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Super High Pressure Mercury Lamp Power Supply

MODEL: HB-10103AF HB-10104AF

Instructions

Nikon

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This manual is written for the users of Nikon super high pressure mercury lamp power supply. Thoroughly read this manual before using the equipment, and follow the instructions and precautions to properly and safely operate the equipment.

Keep this manual in a convenient place so that you can refer to it whenever necessary.

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SAFETY PRECAUTIONS — *IMPORTANT*

1. PURPOSE

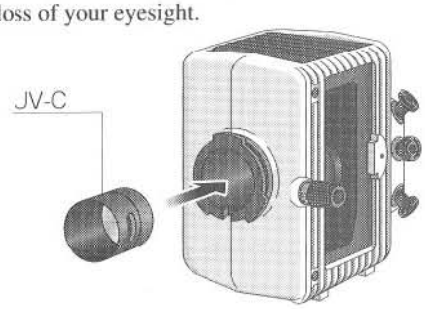
This equipment is a "super high pressure mercury lamp power supply" for the Nikon microscopes designed especially to light up a super high pressure mercury lamp. Never use it for other purposes. The equipment must be used in strict accordance with this manual to avoid serious accidents and/or personal injuries (loss of your eyesight by ultraviolet rays, lamp explosion, electrical shock, burn, etc.).

2. BEWARE OF ULTRAVIOLET RAYS WARNING

The mercury lamp used together with this equipment emits ultraviolet rays harmful to your eyes and skin. If you directly see the lit lamp, you may lose your eyesight. For your safety, follow the instructions below whenever you light the lamp.

1) Always set a collector lens on the lamphouse. (Never light the lamp when no collector lens is set.)

- Set the collector lens marked "UV-C" at anytime except when performing fluorescence microscopy. The collector lens marked "UV-C" shuts out most of the ultraviolet rays emitted from the lamp. If you do not set this collector lens on the lamphouse, your eyes will directly receive the ultraviolet rays through the eyepiece, ending up in snow blindness or in the worst case, loss of your eyesight.

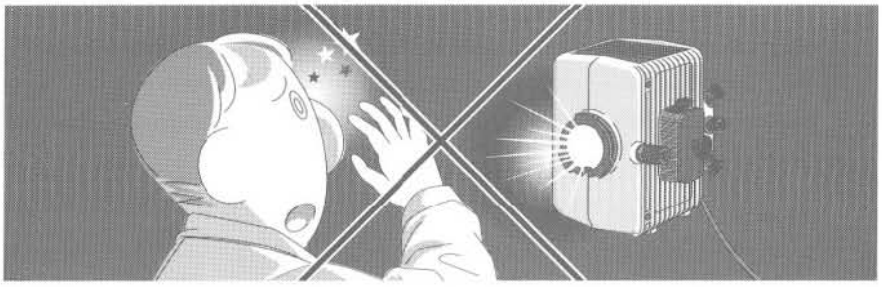


- When performing fluorescence microscopy including "UV excitation", set the collector lens designed especially for the fluorescence microscopy. This collector lens does not have the "UV-C" marking and thus allows the ultraviolet rays to pass through. The ultraviolet rays will be stopped by the fluorescence filter block, which is essential to the fluorescence microscopy. If you are performing fluorescence microscopy with the "Universal epi-illuminator 10" or "OPTIPHOT-200D,-200", please also read the item 3) described later.

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2) Mount the lamphouse on the microscope. (Never light the lamp when the lamphouse is off the microscope.)

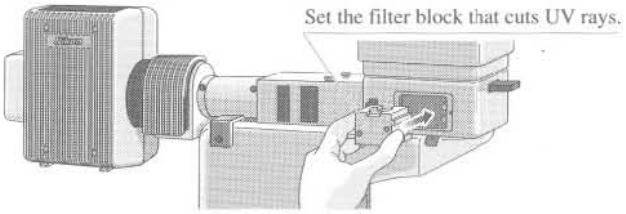
- You should never take off the lamphouse from the microscope and look directly at the lit mercury lamp through the collector lens port. You may lose your eyesight. The "UV-C" collector lens cannot cut all of the ultraviolet rays for you.



- For your safety, the mercury lamp is designed not to light up outside the lamphouse. (The lamp automatically extinguishes when the lamp socket is removed from the lamphouse). But never rely on this. Be always sure to turn off the lamp whenever you take off the lamp socket from the lamphouse.

3) If you are performing fluorescence microscopy with the "Universal epi-illuminator 10" or "OPTIPHOT-200D,-200".

- Be sure to set the fluorescence filter blocks on the equipment. The fluorescence filter block has a function to shut out the ultraviolet rays. If other filter(illumination) block is used, you may lose your eyesight since they cannot stop the ultraviolet rays.



- If you are also performing brightfield or darkfield microscopy, use B.F. or D.F. block especially designed to shut out the ultraviolet rays. You may lose your eyesight if the combination of normal B.F. or D.F. block and the collector lens without UV-C function is used since they cannot shut out the ultraviolet rays. Much more, it will be too bright for observation.

- Use "HG adapter B" instead of the HMX-3 lamphouse adapter. If the combination of HMX-3 lamphouse adapter and the collector lens without CU-C function is used, the harmful ultraviolet rays will leak out from the filter receptacle. (Even when the collector lens with the UV-C function is used, the leaking light will be dazzling.)

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3. OZONE

WARNING

It is said that a small amount of ozone is generated by the illumination of the mercury lamp. To avoid the ozone hurting the mucous membrane of your eyes and nose, ventilate the room well while you light the lamp. Never inhale the air directly exhausted from the lamp, or let the same air hit your face.

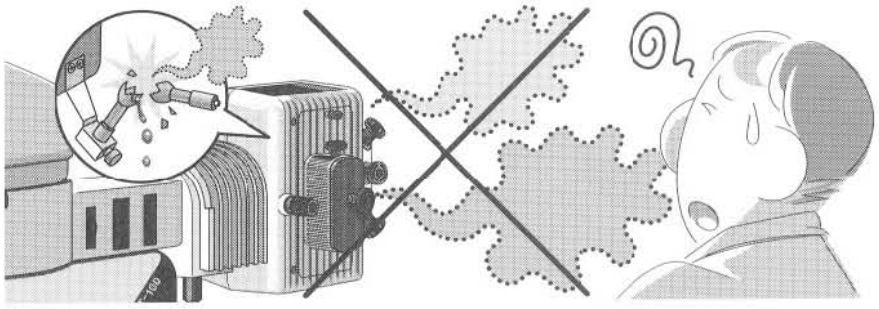
4. EXPLOSION AND GAS LEAK OF MERCURY LAMP

WARNING

The mercury lamp tube is filled with inorganic mercury and a small amount of Ar and Xe deactivated gas. The pressure inside the cold (room temperature) mercury lamp is as low as the atmospheric pressure. Once the lamp is lit, the mercury is vaporized, causing extremely high pressure inside the lamp.
If the lamp is damaged or used in excess of its average service life, it may explode and/or its gas may leak.

If the lamp explodes, the broken glass may be scattered and hurt human beings and/or the instruments. The gas inside the lamp (vaporized mercury, Ar and Xe gas) will be released into the air bringing about the danger of inhaling the mercury vapor. To avoid these dangers and to cope effectively with these abnormal situations, please read the articles below before using the equipment.

- Ar and Xe deactivated gas inside the lamp are the same as those exist in air. They are harmless.
- The inorganic mercury (chemical symbol: Hg. chemical formula: Hg) inside the lamp is said to be less harmful and less absorbed by human beings than the organic mercury, but still is harmful and an utmost care is needed in handling them.
- Should the lamp explode, or the gas leak, all the personnel must immediately leave the room so as not to inhale the mercury vapor. Further, thoroughly ventilate the room for at least 30 minutes.



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- If you happened to inhale the mercury vapor, immediately rinse your mouth and throat with a plenty amount of water. If the mercury vapor stick on your skin or get into your eyes, wash it off with a plenty amount of water likewise. If you feel sick, or notice any sign of illness, please at once consult your doctor.

- Wait till the lamp and the lamphouse cool down before cleaning up the mess.

- To gather the scattered liquid mercury, use a special material for absorbing the mercury (available from vendors handling experimental materials). Dispose them as the special industrial waste.

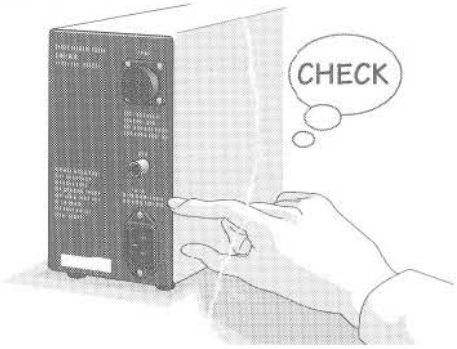
- Pick up the broken pieces of glass with the greatest care so as not to cut your fingers. Put the broken pieces of glass in a hard container and dispose them as the special industrial waste.

