INSTRUCTIONS

OLYMPUS CLK-4

HALOGEN LIGHT SOURCE

WARNING

The user of this equipment should be thoroughly trained in the applicable procedure. Furthermore, failure to read and thoroughly understand the contents of this instruction manual may result in serious injury to the patient and/or user. It is essential to follow the instructions contained in this and other manuals which pertain to any equipment and accessories used in conjunction with the procedures. Possible injuries related to endoscopic procedures may include electrical shock, explosion, burns, perforation, hemorrhage, etc.

Failure to follow these instructions may also result in damage and/or malfunction of the instrument.

OLYMPUS

IMPORTANT

The Olympus CLK-4 has been designed for endoscopic diagnosis, treatment and photodocumentation in conjunction with Olympus endoscopes, accessories and other related devices. Do not use the instrument for any purpose other than its intended application.

Please read this entire manual carefully before using the instrument in order to acquaint yourself with the proper care and handling of your new light source. Following this, the equipment should be inspected and prepared for use.

Safety is of prime importance when handling electrical equipment to prevent operator or patient shock, fire or damage to instruments. To ensure safe operation of the endoscopic system, it is recommended that only Olympus products be used.

If you have any queries regarding operation, safety or any other instructions contained in this manual, please contact your Olympus representative or the nearest Olympus office.

CONTENTS

1 FEATURES AND MAIN SPECIFICATIONS

1-1 Features

① The CLK-4 light source is designed to be used with OES fiberscopes for endoscopic observation and diagnosis.

② It incorporates a high-intensity halogen lamp.

③ The CLK-4 can be used for feeding either air or water.

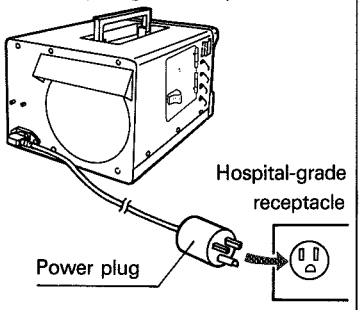
④ The compact, lightweight design enhances portability.

1-2 Main Specifications

Item		Description
Illumination	Lamp	Halogen bulb with mirror, 15V, 150W
	Lamp life	Approx. 50 hours (at rated voltage)
	Light output adjustment	Continuous manual adjustment
	Color temperature	3250°K equivalent
Air feed	Pump	Electromagnetic vibrator
	Pump pressure	0.3 – 0.6kg/cm^2 (at Occ/min.) 0.18kg/cm^2 or below (at 2,000cc/min.)
Water feed	Method	Air pressurization of water container
	Water container	Capacity: 250cc, should not be used when more than 2/3 full.
Compatible endoscopes	Fiberscopes	Olympus OES fiberscopes
Type and degree of protection against electric shock		Class I, Type BF
Size	Dimensions	186(W) × 151(H) × 270(D)mm
	Weight	6 kg

1-3 Safety Precautions

Be sure to connect the power plug to a hospital-grade receptacle.



[Protection against electric shock]

① The CLK-4 light source should be used only in a medical facility for the purposes for which it is intended, and always under supervision of a trained physician.

② The light source/endoscope combination should never be applied directly to the heart, as electric shock may result .

③ The light source housing must be grounded properly. Be sure to plug power cord to a grounded hospital-grade receptacle.

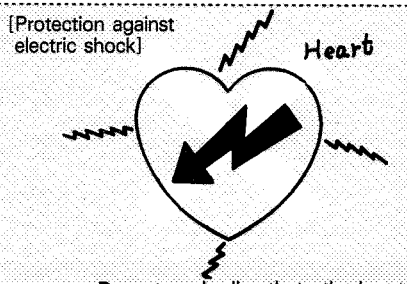
④ The light source is not explosion-proof. Never install and operate it, where there is risk of flammable gases, as explosion may result.

⑤ The equipment should be kept away from liquids at all times to prevent patient and/or operator shock and instrument damage. Do not use the light source if fluids have been spilled into or near the unit.

⑥ The light source should be used in accordance with the following conditions to avoid performance or safety from being impaired or instruments from becoming damaged.

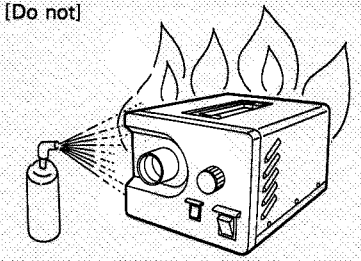
Power requirements	Voltage: AC110 or 120 Frequency: 50/60Hz Input: 1.7 A Voltage fluctuation: Within ±10%
Ambient temperature	10–40°C (50–104°F)
Relative humidity	30–75%
Atmospheric pressure	700–1,060 mbr

[Protection against electric shock]



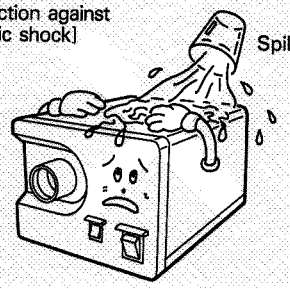
Do not apply directly to the heart.

[Do not]



Flammable gases

[Protection against electric shock]



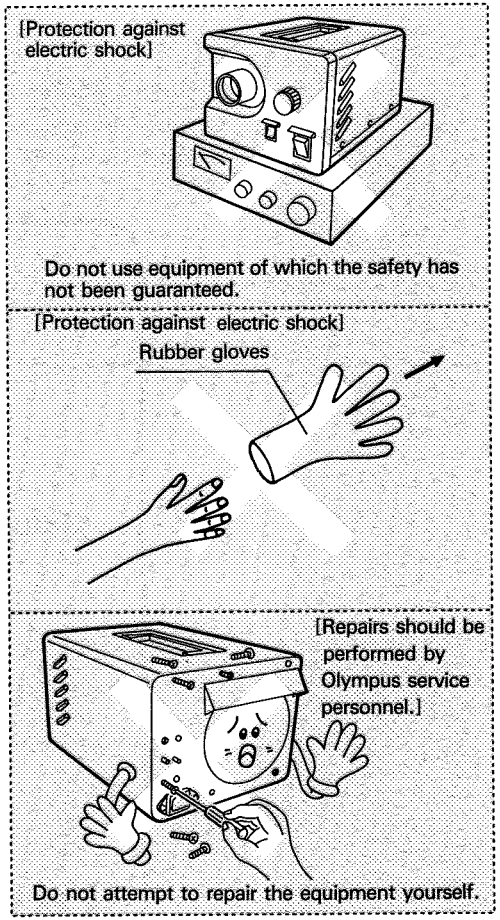
Spillable liquids

⑦ The light source and endoscope should not be used in conjunction with:

1) Electrical apparatus for which guarantees have not been supplied against leakage current.
2) Electrosurgical equipment whose safety in combined usage has not been guaranteed.

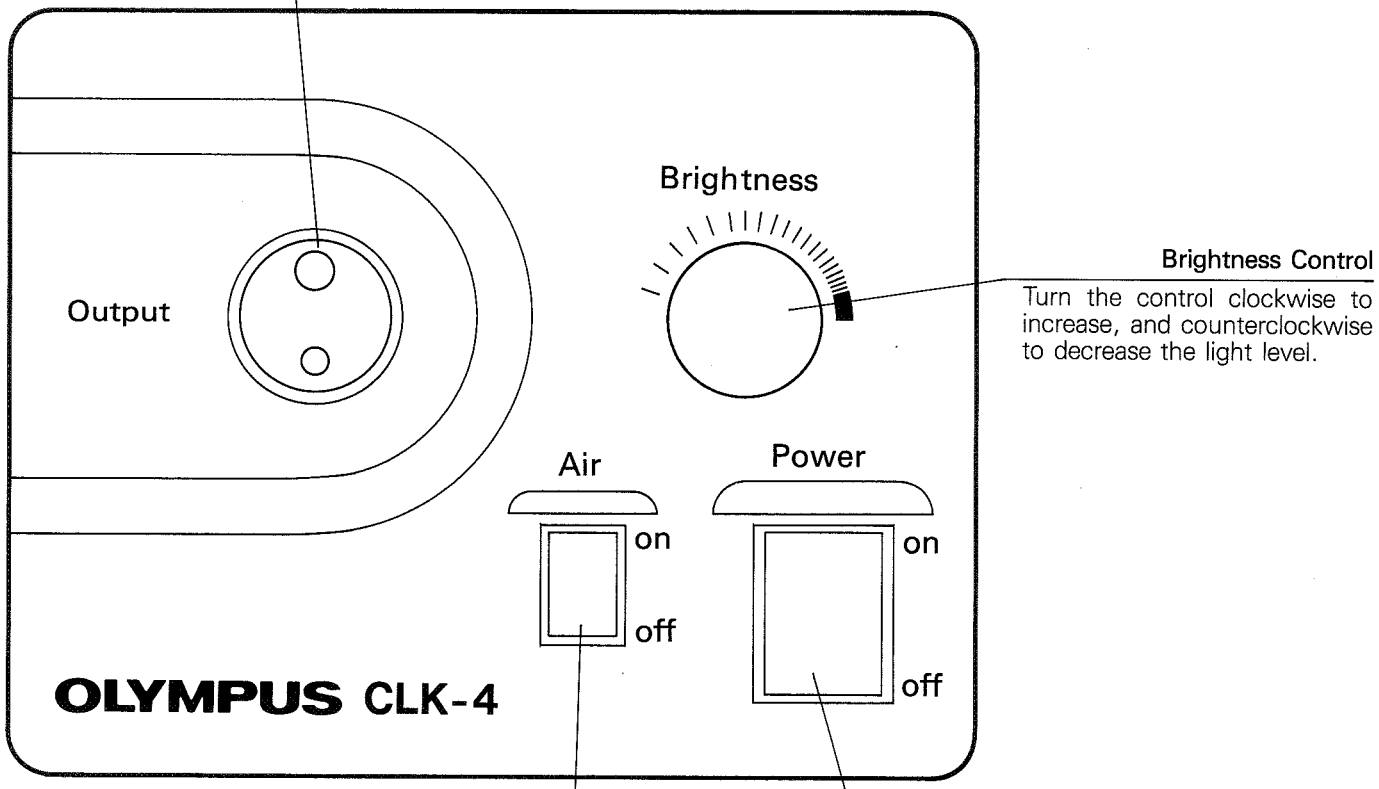
⑧ The light source is designed to function integrally with insulated endoscopes to prevent shocks being sustained by operator or patient due to leakage current. As an added precaution, the endoscopist should wear rubber gloves.

⑨ Repairs should only be carried out by Olympus service personnel.

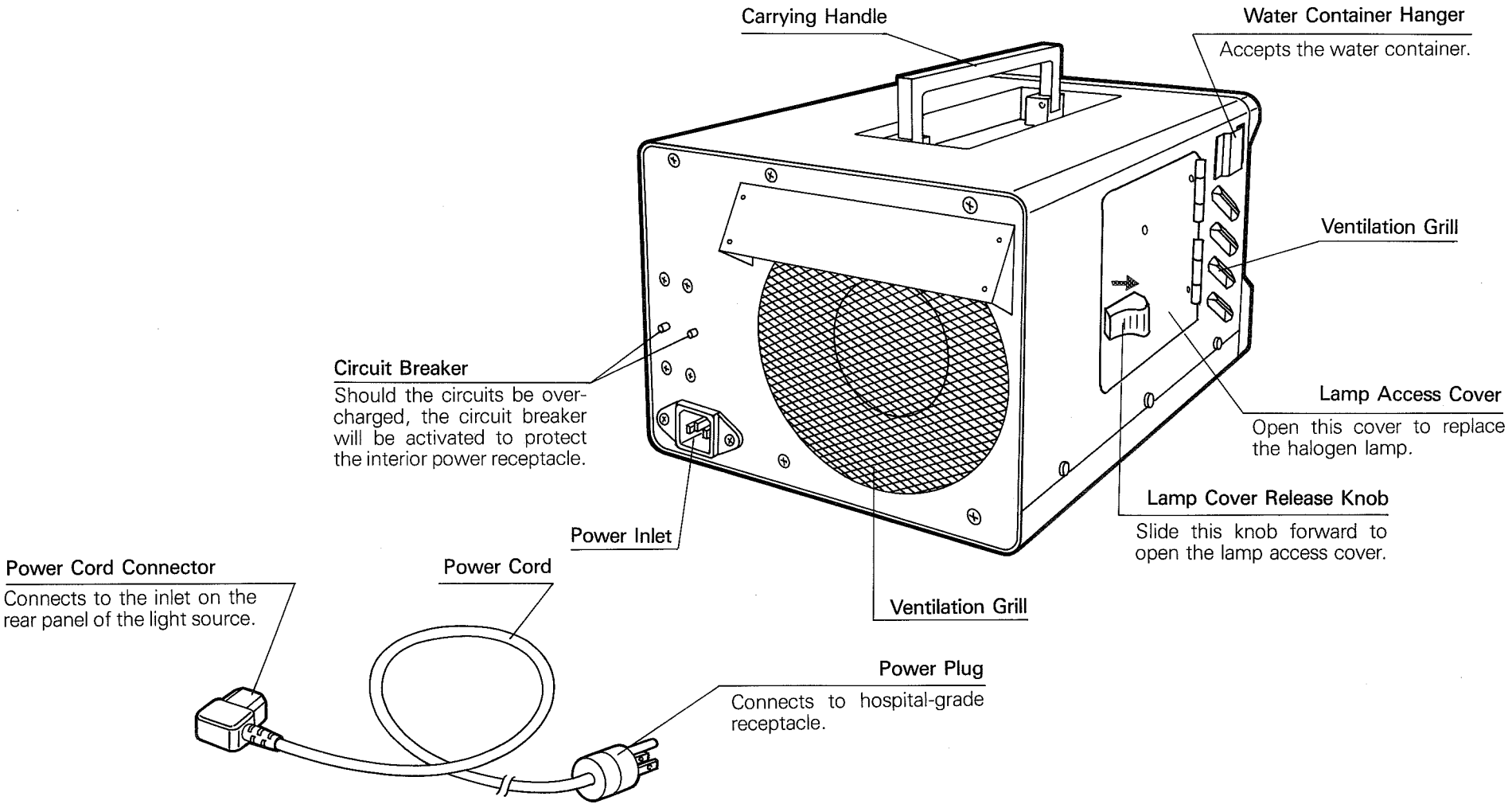


2 DESCRIPTION OF CONTROLS

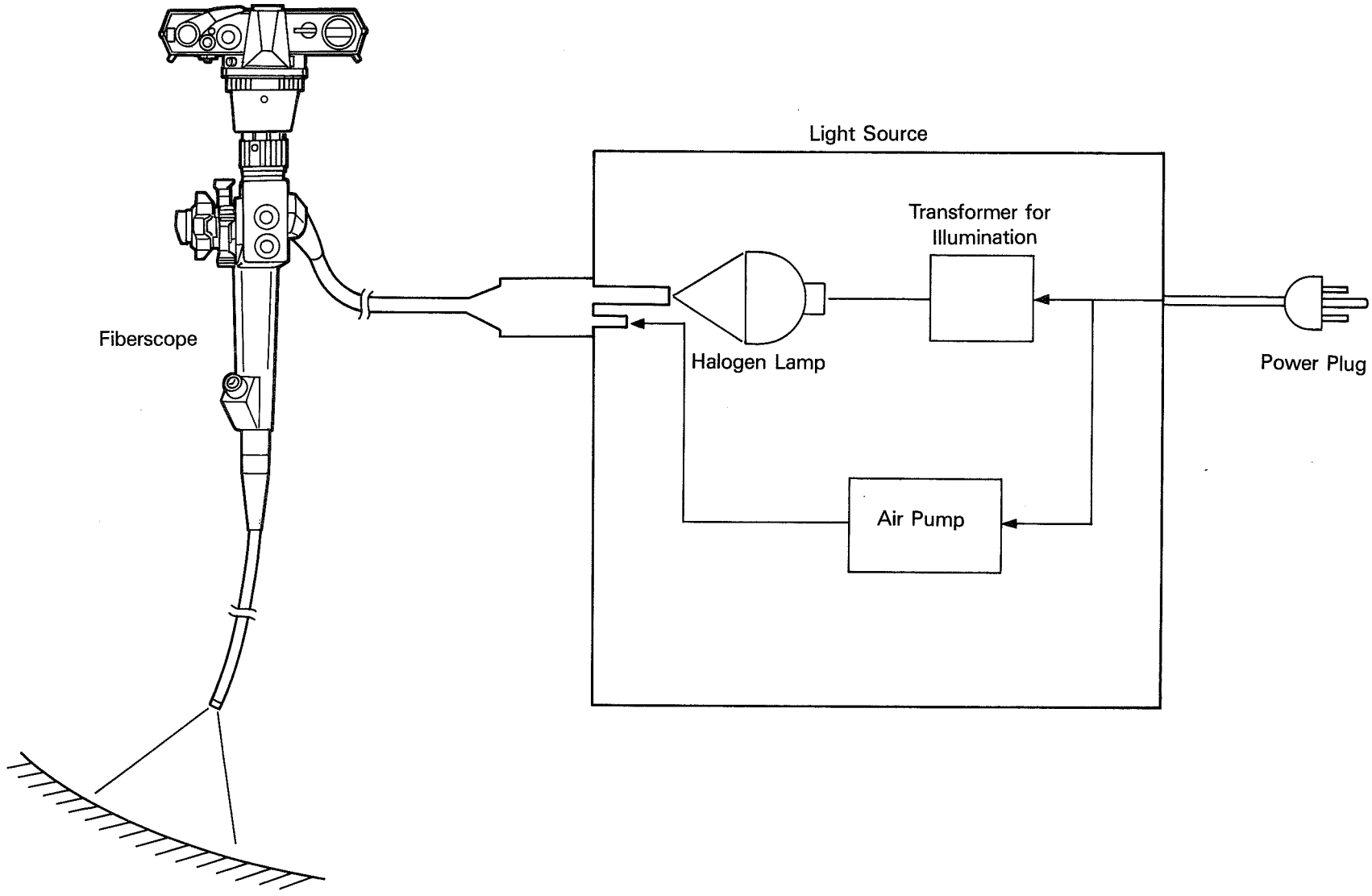
2-1 Front Panel



2-2 Main Body

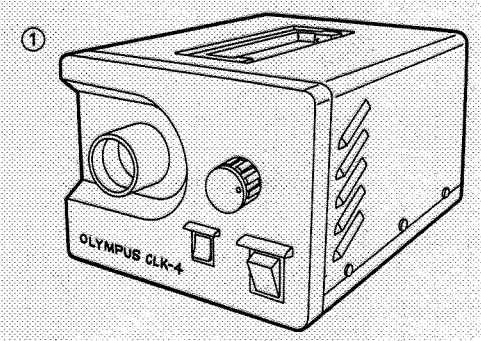

Carrying Handle
Water Container Hanger
Accepts the water container.
Ventilation Grill
Circuit Breaker
Should the circuits be over-charged, the circuit breaker will be activated to protect the interior power receptacle.
Lamp Access Cover
Open this cover to replace the halogen lamp.
Lamp Cover Release Knob
Slide this knob forward to open the lamp access cover.
Power Inlet
Power Cord Connector
Connects to the inlet on the rear panel of the light source.
Power Cord
Ventilation Grill
Power Plug
Connects to hospital-grade receptacle.

