Nikon

INTENSILIGHT
C-HGFI / C-HGFIE
Precentered Fiber Illuminator

Instructions
Introduction

Thank you for purchasing the Nikon product.

This instruction manual is written for the users of the Nikon "C-HGFI Intensilight (Precentered Fiber Illuminator)," manual operation type, or the "C-HGFIE Intensilight (Precentered Fiber Illuminator)," motorized operation type.

To ensure correct usage, read this manual carefully before operating the product.

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- The contents of this manual are subject to change without notice.
- Although every effort has been made to ensure the accuracy of this manual, errors or inconsistencies may remain. If you note any points that are unclear or incorrect, please contact your nearest Nikon representative.
- Some of the products described in this manual may not be included in the set you have purchased.
- Be sure to read the manuals for any other products that you are using with this system (the microscope, epi-fl illuminator, or so on).
- If the products are used in a manner not specified by the manufacturer, the protection provided in the products may be impaired.
Safety Precautions

WARNING and CAUTION symbols used in this manual

Although Nikon products are designed to provide the utmost safety during use, incorrect usage or failure to follow the safety instructions provided may cause personal injury or property damage. Damage or injury that may occur due to mishandling is unwarranted. To ensure correct usage, read the instruction manual carefully and thoroughly before using the product. Do not discard the manual; keep it handy for easy reference.

Safety instructions within this manual are described with the following symbols to highlight their importance. For your safety, always follow the instructions accompanied by these symbols.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>![WARNING]</td>
<td>Disregarding instructions accompanying this symbol may lead to serious injury or death.</td>
</tr>
<tr>
<td>![CAUTION]</td>
<td>Disregarding instructions accompanying this symbol may lead to injury or property damage.</td>
</tr>
</tbody>
</table>

Meaning of the symbol used on the product

The symbol appearing on the product indicates the need for caution at all times during use. Always refer to the instruction manual and read the relevant instructions before manipulating any part to which the symbol has been affixed.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>
| ![Caution for heat] | The symbols are labeled near the lamp replace cover on the top of the product and above the air vents on the back of the product. The symbols indicate that the lamp and the surrounding parts become extremely hot while the lamp is lit and immediately after it is turned off and that extremely hot air flows from the air vents while the lamp is lit. Follow the cautions below to avoid burn injury and to prevent fire.  
  • Never touch the lamp and the surrounding parts while the lamp is lit or within 30 minutes after the lamp is turned off.  
  • Keep hands away from the air vents when the lamp is lit. Do not block the airflow from the air vents.  
  • Allow the lamp and surrounding parts to cool sufficiently before replacing the lamp.  
  • Do not allow walls, curtains, or papers to contact the product.  
  • Do not allow cloth, paper, or highly flammable volatile materials, such as gasoline, benzine, paint thinner or alcohol, to come near the lamp or the surrounding area while the lamp is lit or within 30 minutes after switching off the power.  
  • Do not draw any power cord on the product body. |
| ![CAUTION] | The symbol is labeled near the lamp replace cover on the top of the product and above the air vents on the back of the product. The symbol indicates the following cautions:  
  • Before changing the lamp, turn off the product and pull out the power cord from the wall outlet. Before opening the lamp replace cover, check that the power switch is set to the "0" side (the "|" side is Off and the "0" side is On) and that the power cord is disconnected with the wall outlet.  
  • Before changing the lamp, read the instruction manual carefully. When replacing the lamp, refer to page 14, "Installing/replacing the mercury lamp" and be careful for safety. |
WARNING

1. Intended application
   This product must be used only for microscopic observation. Do not use this product for other purpose.

2. Do not disassemble
   Disassembling this product may result in electric shock or other hazards. Malfunctions and damage due to disassembling are unwarranted. Never attempt to disassemble any part other than the parts described in this manual. If you experience problems with this product or the microscope system, contact your nearest Nikon representative.

3. Power supply ratings and power supply cords
   The power supply circuit in this product is designed for AC power of 100 to 240 VAC and 50/60 Hz. Before connecting the power cord, check that the AC power supply to be used conforms to the voltage and frequency described above.
   Always use power cords that satisfy local safety regulations. Always use three-pole grounded outlets.
   For specifications of the power cord, refer to "VII. Specifications."

4. Use the specified mercury lamp
   Use the specified mercury lamp. If a wrong lamp is used, it may cause a malfunction, a fire, or an electric shock.
   • Mercury lamp: Nikon C-LHGFI HG lamp
   For details about the lamp handling, refer to page 7, "3. When handling mercury lamp" and follow the instructions.

5. Turn off the power before assembling and connecting the illuminator or replacing lamps.
   To prevent an electric shock and fire, turn off the power by pressing down the "0" side of the power switch and disconnect the power cable from the outlet before operations such as assembling the illuminator or replacing lamps.

6. Heat from the light source
   The symbol of 🔥 is attached near the lamp replace cover on the top of the product and above the air vents on the back of the product. The symbol indicate that the lamp and the surrounding parts become extremely hot while the lamp is lit and immediately after it is turned off and that extremely hot air flows from the air vents while the lamp is lit. Follow the cautions below to avoid burn injury and to prevent fire.
   • Never touch the lamp, its surrounding parts, and the air vents while the lamp is lit or within 30 minutes after the lamp is turned off.
   • Keep hands away from the air vents when the lamp is lit. Do not block the airflow from the air vents.
   • Allow the lamp and surrounding parts to cool sufficiently before replacing the lamp.
   • Do not allow walls, curtains, or papers to contact the product.
   • Do not allow cloths, papers, or highly flammable volatile materials, such as gasoline, benzine, thinner or alcohol, to come near the lamp, its surrounding parts, or the air vents while the lamp is lit or within 30 minutes after the lamp is turned off.
   • Do not draw any power cord on the product body.
7. **Ultraviolet light**

A mercury lamp radiates ultraviolet light that is harmful to the eyes and skin when the lamp is turned on. Direct viewing of light from the lamp may result in snow blindness at a light case or blindness at the worst case. To prevent injury, follow the guidelines below:

- Use a filter or a collector lens with UV cut specification in the optical path of the microscope or the illuminator unless UV excitation light is necessary for epi-fl microscopy.
- When performing the epi-fl microscopy by using the UV excitation light, attach the filter cube dedicated to the UV excitation light. And then, if you must see the objective or its surroundings, be sure to see through the ultraviolet light shield.

