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# **INDUSTRIAL REMOTE VISUAL INSPECTION PRODUCT GUIDE**



- **Videoscopes** • **Fiberscopes** • **Rigid Borescopes** •
- **Miniboscopes** • **Light Sources** • **Peripheral Products** •

# Olympus Industrial Endoscopes meet needs across a wide range of areas, from maintenance to R & D

Olympus technology has made it possible to obtain views from internal or difficult to reach areas, easily and quickly, without teardown or disassembly, and without destroying exterior features.

Olympus has a comprehensive range of industrial endoscopes, such as videoscopes, fiberscopes and borescopes, with a range of ancillary equipment to match your specific requirements. These scopes, all designed and made by Olympus, offer superior imaging and performance achieved through combining Olympus expertise in optics, electronics and precision mechanics gained through years of experience. With the ease of use and durability of Olympus products, it is clear that Olympus Industrial endoscopes can make a large contribution to productivity, safety and reliability in your industry.



## SOME APPLICATION EXAMPLES

### Aerospace Industries

For examination of Airframe and Gas turbines in research, production and maintenance for military and civil aircraft. Also rockets and rocket engines.

### Security

For detection of Narcotics and other contraband items, for bomb and weapons searches, and for locating those trapped following disasters.

### Power Generation

For maintenance of heat exchange pipes, condensers, piping and turbines at nuclear, fossil fuel and hydroelectric power generation facilities.

### Industrial Machinery

For quality control and maintenance of motors, boilers, heat exchangers and machine tools.

### Refineries/Chemical Plants

For routine and urgent inspection of process piping, pressurised storage reservoirs, heat exchangers, boilers etc.

### Automotive

For quality control examinations of engines, hydraulic components and injection nozzles, as well as detection of leaks, squeaks and rattles in assembled vehicles.

### Electrical Equipment/Electronics Industries

For monitoring operation of equipment and factory automation through automatic inspection and positioning, as well as a wealth of R & D applications.

### Gas Pumping & Delivery Systems

For monitoring corrosion inside and outside gas pipes, the presence of water infiltration and flaws in outlets, and for maintenance of gas turbines used for pumping.

### Steel Industries

For equipment maintenance as well as quality control of pipes and tubes.

### Architecture/Construction

For examination of walls, ducts, structured joints, as well as for viewing inside architectural models.

### Education/Research

For monitoring animals and insects, root systems of plants etc. Also for historical and archaeological applications such as internal inspection of statues and tombs.

### Railroad/Shipping

For routine inspection of motors, turbines, diesel engines, piping etc.

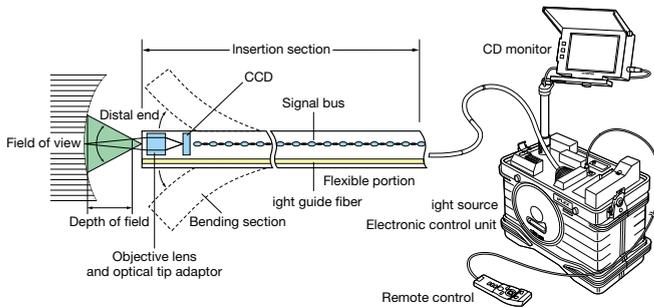
### Water Supply/Drainage

For locating rust and blockages inside pipe systems. Useful for documentation before and after lining is coated.

## Industrial Videoscopes - Providing comprehensive and remote visual inspection ability, with the highest quality colour images, accurate internal measurement, and PC interaction

Olympus Videoscopes provide bright, clear, full screen images, and offer the most versatile of inspection tools.

### STRUCTURAL DRAWING



**Ultra-compact CCD for image transmission. High-resolution images are displayed on a TV monitor.**

The videoscope captures light reflected from a subject through an objective lens and directs it to the surface on the CCD. The CCD then converts the light into electrical signals and transfers this data to the videoscope control unit. The unit then sends a video output to the monitor.

### MAIN APPLICATIONS

**Ideal when higher resolution, longer insertion and brighter images than those obtainable with fiberscopes are required. TV monitor observation only.**

For inspecting:

- Inside engines of vehicles, aircraft etc.
- Inside piping, such as heat exchangers, steel pipes and drainage pipes.
- Inside long pipes, such as plant piping and condensers.
- For wide cavities, such as interiors of tanks, structures and large diameter pipes.
- Inside precision machinery, such as fax machines and copiers.

### MAIN FEATURES

#### Bright, high-resolution images

The bright, high-resolution images captured by the high-performance CCD are larger, clearer and easier to view with full-screen colour display.

