

Nikon

Microscope
ECLIPSE E1000M/E1000
Instructions

Thank you for purchasing this Nikon product. This instruction manual is for users of the Nikon Microscope ECLIPSE E1000M and E1000. To ensure correct usage read this manual carefully before operating the instrument.

- It is prohibited to alter this manual in whole or in part without expressed permission.
- The contents of this manual are subject to change without notice.
- Although every effort has been made to ensure the accuracy of this manual, if you find anything that is unclear or incorrect, contact your nearest Nikon representative.
- Some of the parts that appear in this manual may not be included in the system you have bought.
- Also be sure to read the instruction manual for the power supply that you are using, the V-PS100DU-2 or the V-PS100E.

Warning/Caution Symbols in This Manual

Though Nikon products are designed to provide you with utmost safety during use, incorrect usage or disregard of the instructions may cause personal injury or property damage. For your own safety, read the instruction manual carefully and thoroughly before using the product. Do not discard this manual. Always keep it near the product for easy reference.

Inside this instruction manual, safety instructions are indicated with the symbols shown below. Be sure to follow the instructions marked with these symbols for your safety.

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

Symbol Labels Attached to the Product

Symbol	Contents
	Be aware of the danger of fire and burns, as products/parts with this symbol may become extremely hot during use.



WARNING

1. Intended product use

This microscope should only be used for microscopic observation. Do not use this microscope for any other purpose.

2. Do not disassemble

Attempting to disassemble this product could result in electric shock or damage. Never attempt to disassemble any portion of the microscope unless the procedure is described in this instruction manual. If you have any problems with the microscope, contact your nearest Nikon representative.

3. Confirm the input voltage

Make sure that the input voltage indicated on the back panel of the power supply is the same as the voltage provided in your region. If the indicated voltage is different, do not use the power supply; rather, contact your nearest Nikon representative immediately. If the power supply is used with the wrong input voltage, a short circuit or fire may result, and the power supply and any connected equipment may be damaged.

If you are using the V-PS100DU-2 power supply, set the voltage switch on the back panel of the unit to the voltage supplied in your region.

4. Use the specified fuse

If the power supply fuse blows, replace it with the specified fuse. (See the manual for the power supply.) Using the wrong fuse could result in damage or fire.

In order to prevent electric shock, always turn the power switch on the power supply off (flip it to the "O" side) and unplug the power cord before replacing the fuse.

5. Use the specified power cord

Always use a power cord that is rated for the voltage used in your area and that has been approved under local safety standards. Using the wrong power cord could result in damage or fire. The protection Class I equipment should be connected to PE (protective earth) terminal.

- For 100–120 V AC area UL listed, detachable power cord set, 3-conductor grounding Type SVT, No. 18 AWG, 3 m long maximum, rated at 125 V AC minimum.

In case of using the extension cord, use only the power supply cord with the PE (protective earth) wire.

- For 220–240 V AC area Approved according to EU/EN standards, 3 conductor grounding Type H05VV-F, 3 m long maximum, rated at 250 V AC minimum.

In case of using the extension cord, use only the power supply cord with the PE (protective earth) wire.

In order to prevent electric shock, always turn the power switch on the power supply off (flip it to the "O" side) before connecting the power cord.

 **WARNING**

6. Heat from the light source

The lamp and the lamphouse become extremely hot when the lamp is on. To avoid burns, do not touch the lamphouse when the lamp is on or for at least thirty minutes after the lamp has been turned off.

Furthermore, in order to avoid the risk of fire, do not place any fabrics, paper, or highly flammable materials such as gasoline, benzene, paint thinner or alcohol near the lamphouse when the lamp is on or for at least thirty minutes after the lamp has been turned off.

 **CAUTION**

1. Check the light source

The V-PS100DU-2 and V-PS100E-2 power supplies provide power for the halogen lamp that serves as the microscope light source. Although these power supplies can power a halogen lamp of up to 12 V-100 W, the specified lamp and lamphouse must be used. The equipment could be damaged if a non-specified combination of components is used.

Specified lamphouse: Nikon halogen lamphouse, C-LP HALOGEN 12 V 100 W

**Specified lamp: Halogen lamp, 12 V-100 W LONGLIFE
(OSRAM HLX 64623 or PHILIPS 7724)**

2. Turn off the power when connecting or disconnecting cables or when replacing the lamp

In order to prevent electric shock or damage to the equipment, always turn the power switch on the power supply off (flip it to the "O" side) and unplug the power cord before connecting or disconnecting cables or replacing the lamp.

3. Cautions when replacing the lamp

In order to prevent burns, allow the lamp to cool (for at least thirty minutes after the lamp has been turned off) before replacing the lamp.

Furthermore, in order to prevent electric shock or damage to the equipment, always turn the power switch on the power supply off (flip it to the "O" side) and unplug the power cord before replacing the lamp.

After replacing the lamp, make sure that the lamphouse cover is securely closed. Never use the lamphouse when its cover is open.

4. Electrically operated parts

Some parts of this microscope are electrically driven. Do not touch these parts while they are moving.

Moving parts of the E1000M when it is electrically driven:

Field diaphragm dial (rotating), aperture diaphragm dial (rotating), motorized revolving nosepiece (rotating), motorized micro/macro condenser (rotating), and macro stage (up/down movement)

Moving parts of the E1000 when it is electrically driven:

Field diaphragm dial (rotating), aperture diaphragm dial (rotating), motorized revolving nosepiece (rotating), and stage (up/down movement)



CAUTION

5. Be careful not to get injured in stage operations

The stage rack may stick out as a result of stage operations. Be careful not to strike your hand against the rack when you are turning the filter levers, the focus knobs, the condenser focus knob, or the aperture diaphragm dial, as the edge of the rack may injure you.

6. Do not wet

If the microscope or the power supply becomes wet, a short circuit may result and the equipment could be damaged or become extremely hot. If you accidentally spill a liquid on the equipment, immediately turn the power switch on the power supply off (flip it to the "O" side) and unplug the power cord. Then use a dry cloth to wipe away the moisture. If any liquid should get inside the equipment, do not use it; rather, contact your nearest Nikon representative.

7. Weak electromagnetic waves

This microscope emits weak electromagnetic waves. The accuracy of any precision electronic equipment may be adversely affected if it is positioned near this microscope. If this microscope affects TV or radio reception, move the radio or TV away from the microscope.

8. Notes on installation

Be careful not to get your hands or fingers caught in the equipment when installing the microscope.

This microscope is a precision optical instrument, and using or storing it under unsuitable conditions may damage it or adversely affect its precision. See "Installation location" on page 31, and use this microscope in a suitable environment.

9. Notes on transport

Because this microscope is a precision optical device, handle it carefully. Do not subject it to strong physical shocks. (The precision of the objective in particular may be adversely affected by even weak physical shocks.)

When moving the microscope, first detach the lamphouse. Then have at least two people carry the microscope, one on each side, using the carrying handles.

Be sure to screw the carrying handles in as far as they will go, and make sure that they are secure. If the carrying handles are not attached securely, they could come loose or break off while the microscope is being carried, creating a hazardous situation. Screw the carrying handles into the upper holes on the rear of the microscope. If you use the lower holes, your hands may get caught between the handles and the table when you place the microscope down. (Page 31)

In addition, do not grasp the coarse focus knob, fine focus knob, eyepiece tube, stage, etc., when carrying the microscope, as there is a chance that this part could come off, and the equipment could be damaged.

Contents

Symbol Labels Attached to the Product	i
Warning/Caution Symbols in This Manual	i
⚠ WARNING	ii
⚠ CAUTION	iii
I Names of Component Parts	2
II Microscopic Procedure	6
III Operation of Each Part	11
1 Electric Macro Slider (Macro Auxiliary Lens)	11
2 Condenser	11
3 Aperture Diaphragm	13
4 Field Diaphragm	15
5 Diopter Adjustment	15
6 Interpupillary Distance Adjustment	16
7 Coarse Focus Knob/Fine Focus Knob	16
8 Objective Selector Switch	17
9 Inputting of Objective Focal Position	19
10 Optical Path Selection of the Trinocular Eyepiece Tube	20
11 Filters	20
12 Stage	22
13 Preset Voltage Switch (for Photomicrography)	24
14 Liquid-Immersion Operation	24
15 Use of the Smart Card	27
IV Assembly	29
V Communications	41
VI Troubleshooting	42
1 Viewing and control systems	42
2 Electrical system	45
VII Care and Maintenance	48
1 Cleaning the lenses	48
2 Cleaning painted components	48
3 Storage	48
4 Regular inspections	48
5 Recycling of Nickel-Cadmium battery	49
VIII Electrical Specifications	50
Bar Code List (Separate volume)	

I

II

III

IV

V

VI

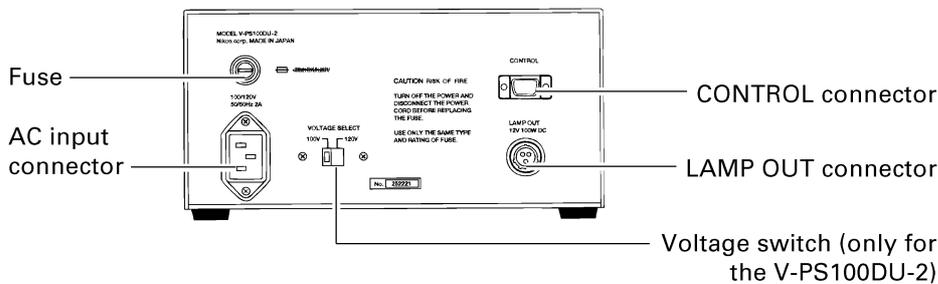
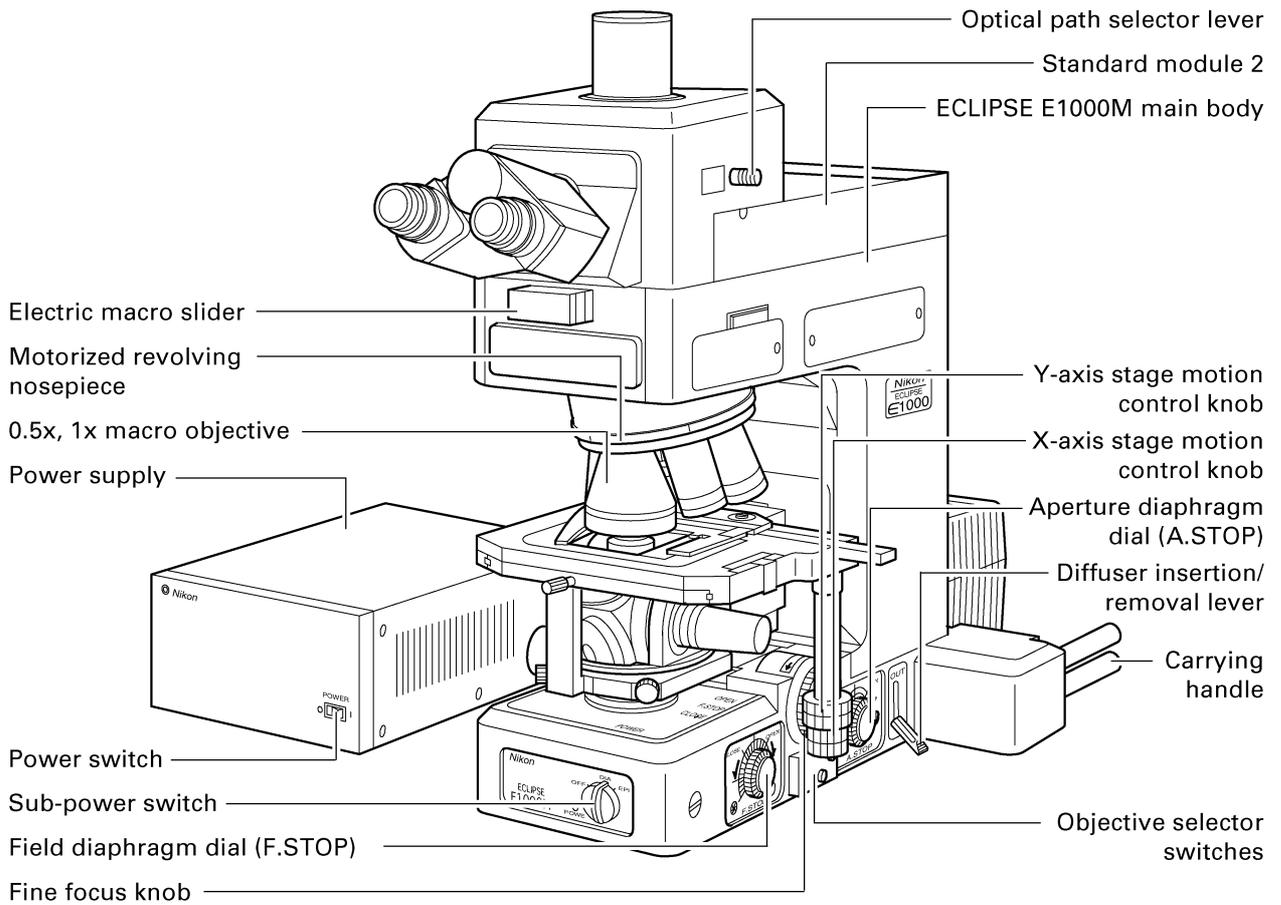
VII

VIII

Names of Component Parts – E1000M –

If the microscope is not yet assembled, see Chapter IV, "Assembly" first.