8. **For safety**

While the mercury lamp is lit, it emits the very strong light beam, which includes ultraviolet light and is harmful to human eyes and skin, through the light guide fiber connected to the product. The beam is so intense that there are possibilities of danger, such as fire or burn, and especially, leading to blindness if one sees the beam directly. In order to avoid an accident, the following instructions must be always observed:

- Attach the light guide fiber to the microscope before turning on the lamp.
  
  While the mercury lamp is lit, it is strictly prohibited that removing the light guide fiber from the microscope or looking into the light guide fiber tip.
- Before removing the light guide fiber from the product, turn off the lamp.
  
  Also, before removing the light guide fiber from the microscope, turn off the lamp.
- Before turning on the power of the product, connect the light guide fiber correctly.
  
  If the light guide fiber is not connected correctly and the power of the product is turned on, the connection part of the light guide fiber becomes hot and it may cause a burn injury.
9. Mercury lamp (HG lamp) burst and gas leak

If the lamp is scratched or used over the life, the lamp may burst or gas may leak from the lamp. If the lamp bursts, the broken glass may be scattered and hurt human beings and/or the product. Besides, the gas inside the lamp (vaporized mercury and Ar inert gas) is released into the air bringing about the danger of inhaling the gas. To avoid these dangers and to cope effectively with these abnormal situations, please read the articles below before using the product. For details about the lamp handling, refer to page 7, “3. When handling mercury lamp” and follow the instructions.

- The inorganic mercury is said to be less harmful and less absorbed by human beings than the organic mercury (methyl mercury), but sill is harmful and an utmost care is needed in handling them.
- If the lamp bursts or the gas leaks, 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.
- If you happen to inhale the mercury vapor, immediately rinse your mouth and throat with a plenty amount of water. If mercury or mercury vapor contacts on your skin or gets 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.
- Before cleaning up the mess, wait till the lamp and the surrounding parts cool down.
- To gather the scattered liquid mercury, use a special material for absorbing the mercury (available from vendors handling experimental materials). Dispose of them as the special industrial waste or dispose of them according to the laws or rules of your local waste system.
- 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 of them as the special industrial waste or dispose of them according to the laws or rules of your local waste system.
- Because safety is a top priority in the design of Nikon products, the hazards described above should not pose any danger as long as you heed all of the warnings and cautions in the manuals and use the system only for its intended purpose. However, the hazards described above could lead to an accident if you fail to heed all of the warnings and cautions in the manuals, if you strike the system, or if you attempt to disassemble the system. Therefore, always be sure to heed all of the warnings and cautions.
- If the lamp bursts, contact your nearest Nikon representative immediately. Never continue to use the product in "as is" condition, because some glass shreds may remain in the product.
1. **Do not wet the product or allow foreign matter to get inside**

If the product gets wet, a short circuit may cause malfunction or abnormal heating of the product. Similarly, if foreign matter gets inside, a short circuit may occur. If you accidentally spill water on the product, immediately turn off the power switch (flip it to the "0" side) and unplug the power cord from the wall outlet. (Take care not to touch the cord with wet hands at this time.) And then, wipe off the water with a dry cloth.

Check the connectors such as AC inlet on the back of the product. If you find any moisture, wipe them away. If any liquid or foreign matter gets inside, do not use the equipment, but contact your nearest Nikon representative.

2. **Mercury lamp life expectancy**

The average life expectancy of a Nikon HG lamp C-LHGFI is 2000 hours. Exceeding 2000 hours of use may lead to an accident such as burst of the lamp. Always replace with a new lamp once the RUN TIME counter reading exceeds "2000.0." (Hour meter reads 2000.0 which equals 2000 hours.)

After replacing a lamp, be sure to reset the RUN TIME counter display to "000.0" by pressing the reset button. The RUN TIME counter shows the total accumulated time that the lamp has been lit. Do not press the reset button except when replacing with a new lamp. Doing so will cause you to lose track of the accumulated time of operation.

* If the lamp bulb becomes noticeably blackened, replace with a new lamp regardless of the accumulated time of operation.
3. When handling mercury lamp

When handling the mercury lamp, follow the guidelines given below and take enough care in order to avoid accidents and injury caused by the lamp burst.

- Do not subject the lamp to shock or vibration.
- Do not allow dirt or fingerprints to get on the inner surface of the reflector.
- Do not scratch the inner surface of the reflector.
- Do not exert excessive force on the electrode or the reflector. (Particularly when installing the lamp into the socket.)
- When attaching the lamp into the lamp holder, insert the lamp as far as it goes and fix the lamp with the wire form hooked.
- When connecting the lamp cord, securely insert the connector.
- Take care not to cut your hands when cleaning up the glass shreds of the burst lamp.
- Do not use a lamp beyond its life expectancy.
- Store lamps in a proper storage environment. Storage of the lamp in an inappropriate environment may cause the lamp to burst.

<Storage conditions>
Temperature: -20 to +60°C
Humidity: relative humidity 90% maximum (no condensation)
Miscellaneous: Do not subject the lamp to vibration or shock as these may cause the lamp to burst or shorten its life expectancy.
- Do not break the used up lamps, but dispose of them as the special industrial waste or dispose of them according to the laws or rules of your local waste system.

<Supplemental notes>
- If fingerprints or dirt stuck on the reflector surface, wipe them with a piece of soft, clean cotton cloth or gauze lightly dampened with absolute alcohol.
- The glass shards should be placed in a hard container for disposal.
- If you notice an abnormality while using a lamp, immediately stop operation and contact your nearest Nikon representative.
- The product is designed to keep the glass shreds within the product even if the lamp bursts during illumination (when a burst occurs inside the product).
- If the lamp bursts during illumination, wait till the periphery of the lamp cools sufficiently before cleaning up.
- For details on installing a lamp, see page 14, "Installing/replacing the mercury lamp."

4. Ozone

It is assumed that a small amount of ozone is produced during mercury lamp illumination. Since ozone can irritate the mucous membranes of the eyes and nose upon contact, be sure to provide sufficient ventilation while the lamp is illuminated. Never inhale the air exhausted from the mercury lamp directly, or never let the same air hit your face.
Notes on handling the product

1. **Handle with care**

   This product is a precision optical instrument. Make sure that the product is not subject to shock; handle the product gently. Also be sure to handle cables with care. Light guide fiber, in particular, must not be bent or pulled with excessive force, to prevent failure, malfunction, or broken wires.