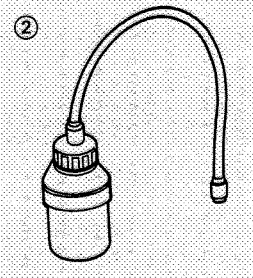
3 CONSTRUCTION

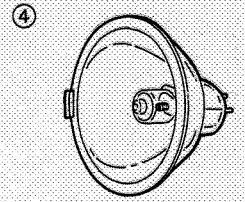


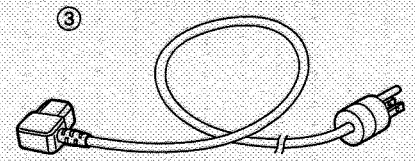
4 STANDARD SET

① Main Body (CLK-4) 1
② Water Container (MA-995) 1
③ Power Cord 1
④ Halogen Bulb (MD-151) (inside the body) 1

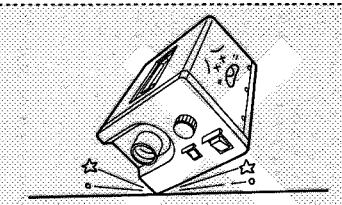








★ The instruction manual should be stored in its vinyl bag and kept handy for future reference.



The light source is a precision instrument. The utmost care should be taken when in both handling and storage.

Instruction manual is invaluable for staff training and should be retained for future reference.

5 PREPARATION FOR USE

Refer also to the instruction manual supplied with the endoscope.

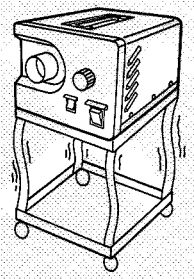
5-1 Installation of the Light Source

① The safety precautions laid out in section 1-3 on page 2 should be adhered to strictly.

② Place the light source horizontally on flat surface.

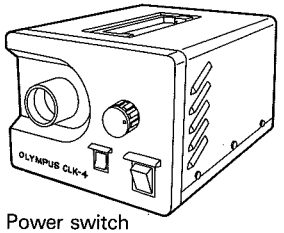
★ Ventilation must not be blocked.

★ The light source should be handled extremely carefully when placing it on the cart.

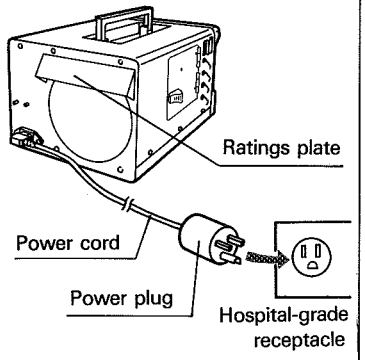


Place on a flat, stable surface.

5-2 Connection to AC Mains Supply



Power switch should be in the "off" position.



① Check that the power switch in the "off" position.

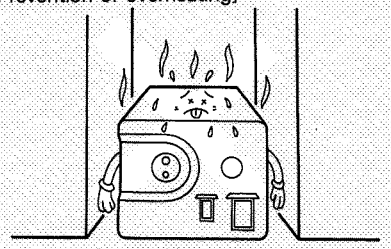
② Connect the power cord to a "HOSPITAL-GRADE" 3core receptacle. Ensure that this receptacle meets the input current marked on the rear panel of the light source.

★ Do not use an adapter that is designed to convert a 3-core power plug into a 2-core plug as this may impair safety.

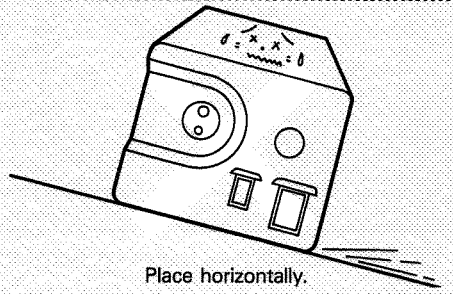
★ Do not use a tap located on a table as this may reduce safety. Ensure that a hospital-grade receptacle is used.

★ Connect the power cord securely to prevent disconnection during observation. Do not pull, twist or squeeze the power cord excessively.

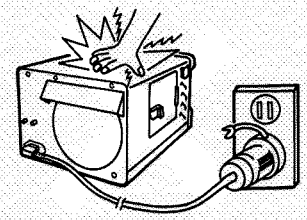
[Prevention of overheating]



Do not block ventilation.

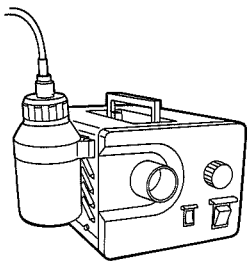


Place horizontally.

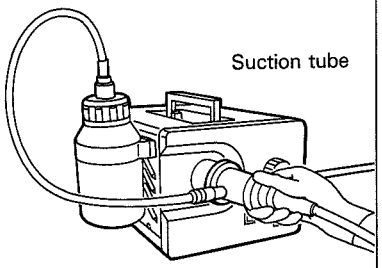


Do not use a 3-core/2-core convertible plug as this cannot be grounded and may cause electric shock.

5-3 Connecting the Endoscope



[Attaching water container]



[Connecting fiberscope]

1 Connection of the Fiberscope

Insert the fiberscope light guide connector into the output socket of the light source as far as it will go.

2 Air/Water Feeding and Suction

① Should it be necessary to feed water, fill the water container with clean water until it is approximately 2/3 full. Tighten the cap securely and attach the container to the hanger on the side of the light source.

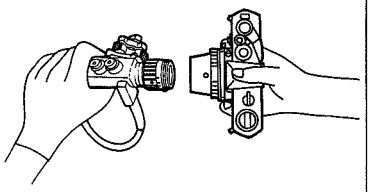
- ★ Empty the water container and dry thoroughly at the end of each day.
- ★ Use only distilled or sterile water to prevent the water channel from clogging.
- ★ Wipe the light source dry of any water that may have spilled into it during connection.

② Connect the tube attached to the water container cap to its respective connector on the light guide section of the fiberscope.

③ If suction is required, connect the suction device's tube to the suction connector on the light guide section of the fiberscope.

- ★ The suction device should be maintained in an optimum working condition.
- ★ A suction tube made from insulating material should be used.

5-4 Photodocumentation

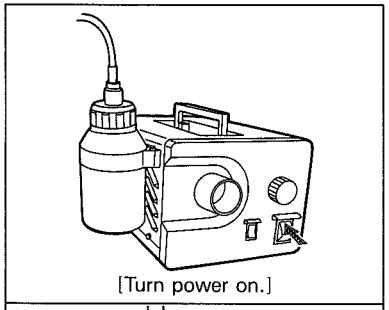


[Attaching camera]

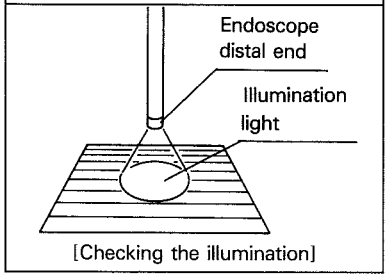
① Refer to the instruction manuals supplied with the endoscope and photographic attachment. The OM-4Ti camera equipped with an adapter compatible with the endoscope should be attached to the endoscope's ocular section. Adjust the exposure (Shutter speed) of the photographic attachment to attain optimum brightness.

② Make tungsten type film available.

6 INSPECTION OF ENDOSCOPIC SYSTEM



[Turn power on.]



[Checking the illumination]

Before each operation, the equipment should be inspected in accordance with the following procedures. Should the slightest irregularity or abnormality be suspected, do not use the equipment, but contact the Olympus service center.

1 Power Feeding

Turn on the power and check that the indicator of the power switch and that the cooling fan can be heard to be operating.

2 Inspection of Illumination

① Make sure that light is emitted from the endoscope's distal end.

② Check the brightness control to ensure that it is operating correctly. Turn it clockwise to increase light level, and vice versa.

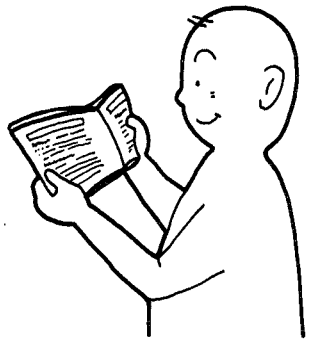
3 Inspection of Air/Water Feed

Turn the air feeding switch "ON" to check that the pump is activated, and to "OFF" to check that it terminates operation.

7 OPERATING THE LIGHT SOURCE

—— This section outlines general procedures for use during endoscopy. The endoscopist should carefully evaluate the clinical factors involved to decide the technical details. Ensure that safety requirements are met. ——

7-1 With Fiberscopes



[Ensure safety requirements are met.]

1 Adjusting Brightness

Adjust the brightness control to the level appropriate for the observation.

2 Air/Water Feed

① Turn on the air feeding switch.

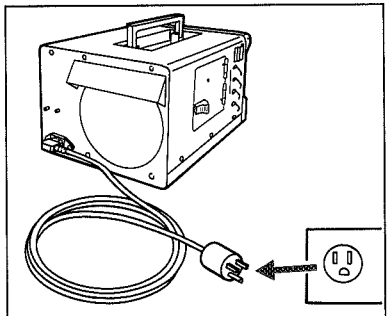
② Feed air and water by operating the air/water valve on the fiberscope control section.

3 Still Photography

① Set the camera in accordance with the instructions contained in the manual.

② Manually adjust the exposure (Shutter speed) of the camera to an appropriate level.

7-2 After Use



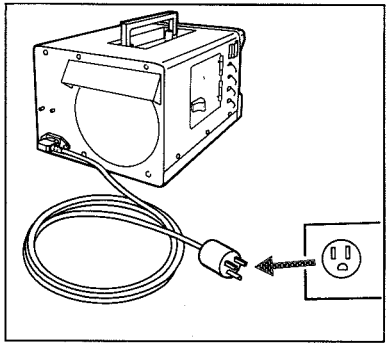
Remove the power plug and store the power cord.

Turn off the power switch.

★ **If the light source is not used for long periods of time, remove the power plug from the hospital-grade receptacle.**

8 CARE AND STORAGE

8-1 Care after Use



① Lightly wipe all surfaces using a soft cloth or gauze. If dirt proves difficult to remove, wipe again using a gauze moistened with disinfectant ethanol.

② For disinfection, wipe with gauze moistened with disinfectant ethanol or 2% glutaraldehyde solution. The front panel can also be disinfected in the same manner.

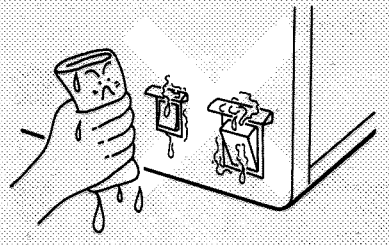
★ Keep electrical components, such as the power switch, air feeding switch, circuit breaker and inlet, away from liquids to prevent electric shock.

★ Do not use hard or abrasive wiping material to avoid scratches.

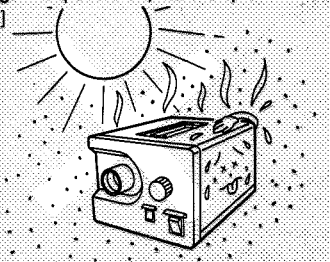
★ If chemical solutions are used, be sure to wipe after with disinfectant ethanol.

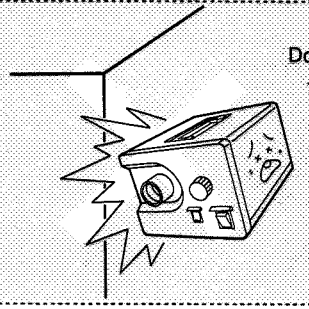
★ Surfaces must be dried thoroughly before use.

[Keep the switches away from liquids.]



[Avoid high temperatures, humidity and direct sunlight.]





Do not hit or drop the light source.

8-2 Storage

① Place the light source horizontally on a flat surface.

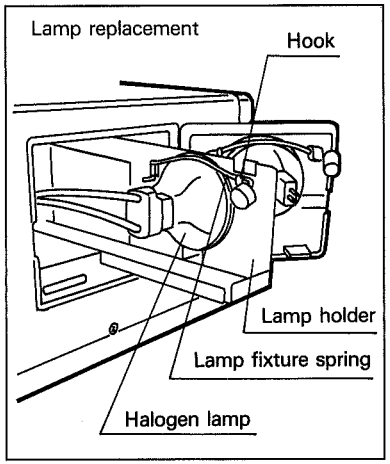
② Turn off the power and remove power plug from the hospital-grade receptacle. Store the power cord.

★ Equipment should be stored at normal temperature and humidity, and away from direct sunlight.

★ The light source should be handled carefully to avoid damage due to impact.

9 MAINTENANCE

9-1 Replacement of Halogen Lamp



① Open the lamp cover and remove the lamp holder.

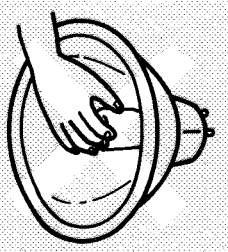
② After the halogen lamp has cooled sufficiently, remove the lamp fixture spring from the hook and remove the lamp.

③ Pull the lamp socket out of the halogen lamp.

④ Mount the lamp socket to a new lamp, attach the lamp to the lamp holder and clamp with the lamp fixture spring.

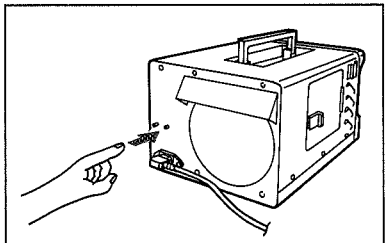
★ Be sure to use only halogen lamps approved by Olympus.
★ Never touch the bulb surface.
★ Connect the halogen lamp correctly to the lamp socket.

Approved Lamps:	Ushio	EFR or JCM (15V-150W)
	Philips	Type 6423
	Kondo Sylvania	JCR15-150W/O



Do not touch the bulb surfaces.

9-2 Resetting the Circuit Breaker

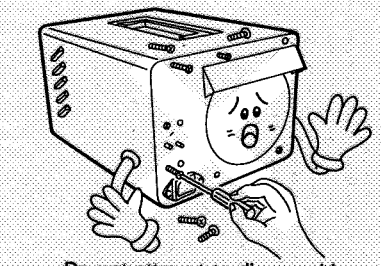


Press the circuit breaker button.

① If the light source fails to operate even when the power is turned on, turn it off and check the circuit breakers on the rear panel of the light source. If this has been activated, press the button until a click is heard.

★ Check that the power cord is plugged into a hospital-grade receptacle.

② Turn on the power again. If the circuit breaker operates, turn off the power immediately, disconnect the power plug from the hospital-grade receptacle, and contact your Olympus representative or nearest Olympus office.



Do not attempt to disassemble.

9-3 Periodic Inspection

Periodically inspect the light source according to the procedures in Section 6, "INSPECTION."

★ If any irregularity or abnormality is suspected, contact your Olympus representative or nearest Olympus office.
★ Repairs must be made by an authorized Olympus service personnel. They should not be attempted by non-Olympus service personnel.

10 TROUBLESHOOTING GUIDE

	Symptom	Possible Problem	Remedy
Light Source/Lamp	Power does not come on.	Power plug is not plugged into the receptacle.	Plug in power cord.
		Power switch is off.	Turn on power switch.
		Circuit breaker is engaged.	Reset circuit breaker.
		Lamp cover is not closed tightly.	Close lamp cover completely.
	Lamp does not turn on.	Power plug is not connected into the receptacle.	Plug in power cord.
		Power switch is off.	Turn on power swich.
		Circuit breaker is engaged.	Reset circuit breaker.
		Lamp cover is not closed tightly.	Close lamp cover completely.
		Lamp is installed incorrectly.	Reinstall lamp in correct position.
		Lamp disconnection.	Replace with new lamp.
	No light output.	Power plug is not connected into the receptacle.	Plug in power cord.
		Power switch is off.	Turn on power switch.
		Circuit breaker is engaged.	Reset circuit breaker.
		Lamp cover is not closed tightly.	Close lamp cover completely.
		Lamp is installed incorrectly.	Reinstall lamp in correct position.
		Lamp disconnection.	Replace with new lamp.
		Endoscope is not connected.	Connect endoscope correctly.
	Field of view is dark.	Lamp is installed incorrectly.	Reinstall lamp in correct position.
		Lamp disconnection.	Replace with new lamp.
Air/Water	Little or no air is fed.	Power plug is not connected into the receptacle.	Plug in power cord.
		Power switch is off.	Turn on power switch.
		Circuit breaker is engaged.	Reset circuit breaker.
		Lamp cover is not closed tightly.	Close lamp cover completely.

	Symptom	Possible Problem	Remedy
Air/Water		The air feeding switch is not set to "on."	Set the air feeding switch to "on".
		Endoscope is not connected.	Connect endoscope correctly.
		Nozzle clogging.	Send to be repaired.
		Dirty air/water valve.	Remove the valve, wash under running water and apply silicon oil.
		Cap is not tight.	Tighten cap securely.
	Little or no water is fed.	Power plug is not connected into the receptacle.	Plug in power cord.
		Power switch is off.	Turn on power switch.
		Circuit breaker is engaged.	Reset circuit breaker.
		Lamp cover is not closed tightly.	Close lamp cover completely.
		The air feeding switch is not set to "on."	Set the air feeding switch to "on".
		Nozzle clogging.	Send to be repaired.
		Dirty air/water valve.	Remove the valve, wash under running water and apply silicon oil.
		Cap is not tight.	Tighten cap securely.
		Water container is empty.	Fill the container approx. 2/3 full of water.
		Water container is filled with too much water.	Fill the container approx. 2/3 full of water.

OLYMPUS

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INSTRUCTIONS

OLYMPUS BF TYPE 1T20D

OES BRONCHOFIBERSCOPE

OLYMPUS ENDOSCOPY SYSTEM

WARNING

The user of this equipment should be thoroughly trained in the applicable procedure. Furthermore, failure to read and thoroughly understand the contents of this instruction manual may result in serious injury to the patient and/or user. It is essential to follow the instructions contained in this and other manuals which pertain to any equipment and accessories used in conjunction with the procedures. Possible injuries related to endoscopic procedures may include perforation, electrical burns and shock, hemorrhage, infection, explosion, etc.
Failure to follow these instructions may also result in damage to and/or malfunction of the instrument.

OLYMPUS

IMPORTANT

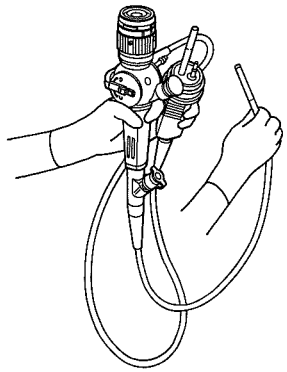
The Olympus BF-1T20D has been designed for endoscopic diagnosis and treatment within the bronchial tree. Do not use the instrument for any purpose other than its intended application.

