



C-FIDH Fiber Holder

10.3

C-FID2 Double Arm Fiber Illuminator

This illuminator for illuminating samples is a light guide connected to the C-FLED2 LED Light source for fiber illuminator.

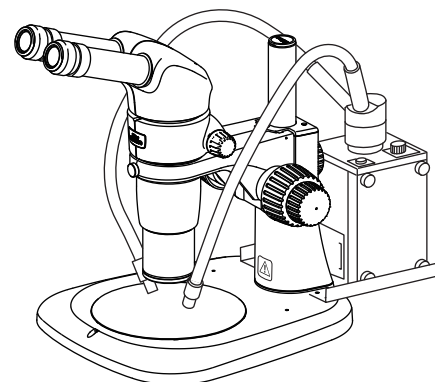
The fiber is bifurcated at the mount to the light source. An interlock type covering mechanism enables adjustment of illumination position and orientation.

⚠ Important note on handling fibers
Do not excessively bend or apply excess force to the fibers. Doing so may damage the fibers.

The C-FID2 Double Arm Fiber Illuminator can be attached to the following stands:

- P-PS32 Plain Stand
- P-DSL32 LED Diascopic Illumination Stand
- P-DSF32 Fiber Diascopic Illumination Stand
- C-PSN/C-PSCN Plain Stand

For details on attaching the illuminator to a stand, connecting to a light source, and using a light source, refer to the instruction manual supplied with the light source.



C-FID2 Double Arm Fiber Illuminator

10.4 C-FIR Ring Fiber Illumination Unit

The C-FIR is a ring shaped fiber illuminator that attaches to the external tip of the objective and connects to the C-FLED2 LED Light Source for Fiber Illuminator.

The edge face of the sample can be illuminated evenly using this ring-shaped fiber.

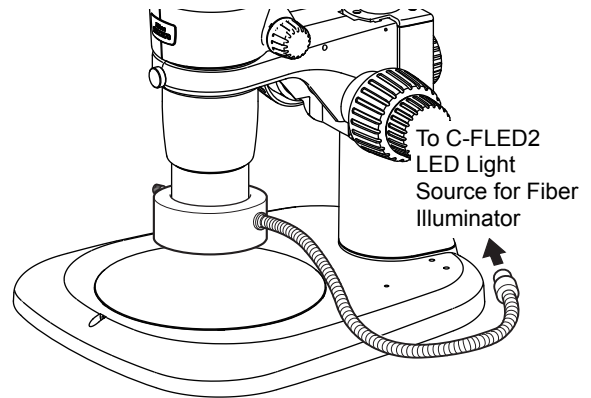
⚠ Restriction

The C-FIR Ring Fiber Illumination Unit cannot be used with the P-ED Plan 2X/WF.

⚠ Important notes on handling the fiber

Do not excessively bend or apply excess force to the fibers. Doing so may damage the fiber.

For details on attaching the unit to an objective, connecting to a light source, and using a light source, refer to the instruction manual supplied with the light source.



C-FIR Ring Fiber Illumination Unit

10.5 Other Episcopic Illuminators

In addition to the illuminators with the episcopic illumination function described in Section 10.1 to Section 10.4, the C-LSL2 LED Epi Illuminator 2 and C-LEDS Hybrid LED Stand can also be used.

The C-LEDS Hybrid LED Stand also has the diascope illumination function. For details, refer to the instruction manual supplied with the illuminators.

11

Epi-Fluorescence Attachment

This microscope system can be used with the P-EFL Epi Fluorescence Attachment to perform epi-fluorescence microscopy

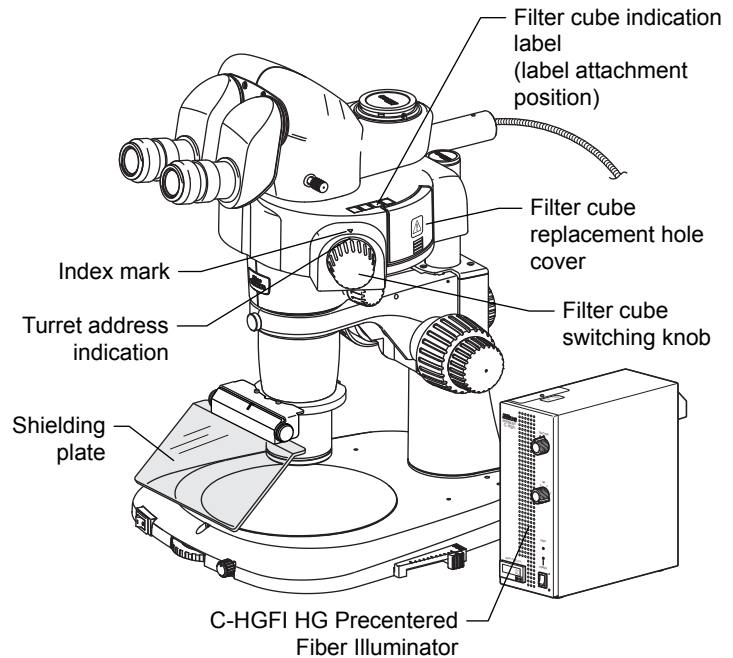
11.1

P-EFL Epi Fluorescence Attachment

This epi-fluorescence attachment is used with filter cubes attached to the turret inside the attachment. Bring the desired filter cube into the optical path when performing epi-fluorescence microscopy. Install this attachment between the zooming body and the tube.

An HG precentered fiber illuminator is used as the light source. The light from the light source is introduced inside the attachment and led through the filter cubes attached to the turret for epi-fluorescence illumination. (For details on how to use the light source, refer to the instruction manual supplied with the light source.)

Up to four cubes can be attached to the turret of the epi-fluorescence attachment. Turn the turret using the filter cube switching knob. Align a turret address number (1 to 4) displayed on the knob with the indicator to bring the filter cube of the selected address into the optical path.



P-EFL Epi Fluorescence Attachment

⚠ CAUTION

- Do not use the epi-fluorescence attachment while the filter cube replacement cover is open. Harmful light including ultraviolet light may leak and affect fluorescence observation.
- Immediately after diascope observation using an epi-fluorescence attachment, the front face of the empty cube may become hot, resulting in burns. Do not touch the front face of the empty cube. Replace the empty cube several minutes after finishing the diascope observation.

❗ Be sure to attach four cubes to the turret.

Attach an empty cube at positions where no filter cube is required.

■ Filter cube

- P-GFP-B Filter Cube and P-GFP-L Filter Cube: Used for fluorescence observation at a given wavelength.
- P-EFLC Filter Cube: Used for fluorescence observation at an arbitrary wavelength when combined with arbitrary filters, for example.

The sizes of the attachable filters and mirror are listed below:

- Excitation filter (EX): External diameter 18 mm, Thickness 8 mm or less
- Dichroic mirror (DM): Dimensions 18 mm x 26 mm, Thickness 1 mm or less
- Barrier filter (BA): External diameter 18 mm, Thickness 3.8 mm or less

For details, refer to Chapter 5, “3.2 Assembly of Other Devices (Optional) - [3] Attach a P-EFL Epi Fluorescence Attachment.”

- P2-EFLBF Filter Cube (Bright Field): Used for episcopic bright-field observation.
- Empty cube (Three cubes are supplied with an epi-fluorescence attachment): Used when performing diascope illumination observation using the epi-fluorescence attachment.

✔ Light shielding plate

The device is equipped with a light shielding plate for preventing the reflection of ultraviolet light. Use the light shielding plate when performing fluorescence microscopy. When in use, the light shielding plate can be pushed aside to positions up to 45° horizontally to the rear. When not in use, the plate can be pushed aside to positions up to 170°.

✔ Episcopic bright-field observation

This is useful for viewing the entire image of an opaque specimen during fluorescence observation.

Even though the P-EFLBF Filter Cube has a built-in UV-cut filter, adjust the light intensity to the appropriate level with the light source illuminator so that illumination is not too bright. In addition, two types of $1/4 \lambda$ plates are provided in order to prevent flares at the imaging system caused by the light reflected inside the optical system: the $1/4 \lambda$ plate for 1x or lower power objectives, and the $1/4 \lambda$ plate for 1x objectives. Attach a corresponding $1/4 \lambda$ plate to the tip of each objective.

Note the following points when using a P-EFLBF Filter Cube:

- Brightness differs between the right and left optical path when reflected light from mirror plane type specimens is observed.
- Double image may occur due to the built-in half mirror.
- The periphery of the image may not be clearly visible in the low zoom magnification range.
- The periphery of the image may become dark when an intermediate tube such as a beam splitter is used together.

✔ OCC light shielding plate

When using an epi-fluorescence attachment in combination with a P-DSL32 LED Diascopic Illumination Stand, Nikon recommends closing the OCC light shielding plate on the dia-illumination completely. This can decrease background noise caused by intrinsic fluorescence in the diascope illuminator.

* The P-EFL Epi Fluorescence Attachment cannot be used together with the microscope system that includes a C-PSN/C-PSCN Plain Stand, a C-DS Dia Illumination Stand or a C-LEDS Hybrid LED Stand.

12 Diascopic Illuminators

The primary diascopic illuminator for this microscope system consists of a stand equipped with an illuminating optical system. A dark-field illuminator and polarizing illuminator are also available.

12.1 P-DSL32 LED Diascopic Illumination Stand

The P-DSL32 is a stand equipped with diascopic illumination optical systems and the focus mechanism of the support pillar vertical movement type.

Attach a C-FMCN Focus Mount to the support pillar.

The base with a large glass plate (180 mm dia.) enhances usability and enables easier observation of samples in a container such as a petri dish.

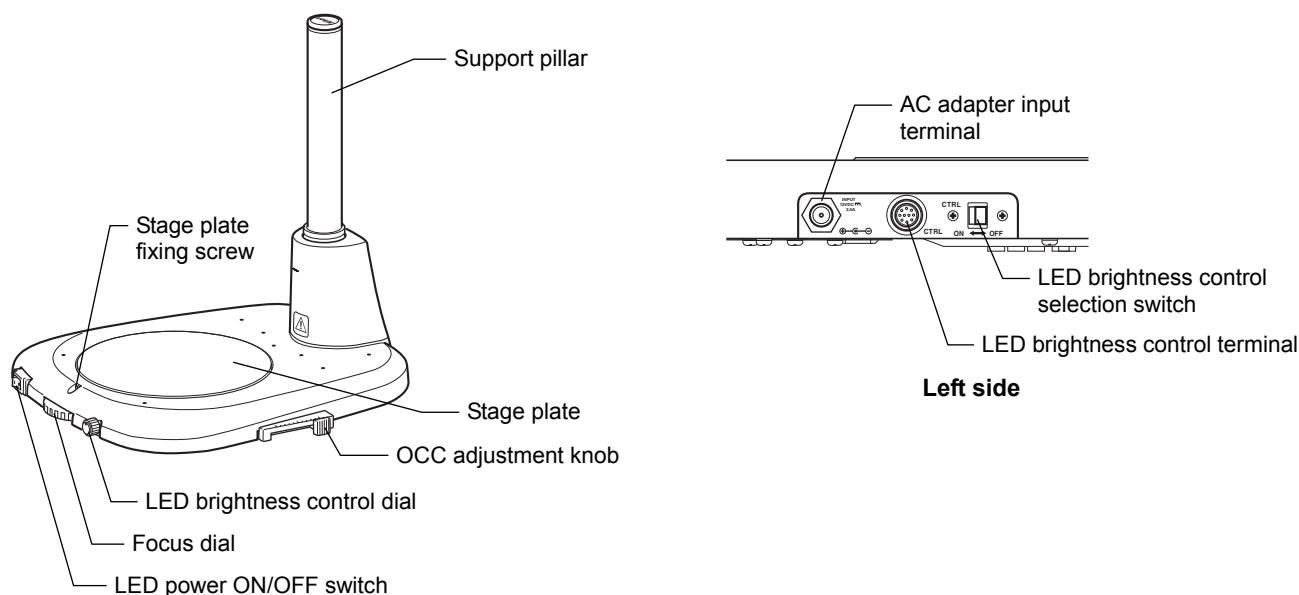
A dedicated hex driver is located at the top of the support pillar.

✔ Sliding mechanism of the stage plate

The sliding parts are mounted on the base part for mounting the stage plate, which can be slid by loosening the stage plate fixing screw. There is a clearance gap of approximately 3 mm around the stage plate when the stage is securely set. The stage plate can be smoothly and finely moved within the clearance gap by loosening the stage plate fixing screw.

This mechanism is useful for positioning, especially for high-magnification observation.

Securely fix the stage plate in place using the fixing screw when this mechanism does not need to be used.



P-DSL32 LED Diascopic Illumination Stand

■ Power supply and illumination control

Power to the P-DSL32 LED Diascopic Illumination Stand is supplied by connecting a P2-CTLB Control Box or a 12 V AC adapter. To provide diascopic illumination without using a control box, connect a 12 V AC adapter.

Turn on or off the LED diascopic illumination using the LED power ON/OFF switch at the front of the base.

Adjust illumination using the LED brightness control dial on the base. To enable adjustment using the LED brightness control dial on the base, the LED brightness control selection switch must be turned off.

[When the power is supplied from a control box]

When a P2-CTLB Control Box is connected to the base, turn on the LED brightness control selection switch. In this state, diascopic illumination can be turned on or off, brightness can be controlled, and light intensity can be monitored from the control box.

Actual control is carried out by the PC (software: NIS-Elements) connected to the control box.

Note that illumination cannot be controlled from the control box, even if the LED brightness control selection switch is turned on, unless the LED power ON/OFF switch on the base is turned on. Be sure to turn on the LED power ON/OFF switch.

- LED brightness control selection switch On: Assigns control to the control box.
- LED brightness control selection switch Off: Assigns control to the base.

For details about the P2-CTLB Control Box, see “13 P2-CTLB Control Box.”

■ OCC (oblique coherent contrast) illumination

This stand supports OCC illumination so that a transparent sample can be observed at high contrast using diascope illumination with a white LED. OCC illumination is an oblique illumination method suitable for observing the phase objects, where a sample is obliquely illuminated with a coherent illuminating light by shielding a part of the optical path using a shading plate. With this illumination method, a colorless transparent sample can be observed with relief and contrast.

To adjust the OCC contrast, slide the OCC adjustment knob at the right front of the base back and forth. Adjust until the optimum observation state is obtained in combination with the selected magnification and phase amount of the sample. For ordinary bright-field microscopy under diascope illumination, set the OCC adjustment control to the farthest position. Sliding the control gradually forward from that position will cause the OCC effect to increase. Sliding the control by 46 mm will result in a completely shielded state.

In addition, the control position (knob position) can be reproduced using the OCC adjustment knob with a scale.

Usable objectives and recommended zoom magnifications

Objective	Zoom magnification	
	Bright-field diascope illumination	OCC illumination
0.5X	1.5x - 8x	Contrast in the field of view is not uniform.
0.75X	1x - 8x	Contrast in the field of view is not uniform.
1X	Min. - 8x	5x - 8x
1.5X	Min. - 8x	3x - 8x
2X	2.5x - 8x	1.5x - 8x

* Shading may occur in the low zoom magnification range.

✔ Increasing contrast of the OCC observation image

For observations of the OCC observation image with higher contrast, remove the filter dropping ring (attached to the base optical path immediately under the glass plate). The contrast can be increased by removing the filter dropping ring that contains a diffuser plate to control excess contrast for OCC.

