

Industrial Fiberscopes



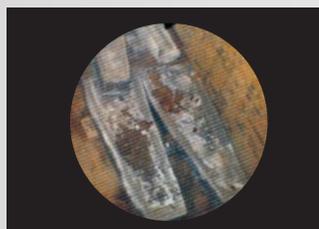
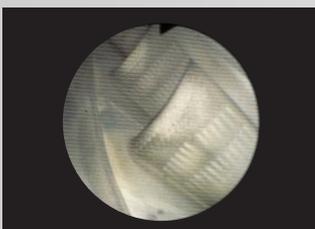
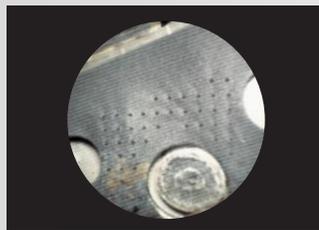
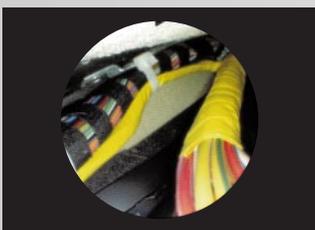
Flexible fiberscopes allow remote visual inspection of areas inside machinery, plant, structures and other difficult to access objects.

The manufacture of high quality fiberscopes for industrial use is an extremely specialised process, requiring a combination of advanced opto-mechatronic technologies. Olympus is the largest and most innovative specialist in the field of endoscopy, with fiberscopes to suit virtually every requirement.

Olympus fiberscopes incorporate coherent fibre optic image guides of the highest quality, integrated with advanced light guide systems which transmit clear, bright illumination from a remote light source to the area under inspection.

A wide choice of lengths and diameters is available, from ultra-thin instruments of 0.6mm diameter up to the larger 13mm diameter series. Scopes from 6mm diameter upwards have 4-way tip angulation for negotiating tortuous access routes, and 2mm and 4mm diameters have 2-way articulation.

The latest Olympus fiberscopes, the Mk 5 range, have the added benefits of fixed objective focus and a selection of interchangeable tips for 6, 8 and 11mm models provides maximum brightness and resolution for each application.



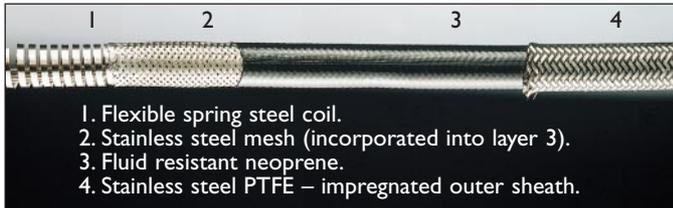
Olympus light transmission systems give bright, even illumination over the whole image.



FIBERSCOPES

Industrial Fiberscopes

CONSTRUCTION



The four protective layers of the fiberscope insertion tube.

The fibre optic components are protected by a tough, multi-layer insertion tube, which is highly flexible yet constructed to maximise torsional control and resist kinking.

Angulation and insertion of the instrument are controlled from an ergonomically designed handle, incorporating diopter focus and controls for adjusting/locking the viewing tip angulation.



The Mk 5 range includes models with 'tapered flexibility' offering greater insertion tube flexibility nearer the viewing tip. This allows easier insertion and manoeuvrability, as well as improving durability.

Olympus fiberscopes incorporate diopter correction to adjust for the users' eyesight and are designed to be operated easily with either left or right hand. They incorporate a splash-proof control body and fully fluid-proof insertion tube, to withstand the rigours of most industrial environments.

IMAGE TRANSMISSION

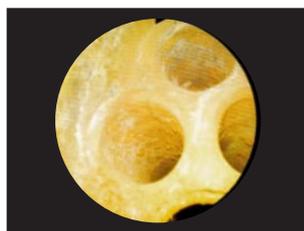
Fiberscopes utilise two intrinsic properties of optical fibres; the ability to transmit light with negligible loss, and their inherent flexibility, enabling them to follow tight curves without breaking.



Olympus' optical design engineers have created a special glass, which can be drawn to extremely fine diameters (less than one hundredth of a millimetre) and yet maintain very high optical transmission properties. These fine fibres are formed into a coherent optical bundle, or 'image guide' of tens of thousands of fibres, in which each fibre is packed in exactly the same position at both ends. Olympus' advanced manufacturing technology allows the fibres to be packed densely and yet in a high precision matrix to optimise image transmission qualities. The resultant flexible image guides are considered the endoscope industry's highest standard.

LIGHT TRANSMISSION

Fiberscopes are generally used in areas where there is little or no natural or ambient lighting, so of almost equal importance as the quality of the image bundle is the performance of the illumination system. Again, Olympus has painstakingly developed its light guide technology to ensure an even spread across the whole viewing area. An image can only be seen and analysed effectively if it is adequately illuminated – without the 'hot spots' caused by poor light distribution or an illumination field which does not match the image field.