2. **Installation conditions**

   If this product is used or stored under unsuitable conditions, it may get damaged or loose accuracy. Consider the following factors when arranging an installation location or storing the product:

   - Use the product at ambient temperatures of between 0 and +35°C and in conditions of relative humidity 85% or less (no condensation) in a room. Store the product at ambient temperatures of between -20 to +60°C and in conditions of relative humidity 90% or less (no condensation). Using or storing the product in hot, humid locations may result in mold formation or condensation on lenses, performance degradation, or malfunctions.
   - Install the product in a surrounding clear area of 10 cm or more (20 cm or more for the rear). In particular, do not block the airflow form the cooling fan and the air vents on the back of the product. Do not place any obstacle near the cooling fan and the air vents.
   - Do not place anything on the product.
   - Do not install or use the product in a closed place such as a shelf or a locker.
   - Install the product in a place with little dust and dirt.
   - Install the product in a place with little vibration.
   - Install or store the product on a sturdy horizontal desk or table that is able to bear the weight of the system.
   - During storage, cover the product so that it does not gather dust.
   - Arrange a layout that allows easy removal of the power cord from the inlet of the product in the event of an emergency.
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Names of Component Parts

For connecting this equipment to the microscope and illumination system, refer to "II. Connecting the Equipment" on page 12.
For attaching and replacing lamps, refer to "Installing/replacing the mercury lamp" on page 14.

C-HGFI  Precentered fiber illuminator (manual operation type)

The knobs on the front panel enable the shutter open/close control and the six step light control.

C-HGFIF15/C-HGFIF30  HG fiber

Cable length
- C-HGFIF15 : 1.5 m
- C-HGFIF30 : 3.0 m
C-HGFIE  Precentered fiber illuminator (motorized operation type)

This type of illuminator has motorized shutter open/close function and light control function. You can operate the shutter open/close control and the light control by using the C-HGFIE-C HG controller. Also, you can operate them by external equipment through RS-232C interface and shutter control signal I/O connector.

C-HGFIE-C  HG controller

This is the specially-designed remote controller for the C-HGFIE.
Connecting the Equipment

Before connecting the illuminator, read all precautions written in "Safety Precautions" found at the beginning of this instruction manual.

For attaching and replacing lamps, refer to "Installing/replacing the mercury lamp" on page 14.

- Required tool: M2.5 Hex driver (or hex key)

Connecting the light guide fiber

**WARNING**

When the lamp is lit, illumination light including ultraviolet light harmful to skin and eyes is emitted from the tip of the light guide fiber.

The light guide fiber must be connected to the microscope or illuminator whenever the lamp is lit. And if the light guide fiber is removed from the microscope, be sure the lamp is turned off.

Do not remove the light guide fiber when the lamp is lit. Do not take a look at the light guide fiber tip while the lamp is lit.

1. Attach the bayonet mount of the fiber adapter to the connection port of the microscope or illuminator to be used.

   Rotate the bayonet ring to the (1) direction. Align the positioning pin to the groove and connect them (2). Then, rotate the bayonet ring to the (3) direction up to the limited position.

2. Insert the emission side tip of the light guide fiber into the fiber adapter C-HGFIA connection port up to the limited position. And then, tighten the clamp screw.

   Use a hex driver to tighten the clamp screw.

3. Insert the source side connector of the light guide fiber into the light guide fiber connection port of the illuminator up to the limited position. And then, tighten the clamp screw.

   Use a hex driver to tighten the clamp screw.

   * For safety, this illuminator has a mechanical shutter in the light guide fiber connection port. When the source side connector of the light guide fiber is detached, the mechanical shutter closes together.

Connection to a microscope

Some microscope systems connect the light guide fiber to an epi-fl attachment or epi illuminator. Some microscope systems connect the light guide fiber directly to the microscope. And most industrial microscope and metallographic microscope must use an adapter to connect the light guide fiber. For information about adapters, refer to "VIII. Connection to a Microscope." For information about connecting devices other than those described in the list, contact your nearest Nikon representative.

An example of other connection

Fiber adapter clamp screw

Fiber clamp screw

Emission side tip

Light guide fiber connection port

Source side connector

Clamp screw

Emission side tip

Fiber adapter (C-HGFIA, option)
Power code connection

This equipment is powered by 100 to 240 VAC, and 50 or 60 Hz. Before connecting the power cord to an outlet, check that the input voltage and frequency meet requirements of this equipment.

1. Check that the power switch of the equipment is off. (The "0" side is pressed.)

2. Insert the power cord into the AC inlet on the back of the equipment.

3. Insert the other end of the power cord into a wall outlet.

Connecting the HG controller (only for the C-HGFIE)

To use the C-HGFIE (motorized type illuminator) with the C-HGFIE-C HG controller, connect the remote controller cable to the remote controller connector on the back of the equipment.

At this time, check the direction of the connector beforehand.

Affxing the luminous sticker (only for the C-HGFIE)

The C-HGFIE-C HG controller is provided with a luminous sticker.

Affix the luminous sticker above the ND indicator on the HG controller as shown in the figure in case the ND indicator markings are difficult to read in the dark place such as a dark room.

Connecting the RS-232C cable (only for the C-HGFIE)

The C-HGFIE (motorized type illuminator) has a RS-232C interface that can be used to control the illuminator by external equipment such as a PC. To utilize the RS-232C connector, see "RS-232C interface" in "VI. Controlling by External Equipment (C-HGFIE)."

Connecting the external shutter control signal I/O cable (only for the C-HGFIE)

The C-HGFIE (motorized type illuminator) has a shutter control interface that can be used to control the shutter by external equipment. To utilize the shutter control signal I/O connector, see "Shutter control by external signal" in "VI. Controlling by External Equipment (C-HGFIE)."
Installing/replacing the mercury lamp

Before installing or replacing a lamp, read all precautions written in “Safety Precautions” found at the beginning of this instruction manual and observe them.

Use the Nikon C-LHGFI HG lamp for the mercury lamp.

* Do not touch the inner surface of the reflector and the surface of the bulb with bare hands.