■ Focusing mechanism

The support pillar moves vertically using the focus dial at the front of the base so that samples with height variations can easily be in focus.

- Focusing stroke: 6.2 mm
- Stroke per focus dial rotation: 3.24 mm

■ Attachable optional devices

The following devices can be attached optionally to this stand:

- P-SXY64 XY Stage
- C-SSL DIA Sliding Stage
- P-DF2 LED Dark Field Unit 2
- C-TRS Tilting Stage
- C-LSL2 LED Epi Illuminator 2 (via an SMZ-U Epi Arm)
- C-FDF Flexible Double Arm Fiber Illumination Unit (via a C-FIDH Fiber Holder)
- C-FID2 Double Arm Fiber Illuminator
- C-POL Simple Polarizing Attachment

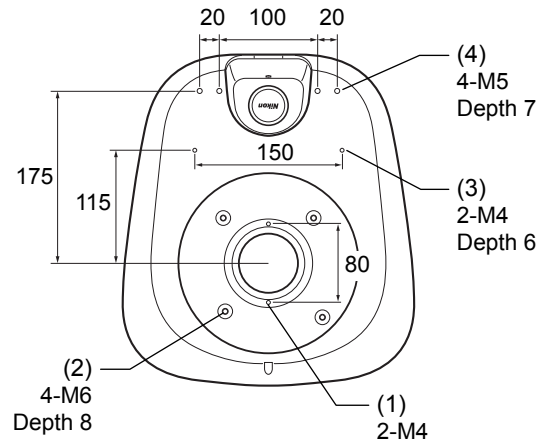
✔ 45-mm dia. filter

A 45-mm dia. filter (no thicker than 5 mm) can be dropped onto the filter dropping ring (attached to the base optical path immediately under the glass plate).

✔ **Screw holes for attaching optional devices**

The base's top board has screw holes for attaching various devices. Screw holes (2) to (4) do not go right the way through to prevent liquid penetrating into the base.

- (1) 2-M4: Positioned under the stage plate attachment part of the base. Usable for multiple purposes. Used for attaching a C-TRS Tilting Stage.
- (2) 4-M6: Positioned under the stage plate attachment part of the base. Used for attaching the P-SXY64 XY Stage.
- (3) 2-M4: Positioned at the center on the top surface of the base. Usable for multiple purposes.
- (4) 4-M5: Positioned at the rear on the top surface of the base. Used for attaching a C-FDF Flexible Double Arm Fiber Illumination Unit (via a C-FIDH Fiber Holder).



Screw holes for attaching optional devices

✔ **Exchange for a C-EP support**

The support length is 145 mm longer than standard when the original support pillar for this stand is exchanged for a C-EP support pillar. This is useful for attaching the focus mount to a high position.

12.2 P-DSF32 Fiber Diascopic Illumination Stand

The P-DSF32 is a stand equipped with diascopic illumination optical systems and the focus mechanism of the support pillar vertical movement type.

Attach a C-FMCN Focus Mount to the support pillar.

The base with a large glass plate (180 mm dia.) enhances usability and enables easier observation of samples in a container such as a petri dish.

The base has three indents for holding the base: on the right and left planes and the rear plane.

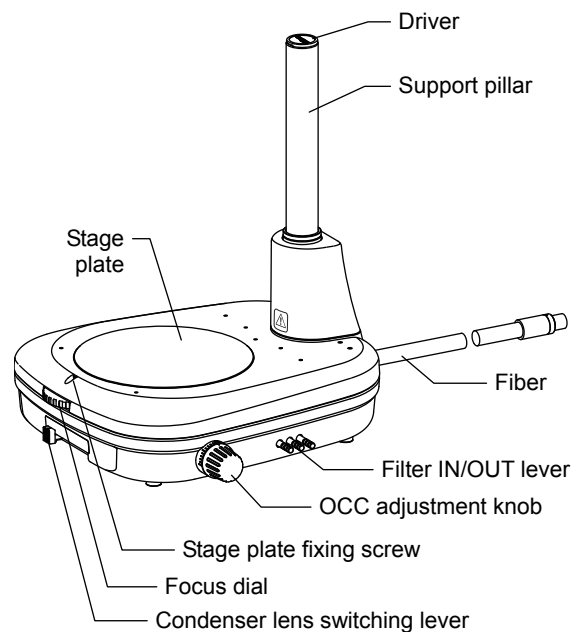
A dedicated hex driver is located at the top of the support pillar.

✔ **Sliding mechanism of the stage plate**

The sliding parts are mounted on the base part for mounting the stage plate, which can be slid by loosening the stage plate fixing screw. There is a clearance gap of approximately 3 mm around the stage plate when the stage is securely set. The stage plate can be smoothly and finely moved within the clearance gap by loosening the stage plate fixing screw.

This mechanism is useful for positioning, especially for high-magnification observation.

Securely fix the stage plate in place using the fixing screw when this mechanism does not need to be used.



P-DSF32 Fiber Diascopic Illumination Stand

■ **Illumination on/off, brightness adjustment**

Attach the C-FLED2 LED Light source for fiber illuminator as the light source to the rear side of the base using a fiber. Turn the illumination on/off and adjust the brightness using the C-FLED2. For details, refer to the instruction manual supplied with the light source.

■ **OCC (oblique coherent contrast) illumination**

This stand supports OCC illumination so that a transparent sample can be observed at high contrast using diascope illumination with a white LED. OCC illumination is an oblique illumination method suitable for observing the phase objects, where a sample is obliquely illuminated with a coherent illuminating light by shielding a part of the optical path using a shading plate. With this illumination method, a colorless, transparent sample can be observed with relief and contrast. To adjust the OCC contrast, turn the OCC adjustment knob. Adjust until the optimum observation state is obtained in combination with the selected magnification and phase amount of the sample. In addition, the control position (knob position) can be reproduced using the adjustment knob with a scale.

■ **Condenser lens**

The base contains condenser lenses for low/high-magnification microscopy. Switch the condenser lens based on the objective being used to ensure uniform diascope illumination. A wide range of observation magnifications are supported. To switch the condenser lens, slide the condenser lens switching lever to the right or left.

Slide the lens switching lever to the right: For low magnification; objective lens 0.5x to 1.5x
 Slide the lens switching lever to the left: For high magnification; objective lens 2x

Usable objectives and recommended zoom magnifications

Objective	Zoom magnification	
	Bright-field diascope illumination	OCC illumination
0.5X + condenser lens for low magnification	1.5x - 8x	Unusable
0.75X + condenser lens for low magnification	1x - 8x	Unusable
1X + condenser lens for low magnification	Min. - 8x	3x - 8x
1.5X + condenser lens for low magnification	Min. - 8x	3x - 8x
2X + condenser lens for height magnification	Min. - 8x	2x - 8x

* Shading may occur in the low zoom magnification range.

■ **Filter**

The base has three different filters: NCB11, ND4, and ND16. The individual filters can be inserted into and removed from the optical path separately. To insert a filter into the optical path, push in the filter IN/OUT lever.

■ **Focusing mechanism**

The support pillar moves vertically using the focus dial at the front of the base so that samples with height variations can easily be in focus.

- Focusing stroke: 6.2 mm
- Stroke per focus dial rotation: 3.24 mm

■ **Attachable optional devices**

The following devices can be attached optionally to this stand:

- P-SXY64 XY Stage
- C-SSL DIA Sliding Stage
- P-DF2 LED Dark Field Unit 2
- C-TRS Tilting Stage
- C-LSL2 LED Epi Illuminator 2 (via an SMZ-U Epi Arm)
- C-FDF Flexible Double Arm Fiber Illumination Unit (via a C-FIDH Fiber Holder)
- C-FID2 Double Arm Fiber Illuminator
- C-POL Simple Polarizing Attachment

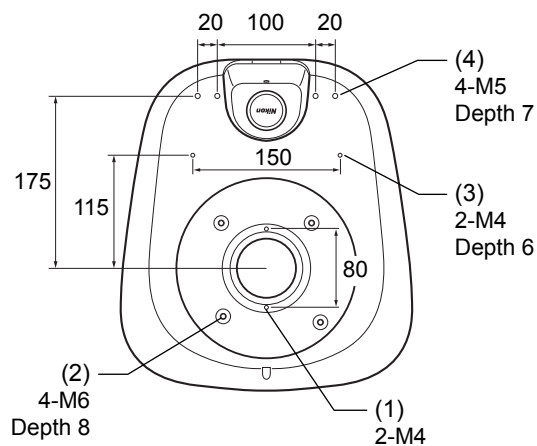
✔ **45-mm dia. filter**

A 45-mm dia. filter (no thicker than 2 mm) can be dropped onto the filter dropping ring (attached to the base optical path immediately under the glass plate).

✔ **Screw holes for attaching optional devices**

The base's top board has screw holes for attaching various devices. Screw holes (2) to (4) do not go right the way through to prevent liquid penetrating into the base.

- (1) 2-M4: Positioned under the stage plate attachment part of the base. Usable for multiple purposes. Used for attaching a C-TRS Tilting Stage.
- (2) 4-M6: Positioned under the stage plate attachment part of the base. Used for attaching the P-SXY64 XY Stage.
- (3) 2-M4: Positioned at the center on the top surface of the base. Usable for multiple purposes.
- (4) 4-M5: Positioned at the rear on the top surface of the base. Used for attaching a C-FDF Flexible Double Arm Fiber Illumination Unit (via a C-FIDH Fiber Holder).



Screw holes for attaching optional devices

✔ **Exchange for a C-EP support**

The support pillar length is 145 mm longer than standard when the original support pillar for this stand is exchanged for a C-EP support. This is useful for attaching the focus mount to a high position.

12.3 P-DF2 LED Dark Field Unit 2

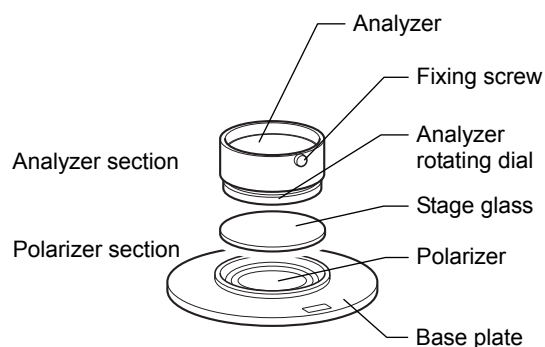
This dark-field illumination unit has LEDs that are tilted and positioned like a ring. The unit is attached to the base of the stand. For details, refer to the instruction manual for the P-DF2 LED Dark Field Unit 2.

12.4 C-POL Simple Polarizing Attachment

The C-POL is a simple polarizing device that consists of the polarizer section and the analyzer section.

Polarizing observation is enabled by changing the orientation of the polarizer installed on the base of the stand and the analyzer that attaches to the tip of the objective.

The polarizer and analyzer have indicators which show the orientation of the polarizing plate. Use the screw head at the bottom plane of the analyzer rotating dial as the analyzer's indicator.



C-POL Simple Polarizing Attachment

✔ Directly placing the polarizer

When a polarizing attachment is used, the periphery becomes dark in the low zoom magnification range. To reduce vignetting, remove the stage glass and directly place the polarizer.

Drop the polarizer removed from the polarizer section into the position where the diffuser was removed from the base of the stand. Use the original stage plate supplied with the base.

The polarizer cannot be placed directly on the C-DS Dia Illumination Stand.

⚠ Restrictions

The C-POL Simple Polarizing Attachment cannot be used with the P-ED Plan 2X/WF.

The 0.5x objective supports a 1x or larger zoom area more and other objectives cover the entire zoom area.

12.5 Other Diascopic Illuminators

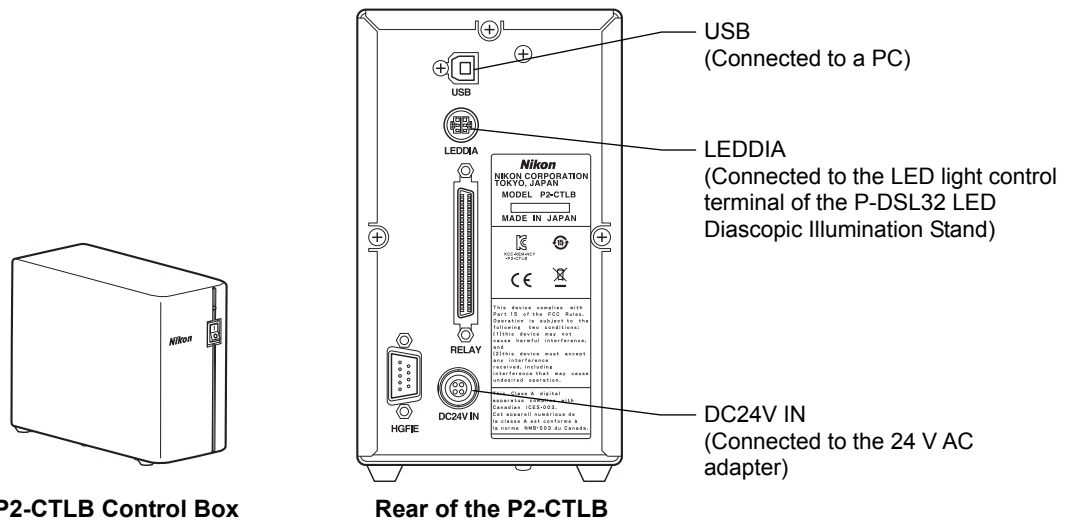
In addition to the devices equipped with the diascope illumination function listed above (12.1 to 12.4), the C-DS Dia Illumination Stand and C-LEDS Hybrid LED Stand also have the diascope illumination function. The C-LEDS Hybrid LED Stand also has the episcopic illumination function. For details, refer to the instruction manual supplied with the stands.

13

P2-CTLB Control Box

The P2-CTLB Control Box supplies illumination power to the P-DSL32 LED Diascopic Illumination Stand, turns on or off the LED power source, adjusts brightness and monitors the light intensity.

Connect a PC (software: NIS-Elements) to the control box in order to control illumination. For details on the procedure for controlling illumination, refer to the instruction manual for NIS-Elements.



P2-CTLB Control Box

Rear of the P2-CTLB

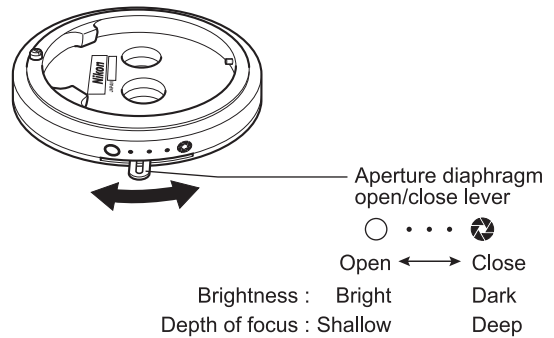
Use the power cable specified in Chapter 8, “2 Performance Properties” to connect to the AC adapter.

14 Other Devices

In addition to the devices described in the earlier sections, the following optional devices can be used with this microscope system:

14.1 SMZ10A Aperture Unit

To increase the depth of focus during image capture, attach this unit between the zooming body and the tube. When using this unit with a coaxial epi illuminator, first attach this unit and then the coaxial epi illuminator above the unit. Move the aperture diaphragm open/close lever to adjust the diaphragm appropriately. The \bigcirc marks above the lever represent the diaphragm diameter sizes that vary between 16 mm dia. and 6.5 mm dia.