5. CHECK THE INPUT VOLTAGE

Make sure that the input voltage marked on the back panel of the super high pressure mercury lamp power supply matches your available line voltage. If not, contact your nearest Nikon representative Should you use the power supply with an incorrect input voltage marking, it may cause a failure, fire, or electrical shock.
Always use the specified power cord. See page 25 for the specification of the power cord.

Input voltage marking

In 100 - 120V area: 100-120~
In 220 - 240V area: 220-240~



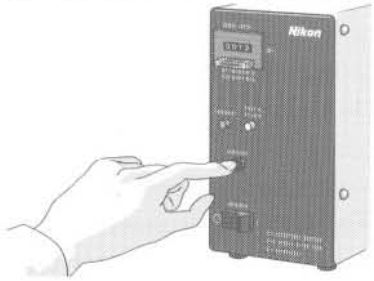
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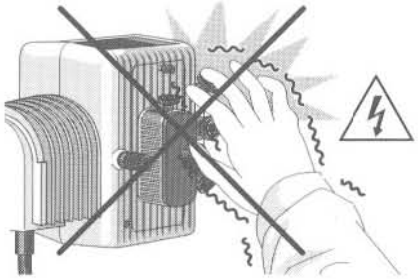
6. BE CAREFUL NOT TO GET AN ELECTRICAL SHOCK
Schützen Sie sich vor einem elektrischen Schlag

WARNING

While the IGNITION button is held down, a high voltage is applied to the mercury lamp. If you touch the lamphouse or lamp socket at this moment, you may get an electrical shock. Never touch the lamphouse or lamp socket while you hold the IGNITION button down. In the case of an emergency, disconnect the power cord from the power supply.

Beim Drücken der IGNITION (ZÜNDUNGS) - Taste wird eine hohe Spannung an die Quecksilberlichtlampe angelegt. Wenn Sie in diesem Augenblick das Lampengehäuse oder die Fassung berühren, können Sie dabei einen elektrischen Schlag erleiden. Fassen Sie die daher niemals das Lampengehäuse order die Fassung an, wenn Sie die IGNITION (ZÜNDUNGS) - Taste drücken. Im Notfall unterbrechen Sie die Stromzufuhr, indem Sie den Netzstecker ziehen.





Isolation from the main power

In the case of an emergency, disconnect the power cord from the super high pressure mercury lamp power supply to thoroughly isolate the equipment from power mains (a wall outlet etc.).

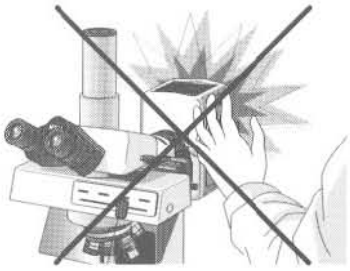
Unterbrechen der Stromzufuhr

Zur vollständigen Netztrennung ist die Nezleitung aus dem Gerät zu ziehen.

7. HEAT OF THE MERCURY LAMP
HITZEENTWICKLUNG DER QUECKSILBERLICHTLAMPE

The mercury lamp and the lamphouse get extremely hot while the mercury lamp is lit or immediately after the mercury lamp is turned off. Please follow the instruction below to avoid burn, fire, or any other malfunction.

Die Quecksilberlichtlampe und das Lampengehäuse entwickeln eine extreme Hitze, solange die Quecksilberlichtlampe brennt und auch unmittelbar nachdem diese ausgeschaltet wird. Bitte beachten Sie die nachfolgenden Anweisungen, um Verbrennungen, Feuer oder sonstige Fehlfunktionen zu vermeiden.



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- Never touch the lamphouse during or right after the illumination.
- Berühren Sie niemals das Gehäuse der Lampe, während diese brennt oder kurz nachdem diese ausgeschaltet wurde.

- Before exchanging the lamp, turn off the lamp and wait till the lamp and the lamphouse cool down.
- Bevor Sie die Lampe austauschen, schalten Sie diese aus und warten bis Lampe und Lampengehäuse abgekühlt sind.

- Do not bring the wall, curtain, papers, etc. near the lamphouse.
- Achten Sie auf einen sicheren Abstand zwischen Lampe und Wand,Vorhängen, Papier usw.

- Never bring inflammable substances (such as gasoline, petroleum benzine, thinner, alcohol, etc.) near the lamphouse.
- Bringen Sie niemals brennbare Stoffe (wie beispielsweise Benzin, Petroleum, Verdünnungsmittel, Alkohol usw.) in die Nähe des Lampengehäuses.

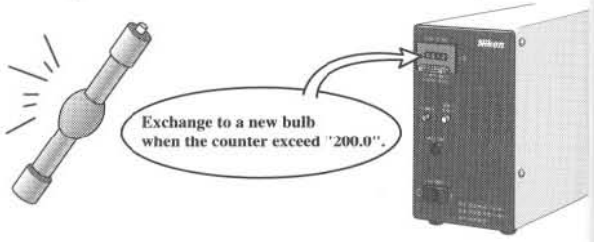
- Never light the lamp within 10 minutes after you turned it off. (It is difficult to light the lamp while the pressure inside the lamp is still high. Wait till the lamp cools and the pressure lowers before re-lighting the lamp.)
- Warten Sie stets 10 Minuten nach dem Abschalten der Lampe, bevor Sie diese wieder einschalten. (Wenn der Druck in der Lampe noch hoch ist, ist es schwierig, diese einzuschalten. Warten Sie mit dem erneuten Einschalten, bis die Lampe abgekühlt und der Druck gefallen ist.)

8. WHEN EXCHANGING THE MERCURY LAMP

1) Service life of the mercury lamp.

The average service life of the mercury lamp is 200 hours. The lamp used over its average service life may explode. It is strongly recommended to replace the lamp when the RUN TIME counter has reached a number "200.0". After you replaced the lamp, push the reset button to reset the RUN TIME counter to "000.0".

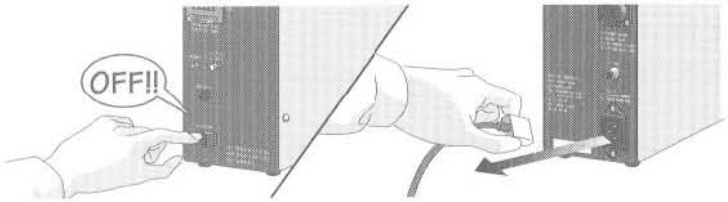
(The RUN TIME counter records the lamp's total time in use. If the reset button is pressed during use, you will lose the total time of usage. Never press the reset button on the RUN TIME counter except when you start using a new lamp.)



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2) Turn off the POWER switch.

To avoid the risk of electrical shock, before replacing the mercury lamp, turn off the POWER switch on the power supply (press the switch to "O" side and confirm that the POWER monitor lamp is extinguished) and disconnect the power cord.



3) The heat of the lamp.

Hitzeentwicklung der Lampe

The lamp and the lamphouse get extremely hot while the mercury lamp is lit or immediately after the mercury lamp is turned off. When replacing the lamp, turn off the lamp and allow the lamp and the lamphouse to thoroughly cool down.

Die Lampe und das Lampengehäuse entwickeln eine extreme Hitze, solange die Quecksilberlichtlampe brennt und auch unmittelbar nachdem diese ausgeschaltet wurde. Wenn Sie die Lampe austauschen möchten, schalten Sie diese aus und warten, bis Lampe und Lampengehäuse gründlich abgekühlt sind.

4) Use only the specified mercury lamp.

Use only the specified mercury lamp. Other lamps can cause accidents or malfunction.

Specified mercury lamp

USH-102DH: 100W manufactured by Ushio Electric Inc.

5) Avoid touching the lamp with bare hands.

NEVER touch the glass part of the mercury lamp with bare hands. A fingerprint or dirt on the lamp can cause lamp explosion. If the lamp is stained with a fingerprint or dirt, clean it with a clean, soft cotton cloth or gauze moistened with absolute alcohol. Wear gloves or use any other appropriate items when you replace the lamp.

6) Do not apply excessive power.

Do not apply an excessive power to the lamp when setting the lamp to the lamp socket.

7) Malfunction of the lamp.

If you notice any malfunction on the lamp during use, immediately turn off the lamp and notify your nearest Nikon representative.

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9. HANDLE WITH CARE

1) Follow the rules below to avoid failures or unusual heat generation.
   - NEVER drop, jar or bump the equipment against something.
   - NEVER wet the equipment.
   - NEVER open the enclosure of the equipment.

2) When transporting or handling the equipment, never apply strong shocks to the lamp.
   If you do, especially in the direction of the radius, the lamp is likely to break. When you transfer the lamp, put it inside its case and handle gently.