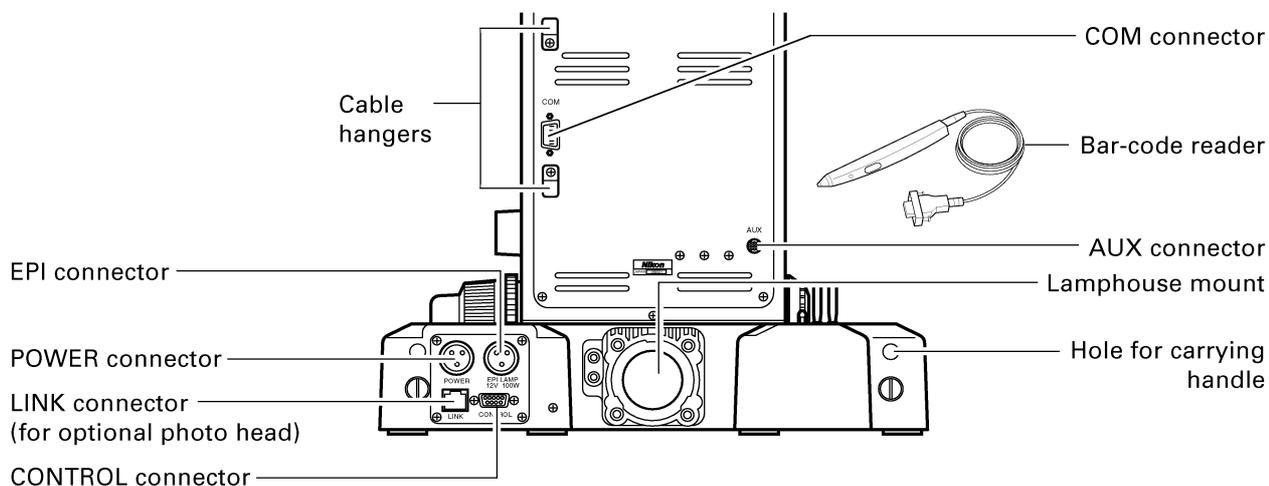
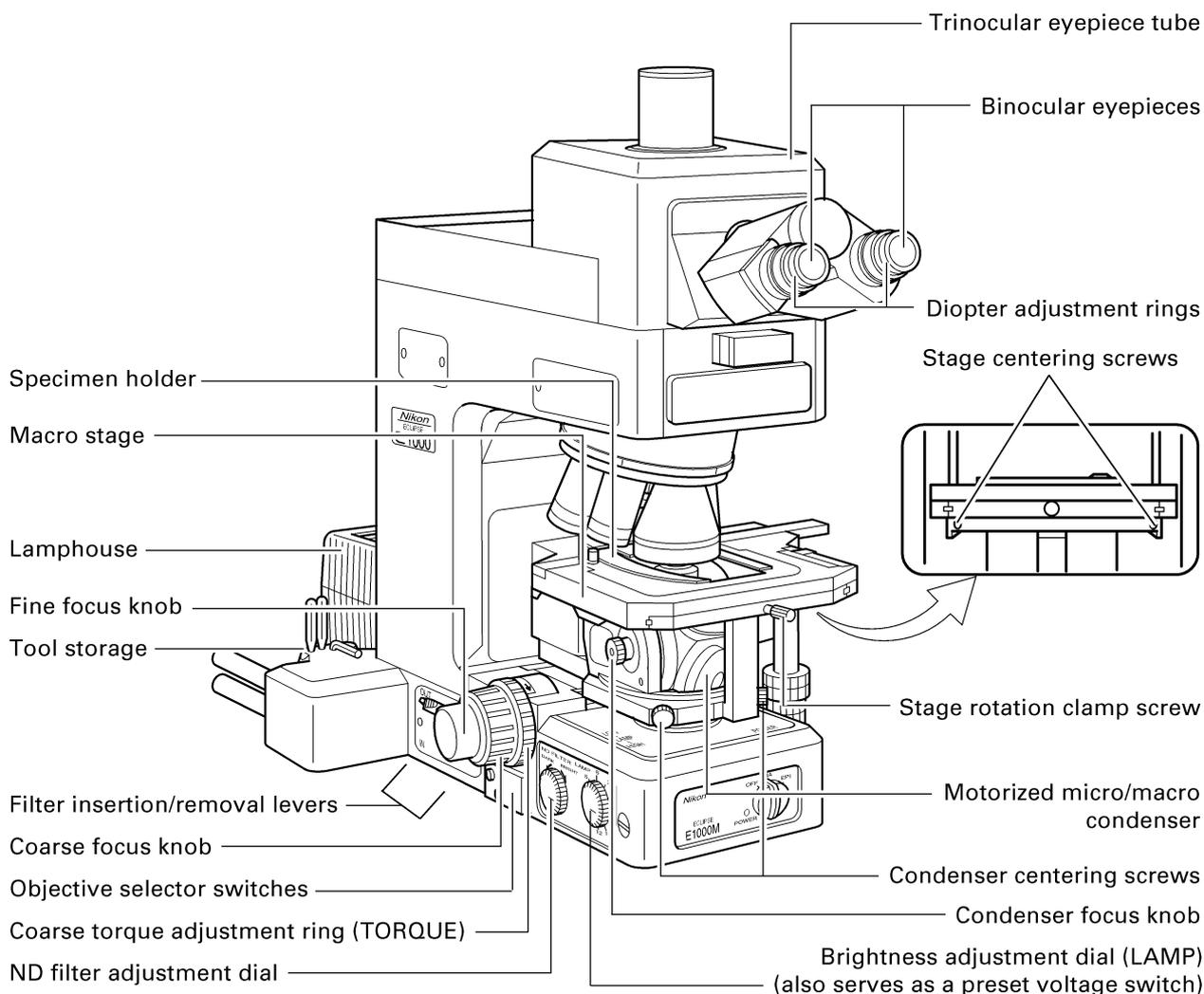
The ECLIPSE E1000M main body, the 0.5x, 1x macro objective, the electric macro slider and the motorized revolving nosepiece have been factory-adjusted to each other and labeled with the same manufacturing number. Don't assemble the parts with different manufacturing numbers in order to ensure satisfactory performance.



Rear of power supply

(This illustration shows the rear of the V-PS100DU-2.)

- E1000M - I Names of Component Parts

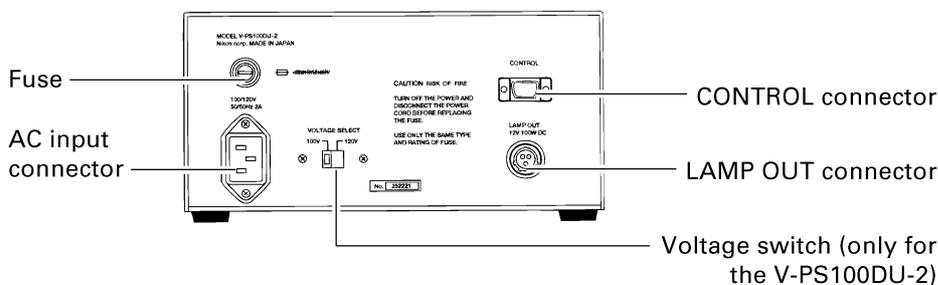
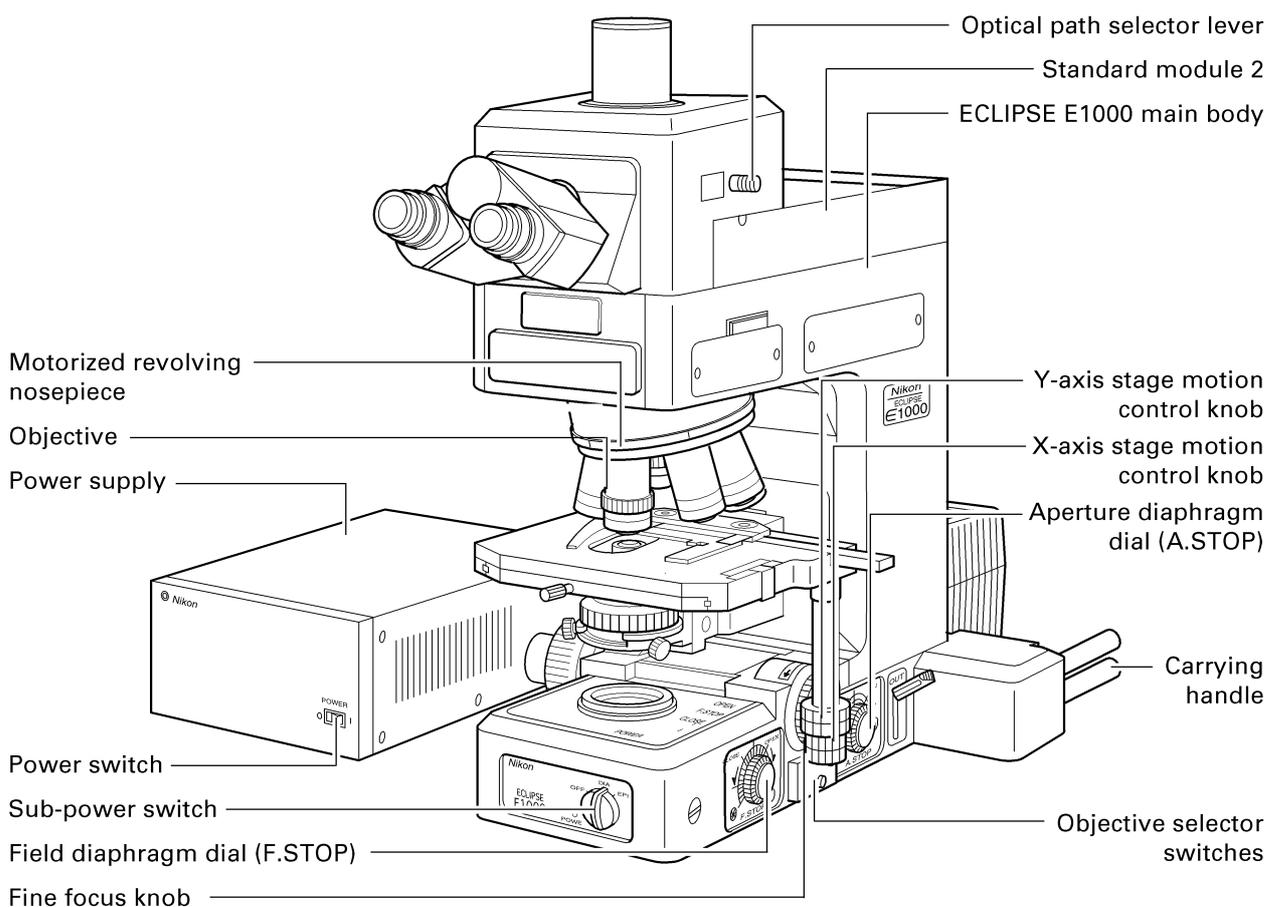


Rear of microscope

I Names of Component Parts – E1000 –

If the microscope is not yet assembled, see Chapter IV, "Assembly" first.

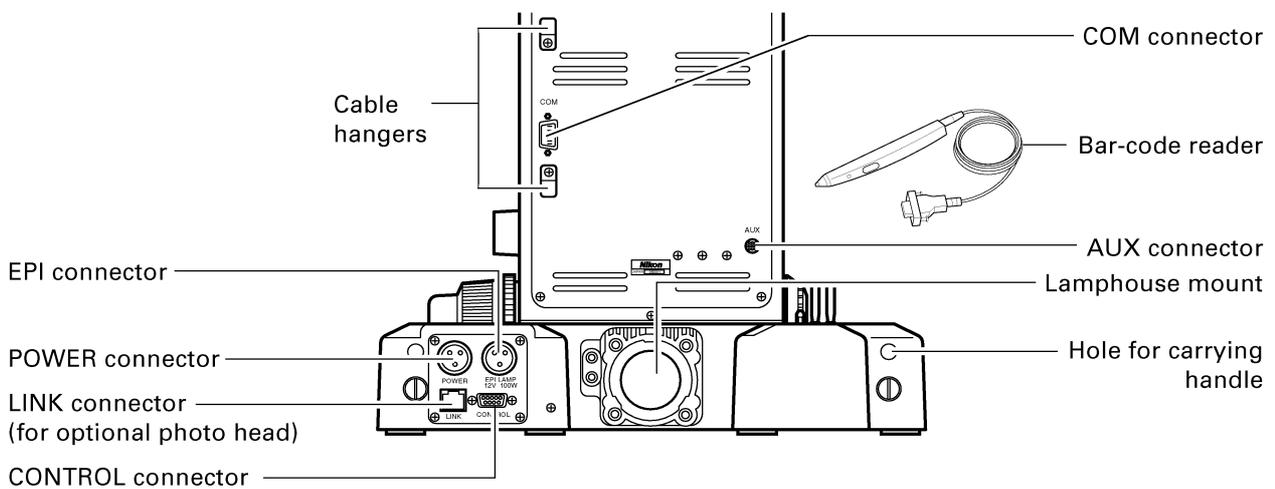
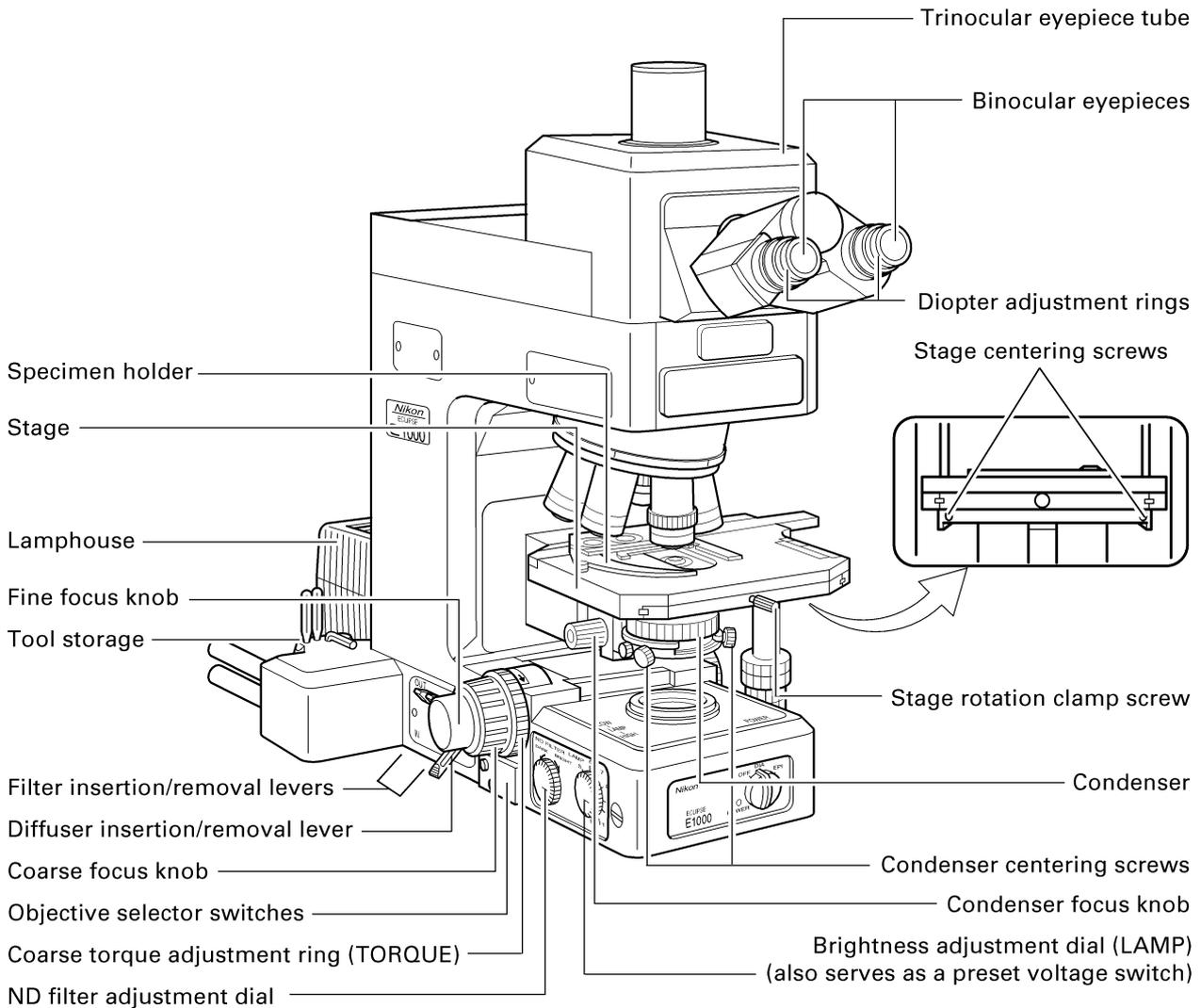
 The E1000 is not equipped with the 0.5x, 1x macro objective or the electric macro slider. The E1000 also does not have a motorized micro/macro condenser, but it does have a manual condenser suitable for observation purposes. The E1000 also uses a standard stage type.



Rear of power supply

(This illustration shows the rear of the V-PS100DU-2.)

- E1000 - I Names of Component Parts



Rear of microscope

Microscopic Procedure

The general procedure for microscopy is described below.

