

# The Nikon E200<sup>15</sup>

## Notes on Handling the System

### (1) Installation

This microscope is a precision instrument. Using the microscope in an unfavorable environment could result in malfunctions or degraded performance. Consider the following conditions when choosing the installation location.

- Observation conditions are better if light from windows and bright room light can be avoided.
- Install the microscope in a location with a room temperature of 0° to 40°C and with a maximum relative humidity of 85%. High temperature and humidity are to be avoided because they promote mold growth and condensation, which may damage the microscope.
- Dirt and dust degrade optical performance and are to be avoided.
- Vibrations in the environment will degrade the image. Install the microscope in a location free of vibrations.
- Install the microscope on a solid table and keep the microscope level.
- Select a layout that allows easy detachment of the power cord from the AC inlet of this microscope in the event of emergency.
- This microscope emits a feeble electromagnetic wave. Do not place a precision electronic device near the microscope as precision could be degraded. Also, avoid placing a radio or TV near the microscope as reception of sound and images may be hampered.

### (2) Carrying the Microscope

This microscope is a precision instrument. Handle it gently. Strong shocks and forcible operation will damage the instrument. Shocks to the objectives, especially, could degrade image precision.

- When carrying the microscope, hold it at its upper rear and lower front ends.
- Do not hold the focus knobs, the eyepiece tube, or the stage. These parts could easily come off and could result in malfunctions.



### (3) Handling the Lamps

Do not touch the glass part of the lamp with bare hands. Wear gloves or use a cloth when handling the lamp so as not to leave fingerprints on the surface. Wipe off any fingerprints or stains using a clean cloth moistened with alcohol. Fingerprints will etch into the hot surface of the lamp and reduce the brightness, damage the lamp or reduce its service life.

Handle the lamp gently. Shocks and vibrations will damage the lamp or reduce its service life.

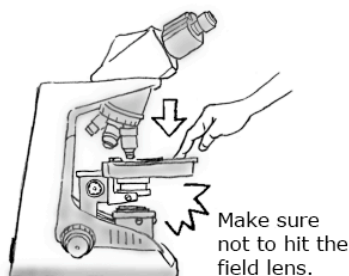
When changing the lamp, be sure that the contact is not damaged. If the contact is damaged, the lamp may not light up or may overheat. Insert the lamp's contact pins fully into the socket holes. If the pins are loose, the lamp could come off or result in a contact failure, which will cause overheating or smoke. Also, make sure that the field lens unit is securely attached.

Do not break the used lamps ; instead dispose of them as special industrial waste or according to the laws applicable to your municipal waste system.

<sup>15</sup> From *Nikon Eclipse E200 Instructions*, Nikon Instruments, Inc., 1300 Walt Whitman Road, Melville, NY 11474-3064, reproduced with permission.

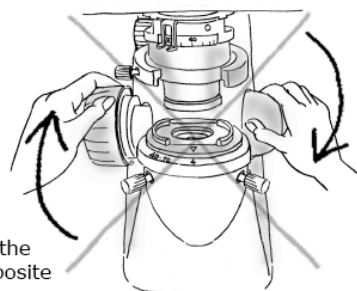
#### (4) Refocusing

When changing specimens using the refocusing mechanism, gently lower the stage by hand taking care not to hit the field lens with the condenser holder (p. 60).



#### (5) Focus Knobs

Do not turn the right and left focus knobs simultaneously in opposite directions. Do not turn the coarse focus knob any further after the stage has been moved up or down to its limit. These operations will damage the focusing mechanism. (The coarse focus knob has a protection device. The knob turns freely for a while after it has reached its upper limit.)



#### (6) Oil-Immersion Observation

Use only a minimum quantity of oil. If too much oil is applied, surplus oil could flow out to the stage and the condenser which could lead to degraded performance.



##### WARNING

**When using petroleum benzine or absolute alcohol to wipe off immersion oil or to clean the lenses, follow the instructions provided by their manufacturers. Absolute alcohol and petroleum benzine are inflammable. Take great care when handling them.**

#### (7) Shipping Clamps

The microscope is held tightly by the clamps during shipment before use. For details, see p. 69.



# 1

## Nomenclature of Each Part

The microscope is made up of the following components.

**(1) Basic unit**

**(2) Eyepieces**

Screwed on to the eyepiece tube.