10. WHERE TO INSTALL OR STORE THE EQUIPMENT

1) Place the equipment at a temperature below 40℃ and a humidity not more than 85%.
   Placing it in a hot and humid place can cause mold, condensation, or failures.

2) The equipment generates weak radio frequency energy.
   It may be the cause of radio or television reception interference. Install the equipment away from these instruments.

3) Store the mercury lamps in the following conditions.
   - Temperature: -40℃ to 70℃
   - Humidity: 10 to 80% RH
   - Pressure: Atmospheric pressure

11. MAINTENANCE

1) Avoid using organic solvents (including thinner, ether, and acetone) to clean the equipment. They will discolor the surfaces of the equipment and peel off the printed letters.

2) Should the equipment operate improperly, disconnect the power cord from the equipment and call your nearest Nikon representative.

3) Consult your nearest Nikon representative for any questions on this equipment.

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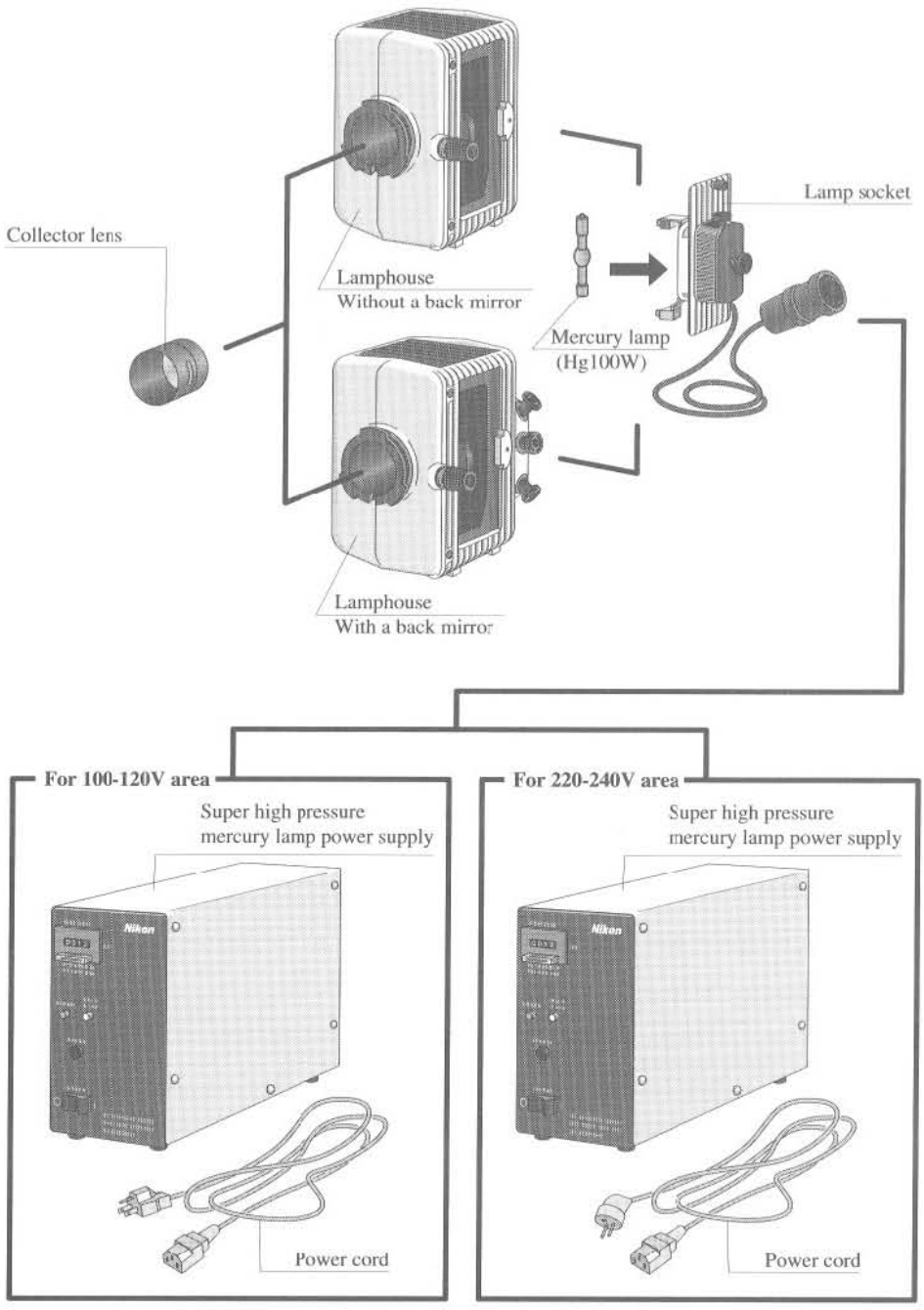
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Overall Configuration



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1 Collector Lens

Always use the lamphouse with a collector lens attached to avoid the harmful ultraviolet rays emitted by the mercury lamp.

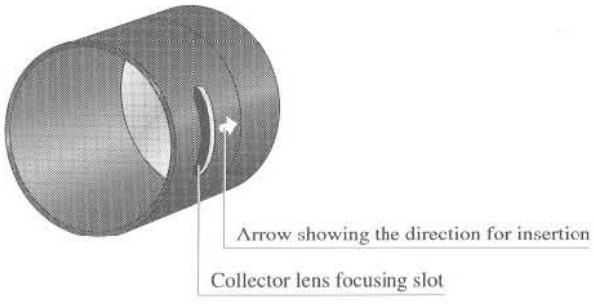
Set the collector lens marked "UV-C" at anytime except when performing fluorescence microscopy. The collector lens marked "UV-C" shuts out most of the ultraviolet rays emitted from the lamp. If you do not set this collector lens on the lamphouse, your eyes will directly receive the ultraviolet rays through the eyepiece, ending up in snow blindness or in the worst case, loss of your eyesight.

When performing fluorescence microscopy including "UV excitation", set the collector lens designed especially for the fluorescence microscopy. This collector lens does not have the "UV-C" marking and thus allows the ultraviolet rays to pass through. The ultraviolet rays will be stopped by the fluorescence filter block, which is essential to the fluorescence microscopy.

If you are performing fluorescence microscopy with the "Universal epi-illuminator 10" or "OPTIPHOT-200D, -200", and are also performing brightfield or darkfield microscopy at the same time, use B.F. or D.F. block especially designed to shut out the ultraviolet rays. The normal B.F. or D.F. block cannot shut out the ultraviolet rays. You may lose your eyesight if the normal B.F. or D.F. block is used. More over, it will be too bright for observation.

Types and uses of collector lenses

Marking	Uses	Shuts out ultraviolet rays
UV-C	For diascopic illumination	Yes
Epi UV-C	For episcopic illumination	Yes
Epi-FL	For episcopic-fluorescence microscopy	No
Epi-Q	For episcopic-fluorescence microscopy (Especially for Quin 2, and Fura 2)	No
No marking	Cannot be used with this equipment.	No



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2 Lamphouses

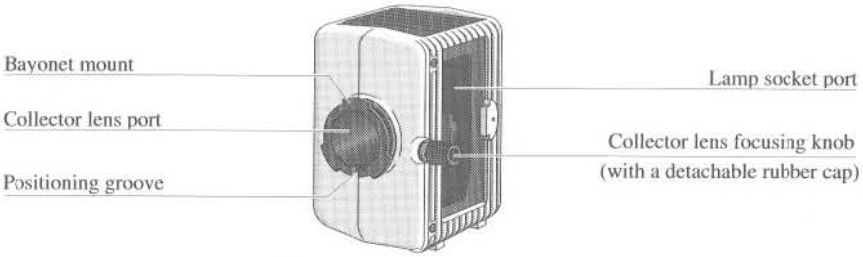
The lamphouses are available in two types -- with a back mirror and without a back mirror. The one with a back mirror provides a brighter illumination.
To use a lamphouse, fit a collector lens into a round hole in the front and the lamp socket into a square hole at the side.

The lamphouse gets extremely hot while the lamp is lit or immediately after the lamp is turned off. To avoid the danger of burn or fire, carefully read and follow the warnings and cautions written in section 7 (HEAT OF THE LAMP) and 8 (WHEN EXCHANGING THE MERCURY LAMP) of the "SAFETY PRECAUTIONS".

While the IGNITION button is held down, a high voltage is applied to the lamp. If you touch the lamphouse or the lamp socket on that same moment, you may get an electrical shock. Never touch the lamphouse or the lamp socket while you hold the IGNITION button down. In the case of an emergency, disconnect the power cord from the power supply.