MANUFACTURE



EUROPEAN MANUFACTURE

The Olympus name has always been synonymous with high optical quality and exceptional mechanical performance. The manoeuvrability and durability of the instruments is as important to many customers as the quality of the image. The workmanship during production must be of the highest standard to provide a long service life in the rigours of the everyday industrial environment.

A new fiberscope production facility has been established at Olympus Industrial in Southend, England to provide the fastest and shortest supply routes to the European, Middle East and African Markets.

Investing heavily in the latest computer aided assembly and inspection procedures, the new line will ensure that Olympus fiberscopes remain the best in the world.

QUALITY ASSURANCE

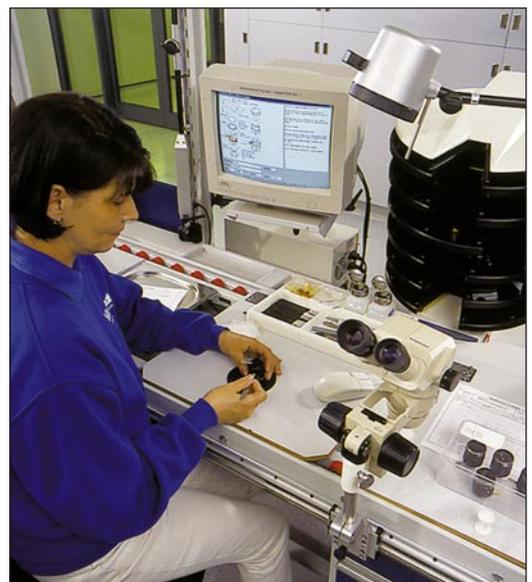
At every step of production, the process is precisely controlled to ensure that quality is built into every product. Each stage is controlled by computer, which presents the correct parts and assembly diagram together with the work instruction to the assembler. The line incorporates fixed inspection points where the overall mechanical and optical quality of every instrument is checked before putting into stock.

CUSTOMER SUPPORT

Professional manufacture and supply of Remote Visual Inspection equipment from Olympus is only part of the story. Of equal importance is the support the customer can expect.

Training courses in the use, care and maintenance of all equipment supplied can be offered either at the customers' premises or in the purpose designed facilities at Olympus Industrial. Correct training is backed up with field visits to assist in tips and techniques for unusual inspection procedures, minimising the possibility of equipment damage.

No matter how robust the equipment, and how well trained the operator, there is still the possibility of damage due to the inspection environment. In these circumstances it is vital that the equipment is returned to perfect working order in the shortest time possible. Olympus' high investment in service and repair facilities, together with a large parts stock, ensures fast, high quality repairs.



PRODUCT RANGE

6, 8 AND 11mm DIAMETER



These Mk5 instruments have 4-way tip angulation and the lightweight control section is designed for easy operation and comfort during the inspection procedures.

The objective end allows for the use of an extensive range of interchangeable tips, providing different depths of field, directions and fields of view. A double-lock fixing system, combined with a failsafe through-scope visual check, ensures that the tip is always secure during use.

All scopes incorporate 'tapered flexibility' – the stiffness of the insertion tube varies along its length, allowing the scope to be more easily manoeuvred through particularly tortuous access areas.

The multi-lens precision eyepiece allows firm connection of adaptors for both CCTV and photography.

Mk 5 FIBERSCOPE SPECIFICATIONS

Model	Max. dia. (mm)	Working length (mm)	Tapered flexibility	Angulation
IF6C5X1-8	6.0	800	Yes	120° up
IF6C5X1-13	6.0	1300	Yes	120° down
IF6C5X1-20	6.0	2000	Yes	100° left
IF6C5X1-30	6.0	3000	Yes	100° right
IF8C5-10	8.4	1000	Yes	120° up
IF8C5-15	8.4	1500	Yes	120° down
IF8C5-20	8.4	2000	Yes	100° left
IF8C5-30	8.4	3000	Yes	100° right
IF11C5-10	11.3	1000	Yes	120° up
IF11C5-20	11.3	2000	Yes	120° down
IF11C5-30	11.3	3000	Yes	100° left 100° right