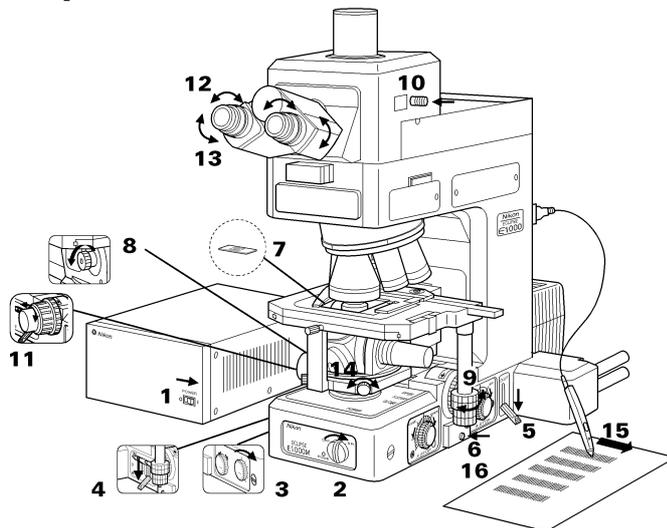
For details on each step, refer to the corresponding item in Chapter III, "Operation of Each Part."

If the microscope is not yet assembled, see Chapter IV, "Assembly" first.

■ Notes on the use of E1000M and E1000

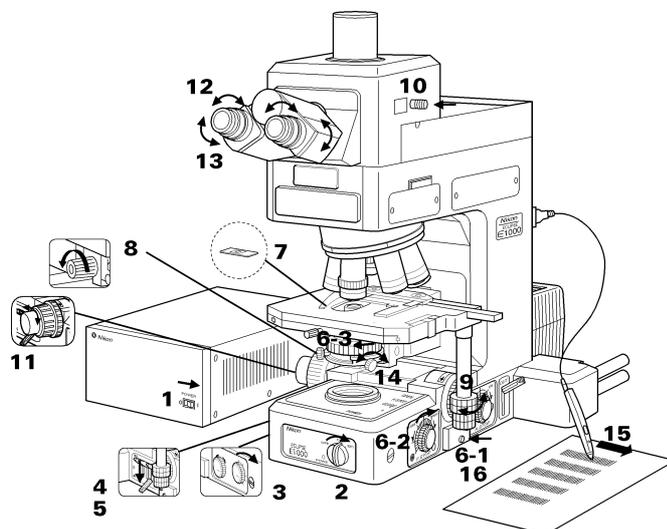
The E1000M and the E1000 are operated using almost the same procedure. This manual covers both models, although instructions marked  apply to the E1000 only.

■ E1000M: Items to be operated in the basic microscopic procedure



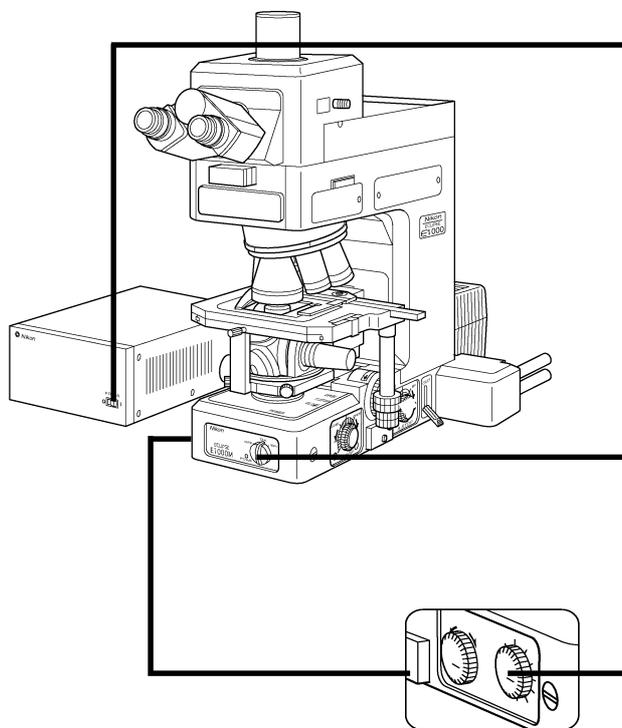
- 1 Power switch ON
- 2 Sub-power switch ON
- 3 Brightness adjustment
- 4 Filter setting
- 5 Diffuser setting
- 6 10x objective setting
- 7 Specimen setting
- 8 Set the condenser position to its upper limit
- 9 Enter the microscopic portion to be viewed into the optical path
- 10 Set the optical path to "binocular eyepieces 100%"
- 11 Focusing
- 12 Diopter adjustment
- 13 Interpupillary distance adjustment
- 14 Condenser focusing and centering
- 15 Each objective data input
- 16 Insert the desired objective into the optical path and observe the specimen

■ E1000: Items to be operated in the basic microscopic procedure



- 1 Power switch ON
- 2 Sub-power switch ON
- 3 Brightness adjustment
- 4 Filter setting
- 5 Diffuser setting
- 6-1 10x objective setting
- 6-2 Fully open the field diaphragm
- 6-3 Fully open the aperture diaphragm
- 7 Specimen setting
- 8 Set the condenser position to its upper limit
- 9 Enter the microscopic portion to be viewed into the optical path
- 10 Set the optical path to "binocular eyepieces 100%"
- 11 Focusing
- 12 Diopter adjustment
- 13 Interpupillary distance adjustment
- 14 Condenser focusing and centering
- 15 Each objective data input
- 16 Insert the desired objective into the optical path and observe the specimen

II Microscopic Procedure



1 Turn on the power switch on the power supply.

Flip the power switch to the “|” side.

- The pilot lamp goes on.

▶ When the microscope is turned on, a buzzer will sound (page 39). If the last sound of the buzzes lasts for a long time (about one second), reset the home position (page 39).

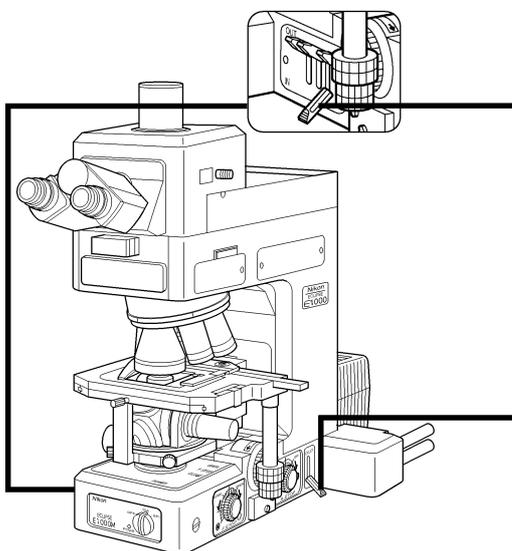
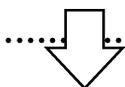
2 Turn on the sub-power switch.

Set the sub-power switch to “DIA”.

- The lamp goes on.

3 Set the brightness adjuster to “9”. (Page 24)

- This brightness provides the best color reproduction.



4 Insert filters ND8 and NCB11 into the optical path. (Page 20)

Press down filter insertion/removal levers “ND8” and “NCB11”.

- ND8 reduces glare in the binocular eyepieces and NCB11 improves color reproduction.

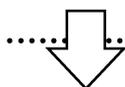
5 Insert the diffuser into the optical path. (page 20)

When the E1000M is used, lower the diffuser insertion/removal lever on the right side of the base.

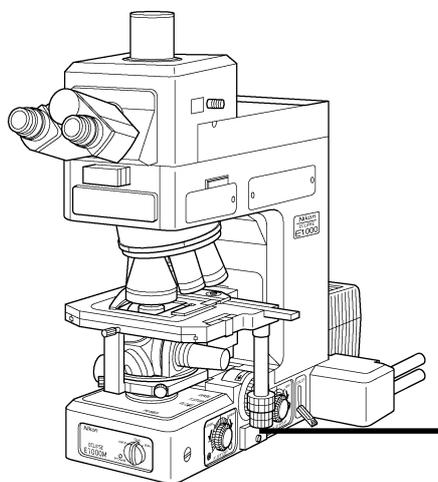
- This will spread out the light at the light source.



When the E1000 is used, insert the diffuser into the optical path by pressing down the diffuser lever [D] of the filter cassette on the left side of the base.



II Microscopic Procedure



6 Move the 10x objective into the optical path.

Press the objective selector switch.

- This will automatically adjust the parts below.

Motorized micro/macro condenser (page 11)

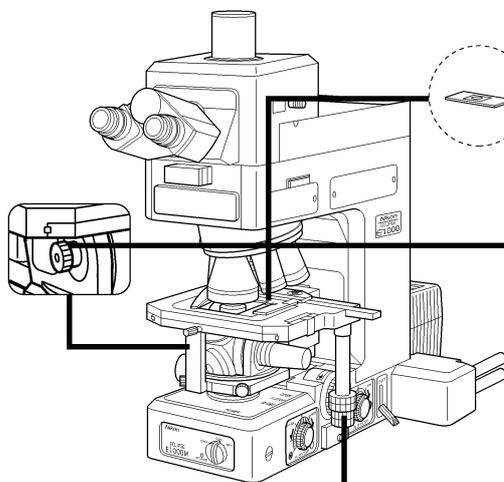
Macro auxiliary lens (electric macro slider) (page 11)

Field diaphragm (page 15)

Aperture diaphragm (page 13)



When the E1000 is used, fully open the field diaphragm manually, and fully open the aperture diaphragm by turning the diaphragm knob on the condenser.



7 Setting the specimen.

Set the specimen in place with the cover glass facing up.

8 Raise the condenser lens until it reaches the upper limit.

Rotate the condenser focus knob in the counterclockwise direction.



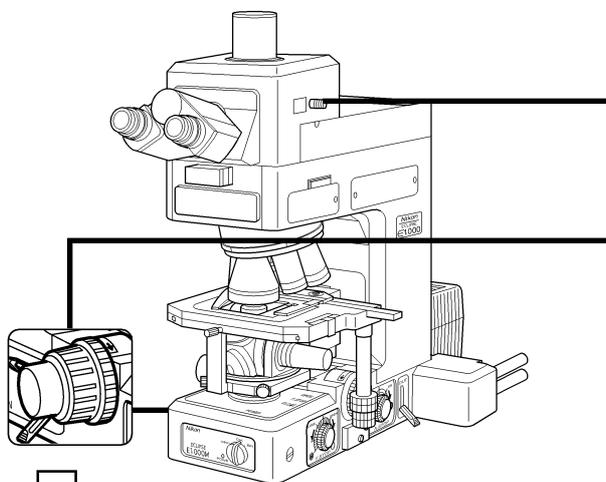
Condenser focus knob of the E1000 can be found on the left side of the sub-stage.

9 Enter the portion to be viewed into the optical path. (Page 22)

Move the specimen by rotating the stage motion control knobs.

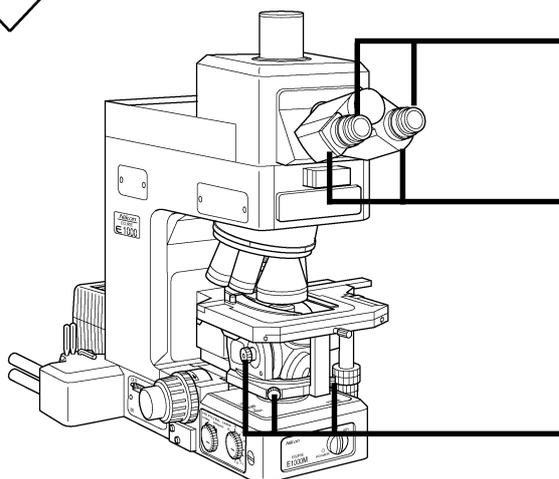
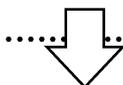


II Microscopic Procedure



10 Set the optical path to the "binocular eyepieces 100%". (Page 20)

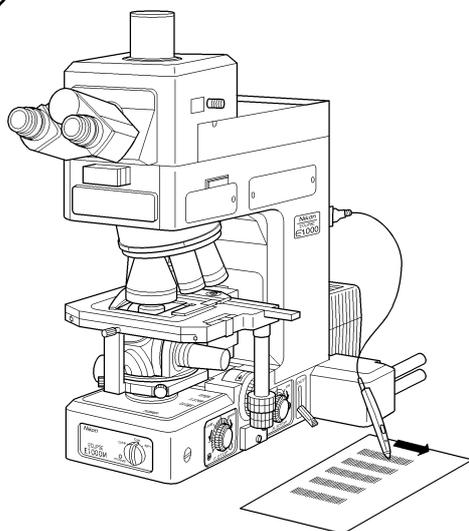
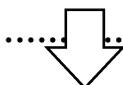
11 Focusing (Page 16)
Focus on the specimen with the coarse and fine focus knobs.



12 Diopter adjustment. (Page 15)
Adjust the diopter adjustment rings for both eyepieces.

13 Interpupillary distance adjustment. (Page 16)
Adjust the interpupillary distance so that the view field for each eye is aligned on one position.

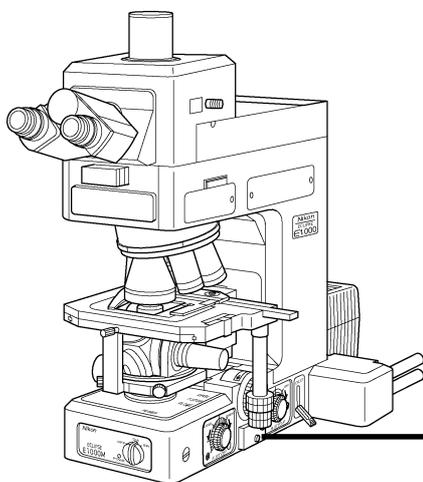
14 Focusing and centering the condenser. (Page 12)
 Condenser focus knob of the E1000 can be found on the left side of the sub-stage.



15 Input the focal position of each objective. (page 19)



II Microscopic Procedure



16 Press the objective selector switch to switch to any desired objective and observe the specimen.



When the E1000 is used, stop down the field diaphragm until it is circumscribed around the view field and the aperture diaphragm to 70%–80% of the objective's numerical aperture in operating the aperture diaphragm knob of the condenser.

17 Store and recall the positions of each part. (page 27)

- Using the smart card, you can store and recall data on the various positions of the field diaphragm, the aperture diaphragm, and the brightness adjust ND filter.

■ If a portion of the view field is dark, try adjusting the condenser centering screws.

If that does not solve the problem, check the following items:

- Filter insertion/removal (Page 20)
- Condenser focusing (Page 12)
- Optical path selection for the eyepiece tube (Page 20)
- Lamp installation (Page 32)
- Motorized revolving nosepiece installation (Page 35)

■ If it is not possible to focus on the specimen, check the following items:

- Mounting of the specimen (Page 8)
- Thickness of the cover glass (0.17 mm is standard.)

