TK-VETKIT

# User Manual

**Multifunctional Veterinary Endoscope**

**GU Series**



**TK VETKIT CO., LTD**

TK-VETKIT

# TK VETKIT CO., LTD

## *Product Information*

- Product Model : GU Series
- Product Name : Multifunctional Veterinary Endoscope
- Date of Manufacture : See the product label
- Manufacturer : TK VETKIT CO., LTD
- Manufacturer Address : 3/F, Building 1, No. 199 Shuian First Road, Xiangzhou District, Zhuhai, Guangdong, China
- After-sales Service Unit : TK VETKIT CO., LTD

## *Release Information*

The version number of the user manual may be upgraded at any time without notice due to changes in software or technical specifications. Version of the User Manual:

- Version No.: A 1.0



## *Statement*

The manufacturer owns the copyright of this non-publicly published manual and has the right to treat it as confidential information. The user manual is intended only as a reference for the operation, maintenance and repair of the product and no other person has the right to disclose it to others.



The contents of this product manual are subject to change without notice.

## *Manufacturer's Responsibilities*

The manufacturer will assume responsibilities for the safety, reliability and performance of the product if all of the following conditions are met:

- The installation, maintenance or upgrade of the product is carried out by personnel authorized or approved by the manufacturer.
- The storage environment, operating environment, and electrical environment of the product are in accordance with the product specifications.
- The product is used in accordance with the User Manual.

## *Summary of the User Manual*

### ◆*Main structure*

This product is mainly composed of a multifunctional veterinary endoscope and accessories.

### ◆*Scope of application*

Regarding the scope of application of multifunctional animal endoscope in examination and treatment, if a statutory standard is established by a veterinary administrative agency or other statutory body, the standard will be followed. The nature, purpose, efficacy, and possible risks (nature, extent, and probability) of the examination and treatment shall be fully considered before start.

### ◆*Precautions, warnings and suggestive notes*

1) The product does not contain parts that can be maintained by the user, and the internal maintenance of the device must be carried out by the technical maintenance personnel authorized by the manufacturer.

2) The product is not a medical device for human use and shall not be used for medical activities on human.

3) The device used with The product must be disconnected before cleaning.

4) Strictly follow the Manufacturer's instructions for use of the product.

5) This product is only used in conjunction with the endoscope and related accessories of our

company. Please refer to the instructions for specific operation and installation requirements.

## *About the User Manual*

The user manual describes in detail the use, functionality and operation method of the product. Before using the product, please read the user manual carefully and understand the contents to ensure that the product can be used correctly and to ensure the safety of animals and users.

The user manual describes the product in its most complete configuration, so some of the contents may not apply to the product you have purchased. If you have any questions, please contact us.

Please keep this manual near the product so that it can be easily and promptly accessed when needed.

The user manual is suitable for professional animal clinical staff with knowledge and working experience in the medical procedures, practices and terminology necessary for endoscope.

All illustrations provided in the manual are for reference only and the settings or data in the illustrations may not exactly match the actual display you see on the product.

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## *Symbols Description*

The symbols that appear on the back cover of the package, the manual, or in the product are described as follows:

Keep dry

Fragile, handle with care

This side up


Stacking limit by 5

Warning

Consult operating instructions

Refer to instruction manual/booklet

# *Key Points (Instructions before Use)*

## *Structural composition*

This product is mainly composed of a multifunctional veterinary endoscope and accessories.

## *Intended use*

The product is used in conjunction with the cold light source of veterinary endoscope and the image processor of veterinary endoscope manufactured by our company, to provide images for the observation, diagnosis, photography and treatment of upper digestive tract, throat and nasal cavity, and the observation, diagnosis and photography of oral cavity after oral or nasal insertion.

## *Operating Manual*

The User Manual contains basic information on the safe and effective use of this product. Be sure to read the User Manual, as well as the manuals for other devices, carefully before use, and follow the instructions.

Keep all relevant instruction manuals in a safe and easily accessible place. If you have any questions or comments about the contents of this manual, please contact our company.

This manual is described according to the top configuration of the product. The functional configuration of the product is subject to the actual.

## *User Qualification*

The operator of this product must be a veterinarian with the qualification as a veterinary practitioner as specified by the Ministry of Agriculture of the People’s Republic of China, or a veterinarian designated by the director of the department in which it is to be used who is able to safely perform the prescribed operation in accordance with official regulations, depending on the difficulty of the technique used.

## *Ancillary Instrument*

Refer to “Check of Box Contents” in Chapter I to confirm that this product is compatible with the ancillary instrument you are using. Use of incompatible device may result in animal or operator injury or device damage.

## *Spare Equipment*

Be sure to have spare equipment or equipment with similar functions to avoid accidents when the equipment fails or malfunctions during operation.

## *Maintenance*

The failure rate of the product and its ancillary instruments increases with the number of operations and the cumulative time of use. In addition to inspection prior to each use, the person in charge of maintenance of the veterinary device should inspect the components mentioned in the User Manual on a regular basis. If an abnormality is observed with the endoscope, do not use it and follow the instructions in Section 10.1, “Troubleshooting Guide” for inspection. If the abnormality is still observed after inspection, contact our company.

## *Improper Repair and Modification Prohibited*

The product does not contain any parts that can be maintained by the user themselves. Do not disassemble, modify, or attempt to repair, as this may result in animal injury or equipment damage.

Devices that have been disassembled, repaired or modified by non-authorized technicians are not covered by our warranty and are no longer covered by our warranty in any way.

## *Symbols Description*

The following symbols are used in this User Manual:

**WARNING** Indicates a potential hazard, which, if not avoided, could result in death or serious injury.

**CAUTION** Indicates a potential hazard, which, if not avoided, could result in death or serious injury.

**NOTE** Indicates additional help information.

## *Warnings and Precautions*

Before using this product, strictly observe the following warnings and precautions. These will be supplemented in subsequent chapters.

**WARNING**

- After use, it shall be cleaned, disinfected, sterilized and stored in accordance with the contents of the cleaning, disinfection and sterilization section consistent with this product. Inadequate cleaning, disinfection, sterilization or improper storage may result in cross contamination or infection of animals.
- Do not hit, bump, or drop the distal tip, insertion section, bending section, control section, universal cable, or light source connector section of the endoscope. Otherwise, the endoscope will be damaged, causing injury, burning, bleeding or perforation to animals. Also, it is likely to cause the endoscope parts to fall off into the animal.
- When using theendoscope, please follow the following precautions:
- Do not forcefully or abruptly bend the unit. Do not forcibly pull, twist, or rotate an angled bending section. Otherwise, it may cause injury, bleeding or perforation to animals. It may also cause failure to straighten the bending section during examination
- Do not insert or withdraw the insertion section of the endoscope when the bending section is angled and/or the angulation locking mechanism is locked. Otherwise, it may cause injury, bleeding or perforation to the animal.
- The bending section can be bent up, down, left and right. When inserting or withdrawing the endoscope, the bending direction of the bending section should be considered. Do not apply excessive force when inserting or withdrawing the endoscope. Otherwise, it may cause injury, bleeding or perforation to the animal.

- When it is difficult to insert the endoscope, do not forcibly insert it, and the endoscopy and treatment should be stopped. Forced insertion can cause injury, bleeding or perforation to the animal.

- When a clear image is not obtained or the image is frozen, do not perform suction, bending of control section, inserting or withdrawing of the endoscope, or use accessories, which may cause injury, bleeding, or perforation to the animal.

- When the endoscope light guide connector is removed from the light source, the temperature of the connector is high. Do not touch it to avoid burning the operator or animal.

- When the endoscopic image is not displayed on the monitor, the image processing device should be turned off in time. Failure to do so may cause the distal tip of the endoscope to heat up, causing burns to the operator or the animal.

**CAUTION**

- Electromagnetic interference may occur when this product is used near the devices marked with the following symbols or handheld or mobile RF (radio frequency) communication devices (such as mobile phones). In the event of electromagnetic interference, necessary mitigation measures such as reorienting, positioning, or shielding the space in which this device is used may be taken.

- Make sure that the instrument is not adjacent to or stacked with other equipment (components the instrument or system) to avoid electromagnetic interference.

- To check for electromagnetic interference from other devices (other than any of this device or the components that make up this system), observe whether this system works properly in the operating environment.

- Do not allow the winding diameter of the insertion tube to be less than 30cm, as this may result in equipment damage.

- Keep the insertion section and bending section as straight as possible. Do not attempt to bend the insertion section of the endoscope forcibly; otherwise, the endoscope may be damaged.

- Do not collide the distal tip, especially the surface of the objective lens at the distal tip. Otherwise, framing malfunction may be caused.

- Do not twist or bend the bending section by hand, as this may result in damage to the unit.

- Do not squeeze the bending section hard, as this may deform or crack the rubber on it and lead to water leakage of the instrument.
- During examination, do not pull the universal cable; otherwise, the light guide connector will fall off from the light source output socket, resulting in darkened or blurred image of the endoscope.
- When using this product, users shall wear gloves for related operations.
- Water leak test and imaging function inspection should be carried out before each use of this equipment. Otherwise, the endoscope with poor sealing performance or abnormal imaging function may be seriously damaged or injure animals.

## *Examples of Improper Operation*

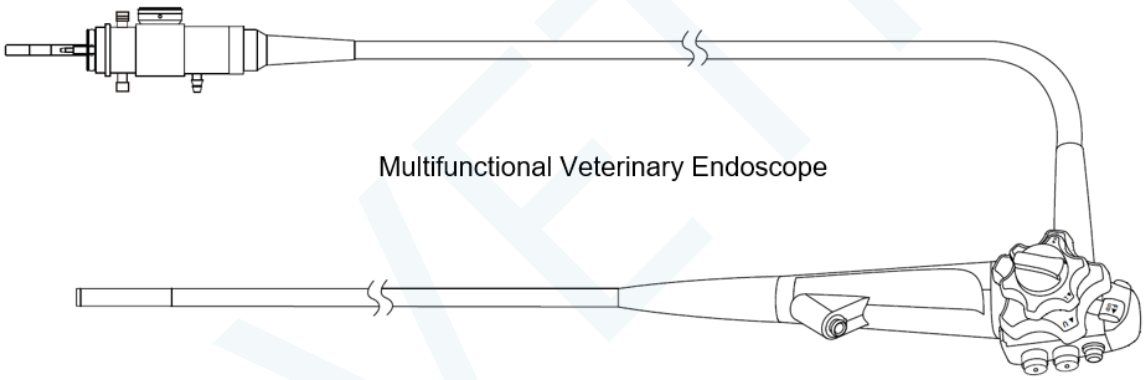
It is the responsibility of a senior expert to teach in detail the clinical techniques of veterinary endoscopy procedure, which must be performed correctly by the veterinarian with reliable medical equipment to ensure animal safety during examination and treatment by the device. The following are some examples of improper operation.

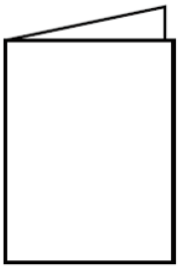
- Bleeding or injury can result from prolonged contact of distal tip with the mucosal surface or from high suction pressure during prolonged suction.
- Overinflating the body cavity may cause pain, injury, bleeding, or perforation to the animal.
- Insertion, withdrawal, and use of accessories in the presence of an unclear FOV of the endoscope can result in injury, bleeding, or perforation to the animal.
- Insertion, withdrawal, and bending of control section in the presence of an unclear FOV of the endoscope can cause injury to the animal.
- This endoscope cannot be used for flip observation of parts other than the stomach. Flip observation in a narrow body cavity may cause the endoscope to be unable to straighten or pull out.

# *Chapter I Check of Box Contents*

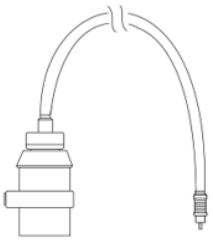
Check the contents in the box against the picture below. Check whether the articles are damaged. If you find any damage to the equipment, missing parts, or if you have any questions, do not use the product and contact us immediately.

The product not been cleaned, disinfected, or sterilized prior to shipment. Before initial use, clean, disinfect, and sterilize the product according to the instructions in Chapter *V* “Cleaning, Disinfection, and Sterilization: General Rules” through Chapter VII, “Cleaning, Disinfection, and Sterilization Procedures”.





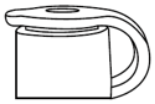
User Manual



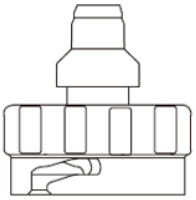
Water bottle

Cleaning brush

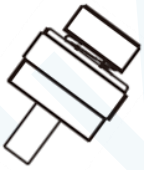
Channel cleaning brush



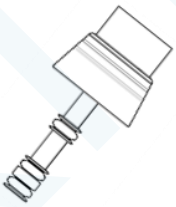
Biopsy valve



Waterproof cap



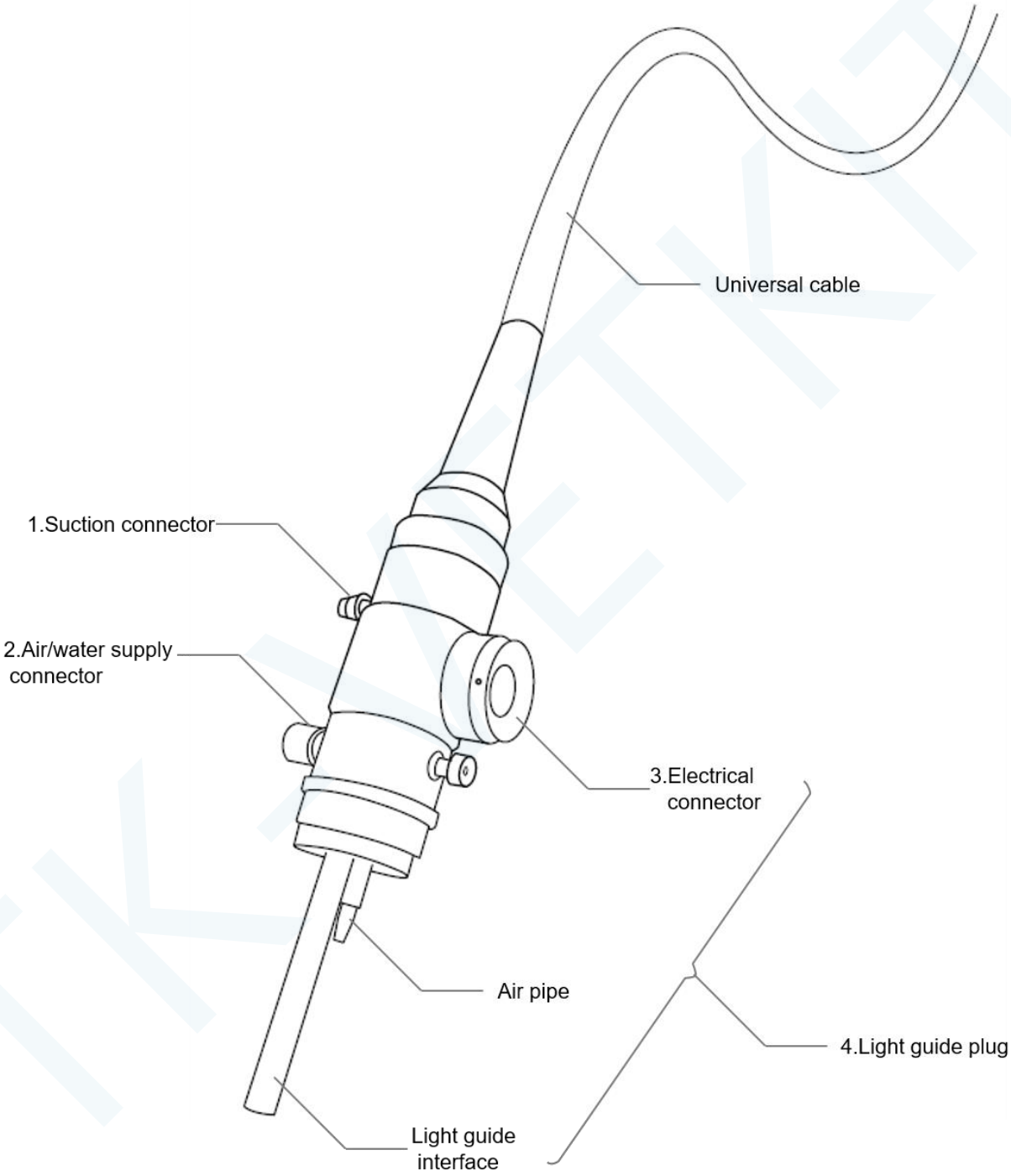
Suction button

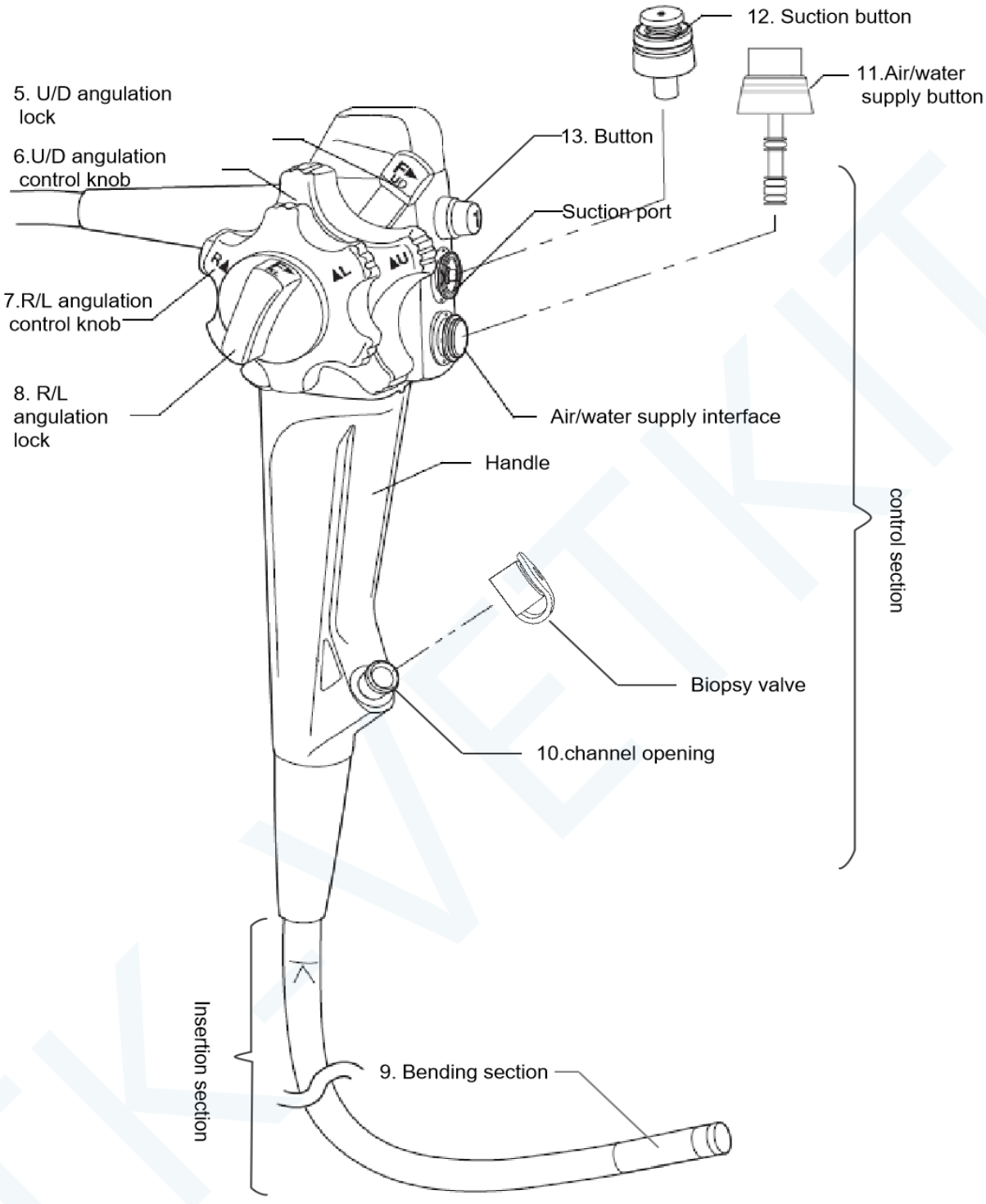


Air/water supply button

# *Chapter II Names and Specifications of Components*

## 2.1 Names of Components




12. Suction button
11.Air/water supply button
5. U/D angulation lock
6.U/D angulation control knob
13. Button
Suction port
7.R/L angulation control knob
8. R/L angulation lock
Air/water supply interface
Handle
control section
Biopsy valve
10.channel opening
Insertion section
9. Bending section

## *2.2 Endoscope functions of components*

### 1. Suction connector

Connect the endoscope to the suction tube of the suction pump.

### 2. Air/water supply connector

The endoscope is connected to the water bottle through the water bottle supply pipe to deliver water to the distal tip of the endoscope.

### 3. Electrical connector

Endoscope and image processing device are connected through endoscope cable.

### 4. Light guide plug

The endoscope is connected to the output socket of a light source to transmit light from the light source to the endoscope.

### 5. U/D angulation lock

When pushed in the direction of “F►”, the U/D angulation is unlocked; when pushed in the opposite direction, the bending section of the endoscope can be locked into the desired position.

### 6. U/D angulation control knob

When rotated in the direction of “▲U”, the bending section bends upward; when rotated in the direction of “D▲”, the bending section bends downward.

### 7. R/L angulation control knob

When rotated in the direction of “R▲”, the bending section bends to the right; when rotated in the direction of “▲L”, the bending section bends to the left.