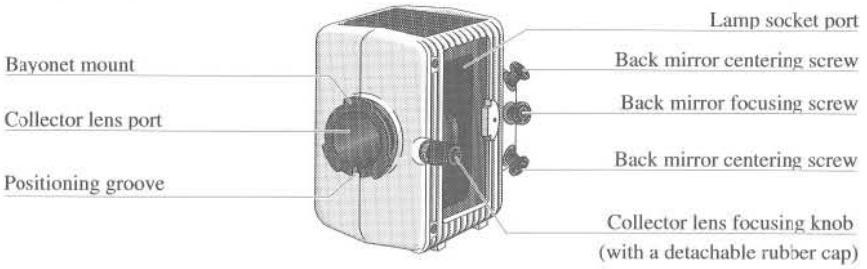
1) Lamphouse without a back mirror

HG lamphouse 3 (Model: LH-M100C-1)



2) Lamphouse with a back mirror

HG lamphouse 4 (Model: LH-M100CB-1)



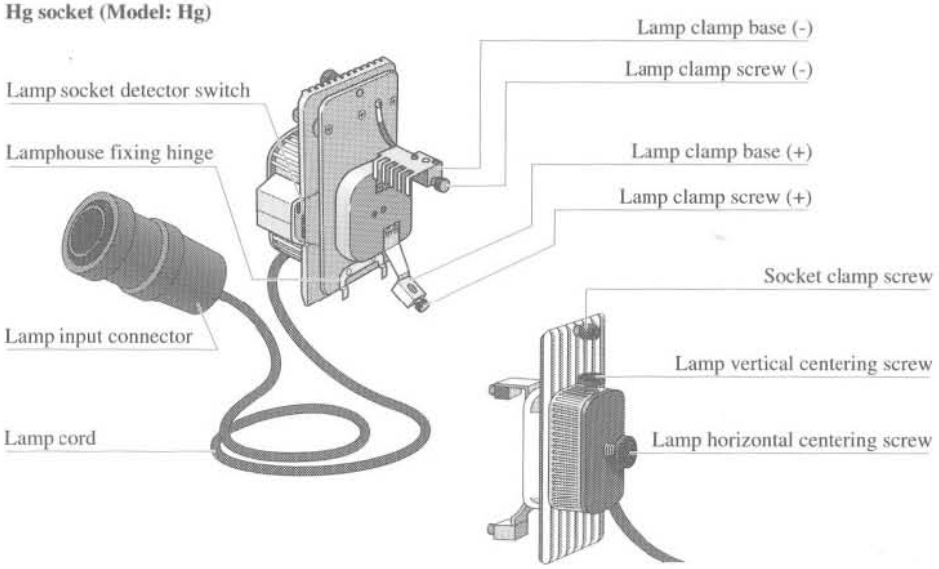
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3 Lamp Socket (Model: Hg)

The lamp socket are to be fitted into the lamphouse. It has two lamp clamp bases to hold the lamp -- the upper one designated as the minus polarity and the lower designated as the plus polarity. The lower one (+) is flexible so as to protect the mercury lamp from being damaged when secured. To fix the lamp, secure this flexible lamp clamp base first.

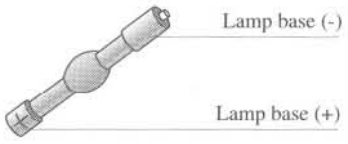
The mercury lamp does not illuminate while the lamp socket is disconnected from the lamphouse so as to avoid the danger of directly staring into the lamp.

Hg socket (Model: Hg)



4 Super High Pressure Mercury Lamp (Hg 100W)

To prevent explosion of mercury lamp and/or accidents, burns, or failures caused by the ultraviolet rays, carefully read and follow the warnings and cautions contained in section 2 (BEWARE OF ULTRAVIOLET RAYS), 3 (OZONE), 4 (EXPLOSION AND GAS LEAK OF MERCURY LAMP), 7 (HEAT OF THE MERCURY LAMP) and 8 (WHEN EXCHANGING THE MERCURY LAMP) in "SAFETY PRECAUTIONS".



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5 Super High Pressure Mercury Lamp Power Supply

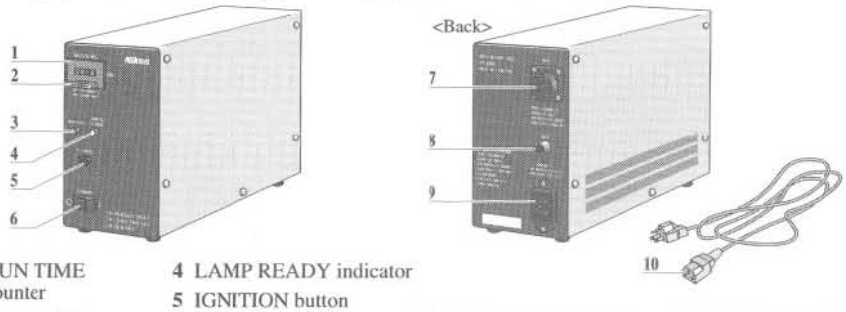
The super high pressure mercury lamp power supply, incorporating a DC starter, delivers 100-watt constant power required to illuminate the mercury lamp.

Before you use the power supply, make sure that the input voltage marked on its back panel is consistent with the line voltage in your area. If it is not, contact your nearest Nikon representative. Should you use the power supply with an inconsistent input voltage marking, it may cause a failure, fire, or electrical shock.

Always use the specified power cord.

1) For 100 - 120V area

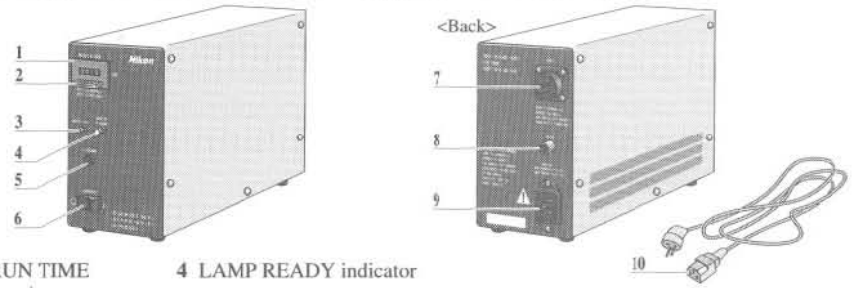
Super high pressure mercury lamp power supply (Model: HB-10103AF)



1 RUN TIME counter
2 RUN TIME counter reset button
3 POWER monitor lamp
4 LAMP READY indicator
5 IGNITION button
6 POWER switch
7 LAMP output connector
8 CASE terminal (To eliminate the potential difference against the other equipment.)
9 AC IN receptacle
10 Power cord

2) For 220 - 240V area

Super high pressure mercury lamp power supply (Model: HB-10104AF)



1 RUN TIME counter
2 RUN TIME counter reset button
3 POWER monitor lamp
4 LAMP READY indicator
5 IGNITION button
6 POWER switch
7 LAMP output connector
8 CASE terminal (To eliminate the potential difference against the other equipment.)
9 AC IN receptacle
10 Power cord

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II ASSEMBLY

Tools required: Minus (-) screwdriver, gloves (hexagonal screwdriver and plus screwdriver)

1 Attaching Collector Lens

Attach a collector lens to the lamphouse by the following procedure.
Attach the collector lens marked "UV-C" except when performing fluorescence microscopy. For fluorescence microscopy including "UV excitation", attach the collector lens without "UV-C" marking designed especially for fluorescence microscopy.
Carefully read Section I-1 for uses of collector lenses, and section 2 (BEWARE OF ULTRAVIOLET RAYS) in 'SAFETY PRECAUTIONS" for warnings and cautions on the ultraviolet rays.

WARNING

You may lose your eyesight by the harmful ultraviolet rays if you remove the lamphouse from the microscope while the mercury lamp is lit. Always turn OFF the mercury lamp (press the POWER switch on the high pressure mercury lamp power supply to "o" side and confirm that the POWER monitor lamp is extinguished) and disconnect the power cord from the power supply before removing the lamphouse from the microscope.

How to attach

(1) Remove the rubber cap from the collector lens focusing knob.

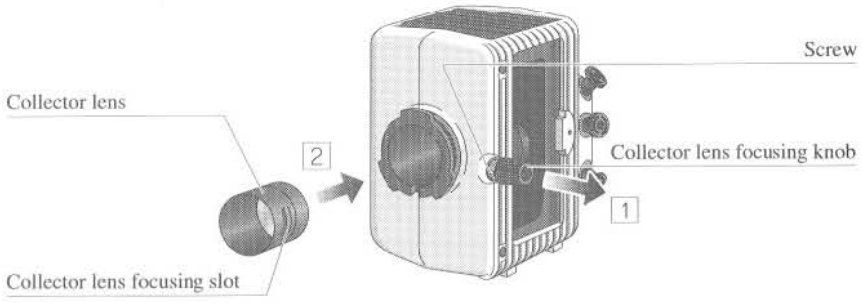
(2) Using a minus screwdriver, loosen the screw at the root of the lens focusing knob.

