

# **OLYMPUS<sup>®</sup>**

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## INSTRUCTIONS



EVIS EXERA XENON LIGHT SOURCE  
**OLYMPUS CLV-160**



# Contents

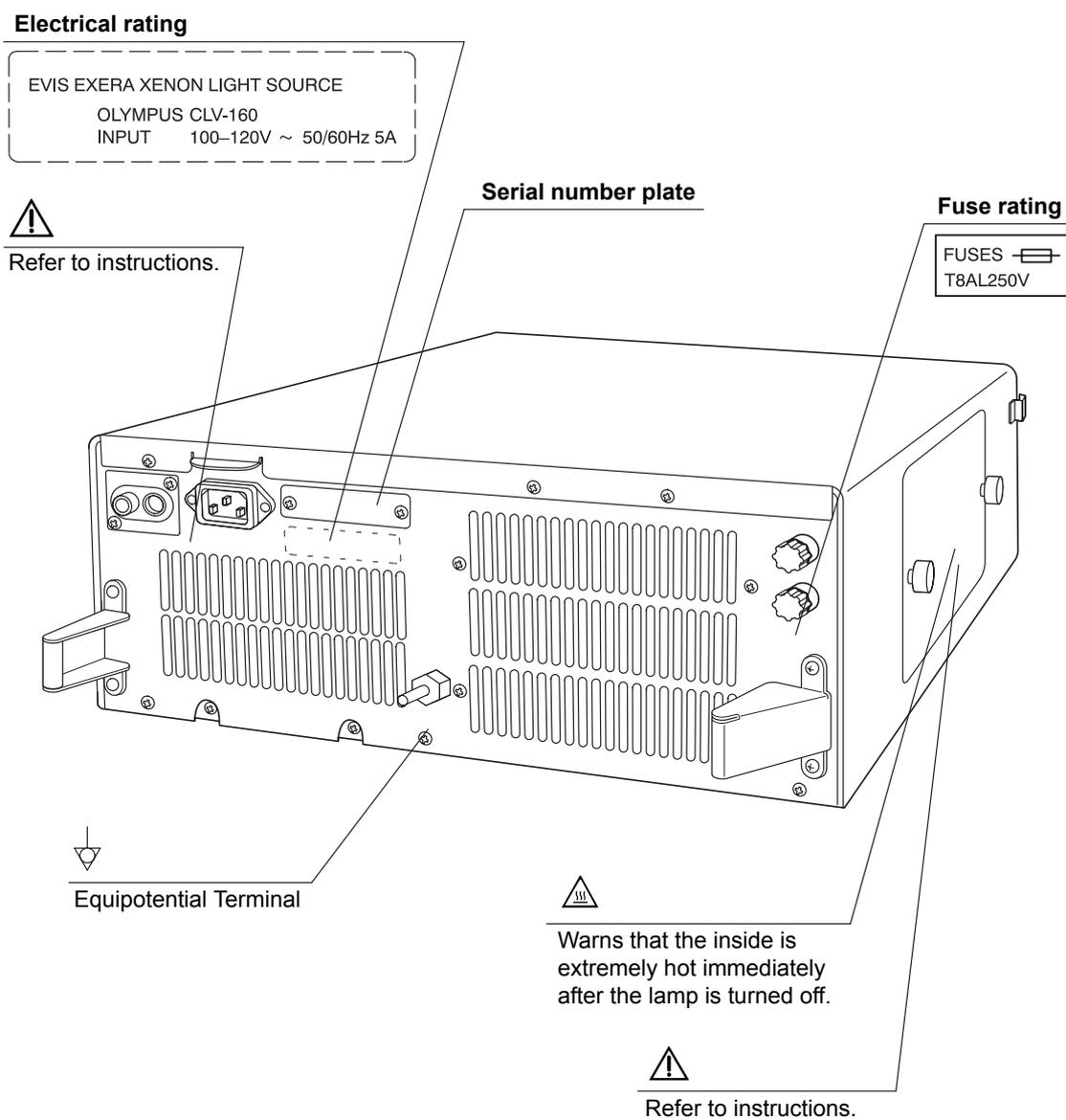
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# Labels and Symbols

Safety-related labels and symbols are attached to the light source at the locations shown below. If labels or symbols are missing or illegible, contact Olympus.

## ○ Rear side



○ **Back cover of this instruction manual**



Manufacturer



Authorized representative in the European  
Community

# ***Important Information — Please Read Before Use***

## ***Intended use***

This light source has been designed to be used with Olympus endoscopes, and ancillary equipment for observation, diagnosis, endoscopic treatment and recording of image data.

Do not use this light source for any purpose other than its intended use.

## ***Instruction manual***

This instruction manual contains essential information on using this light source safely and effectively. Before use, thoroughly review this manual and the manuals of all equipment which will be used during the procedure and use the equipment as instructed.

Keep this and all related instruction manuals in a safe, accessible location.

If you have any questions or comments about any information in this manual, please contact Olympus.

### **○ Terms used in this manual**

#### **OES video converter, OES video system:**

The OES video converter and OES video system are devices that convert endoscope images from a fiberscope into monitor images.

#### **EVIS video system center:**

The EVIS video system center is a device that converts signals from a videoscope or OES video converter into monitor images.

#### **Mobile workstation:**

The mobile workstation is a special trolley on which this light source is placed and used for endoscopic diagnosis and treatment.

## ***User qualifications***

The operator of this light source must be a physician or medical personnel under the supervision of a physician and must have received sufficient training in clinical endoscopic technique. This manual, therefore, does not explain or discuss clinical endoscopic procedures.

## ***Instrument compatibility***

Refer to the “System chart” in the Appendix to confirm that this light source is compatible with the ancillary equipment being used. Using incompatible equipment can result in patient injury or equipment damage.

## ***Repair and modification***

Aside from the examination lamp and the fuses, this light source does not contain any user-serviceable parts. Do not disassemble, modify or attempt to repair it; patient or user injury and/or equipment damage can result. Some problems that appear to be malfunctions may be correctable by referring to Chapter 8, “Troubleshooting”. If the problem cannot be resolved using the information in Chapter 8, contact Olympus.

## **Signal words**

The following signal words are used throughout this manual:

### **DANGER**

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

### **WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

### **CAUTION**

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices or potential equipment damage.

### **NOTE**

Indicates additional helpful information.

## **Dangers, warnings and cautions**

Follow the dangers, warnings and cautions given below when handling this light source. This information is to be supplemented by the dangers, warnings and cautions given in each chapter.

### **DANGER**

- As a TYPE BF applied part, this light source must never be applied directly to the heart and must not be used in procedures involving cardiac observation or surgery. Leakage current from the TYPE BF applied part may be dangerous and cause ventricular fibrillation or otherwise seriously affect the cardiac function of the patient. Accordingly, always adhere to the following points:
  - Never apply the endoscope connected to this light source to the heart or any area near the heart.
  - Never allow an endo-therapy accessory or another endoscope applied to or near the heart to come in contact with an endoscope connected to this light source.

- Strictly observe the following precautions. Failure to do so may place the patient and medical personnel in danger of an electrical shock.
  - When the light source is used to examine a patient, do not allow metal parts of the endoscope or its accessories to touch metal parts of other system components. Such contact may cause unintended current flow to the patient.
  - Keep liquids away from all electrical equipment. If fluids are spilled on or into the unit, stop operation of the light source at once and contact Olympus.
  - Do not prepare, inspect or use this light source with wet hands.
- Never install and operate the light source in locations where:
  - The concentration of oxygen is high.
  - Flammable anesthetics are present in the atmosphere.Otherwise, explosion or fire may result because this light source is not designed to be explosion-proof.

**WARNING**

- Do not touch the light guide of the endoscope connector immediately after removing it from the light source because it is extremely hot. Operator or patient injury can result.
- Do not look directly into the distal end of the endoscope or the output socket of this light source while the examination lamp is ignited. The intense light may cause eye injury.
- To be prepared in case of a light source failure, always have another light source available for immediate use.
- Xenon light sources produce significant heat due to the high intensity light required for endoscopic procedures and can cause a fire if brought into contact with flammable material. To avoid this, make sure that the distal ends of the light guide cable and endoscope do not touch drapes or other flammable material. Also, make sure that light emitted from the cable and scope is not directed toward a drape or other flammable material. Turn OFF the light source whenever it is not being used.
- The system should be established with equipment complied with relevant EMC standards for safety reasons.
- Equipment which do not comply with EMC standard may cause interference and its function or performance may be affected.

- Portable or mobile phones may influence the medical electrical equipment by their emitting energy.

**CAUTION**

- Do not use a pointed or hard object to press the switches on the front panel. This may damage the switches.
- To avoid breaking electric contacts and causing a malfunction:
  - Do not touch the electric contacts of the light source output socket.
  - Do not subject any connector to excessive force.

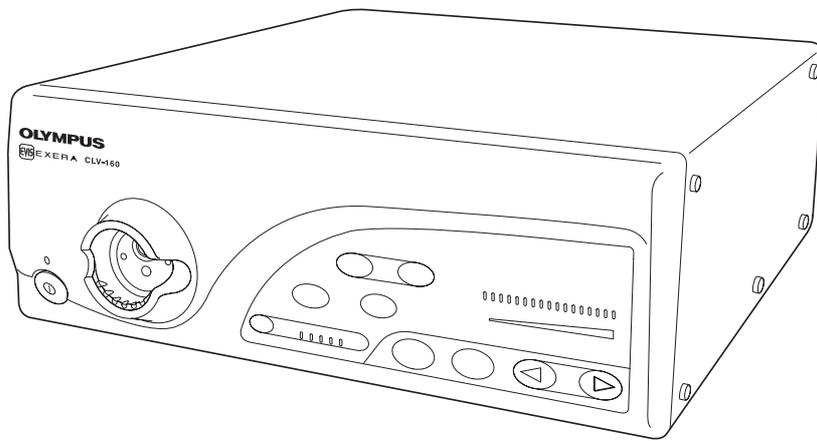
**NOTE**

As defined by the international safety standard (IEC 60601-1:1988), medical electrical equipment is classified into the following types: TYPE CF applied part (the instrument can safely be applied to any part of the body, including the heart), and TYPE B/BF applied part (the instrument can safely be applied to any organ except the heart). The part of the body a videoscope or electrosurgical accessory can safely be applied to depends on the classification of the equipment to which the instruments are connected. Before beginning the procedure, check the current leakage classification type of each instrument to be used for the procedure. Classification types are clearly specified on the instruments and in the instruments' instruction manuals.

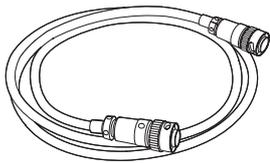
Symbol	Classification
	TYPE CF applied part
	TYPE BF applied part
	TYPE BF applied part

# Chapter 1 Checking the Package Contents

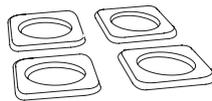
Match all items in the package with the components shown below. Inspect each item for damage. If the light source is damaged, a component is missing or you have any questions, do not use the light source; immediately contact Olympus.



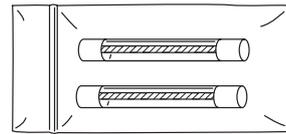
Light source (CLV-160)



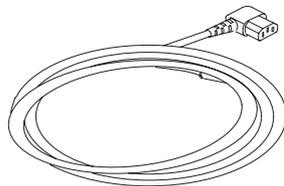
Light control cable (MH-966)



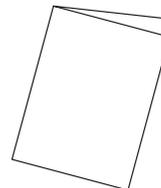
Foot holder (MAJ-878)



Spare fuse (MAJ-892)



