

جامعة الانبار
كلية العلوم التطبيقية – هيت
قسم الفيزياء الحياتية

الاجهزة الطبية

Endoscopy 2

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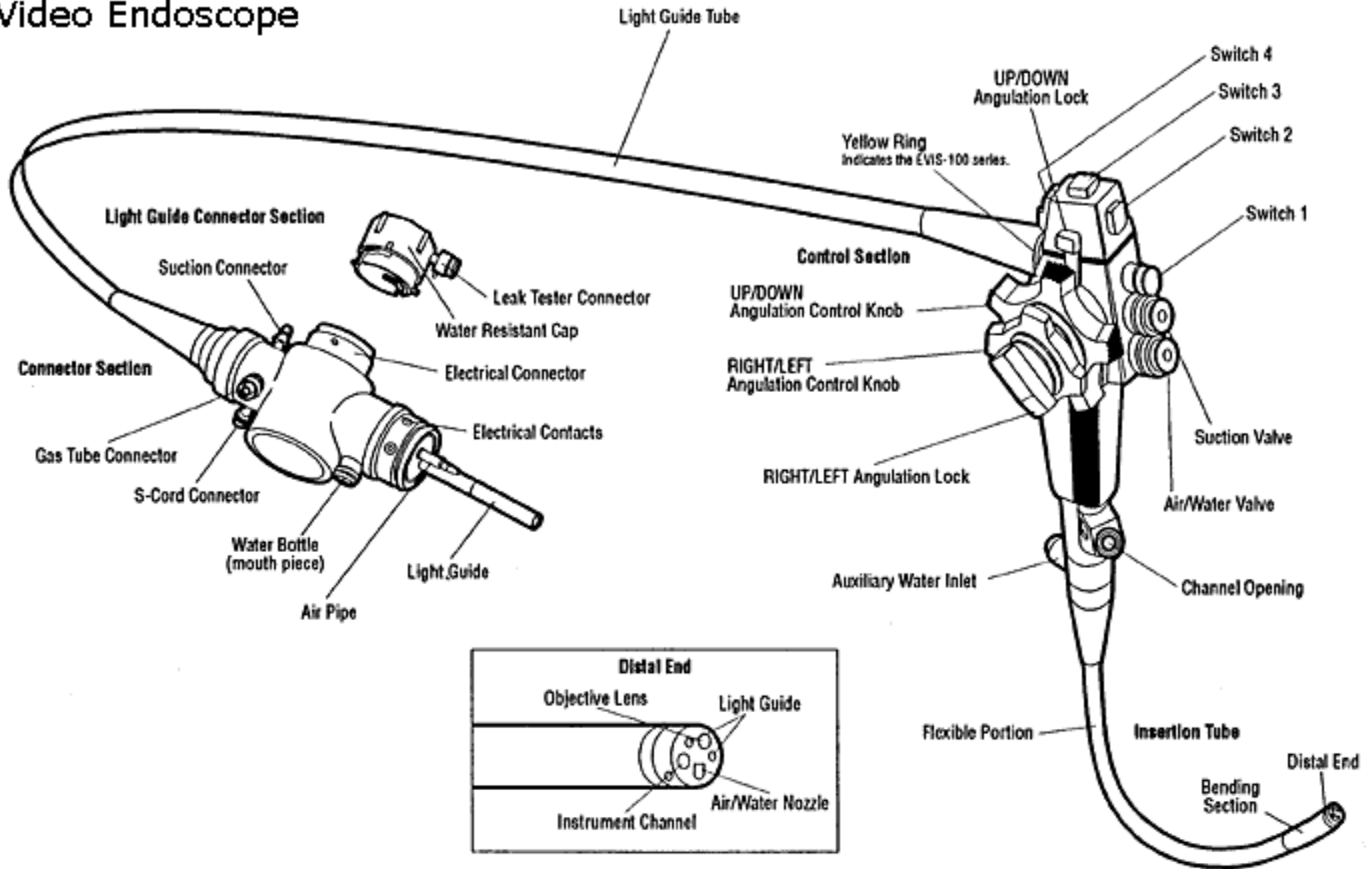
Endoscopy System Items