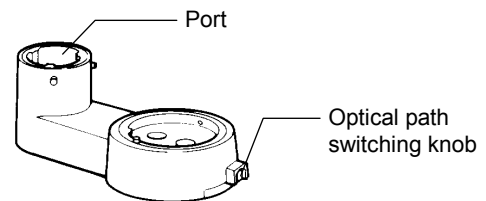


SMZ10A Aperture Unit

14.2 P-IBSS2 Beam Splitter

Attach the P-IBSS2 between the zooming body and the tube to split the optical path.

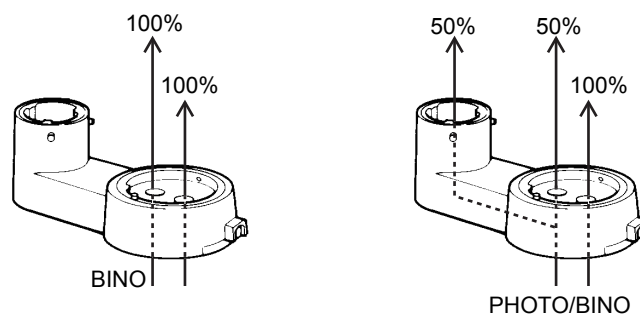
Mounting a digital camera on the beam splitter port via a camera adapter enables image capture of the specimen being observed. Also read the instruction manual supplied with the digital camera in use.



P-IBSS2 Beam Splitter

■ Optical path switching

Switch the optical path by sliding the optical path switching knob.



- BINO position
Left eyepiece:Right eyepiece:Port (camera)=100:100:0
- PHOTO/BINO position
Left eyepiece:Right eyepiece:Port (camera)=50:100:50 (port positioned on the left)
Left eyepiece:Right eyepiece:Port (camera)=100:50:50 (port positioned on the right)

14.3

P-IER Eyelevel Riser

Attach the P-IER between the zooming body and the tube to raise the eyelevel 25 mm.

Up to two eyelevel risers can be used by putting one on top of the other.



P-IER Eyelevel Riser

! Note on use of the eyelevel riser

Do not use more than two eyelevel risers at once or together with other intermediate tube such as a beam splitter or a coaxial episcopic illuminator. Doing so will cause vignetting around the image.

14.4

P-THSS Teaching Head

Observation by main and secondary observers is enabled by attaching a zooming body and a tube.

Simultaneous observation of the same viewfield is possible through the eyepieces on the secondary observer side and the eyepieces on the main observer side, making it ideal for educational purposes.

For details, refer to the instruction manual supplied with the P-THSS Teaching Head.

14.5

P-IDT Drawing Tube

The image of the specimen being observed can be sketched by tracing the image of the specimen.

Both the microscopic image and the sketched image can be seen simultaneously through the binocular tube.


For details, refer to the instruction manual supplied with the P-IDT Drawing Tube.

Chapter

5

Assembly

This chapter contains the system configuration diagrams and lists of the system components, and explains how to assemble the systems.

Before starting assembling, read the appropriate notes such as  CAUTION “12 Cautions on assembling and installing the product” at the beginning of this instruction manual and “3 Installation location” in “Notes on Handling the Product” in this instruction manual.

 **CAUTION** When moving or carrying the system

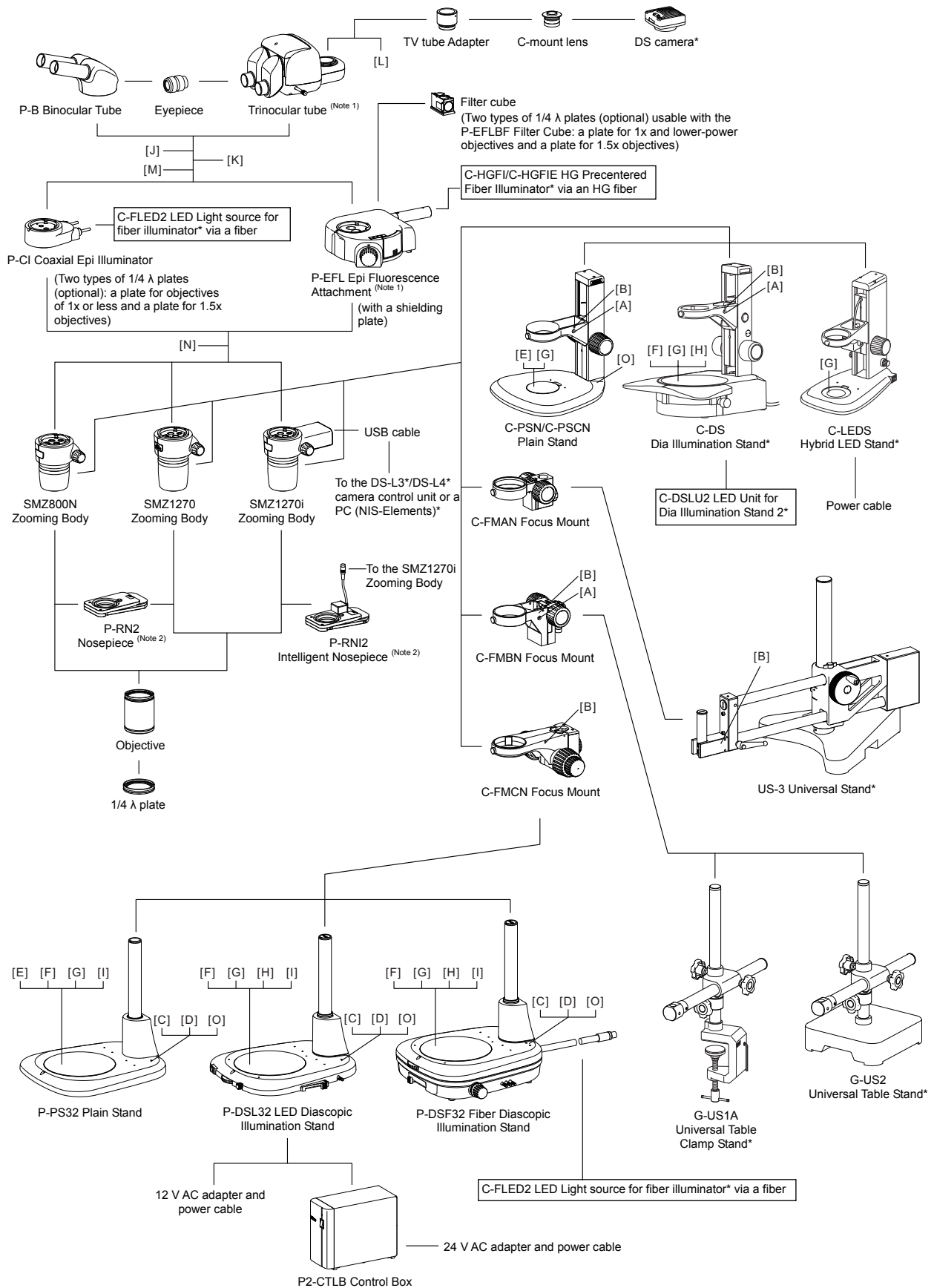
The total mass of the microscope system may become approx. 17 kg.

When moving the assembled microscopy system, work with at least two people. Put hands in the depression at the front of the base and the rear of both sides to lift up the system. Be very careful not to let fingers be caught when putting it down.

■ Tools necessary for assembly

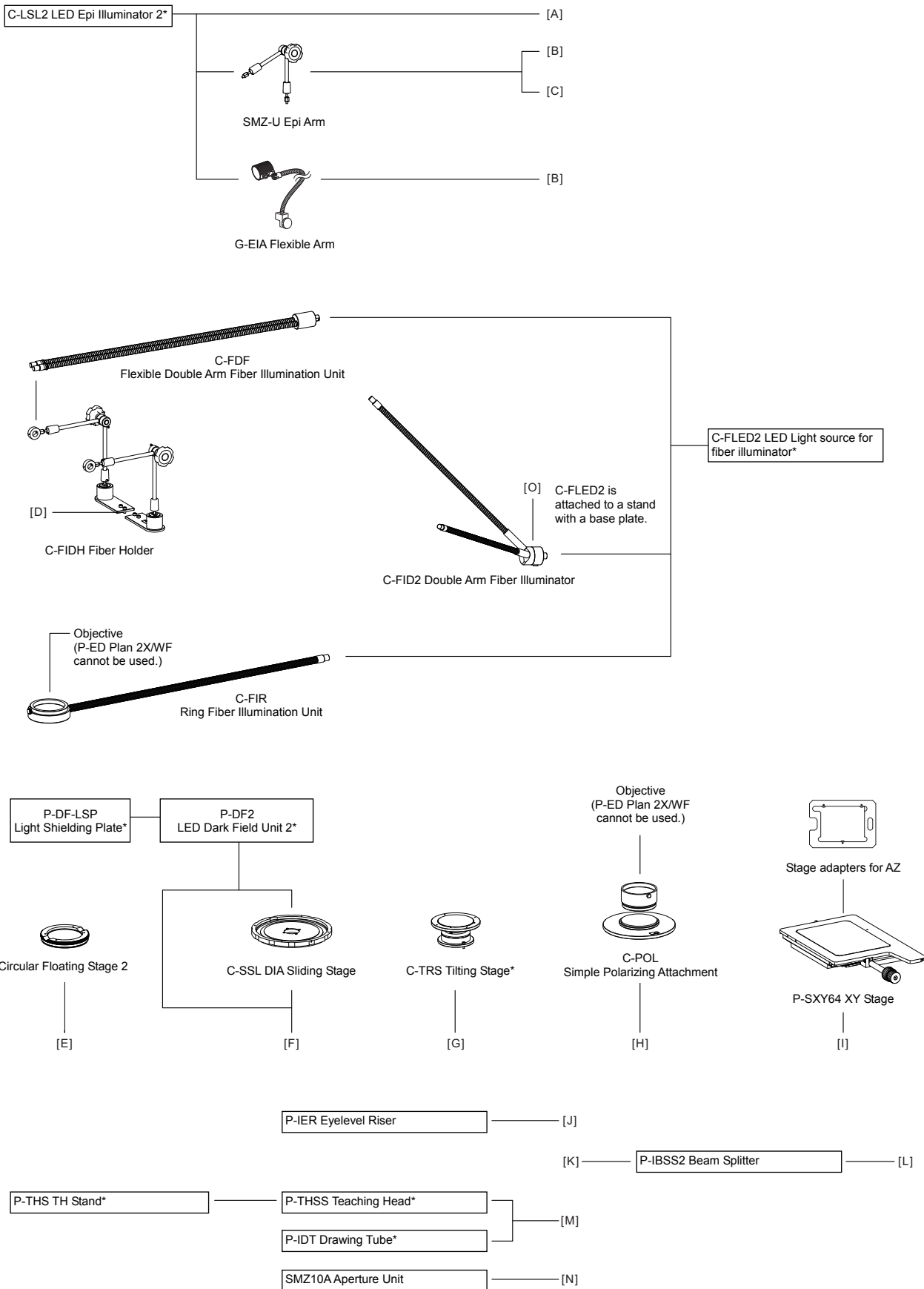
Tools	Devices that supply tools
Hex wrench (nominal designation: 2)	SMZ800N, SMZ1270, SMZ1270i Zooming Body
Hex wrench (nominal designation: 2.5)	P-SXY64 XY Stage
Hex wrench (nominal designation: 3)	P-SXY64 XY Stage
Hex wrench (nominal designation: 4)	C-FIDH Fiber Holder, C-PSN/C-PSCN Plain Stand
Hex wrench (nominal designation: 5)	P-SXY64 XY Stage
Hex driver (nominal designation: 2)	P-DSF32 Fiber Diascopic Illumination Stand
Hex driver (nominal designation: 2) (support pillar fit-in type)	P-PS32 Plain Stand, P-DSL32 LED Diascopic Illumination Stand, P-DSF32 Fiber Diascopic Illumination Stand
Spanner wrench (nominal designation: 10)	C-FIDH Fiber Holder

1 System Configuration



The instruction manual is supplied with the products marked with an asterisk (*).

Chapter 5 Assembly



The instruction manual is supplied with the products marked with an asterisk (*).

(Note 1) A P-TERG100 trinocular tube, a P-TERG50 trinocular tube or an epi-fluorescence attachment cannot be used together with the microscope system that includes a C-PSN/C-PSCN Plain Stand, a C-DS Dia Illumination Stand or a C-LEDS Hybrid LED Stand.

(Note 2) This nosepiece can be used together with the microscope system that includes a C-FMAN/C-FMBN Focus Mount, or a C-LEDS Hybrid LED Stand.

2

Device List

Select one device from each group marked with “√” and configure the basic microscopy system.

Device	Name	Model	Basic System Configuration	Remarks
Main Body	Zooming Body	SMZ800N	√	
	Zooming Body	SMZ1270		
	Zooming Body	SMZ1270i		
Focus Mount	Focus Mount	C-FMAN	√	
	Focus Mount	C-FMBN		
	Focus Mount	C-FMCN		
Nosepiece	Intelligent Nosepiece	P-RNI2	Optional	Unusable with the C-FMAN/C-FMBN or C-LEDS
	Nosepiece	P-RN2		
Objective	Objective	P-Achro 0.5X	√	Unusable with the SMZ1270/1270i
	Objective	P-ED Plan 0.75X		
	Objective	P-Plan 1X		
	Objective	P-ED Plan 1.5X/WF		
	Objective	P-ED Plan 2X/WF		
	Objective	P-Plan Apo 0.5X/WF		
	Objective	P-Plan Apo 0.75X/WF		
Stand, Stage (including products that contain the diascope illumination function)	Plain Stand	P-PS32	√	
	LED Diascopic Illumination Stand	P-DSL32		
	Fiber Diascopic Illumination Stand	P-DSF32		
	Plain Stand	C-PSN		
	Compact Plain Stand	C-PSCN		
	Dia Illumination Stand	C-DS		
	Hybrid LED Stand	C-LEDS		
	Universal Table Clamp Stand	G-US1A		
	Universal Table Stand	G-US2		
	Universal Stand	US-3		
	XY Stage	P-SXY64	Optional	
	Stage adapters for AZ	Various types	Optional	
	DIA Sliding Stage	C-SSL	Optional	
	Circular Floating Stage	2	Optional	
	Tilting Stage	C-TRS	Optional	
	LED Dark Field Unit 2	P-DF2	Optional	
	Light Shielding Plate	P-DF-LSP	Optional	
	Simple Polarizing Attachment	C-POL	Optional	Not attachable to the P-ED Plan 2X/WF
Tube	Binocular Tube	P-B	√	Unusable with the C-PSN/C-PSCN or C-LEDS
	Trinocular Tilting Tube	P-TERG100		
	Trinocular Tilting Tube	P-TERG50		
	Trinocular Tube	P-T 100		
Eyepiece	Eyepiece	C-W 10XB	√	
	Eyepiece	C-W 15X		
	Eyepiece	C-W 20X		
	Eyepiece	C-W 30X		
Episcopic Illuminator	Coaxial Epi Illuminator	P-CI	Optional	1/4 λ plates (optional, for objectives of 1x or less and for 1.5x objectives)
	Flexible Double Arm Fiber Illumination Unit	C-FDF	Optional	
	Fiber Holder	C-FIDH	Optional	
	Double Arm Fiber Illuminator	C-FID2	Optional	
	LED Epi Illuminator 2	C-LSL2	Optional	
	SMZ-U Epi Arm		Optional	
	Flexible Arm	G-EIA	Optional	
Ring Fiber Illumination Unit	C-FIR	Optional	Not attachable to the P-ED Plan 2X/WF	

Chapter 5 Assembly

Device	Name	Model	Basic System Configuration	Remarks
Epi Fluorescence Attachment	Epi Fluorescence Attachment	P-EFL	Optional	Unusable with the C-PSN/C-PSCN or C-LEDS With three empty cubes and a shielding plate
	Filter Cube	P-EFL GFP-B	Optional	
		P-EFL GFP-L	Optional	
		P-EFLC	Optional	
P-EFLBF		Optional	1/4 λ plates (optional, for objectives of 1x or less and for 1.5x objectives)	
Light Source	HG Precentered Fiber Illuminator	C-HGFI	Optional	Light source for P-EFL
	HG Precentered Fiber Illuminator	C-GHFIE	Optional	Light source for P-EFL
	LED Light source for fiber illuminator	C-FLED2	Optional	Light source for P-CI, P-DSF32, C-FDF, C-FID2 and C-FIR
	LED Unit for Dia Illumination Stand 2	C-DSLU2	Optional	Light source for C-DS
Control Box	Control Box	P2-CTLB	Optional	Power supply when not connecting an AC adapter to P-DSL32
Others	Teaching Head	P-THSS	Optional	
	TH Stand	P-THS	Optional	
	Drawing Tube	P-IDT	Optional	
	SMZ10A Aperture Unit		Optional	
	Beam Splitter	P-IBSS2	Optional	
	Eyelevel Riser	P-IER	Optional	
	DS cameras		Optional	

3 Assembly Procedures

The stereo microscopes SMZ800N/SMZ1270/SMZ1270i Zooming Bodies are the system microscopes that can be used in various device configurations.