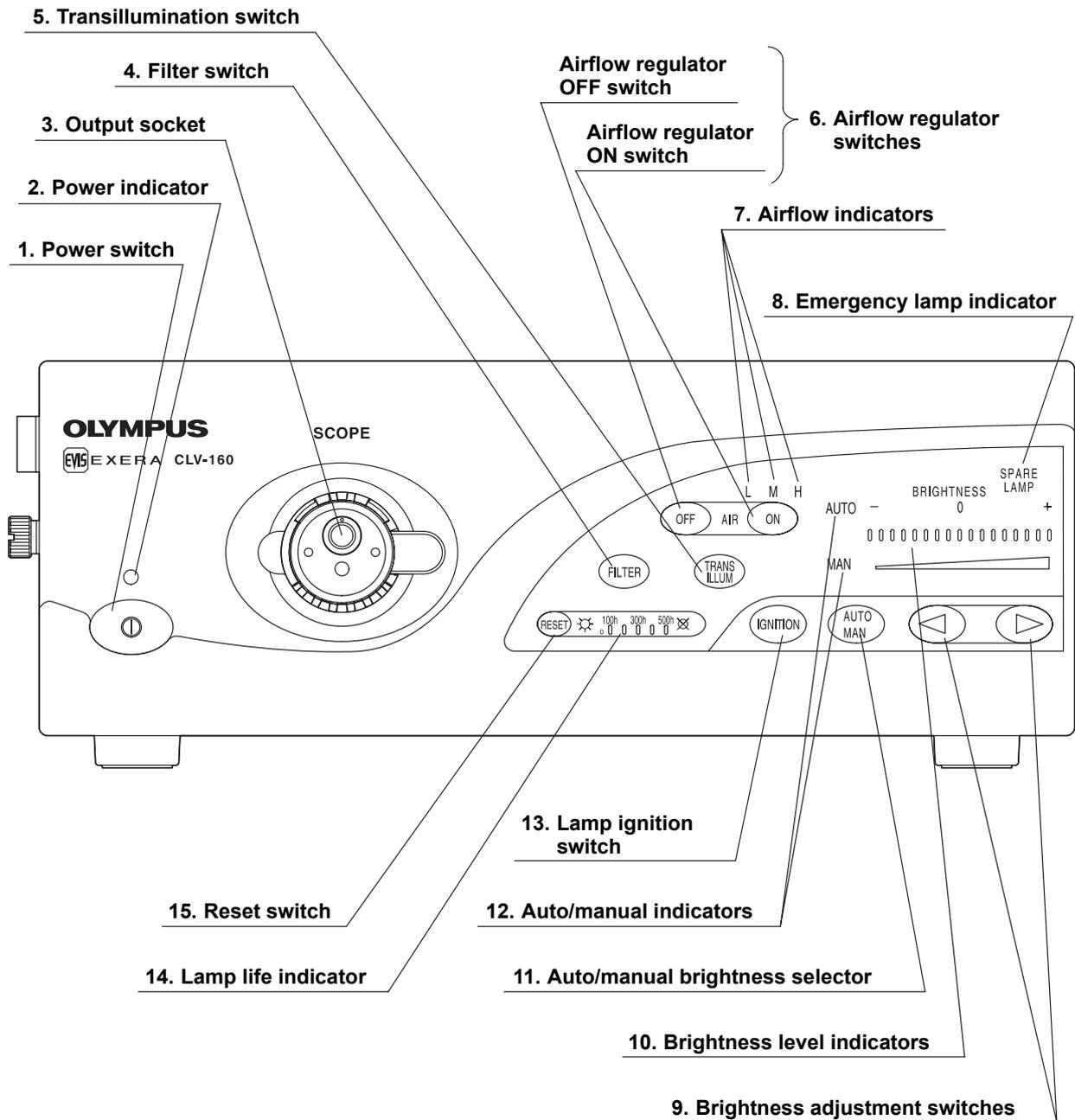
Power cord



Instruction manual

# Chapter 2 Light Source Nomenclature

## 2.1 Front panel



**1. Power switch**

Pressing the power switch in until it stops turns the light source ON. When the power is ON, the power indicator above the power switch is lit. To turn the light source OFF, press the power switch once again.

**2. Power indicator**

The power indicator is lit when the power is ON.

**3. Output socket**

This socket provides light, electrical signals and air to the endoscope.

**4. Filter switch**

When a special-purpose filter is installed, pressing this switch changes between normal observation mode and filter mode.

**5. Transillumination switch**

When pressing this switch, light emitted from the endoscope's distal end becomes brighter for 7 seconds, then returns automatically to its original brightness level.

**6. Airflow regulator switches**

With these switches, the pressure of the air being fed from the endoscope can be controlled.

**7. Airflow indicators**

These indicators display the current airflow regulator setting ("L", "M", or "H") when the airflow regulator "ON" switch is pressed.

**8. Emergency lamp indicator**

This indicator is lit when the emergency lamp (halogen) is in use, and blinking when emergency lamp (halogen) is disconnected or not mounted.

**9. Brightness adjustment switches**

These switches are pressed to adjust the brightness level.

**10. Brightness level indicators**

These indicators display the current brightness level.

**11. Auto/manual brightness selector**

This selector is pressed to select automatic or manual brightness control.

**12. Auto/manual indicator**

This indicator displays the brightness selector setting ("auto" or "manual").

**13. Lamp ignition switch**

This switch is pressed to turn ON the examination (xenon) lamp.

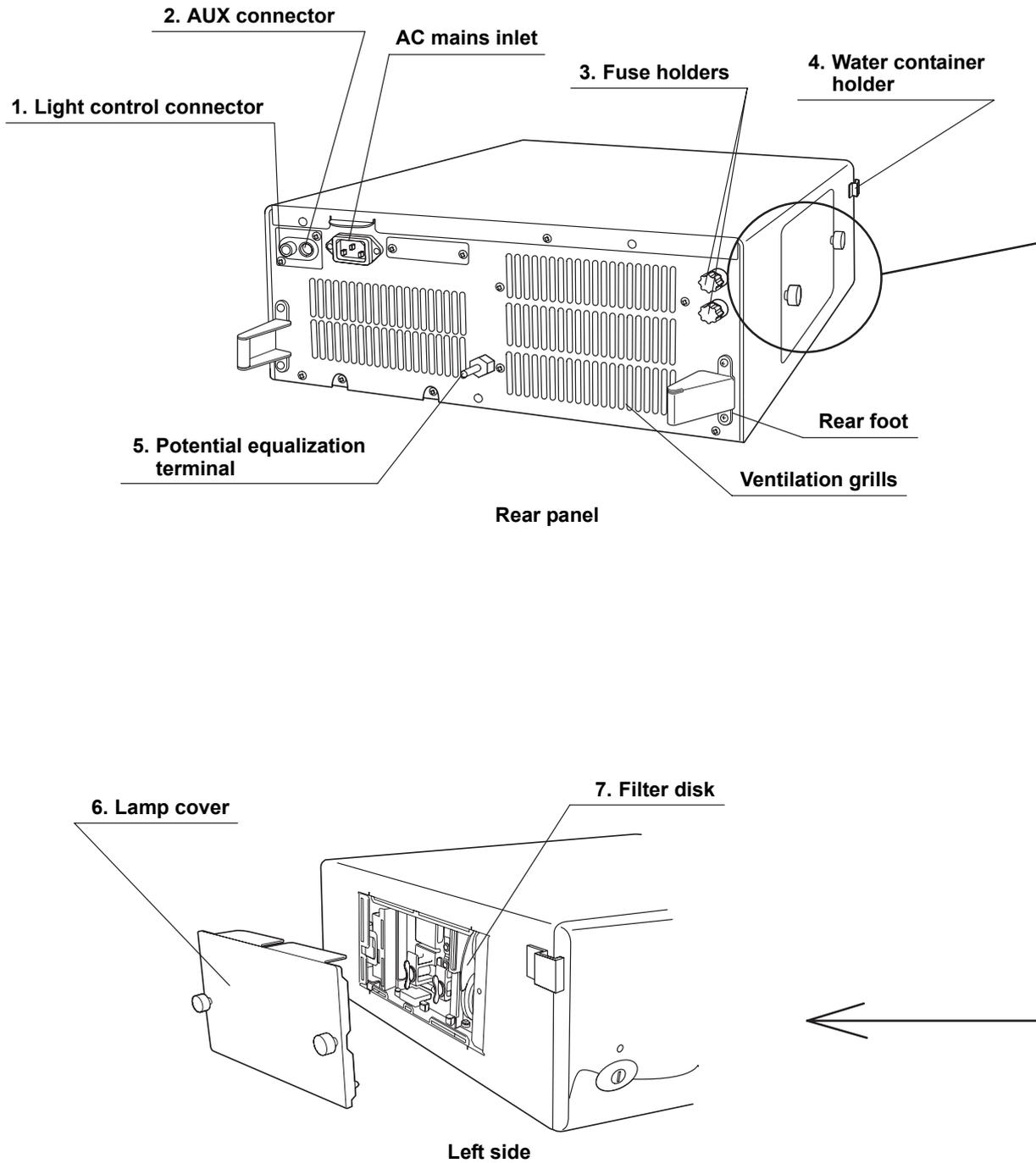
**14. Lamp life indicator**

This indicator displays the total working hours of the examination (xenon) lamp.

**15. Reset switch**

After replacing the examination (xenon) lamp, the lamp life indicator is reset by pressing this switch for more than 3 seconds.

## 2.2 Rear and side panels



**1. Light control connector**

This connector is receptacle for the light control cable to connect the light source to the EVIS EXERA video system center or the EVIS video system center.

**2. AUX connector**

This connector is receptacle for the light control cable to connect the light source to the OES video system.

**3. Fuse holders**

The fuses are mounted here.

**4. Water container holder**

This holder is used for the installation of the water container.

**5. Potential equalization terminal**

For safety purposes, this terminal is connected to a potential equalization busbar of the electrical installation.

**6. Lamp cover**

This cover is removed to replace the examination lamp and a special-purpose filter.

**7. Filter disk**

This disk is hold a special-purpose filter when necessary.

# **Chapter 3 Installation and Connection**

## **CAUTION**

- Turn OFF all system components before connecting them. Otherwise, equipment damage can result.
- Use appropriate cables only. Otherwise, equipment damage or malfunction can result.
- Use the light source under the conditions described in the “Operating environments” and the “Specifications” in the Appendix only. Otherwise, improper performance, compromised safety and/or equipment damage may result.

Prepare the light source and compatible equipment (shown in the “System chart” in the Appendix) before each use, and refer to the instruction manuals of each system component. Install and connect the equipment as follows:

## **3.1 Installation of equipment**

### **CAUTION**

- Do not place any equipment other than the EVIS video system center or OES video system on the top of the light source. Otherwise, equipment damage can result.
- Keep the ventilation grills of the light source clear. Blockage can cause overheating and equipment damage.
- Place the light source on a stable level surface, using the foot holder (MAJ-878).
- If no mobile workstation (WM-30, WM-N60) is used, confirm that the light source does not exceed the allowed maximum load of the installation site.

### ○ Installation on the mobile workstation

1. Place the mobile workstation on a level surface. Lock the caster brakes as shown in Figure 3.1.

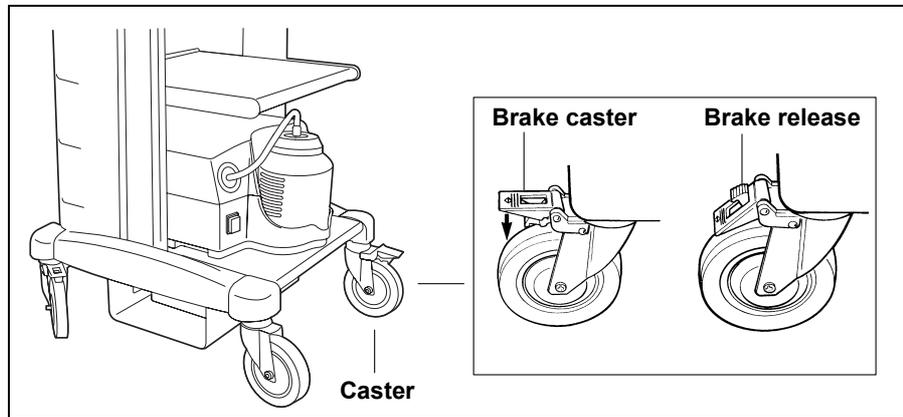


Figure 3.1

2. Install the shelf of the mobile workstation as described in the mobile workstation's instruction manual.
3. Using the pattern sheet as a template on the mobile workstation, position the foot holders at the four corners.
4. Peel the paper from the bottom of the foot holders and gently place them in position as shown in Figure 3.2.

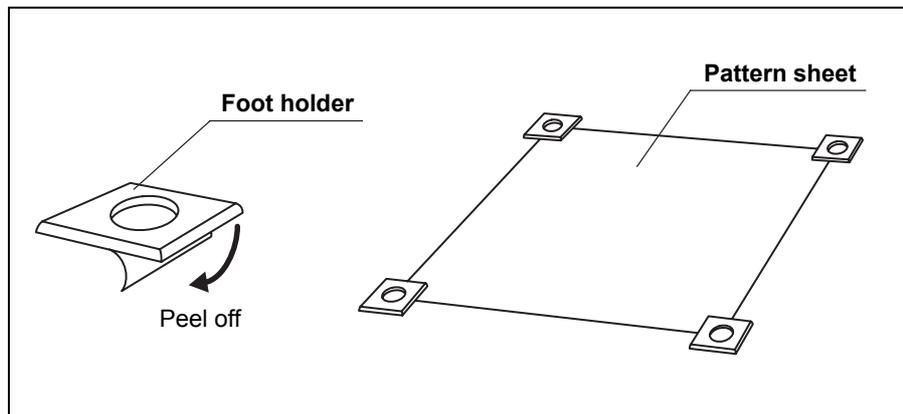


Figure 3.2

5. Once in position, press the foot holders firmly in place.
6. Place the light source on the mobile workstation so that the feet rest in the foot holders (see Figure 3.3).

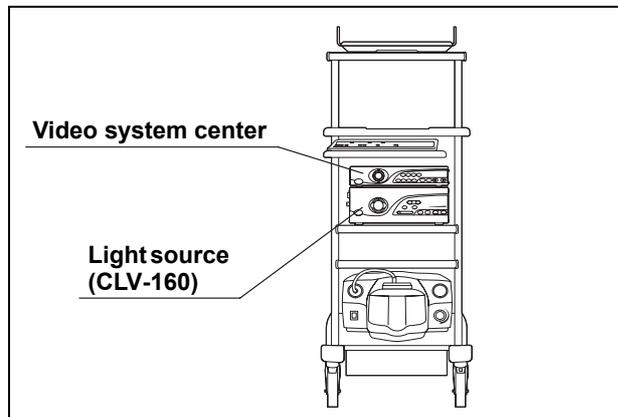


Figure 3.3

#### ○ Installation in another location

When installing the light source in another location, adhere the foot holders as described above.

## 3.2 Connection of the *EVIS EXERA* video system center or *EVIS* video system center

Prepare an *EVIS EXERA* video system center or an *EVIS* video system center when using a videoscope or an OES video converter.

Connect the light control cable that comes with the *EVIS EXERA* video system center or the *EVIS* video system center to the light control connector (see Figure 3.4).