(3) Pull out the lens focusing knob [1] and fit the collector lens into the lamphouse [2] in the direction of the arrow.

(4) Matching the collector lens focusing slot with the tip of the lens focusing knob, gently return the lens focusing knob back into its place.

(5) Using a minus screwdriver, tighten the screw at the root of the lens focusing knob as far as possible.

(6) Replace the rubber cap to the collector lens focusing knob.



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2 Attaching (Replacing) Mercury Lamp

Attach the mercury lamp to the lamp socket by the following procedure.
For harmful ultraviolet rays emitted from the mercury lamp, carefully read and follow the warnings and cautions contained in section 2 (BEWARE OF ULTRAVIOLET RAYS) on the "SAFETY PRECAUTIONS".
When attaching or replacing the mercury lamp, always keep the following warnings and cautions in mind.

1) Service life of mercury lamp

The average service life of the mercury lamp is 200 hours. The mercury lamp may explode if used over its average service life. When the RUN TIME counter has reached the number "200.0", it is best recommended to replace the lamp. After you replaced the mercury lamp, push the reset button on the RUN TIME counter to reset the counter to "000.0".

2) Turn OFF the POWER switch.

To avoid a risk of electrical shock, before you replace the mercury lamp, turn OFF the POWER switch on the power supply (press the switch to the "O" side and confirm that the POWER monitor lamp is extinguished) and disconnect the power cord from the power supply.

3) The heat of the lamp

The lamphouse gets extremely hot while the mercury lamp is lit or immediately after the lamp is turned off. Before replacing the mercury lamp, turn OFF the mercury lamp and allow the lamphouse and mercury lamp to cool down thoroughly.

4) Use only the specified mercury lamp

Use only the specified mercury lamp. Any other lamps may cause an accident or failure.
Specified mercury lamp:
USH-102DH:100W manufactured by Ushio Electric Inc.

5) Do not touch the mercury lamp with bare hands.

Never touch the glass part of the mercury lamp with bare hands. A fingerprint or dirt on the mercury lamp can cause lamp explosion. Should the mercury lamp get a fingerprint or dirt, clean it

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with a clean, soft cotton cloth or gauze moistened with absolute alcohol. Wear gloves or use any other appropriate items when you replace the mercury lamp.

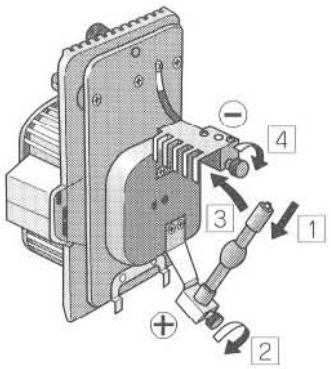
How to attach

(1) Loosen two lamp clamp screws (+ and -) and remove the mercury lamp. (For your initial use, remove the dummy lamp factory attached to the socket.)

(2) Further loosen the lamp clamp screws.

(3) Fit the plus-side base of the mercury lamp into the lower flexible lamp clamp base (+) [1] and tighten the clamp screw [2].

(4) Fit the minus-side base of the mercury lamp into the upper fixed lamp clamp base (-) [3] and tighten the clamp screw [4].



To protect the mercury lamp from being damaged, fix the mercury lamp on the flexible lamp clamp base first. (Flexible lamp clamp base = lower base = (+) base.)

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3 Attaching Lamp Socket

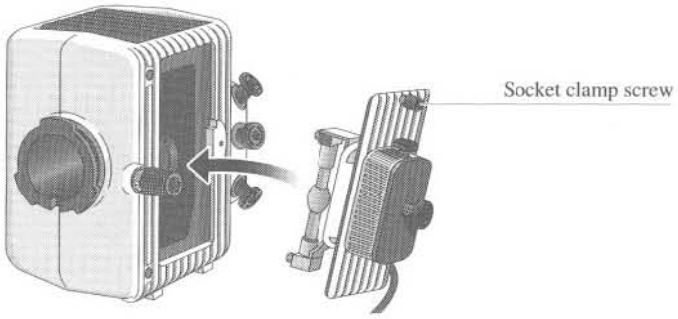
Attach the lamp socket to the lamphouse by the following procedure.
Carefully read the warnings and cautions contained in section 2 (BEWARE OF ULTRAVIOLET RAYS) on the "SAFETY PRECAUTIONS" for harmful ultraviolet rays emitted from the mercury lamp.

To avoid the risk of electrical shock, before attaching the lamp socket, turn OFF the POWER switch of the power supply (press the switch to the "O" side and confirm that the POWER monitor lamp is extinguished) and disconnect the power cord from the power supply.

How to attach

(1) Holding the lamp socket aslant, fit its lamphouse fixing hinge into the socket port of the lamphouse.

(2) Push the lamp socket against the lamphouse until it snugly fits to the lamphouse. Tighten the socket clamp screw to secure the socket.



4 Attaching Lamphouse

Attach a lamphouse to your microscope by the following procedure.
When a lamphouse cannot be attached directly onto the lamphouse mount of the microscope, it should be attached via the Universal epi-illuminator 10 or the Episcopic-fluorescence attachment EFD-3.
Some microscopes require a lamphouse adapter or an HMX-3 lamphouse adapter for connection.
Referring to the table and illustration below, check the component you need to attach the lamphouse onto your microscope.
Since the mercury lamp is usually used as a light source for episcopic illumination, only the attachment for episcopic illumination is described on this chapter. If your microscope is not listed on the table, or if you want to use the mercury lamp for diascopic illumination, contact your nearest Nikon representative.

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To avoid the risk of electrical shock, before attaching the lamphouse, turn OFF the POWER switch of the power supply (press the switch to the "O" side and confirm that the POWER monitor lamp is extinguished) and disconnect the power cord from the power supply.

List of components for connection (for episcopic illumination)

	Direct mounting	Lamphouse adapter	HMX-3 lamp-house adapter
Microscopes			
MICROPHOT-FXA	Possible	Not required	Required
MICROPHOT-FXL	Possible	Not required	Required
MICROPHOT-SA	Possible	Not required	Required
OPTIPHOT-2	No (*1)	-	-
LABOPHOT-2A	No (*1)	-	-
LABOPHOT-2	No (*1)	-	-
OPTIPHOT-300D	Possible	Required (*2)	Required
OPTIPHOT-200D	Possible	Required (*2)	Required
OPTIPHOT-200	Possible	Required (*2)	Required
OPTIPHOT-150	No (*3)	-	-
OPTIPHOT-150S	No (*3)	-	-
OPTIPHOT-100S	No (*3)	-	-
DIAPHOT 300	No (*4)	-	-
DIAPHOT 200	No (*4)	-	-
EPIPHOT 300	Possible	Required (*5)	Required
EPIPHOT 200	Possible	Required (*5)	Required
Attachments			
Universal epi-illuminator 10	Possible	Required (*6)	Required (*7)
Episcopic-fluorescence attachment EFD-3	Possible	Not required	Not required
DIAPHOT 300/200 epi-fluorescence attachment	Possible	Not required	Not required

*1 Attach the lamphouse via the Universal epi-illuminator 10 or the Episcopic-fluorescence attachment EFD-3.

*2 Use the Episcopic lamphouse adapter.

*3 Attach the lamphouse via the Universal epi-illuminator 10. (*7)

*4 Attach the lamphouse via DIAPHOT 300/200 epi-fluorescence attachment.

*5 Use 100W lamphouse adapter for U-epi 10.

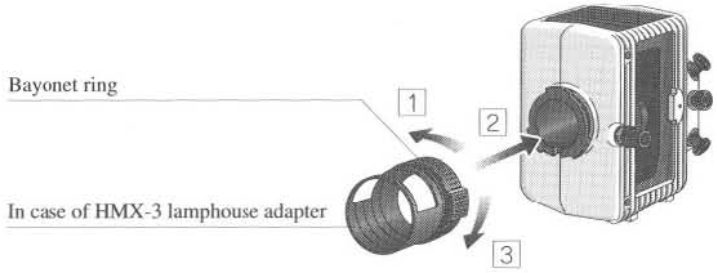
*6 Use 100W lamphouse adapter for U-epi 10 or 100W lamphouse adapter for X150 series.

*7 When performing "UV excitation fluorescence microscopy" with the Universal epi-illuminator 10, use "HG adapter B" instead of the HMX-3 lamphouse adapter. (If HMX-3 lamphouse adapter is used, the harmful ultraviolet rays will leak out from the filter receptacle on the adapter.)

