

OLYMPUS BOROSCOPES

Introduction

Borescopes are the ideal choice when straight-line access to the area of interest is available. These rigid instruments use an optical lens system to transmit an image from the inspection area back to the eye and a non-coherent fibre bundle to illuminate the object. They are available in a range of diameters from 0.9mm to 16mm (0.04 to 0.63") and working lengths up to 1.5m (4.8'). Their ease of use ensures a straightforward inspection solution with minimum set-up.



Series 5 Borescopes

Rigid borescopes are used where straight-line access to the inspection area is available, providing a cost effective solution for many applications. By using a precision optical lens system, high definition images of the inspection area are provided to the operator's eye. An external light source is then used to transmit illumination to the subject area via a detachable light guide cable.

Download the [Olympus Industrial brochure](#) and refer to pages 14 and 15.



Series 5 borescopes are available in a wide range of diameters, working lengths, direction of view and field of view (magnification). All models feature a number of innovative design elements, including:

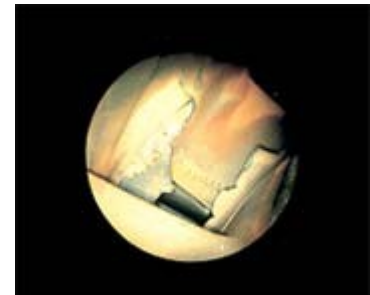
Sophisticated optical system - Olympus is renowned for optical innovation and the Series 5 is no exception. Each diameter of borescope has its own lens system design, optimized to the available space. Multi-layer lens coating is used to reduce internal reflections and maximize image brightness and contrast.

Orbital Scan - Especially useful when the borescope is clamped or being used in conjunction with CCTV, this feature allows the insertion tube to be rotated a full 370 degrees without affecting the orientation of the control body or accessories attached to the eyepiece.

High-grade stainless steel insertion tube - Ensures a durable, corrosion free, fluid resistant, outer protective sheath.

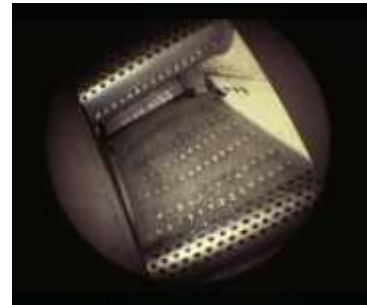
Laser welded tip - Significantly reduces the possibility of tip detachment for safe, trouble free inspections.

Ergonomically designed control body - A comfortable and functional control body design has always been a hallmark of Olympus borescopes. The Series 5 design further enhances this and integrates all controls, placing them within easy reach for true single handed operation.



Color coded identification ring - The serial number and model reference are engraved in the eyepiece ring. This is also color coded to indicate the borescope direction of view.

Lens to fiber ratio - While large lenses provide bright, clear images in ambient lighting conditions, the overall result in an actual inspection is far more dependant on the light transmission performance of the instrument. Series 5 achieves a precise balance of lenses and fibers for superb image brightness.



Some models have been specifically designed for gas turbine applications - select the [Series 5 Aeroengine](#) category from the Products menu for further information. For increased versatility, a range of instruments featuring a variable direction of view is also available. These [Series 5 Swing Prism borescopes](#) can replace three or more conventional instruments and are available in 6 or 8mm diameter.

Environmental Specification

All Series 5 borescopes are built to withstand the rigors of industrial inspections and have the following environmental specification:

Temperature:

Insertion tube (in air): -20 to 150°C (-4 to 302°F)

Complete instrument (in air): -20 to 50°C (-4 to 122°F)

Pressure:

Insertion tube: 0.7 to 1.7 bar absolute in air (upto 1.7 bar absolute in water)

Complete instrument: 0.7 to 1.06 bar absolute in air

Fluid resistance:

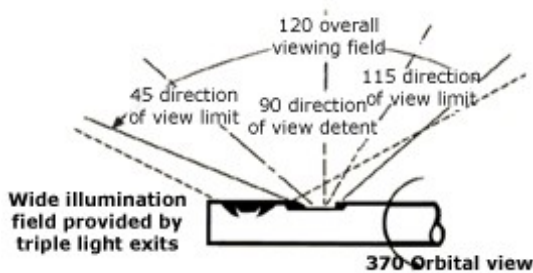
The insertion tube can be immersed for short periods, and control body wiped with, the following chemicals: Water, 5% salt water, petrol, diesel, mineral and synthetic oils, aviation fuel, Skydrol.