#### Interchangeable optical adaptors

You can easily change optical adaptors to suit the observation requirements such as direction of view, angle of view and depth of field. Simultaneous direct and side-viewing and super-wide-angle adaptors are also available.

#### TTF tube with superb insertability and durability

The superior insertability of the Olympus-designed TF (Tapered Flex) tube allows you to easily negotiate bends. Incorporated in the IPLEX inserting tube, the new TTF (Tough Tapered Flex) tube design features a braided tungsten exterior and is three times more durable than conventional tubes.

#### Observation functions including zoom and brightness adjustment

In addition to zoom observation and various image adjustment functions such as brightness and sharpness adjustment, the IPLEX system offers a convenient comparison function that displays live and recorded images simultaneously.

#### Digital image recording with voice annotation

Digital still and movie image recording provides flexible and powerful image management. Voice annotation recording is also possible.

#### Stereo measurement capability

Up to six different stereo measurement modes are available to facilitate high-precision measurement, including distance, height and depth.

#### 4 way tip angulation

The tip of the videoscope can be moved in four directions, controlled by the user, allowing the negotiation of difficult access routes and scanning during the inspection.



Bright, High-Quality Images



4 way Tip Angulation



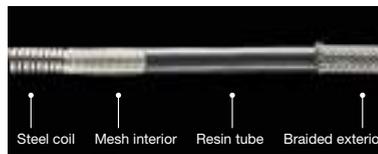
Optical Tip Adaptors



Forward/Side-Viewing Adaptor



Ultra-Wide-Angle Adaptor



"Tough Tapered Flex" Tube:

Featuring a more flexible distal end and stiffer proximal end, this Olympus-developed tube design provides the superior insertion capability you need to perform inspections more easily.



Image Recording & Report Generation



Stereo Measurement



"3D Eye-Trek" Face-Mounted Display

Lightweight, comfortable and portable the 3D Eye-Trek displays observation images literally right in front of your eyes. When combined with the IPLEX Series, it delivers ultra-real three-dimensional images.

## IPLEX

### IPLEX SERIES

#### INDUSTRIAL VIDEOSCOPE SYSTEM

#### IPLEX SA (STEREO MEASUREMENT)

#### IPLEX SA

#### IPLEX

A videoscope system that integrates everything you need for industrial endoscopic inspections.

- All-in-one design for easy transport and set up
- Compact, lightweight remote control for single-hand operation
- Four-way joystick-controlled angulation via remote control
- Stepless electronic zoom and versatile brightness adjustment functions
- Still image recording, still image and voice annotation recording, and moving image recording
- Six stereo measurement modes
- Scope operation, image recording and management, and measurement can all be done using a PC. You can also create and edit reports, e-mail images and more
- Ultra-real three-dimensional observation with 3D Eye-Trek

#### BASIC PERFORMANCE

##### All-in-One Design

All the components and functions you need for industrial inspection are built into IPLEX's sophisticated all-in-one design. A retractable handle and integral wheels make transportation simple, while the streamlined design is optimised for easy manoeuvring through tight spaces.



##### Set-up is easy

- All you have to do is:
1. Open the lid
  2. Adjust the monitor position
  3. Connect a power supply
  4. Take out the remote control and turn it on
  5. Pull out the insertion tube from the integral drum
- When the inspection is complete, just wind up the insertion tube with the winding handle. It's quick and easy.



##### Rugged design

From its material and construction, to its sophisticated shock-absorbing mechanism, everything about the IPLEX case has been designed to provide maximum protection against external impact. The components themselves are also more toughly built. The TTF (Tough Tapered Flex) tube, for instance, features an extremely durable interior construction that's about three times more crush resistant than conventional tubes, without compromising flexibility.



##### Detachable monitor

The high-resolution LCD monitor can be detached from the monopod and connected to the remote control with an optional extension cable. This makes it possible to continue an inspection without having to move the main unit.



##### Narrow insertion tubes

A variety of insertion tubes are available to suit different observation purposes. The IPLEX Series includes the narrow 4.4mm diameter insertion tube.



#### EASY OPERATION

##### Single-Hand Operation

IPLEX's compact, lightweight remote control allows you to operate all inspection related functions with one hand, including insertion tube manipulation, observation, image recording, image management and measurement.



##### High-precision motorised angulation

Angulation of the insertion tube tip can be controlled with the joystick on the remote control. In addition to normal movement, a fine movement mode is provided that allows exact positioning of the insertion tube tip.



##### Stepless electronic zoom

The stepless zoom enables smooth, continuous magnification adjustment from 1X to 3X at the touch of a button on the remote control.



##### Optical brightness adjustment

Various brightness adjustment functions such as gain control, automatic brightness control and extended exposure are available to suit different inspection environments. All of these functions can be operated from the remote control.