**(3) Eyepiece Tube**

This is a binocular eyepiece tube. A trinocular eyepiece tube is available for photomicrography and TV microscopy.

**(4) Objectives**

Objectives with various magnifying powers are available.

**(5) Condenser**

Used for condensing light.

The condenser should be positioned slightly lower than its upper limit.

Adjust the aperture diaphragm lever according to the objective.

**(6) Field Lens Unit**

Draw out the field lens unit when changing lamp.

The microscope may have a field diaphragm. A field diaphragm is used to control the illumination range and should be adjusted according to the objective. (Note that there are two types of microscopes; the one with the field diaphragm, and the one without.)

**(7) Lamp**

Halogen lamp 6 V-20 W or 6 V-30 W is used.

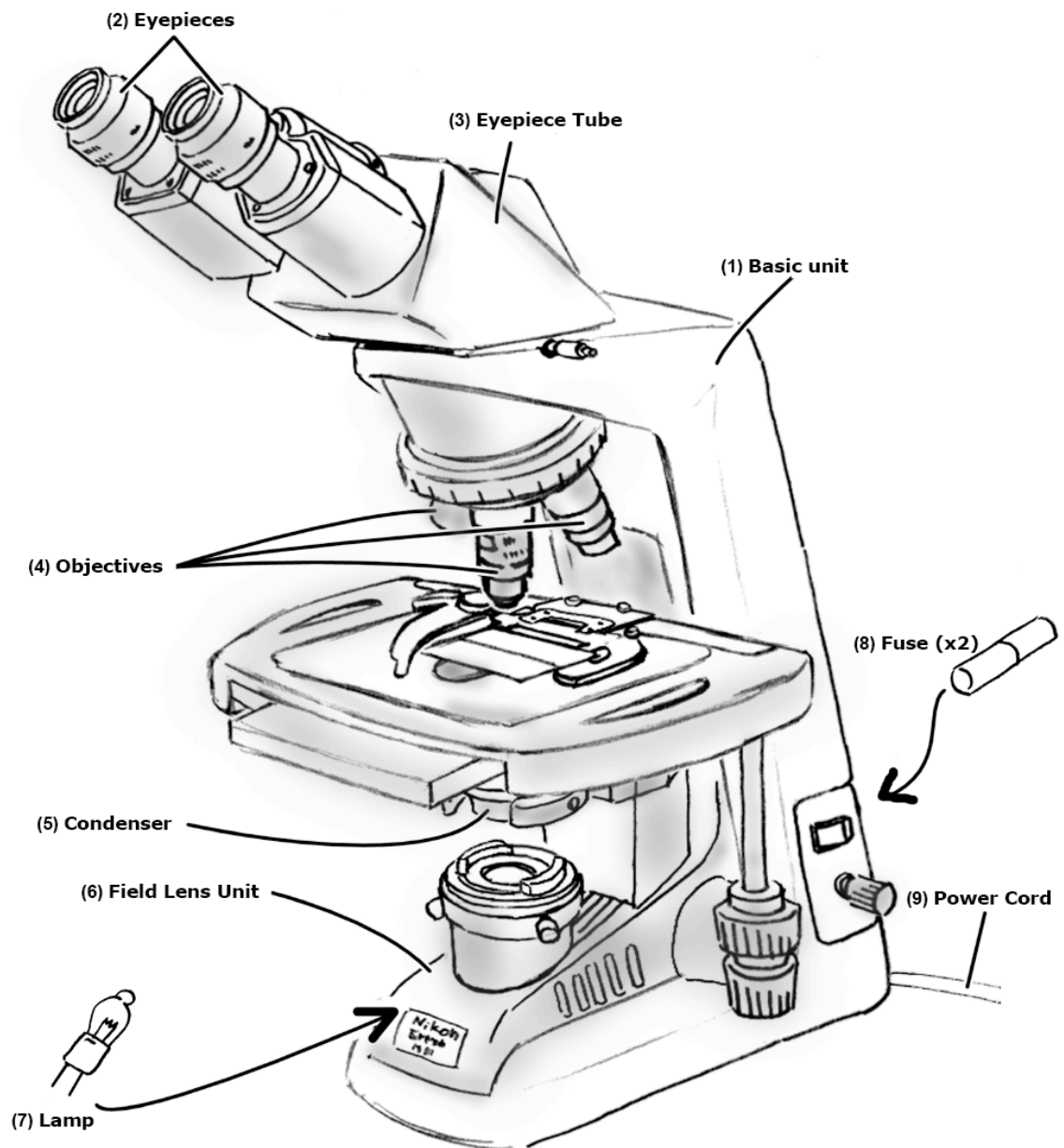
**(8) Fuse**

Two 250 V 1A time-lag low-breaking type fuses are used.