### 8. R/L angulation lock

When pushed in the direction of “F►”, the R/L angulation is unlocked; when pushed in the

opposite direction, the bending section of the endoscope can be locked into the desired position.

## 9. Bending section

Adjust the position of the distal tip of the endoscope by manipulating the U/D and R/L angulation control knobs.

## 10. Channel opening

The functions are as follows:

— Channel opening for insertion of endoscope accessories.

— Suction channel opening.

— Pincers opening for liquid injection (from syringe through biopsy valve).

## 11. Air/water supply button

Air can be supplied by blocking the central hole, and water can be sent to clean the objective lens by pressing this button. If necessary, air can also be supplied to remove liquid or debris attached to the objective lens.

## 12. Suction button

Press this button for suction. It is used to remove fluid, debris, intestinal gas, or air from the animal body.

## 13. Button

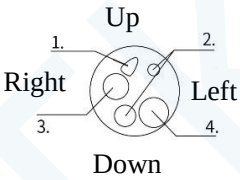
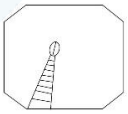
Press the button to freeze the real-time image displayed by the animal image processor, press and hold this button to adjust the white balance of the image displayed by the animal image processor.

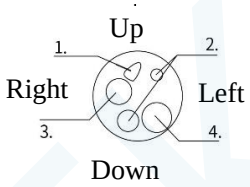
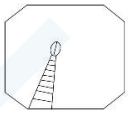
## 2.3 Specifications

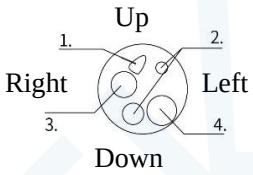
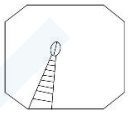
### 2.3.1 Environment conditions

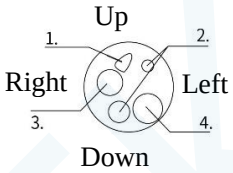
| | | |
|---|---|---|
| Normal operating environment | Ambient temperature: | 10~40°C |
| | Relative humidity: | 20~85% |
| | Atmospheric pressure: | 700~1060hPa |
| Storage and transportation environment | Ambient temperature: | -50~70°C |
| | Relative humidity: | 10~95% |
| | Atmospheric pressure: | 700~1060hPa |

### *2.3.2 Endoscope specifications*

| **Model** | | **GU-160H** |
|---|---|---|
| Optical system | Field of view | 120° |
| | Viewing angle | 0° |
| | Depth of field | 3-100mm |
| Insertion section | Outer diameter of distal tip | φ6.8mm |
| | Enlarged view of distal tip | 1. Air/water nozzle<br>2. Light guides<br>3. Objective lens<br>4. Instrument channel outlet<br>  |
| | Outer diameter of insertion section | φ6.8mm |
| | Effective length | 1500mm |
| Instrument channel | Channel I.D. | φ2.2mm |
| | Minimum viewing distance | Not more than 3mm from the distal tip |
| | Visibility of accessories on endoscopic images |  |
| Air supply amount | | Not less than 800ml/min |
| Bending section | Angle range<br>(-10%, upper limit excluded) | Up 210°/Down 130°<br>Left 100°/Right 100° |

| **Model** | | **GU-180H** |
|---|---|---|
| Optical system | Field of view | 120° |
| | Viewing angle | 0° |
| | Depth of field | 3-100mm |
| Insertion section | Outer diameter of distal tip | φ8.0 mm |
| | Enlarged view of distal tip | 1. Air/water nozzle<br>2. Light guides<br>3. Objective lens<br>4. Instrument channel outlet<br>  |
| | Outer diameter of insertion section | φ8.0 mm |
| | Effective length | 1500mm |
| Instrument channel | Channel I.D. | φ2.2mm |
| | Minimum viewing distance | Not more than 3mm from the distal tip |
| | Visibility of accessories on endoscopic images |  |
| Air supply amount | | Not less than 800ml/min |
| Bending section | Angle range<br>(-10%, upper limit excluded) | Up 210°/Down 130°<br>Left 100°/Right 100° |

| Model | | GU-190H |
|---|---|---|
| Optical system | Field of view | 120° |
| | Viewing angle | 0° |
| | Depth of field | 3-100mm |
| Insertion section | Outer diameter of distal tip | φ9.2 mm |
| | Enlarged view of distal tip | 1. Air/water nozzle<br>2. Light guides<br>3. Objective lens<br>4. Instrument channel outlet<br>  |
| | Outer diameter of insertion section | φ9.2 mm |
| | Effective length | 1500mm |
| Instrument channel | Channel I.D. | φ2.8 mm |
| | Minimum viewing distance | Not more than 3mm from the distal tip |
| | Visibility of accessories on endoscopic images |  |
| Air supply amount | | Not less than 800ml/min |
| Bending section | Angle range<br>(-10%, upper limit excluded) | Up 210°/Down 130°<br>Left 100°/Right 100° |

| Model | | GU-190HL |
|---|---|---|
| Optical system | Field of view | 120° |
| | Viewing angle | 0° |
| | Depth of field | 3-100mm |
| Insertion section | Outer diameter of distal tip | φ9.2 mm |
| | Enlarged view of distal tip | 1. Air/water nozzle<br>2. Light guides<br>3. Objective lens<br>4. Instrument channel outlet<br>  |
| | Outer diameter of insertion section | φ9.2mm |
| | Effective length | 3000mm |
| Instrument channel | Channel I.D. | φ2.8mm |
| | Minimum viewing distance | Not more than 3mm from the distal tip |
| | Visibility of accessories on endoscopic images |  |
| Air supply amount | | Not less than 800ml/min |
| Bending section | Angle range<br>(-10%, upper limit excluded) | Up 210°/Down 130°<br>Left 100°/Right 100° |

# *Chapter III Preparation and Check*

This endoscope must be prepared and inspected in accordance with the following regulations before each use. And other equipment used in conjunction with this instrument must be inspected in accordance with the operating instructions. If any abnormality is found, refer to Chapter X “Troubleshooting” for troubleshooting. If there is still a problem with the equipment, or any doubt about the equipment, do not use it and return it to our company for repair according to the contents of Section 10.3 “Endoscope Return for Repair”.

**WARNING**

- Using an abnormal endoscope can endanger the safety of the animal or operator and lead to increased equipment damage.
- This product is not cleaned, disinfected and sterilized before delivery. Before initial use, clean, disinfect, and sterilize the endoscope as described in the Cleaning, Disinfection, and Sterilization section of the model.

## *3.1 Prepare the equipment*

Before each use, please prepare corollary equipment as shown in Figure 3.1 (to check whether the endoscope is functioning properly) and personal protective equipment (such as goggles, face mask, waterproof suit and chemical gloves). Personal protective equipment should be of appropriate size and long enough to prevent skin exposure. For details on the use of the corollary equipment, please refer to the respective instruction manual.

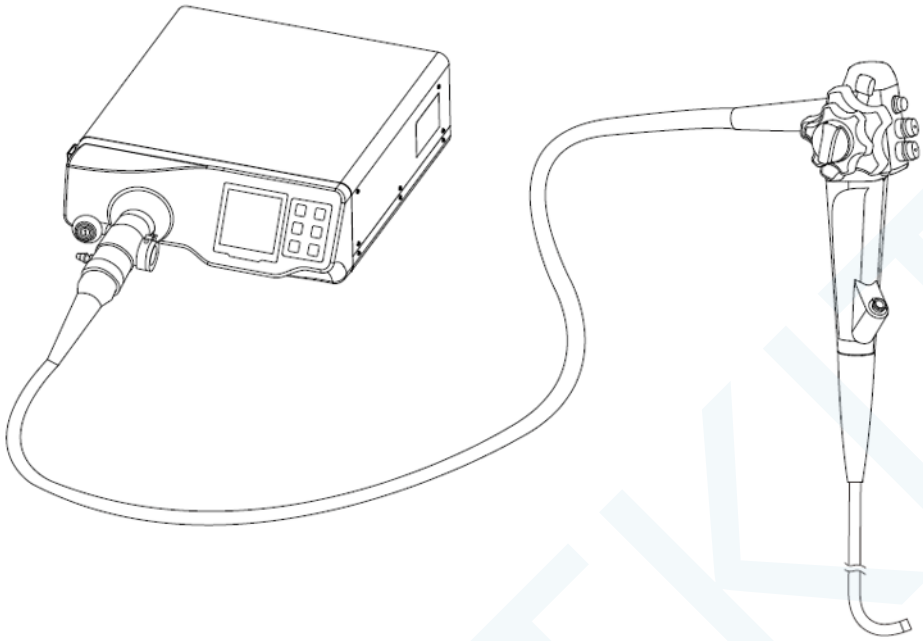


Figure 3.1

## *3.2 Check the endoscope*

Clean and disinfect or sterilize as described in the “Cleaning, Disinfecting and Sterilizing” section. Then remove the waterproof cap from the light guide connector.

### ☐ *Check the endoscope*

1. Check the control section and light guide connector for excessive scratches, deformation, or other abnormalities.
2. Check whether the boot and insertion section for bending, twisting, or other abnormalities.
3. Check for dents, bulges, swells, scratches, holes, slack, deformation, bending, adhesion of foreign bodies, missing parts, protrusions, or other abnormalities on the surface of the bending section, distal tip, and the entire insertion section.
4. Gently stroke the entire surface of the insertion section in both directions (Figure 3.2). Make sure there is no object or inserted wire protruding from the clamp. And make sure the insertion section is not unusually stiff.

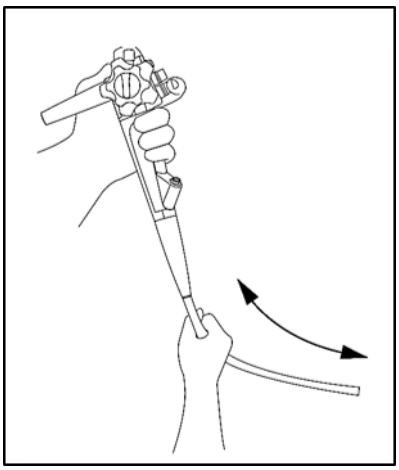


Figure 3.2

5. Bend the endoscope insertion section into a semicircle with both hands, then move your hands in the direction indicated by the arrow (Figure3.3) to confirm that the entire bending section can be smoothly bent into a semicircle with good flexibility.

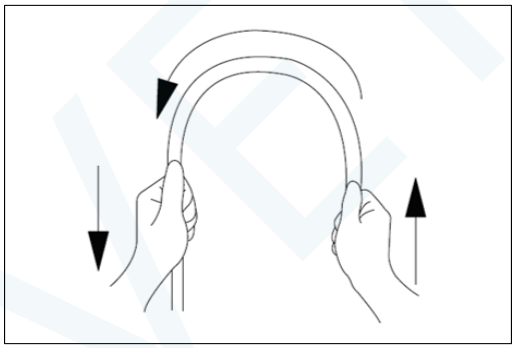


Figure 3.3

6. Hold the middle of the bending section and 20cm from the distal tip with your hand, and gently push and pull to make sure there is no gap between the bending section and the insertion section.
7. Check the objective lens and light guides at the distal tip of the endoscope for scratches, cracks, smudges, or other abnormalities.
8. Check the air/water nozzles at the distal tip of the endoscope for swells, bulges, dents, or other abnormalities.

## ☐ *Check the bending function*

When the bending section is in a straight state, make the following checks.

**WARNING**

- If the U/D angulation lock, the R/L angulation lock and the angulation control knobs do not move smoothly, the bending function may be problematic. In this case, do not use the endoscope, otherwise the bending section may not be straighten during examination.

## ☐ *Check for smooth operation*

1. Check that the U/D and R/L angulation locks are in the “F▶” position, as shown in Figure 3.4 (a).
2. Slowly rotate the U/D and R/L angulation control knobs to head in all directions, then return to natural position. Check that the bending of the bending section is smooth and normal, can reach the maximum size, and return to the natural position, as shown in Figure 3.4 (b) and (c).
3. Slowly rotate the U/D and R/L angulation control knobs to their natural positions as shown in Figure 3.4, and confirm that the bending section can be smoothly restored to a nearly straight state, as shown in Figure 3.4 (d).

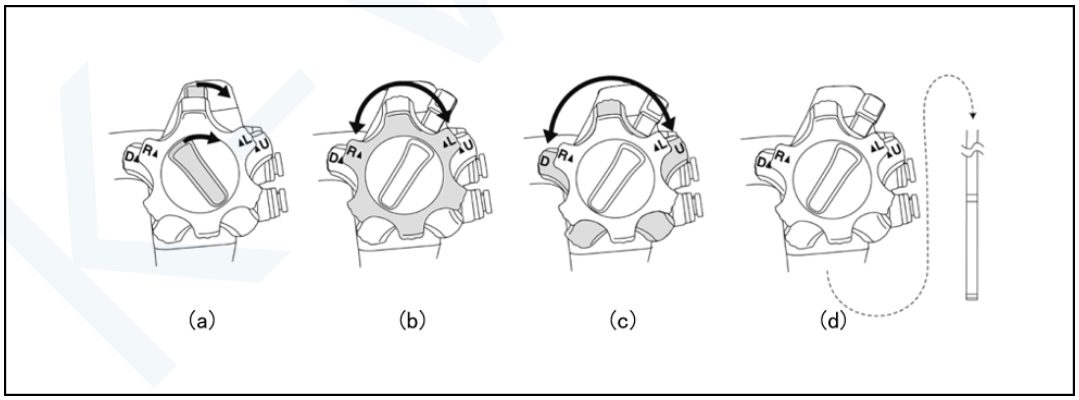



Figure 3.4

## ☐ *Check the U/D angulation adjustment function*

1. Rotate the U/D angulation lock in the opposite direction of the mark “F►”. Rotate the U/D angulation control knob to the end in the direction of “▲U” or “D▲”, as shown in Figure 3.5 (ⅰ), (ⅱ) and (ⅲ).
2. Before releasing the U/D angulation control knob, make sure the angle of the bending section is locked.
3. When the angulation control knob is released and the U/D angulation lock is rotated in the direction of “F►”, confirm that the bending section is in a straight state, as shown in Figure 3.5 (ⅳ).

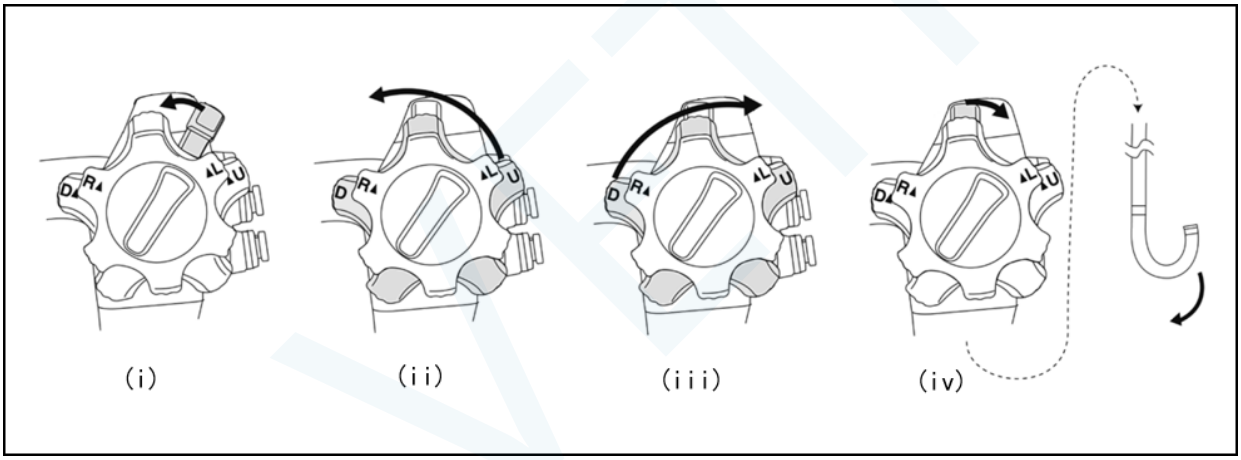



Figure 3.5

## ☐ *Check R/L angulation adjustment function*

1. Rotate the R/L angulation lock in the opposite direction of the mark “F►”. Rotate the R/L angulation control knob to the end in the direction of “R▲” or “▲L”, as shown in Figure 3.6 (1), (2), and (3).
2. Before releasing the R/L angulation control knob, make sure the angle of the bending section is locked.
3. When the angulation control knob is released and the R/L angulation lock is rotated in the direction of “F►”, confirm that the bending section is in the straight state, as shown in Figure 3.6 (4).

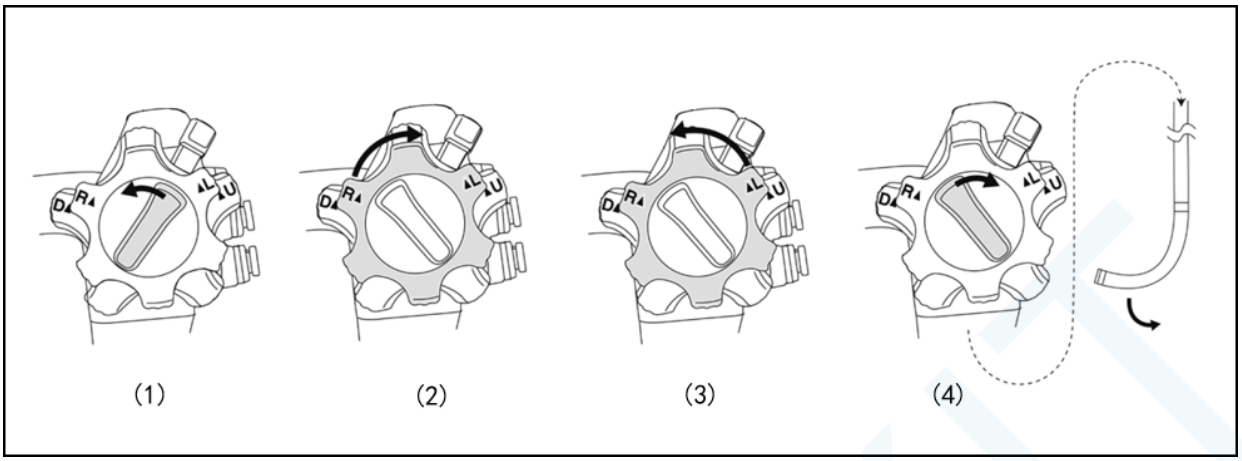



Figure 3.6

## *3.3 Prepare and check accessories*

Clean and disinfect or sterilize the air/water supply button, suction button, and instrument channel opening as described in the “Cleaning, Disinfection and Sterilization” section.

### ☐ *Check the air/water supply button and suction button*

**WARNING**

- Air/water supply button and suction button are consumables. If the button is abnormal, replace it with a new one. Check that the hole in the air/water supply button is not blocked (Figure 3.7). If blocked, air supply will not stop, causing pain, bleeding or perforation to the animal.

1. Check that the holes in the buttons are not blocked (Figures 3.7 and 3.8).
2. Check that the buttons are not deformed or cracked (Figures 3.7 and 3.8).
3. Check air/water supply button gaskets for excessive scratches or cracks (Figure 3.7).

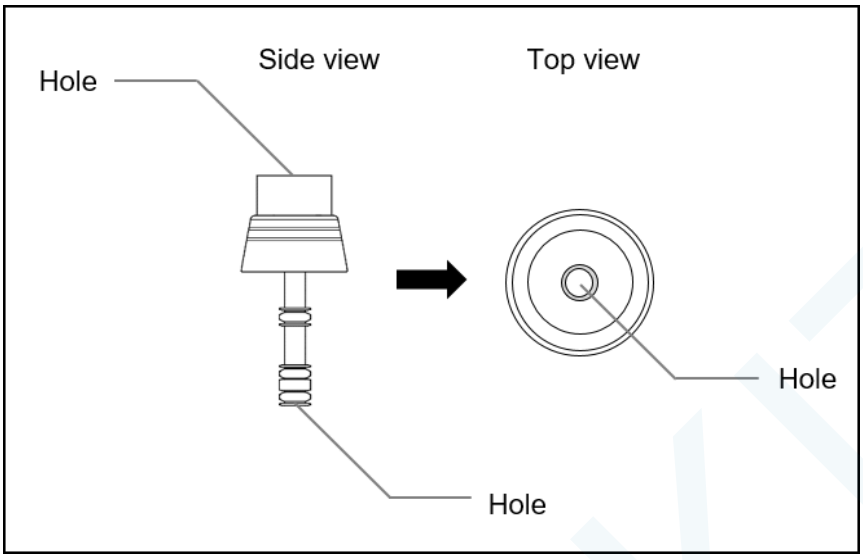



Figure 3.7

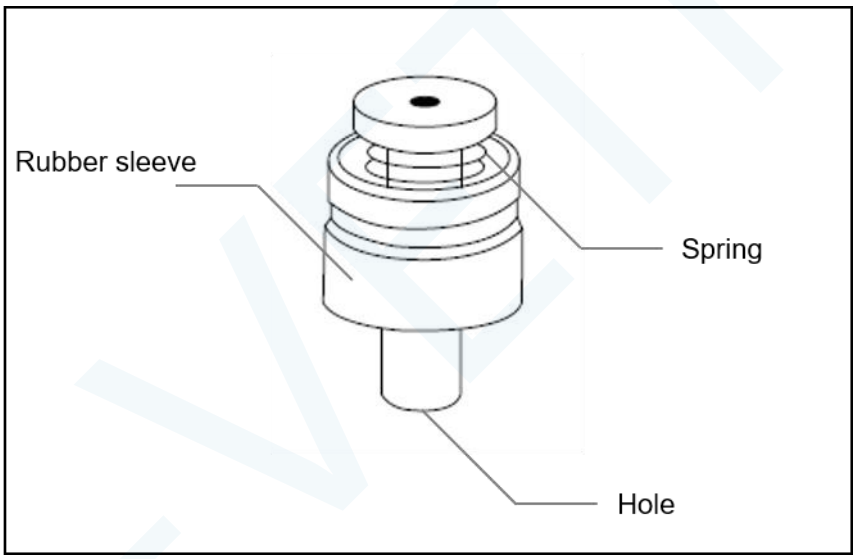



Figure 3.8

## ☐ *Check the biopsy valve*

**WARNING**

- Biopsy valve is a vulnerable part. It should be checked before each use. If abnormalities are found during the following checks, a new biopsy valve should be replaced. An abnormal or damaged biopsy valve can interfere with the suction of the endoscope and can cause animal debris or fluid to leak or spatter, posing an infection risk.