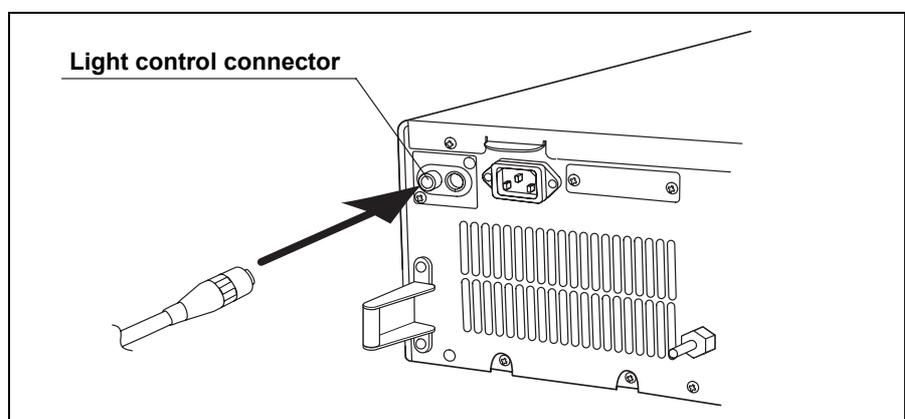


Figure 3.4

### 3.3 Connection of an endoscope

**WARNING**

Before connecting the endoscope's light guide connector to the light source, make sure that it is perfectly dry. If the endoscope's light guide connector is wet (after disinfecting, for example), wipe and dry the exterior as described in the endoscope's reprocessing manual. Otherwise, electrical shock or equipment damage can result.

Insert the light guide connector into the output socket on the front panel of the light source until it clicks into place (see Figure 3.5).

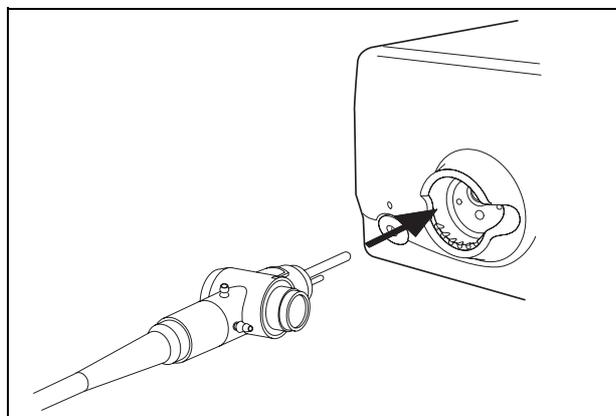


Figure 3.5

### 3.4 Connection of the OES video system

**WARNING**

- Set the auto/manual brightness selector to “AUTO” to prevent burns caused by close observation. So the brightness is adjusted automatically. If using manual brightness adjustment, set the brightness to the middle or lower level and never observe close to mucous membranes for a long time.
- When using rigidscope, set the auto/manual brightness selector to “AUTO” to prevent burns caused by close observation. So the brightness is adjusted automatically. If using manual brightness adjustment, set the brightness to the middle or lower level and never observe close to mucous membranes for a long time.

To view a fiberscope's image on a video monitor, prepare an OES video system, such as the OTV-S6.

Connect the light control cable supplied with the OES video system to the AUX connector (see Figure 3.6).

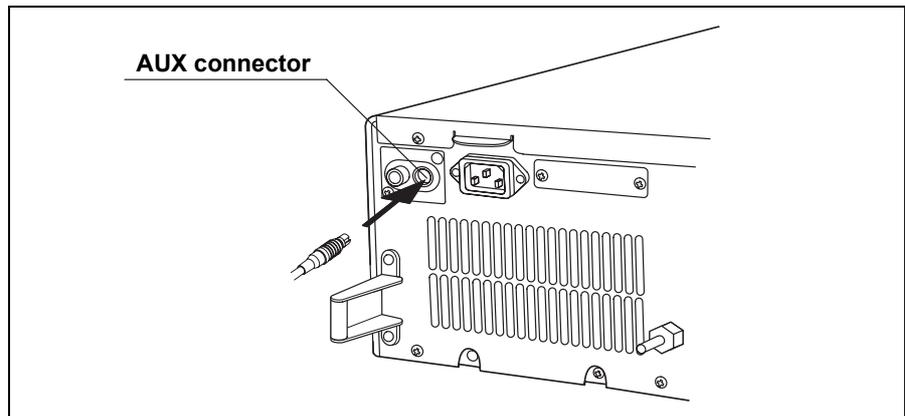


Figure 3.6

### **3.5 Installation of the water container**

When using an endoscope where water can be fed via the light source, prepare the water container as shown in the "System chart" in the Appendix. Install the water container in the water container holder on the left side of the light source (see Figure 3.7).

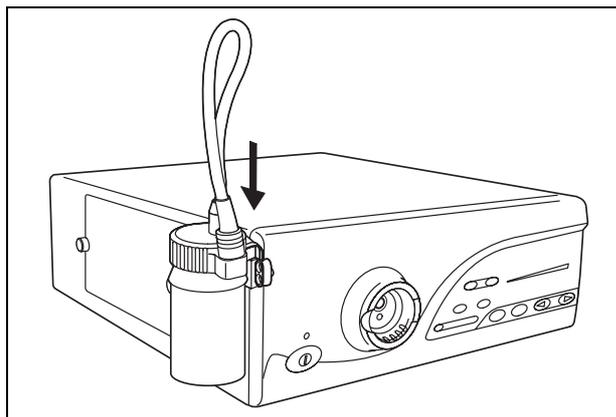


Figure 3.7

## 3.6 Connection to an AC mains power supply

### **DANGER**

Connect the power plug of the power cord directly to a grounded wall mains outlet. If the light source is not grounded properly, it can cause an electric shock and/or fire.

### **WARNING**

- Do not allow the power cord to become wet. A wet power cord may cause electrical shock.
- Make sure that the wall mains outlet to which the light source is connected has a higher capacity than the total power consumption of all connected equipment (including this light source). If the capacity is inadequate, fire can result or the circuit breaker may trip and turn OFF the light source and all other light sources connected to it.
- Do not bend, pull or twist the power cord. Electrical shock, equipment damage or fire can result.

### **CAUTION**

When combined with the mobile workstation (WM-30), do not connect the power cord of the light source to the secondary outlet on the workstation. Connect the power cord directly to a wall mains outlet. Otherwise the system may malfunction or the supplied voltage will be insufficient.

1. Confirm that the light source is OFF.
2. Connect the power cord to the AC mains inlet and to a wall mains outlet.

## Chapter 4 Inspection

### **WARNING**

Before each case, inspect this light source as instructed below. Inspect other equipment to be used with this light source as instructed in their respective instruction manuals. Should the slightest irregularity be suspected, do not use the light source and see Chapter 8, "Troubleshooting". If the irregularity is still suspected after consulting Chapter 8, contact Olympus. Damage or irregularity may compromise patient or user safety and may result in more severe equipment damage.

Prepare this light source and other equipment (shown in the "System chart" in the Appendix) to be used with this light source for each particular case. Refer to respective instruction manuals for each piece of equipment.

### 4.1 Inspection of the power supply

Press the power switch once to turn ON the light source. Confirm that the power indicator is lit (see Figure 4.1).

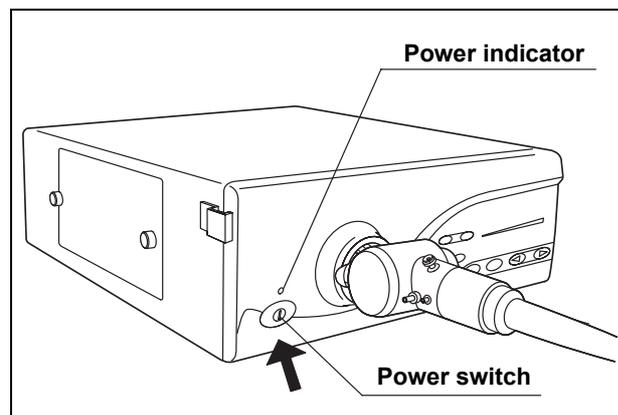


Figure 4.1

### ○ If the power fails to come on

If the power fails to come on, inspect the system as follows:

1. Confirm that the power cord is connected securely to the wall mains outlet and to the AC mains inlet on the light source.
2. Confirm that the lamp cover is completely closed. For safety, the light source cannot be turned ON unless the lamp cover is completely closed.
3. Confirm that the fuses have not blown. If the fuses have blown, replace them with new ones according to the following procedures.

#### **WARNING**

- Turn the light source OFF and remove the power cord from the wall mains outlet before replacing the fuses with new ones. Otherwise, electric shock may result.
  - When changing fuses, use only MAJ-892 (6.35 × 31.8 mm). Otherwise, fire or equipment damage can result.
  - If the power fails to come ON after replacing the fuses with new ones, immediately turn the light source OFF. Remove the power cord from the wall mains outlet and contact Olympus. Equipment damage or malfunction may have occurred and fire or electric shock can result.
4. Turn the light source OFF and disconnect the power cord from the wall mains outlet.
  5. Turn the knob of the fuse holder counterclockwise about 90°, then pull it out straight (see Figure 4.2).

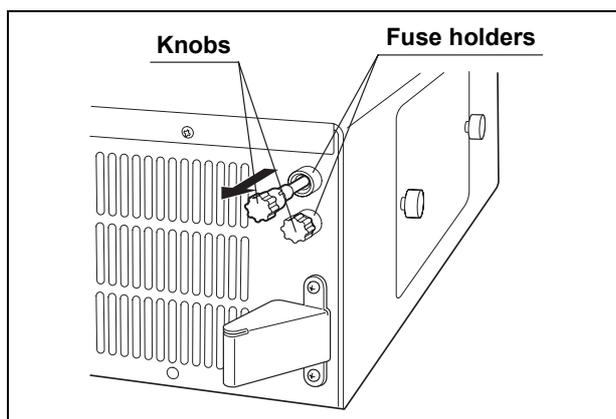


Figure 4.2

6. Inspect the fuses (see Figure 4.3). Even if only one fuse has blown, always replace both of them.

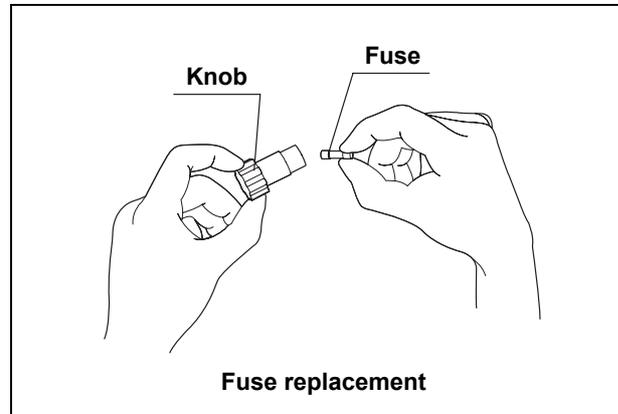


Figure 4.3

7. Push the knob into the fuse holder. When fully pushed, turn the knob clockwise until it stops.
8. Reconnect the power cord and press the power switch. Confirm that the power indicator is lit.

#### ○ If the emergency lamp indicator is lit

If the emergency lamp indicator is lit immediately after the light source is turned ON, it is highly likely that the installed emergency lamp is burned out or out of order, contact Olympus.

## 4.2 Checking the lamp life

Check the lamp life indicator.

The total working hours of the examination lamp are displayed by this lamp life indicator.

If the “500 h” indicator is lit (see Figure 4.4), replace the examination lamp with a new one as described in Chapter 6, “Lamp Replacement”.

#### NOTE

The examination lamp should be replaced as soon as it appears to darken, even if the “500 h” indicator is not yet lit.

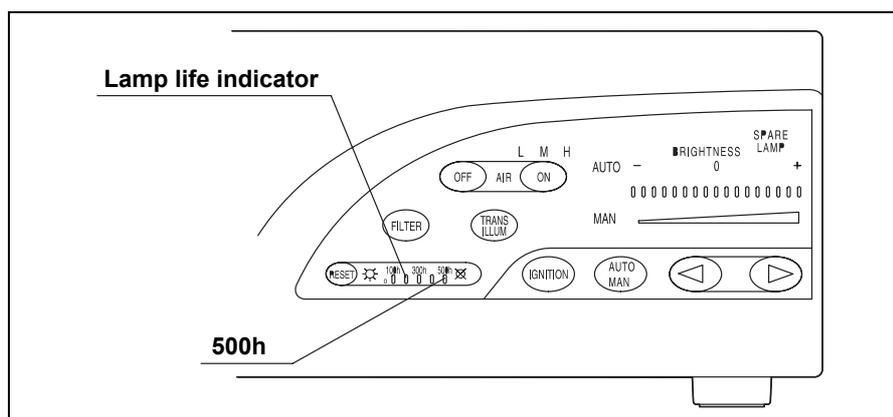


Figure 4.4

### 4.3 Inspection of the filter function

The filter function makes it possible to place a filter of your choice in the light path for special applications. For instructions on selecting and installing a special-purpose filter, see Section 5.3, “Using the filter function”.

#### **WARNING**

- Do not use the filter function when no filter is installed in the filter disk. Confirm that the frame of a special-purpose filter is pushed into the filter disk as far as possible. Otherwise, equipment damage can occur, or light emitted from the distal end of the endoscope can cause burns.
- While inspecting the filter function, do not touch anything inside the lamp chamber. The lamp cover and everything inside is extremely hot and may cause burns.

#### **CAUTION**

Do not touch the emergency lamp, reflector or filter. Natural skin moisture from your fingers can cause cracks and damage the light source.

#### **NOTE**

- When switching the light source ON, the filter function is automatically set to normal observation mode (the filter switch is not lit).
- The color of the filter’s frame for the special purpose filter is silver.
- In the factory, the metal board is set instead of the filter in the filter’s frame.

