# 2 Operation

## 1 Installing and Replacing Lamps

Read the sections "⚠ WARNING", "⚠ CAUTION" and "Notes on Handling This Product" and follow the instruction written therein before attempting to install or replace a lamp.
Use only the specified mercury lamps (p.3). For details on handling lamps, please see the instruction manual supplied with it.

**1** Turn off the POWER switch on the power supply (set to "○" side).

**2** Unplug the power cord plug from the electrical outlet.

**3** Wait for the lamp and lamphouse to cool to prevent burn injury.

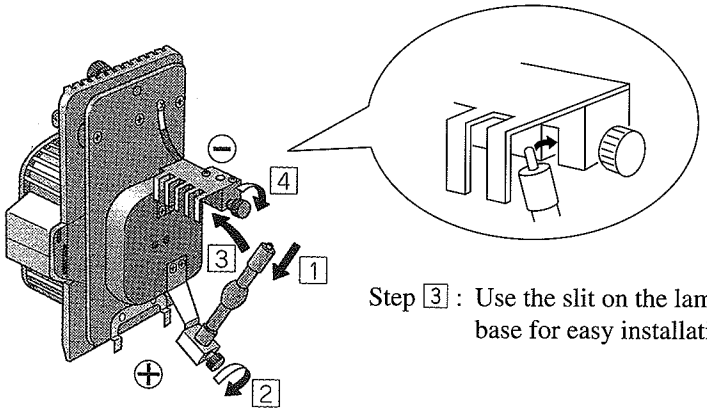
**4** Put on the gloves. (This prevents scratches or fingerprints from getting on the lamp.)

**5** Loosen the socket clamp screw and remove the lamp socket from the lamphouse.

**6** Loosen the lamp clamp screws on both the plus and minus lamp clamp base and remove the lamp. (This will be a dummy lamp when the product is new.)
Do not break the used up lamp but dispose of them as the special industrial waste.

**7** Install a new lamp.
When installing the lamp into the socket, secure its plus polarity side first (tighten the clamp screw on the flexible base first) to prevent the lamp from breaking. The lamp clamp screws should be securely tightened. If not, the contact resistance is greatly increased causing overheating of the lamp clamp base, resulting in oxidation of the metal and the lamp burst.

(1) Further loosen the lamp clamp screws on the plus and minus lamp clamp base.
(2) Fit the plus-side base of the mercury lamp into the lower flexible lamp clamp base (+) [1] and tighten the clamp screw [2].
(3) Fit the minus-side base of the mercury lamp into the upper fixed lamp clamp base (–) [3] and tighten the clamp screw [4].




Step [3] : Use the slit on the lamp clamp base for easy installation.

**8** Attach the lamp socket to the lamphouse.

(1) Holding the lamp socket at an angle, insert the hinge of the socket into the socket port of the lamphouse.
(2) Fit the lamp socket to the lamphouse ans secure it in place by tightening the socket clamp screw.

**9** Press the reset button of the RUN TIME counter on the power supply so that the time reads "000.0".
(The RUN TIME counter records the total time a lamp has been in use. Since pressing the reset button in the middle of the life of a lamp will cause you to lose track of the total elapsed time, only press the reset button when installing a new lamp. Put the cover on the reset button after reset.)

**10** Center the lamp.
The lamp should be centered every time the lamp is replaced. If the lamp is not properly centered, the image may become dark or lighting may not be uniform. (For details, see "3. Centering the Lamp".)

## 2 Turning On and Off the Lamp

Read the sections "⚠ WARNING", "⚠ CAUTION" and "Notes on Handling This Product" and follow the instructions written therein before turning on the lamp.

### 1. Turning on and off the power

Before turning on the power supply, check that the input voltage marking on the rear panel of the power supply matches your available line voltage.

**Power ON** Turn on the power supply (set the POWER switch to " | " side).
The POWER lamp will light to show that the power is turned on.
Note that the lamp itself will not light just from turning on the power supply.

**Power OFF** Turn off the power supply (set the POWER switch to "○" side).
If the mercury lamp was lit, it will now turn off.
The POWER lamp and the LAMP READY lamp will all go out.