Please read this entire manual carefully before using the instrument. It contains pertinent information on the proper care and handling of your new fiberscope. Although fiberscopes by nature are delicate instruments, proper handling and cleaning, as described in this manual, will greatly reduce the need for costly repair and prolong the life of your new instrument.

This manual describes the recommended procedure for preparing and inspecting the equipment prior to use. It does not describe how an actual procedure is to be performed in detail. Nor does it attempt to acquaint a beginner with endoscopic technique and the medical aspects of bronchoscopy. This instrument should be used only by physicians who have received thorough previous training in the art of flexible endoscopy.

The safety and performance of an endoscopic system depends not only on the fiberscope but also on any ancillary equipment used with it. To ensure compatibility, it is recommended that you use only Olympus accessories with this fiberscope.

If you have any questions concerning the material contained in this manual or concerning the operation or safety of the equipment, please contact your Olympus representative or the nearest Olympus office.



Hold fiberscope with both hands.

UPON RECEIVING THE EQUIPMENT

Please check each item in the set against the list of standard components found in Section 3. Contact Olympus if there are any missing or defective parts. Refer to the following sections on MAIN SPECIFICATIONS and NOMENCLATURE to become acquainted with the name and function of each part of the instrument. Review the instrument preparation, inspection and cleaning/disinfecting procedures carefully. The fiberscope should be disinfected prior to its initial use.

The fiberscope and accessories should be removed from the carrying case and stored as described in Section 6–4 Storage. The carrying case is not intended to be used for storage of the equipment. Retain the carrying case only for shipping or transporting the instrument.

☆ **Remove the ETO cap (venting cap) from the fiberscope and store in an appropriate place.**

PRIOR TO USE

In addition to thoroughly reading this manual, refer also to the instruction manuals supplied with your light source, accessories and other ancillary equipment.

CONTENTS

1 FEATURES·MAIN SPECIFICATIONS

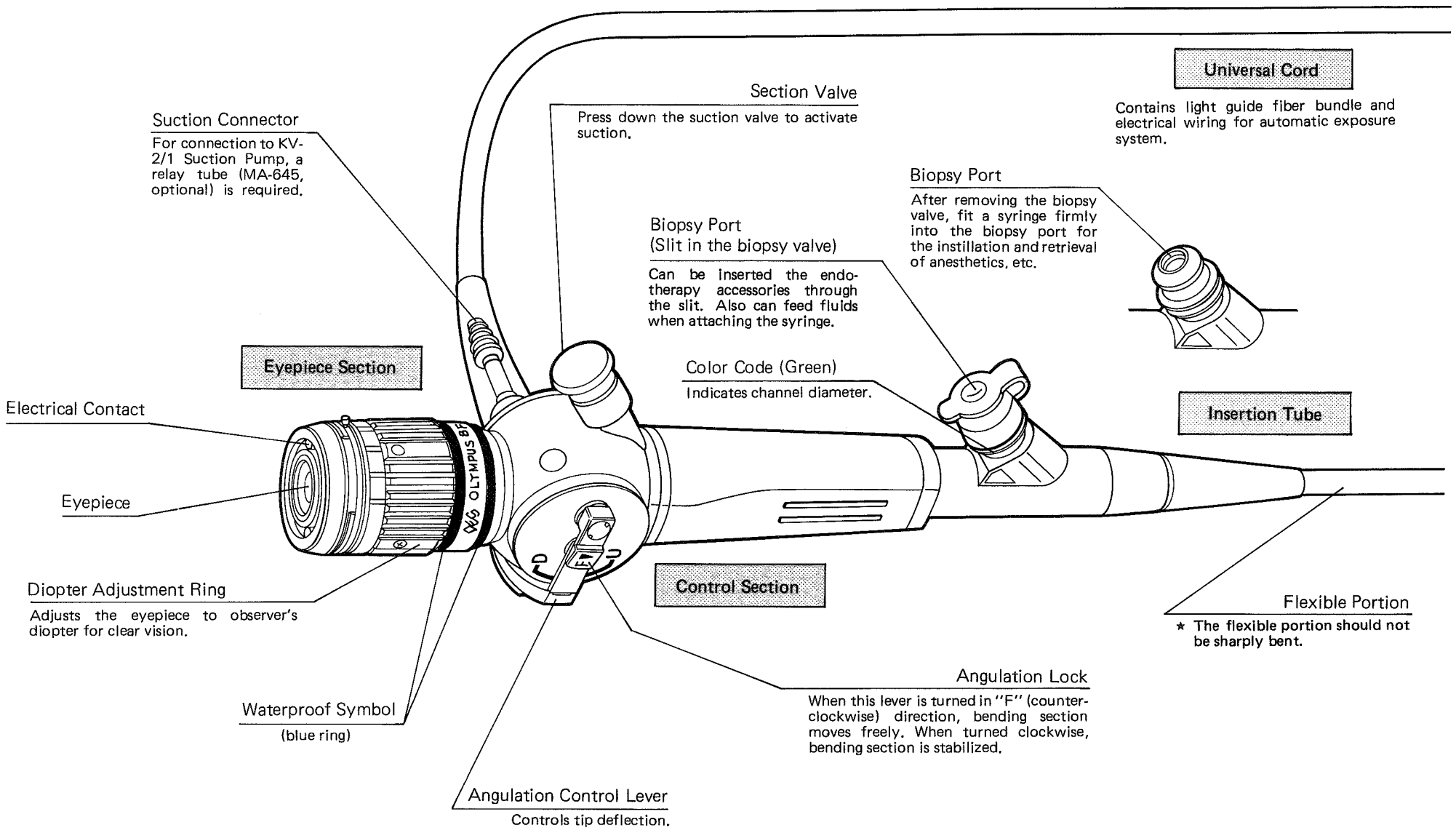
1-1 Features

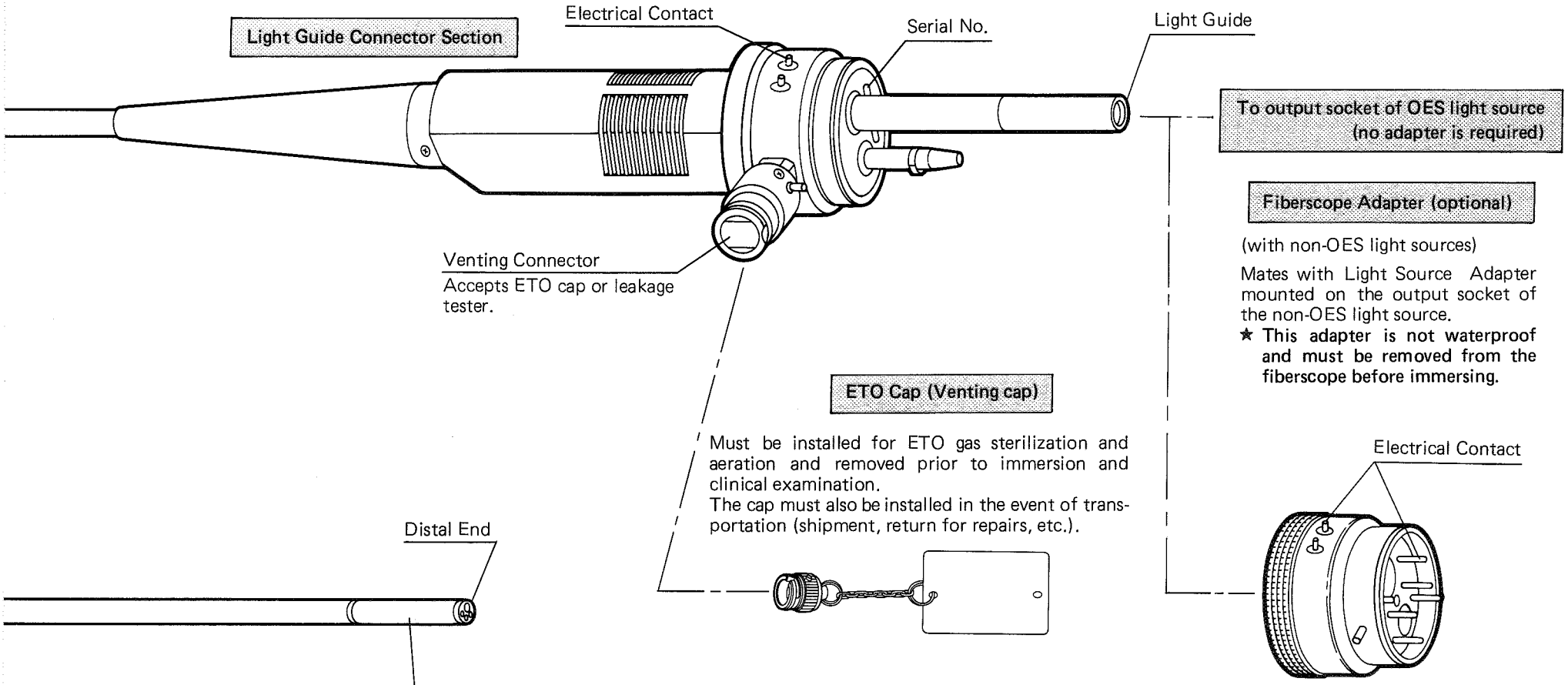
The BF-1T20D is a bronchofiberscope featuring high-resolution optics with a wide-angle lens system. As one of the waterproof OES series fiberscopes it can be completely immersed allowing total cleaning and disinfection. Its 6 mm insertion tube incorporates a 2.8 mm instrument channel for maximum versatility and performance.

1-2 Main Specifications

Optical System	Field of view Direction of view Depth of field	100° 0° (Forward viewing) 3 – 50 mm
Distal End	Outer diameter	5.9 mm
Bending Section	Range of tip bending	Up 180°, Down 100°
Insertion Tube	Outer diameter	6 mm
Working Length		550 mm
Total Length		840 mm
Instrument Channel	Inner diameter	2.8 mm
Biopsy Forceps	Minimum visible distance	5 mm from distal end
Photo Documentation	Still CCTV Cine	Olympus SC16-10, SCP-10, OM-1N, etc. Olympus OTV-F2 C-mount adapters available

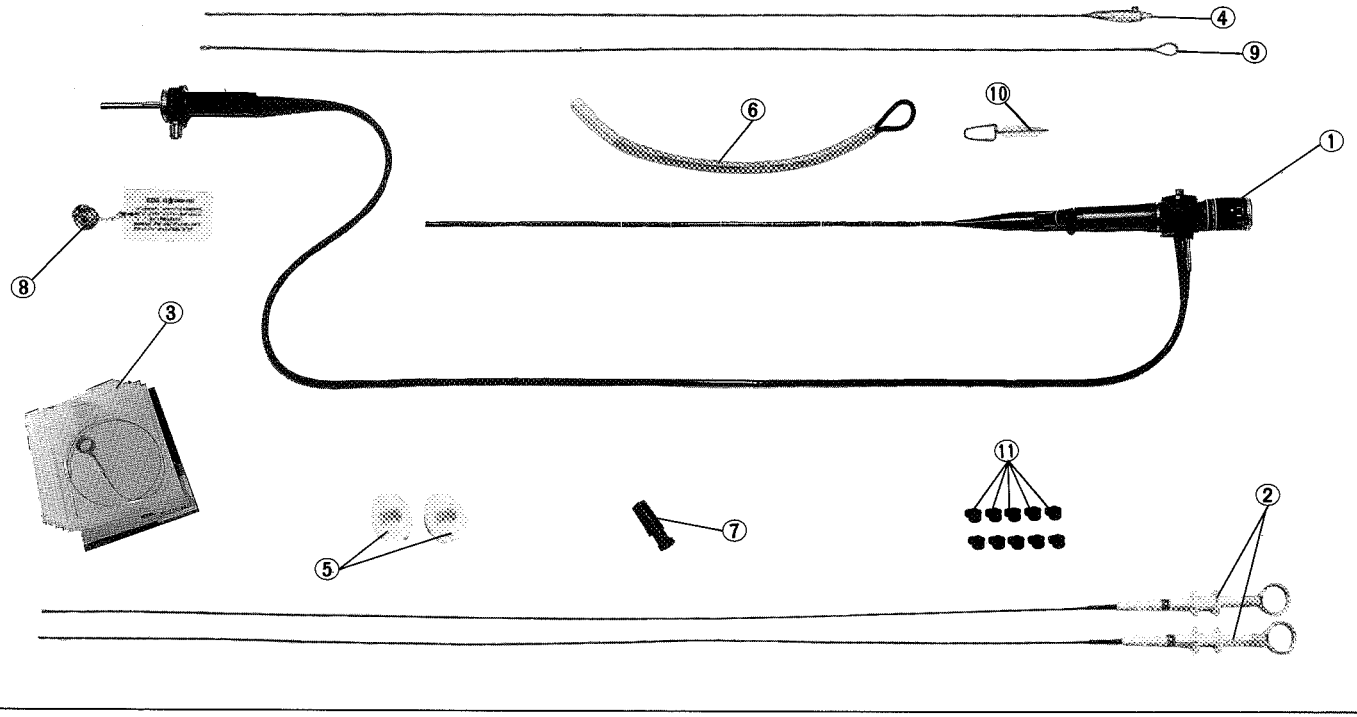
2 NOMENCLATURE



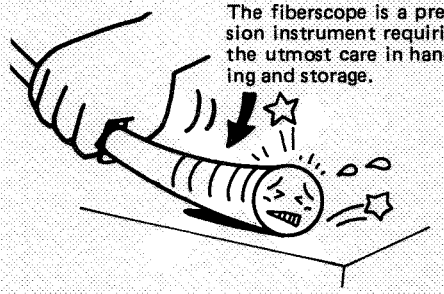

Light Guide Connector Section
Electrical Contact
Serial No.
Light Guide
To output socket of OES light source (no adapter is required)
Venting Connector
Accepts ETO cap or leakage tester.
Fiberscope Adapter (optional)
(with non-OES light sources)
Mates with Light Source Adapter mounted on the output socket of the non-OES light source.
★ This adapter is not waterproof and must be removed from the fiberscope before immersing.
ETO Cap (Venting cap)
Must be installed for ETO gas sterilization and aeration and removed prior to immersion and clinical examination.
The cap must also be installed in the event of transportation (shipment, return for repairs, etc.).
Electrical Contact
Distal End
Bending Section
Instrument Channel (for accessories and suction)
Light Guides
Objective Lens
Distal End

3 STANDARD SET

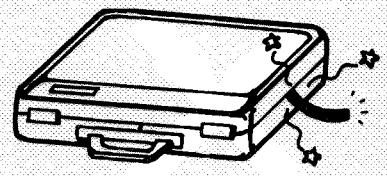
①	Fiberscope	1	
②	Biopsy Forceps (FB-20C)	2	
③	Cytology Brush (BC-15C)	1	set
④	Cannula (PR-2B) with stylet	1	
⑤	Mouthpiece (Bite guard) (MA-651)	2	
⑥	Trachea Tube (TT-1) with stylet	1	
⑦	Lens Cleaner (MA-2)	1	
⑧	ETO Cap (Venting cap) (MB-156)	1	
⑨	Channel Cleaning Brush (BW-10B)	1	
⑩	Channel-Opening Cleaning Brush (MB-206)	1	
⑪	Semi-Disposable Biopsy Valve Set (spare) (MD-50)	1	set



Instruction manuals are invaluable for staff training and should be retained for future reference.



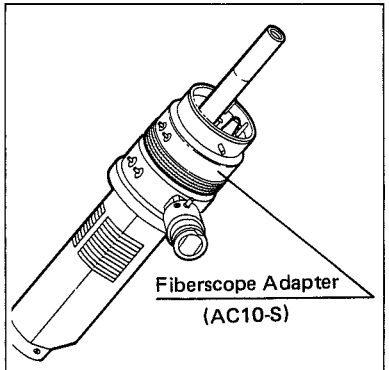
The fiberscope is a precision instrument requiring the utmost care in handling and storage.



Accidentally closing the fiberscope in the carrying case will severely damage the instrument, necessitating an expensive repair.

4 PREPARATION·INSPECTION

4-1 Preparation of Fiberscope



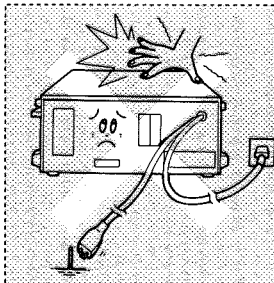
(For use with non-OES light source)

Remove the fiberscope from storage area. Remove protective caps from the eyepiece and light guide.

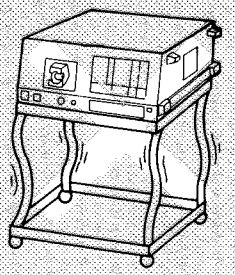
★ The use of an optional low-magnifying power adapter (A10-S1) for the SC16 is recommended for distant photography in order to ensure proper exposure.

★ Attach the Fiberscope Adapter (AC10-S) to the light guide connector section, if the fiberscope is going to be used with a light source which is not an OES.

★ For use with the OES light source (CLV-F10, -10; CLE-F10, -10), the fiberscope adapter is not required. (Remove if one is attached.)

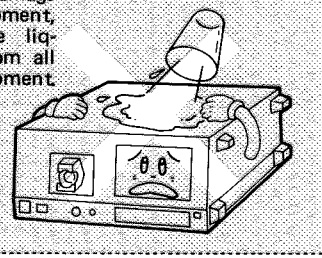


To prevent shock or electrical hazard, make sure light source, suction device, etc. are properly grounded.

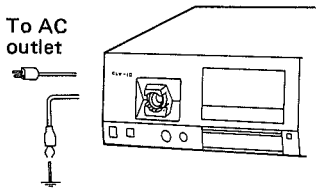


Carts and stands must be of adequate size and strength to support load.

To prevent operator shock and damage to the equipment, keep spillable liquids away from all electrical equipment.



4-2 Preparation and Inspection of Light Source



Earth terminal
(2-core cord)

1 Preparation

① Plug the power cord (3-core cord) into a properly grounded hospital grade AC outlet.

★ When using a power cord with a 2-core cord, securely connect the ground wire to an each terminal. Do not connect to a gas pipe or it may cause explosion.

② (In case of non-OES light source) Make sure the Light Source Adapter (AC10-L) has been mounted on the output socket of the light source.

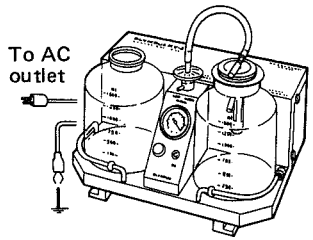
★ Adapters AC10-S and AC10-L must always be used with non-OES light sources.

③ Check proper exposure settings for photography.

2 Inspection

Inspect the light source according to its instruction manual.