1. Check that there are no cracks, ruptures deformations, or other damage in the seams and hole of the biopsy valve (Figure 3.9).

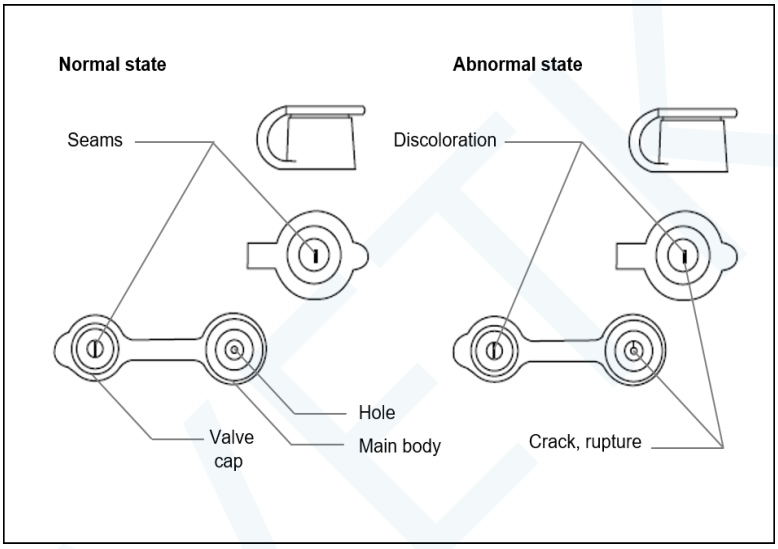



Figure 3.9

2. Put the cap on the body (Figure 3.10).

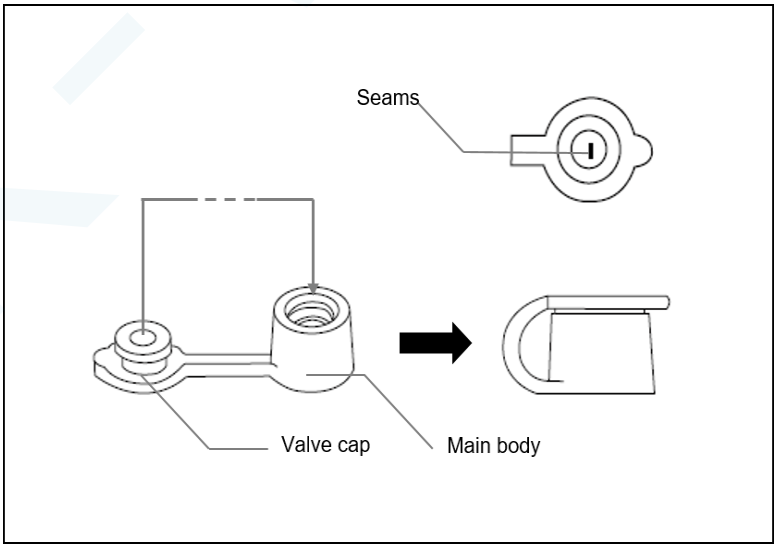



Figure 3.10

## ☐ *Check the waterproof cap*

**WARNING**

- Waterproof cap is a wearing part , it should be checked before each use. If any abnormality is found, a new waterproof cap should be replaced immediately. Otherwise, the use of abnormal or damaged waterproof cap may cause water ingress and damage to the endoscope.

1. Check that the surface of the waterproof cap is free of gaps, cracks, deformation, wear or other damage (Figure 3.11).
2. Put the waterproof cap on the electrical connector of the light guide connector (Figure 3.11).

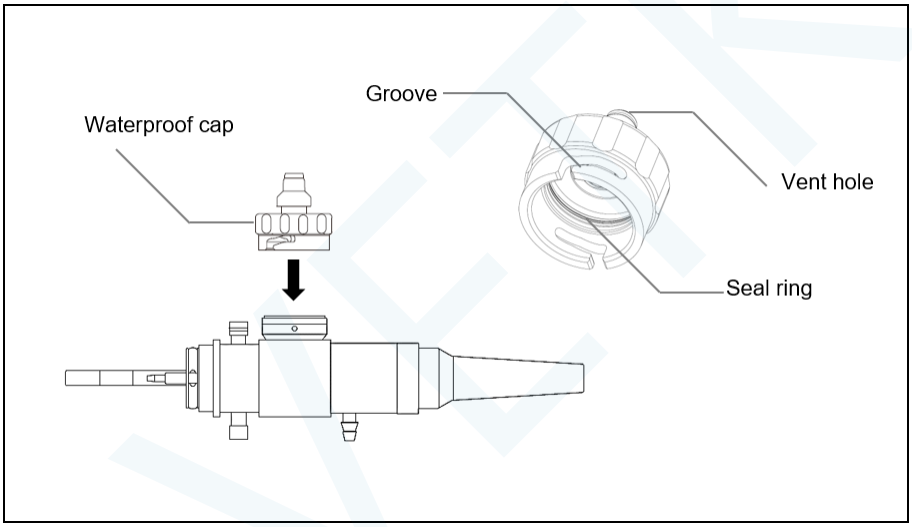



Figure 3.11

## *3.4 Assemble accessories for the endoscope*

**WARNING**

- Air/water supply button and suction button do not require lubrication. Lubricant can cause the button gasket to swell and thus interfere with the function of the button.

### ☐ *Install the suction button*

1. Align the two metal protrusions at the bottom of the suction button with the two small holes in the piston.
2. Install the suction button on the suction port of the endoscope (Figs. 3.12 and 3.13), make sure the button is properly installed, the rubber sleeve is not raised, and that the button cannot rotate.

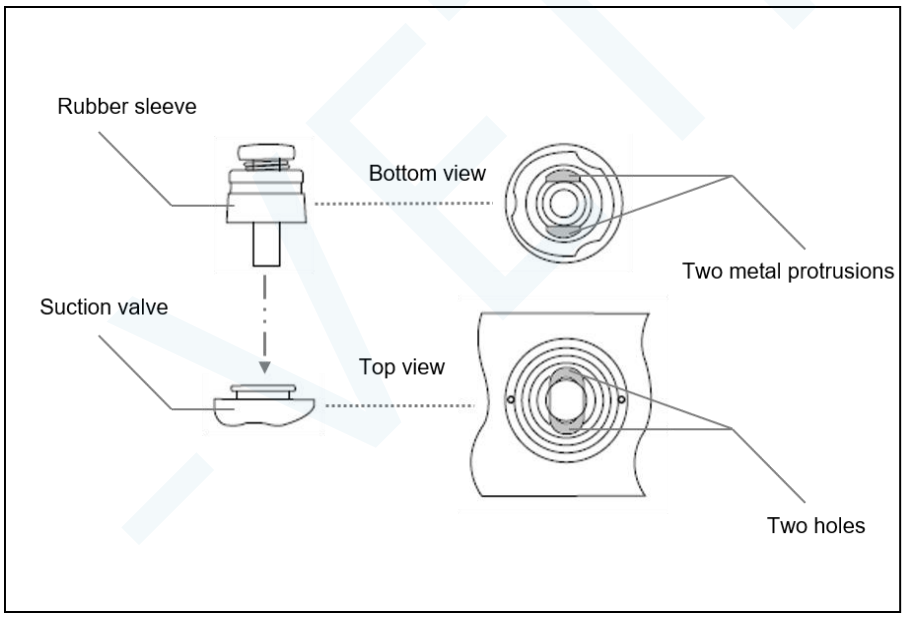



Figure 3.12

**NOTE**

- A whistle may sound when the suction button is dry; this does not indicate a malfunction.

## ☐ *Install air/water supply button*

1. Install the air/water supply button on the air/water port of the endoscope (Figure 3.13).

2. Make sure the button is installed correctly and the rubber sleeve is installed in place.

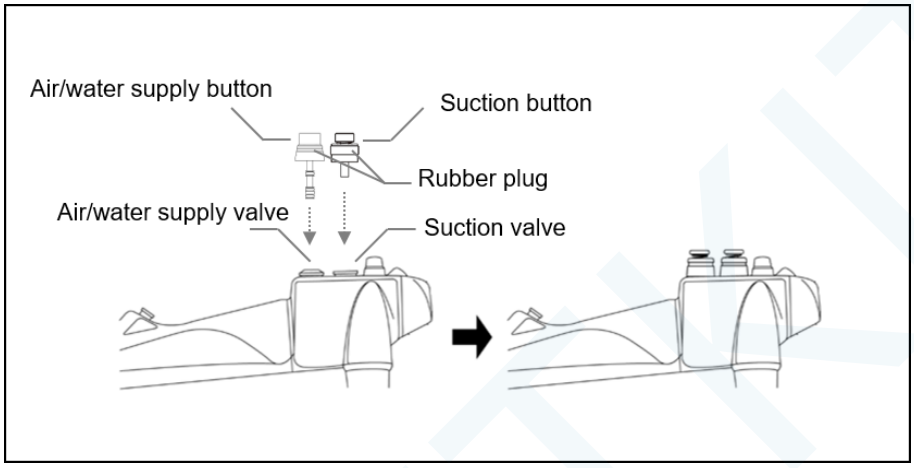



Figure 3.13

**NOTE**

- The air/water supply button may be a little unsmooth at the beginning, but it will be smooth after several operations.

## ☐ *Install the biopsy valve*

**WARNING**

- If the biopsy valve is not properly connected to the channel opening, it will affect the suction effect of the endoscope, and it can also cause animal debris or fluid to leak or spatter, posing a risk of infection.

Attach the biopsy valve to the channel opening of the endoscope (Figure 3.14). Check that the valve is properly installed.

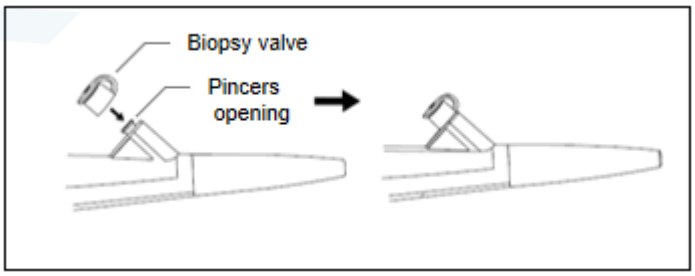



Figure 3.14

## *3.5 Check and connect peripheral devices*

**NOTE**

- Install the water bottle on the trolley or the water bottle mounting bracket of the light source. If the water bottle is installed in another position, the water supply pipe of the water bottle may leak, which will affect the device performance.
- When removing the water bottle connector from the endoscope, do not let water spill out of the water bottle connector. If water spills onto the device, the device performance will be affected.
- Prepare and inspect light source, image processing device, video monitor, water bottle, suction pump and endoscopic treatment accessories according to the respective instructions.

### ☐ *Connect endoscope to peripheral devices*

**WARNING**

- Firmly connect the suction tube of the suction pump to the suction connector of the endoscope. If not properly connected, debris may leak out of the tube, resulting in risk of infection, equipment damage, or reduced suction performance of the equipment.

1. Power off all peripheral devices.
2. Insert the light guide connector completely into the endoscope socket of the cold light source.
3. Connect the water bottle connector to the air/water supply connector, as shown in Figure 3.15(1), (2) and (3).
4. Ensure that the water bottle connector is correctly connected and that there is no obvious torsion or stress between the water bottle connector and the air/water supply connector.

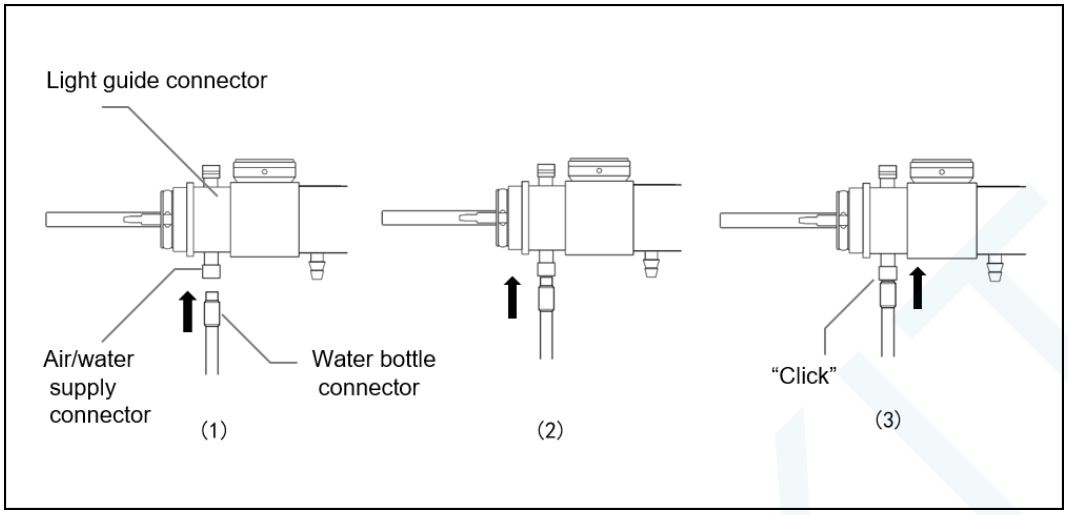



Figure 3.15

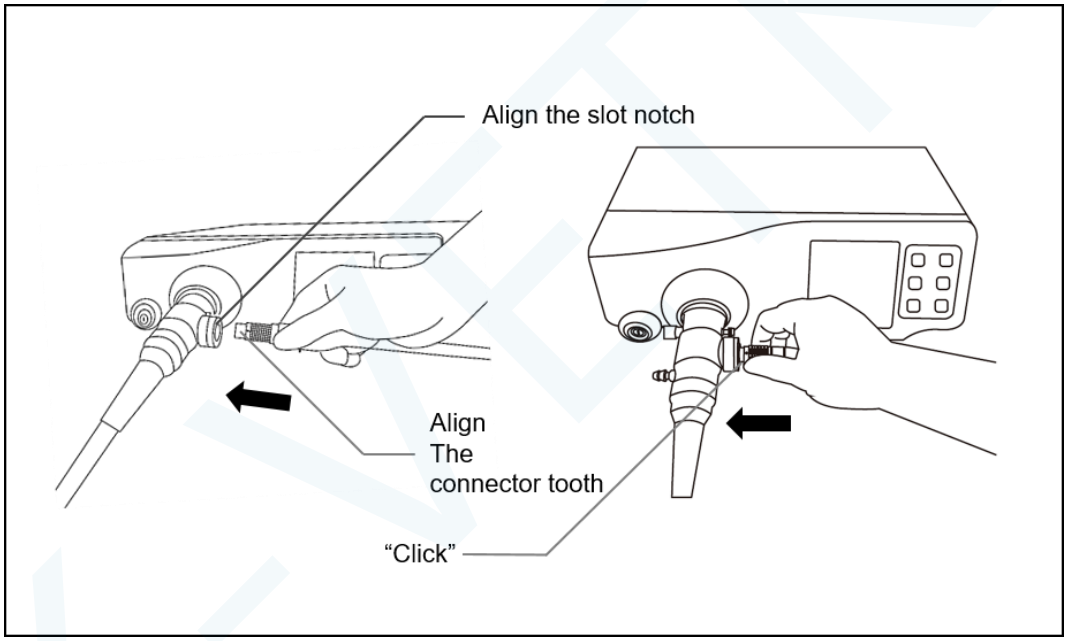



Figure 3.16

5. Connect the animal image processor to the endoscope using a video converter cable. When connecting the electrical connector of the endoscope, align the slot notch of the electrical connector and the convex tooth of the video converter plug, as shown in Figure 3.16.

6. Connect the suction tube of the suction pump to the suction connector of the light guide connector (Figure 3.17).

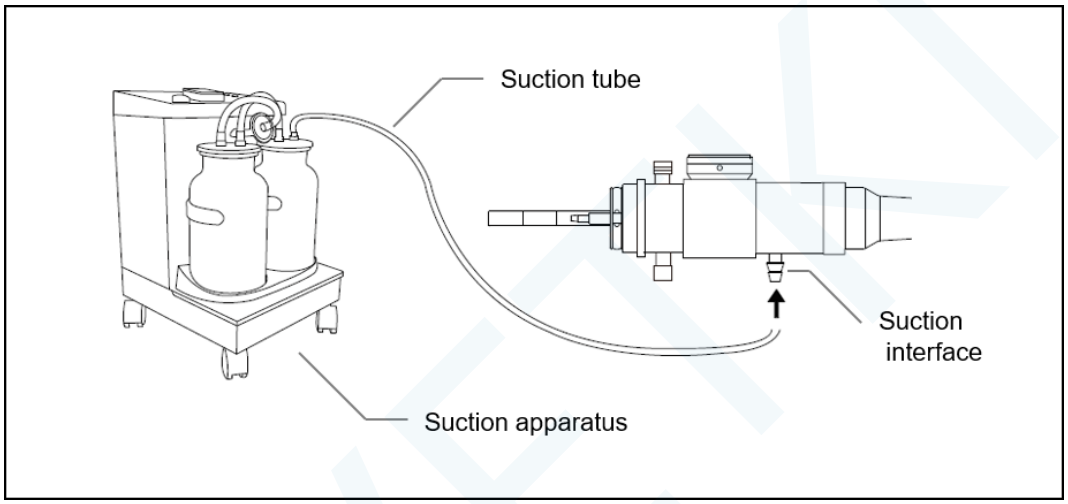



Figure 3.17

## *3.6 Check endoscopy system*

### ☐ *Check the endoscopic images*

**WARNING**

- Do not look directly at the top of the endoscope when the illumination light is output. Otherwise, eye injury may occur.

1. Turn on the image processing equipment, light source equipment, and video monitor according to the respective instruction manual of the corollary equipment, and check the endoscopic image.
2. Check that the distal tip of the endoscope outputs illumination light.
3. Look at your palm to make sure the endoscopic image is free of interference, foggy blur or other abnormalities.
4. Bend the endoscope to check that the endoscopic image does not temporarily disappear or show other abnormalities.

**NOTE**

- If the endoscope has blurred vision, wipe the objective lens with a clean lint-free cloth dipped in 75%-95% ethanol or propanol.

### ☐ *Check the handle buttons*

**WARNING**

- Even if you do not plan to use the handle buttons, check that all the handle buttons are working properly. Otherwise, the endoscopic image may freeze or be abnormal during the examination, which may cause injury, bleeding or perforation to the animal.

Press each button on the handle to make sure the set function works properly.

### ☐ *Check the air supply function*

1. Adjust the air supply of the light source to the highest level according to the instruction manual of the light source.
2. Immerse the distal tip 10cm or less in sterile water to ensure that no bubbles emerge when the air/water supply button is not operated.

3. Block the hole in the air/water supply button with your hand to ensure that bubbles continue to emerge from the air/water nozzle.

4. Release the hole in the air/water supply button to ensure that no more bubbles are emerging from the air/water nozzle.

**WARNING**

- If the air/water supply button is not operated and bubbles continue to emerge from the air/water nozzle 10cm or less after the distal tip is soaked in sterile water, the air supply function may be abnormal. If continued, it can lead to over-ventilation and injury to the animal.
- If bubbles emerge from the air/water nozzle, remove the air/water supply button and reinstall it correctly or replace it with a new button. Do not use the endoscope if you still cannot remove the bubbles, as the endoscope may be faulty. Please contact us.

**NOTE**

- If less than 10cm of the distal tip is soaked in sterile water, a small number of bubbles will emerge from the air/water nozzle even when the air/water supply button is not operated, which does not indicate a fault.

### ☐ *Check objective lens cleaning function*

**WARNING**

- Sterile water must be used. The use of non-sterile water may lead to cross infection or infection of animals.

**NOTE**

- When the air/water supply button is pressed for the first time, it may take several seconds for water to flow out.
- If the air/water supply button is slow to return to its original position after water supply, remove the button and infiltrate the gasket surface of the air/water supply button with sterile water.
- Place the distal tip of the endoscope in a beaker or other container to avoid wetting the floor during the examination.

1. Put your finger on the air/water supply button and press it. Observe the endoscopic image and confirm that there is water flow across the entire objective lens.

2. Release the air/water supply button, confirm that water flow stops by observing the endoscopic image, and the air/water supply button can return to its original position smoothly.

3. While looking at the endoscopic image, block the hole in the air/water supply button with a

finger and start air supply. Check that the air supply can blow the objective lens to dry and result in clear endoscopic images.

### ☐ *Check suction function*

**WARNING**

- If the suction button does not work smoothly, remove and reinstall it, or replace it with a new one. When using the endoscope with an abnormal suction button, the suction may not be stopped, resulting in injury to the animal. If reinstallation or replacement with a new button still cannot make it work smoothly, the endoscope may be faulty, please stop using, and contact our company.
- If the biopsy valve leaks, replace it with a new one. Using a biopsy valve with air leakage can degrade the suction function of the endoscope and can cause animal debris or fluid to leak or spatter, posing an infection risk.