1. When the light source is already ON, set the filter function to normal observation mode.
2. Turn the light source OFF and disconnect the power cord from the wall mains outlet.
3. Remove the lamp cover and confirm that a special-purpose filter is installed in the filter disk (see Figure 4.5).

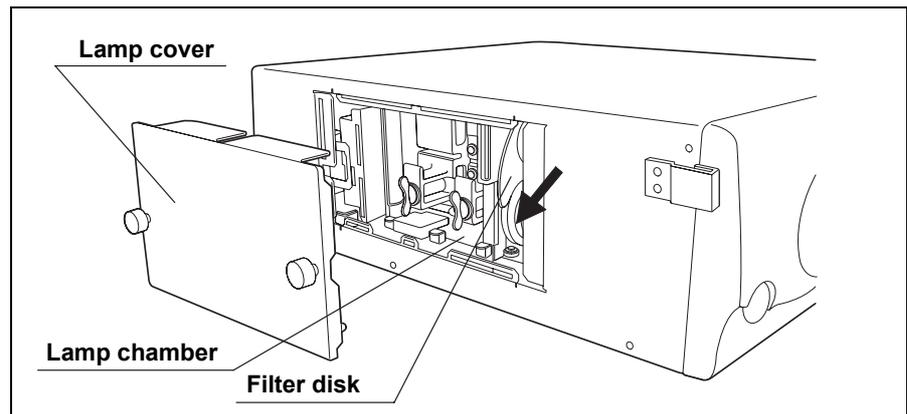


Figure 4.5

If the filter is loose, reinstall it as instructed in Section 5.3, “Using the filter function”.

4. Close the lamp cover securely. Then reconnect the power cord and turn the light source ON.
5. Press the filter switch (see Figure 4.6) to activate the filter mode. A beep is heard and the filter switch lights.

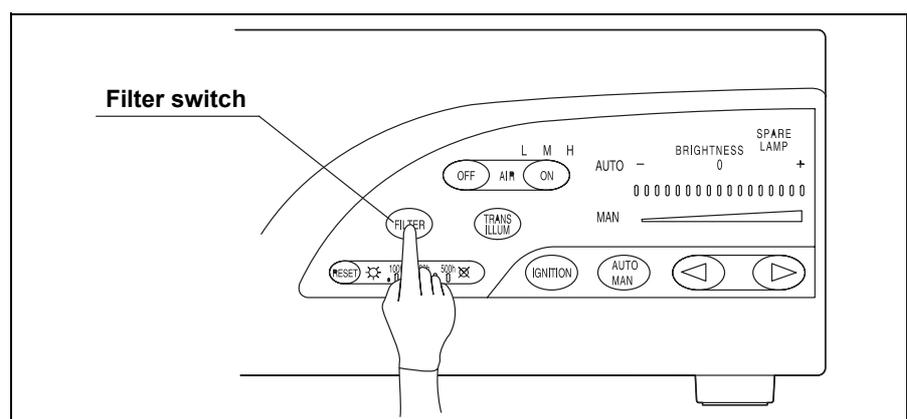


Figure 4.6

6. Press the filter switch once again. The filter function returns to the normal observation mode and the filter switch is not lit.

## 4.4 Inspection of air and water feeding

When using a water container to feed water from the endoscope, inspect the air and water feeding functions as follows.

1. Confirm that one of the airflow indicators (“L”, “M”, and “H”) is lit. If no indicator is lit, press the airflow regulator ON switch once. Then confirm that a beep is heard and one of indicators (“L”, “M”, and “H”) is lit (see Figure 4.7).

**NOTE**

- When the light source is turned OFF, the airflow regulator setting is automatically stored and recalled when the light source is ON again.
- The airflow regulator has been set to OFF before shipment. Press the airflow regulator ON switch once to set the airflow regulator to “L”.

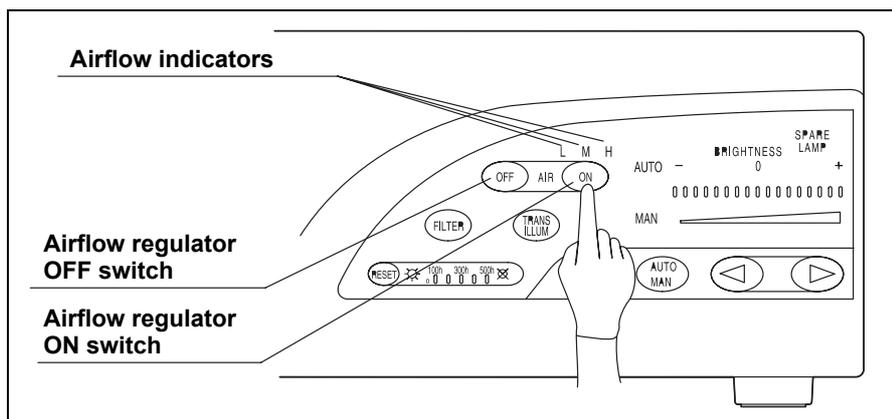


Figure 4.7

2. With the airflow regulator set to “L”, “M” or “H”, immerse the distal end of the connected endoscope in sterile water and operate the endoscope’s air feeding function as described in the endoscope’s instruction manual.

Check the following functions:

- Air bubbles are emitted from the air/water nozzle at the distal end of the endoscope.
  - When the air bubbles are emitted, pressing the airflow regulator OFF switch stops the air bubbles.
  - When restarting, the setting of the airflow regulator is the same as before the airflow regulator OFF switch is pressed; the emission of air bubbles is resumed.
  - Pressing the airflow regulator ON switch again increases the air pressure and the airflow indicator moves to the next level (level “H” is followed by level “L”).
3. Remove the distal end of the endoscope from the sterile water and operate the endoscope’s water feeding function as described in the endoscope’s instruction manual. Confirm that the amount of water emitted from the air/water nozzle at the distal end of the endoscope corresponds to the setting of the air flow regulator.

## 4.5 *Inspection of the examination light*

### **WARNING**

Do not look directly into the distal end of the endoscope or the output socket of the light source when they are emitting light. Eye damage may result.

Press the lamp ignition switch. Confirm that the white examination light is emitted from the distal end of the endoscope as shown in Figure 4.8.

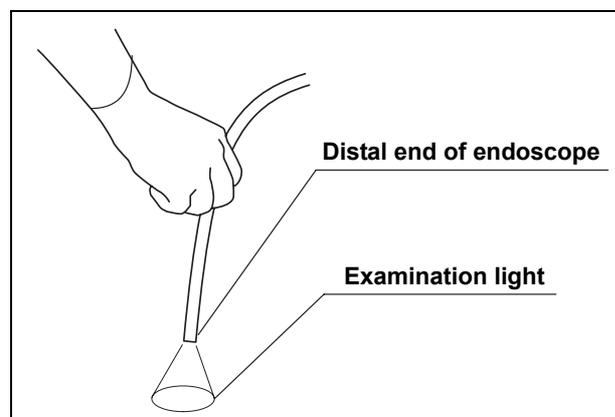


Figure 4.8

1. Press the lamp ignition switch once. The ignition operation is repeated automatically for up to about 5 seconds until the examination (xenon) lamp ignites. If ignition fails, the light source automatically switches to the emergency (halogen) lamp and the emergency lamp indicator is lit. If this happens, turn the light source OFF and ON again. Then press the lamp ignition switch.
2. If ignition of the examination (xenon) lamp fails, install a new lamp as described in Chapter 6, "Lamp Replacement".

## **4.6 Inspection of the light decreasing function**

### **WARNING**

Do not look directly into the distal end of the endoscope or the output socket of the light source when they are emitting light. Eye damage may result.

The light decreasing mechanism is a safety feature designed to prevent light from being emitted when not necessary, for example when no endoscope is connected. Inspect this function as follows:

1. Disconnect the endoscope while it is emitting light. Confirm that no intense light is emitted from the output socket of the light source by holding a suitable object to the light.
2. Reconnect the endoscope to the output socket and confirm that light is emitted from the distal end of the endoscope following the procedure as described in Section 4.5, "Inspection of the examination light".

## 4.7 Inspection of transillumination function

**WARNING**

When using a fiberscope without video or TV systems, do not use the transillumination function while looking into the eyepiece of the endoscope. Using this function sets the examination light to maximum, and eye damage can result.

The transillumination function allows to externally confirm the endoscope's position in the patient's body due to more intense examination light emitted from the endoscope's distal end. Inspect this function as follows.

Press the transillumination switch and confirm that:

- A beep is heard
- The transillumination indicator on the front panel blinks.
- Brightness is set to maximum for manual brightness control.
- Brightness control remains switched to manual even if the auto/manual brightness selector is pressed.
- After 7 seconds, the light returns to its original brightness.

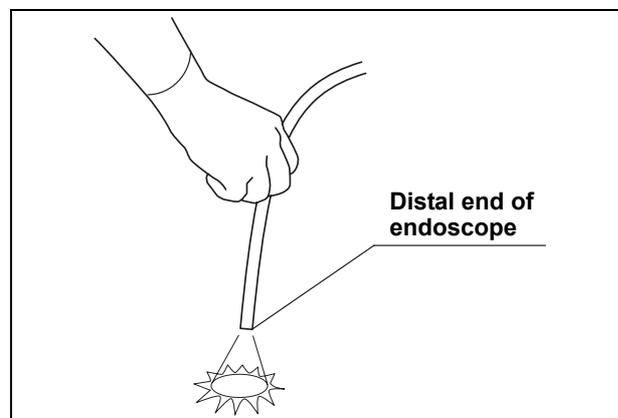


Figure 4.9

**NOTE**

Pressing the transillumination switch while the transillumination function is activated cancels the function and restores the previous setting.

## 4.8 Inspection of brightness adjustment

### **WARNING**

When using the fiberscope without video or TV systems, set the auto/manual brightness selector to “MAN.”. Setting to “AUTO” changes the examination light to maximum, and eye damage can result.

### ○ Selecting automatic or manual brightness control

When selecting a brightness control mode, confirm that the corresponding indicator lights up when pressing the auto/manual brightness selector (see Figure 4.10) and a beep is heard.

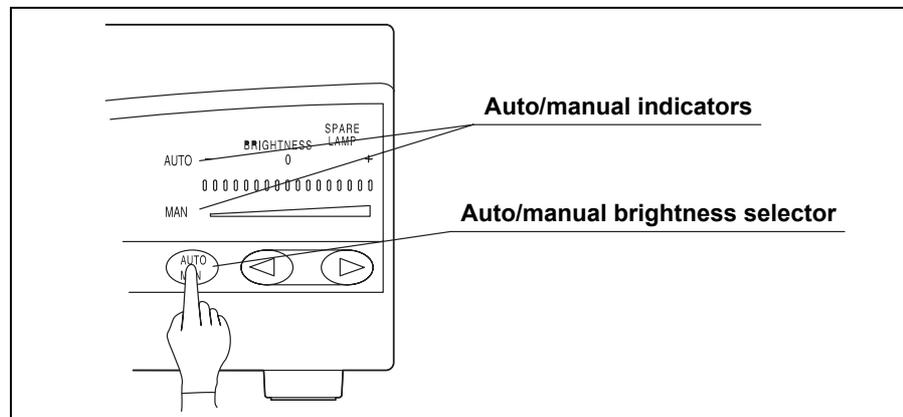


Figure 4.10

## ○ Automatic brightness adjustment

### **WARNING**

Before disconnecting the video system from the endoscope, always select manual brightness control and set the brightness to minimum. If the video system is disconnected while the brightness adjustment is set to automatic, examination light may change to maximum and eye damage can result.

1. Press the auto/manual brightness selector to select "AUTO".
2. Point the distal end of the endoscope at a suitable object and vary the distance between 5 and 60 mm (see Figure 4.11). Confirm that the light being emitted from the distal end varies with the distance.

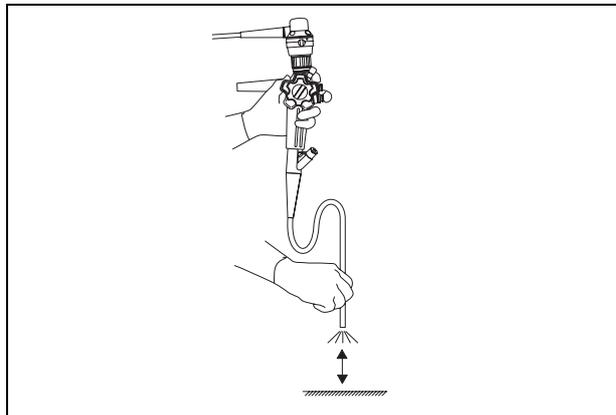


Figure 4.11

3. Hold the distal end of the endoscope at a distance between 30 and 40 mm to the object and press the brightness adjustment switches ("◀" or "▶"). Confirm the following:
  - Each time either of the brightness adjustment switches is pressed, a beep is heard and the brightness level increases or decreases accordingly. The present brightness level is indicated and the indicator moves one level up or down.
  - When either of the brightness adjustment switches is pressed down continuously, successive beeps are heard and one of the brightness level indicator moves continuously.