4-3 Preparation and Inspection of Suction Device



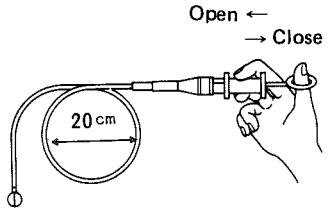
① Connect the power cord of suction device to the AC mains (and the ground wire to each terminal – see page 5) following its operating manual.
★ **The suction device must be in safe and proper working condition.**

② Inspect the suction device following its operating manual.

③ Connect the suction tube to the suction device and to the suction connector on the control section of the fiberscope. (A relay tube—MA645, optional—is required for connection to KV-2 Suction Pump.)

④ Turn on suction device. Suction is activated by covering the fiberscope's suction valve.

4-4 Preparation and Inspection of Biopsy Forceps



Inspecting forceps operation

1 Preparation

Select proper biopsy forceps and cytology brush for fiberscope being used. (Refer to the System Chart, page 35.)

★ **Always have spare forceps and brushes available.**

★ **Incompatible accessories – e.g., grasping forceps FG-4L (W-shape) and FB-14P (Rat tooth) – may cause damage to both the instrument channel and accessory.**

2 Inspection

Accessories should be inspected before each use!

If there is any irregularity in the operation or external appearance of a forceps, cytology brush, etc., the item should be replaced with a new one.

[Biopsy Forceps]

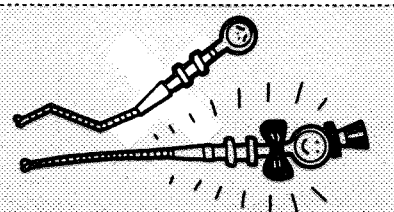
Form a loop in the biopsy forceps approximately 20 cm in diameter. Make sure that the forceps cups open and close smoothly when the handle is lightly operated.

[Cytology Brush] [BC-15C or BC-9C (optional)]

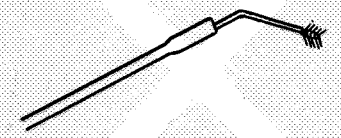
- Make sure that the Nylon-bristle fastener is recessed in the distal tip of the brush sheath.
- Lightly pull on the bristles and make sure that the brush wire does not come out.

★ **Brush wire is designed for single use only.**

★ **All Olympus accessories have been designed and manufactured with utmost care. Due to the delicate nature of the small precision involved, it is considered neither safe nor economical to repair endoscopic accessories. In the interest of patient safety, Olympus' policy is to replace rather than repair these items. Repair by unauthorized individuals should not be attempted.**

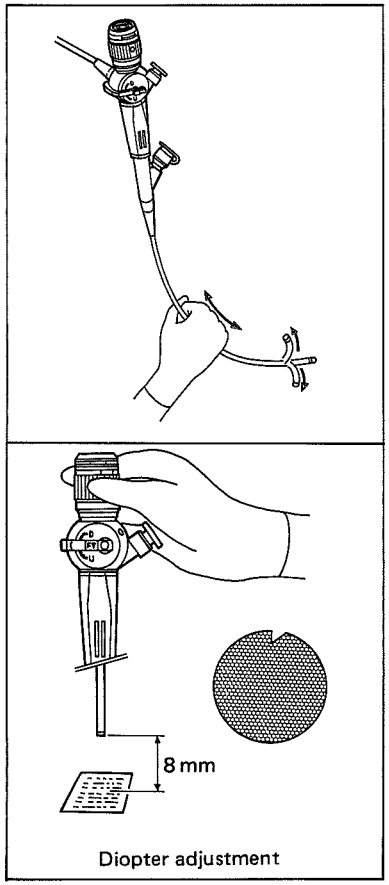


Any accessory which is kinked or bent along its shaft will not operate smoothly, will be difficult to pass through the fiberscope, and must be replaced.



Brush wire is designed for single use only.

4-5 Inspection of the Fiberscope



Diopter adjustment

Before each use, the instrument should be inspected according to the following procedure. Should the slightest irregularity or abnormality be suspected, do not use the fiberscope.

1 Inspection of the Insertion Tube

① Inspect the surface of the insertion tube visually for any dents, bulges, etc.

② Run your finger tips over the whole length of the insertion tube checking for any protruding objects, internal looseness, or other irregularities.

★ **Do not squeeze the bending section forcefully.**

2 Inspection of the Bending Mechanism

① Operate the angulation control lever slowly and to the limit in each direction. Make sure the bending section bends smoothly and correctly. Simultaneously inspect the outlet surface of the bending section visually for any irregularity.

② Operate the angulation lock and check that the bending section is stabilized when the lock is engaged. Also check that the lever rotates freely when the lock is released ('F' Position).

③ Inspect the rubber covering of the bending section for small holes, breaks, etc.

★ **Do not bend or twist the bending section by hand.**

3 Inspection of the Optical System

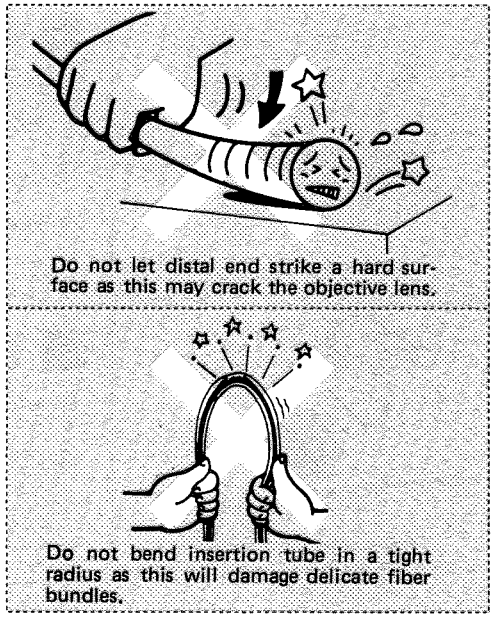
① Using clean gauze lightly moistened with 70% alcohol wipe all electrical contacts and lens surfaces.

② With the OES light source, rotate the output socket ring fully clockwise (a blue dot is visible), and plug the light guide connector into the output socket. Turn on the light source and adjust the light level.

★ **With the non-OES light source, plug the light guide connector into the AC10-L Light Source Adapter mounted on the output socket.**

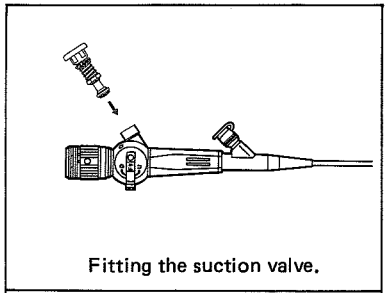
③ Turn the diopter adjustment ring until the fiber pattern is clearly focused. Check to see if an object approximately 8 mm away from the objective lens can be visualized clearly.

★ **Do not use abrasive cleaners on lens surfaces or lenses will be scratched.**

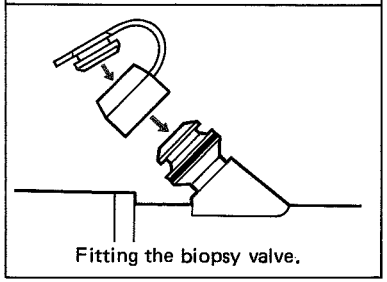


Do not let distal end strike a hard surface as this may crack the objective lens.

Do not bend insertion tube in a tight radius as this will damage delicate fiber bundles.



Fitting the suction valve.



Fitting the biopsy valve.

4 Inspection of the Suction Valve

① Pinch the valve of the suction valve by your finger and let the suction valve fall into the suction opening.

② Push the valve by your finger until it stops.

③ Make sure the suction valve moves smoothly.

5 Inspection of the Biopsy Valve

① Visually inspect the inner and outer part of the biopsy valve is free from breaks or debris.

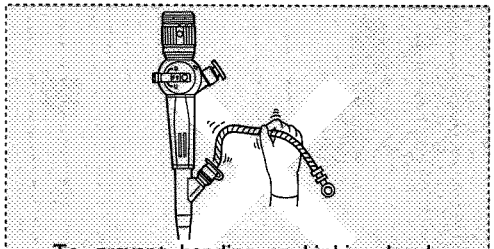
② Close the cap of the biopsy valve, and install it on the biopsy valve opening.

6 Inspection of Instrument Channel

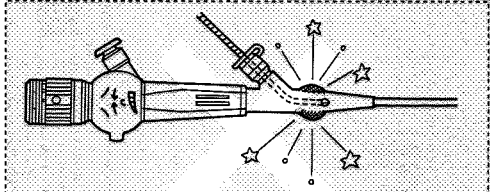
Check to see if the biopsy forceps which is inserted from the biopsy port (slit) passes through the instrument channel smoothly.

7 Inspection of Other Parts

Check universal cord for any damage (i.e. breaks, cracks, twisted or crushed area) and the light guide connector, eyepiece and control section for loose connections.

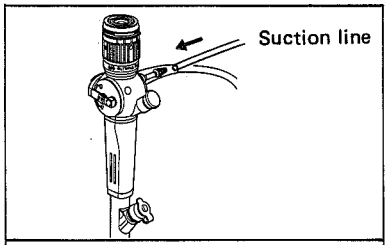


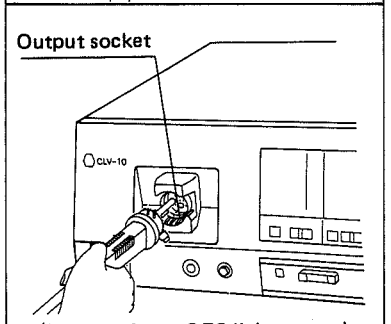
To prevent bending or kinking brush shaft, hold shaft close to suction valve and advance using repeated, short strokes.



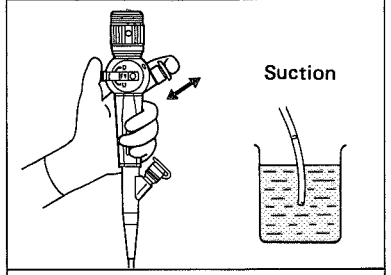
If brush does not pass smoothly, do not force! Damage will occur to both cytology brush and instrument channel.

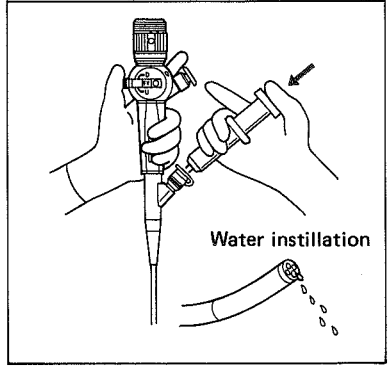
4-6 Inspection of the Endoscopic System





(In case of non-OES light source)





1 Preparation

① Connect the suction line to the fiberscope.

② Plug the light guide connector into the output socket.

③ Switch on the light source and suction device.

★ **Turnoff the air switch (OES light sources).**

2 Inspection of Suction Mechanism

① Dip the distal end in tap water and press down the suction valve until it stops. Make sure water is aspirated. Remove finger from ports and make sure aspiration ceases.

② Insert an endo-therapy product into the biopsy port (slit) and dip the distal end in clean water. Press down the suction valve and check to see that the water is aspirated. Remove your finger from the valve and make sure that aspiration ceases.

★ **Replace the semi-disposable biopsy valve with a new one every day, or after several uses, as the biopsy valve wears out after long periods of use and leakage could result.**

★ **If the valve does not operate smoothly, see Section 6, MAINTENANCE on page 15.**

③ When the syringe is used for aspiration, remove the biopsy valve and dip the fiberscope distal end in clean water. Fit an empty syringe firmly into the biopsy port and press the plunger, making sure that water is aspirated correctly into the syringe.

3 Inspection of Water Instillation

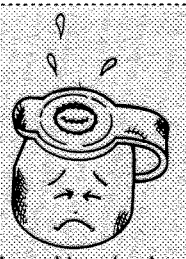
① Attach a syringe filled with clean water straight to the biopsy port (slit) fully and press the plunger. Check to make sure that water is emitted from the channel outlet.

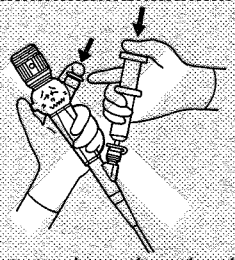
★ **Do not push down the valve during instillation.**

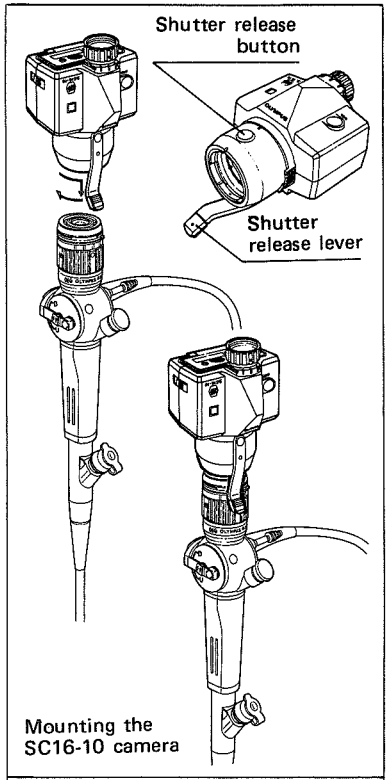
② Remove the biopsy port.

③ Fit a syringe filled with water firmly into the biopsy port and press the plunger. Check to make sure that water is emitted from the channel outlet.

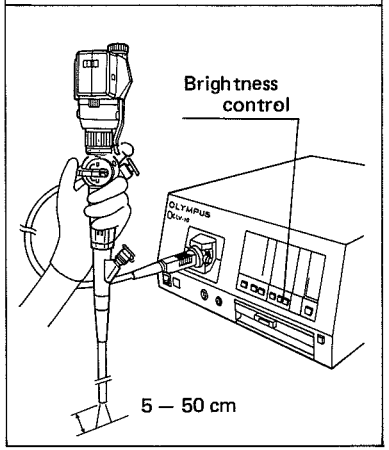
★ **If water leaks into the suction line, replace the suction valve with a new one.**


The semi-disposable valve is an expendable item.


Do not press down the valve during instillation.



Mounting the SC16-10 camera



4 Inspection of the Automatic Exposure System

① Mount camera on fiberscope in the following manner:

- Roughly align the yellow dots on camera and instrument eyepiece.
- Rotate camera slightly until it seats.
- Continue rotating clockwise (approximately 1/8 turn) until camera locks into place.

② Manually adjust light source brightness to minimum light output.

③ Hold the distal end of the fiberscope to within 1 cm of a white piece of paper and depress the camera's shutter release. A momentary increase in light intensity should be noted.

④ Repeat the above procedure, holding the distal end of the fiberscope at 2 cm and 5 cm from paper. Flash duration should increase with distance.

★ **If the automatic exposure system fails to function as described, refer to Section 9, TROUBLESHOOTING GUIDE.**

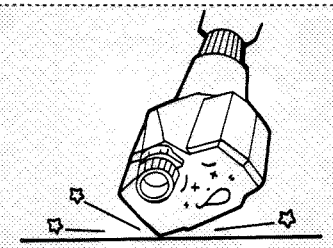
⑤ Remove camera by rotating counterclockwise.

⑥ Disconnect the light guide connector from the light source.

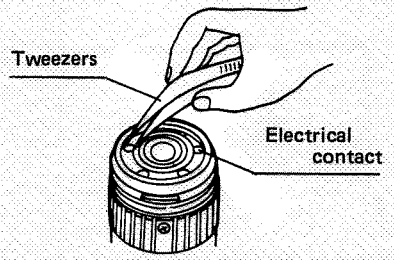
(With non-OES light source)

- If the light guide connector is simply pulled from the output socket, AC10-S fiberscope adapter will remain in the AC10-L light source adapter.
- If the light guide connector is pulled from the output socket while depressing release knob on top of the AC10-L adapter, both the fiberscope and fiberscope adapter will be released.

★ **Electrical contacts may be cleaned using a cotton-tipped applicator moistened with alcohol. Be sure to turn off light source before cleaning the electrical contacts on the AC10-L adapter.**



Take care not to drop or knock.



5 OPERATING THE FIBERSCOPE

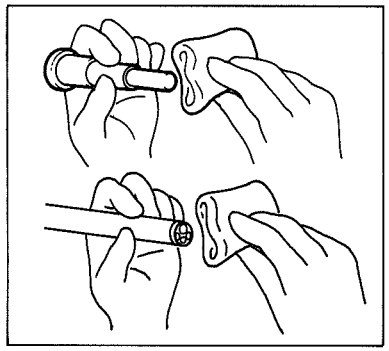
This section describes the basic operation of the fiberscope and outlines a general procedure for endoscopy. The endoscopist should carefully evaluate the clinical factors involved and decide on the technical details of the procedure.

SPECIAL NOTE

To become more thoroughly acquainted with some of the potential hazards associated with flexible endoscopy, the following are examples of possible complications resulting from improper technique.

Improper Technique	Possible Complication
① Use of faulty fiberscope and/or accessory	Mucosal trauma, Perforation, Laceration, etc.
② Forceful insertion without clear view of the lumen	Perforation, etc.
③ Prolonged suction with distal tip in contact with mucosal surface	Bleeding, Suction artifact, etc.
④ Prolonged close-up observation with intense illumination	Thermal injury to mucosa, etc.
⑤ Blind or abrupt protrusion of accessory from distal tip	Perforation, etc.
⑥ Withdrawal of fiberscope with angulation control in locked position	Trauma, Perforation, Laceration, etc.
⑦ Blind withdrawal of fiberscope	Trauma, Perforation, Laceration, etc.
⑧ Improperly cleaned/disinfected instruments	Cross-contamination, Infection, etc.

5-1 Preparation for Use



1 Disinfection/Sterilization of Instruments

Disinfect or sterilize the fiberscope and accessories as described in Secton 6.

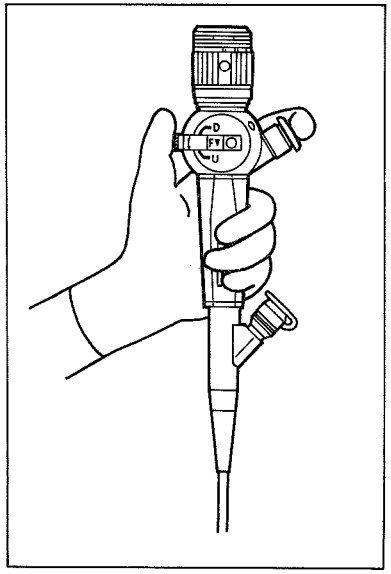
2 Application of Lens Cleaner (Anti-Fogging Agent)

① Wipe moisture from objective lens.
② Apply lens cleaner to a piece of clean gauze and lightly wipe the objective lens. Remove excess.