1. Place the water bottle with sterile water on the same table as the endoscope, and adjust the suction pressure while checking the suction.
2. Dip the distal tip into the sterile water so that the height of the instrument channel opening is close to the level of the sterile water in the bottle. Press the suction button to confirm that the water is continuously drawn from the distal tip of the endoscope.
3. Release the button to confirm that the suction stops and the button returns to its original position.
4. Press the suction button to suck water for one second. Then, release the suction button for one second. Repeat several times to make sure that water is not leaking from the biopsy valve.
5. Remove the distal tip of the endoscope from the water. Hold the suction button and draw air for a few seconds to remove water from the instrument channel.

## ☐ *Check the instrument channel*

**WARNING**

- When inserting an endoscope diagnosis and treatment accessory, keep the distal tip away from the eye. Otherwise, the accessory protruding from the distal tip can cause eye injury.

1. Insert the endoscope diagnosis and treatment accessory through the instrument channel opening. Make sure that the accessory extends smoothly from the distal tip and no foreign body falls out from the distal tip.
2. Ensure that the endoscope treatment accessory can be smoothly withdrawn from the instrument channel.

# *Chapter IV Use and Operation*

The operator of this endoscope must be a veterinarian or a medical worker under the supervision of a veterinarian. They must have adequate training in clinical endoscopy techniques. Therefore, this instruction manual does not explain or discuss any clinical endoscopy techniques. This instruction manual only describes the basic procedures and measures related to the operation of this endoscope.

**WARNING**

- Wearing personal protective equipment protects the operator from dangerous chemicals and potentially infectious substances. During operation, wear appropriate personal protective equipment, such as goggles, face mask, waterproof clothing, and chemical gloves. The protective equipment should be of appropriate size and long enough to prevent skin exposure.

- Due to the high illumination, the temperature at the distal tip of the endoscope may exceed 41°C and even reach 50°C. Surface temperature exceeding 41°C can cause mucosal burns. Try to use the lowest possible brightness, shortest possible time, and appropriate distance for accurate observation. When possible, close static observation should be avoided and the distal tip of the endoscope should not be kept close to the mucosa for too long.

- Turn off the endoscope lighting as much as possible before and after the examination. Continuous lighting can increase the temperature at the distal tip of the endoscope and cause burns to the animal or the operator.

- Do not insert or withdraw the endoscope in the following cases. Otherwise, it may cause injury, bleeding or perforation to the animal.
  - When the accessory protrudes from the distal tip of the endoscope.
  - When the bending section is locked.
  - When the endoscope is inserted/withdrawn with excessive force or forcibly.

- If any of the following occurs during use, it should be immediately discontinued and slowly withdrawn in accordance with Section 10.2, “Withdraw Abnormal Endoscope”.
  - If abnormal function of the endoscope is suspected.
  - If the endoscopic image on the video monitor accidentally disappears or freezes.
  - If the angulation control knob is locked.
  - If the angulation control function is abnormal.
  - If the magnification function is abnormal (when using the image magnification function of the image processing device).

- Continued use of endoscopes in these situations can result in injury, bleeding, or perforation to the animal.
- If the image or function of the endoscope is found abnormal, but it quickly returns to normal on its own, the endoscope may be faulty. Continued use of the endoscope may cause such error again which cannot return to normal. In this case, the examination should be stopped immediately and the endoscope should be slowly pulled out while the endoscopic image is observed. Otherwise, it can cause injury, bleeding or perforation to the animal.

## *4.1 Insertion*

### ☐ *Grip and operation of the endoscope*

Grip the control section of the endoscope with your left hand and operates the air/water supply button and suction button with the left index finger, and the U/D angulation control knob can be operated freely with the left thumb. The insertion tube and R/L angulation control knob are operated (Figure 4.1) with right hand.

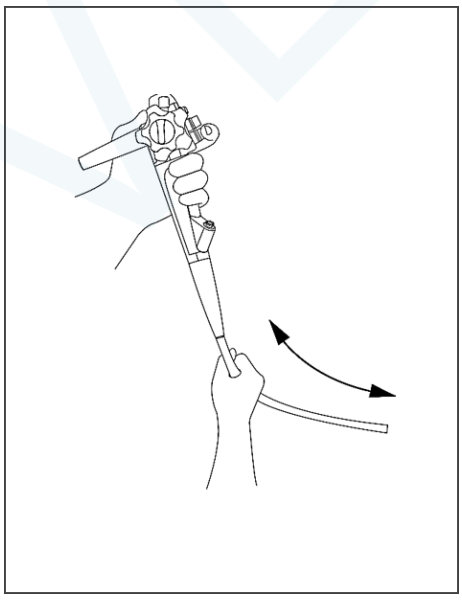


Figure 4.1

### ☐ *Insert the endoscope*

**NOTE**

- In order to prevent the animal from biting the insertion section during examination, it is recommended to place a guide tongue piece or dental pad in the animal's mouth before inserting the endoscope, if necessary.

- Do not apply olive oil or products containing petroleum jelly lubricants (e.g., petroleum jelly). Because these products will cause the surface of bending section to age and lose elasticity.

- As shown in Figure 4.2, do not bend the part within 10cm of the contact point between the insertion tube stiffness and the control section. Otherwise, the insertion section will be damaged.

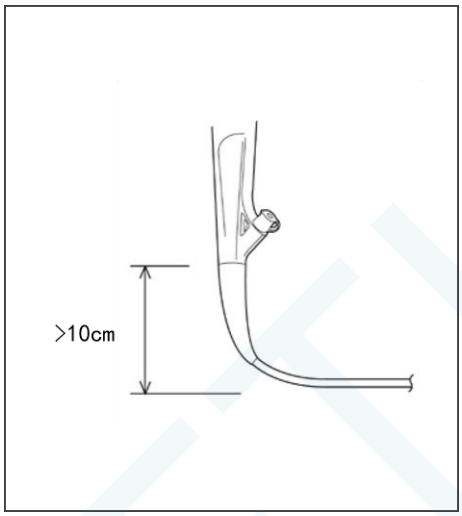



Figure 4.2

1. If needed, apply a water-soluble medical lubricant to the insertion section.

2. Insert the distal tip of the endoscope through the dental pad opening, and then insert the distal tip of the endoscope into the throat while observing the endoscopic image. Do not exceed the insertion section limit when inserting.

### ☐ *Bending angle of distal tip*

**WARNING**

- Do not bend an angle forcibly or with excessive force. Otherwise, the wire that controls the bending section will bear a large load. This can stretch or break the wire, affecting the movement of the bending section.

1. Operate the angulation control knob to guide the insertion and observation of distal tip as needed.

2. The angulation lock of the endoscope is used to fix the angled distal tip position.

**NOTE**

- If the accessory of the endoscope is inserted when the angulation lock is locked, the angle of the distal tip may change. To keep the angle, hold the angulation control knob with your hand.

- When operating the U/D or R/L angulation lock, hold the angulation control knob with your finger. Otherwise, the angle will change.

### ☐ *Air/water supply*

**WARNING**

- If the bottle contains too little sterile water, it will supply air instead of water. In this case, turn off the air pump switch of the light source and add sterile water to the water bottle to the specified water level.
- If the air/water supply cannot be stopped, turn off the air pump switch on the light source and replace the new button.
- When using a syringe to inject liquid from the instrument channel opening, remove the valve from the main body, insert the syringe vertically into the instrument channel opening, and inject liquid. If the valve is not removed or the syringe is not inserted vertically, the instrument channel opening will be damaged, the suction effect of the endoscope will be reduced, and animal debris or liquid will leak or spill from the instrument channel opening, posing a risk of infection.
- If the instrument channel opening is opened during operation, animal debris or liquid may leak or spill out from the instrument channel opening, causing a risk of infection. When the instrument channel opening is opened, cover it with a piece of sterile gauze to prevent leakage.
- If the endoscope temperature is too low, dew may form on the surface of the objective lens and the endoscopic image may be somewhat blurred. In this case, the temperature of sterile water in the water bottle should be raised to 40-50 °C before using the endoscope.

1. Block the hole in the air/water supply button and send air through the air/water nozzle at the distal tip (see Figure 4.3).
2. Press the air/water supply button to send water to the objective lens (Figure 4.3).

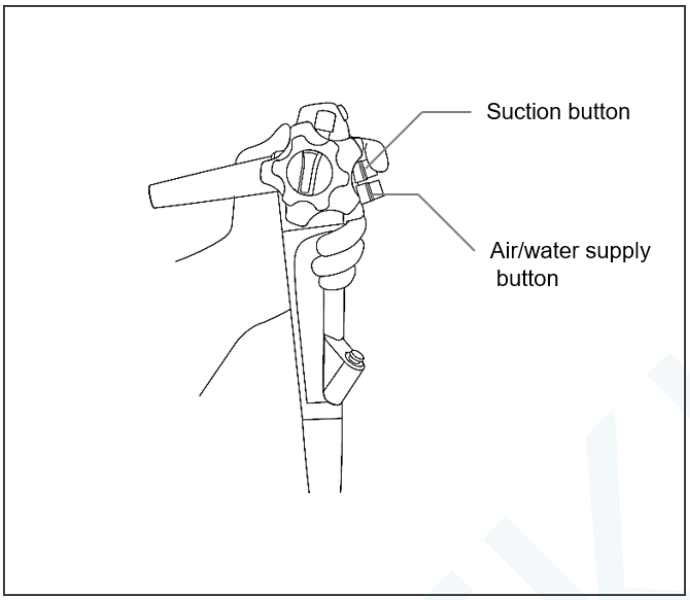



Figure 4.3

## ☐ *Suction*

**WARNING**

- Do not suck solid substances or high viscosity liquids. Otherwise, the suction tube or the suction button will be blocked. If the suction button is blocked, the suction cannot be stopped. Please remove the suction tube from the suction connector on the light guide connector. Turn off the suction pump and remove the suction button to remove solids or high viscosity liquids.

- If the suction button is blocked and the suction function cannot be used when a solid substance such as a clip or high viscosity liquid is sucked, pull out the endoscope and remove the suction tube from the suction connector of the light guide connector. Install a syringe with sterile water at the suction connector. Straighten the insertion tube as much as possible and rinse the connector vigorously with water, at which point the suction button of the endoscope sinks slightly. Rinse repeatedly until a high viscosity liquid or solid substance exits from the distal tip of the suction channel. Before using the endoscope again, confirm that the suction function is normal according to the content of “Check Suction Function”. If the high viscosity liquid or solid substance cannot flow out, discontinue the suction function and contact the company.

- When performing suction, set the suction pressure to the lowest value required for safe operation. Excessive suction pressure can lead to sucking mucous membrane and damaging mucous membrane. It can also cause animal debris or liquid to leak or spill out from the instrument channel opening, posing a risk of infection.

- To perform suction, place the biopsy valve over the main body of the

instrument channel opening. Otherwise, it will affect the suction effect, but also make animal debris or liquid leak or spatter, posing infection risk.

**CAUTION**

- During examination, please be careful not to overfill the suction bottle. Sucking liquid to a full bottle will damage the suction pump.

Press the suction button to suck excess fluid or other debris that obstructs the view of the endoscope (Figure 4.3).

**NOTE**

- Air supply and suction at the same time are easier to remove water droplets from the surface of the objective lens.

☐ ***Observe the endoscopic image***

For details on the operation of brightness adjustment, please refer to the veterinary endoscope cold light source instruction manual.

## *4.2 Use of endoscope diagnosis and treatment accessory*

For details on the use of this endoscope with each medical accessory, please refer to the instruction manual of each medical accessory.

**WARNING**

- When using an accessory, keep the distance between the distal tip of the endoscope and the mucosa greater than the minimum viewing distance of the device to view the accessory in the endoscopic image. If the endoscope is placed within the minimum viewing distance, the position of the accessory will not be visible in the endoscopic image. This can result in serious injury to animal or damage to the equipment. The minimum viewing distance depends on the type of endoscope.
- When inserting or withdrawing an accessory, make sure that the distal tip of the accessory is closed or retracted into the sheath. Slowly and vertically insert or withdraw the accessory through the slit in the instrument channel opening. Otherwise, the instrument channel opening may be damaged and the debris may fall off.
- If it is difficult to insert or withdraw the accessory, straighten the bending section without affecting the endoscopic image as much as possible. Excessive force to insert or withdraw the accessory can cause damage to the instrument channel or accessory fragments to fall off, causing injury to the animal.
- Do not open the distal tip of the accessory or extend the needle when the

distal tip is not visible in the endoscopic image. Failure to do so can result in injury to the animal, bleeding and perforation, or equipment damage.

**CAUTION** When using biopsy forceps with a needle, make sure the needle is not excessively bent. An overly bent needle will stick out of the closed forceps cup. Using such biopsy forceps can damage the tube or cause injury to the animal.

- Insert biopsy forceps or other accessory while keeping the bending section straight. When the accessory is inserted as the bending section is bent at a large angle, it should be confirmed that the distal tip of the accessory is closed or retracted into the sheath and is in the field of view of the endoscope. Otherwise, the working channel of the endoscope may be damaged or the animal may be injured.

- When using the injection needle, do not extend or withdraw the needle out of the syringe sheath before the needle is extended from the distal tip of the endoscope. Extending, inserting or withdrawing the needle in the tube will damage the instrument channel.

### ☐ *Insert accessory into the endoscope*

**WARNING**

- Do not force to or suddenly insert an accessory. Otherwise the accessory can suddenly protrude from the distal tip of the endoscope, causing injury, bleeding, or perforation to the animal.

- When using a diagnosis and treatment accessory for the endoscope, remove the biopsy valve to make it easier to insert the accessory. However, opening or removing the biopsy valve can reduce the suction effect of the endoscope and can cause animal debris or fluid to leak or spill, posing a risk of infection. Therefore, the biopsy valve should be covered on the main body when the endoscope diagnosis and treatment accessory is not used.

- Opening the biopsy valve can cause animal debris or fluid to leak or spatter, posing an infection risk. When the instrument channel opening is opened, cover the opening with a piece of sterile gauze to prevent leakage.

- Do not make the endoscope diagnosis and treatment accessory droop at the instrument channel opening, which will increase the gap between the accessory and the seam or hole of the instrument channel opening, and damage the instrument channel opening. This can reduce the suction effect of the endoscope and cause animal debris or fluids to leak or spill, posing a risk of infection.

- Pinch the part of the accessory near the instrument channel opening and insert it vertically slowly and gradually. Otherwise the endoscope diagnosis and treatment accessory or instrument channel opening will be damaged.

This can reduce the suction effect of the endoscope and cause animal debris or fluids to leak or spill, posing a risk of infection.

1. Please refer to the operating instructions of the endoscopy accessory for details of operation.

2. Keep the U/D and R/L angulation control knobs still.

3. Make sure the distal tip of the accessory is closed and retracted into the sheath, then slowly insert the accessory straight into the slit at the instrument channel opening.

**CAUTION**

- Do not open the accessory in the instrument channel opening or extend the distal tip of the accessory from the sheath. Otherwise, the instrument channel or diagnosis and treatment accessory will be damaged.
- Pinch the part of the accessory near the instrument channel opening and insert it vertically slowly and gradually. Otherwise, the sheath of the endoscope diagnosis and treatment accessory will be bent or damaged.

4. Hold the accessory 4cm away from the instrument channel opening and slowly and vertically insert it while observing the endoscopic image.

**NOTE**

- When the distal tip of the endoscope diagnosis and treatment accessory extends more than 3mm from the distal tip of the endoscope, the accessory will be visible in the endoscopic image.

### ☐ *Operation of endoscope diagnosis and treatment accessory*

Operate the endoscope accessories according to the respective instruction manual.

### ☐ *Withdrawal of endoscope diagnosis and treatment accessory*

**WARNING**

- Animal debris may spill out when the accessory is withdrawn from the instrument channel opening. Gauze should be used to cover the accessory and instrument channel opening to prevent debris from spilling out.
- Do not withdraw the accessory if its distal tip is open or protruding from the sheath. Otherwise, it can cause injury to the animal, bleeding, perforation, or damage to equipment.
- When pulling out the accessory from the instrument channel opening, be sure to operate slowly and keep straight. Otherwise, the seam or hole in the channel opening will be damaged. This can reduce the suction effect of the

endoscope and cause animal debris or fluid to leak or spill, posing risk of infection.

- If the accessory cannot be withdrawn from the endoscope, close the accessory or retract it into the sheath, and carefully pull the endoscope and accessory out at the same time while observing the endoscopic image, taking care not to cause tissue damage.

Close the distal tip of the accessory or retract it into the sheath, and slowly pull out the endoscopic diagnostic accessory.

## *4.3 Pull out the endoscope*

**WARNING**

- If blood is found on the surface of the pulled out insertion section of the endoscope, the animal should be examined carefully.

1. Disable the image magnification function of the image processor when using it.
2. Press the suction button to suck excess air, blood, mucus, or other debris.
3. Turn the U/D and R/L angulation locks in the direction of “F▶” to unlock.
4. Slowly pull out the endoscope while observing the endoscopic image.

# *Chapter V Cleaning, Disinfection and Sterilization General Rules*

## *5.1 General description*

- This section describes the recommended methods for cleaning, disinfecting and sterilizing the multifunctional veterinary endoscope manufactured by the company.
- This section contains basic information on how to safely and effectively clean, sterilize, and sterilize the models covered by this manual.
- Before cleaning, disinfection and sterilization, be sure to read carefully the operating instructions of the chemicals used for cleaning, disinfection and sterilization and the instruments matching with the machine, and operate according to the regulations.
- All relevant instructions should be stored in a safe and accessible place.
- If you have any unsolvable problems during cleaning, disinfection or sterilization or have any concerns or comments about this part, please contact the Company.

## *5.2 Essentials of Cleaning, Disinfection and Sterilization*

In medical literature, there are reports of cross-infection accidents due to incorrect cleaning, disinfection or sterilization. Personnel responsible for cleaning, disinfection and sterilization should read this section in detail and be familiar with the following:

- Occupational health and safety regulations of animal medical institutions.
- Special cleaning, disinfection and sterilization regulations.
- Mechanical construction of endoscope equipment.
- Proper use of disinfectants.

The relevant animal health care personnel should make a professional judgment about the methods and conditions of cleaning, disinfection and sterilization.

## *5.3 Precautions*

**WARNING**

- If the endoscope is not properly cleaned and disinfected or sterilized at a high level after each use, the safety of animals will be endangered. To reduce the risk of cross-infection, the endoscope should be thoroughly cleaned manually after each use according to the instructions in Chapter VII “Cleaning, Disinfection and Sterilization Procedures”, followed by a high level of disinfection or sterilization, including all tubes on the surface of the endoscope.

- In every cleaning, disinfection and sterilization process, it is necessary to clean and disinfect or sterilize all channels of the endoscope at a high level, even if some channels were not used in the previous case. Otherwise, improper cleaning and disinfection or sterilization of the endoscope may pose a risk of infection to the next animal or operator to use the endoscope.

- If the endoscope is not thoroughly cleaned, it cannot be effectively sterilized or sterilized. The endoscope and accessories should be thoroughly cleaned before disinfection or sterilization to remove microorganisms or organic matter affecting the disinfection or sterilization effect.

- Our company only approves the endoscope cleaning and disinfection machine recommended by our company. If a sterilizer other than one recommended by our company is used, it is the responsibility of the manufacturer of the sterilizer to confirm the compatible endoscope model.

- Before using the endoscope sterilizer, be sure that it can clean, disinfect, and sterilize the endoscope and all its channels. If you are not sure whether the endoscope sterilizer can clean and sterilize the endoscope and all its channels at a high level, contact the manufacturer of the endoscope sterilizer for details. Otherwise, improper cleaning and disinfection or sterilization of the endoscope may pose a risk of infection to the next animal or operator to use the endoscope.

- Animal debris and chemicals used for cleaning, disinfection and sterilization are dangerous. Please wear personal protective equipment to protect yourself from dangerous chemicals and potentially infectious substances. When cleaning, disinfecting or sterilizing, wear appropriate personal protective equipment, such as goggles, face masks, protective clothing and chemical gloves. Personal protective equipment should be of appropriate size and long enough to prevent skin exposure. Remove contaminated personal protective equipment before leaving the cleaning, disinfection and sterilization area.

- Be sure to remove the disinfectant thoroughly by rinsing. Rinse the outside

surface of the endoscope, all channels and cleaning equipment thoroughly with clean water to remove residual disinfectant.

- Pay attention to ventilation in disinfection/sterilization room. Adequate ventilation will help prevent the build-up of toxic chemical gases.
- Always store alcohol in an airtight container. If keeping alcohol in an open container, it is easy to cause fire, but also cause failure due to volatilization.
- Be sure to test for water leakage in case the endoscope fails. The use of a leaky endoscope may result in the sudden disappearance of the endoscopic image or abnormal bending function.
- Before use, check whether the endoscope has been cleaned, disinfected and sterilized normally. If it is found that the endoscope is not cleaned, disinfected and sterilized normally, it should be cleaned, disinfected and sterilized again according to the contents of the relevant sections of cleaning, disinfection and sterilization.
- The cleaning, disinfection and sterilization methods described in this section are not considered to eliminate “Prion”, the causative agent of Creutzfeldt-Jakob disease (CJD). The use of this product in animals suffering from CJD or variant CJD (VCJD) shall be ensured that proper measures are taken to dispose of the product immediately after its use in such animals. Regarding the method of handling CJD, please follow the relevant regulations of your country.
- This device may not be able to tolerate the treatment methods used to remove or inactivate “Prion” in various countries. For durability information for various methods, please contact us. If cleaning, disinfection and sterilization methods not mentioned in this manual are adopted, the company does not guarantee the effectiveness, safety and durability of the product. Make sure the equipment is normal before use, and use it under the guidance of the responsible physician. Do not use any abnormal device.
- The disinfection and sterilization methods mentioned in this equipment involve different reagents, but the cross-sterilization methods of different reagents have not been verified and risk assessed. It is not recommended to change the sterilization methods randomly during use. Otherwise, there may be a risk of infection.