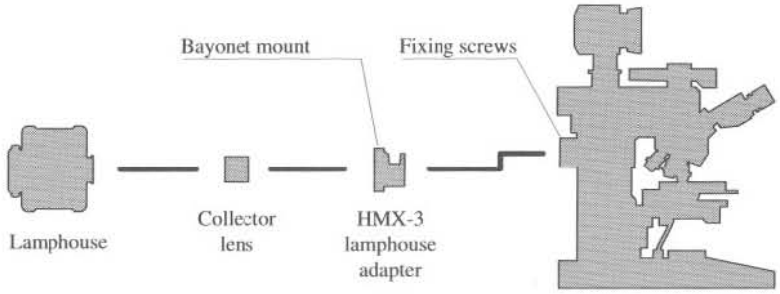
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How to attach

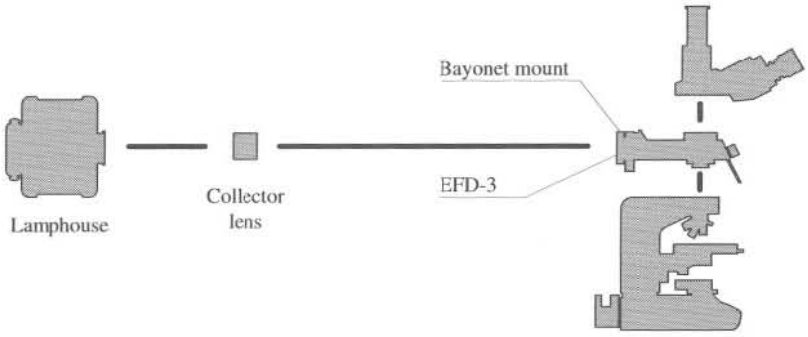
Connect all the required components referring to the illustrations below. If the connection is to be made by the bayonet mount, do as follows.
Turn the bayonet ring in the direction of arrow [1]. Matching the positioning pin and the slot, connect the components [2]. Turn the bayonet ring in the direction of arrow [3] to secure.



Pattern 1: MICROPHOT-FXA, -FXL, -SA

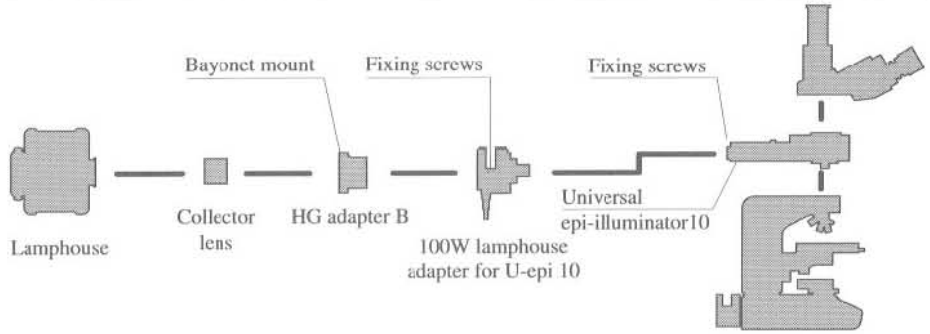


Pattern 2: OPTIPHOT-2, LABOPHOT-2A, -2 and Episcopic fluorescence attachment EFD-3

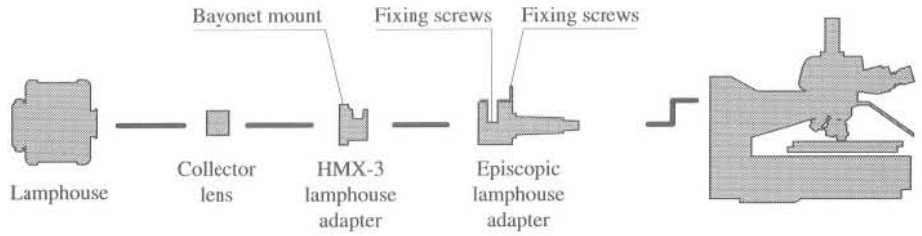


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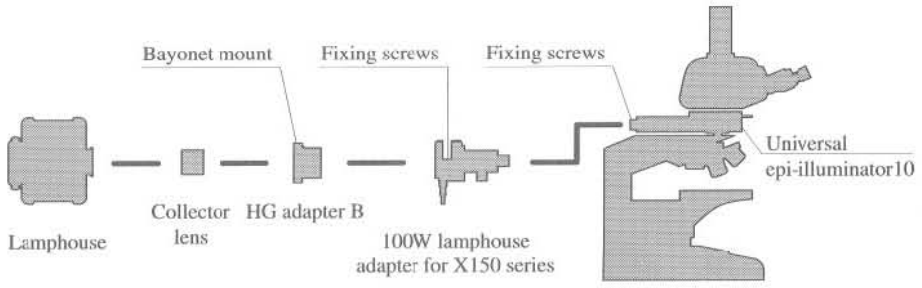
Pattern 3: OPTIPHOT-2, LABOPHOT-2A, -2 and Universal epi-illuminator 10



Pattern 4: OPTIPHOT-300D, -200D, -200

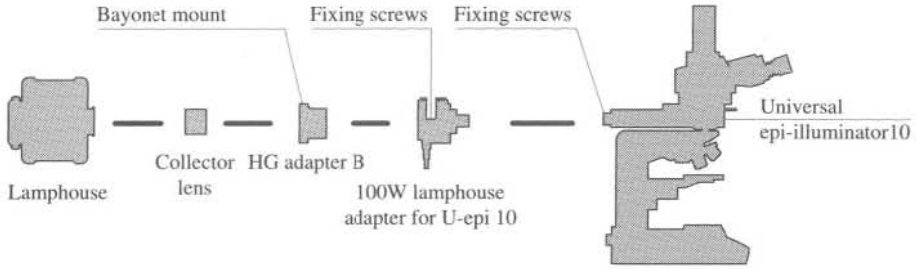


Pattern 5: OPTIPHOT-150, -150S and Universal epi-illuminator 10

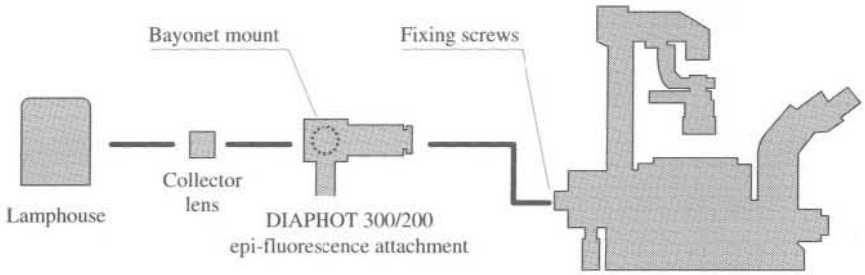


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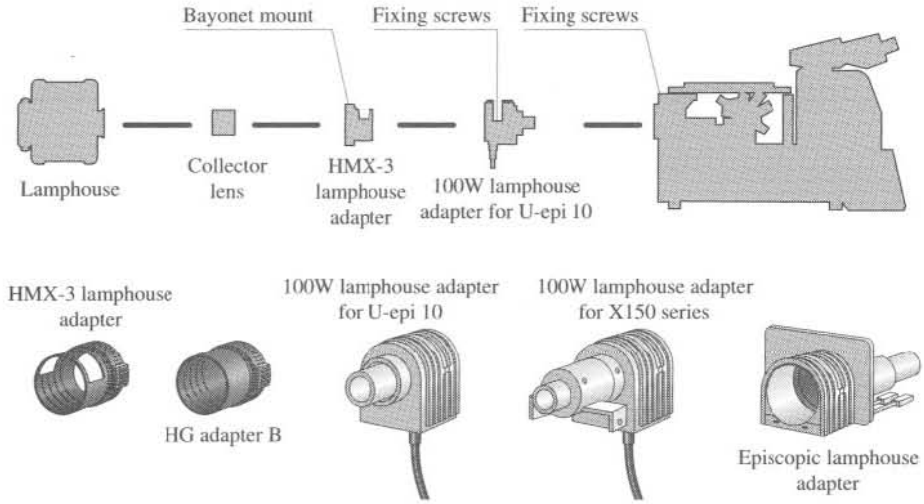
Pattern 6: OPTIPHOT-100S and Universal epi-illuminator 10



Pattern 7: DIAPHOT 300, DIAPHOT 200 and DIAPHOT 300/200 epi-fluorescence attachment



Pattern 8: EPIPHOT 300, EPIPHOT 200



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5 Connecting Super High Pressure Mercury Lamp Power Supply

Connect the appropriate cords to the super high pressure mercury lamp power supply.

Note: Specification of the power cord

For 100 - 120V area

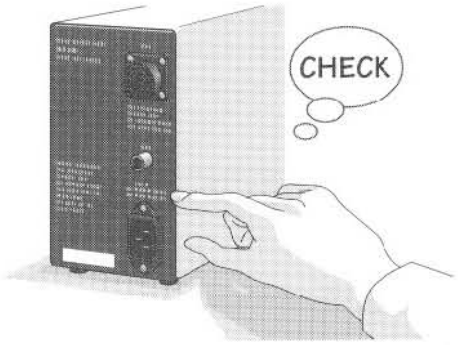
- Use only the following power supply cord.
  UL listed, detachable cord set. 3-conductor grounding type SVT, No.18 AWG rated a minimum 125V, 7A.
- In case of using the extension cord, use only the power supply cord including PE wire.