##### Image recording (IPLEX SA)

During observation, you can use the remote control to access the menu screen and record instantly. Still images, with voice annotation and moving images can be recorded on the large-capacity memory card.



##### Data management (IPLEX SA)

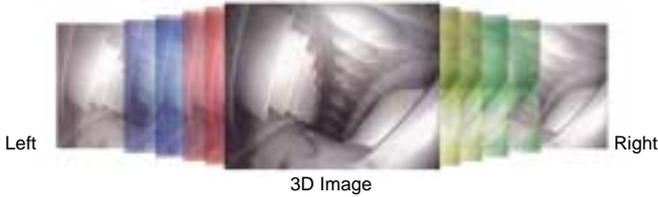
Data management functions such as thumbnail display, folder search and erasing, moving and copying images can be operated using the remote control.



## 3D EYE-TREK



When the 3D Eye-Trek face-mounted display is connected to the remote control, surface contours that would normally be difficult to detect can be observed in three dimensions where they can easily be interpreted.



3D Image

## IPLEX Equipment Components and Functions

		IPLEX SA STEREO MEASUREMENT	IPLEX SA	IPLEX	IPLEX SX
<b>Scope Variation</b>					
Outer diameter	Insertion tube length	Product code			
ø4.4mm	3.5m	IV7435A	IV7435A	IV7435	—
	4.0m	—	—	—	IV7440X1
ø6.0mm (IPLEX SX 6.2mm)	3.5m	IV7635A	IV7635A	IV7635	IV7635X1
	5.0m	IV7650A	IV7650A	IV7650	—
	7.5m	IV7675A	IV7675A	IV7675	—
	9.6m	IV7696A	IV7696A	IV7696	—
<b>Basic Functions</b>					
Interchangeable optical adaptor		✓	✓	✓	✓
4-way motorised angulation		✓	✓	✓	✓
Tough Tapered Flex insertion tube		✓	✓	✓	✓
Scope length index line		✓	✓	✓	✓
LCD monitor		✓	✓	✓	✓
LCD fixing device (monopod)		✓	✓	✓	✓
Remote controller		✓	✓	✓	✓
50-W metal-halide light source		✓	✓	✓	✓
Integrated shock-resistant case		✓	✓	✓	✓
Rod handle & casters		✓	✓	✓	✓
Vertical and horizontal operation		✓	✓	✓	✓
Insertion tube winding drum		✓	✓	✓	✓
AC power supply		✓	✓	✓	✓
DC power supply		✓	✓	✓	✓
Working channel		—	—	—	ø1.7mm (IV7635X1 ONLY)
<b>CCU Functions</b>					
Freeze		✓	✓	✓	✓
Seamless digital zoom		✓	✓	✓	✓
Panning		✓	✓	✓	✓
Exposure		✓	✓	✓	✓
Brightness adjustment		✓	✓	✓	✓
Gain		✓	✓	✓	✓
Enhancement		✓	✓	✓	✓
Comparison		✓	✓	—	✓
Menu language selection		✓	✓	✓	✓
Video signal output		✓	✓	✓	✓
Video signal input		✓	✓	—	✓
Audio signal output		✓	✓	—	✓
<b>Recording Management Functions</b>					
Still image recording/playback		✓	✓	—	✓
Audio recording/playback		✓	✓	—	✓
Movie recording/playback		✓	✓	—	✓
Removable medium		✓	✓	—	✓
Thumbnail display		✓	✓	—	✓
Image file operation		✓	✓	—	✓
Search function		✓	✓	—	✓
Image title entry		✓	✓	—	✓
USB terminal		✓	✓	—	✓
IPLEX MANAGER software		✓	✓	—	✓
Direct recording to PC		✓	✓	—	✓
Recorded data transferring to PC		✓	✓	—	✓
Remote operation by PC		✓	✓	—	✓
<b>Measurement Functions</b>					
Scalar measurement		✓	✓	—	✓
Stereo measurement (Distance)		✓	—	—	✓
Stereo measurement (Point-to-Line)		✓	—	—	✓
Stereo measurement (Depth)		✓	—	—	✓
Stereo measurement (Area/Lines)		✓	—	—	✓
Stereo measurement (Profile)		✓	—	—	✓
<b>Other Functions</b>					
3D observation		Option	Option	Option	Option

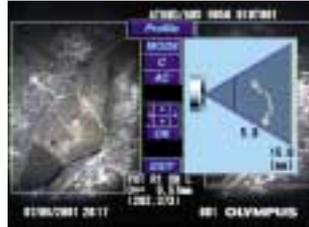
## Stereo Measurement Optical Adaptor Set Specifications