**CAUTION**

- When delivering air or water to the endoscope channel, the pressure or water pressure must not exceed 0.5MPa (5kgf/cm2, 71psig). Too much pressure can cause damage to the endoscope.
- When cleaning, disinfecting and sterilizing the endoscope, make sure that the

electrical connector on the light guide connector is covered with waterproof cap before soaking the endoscope in the liquid. If the waterproof cap is not covered, water, washing solution or disinfectant may enter the endoscope and cause damage to the endoscope.

## *5.4 Cleaning, disinfection and sterilization before initial use/cleaning, disinfection, sterilization and storage after use*

The product has not been cleaned, disinfected, or sterilized prior to shipment. Before the first use, cleaning, disinfection and sterilization should be carried out according to the cleaning, disinfection and sterilization section of the manual.

After use, clean, disinfect, sterilize and store according to the contents in this manual. Incomplete cleaning, disinfection, and sterilization or improper storage may cause infection, damage, and performance degradation of the device.

# *Chapter VI Applicable Cleaning, Disinfection, Sterilization Methods and Chemical Agents*

## *6.1 Compatibility overview*

The endoscope of our company is suitable for a variety of cleaning, disinfection, sterilization methods, but some parts and accessories are not suitable for some methods, otherwise it will cause damage to the instruments.

### ☐ *Compatibility Overview*

The materials and structures used in our endoscopes may not be suitable for some cleaning, disinfection and sterilization methods. Our company identifies whether they are effective methods based on the following two points.

- Microbial efficacy
- Material durability
    - Microbial efficacy
    - If the method is declared “certified” for microbial efficacy, the standard method described in this user manual can successfully clean, disinfect, and sterilize the instrument.
    - Material durability
    - If the method is declared “validated" for material durability, it means that the method can be used for repeated cleaning, disinfection, and sterilization. Simply because the material durability is certified does not mean that the microbial efficacy is proven.

### ☐ *Selection of cleaning, disinfection, and sterilization method*

The actual method of cleaning, disinfection and sterilization is selected by the institution where the product is used in accordance with national and local regulations or rules, and determined by the animal medical institution’s sterilization control committee.

Manual or automatic cleaning methods that achieve appropriate efficacy should be used. Manual

cleaning method may pose infection risks to cleaning personnel. Automatic cleaning method reduces these risks and has the advantage of standardized and certified procedures. Therefore, in general, the company recommends using automatic cleaning method to clean the endoscope.

- ***Monitoring***

Inspect and certify cleaning, disinfection, and sterilization methods for reusable devices in accordance with national and local regulations or rules, and document the results of cleaning, disinfection, and sterilization at regular intervals or procedures.

## ☐ *List of compatible methods and chemical agents*

When selecting appropriate cleaning, disinfection, and sterilization methods, refer to table 6.1, recommendations of infection control authorities, and all national and local hospital regulations.

| | **Detergent** | **75%-95% ethanol Or isopropyl alcohol** | **o-phthalaldehyde Disinfectant** | **Peroxyacetic acid Disinfectant** |
|---|---|---|---|---|
| Endoscope | o | o | o | o |
| Waterproof cap | o | o | o | o |
| Air/water supply button | o | o | o | o |
| Suction button | o | o | o | o |
| Biopsy valve | o | o | o | o |
| Channel cleaning brush, cleaning brush | o | o | o | o |
| Channel plug | o | o | o | o |
| Suction cleaning connector | o | o | o | o |
| Perfusion tube | o | o | o | o |
| Syringe | o | o | o | o |

Note: O Applicable – Not applicable

Table 6.1(Applicability validation)

1. This equipment can be cleaned by manual cleaning and automatically using endoscope cleaning machine.
2. Waterproof cap can only be cleaned with the cleaning and disinfection machine when it is connected to the endoscope.

**WARINNG**

- Alcohol is not a sterilizer and a high-level disinfectant.

## 6.2 Detergent

Use a medical, low-foam, PH-neutral detergent or enzymatic detergent, and control the concentration and temperature as recommended by the manufacturer. For brand names of detergents proven through tests to be applicable to the endoscope, please contact the company. Do not reuse detergent.

**WARINNG**

- Too much foam prevents the detergent from reaching the inside of the channel.

## 6.3 Disinfectant solution

In general, the company applies the OPA solution used according to the manufacturer's instructions to achieve a high level of disinfection. For brand names of disinfectants proven through tests to be applicable to the endoscope, please contact the company.

If a disinfectant is used repeatedly, it should be regularly checked for effectiveness with the test strips recommended by the manufacturer. Do not use disinfectant beyond the expiration date.

**NOTE**

- For compatibility information on non-OPA disinfectant, please contact us.

## 6.4 Sterilizing agent

In general, the company applies to use 2.0g/L peracetic acid solution according to the manufacturer's instructions to achieve sterilization purpose. For brand names of sterilizing agents proven through tests to be applicable to the endoscope, please contact the company.

If a sterilizing agent used repeatedly, it should be regularly checked for effectiveness with the test strips recommended by the manufacturer. Do not use the sterilizing agent beyond expiration date.

**NOTE**

- For compatibility information on non-peracetic acid sterilizing agents, please contact us.

## *6.5 Rinse water*

Once removed from the disinfectant, rinse the instruments thoroughly with sterile water to remove any remaining disinfectant or, if sterile water is not available, use clean drinking water or water that has been treated (e.g. filtered) to remove microorganisms.

If rinsing with non-sterile water after disinfection, wipe the endoscope with 75%-95% ethanol or isopropyl alcohol and rinse the channels, then allow all internal channels to dry naturally to prevent bacterial proliferation. Do not reuse rinse water.

# Chapter VII Cleaning, Disinfection and Sterilization Procedures

**WARNING**

- It is essential that all channels of the endoscope be cleaned and sterilized at a high level in each cleaning, disinfection, and sterilization process, even if some channels were not used in the previous case. Otherwise, improper cleaning and disinfection or sterilization of the endoscope may pose a risk of infection to the next animal or operator using the endoscope.

**CAUTION**

- Do not make the insertion section of the endoscope or the coil diameter of the universal cable less than 30cm, otherwise the endoscope will be damaged.
- For better cleaning, disinfection and sterilization, do not make the coil diameter of the insertion section or universal cable less than 30cm. If the diameter is less than 30cm, it will be difficult to insert the channel cleaning brush.
- When ventilating or irrigating the endoscope, the air or water pressure should not exceed 0.5MPa, otherwise the endoscope will be damaged.
- Before the endoscope is soaked in liquid (such as washing solution), make sure that the waterproof cap has been installed on the endoscope. Otherwise, the liquid will penetrate into the endoscope and cause damage.

## 7.1 Instruments used for cleaning, disinfection and sterilization

### ☐ *Prepare instruments*

Before cleaning, disinfecting, or sterilizing, prepare the instruments as shown in Figure 7.1.

**CAUTION**

- Use a basin at least 80cm*50cm (“32*20”) in size and deep enough to completely soak the entire endoscope.
- Necessary equipment
- Personal protective equipment
- 500cm3 (500mL) container
- A large basin with a sealing lid
  80*50cm (32”*20”)
- A small basin with a sealing lid

- Clear water
- Detergent
- Disinfectant
- Sterile water
- 75%-95% ethanol or isopropyl alcohol
- Bristle brush
- Clean lint-free cloth
- Sterile lint-free cloth
- Sterile cotton swabs
- 50cm³ (50ml)syringe

## ☐ *Cleaning, disinfection and sterilization instruments and functions*

For inspection of instruments not mentioned below, please refer to the instruction manual of all equipment.

- ***Waterproof cap***

When cleaning, disinfecting and sterilizing, attach the waterproof cap to the electrical connector of the endoscope to prevent the connector from water ingress. When performing a water leak test, the vent port of the waterproof cap must be connected to the electronic endoscope leak tester (Figure 7.2).

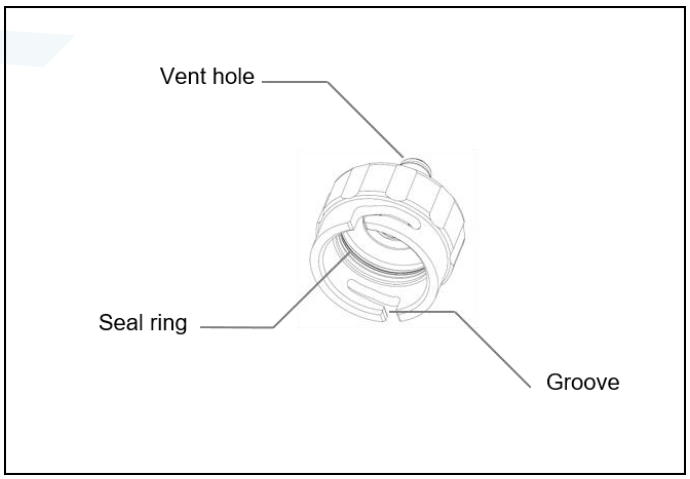



Figure 7.2

- ***Channel plug/tube plug***

The channel plug is used to block the opening of the instrument channel, air/water supply and suction port during cleaning (Figure 7.3).

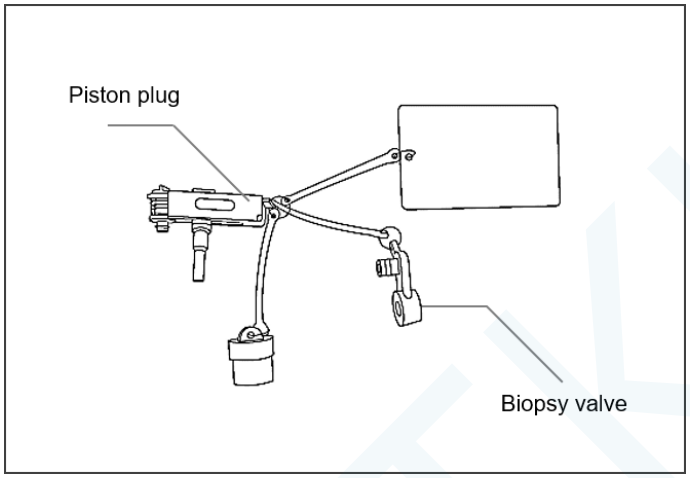



Figure 7.3

- ***Channel cleaning brush/channel brush***

The channel cleaning brush is used to scrub the inside of the biopsy channel and the suction channel, and the inside or opening of the suction button, the air/water supply button and the instrument channel (Figure 7.4).

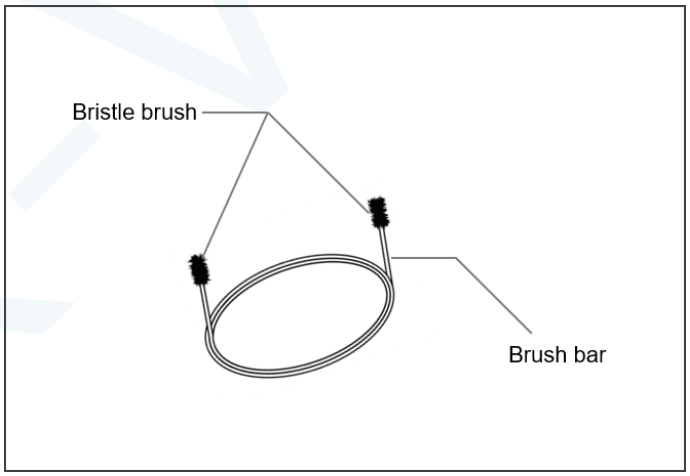



Figure 7.4

- ***Cleaning brush***

The cleaning brush is used to scrub the suction port and instrument channel opening (Figure 7.5).

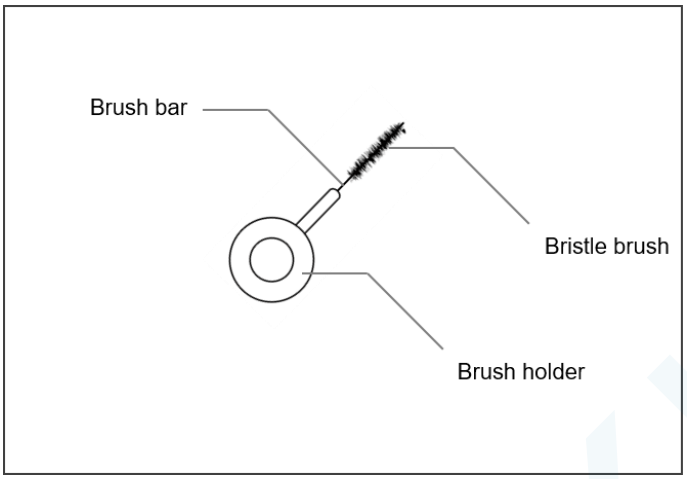



Figure 7.5

- ***Suction cleaning connector***

The suction cleaning connector is used to suck out cleaning, disinfecting, and sterilizing fluids from the distal tip of the endoscope through the instrument channel (Figure 7.6).

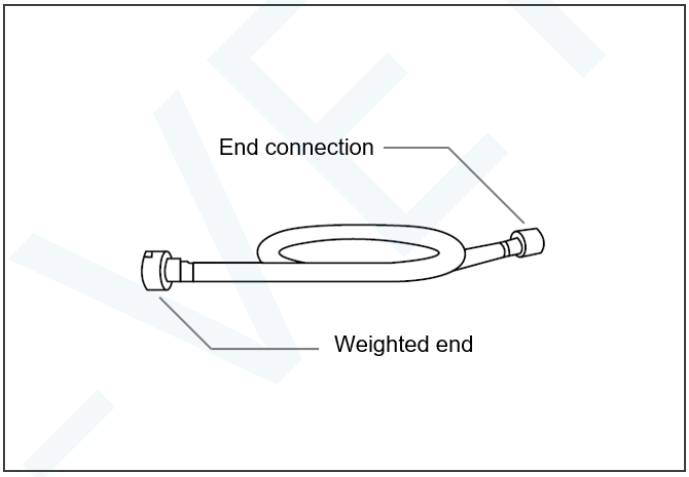



Figure 7.6

## ☐ *Check the instruments*

Please refer to the respective instruction manual for inspection of instruments not mentioned below.

**WARNING**

- All the equipment listed below belongs to the category of consumables.Even if you find minor abnormalities, you need to switch to spare parts. Using defective equipment can make it difficult to effectively clean, disinfect, and sterilize the endoscope and lead to damage to the endoscope or equipment.

**CAUTION**

- Do not soak the waterproof cap separately. Residual water vapor in the

inner wall of the waterproof cap will enter the electrical connector, resulting in equipment damage.

- ***Inspection of waterproof cap***

1. Make sure the inner wall of the waterproof cap is completely dry and free of debris (Figure 7.2). If there is water or debris in the waterproof cap, please wipe it dry with a dry lint-free cloth.
2. Make sure the seal ring inside the waterproof cap is free of scratches, cracks and debris.
3. Check that the vent port is not loose.
4. Make sure the thread of the waterproof cap is free of deformation and other cracks.

- ***Inspection of channel plug***

Check that the piston plug and instrument channel opening are free of cracks, scratches, crazing and debris (Figure 7.3).

- ***Inspection of channel cleaning brush***

1. Make sure the brush head is securely attached to the metal tip at the distal tip. Check to see if the brush is loose or falling off (Figure 7.4).
2. Check the brush rod for bends, scratches, or other damage.
3. Check the brush rod or bristles for debris.

- ***Inspection of channel opening cleaning brush***

1. Check to see if the brush head is loose or falling off (Figure 7.5).
2. Check the brush rod for bends, scratches, and other damage.
3. Check the brush rod or bristles for debris.

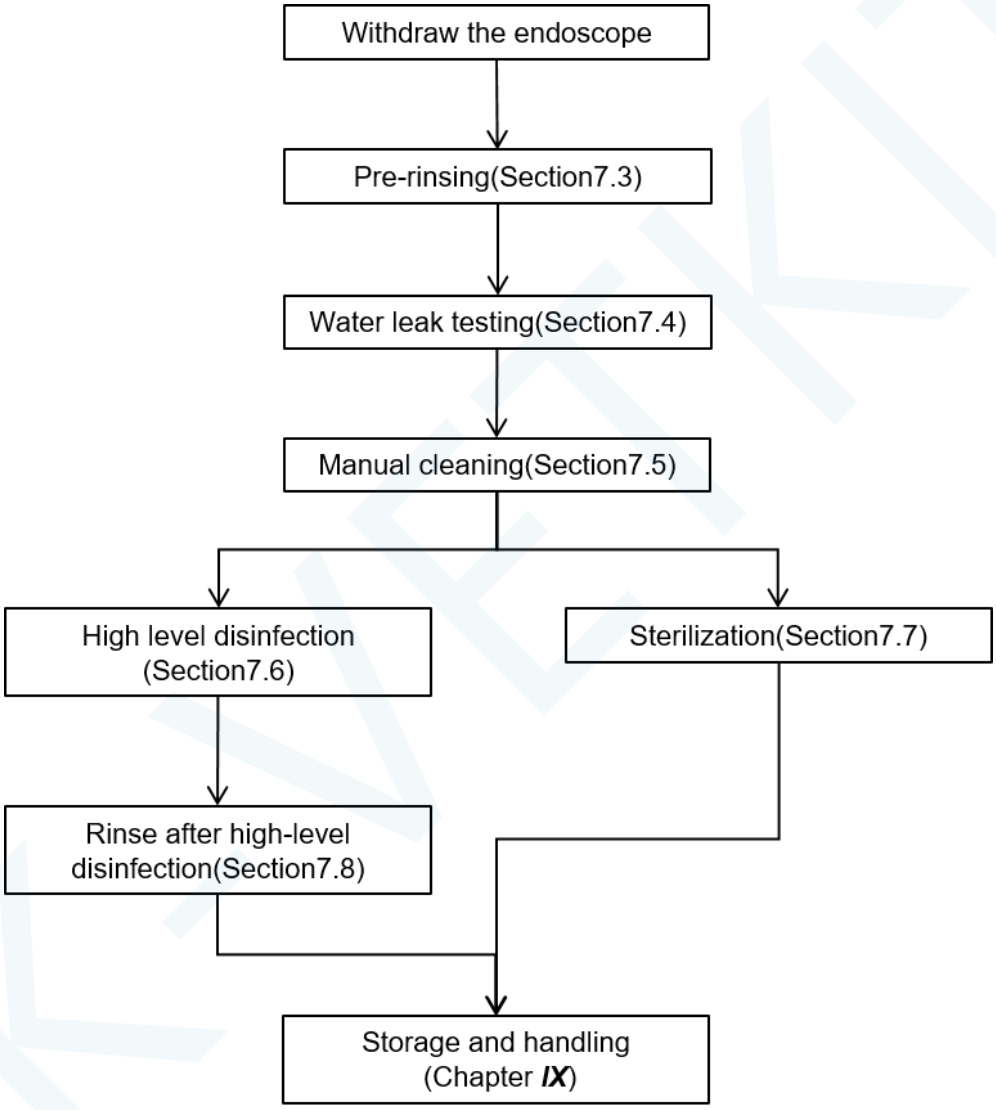
- ***Inspection of suction cleaning connector***

Check for cracks, scratches, crazing, debris, and other damage (Figure 7.6).

## *7.2 Endoscope cleaning, disinfection and sterilization procedure*

Clean, disinfect and sterilize the endoscope according to the following procedures.

**Schematic of endoscope cleaning, disinfection and sterilization procedures**




**WARNING**

- It is essential that all channels of the endoscope be cleaned and sterilized at a high level in each cleaning, disinfection, and sterilization process, even if some channels were not used in the previous case. Otherwise improper cleaning and disinfection or sterilization of the endoscope may pose a risk of infection to the next animal or operator to use the endoscope.

## *7.3 Pre-rinsing*

**WARNING**

- If the endoscope is not cleaned promptly after each use, residual tissue debris will solidify, making it difficult to effectively clean, disinfect and sterilize the endoscope.

The endoscope should be pre-rinsing in the operating room immediately after each use.

### ☐ *Required equipment & tools*

Prepare the following instruments and wear appropriate personal protective equipment.

- Personal protective equipment
- 500cm3 (500mL) container
- Washing solution
- Clear water
- Clean, lint-free cloth
- Suction pump
- 50cm3 (50mL) syringe

### ☐ *Preparation*

1. Withdraw the endoscope from disposable slip tube (if used).
2. Remove the air supply tube of the disposable slip tube from the airbag control device (if used) and discard the disposable slip tube in accordance with all national and local laws and regulations.
3. Turn off the image processor and light source.
4. Turn off the magnification controller and insert the endoscope into the shape observation device.
5. Prepare the washing solution in a 500cm$^3$ (500mL) container at the temperature and concentration recommended by the detergent manufacturer.

6. Prepare clean water in a 500cm$^3$ (500mL) container.

### ☐ *Cleaning of insertion section*

**WARNING**

- Grip the insertion section carefully. Tight grip or excessive bending of the insertion section or bending section may cause serious damage to the rubber of the insertion section or bending section.