Series 5 Swing Prism

Some applications require the observation of a wider area than can be achieved using a single rigid instrument. Standard Olympus Series 5 borescopes have a fixed direction of view and a fixed field of view, which although perfectly suited to a single area inspection, can necessitate a kit of multiple instruments to fully inspect a larger area.



Download the [Olympus Industrial Brochure](#), page 15



The Olympus Series 5 Swing Prism borescopes feature an adjustable prism in the objective end of the instrument that allows the operator to remotely control the direction of view from 45° fore-oblique to 115° retro, thus allowing the area to be scanned. Coupled to the standard 50° field of view of the instrument, a total arc of 120° can be viewed. In addition, the light guide fibers at the objective end are separated to provide a spread of illumination across the entire viewing range.

In addition to the swing-prism for direction of view adjustment, some models feature an optical zoom function to provide instant adjustment of image magnification. This allows for detailed analysis of a defect without changing instruments or complicated post-inspection image enhancement. Click on the image to see the effectiveness of this combination of functions.

All the optical innovations of conventional Olympus Series 5 instruments are also incorporated in the Swing Prism design.

Environmental Specification

The swing prism models meet the same environmental specifications as the standard Olympus Series 5 borescopes, as follows:

Temperature:

Insertion tube (in air): -20 to 150°C (-4 to 302°F)

Complete instrument (in air): -20 to 50°C (-4 to 122°F)

Pressure:

Insertion tube: 0.7 to 1.7 bar absolute in air (up to 1.7 bar absolute in water)

Complete instrument: 0.7 to 1.06 bar absolute in air

Fluid resistance:

The insertion tube can be immersed for short periods, and control body wiped with, the following chemicals: Water, 5% salt water, petrol, diesel, mineral and synthetic oils, aviation fuel, Skydrol

Series 5 Aeroengine

The aerospace industry has for a considerable period of time adopted rigid borescopes as the preferred choice of instrument for the inspection of aero gas turbine engines. Olympus have partnered with many of the principal engine manufacturers to produce a range of dedicated aeroengine borescopes, designed and built to meet the engine manufacturers specifications for optimum inspection performance. Some of these instruments feature a rotating graticule to aid in the visual assessment of defects, and others have a removable handle for areas where access is limited.

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Other engine types are supported by use of the standard [Series 5](#) or [Swing Prism](#) instruments. Please refer to the Applications section or check with your local Olympus representative for further information.

The Aeroengine scopes can be used for other applications - see the table below to see if they are relevant to your inspection requirements.



Series 5 aeroengine scope used during an on-wing inspection



Borescope view of turbine nozzle guide vane (NGV)

Small Diameter Borescopes

For applications where access to the area of interest is only possible through an aperture less than 4mm (0.16"), the Olympus range of small diameter borescopes offers a wide choice of specifications. These instruments are ideal for many applications, including the inspection of electronic components, fine castings, fuel injectors and hydraulic systems.



Download the [Olympus Industrial Brochure](#), page 16.



Small diameter borescopes are available in 0.9, 1.2, 1.7, 2.5 or 2.7mm (0.04, 0.05, 0.07, 0.10 or 0.11") diameter insertion tubes and up to 250mm (10") working length. The instruments direction of view can be direct (000°), fore-oblique (015°) or lateral (090°) and with the introduction of a new range of instruments, two types of image transmission are available. Models with close focus capability are also available to provide a view of very small and intricate areas.

This new range (X-series) utilizes a high resolution fiber conduit image transmission system which provides excellent image quality and a more robust, semi-flexible insertion tube. This also allows smaller diameter models to be produced, including the new 0.9mm (0.04") version which offers distinct advantages in some applications. Other models utilize a Selfoc optical lens system (K-series) which offers exceptional image resolution and image brightness, but does not offer the same robustness as the fiber versions. Any one of the Olympus light sources can be used with the small diameter borescopes, including the ILK-M1 - a compact battery powered light source developed specifically for these instruments. All instruments include a 32mm eyepiece, which ensures compatibility with the full range of borescope accessories, including photographic, CCTV and viewing adaptors.

Surface Mount Inspection Probes

There's never been a quicker, more comfortable and effective way to inspect beneath electronic components

SolView is a simple and cost-effective tool for inspection of the quality of solder bonds beneath surface mount components. Battery power eliminates the need for external power supplies, making this a truly portable system.