3 Diopter Adjustment

Turn the diopter adjustment ring until the fiber pattern is clearly focused.
☆ **Four color-coded index lines serve as a reference for repeated setting.**

5-2 Insertion and Observation

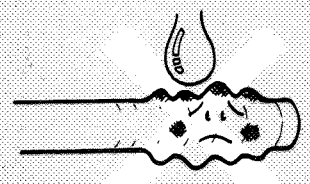


1 Preparation for Insertion

① A mouthpiece (bite guard) must be used to prevent the instrument from being bitten, in the case of transoral introduction without using endotracheal tube.

② Lubricate the insertion tube with a water soluble medical grade lubricant, taking care to avoid the distal tip.

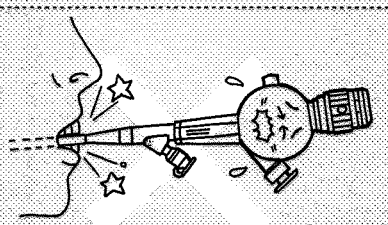
③ When inserting the scope, be careful not to bend the insertion tube sharply at the flexible portion as this could damage the tube.



Petroleum based lubricants will cause stretching and deterioration of bending section rubber.

2 Holding the Fiberscope

The control section of the instrument is designed to be held in the left hand. Suction is activated by pressing the suction valve with the index finger. The angulation control lever is operated by the thumb. The right hand is free to manipulate the insertion tube.



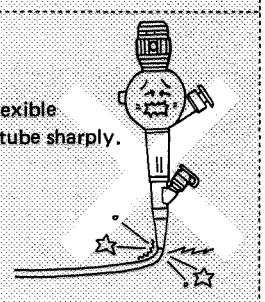
Use a mouthpiece to prevent damage to the insertion tube, if the fiberscope is introduced transorally without using endotracheal tube.

3 Intubation (for Transoral Introduction)

① Fit the stylet into the endotracheal tube and shape it into a form suitable for insertion.

② Observing laryngoscopic view, insert the endotracheal tube into the paitnet.

③ Withdraw the stylet.



Do not bend the flexible portion of insertion tube sharply.

4 Adjusting Brightness

Adjust the brightness control on the light source to a comfortable level of illumination.

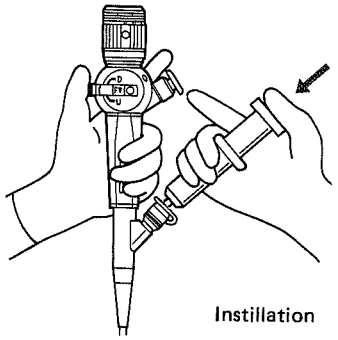
★ **Always use the minimum necessary light level to avoid thermal mucosal damage as well as to protect your eye.**

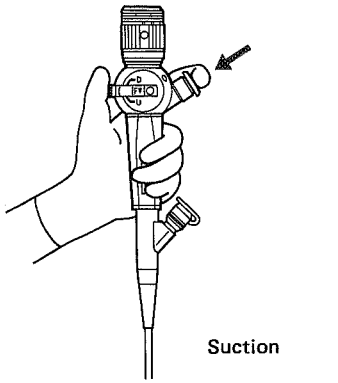
5 Tip Deflection

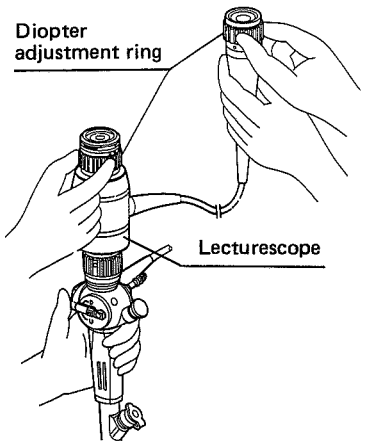
Operate the angulation control lever as necessary to guide the distal end for insertion and observation.

★ **If the angle control mechanism ceases to function, or if any other irregularity is noticed in the operation of the fiberscope, stop the examination immediately; free the angulation lock and return the angulation control lever to the neutral position. Carefully withdraw the fiberscope while observing through it.**

★ **Always operate the angulation control lever slowly.**







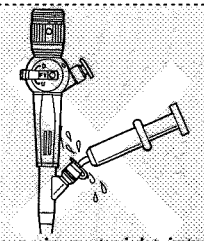
6 Instillation of Antitussive Agents

Fit the syringe firmly into the biopsy port (slit) and instill antitussive agents, as necessary.

★ Do not touch the suction valve by your finger during instilling the agents, etc. or a slight amount of fluid may leak into the suction line.

★ The antitussive agent instilled may not exit smoothly from the channel outlet on the fiberscope's distal end. In such a case, use an empty syringe and feed air into the instrument channel to remove any remaining antitussive agent.

★ Insert the syringe completely and straightly into the biopsy port. An angled or incomplete insertion may result in an overflow of the antitussive agent without it being properly instilled through the instrument channel.



Insert the syringe straight into the biopsy port until it stops. If this is not done, fluid may leak from the biopsy valve.

7 Aspiration of Mucus

① Press down the suction valve to aspirate thin mucus.

② Also when aspirating during the use of endo-therapy product, press down the suction valve.

★ Replace the semi-disposable biopsy valve with a new one every day, or at least after several uses, as the biopsy valve wears out after long periods of use and leakage could result.

8 Using the Lecturescope (Teaching Attachment)

① Either the LS-10 lecturescope or LS-2 lecturescope (with A10-L2 adapter) may be used with the fiberscope.

② If desired camera may be attached to the primary eyepiece of the LS-10 lecturescope.

9 Still Photography

Mount photographic equipment to the eyepiece to carry out still photography.

★ Close-distance photography or the use of either a high-intensity light source or low-magnification adapter is recommended as proper exposure may not be obtained during distant photography.

WARNING

THERE IS A RISK OF THERMAL INJURY TO TISSUE FROM PROLONGED EXPOSURE TO THE INTENSE ILLUMINATION TRANSMITTED THROUGH A FIBERSCOPE. Because of the increased light carrying capabilities of OES endoscopes combined with the high output of high-intensity (Xenon) light sources, it is possible to convey a large amount of light energy and to concentrate this energy in a very small area (for example, when the fiberscope tip comes in close contact with the mucosa, thermal injury to the tissue may result). Because this fiberscope does not contain a photocell for automatic brightness control, the level of illumination will become very great under close-viewing conditions unless manually reduced.

The risk of injury is increased under the following conditions:

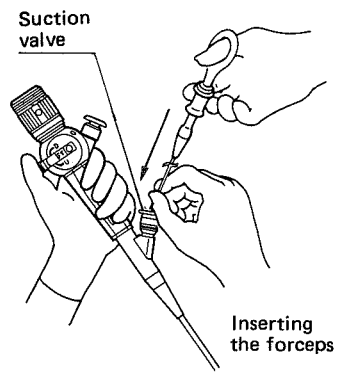
1) Prolonged close contact or close stationary viewing of the mucosa.
2) Advancing the fiberscope through a narrow lumen.
3) Using a high-intensity light source (e.g., CLV-F10, -10; CLV; CLX-F).

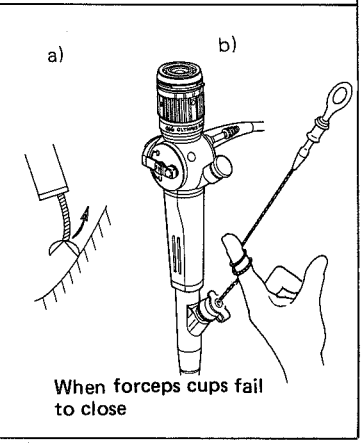
The following recommendations will reduce the risk of thermal injury:

1) Use the minimum level of illumination necessary for adequate visualization. The filter built into high-intensity (Xenon) light sources may be used for this purpose.
2) When possible, avoid close stationary viewing.

To prevent accidents, do not leave the fiberscope plugged into the light source with the lamp on when no use.

5-3 Biopsy and Brush Cytology





1 Inserting Biopsy Forceps

① While visualizing the area of interest, insert forceps into the biopsy port (slit) with its cups closed.

★ If the forceps encounters resistance to passage through the bending section, decrease tip angulation until smooth passage is possible. Application of a medical grade lubricant to the forceps prior to insertion into the fiberscope will enhance passage.

② Slowly advance the forceps using repeated short strokes, grasping the forceps approximately 3 cm from the biopsy port (slit). When the tip protrudes approximately 5 mm from the the distal end, the forceps will come into view.

2 Biopsy Procedure

Tissue samples are obtained by grasping the mucosa in the biopsy cups and then gently pulling the forceps back until the specimen is removed.

★ Do not attempt to cut through the tissue by applying excessive force.

• Withdraw forceps slowly with cups in a closed position.

★ In the event the cups of forceps fail to close when the slider is operated making it impossible to withdraw the forceps, close the cups by winding proximal portion of the shaft several times around your finger. If this fails to close the cups, withdraw the forceps as far as possible into channel opening. While viewing through the fiberscope, carefully withdraw both fiberscope and forceps.

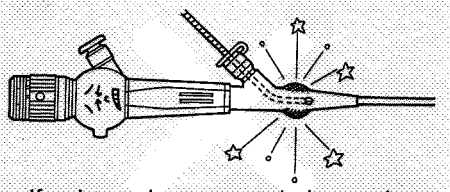
3 Brush Cytology

① Insert the cytology brush into the fiberscope in the manner described in 1 above.

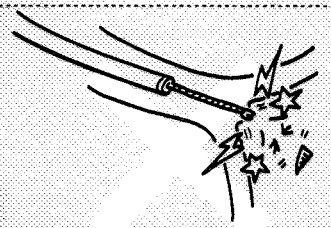
★ Prior to insertion of Double-joint Cytology Brush BC-8C (or Curette CC-3C), return insertion tube to the neutral position to prevent damage to the instrument channel.

② Protrude the brush wire and collect the specimen.

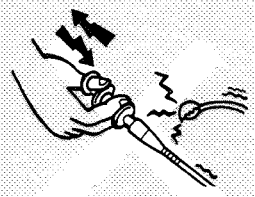
③ Withdraw the cytology brush from inside (or together with) the fiberscope.



If resistance is encountered when passing biopsy forceps DO NOT FORCE. Extensive damage to both forceps and fiberscope may result.

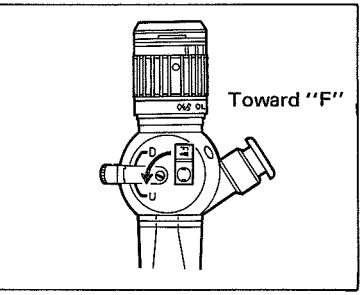


Advance forceps slowly. To prevent injury or perforation, always view through fiberscope when advancing forceps.



Do not apply excessive force when opening and closing biopsy forceps.

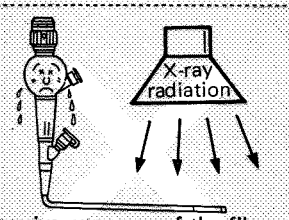
5-4 Withdrawing the Fiberscope



① Before withdrawing the fiberscope, set the angulation lock in the "Free" (F) position.

② Always view through the fiberscope when withdrawing the instrument.

★ The fiberscope must be cleaned immediately after withdrawal from the patient. (Refer to pp. 19 through 21.)



Excessive exposure of the fiberscope to X-ray radiation will result in a yellow discoloration and darkening of the glass fiber bundles.

6 MAINTENANCE

6-1 Cleaning, Disinfection, Sterilization

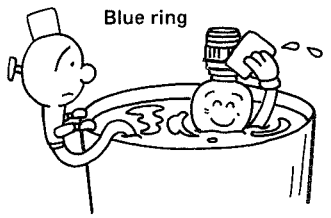
Endoscopic instruments must be meticulously cleaned prior to disinfection or sterilization. The methods employed to achieve these conditions are left to the discretion of the endoscopist, hospital infection control committee, etc.

Olympus instruments are made of materials and constructed in a manner which may not tolerate certain methods of cleaning, disinfection or sterilization. Those procedures, as described on pages 17 through 24 of this manual, have been thoroughly tested and found to have no adverse effects. Strict adherence to these procedures is highly recommended.

Cleaning • Disinfecting \ Instruments		Fiberscopes	Accessories, Mouthpiece, Anticontamination Cover	Cameras	Adapters (A10, A10-S etc.)	Lecturescope (LS-10)	Channel Cleaning Brush & Channel-Opening Cleaning Brush	Endotracheal tube	Suction Valve, Semi-disposable Biopsy Valve
Cleaning	Ultrasonic		■				■	■	■
	Solutions		■				■	■	■
Disinfectant	70% alcohol (wiping)	■	■	■	■	■	■	■	■
	Solutions (immersion)	■	■				■	■	■
Gas	Formalin	■	■	■	■	■	■	■	■
	Ethylene Oxide Gas		■			■	■	■	■
Heat	Boiling		■						■
	Autoclave		■						■

■ Applicable □ Not applicable

★ Only those fiberscopes identified by a Blue Ring on the Eyepiece may be totally immersed.
★ Only those accessories identified by a Green Color or marked "AUTOCLAVE" may be autoclaved.



Non-immersible fiberscopes

6-2 Cautions

1 General Precaution

- Before using any disinfectant solution not mentioned below, check with Olympus.
- Removable parts (e.g. suction valve) as well as the areas on which these parts are mounted, should be thoroughly cleaned and disinfected (sterilized).

2 Disinfectant Solution

- Reference herein to solutions for disinfection is not an endorsement of their germicidal effectiveness. Qualified persons from the disinfectant manufacturer should be consuled if any questions exist on this subject.
- When the disinfectant solution has been in contact with the instrument for the recommended time, remove the instrument from the disinfectant and rinse thoroughly to remove all toxic residue and to prevent instrument deterioration. The recommended dilution percentage and contact time listed below should not be exceeded.
- Rubber gloves should be worn for protection against risk of infection or skin irritation.

MATERIAL		BRAND NAME	DISTRIBUTED BY	CONDITIONS
Disinfectant Solution	Alcohol 70% (Disinfectant Ethanol)			Wipe using alcohol dampened gauze
	Surgical scrub soap solution			Maximum Immersion: 30 Minutes
	Iodophor	Wescodyne (1.6%)	West Chemical Products (USA)	Dilution: 100X (0.016%) Max. Immersion: 20 Min.
	Glutaraldehyde	Sporicidin (1:16) Cidex (2%) Sonacide (2%) Glutares (2%)	The Sporicidin Co. Surgikos (USA) Ayerst Labs (USA) 3-M Medical Products	Follow Manufacturer's Instructions
		Alhydex Plus (2.2%)	Surgikos (West Europe)	
		Aldecyde 28 (2%)	Antiseptics Consultant Service (Australia)	

3 Ethylene Oxide Gas Sterilization

- Prior to sterilizing the fiberscope, the ETO Cap (venting cap) must be attached. OES fiberscopes are completely sealed to make them watertight. Failure to attach the ETO cap will prevent the air sealed inside the fiberscope from escaping as a vacuum is created within the sterilization chamber. This will cause the rubber covering the bending section to rupture. After the ETO procedure is completed, the ETO Cap must be removed in order to reseal the fiberscope and insure water tightness.
- Before sterilization, the instrument must be thoroughly cleaned and dried as described in pages 20 through 22 of the manual. Failure to do so will inhibit sterilization.
- The instrument must be properly aerated after ETO sterilization to remove all residual toxic gas.
- Always use a biological indicator and follow the manufacturer's instructions for the particular gas sterilizer being used.

Gas	Formaldehyde	Formalin gas (Formaldehyde 14%)		To be kept insealed condition for 24 hours max.
	Ethylene Oxide Gas	Anprolene	H.W. Andersen Products (USA)	Follow Manufacturer's Instructions
		Gas sterilizer		Temperature 57°C (135°F) max. Pressure 1 – 1.7 kg/cm² (24 psi) Humidity 50% max. Gas Concentration 12% Time 4 Hours Aeration Time: 7 days at room temperature or 12 hours in an aeration chamber between 50°C (122°F) and 57°C (135°F)

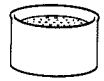
4 Autoclave

Only those endo-therapy products identified by a Green Color or marked "AUTOCLAVE" may be autoclaved. Meticulous mechanical cleaning followed by 5 minutes of ultrasonic cleaning (at 40 kHz or higher) is mandatory prior to autoclaving. (Refer to Autoclavable endo-therapy product Instruction Manual for details.)
Standard autoclave cycles, including "flash" may be used provided the temperature does not exceed 132°C.

Heat	Boiling Water	Maximum Immersion: 30 Minutes
	Autoclave	2 atmospheres of air pressure (132°C or 270°F) for 5 minutes or 1 atmosphere (121°C or 250°F) for 20 minutes.