Wipe the whole insertion section with a clean lint-free cloth dipped in detergent, from the protective sleeve of the control section to the whole insertion section at the top.

### ☐ *Suction washing liquid*

**CAUTION**

- Carefully observe the suction bottle on the suction pump to avoid overflow. Otherwise, it will cause damage to the suction pump.

1. Turn on the suction pump.
2. Install the biopsy valve.
3. Insert the distal tip into the washing solution. Press the suction button and draw the detergent into the instrument channel for about 50 seconds. (Figure 7.7)
4. Remove the distal tip from the detergent. Press the suction button and perform 10 seconds of air suction.
5. Turn off the suction pump.

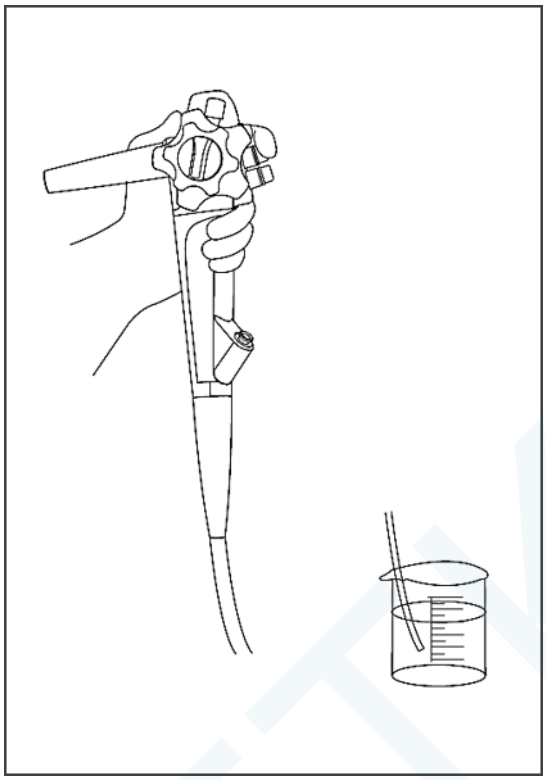


Figure 7.7

☐ ***Disassembly of endoscope, reusable parts, and cleaning, disinfection, and sterilization instruments***

**WARNING**

- The light guide connector is very hot when removed from the light source. Do not touch it. Failure to do so may result in injury to the operator or animal.

1. Remove the electronic endoscope cable from the electrical connector of the endoscope.
2. Remove the suction tube from the suction connector of the light guide connector.
3. Remove the metal head of the water bottle from the air/water supply connector of the light guide connector, and then attach the metal head to the distal tip socket on the lid of the water bottle according to the instruction manual of the water bottle.

4. Remove the light guide connector from the light source.
5. Transport the endoscope to the cleaning, disinfection and sterilization area.
6. Remove the suction button and biopsy valve from the endoscope and place it in a container of washing solution.

## *7.4 Leakage testing*

After pre-cleaning, the endoscope is tested for water leakage to ensure that it is water-resistant.

### ☐ *Required equipment & tools*

Prepare the following instruments and wear appropriate personal protective equipment

- Personal protective equipment
- Large basin with sealing lid
- Clear water
- Maintenance device or light source
- Leak detector
- Waterproof cap

### ☐ *Install waterproof cap*

**CAUTION**

- The electrical connector of the endoscope is not waterproof, so be sure to cover the waterproof cap before soaking the endoscope or performing a leak test. Otherwise, it may cause damage to the equipment.
- If there is a scratch on the outside of the electrical connector, the connector may no longer be waterproof and the gasket inside the waterproof cap may be scratched. If the electrical connector is scratched, it should be immediately sent to our company for repair.
- Be sure to use a dry waterproof cap. Residual water droplets on the waterproof cap can cause damage to the endoscope, maintenance device or light source.

1. Make sure the inner wall of the waterproof cap is completely dry and free of debris. If there is water or debris attached to the inner wall of the waterproof cap, wipe it dry with a dry lint-free cloth.

2. Align the notch on the waterproof cap with the protrude on the electrical connector.

3. Press the waterproof cap and rotate clockwise for approximately 45°, as shown in Figure 7.8 (1) (2) (3).

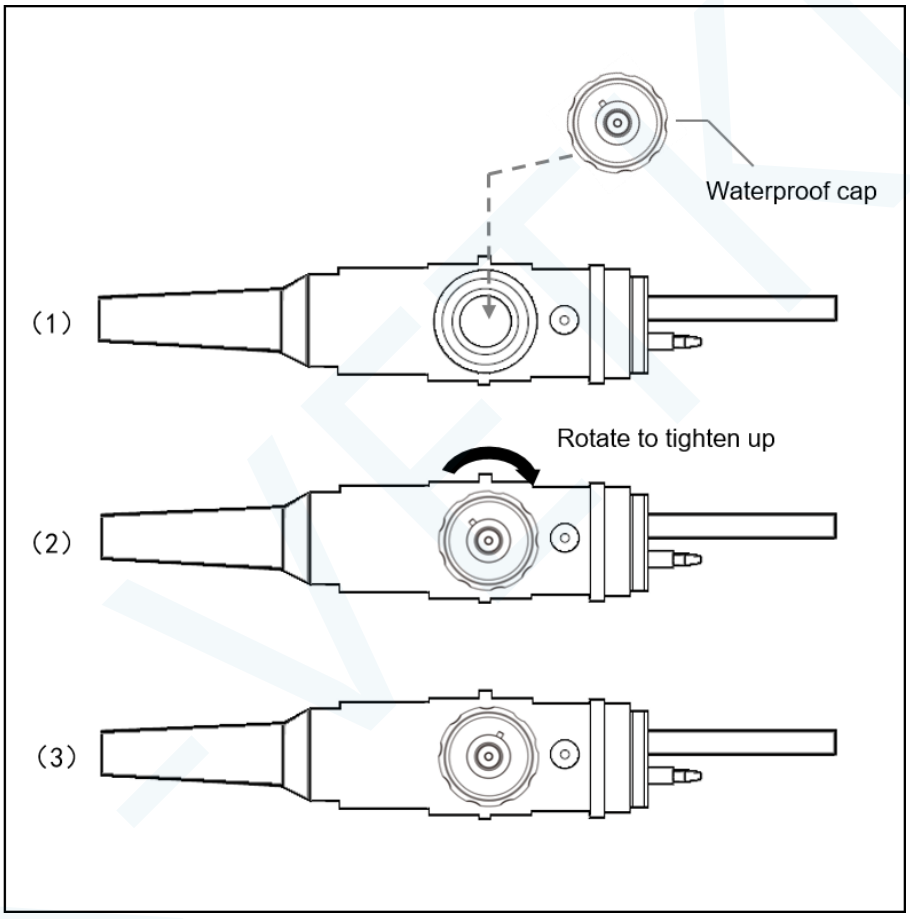



Figure 7.8

## ☐ *Leakage test*

**CAUTION**

- During the leakage test, if continuous bubbles come out of a part of the endoscope, it means that there is a water leak. This suggests that water can get inside the endoscope. If a leak is found, remove the endoscope from the water and contact the company.
- Do not connect or remove waterproof cap or leak tester connector cap while soaked in water. Otherwise, water can enter the endoscope and cause equipment damage.
- The connector cap of the leak tester must be completely tightened to the end. If the connection is not correct, it will not be able to pressurize the inside of the endoscope, and it will not be able to perform an accurate water leak test.
- When connecting the connector cap of the leak tester to the vent connector of the waterproof cap, ensure that the inner side of the connector cap of the leak tester and the outer side of the vent connector of the waterproof cap are completely dry. Residual water droplets may penetrate the waterproof cap and cause the endoscope to malfunction.

**NOTE**

- When the leak tester connector is connected, the rubber on the bending section will expand with the increase of pressure in the endoscope, which is a normal phenomenon.

1. Inject clean water in a basin at least 80cm*50cm (“32*20”) in size and deep enough to soak the entire endoscope.

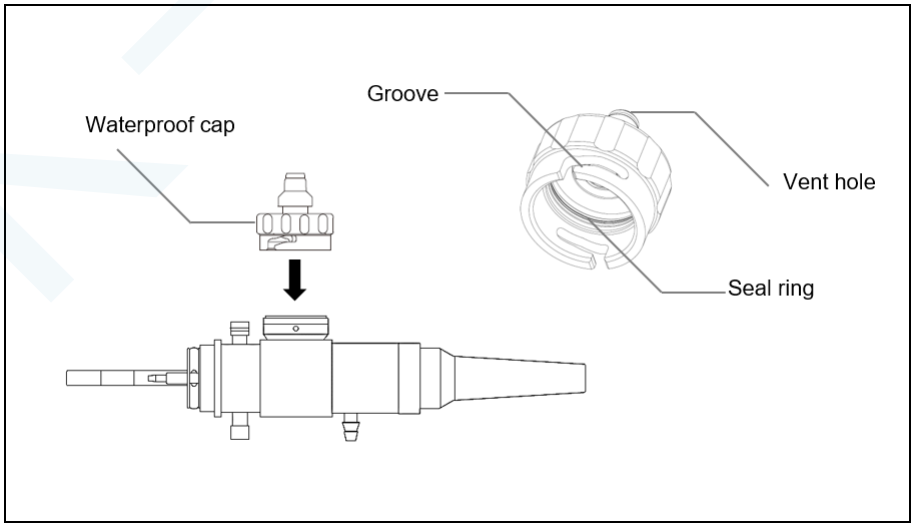



Figure 7.9

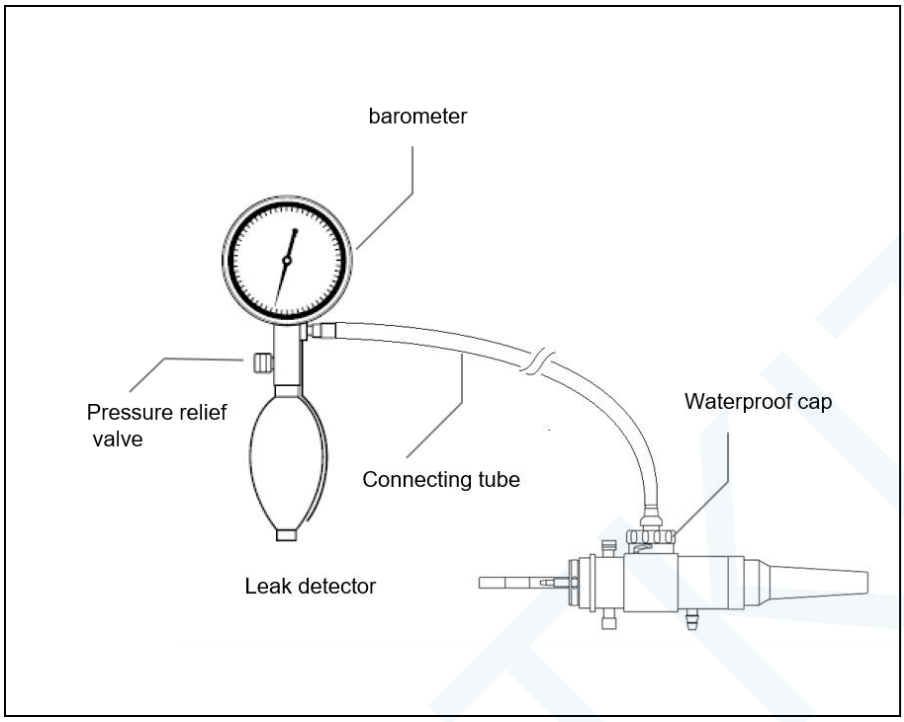



Figure 7.10

2. Make sure there is no water inside the connector cap of the leak tester.

3. Ensure that there is no water outside the vent connector of the waterproof cap. Put the waterproof cap on the electrical connector of the light guide connector, and connect the connector cap of the leak tester to the vent connector of the waterproof cap through the connecting tube (Figures 7.9 and 7.10).

4. Confirm that the air pressure leak valve is closed. Press the airbag until the pressure display indicates between 200-240mmHg. To test for minor leaks, pressurize to about 240mmHg. After pressurization, hold the pointer steady for a few seconds. Read the pressure while the pointer is stable.

**CAUTION**

- If the pointer continuously drops to 0mmHg, the endoscope may have a serious leak or the leak detector may be damaged. Then, leak testing should be stopped immediately. If the endoscope remains soaked in water, water can enter the device without pressure inside. The result can be more serious problems or even irreparable damage to the endoscope.

- If air bubbles continuously emerge from the leak test cap during the leak test, the leak test cap or leak test fitting may be damaged. Please replace the leak test cap or contact the manufacturer for repair in a timely manner.

5. Immerse the endoscope connected to a leak detector in water and observe the bending section for 30 seconds to make sure that no continuous bubbles emerge from the endoscope.
6. Remove the endoscope attached to the leak detector from the basin.
7. Rotate the air pressure leak valve to release air pressure from the endoscope.
8. Remove the leak test cap from the leak detector connector of the endoscope by turning the cap counterclockwise.
9. Thoroughly dry endoscope and associated leak detection components.

## *7.5 Cleaning*

### *7.5.1 Manual cleaning*

**CAUTION**

- To avoid water leakage, do not forcibly clean the endoscope.
- After the leak test is complete, perform manual cleaning according to the following procedure.

In case of excessive bleeding or delay in cleaning, disinfection and sterilization, “Pre-soaking for excessive bleeding or delayed cleaning, disinfection and sterilization after each use” should be performed before proceeding with the following procedures.

☐ ***Reusable parts that can usually be cleaned, disinfected and sterilized with the endoscope***

- Channel plug
- Perfusion tube
- Waterproof cap
- Waterproof cap connection chain

☐ ***Required equipment & tools***

Prepare the following instruments and wear appropriate personal protective equipment.

- Personal protective equipment
- Large basin with sealing lid
- Washing solution
- Clear water
- Soft bristle brush
- Clean, lint-free cloth
- Channel cleaning brush
- Instrument channel opening cleaning brush
- Suction cleaning connector
- Channel plug
- Perfusion tube
- 50cm3 (50mL) syringe
- Suction pump

**CAUTION**

- Do not soak the endoscope with parts other than those mentioned above to avoid damage to the endoscope.

☐ ***Preparation***

1. Inject the washing solution in a basin at the temperature and concentration recommended by the detergent manufacturer. The basin should be at least 80cm*50cm (“32*20”) in size and deep enough to completely soak the entire endoscope.
2. Inject clean water in the basin. The basin should be at least 80cm*50cm (“32*20”) in size and deep enough to completely soak the entire endoscope.

☐ ***Clean the outer surface***

1. Soak the endoscope in the washing solution.
2. Thoroughly scrub or wipe the entire outer surface of the endoscope with a soft bristle brush or lint-free cloth in the washing solution. Pay particular attention to the air/water nozzle

openings and the objective lens, and ensure that all surfaces at the distal tip are thoroughly cleaned (Figure 7.11).

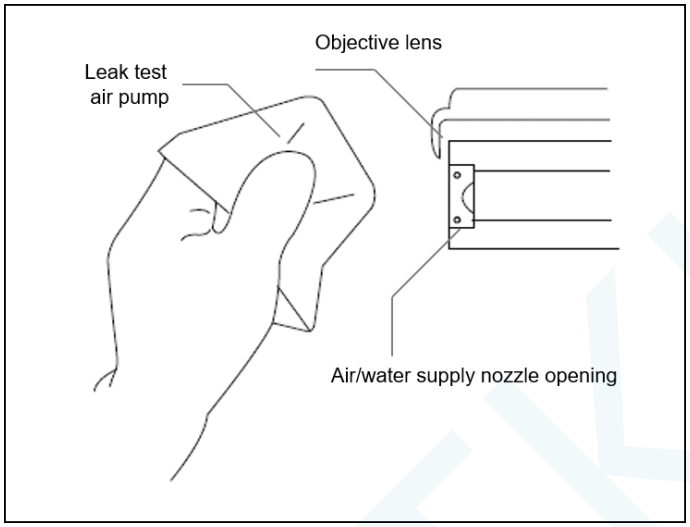



Figure 7.11

### ☐ *Scrub channels*

**WARNING**

- Make sure to scrub the inside of the instrument channel and suction channel. Otherwise, inadequate cleaning and disinfection of the endoscope can pose a risk of infection to the next animal or operator using the endoscope.
- In order to prevent the washing solution splashing out of the channel cleaning brush, the cleaning brush should be drawn out in the water.
- Channel cleaning brush is a consumable. Repeated use may cause the brush head to bend or become knotted, or even fall off during use. Make sure the cleaning brush is not damaged or abnormal before and after each use. If the brush head falls off into the endoscope after brushing, it should be immediately found out and passed through the channel with a new cleaning brush or other endoscope diagnosis and treatment accessory to ensure that there is no foreign body left in the endoscope channel. If any parts are left inside the channel, they may fall into the animal during use. Because of the location, it may not be possible to remove the detached part through a new cleaning brush or other endoscopic treatment accessory. In this case, please contact the company.

**CAUTION**

- Gently pull the channel cleaning brush out of the instrument channel or the suction channel. Make sure that the brush rod does not rub the external opening of the suction connector. Otherwise, the cleaning brush will be damaged and a dent will be worn at the opening, affecting the suction effect and causing water leakage.

- Do not attempt to pass through the channel cleaning brush from the distal tip of the insertion section or suction connector. Otherwise, the cleaning brush will be stuck and cannot be restored to its original position.

During endoscope soaking, scrub the instruments and suction channel, suction connector, and instrument channel opening as per the following procedure (Figure 7.12).

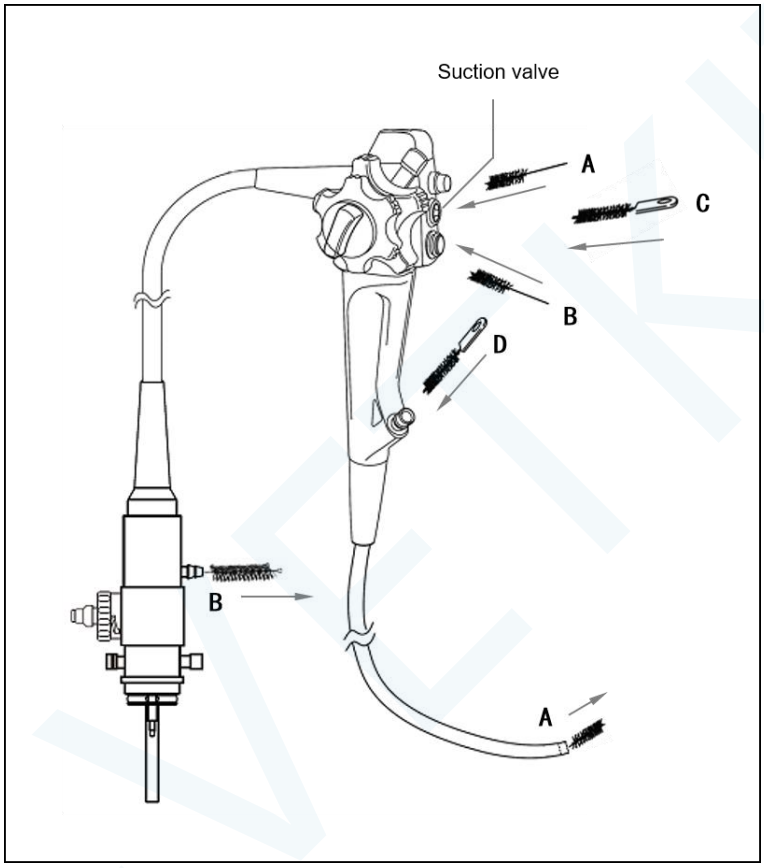



Figure 7.12

**A. Scrub the instrument channel of the insertion section and the instrument channel of the control section (at A)**

1. Soak the endoscope in the washing solution to avoid spillage.
2. Straighten the bending section of the endoscope. Hold the channel cleaning brush 3cm from the brush head.
3. Insert the channel cleaning brush into the opening of the suction connector side wall at an angle of 45°, as shown in A in Figure 7.12. Gently tap and insert the cleaning brush from the insertion section until the brush head protrude from the distal tip of the endoscope.

4. Wash the brush with fingertips in the washing solution. Then carefully pull the cleaning brush back from the channel.
5. Wash the brush again in the washing solution.
6. Repeat several times until debris is completely removed.

**B. Scrub the suction channel of the universal cable (at B)**

1. Hold the channel cleaning brush 3cm from the brush head.
2. Insert the channel cleaning brush straight into the opening of the suction connector as shown in B of Figure 7.12. Gently tap, insert the cleaning brush through the universal cable until the brush head protrude from the suction connector of the light guide connector.
3. Wash the brush with fingertips in the washing solution. Then carefully pull the cleaning brush back from the channel.
4. Wash the brush again in the washing solution.
5. Repeat several times until debris is completely removed.

**C. Scrub the suction connector (at C)**

**CAUTION**

- When inserting the channel opening cleaning brush into the suction connector, do not force the brush into half. Otherwise, the brush will get stuck in the suction connector.

1. As shown in C in Figure 7.12, insert the channel opening cleaning brush into the instrument channel opening until the brush handle touches the channel opening.
2. Rotate to clean and brush once.
3. Pull out the brush and clean the bristles with fingertips in the washing solution.
4. Repeat several times until debris is completely removed.

**D. Scrub the suction connector (at D)**

1. As shown in D in Figure 7.12, insert the channel opening cleaning brush into the instrument channel opening until the brush handle touches the channel opening.

2. Rotate to clean and brush once.
3. Pull out the brush and clean the bristles with fingertips in the washing solution.
4. Repeat several times until debris is completely removed.
5. Clean, disinfect and sterilize channel opening cleaning brush according to the instructions in Section 7.9, Procedures for cleaning, disinfecting and sterilizing reusable components and cleaning, disinfection and sterilization instruments.