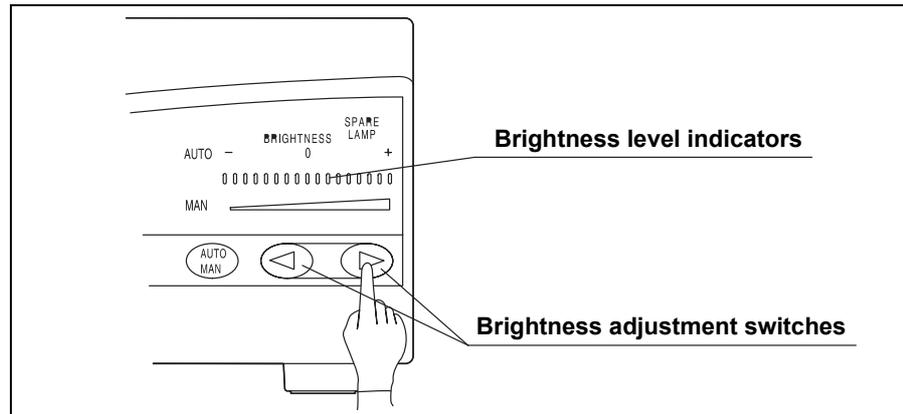


Figure 4.12

## ○ Manual brightness adjustment

### **WARNING**

When using manual brightness adjustment, always set the brightness to the minimum level necessary to complete the examination. If the light is too bright, eye damage or burns can result.

1. Press the auto/manual brightness selector to select "MAN."
2. Press the brightness adjustment switches ("◀" or "▶") and confirm the following (see Figure 4.13):
  - Each time either of the brightness adjustment switches is pressed, a beep is heard and the brightness level increases or decreases accordingly. The brightness level indicators also increase or decrease.
  - When either of the brightness adjustment switches is pressed down continuously, successive beeps are heard and the level indicator increases or decreases continuously.

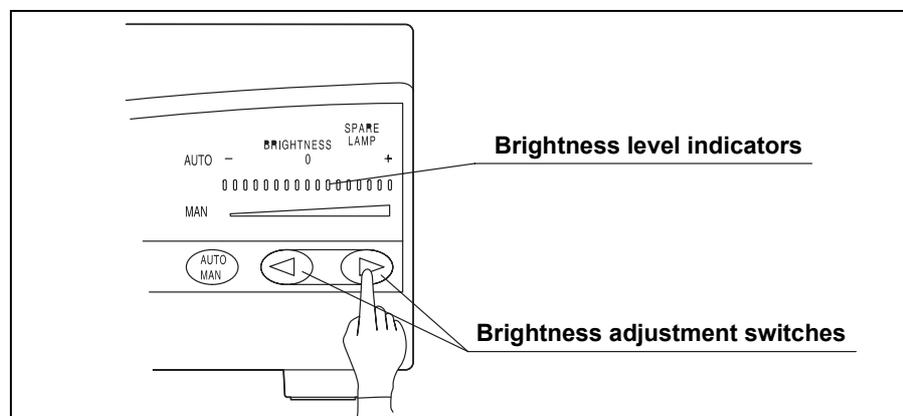


Figure 4.13

# Chapter 5 Operation

The operator of this light source must be a physician or medical personnel under the supervision of a physician and must have received sufficient training in clinical endoscopic technique. This manual, therefore, does not explain or discuss clinical endoscopic procedures. It only describes basic operation and precautions related to the operation of this light source.

## **WARNING**

- Wear personal protective equipment to guard against dangerous chemicals and potentially infectious material. During operation, wear appropriate personal protective equipment, such as eye wear, face mask, moisture-resistant clothing and chemical-resistant gloves that fit properly and are long enough so that your skin is not exposed.
- If the examination lamp does not ignite or go off with blinking the brightness level indicators, immediately stop using the light source and withdraw the endoscope from the patient slowly as described in the endoscope's instruction manual. And then, contact Olympus.
- Anytime you suspect an abnormality in a light source function, stop the examination immediately. Take action according to the procedures described below. Using a defective light source may cause injury.
  - If the image on the monitor becomes completely white or black when the automatic brightness adjustment is selected, the automatic brightness adjustment may be malfunctioning. In this case, set the auto/manual brightness selector to "MAN." and adjust the brightness manually. Withdraw the endoscope from the patient slowly as described in the endoscope's instruction manual.
  - If the examination lamp fails and the emergency lamp lights, withdraw the endoscope from the patient slowly as described in the endoscope's instruction manual.
  - The emergency lamp provides only the absolute minimum of light needed to keep operating in an emergency, so do not use the emergency lamp for operation unless absolutely necessary.

- If any other abnormality occurs or is suspected, stop using the equipment and immediately withdraw the endoscope from the patient slowly as described in the endoscope's instruction manual. Then refer to the instructions in Chapter 8, "Troubleshooting". If the problems cannot be resolved by the remedial action as described in Chapter 8, do not use this light source on a patient again and immediately contact Olympus.
- Whenever possible, do not leave the endoscope illuminated before and/or after an examination. Continued illumination will cause the distal end of the endoscope to become hot and could cause operator and/or patient burns.
- Turn the video system center ON to operate the light source's auto-brightness function. When the video system center is OFF, it cannot operate the light source's auto-brightness function, and the light intensity is set to the maximum level. In this case, the distal end of the endoscope can become hot and could cause operator and/or patient burns.
- Do not use the light source in a location exposed to strong electromagnetic radiation (e.g., near microwave medical treatment equipment, short wave medical treatment equipment, MRI equipment or radio). Brightness fluctuation can occur.
- It is recommended to use only Olympus high frequency electrosurgical equipment with this unit. Non-Olympus equipment can cause interference on the monitor display or a loss of the endoscopic image.

**NOTE**

Set the brightness of the light source to the minimum necessary to perform the procedure safely. If the endoscope is used for a prolonged period at or near maximum light intensity, vapor like smoke may be observed in the endoscopic image. This is caused by the evaporation of organic material (remaining blood, moisture of stool and so on) due to heat generated by the light guide near the light guide lens. If this vapor continues to interfere with the examination, remove the endoscope, wipe the distal end of the endoscope with a lint-free cloth moistened with 70% ethyl or isopropyl alcohol, reinsert the endoscope and continue the examination.

## 5.1 Igniting the lamp

1. Confirm that the endoscope is connected to the output socket, and press the power switch (see Figure 5.1).

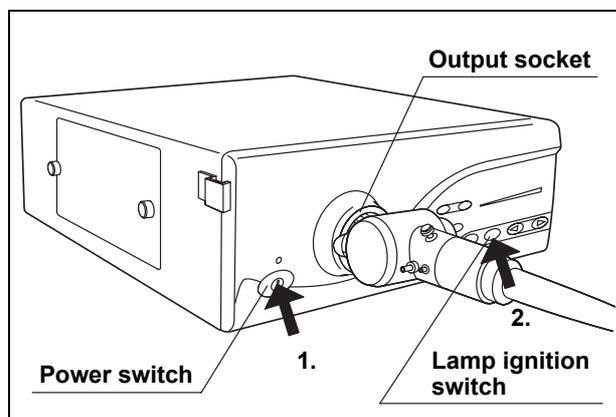


Figure 5.1

2. Press the lamp ignition switch to ignite the examination lamp.

## 5.2 Brightness adjustment

### **WARNING**

- When using the fiberscope without a video system, set the auto/manual brightness selector to “MAN.”. Setting to “AUTO” changes the examination light to maximum, and eye damage can result.
- When using in combination with an OES video system, set the auto/manual brightness selector to “AUTO” to prevent burns caused by close observation. So the brightness is adjusted automatically. If using manual brightness adjustment, set the brightness to the middle or lower level and never observe close to mucous membranes for a long time.
- When using rigidscope with an OES video system, set the auto/manual brightness selector to “AUTO” to prevent burns caused by close observation. So the brightness is adjusted automatically. If using manual brightness adjustment, set the brightness to the middle or lower level and never observe close to mucous membranes for a long time.

Adjust the brightness of the video monitor.

## Operating the automatic brightness adjustment

### WARNING

Before disconnecting the video system from the endoscope, always select manual brightness adjustment and set the brightness to minimum. If the video system is disconnected while the brightness adjustment is set to automatic, examination light may change to maximum and eye damage or burns can result.

1. Press the auto/manual brightness selector to select automatic brightness adjustment.
2. Press either of the brightness adjustment switches (“◀” or “▶”) to set the brightness to a level suitable for observation. The standard setting is “0” (see Figure 5.2).

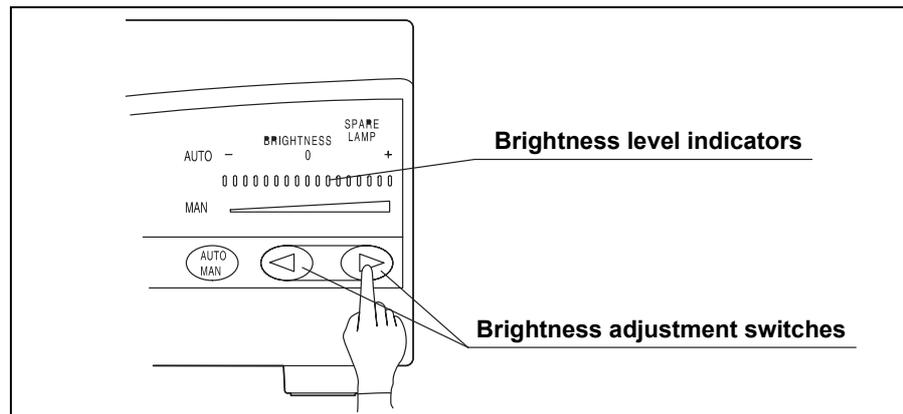


Figure 5.2

- Depending on the endoscopic system being used and the part being observed, the standard setting may be too bright or too dark. In this case, adjust the brightness as needed. This can also be done during observation, if necessary.
- Pressing either of the brightness adjustment switches (“◀” or “▶”) once moves the level one step; pressing the switch continuously moves the level continuously.

## Operating the manual brightness adjustment

### WARNING

- When using manual brightness adjustment, always set the brightness to the minimum level necessary to complete the examination. If the brightness is set higher than necessary, eye damage or burns can result.
- When using a fiberscope without a video system, do not use the transillumination function while looking into the eyepiece of the endoscope. Using this function when the examination light is set to maximum, and eye damage can result.

1. Press the auto/manual brightness selector to select manual brightness adjustment.
2. Press either of the brightness adjustment switches (“◀” or “▶”) to set the brightness to a level suitable for observation (see Figure 5.3).

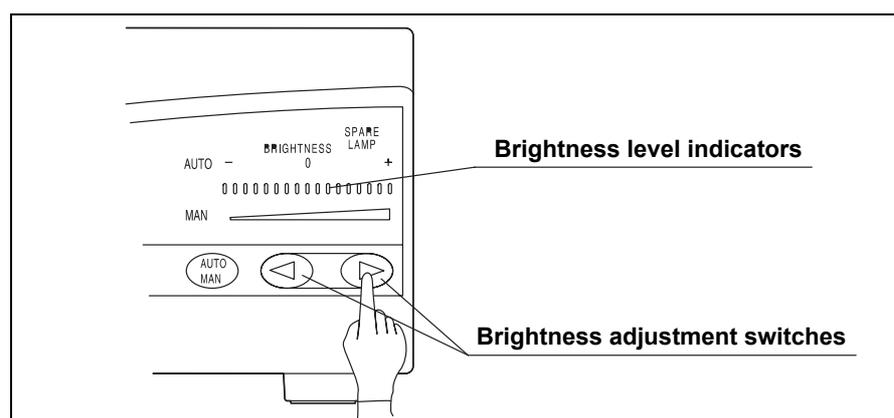


Figure 5.3

Pressing either of the brightness adjustment switches (“◀” or “▶”) once increases or decreases the level one step; pressing the switch continuously increases or decreases the level continuously.

## 5.3 Using the filter function

### WARNING

Do not use the filter function without a special-purpose filter installed in the filter disk. Otherwise, equipment damage can occur or light emitted from the distal end of the endoscope can cause burns.

**CAUTION**

Use the filter function only when a special-purpose filter is installed. If the special-purpose filter is used for normal observation, the correct color or brightness cannot be obtained.

A special-purpose filter of your choice can be mounted on the filter disk, which is then placed in the light path.

### ***Installing a special-purpose filter***

**WARNING**

- Before installing a special-purpose filter, contact Olympus to confirm its compatibility. If an inappropriate filter is used, equipment damage and/or fire can result.
- Install a special-purpose filter as described below. If the special-purpose filter becomes detached, electric shock can occur.
- If the filter falls into the light source, turn it OFF immediately, disconnect the power cord and contact Olympus. If the light source is used with the filter left inside of it, an electric shock and/or fire may result.

**CAUTION**

Do not touch the emergency lamp, reflector or filter. Natural skin moisture from your fingers can cause cracks and damage the light source.

**NOTE**

The color of the filter's frame for the special purpose filter is silver.

1. When the light source is turned ON, confirm that the filter switch is not lit. If the filter switch is lit, press the filter switch to go back to normal observation mode.
2. If the lamp was in use immediately, the lamp chamber is extremely hot. Cool the chamber down by turning the light source OFF and ON again. This activates the built-in fan. Do not press the lamp ignition switch.
3. Turn the light source OFF and disconnect the power cord.
4. Remove the lamp cover.

5. Align the filter's frame installed a special-purpose filter with the groove in the filter disk, and push the filter's frame into the filter disk until it locks (see Figure 5.4).