For 220 - 240V area

- Use only the 3-pole power supply cord type H05VV-F, which must be approved according to DIN VDE 0625. The plug and the outlet are to be approved according to DIN VDE 0620 and DIN VDE 0625, respectively.
- Class I equipment should be connected to PE (protective earth) terminal.
- In case of using the extension cord, use only the power supply cord including PE wire.

How to attach

(1) Make sure that the input voltage marked on the back panel of the power supply matches the line voltage in your area. If it is not, do not turn on the POWER switch but contact your nearest Nikon representative. Should you use the power supply with an incorrect input voltage marking, the internal circuitry may be damaged, which can result in an accident.



(2) Make sure that the POWER switch is turned OFF (pressed to the "O" side). If it is not, press the switch to the "O" side.

(3) Plug the lamp input connector of the lamp socket into the LAMP output connector on the back panel of the power supply. Secure it by tightening the lock ring.

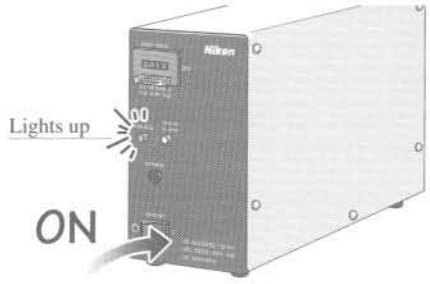
(4) Plug the power cord provided with the power supply into the AC IN receptacle on the back panel of the power supply.

(5) Plug the power cord into an appropriate AC outlet.

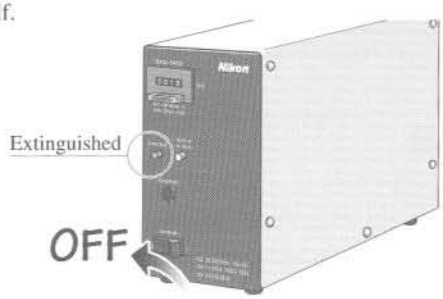
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1 Turning On and Off the Power

(1) Press the POWER switch of the super high pressure mercury lamp power supply to the "I" side. The power is applied to the equipment and the POWER monitor lamp lights up.
Note that the mercury lamp is not lit by simply applying power to the equipment. (See the chapter III-2. for how to turn on the mercury lamp.)



(2) When you press the POWER switch to the "O" side, the power is shut down and all of the following will be extinguished. The POWER monitor lamp, LAMP READY indicator, and the mercury lamp itself.



2 Turning On and Off the Mercury Lamp

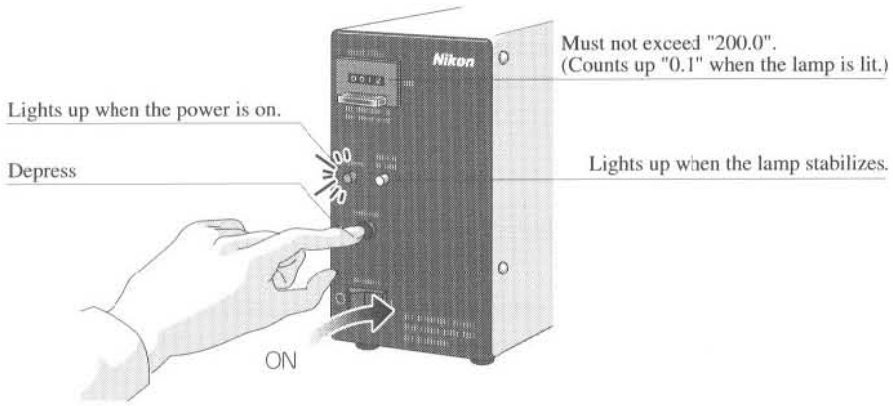
1) Turning on the lamp

(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, you must let the lamp thoroughly cool down which takes approximately ten minutes.)

(2) Set the POWER switch on the super high pressure mercury lamp power supply to ON (press the switch to the "I" side). Confirm that the POWER monitor lamp is lighted up.

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(3) Push the IGNITION button on the power supply for several (2-3) seconds. (The DC starter incorporated in the power supply lights up the mercury lamp.)



- The RUN TIME counter counts up 0.1 to show that the mercury lamp has been lighted up.

- If the mercury lamp did not light up though you have pressed down the IGNITION button for about ten seconds in total, the lamp can no more be lighted by pressing the IGNITION button down.
  To light up the lamp, turn off the power once. Check if the mercury lamp hasn't gotten old or the RUN TIME counter isn't exceeding "200.0". (Replace the lamp if necesssary.) Then, turn on the power again and press the IGNITION button.
  (An old lamp or the lamp having been used for over 200 hours cannot be lighted up easily. Since the use of such lamps can cause explosion or other serious accidents, a safety interlock circuit automatically cuts off the lamp ignition. See the chapter III-2, 3) for the safety interlock circuit.)

- The RUN TIME counter counts up the elapse of lighting time. (See the chapter III-2, 4) for the RUN TIME counter.)

- The LAMP READY indicator will light up several minutes after the lamp is turned on to show that the lamp is stabilized.

- While the mercury lamp is lit, the lamp and the part of the lamphouse become very hot. You must be very careful not to get yourself burned. Wait sufficiently until the lamp is cooled down before replacing the lamp. (See section 7 (HEAT OF THE MERCURY LAMP) on "SAFETY PRECAUTIONS" for the heat that mercury lamp generates.)

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- The average service life of the mercury lamp specified for this equipment is 200 hours. It is strongly recommended to replace the lamp when the RUN TIME counter has reached a number "200.0". After replacement, reset the counter to "000.0".

- Carefully read the section 2 (BEWARE OF ULTRAVIOLET RAYS), 7 (HEAT OF THE MERCURY LAMP) and 8 (WHEN EXCHANGING THE MERCURY LAMP) in "SAFETY PRECAUTIONS" for handling of the lamp.

2) Turning off the lamp

To shut down the power and extinguish the mercury lamp, turn OFF the POWER switch of the super high pressure mercury lamp power supply (press the switch to the "O" side and confirm that the POWER monitor lamp is extinguished).
If you want to light up the lamp again, wait about ten minutes for the mercury lamp to cool down to its normal state.

3) Safety interlock

The equipment incorporates a safety interlock circuit to avoid the possible risk involved in lighting of the super high pressure mercury lamp. When the safety interlock circuit activates, the lamp output is automatically disabled and the lamp is extinguished.
To light up the mercury lamp again, turn off the POWER switch (press the switch to the "O" side and confirm that the POWER monitor lamp is extinguished) and remove the cause by which the safety interlock circuit has been activated. Wait about ten minutes until the temperature in the mercury lamp has returned to its normal state. Then turn on the POWER switch and push the IGNITION button.

The safety interlock circuit is activated if:

- The lamphouse and the lamp socket are not connected.
- Lamp socket is disconnected from the lamphouse while the lamp is lit. (Never disconnect.)
- LAMP output and input connectors are not connected.
- Lamp output or input connector is disconnected while the lamp is lit. (Never disconnect.)
- The temperature inside the power supply has significantly risen.
- The lamp did not light up though you have held down the IGNITION button for about ten seconds in total. (The mercury lamp has gotten old or the accumulated time of usage indicated on the RUN TIME counter has exceeded "200.0".)

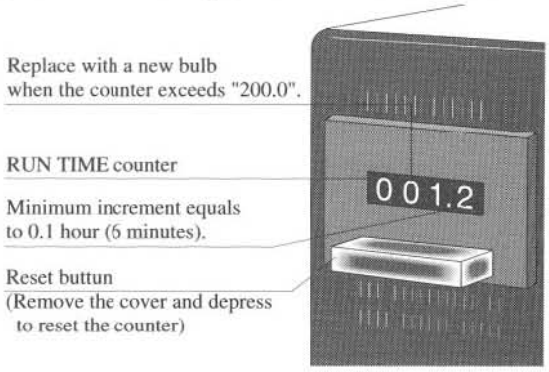
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4) RUN TIME counter

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 in a range from "000.0" to "999.9" hours.

Several seconds after the mercury lamp is lit, the counter counts up "0.1" to indicate the lamp is lighted. 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 "200.0" (the lamp's average service time), replace the lamp.



3 Centering the Mercury Lamp

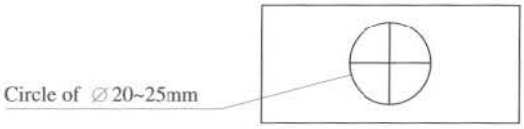
After you replaced the mercury lamp, perform the lamp centering. If the lamp is not properly centered, image brightness can be impaired or uniformity of illumination can be lost.