Scope	Set Name	Optical Adaptor	Optical System			Distal End		
			Field of view	Direction of view	Depth of field	F No.	Outer diameter	Rigid distal end length*
IV74	MAJ-1044D	AT60D/60D-IV74	60°	Forward	5~∞mm	7.5	ø4.4mm	25.9mm
	MAJ-1044S	AT50S/50S-IV74	50°	Slide	4~∞mm			31.9mm
IV76	MAJ-1046D	AT60D/60D-IV76	60°	Forward	5~∞mm	7.5	ø6.0mm	26.3mm
	MAJ-1046S	AT60S/60S-IV76	60°	Slide	4~∞mm			30.7mm

## STEREO MEASUREMENT

(IPLEX SA STEREO MEASUREMENT)

Olympus's stereo measurement technology uses triangulation to measure image information captured by two parallax lenses. With six different measurement modes available, high-precision measurement capabilities are available from any angle.



- Distance:** Measures the total length of a defect or zone of damage.
- Point-to-Line:** Measure the distance between a hypothetical line between two designated positions and the required point.
- Depth:** Measures the depth/height of corrosion, protrusion and indentation from a hypothetical plane to the required point.
- Lines:** Total length of a crack with complicated contours can be measured by plotting multiple positions.
- Area:** Calculates the area of a burn or zone of damage surrounded by multiple designated positions.
- Profile:** Hard-to-see irregularities are simulated with computer graphics for easier analysis.

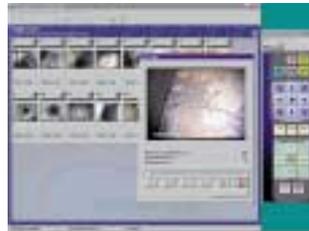
## PC SOLUTION

(IPLEX SA and SX PC COMPATIBILITY)

All aspects of inspection operation can be controlled with a PC connected to IPLEX via a USB cable. Stored image data can also be transferred to a PC for more extensive processing and analysis.



- Remote operation:** All IPLEX functions including angulation, image recording and data management can be operated from a connected PC.
- Stereo measurement:** You can concentrate on capturing images at the inspection site. The image data can be downloaded to your PC for stereo measurement.
- Database management:** IPLEX MANAGER, an image management program provided with the IPLEX SA and SX Series, allows you to quickly build an inspection database.
- Create and edit reports:** IPLEX MANAGER includes a template creation function so you can easily create your own report formats.
- Send inspection data by e-mail:** IPLEX MANAGER's e-mail function lets you send image data and measurement data by e-mail. This makes it much easier to share data for comprehensive checking and analysis.



## IPLEX Optical Adaptor Specifications

Scope	Optical Adaptor	Optical System			Distal End		
		Field of view	Direction of view	Depth of field	F No.	Outer diameter	Rigid distal end length*
IV74	AT40D-IV74	40°	Forward	200~∞mm	2.4	ø4.4mm	19.7mm
	AT80D/NF-IV74	80°		8~∞mm	9.5		20.2mm
	AT80D/FF-IV74	80°		35~∞mm	3.1		20.1mm
	AT120D/NF-IV74	120°		4~190mm	9.2		20.2mm
	AT412D/FF-IV74	120°	Slide	25~∞mm	3.3		20.1mm
	AT80S-IV74	80°		25~∞mm	3.7		23.1mm
	AT120S/NF-IV74	120°		1~20mm	9.6		23.1mm
	AT120S/FF-IV74	120°		6~∞mm	6.0		23.1mm
IV76	AT40D-IV76	40°	Forward	200~∞mm	2.4	ø6.0mm	19.3mm
	AT80D/NF-IV76	80°		8~∞mm	9.5		19.8mm
	AT80D/FF-IV76	80°		35~∞mm	3.1		19.7mm
	AT120D/NF-IV76	120°		4~190mm	9.2		19.8mm
	AT412D/FF-IV76	120°	Slide	25~∞mm	3.3		19.7mm
	AT80S-IV76	80°		18~∞mm	4.0		25.2mm
	AT120S/NF-IV76	120°		1~25~∞mm	9.6		25.2mm
	AT120S/FF-IV76	120°		5~∞mm	5.9		25.2mm
	AT1100D/100S-IV76	100°/100°	Forward/Slide	2~150mm	7.0		27.2mm
	AT220D-IV76	220°	Forward	3~100mm	4.3		ø8.4mm

