

EndoScan™
Endoscope Lens Tester
User's Manual



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1. Features

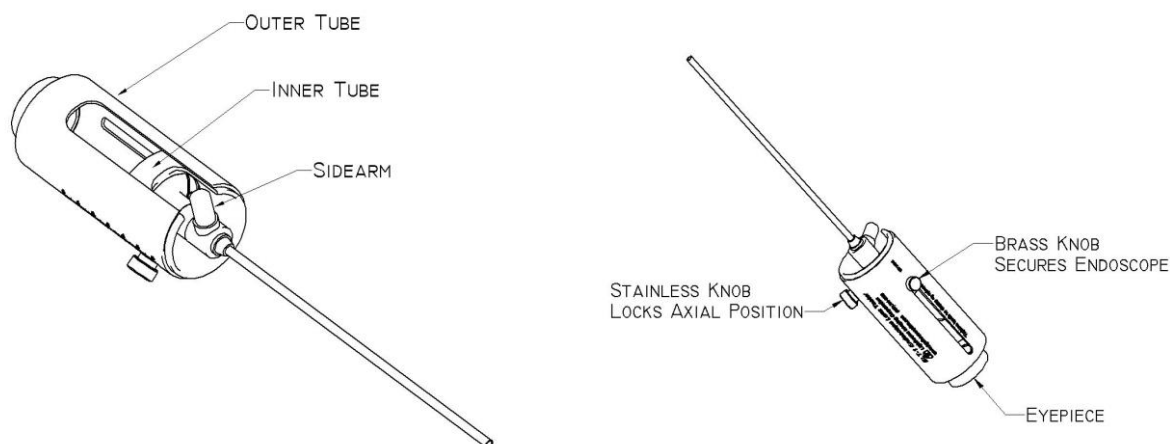
The EndoScan™ permits the user to examine the interior optical components of a rigid endoscope. It can be used to detect broken relay lenses, dirty lenses, and other defects. These defects can arise from extended use, abuse, or improper repair. The endoscope eyepiece window should be cleaned before testing with the EndoScan.

2. Using the EndoScan

2.1 Attaching the EndoScan to an Endoscope

- Loosen the Stainless Steel Knob, slide the inner tube as far as possible from the eyepiece, and use the Stainless Steel Knob to lock it in place. Locking the inner tube in place prevents it from shifting while the endoscope is inserted, and reduces the risk of dropping the endoscope
- Loosen, but do not remove, the Brass Knob
- Insert the eyepiece into the inner tube, making sure that the proximal plane of the eyepiece is flat on the base of the inner tube. Align the endoscope sidearm with the slot in the outer tube
- Tighten the brass knob until the split ring is snug against the eyepiece.

TIP: Do not over tighten the brass knob, as this could damage the eyepiece.



TIP: The split ring is free to rotate in the inner tube—you should ensure that the gap in the ring is opposite the brass knob. If the gap were aligned with the brass knob, the tip of the knob could come into contact with the eyepiece, resulting in possible damage.

2.2 Examining Lenses

2.2.1 Lighting and background

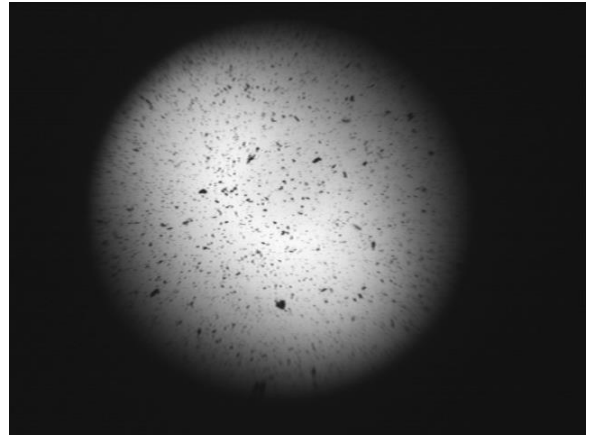
The EndoScan should be used with the endoscope pointing towards a well-lit neutrally colored background. The background will not be visible, but should be evenly colored and illuminated to provide a consistent image. To provide consistent background, try to hold the endoscope at a relatively constant distance from the background.

2.2.2 Test procedure

- Loosen the Stainless Steel knob, permitting the inner tube to slide in the outer tube. Do not remove the knob.
- Slowly move the inner tube and endoscope towards the EndoScan eyepiece until the outside edge of the endoscope eyepiece window comes into focus. This is the first optical surface that can be examined.

TIP: Avoid touching the brass knob while conducting a test. If the brass knob is loosened accidentally, the endoscope can fall from the instrument and be damaged.

- As the endoscope moves closer to the EndoScan eyepiece, the interior optical surfaces of the endoscope come into focus—first the eyepiece lenses, then the relay lenses, finally the distal lens group and, for inclined direction of view endoscopes, the prism.
- By scanning back and forth between the eyepiece window and the distal end, the user can sequentially examine each of the optical surfaces.
- Defects that can be observed include:
 - Dirt and Dust
 - Scratches
 - Moisture
 - Adhesive Separations
 - Broken Relay Lenses



A dirty relay lens, as seen with the EndoScan

If a defective surface, or some other point of interest, is detected, the Stainless Steel knob can be used to lock the unit in place. The Scale and indicator line adjacent to the knob can be used as a position reference for finding points of interest at a later date. As discussed in the Advanced Topics section, a video camera may also be used to document defects discovered with the EndoScan

TIP: Due to variations in people's eyesight, the position of a defective surface as indicated by the scale is only approximate. You may need to move the endoscope a few millimeters either way to find a particular point of interest.

3. Advanced Topics

3.1 Using the EndoScan with a video camera

Any video camera and coupler that can be attached to a standard endoscope eyepiece can be attached to the eyepiece on the EndoScan. Using a video camera allows more than one person at a time to examine any defects. Captured images permit documentation of any defects that may be discovered.

3.1.1 Focus

Focus the camera at infinity. The camera focus need not be changed while using the EndoScan.

3.1.2 Lighting

When used with a video camera, the EndoScan will generally require the use of an external light source. Connect the sidearm of the endoscope to a light cable and external light source.

If using an external light source, it can be helpful to cap the distal end of the endoscope. The plastic caps that are often provided with new endoscopes can be used. If a plastic cap is used, white or a light color is best.

3.2 Cleaning the EndoScan lens

Clean the lens with a swab or lens tissue that has been moistened with alcohol or acetone. If the interior side of the lens needs cleaning, the eyepiece unscrews, permitting easy access.