This chapter describes the basic device assembly procedures. See figures in Chapter 1, “Components” for basic configuration examples. This chapter also describes the assembly procedures for various optional devices such as illuminators that can be added to the basic configuration.

Before starting assembling, see “2 Device List” and check the devices to be used.

3.1 Assembly of the Basic System

1 Install a stand.

Install a stand on a flat and stable table or a working table in the position that has no influence from vibration.

See the instruction manual supplied with the following stands:

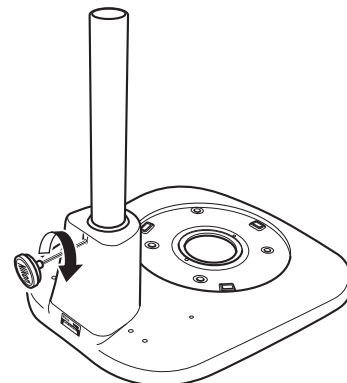
- C-DS Dia Illumination Stand
- C-LEDS Hybrid LED Stand
- G-US1A Universal Table Clamp Stand
- G-US2 Universal Table Stand
- US-3 Universal Stand

■ Support pillar attachment to the stand

[P-PS32 Plain Stand,
P-DSL32 LED Diascopic Illumination Stand,
P-DSF32 Fiber Diascopic Illumination Stand]

Attach a support pillar supplied with the stand to the stand. The procedure for attaching the support pillar is the same for all stand types.

Insert the support pillar to the stand and tighten the clamp screw on the rear side using the hex driver supplied with the support pillar (The hex driver is located at the top of the support pillar).



Securely attaching the support pillar

✔ C-EP Support

When attaching not the supplied support pillar, but a long-type C-EP Support, do it in the same way as instructed above.

■ Stage plate attachment

A transparent glass stage plate or acrylic stage plate is supplied with the stand in accordance with the types of stands.

The acrylic stage plate has black and milky white surfaces. Attach the stage plate with the surface appropriate for the sample up.

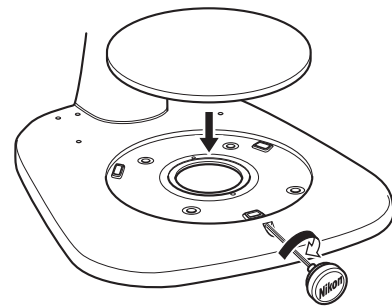
⚠ Glass stage plate handling precautions

Be very careful when handling the glass stage plate. Attach all other components before attaching the glass stage plate in order to avoid the risk of breaking the glass during assembly.

**[P-PS32 Plain Stand,
P-DSL32 LED Diascopic Illumination Stand,
P-DSF32 Fiber Diascopic Illumination Stand]**

Attach the stage plate supplied with the stand to the base. The procedure for attaching the stage plate is the same for all stand types.

- (1) First loosen the M4 set screw for the stage plate located at the middle front of the stand's base using a hex driver (nominal designation: 2).
- (2) Tilt the stage plate and attach it so that it fits the base, and then tighten the fixing screw.



Securely attaching the stage plate

! Note on fixing a glass stage plate in place

Do not tighten the fixing screw too much to fix the glass stage plate in place to prevent the glass from being damaged or broken.

✓ Sliding mechanism

There is a clearance gap of approximately 3 mm for the sliding mechanism, around the stage plate when the stage is securely set.

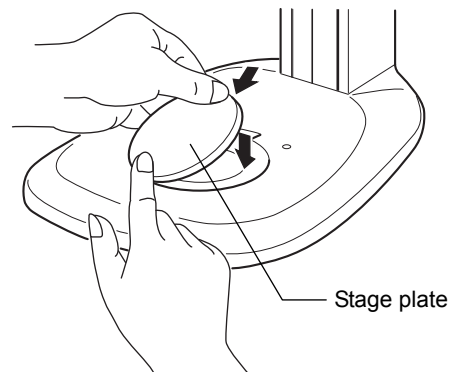
[C-PSN/C-PSCN Plain Stand]

Attach the stage plate supplied with the stand to the base.

Insert the stage plate tilted toward the front, and push in the rear side while holding the front side.

The stage plate is securely attached by the spring.

Instead of the standard stage plate, an antistatic plate (ESD stage plate) can be attached by following the same procedure.



Attaching the stage plate

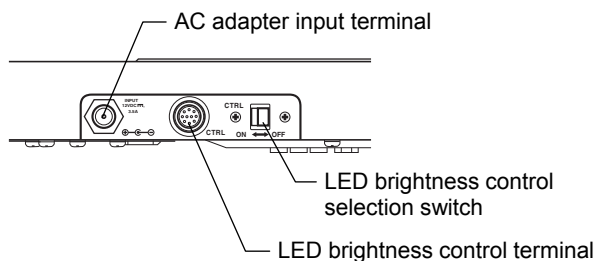
■ P-DSL32 LED Diascopic Illumination Stand cable connection (Connection of the power supply to diascope illumination)

• When not using a control box:

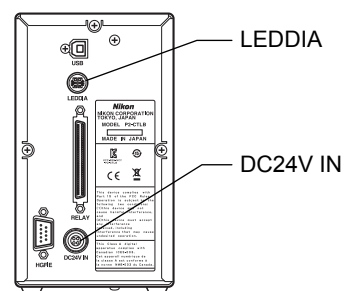
Connect a 12 V AC adapter to the AC adapter input terminal on the left side of the stand's base, and then connect the power cord.

• When using a control box:

Connect the LED brightness control terminal "CTRL" on the left side of the stand's base to the connector "LEDDIA" on the rear side of the control box. Use the CTRL cable supplied with the control box. Connect the 24 V AC adapter to DC24V IN of the control box, and then connect the power cord.



Left side of the base



Rear side of the P2-CTLB

⚠ Beware of overhang of cables

When these cables are connected, the connectors (cables) overhang to the left of the base. Be careful so that they do not interfere with other devices such as a control box or they are not accidentally touched and disconnected while attaching devices or performing observation.

Use the power cord specified in Chapter 8, “2 Performance Properties.”

⚠ WARNING

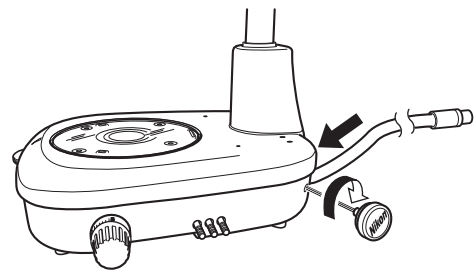
Before connecting the power cord

To prevent electric shock, be sure to turn off the power switch (press it to the “O” position) at the front of the base before connecting the power cord to the adapter.

■ Fiber attachment to the P-DSF32 Fiber Diascopic Illumination Stand

Insert a hex driver (nominal designation: 2) in the fiber fixing screw hole at the right rear side of the base and loosen the internal fixing screw (M4 set screw). Insert the fiber to the rear side of the base until it reaches the limit and tighten the fixing screw.

Firmly insert the other end of the fiber into the fiber attachment hole of the C-FLED2 LED Light Source for Fiber Illuminator. See the instruction manual for the light source for details.

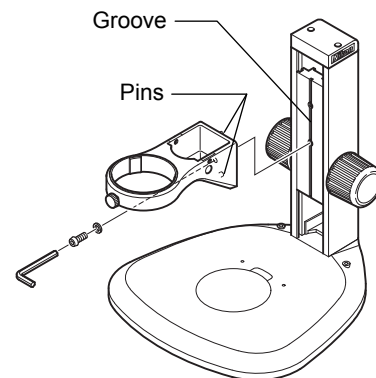


Securely attaching the fiber

■ C-PSN/C-PSCN Plain Stand’s arm position change

The arm of the C-PSN/C-PSCN Plain Stand can be attached to a lower position.

Loosen the arm attachment screw and attach the arm to the lower screw hole position on the vertical slider using the hex wrench (nominal designation: 4) supplied with the stand. The arm can be attached to the position 55 mm lower than the standard. Check that two pins of the arm are fitted in the groove of the vertical slider before tightening the fixing screw.



Arm position change

2 Attach a focus mount.

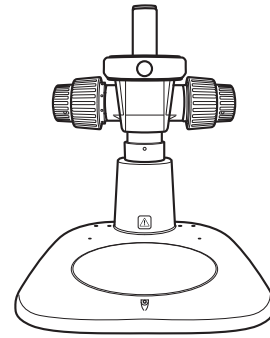
■ C-FMCN Focus Mount attachment

The C-FMCN Focus Mount can be attached to the following stands:

- P-PS32 Plain Stand
- P-DSL32 LED Diascopic Illumination Stand
- P-DSF32 Fiber Diascopic Illumination Stand

[Focus mount orientation]

Attach the focus mount to the stand so that the focus mount faces the front of the stand as shown in the figure.

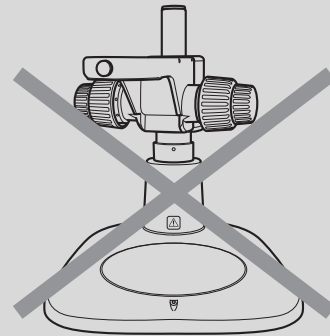


Correct orientation of the focus mount

⚠ CAUTION

Incorrect orientation of the focus mount

If the focus mount is attached in the incorrect orientation, the stand may fall over. This may result in damage to the device or unexpected injury. Do not attach the focus mount if the focus mount does not face the front of the stand as shown in the figure.

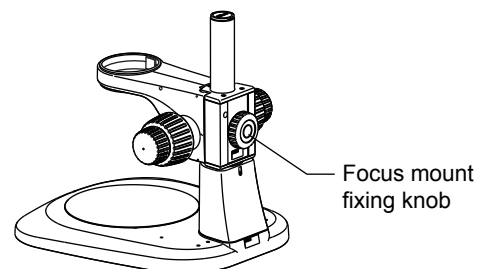


Incorrect focus mount orientation

[Focus mount attachment position]

(1) Standard position

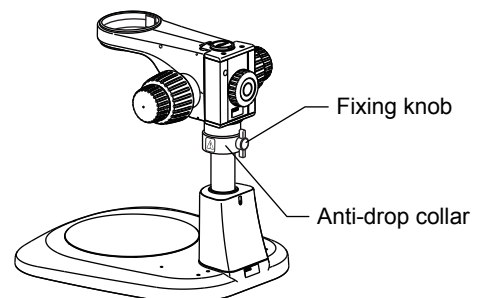
Insert the focus mount until it reaches the lower limit of the support pillar, and tighten the focus mount fixing knob on the rear side.



Securely attaching the focus mount

2) Position higher than the standard

Attach the supplied anti-drop collar so that it fits the support pillar with the convex side up as shown in the figure, and tighten the fixing knob on the rear side at the required position. Then, insert the focus mount until it reaches the anti-drop collar, and tighten the fixing knob on the rear side of the focus mount.



Securely attaching the anti-drop collar

⚠ CAUTION**Use of the anti-drop collar**

When using a C-FMCN Focus Mount attached in the middle of the support pillar, be sure to use the anti-drop collar. Otherwise the zooming body may slide down when the focus mount fixing screw is loosened. This may result in injury such as pinching fingers between the objective and sample, or damage to the sample on the stage plate by the objective.

■ C-FMBN/C-FMAN Focus Mount Attachment

The C-FMBN Focus Mount can be attached to the following stands:

- G-US1A Universal Table Clamp Stand
- G-US2 Universal Table Stand

C-FMAN Focus Mount can be attached to the following stand:

- US-3 Universal Stand

Refer to the instruction manual supplied with the stand for how to attach the focus mount.

✔ Stand with a vertically movable arm

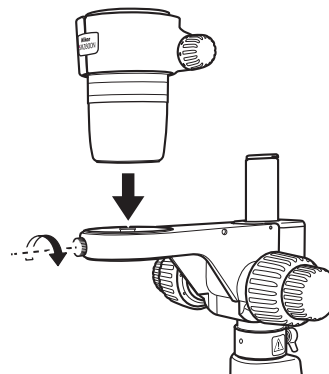
The C-PSN/C-PSCN Plain Stand, C-DS Dia Illumination Stand and C-LEDS Hybrid LED Stand is equipped with a vertically movable arm.

The focus mount is not required to be attached.

3 Attach a zooming body.

Attach a zooming body to the focus mount or to the vertically movable arm of the stand. The procedure for attaching a zooming body is the same for all types.

Loosen the zooming body fixing screw of the focus mount or vertically movable arm, and then insert the zooming body into the abutting joint. Place the zooming body so that its name plate faces the front, and then gently tighten the zooming body fixing screw to attach the zooming body.



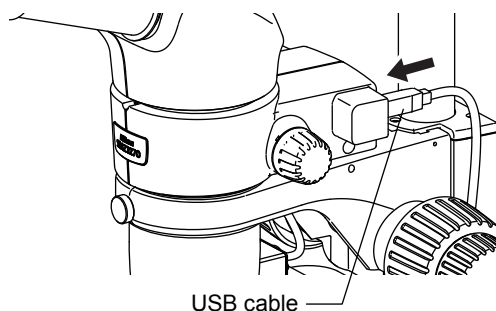
Securely attaching the zooming body

⚠ Caution when attaching the zooming body

Do not forcibly tighten the zooming body fixing screw. This may cause malfunction.

■ USB cable connection to SMZ1270i

When an SMZ1270 Zooming Body is attached, connect a DS-L3/DS-L4 camera control unit or a PC (NIS-Elements) to the connector on the rear right side of the SMZ1270i using a USB cable.