1. Camera Processor
2. Monitor
3. Light Source
4. Video Recorder
5. Video Printer
6. Suction System
7. E.S.U (Endoscopic Ultrasonography)
8. Trolley With Hanger
9. Endoscope
10. Endo-accessories



VIDEOSCOPE

Video Endoscope

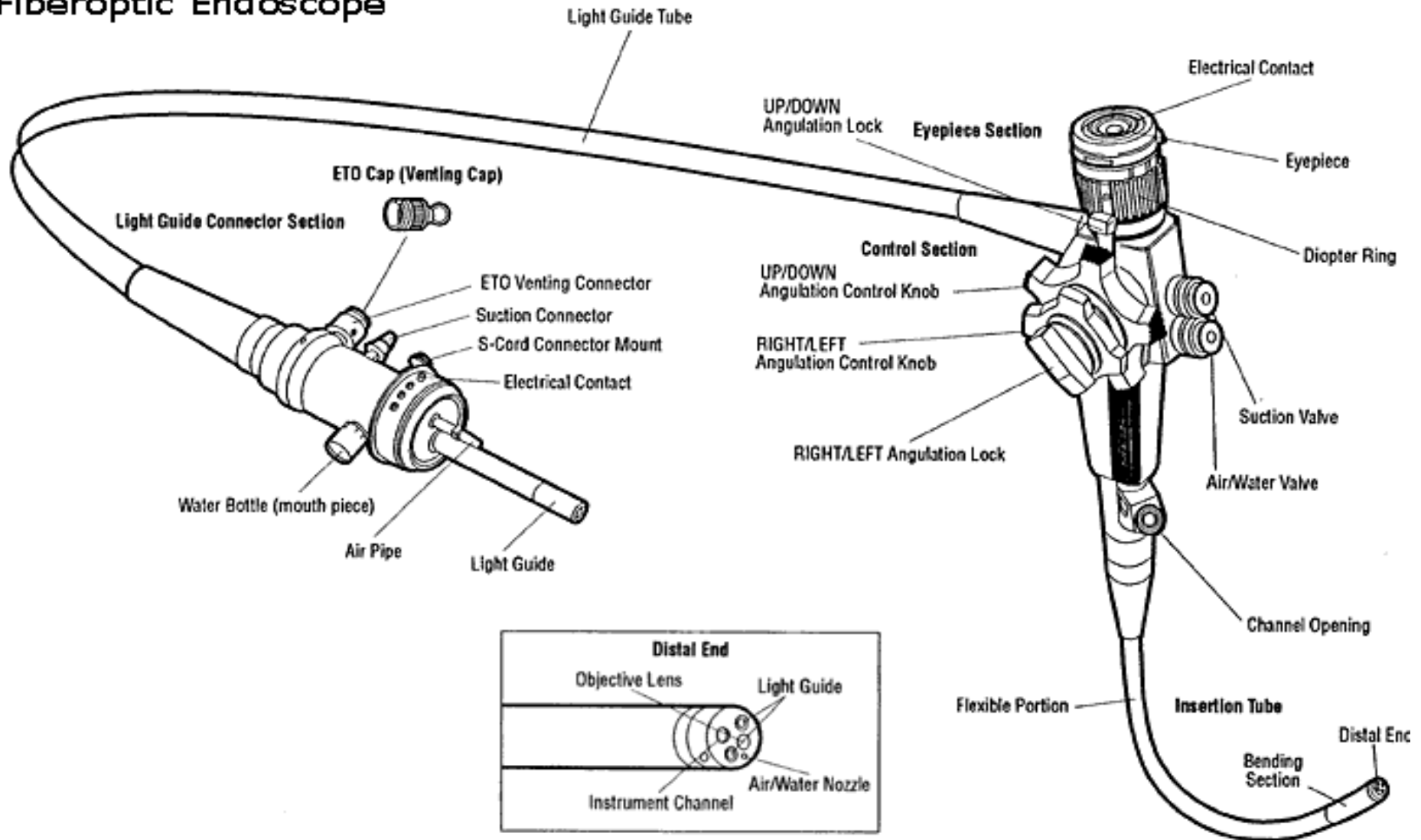


FLEXIBLE ENDOSCOPE

The **flexible endoscope** is a remarkable piece of equipment that can be directed and moved around the many bends in the gastrointestinal tract. Endoscopes now come in two types : The original pure **fiberoptic** instrument has a flexible bundle of glass fibers that collect the lighted image at one end and transfer the image to the eye piece. The newer **video** endoscopes have a tiny, optically sensitive computer chip at the end. Electronic signals are then transmitted up the scope to computer then displays the image on a large video screen. An open channel in these scopes allows other instruments to be passed through in order to take tissue samples, remove polyps and perform other exams.

FIBEROPTIC SCOPE

Fiberoptic Endoscope



Construction of Flexible Endoscope

- Control Body
- Insertion Tube
- Light Guide Tube



Control Body

- Houses the following :
 - Angulation mechanism (drives)
 - Air/water and suction valves
 - Eye-piece(fiberscopes) or remote function buttons(videoscopes).