TIP SPECIFICATIONS

Model	Direction of view (DOV)	Field of view (FOV)	Depth of field (mm)
IF6C5-AT30D	Direct	30°	26 - 372
IF6C5-AT60D/NF	Direct	60°	5 - 102
IF6C5-AT60D/FF*	Direct	60°	11 - ∞
IF6C5-AT100D	Direct	100°	4 - ∞
IF6C5-AT30S	Side (90°)	30°	21 - 138
IF6C5-AT60S/NF	Side (90°)	60°	4 - 85
IF6C5-AT60S/FF	Side (90°)	60°	9 - ∞
IF6C5-AT100S	Side (90°)	100°	4 - ∞
IF8C5-AT30D/NF	Direct	30°	30 - 70
IF8C5-AT30D/FF	Direct	30°	60 - 250
IF8C5-AT60D/NF	Direct	60°	9 - 50
IF8C5-AT60D/FF**	Direct	60°	20 - ∞
IF8C5-AT100D/NF	Direct	100°	3 - 200
IF8C5-AT100D/FF	Direct	100°	9 - ∞
IF8C5-AT30S	Side (90°)	30°	45 - 90
IF8C5-AT60S/NF	Side (90°)	60°	8 - 40
IF8C5-AT60S/FF	Side (90°)	60°	20 - 240
IF8C5-AT100S/NF	Side (90°)	100°	3 - 140
IF8C5-AT100S/FF	Side (90°)	100°	9 - 200
IF11C5-AT30D/NF	Direct	30°	38 - 70
IF11C5-AT30D/FF	Direct	30°	65 - 120
IF11C5-AT60D/NF	Direct	60°	11 - 45
IF11C5-AT60D/FF***	Direct	60°	27 - 390
IF11C5-AT100D/NF	Direct	100°	5 - 70
IF11C5-AT100D/FF	Direct	100°	16 - 300
IF11C5-AT30S	Side (90°)	30°	55 - 100
IF11C5-AT60S/NF	Side (90°)	60°	11 - 40
IF11C5-AT60S/FF	Side (90°)	60°	28 - 440
IF11C5-AT100S/NF	Side (90°)	100°	3 - 22
IF11C5-AT100S/FF	Side (90°)	100°	12 - 250



* Supplied as standard with 6mm scopes.
 ** Supplied as standard with 8mm scopes.
 *** Supplied as standard with 11mm scopes

PRODUCT RANGE

2 AND 4mm DIAMETER FIBERSCOPES

Olympus 2 and 4mm diameter Mk 5 industrial fiberscopes are specifically designed for the inspection of remote areas where access is particularly restricted, but when bright high quality images are important. These scopes incorporate the latest high resolution image bundles, producing clearer images, up to 25% larger than previous designs.

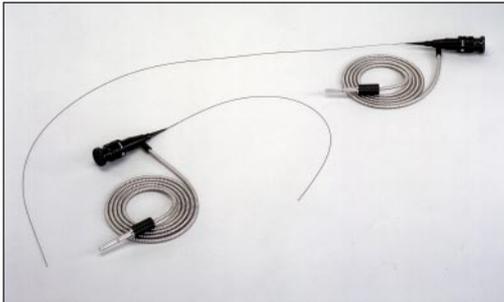
The 700 and 1500mm long, 4mm diameter fiberscopes are available in either direct (65° FOV) or lateral (60° FOV) viewing versions and have 2-way angulation. The 2mm diameter fiberscopes are available in lengths of 600mm and 1170mm in direct view (75° FOV) and also have 2-way angulation. The insertion tube on the 2 and 4mm instruments is finished with a hard-wearing, fluid-proof neoprene outer sheath.

As with larger diameter instruments, the 4mm Mk 5 fiberscopes incorporate 'tapered flexibility' insertion tubes allowing easier insertion and manoeuvrability.

Hard copy records of the inspection can be produced easily, as the eyepiece allows the connection of adaptors for video and 35mm photography.



Model	Max. dia. (mm)	Working length (mm)	Tapered flexibility	Angulation	Direction of view (DOV)	Field of view (FOV)	Depth of field (mm)	Focusing	Eyepiece
IF2D5-6	2.4	600	No		Direct	75°	2-50	Adjustable Diopter	32mm
IF2D5-12	2.4	1170	No		Direct	75°	2-50		32mm
IF4D5-7	4.1	700	Yes	120° up	Direct	65°	5-60		32mm
IF4D5-15	4.1	1500	Yes	120° down	Direct	65°	5-60		32mm
IF4S5-7	4.1	700	Yes		Side (90°)	60°	4-40		32mm
IF4S5-15	4.1	1500	Yes		Side (90°)	60°	4-40		32mm



SMALL DIAMETER FIBERSCOPES

Olympus small diameter fiberscopes offer a diameter of 0.6mm in lengths up to 990mm. These are particularly useful where access is severely restricted, and use quartz image guides to provide quality images in the smallest diameter.

Each instrument retains ocular focus control to suit individual operator eyesight. All models have a protective, multi-layer insertion tube designed to provide fluid proofing and to enable the instrument to be easily inserted and manoeuvred.