### 2. Turning on the lamp

High voltage is supplied to the lamp while the IGNITION switch is pressed. Touching the lamphouse or lamp socket during this time poses a risk of electric shock. To prevent electric shock, never touch the lamphouse or lamp socket while the LAMP ON switch is depressed.

**1** Make sure that more than ten minutes have passed since you turned off the mercury lamp. (It is hard to light the lamp when the pressure inside the lamp is high. To lower the pressure, let the lamp thoroughly cool which takes approximately ten minutes.)

**2** Turn on the power supply (set the power switch to " | " side). Confirm that the POWER monitor lamp is on.

**3** Push the IGNITION button on the power supply for several (2 to 3) seconds. (The lamp lights.)

- The LAMP READY indicator lights up to show that the mercury lamp is lit.
- If the mercury lamp did not light even though you pressed the IGNITION button for about ten seconds in total, the lamp can no more be turned on by pressing down the IGNITION button. To turn on the lamp, once turn off the power. Check that the mercury lamp is not old or the RUN TIME counter is not exceeding "300.0" and replace the lamp when necessary. Then , turn on the power and press the IGNITION button.
  (An old lamp or the lamp having been used for over 300 hours cannot be turned on easily. Since the use of such lamps can cause lamp burst or other serious accidents, a safety interlock circuit automatically cuts off the lamp ignition. See the following item 4. for the safety interlock circuit.)
- The RUN TIME counter counts up 0.1 when 10 or so seconds has elapsed after the lamp is lit.
- The RUN TIME counter counts up the elapsed lighting time. (See the following item 5. for the RUN TIME counter.)
- The mercury lamp will not light if the safety interlock circuit is activated. (See the following item 4. for the safety interlock circuit.)

## 3. Turning off the lamp

Turning off the power supply (set the POWER switch on the power supply to "○" side) will turn off the power and the lamp. (Make sure that the POWER monitor lamp is extinguished.) If you want to turn on the lamp again, wait for about ten minutes for the mercury lamp to cool down to the room temperature.

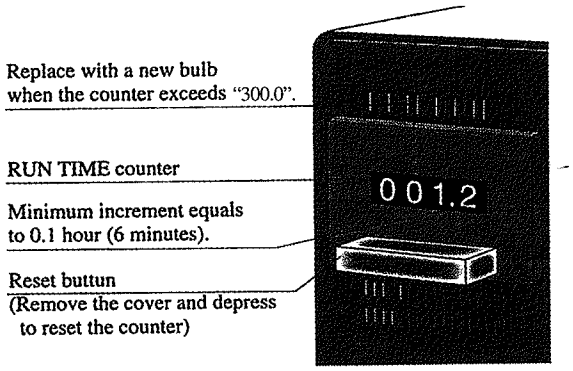
## 4. Safety interlock

This equipment incorporates a safety interlock circuit. When the safety interlock circuit activates, lamp output is automatically disabled and the lamp is turned off.
To turn on the lamp again, first turn off the POWER switch and remove the cause that activated the safety interlock circuit. Wait for more than 10 minutes for the lamp to cool to the room temperature, and turn on the POWER switch. Then press the IGNITION button.
The safety interlock circuit is activated in the following situations:

- The lamp socket is not properly connected to the lamphouse.
- The lamp socket is disconnected from the lamphouse while the lamp is lit. (Never disconnect the lamp socket from the lamphouse while the lamp is lit.)
- The lamp input connector is not connected to the power supply.
- The lamp input connector is disconnected from the power supply while the lamp is lit. (Never disconnect the lamp input connector from the power supply while the lamp is lit.)
- The temperature inside the power supply has risen significantly.
- The mercury lamp did not light though the IGNITION button is pressed for more than 10 seconds. (The lamp is old, or has been used for more than 300 hours.)