\* The rigid portion at the scope's distal end when the adaptor is mounted

## IPLEX Operating Environment

- IPLEX can be upgraded to IPLEX SA after purchase.
- IPLEX SA can be used for stereo measurement by purchasing a stereo measurement optical adaptor.
- Operating temperature: Insertion tube: In air: -25~80°C Under water: 10~30°C
- Operating temperature: Other parts than above: In air: 0~40°C
- Operating atmospheric pressure: Insertion tube: In air: 1013hPa (1atm) In water: 1013~1985hPa (1~1.96atm) (IV7635,7670,7675 & 7696) Under water: 1013~1368hPa (1~1.35atm) (IV7435) Other parts than above: In air: 1013hPa (1atm)
- Liquid resistance: Insertion tube, remote control: Machine oil, light oil and 5% saline.
- Other parts than above: Machine oil, light oil and 5% saline.
- Waterproof: Insertion tube: Can be used under water.
- Drip-proof: Remote control, LCD monitor: Can be used in rain but cannot be used under water. Other parts than above: Neither waterproof nor drip-proof.

\* Angulation to a large angle may become difficult under low temperatures.

## IPLEX SX

### IPLEX SX SERIES

#### INDUSTRIAL VIDEOSCOPE SYSTEM

#### IPLEX SX 6.2mm (with channel)

#### IPLEX SX 4.4mm

Purpose-built to meet the specific requirements of gas turbine inspection, the new IPLEX SX provides improved access to intricate engine interiors, enhanced hooking and retrieval operation for exceptional ease of use, together with all high-quality capabilities synonymous with Olympus, such as advanced observation performance and proven stereo measurement.

- All features of the IPLEX SA unit including stereo measurement plus working channel in 6.2mm model.
- Control unit can be removed from case for enhanced portability.

#### World's slimmest (ø6.2mm) scope with channel incorporated

With a diameter of only 6.2 mm, this is the world's slimmest videoscope to incorporate a working channel. The channel port can be mounted on the remote control, further enhancing operability, while the hook assembly features a highly responsive Olympus-original design that optimizes hook operation for inspection of the second nozzle guide vane of the F100 engine.

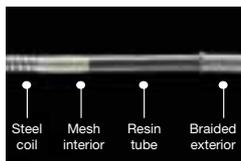
#### Interchangeable with ø4.4mm scope

The IPLEX SX range includes a ø4.4mm scope (without a channel) that enables inspection of minute parts. Interchangeability between ø4.4mm scope and the ø6.2mm scope makes for a simple and very cost effective system.



#### Rigid Sleeve

Useful as an auxiliary insertion tool and also makes the scope easier to handle. Simply fit and lock the sleeve onto the tip of the insertion tube.



#### Optimized for jet engine inspection

Olympus's innovative Tapered Flex technology is well known for its unequalled insertion capability. The IPLEX SX's "Tough Tapered Flex" tube has been designed to provide optimum flexibility in aircraft engine inspection and excellent resistance to crushing.



#### Various working tools available

Versatile tools are available to meet a wide range of inspection requirements such as retrieval of foreign objects and dropped objects. Snare basket, 3-prong grasper, magnet and alligator forceps are available.



#### Belt holder for hands-free operation

The remote control with channel port mounted can be attached to a belt around your waist. This allows you to operate the scope without having to hold the remote control, and leaves your hands totally free for other tasks when you're not operating the remote control.



#### Portable package design

An integrated all-in-one design offers superior portability and faster, more efficient set-up and takedown. Removing the control unit from the case allows you to carry the IPLEX SX on your shoulder, enhancing mobility in confined spaces and elevated locations.



#### IPLEX SX Optical Adaptor Specifications

Scope	Optical Adapter	Optical System			Distal End		
		Field of view	Direction of view	Depth of field	F No.	Outer diameter	Rigid distal end length*
IV7635X1	AT120D/NF-IV76X1	120°	Forward	4-190mm	9.2	ø6.2mm	20.6mm
	AT120D/FF-IV76X1	120°		25~∞mm	3.3		20.5mm
	AT80S-IV76X1	80°	Side	18~∞mm	4.0		24.6mm
	AT120S-IV76X1	120°		5~∞mm	5.9		24.6mm
IV7440X1	AT40D-IV74	40°	Forward	200~∞mm	2.4	ø4.4mm	19.7mm
	AT80D/NF-IV74	80°		8~∞mm	9.5		20.2mm
	AT80D/FF-IV74	80°		35~∞mm	3.1		20.1mm
	AT120D/NF-IV74	120°		4-190mm	9.2		20.2mm
	AT120D/FF-IV74	120°	Side	25~∞mm	3.3		20.1mm
	AT80S-IV74	80°		25~∞mm	3.7		23.1mm
	AT120S/NF-IV74	120°		1-20mm	9.6		23.1mm
	AT120S/FF-IV74	120°		6~∞mm	6.0		23.1mm