Connecting the USB cable

4 Attach a tube.

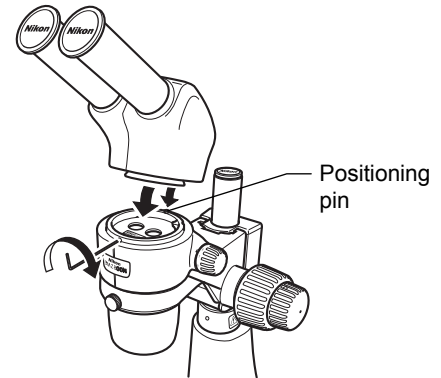
⚠ Note on device combinations

A P-TERG100 or P-TERG50 trinocular tube cannot be used in the microscope system that includes any of the following stands:

- C-PSN/C-PSCN Plain Stand
- C-DS Dia Illumination Stand
- C-LEDS Hybrid LED Stand

Attach a tube to the zooming body. The procedure for attaching a tube is the same for all types.

- (1) Completely loosen the M4 set screw for the tube at the upper front of the zooming body using a hex wrench (nominal designation: 2).
- (2) Align the positioning groove on the rear of the round dovetail at the bottom of the tube with the positioning pin on the rear of the round dovetail groove at the zooming body upper plane so that they fit, and then tighten the fixing screw.

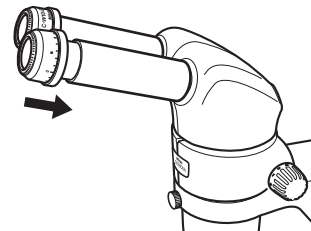


Securely attaching the tube

5 Attach eyepieces.

Attach eyepieces to the tube.

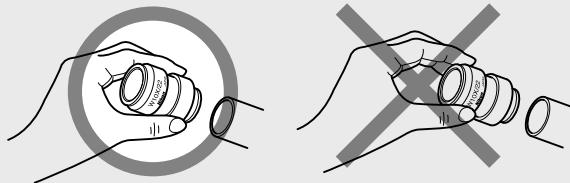
Use two eyepieces of the same magnification. Completely insert them into the tube until they touch the edge plane of the tube sleeve.



Attaching the eyepieces

⚠ Caution when attaching the eyepieces

Pay attention when inserting a 10x eyepiece because a rubber cover is attached to the 10x eyepiece so the eyepiece end is not visible. To prevent malfunction, hold the rubber cap when inserting the 10x eyepiece. Do not hold the diopter adjustment ring when inserting it.

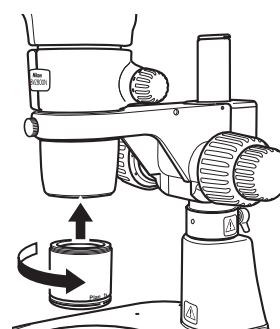


6 Attach an objective.

Attach the objective to be used to the zooming body. The procedure for attaching an objective is the same for all types.

Screw the objective into the objective attachment screw hole at the lower plane of the zooming body.

Insert it straight from the bottom and securely screw it until it touches the abutting joint.



Attaching the objective

⚠ Restriction

P-Achro 0.5X, P-ED Plan 0.75X and P-Plan 1X cannot be used with the SMZ1270/SMZ1270i.

The basic system assembly is complete.

1 Attach a nosepiece.

⚠ Note on device combinations

The nosepiece cannot be used in combination with the microscope system that includes any of the following devices:

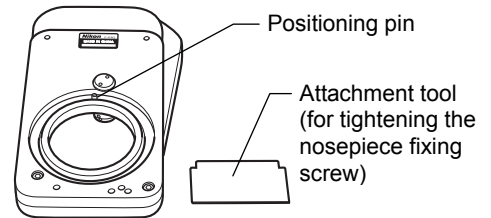
- C-FMAN/C-FMBN Focus Mount
- C-LEDS Hybrid LED Stand

To use two objectives, attach a nosepiece to the zooming body.

Attach a nosepiece before performing 3.1, step 6 “Install an objective.”

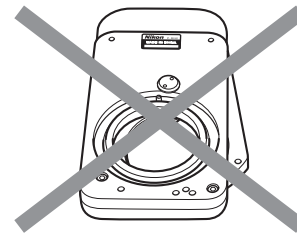
The P-RN2 Nosepiece is intended for the SMZ800N Zooming Body or the SMZ1270 Zooming Body, and the P-RN12 Intelligent Nosepiece is intended for the SMZ1270i Zooming Body. The procedure for attaching a nosepiece is the same for both types.

- (1) First check that the nosepiece is in the stereoscopic view state as shown in the figure.



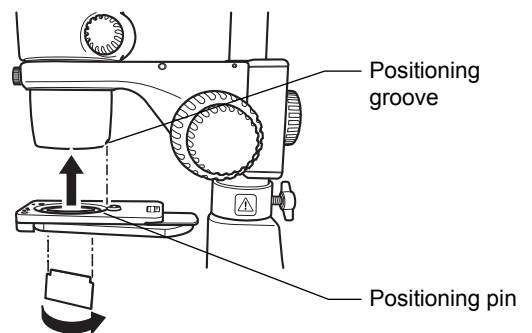
**Nosepiece in the stereoscopic view state
(The P-RN2 is used as an example.)**

Note that the nosepiece in the vertical view state as shown in the figure cannot be attached.



**Nosepiece in the vertical view state
(Attachment not possible in this state)**

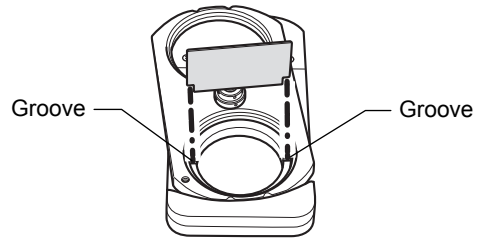
- (2) Align the positioning pin for attaching the nosepiece with the positioning groove at the bottom rear of the zooming body so that the nosepiece fixing screw fits the objective fixing screw at the bottom of the zooming body. Insert the attachment tool along the two grooves from the bottom of the nosepiece and tighten the nosepiece fixing screw to securely attach the nosepiece by turning the attachment tool.



Securely attaching the nosepiece

ⓘ Attachment tool

Be sure to insert the attachment tool straight along the two grooves of the nosepiece. Check the groove positions by referring to the figure “Nosepiece viewed from the bottom.” If the tool is inserted at an angle, the convex part of the tool contacts the objective, resulting in scratches or damage to the objective.



Nosepiece viewed from the bottom

■ Cable connection to P-RNI2

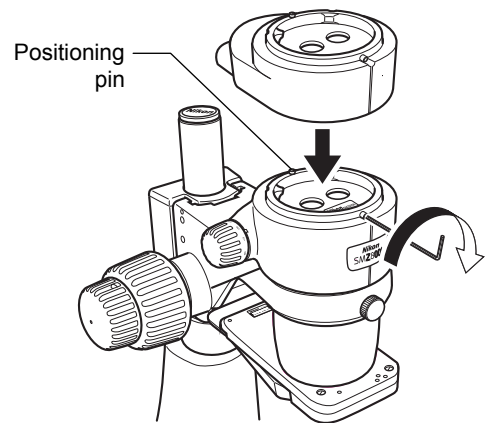
When a P-RNI2 Intelligent Nosepiece is attached, connect the P-RNI2 connector to the connector on the rear left side of the SMZ1270i Zooming Body.

After attaching the nosepiece, attach objectives by following 3.1, step 6 “Attach an objective.”

2 Attach a P-CI Coaxial Epi Illuminator.

Attach a coaxial epi illuminator after performing 3.1, step 3 “Attach a zooming body.”

- (1) First completely loosen the M4 set screw for the illuminator at the upper front of the zooming body using a hex wrench (nominal designation: 2).
- (2) Align the positioning groove on the rear of the round dovetail at the bottom of the coaxial epi illuminator with the positioning pin on the rear of the round dovetail groove at the zooming body upper plane so that they fit, and then tighten the fixing screw.



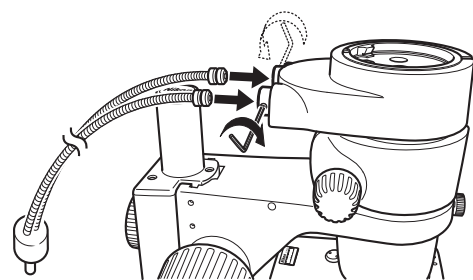
Securing attaching the coaxial epi illuminator

■ Fiber attachment

First loosen the M4 set screws for the fiber on the side plane of the two fiber attachment holes on the rear side of the coaxial epi illuminator using a hex wrench (nominal designation: 2). Insert the fiber to the attachment hole until it reaches the limit and then tighten the fixing screw.

Insert the other end of the fiber into the fiber attachment holes of the C-FLED2 LED Light source for fiber illuminator.

Refer to the instruction manual for the light source for details.



Securely attaching the LED fiber

■ 1/4 λ plate attachment (optional)

There are two types of 1/4 λ plates: a 1/4 λ plate for objectives of 1x or less, and a 1/4 λ plate for 1.5x objectives. Both types of 1/4 λ plates are screwed in the tip of the objective when used.



1/4 λ plate

After attaching the coaxial epi illuminator, continue assembly by following from 3.1, step 4 “Attach a Tube.”

3 Attach a P-EFL Epi Fluorescence Attachment.

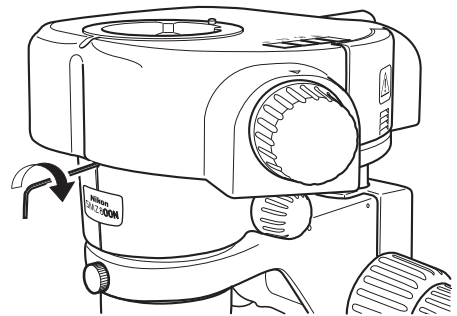
⚠ Note on device combinations

The P-EFL Epi Fluorescence Attachment cannot be used in the microscope system that includes any of the following stands:

- C-PSN/C-PSCN Plain Stand
- C-DS Dia Illumination Stand
- C-LEDS Hybrid LED Stand

Attach an epi fluorescence attachment after performing 3.1, step 3 “Attach a zooming body.”

- (1) Completely loosen the M4 set screw for the illuminator at the upper front of the zooming body using a hex wrench (nominal designation: 2).
- (2) Align the positioning groove on the rear of the round dovetail at the bottom of the epi fluorescence attachment with the positioning pin on the rear of the round dovetail groove at the zooming body upper plane so that they fit, and then tighten the fixing screw.



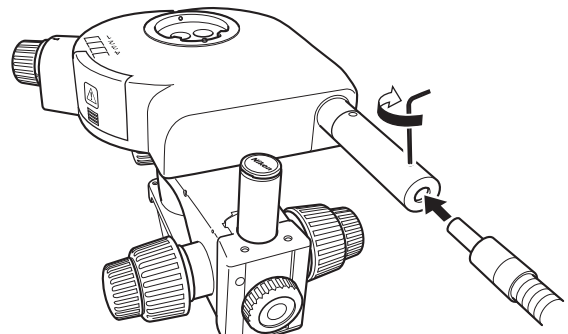
Securely attaching the epi fluorescence attachment

■ HG fiber attachment

Loosen the M4 set screw for the HG fiber on the top of the HG fiber attachment hole on the rear side of the epi fluorescence attachment using a hex wrench (nominal designation: 2).

Insert the emission side tip of the HG fiber to the attachment hole until it reaches the limit and tighten the fixing screw.

Firmly insert the source side connector to the HG fiber attachment hole of the C-HGFI or C-HGFIE HG Precentered Fiber Illuminator. See the instruction manual for the light source for details.



Securely attaching the HG fiber

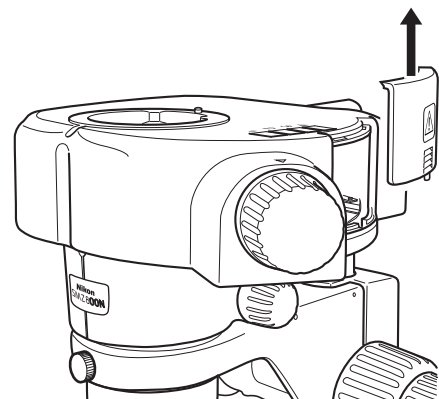
■ Filter cube attachment

Attach a filter cube to the turret inside the epi fluorescence attachment. Up to four filters can be attached.

⚠ Do not touch the surface of the filter with bare hands

Scratches or fingerprints on the filter surface will degrade microscope images. Handle the filter cube carefully.

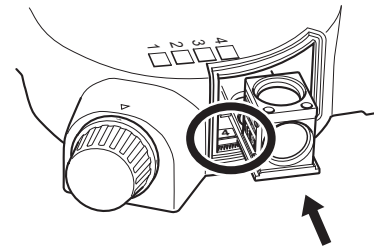
- (1) Remove the filter cube replacement hole cover on the right side of the epi fluorescence attachment (as viewed from the front). Push it upward to remove.



Removing the filter cube replacement cover

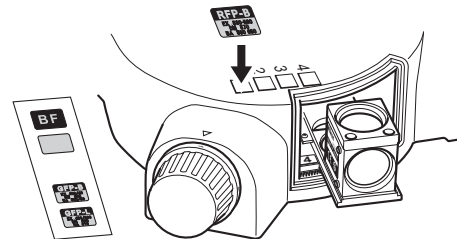
- (2) Align the dovetail groove of the filter cube with the internal dovetail and insert the filter cube until it reaches the limit. The installation positions are numbered from [1] to [4] and are shown on the left inside of the filter cube attachment hole.

! **Be sure to attach four cubes to the turret.**
 Attach an empty cube to the position to which no filter cube is attached.



Attaching the filter cube

- (3) Affix the filter cube indication label.
 Labels indicating the type of filter cube are supplied with the epi fluorescence attachment. It is useful to identify the type with the labels. Affix a label indicating the type of attached filter cube to the label attachment position at the top of the filter cube attachment hole. Numbers 1 through 4 are indicated next to the label indents. Affix a label for the attached filter cube to the indent corresponding to the filter cube address. A plain label is supplied with the P-EFLC Filter Cube. Write information on the filter to the plain label when using the P-EFLC.



Affixing a label indicating the type of the filter cube

- * Label "RFP"
 The supplied filter cube labels used in common with other devices include a label "RFP" that is not used for the P-EFL Epi Fluorescence Attachment. Do not use the label "RFP."

- (4) Return the cover of the filter cube replacing hole to the original position.

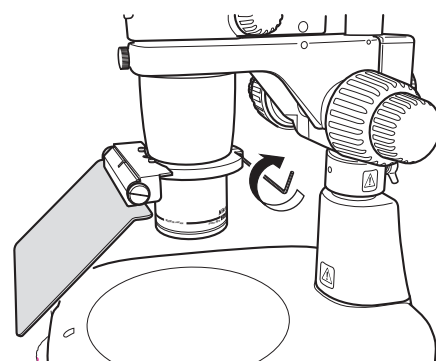
■ **1/4 λ plate attachment (optional)**

When using a P-EFLBF Filter Cube, screw the optional 1/4 λ plate in the tip of the objective.

■ **Shielding plate attachment**

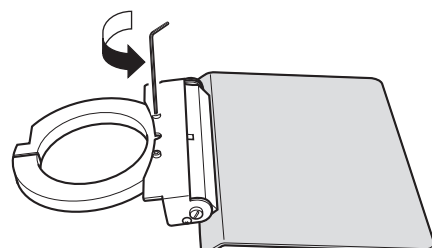
Attach the shielding plate to the objective or the nosepiece.