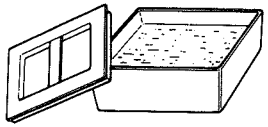
6-3 Cleaning, Disinfection and Sterilization Procedures

1 Supplies Needed

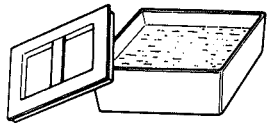


Cleaning solution

Disinfectant solution

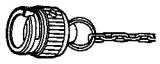


Large basin for water



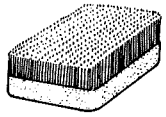
Large basin for disinfectant solution

Rubber gloves

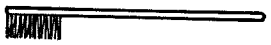


ETO cap (venting cap)
(MB-156)

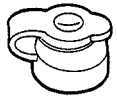
Channel-opening cleaning brush
(MB-206)



Scrub brush (soft)



Tooth brush



Semi-disposable biopsy valve
(spare)

Syringe

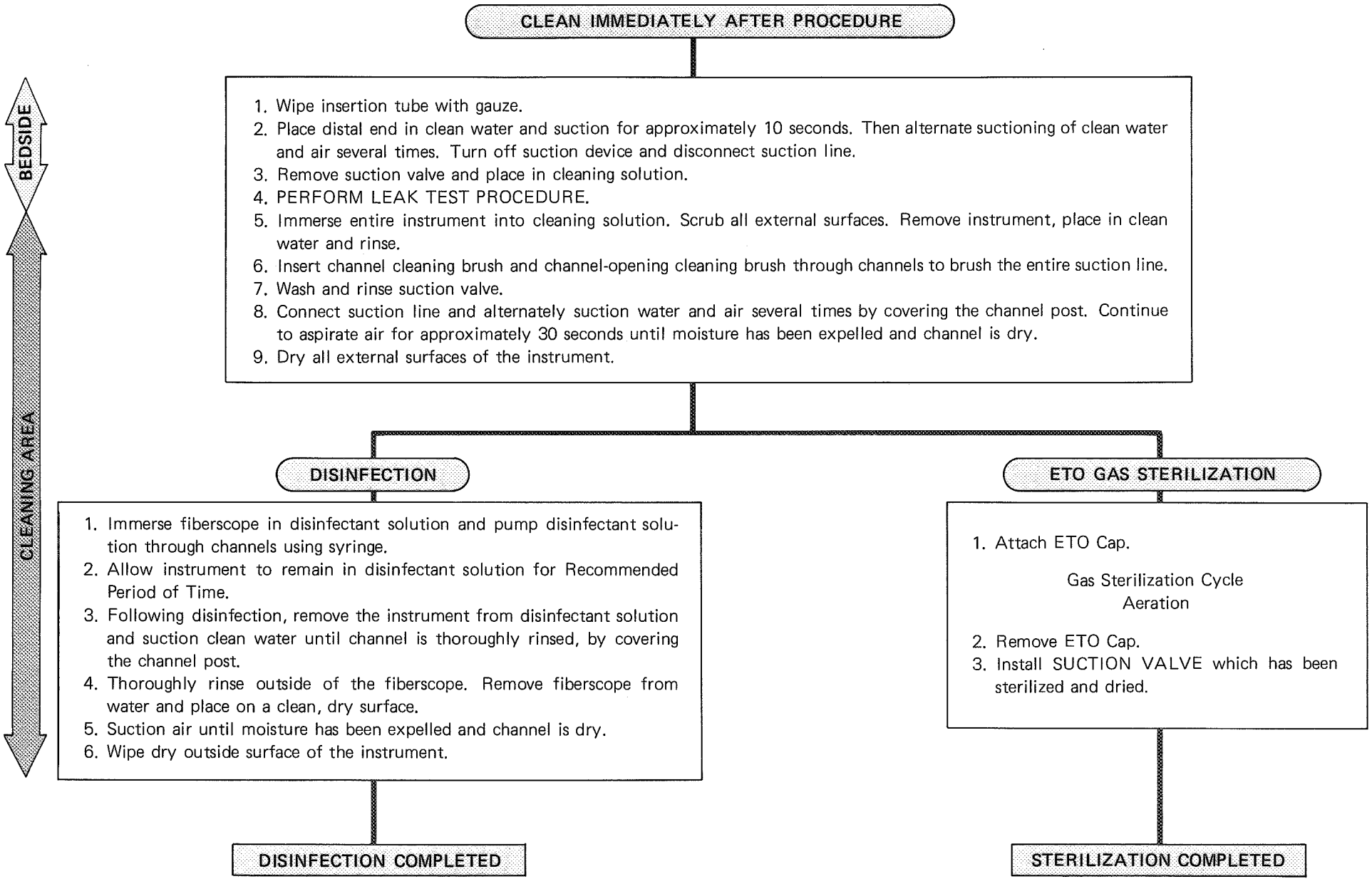
Gauze pads

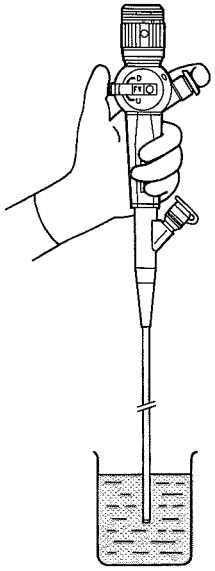
Channel cleaning brush
(BW-10B)

Leakage Tester (optional)

- To avoid extensive damage and costly repair, it is recommended that OES fiberscopes be tested for water leakage prior to immersion in cleaning solutions.
- To facilitate leak testing and cleaning procedures, the use of a leakage tester, maintenance until (MU-1) or endoscope washer (EW-20/10) is recommended (optional items).

  Refer to the operasting manuals provided with these units.


CLEAN IMMEDIATELY AFTER PROCEDURE
BEDSIDE
CLEANING AREA
1. Wipe insertion tube with gauze.
2. Place distal end in clean water and suction for approximately 10 seconds. Then alternate suctioning of clean water and air several times. Turn off suction device and disconnect suction line.
3. Remove suction valve and place in cleaning solution.
4. PERFORM LEAK TEST PROCEDURE.
5. Immerse entire instrument into cleaning solution. Scrub all external surfaces. Remove instrument, place in clean water and rinse.
6. Insert channel cleaning brush and channel-opening cleaning brush through channels to brush the entire suction line.
7. Wash and rinse suction valve.
8. Connect suction line and alternately suction water and air several times by covering the channel post. Continue to aspirate air for approximately 30 seconds until moisture has been expelled and channel is dry.
9. Dry all external surfaces of the instrument.
DISINFECTION
1. Immerse fiberscope in disinfectant solution and pump disinfectant solution through channels using syringe.
2. Allow instrument to remain in disinfectant solution for Recommended Period of Time.
3. Following disinfection, remove the instrument from disinfectant solution and suction clean water until channel is thoroughly rinsed, by covering the channel post.
4. Thoroughly rinse outside of the fiberscope. Remove fiberscope from water and place on a clean, dry surface.
5. Suction air until moisture has been expelled and channel is dry.
6. Wipe dry outside surface of the instrument.
DISINFECTION COMPLETED
ETO GAS STERILIZATION
1. Attach ETO Cap.
Gas Sterilization Cycle
Aeration
2. Remove ETO Cap.
3. Install SUCTION VALVE which has been sterilized and dried.
STERILIZATION COMPLETED



Suctioning of clean water

2 Cleaning/Disinfecting/Sterilizing the Fiberscope

CLEAN IMMEDIATELY AFTER PROCEDURE

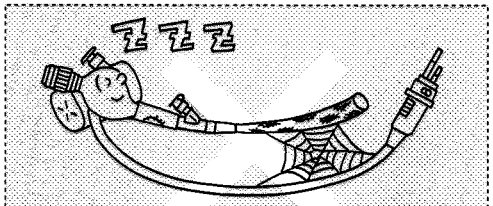
Initiate the following cleaning procedure immediately after each examination. Failure to do so may result in a malfunction of the instrument.

★ **The light guide plug (chrome shaft extending from the light guide connector) may be extremely hot immediately after removal from the light source.**
DO NOT TOUCH!

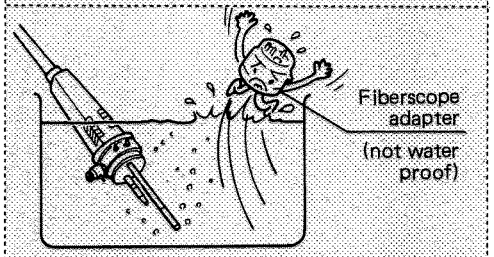
1. Wipe insertion tube with gauze.
   ★ **Do not squeeze the bending section forcefully.**

2. Place the distal end in clean water and suction for approximately 10 seconds. Then alternate suctioning of clean water and air several times by alternately inserting and removing distal end of the instrument from the water. (Suction is conducted by depressing the suction valve with a fingertip.) Turn off suction device and disconnect suction line.

3. Pinch the valve of the suction valve by your finger and remove it. Remove the biopsy valve from fiberscope.
   Refer to 3 Cleaning/Disinfecting the Suction Valve on page 25 to clean or disinfect the suction valve; and 4 Cleaning/Disinfecting Sterilizing the Semi-disposable Biopsy Valve on page 25 to clean or disinfect the semi-disposable biopsy vlave.



Clean fiberscope and suction valve immediately after each examination.



Remove fiberscope adapter before cleaning/disinfecting procedure.

4. PERFORM LEAK TEST PROCEDURE

① Remove fiberscope from light source by simply pulling outward.
(With non-OES light source)
- ★ **DO NOT DEPRESS Silver Button on top of the light source adapter (AC10-L).**
- ★ **Be sure fiberscope adapter (AC10-S) remains in the light source adapter.**

② Detach suction line from the fiberscope.

③ Insert black end of the leakage tester into output socket on the light source.

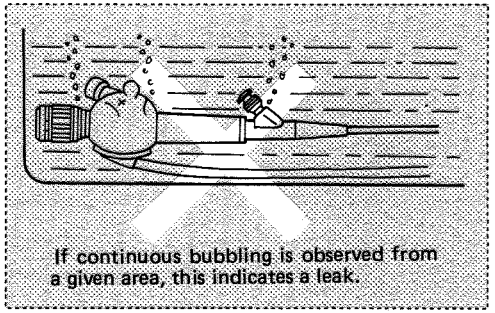
④ Turn on the light source. **(With OES light source, set air switch to "HIGH" or "3".)**
- ★ **Be sure air pump is also "ON". To ensure that air is being emitted from the leakage tester, lightly depress the pin inside the connector cap.**

⑤ Attach leakage tester to venting connector on the light guide connector.
- ★ **Place the connector cap over the venting connector, aligning the pin on the connector with the keyway on the cap. Depress and rotate cap clockwise (approximately 90°) until no further rotation is possible.**
- ★ **At this point, note expansion of the rubber covering of the bending section due to increased internal pressure.**

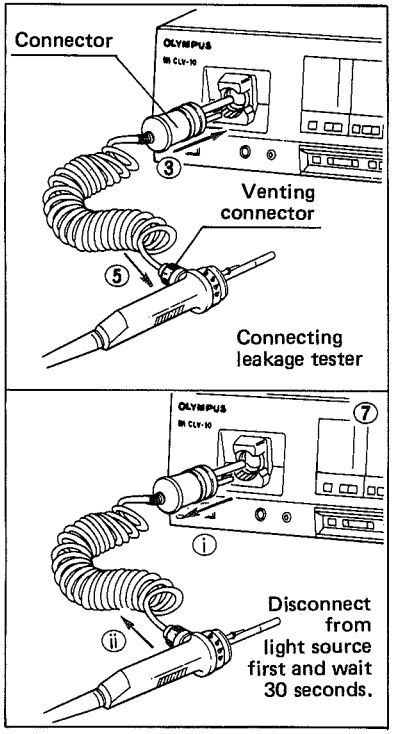
⑥ Immerse entire instrument in water.
Observe the instrument carefully for about 30 seconds.
If no bubbling is observed from the instrument, the instrument is watertight. Proceed to step ⑦.
- ★ **Some initial bubbles may be observed due to air trapped in crevices on the fiberscope's outer surface. This is normal.**

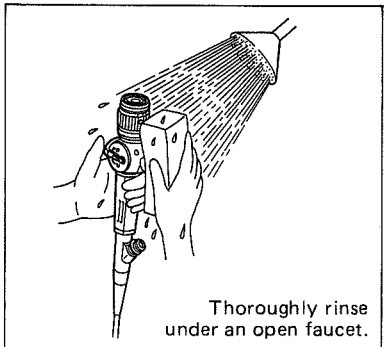
- If continuous bubbling is observed from a given area, this indicates a leak. Remove the instrucment from water immediately.
- Turn off light source and disconnect leakage tester from light source.
- Wait approximately 30 seconds (or until rubber which covers the bending section returns to its normal shape); then disconnect opposite end of leakage tester from the instrument.
- DO NOT USE THE INSTRUMENT! Reattach valve and ETO vent cap and send to your nearest Olympus Service Center.

⑦ Remove the entire instrument from the water and turn off the light source.
i Disconnect the leakage tester from the light source.
ii Wait approximately 30 seconds (or until the rubber which covers the bending section returns to its normal shape).
- Disconnect the leakage tester from the venting connector on the light guide connector by depressing and rotating counterclockwise.
  - ★ **Do not detach the leakage tester before the fiberscope has been removed from water.**
  - ★ **When detaching the leakage tester, always disconnect from the light source first. Failure to follow this exact procedure will not allow the instrument to depressurize and damage will result.**
  - ★ **Thoroughly dry the leakage tester.**

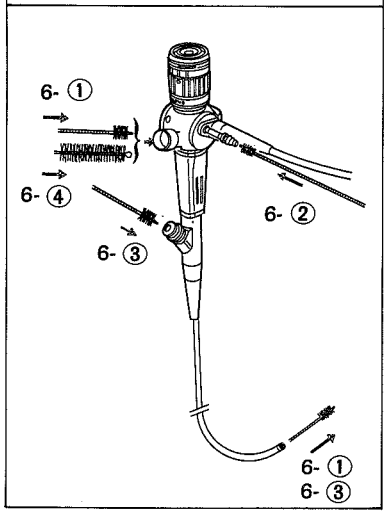


If continuous bubbling is observed from a given area, this indicates a leak.





Thoroughly rinse under an open faucet.



5. Immerse entire instrument in cleaning solution. Scrub all external surfaces. Remove instrument, place in clean water and rinse.
6. Insert channel cleaning brush and channel-opening cleaning brush through channels to brush the entire suction line.

① Pass Channel Cleaning Brush through suction plunger opening until the brush extends from the distal end of the instrument. Brush channel several times.

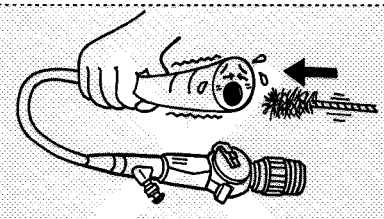
② Pass the Channel Cleaning Brush directly into the suction connector until the brush extends toward the channel post. Brush channel several times.

③ Pass the channel cleaning brush through biopsy port until the brush extends from the distal end of the instrument. Brush the branch part and the insertion tube of the channel several times.

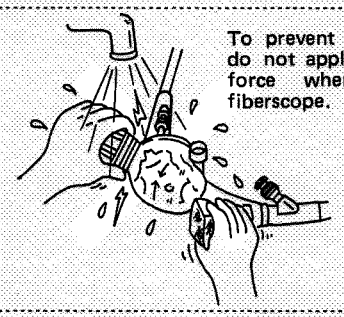
④ Insert Channel-Opening Cleaning Brush into suction plunger opening until it stops. Brush several times.

☆ **Use only the cleaning brushes supplied with the instrument.**

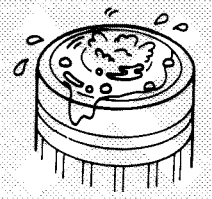
7. Wash and rinse suction valve and semi-disposable biopsy valve.
   ☆ **For details, refer to ▩ and ▩ , page 25.**
8. Connect suction line and alternately suction water and air several times by covering the suction plunger opening and the biopsy port by your finger. Continue to aspirate air for approximately 10 seconds until moisture has been expelled and channel is dry.
   ☆ **Failure to cover completely the suction plunger opening and the biopsy port will make unable to aspirate or insufficient suction. Always cover the biopsy port or install the biopsy valve to aspirate.**
9. Dry all external surfaces of the instrument.
   - Using a cotton-tipped applicator, dry electrical contacts, distal end and eyepiece.
   - Wash, Rinse and Dry all cleaning equipment.



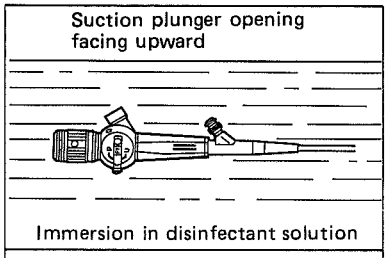
Do not attempt to pass channel cleaning brush in reverse direction: it may get caught, making retrieval impossible.



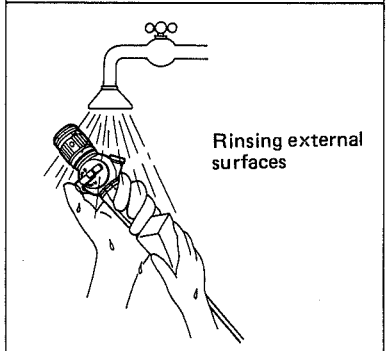
To prevent water leak, do not apply excessive force when washing fiberscope.



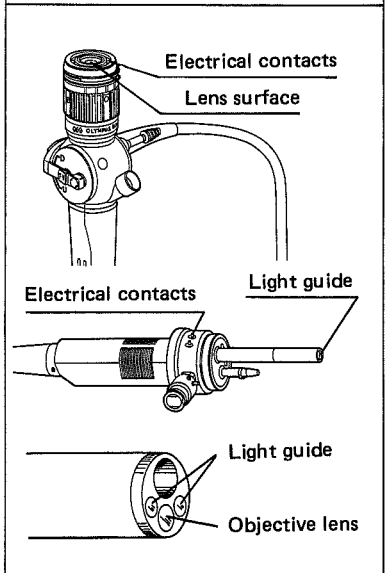
Wet electrical contacts cause faulty exposure.



Immersion in disinfectant solution



Rinsing external surfaces



Thoroughly wipe above areas dry.

DISINFECTION

OES fiberscopes (identified by a blue ring around the eyepiece) have been designed to withstand complete immersion in disinfectant solutions. Prior to immersion, the following points must be noted:

- **The fiberscope must be physically clean as outlined steps 1 through 9 of the Cleaning Pro-**
- **The disinfectant solutions listed on page 16 of this manual have been tested by Olympus and found to have no adverse effects on the instrument when used in accordance with the disinfectant manufacturer's label instructions.**
- **Remove suction valve and place in disinfectant solution.**

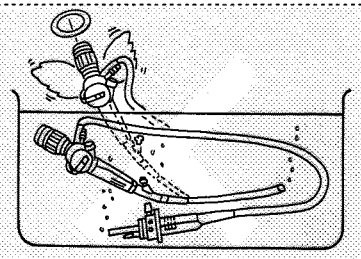
1. Immerse fiberscope in disinfectant solution and pump disinfectant solution through channels using syringe.
   - Immerse the fiberscope with suction plunger opening facing upward.
   - Attach syringe to suction connector. Cover suction plunger opening and withdraw the plunger until syringe fills with disinfectant solution.
   - Depress plunger forcing solution through the channels until air has been expelled and solution comes out of the channel outlet at the distal end of the insertion tube as well as out of the suction connector on the control section.
2. Allow instrument to remain in disinfectant solution for Recommended Period of Time.
3. Following disinfection, remove the instrument from disinfectant solution and suction clean water until channel is thoroughly rinsed, by covering the suction plunger opening.
4. Thoroughly rinse outside of the fiberscope. Remove fiberscope from water and place on a clean, dry surface.
5. Suction air until moisture has been expelled and channel is dry.
6. Wipe dry outside surface of the instrument.
   - Using a cotton-tipped applicator, dry the electrical contacts, distal end and eyepiece.
   - Replace suction valve which has been previously disinfected, rinsed and dried.

Cold sterilization

If absolutely necessary, the fiberscope may be left in glutaraldehyde solution for a maximum of 10 hours to achieve "Cold Sterilization". NEVER EXCEED 10 HOURS MAXIMUM. After four (4) such extended immersions, the instrument MUST be aerated to reduce the level of internal humidity. (ETO cap must be attached during aeration.)

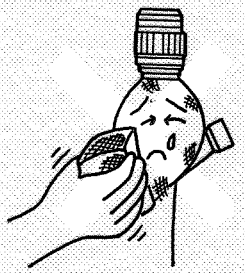
Aeration conditions:

Temperature	50°C (122°F)
Time	15 hours

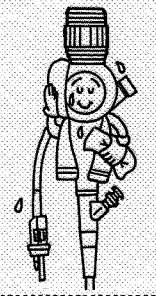


Do not exceed recommended period of time.

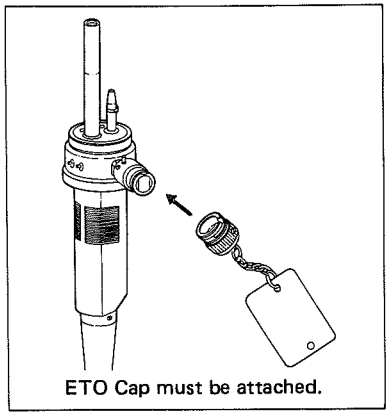
Thoroughly remove toxic residual disinfectant solution.