\*The rigid portion at the scope's distal end when the adaptor is mounted

#### Stereo Measurement Optical Adaptor Set Specifications

Scope	Set Name	Optical Adapter	Optical System			Distal End		
			Field of view	Direction of view	Depth of field	F No.	Outer diameter	Rigid distal end length*
IV7635X1	MAJ-1241D	AT60D/60D-IV76X1	60°	Forward	5~∞mm	7.5	ø6.2mm	26.7mm
	MAJ-1241S	AT60S/60S-IV76X1	60°	Side	4~∞mm			32.4mm
IV7440X1	MAJ-1244D	AT60D/60D-IV74	60°	Forward	5~∞mm	7.5	ø4.4mm	26.3mm
	MAJ-1244S	AT50S/60S-IV74	50°	Side	4~∞mm			30.7mm

#### IPLEX SX Operating Environment

- **Operating temperature:** Insertion tube: In air: -25~80°C\*  
Under water: 10~30°C (IV7440X1 only)  
Other parts than above: In air: 0~40°C
- **Operating atmospheric pressure:** Insertion tube: In air: 1013hPa (1atm)  
In water: 1013~1418hPa (1~1.96atm) (IV7440X1 only)  
Other parts than above: In air: 1013hPa (1atm)
- **Liquid resistance:** Insertion tube, channel port, remote control: Machine oil, light oil and 5% saline is attached.
- **Other parts than above:** The SX case outer finish is resistant to machine oil, light oil and 5% saline is attached.
- **Waterproof:** Insertion tube: Can be used under water (IV7440X1 only).  
Drip-proof: Remote control, LCD monitor, channel port: Can be used in rain but cannot be used under water. Neither waterproof nor drip-proof.

\*Angulation may be affected by extreme temperatures.

## A wide range of videoscopes for specialist inspection



### SERIES 6 VIDEOSCOPIES

#### INDUSTRIAL VIDEOSCOPE IV6C6-13/20/35/50/75

#### IV8C6-20/35/50/75

#### IV7D6X1-26 (NTSC type, LCD monitor mountable)

#### IV7D6X2-26 (PAL type)

#### IV5C6X1-15

Series 6 videoscopes can be used in a wide variety of specialist inspections, including F100 (IV7D6X1-26) and T700/CT-7 (IV5C6X1-15) inspections.

- Full screen display.
- Four way angulation
- Tapered Flex (TF) Tube for enhanced insertion.
- Five button remote operation.
- Diameters of 5.1mm, 6mm, 7.3mm (with Channel) and 8.4mm.

#### IV5C6, IV6C6 and IV8C6 Scope Specifications

	Distal end	Diameter	IV5C6X1-15	IV6C6-13	IV6C6-20	IV6C6-35	IV6C6-50	IV6C6-75	IV8C6-20	IV8C6-35	IV8C6-50	IV8C6-75	
			ø5.1mm	ø6.0mm		ø8.4mm							
Insertion tube	Bending section	Angulation range	150° up/down direction	150° in up/down and right/left directions									
	Flexibility		Tapered flex tube										
	Minimum bending radius		30mm					50mm					
	Working length		1,500mm	1,340mm	2,040mm	3,540mm	5,030mm	7,530mm	2,010mm	3,510mm	5,000mm	7,500mm	

#### IV5C6 Optical Adaptor Specifications

	Optical system				Distal end	
	Field of view	Direction of view	Depth of field	F No	Outer diameter	Rigid distal end length
AT120D-IV5C6X1	120°	Forward	14~100mm	5.2	5.1mm	17.5mm
AT90S-IV5C6X1	90°	Slide	12~100mm	5.2		22.8mm

#### IV6C6 Optical Adaptor Specifications

	Optical system				Distal end		
	Field of view	Direction of view	Depth of field	F No	Outer diameter	Rigid distal end length <sup>*1</sup>	
AT40D-IV6C6	40°	Forward	330~∞mm	3.0	ø6.0mm	26.9mm	
AT80D/NF-IV6C6	80°		10~∞mm	13.0		27.5mm	
AT80D/NF-IV6C6	80°		34~∞mm	4.5		27.4mm	
AT120D/NF-IV6C6	120°		5~∞mm	12.5		27.0mm	
AT120D/FF-IV6C6	120°		20~∞mm	5.5		26.9mm	
AT80S-IV6C6	80°	Side	23~200mm	5.0	ø6.0mm	32.3mm	
AT120S/NF-IV6C6	120°		1~9mm	15.5		32.3mm	
AT120S/FF-IV6C6	120°		7~90mm	8.0		32.3mm	
AT60D/60D-IV6C6 <sup>*2</sup>	60°/60°		Direct/Direct	7~30mm		9.3	38mm
AT60S/60S-IV6C6 <sup>*2</sup>	60°/60°		Side/Side	6~30mm		9.3	44mm