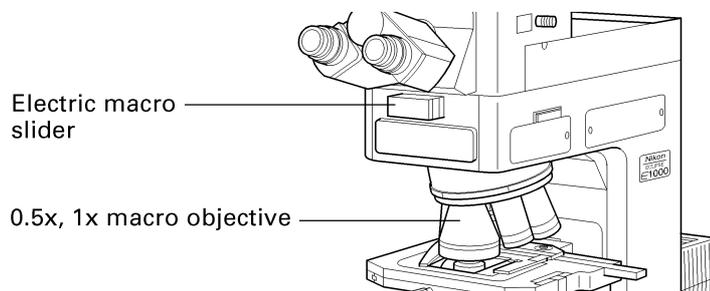


Operation of Each Part

1 Electric Macro Slider (Macro Auxiliary Lens)

 The E1000 is not equipped with an electric macro slider. When using the E1000, skip this section.

The macro auxiliary lens is used together with the 0.5x, 1x macro objective. Insert the 0.5x, 1x macro objective into the optical path, and the macro auxiliary lens in the electric macro slider will be automatically inserted into the optical path. When other objectives are used, the macro auxiliary lens will be automatically pulled out from the optical path.



2 Condenser

The settings of the motorized micro/macro condenser automatically change according to the objective in the optical path.

The table below shows the combinations of the objectives and the condenser lenses.

Objective magnification	Motorized micro/macro condenser display	Condenser lens N.A.
0.5–1x	"0.5–1x"	0.07
2–4x	"2–4x"	0.2
10–100x	"10–100x"	0.88 (*)

*Depending on the type of objective, its numerical aperture may not be satisfied. For example, when an objective with an N.A. of 1.4 is used, the aperture size will only be about 63% of the objective numerical aperture even if it is opened as far as it will go.

 The E1000 incorporates a manual condenser instead of the motorized micro/macro condenser. A universal condenser enabling DIC and phase difference observations, and a swing-out condenser enabling polarized observation are used to suit the subject to be examined.

III Operation of Each Part

■ Focusing and centering the condenser

Focus and center the condenser so that the light passing through the condenser forms the image at the proper position on the specimen (i.e., at the center of the optical path).

Before focusing and centering the condenser, perform steps **1** to **13** in Chapter II, "Microscopic Procedure", so that the specimen is focused with the 10x objective.

1 Rotate the field diaphragm dial until the field diaphragm is closed to its minimum size.

2 Turn the condenser focus knob so that the image of the field diaphragm forms on the specimen.

3 Make adjustments using the condenser centering screws so that the image of the field diaphragm appears at the center of the eyepiece view field.

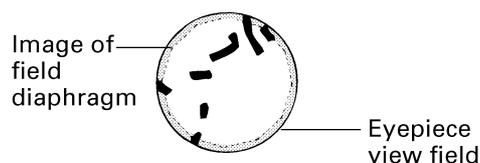
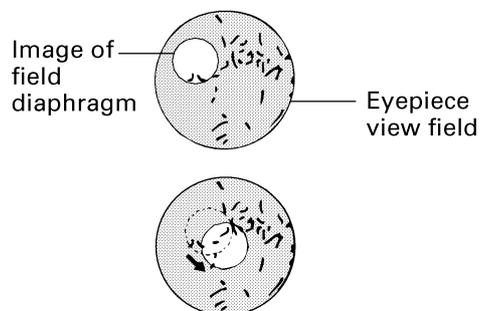
4 Move the 40x objective into the optical path. Turn the fine focus knob to focus on the specimen.

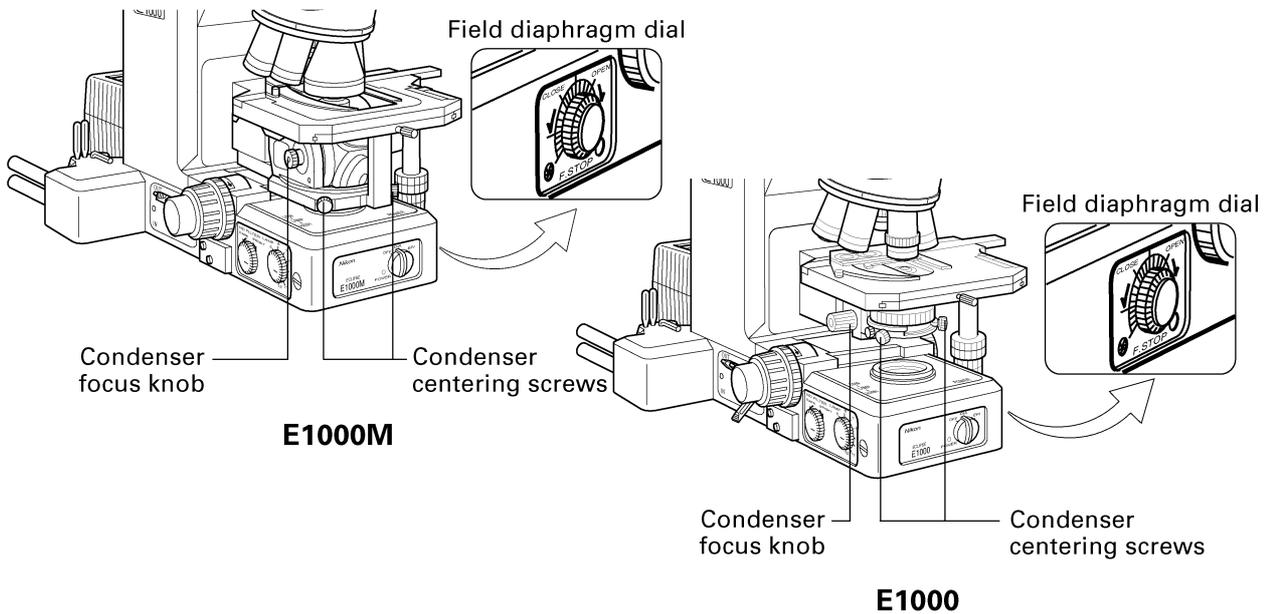
5 Rotate the field diaphragm dial again until the field diaphragm is closed to its minimum size.

6 Turn the condenser focus knob so that the image of the field diaphragm forms on the specimen.

7 Adjust the condenser centering screws so that the image of the field diaphragm appears at the center of the eyepiece view field.

- This adjustment is easier to make if you adjust the size of the field diaphragm so that it is slightly smaller than the eyepiece view field.



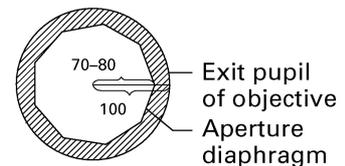


3 Aperture Diaphragm

The aperture diaphragm is important because it is related to the resolution, contrast, depth of focus, and brightness of the optical image. Turning the aperture diaphragm dial changes the size of the aperture diaphragm.

As the aperture diaphragm is closed, resolution and brightness are reduced, while contrast and depth of focus are increased. Conversely, as the aperture diaphragm is opened, resolution and brightness are increased, while contrast and depth of focus are reduced. It is not possible to adjust one pair of characteristics without affecting the other. Generally, a satisfactory image with the appropriate contrast can be obtained with an aperture setting that is 70% to 80% of the objective numerical aperture.

If the aperture diaphragm is closed too far, the resolution is reduced. Therefore, except when viewing a nearly transparent specimen, closing the aperture to less than 60% of the numerical aperture of the objective is not recommended.



Size of aperture diaphragm

The aperture diaphragm of the E1000M is automatically set at about 75% of the objective's numerical aperture. When the 0.5x and 1x objectives are used, the aperture diaphragm is fully opened automatically.

When adjusting the aperture diaphragm manually, operate the aperture diaphragm dial on the right of the base. We recommend that you store this adjustment position in the smart card (page 27).



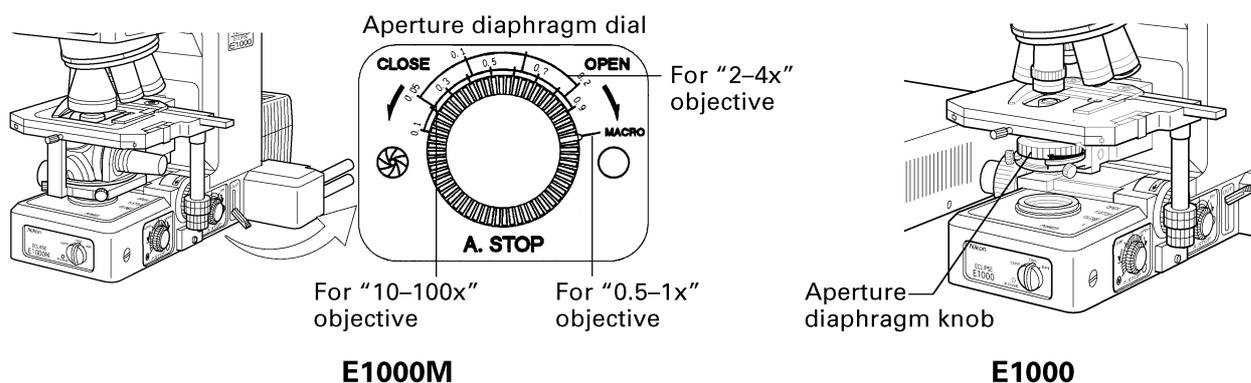
The aperture diaphragm dial on the base is to adjust the diaphragm of motorized micro/macro condenser, but not the aperture diaphragm of the condenser mounted on the E1000. Adjust the aperture diaphragm knob of the condenser manually, if necessary.

III Operation of Each Part

■ Adjusting the aperture diaphragm using the aperture diaphragm scale

The aperture diaphragm scale indicates the numerical aperture (N.A.). Adjust the aperture diaphragm dial or knob to the required N.A. of the scale.

- In general, align the index of the dial with the scale indicating 70% to 80% of the N.A. of the objective.



■ Adjusting the aperture diaphragm using a centering telescope (optional)

- 1 Remove one of the eyepieces and, using a special adapter (optional), mount a centering telescope in its place.
- 2 Turn the aperture diaphragm dial/knob to close the aperture diaphragm as far as possible.
- 3 While holding down the flange of the centering telescope, turn the eyepiece of the centering telescope and focus on the aperture diaphragm.
- 4 Turn the aperture diaphragm dial/knob to adjust the size of the aperture diaphragm.
 - Normally, the aperture diaphragm should be adjusted so that it is about 70% to 80% of the size of the view field.
- 5 Remove the centering telescope and the adapter, then re-install the eyepiece.

4 Field Diaphragm

The field diaphragm limits illumination to the area of the specimen that is being viewed. Turning the field diaphragm dial on the right of the base changes the size of the field diaphragm. For normal observation, the size of the diaphragm should be such that it is just inside or outside the edge of the view field. If a broader area than necessary is illuminated, stray light from outside sources will also enter the optical system, creating flaring and reducing the contrast of the optical image. The operation of the field diaphragm is especially important in photomicrography. Generally, good results can be obtained by closing the field diaphragm so that it is just slightly larger than the area that will be reproduced on the film, i.e., the size of the photo frame.

When the E1000M is used, the field diaphragm is automatically adjusted to the size slightly larger than the view field. When the 0.5x and 1x objectives are used, the field diaphragm is fully opened automatically.



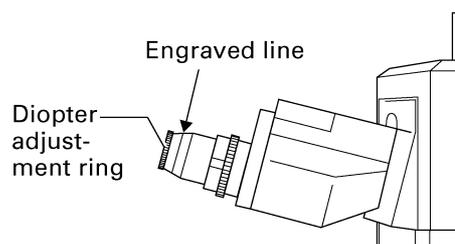
As the field diaphragm is designed to be automatically set according to the setting of the motorized micro/macro condenser of the E1000M, with the automatic setting of the E1000, the field diaphragm may be set too large or too small. Adjust the size of the diaphragm manually until it is slightly larger than the view field. We recommend that you store this adjustment position in the smart card (page 27).

5 Diopter Adjustment

Diopter adjustment compensates for differences in the diopter between the left and right eyes. In addition to making observation through both eyes easier, this adjustment also reduces the extent to which focusing is lost when the objective is changed. In particular, when a low-power objective is used, make sure that the diopter is correctly adjusted. Perform diopter adjustment for both eyepieces.

■ Diopter adjustment method

- 1 Perform steps **1** to **11** in Chapter II, "Microscopic Procedure", so that the specimen is focused with the 10x objective.
- 2 Turn the diopter adjustment rings on the eyepieces, and align the edges of the diopter adjustment rings with the engraved lines.
 - This is the diopter adjustment "0" position.



III Operation of Each Part

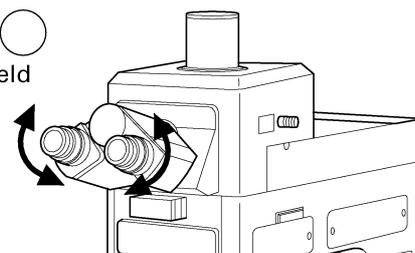
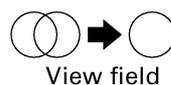
- 3 Move the 40x objective into the optical path. Turn the coarse and fine focus knobs to focus on the specimen.
- 4 Move the 4x or 10x objective into the optical path.
- 5 Turn the diopter adjustment rings on the eyepieces, not the coarse and fine focus knobs, and focus on the specimen. Do so while peering through the right eyepiece with your right eye and the left eyepiece with your left eye.
- 6 Repeat steps 3 to 5 twice.

6 Interpupillary Distance Adjustment

Before adjusting the interpupillary distance, perform steps 11 to 12 in Chapter II, "Microscopic Procedure", so that the specimen is focused with the 10x objective.

Adjust the interpupillary distance of the binocular eyepieces so that the view field for each eye is aligned to one position.

Doing so will facilitate observation through the binocular eyepieces with both eyes.



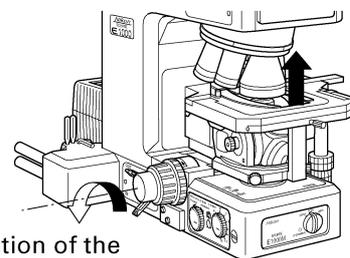
7 Coarse Focus Knob/Fine Focus Knob

The coarse focus knob and the fine focus knob are used to bring the specimen into focus by moving the stage up or down.

When the stage reaches the limit of its stroke, the stage stops. The stage will not move even if you rotate the knobs.

The relationship between the rotation of the coarse and fine focus knobs, and the vertical movement of the stage is as shown in the illustration.

- Rotating the fine focus knob one step moves the stage 1 μm .
- Rotating the fine focus knob one complete turn moves the stage 0.1 mm.



Rotation of the coarse and fine focus knobs and vertical movement of the stage

- Rotating the coarse focus knob one complete turn moves the stage 5 mm.
- The coarse and fine focus stroke (range of vertical motion) for the stage is 2 mm above and 12 mm below the reference (focused) position.

► Notes on using the coarse and fine focus knobs

Never attempt the following action, since doing so may damage the instrument.

- Rotating the left and right knobs in opposite directions at the same time.

