

Understanding Videoscope Technology

Videoscopes are flexible remote visual inspection systems that are used when access to the area to be examined is restricted, typically by a series of bends or turns. They have become the instrument of choice throughout industry because they are a versatile and easy-to-use platform with many advanced technological features.

Videoscopes deliver excellent image quality and image recording functionality in a portable, integrated product. All Olympus videoscope systems feature still-image and movie recording in a PC-ready format. Stereo measurement is a key feature of Olympus IPLEX™ NX, GX, and G Lite videoscopes, enabling accurate and repeatable measurement of defects to help inspectors assess a component's condition.



Features and Benefits

CCD Sensor

Unlike traditional flexible instruments, which are constructed using a fiberoptic image guide, a videoscope is a digital system that features a high-quality CCD (charge-coupled device) image sensor mounted in the distal end of the insertion tube. From this position at the end of the insertion tube, the image sensor is always the first piece to enter the inspection area, helping ensure image fidelity. This high-resolution CCD sensor features increased light sensitivity for operating in low light conditions, delivering high-quality images to an LCD monitor for immediate visual assessment of a component's condition.

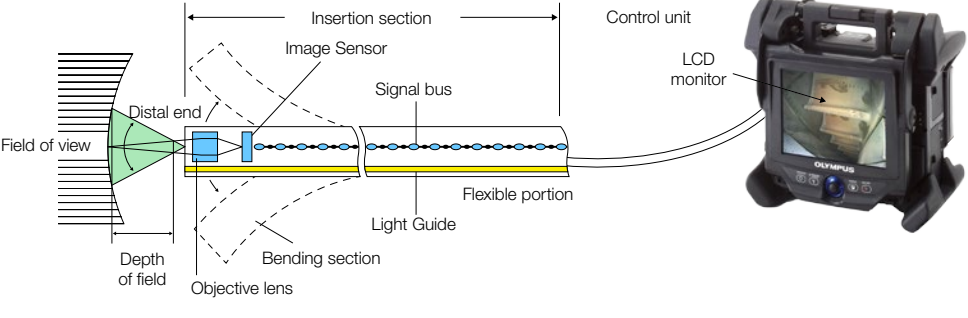
LCD Monitor

Advances in LCD monitor technology enable larger screens with clearer, brighter images that help inspectors spot and evaluate flaws while maintaining an ergonomic position. The LCD monitor is optimized in conjunction with the other system components – the CCD image sensor, image processor, and optical design. The LCD monitor can also enable on-screen commands and stored images to be viewed. Many of the IPLEX videoscope platforms now offer daylight-view technology for clear images, even in direct sunlight.



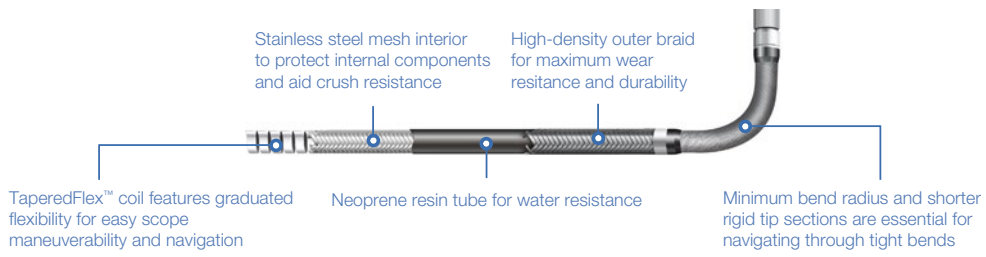
Processor

Olympus' innovative PulsarPic™ processor balances processing, illumination, and image recording in the IPLEX G Lite, GX/GT, and NX videoscopes. The PulsarPic processor also carries our latest active noise reduction algorithm to generate clearer images.