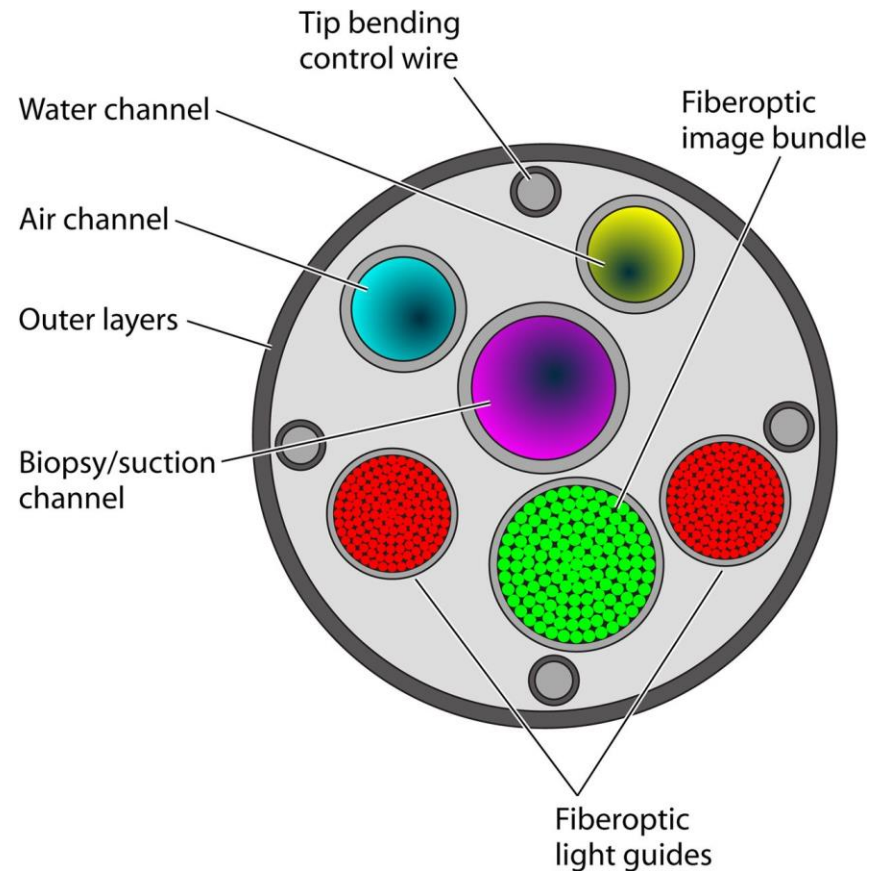


Insertion Tube