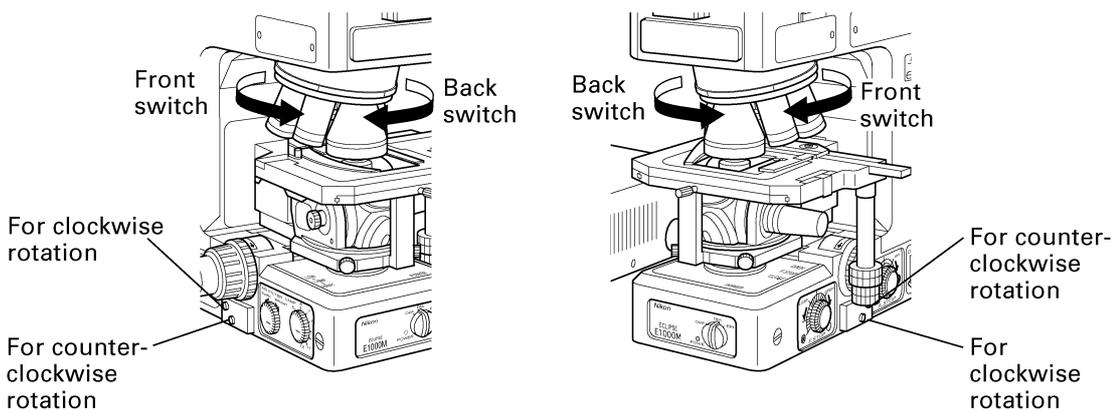
■ Adjusting the torque of the coarse focus knob

To increase the torque, turn the coarse torque adjustment ring "TORQUE" located behind the coarse focus knob in the direction indicated by the arrow on the base of the microscope (i.e., the counterclockwise direction). To reduce the torque, turn the ring in the direction opposite to that indicated by the arrow (i.e., the clockwise direction).

8 Objective Selector Switch

Press the objective selector switch to select the objective that you wish to insert into the optical path.

The selector switches are located on the right and left sides of the microscope base in symmetrical positions. The drawing below shows the relationship between the switch position and the rotating direction of the revolving nosepiece.



III Operation of Each Part

You can also rotate the revolving nosepiece manually, without using the selector switch. Whether using the selector switch or directly rotating the revolving nosepiece, all the settings will be made automatically.

▶ **When operating the objective selector switch:**

- Press the switch without resting fingers on the coarse/fine focus knob. In order to prevent the objective touching the specimen, up/down movement is stopped if the objective selector switch is pressed while moving the coarse/fine focus knob. Note that this is highly sensitive to rotation of the fine focus knob in particular. Similarly, up/down movement is also stopped when the revolving nosepiece is being turned, even if the coarse/fine focus knob is rotated.
- When operating the objective selector switch on the E1000M, check that the condenser lens is either at or below the focus position. Depending on the position, with a high magnification condenser lens, it may hit neighboring components when rotating automatically.

▶ **When selecting from the dry type objective to the liquid-immersion objective (or its reverse):**

The revolving nosepiece stops just before the objective enters the optical path (page 24).

▶ **Revolving nosepiece switch-over limitation function**

- The 0.5x, 1x and 2x objectives have larger depth of focus than other objectives, and this may cause these lenses to come too close to the specimen under observation.
If any of these objectives is positioned within 60 mm of parfocal distance and then switched to the largest magnification objective mounted next to it, the objective's top end will come into contact with the specimen. To prevent unintentional contact, give the Revolving Nosepiece Switch-Over Limitation Function to the objective. When using this setting, manual rotation of the revolving nosepiece is still possible.
- Setting the revolving nosepiece switch-over limitation function
In the "■ Revolving Nosepiece Switch-Over Limitation" in the separate bar code list, input the revolving nosepiece switch-over limitation setting bar code. This setting prevents the objective selector switch from switching the revolving nosepiece, if the following conditions are satisfied at the same time. A short buzz will be issued when this function is effectuated.

[Conditions]

- ① When the 0.5x, 1x or 2x objective is used before a switch-over.
- ② The W.D. (working distance) of the objective used after the switch-over is less than 1 mm.

9 Inputting of Objective Focal Position

1 Insert the 10x objective into the optical path. Focus on the specimen and input the reference focal position setting bar code shown in “■ Focal Position Setting” in the separate bar code list. This sets the focal position of all objectives to the same as that of the reference focal position.

▶ If a long buzz is made when inputting the bar code, the data has not been accepted. Set the home position for the up/down movement again (page 39).

2 Set different objectives one by one on the microscope, and focus on the specimen with each objective. Input the focal position setting bar code shown in “■ Focal Position Setting” in the separate bar code list for each objective.

- You don't need to input the focal position of the 0.5x objective. (It is set in the same position as the focal position of the 10x objective.)
- When the 10x objective is not used, use the 20x objective and input the reference focal position setting bar code.
- The reference focal position setting and focal positions setting data are read according to the address for the revolving nosepiece (the position of the objective mounting hole). After changing the objectives, input the appropriate data again.

▶ Once a switch-over of objectives is made on the E1000/E1000M, you can adjust the focal position to the preset value. For focal position adjustment, two focus modes are available: the ALF (Auto Link Focus) mode and the Absolute Position mode. As the default, the focus mode is set in the ALF mode.

[ALF mode]

Function: Adjustment of the objective focal position differences before and after a switch-over.
 Setting: From the “■ Focus Mode” in the separate bar code list, input the ALF mode setting bar code.

[Absolute position mode]

Function: Move to the focal position of the objective after a switch-over.
 Setting: From the “■ Focus Mode” in the separate bar code list, input the absolute position mode setting bar code.

During specimen replacement: The focal point may vary from one specimen to another (for example, due to a difference in thickness of the slide glass). In the cases, the initial focal position can be adjusted as follows:
 Using an objective with 10x or higher magnification, focus on the specimen. Then, from the “■ Focus Mode” in the separate bar code list, input the offset adjustment setting in the absolute position mode bar code.

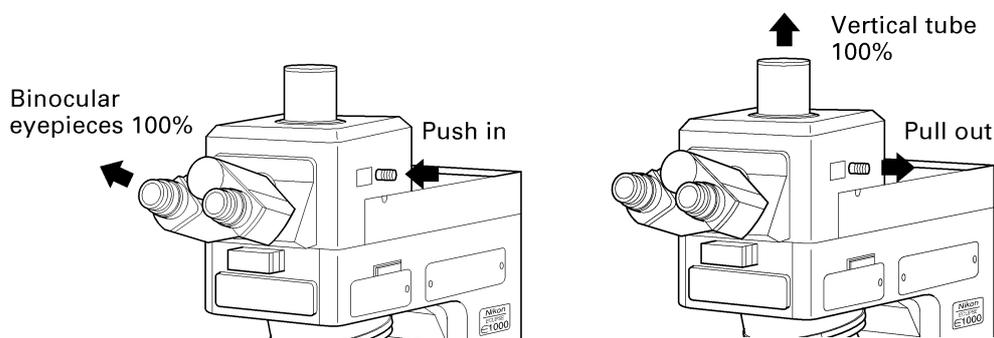


III Operation of Each Part

10 Optical Path Selection of the Trinocular Eyepiece Tube

The optical path selector lever can be used to set the optical path to either the “binocular eyepieces 100%” or the “vertical tube 100%.”

- If you push the optical path selector lever all of the way in until it clicks into place, 100% of the light goes to the binocular eyepieces.
- If you pull the optical path selector lever all of the way out until it clicks into place, 100% of the light goes to the vertical tube.



11 Filters

In this microscope, the filters indicated below are housed in the base of the microscope.

A filter is inserted into the optical path by pressing its filter insertion/removal lever down. When a lever is lifted, the filter is removed from the optical path.

Description	Purpose	Location
D (Diffuser)	Diffuse the light at the light source. (Select it when the motorized micro/ macro condenser is used.)	On the right of the base
NCB11 (Color-balancing filter)	For general microscopy and color photomicrography	In the filter cassette on the left of the base
ND8 (Transmission of 12.5%)	Adjust the brightness during general microscopy and photomicrography.	In the filter cassette on the left of the base
ND32 (Transmission of 3%)	Adjust the brightness during general microscopy and photomicrography.	In the filter cassette on the left of the base
D (Diffuser)	Diffuse the light at the light source. (Select it when a general condenser is used.)	In the filter cassette on the left of the base



Do not use the diffusers on the right and left together. For the E1000M, use the diffuser on the right of the base. For the E1000, use the diffuser in the filter cassette on the left.

- Insert D, NCB11 and ND8 into the optical path for general microscopy.
- The filter in the filter cassette may be changed to a different type of filter. For detailed changing procedures, see page 37.

Information: Electric brightness adjust ND filter

This microscope has a built-in electric brightness adjust ND filter.

Its primary purpose is to keep the amount of light on the observation side constant while changing the objectives.

Based on the objective data input using the bar code, the brightness is automatically adjusted. The operator does not need to perform any adjustments.

But manual adjustment can be executed in rotating the ND filter adjustment dial located on the left side of the base (behind the brightness adjustment dial). To store and recall the manually adjusted brightness data, the smart card is required (page 27).



When the E1000 is used, the illumination may be automatically adjusted slightly brighter or darker than required depending on the condenser being used. However, such differences in brightness tend to be very small and can be safely ignored.

▶ ND filter operation during photomicrography

(For details, see the operation manual of the photomicrographic system you use. This section covers only the setting procedure for the ND filter.)

The operation of the ND filter is not required when you use ISO 100 film and a general specimen.

When you use a film with lower sensitivity than the ISO 100, the brightness must be increased. Remove the ND8 in the filter cassette on the left of the base from the optical path. Removing the ND8 reduces the exposure time to one second or less. This method may not be suitable for some types of specimens.

The primary purpose of using the electric brightness adjust ND filter is to keep the brightness constant. To adjust the brightness during photomicrography, remove the ND filter in the filter cassette first and operate the ND filter adjustment dial. If you operate the ND filter adjustment dial before removing the ND filter in the filter cassette, the electric brightness adjustment range may be narrowed.



III Operation of Each Part

12 Stage



CAUTION

The stage rack may stick out as a result of stage operations. Be careful not to strike your hand against the rack when you are turning the filter levers, the focus knobs, the condenser focus knob, or the aperture diaphragm knob, as the edge of the rack may injure you.



The E1000 uses a standard stage type. This stage is not designed for macro observation.

■ Adjusting the torque of the stage motion control knobs

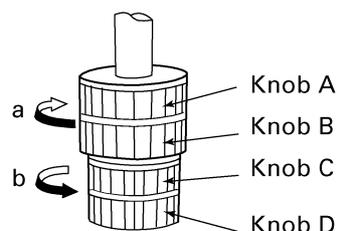
The torque of the X-axis and Y-axis stage motion control knobs can be adjusted.

● For Y-axis motion

To tighten the tension in the Y-axis, turn knob B in the direction of arrow "a" while holding knob A; to reduce the tension, turn knob B in the opposite direction.

● For X-axis motion

To tighten the tension in the X-axis, turn knob C in the direction of arrow "b" while holding knob D; to reduce the tension, turn knob C in the opposite direction.



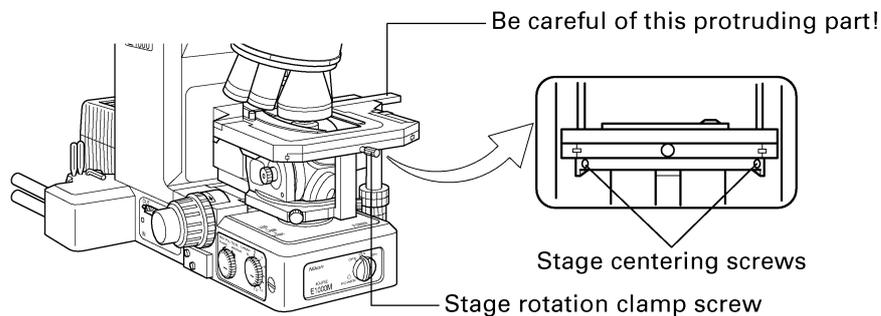
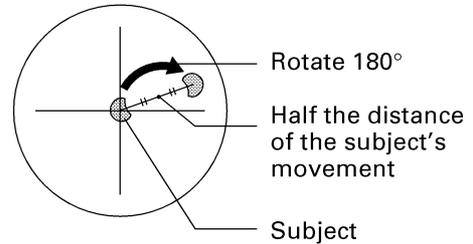
■ Stage rotation

Loosen the stage rotation clamp screw in order to rotate the stage. Rotating the stage is useful for cropping images during photomicrography.

■ Stage centering

If necessary, center the stage according to the following procedure:

- 1** Move the 10x objective into the optical path and focus on the specimen. Designate a prominent feature of the specimen as the subject, then use the stage motion control knobs to move the subject into the center of the view field.
- 2** Loosen the stage rotation clamp screw and rotate the stage approximately 180°.
- 3** If the subject is no longer in the center of the view field, use a hexagonal screwdriver to turn the two stage centering screws so that the subject moves half way back towards the center of the view field.
- 4** Using the stage motion control knobs, move the subject back to the center of the view field.
- 5** Next, move the 40x objective into the optical path, and repeat steps 2 through 4.



13 Preset Voltage Switch (for Photomicrography)

The color temperature of the lamp varies according to the voltage. If the voltage is high, the color temperature of the lamp increases and the light becomes bluer; if the voltage is low, the color temperature of the lamp decreases and the light becomes redder. Therefore, in order to obtain the best color reproduction in color photomicrography, it is necessary to keep the lamp voltage constant. When using daylight color film, the standard setup is to use the color-balancing filter (NCB11) and set the lamp voltage to 9 V.

The preset voltage switch is used to automatically set the standard lamp voltage (9 V). Because the brightness adjustment dial also serves as the preset voltage switch, setting the brightness adjustment dial to the "PRESET" position automatically sets the lamp voltage to 9 V.

■ Fine adjustment of the preset voltage

If the final images on color film shot with the brightness adjustment dial set to the "PRESET" position are reddish or bluish, adjust the preset voltage. You can adjust the voltage at 8.0 V, 8.4 V, 8.6 V, 9.0 V, 9.4 V and 9.6 V. For setting procedure, first input any setting data shown in "■ Preset Voltage Setting" in the separate bar code list. Then, input the preset voltage storage bar code. This will set the preset voltage for all the objective (the address for all the revolving nosepiece).

- If images are reddish, increase the voltage. (Doing so will increase the lamp color temperature, giving the light a bluish tint.)
- If images are bluish, decrease the voltage. (Doing so will decrease the lamp color temperature, giving the light a reddish tint.)

If this adjustment does not solve the problem, you may use color-compensation filters (CC filters), which are available commercially.

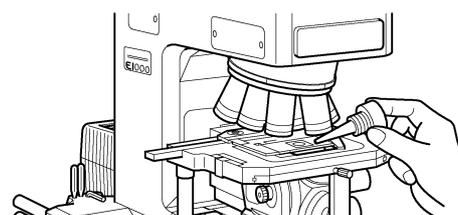
14 Liquid-Immersion Operation

■ Oil-immersion operation (using an oil-immersion objective)

Objectives marked "Oil" are oil-immersion objectives. These objectives are used with the provided immersion oil applied between the specimen and the tip of the objective.

The microscope determines from the objective data that the objective is the oil-immersion objective. The motorized revolving nosepiece stops before the oil-immersion objective is inserted into the optical path (in the middle of changing from one objective to another).

Apply oil to the top of the specimen.



- ▶ Use as little oil as possible (just enough to fill the space between the tip of the objective and the specimen). If too much oil is applied, the excess will flow onto the stage and around the condenser. Bubbles in the oil will adversely affect the viewing of the image. Carefully apply oil to prevent the formation of air bubbles.

Press the objective selector switch to rotate the motorized revolving nosepiece and insert the oil-immersion objective into the optical path.

- ▶ Make sure that you rotate the revolving nosepiece in the correct direction. If the revolving nosepiece rotates in the opposite direction after you have applied oil to the specimen, the oil may stick to the objective to be inserted into the optical path.