**CAUTION**

- Channel cleaning brush is used to scrub endoscope accessories as described in Section 7.9, Procedures for Cleaning, Disinfecting, and Sterilizing Reusable Components and Cleaning, Disinfecting, and Sterilizing instruments.

6. Remove the endoscope from the washing solution.

☐ ***Inject washing solution into the instrument channel and suction channel***

1. Connect the suction cleaning connector to the instrument channel opening (Figure 7.13).
2. Connect the suction tube of the suction pump to the suction connector of the light guide connector. Turn on the suction pump.
3. Soak the distal tip of the endoscope and the weighted end of the suction cleaning connector in the washing solution.
4. Plug the suction connector with a finger and suck the detergent for about 50 seconds.
5. Release the finger from the suction connector.
6. Turn off the suction pump.
7. Remove the suction tube and suction cleaning connector.
8. Clean, disinfect and sterilize suction cleaning connector according to the instructions in Section 7.9, Procedures for cleaning, disinfecting and sterilizing reusable components and cleaning, disinfection and sterilization instruments.

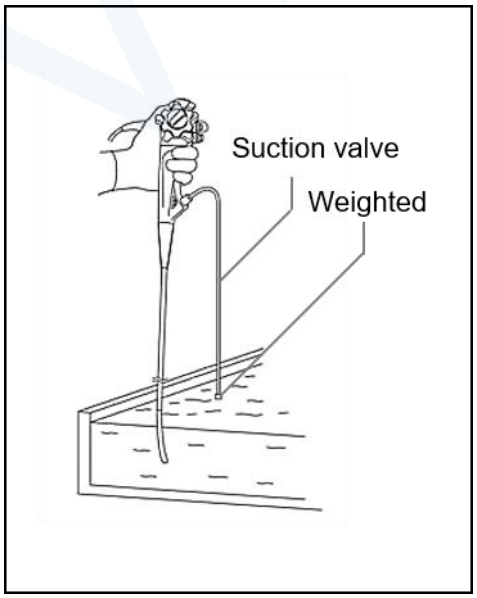



Figure 7.13

## ☐ *Rinse the air/water channel with washing solution*

1. Attach the biopsy valve of the channel plug to the instrument channel opening (Figure 7.20).
2. Install the piston plug of the channel plug on the air/water and suction connectors (Figure 7.20).
3. Press the plug on the control section of the endoscope and slide the plug to the end (Figure 7.20).

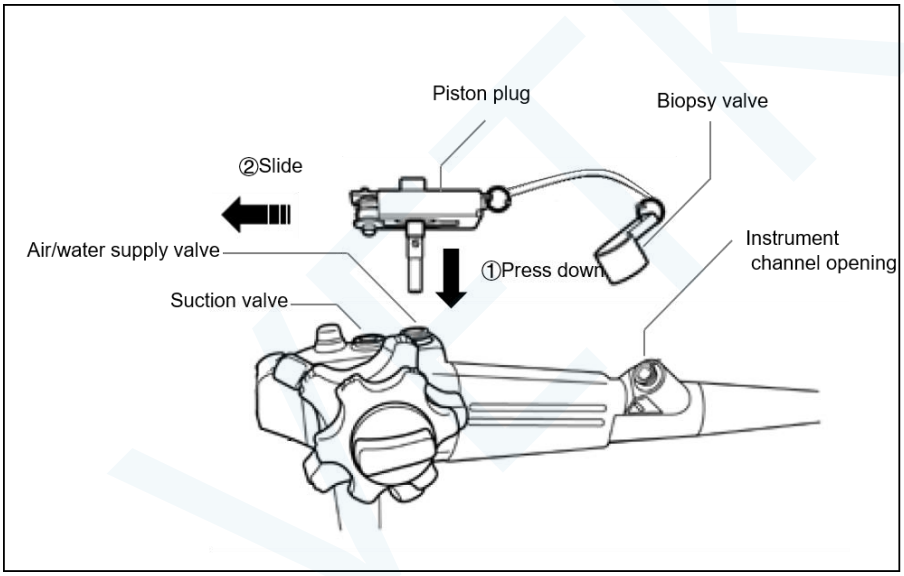



Figure 7.20

4. Install the connector plug of the perfusion tube to the air/water connector on the light guide connector.
5. Install the air supply port of the perfusion tube to the air supply tube of the light guide connector.
6. Install the suction channel of the perfusion tube to the suction connector of the light guide connector.
7. Immerse the suction port of the perfusion tube into the washing solution.
8. Install the 50cm$^3$ (50mL) syringe to the air/water connector of the perfusion tube.
9. Pour 150cm$^3$ (150mL) washing solution into the air/water pipe.

10. Remove channel plug and perfusion tube from endoscope and soak all parts.

☐ ***Soak the endoscope and all cleaning, disinfection and sterilization instruments in the washing solution***

1. Use a lint-free cloth to remove all debris from the outside surface of the endoscope while it is soaked in the washing solution.
2. Cover the basin with a sealing lid to minimize the evaporation of washing solution.
3. Soak the endoscope and all cleaning, disinfecting, and sterilizing instruments at the time, temperature, and concentration recommended by the detergent manufacturer.
4. Remove the endoscope and all cleaning, disinfecting, and sterilizing instruments from the washing solution.
5. Inspect the endoscope and all cleaning, disinfecting, and sterilizing instruments. If debris remains, repeat steps 1-5 above.
6. Place all instruments in clean water and stir gently to rinse thoroughly.

☐ ***Discharge washing solution from all channels***

1. Install channel plug and perfusion tube to endoscope. Place the suction port of the perfusion tube into the clean water. Attach the biopsy valve of the channel plug to the instrument channel opening (Figure 7.20).
2. Install the $50cm^3$ (50mL) syringe to the outlet of the air/water supply connector of the perfusion tube, and inject $150cm^3$ (150mL) clean water into the air/water supply channel.
3. Install the $50cm^3$ (50mL) syringe to the suction channel opening of the perfusion tube, and inject $150cm^3$ (150mL) clean water into the suction channel.
4. Remove the endoscope and all its parts from the water.
5. Cover the distal tip and control section of the endoscope with a clean lint-free cloth.
6. Use a $50cm^3$ (50mL) syringe to inject $150cm^3$ (150mL) air into the air/water and suction

channels respectively through the perfusion tube (Figure 7.20).

7. Remove clean lint-free cloth from the distal tip and control section of the endoscope.

8. Remove channel plug and perfusion tube from endoscope.

☐ ***Dry the external surface***

1. Thoroughly dry the outer surface of the endoscope and all instruments with a clean lint-free cloth.

2. Check the endoscope and all instruments for residual debris. If there are still debris, repeat this section.

### *7.5.2 Automatic cleaning*

Refer to the manual of the automatic cleaning device for related operations.

☐ ***Pre-soaking for excessive bleeding or delayed cleaning, disinfection, sterilization after each use***

**CAUTION**

- Only in the case of excessive bleeding or delay in cleaning, disinfection, sterilization, the following steps are performed; unnecessary soaking should be avoided. Prolonged soaking can cause damage to the endoscope.

1. Inject the detergent in a basin at the temperature and concentration recommended by the detergent manufacturer. The basin should be at least 80cm*50cm (32”*20”) in size and deep enough to completely soak the entire endoscope.

2. Carefully place the endoscope insertion section and universal cord, and completely soak the endoscope in the washing solution.

3. Feed the washing solution into all channels according to the procedure described in this section.

4. Remove only cleaning, disinfection and sterilization instruments from the washing solution.

5. Cover the basin with a sealing lid to minimize the evaporation of washing solution.

6. Soak the endoscope for about 10 hours at the temperature and concentration recommended by the detergent manufacturer.
7. Remove the endoscope from the washing solution.
8. After soaking, clean the endoscope manually according to the procedure in this section or using an automatic cleaning device.

## *7.6 High level disinfection*

### *7.6.1 Manual disinfection*

**WARNING**

- The endoscope and all instruments should be completely soaked in the disinfectant during the entire process of disinfection. When soaked, if the instruments are connected to the endoscope or if any parts of the instruments are not completely soaked in the disinfectant, the disinfectant will not be in sufficient contact with all external surfaces of the instruments.

After manual cleaning, disinfect the endoscope as follows.

☐ ***Required equipment & tools***

Prepare the following instruments and wear appropriate personal protective equipment.

- Personal protective equipment
- Large basin with sealing lid
- Disinfectant
- Channel plug
- Perfusion tube
- Clean, lint-free cloth
- 50cm3 (50mL) syringe

☐ ***Preparation***

1. Fill the basin with disinfectant according to the temperature and concentration recommended by the disinfectant manufacturer. The basin should be at least 80cm*50cm

("32*20") in size and deep enough to completely soak the entire endoscope.

2. Install channel plug and perfusion tube to endoscope. Attach the biopsy valve of the channel plug to the instrument channel opening (Figure 7.20).

### ☐ *Feed disinfectant to all channels*

**WARNING**

- Completely remove all bubbles from channels. Otherwise the bubbles will affect the disinfection effect of the channel surface.

**NOTE**

- Strong injection of disinfectant into the pipe can remove air bubbles.

1. Soak all instruments of the endoscope in disinfectant.
2. Make sure the suction port of the perfusion tube is soaked in disinfectant.
3. Use a 50cm$^3$ (50mL) syringe to inject 150cm$^3$ (150mL) disinfectant into the air/water and suction channels respectively through the perfusion tube (Figure 7.20). Make sure there are no bubbles emerging from the distal tip of the endoscope.

### ☐ *Soak the endoscope and all instruments in disinfectant*

**WARNING**

- The endoscope and all instruments should be completely soaked in the disinfectant during the entire process of disinfection. If the instruments are removed and not completely soaked, the disinfectant will not be in sufficient contact with all surfaces of the instruments. Then, the disinfection effect is affected.

1. Soak the endoscope and all instruments completely in the disinfectant and remove all instruments from the endoscope. Soak the endoscope and all instruments in disinfectant.
2. If air bubbles are attached to the surface of the endoscope or instruments, wipe them off with a clean lint-free cloth.
3. Cover the basin with a sealing lid to minimize evaporation of disinfectant.
4. Soak the endoscope and all instruments in disinfectant at the time, temperature, and concentration recommended by the disinfectant manufacturer. The disinfection method recommended by the company is soaking in 0.5%~0.6% (w/v) OPA disinfectant, soaking time at room temperature should be more than 5 minutes.

☐ ***Remove the endoscope and all instruments from the disinfectant***

1. Connect the channel plug and perfusion tube to the endoscope before removing the endoscope from the disinfectant. Install the biopsy valve of the channel plug to the instrument channel opening.
2. Remove the suction connector of the perfusion tube from the disinfectant.
3. Use a 50cm3 (50mL) syringe to inject 150cm3 (150mL) disinfectant into the air/water and suction channels respectively through the perfusion tube.
4. Remove the endoscope and all instruments from the disinfectant.
5. Remove all instruments from the endoscope.

### *7.6.2 Automatic disinfection*

Refer to the manual of automatic disinfection equipment for related operations.

## *7.7 Sterilization*

In addition to high-level disinfection, the endoscope can also be sterilized by peracetic acid soaking. After manual or automatic cleaning and drying as described in Section 7.3, “Pre-Rinsing”, Section 7.4, “Leaking Testing”, and Section 7.5, “Cleaning”, perform the following steps.

**WARNING**

- The endoscope and all instruments should be completely soaked in the sterilization solution during the entire sterilization process. When soaked, if the instruments are connected to the endoscope or if any parts of the instruments are not completely soaked in sterilization, the sterilization solution will not be in sufficient contact with all external surfaces of the instruments.

## ☐ *Required equipment & tools*

Prepare the following instruments and wear appropriate personal protective equipment.

- Personal protective equipment
- Large basin with sealing lid
- Sterilization solution
- Channel plug
- Perfusion tube
- Clean, lint-free cloth
- 50cm3 (50mL) syringe

## ☐ *Preparation*

1. Fill the basin with sterilization solution according to the temperature and concentration recommended by sterilizing agent manufacturer. The basin should be at least 80cm*50cm (“32*20”) in size and deep enough to completely soak the entire endoscope.
2. Install channel plug and perfusion tube to endoscope. Install the biopsy valve of the channel plug to the instrument channel opening.

## ☐ *Feed sterilization solution to all channels*

**WARNING**

- Completely remove all bubbles from channels. Otherwise the bubbles will affect the sterilization effect of the channel surface.

**NOTE**

- Strong injection of sterilization solution into the pipe can remove air bubbles.

1. Soak all instruments of endoscope in sterilization solution.
2. Make sure the suction port of the perfusion tube is soaked in sterilization solution.
3. Use a $50cm^3$ (50mL) syringe to inject $150cm^3$ (150mL) sterilization solution into the air/water and suction channels respectively through the perfusion tube. Make sure there are no bubbles emerging from the distal tip of the endoscope.

### ☐ *Soak the endoscope and all instruments in sterilization solution*

**WARNING**

- The endoscope and all instruments should be completely soaked in the sterilization solution during the entire process of sterilization. If the instruments are removed and not completely soaked, the sterilization solution will not be in sufficient contact with all surfaces of the instruments. Then, the sterilization effect is affected.

1. Soak the endoscope and all instruments completely in the sterilization solution and remove all instruments from the endoscope. Soak the endoscope and all instruments in a sterilization solution.
2. If air bubbles are attached to the surface of the endoscope or instruments, wipe them off with a clean lint-free cloth.
3. Cover the basin with a sealing lid to minimize evaporation of sterilization solution.
4. Soak the endoscope and all instruments in sterilization solution at the time, temperature, and concentration recommended by the disinfectant manufacturer. The sterilization method recommended by our company is soaking in peracetic acid solution with an effective concentration of not less than 0.2%-0.35%, and the soaking time should be more than 20min.

### ☐ *Remove the endoscope and all instruments from the sterilization solution*

1. Connect the channel plug and perfusion tube to the endoscope before removing the endoscope from the sterilization solution. Install the biopsy valve of the channel plug to the instrument channel opening.
2. Remove the suction connector of the perfusion tube from the disinfectant.
3. Use a 50cm$^3$ (50mL) syringe to inject 150cm$^3$ (150mL) disinfectant into the air/water and suction channels respectively through the perfusion tube.
4. Remove the endoscope and all instruments from the sterilization solution.
5. Remove all instruments from the endoscope.

☐ ***Automatic sterilization***

Refer to the manual of automatic sterilization equipment for related operations.

## *7.8 Rinse after high level disinfection or sterilization*

**WARNING**

- After cleaning, disinfection and sterilization, clean and thoroughly dry the channels of the endoscope. Otherwise, bacteria can grow inside the channels, posing a risk of infection to the next animal or operator to use the endoscope.

After a high level of disinfection, rinse the endoscope and all instruments as follows.

Use water of acceptable microbiological quality. When removing the instruments from the disinfectant, rinse the instruments thoroughly with sterile water immediately to remove the remaining disinfectant. If sterile water is not available, use clean drinking water or water that has been treated (e.g. filtered) to improve microbiological quality in combination with 75%-95% ethanol or isopropyl alcohol (see “Rinse with non-sterile water and alcohol”). Please also consult the infection control department of your hospital.

☐ ***Required equipment & tools***

Prepare the following instruments and wear appropriate personal protective equipment.

- Personal protective equipment
- A large sterile basin with a sealing lid
- Sterile water for sterile water rinsing
- Sterile lint-free cloth
- Channel plug
- Perfusion tube
- 50cm3 (50mL) syringe
- Suction pump (with sterile suction tube)
- If sterile water is not available, prepare the following instruments.
- Clean water for non-sterile water rinsing.

- A small basin with a sealing lid
- 75%-95% ethanol or isopropyl alcohol
- Sterile cotton swabs

**WARNING**

- Alcohol is flammable. Be sure to take care when using.

☐ ***Rinse with sterile water***

1. Inject sterile water in the basin. The basin should be at least 80cm*50cm (“32*20”) in size and deep enough to completely soak the entire endoscope.
2. Soak the endoscope, channel plug, and perfusion tube in sterile water. Rinse and scrub all exterior surfaces thoroughly with a sterile lint-free cloth.
3. Install channel plug and perfusion tube to endoscope. Place the suction port into sterile water. Install the biopsy valve of the channel plug to the instrument channel opening.
4. Use a $50cm^3$ (50mL) syringe to inject $150cm^3$ (150mL) sterile water into the air/water and suction channels respectively through the perfusion tube.
5. Remove the endoscope and all its instruments from the sterile water and place it in a large sterile basin.
6. Cover the distal tip and control section of the endoscope with a sterile lint-free cloth.
7. Use a $50cm^3$ (50mL) syringe to inject $150cm^3$ (150mL) disinfectant into the air/water and suction channels respectively through the perfusion tube.
8. Remove the sterile lint-free cloth from the distal tip and control section of the endoscope.
9. Remove only the perfusion tube. Connect the sterile suction tube from the suction pump to the suction connector of the endoscope. Turn on the suction pump and apply air suction for at least 15 seconds.
10. Turn off the suction pump and remove all instruments from the endoscope.
11. Use a sterile lint-free cloth to thoroughly dry the outer surface of the endoscope and all instruments.

12. Dry the endoscope and all instruments completely.

13. Store the parts as described in Chapter IX, “Storage and Handling of Endoscope”.

**NOTE**

- Rinsing the channels with sterile water followed by 75%-95% ethanol or isopropyl alcohol will help to dry the channels.

☐ ***Rinse with non-sterile water and alcohol***

1. Inject sterile water in the basin. The basin should be at least 80cm*50cm (“32*20”) in size and deep enough to completely soak the entire endoscope.

2. Soak the endoscope and all instruments in clear water. Rinse and scrub all exterior surfaces thoroughly with a sterile lint-free cloth and perform steps 2 to 11 of “Rinse with sterile water”.

3. Fill the small basin with 75%-95% ethanol or isopropyl alcohol.

4. Install channel plug and perfusion tube to endoscope. Install the biopsy valve of the channel plug to the instrument channel opening.

5. Cover the distal tip and control section of the endoscope with a sterile lint-free cloth.

6. Soak the suction port of the perfusion tube in alcohol. Use a $50cm^3$ (50mL) syringe to inject $150cm^3$ (150mL) alcohol into the air/water and suction channels respectively through the perfusion tube.

7. Remove the suction port of the perfusion tube from the alcohol. Use a $50cm^3$ (50mL) syringe to inject $150cm^3$ (150mL) disinfectant into the air/water and suction channels respectively through the perfusion tube.

8. Remove the sterile lint-free cloth from the distal tip and control section of the endoscope.

9. Remove all instruments from the endoscope.

10. Use a sterile lint-free cloth dampened with alcohol to thoroughly rub the outer surface of the endoscope and all instruments.

11. Use a sterile cotton swab to dry the inside of the air/water supply connectors, suction

connector, and instrument channel opening.

12. Dry the endoscope and all instruments completely.

13. Store the parts as described in Chapter IX “Storage and Handling of Endoscope”.

## *7.9 Procedures for cleaning, disinfecting and sterilizing reusable components and cleaning, disinfection and sterilization instruments*

**WARNING**

- After each use, reusable parts and cleaning, disinfection and sterilization instruments must be cleaned and disinfected or sterilized at high temperature. Otherwise, there is a risk of infection to the animal or operator.

This section describes the procedures for cleaning, disinfecting and sterilizing the following reusable components and cleaning, disinfection and sterilization instruments.

- Air/water supply button
- Suction button
- Biopsy valve
- Channel opening cleaning brush
- Channel cleaning brush
- Suction cleaning connector

### ☐ *Required equipment & tools*

Prepare the following instruments and wear appropriate personal protective equipment.

- Personal protective equipment
- A small basin with a sealing lid
- Clear water
- Washing solution
- Channel cleaning brush
- Soft bristle brush

- Clean, lint-free cloth
- 50cm3 (50mL) syringe
- Disinfectant
- Sterile water for rinsing
- Sterile lint-free cloth
- If sterile water is not available, prepare the following instruments.
- A small basin with a sealing lid
- 75%-95% ethanol or isopropyl alcohol

## ☐ *Manual cleaning*

**CAUTION**

- Confirm that the components soaked in the washing solution do not contact each other.
- Make sure the seal ring on the air/water supply button is not scratched.

1. Put water in a small basin. The basin should be deep enough to completely soak all instruments.
2. Inject the washing solution in a small basin at the temperature and concentration recommended by the detergent manufacturer. The basin should be deep enough to completely soak all instruments.
3. Before soaking in the washing solution, remove the biopsy valve cap from the body (Figure 7.21).

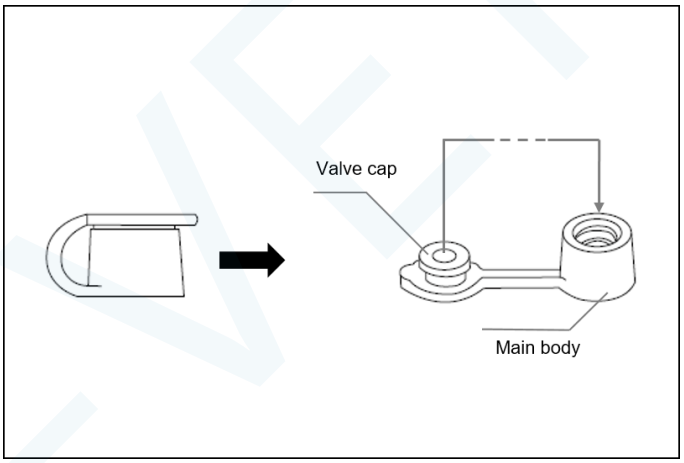



Figure 7.21

4. Soak other instruments in the washing solution.
5. Clean all exterior surfaces of the instruments with a soft brush or a clean lint-free cloth in the washing solution.
6. Use a channel cleaning brush to thoroughly scrub the opening of the suction and air/water buttons until all debris is removed.
7. Thoroughly scrub the inside and opening of the biopsy valve with a channel cleaning brush.
8. Thoroughly clean the bristles of the channel cleaning brush and channel opening cleaning

brush while soaking the brush in the washing solution.