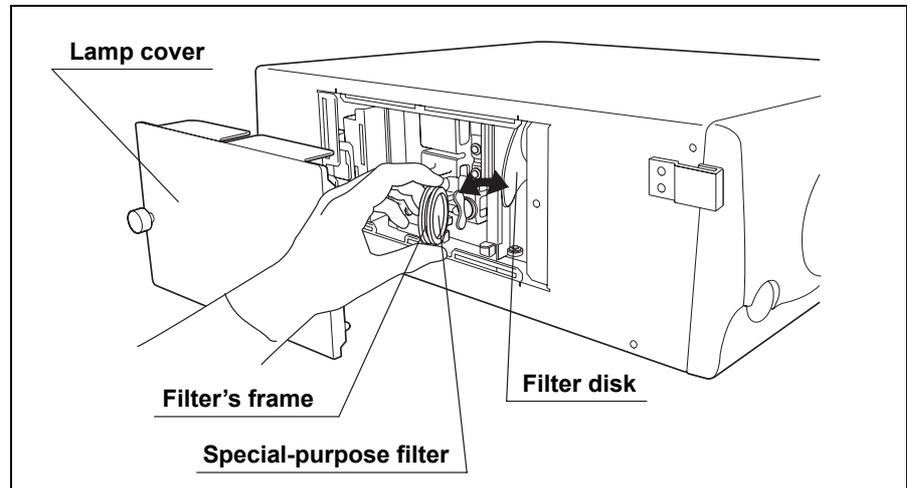


Figure 5.4

6. Close the lamp cover securely.
7. Turn the light source ON and press the filter switch to enable the filter mode.

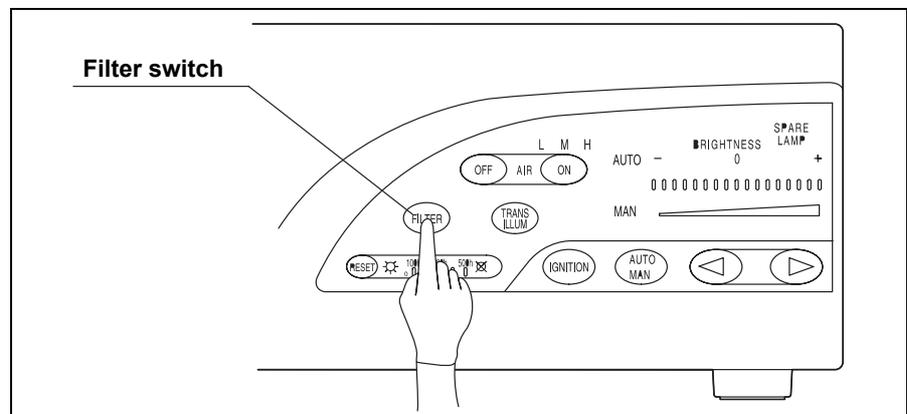


Figure 5.5

## 5.4 Using the transillumination function

### WARNING

- Do not use the transillumination function unless absolutely necessary. Otherwise, eye damage or burns can result.
- When using a fiberscope without video or TV systems, do not use the transillumination function while looking into the eyepiece of the endoscope. Using this function sets the examination light to maximum, and eye damage can result.

When the transillumination function is used in a darkened room, the more intense examination light emitted from the endoscope makes it possible to externally confirm the position of the endoscope inside the patient's body.

1. Press the transillumination switch. The brightness adjustment automatically changes to maximum for manual brightness control (see Figure 5.6).

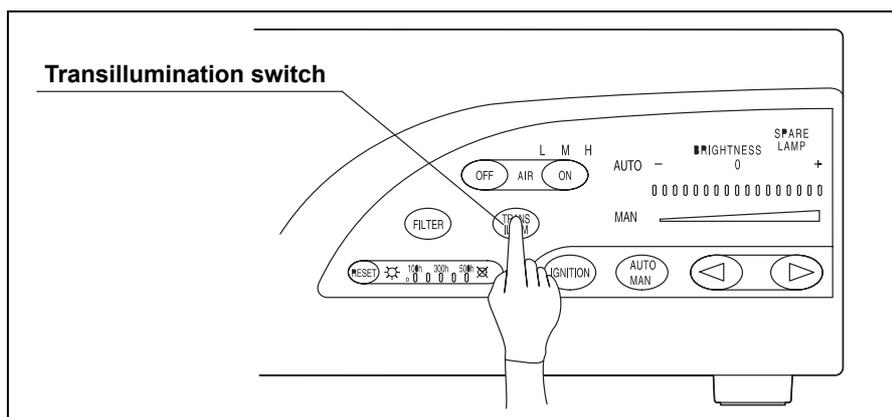


Figure 5.6

2. After 7 seconds, the brightness returns to its original level.

To stop transillumination before 7 seconds have passed, press the transillumination switch again. The original setting will be restored.

### NOTE

In some areas of the patient, the transillumination function may not be sufficient to confirm the endoscope's position.

## 5.5 Adjusting air/water pressure

1. Confirm that one of the airflow indicators (“L”, “M”, or “H”) is lit. If no indicator is lit, press the airflow regulator ON switch to set the airflow regulator to “L”, “M” or “H”.

**NOTE**

The standard air pressure is “H”.

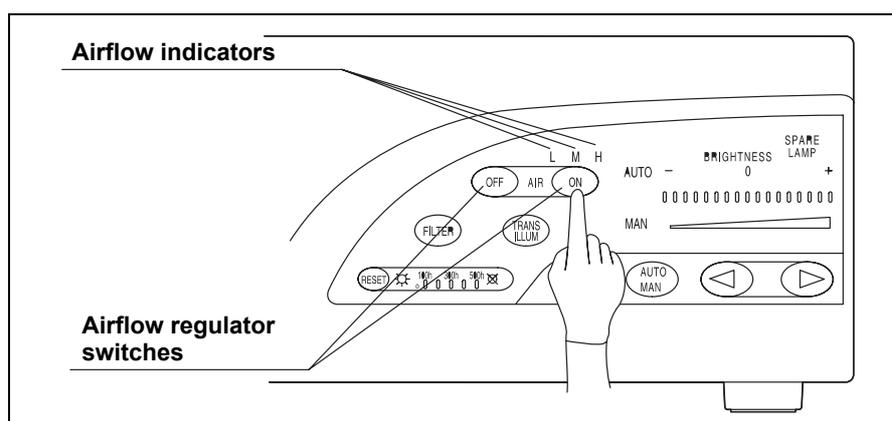


Figure 5.7

2. Change the air pressure according to the technique or the patient's condition.
3. Feed water or air as described in the endoscope's instruction manual.
4. Pressing the airflow regulator OFF switch stops air feeding from the light source.

**NOTE**

When the airflow regulator OFF switch is pressed, the airflow regulator setting is automatically stored and recalled when the airflow regulator ON switch is pressed again.

## 5.6 Turning the light source OFF

1. Press the power switch to turn the light source OFF.
2. If the light source is not to be used for an extended period of time, disconnect the power cord.

The light source is OFF when the power indicator is not lit.

# Chapter 6 Lamp Replacement

## 6.1 Lamp life

When the lamp life indicator “500 h” is lit, replace the examination (xenon) lamp as instructed below. Although the lamp brightness from the distal end of the endoscope depends on the part being observed, the lamp should be replaced as soon as the lamp appears darker than normal, even if the lamp life indicator “500 h” is not yet lit.

### NOTE

- The lamp life indicator displays the total working hours of the examination (xenon) lamp (e.g. “500 h” means about 500 hours).
- The examination lamp can be replaced by the user as described in Section 6.2.
- The emergency lamp cannot be replaced by the user. If the emergency lamp has burned out or is out of order, contact Olympus.

## 6.2 Replacement of the examination (xenon) lamp

### WARNING

- Do not touch anything inside the lamp chamber. The lamp chamber is extremely hot immediately after the lamp is turned OFF.
- When replacing the lamp, do not leave any objects (such as a cloth) inside the lamp chamber. Fire and/or equipment damage can result.
- Store the hexagon wrench securely on the back side of the lamp cover. If the wrench falls inside the light source, turn OFF the light source immediately, disconnect the power cord and contact Olympus. If the light source is used while the wrench is detached inside the light source, equipment damage and/or electrical shock can result.

- Never install a lamp that has not been approved by Olympus. The use of a non-approved lamp can cause damage to the light source and ancillary equipment, malfunction or fire.
- Do not apply shock, excessive force or scratches to the lamp. It could break the glass and/or shorten the lamp life due to the high internal pressure of the lamp.
- When disposing of the used lamp, make sure to cut the projection part on the “+” side of the examination lamp by using a nipper and discharge the internal gas (see Figure 6.1). Otherwise, the glass could break due to the high internal pressure of the lamp.
- When cutting the projection part on the “+” side of the examination lamp, wear appropriate protection equipment all the time and be sure to cover the lamp with cloth. Otherwise, the projection part could scatter in all direction and cause injury to people around. The protective equipment may include eye wear, face mask and gloves.

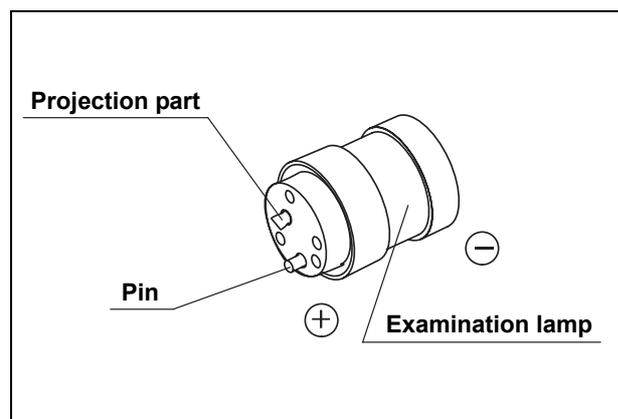


Figure 6.1

**CAUTION**

- Do not touch the glass surface of the lamp, filter or reflector. Natural skin moisture from your fingers can cause cracks and damage the light source.
- Handle the lamp carefully. Otherwise, the lamp may be damaged, resulting in equipment failure.
- When replacing the examination lamp, use a clean lint-free cloth to wipe off residual heat compound from the heat sink. If the heat compound is not wiped off completely, the lamp's heat efficiency will be impaired and the examination lamp life will be shortened significantly.

To replace the examination lamp, follow the procedure given below. Use the examination lamp MD-631 only.

To order a new examination lamp, contact Olympus.

1. Turn the light source OFF and disconnect the power cord.
2. If the lamp was in use immediately, the lamp chamber is extremely hot. Cool the lamp chamber down by turning the light source OFF and ON again. This activates the built-in fan. Do not press the lamp ignition switch.
3. Remove the lamp cover on the side of the light source. After making sure the interior has cooled down, remove the hexagon wrench from the rear of the lamp cover (see Figure 6.2).

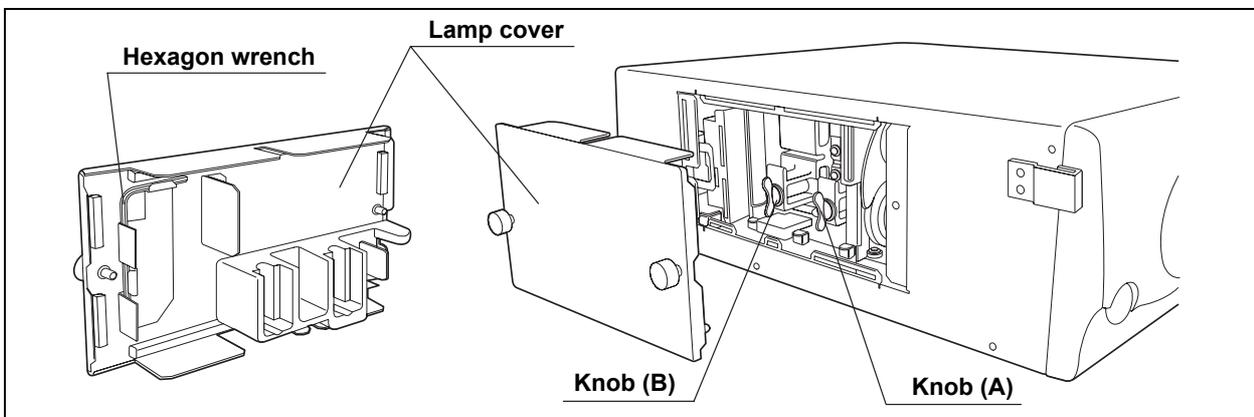


Figure 6.2

4. Turn knob (A) counterclockwise by 90° to loosen it. Then loosen knob (B) in the same manner.
5. Holding the knobs or projections of the heat sinks, remove the examination lamp with heat sinks (A) and (B) attached (see Figure 6.3).

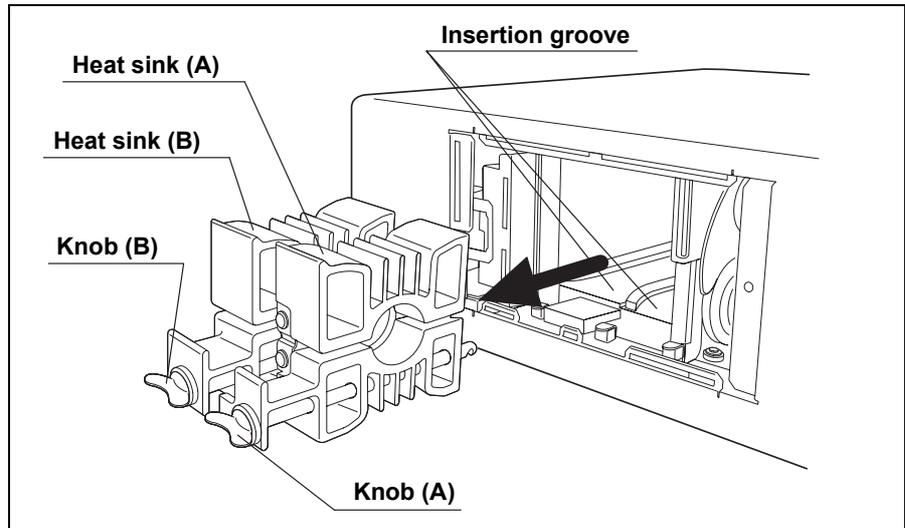


Figure 6.3

6. Using the hexagon wrench, loosen the three bolts on heat sink (B) (on the “+” side of the examination lamp or heat sink (B)) and remove heat sink (B) from the examination lamp (see Figure 6.4).