The mercury lamp is installed to the appropriate position when the lamp is attached into the lamp holder. There is no need of centering or focusing the lamp.

- Required tool: M2.5 Hex driver (or hex key)

1. Turn off the power switch (push down the "0" side). And then, disconnect the power cord from the equipment main body.

2. Wait for 30 minutes or more to allow the lamp and its surroundings to cool.

3. Loosen the clamp screw of the lamp replace cover plate, and then remove the lamp replace cover plate.

   There is a clamping latch on the back of the lamp replace cover plate. Slide the cover plate up, and then remove it.

4. Unhook the wire form of the lamp holder.

   Remove the old lamp when replacing lamps.

   (1) Disconnect the lamp cable connector from the connector on the equipment.

   (2) Unhook the wire form and move it to the innermost.

   (3) Pull out the old lamp from the lamp holder.

   Do not break the used up lamps, but dispose of them as the special industrial waste or dispose of them according to the laws or rules of your local waste system.
5 Attach a new lamp.
Set the new lamp with its "TOP" label side up. (See the right figure.)

(1) Align the lamp with the socket and insert the lamp. (See the arrow symbol in the right figure.)
Temporarily fix the lamp with the flat springs of the lamp holder.

(2) While pushing the lamp against the lamp holder, hook the wire form.
Check that the lamp is fixed firmly.

(3) Connect the lamp cable connector to the connector on the equipment.
Be careful about the direction of the connector.

6 Put the lamp replace cover plate to its original position, and then fix it by tightening the clamping screw.
Slide down the lamp replace cover plate to insert the latch on the back of the plate into the panel.
Turning on/off the lamp

The mercury lamp turns on/off with the equipment power on/off.

1  Before turning on the power supply
   • Always follow all precautions written in "Safety Precautions" found at the beginning of this instruction manual.
   • Check that 10 minutes or more elapse after turning off the lamp before turning it on again.
   • Check that the total accumulated lit time of the lamp with RUN TIME hrs. counter. If the indicator of the counter exceeds the average life expectancy, 2,000 hours or "2000.0" in the indication of the counter, replace lamp.

2  Turn on the power by pressing down the power switch to "|" side.
   • The power of the equipment turns on, and the mercury lamp turns on too.
   • The POWER indicator on the front panel is lit. And the LAMP indicator flashes. When the mercury lamp is lit correctly, the LAMP indicator becomes lit.
   • The arc of the lamp will stabilize in about 10 minutes after being turned on.
   • For C-HGFIE (motorized type illuminator), indicators on the HG controller display the equipment status.
     (See "HG controller operation for C-HGFIE" on P. 18.)

3  Open the shutter.
    Only when the shutter is opened, Illumination is emitted from the equipment.
    For details about the shutter operation, see the next page "Opening/closing the shutter."

4  To turn off the lamp, turn off the power by pressing down the power switch to "0" side.
    To turn on the lamp again, wait for 10 minutes or more to cool down the lamp.
Opening/closing the shutter

This equipment has a mechanical shutter. You can control the light transmit/shield by operating the illuminator by the following operations:

**For C-HGFI (manual operation type illuminator)**

Rotate the shutter knob on the front side of the equipment to open/close the shutter.

The shutter closes when "●" is selected. And the shutter opens when "ο" is selected.

**For C-HGFIE (motorized type illuminator)**

Push the shutter button on the HG controller to open/close the shutter.

The shutter open/close state toggles when the shutter button is pressed. The OPEN indicator turns on when the shutter opens.

Controlling the lamp

You can control the light in six steps by the optical system inside the equipment.

<table>
<thead>
<tr>
<th>ND scale</th>
<th>32</th>
<th>16</th>
<th>8</th>
<th>4</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmittance (Brightness)</td>
<td>3% (1/32)</td>
<td>6.25% (1/16)</td>
<td>12.5% (1/8)</td>
<td>25% (1/4)</td>
<td>50% (1/2)</td>
<td>100% (Not reduced)</td>
</tr>
</tbody>
</table>

**For C-HGFI (manual operation type illuminator)**

Rotate the ND select knob on the front of the equipment to control the light.

Be sure to stop the knob at its click stop positions.

**For C-HGFIE (motorized type illuminator)**

Push the ND select button on the HG controller to control the light.

There are two buttons for controlling the light. The right button is used to increase the amount of light, and the left button to decrease the amount of light. The current brightness is displayed on the ND indicator.
Operating the HG controller (only for the C-HGFIE)

For the C-HGFIE, you can control operations of shutter open/close and lamp light control from the HG controller.

Operation parts and indicators of the HG controller are described below.

- **POWER indicator (green)**
  - It is lit when the power turns on.
  - If the safety interlock activates, this indicator flashes.

- **OPEN indicator (green)**
  - It is lit when the shutter opens.
  - The shutter opens/closes with the shutter button.

- **LAMP indicator (yellow)**
  - It is lit when the mercury lamp lights up.
  - Before the lamp lights up correctly, it flashes after power on. When the lamp turns off, this indicator turns off too.

- **ND select buttons**
  - It switches the light of the equipment in six steps. The selected amount of light (brightness) is displayed on the ND indicator.
  - The right button is used to increase the amount of light, and the left button to decrease the amount of light.

- **Indicator brightness select switch**
  - It changes indicator (LED) brightness in three steps (bright/dark/off).

- **SHUTTER button**
  - It toggles the shutter open/close status.
  - When the shutter opens, the OPEN indicator is lit.

- **ND indicator**
  - It displays the current light amount. To control the light, use the right/left ND select buttons.

<table>
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</table>

Operating the RUN TIME hrs. counter

The RUN TIME hrs. counter on the front panel is an hour meter of the lamp to check the total accumulated lit time.

The counter is incremented in 0.1 hour step (6 minutes) while the power is on (the power switch is the "||" side) and displays the total accumulated lit time of the lamp.

When a new lamp begins its life time, push the reset button of the counter to set the display as "0.0." When the counter displays "2000.0 (2,000 hours)," the average life expectancy, replace the lamp with new one.

Do not push the reset button except when the lamp replacing. That will confuse the replacement period.
Even though it is not an equipment failure, this product performance itself can be adversely affected by misuse. If any of the following symptoms arise, be sure to first check the following table for possible causes before requesting service.