**(9) Power Cord**

Use the power cord provided.

## Chapter 1 Nomenclature of Each Part



# 2

## Switches and Controls

### (1) Diopter Ring

Adjust the diopter ring to compensate for the difference between your right and left eyesight. (p. 57)

### (2) Revolving nosepiece

Can hold up to four objectives.

### (3) Stage

### (4) Specimen holder

Put your finger at the root or the tip tilt of the claw to open the claw. (p. 55, 71)

### (5) Condenser aperture diaphragm lever

Set the lever to match the magnifying power of the objective. (p. 59)

### (6) Condenser Clamp Screw

### (7) Auxiliary lens for the condenser

Screw on to the bottom of the condenser.

### (8) Blue filter and the filter holder

### (9) Longitudinal stage motion (Y Axis) knob

### (10) Lateral stage motion (X Axis) knob

These knobs are located either to the right or the left of the stage.

### (11) Field diaphragm ring

Set the ring to match the magnifying power of the objective. (p. 60)  
This ring is equipped only on the microscope with a field diaphragm.

### (12) Field diaphragm centering screws

Used to center the field diaphragm image. (p. 57)  
These screws are equipped only on the microscope with a field diaphragm.

### (13) Fine focus knob

Used for focusing. There is no coarse focus knob on the side with the stage motion knobs.

### (14) Power switch

When turned to I, power is turned on and the lamp lights.

When turned to "O", power is turned off and the lamp goes off.

### (15) Brightness control dial

When turned clockwise, the lamp voltage increases and the viewfield becomes brighter.

When turned counterclockwise, the lamp voltage decreases and the viewfield becomes darker.

### (16) Condenser focus knob

Use this knob when focusing the field diaphragm image on the specimen. (p. 57)

The condenser focus knob is located on the opposite side of the stage motion knobs.

### (17) Fine focus knob

### (18) Coarse focus Knob

There are both coarse and fine focus knobs on the opposite side of the stage motion knobs.

### (19) Coarse focus knob torque adjustment ring

Used to adjust the tension (torque) of the coarse focus knob. (p. 64)

### (20) Nameplate

Indicates the input voltage.