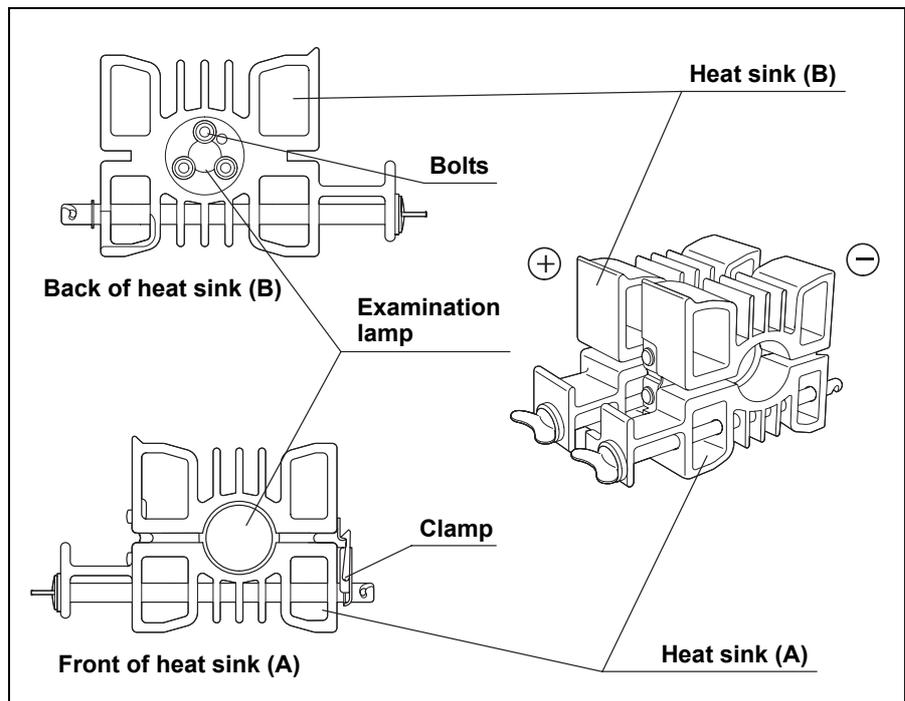


Figure 6.4

7. Remove the clamp of heat sink (A) and pull out the examination lamp.
8. Using a clean lint-free cloth, wipe off any residual heat compound from the heat sink.

9. Hold the new examination lamp without touching the glass surface.

**CAUTION**

- Do not apply the heat compound to the glass surface and the ceramic part of the examination lamp. If any compound gets on the glass surface, wipe it off with a clean lint-free cloth.
- Apply enough heat compound. If not enough heat compound is applied, the heat can cause lamp ignition failures.

10. Using your finger, apply the heat compound evenly over the outer circumference (see the cross-hatched area in Figure 6.5) on the “-” side of the new examination lamp (the metal portion on the light emitting side).
11. Insert the “-” side of the examination lamp (see Figure 6.5) into heat sink (A) until it stops.

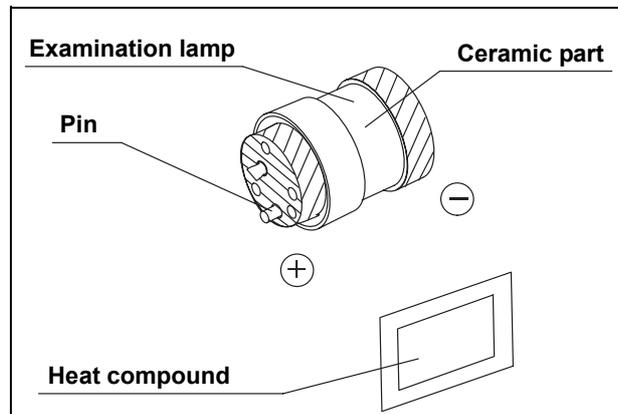


Figure 6.5

**CAUTION**

Match the examination lamp and heat sink pin positions, then press them tightly together. Otherwise a decrease in the light output can result.

12. Apply heat compound to the end surface (see the cross hatched area in Figure 6.5) on the “+” side of the examination lamp in the same manner.
13. Insert the “+” side of the examination lamp (see Figure 6.5) into heat sink (B) and tighten the three bolts firmly with the hexagon wrench.

**CAUTION**

Install the heat sink securely in the light source and tighten the knobs securely. Otherwise, a decrease in light output can result.

14. Make sure that the undersides of the heat sinks (A) and (B) are flat, and close the clamp of heat sink (A).
15. Turn the knobs of heat sinks (A) and (B) to the horizontal position, and insert the heat sinks all the way into the lamp chamber along the insertion grooves.

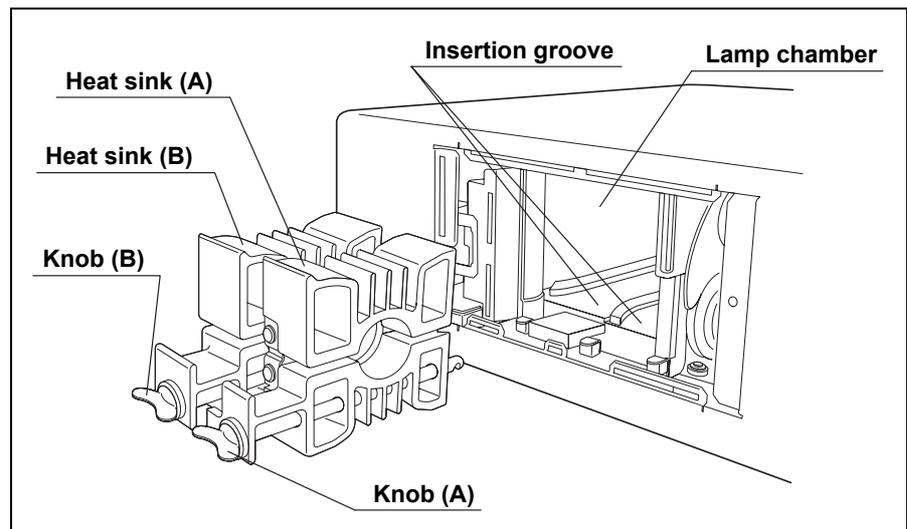


Figure 6.6

16. First secure heat sink (B) by turning knob (B) clockwise by 90°, then secure heat sink (A) by turning the knob (A) clockwise by 90°.
17. Store the hexagon wrench back on the rear of the lamp cover. Then close the lamp cover securely (see Figure 6.7).

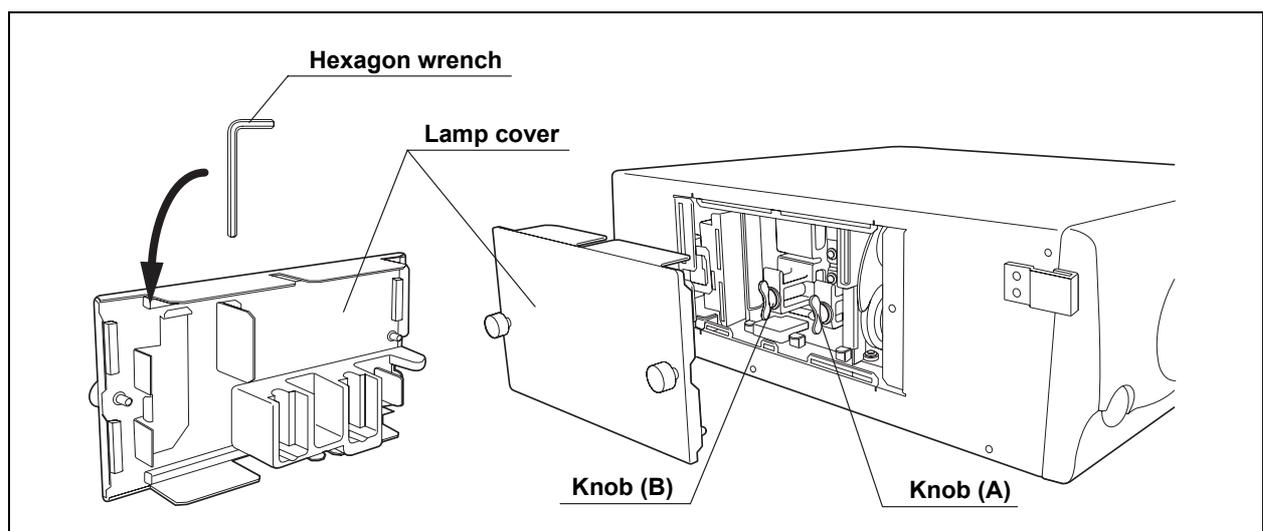


Figure 6.7





# **Chapter 7 Care, Storage and Disposal**

## **7.1 Care**

### **WARNING**

- After wiping with a piece of moistened gauze, dry the light source thoroughly before using it again. If it is used while still wet, there is the risk of an electrical shock.
- When cleaning the light source, always wear appropriate personal protection equipment. Blood, mucous and other potentially infectious material adhering to the light source could pose an infection control risk.

### **CAUTION**

- Do not clean the output socket, other connectors or the AC mains inlet. Cleaning them can deform or corrode the contacts, causing damage to the light source.
- Do not autoclave or gas sterilize the light source. These methods will damage it.
- Do not wipe the external surface with hard or abrasive wiping material. The surface will be scratched.

If the light source is soiled, perform the following cleaning procedure immediately after use. If cleaning is delayed, residual organic debris will begin to solidify, and it may be difficult to effectively clean the light source. The light source should also be cleaned routinely.

1. Turn the light source OFF and disconnect the power cord.
2. To remove dust, dirt and non-patient debris, wipe the light source using a soft, lint-free cloth moistened with 70% ethyl or isopropyl alcohol.
3. If the light source is soiled with blood or other potentially infectious materials, first wipe off all gross debris using detergent and then decontaminate its surface using a lint-free cloth moistened with 70% ethyl or isopropyl alcohol. The light source is compatible with 70% ethyl or isopropyl alcohol.
4. Make sure that the light source is completely dry before use.

## **7.2 Storage**

### **CAUTION**

Do not store the light source in a location exposed to direct sunlight, X-rays, radioactivity or strong electromagnetic radiation (e.g., near microwave medical treatment equipment, short-wave medical treatment equipment, MRI equipment or radio). Damage to the light source may result.

1. Turn the light source OFF and disconnect the power cord.
2. Disconnect all ancillary equipment connected to the light source.
3. Store the equipment at room temperature in the horizontal position in a clean, dry and stable location.

## **7.3 Disposal**

When disposing of this equipment or any of its components (e.g., lamps, fuses or filters), follow all applicable national and local laws and guidelines.

# Chapter 8 Troubleshooting

If the light source is visibly damaged, does not function as expected or is found to have irregularities during the inspection as described in Chapter 3, “Installation and Connection” and Chapter 4, “Inspection”, do not use the light source. Contact Olympus.

Some problems that appear to be malfunctions may be correctable by referring to Section 8.1, “Troubleshooting guide”. If the problem cannot be resolved by the described remedial action, stop using the light source and send it to Olympus for repair.

Olympus does not repair accessory parts. If an accessory part becomes damaged, contact Olympus to purchase a replacement.

**DANGER**

Never use the light source if an abnormality is suspected. The patient can be fatally or seriously injured.

## 8.1 Troubleshooting guide

Irregularity description	Possible cause	Solution
The endoscope cannot be connected to the light source.	The endoscope is not compatible with this light source.	Connect an endoscope that is listed in the “System chart” in the Appendix.
The power fails to come ON.	The power cord is not connected.	Connect the power cord to a hospital grade outlet.
	The power switch is not turned ON.	Turn the power switch ON.
	The lamp cover is not closed.	Close the lamp cover securely.
	The fuses have blown.	Replace both fuses with new ones as described in Section 4.1, page 19.

<b>Irregularity description</b>	<b>Possible cause</b>	<b>Solution</b>
The examination lamp does not ignite.	The examination lamp has not been ignited yet.	Press the lamp Ignition switch.
	The examination lamp is not installed.	Install an examination lamp as described in Section 6.2, page 40.
	The examination lamp is not installed correctly.	Reinstall the examination lamp as described in Section 6.2, page 40.
	The examination lamp is broken.	Replace the examination lamp with a new one as described in Section 6.2, page 40.
The examination lamp does not ignite, and the emergency lamp indicator (red) is lit.	The examination lamp is not installed.	Install an examination lamp as described in Section 6.2, page 40.
	The examination lamp is not installed correctly.	Reinstall the examination lamp as described in Section 6.2, page 40.
	The examination lamp is broken.	Replace the examination lamp with a new one as described in Section 6.2, page 40.
The examination lamp does not ignite, and a beep is heard.	The temperature of the light source is too high.	Turn OFF the light source and conform that the ventilation grills are not covered. Allow the light source to cool down, then turn it ON again.
No light is emitted from the endoscope.	The endoscope is not connected to the output socket.	Connect the endoscope to the output socket securely as described in Section 3.3, page 16.
The brightness level does not change even when the brightness control switches are pressed.	The level is set to the minimum or maximum.	(The level cannot be set above or below these limits.)