When changing from the oil-immersion objective to a dry objective, the motorized revolving nosepiece stops halfway as described above. After the nosepiece stops, remove the oil. Press the objective selector switch again to rotate the motorized revolving nosepiece, and insert the objective you want to use next into the optical path.

■ Checking for air bubbles in the oil

Remove the eyepieces, open the field diaphragm and the aperture diaphragm as far as possible, and look at the exit pupil of the objective within the eyepiece tube. (The exit pupil will appear as a bright circle.) If it is difficult to see if there are any bubbles, mount an optional centering telescope on an eyepiece sleeve by using an optional adapter. Then, while turning the eyepiece on the centering telescope to change the focus, look through the centering telescope for bubbles. If there are bubbles in the oil, remove them by using one of the following methods:

- Turn the revolving nosepiece slightly by hand, moving the objective with the air bubbles back and forth one or two times.
- Add more oil.
- Remove the oil and replace it with new oil.

■ Removal of immersion oil



CAUTION

When using petroleum benzene or absolute alcohol to remove the immersion oil, please follow the instructions of the manufacturer. Keep these flammable liquids away from fire or sparks.

Any oil remaining on oil-immersion objectives or on the tip of dry type objectives will have a negative effect on viewing. After using oil, wipe all of it away and make sure that there is no oil on the tips of the other objectives.

Use petroleum benzene to wipe away immersion oil. Wiping with absolute alcohol (ethyl alcohol or methyl alcohol) after the oil has been cleaned up completes the clean-up process.

III Operation of Each Part

If you cannot obtain petroleum benzene, use methyl alcohol. However, because methyl alcohol does not clean as well as petroleum benzene, it will be necessary to wipe the surfaces repeatedly. (Usually, three or four times is sufficient to clean the lenses.)

▶ Immersion oil container

- Make sure that the cap of the container is closed tight after use. After you have refilled the container, make sure that the base cap is closed tight. This cap might come loose by itself during use. Regularly check it to prevent oil leaks.
- Be careful not to press the container too hard. If the container is pressed too hard, oil may jet out.
- If oil leaks out, wipe it off.
- Be careful not to get oil in your eyes. Although the oil is not toxic, in the event of contact with the eye or skin, follow the instructions below.
Contact with skin: Thoroughly wash the area with water and soap.
Contact with eye: Thoroughly rinse the eye with clean water for more than 15 minutes, then see a doctor.
- Don't leave the container where it will be exposed to daylight (especially ultraviolet rays).

■ Water-immersion operation (using a water-immersion objective)

The water-immersion objectives are marked "WI" or "W". Immerse the part between the specimen and the tip of the objective in water (distilled water or normal saline solution) before conducting microscopic observation. Follow the liquid-immersion operation for the general microscopy. The water-immersion objective stops halfway, just as the oil-immersion objective.

- ▶ ● Water evaporates easily. Frequently check the water during microscopic observation. Also, be careful not to apply too much water. If too much water is applied, the water may flow into the stage or the condenser, and that may cause corrosion.
- Wipe off the moisture from the objective after use, then clean it with absolute alcohol.
- If the water has evaporated and left a stain on the objective, apply a small quantity of neutral detergent to the lens, then gently wipe off the stain and complete the lens cleaning with absolute alcohol.

15 Use of the Smart Card

Using the smart card, you can store and recall various positions of the three parts below:

Field diaphragm, aperture diaphragm and electric brightness adjust ND filter.

■ Procedure

- 1 Set up the microscope as usual.
- 2 Turn off the power. Insert a smart card into the IC card reader. Turn on the power.
- 3 Observe the specimen and adjust the field diaphragm, the aperture diaphragm and the electric brightness adjust ND filter.
- 4 Press the objective selector switch to change the objectives.
 - The adjusted positions before changing the objectives are written onto the smart card.
- ▶ Data on the positions is updated every time the objective selector switch is pressed, unless the smart card is write-protected (described below).
- 5 If the same objective as that used in the step 3 above is inserted into the optical path, the microscope will be set in the positions stored on the smart card.

■ Write-Protection of Stored Data

To protect the data, input the smart card write-protection bar code shown in “■ Smart Card” in the separate bar code list.

- ▶ ● Neither the card nor the microscope will show whether a smart card is write-protected. We recommend that you write the date and other information on a write-protected card using an oil-based or alcohol-based ink.
- To cancel the write-protection of a smart card, input the smart card write-enable bar code.

■ Use of a Write-Protected Smart Card

- 1 Turn off the power. Insert the card and turn on the power.
- 2 Operate the microscope using the usual procedure. The microscope will operate according to the stored data on the card.

III Operation of Each Part

▶ **CAUTION**

- Do not touch the terminals on the reverse side of the cards. Keep them free of dust to prevent contact failure.
- Be careful not to drop the smart cards, bend them, or give any other shock to them. If a card is bent, it will not fit into the card reader. The electric circuit on the card may be damaged or the data may be lost.
- Do not carry smart cards in your pocket. If you sit down, the cards inside your pocket may be broken.
- The cards must be free of moisture.
- Do not expose the cards to direct sunlight or place them near a heater.
- Do not store cards in a hot or humid place.



⚠ WARNING

In order to prevent electric shock or fire, turn the power switch on the power supply off (flip to the "○" side) during assembly. Also turn the microscopes sub-power switch off.

⚠ CAUTION

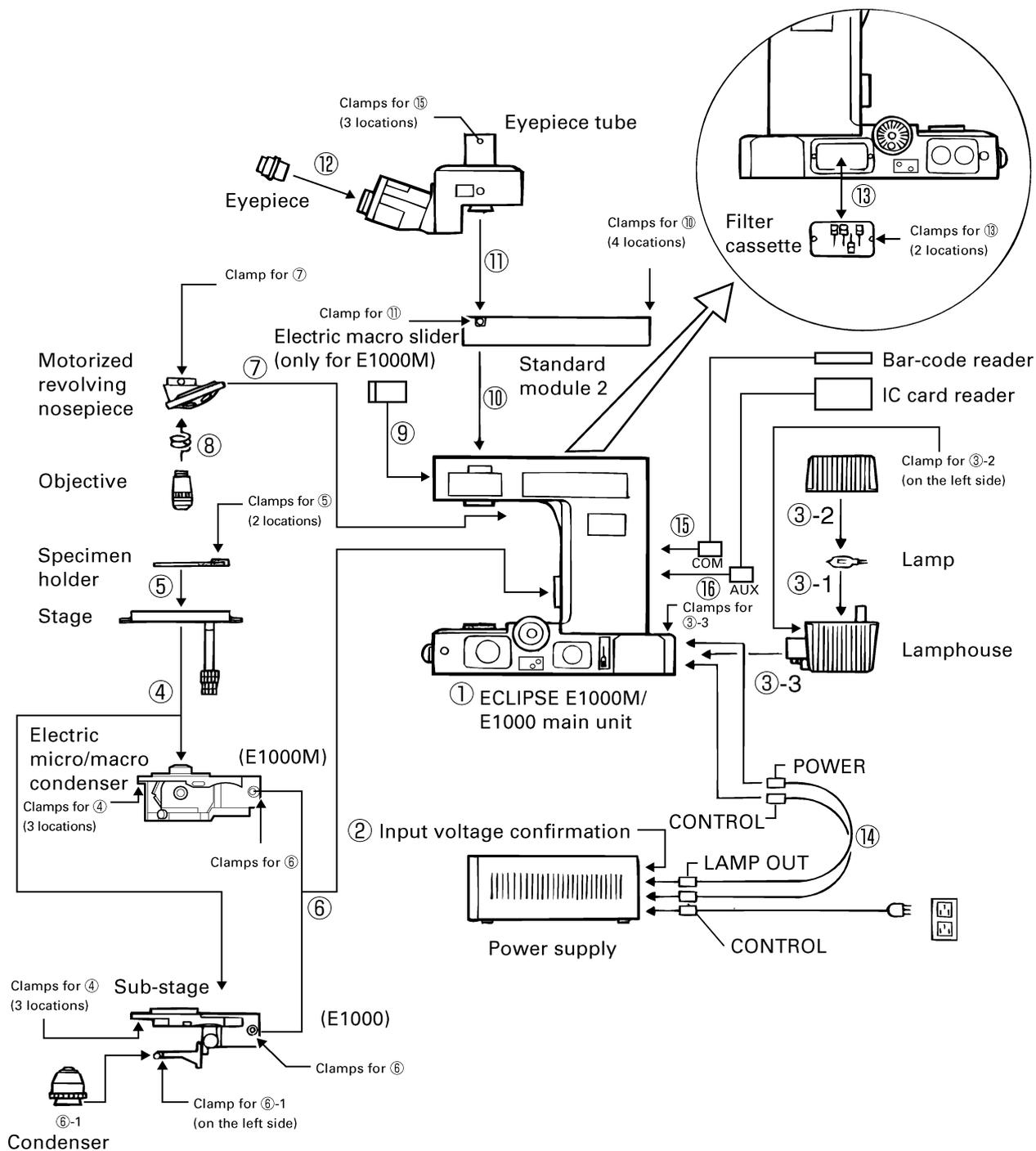
- When moving the microscope, first detach the lamphouse. Then have at least two people carry the microscope, one on each side, using the carrying handles.
- Be sure to screw the carrying handles in as far as they will go, and make sure that they are secure. If the carrying handles are not attached securely, they could come loose or break off while the microscope is being carried, creating a hazardous situation. Screw the carrying handles into the upper holes on the rear of the microscope. If you use the lower holes, your hands may get caught between the handles and the table when you set the microscope down.
- Do not grasp the coarse focus knob, fine focus knob, eyepiece tube, stage, etc., when carrying the microscope, as there is a chance that this part could come off, and the equipment could be damaged.
- The motorized revolving nosepiece, the motorized micro/macro condenser, the electric macro slider and the standard module 2 all have electrical contacts (pin-connector or connector). These contacts are connected to the contact circuit boards on their corresponding parts. Do not touch these contacts or circuit boards. Also, be careful not to scratch them.
- Make sure that all the attachments are connected to the microscope before turning on the power.
- Be careful not to get your hands or fingers caught when installing the microscope.

■ Tools needed

- Two hexagonal screwdrivers (provided)
 - One hexagonal wrench (provided)
 - Four carrying handles (provided)
 - One coin (or a regular (-) screwdriver)
- ▶
- Viewing will be adversely affected if any of the lenses are scratched or if they have any fingerprints on them. Handle the lenses carefully during assembly.
 - Because this microscope is a precision optical device, handle it carefully and make sure that it is not subject to strong physical shocks. (The precision of the objectives in particular may be adversely affected by even weak physical shocks.)

IV Assembly

Assemble each part in sequence as numbered in the diagram. (For details, refer to pages 31 to 41.)



(Some components may not be included in the set that you purchased.)

1 Setting up the microscope

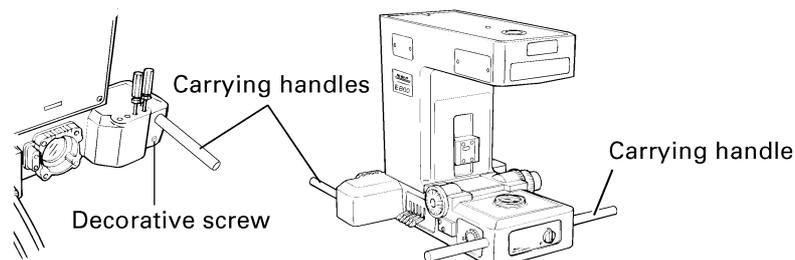
▶ Installation location

This product is a precision optical instrument, and using or storing it under unsuitable conditions may damage it or may adversely affect its precision. The following conditions should be kept in mind when selecting the installation location.

- Avoid installing the microscope in a bright location, such as in a room that receives direct sunlight, or directly under room lights. The quality of the view through the microscope will deteriorate if there is a lot of ambient light.
- Install the microscope in a location that is free of dust or dirt.
- Install the microscope on a flat surface with little vibration.
- Install the microscope on a sturdy desk or table that will be able to bear the weight of the microscope.
- Do not install the microscope in a location with high temperature and humidity. If the microscope is installed in a warm, humid location, condensation or mold may form on the lenses, degrading performance or damaging the equipment.

Screw the carrying handles into the holes on both sides of the front and rear (use the upper holes) of the microscope. Be sure to screw all of the handles in as far as they will go.

Have at least two people, one on each side, carry the microscope to where it will be installed. After placing the microscope in the desired position, use a coin (or regular (-) screwdriver) to remove the decorative screws on the rear of the microscope (in the lower holes). Remove the front pair of carrying handles from the microscope, then screw the decorative screws into the open holes. Screw the removed handles into the holes on the rear of the microscope.

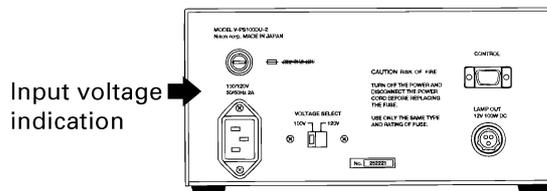


2 Confirming the input voltage

WARNING

Make sure that the input voltage indicated on the back panel of the power supply is the same as the voltage provided in your region. If the indicated voltage is different, do not use the power supply; rather, contact your nearest Nikon representative immediately. If the power supply is used with the wrong input voltage, a short circuit may occur resulting in electric shock or fire, and the power supply and any connected equipment may be damaged.

If using the V-PS100DU-2 power supply, set the voltage switch on the back panel of the unit to the voltage supplied in your region.

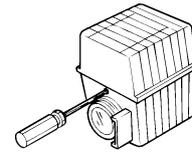


3 Installing the lamp and lamphouse (lamp replacement)

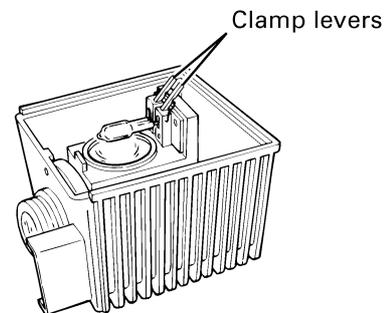
CAUTION

- In order to prevent electric shock and damage to the equipment, always turn the power switch on the power supply off (flip it to the "O" side) and unplug the power cord before replacing the lamp.
- In order to prevent burns, allow the lamp and the lamphouse to cool before replacing the lamp.
- Use the Nikon halogen lamphouse C-LP HALOGEN 12 V 100 W for the lamphouse.
- Use a 12 V-100 W LONGLIFE halogen lamp (the OSRAM HLX 64623 or the PHILIPS 7724).
- After replacing the lamp, make sure that the lamphouse cover is closed securely. Never use the lamphouse when its cover is open.

- 1** Confirm that the power supply power switch is off (i.e., it is flipped to the "O" side). Also confirm that the sub-power switch on the microscope is in the "OFF" position.
- 2** If the lamphouse is mounted on the microscope, use a hexagonal screwdriver to loosen the lamphouse clamp screw (the screw is on the top of the lamphouse mount), then remove the lamphouse from the microscope.
- 3** Use a hexagonal screwdriver to loosen the clamp screw on the front of the lamphouse and remove the cover.



- 4** While pressing the lamp clamp levers, push the lamp into the socket pin holes as far as it will go.