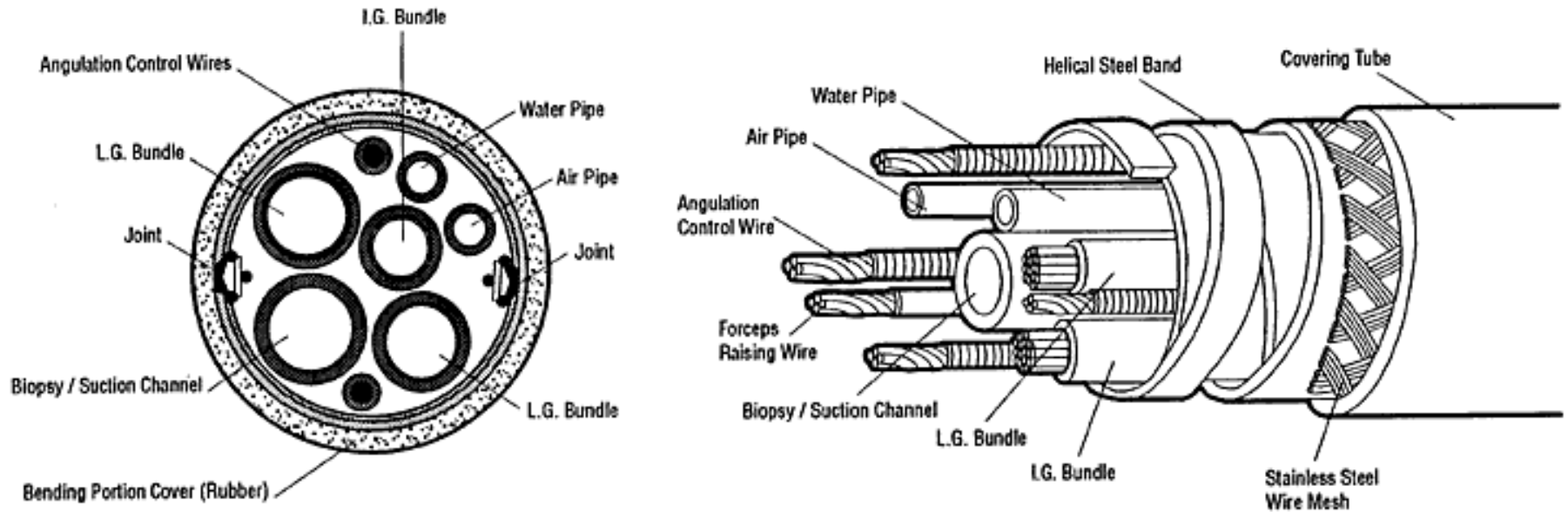
- Made of a complex plastic.