Contact your nearest Nikon representative if the problem cannot be resolved using the following table.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Countermeasure</th>
</tr>
</thead>
<tbody>
<tr>
<td>The equipment does not work even though the power is turned on</td>
<td>The power cord is not connected to the wall outlet, or connected incompletely.</td>
<td>Connect the power cord securely.</td>
</tr>
<tr>
<td>(the power switch is &quot;[&quot; side).</td>
<td>A power rating such as voltage does not meet the requirements.</td>
<td>Check the power ratings, voltage and frequency, of the wall outlet with the</td>
</tr>
<tr>
<td></td>
<td>The fuse in the equipment is blown.</td>
<td>input range of this equipment.</td>
</tr>
<tr>
<td>The power is on. But the mercury lamp does not light up and the</td>
<td>The used lamp is not the specified type.</td>
<td>Use the specified lamp (Nikon C-LHGFI HG lamp).</td>
</tr>
<tr>
<td>LAMP indicator flashes.</td>
<td>The lamp life is over.</td>
<td>Replace the lamp with a new.(P.14)</td>
</tr>
<tr>
<td></td>
<td>The lamp cable connector is not connected correctly.</td>
<td>Connect the lamp cable connector properly.(P.14)</td>
</tr>
<tr>
<td>The LAMP indicator is lit. But no illumination light is emitted from</td>
<td>The source side connector of the light guide fiber is not connected correctly.</td>
<td>Push in the light guide fiber up to the limited position, and tighten the clamp</td>
</tr>
<tr>
<td>the light guide fiber.</td>
<td>The shutter in the optical path is closed.</td>
<td>screw.</td>
</tr>
<tr>
<td></td>
<td>The ND select knob stops at an intermediate position.</td>
<td>Rotate the knob to the click stop position.</td>
</tr>
<tr>
<td>The illumination from the light guide fiber is dark.</td>
<td>The light guide fiber is not connected correctly.</td>
<td>Connect the light guide fiber correctly.</td>
</tr>
<tr>
<td></td>
<td>The light guide fiber is broken.</td>
<td>Replace the light guide fiber with a new one.</td>
</tr>
<tr>
<td></td>
<td>An ND filter with low transmittance is in the optical path.</td>
<td>Adjust the brightness with the ND select knob (for the manual operation type) or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the ND select button on the HG controller.</td>
</tr>
<tr>
<td>The mercury lamp turns off, the POWER indicator flashes.</td>
<td>The safety protection circuit was activated.</td>
<td>Turn off the power and wait for 10 minutes or more to cool down the lamp.</td>
</tr>
<tr>
<td>(For the C-HGFIE, an electronic sound beeps too.)</td>
<td></td>
<td>Take measures to the cause of protection circuit activation. Then, turn on the</td>
</tr>
<tr>
<td></td>
<td></td>
<td>power again.(P.20)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>For C-HGFIE (motorized type illuminator), the ND indicator of the HG controller</td>
</tr>
<tr>
<td></td>
<td></td>
<td>displays the cause.(P.20). Check it before turning off the power.</td>
</tr>
<tr>
<td>Indicators on the HG controller do not light up. (Only for the C-HGFIE)</td>
<td>The indicator brightness select button is pressed to select &quot;OFF&quot; status.</td>
<td>Press the indicator brightness select button to change to &quot;bright&quot; or &quot;dark&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>status. (The status changes each time the button is pressed.)</td>
</tr>
<tr>
<td>The RUN TIME hrs. counter display disappeared. Or, the counter does not</td>
<td>The internal lithium battery for the RUN TIME hrs. counter is just about dead.</td>
<td>Change the battery. Contact your nearest Nikon representative.</td>
</tr>
</tbody>
</table>
Safety protection circuit

This equipment is provided with a safety protection circuit. The safety protection circuit is activated in the following cases:

- The lamp replace cover plate is opened.
- The temperature around the lamp rises abnormally.
- The number of revolutions of the cooling fan for the lamp mounted in the equipment drops below a predetermined level.
- The number of revolutions of the cooling fan mounted on the rear panel drops below the predetermined level.

If the safety protection circuit is activates, the following procedures are performed: the mercury lamp turns off, the lamp indicator turns off, and the power indicator flashes. For C-HGFIE (motorized type illuminator), an electronic sound beeps and the ND indicator on the HG controller displays the detected problem. (See the followings.)

### Indication of detected abnormality (only for C-HGFIE)

In case of C-HGFIE (motorized type illuminator), when the safety protection circuit is activated, one of 1, 2, 4, or 8 ND indicators on the HG controller lights up to indicate the cause of the problem.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Cause of problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The lamp replace cover plate is opened.</td>
</tr>
<tr>
<td>2</td>
<td>Abnormal temperature around lamp</td>
</tr>
<tr>
<td>4</td>
<td>Abnormal rotation of lamp cooling fan</td>
</tr>
<tr>
<td>8</td>
<td>Abnormal rotation of rear cooling fan</td>
</tr>
</tbody>
</table>

### Resetting the protection circuit

Power off the equipment by turning off the power switch (the "0" side), and remove the problem that caused the activation of the protection circuit. Then, after waiting for 10 minutes or more until the lamp cools down, power on the equipment by turning on the power switch (the "|" side).

If the safety protection circuit is activated again after the above procedure, the equipment may be broken. In such cases, contact your nearest Nikon representative.
Cleaning optical parts

Do not let dust, fingerprint, and such get on the tip of the light guide fiber. Dirt will adversely affect the view of image. If the tip of the light guide fiber gets dirty, clean it as described below.

- Brush away dust with a soft brush, or else gently wipe it off with gauze.
- Only if there are fingerprints or grease, dampen lightly a piece of soft, clean cotton cloth, lens tissue, or gauze with absolute alcohol (ethyl or methyl) and gently wipe off the dirt.
- Do not use any organic solvent other than absolute alcohol. The light guide fiber joint surface may be degraded.
- Absolute alcohol is highly flammable. Be careful when handling around open flames and when turning the power switch on/off, and so on.
- Follow the instructions provided by the manufacturer when using absolute alcohol.

Cleaning painted components

- Do not use organic solvents such as alcohol, ether, or paint thinner. Doing so may result in discoloration of painted components or plastic components or in peeling of printed letters.
- We recommend that you use a piece of silicon cloth to clean the equipment.
- For persistent dirt, dampen a piece of gauze with neutral detergent and wipe gently.