- Attachment to the objective
 Align the ring of the shielding plate with outer periphery of the objective, and tighten the M2.5 hexagon socket head bolt on the rear side of the ring using a hex wrench (nominal designation: 2) to secure the shielding plate.



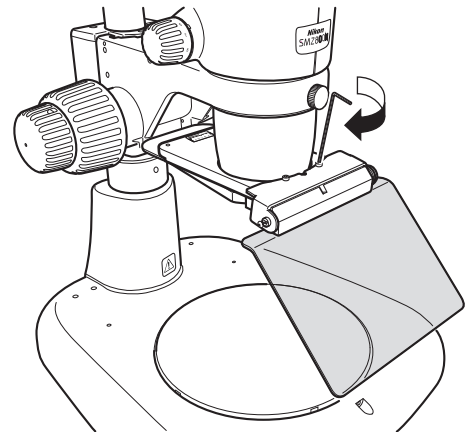
Securely attaching the shielding plate

- Attachment to the nosepiece
 (1) Separate the ring attached to the light shielding plate. The ring is attached to the light shielding plate with the two M2.5 hexagon socket head bolts. Remove them using a hex wrench (nominal designation: 2).



Removing the ring from the light shielding plate.

- (2) Align two screw holes on the upper plane of the nosepiece with the screw holes on the shielding plate, and securely attach the shielding plate using the two M2.5 hexagon socket head bolts used for attaching the ring.



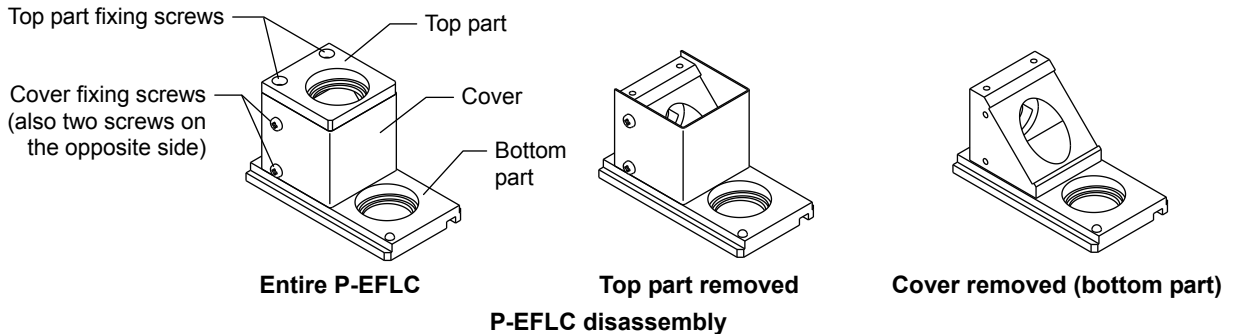
Securely attaching the shielding plate

■ Filter and mirror attachment to the P-EFLC Filter Cube

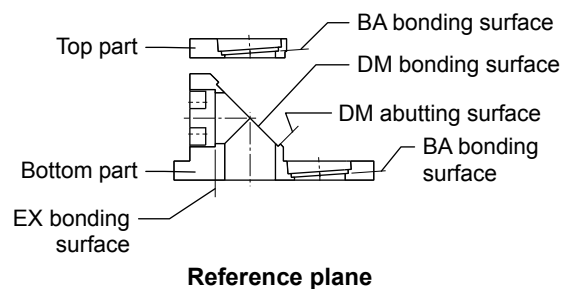
Filters of the following sizes and a mirror of the following size can be attached to the P-EFLC Filter Cube:

- Excitation filter (EX): External diameter 18 mm, Thickness 8 mm or less
- Dichroic mirror (DM): Dimensions 18 mm x 26 mm, Thickness 1 mm or less
- Barrier filter (BA): External diameter 18 mm, Thickness 3.8 mm or less

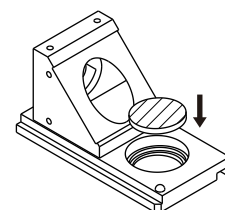
- (1) Remove the top part and cover from the P-EFLC.
 - 1) Loosen and remove the two top part fixing screws from the top surface of the filter cube to take off the top part.
 - 2) Loosen and remove the four cover fixing screws from the right and left sides of the filter cube to take off the cover.



* See the section view on the right for the reference plane of each part.

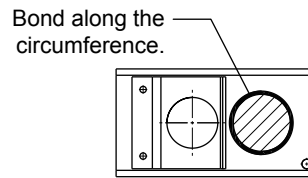


- (2) Bond to attach the barrier filter to the bottom part.
 - 1) Push the barrier filter into the position shown in the figure of the bottom part until it hits the bonding surface. Observe the manufacturer's instructions for the orientation of the barrier filter.



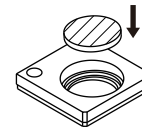
Barrier filter setting - 1

- 2) Fill in the gap between the bottom part and the barrier filter with adhesive.

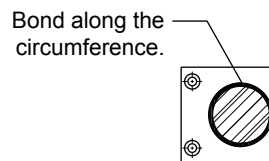


Barrier filter bonding - 1

- (3) Bond to attach the barrier filter to the top part.
 - 1) Push the barrier filter into the position shown in the figure of the top part until it hits the bonding surface. Observe the manufacturer's instructions for the orientation of the barrier filter.
 - 2) Fill in the gap between the top part and the barrier filter with adhesive.

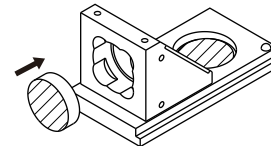


Barrier filter setting - 2

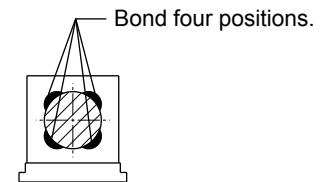


Barrier filter bonding - 2

- (4) Bond to attach the excitation filter.
 - 1) Push the excitation filter into the position shown in the figure of the bottom part until it hits the bonding surface. Observe the manufacturer's instructions for the orientation of the excitation filter.
 - 2) Fill in the four bonding positions of the bottom part with adhesive to bond the excitation filter to the bottom part.

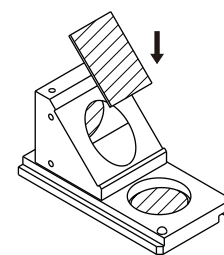


Excitation filter setting



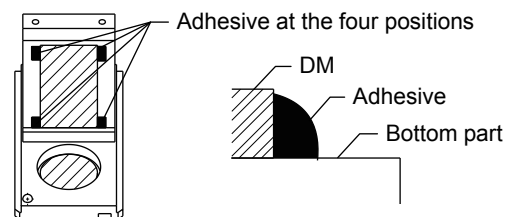
Excitation filter setting

- (5) Bond to attach the dichroic mirror.
 - 1) Place the dichroic mirror so that its evaporated surface contacts the bonding surface and the side touches the abutting surface.



Dichroic mirror setting

- 2) Place the dichroic mirror at the center of the bonding surface and place adhesive at the four bonding positions shown in the figure.

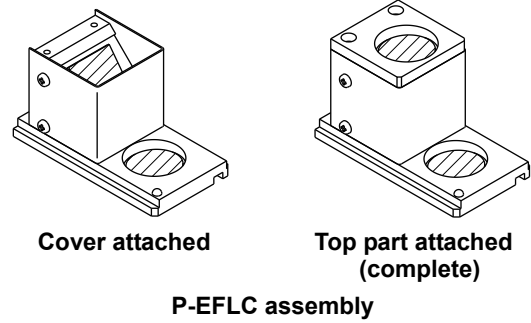


Dichroic mirror bonding

✓ Adhesive application

- Make sure that the adhesive does not seep in between the dichroic mirror and the bonding surface.
- Adhesive must not leak from the bottom part.

- (6) Assembling each part of the P-EFLC.
- 1) Securely attach the cover to the bottom part by tightening the four screws on the sides.
 - 2) Securely attach the top part by tightening the two screws on the top.



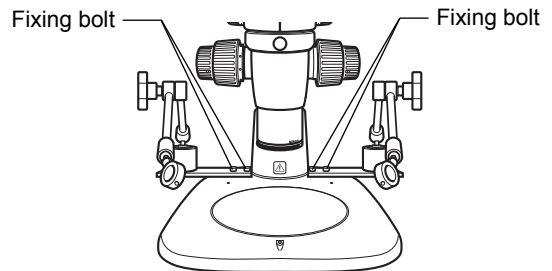
After attaching the epi fluorescence attachment, continue the assembly by following the procedure from 3.1, step 4 “Attach a tube.”

4 Attach a C-FDF Flexible Double Arm Fiber Illumination Unit.

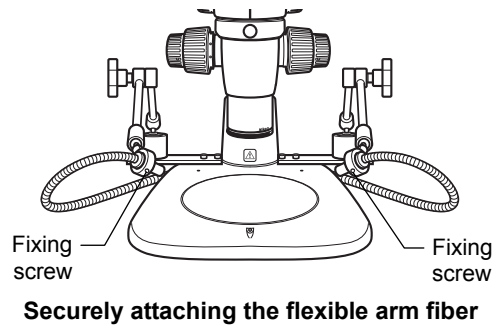
Attach a flexible double arm fiber illumination unit to a P-PS32 Plain Stand, P-DSL32 LED Diascopic Illumination Stand or P-DSF32 Fiber Diascopic Illumination Stand.

Attach fiber holders using the tool holes on the base to hold the fiber. The procedure for attaching holders is the same for all stand types.

- (1) Attach a holder of the C-FIDH Fiber Holder to the right and left rear sides of the base. Two bolt holes are located on each side. Tighten four M5 hexagon socket head bolts using a hex wrench (nominal designation: 4).



- (2) Insert the flexible double arm fiber tip into the ring at the arm end, and tighten the M4 set screw for the fiber using a hex driver (nominal designation: 2).
- (3) Firmly insert the fiber source side connectors into the fiber attachment holes on the C-FLED2 LED Light Source. See the instruction manual for the light source for details.



5 Attach a C-FID2 Double Arm Fiber Illuminator.

Attach a double arm fiber illuminator to a P-PS32 Plain Stand, P-DSL32 LED Diascopic Illumination Stand, P-DSF32 Fiber Diascopic Illumination Stand, C-PSN Plain Stand or C-PSCN Compact Plain Stand.

See the instruction manual for the C-FLED2 LED Light source for fiber illuminator for details on how to attach the illuminator.

6 Attach a C-FIR Ring Fiber Illumination Unit.

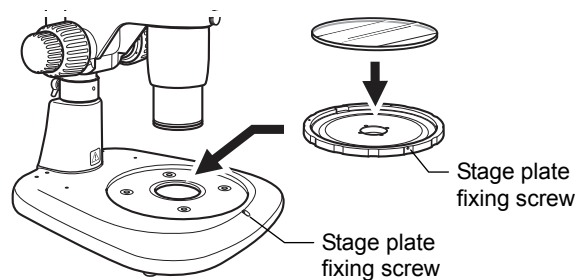
Attach a ring fiber illumination unit to a P-Achro 0.5X, P-ED Plan 0.75X, P-Plan 1X, P-ED Plan 1.5X/WF, P-Plan Apo 0.5X/WF, P-Plan Apo 0.75X/WF or P-Plan Apo 1X/WF.

See the instruction manual for the C-FLED2 LED Light source for fiber illuminator for details on how to attach the unit.

7 Attach a C-SSL DIA Sliding Stage.

Attach a DIA sliding stage to a P-PS32 Plain Stand, P-DSL32 LED Diascopic Illumination Stand, P-DSF32 Fiber Diascopic Illumination Stand or C-DS Dia Illumination Stand.

- (1) Loosen the M4 set screw for the stage plate on the base using a hex driver (nominal designation: 2) to remove the stage plate.
- (2) Attach the C-SSL DIA Sliding Stage to the base so that it fits, and tighten the stage plate fixing screw.
- (3) Attach the stage plate removed in Step (1) to the C-SSL DIA Sliding Stage.
- (4) Tighten the stage plate fixing screw for the C-SSL DIA Sliding Stage.

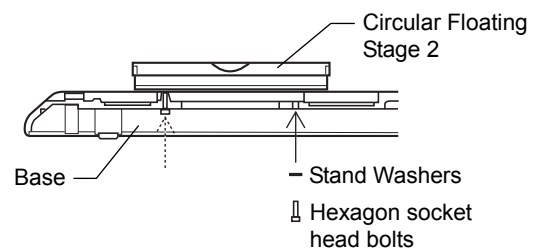


Securely attaching the C-SSL DIA Sliding Stage

8 Attach a Circular Floating Stage 2.

Attach a Circular Floating Stage 2 to a P-PS32 Plain Stand, C-PSN Plain Stand or C-PSCN Compact Plain Stand.

- (1) Remove the stage plate from the base.
- (2) Place a Circular Floating Stage 2 so that it fits the base, and then securely attach it by tightening two M2.5 hexagon socket head bolts and washers from the base surface of the stand using a hex wrench (nominal designation: 2) or a hex driver (nominal designation: 2).
- (3) Attach the stage plate removed in step (1) to the Circular Floating Stage 2.
When using a P-PS32 Plain Stand, use a 90-dia. stage plate separately.



Securely attaching the Circular Floating Stage 2

✔ Circular Floating Stage 2 attachment

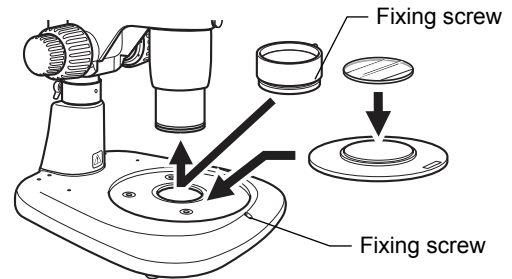
The Circular Floating Stage 2 can be attached by fitting it into the base of the C-PSN/C-PSCN. Nikon recommends securely attaching the stage by tightening bolts.

9 Attach a C-POL Simple Polarizing Attachment.

Attach a simple polarizing attachment to a P-DSL32, a P-DSF32 or a C-DS stand.

This simple polarizing attachment cannot be used with a P-ED Plan 2X/WF.

- (1) Loosen the M4 set screw for the stage plate of the base using a hex driver (nominal designation: 2) to remove the stage plate, and alternatively place the base plate of the polarizer so that it fits the base.
- (2) Determine the orientation of the polarizer and tighten the stage plate fixing screw.
- (3) Place the stage glass (90 mm dia.) supplied with the polarizer attachment on the polarizer.
- (4) Loosen the fixing screw of the analyzer. Insert the analyzer into the objective end until it reaches the limit, and tighten the fixing screw.



Securely attach a simple polarizing attachment

✔ Directly placing the polarizer

When a polarizing attachment is used, the periphery becomes dark in the low zoom magnification range. To reduce vignetting, remove the stage glass and directly place the polarizer.

Drop the polarizer removed from the polarizer section into the position on the base or the stand where the diffuser was removed. Use the original stage plate supplied with the base.