9. Rinse the insides and openings of all instruments with a 50cm$^3$ (50mL) syringe, until there are no bubbles.

10. During soaking, press and release the pistons of the air/water button and suction button. Check that all air bubbles have been removed.

11. Run your hand over the bristles of the channel cleaning brush and channel opening cleaning brush to remove any air bubbles.

12. Use a 50cm$^3$ (50mL) syringe to inject and rinse the inside of the suction cleaning connector soaked in the washing solution. Check that all air bubbles have been removed.

13. Cover the basin with a sealing lid to minimize the evaporation of washing solution. Soak all instruments at the temperature and concentration recommended by the detergent manufacturer.

14. Remove all instruments from detergent and inspect them. If residual debris is found on the instruments, ultrasonic cleaning is performed at 33-48KHz for 5 minutes.

15. Soak all instruments in clean water.

16. Stir gently and rinse all instruments thoroughly.

17. During soaking, press and release the pistons of the air/water button and the suction button. Make sure there are air bubbles coming out.

18. Run your hand over the bristles of the channel cleaning brush and channel opening cleaning brush to remove any air bubbles.

19. Use a 50cm$^3$ (50mL) syringe to thoroughly rinse the inside of the suction cleaning connector soaked in clean water. Check that all air bubbles have been removed.

20. Remove the suction cleaning connector from the clean water, hold the connector and tilt it to drain the residual clean water from the connector.

21. Remove all instruments from the clean water.

22. Dry the exterior surfaces of all instruments thoroughly with a sterile lint-free cloth.

23. Check all instruments for residual debris. If debris remains on the instruments, repeat until all debris is removed.

### ☐ *High level disinfection*

**WARNING**

- Completely remove the bubbles from all instruments. If the bubbles remain, it will affect the disinfection effect.
- All disinfection procedures should be performed with all instruments completely soaked in disinfectant. If any part of the instruments are not fully soaked, the disinfectant may not reach all surfaces adequately.

1. Put the disinfectant in the basin at the temperature and concentration recommended by the disinfectant manufacturer. The basin should be deep enough to completely soak all instruments. The disinfection method recommended by the company is soaking in a 0.5%~0.6%(w/v) OPA disinfectant solution, and the soaking time at room temperature should be more than 5 minutes

2. Soak all instruments in disinfectant.

3. Wipe or rinse all external surfaces with lint-free cloth or a $50cm^3$ (50mL) syringe in disinfectant, ensuring that all air bubbles have been removed.

4. Use a $50cm^3$ (50mL) syringe to rinse and soak the insides or dents of all equipment in the disinfectant. Check that all air bubbles have been removed.

5. During soaking, press and release the piston of the button. Check that all air bubbles have been removed.

6. Use a $50cm^3$ (50mL) syringe to rinse the depression of the channel opening soaked in the disinfectant. Check that all air bubbles have been removed.

7. Run your hand over the bristles of the channel cleaning brush and channel opening cleaning brush to remove any air bubbles.

8. Use a $50cm^3$ (50mL) syringe to thoroughly rinse the inside of the suction cleaning connector soaked in the disinfectant and confirm that all air bubbles have been removed.

9. Cover the basin with a sealing lid, minimize evaporation of disinfectant, and soak all instruments at the temperature and concentration recommended by the disinfectant manufacturer.

10. Remove the suction cleaning connector from the disinfectant. Tilt the connector to discharge the residual disinfectant in the connector.

11. Remove all instruments from the disinfectant.

### ☐ *Sterilization*

**WARNING**

- Completely remove the bubbles from all instruments. If the bubbles remain, it will affect the sterilization effect.
- All sterilization procedures should be performed with all instruments completely soaked in sterilization solution. If any parts of the instruments are not fully soaked, the sterilization solution may not reach all surfaces adequately.

1. Inject sterilization solution in the basin at the temperature and concentration recommended by the disinfectant manufacturer. The basin should be deep enough to completely soak all instruments. The sterilization method recommended by our company is soaking in peracetic acid solution with effective concentration of hydrogen peroxide of 0.2%-0.35%, and the soaking time should be more than 20min.

2. Soak all instruments in sterilization solution.

3. Wipe or rinse all external surfaces with lint-free cloth or a $50cm^3$ (50mL) syringe in sterilization solution, ensuring that all air bubbles have been removed.

4. Use a $50cm^3$ (50mL) syringe in sterilization solution to rinse and soak all equipment insides or indents. Check that all air bubbles have been removed.

5. During soaking, press and release the piston of the button. Check that all air bubbles have been removed.

6. Use a $50cm^3$ (50mL) syringe to rinse the depression in the instrument channel opening soaked in the sterilization solution. Check that all air bubbles have been removed.

7. Run your hand over the bristles of the channel cleaning brush and channel opening cleaning brush to remove any air bubbles.

8. Use a 50cm$^3$ (50mL) syringe to thoroughly rinse the inside of the suction cleaning connector soaked in sterilization solution and confirm that all air bubbles have been removed.

9. Cover the basin with a sealing lid, minimize evaporation of sterilization solution, and soak all instruments at the temperature and concentration recommended by the sterilizing agent manufacturer.

10. Remove the suction cleaning connector from the sterilization solution. Tilt the connector to discharge the residual sterilization solution in the connector.

11. Remove all instruments from the sterilization solution.

### ☐ *Rinse after high level disinfection or sterilization*

After high level disinfection or sterilization, rinse all instruments as follows.

Use water of acceptable microbiological quality. Once removed from the disinfectant or sterilization solution, rinse the instruments thoroughly with sterile water to remove any remaining disinfectant or sterilization solution. If sterile water is not available, use clean drinking water or water that has been treated (e.g. filtered) to improve microbiological quality in combination with 75%-95% ethanol or isopropyl alcohol (see “Rinse with non-sterile water and alcohol”). Please also consult the infection control department of your hospital.

**WARNING**

- Alcohol is flammable. Be sure to take care when using.

### ☐ *Rinse with sterile water*

1. Inject sterile water in a small basin. The basin should be deep enough to completely soak all instruments.

2. Soak all instruments in sterile water.

3. Stir gently to rinse instruments thoroughly.

4. Use a 50cm$^3$ (50mL) syringe to rinse all interiors and dents of the instruments soaked in sterile water and confirm that all air bubbles have been removed.

5. During soaking, press and release the air/water button to suck the piston of the button. Check that all air bubbles have been removed.

6. Run your hand through the bristles of the channel cleaning brush and channel opening cleaning brush to remove any air bubbles.

7. Install the 50cm$^3$ (50mL) syringe to the suction cleaning connector, and inject 50cm$^3$ (50mL) syringe sterile water into the connector during soaking. Check that all air bubbles have been removed.

8. Remove the suction cleaning connector from sterile water and tilt the connector. Discharge the residual sterile water from the connector.

9. Use a 50cm$^3$ (50mL) syringe to supply air into the suction cleaning connector to dry the inside of the connector.

10. Remove all instruments from sterile water.

11. Dry all exterior surfaces thoroughly with a sterile lint-free cloth.

12. Dry all instruments.

13. Store the parts as described in Chapter IX, “Storage and Handling of Endoscope”.

**NOTE**

- Rinsing the interior and depression of the instruments with sterile water followed by 75%-95% ethanol or isopropanol will help to dry the instruments.

### ☐ *Rinse with non-sterile water and alcohol*

1. Inject clean water in a small basin. The basin should be deep enough to completely soak all instruments.

2. Perform steps 3 through 11 of “Rinse with Sterile Water” by soaking all instruments in clean water.

3. Inject 75%-95% ethanol or isopropyl alcohol in the small basin.

4. Soak all instruments in alcohol.
5. Stir all instruments gently in the alcohol.
6. Remove all air bubbles by injecting alcohol into the insides and depressions of all instruments using a 50cm$^3$ (50mL) syringe.
7. During soaking, press and release the air/water button to suck the piston of the button. Check that all air bubbles have been removed.
8. Run your hand over the bristles of the channel cleaning brush and channel opening cleaning brush to remove any air bubbles.
9. Install the 50cm$^3$ (50mL) syringe to the suction cleaning connector, and inject 50cm$^3$ (50mL) alcohol to rinse the connector and remove all bubbles.
10. Remove the suction cleaning connector from the alcohol and tilt the connector to drain the residual alcohol from the connector.
11. Use a 50cm$^3$ (50mL) syringe to inject air into the inside of the suction cleaning connector for drying.
12. Remove all instruments from alcohol.
13. Dry all exterior surfaces thoroughly with a sterile lint-free cloth.
14. Dry all instruments Store the instruments in accordance with the contents of Chapter IX, “Storage and Handling of Endoscope”.

# *Chapter VIII Cleaning and Disinfection Equipment*

The endoscope can be automatically cleaned, disinfected and sterilized using some of the endoscope cleaning and disinfection machines recommended by the company. For detailed operation, please refer to the instruction manual of the endoscope cleaning and disinfection machine.

**WARNING**

- Before cleaning, disinfection and sterilization, the endoscope should be thoroughly cleaned in accordance with the instructions in Section 7.2, Procedures for cleaning, sterilizing and sterilizing endoscope. If an endoscope that has not been thoroughly cleaned is placed in an endoscope cleaning and disinfection machine, debris attached to the endoscope may reduce the cleaning and disinfection or sterilization effect of the endoscope cleaning and disinfection machine, posing a risk of infection to the next animal or operator. Note that the endoscope is not pre-cleaned immediately after use, which will lead to coagulation of animal debris and reduce the cleaning and disinfection effect of the endoscope. Please refer to the instruction manual of the endoscope cleaning and disinfection machine for the connection between the endoscope and the endoscope cleaning and disinfection machine and the operation details of the endoscope cleaning and disinfection machine.

- Our company only approves the endoscope cleaning and disinfection machine recommended by our company. If an endoscope cleaning and disinfection machine is used that is not recommended by our company, the manufacturer of the endoscope cleaning and disinfection machine is responsible for confirming the compatibility of the endoscope model listed in the instruction manual.

- Before using the endoscope cleaning and disinfection machine, be sure that it can clean, disinfect, and sterilize the endoscope and all its channels. If it is not clear that the endoscope cleaning and disinfection machine can clean, disinfect and sterilize the endoscope including all channels, contact the manufacturer of the endoscope cleaning and disinfection machine to confirm its specific specifications or connector information. Otherwise, improper cleaning and disinfection or sterilization of the endoscope may pose a risk of infection to the next animal or operator to use the endoscope.

- When cleaning and disinfecting the endoscope in the endoscope cleaning and disinfection machine, use a connector compatible with the endoscope model. Otherwise, improper cleaning and disinfection or sterilization of the endoscope poses a risk of infection to the next animal or operator. This product is suitable for use of the endoscope cleaning and disinfection

machine information please contact our company.

**WARNING**

- If the endoscope cleaning and disinfection machine is used, the endoscope cannot be cleaned, disinfected and sterilized with other endoscopes at the same time. At the same time, if the endoscope cleaning and disinfection machine is used, it can not be cleaned, disinfected and sterilized with other endoscopes. These endoscopes can only be cleaned, disinfected and sterilized one by one. Otherwise, improper cleaning or disinfection of the endoscope may pose a risk of infection to the next animal or operator to use the endoscope.

# Chapter IV Storage and Handling of Endoscope

**WARNING**

- After cleaning, disinfection and sterilization, a clean endoscope and its accessories should be kept away from any contaminated equipment. If the clean endoscope and accessories get contaminated between examinations, there is a risk of infection to the animal or operator for the next use.
- In order to avoid contamination to the clean endoscope and accessories that have been cleaned, disinfected and sterilized, ensure that the storage cabinet is clean.
- The storage cabinet must be clean, dry, well-ventilated, and kept at room temperature. Do not store the endoscope in direct sunlight, at high temperature and high humidity, or expose it to ozone, x-rays, or ultraviolet light, as this may cause damage to the device or pose a risk of infection.
- Do not store the endoscope in a carrying case. The carrying case can only be used to carry endoscope, and storing in humid and unventilated environments such as carrying case for a long time will result in the risk of infection.

## 9.1 Storage of endoscope

1. The endoscope should be stored in an environment of 10-40°C (50-104°F) and humidity of 50-80%.
2. Remove all matching components from the endoscope. Such as: suction button, air/water button, biopsy valve, waterproof cap, etc.
3. Ensure that all surfaces of the endoscope (especially inside the instrument channel, distal tip, and electrical connections) are completely dry.
4. Carefully wipe the distal tip objective lens with a cotton swab dipped in 75%-95% alcohol.
5. Place the U/D and R/L angulation locks of the endoscope in the unlocked position.
6. Hang the distal tip of the endoscope naturally in the storage cabinet. Make sure that the insertion section is hanging vertically and should be as straightened as possible.

## *9.2 Storage of reusable components, cleaning, disinfection and sterilization equipment and leak detector*

1. Make sure that all reusable components and cleaning, disinfection, and sterilization equipment are completely dry.
2. Store all reusable components in a storage cabinet. Make sure that the components are not in contact with each other during storage.
3. Place all cleaning, disinfection and sterilization equipment in one container, and then place the container in the storage cabinet.

☐ ***Disposal***

This endoscope and any components (such as buttons) shall be disposed of in accordance with all applicable national and local laws and regulations.

## *9.3 In-hospital handling*

When handling the endoscope by hand, coil the universal cord, pick up the control section and light guide connector with one hand, and carefully hold the front end of the insertion section with the other hand, but do not force too hard and do not squeeze.

## *9.4Out-of-hospital handling*

The endoscope should be loaded into a handling box for handling.

**WARNING**

- The endoscope must be cleaned, disinfected or sterilized after removal from the shipping case. If the endoscope is not cleaned, disinfected or sterilized, it can cause infection.

**CAUTION**

- The shipping case cannot be cleaned, disinfected or sterilized. The endoscope must be cleaned, disinfected or sterilized before loading.
- When handling the endoscope, do not cover the waterproof cap, so as not to damage the endoscope due to the change of air pressure during handling.

## ☐ *Disposal*

All applicable national and local laws and regulations should be followed when handling the endoscope and any of its components (e.g., suction button, air/water button, etc.).

**WARNING**

- After the disinfectant or sterilizing agent recommended by the company is used to disinfect or sterilize the endoscope and its components, the waste liquid such as waste chemical reagents and waste disinfectants in batches after use shall be disposed of by special institutions.

Dispose of the endoscope and its accessories at the end of life according to the regulations, it is strictly prohibited to dispose of the instrument as domestic waste, so as not to cause environmental pollution.

# Chapter X Troubleshooting

Do not use the endoscope if it is found to be damaged, performance degraded or otherwise abnormal as described in Chapter III, Preparation and Check. Please contact us.

Some non-functional faults can be resolved through the Troubleshooting Guide in Section 10.1 of this chapter. If the fault still cannot be removed, please stop using it and contact our company.

The company does not repair accessories. If the accessory is damaged, please contact our company to buy a new one.

**WARNING**

- Do not use the endoscope on animals if an abnormality is suspected. Damage to equipment or other abnormal conditions may endanger the life safety of animals and operators, and may cause more serious damage to equipment.
- If the endoscope parts fall into the animal due to equipment damage or malfunction, stop using them immediately and remove the parts properly.

If any abnormality in the function or image of the endoscope is detected during use, it should be immediately discontinued and carefully withdrawn from the animal in accordance with the contents of Section 10.2, “Withdraw abnormal endoscope”.

## 10.1 Troubleshooting Guide

The following tables show faults due to incorrect settings or broken consumables and countermeasures.

Faults other than the following should be repaired. Maintenance by personnel not authorized by the company may result in injury to the animal or operator, so be sure to contact the company for maintenance in accordance with the regulations of Section 10.3 “Return Endoscope for Repair”.

## ☐ *Functions of the endoscope*

**Bending angle**

| Fault | Possible cause | Handling method |
|---|---|---|
| Blocked when turning the angulation control knob | The angulation lock is stuck | Turn the angulation lock in the direction of “F►” |

**Air/water supply**

| Fault | Possible cause | Handling method |
|---|---|---|
| Can’t supply air | The air pump is not started | Press the air pump switch on the light source to adjust the air pump level according to the light source instruction |
| | The air/water supply button is damaged | Replace the air/water supply button |
| Cannot supply water | The air pump is not started | Press the air pump switch on the light source to adjust the air pump level according to the light source instruction |
| | There is no sterile water in the bottle | Add sterile water to the water bottle to its stated water level |
| | The air/water supply button is damaged | Replace the air/water supply button |
| The air/water supply button is not smooth | The air/water supply button is contaminated | Remove the air/water supply button and reinstall it after cleaning |
| | The air/water supply button is damaged | Replace the air/water supply button |
| Unable to install air/water supply button | Use the wrong air/water supply button | Use the correct air/water supply button |
| | The air/water supply button is damaged | Replace the air/water supply button |

**Suction**

| Fault | Possible cause | Handling method |
|---|---|---|
| Inability or lack of suction | The biopsy valve is not properly installed | Correct installation |
| | The biopsy valve is damaged | Replace the biopsy valve |
| | Improper suction pump settings | Adjust the settings according to the suction pump instruction |
| | Suction button damaged | Replace with a new button |
| The suction button is unsmooth | The suction button is contaminated | Remove the suction button and reinstall after cleaning |
| | Suction button damaged | Replace the suction button with a new one |
| The suction button cannot be installed | Suction button damaged | Replace the suction button with a new one |
| | Incorrect suction button is used | Use the correct suction button |
| Water leak from the clamp | The biopsy valve is damaged | Replace the biopsy valve |
| | The biopsy valve is not properly installed | Correct installation |

**Image quality or brightness**

| Fault | Possible cause | Handling method |
|---|---|---|
| No image displayed | The power is not turned on. | Turn on all power switches |
| Image is not clear | Objective pollution | Feed water to the objective lens, clean mucus, etc. |
| The image is too dark or too bright | The light source is not set correctly | Please refer to the instruction manual of the light source for correct settings |
| Abnormal image | Image processing device is not compatible | Select the matching image processing device |

| | | |
|---|---|---|
| | The light source used is not compatible | Choose a matching light source |

**Endoscope diagnosis and treatment accessories**

| Fault | Possible cause | Handling method |
|---|---|---|
| The accessories are not smoothly inserted through the instrument channel | The accessories used are not compatible | Refer to the instruction manual of each accessory and select the matching accessory |

**Others**

| Fault | Possible cause | Handling method |
|---|---|---|
| Button failure | Wrong button was used | Use the button corresponding to the desired function |
| | The button is not set correctly | Set the button function correctly according to the instruction manual of image processing device |

## *10.2 Withdraw abnormal endoscope*

If the endoscope is abnormal, take appropriate actions according to the following instructions: “When the endoscopic image is displayed on the monitor” or “When the endoscopic image is not displayed on the monitor or when the frozen image cannot be restored”. After withdrawal, return the endoscope for repair as described in Section 10.3, “Return the Endoscope for Repair”.

**WARNING**

- If the endoscope or accessory cannot be removed smoothly from the animal, do not attempt to remove it by force, but dispose of it properly. If you find any abnormalities, contact the company immediately. Forcing the endoscope or accessory out can result in injury, bleeding, or perforation to the animal.

### ☐ *When endoscopic image is displayed on the monitor*

1. Turn off all equipment except image processing unit, light source, and monitor.
2. When using the image magnification function of the image processing device, turn it off.
3. If endoscopic accessory is used, the distal tip of the accessory is closed or retracted into the sheath. Then slowly pull out the accessory.
4. Press the suction button to suck excess air, blood, mucus, or other debris.
5. Turn the U/D and R/L angulation locks in the direction of “F▶ and release them.
6. Carefully pull the endoscope out as you observe the image.
7. Remove the dental pad from the animal’s mouth.

### ☐ *When image cannot be zoomed in*

1. Turn off all equipment except image processing unit, light source, and monitor.
2. When the image processing device cannot enlarge the image, turn off the image processing device and then turn it back on. If you still cannot zoom in, turn off the image processing device and proceed to step 2 and subsequent operations in Section 10.2 “When endoscopic image is displayed on the monitor”.

3. Turn off all equipment except image processing unit, light source, and monitor.
4. If endoscopic accessories are used, close or retract the distal tip of the accessories into the sheath. Then slowly pull out the accessory.
5. Turn the U/D and R/L angulation locks in the direction of "F▶" to unlock.
6. Return the U/D and R/L angulation control knobs to their natural positions (Figure 3.4). Release the angulation control knob and carefully pull the endoscope out.
7. Remove the dental pad from the animal's mouth.

## *10.3 Return endoscope for repair*

**WARNING**

- Before the endoscope is returned for repair, it should be thoroughly cleaned and sterilized at a high level. Improper cleaning, disinfection, and sterilization will cause infection risk to the hospital or the company's disposal equipment personnel.

Please contact us before repairing the endoscope. When repairing the endoscope, please attach the description of the endoscope failure or damage and the name, contact information and warranty card of the person who is most familiar with the endoscope failure in your organization.

If the endoscope is to be repaired, move it as described in Section 9.4, "Out-of-hospital handling".

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