## 5. RUN TIME counter

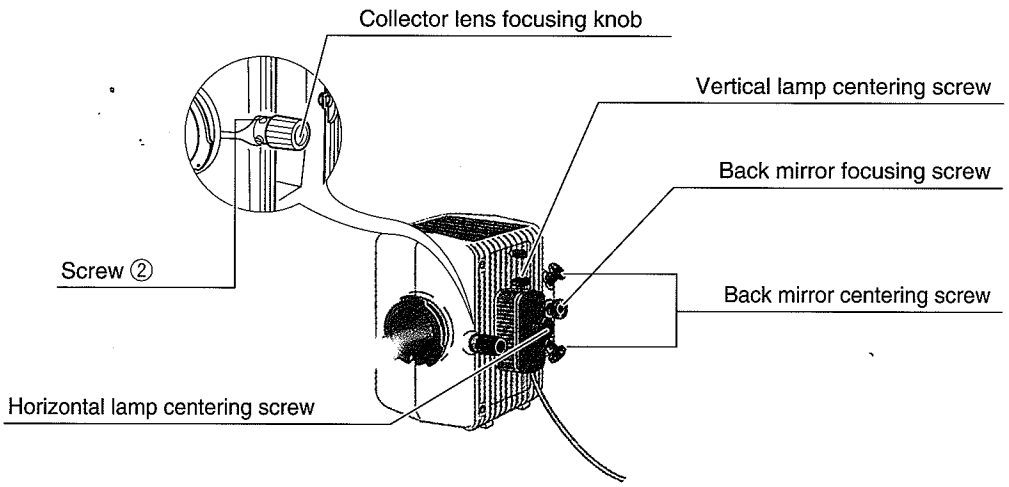
The RUN TIME counter allows the user to determine the useful life of the mercury lamp. The least increment of the counter is 0.1 hours (6 minutes). The counter can count up from "000.0" to "999.9" hours.
About 10 seconds after the mercury lamp is lit, the counter counts up "0.1". Afterwards, the counter is counted up by "0.1" for every 0.1 hours to show the accumulated lighting time of the lamp.
Before using a new lamp, reset the counter to "000.0" by pushing the reset button and, when the counter has reached a number beyond "300.0" (the lamp's average service time), replace the lamp.

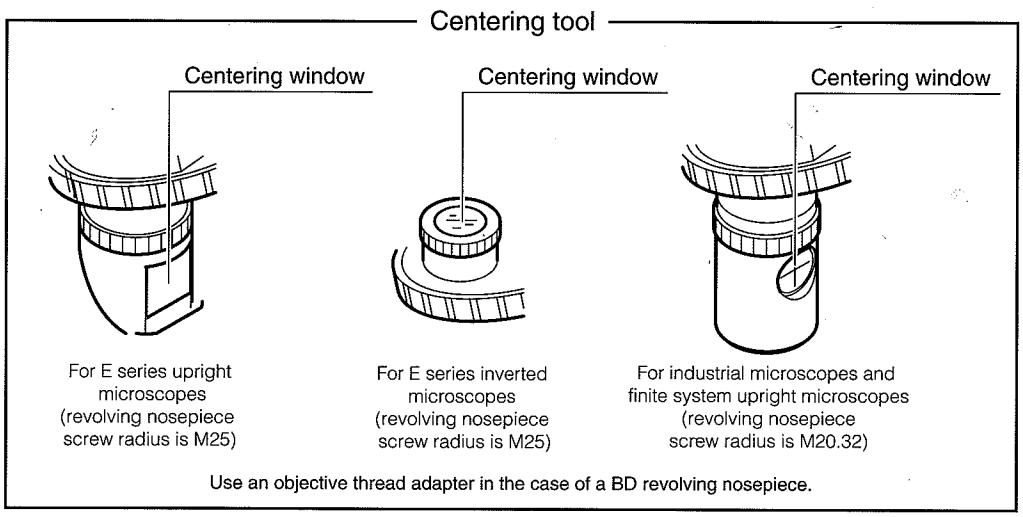



# 3 Centering the Lamp

The lamp should be centered every time the lamp is replaced. If the lamp is not properly centered, the image may become dark or lighting may not be uniform.