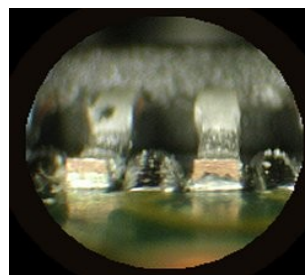
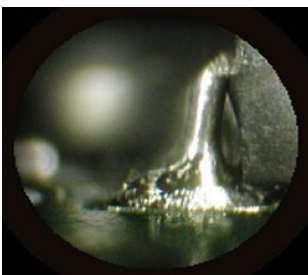


Inspection of printed circuit board assemblies is vital for PCB and original equipment manufacturers for quality control purposes, instilling confidence in the integrity of their soldering processes and delivering improved product reliability. Previously, however, the initial high costs of specialist inspection equipment have been a deterrent to investment for many manufacturers, leaving end users to suffer the consequences.



To overcome this potential problem, Olympus has created a cost-effective solution with *SolView* - a versatile inspection probe that provides instant visual feedback to meet the most stringent user requirements in a wide range of manufacturing environments, including cell phones, PDAs, entertainment systems, audio/visual products and military applications.

The following through-probe images illustrate the optical capabilities of *SolView*. In the examples below two J-lead devices are captured via an Olympus Camedia Digital Camera. The left hand image displays a joint with excess solder and the image on the right displays a misplaced component.



SolView Range

Two SolView probes are available - the lateral viewing *SolView-90*, and the direct viewing *SolView-00*. Light emitting diodes (LEDs) illuminate the area of interest and *SolView-90* is supplied with an easy-to-attach backlight to provide additional illumination to the rear of the component.

The two models cater for all inspection requirements by allowing the user to view either perpendicular to the solder bonds or from alternate angles for a profile view.



SolView-90



SolView-00

SolView is a truly portable system and requires just two LR6/AA batteries, allowing at least 8 hours operating time.

***SolView* Features**

- Two models - direct and lateral viewing
- Hand held, visual inspection probes
- Excellent optical performance
- LED illumination
- Removable backlight illuminator
- Variable focus control
- Strap attachment
- Anti-roll supports
- Only two AA batteries required for full portability
- Ergonomic design
- Digital CCTV compatibility
- No additional equipment required for full operation and maintenance



Accessories:

SolView in itself provides a complete working system, however ancillary equipment is available to meet more sophisticated inspection requirements.

Olympus OmniStage

OmniStage provides a convenient base for inspecting printed circuit boards over extended periods. A multi-directional platform can be translated 305mm in the X-axis, 75mm in the Y-axis and rotated 360 degrees to allow optimum presentation of the component under inspection. Z-axis movement is achieved by the counterbalanced mounting arm, which eliminates any load that the probe might otherwise apply to the PCB.

OmniStage Features

- Aesthetically refreshing new XYZ Stage design
- 440mm diameter platform for 300mm x 300mm PCBs
- Multi-directional platform
- Electrostatically safe
- Counterbalanced arm with position stops
- Portable and easily assembled system
- CCTV camera, digital camera or eyeball viewing attachments
- Magnetic PCB support pillars



Other Accessories

- CCTV equipment can easily be attached to *SolView* via C-mount adaptor
- The Olympus range of Camedia digital cameras can also be attached to *SolView* via an adaptor

- Image capture and record can be achieved through *i-SAVE* portable image capture unit
- Laboratory bench stand securely holds *SolView* when not in use



Specifications:

SolView

Model	Field of View (FOV)	Direction of View (DOV)	Depth of Field (DOF)	Tip Footprint	Tip Length	Entrance Pupil Height
<i>SolView-00</i>	45° Degrees	Direct 00°	0.5mm to infinity	6.05mm x 1.65mm	11.5mm	0.3mm
<i>SolView-90</i>	45° Degrees	Lateral 90°	0.5mm to infinity	4.65mm x 1.65mm	11.5mm	0.3mm

Note: Both models have variable diopter focus control from 0 to -4.

- 2 x LR6 (AA) batteries are required for operation and provide 8 hours run time. Can take either non-rechargeable or rechargeable batteries.
- The backlight illuminator is only available for *SolView-90*. This range span of this backlight is 4mm to 50mm.
- *SolView* eyepiece is industry standard 32mm type.
- Dimensions of *SolView* are 44mm maximum diameter by 177mm long.

OmniStage

Model	Platform Diameter	X-axis movement	Y-axis movement	Weight
OmniStage	440mm (accommodates board sizes up to 300mm x 300mm)	305mm	75mm	<17kg

Note: Both *SolView* and *OmniStage* are electrostatically safe (ESD).