#### IV8C6 Optical Adaptor Specifications

	Optical system				Distal end		
	Field of view	Direction of view	Depth of field	F No	Outer diameter	Rigid distal end length <sup>*1</sup>	
AT40D-IV8C6	40°	Forward	200~∞mm	2.5	ø8.4mm	26.2mm	
AT80D-IV8C6	80°		40~∞mm	5.5		29.4mm	
AT120D/NF-IV8C6	120°		5~∞mm	14.0		29.6mm	
AT120D/FF-IV8C6	120°		45~∞mm	3.0		29.3mm	
AT80S-IV8C6	80°		Side	22~∞mm		6.0	ø8.4mm
AT120S-IV8C6	120°	3~55mm		16.0	35.8mm		
AT120D/120S-IV8C6	120°/120°	Forward/Side		5~∞mm/3~∞mm	5/9	28.0mm	
AT60D/60D-IV8C6 <sup>*2</sup>	60°/60°	Forward/Forward		5~50mm/5~50mm	11/11	24.0mm	

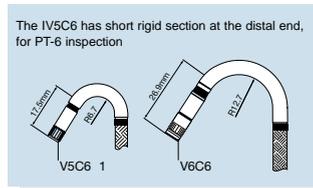
\*1 When the Adaptor is attached to the scope.  
\*2 For 3D measurement.



Series 6 systems can be conveniently packaged (see page 18 for details). All systems require a control unit and can be used with digital image storage devices (see page 8).



MAJ-456 Rigid Sleeve



The IV5C6 has short rigid section at the distal end, for PT-6 inspection



#### IV7D6X1/IV7D6X2 Scope Specifications

Optical system	Field of view	120°	
	Direction of view	Forward viewing	
	Depth of field	9 to 80mm	
Insertion tube	Distal end	Outer diameter	ø7.3mm
		Rigid distal end length	19.8mm
	Bending section	Angulation range 130° in up/down and right/left directions	
	Flexible portion (tube)	Flexibility Tapered Flex Tube	
		Outer diameter	ø7.3mm
Channel	Working length	2,610mm	
	Inner diameter	ø1.7mm	
Universal cord length	2,000mm		

#### MAJ-456 Rigid Sleeve Specifications

Optical system	Field of view	120°
	Direction of view	Side view
	Depth of field	7~80mm
Insertion tube	Outer diameter	ø8mm
	Working length	338mm
Total length	420mm	

#### Operating Environment for Series 6 Videoscopes

- Operating temperature: Insertion tube: In air: -10~80°C (14~176°F)\*  
In water: 10~30°C (50~86°F)\*\*
- Operating pressure: All portions except insertion tube: In air: 0~40°C (32~104°F)
- Operating pressure: Insertion tube: In air: 1013hPa (normal pressure) (IV6C6/8C6)  
In water: 1013 (normal pressure)~1360hPa (1~1.35atm) (IV6C6/8C6-13,20,35)  
1013 (normal pressure)~1773hPa (1~1.75atm) (IV6C6/8C6-50,75)
- All portions except insertion tube: In air: 1013hPa (1atm normal pressure)
- Liquid resistance: Insertion tube: Withstands machine oil, light oil and 5% salt water (10~30°C or 50~86°F) (normal temperature).

\* At 50~80°C atmosphere, use the instrument at a relative humidity of 40% or below. Using the instrument at a higher humidity may cause equipment damage.  
\*\* Insertion tube of IV7D6 and IV5C6X1 scopes is splashproof, except for the channel of IV7D6, which is not fluid-proof.

## SERIES 5 VIDEOSCOPIES

### INDUSTRIAL VIDEOSCOPE IV6C5-110/160

The IV6C5 Series offers working lengths of up to 16 metres.

### RADIATION RESISTANT VIDEOSCOPIES IV6C5X1-75/110

The IV6C5X1 Series scopes are radiation-resistant up to 50Gy (5000 Rad).