When the lamphouse is attached to an episcopic-fluorescent attachment EFD-3, be sure to insert a filter block other than an "UV excitation filter block" into the optical path when you center the lamp. Centering the lamp with an "UV excitation filter block" can expose your eyes to harmful ultraviolet radiation. Never attempt to do so. Carefully read the section 2 (BEWARE OF ULTRAVIOLET RAYS) on "SAFETY PRECAUTIONS" for the ultraviolet rays.

The lamp can be centered by using a white sheet of paper or the centering tool (provided with an episcopic-fluorescent attachment EFD-3). We recommend that you use a white sheet, which facilitates the centering by providing a clear arc image and a wider projected pupil plane.

A target drawn on a white sheet of paper, as shown by the figure, ensures an accurate centering.

To center the lamp on an inverted microscope, a thin sheet of paper can give a clear view of the arc image.



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1) Centering using a white sheet

(1) Remove one of the objectives from the revolving nosepiece. Turn the revolving nosepiece to place the hollowed mount from which the objective was removed in the optical path.

(2) Move the stage (or the revolving nosepiece if the inverted microscope is used) to its uppermost position.

(3) Place a white sheet of paper (for example, the rear side of your business card) on the stage.

(4) (When you attached the lamphouse to an episcopic-fluorescent attachment EFD-3.) Insert a B excitation filter block into the EFD-3 and place it in the optical path.

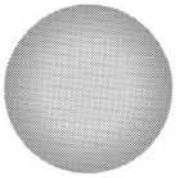
(5) Place ND2 and ND4 filters in the optical path to subdue the glare.

(6) Fully open the field aperture diaphragm. (If the ND filters are not enough to subdue the glare, stop down the diaphragm until the glare is subdued.)

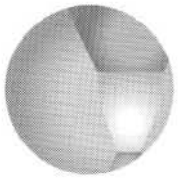
(7) (When you attached the lamphouse to the episcopic-fluorescent attachment EFD-3.) Open the shutter.

(8) Center the arc image projected on the white sheet of paper.

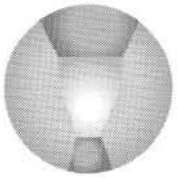
(8)-1 If the arc image cannot be seen in the projected plane, the lamp is far away from the center in both vertical and horizontal directions. Turn the lamp horizontal and vertical centering screws until the image (still out of focus) is roughly centered in the projected plane.



(8)-2 Turn the collector lens focusing knob to focus on the arc image (still not centered) on the paper.



(8)-3 Turn the lamp horizontal and vertical centering screws to bring the image to the center of the projected plane.



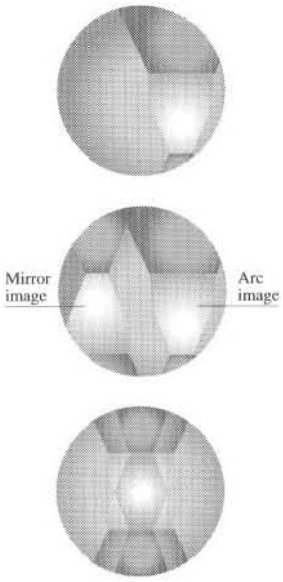
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(9) (When the lamphouse with a back mirror is used.) Center the mirror image.

(9)-1 Slightly move the lamp horizontal centering screw to move the arc image away from the center. (At this time, the mirror image is not yet focused, thus cannot be seen clearly.)

(9)-2 Turn the back mirror centering and focusing screws in the same way as the step (8) to adjust the position of mirror image to be symmetrical with the arc image.

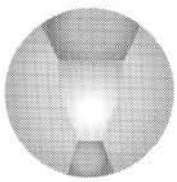
(9)-3 Turn the lamp horizontal centering screw to move the arc image to the center and is superposed on the mirror image. (As the arc image is moved, the mirror image also moves.)

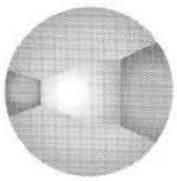


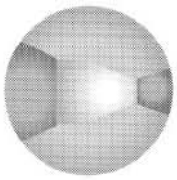
(10) Replace the objective once removed.

2) Centering using the centering tool

Instead of placing a white sheet of paper on the stage, attach the centering tool to the revolving nosepiece and place it in the optical path. Focus the arc image on the window of the tool. For centering of the arc image, see steps (8) and (9) in 1) Centering using a white sheet. The angle of the projected arc image varies depending on the direction of the tool. All illustrations shown in 1) Centering using a white sheet are for the case where the centering window is directed to the front (the side to which the eyepiece is attached).


Window facing front (standard)


Window facing right


Window facing left

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IV TROUBLESHOOTING

? The POWER monitor lamp does not light up even though you turned on the POWER switch.

Possible cause ••• The connection of power cord is loose at the AC IN receptacle.

Action •••➔ Plug it properly.

Possible cause ••• Power requirements including line voltage are not satisfied.

Action •••➔ Check if the input voltage marked on the back panel of the super high pressure mercury lamp power supply matches your available line voltage. If not, do not operate the equipment but contact your nearest Nikon representative.

Possible cause ••• The fuse in the equipment has blown.

Action •••➔ Never open the equipment. It is very dangerous. Contact your nearest Nikon representative.

? The mercury lamp does not light up even though you pressed the IGNITION button down.

Possible cause ••• The connection of LAMP output connector is loose.

Action •••➔ Plug it properly.

Possible cause ••• The mercury lamp used is not the one specified.

Action •••➔ Use the specified mercury lamp (see the chapter V. SPECIFICATIONS).

Possible cause ••• The lamp is almost dead.

Action •••➔ Replace the lamp.

Possible cause ••• The internal temperature of the super high pressure mercury lamp power supply has significantly risen.

Action •••➔ Turn off the POWER switch of the power supply (press the switch to the "O" side and confirm that the POWER monitor lamp is extinguished). Wait until the temperature inside the power supply drops to an appropriate value. (After turning OFF the POWER switch, wait at least ten minutes before turning on the lamp again since the mercury lamp is not easy to light up when its internal pressure is high.)
Turn on the POWER switch and push the IGNITION button.

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Possible cause The safety interlock circuit has stopped the illumination of mercury lamp.

Action Turn off the POWER switch of the power supply (press the switch to the "O" side and confirm that the POWER monitor lamp is extinguished). Remove the cause by which the safety interlock circuit has been activated and wait about ten minutes until the lamp is cooled down. Then turn on the POWER switch again and push the IGNITION button.

Possible cause The IGNITION button is pressed for more than ten seconds in total.

Action Turn off the POWER switch of the power supply (press the switch to the "O" side and confirm that the POWER monitor lamp is extinguished). Check if the mercury lamp hasn't gotten old or the accumulated service time indicated on the RUN TIME counter is over "200.0". If so, replace the lamp. Then turn on the POWER switch and push the IGNITION button.

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SPECIFICATIONS

1 Super High Pressure Mercury Lamp Power Supply for 100 - 120V area (Model: HB-10103AF)

1) Power source

100 - 120V AC, 3.5A, 50 / 60 Hz

2) Light source

100W super high pressure mercury lamp

Specified mercury lamp: USH-102DH (manufactured by Ushio Electric Inc.)

3) Protection class

Class I

4) Conforming standards

UL listed product (UL)

FCC 15B CLASS A satisfied.

5) Operating environment

40℃ maximum ambient temperature

85% maximum humidity (no condensation)

6) Storing environment

60℃ maximum ambient temperature

90% maximum humidity (no condensation)

7) Outlook

Dimensions: 170 (W) x 370 (D) x 270 (H)mm

Weight: Approximately 3.8 kg

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.

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2 Super High Pressure Mercury Lamp Power Supply for 220 - 240V area (Model: HB-10104AF)

1) **Power source**
220 - 240V AC, 2.0A, 50 / 60 Hz

2) **Light source**
100W super high pressure mercury lamp
Specified mercury lamp: USH-102DH (manufactured by Ushio Electric Inc.)

3) **Protection class**
Class I

4) **Conforming standards**
EU Low voltage order satisfied. (GS-listed product) CE
EU EMC order satisfied.

5) **Operating environment**
40°C maximum ambient temperature
85% maximum humidity (no condensation)

6) **Storing environment**
60°C maximum ambient temperature
90% maximum humidity (no condensation)

7) **Outlook**
Dimensions: 170 (W) x 370 (D) x 270 (H)mm
Weight: Approximately 4.0 kg

Nikon reserves the right to make such alterations in design as may be considered necessary in the light of experience. For this reason, particulars and illustrations in this handbook may not conform in every detail to models in current production.

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