Cleaning the fan

The filter for the cooling fan on the back of the equipment may be clogged with dust and dirt. (See the figures on P. 10 and 11.) Clean the filter with a vacuum cleaner periodically.

Battery for the RUN TIME hrs. counter

The RUN TIME hrs. counter is equipped with a lithium battery. The life of the battery is approximately 7 years. When the battery goes dead, the counter display disappears or the counter does not work correctly. In such cases, contact your nearest Nikon representative.

Storage

- Store this equipment in a dry place where mold is not likely to form.
- Put the dust-proof cover over this equipment to protect it from dust.
- Before putting on the dust-proof cover, turn off the power switch of the equipment (flip it to the "0" position) and wait until the lamp gets cool sufficiently
- Store the light guide fiber and fiber adapter in a container or desiccator, with a drying agent.

Periodical inspection (charged)

Periodical inspections (expenses charged) of this equipment are recommended in order to maintain peak performance. Contact your nearest Nikon representative for details.
C-HGFIE (motorized type illuminator) has a RS-232C interface and a shutter control signal I/O connector. You can control the illuminator with external equipment such as PCs through these interfaces.

For programming and creating control hardware, follow the descriptions of this chapter.

RS-232C interface

Overview

The C-HGFIE (motorized type illuminator) has a RS-232C interface. You can connect the illuminator with a PC or other equipment. Read the followings to use the RS-232C interface.

Communication parameters

<table>
<thead>
<tr>
<th>Baud rate</th>
<th>9600 bps (fixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data length</td>
<td>8 bits (fixed)</td>
</tr>
<tr>
<td>Parity bit</td>
<td>None</td>
</tr>
<tr>
<td>Stop bit</td>
<td>1 bit (fixed)</td>
</tr>
<tr>
<td>Flow control</td>
<td>None</td>
</tr>
</tbody>
</table>

Connector pin assignments and cable specifications

Use a crossed type cable with D-sub 9 pin connectors.

(Reference) Crossed type cable on the market
Command format

The data format used when this illuminator receives data from external equipment is referred to as "command format," while that used when the system sends data is called "response format." In the following description, [ ] indicates a delimiter for explanation purpose and not data (characters) that is actually sent or received.

### Command format

\[ [A] [BBB] [C...C] [CR] \]

- **[A]** Command identifier (following three types)
  - **f**: Command with response when received
  - **c**: Command without response when received
  - **r**: Data request command

- **[BBB]** Command name
- **[C...C]** Parameter (if required)

### Response Format

\[ [D] [BBB] [E...E] [CR] [LF] \]

- **[D]** Response identifier (following four types)
  - **q**: Response to \[f\] command
  - **o**: Response when \[f\] or \[c\] command processing is normally terminated
  - **n**: Response if an error occurs during \[f\], \[c\], or \[r\] command processing
  - **a**: Response to \[r\] command (requested data)

- **[BBB]** Command name
- **[E...E]** Data ("A", error code, or requested data)

### Error Code

<table>
<thead>
<tr>
<th>Code</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Command error</td>
<td>Command identifier or command name is bad.</td>
</tr>
<tr>
<td>2</td>
<td>Parameter error</td>
<td>Parameter is bad.</td>
</tr>
<tr>
<td>3</td>
<td>Process timeout</td>
<td>Timeout error occurred in the motorized mechanism control.</td>
</tr>
<tr>
<td>4</td>
<td>Receive buffer overflow</td>
<td>Received data exceeds the limit.</td>
</tr>
<tr>
<td>6</td>
<td>Command overflow</td>
<td>Number of commands exceeds the limit for the drive table.</td>
</tr>
<tr>
<td>7</td>
<td>Processing inhibit error</td>
<td>Processing is disabled in the software. Limit error or such.</td>
</tr>
<tr>
<td>8</td>
<td>Initialization error</td>
<td>This illuminator has not initialized.</td>
</tr>
</tbody>
</table>

* Code number 5 does not occur on this illuminator.
Communication sequence

[f] command

\[ \text{[C-HGFIE]} \rightarrow \text{[External equipment such as PC]} \]

\[ \text{[f] command} \rightarrow \text{[o] response} \]

* If an error occurs in the command processing, [n] response is issued.

[c] command

\[ \text{[C-HGFIE]} \rightarrow \text{[External equipment such as PC]} \]

\[ \text{[c] command} \rightarrow \text{[o] response} \]

* If an error occurs in the command processing, [n] response is issued.

[r] command

\[ \text{[C-HGFIE]} \rightarrow \text{[External equipment such as PC]} \]

\[ \text{[r] command} \rightarrow \text{[a] response} \]

* If an error occurs in the command processing, [n] response is issued.

Communication buffer

Communication commands can be sent up to 100 commands (or 2048 characters) in a row without waiting for responses.

However, the process sequence may be different from the sent command order when multiple commands are sent.

Normally, the sent order will be kept when drive commands for the same equipment are sent in a row.
### Communication command

#### ND control

1. **Command list**

<table>
<thead>
<tr>
<th>Description of operation</th>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ND forward rotation</strong></td>
<td>fNCW</td>
<td>qNCWA</td>
</tr>
<tr>
<td>Rotate the ND to the next stop in the forward direction. (address increment)</td>
<td>cNCW</td>
<td>oNCW, nNCW(2) (error response)</td>
</tr>
<tr>
<td><strong>ND reverse rotation</strong></td>
<td>fNCC</td>
<td>qNCCA</td>
</tr>
<tr>
<td>Rotate the ND to the next stop in the reverse direction. (address decrement)</td>
<td>cNCC</td>
<td>oNCC, nNDD(2) (error response)</td>
</tr>
<tr>
<td><strong>ND position specification</strong></td>
<td>fNDM(1)</td>
<td>qNDMA</td>
</tr>
<tr>
<td>Move the ND to the specified position.</td>
<td>cNDM(1)</td>
<td>oNDM, nNDM(2) (error response)</td>
</tr>
<tr>
<td><strong>ND position read</strong></td>
<td>rNAR</td>
<td>aNAR(1), nNAR(2) (error response)</td>
</tr>
<tr>
<td>Read the ND position.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. **Parameter**

   (1) Position (address): 1 = ND1, 2 = ND2, 3 = ND4, 4 = ND8, 5 = ND16, and 6 = ND32

   (2) Error code (See P.23.)