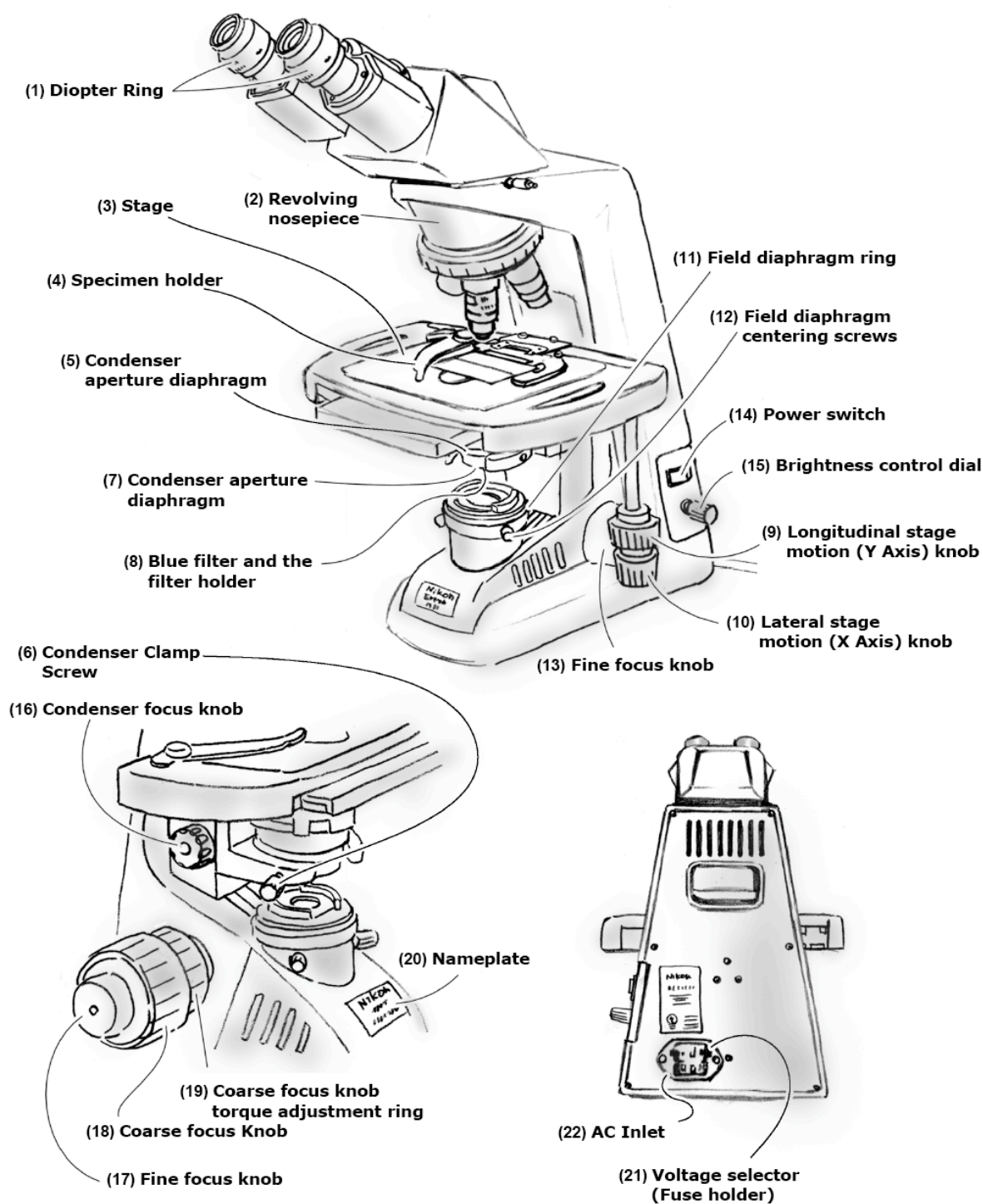
### (21) Voltage selector (Fuse holder)

Use this selector to match the input voltage of the microscope to the voltage provided in your region. (p. 68)

### (22) AC Inlet

Plug the power cord into this inlet. Make sure that the power switch is off (turned to "O") before plugging the cord in.

## Chapter 2 Switches and Controls



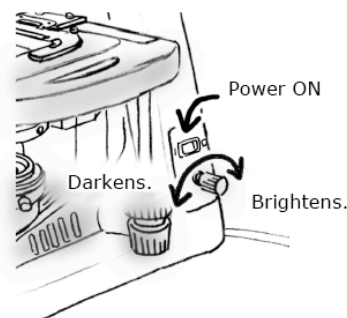


## 4

## Microscopy (Detailed Procedure)

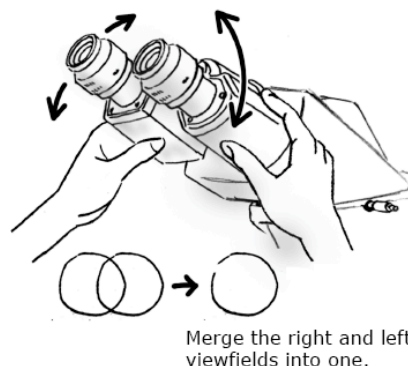
## 1 Lamp Illumination

Turn on the power switch (turn to I) and the lamp will come on. Turn the brightness control dial to adjust the brightness of the viewfield. (Turning the dial clockwise increases the brightness; turning the dial counterclockwise decreases it.)



## 2 Interpupillary Distance Adjustment

Adjust the distance between the eyepieces to merge the right and left viewfields into one. (This is an adjustment to match the distance between eyepieces with the distance between your eyes).



Try!!

## Changing the Eye Level

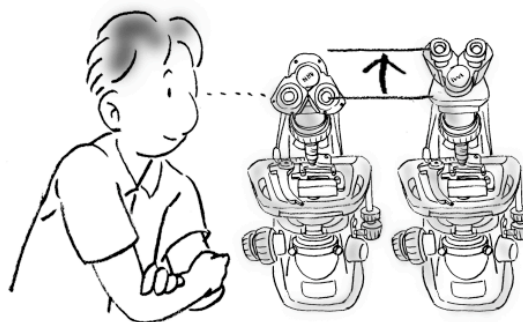
Turn the binocular part of your microscope 180 degrees, and you will get the microscope with higher eye level. \*1

If you feel uncomfortable in observing the image due to its size, you may find this convenient.