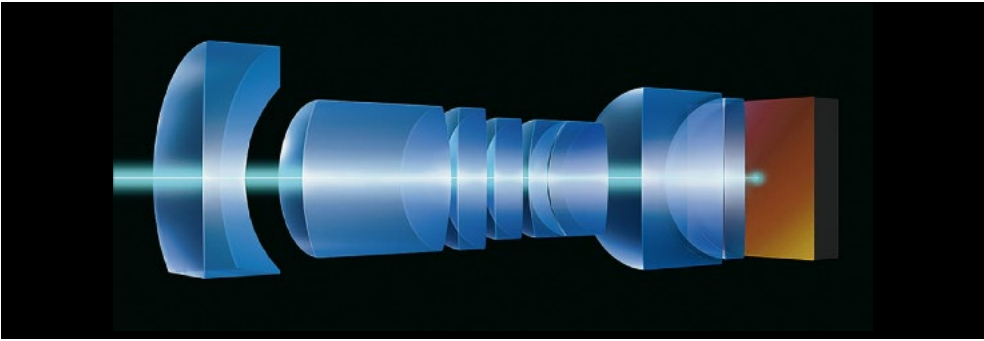
Insertion Tube

The insertion tube is the most critical component. The insertion tube is the part of the scope that enters the inspection area, so it is frequently required to navigate through narrow paths and abrasive surfaces. Olympus IPLEX™ videoscopes feature four-layer, tungsten braided insertion tubes that are both durable and flexible. Standard insertion tube diameters are 4 mm (0.16 in.), 6 mm (0.24 in.), and 8.5 mm (0.33 in.). A 6.2 mm diameter insertion tube with an internal working channel is also available for through-scope object retrieval and advanced hook/drag applications.



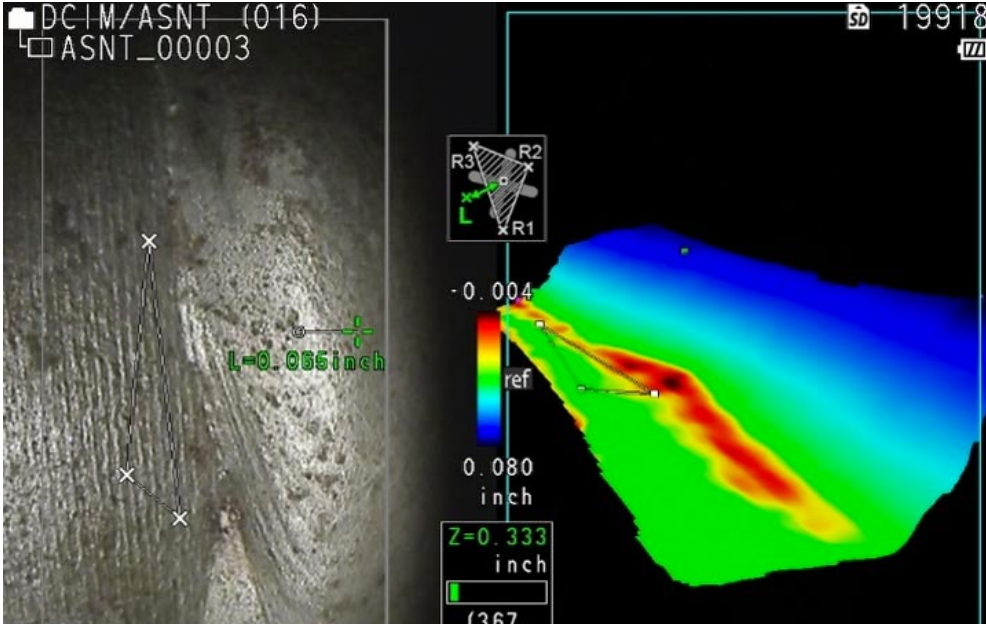
Lens Technology

As a world-renowned optical company, Olympus used its expertise to design a series of small-diameter, interchangeable tip adaptors for use with our videoscopes. We apply more than 100 years of optics experience from microscopes to SLR camera lenses to help ensure that our videoscope images are represented accurately, with minimal distortion, and no glare or reflection. A wide range of tip adaptors are available to suit varying inspection requirements.



3D Modeling

The IPLEX NX videoscope provides 3D modeling of your target, enabling you to see the details of what you're inspecting from multiple angles. The 3D view eases the task of setting your reference points and lines, reducing the chance of misalignment and helping minimize the need to remeasure.