- **Contains the following:**

1. Light Guide fiber
2. Air/Water channel
3. Biopsy channel
4. Angulation wires
5. Lenses or CCD



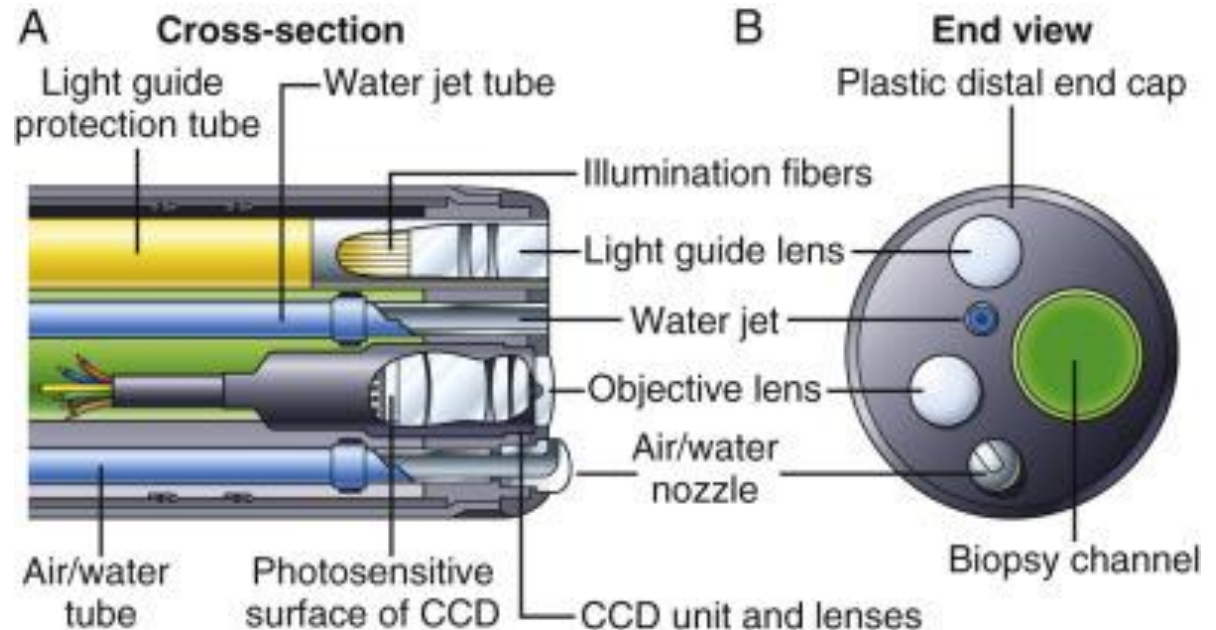
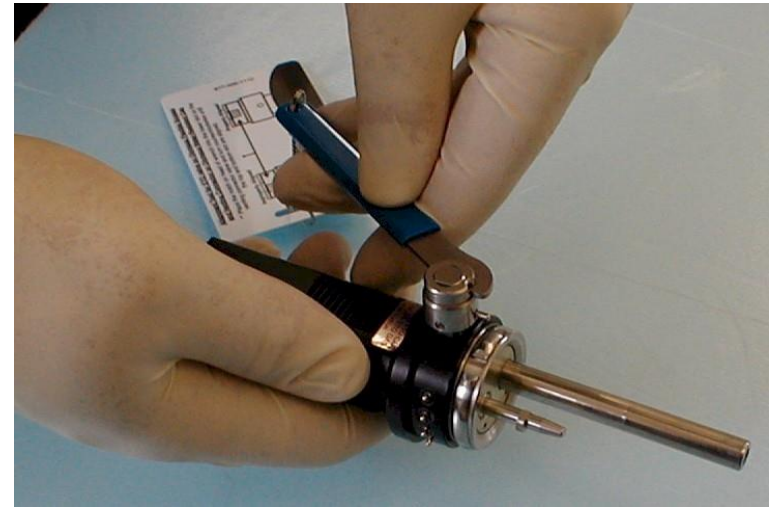
Endoscope Cross Section