There is one condition, however, that should be met. Before returning the microscope in the cabinet, put back the binocular part to its original low position. Since left high, the tip of the eyepiece will become the highest point of the microscope and may be damaged easily when bumped against the shelf. In addition, the microscope may be higher than the shelf.

The eye level can be raised even higher (till 50 mm) if an "Eye level raiser (optional)" is installed between the basic unit and the eyepiece tube. See p. 65 for details on the eye level raiser.

\*1: When the interpupillary distance is 64 mm, the eye level is raised about 30 mm.



### 3 Align the Diopter Ring with the Engraved Base Line

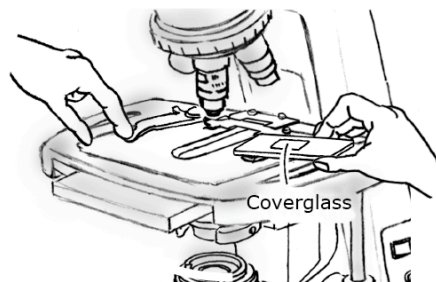
Turn the diopter ring on the right eyepiece to align its bottom edge with the engraved base line. Turn and align the diopter ring on the left eyepiece in the same way.



Match the bottom edge of the diopter ring with the engraved base line.

### 4 Specimen Mounting

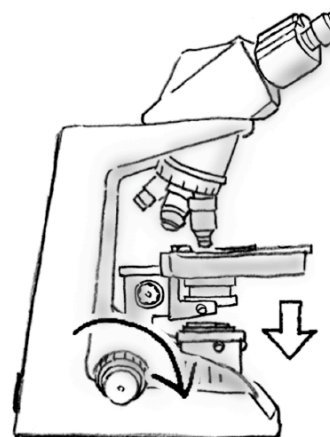
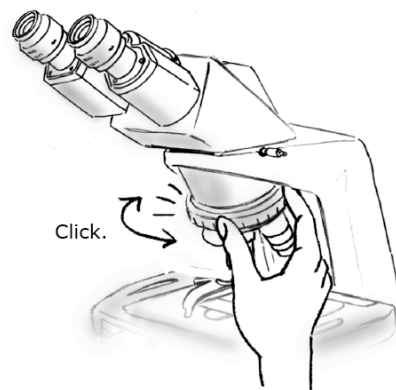
Place specimen slide on the stage with the coverglass facing upward. Open the claw of the specimen holder with your finger at the root or the tip tilt and fix the specimen slide with the claw.



### 5 Focus with the 10x Objective

Rotate the revolving nosepiece to bring the 10x objective into the optical path. (The objective will click into place when rotated into position.) Bring the specimen image into focus by turning the coarse focus and then fine focus knob.

- Direction of stage movement relative to focus knob rotation is shown in the figure.
- There is no coarse focus knob on the side with the stage motion knobs. There are both coarse and fine focus knobs on the opposite side of the stage motion knobs.
- Do not turn the right and left focus knobs simultaneously in the opposite directions. Do not turn the coarse focus knob further after the stage has reached its lower or upper limit. These operations could result in a malfunction.
- Turn the ring below the stage to set the appropriate condenser: C for bright field, A for dark field, and the appropriate Ph for phase. Match the Ph (1, 2, or 3) to the objective.