Model	Max. dia. (mm)	Working length (mm)	Angulation	Direction of view (DOV)	Field of view (FOV)	Depth of field (mm)	Focusing	Eyepiece
IF6PD4-6	0.64	490	None	Direct	58°	1-50	Adjustable diopter	32mm
IF6PD4-11	0.64	990	None	Direct	58°	1-50	Adjustable diopter	32mm



AUTOMOTIVE FIBERSCOPE

The Olympus IF8D4X2-10 is a general purpose diagnostic tool to be used in trouble shooting as well as analysis of specific problems.

The 8.5mm diameter scope has a working length of 770mm with 2-way angulation, allowing access to many areas, including intake valves, exhaust valves, rear of engine, transmission, cylinders, exhaust, dash board, body work/chassis, fuel tank and radiator. It has a 32mm eyepiece allowing connection of any of the standard rigid borescope accessories.

Model	Max. dia. (mm)	Working length (mm)	Angulation	Direction of view (DOV)	Field of view (FOV)	Depth of field (mm)	Focusing	Eyepiece
IF8D4X2-10	8.5	770	90° up/down (no brake mechanism)	Direct (side with tip adaptor)	60°	6-250	Adjustable diopter	32mm

PRODUCT RANGE

6 METRE LONG FIBERSCOPE



The Olympus IF13D3-60 provides all the benefits of an industrial fiberscope in a working length of 6 metres. It is specifically designed for the visual inspection of plant such as pipes, boilers and heat exchangers, where the inspection site is some distance from the access point, and a fiberscope is required. 4-way angulation is included to aid insertion and versatility is increased by a range of interchangeable tips, to enable alteration of both direction and field of view.

This instrument has a maximum diameter of 13.5mm and is equipped with both diopter and objective focusing.

Model	Max. dia. (mm)	Working length (mm)	Angulation	Direction of view (DOV)	Field of view (FOV)	Depth of field (mm)	Focusing	Eyepiece
IF13D3-60	13.5	6050	120° up 120° down 120° left 120° right	Direct (lateral with adaptor)	32° standard Interchangeable tips available	10-infinity	Adjustable diopter and objective	Mk III Type

Interchangeable tips are available in direct and side viewing versions to provide a field of view 16°, 32°, 63° or 76°.

ENVIRONMENTAL SPECIFICATION

The following environmental specification applies to all scopes in this literature

	IF2D5	IF4D5 IF4S5	IF6C5 IF8C5 IF11C5	IF13D3	IF8D4X1	IF6PD4
Temperature: Insertion Tube Complete Instrument	-10 to 80C -10 to 50C	-10 to 80C -10 to 50C	-10 to 80C -10 to 50C	0 to 80C 0 to 50C	10 to 80C 10 to 50C	0 to 40C 10 to 30C
Pressure: Insertion tube at 10-30C	1 to 1.3 bar absolute	1 to 1.3 bar absolute	1 to 1.3 bar absolute	1 to 1.3 bar absolute	1 to 1.3 bar absolute	1 to 1.3 bar absolute
Fluid Resistance:	The insertion tube can be immersed for short periods, and handle wiped with the following chemicals: 4mm and above: Water, 5% salt water, machine oil and light oil. Other Instruments: Water only.					

Note: Olympus reserves the right to change the above specification without notice.

OLYMPUS

OLYMPUS OPTICAL CO., LTD.

Borecope Section, Endoscope Department
San-Ei Building, 22-2, Nishi Shinjuku 1-chome, Shinjuku-ku, Tokyo, Japan
Telephone: (03) 3340 2246 Fax: (03) 3340 2202 Telex: 24209

OLYMPUS OPTICAL CO., (EUROPA) GMBH.

Postfach 10 49 08, 20034 Hamburg
Wendenstraße 14-16, 20097 Hamburg, Germany
Telephone: (40) 237 730 Fax: (40) 237 73-654 Telex: 2163467

OLYMPUS KEYMED

KeyMed (Medical & Industrial Equipment) Ltd.
KeyMed House, Stock Road, Southend-on-Sea, Essex SS2 5QH, United Kingdom
Telephone: + 44 (0)1702 616333 Fax: + 44 (0)1702 465677,
e-mail: industrial@keymed.co.uk www.olympus-industrial.co.uk

OLYMPUS AMERICA INC.

Industrial Products Group
Two Corporate Center Drive, Melville, New York 11747-3157, USA
Telephone: (516) 844-5888, (800) 446-5260 Fax: (516) 844-5620

OLYMPUS SINGAPORE PTE LTD.

491B River Valley Road #12-01/04, Valley Point Office Tower, Singapore 248373, Singapore
Telephone: (65) 8340010 Fax: (65) 8342438/2436

OLYMPUS
INDUSTRIAL



ISO 9001 Registered
Certificate No. FM 20993