<b>Irregularity description</b>	<b>Possible cause</b>	<b>Solution</b>
The field of view and the image are too dark or too bright.	The examination lamp is old.	Replace the examination lamp with a new one as described in Section 6.2, page 40.
	The emergency lamp is active.	Replace the examination lamp with a new one as described in Section 6.2, page 40.
	The endoscope is not connected to the output socket.	Connect the endoscope to the output socket securely as described in Section 3.3, page 16.
	The filter mode is activated. (The filter switch is lit.)	Press the filter switch to change to the normal observation mode.
	The brightness level is unsuitable.	Adjust the brightness to a suitable level as described in Section 5.2, page 33.
	Transillumination is activated. (The transillumination switch is lit.)	Wait for automatic restoration (about for 7 seconds).
	When automatic brightness control is intended:	The brightness control is still set to manual.
The connections and ancillary equipment are incomplete or a component has a malfunction.		Confirm that the ancillary equipment is connected and functioning correctly. Refer to the corresponding instruction manuals.
When manual brightness control is intended:	The brightness control is still set to automatic.	Set the brightness control to manual as described in Section 5.2, page 33.

<b>Irregularity description</b>	<b>Possible cause</b>	<b>Solution</b>
The field of view and image color are poor.	The emergency lamp is active.	Replace the examination lamp with a new one as described in Section 6.2, page 40.
	The filter mode is activated. (The filter switch is lit.)	Press the filter switch to change to the normal observation mode.
When using an OES endoscope, the field of view suddenly alternates between dark and bright.	The brightness control is set to automatic.	Set the brightness control to manual as described in Section 5.2, page 33.
The air/water feeding function does not operate.	The air/water feeding function is not being operated.	Operate the air/water feeding function as described in Section 5.5, page 39.
	The endoscope is not connected to the output socket.	Connect the endoscope to the output socket securely as described in Section 3.3, page 16.

## **8.2 Returning the light source for repair**

### **CAUTION**

Olympus is not liable for any injury or damage which occurs as a result of repairs attempted by non-Olympus personnel.

When returning the light source for repair, contact Olympus. With the light source, include a description of the malfunction or damage and the name and telephone number of the individual at your location who is most familiar with the problem. Include a repair purchase order.

### **NOTE**

If a light source accessory (e.g., examination lamp, spare fuse, foot holder, power cord, light control cable) needs to be replaced, contact Olympus to purchase a new accessory.

# ***Appendix***

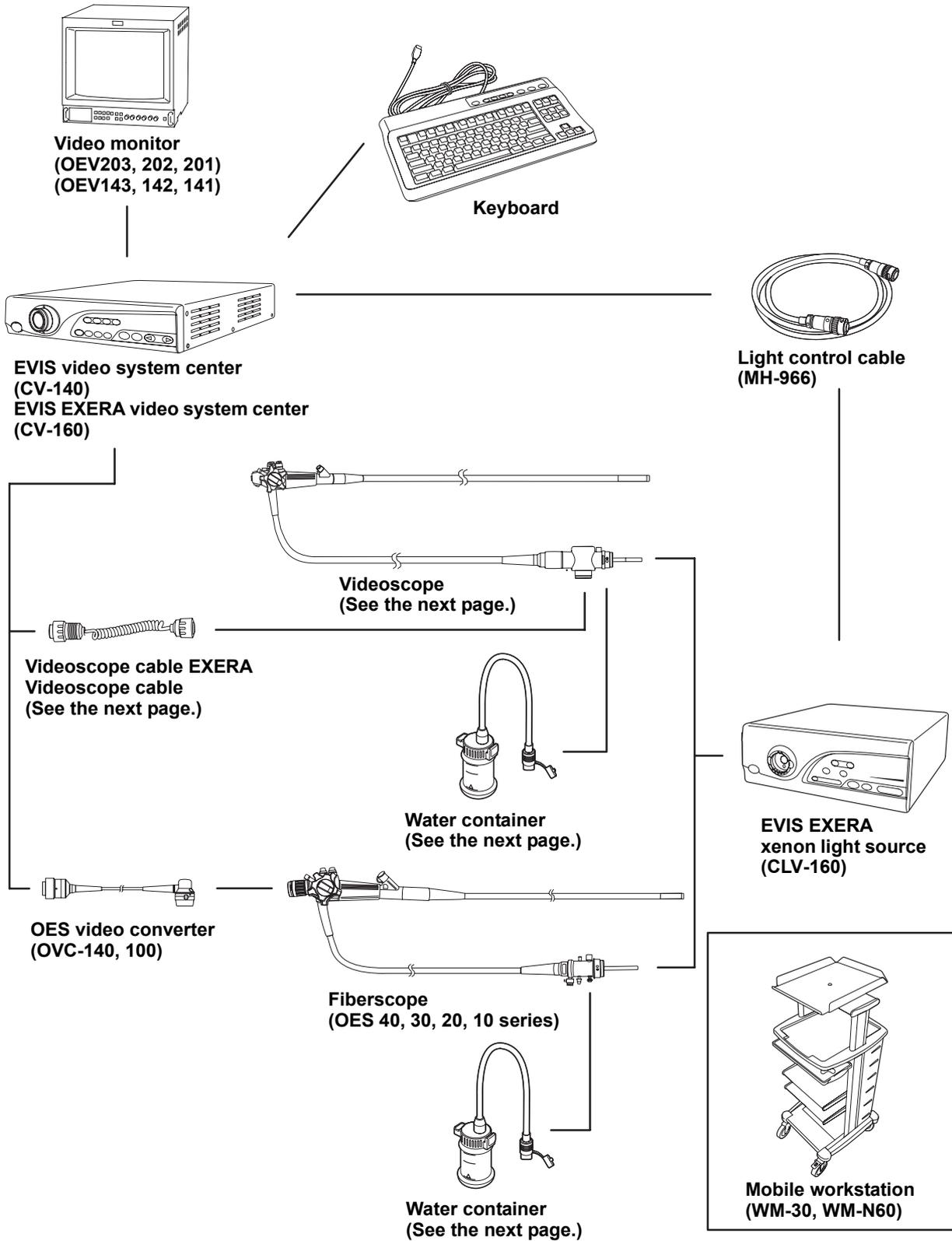
## ***System chart***

The recommended combinations of equipment and accessories that can be used with this light source are listed below. New products released after the introduction of this light source may also be compatible for use in combination with this light source. For further details, contact Olympus.

**WARNING**

If combinations of equipment other than those shown below are used, the full responsibility is assumed by the medical treatment facility.

## EVIS system chart



## ○ Videoscope cable EXERA/videoscope cable

EVIS EXERA video system center/ EVIS video system center	Videoscope cable EXERA/Videoscope cable		
	MAJ-843	MH-976	MD-148
CV-160	○	○	○
CV-140	–	○	○

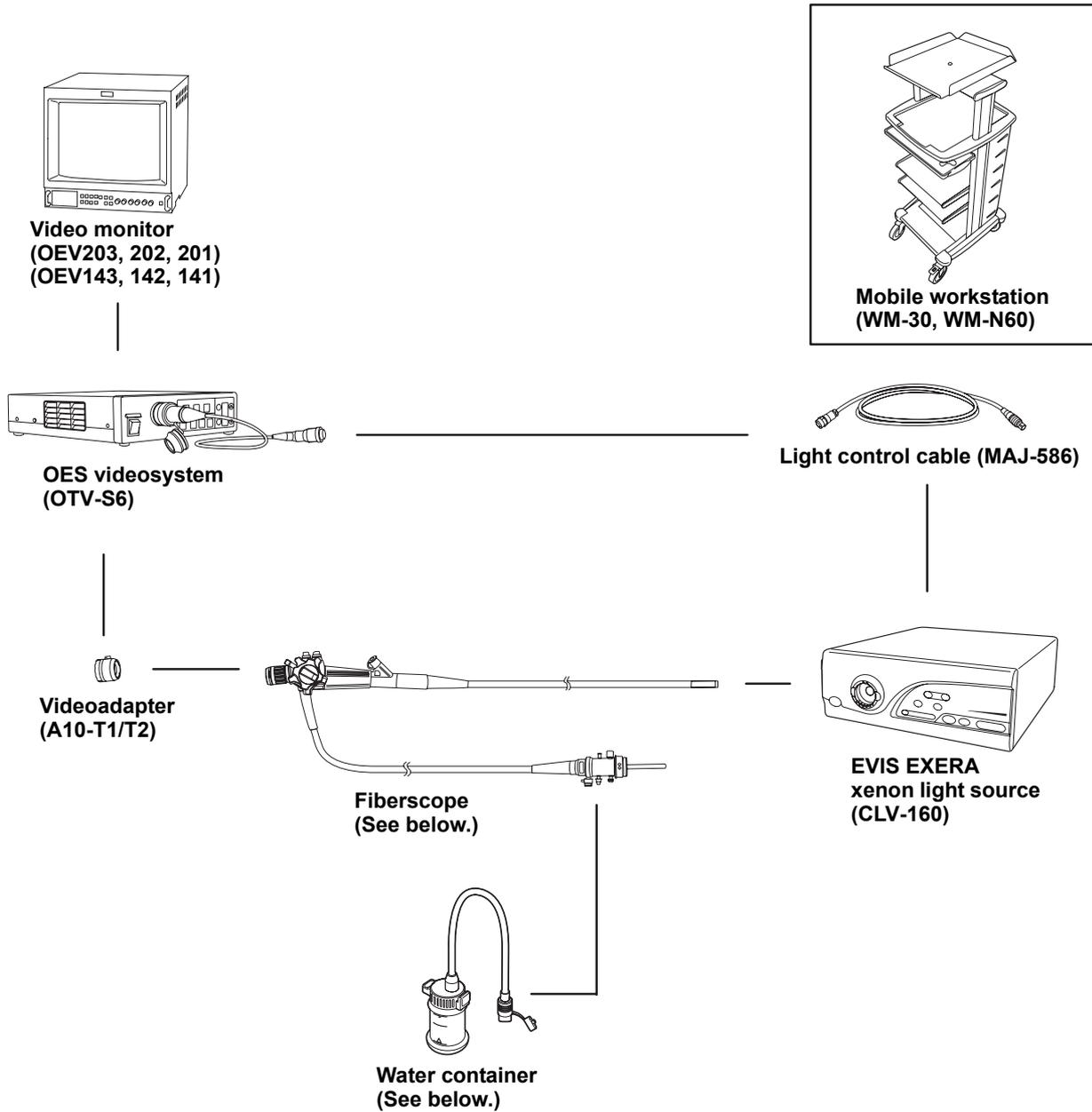
○ applicable      – not applicable

## ○ Water container

Endoscope	Water container					
	MAJ-901	MAJ-902	MH-884	MH-970	MD-431	MA-995
EVIS EXERA 160 series	○	○	○	○	–	–
EVIS 140 series	○	○	○	○	–	–
EVIS 100, 130 series	–	–	–	–	○	○
OES 40 series	○	○	○	○	–	–
OES 10, 20, 30 series	–	–	–	–	○	○

○ applicable      – not applicable

## OES system chart



### ○ Water container

Endoscope	Water container					
	MAJ-901	MAJ-902	MH-884	MH-970	MD-431	MA-995
OES 40 series	○	○	○	○	—	—
OES 10, 20, 30 series	—	—	—	—	○	○

○ applicable      — not applicable

## ***Operating environment***

<b>Operating environment</b>	<b>Ambient temperature</b>	10 – 40°C (50 – 104°F)
	<b>Relative humidity</b>	30 – 85%
	<b>Air pressure</b>	700 – 1060 hPa (0.7 – 1.1 kgf/cm <sup>2</sup> ) (10.2 – 15.4 psia)

## ***Transportation and storage environment***

<b>Transportation and storage environment</b>	<b>Ambient temperature</b>	–25 to +85°C (–13 to +185°F)
	<b>Relative humidity</b>	10 – 90%
	<b>Atmospheric pressure</b>	700 – 1060 hPa

## Specifications

	Item	Specification
Power supply	Voltage	100 – 120 V AC
	Power fluctuation	Within $\pm 10\%$
	Frequency	50/60 Hz
	Frequency fluctuation	Within $\pm 1$ Hz
	Input current	5 A
	Fuse rating	8 A, 250 V
	Fuse size	6.35 × 31.8 mm
Size	Dimensions	385 (W) × 145 (H) × 490 (D) mm (maximum)
	Weight	15 kg
Illumination	Examination lamp	Xenon short-arc lamp (ozone-free) 300 W
	Average lamp life	Approximately 500 hours of continuous use (With intermittent use, the lamp life may vary slightly.)
	Ignition method	Switching regulator
	Brightness adjustment	Light-path diaphragm control
	Cooling	Forced-air cooling
	Color conversion	Possible by using exchangeable filter
	Emergency lamp	Halogen lamp (without mirror) 12 V 100 W
	Average emergency lamp life	Approximately 100 hours

	Item	Specification
<b>Automatic brightness control</b>	<b>Automatic brightness control method</b>	Servo-diaphragm method
	<b>Automatic exposure</b>	17 steps
<b>Air feeding</b>	<b>Pump</b>	Diaphragm type pump
	<b>Pressure switching</b>	4-level available (off, low, mid, high)
<b>Water feeding</b>	<b>Method</b>	Air pressurization or detachable water container
<b>Indicators on front panel</b>	<b>Emergency lamp</b>	It reports absence of emergency lamp, disconnection and use of emergency lamp.
	<b>Filter</b>	It identifies a special-purpose filter setting.
<b>Setting memory</b>		Settings (except filter setting) are stored even when the light source is OFF.
<b>Classification (Electro-medical equipment)</b>	<b>Type of protection against electric shock</b>	Class I
	<b>Degree of protection against electric shock of applied part</b>	TYPE BF applied part NOTE: The applied part as classification types are not marked is the TYPE BF applied part.
	<b>Degree or protection against explosion</b>	Use prohibited in flammable environment.
<b>EMC</b>		This device complies with the EMC requirements of IEC 60601-1-2:1993 Emission: Class B of CISPR 11:1997
<b>Year of manufacture</b>	<b>7012345</b> ↑	The year of manufacture is given in the second digit of the serial number.





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