#### Shutter control

1. **Command list**

<table>
<thead>
<tr>
<th>Description of operation</th>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Shutter control</strong></td>
<td>fSXC(1)</td>
<td>qSXCA</td>
</tr>
<tr>
<td>Control the shutter to the specified status.</td>
<td>cSXC(1)</td>
<td>oSXC, nSXC(3) (error response)</td>
</tr>
<tr>
<td><strong>Shutter status read</strong></td>
<td>rSXR</td>
<td>aSXR(1), nSXR(3) (error response)</td>
</tr>
<tr>
<td>Read the shutter status.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Shutter control by schedule</strong></td>
<td>fSXT(1):(2)</td>
<td>qSXTA</td>
</tr>
<tr>
<td>Control the shutter to the specified status and reverse its status at the specified time.</td>
<td>cSXT(1):(2)</td>
<td>oSXT</td>
</tr>
<tr>
<td></td>
<td></td>
<td>nSXT(3) (error response)</td>
</tr>
</tbody>
</table>

   * See the note on the next page.

2. **Parameter**

   (1) Status: 0 = reverse, 1 = open, or 2 = close

   (2) Open time (4 bytes fixed): 0000 to 1000

     * .0001 denotes 0.1 second. Up to 100.0 seconds can be set in 0.1 second step.

     However, 0000 denotes continuous open status.

   (3) Error code (See P.23.)
3. Note for the shutter control by schedule (SXT command)

<Protocol>

<table>
<thead>
<tr>
<th>[C-HGFIE]</th>
<th>[PC or so on]</th>
</tr>
</thead>
<tbody>
<tr>
<td>cSXT1:0010</td>
<td>oSXT</td>
</tr>
</tbody>
</table>

Shutter opens.

1 sec.

Shutter closes.

(No response)

<NOTE>

The following limitations must be noted about this command.

When a shutter control by schedule command is sent to this illuminator and the shutter open/close schedule is set, the following cases occur.

(A) If a communication command other than shutter control commands is issued, that communication command is processed.

(B) If a shutter control command is issued, the shutter control command is processed. The new shutter control command is processed, and the shutter control by schedule command is disabled.

(C) If another shutter control by schedule command is issued, the new command is processed. The new schedule is enabled.

The items of (A) and (B) are applied for shutter controls by the remote controller or external signals.

<Example>

<table>
<thead>
<tr>
<th>[C-HGFIE]</th>
<th>[External equipment such as PC]</th>
</tr>
</thead>
<tbody>
<tr>
<td>cSXT1:0020</td>
<td>oSXT</td>
</tr>
<tr>
<td>cSXT2:0040</td>
<td>oSXT</td>
</tr>
<tr>
<td>cSXC1 (shutter close)</td>
<td>oSXC</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Before 2.0 sec. time-lapse

Before 4.0 sec. time-lapse
**Remote controller**

1. **Command list**

<table>
<thead>
<tr>
<th>Description of operation</th>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote controller enable set</td>
<td>cREM(1)</td>
<td>oREM</td>
</tr>
<tr>
<td>Set the remote controller enabled.</td>
<td></td>
<td>nREM(3) (error response)</td>
</tr>
<tr>
<td>Remote controller enable read</td>
<td>rREN</td>
<td>aREN(1)</td>
</tr>
<tr>
<td>Read the remote controller validity.</td>
<td></td>
<td>nREN(3) (error response)</td>
</tr>
<tr>
<td>Remote controller LED brightness change</td>
<td>cRIL(2)</td>
<td>oRIL</td>
</tr>
<tr>
<td>Change the remote controller LED brightness.</td>
<td></td>
<td>nRIL (3) (error response)</td>
</tr>
<tr>
<td>Remote controller LED brightness read</td>
<td>rRIR</td>
<td>aRIR(2)</td>
</tr>
<tr>
<td>Read the remote controller LED brightness.</td>
<td></td>
<td>nRIR(3) (error response)</td>
</tr>
</tbody>
</table>

2. **Parameter**

(1) Validity: 0 = disabled (initial condition), 1 = enabled
* When the validity is disabled, the button operation on the remote controller is disabled. (No reaction even if a button is pressed.)

(2) LED brightness: 0 = off, 1 = dark, 2 = bright, 9 = toggle (off → dark → bright → off →...)

(3) Error code (See P.23.)

**Program version read**

1. **Command list**

<table>
<thead>
<tr>
<th>Description of operation</th>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version read *</td>
<td>rVEN</td>
<td>aVEN(1)</td>
</tr>
<tr>
<td>Read the program version number.</td>
<td></td>
<td>nVEN(2) (error response)</td>
</tr>
</tbody>
</table>

2. **Parameter**

(1) Program version (5 bytes fixed): "V*.***

(2) Error code (See P.23.)

**Program checksum read**

1. **Command list**

<table>
<thead>
<tr>
<th>Description of operation</th>
<th>Command</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checksum read *</td>
<td>rSUM</td>
<td>aSUM(1)</td>
</tr>
<tr>
<td>Read the checksum of the program.</td>
<td></td>
<td>nSUM(2) (error response)</td>
</tr>
</tbody>
</table>

2. **Parameter**

(1) Program checksum (4 bytes fixed): "0000" to "FFFF" (hex)

(2) Error code (See P.23.)
Shutter control by external signal

C-HGFIE (motorized type illuminator) has a connector to control opening/closing of the shutter by external equipment. You can use an external switch box, PC and so on, to control the shutter and to read the shutter status.

To use the shutter control signal I/O connector, connect signals according to the description below.

**Connector pin configuration**

For the equipment side connector, a 3.5 mm diameter audio mini-stereo jack is adopted. Follow the instruction below to make the connection.

<table>
<thead>
<tr>
<th>1: GND</th>
<th>Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>2: EX-SHT-IN</td>
<td>Shutter control signal input</td>
</tr>
<tr>
<td>3: EX-SHT-OUT</td>
<td>Shutter control signal output</td>
</tr>
</tbody>
</table>

**Usage**

1. **Opening/closing of the shutter**

   Making a short circuit between the pin No. 2 (EXT-SHT-IN) and No. 1 (GND) performs switching of the shutter opening/closing. By connecting a momentary type switch, the shutter status can be switched every time the switch is pressed.