Do not use hard or abrasive scrub brush.



After rinsing, thoroughly wipe dry.



ETO Cap must be attached.

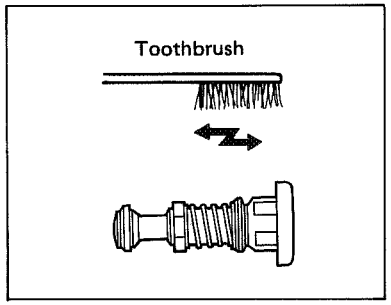
ETO GAS STERILIZATION

OES fiberscopes have been designed to withstand Ethylene Oxide Gas Sterilization provided the following conditions are met prior to sterilization.

- The fiberscope must be physically clean and thoroughly dried as outlined in steps 1 through 9 in the Cleaning Procedure.
- Suction valve and Semi-disposable biopsy valve must be removed from the fiberscope prior to sterilization.
- ETO Cap MUST be securely attached to the venting connector on the light guide connector and must remain in place throughout the sterilization and aeration process. To attach the ETO Cap, place cap over the connector, aligning the pin on the connector with the keyway on the cap; depress and rotate cap clockwise (approximately 90°) until no further rotation is possible. To remove, depress cap and rotate counterclockwise.

  Sterilization and aeration must be performed under the conditions described in Section 6–2, 3 of this manual.

  To insure that sterilization has been accomplished, always use a biological indicator and follow the manufacturer's instructions for the particular gas sterilizer being used.



3 Cleaning/Disinfecting the Suction Valve

① Wash the suction valve in cleaning solution, using the toothbrush.

★ **If there are soils on the spring, the malfunction may occur. Clean the spring with a special care.**

② Thoroughly rinse under running water.

③ After immersion in disinfectant solution for the Recommended Period of Time, thoroughly rinse each item.

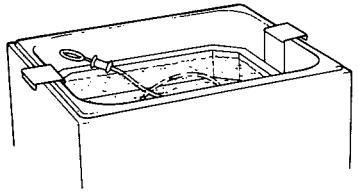
★ **All toxic residue must be removed.**

④ Shake water drops off the suction valve main body and remove moisture with a piece of gauze.

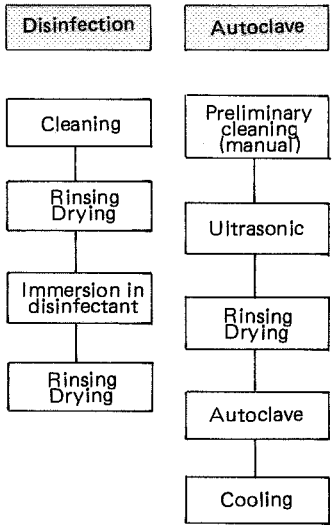
★ **As with the biopsy forceps, the suction valve can be autoclaved.**

4 Cleaning/Disinfecting the Semi-disposable Biopsy Valve

To clean/disinfect the semi-disposable biopsy valve, refer to the steps in 3 "Cleaning/Disinfecting the Suction Valve".



Ultrasonic cleaning (over 40 kHz, 5 minutes min.)



5 Cleaning/Disinfecting/Sterilizing the Biopsy Forceps and Brush Cytology

① Manual Cleaning

Thoroughly wash the accessories in cleaning solution using a soft brush to remove all debris. Particular care should be taken to remove all blood and secretions from difficult to clean areas such as the biopsy cups. After a thorough rinsing, wipe off all moisture. (Remove brush wire from cytology brush sheath and discard the wire.)

★ **Do not kink or sharply bend the forceps shaft and brush sheath.**

② Ultrasonic Cleaning

The use of an ultrasonic cleaner is desirable to aid in the removal of particulate matter. Ultrasonic cleaning is mandatory if the biopsy forceps are to be autoclaved.

- Clean the biopsy forceps immediately after use.
- Immerse in an ultrasonic cleaner with 40 kHz or higher output for a minimum of 5 minutes.
- Use only tap water in the ultrasonic cleaner. Some surfactants and other agent may cause the forceps to operate sluggishly.

③ Disinfecton

- Prior to disinfection or sterilization, the accessories must be meticulously cleaned.
- Immerse in disinfectant solution for recommended time.
- Rinse thoroughly and dry.
- Lubricate cups with a medical grade silicone lubricant.

④ ETO Gas Sterilization

- Prior to ETO gas sterilization, the accessories must be meticulously cleaned and thoroughly dried. Accessories with plastic parts must be aerated following ETO gas sterilization.
- Lubricate forceps cups with medical grade silicone lubricant.

★ **Always use a biological indicator and follow the manufacturer's instructions for the particular gas sterilizer being used.**

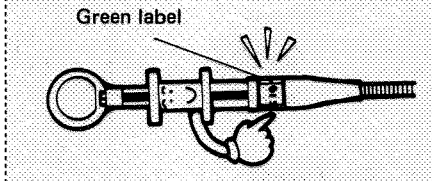
⑤ Autoclave

- Prior to steam autoclavingg, the biopsy forceps must be mechanically cleaned and have undergone a minimum of 5 minutes of ultrasonic cleaning.
- Autoclave under the following conditions:

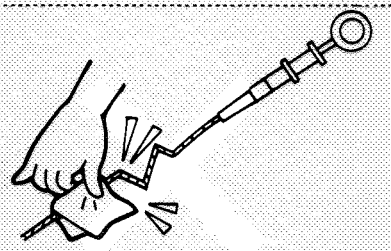
Temperature:	132°C (270°F)	or	Temperature:	121°C (250°F)
Pressure:	2 atmospheres		Pressure:	1 atmosphere
Time:	5 minutes		Time:	20 minutes

- Lubricate forceps cups with a medical grade silicone lubricant.

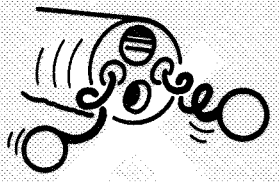
★ **Only those accessories identified by a green color or marked "AUTOCLAVE" may be autoclaved. (Cytology brush sheath may not be autoclaved.)**



Only those accessories identified by a green color or marked "AUTOCLAVE" may be autoclaved.

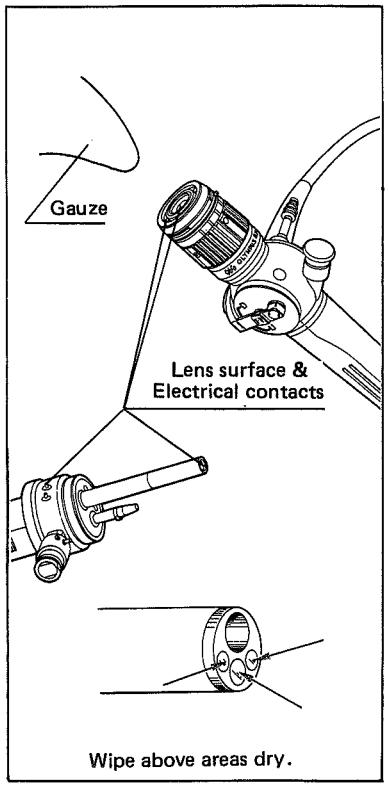


Do not apply excessive force.



Never autoclave or boil the fiberscope, nor use ultrasonic cleaner with it.

6-4 Storage



Wipe above areas dry.

1 Care for Storage

① The fiberscope must be dried thoroughly prior to storing. Take special care to dry the distal tip, all lenses, and electrical contacts.

② The storage location must be clean, dry, well ventilated and maintained at a normal temperature. Avoid direct sunlight (ultraviolet ray), ozone, high temperature, high humidity and X-ray exposure.

③ The fiberscope should be stored with the insertion tube as straight as possible. Release the angulation control lock. If it must be coiled for storage, do not coil insertion tube tighter than its condition when in the instrument carrying case.

④ Do not use the carrying case for storage. The carrying case is designed for shipping purpose only. Routine storage of the fiberscope in a himid, dark, non-ventilated environment, such as the carrying case, may cause problems with infection control. Accessories must also be dried thoroughly before storage. Do not coil tightly.

2 Fiberscope Repair

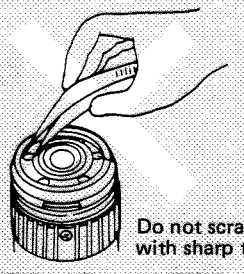
① Should the fiberscope require repair, it should be shipped to the nearest Olympus service center in its original carrying case, along with a description of the instrument malfunction or damage. Include the name and telephone number of the individual most familiar with the instrument problem and a repair purchase order.

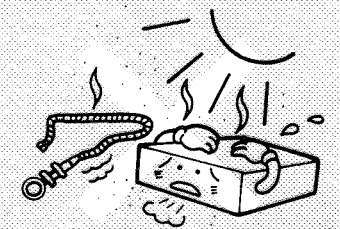
★ Attach the ETO cap (venting cap) to the venting connector.

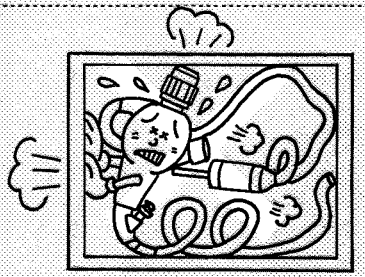
② Minor problems with the operation of the fiberscope may be correctable by the endoscopist or assistant. Refer to Section 9 TROUBLESHOOTING GUIDE.
All other repairs should be made only an authorized Olympus service center. In no event will Olympus be liable for any injury or damage due to repairs performed by non-Olympus personnel.

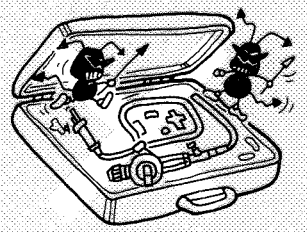
NOTICE

For the purpose of infection control, and for the safety of all those who will handle the equipment, before returning any instrument to Olympus, the instrument must be thoroughly cleaned and subjected to a high-level disinfecton procedure.


Do not scratch electrical contacts with sharp tools.

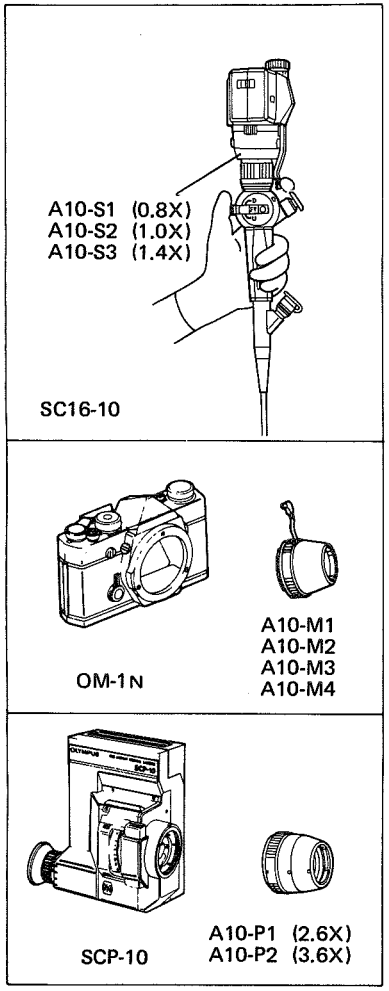

Direct sunlight, dust, high humidity and high temperature will damage instruments.


Do not sharply bend.


Do not store in the carrying case.

7 ENDOSCOPIC PHOTODOCUMENTATION

7-1 Still Photography



For instructions on loading and operating the camera and the light source, refer to instruciton manuals provided with each piece of equipment.

1 Camera Adapters

Camera	Light Source			
	Xenon or Halogen with Flash		Halogen	
	(OES) CLV-F10, CLV-10, CLE-F10	(Non-OES)* CLX-F, CLS-F, CLV, CLE-F	(OES) CLE-10	(Non-OES)* CLE-4E/4U, CLE-3
SC16-10	A10-S1 (reduced image: 0.8X), A10-S2 (standard image: 1.0X), A20-S3 (enlarged image: 1.4X)			
SC16-4	Not required.			
OM-1N	A10-M1 (0.8X), A10-M2 (1.0X) A10-M3 (1.4X), A10-M4 (2.0X)		A10-M1 (0.8X) A10-M2 (1.0X)	
SCP-10	A10-P1 (2.6X), A10-P2 (3.6X)		A10-P1 (2.6X)	
EC-3	A10-E3			

2 Light Source Setting (STILL exposure switch: AUTO)

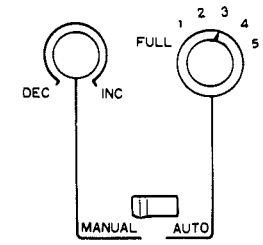
SC16-10	ADJUST (→±←) 0	Index: 3	ADJUST (→±←) 0	Index: 4
	Film: 1610-D		Film: 1610-T	
SC16-4	INDEX (→▼←) 3	Index: 3	INDEX (→▼←) 4	Index: 4
	Film: 1604-D		Film: 1604-T	
OM-1N	INDEX (→▼←) 3	Index: 3	INDEX (→▼←) 4	Index: 4
	Film: ISO 200 Daylight		Film: ISO 160 Tungsten	
SCP-10	INDEX (→▼←) 3	Index: 3		
	Film: Polaroid 779			
EC-3	INDEX (→▼←) 1	Index: 1		
	Film: Polaroid 779			

*AC10-L light source adapter must be mounted on the output socket.

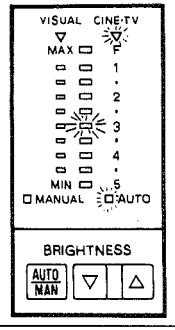
★ **Exposure index numbers are the standard setting. Adjust index depending on conditions.**

★ **OM-1N: Shutter speed (1/4 sec.), sync contact ("X"; however, "FP" with CLE-F, -F10), meter switch ("OFF").**
SCP-10, EC-3: Shutter speed (1/4 sec.), sync contact ("X").

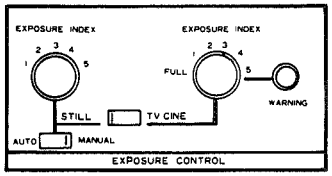
7-2 CCTV



CLV



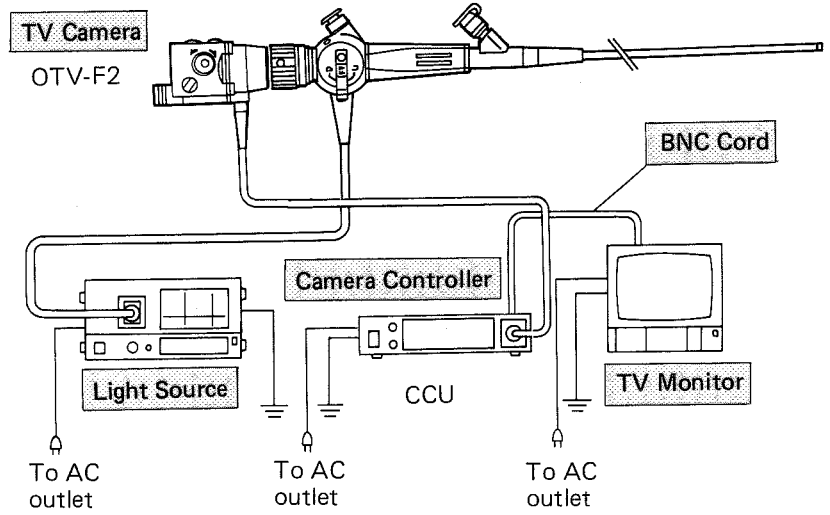
CLV-F10, -10



CLX-F

Refer to the instruction manuals provided with light source and OTV-F2 Medical TV System.

1 Connections



2 Light Source Setting

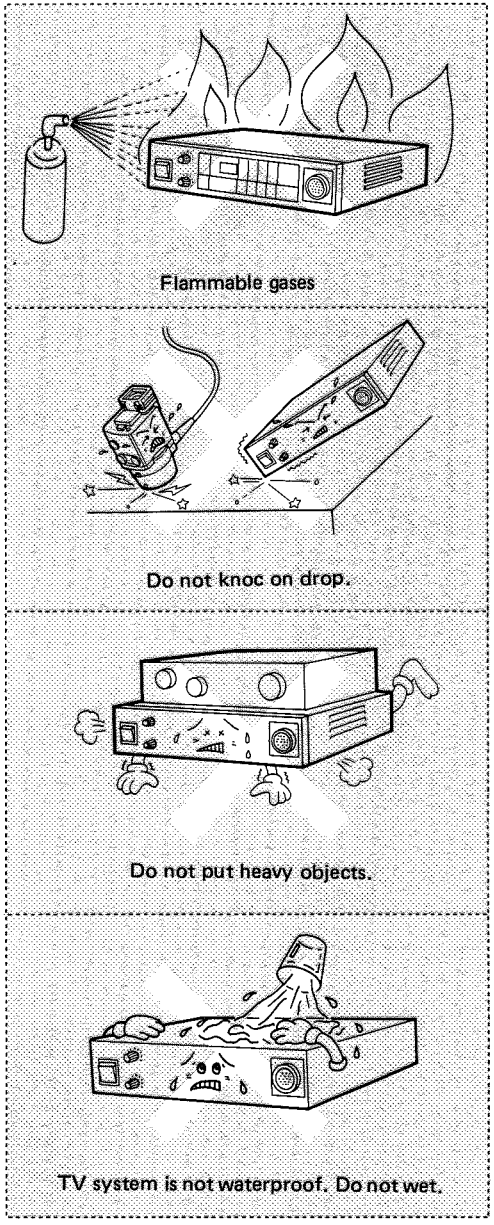
The light intensity for the OTV-F2 TV System can be adjusted automatically when using the OTV-F2 with one of those light sources as follows: CLV-10, CLV-F10, CLV or CLX-F.

Light Soruce	Exposure Control	When the sensitivity on OTV-F2 is in AGC,	When the sensitivity on OTV-F2 is in NORMAL,
CLV-10 CLV-F10	or AUTO	CINE • TV Index/Exposure Index should be set to;	
CLV	AUTO	3	4
CLX-F	TV • CINE		

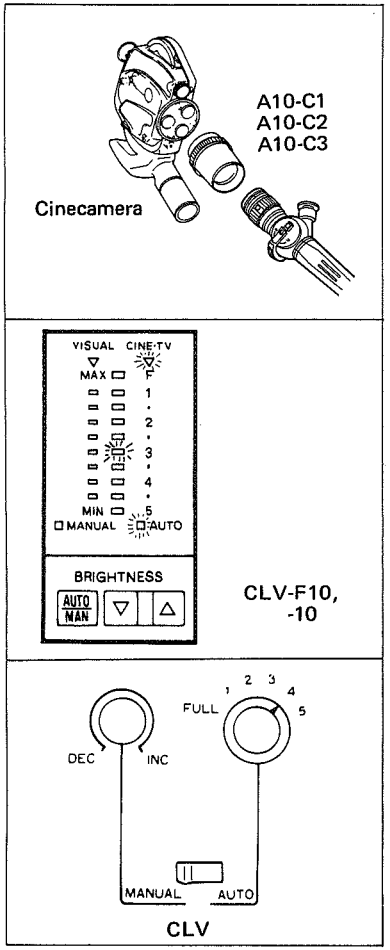
The table above shows CINE • TV Index/Exposure Index when measuring the light intensity for the OTV-F2 in PEAK. When measuring it in APL, decrease the CINE • TV Index/Exposure Index by 1 point (for example 3 to 4).