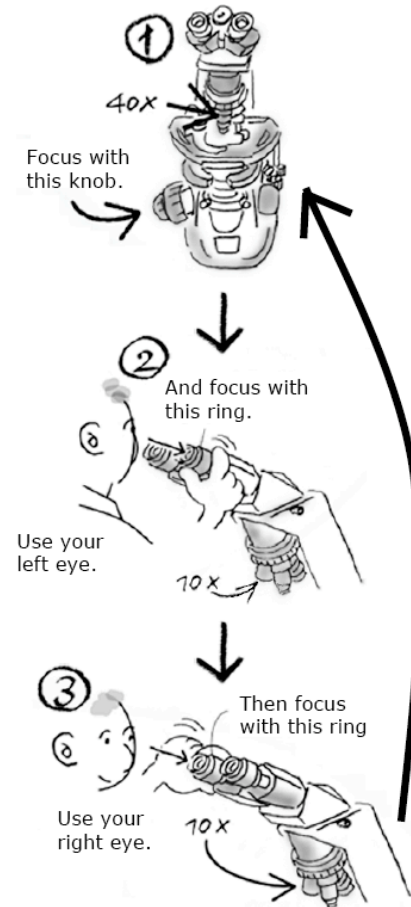


## 6 Eyepiece Diopter Adjustments

Adjust the diopter ring on the eyepieces according to the difference between your left and right eyesight. This adjustment enables the user to take full advantage of the high-quality objectives, including their parfocality.

- (1) **Swing the 40x objective in the optical path. Rotate the coarse and then fine focus knobs to bring the specimen in focus.**
- (2) **Switch back to the 10x (or 4x) objective. While looking into the right eyepiece with your right eye, focus on the specimen by rotating the right diopter ring and not using the focus knob.**
- (3) **While looking into the left eyepiece with your left eye, focus on the specimen by rotating the left diopter ring and not using the focus knob.**
- (4) **Repeat the steps ② to ③.**

\* The next procedure is for microscopes equipped with field diaphragm. If the microscope does not have a field diaphragm, confirm the position of the condenser and skip to procedure 8. (The condenser should be a little lower than its highest position.)



## 8 Objective Selection

Rotate the revolving nosepiece to the desired objective magnification. (The objective will click into place when rotated into position.)

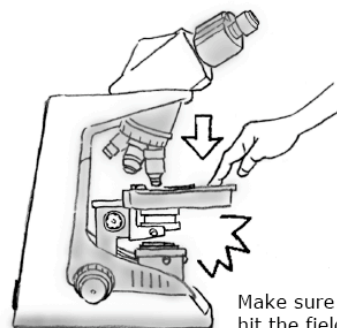
Adjust the aperture diaphragm lever according to the selected objective. If the microscope is equipped with a field diaphragm, also adjust the size field diaphragm (see the procedures 9 and 10).



### Replacing a Specimen Using the Refocusing Mechanism

Try focusing on the specimen with 40x or higher magnification objective. You will find the specimen is brought very near to the objective.\*<sup>1</sup> It will be very difficult to change the specimen without moving the focus knob. In a case like this, use the refocusing mechanism for easy specimen replacement.

- (1) Use one hand to gently press down the stage.\*<sup>2</sup>
- (2) While holding the stage at that position, change the specimen.
- (3) Gradually release the stage so that it rises slowly. The stage will return to the focal position.



Make sure not to hit the field lens.

\*1 : The distance between the front of the objective and the specimen when the specimen is in focus is called the "working distance" of the objective. For details, see p. 74.

\*2 : When lowering the stage, take great care not to hit the field lens with the condenser and the parts under the condenser

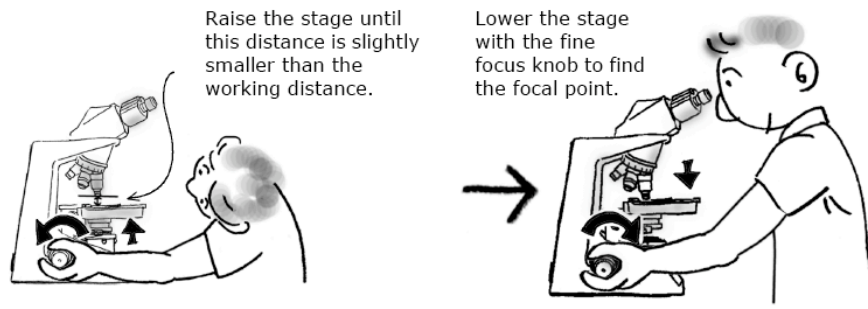


## Using the Working Distance for Focusing

Each objective has its working distance indicated on its side. The working distance is the distance between the front of the objective and the specimen when the specimen image is in focus. If you have difficulties in focusing with the standard procedure described on p. 56, try one of the following methods using the working distance for focusing.

### Method 1:

While looking at the microscope from the side, rotate the coarse focus knob to bring the specimen close to the objective. When the distance between the specimen and the front of the objective becomes slightly smaller than the working distance, take your hands off the coarse focus knob. The specimen is now almost in focus. Look into the eyepieces and rotate the fine focus knob in the direction that lowers the stage.