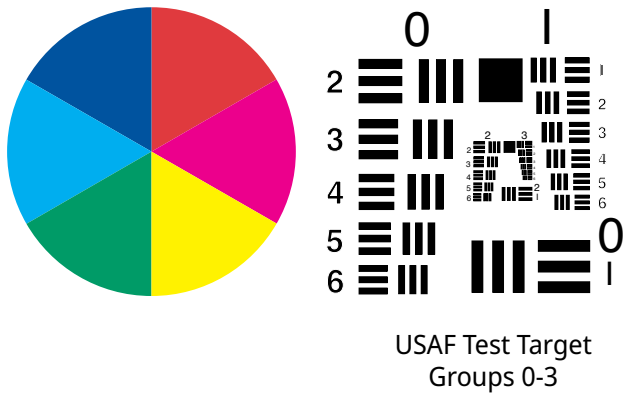


Left: Stereo image of a weld. Right: 3D model of the weld with depth mapping. The colors show the location of the undercut at a glance. Green: in line with reference plane (ref). Red: below the plane (undercut).

Image Quality and Ease of Use

Resolution

The widely accepted standard used to measure the optical performance of a videoscope is the US Air Force (USAF) 1951 resolution chart. The USAF test targets are normally observed at a working distance of 25.4 mm (1.0 in.). Because of the wide range of optical tip adaptors available for the IPLEX series of videoscopes, the resolution will vary depending on the optical characteristics in use (field of view and depth of field) and condition/cleanliness of the lens.



WiDER™ Image Processing Software

Wide Dynamic Extended Range (WiDER) is a unique image processing function that enables objects in both the foreground and background to be viewed simultaneously and in balanced contrast, saving time. The WiDER system makes it easier to select and view the area of interest during inspection.



Before WiDER



After WiDER

TrueFeel™ Scope Articulation

Navigating and positioning the insertion tube to display the required view makes articulation important. IPLEX videoscope systems feature TrueFeel four-direction scope tip angulation, enabling precise control over the movement.

TrueFeel articulation makes the videoscope's joystick incredibly responsive. TrueFeel articulation uses rapid responding servo motors to control the scope tip movement so users can easily navigate tight angles.