▶ When installing the lamp,

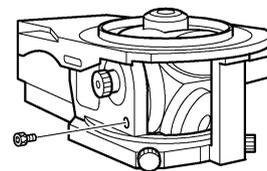
do not touch the glass portions of the lamp with your bare hands. Doing so will cause fingerprints, grease, etc., to burn onto the lamp surface, reducing the illumination provided by the lamp. If you do get any fingerprints or dirt on the lamp, wipe it clean.

- 5** Return the clamp levers to its original position. Make sure that the lamp is not tilted.
- 6** Close the cover securely and tighten the clamp screw. Make sure that the cover is fixed in place and that it does not come off even when you shake it with your hand.
- 7** Plug the lamphouse into the microscope so that the lamphouse plug fits into the lamphouse socket. Tighten the lamphouse clamp screw to secure the lamphouse in place.

4 Installing the stage

▶ Locking screw for shipment

The motorized micro/macro condenser is tightened with a locking screw as shown in the drawing to prevent it from rotating during transport. Remove the screw using a hexagonal wrench before performing assembly.



Place the stage with the bottom facing up. Place the motorized micro/macro condenser on top of the stage. Align the three mounting holes on the stage and the motorized micro/macro condenser, then use a hexagonal screwdriver to tighten the three mounting bolts so that the micro/macro condenser is securely attached to the stage.

- ▶ One of the three bolts can be tightened by inserting a hexagonal screwdriver through the oval hole. When tightening this bolt, it may not be possible to insert the hexagonal screwdriver depending on the condenser and stage centering position. In this case, tighten the bolt after moving by turning the condenser centering screws counterclockwise and turning the stage centering screws clockwise.

 With the E1000, lay the underside of the stage face up, and place the sub-stage on the stage. Align the three attachment holes on the stage and sub-stage, and then fix securely by tightening the three fixing bolts using a hexagonal screwdriver. Loosen the sub-stage clamp screw sufficiently using a hexagonal wrench. Insert the left-hand edge of the sub-stage into the sub-stage mount on microscope main unit. Insert the right-hand edge of the sub-stage into the microscope sub-stage mount so as to align the sub-stage pin with the sub-stage mount slot, and secure by tightening the sub-stage clamp screw with the hexagonal wrench.

5 Installing the specimen holder

Attach the specimen holder, using the two mounting holes on the top of the stage.

6 Installing the condenser

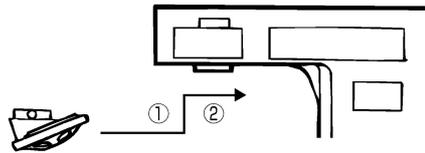
For the E1000M, use a hexagonal wrench to loosen the motorized micro/macro condenser clamp screw. Fit the left side of the condenser to the mount on the microscope. Aligning the pin on the condenser with the notch on the mount, fit the right side of the condenser to the microscope. Use a hexagonal wrench to tighten the clamp screw and secure the condenser in place.



Install a standard condenser on the E1000 using the following procedure. Rotate the condenser focus knob and lower the condenser mount until it reaches the lower limit. Insert the condenser into the condenser mount. Make sure that the label on the condenser faces front. Tighten up the clamp screw on the left of the condenser mount to fasten the condenser. Rotate the condenser focus knob to move up the condenser to its uppermost position.

7 Installing the motorized revolving nosepiece

Use a hexagonal screwdriver to loosen the revolving nosepiece clamp screw. Fit the revolving nosepiece into the revolving nosepiece mount on the microscope from the bottom, then slide it toward the rear of the microscope as far as it will go. Tighten the revolving nosepiece clamp screw to secure the revolving nosepiece.



▶ Removing the revolving nosepiece

First remove all of the objectives. Lower the stage completely, then hold the revolving nosepiece in your hand so that it does not fall when you remove it.

■ When installing the V-NDMG DIC-MG6 Revolving Nosepiece

After you have assembled the microscope, input the MG rev. setting bar code and six-slot setting bar code shown in “■ Rev. Type” in the separate bar code list to read the position of the revolving nosepiece. This enables the microscope to control the revolving nosepiece according to the data. The V-NDMG DIC-MG6 revolving nosepiece cannot be rotated using the objective selector switch. When removed this revolving nosepiece, input the motorized rev. setting bar code and seven-slot setting bar code.

■ When the six-slot motorized revolving nosepiece has been installed

From the “■ Bar Code Type” in the separate bar code list, input the motorized revolving nosepiece setting bar code and the six-slot setting bar code.

8 Installing the objectives

Lower the stage completely. Screw the objectives into the revolving nosepiece so that the magnification increases when the revolving nosepiece is rotated in the clockwise direction, looking down on the revolving nosepiece from above.

▶ Removing the objectives

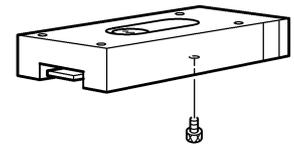
If there is a specimen on the stage, remove it first. Lower the stage completely, then hold each objective in your hands so that they do not fall when you remove them.

9 Installing the electric macro slider (only for E1000M)

Insert the electric macro slider into the mounting slot on the microscope. Fully insert it so that the connector is properly connected.

▶ Locking screw for shipment

The electric macro slider is tightened with the locking screw as shown in the drawing to prevent it from sliding during transport. Remove the screw using a hexagonal wrench before performing assembly.



The E1000 is not equipped with an electric macro slider.

10 Installing the standard module 2

Install the standard module 2 by aligning the two pins on the standard module with the holes on the microscope, then use the hexagonal wrench to tighten the four bolts with hexagonal holes so that the standard module 2 is secured in place.

11 Installing the trinocular eyepiece tube

Use a hexagonal screwdriver to loosen the eyepiece tube clamp screw. Tilt and insert the round dovetail on the trinocular eyepiece tube to the round dovetail mount on the standard module 2. Then tighten the eyepiece tube clamp screw so that the trinocular eyepiece tube is secured in place.

12 Installing the eyepieces

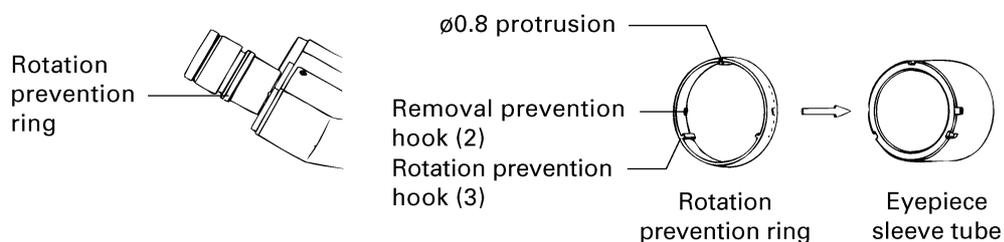
Install the left and right eyepieces, giving both the same magnification.
Align the three notches on each of the eyepieces with the three protrusions on each sleeve of the eyepiece tube, then slide the eyepieces on.
Slide the rubber eyeguard (optional) into the groove around each of the eyepieces.

▶ Removing the eyepieces

Each eyepiece sleeve on the eyepiece tubes has a ring designed to prevent the eyepiece from rotating. When removing the eyepiece, be careful not to accidentally grasp the rotation prevention ring and forcibly pull it out together with the eyepiece. To re-install a rotation prevention ring, turn the rotation prevention ring so that the surface with the $\varnothing 0.8$ protrusion on it is visible (on the front side), then insert the ring.

To the right eyepiece sleeve: To install the rotation prevention ring to the right sleeve, position the $\varnothing 0.8$ protrusion of the ring to the top so that the three rotation prevention hooks are engaged with the corresponding notches in the sleeve.

To the left eyepiece sleeve: Insert the ring so that its three rotation prevention hooks and two removal prevention hooks are engaged with the corresponding notches in the sleeve.



13 Replacing the filters in the filter cassette

Press all of the filter insertion/removal levers down.
Using the hexagonal screwdriver, loosen the two fixing screws, and remove the filter cassette from the microscope.
Using gloves or gauze, push the filters in the filter cassette up in the direction of the hooks in order to remove them.
Push up the filter hooks, then insert the $\varnothing 33$ filters that are to be used.
Install the filter cassette back into the microscope as it was, tighten the screws and secure the cassette in place.

14 Connecting the power supply

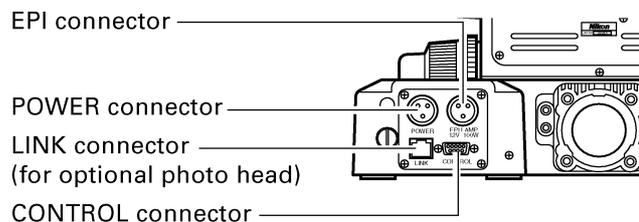
Three types of cables must to be connected: the lamp output cable, the lamp voltage control cable, and the power cord.

Lamp output cable

Plug one end into the POWER connector on the rear of the microscope base, and the other end into the LAMP OUT connector on the rear of the power supply, then screw on the locking rings so that each connection is secure.

Lamp voltage control cable

Plug one end into the CONTROL connector on the rear of the microscope base, and the other end into the CONTROL connector on the rear of the power supply.



Power cord



WARNING

Use only the following power supply cord set. Using the wrong power cord could result in danger or fire. The protection Class I equipment should be connected to PE (protective earth) terminal.

- For 100–120 V AC area UL listed, detachable power cord set, 3-conductor grounding Type SVT, No. 18 AWG, 3 m long maximum, rated at 125 V AC minimum. In case of using the extension cord, use only the power supply cord with the PE (protective earth) wire.
- For 220–240 V AC area Approved according to EU/EN standards, 3 conductor grounding Type H05VV-F, 3 m long maximum, rated at 250 V AC minimum. In case of using the extension cord, use only the power supply cord with the PE (protective earth) wire.

In order to prevent electric shock, always turn the power switch on the power supply off (flip it to the “O” side) before connecting the power cord.

Plug the socket into the AC input connector on the rear of the power supply, and insert the plug into an AC outlet.

15 Connecting the bar-code reader

Connect the bar-code reader to the [COM] connector on the rear of the microscope stand.

When the bar-code reader is not being used, wind the cable around the cable hooks.

16 Connecting the IC card reader

Connect the IC card reader to the [AUX] connector on the rear of the microscope stand.

When using the smart card, insert the card into the reader before turning on the power.

17 Buzzing at startup

When you have turned on the power, the buzzer will sound. The number of buzzes varies depending on what attachments you use, as follows:

No attachments are used: 1

Motorized micro/macro condenser only: 2

Motorized revolving nosepiece (E1000) only: 2

Motorized micro/macro condenser and motorized revolving nosepiece: 3

Smart card: 1 + one of the numbers shown above

- If no buzzing is emitted or the number of buzzes is different from the number above when you have turned on the power, turn off the power and turn it on again. If this does not solve the problem, contact your nearest Nikon representative.

18 Home position setting for up/down movement

The up/down movement of the stage are detected using the set home position as a reference. After you have assembled the microscope, set the home position using the following procedure.

- 1 Move the stage to its lower limit using the coarse focus knob.
When the stage reaches its lower limit, the microscope buzzes once. (After the stage has reached its lower limit, it will not go down further even if you rotate the knob.)
- 2 Input the home position setting bar code shown in the separate bar code list.

- The registered home position is stored using the built-in battery. The battery is charged while the microscope is turned on. The fully charged battery can back up the position data for about one year. This back-up period may vary depending on the charging time, i.e., how long the microscope is turned on. Once the battery has run down, the stored home position data is lost and the up/down movement of the stage cannot be correctly controlled. If you try to perform "Inputting of the Objective Focal Position" (III-9), a long buzz is emitted, indicating that you cannot input the data. Reset the home position using the procedure described above.
- When the microscope is turned on, the buzzer will sound (page 39). If the last sound of the buzzes lasts for a long time (about one second), reset the home position.

IV 19 Inputting the objective data

After you have assembled the microscope, input the appropriate bar code shown in "■ Objective Data" in the separate bar code list to register the data on the installed objective with the microscope.

- 1 Input the bar code with the objective data setting address No. which should be the same as the revolving nosepiece hole No. you have installed the objective on.
 - 2 Input the objective data bar code for the installed objective.
 - 3 Repeat the procedure above for all the objectives.
- If you have input incorrect data, input the correct objective data setting address bar code and objective data bar code. The newly input data will override the previous data.

20 Storing the tools

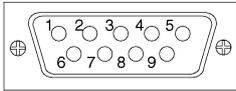
When you finish using the hexagonal screwdriver and the hexagonal wrench, insert them into the tool storage compartment at the base of the microscope.

■ Serial Interface Communications Specification

Baud rate: 9600 bps
 Data length: 8 bits
 Start bit: 1
 Stop bit: 1
 Parity check: Non

■ Connector [COM]

D-Sub 9-pin (male)



Pin No.	Input/Output	Signal	Description
1		N.C.	No connection
2	I	RXD	Serial data input
3	O	TXD	Serial data output
4	I	CTS	Clear to send
5	O	RTS	Request to send
6		N.C.	No connection
7		DGND	Signal ground
8		N.C.	No connection
9		+5V	External power supply

■ Communications Cable

The type of cable varies depending on the computer you use. Ask your nearest Nikon representative.

■ Communications Command

Ask your nearest Nikon representative.

Improper use of the microscope may adversely affect performance even if the microscope is not damaged. If any of the problems listed in the table below arise, take the countermeasures indicated.