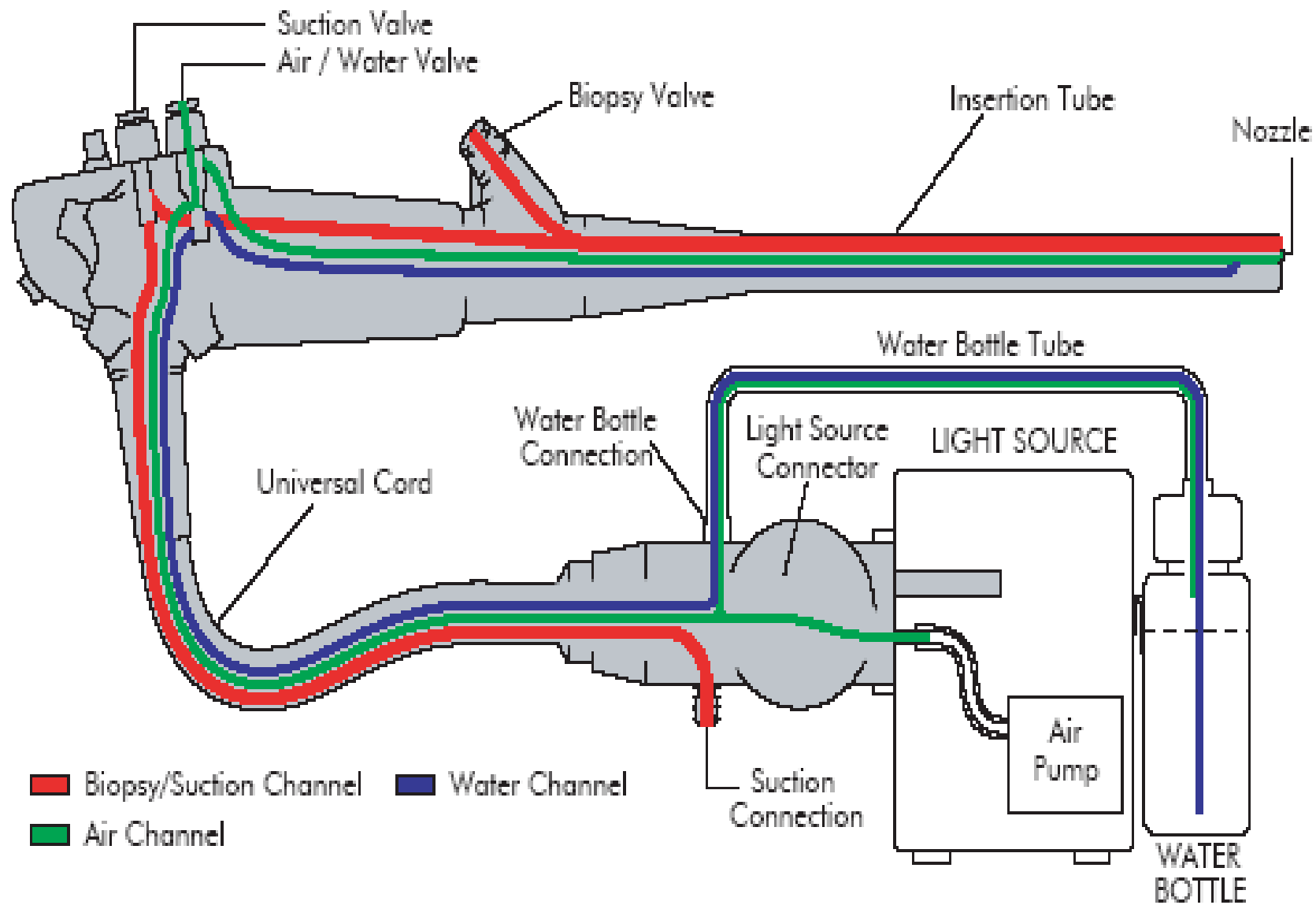
Light Guide Tube

➤ Contains the following:

1. LG fiber
2. Air channel
3. CCD and/or control wires
4. Water channel
5. Suction tube
6. LG plug

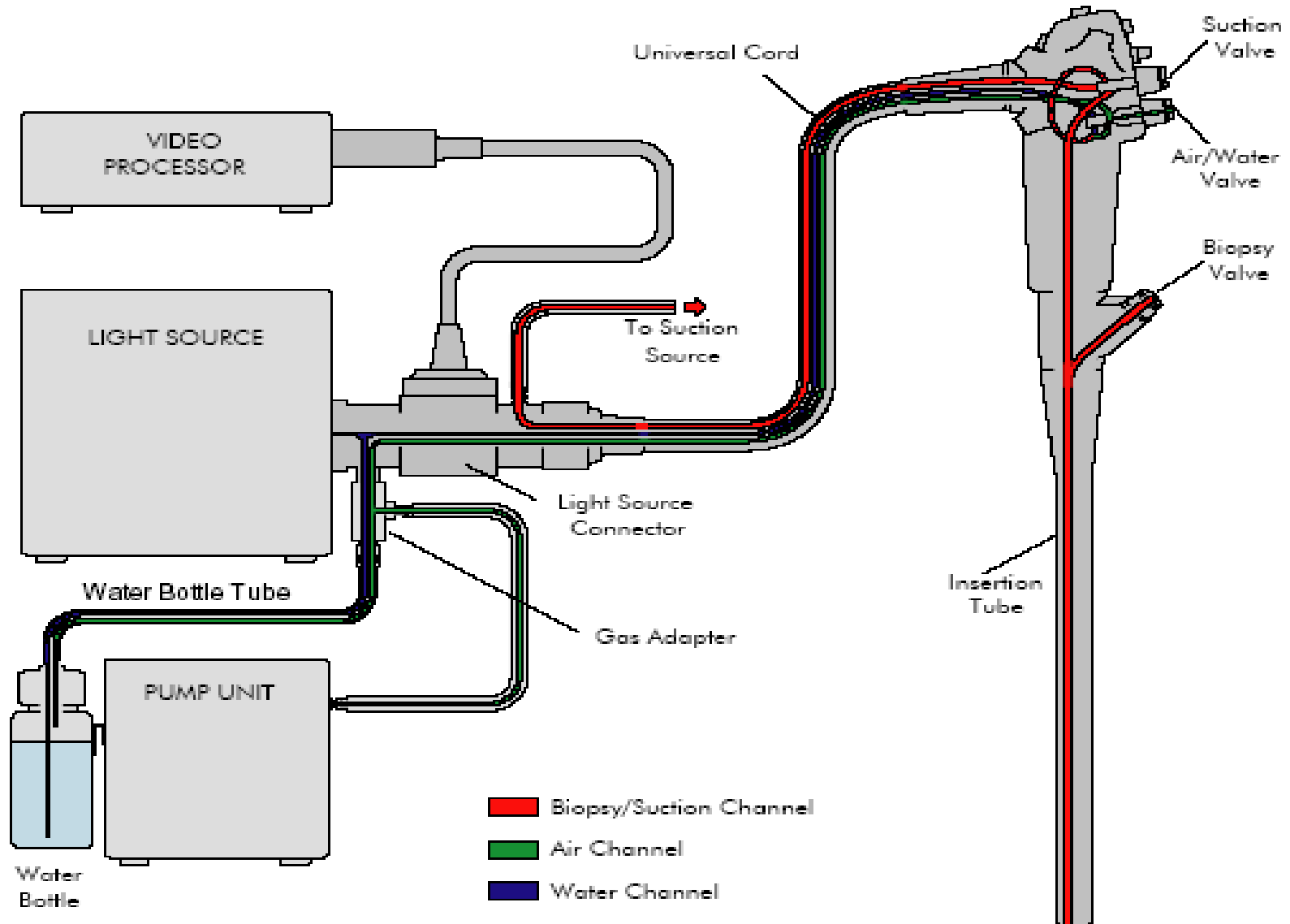


STANDARD CHANNELS - AIR, WATER & SUCTION



Anatomy of Endoscopy System

AIR, WATER & SUCTION CHANNEL SYSTEM



Endoscopic Accessories

1. Biopsy forceps
2. Graspers
3. Baskets
4. Injectors
5. Dilators
6. Knives
7. HF endo-therapy accessories

...And too many types of accessories.