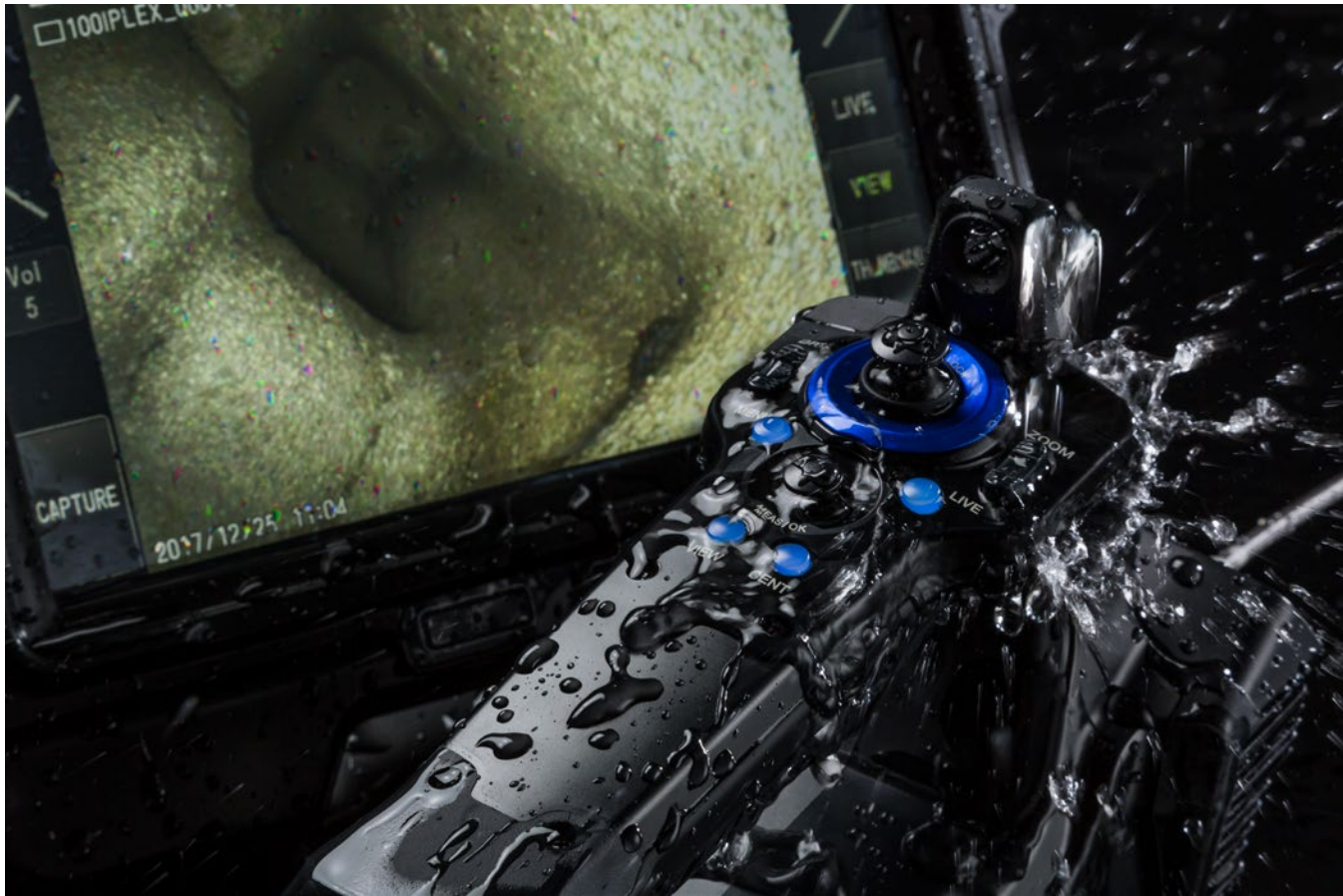
The system is called TrueFeel to underline the fact that the movement of the tip section is very direct, enabling the operator to accurately control the bend angle. When closer examination or fine adjustment is needed, the lock-mode function holds the bend angle in place.

Remember to always release the lock or brake mechanism before retracting the insertion tube from the inspected area to maintain system performance and reliability.



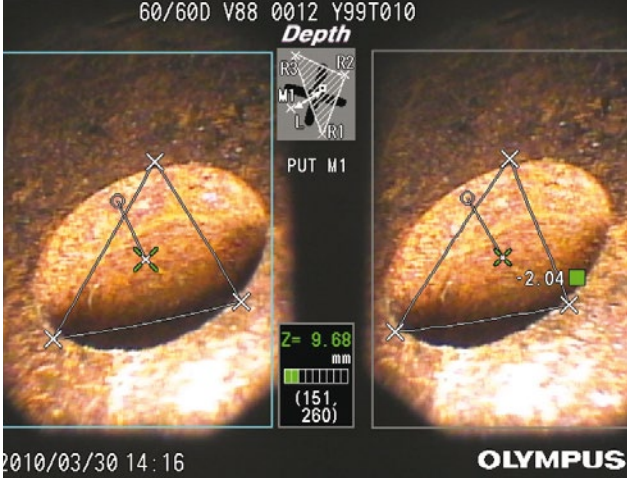
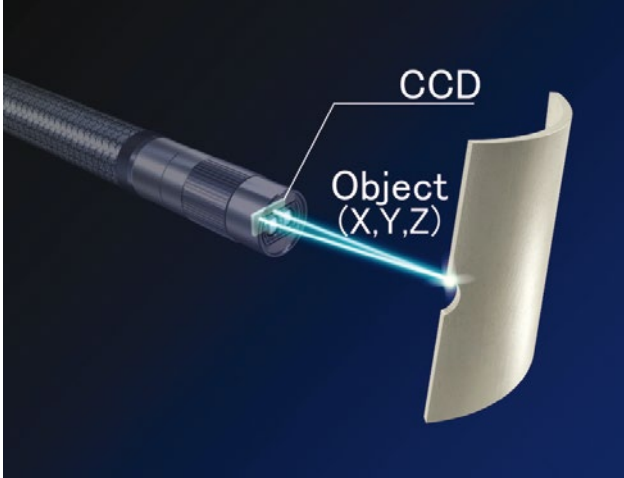
Rugged Durability