1 Viewing and control systems

Problem	Cause	Countermeasure
Vignetting or uneven brightness in the view field; the entire view field cannot be seen.	The optical path selector on the trinocular eyepiece tube is in an intermediate position.	Set the optical path selector to the "binocular eyepiece 100%." (Page 20)
	The optical path selector on the trinocular eyepiece tube is not set to the "binocular eyepiece 100%."	
	The revolving nosepiece has not been installed properly.	Install the revolving nosepiece properly. (Page 35)
	The revolving nosepiece was not rotated until it clicked into place. (The objective is not in the optical path.)	Turn the revolving nosepiece until it clicks into place. (Place objective in the optical path.) (Page 17)
	The condenser is too low.	Position the condenser so that the image of the field diaphragm forms properly on the specimen. (Page 12)
	The condenser is not centered.	Center the condenser. (Page 12)
	The filters are in an intermediate position.	Position the filters correctly. (Page 20)
	The electric macro slider does not fit into the click and stops, because the set speed of the electric macro slider is not adequate.	Contact your nearest Nikon representative.
	The field diaphragm is closed too far.	Open the diaphragm to a suitable degree. (Page 15)
	The lamp has not been installed properly.	Install the lamp properly. (Page 32)
Dirt or dust in the view field	The condenser is too low.	Position the condenser so that the image of the field diaphragm forms properly on the specimen. (Page 12)
	The aperture diaphragm is closed too far.	Open the diaphragm to a suitable degree. (Page 13)
	There is dirt or dust on the lens, condenser, eyepiece, filter or specimen.	Clean the components. (Page 48)

VI Troubleshooting

Problem	Cause	Countermeasure
Viewing is poor (too much or too little contrast). (The details cannot be viewed clearly.)	The aperture diaphragm is closed too far.	Open the diaphragm to a suitable degree. (Page 13)
	The condenser is too low.	Position the condenser so that the image of the field diaphragm forms properly on the specimen. (Page 12)
	The cover glass is too thick.	Use the specified type of cover glass (thickness: 0.17 mm).
	There is no cover glass.	
	There is no oil on the tip of an oil-immersion objective.	Apply Nikon immersion oil. (Page 24)
	The specified immersion oil is not being used.	
	There are bubbles in the immersion oil.	Remove the bubbles. (Page 25)
	There is immersion oil on the tip of a dry type objective (especially in the case of 40x objective).	Clean the objective. (Page 25)
	The compensation ring on the objective has not been adjusted.	Adjust the compensation ring according to the cover glass.
	There is dirt or dust on the lens, condenser, objective, or specimen.	Clean the components. (Page 48)
Uneven focus	The revolving nosepiece has not been installed properly.	Install the revolving nosepiece properly. (Page 35)
	The revolving nosepiece was not rotated until it clicked into place.	Turn the revolving nosepiece until it clicks into place. (Page 17)
	The specimen is not secured in place on the stage.	Install the specimen properly on the specimen holder on the stage.
	The stage has been installed on an inclined plane.	Install the stage correctly. (Page 34)
Image flows.	The revolving nosepiece has not been installed properly.	Install the revolving nosepiece properly. (Page 35)
	The revolving nosepiece was not rotated until it clicked into place.	Turn the revolving nosepiece until it clicks into place. (Page 17)
	The specimen is not secured in place on the stage.	Install the specimen properly on the specimen holder on the stage.
	The condenser is not centered.	Center the condenser. (Page 12)
	The stage has been installed on an inclined plane.	Install the stage correctly. (Page 34)
Image is yellowish.	An NCB11 filter is not being used.	Insert an NCB11 filter. (Page 20)
	The lamp voltage is too low.	Set the brightness adjuster to "PRESET" or to position "9", then adjust the brightness through the ND filter combination. (Page 24)

VI Troubleshooting

Problem	Cause	Countermeasure
Image is too bright.	The lamp voltage is too high.	Set the brightness adjuster to "PRESET" or to position "9", then adjust the brightness through the ND filter combination. (Page 24)
Inadequate illumination (also check for electrical system problems and take countermeasures.)	The lamp voltage is too low.	Set the brightness adjuster to "PRESET" or to position "9", then adjust the brightness through the ND filter combination. (Page 24)
	The aperture diaphragm is closed too far.	Open the diaphragm to a suitable degree. (Page 13)
	The condenser is too low.	Position the condenser so that the image of the field diaphragm forms properly on the specimen. (Page 12)
Focusing is not possible with high-power objectives.	The specimen is placed upside down.	Affix the specimen on the stage with the cover glass facing up.
	The cover glass is too thick.	Use the specified type of cover glass (thickness: 0.17 mm).
The objective strikes the specimen when switching from a low-power objective to a high-power objective.	The specimen is placed upside down.	Affix the specimen on the stage with the cover glass facing up.
	The cover glass is too thick.	Use the specified type of cover glass (thickness: 0.17 mm).
	No diopter adjustment has been made.	Perform diopter adjustment. (Page 15)
The difference in focus when the objective is switched is excessively large.	No diopter adjustment has been made.	Perform diopter adjustment. (Page 15)
The specimen does not move smoothly.	The specimen holder is not fixed securely in place on the stage.	Secure the specimen holder in place. (Page 34)
When viewed through the binocular eyepiece, the image does not resolve into a single image.	No interpupillary distance adjustment has been made.	Perform interpupillary distance adjustment. (Page 16)
	No diopter adjustment has been made.	Perform diopter adjustment. (Page 15)
Eye strain develops during viewing.	No interpupillary distance adjustment has been made.	Perform interpupillary distance adjustment. (Page 16)
	No diopter adjustment has been made.	Perform diopter adjustment. (Page 15)
	The brightness level is not suitable.	Adjust the brightness through the ND filter combination. (Page 20)

2 Electrical system

Problem	Cause	Countermeasure
The lamp does not go on when the power is turned on.	The power supply is not plugged in.	Plug the power cord into an outlet. (Page 38)
	The cables between the microscope and the power supply are not connected.	Connect the cables. (Page 38)
	The sub-power switch is set to "EPI".	Set the switch to "DIA". (Page 7)
	No lamp has been installed.	Install the lamp. (Page 32)
	The lamp is burned out.	Replace the lamp. (Page 32)
The lamp blows out immediately.	The specified lamp is not being used.	Use the specified lamp (refer to the electrical specifications on page 50).
Inadequate brightness	The specified lamp is not being used.	Use the specified lamp (refer to the electrical specifications on page 50).
The brightness adjuster has no effect.	The lamp voltage control cable has not been connected.	Connect the cable. (Page 38)
The lamp flickers; brightness is unstable.	The lamp is near the end of its service life.	Replace the lamp. (Page 32)
	The connectors are not securely connected.	Secure the connections. (Page 38)
	The lamp is not securely plugged into its socket.	Insert the lamp securely into its socket. (Page 32)
The buzzer does not sound when the power is turned on.	The power supply cord is not properly connected.	Properly insert the plug into the outlet (page 38).
	The control cable is not properly connected.	Properly connect the cable (page 38).
	The fuse is blown. (The power supply pilot lamp is out.)	Check the fuse. If it is blown, contact your nearest Nikon representative.
You cannot input bar codes.	The bar-code reader is not turned on.	Make sure that the red LED on the tip of the reader pen lights up when inputting (separate bar code list).
	The setting of the bar-code reader for communications is not correct. (The reader makes a long buzz after scanning a bar code.)	Make the settings for communications while referring to the operations manual of the bar-code reader. (For the communications specification, see Chapter V, "Communications" on page 41.)
The field diaphragm and the aperture diaphragm cannot be adjusted electrically.	The objective data is corrupted.	Input the objective data again (page 40).
The focal position bar codes are not accepted.	The home position data is not set.	Set the home position for the up/down movement (page 39).

VI Troubleshooting

Problem	Cause	Countermeasure
Using the ND filter adjustment dial, the brightness cannot be adjusted to the appropriate level.	The brightness adjust step is too large.	Input the appropriate-level bar code shown in “■ ND Filter Movement” in the separate bar code list. Then input the filter-movement setting storage bar code. Filter movement for single click rotation of the ND filter adjustment dial can be set.
The motorized revolving nosepiece does not work.	Contact failure of the connector. (Check the number of buzzes made when the power is turned on.)	Properly connect the cable (page 35).
	The control data is corrupted.	Input the revolving nosepiece control data initialization bar code shown in “■ Motorized Equipment Control Data Initialization” in the separate bar code list. Turn on the power switch on the power supply again. If this does not solve the problem, contact your nearest Nikon representative.
The motorized revolving nosepiece keeps revolving and does not stop.	The control data is corrupted.	Input the revolving nosepiece control data initialization bar code shown in “■ Motorized Equipment Control Data Initialization” in the separate bar code list. Turn on the power switch on the power supply again. If this does not solve the problem, contact your nearest Nikon representative.
The motorized micro/macro condenser does not work.	Contact failure of the connector. (Check the number of buzzes made when the power is turned on.)	Properly connect the connector.
	The control data is corrupted.	Input the macro-condenser control data initialization bar code shown in “■ Motorized Equipment Control Data Initialization” in the separate bar code list. Turn on the power switch on the power supply again. If this does not solve the problem, contact your nearest Nikon representative.
	The objective data is corrupted.	Input the objective data again (page 40).
The motorized micro/macro condenser keeps revolving and does not stop.	The control data is corrupted.	Input the macro-condenser control data initialization bar code shown in “■ Motorized Equipment Control Data Initialization” in the separate bar code list. Turn on the power switch on the power supply again. If this does not solve the problem, contact your nearest Nikon representative.

VI Troubleshooting

Problem	Cause	Countermeasure
The electric macro slider does not work or, if it does, it stops soon.	The control data is corrupted.	Input the macro-slider control data initialization bar code shown in "■ Motorized Equipment Control Data Initialization" in the separate bar code list. Turn on the power switch on the power supply again. If this does not solve the problem, contact your nearest Nikon representative.
The stage does not move up or down.	The control data is corrupted.	Input the stage-up/down movement control data initialization bar code shown in "■ Motorized Equipment Control Data Initialization" in the separate bar code list. Turn on the power switch on the power supply again. If this does not solve the problem, contact your nearest Nikon representative.
The field diaphragm does not work or, if it does, it stops soon.	The control data is corrupted.	Input the field-diaphragm control data initialization bar code shown in "■ Motorized Equipment Control Data Initialization" in the separate bar code list. Turn on the power switch on the power supply again. If this does not solve the problem, contact your nearest Nikon representative.
The aperture diaphragm does not work or, if it does, it stops soon.	The control data is corrupted.	Input the aperture-diaphragm control data initialization bar code shown in "■ Motorized Equipment Control Data Initialization" in the separate bar code list. Turn on the power switch on the power supply again. If this does not solve the problem, contact your nearest Nikon representative.
The ND filter does not work or, if it does, it stops soon.	The control data is corrupted.	Input the brightness-adjustment ND filter control data initialization bar code shown in "■ Motorized Equipment Control Data Initialization" in the separate bar code list. Turn on the power switch on the power supply again. If this does not solve the problem, contact your nearest Nikon representative.

1 Cleaning the lenses

Do not let dust, fingerprints, etc., get on the lenses. Dirt on the lenses, filters, etc. will adversely affect image viewing. If any of the lenses get dirty, clean them as described below:

- Either brush away dust using a soft brush, or else wipe it away gently using gauze.
- If there are fingerprints or grease on a lens, dampen a piece of soft, clean cotton cloth, lens tissue, or gauze with absolute alcohol (ethyl alcohol or methyl alcohol), then wipe the lens surface.
- Use petroleum benzene to clean off any immersion oil. (Page 25)
- Do not wipe the entrance lens on the eyepiece tube with petroleum benzene.
- Absolute alcohol and petroleum benzene are highly flammable. Be careful when handling them, especially around open flames or when turning the power switch on/off.
- Follow the instructions provided by the manufacturer when using absolute alcohol or petroleum benzene.

2 Cleaning painted components

Do not use organic solvents (such as alcohol, ether, or paint thinner) on painted components, plastic components, or printed labels. Doing so could result in discoloration or in the peeling of printed characters. If the dirt is hard to remove, dampen a piece of gauze with a small amount of neutral detergent thinned with water, then wipe the dirty surface gently.

3 Storage

- Store the microscope in a dry place where mold is not likely to form.
- Store the objectives and eyepieces in a desiccator or similar container with a drying agent.
- Put the vinyl cover on the microscope to protect it from dust. Before putting on the vinyl cover, turn off the sub-power switch on the microscope and the power switch on the power supply (flip to the "O" side), then wait until the lamphouse cools down.

4 Regular inspections

Regular inspections of this microscope are recommended in order to maintain optimum performance. Contact your nearest Nikon representative for details about regular inspections.

5 Recycling of Nickel-Cadmium battery

USA



Ni-Cd

THE PRODUCT THAT YOU HAVE PURCHASED CONTAINS A RECHARGEABLE BATTERY.

THE BATTERY IS RECYCLABLE.

At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream.

Check with your local solid waste officials for details in your area for recycling options or proper disposal.

Europe

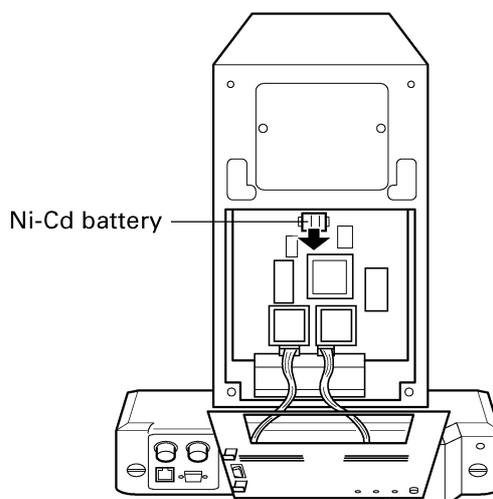
CONTAIN NICKEL-CADMIUM BATTERY.

MUST BE RECYCLED OR DISPOSED OF PROPERLY.

Please return the product to your Nikon representative at the end of its life.

■ How to Remove the Battery

- 1 Unscrew the four screws on the rear cover of the microscope stand and remove the cover.
- 2 Ni-Cd battery is tightly connected to the CPU printed circuit board inside. You can remove the battery by the hand.



Rear of the Microscope

Electrical Specifications

■ ECLIPSE E1000M/E1000 (main body of the microscope)

Power source:	For 100/120 V area: V-PS100DU-2 power supply For 230 V area: V-PS100E-2 power supply
Input voltage:	12 V DC, \pm 18 V DC
Light source:	Lamp rating: 12 V DC, 100 W Lamp type: Halogen lamp (OSRAM HLX 64623 or PHILIPS 7724)
Protection class:	Class 1
Operating environmental conditions:	Temperature: 0° to +40°C Humidity: 85% Rh max., noncondensing Altitude: 2000 m max. Pollution: Degree 2 Installation: Category 2 Indoor use only

Conforming standards (for 100/120 V area):

- UL listed product
- FCC 15B Class A satisfied

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. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

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. 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.

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Conforming standards (for 230 V area):

- GS-approved product
- EU Low Voltage Directive satisfied
- EU EMC Directive satisfied



■ V-PS100DU-2 (Power supply for 100/120 V area)

■ V-PS100E-2 (Power supply for 230 V area)

Refer to the instruction manual provided with the V-PS100DU-2 or V-PS100E-2 power supply.

NIKON CORPORATION / 株式会社 ニコン

2-3, Marunouchi 3-chome, Chiyoda-ku, Tokyo 100-8331, Japan
〒100-8331 東京都千代田区丸の内3-2-3 (富士ビル)

NIKON INSTECH CO., LTD. / 株式会社 ニコン インステック

Parale-Mitsui Bldg., 8, Higashida-cho, Kawasaki-ku, Kawasaki, Kanagawa, 210-0005 Japan TEL +81-44-223-2161 FAX +81-44-223-2182
本社 210-0005 川崎市川崎区東田町8番地 パレール三井ビルディング13階 電話 (044) 223-2160 FAX (044) 223-2180
札幌営業所 001-0011 札幌市北区北11条西4-1-40 (すばるビル) 電話 (011) 746-9381 FAX (011) 746-9398
名古屋営業所 460-0002 名古屋市中区丸の内3-20-17 (中外東京海上ビル) 電話 (052) 954-0165 FAX (052) 954-0166

●系列会社●

株式会社コーガク【大阪(本社)、京都、金沢】

本社 532-0003 大阪市淀川区宮原3-3-31 上村ニッセイビル16階 電話 (06) 6394-8801
京都支社 606-8221 京都市左京区田中西樋ノ口町80 電話 (075) 781-1170

株式会社大熊商会【福岡(本社)、北九州、長崎、大分、熊本、宮崎、国分、鹿児島】

本社 813-0034 福岡市東区多の津1-4-1 電話 (092) 611-1111

NIKON INSTRUMENTS INC.

1300 Walt Whitman Road, Melville, NY 11747-3064, U.S.A.
Tel: +1-631-547-8500 Fax: +1-631-547-0306

NIKON INSTRUMENTS EUROPE B.V.

Schipholweg 321, P.O. Box 222, 1170 AE Badhoevedorp, The Netherlands
Tel: +31-20-44-96-222 Fax: +31-20-44-96-298