Processing of Endoscopes

- Mechanical Cleaning(wiping tubes and channel brushing in a detergent sol'n)
- Disinfection
- Rinsing



Endoscope Processing Fluids

- **Detergent:** medical grade, low foaming, neutral PH or enzymatic with proper dilution and temperature.
- **Disinfectant :** 2.0-3.0% Glauteraldehyde
- **Rinsing water :** Sterile water is needed to remove detergent and disinfectant residues, all channels must be flushed properly then endoscope to be dried by wiping and then hanged in the special endoscope cabinet

Flexible Care and Maintenance

- Endoscope must be inspected before and after use for the following :
 1. Insertion and LG Tubes
 2. Bending mechanism
 3. Optical system
 4. General inspection(appearance)
 5. Endoscope to be leakage tested

Leakage Test

Endoscopes must be checked against any leak or damage before use and processing to ensure its efficiency and avoid instrument malfunction during endoscopy.

Leakage tester is an instrument which can be attached to endoscope and blows certain pressure of air-set by the manufacturer- inside it then endoscope is immersed in a water basin and checked against any leak, if any leak is seen endoscope must be immediately transferred for repair and must not be used.

FLEXIBLE ENDOSCOPE TROUBLESHOOTING

1- Why Do Air/Water Problems Occur?

1. The scope is not cleaned immediately following procedure.
2. Nozzle is damaged, missing or misaligned.
3. Severe glutaraldehyde buildup from chemical disinfectants can break away from the channel and block the air/water nozzle.

2- How Do Bending Sheaths Become Damaged?

Any sharp objects, such as instruments, fingernails or bites can cause tears or holes in the sheath material.

- Over time, normal wear or over inflation can cause stretching or looseness of the bending rubber material.
- If the (**Ethylene oxide**) ETO cap is not in place during the ETO gas sterilization process, the scope will pressurize and the bending sheath will explode like a balloon.
Follow the instructions on the white card attached to the ETO cap.

3. How Do Fluid Problems Occur?

1. If a scope has a leak which is not detected, and the scope comes in contact with any fluid, moisture will enter the scope through the leak.
2. In fiber scopes, the scope will have major fluid invasion if the scope is immersed with the ETO venting cap on. For video scopes, the water proof cap must be attached before contact with any fluid.
3. If a scope has a fluid invasion and is not repaired immediately, video chip damage and image staining can result, as well as corrosion of the internal metal components.

➤ **Remember** - fluid problems are a scope's worst enemy!

4. Angulation Problems are a Result of:

1. The angulation wires can stretch and break if the angulation is forced.
2. Buckling of the insertion tube can stretch and break wires.
3. Problems in the angulation control knobs usually indicates an angulation adjustment is needed.

5. What Causes Damage to The Channels?

1. Kinked, damaged or open flexible biopsy forceps can cause tears in the channel material.
2. Buckling of the insertion tube can cause buckles in the channel.
3. Forcing instrumentation through the channel can cause wear or tears in the channel material. This frequently occurs in the bending section when resistance is met while the scope is angulated. Do not pass anything through the bending section with the tip angulated further than 110° .

6. How Do Image and Light Guide Problems Occur?

1. Buckles or bites in the insertion or light guide tubes can break image and light guide fibers.
2. Fluid invasion can cause staining of the fibers or video chip damage if not repaired immediately. The fluid also causes brittleness of the fiber bundles.
3. Pulling on the insertion or light guide tube, as well as dropping the scope, can cause broken fibers or damage to the video chip.

7. How to Avoid Repair

1. Proper handling of endoscope.
 2. Using recommended accessories correctly.
 3. Proper processing and using protecting cover in case of videoscopes.
 4. Avoid harmful shaking, dropping or hitting against any hard object.
 5. Leakage test before and after use.
 6. Storing in clean, dry, well ventilated and maintained at normal temperature.
- **For Any Enquiry Don't Try to Discover by Yourself, Ask About It.**