

The Air/Water System

The air/water system often needs repair because the air and water paths separate and merge together several times and the lumens are long, narrow and obstruct easily. Fortunately, the system is usually easy to troubleshoot and can often be repaired on site in the hospital.

The first component of the air/water system isn't located on the scope: it is the air pump in the light sources and processors have control panels which regulate the air pressure electronically – up to seven pounds per square inch at their highest setting. The air flows into the scope through a seal either at the air inlet pipe on the light guide connector or at the water bottler. The air travels through a very small channel in the light guide tube to the body of the scope where it flows out the air/water valve. In order to insufflate the organ to be examined, the air/water valve is covered diverting the air down the insertion tube and out the distal tip.

The second component of the air/water system is the water bottle. When the air/water valve is depressed, air entering the scope is split and some of it is diverted into the water bottle causing the bottle to be pressurized. The pressure then forces the water into another small channel in the light guide tube. Some water bottles are pressurized directly from the air pump with a single channel passing water to the scope. The water travels up the channel through the light guide tube, through the air/water valve and down the insertion tube to the distal tip. Some endoscopes have an auxiliary water port that connects directly into the water channel. In this case the water flows through the auxiliary water port prior to flowing down the insertions tube. Some scopes have an entirely separate auxiliary water channel.

It is important to remember that if you use the control panel to reduce the air pressure, the water pressure will also be reduced. The water bottle connector has a set of o-rings to separate the flow of air and water. When they become damaged, they allow air and water to mix. This may cause the air/water valve to spit water.

The air/water channels in the scope are usually problem free. In most endoscopes the air and water channels connect with a metal Y connector forming a common channel at approximately 30 cm from the distal tip. The channel or channels connect to a small metal nozzle that deflects the air or water across the image lens of the scope. In some older endoscopes, the two channels remain separate the entire length of the insertion tube. The nozzle must be directed across the center of the lens to be effective and have a low profile so it can't injure the patient's mucosa.

Several factors can affect the quantity of air and water production in an endoscope.

A damaged seal will allow air or water to leak causing reduced pressure through the scope ultimately reducing the ability to clear the image lens. This can occur with the water bottle tubing and o-rings, the

FIBERTECH – CHANGING THE INDUSTRY – AGAIN!

For more information visit www.FibertechMedical.com or call 866-628-6888.

separator o-rings, the air/water valve and at the auxiliary water port.

If the insertion tube of the light guide tube become buckled or crimped, the channels may be damaged.

The air water nozzle is the area of greatest failure in the channel system. It is the point of smallest inner diameter and can obstruct from debris or become crushed from an impact. During an endoscopic procedure, air infused into the organ being examined can force debris to back up into the nozzle and the air and water channels: this can travel several centimeters into the channels. The best way to prevent clogging of the nozzle of channels is to irrigate the channels immediately after each endoscopic procedure. Each scope manufacturer has specific instructions for this procedure. A soft bristled brush can be used to clean the nozzle. Never probe the opening with a sharp object as it may damage or loosen the nozzle and could inadvertently scratch the image lens. Avoid using cotton tipped applicators to clean any port of component of the air water system as fibers from the applicator may clog the channels of nozzle.

When blowing air through any of the channels, do not exceed 20 PSI of pressure. The auxiliary water port of channel should be cleaned and reprocessed in the same manner as any other channel in the endoscope.

Careful handling of the endoscope and prompt cleaning of the channels after a procedure will maintain your endoscope in optimum working condition.