### Method 2:

Swing the 40x objective into the optical path. While looking at the microscope from the side, rotate the coarse focus knob until the specimen almost touches the objective (about 0.5 mm apart from the front of the objective). The specimen is now almost in focus. Switch to the 10x objective, look into the eyepieces, and rotate the fine focus knob slightly to find the focal point. Be careful not to hit the objective with the specimen.

## 11 Turning Off the Lamp

Turning off the power switch (turn to "O") switches off the lamp.  
When storing the microscope:

- Unplug the power cord.
- Wait until the field lens unit is cool enough to touch.
- Return the binocular part to its lowest position.
- Cover the microscope with the vinyl dust cover. (Before covering the microscope, make sure that the field lens unit is cool enough to touch.)
- When carrying the microscope, hold it at its upper rear and lower front ends.

## 1

**Oil-Immersion Observation**

The "Oil" mark on the side of an objective indicates that it is an oil-immersion type objective. (The oil-immersion objective also has a black band around the barrel end.) An oil-immersion objective is used with the immersion oil applied between the front of the objective and the coverglass. For an oil-immersion objective with a numerical aperture of 1.0 or more, use of an oil-immersion type condenser is required to take full advantage of its performance. An oil-immersion type condenser, like an oil-immersion type objective, needs immersion oil to be applied between the front of the condenser and the coverglass.

The abbe condenser included in the bright viewfield set can be used for oil immersion observation. The condenser has an oil receptacle around its front lens.

**● Example of Oil-Immersion****Condenser:**

Move the specimen toward the back and lower the condenser slightly. Add a drop of oil on the front of the condenser from the long hole on the stage. Bring the specimen back over the condenser and slowly raise the condenser.

**Objective:**

Rotate the revolving nosepiece to move the objective out of position. Add a drop of oil to the specimen. Slowly rotate the revolving nosepiece to bring the objective back into position.

**● Eliminate Air Bubbles**

Make sure that air bubbles are not trapped during oil application. Air bubbles degrade the image. To see if any air bubbles are trapped in the oil, remove one eyepiece and fully open the aperture diaphragm (and field diaphragm, if the microscope has the field diaphragm). Look into the eyepiece tube and check the objective pupil (a bright round part). If you cannot see it well, replace one of the eyepieces with the adapter and the centering telescope (both optional) and look through the eyepieces of the centering telescope while rotating the eyepiece part of the centering telescope.

Do any of the following to eliminate air bubbles:

- Rotate the revolving nosepiece to move the objective back and forth.
- Gently rotate the condenser focus knob to move the condenser up and down.
- Add another drop of oil.
- Wipe off the oil and apply again.

## ● Handling of the Immersion Oil

Use a minimum quantity of oil. If too much oil is applied, surplus oil could flow out onto the stage and the condenser and degrade performance.

After completing oil-immersion observation, be sure to clean the objective, condenser, and any other parts that may be stained by oil. Any oil residue left on the lenses of oil-immersion type objectives or adhesion of oils on the front lens of dry type objectives will degrade image quality. Use petroleum benzine to wipe off oil and finish with absolute alcohol (ethyl or methyl alcohol). If petroleum benzine is not available, use methyl alcohol instead. In that case, wipe off the oil several times (generally 3 or 4 times) as the detergency of methyl alcohol is weaker than petroleum benzine.



### WARNING

**When handling petroleum benzine and absolute alcohol, be sure to follow the instructions provided by the manufacturers. Since they are highly flammable take great care when handling them.**

## ● Cautions on Handling the Immersion Oil

- Close the container cap tightly after use. Make sure that the cap is closed tight after refilling the container. Check the cap periodically to make sure it has not come loose, allowing oil to leak out.
- Do not press the container hard. Oil could splash out.
- If you find an oil drips around the container, wipe them off.
- Avoid contact of immersion oil with eyes or skin. In the event of contact with eyes or skin, take one of the following measures although Nikon immersion oil does not contain any toxic ingredients.
  - ◊ **Contact with skin:**    **Rinse your skin thoroughly with soap and water.**
  - ◊ **Contact with eye:**    **Rinse your eye thoroughly with water (more than 15 minutes) and see a doctor.**
- Do not leave immersion oil in the sun (ultraviolet rays can damage it).