*Exposure index numbers are the standard setting. Adjust index depending on conditions.

*Always set the AUTO/MANUAL Brightness Selector on the light source to MANUAL or STILL before disconnecting the TV camera from the scope.



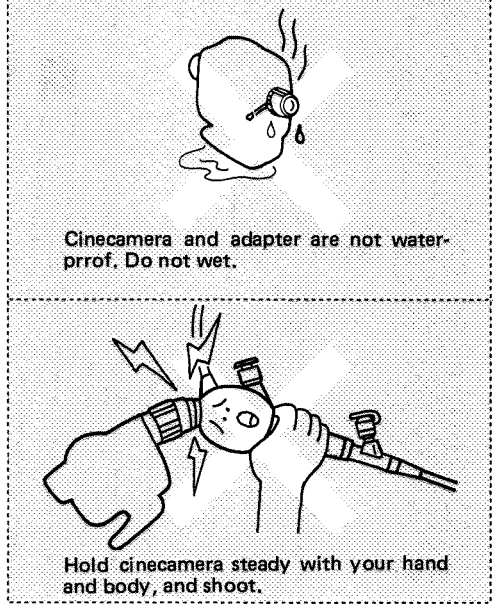
7-3 Cinematography



Refer to the instruction manuals provided with your light source and cinecamera.

		Light Source			
Camera	Adapter	CLV-F10, CLV-10	CLX-F (CLV)	Filming speed	Film
C-mount type	A10-C1, C2, C3	CINE • TV ( ) Exposure Index: 3	Switch: TV • CINE (AUTO) Exposure Index: 4	24 fps	Daylight ISO/ASA 160 Development: 2X push

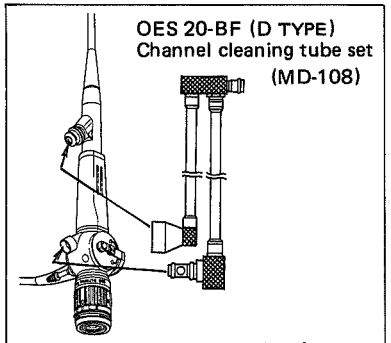
*Index "3" or "4" is standard setting. Adjust index depending on conditions.
*Make sure A10-C2 adapter is securely mounted to the camera.



Cautions before disconnecting the TV- or cine-camera

To prevent thermal mucosal damage as well as to protect your eye, set the brightness control (AUTO/MANUAL brightness selector or • or TV • CINE switch) of the light source to MANUAL (or or STILL) before disconnecting the cine camera or TV camera from the fiberscope, because the light path shutter fully opens (providing maximum brightness) as soon as the camera is disconnected.

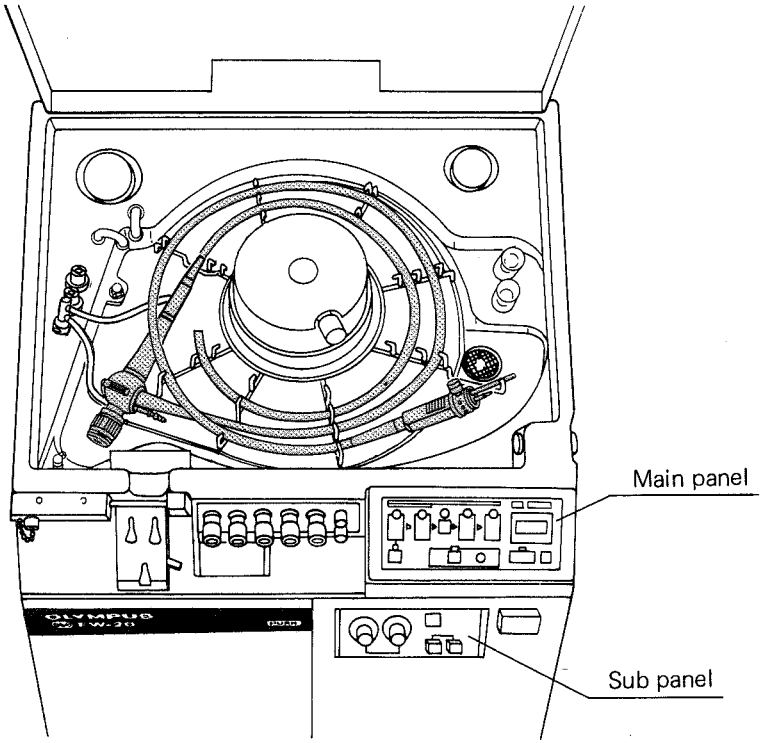
8 AUTOMATIC WASHING·DISINFECTION

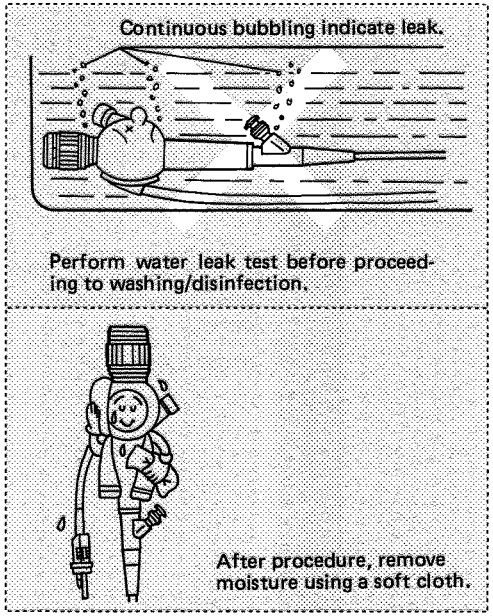


Refer to EW-20 (EW-10) instruction manual for detailed operation.

1 Setup of the Fiberscope

The entire fiberscope is cradled in the tub in the washer.





2 Operation

- Press either detergent switch or disinfectant switch on main panel.
- Adjust wash time selector (and disinfectant time selector) on sub panel. Push START switch.
- At the end of the cycle, the washer stops automatically, the FINISH lamp lights and a buzzer sounds momentarily.

9 TROUBLESHOOTING GUIDE

	Symptom	Possible Problem	Remedy
Connection to Light Source	Fiberscope cannot be connected to light source.	(With OES ligt source) Output socket ring set incorrectly.	Rotate output socket ring fully clockwise.
		(With non-OES light source) AC 10-S fiberscope adapter is missing.	Install AC10-S adapter on fiberscope light guide connector.
		AC10-S fiberscope adapter is defective.	Check for bent electrical terminals. Replace it necessary.
		AC10-L light source adapter installed incorrectly.	Reinstall adapter.
	AC10-S fiberscope adapter cannot be removed from output socket.	Failure to release latch. (Non-OES light source)	Depress release button on top of AC10-L adapter.
Image Quality or Brightness	Image is not clear.	Dirty eyepiece lens and/or objective lens.	Clean with cotton swab moistened with alcohol.
		Optics not adjusted to operator's eyesight.	Rotate diopter adjustment ring until fiber pattern is clear. (Applies to fiberscope eyepiece, lecture scope and SC-16 camera.)
		Dirty camera or adapter lens.	Carefully clean with cotton swab moistened with alcohol.
		Internal fluid damage.	Moisture within the instrument will permanently cloud the lenses in the distal end and/or eyepiece. Send the instrument for repair.
	Image is too dark or too bright.	Dirty light guide.	Clean light guide connector and distal tip with gauze moistened with alcohol.
		Improper light source settings.	Adjust brightness control. Check filter.
		Old or improperly installed light source lamp.	Properly install lamp. Replace old lamp.
Suction	Absent or insufficient suction.	Suction channel obstructed.	Remove suction valve and pass cleaning brushes through suction channels.
		Dirty suction valve.	Remove and clean the valve.
		Semi-disposable biopsy valve worn out.	Replace with new valve.
		Suction pump is off or not connected.	Turn on pump and check suction tube connections.
	Sticky suction valve.	Valve is dirty.	Remove and clean the valve.
	Fluid leaks from biopsy valve.	Semi-disposable biopsy valve worn out.	Replace with new valve.
Angulation	Resistance when rotating angulation control lever.	Angulation lock engaged.	Place lock in "Free" position.
		Internal problem.	Send instrument for repair.
	Tip deflection is not normal.	Amount of tip deflection is less than specifications.	Send instrument for repair.

	Symptom	Possible Problem	Remedy
Illumination	No light output.	Light source not operating.	Turn on power switch. Check fuses and circuit breakers. Depress ignition switch (if applicable). Replace burned out lamp.
Endo-therapy Product	Cytology brush does not pass through channel smoothly.	Brush shaft is bent or kinked.	Discard and replace with new brush. When inserting the brushes, use repeated short strokes, grasping flexible shaft close to suction valve.
		Instrument channel is obstructed.	Pass cleaning brushes through instrument channel. If unable, send instrument for repair.
	Endo-therapy product cannot be inserted.	Endo-therapy product is too large for instrument channel.	Check Endo-therapy product chart. Use only recommended endo-therapy products.
	Cytology brush does not operate smoothly.	Flexible shaft is bent or kinked.	Discard and replace with new brush.
Photography	Camera cannot be attached to fiberscope.	Auto focus pin on fiberscope eyepiece is out of proper position.	Use a pencil eraser or similar object to move pin fully counterclockwise, aligning the mark on the pin with the yellow dot on the eyepiece.
	LED indicator on camera adapter fails to light.	Dirty or bent electrical contacts on camera adapter, eyepiece and light source connector.	Clean all contacts with cotton swab moistened with alcohol.
	Camera fails to activate light source.	Dirty or bent electrical contacts in adapter, eyepiece, and light guide connector.	Clean all contacts with cotton swab moistened with alcohol.
	SC-16 camera fails to operate.	Dirty contacts.	(See above.)
		Open circuit breaker.	Reset circuit breaker on rear panel of light source. (Refer to light source instruction manual.)
	Improper exposure.	Dirty contacts.	Clean all contacts with cotton swab moistened with alcohol.
		Improper exposure index setting.	Refer to page 29 for proper light source setting.
		Improper filter setting.	Adjust filter.
		"Still/TV-Cine" switch not set for still photography.	"Still/TV-Cine" switch (on CLX-F light source must be in "STILL" position for photography.
	Blurred image.	Dirty lenses.	Clean objective lens, eyepiece lens and adapter lens with cotton swab moistened with alcohol.
	Improper color.	Improper film.	Use daylight balanced film with Xenon light source. Use tungsten balanced film with Halogen light sources.
		Outdated film.	Always use fresh film.

10 ENDOSCOPIC SYSTEM CHART

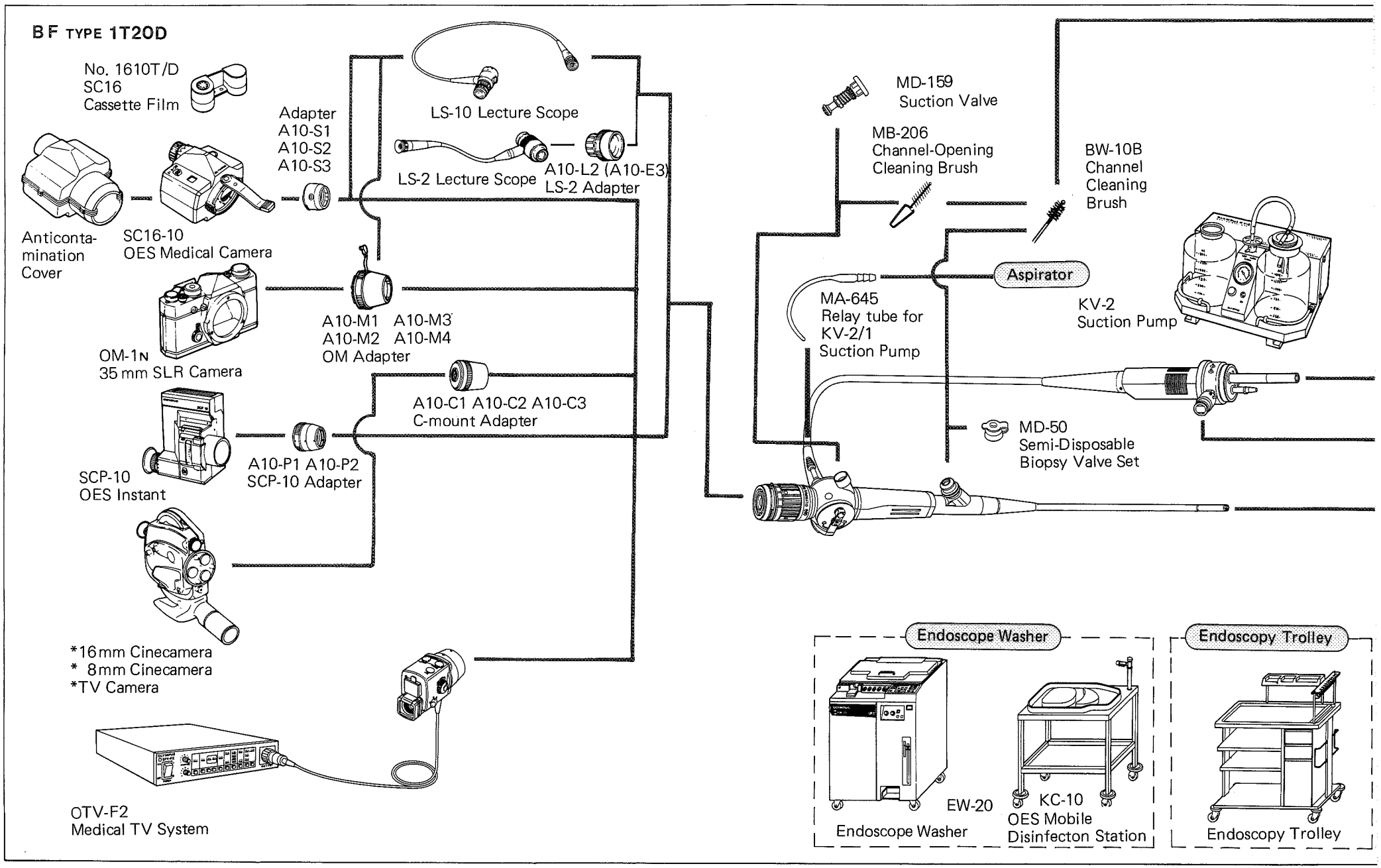
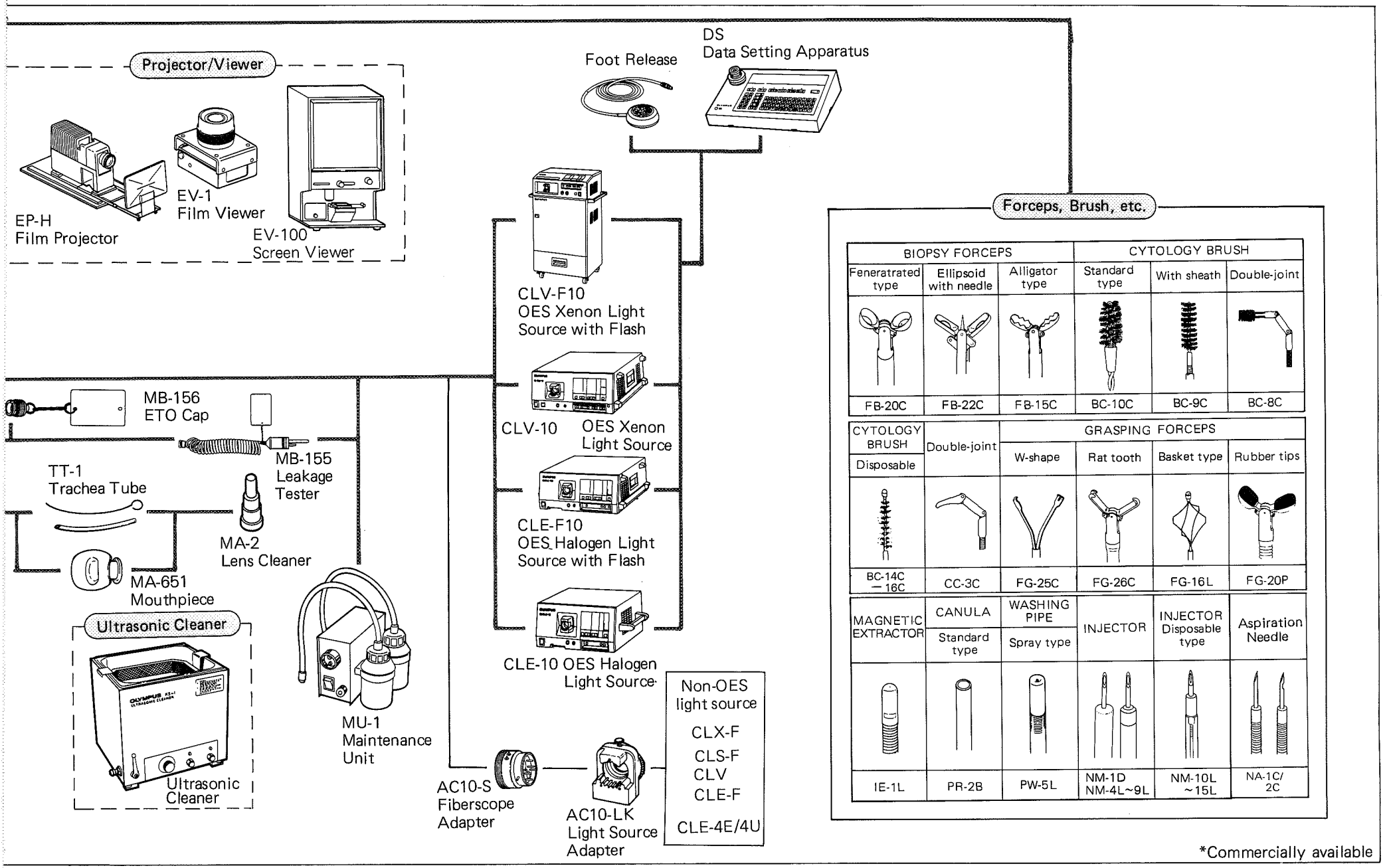


Chart below indicates ancillary equipment compatible with the BF-1T20D. Use of other equipment is not recommended.



*Commercially available

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As we are continually improving and developing our products, the equipment supplied may not agree in all details with the descriptions and/or illustrations shown in the instructions.

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