IPLEX NX, GX/GT, and G Lite videoscopes are built to pass a wide variety of environmental hazard tests in compliance with recognized military standards (MIL-STD-810G/MIL-STD-461F). These videoscopes are built to survive blowing rain, humidity, salt fog, sand and dust, icing/freezing rain, and explosive atmospheres and are drop tested for maximum uptime.



Stereo Measurement

Measurement is an important part of remote visual inspection as users need to accurately size defects in situ without removing the component part. Olympus pioneered stereo measurement in 1996—an innovative 3-dimensional technique using an optical tip adaptor with dual lenses to create a stereo view of the object. Stereo measurement combined with up to 8 measurement modes makes IPLEX videoscopes truly versatile systems. Also on the IPLEX NX videoscope, advanced 3D modeling enables more confident point placement and visualization of the shape of the inspected item.



Tip Adaptors

An important component of any RVI device is its optics, especially in videoscopes that use fibers to transmit illumination from the light source. The optics in the tip adaptor are complete advanced lensing systems and serve to spread the light from the light guide. Lens systems can correct aberrations, and their high-quality materials enable optimal light throughput. Simpler solutions, such as mirrors or single lenses, may be less costly to produce but often result in reduced image quality. The tip adaptor of an IPLEX videoscope is a critical part of a complex lens system that optimizes image fidelity and brightness. Some tip adaptors also include SmartTip technology, which self-identifies and documents with captured images the tip adaptor that was used. This reference provides a record of the method used for the inspection.



IPLEX™ Series Videoscopes



IPLEX NX

The IPLEX NX advanced videoscope features exceptional image quality, an intuitive user interface, ergonomic design, and durability to excel at the most demanding applications. Advanced features include laser diode illumination, expanded stereo measurement capabilities, including 3D modeling, and a multiposition design for user comfort.

IPLEX GX/GT

The IPLEX GX and GT versatile, lightweight videoscopes feature the PulsarPic™ image processor to produce high-resolution, bright images. With TrueFeel™ servo articulation, their handsets make comfortable and ergonomic work of any inspection. The 20.3 cm (8 in.) daylight-view touch-screen monitor and bright LED illumination deliver clear images in dark spaces. The IPLEX GX videoscope has enhanced imaging features such as active noise reduction, image color and sharpness enhancement, and WiDER along with available measurement.

Rapid replacement or interchangeable scopes are available for the IPLEX GT and GX videoscopes, so you can choose the right scope for the right job. Scopes are available in diameters of 4 mm (0.16 in.) and 6 mm (0.24 in.) and in various lengths ranging from 2 m (6.6 ft) to 10 m (32.8 ft).

IPLEX G Lite

Small enough to be held in one hand, the IPLEX G Lite videoscope delivers high-quality images in a compact, durable form. Packed with many advanced features, including WiDER, active noise reduction, PulsarPic, a touch-screen monitor, scalar measurement, and TrueFeel servo articulation, the IPLEX G Lite videoscope is a powerful, ultra-portable tool for inspecting in the field.

Durable insertion tubes either 4 mm (0.16 in.) or 6 mm (0.24 in.) in diameter are available, as well as in varying lengths up to 10 m (32.8 ft). Upgrading to stereo measurement is also possible.

IPLEX TX

Intended for small crevice inspection, the IPLEX TX thin videoscope's insertion tube is 2.4 mm (0.09 in.) in diameter and 1.2 m (3.9 ft) in length. With its very durable rapid-replace insertion tube, the IPLEX TX videoscope is designed to optimize uptime while providing clear images from a small access point.