- A centering tool is used to center the lamp. Although different centering tools are used depending on the type of microscope, the centering procedure itself remains the same (except for OPTIPHOT-200C, that requires different procedure for lamp centering. Please see the instruction manual supplied with OPTIPHOT-200C for detailed explanations.).
- When performing the fluorescence microscopy, insert the fluorescence filter block of B excitation (such as the B-2A) or G excitation (such as the G-2A) into the optical path and center the lamp. An UV excitation block (such as the UV-1A) cannot be used since an arc image will not appear in the centering window.
  (Note that since the centering tool includes an UV cut filter, there is no danger to the eyes even if you look through the centering window with an UV excitation filter.)
- When observations other than fluorescence microscopy are to be performed, center the lamp with a brightfield block (with function for cutting ultraviolet rays) inserted in the optical path. (In this case, replace the phrase "the fluorescence filter block of the B excitation or G excitation" with "a brightfield block" in the text below that describes the centering procedure.)
- If you are using a microscope without a shutter (if you are using an HG adapter YM-EPI or Universal epi-illuminator 10), do not light the lamp until the centering tool has been attached to the revolving nosepiece.




### <Centering Procedure>

(The description of this procedure assumes that fluorescence microscopy using an episcopic-fluorescent attachment is to be performed.)

**1** Close the shutter of the episcopic-fluorescent attachment.

**2** Attach the centering tool to the revolving nosepiece.
(If the objectives are attached to all the holes of the revolving nosepiece, remove one objective and attach the centering tool in the open hole.)

**3** Rotate the revolving nosepiece to bring the centering tool in the optical path.

**4** Insert the B excitation or G excitation fluorescence filter block into the optical path.

**5** When B excitation block is used, insert the ND2 filter in the optical path. When G excitation block is used, insert the ND4 and ND16 filters in the optical path.
(Light levels must be reduced greatly in the case of the G excitation block as the excited light intensity is high.)

**6** Fully open the field aperture diaphragm of the episcopic-fluorescent attachment.

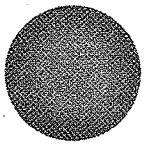
**7** Loosen the screw ② at the root of the collector lens focusing knob.
(Use the hexagonal screwdriver supplied with the microscope.)

**8** Open the shutter.

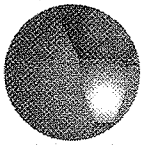
**9** If the arc image projected on the centering window is too bright, insert an additional ND filter into the optical path or slightly close the field aperture diaphragm.
(If the arc image is too dark, remove a filter or open the field aperture diaphragm.)

**10** Center the arc image projected on the centering window.

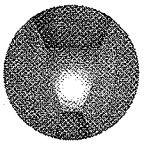
1) If the arc image cannot be seen in the centering window, the lamp is far out of alignment in both the vertical or horizontal directions. Turn the horizontal and vertical lamp centering screws until the image (still out of focus) is roughly centered in the centering window.



2) Turn the collector lens focusing knob to focus on the arc image (still not centered) on the centering window.

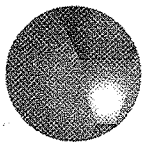


3) Turn the horizontal and vertical lamp centering screws to bring the image to the center of the centering window.

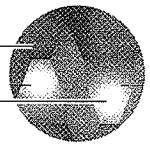


**11** (When the lamphouse with a back mirror is used.)
Center the mirror image.

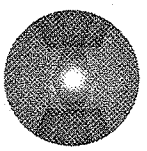
1) Slightly move the horizontal lamp centering screw to move the arc image away from the center. (At this time, the mirror image is not yet focused and thus cannot be seen clearly.)



2) Turn the back mirror centering and focusing screws to adjust the position of the mirror image so that it is symmetrical with the arc image.




3) Turn the horizontal lamp centering screw to move the arc image to the center so that it is superimposed on the mirror image. (Note that as the arc image is moved the mirror image is also moved.)

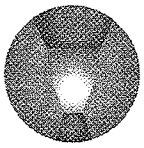


**12** Tighten the screw ② at the root of the collector lens focusing knob using a hexagonal screwdriver. This will prevent focus from being lost after centering.

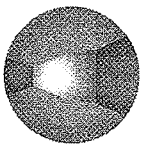
**13** Replace the objective that was removed.

**(Supplemental Note)**

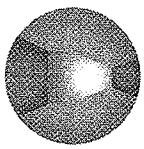
For upright microscopes, the angle at which the arc image is projected will vary depending on the direction the centering tool is facing.



Window facing front (standard)



Window facing right



Window facing left