   Or, the shutter opening/closing is also possible by TTL level logical input. In this case, the shutter status is switched at every fall edge (from high to low) of a signal.

2. **Shutter status read-out**

   The pin No.3 (EXT-SHT-OUT) outputs the open collector output of the transistor. The transistor is ON when the shutter is open, and OFF when it is closed.
### Specifications

| Model | C-HGFI Intensilight (Precentered Fiber Illuminator) (manual operation type)  
C-HGFIE Intensilight (Precentered Fiber Illuminator) (motorized type) |
|-------|---------------------------------------------------------------------|
| Shutter | Shutter system: light shield plate insertion/removal type  
Drive system: manual operation type (C-HGFI) or motorized type (C-HGFIE) |
| Light control function | Light control system: punching metal rotation  
Light control range: ND1, ND2, ND3, ND4, ND8, ND16, and ND32 (6 steps)  
Wavelength range: 380 to 600 nm  
Drive system: manual operation type (C-HGFI) or motorized type (C-HGFIE) |
| Available mercury lamp | Model name: Nikon C-LHGFI HG lamp  
Ratings: 130 W DC  
Lighting system: DC lighting  
Average service life*: 2,000 hrs.  
* The average service life is defined as the hours at which 50% or more normally working lamps still light up with the brightness of 50% or more of the initial optical characteristics after the usage of lifetime lighting (lighting cycle: repetition of 3.5 hours on, and then 0.5 hour off). |
| Available light guide fiber | Model name: Nikon HG fiber 15 C-HGFIF15 (cable length 1.5 m)  
Nikon HG fiber 30 C-HGFIF30 (cable length 3.0 m)  
Core diameter: 3 mm |
| Input ratings | 100 to 240 VAC (±10%), 50/60 Hz, 2.0 A |
| Power cord | For Japan:  
Detachable cord set with a PSE mark, 3 conductor type  
(3 conductor grounding Type HVCTF, 1.25 mm², 3 m long maximum, rated at 125 VAC minimum.)  
For countries excluding Japan where the power supply is 100 to 120 VAC:  
UL Listed detachable cord set, 3 conductor grounding Type SVT, No.18 AWG, 3 m long maximum, rated at 125 VAC minimum.  
For countries where the power supply is 220 to 240 VAC:  
Approved according to EU/EN standards, 3 conductor grounding Type HO5VV-F, 3 m long maximum, rated at 250 VAC minimum. |
| Dimensions and weight | Dimensions: 110 (W) x 283 (H) x 258 (D) mm  
(C-HGFI/C-HGFIE main body excluding protruding portion)  
Weight: approximately 6.0 kg (C-HGFI)  
approximately 6.0 kg (C-HGFIE) |
| Remote controller (only for C-HGFIE) | Model name: C-HGFIE-C  
Connector: mini DIN 8 pin  
Cable length: 2.8 m  
Dimensions: 67 (W) x 122 (H) x 20 (D) mm (excluding protruding portion)  
Weight: Approximately 0.2 kg |
## Specifications

| Communication function (only for C-HGFIE) | Communication type: RS-232C compliance serial interface  
|                                          | Connector: D-sub 9 pin |
| Shutter control signal (only for C-HGFIE) | Connector: 3.5 mm diameter type stereo mini jack |
| Operating environment                   | Temperature: 0 to +35°C  
|                                          | Relative humidity: 85% relative humidity maximum (no condensation)  
|                                          | Altitude: 2000 m maximum  
|                                          | Pollution degree: Degree 2  
|                                          | Installation category: Category II  
|                                          | Electric shock protection class: Class I, indoor use only |
| Storage environment                     | Temperature: -20 to +60°C  
|                                          | Relative humidity: 90% relative humidity maximum (no condensation) |
| Safety standard compliance              | • CE marking  
|                                          | • This product meets EU Low Voltage Directive requirements.  
|                                          | • This product has obtained GS mark. (EN61010-1:2001)  
|                                          | • This product meets EU EMC Directive requirements. (EN61326)  
|                                          | • This is the UL-listed product.(UL61010-1 (Second Edition))  
|                                          | • This product meets FCC Part 15B Class A requirements.  
|                                          | This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.  
|                                          | These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.  
|                                          | This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.  
|                                          | Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.  
|                                          | • This Class A digital apparatus complies with Canadian ICES-003.  
|                                          | Cet appareil numérique de classe A est conforme à la norme NMB-003 du Canada.  
|                                          | • This product complies with Australian EMC. (AS/NZS C1SPR11 Group1 Class B) |
| Acoustic Noise                          | Less than 70 dB  
|                                          | Maschinenlärminformations-Verordnung - 3. GPSGV, 06.01.2004: Der höchste Schalldruckpegel beträgt 70 dB(A) oder weniger gemäß EN ISO 7779 |
## Connection to a Microscope

<table>
<thead>
<tr>
<th>Microscope main body</th>
<th>Epi illumination attachment</th>
<th>Adapter</th>
<th>HG fiber</th>
<th>Fiber illuminator</th>
</tr>
</thead>
<tbody>
<tr>
<td>TE2000-E</td>
<td>T-FL</td>
<td>FL Adapter T-FLA</td>
<td>HG Adapter C-HGFIA</td>
<td>HG Fiber (1.5 m) C-HGFIF 15</td>
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<tr>
<td>TE2000-U</td>
<td>T-FL-E</td>
<td>FL Zoom Adapter T-FLZA</td>
<td>HG Fiber (3 m) C-HGFIF 30</td>
<td>Precentered Fiber Illuminator (manual operation type) Intensilight C-HGFIE</td>
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<td>TE2000-S</td>
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<td>Precentered Fiber Illuminator (motorized type) Intensilight C-HGFIE</td>
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<td>90i</td>
<td>D-FL</td>
<td>HG Adapter C-HGFIB</td>
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<td>U-EPI-FL</td>
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<td>T1-FM</td>
<td>HG Adapter T1-HGFIA</td>
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<td>LV-UEPI2</td>
<td>HG Fiber Adapter LV-HGFA</td>
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<td>LV-UEPI2A</td>
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<td>Double Light Source Adapter LVUEPI2-DLS</td>
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