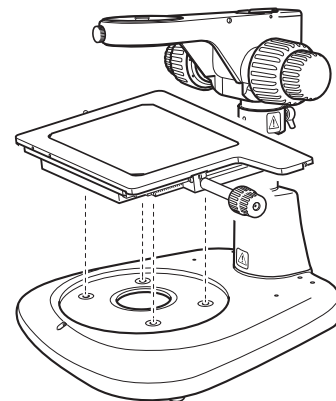
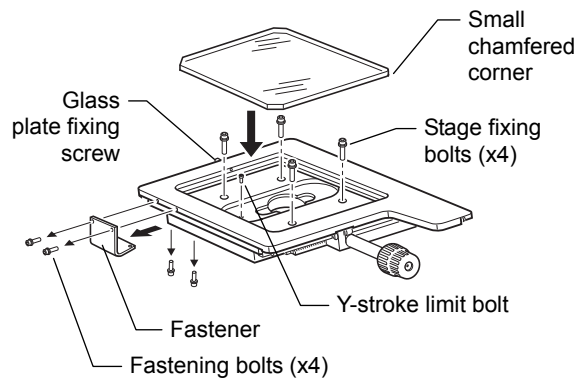
The polarizer cannot be placed directly on the C-DS Dia Illumination Stand.

10 Attach a P-SXY64 XY Stage.

Attach an XY stage to a P-PS32, a P-DSL32 or a P-DSF32 stand.

- (1) Remove the fastener for the stage. Loosen the four M4 hexagon socket head bolts for the stage using a hex wrench (nominal designation: 3).
- (2) Loosen the M4 set screw for the stage plate on the base using a hex driver (nominal designation: 2) to remove the stage plate.
- (3) Screw the Y-stroke limit bolt supplied with the P-SXY64 in the stage. Use a hex wrench (nominal designation: 2.5) when tightening the M3 hexagon socket head bolt.
- (4) Attach the P-SXY64 Stage using the four screw holes that are located under the stage plate attachment position.

Move the upper plate of the P-SXY64 to align the installation holes on the lower plate with the screw holes, insert the four M6 hexagon socket head bolts and firmly tighten them using a hex wrench (nominal designation: 5).



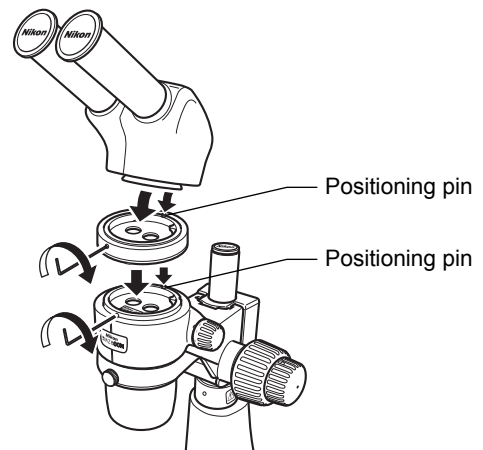
Securely attaching the P-SXY64

- (5) Attach the glass plate supplied with the P-SXY64 XY Stage so that it fits the upper plate of the stage. The glass plate has chamfered corners including one small chamfered corner. Align the small chamfered corner with the right rear side of the stage (as viewed from the front) to fit the glass plate on the stage, and tighten the glass plate fixing screw.

11 Attach an SMZ10A Aperture Unit.

Attach the SMZ10A Aperture Unit after performing the previous section 3.1, step 3, Attach a zooming body.

- (1) Completely loosen the M4 set screw at the upper front of the zooming body using a hex wrench (nominal designation: 2).
- (2) Align the positioning groove at the bottom of the aperture unit with the positioning pin on the rear of the round dovetail groove at the zooming body upper plane so that they fit, and then tighten the fixing screw.
- (3) Attach a tube on top of the aperture unit. Align the positioning groove with the positioning pin of the aperture unit in the same way as the previous section 3.1, step 4, and tighten the tube fixing screw on the aperture unit to securely attach the tube.



Securely attaching the aperture unit

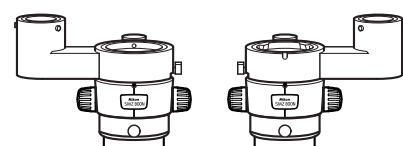
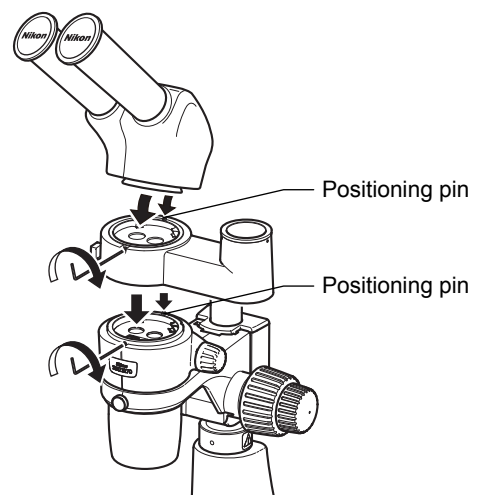
✔ Using together with a coaxial epi illuminator

When using the SMZ10A Aperture Unit together with the coaxial epi illuminator, first attach the SMZ10A Aperture Unit, and then attach the coaxial epi illuminator on top.

12 Attach a P-IBSS2 Beam Splitter.

Attach the P-IBSS2 Beam Splitter after performing 3.1, step 3 "Attach a zooming body."

- (1) Completely loosen the M4 set screw for fixing the tube on top front of the zooming body using a hex wrench (nominal designation: 2).
- (2) Align the positioning groove at the bottom of the beam splitter with the positioning pin on the rear of the round dovetail groove on the zooming body upper plane so that they fit, and then tighten the fixing screw.
The port of the P-IBSS2 can be placed both on the right and the left sides.
- (3) Attach a tube on the beam splitter. Align the positioning groove of the tube with the positioning pin of the beam splitter to attach a tube in the same way as the previous section 3.1, step 4. Tighten the tube fixing screw of the beam splitter to fix the tube in place.



P-IBSS2 port position

Securely attaching the beam splitter

13 Attach a P-IER Eyelevel Riser

Notes on combination

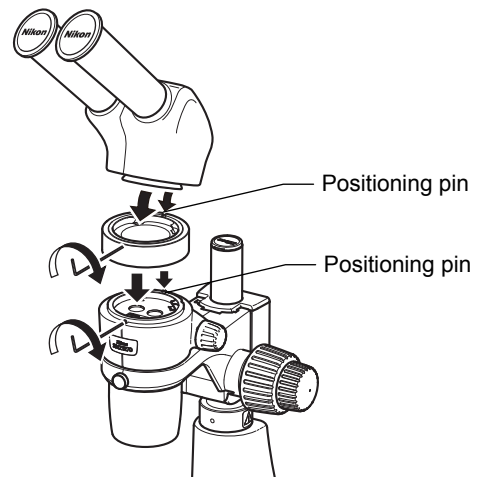
Do not use more than two eyelevel risers at once or together with other intermediate tubes such as a beam splitter or a coaxial episcopic illuminator. Doing so will cause vignetting around the image.

Attach the P-IER Eyelevel Riser after performing 3.1, step 3 "Attach a zooming body."

- (1) Completely loosen the M4 set screw for fixing the tube on top front of the zooming body using a hex wrench (nominal designation: 2).
- (2) Align the positioning groove at the bottom of the eyelevel riser with the positioning pin on the rear of the round dovetail groove on the zooming body upper plane so that they fit, and then tighten the fixing screw.

Also in the same way, attach two eyelevel risers in piles.

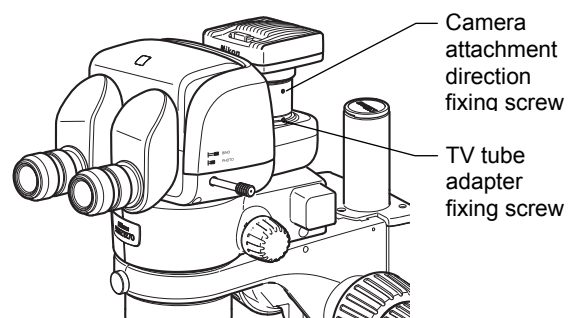
- (3) Attach a tube on the eyelevel riser.
Align the positioning groove of the tube with the positioning pin of the eyelevel riser to attach a tube in the same way as the previous section 3.1, step 4.
Tighten the tube fixing screw of the eyelevel riser to fix the tube in place.



Securely attaching the eyelevel riser

14 Attach a camera.

- (1) Screw the C-mount lens in the DS camera, attach the DS camera head to the LV-TV TV Tube Adapter, and then tighten the camera attachment direction fixing screw on the TV tube adapter.
- (2) Loosen the TV tube adapter fixing screw located on the tube side mount, attach the TV tube adapter, determine the DS camera head orientation, and then tighten the TV tube adapter fixing screw.
- (3) Connect the camera cable connector of the DS camera head to the connector "CAMERA" of the DS-L3/DS-L4/DS-U3 camera control unit using a dedicated camera cable.



Securely attaching the camera

15 Attach other devices.

In addition to the above devices from 1 to 14, the following devices can be used. For details on attaching each device, refer to the relevant instruction manuals.

- C-TRS Tilting Stage
- C-LSL2 LED Epi Illuminator 2
- P-DF2 LED Dark Field Unit 2
- P-THSS Teaching Head
- P-IDT Drawing Tube

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Chapter

6

Troubleshooting

Misuse of the microscope can adversely affect performance even if the microscope is functioning properly. If any of the problems described in this chapter occur, be sure to check the table for possible causes before requesting service.

If problems that are not listed in the table are detected or the problem still persists even after the indicated measures are taken, turn off the device and contact your nearest Nikon representative.

1

Image Viewing

Problem	Cause	Measure
Part of the field of view is missing. The field of view is invisible. The brightness of the field of view is not uniform. Images are dark.	Devices are not attached correctly.	Attach the devices correctly.
	The optical path switching lever of the tube is positioned partway.	Position the lever correctly.
	The nosepiece is not turned to the click position or is placed in the vertical view state.	Firmly turn the nosepiece to the click position for stereoscopic view to bring the objective into the optical path.
	The objective and/or sample is contaminated with dirt or dust.	Clean as needed.
	The light intensity of illumination is too low.	Adjust the light intensity to an appropriate level.
	The turret of the epi-fluorescence attachment is not at the correct position.	Set the turret at the correct position by turning the filter cube switching knob.
Dirty or dusty field of view	The objective is contaminated with dirt or dust.	Clean as needed.
	The sample is contaminated with dirt or dust.	Clean as needed.
One side of the image is blurred or images are distorted.	The stage is not attached horizontally.	Attach the stage correctly.
	A sample is tilted relative to the stage surface.	Correctly reposition the sample on the stage.

2

Operation

Problem	Cause	Measure
Even when looking with both eyes, an image does not appear as a single image.	The interpupillary distance has not been adjusted.	Adjust the interpupillary distance.
	The diopter has not been adjusted.	Adjust the diopter distance.
Eyes become fatigued.	The interpupillary distance has not been adjusted.	Adjust the interpupillary distance.
	The diopter has not been adjusted.	Adjust the diopter distance.
	Brightness is inadequate.	Adjust the brightness of the illumination.
Changing magnification results in large focal deviation.	The diopter has not been adjusted.	Adjust the diopter distance.
The focal deviation is large when objectives are switched.	The diopter has not been adjusted.	Adjust the diopter distance.
The torque of the focus knob is heavy.	The torque of the focus knob is too tight.	On devices with a torque adjustment ring, loosen the torque adjustment ring to some extent. On devices with a focus knob on both sides, turn the focus knobs in the direction for loosening the torque.
The focus becomes less sharp over time. The vertical position of the zooming body may slide due to various loads (such as its own weight or the load of the counterbalance spring inside the focus unit).	The torque of the focus knob is too loose.	On devices with a torque adjustment ring, tighten the torque adjustment ring to adjust the torque to an appropriate level. On devices with a focus knob on both sides, turn the focus knobs in the direction for tightening the torque.

Chapter

7

Maintenance and Storage

This chapter describes how to maintain and store the product.

1 Cleaning

Clean and disinfect the microscope and lenses as described in the procedures below.

■ Tools used for cleaning

- Blower
- Soft brush
- Soft cotton cloth, lens tissue, gauze, etc.
- Absolute alcohol (ethyl or methyl alcohol), medical alcohol

CAUTION

- Absolute alcohol used for cleaning is highly flammable. Be careful when handling these materials particularly around open flames or when turning the power switch on or off.
- Follow the instructions provided by the manufacturer when using absolute alcohol.
- When cleaning the product, do not use organic solvents (alcohol, ether, thinner, etc.) on the coated, plastic, or printed areas. Doing so will result in discoloration or peeling of the printed characters.

1.1 Cleaning Lenses

Keep the lens free of dust and fingerprints. Any contamination on the lenses or filters will reduce the image quality. If the lenses have become dirty, clean them as follows:

■ Cleaning light dirt (dust)

- (1) Use an air blower to blow off any dust.
- (2) If any dust remains, brush the dust off using a soft brush or gently wipe the dust off using a piece of gauze.

■ Cleaning tough dirt (fingerprints or grease)

Use a soft, clean cotton cloth, lens tissue, or gauze lightly dampened with absolute alcohol (ethyl or methyl alcohol) to wipe the dirt off.

Tips on wiping

Do not reuse cotton cloth, lens tissue, or gauze that has already been used.

1.2 Cleaning Parts Other than the Lens

■ Cleaning light dirt (dust)

Use a silicon cloth to clean the part.

■ Cleaning tough dirt (fingerprints or grease)

Lightly dampen a piece of gauze with a neutral detergent and gently wipe the dirt off.

1.3 Disinfecting the Product

For routine disinfection of this product, Nikon recommends using 70% medical alcohol.

Using organic solvents on plastic parts can cause discoloration.

✔ Cautions on disposal

If a sample contacts this product, check whether the sample is hazardous. If the sample is hazardous, follow the standard procedures established for your facility.

2 Storage

- Store this product in a dry location free of mold or mildew.
The storage conditions are as follows: temperature (-20°C to +60°C), humidity (90% RH max., no condensation).
- Place a cover over this product to protect it from dust.
- Switch off the device (press the switch to the “O” position). If the device is warm, wait for it to cool before covering it with a cover.

3 Periodic Inspection (Charged)

To maintain the performance of this product, Nikon recommends periodic inspection (chargeable service). Contact your nearest Nikon representative for details.

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Chapter

8

Specifications

1 Microscopy (Principles)

The microscope's objectives and optical zoom system enable the magnification of minute substances of samples placed on the stage such as metal, mineral, and cells, so that microscopy and image capturing are performed with the focus adjusted using the focus device.

■ Intended use of this product (for medical care)

This product is designed to be used for microscopic observation and photography of living cells, tissues and organisms. This product is intended primarily for observation of and experimentation on living cells and tissues by those in fields such as departments of obstetric, gynecology and dermatology, in hospitals. It is also used for observation of and experimentation on living cells, tissues and organisms (nematode, drosophila, etc.) in research facilities.

This product can also be used for microscopic observation and photography of metals, minerals, electronic parts, etc. using reflected illumination.

Note that the accuracy of the numeric information (such as magnifications or Z-position information) is not guaranteed.

These values are used as a reference and include a margin of error.

The product is classified as an in-vitro diagnostic medical device. **IVD**

■ Intended user

It is intended for the researchers, medical professional and those who work on experiments in the field of pathology and cytology.

2 Performance Properties

■ Stereo microscope

Name	Zooming body	Zooming body
Model	SMZ800N	SMZ1270/1270i
Zoom ratio	8:1	12.7:1
Magnification	1x to 8x	0.63x to 8x
Distance between optical axes	22 mm	22 mm
Max. NA	0.105 (with a 1x objective (f=100) at 8x zoom)	0.105 (with a 1x objective (f=100) at 8x zoom)
Focus mount	76 mm dia. mount	76 mm dia. mount
Tube mount	54 dia. round dovetail	54 dia. round dovetail
Objective mount	M58 x 1.25	M58 x 1.25
Zooming	Right/left single-axis knob Click stop: 2x, 3x, 4x, 5x, 6x, 7x; cancelable	Right/left single-axis knob Click stop: 1x, 2x, 3x, 4x, 6x, cancelable
Magnification detection	Not available	SMZ1270: Not available SMZ1270i: Available Magnification output by USB Display magnification range 0.1x (zoom range: 0.63x to 3x) 0.2x (zoom range: 3x to 6x) 0.5x (zoom range: 6x to 8x)

■ Focus mount

Name	Focus Mount	Focus Mount	Focus Mount
Model	C-FMAN	C-FMBN	C-FMCN
Vertical movement method	Through rotation of the right/left single-axis focus knob Knob torque adjustable	Through rotation of the right/left single-axis focus knob Knob torque adjustable	Through rotation of the right/left single-axis coarse/fine knob Coarse focus knob torque adjustable
Focusing stroke	40 mm	50 mm	50 mm (35 mm when attached to the stand's support pillar without an anti-drop collar)
Stroke per focus knob rotation	18.7 mm/rev	18.7 mm/rev	Coarse: 18.7 mm/rev Fine: 3.27 mm/rev
Mount inclination	Not possible	Possible (Angle of inclination: 180°)	Not possible
Supported stand	US-3 Universal Stand	<ul style="list-style-type: none"> • G-US1A Universal Table Clamp Stand • G-US2 Universal Table Stand 	<ul style="list-style-type: none"> • P-PS32 Plain Stand • P-DSL32 LED Diascopic Illumination Stand • P-DSF32 Fiber Diascopic Illumination Stand
Others	—	—	Anti-drop collar supplied

■ Stand

Name	Plain Stand
Model	C-PSN/C-PSCN
Focusing mechanism	With single-axis focus knobs on the support pillar Focusing stroke: 100 mm Stroke per focus knob rotation: 21.7 mm/rev Knob torque adjustable
Screw hole	Screw holes for optional devices
Stage plate	Black surface and milky white surface, acrylic, 90 mm dia. Attached to the base using a leaf spring Exchangeable for an ESD stage plate.
Arm position	55 mm movable (downward)
Attachable devices	<ul style="list-style-type: none"> • Stage clip • C-LSL2 LED Epi Illuminator 2 (attached directly or via a G-EIA Flexible Arm or SMZ-U Epi Arm) • C-FID2 Double Arm Fiber Illuminator • Circular Floating Stage 2 • C-TRS Tilting Stage
Others	The C-PSCN is a space-saving model with a small base.

* For details on the specification for the C-DS Dia Illumination Stand and C-LEDS Hybrid LED Stand, refer to the instruction manual supplied with the stands.

* For details on the specification for the US-3 Universal Stand, G-US1A Universal Table Clamp Stand and G-US2 Universal Table Stand, refer to the instruction manual supplied with the stands.

Chapter 8 Specifications

Name	Plain Stand	LED Diascopic Illumination Stand	Fiber Diascopic Illumination Stand
Model	P-PS32	P-DSL32	P-DSF32
Stage plate	Black surface and milky white surface, acrylic plate, 180 mm dia. Attached to the base using a fixing screw	Transparent glass plate, 180 mm dia. Attached to the base using a fixing screw	Transparent glass plate, 180 mm dia. Attached to the base using a fixing screw
Illumination optical systems	None	<ul style="list-style-type: none"> • Diascopic illumination using an LED light source (bright field, OCC) • With the LED power ON/OFF switch and brightness control dial, switchable LED brightness control • AC adapter input terminal • LED brightness control terminal • Power supply: Supplied from the 12 V AC adapter or P2-CTLB Control Box 	<ul style="list-style-type: none"> • Diascopic illumination through an external LED light source and fiber (bright field, OCC) • High/low magnification condenser lens: Switching type • Filter (NCB11, ND4, ND16): Removable • Light source: C-FLED2 LED Light Source for Fiber Illuminator (Refer to the instruction manual for the light source.)
Focusing mechanism	None	Support pillar vertical movement system using the focus dial on the base Focusing stroke: 6.2 mm Stroke per focus dial rotation: 3.24 mm	Support pillar vertical movement system using the focus dial on the base Focusing stroke: 6.2 mm Stroke per focus dial rotation: 3.24 mm
Attachable devices	<ul style="list-style-type: none"> • P-SXY64 XY Stage • Circular Floating Stage 2 (P-PS32 only) • C-SSL DIA Sliding Stage • P-DF2 LED Dark Field Unit 2 • C-TRS Tilting Stage • C-LSL2 LED Epi Illuminator 2 (via an SMZ-U Epi Arm) • C-FDF Flexible Double Arm Fiber Illumination Unit (via a C-FIDH Fiber Holder) • C-FID2 Double Arm Fiber Illuminator • C-POL Simple Polarizing Attachment (P-DSL32 and P-DSF32 only) 		
Others	<ul style="list-style-type: none"> • With the sliding mechanism • With the screw holes for optional devices • Dedicated hex driver located at the top of the support pillar • Support pillar exchangeable for a C-EP support (P-PS32: Approx. extra 100 mm, P-DSL32 and P-DSF32: Approx. extra 145 mm) 		

■ Tube

Name	Binocular Tube	Trinocular Tilting Tube	Trinocular Tube
Model	P-B	P-TERG100 P-TERG50	P-T100
Angle of depression	20°	0 to 30° (continuously changeable)	10°
Binocular/tube optical-path switching	None	Lever push-in/pull-out	Lever push-in/pull-out
Eye point	Height: Approx. 121 mm from the mount joint (when the interpupillary distance is 58 mm)	Variation: Approx. 90 mm (25 mm to 115 mm from the mount joint, approx. 106 mm when the binocular part is turned 180°)	Approx. 48 mm (Approx. 154 mm when the binocular part is turned 180°)
Field of view number	22	Binocular eyepiece tube: 22 Vertical tube: 18	Binocular eyepiece tube: 22 Vertical tube: 18
Others	—	Not usable in combination with a C-PSN/C-PSCN Plain Stand, a C-DS Dia Illumination Stand or a C-LEDS Hybrid LED Stand	—

■ Nosepiece

Name	Nosepiece	Intelligent Nosepiece
Model	P-RN2	P-RNI2
Function	<ul style="list-style-type: none"> • A double-hole nosepiece that can hold two objectives so that the objectives are switched during observation • The stereoscopic view and vertical view can be generated by shifting the objective position. • Attached to the objective mount of the zooming body. 	<ul style="list-style-type: none"> • A double-hole nosepiece that can hold two objectives so that the objectives are switched during observation • The stereoscopic view and vertical view can be generated by shifting the objective position. • Attached to the objective mount of the zooming body.
Objective mount	M58x1.25	M58x1.25
Status detection	—	Detect the objective mount address. Detected information is sent to a PC via the SMZ1270i using a USB.
Others	Not usable in combination with a C-FMAN/C-FMBN Focus Mount or C-LEDS Hybrid LED Stand	

■ Objective

Name	Objective	Objective	Objective	Objective
Model	P-Achro 0.5X	P-ED Plan 0.75X	P-Plan 1X	P-ED Plan 1.5X/WF
Magnification	0.5x	0.75x	1x	1.5x
Numerical aperture (max.)	0.053	0.079	0.105	0.158
Working distance	189 mm	117 mm	78 mm	44 mm
Objective mount	M58 x 1.25	M58 x 1.25	M58 x 1.25	M58 x 1.25

Name	Objective	Objective	Objective	Objective
Model	P-ED Plan 2X/WF	P-Plan Apo 0.5X/WF	P-Plan Apo 0.75X/WF	P-Plan Apo 1X/WF
Magnification	2x	0.5x	0.75x	1x
Numerical aperture (max.)	0.21	0.053	0.079	0.105
Working distance	35 mm	82.5 mm	107 mm	70 mm
Objective mount	M58 x 1.25	M58 x 1.25	M58 x 1.25	M58 x 1.25

■ Eyepiece

Name	Eyepiece	Eyepiece	Eyepiece	Eyepiece
Model	C-W10XB	C-W15X	C-W20X	C-W30X
Magnification	10x	15x	20x	30x
Field number	22	16	12.5	7

■ Episcopic illuminator

Name	Coaxial Epi Illuminator	Flexible Double Arm Fiber Illumination Unit	Ring Fiber Illumination Unit	Double Arm Fiber Illuminator
Model	P-CI	C-FDF	C-FIR	C-FID2
Magnification	1.5x	—	—	—
Episcopic illumination	<ul style="list-style-type: none"> • Episcopic illumination through a two-branch fiber • Light source: C-FLED2 LED Light Source for Fiber Illuminator (Refer to the instruction manual for the light source.) 	<ul style="list-style-type: none"> • Episcopic illumination through fiber branched into two • Light source: C-FLED2 LED Light Source for Fiber Illuminator (Refer to the instruction manual for the light source.) • Used together with a C-FIDH Fiber Holder 	<ul style="list-style-type: none"> • Episcopic illumination through fiber positioned like a ring • Light source: C-FLED2 LED Light Source for Fiber Illuminator (Refer to the instruction manual for the light source.) 	<ul style="list-style-type: none"> • Episcopic illumination through fiber branched into two • Light source: C-FLED2 LED Light Source for Fiber Illuminator (Refer to the instruction manual for the light source.)
Installation and related devices	Installed between the zooming body and the tube	<ul style="list-style-type: none"> • P-PS32 Plain Stand • P-DSL32 LED Diascopic Illumination Stand • P-DSF32 Fiber Diascopic Illumination Stand 	Screwed into the tip of the objective <ul style="list-style-type: none"> • Achro 0.5X • P-ED Plan 0.75X/WF • Plan 1X • P-Plan Apo 0.5X/WF • P-Plan Apo 0.75X/WF • P-Plan Apo 1X/WF 	<ul style="list-style-type: none"> • P-PS32 Plain Stand • P-DSL32 LED Diascopic Illumination Stand • P-DSF32 Fiber Diascopic Illumination Stand

■ Epi fluorescence attachment

Name	Epi Fluorescence Attachment
Model	P-EFL
Magnification	1x
Epi-fl illumination	<ul style="list-style-type: none"> • Attachment of filter cubes to the internal turret • Up to four filter cubes can be attached. • Turret switching: Knob rotation method • Light source: HG Precentered Fiber Illuminator C-HGFI/C-HGFIE (Refer to the instruction manual for the light source.)
Others	Not usable in combination with a C-PSN/C-PSCN Plain Stand, a C-DS Dia Illumination Stand or a C-LEDS Hybrid LED Stand

■ Control box

Name	Control Box
Model	P2-CTLB
AC adapter	24 V AC adapter
Function in this system	Power supply to the P-DSL32 LED Diascopic Illumination Stand, Illumination control from a PC (NIS-Elements) connected using a USB cable.

■ AC Adapter

Model	3-AC AC Adapter (Model name by the manufacturer: FSP040-RHAN2)	C-AC AC Adapter (Model name by the manufacturer: PW-120A2-1Y240G)
Manufacturer	FSP Group Inc.	POWER-WIN TECHNOLOGY CORP.
Input rating	100-240 VAC±10%, 1.5 A, 50-60 Hz	100-240 VAC±10%, 2-1 A, 50-60 Hz
Output rating	12 VDC, 3.33 A Max.	24 VDC, 5.0 A Max.

■ Power cable

Relevant device	P2-CTLB Control Box P-DSL32 LED Diascopic Illumination Stand 12 V AC adapter 3-AC (Model name by the manufacturer: FSP040-RHAN2) 24 V AC adapter C-AC (Model name by the manufacturer: PW-120A2-1Y240G)
When used in 100-120 V regions outside Japan	UL listed detachable power cable set, 3 conductor grounding (3 conductor grounding Type SVT, No.18 AWG, 3 m long maximum, rated at 125 VAC minimum)
When used in 220-240 V regions	EU/EN standard approved detachable power cord set, 3 conductor grounding (3 conductor grounding Type H05VV-F 1 mm ² , 3 m long maximum, rated at 250 VAC minimum)
When used inside Japan	PSE approved detachable power cable set, 3 conductor grounding (3 conductor grounding Type VCTF 3 x 0.75 mm ² , 3 m long maximum, rated at 125 VAC minimum)

3

Physical Properties

■ Stereo microscopes SMZ800N/SMZ1270/SMZ1270i

Operating conditions	<p>Temperature: 0°C to +40°C</p> <p>Humidity: 60% RH max. at 40°C (no condensation)</p> <p>Altitude: 2,000 m max.</p> <p>Pollution level: Degree 2</p> <p>Overvoltage Category: Category II</p> <p>Electrical shock protection class (AC Adapter): Class I</p> <p>Indoor use only</p>
Transport/ storage conditions	<p>Temperature: -20°C to +60°C</p> <p>Humidity: 90% RH max. (no condensation)</p>
External dimensions (W x H x L) and mass (reference)	<p>Dimensions and mass vary depending on the composition described in Chapter 1, "Components."</p> <p>SMZ800N Zooming Body system: 292 mm x 376 mm x 387 mm, approx. 5.5 kg</p> <p>SMZ1270 Zooming Body system: 300 mm x 402 mm x 420 mm, approx. 6.5 kg</p>
Safety Standards	<ul style="list-style-type: none"> • CE Marking <ul style="list-style-type: none"> • IVD Directive This equipment complies with the emission and immunity requirements of IEC/EN 61326-2-6. • Low Voltage Directive • EMC Directive • C-UL-US Listed • FCC Part 15 Subpart B Class A <p>Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.</p> <p>These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.</p> <p>This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.</p> <p>Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.</p> <ul style="list-style-type: none"> • CAN ICES-003(A) / NMB-003(A) • Australian EMI (AS/NZS CISPR11)



■ AC Adapter

Model name	3-AC AC Adapter (Model name by the manufacturer: FSP040-RHAN2)	C-AC AC Adapter (Model name by the manufacturer: PW-120A2-1Y240G)
Operating environment	<p>Temperature: 0°C to +40°C</p> <p>Humidity: 10 to 90% RH (no condensation)</p> <p>Altitude: 5,000 m max.</p> <p>Pollution level: Degree 2</p> <p>Overvoltage Category: Category II</p> <p>Electrical shock protection class: Class I</p> <p>Indoor use only</p>	<p>Temperature: 0°C to +40°C</p> <p>Humidity: 10 to 90% RH (no condensation)</p> <p>Altitude: 5,000 m max.</p> <p>Pollution level: Degree 2</p> <p>Overvoltage Category: Category II</p> <p>Electrical shock protection class: Class I</p> <p>Indoor use only</p>
Storage environment	<p>Temperature: -20°C to +75°C</p> <p>Humidity: 5 to 95% RH (no condensation)</p>	<p>Temperature: -20°C to +85°C</p> <p>Humidity: 10 to 90% RH (no condensation)</p>
External dimensions	110 (L) x 50 (W) x 32 (H) mm	170 (L) x 64.8 (W) x 38.5 (H) mm
Mass (reference)	Approx. 210 g (without the power cord)	Approx. 650 g (without the power cord)
Safety standards	CE marking, GS mark, C-UL-US Listed, PSE mark	CE marking, GS mark, C-UL-US Listed, PSE mark