#### ■ IV6C5 Scope Specifications

	IV6C5-110	IV6C5-160	IV6C5X1-75	IV6C5X1-110
Optical system	Field of view			
	60°/100° (convertible using optical adaptor)			
	Direction of view			
	Direct/side viewing (convertible using optical adaptor)			
Depth of field*1	3~44mm/9~127mm/4~∞mm/6~∞mm/17~∞mm/32~∞mm			
	(convertible using optical adaptor)			
Illumination system	Light guide system		Quartz light guide system	
	Distal end			
Outer diameter	ø6.0mm			
	Bending section			
Angulation range*2	Up 90° / Down 90°		Up 120°/Down 120° / Up 120°/Down 120°	
	Insertion tube			
Outer diameter	ø6.0mm (TF tube)			
	Working length			
Total length	11000mm	16000mm	7500mm	11000mm
	11230mm	16230mm	7780mm	11230mm
Universal cord length	2000mm			
	Carrying case			
Drum type case	Attache type case		Drum type case	

\*1 Depth of field refers to the scope-tip-to-object distance range within which the image is clearly focused.  
\*2 As the insertion tube is bent or looped, the range of angulation decreases.

#### ■ Guide Tube Specification

		MH-905		MH-906	
Insertion tube	Flexible portion	Rigid distal length			
		10mm (distal end port length)			
		Inner diameter			
		ø6.8mm			
	Outer diameter				
ø9.9mm					
Working length	Tapered flex tube				
	10845mm	15845mm	15845mm	16000mm	
Total length		15845mm	16000mm		

- **Operating temperature:** Insertion tube: In air: 0~50°C (32~122°F)  
In water: 10~30°C (50~86°F)  
All portions except insertion tube: In air: 0~40°C (32~104°F)
- **Operating pressure:** Insertion tube: In air: 1013hPa (normal pressure) (IV6C5-110/IV6C5-160)  
In water: 1013 (normal pressure)~1773hPa (1~1.75atm) (IV6C5X1-75)  
1013 (normal pressure)~2127hPa (1~2.1atm) (IV6C5-110) (IV6C5X1-110)  
1013 (normal pressure)~2634hPa (1~2.6atm) (IV6C5-160)  
All portions except insertion tube: In air: 1013hPa (1atm normal pressure)
- **Liquid resistance:** Insertion tube: Withstands machine oil, light oil and 5% salt water. (10~30°C or 50~86°F) (normal temperature).
- **Radioactivity resistance target value:** 50Gy (5000Rad) (IV6C5X1-75/110)

Series 5 videoscopes require an IV-6A control unit and MAJ-565 adaptor for operation.

## CONTROL UNIT FOR SERIES 6 & SERIES 5 VIDEOSCOPIES

### INDUSTRIAL VIDEOSCOPE CONTROL UNIT IV-6A

Loaded with every imaginable leading edge RVI function, the IV-6A is designed to make your inspections as efficient and effective as possible.

- Remote control operation using the Series 6 scope's "Five Button" control pad.
- Extended exposure time for darker areas.
- Automatic brightness adjustment.
- Zooming and virtual scrolling (panning) with moving images.
- Built-in image enhancement function.
- Compatible with Series 5 scopes when MAJ-565 adaptor is used.
- Compatible with fiberscopes and borescopes when OTC-6 C-Mount CCD Camera is used (see below).



#### SPECIFICATIONS

**Voltage:** 12V DC  
**Power Consumption:** 24W maximum  
**Dimensions:** 174(W) x 259(H) x 224(D) mm  
**Weight:** 1.5Kg

## CONTROL UNIT FOR SERIES 6

### INDUSTRIAL VIDEOSCOPE CONTROL UNIT IV-6

This camera control unit (CCU) can display full screen, high-resolution images captured by the scope on the monitor.

- Retainable white balance setting.
- Auto gain control function increases brightness in dark areas.
- Electric shutter automatically adjusts brightness on a monitor.



#### SPECIFICATIONS

**Voltage:** 12V DC  
**Power Consumption:** 8W  
**Dimensions:** 149(W) x 250(H) x 224(D) mm  
**Weight:** 1.1Kg

## ACCESSORIES FOR SERIES 6 & SERIES 5 VIDEOSCOPIES

### DIGITAL STORAGE AND MEASUREMENT SYSTEM

#### DSM-2

Compact, lightweight and easy to use, this state of the art system offers an impressive array of versatile functions to meet the most advanced RVI requirements.

- Easy to use, menu driven software for quick capture and storage of still video images - up to 20 images along with accompanying audio annotations can be stored in the internal memory.
- Images and data can be down loaded to floppy disk or Smart-Media card for later review of inspection results on a PC.
- A wide selection of image management functions include measure, recall, delete, export and import.
- All functions controllable from the DSM-2's front panel or the control pad on the control section of an Olympus Series 6 Videoscope.
- Capable of controlling the Digital Measuring Borescope (see page 15).



#### SPECIFICATIONS

**Voltage:** 12V DC  
**Power Consumption:** 24W maximum  
**Dimensions:** 217(W) x 40(H) x 2210(L) mm  
**Weight:** 900g (2lb)

### INDUSTRIAL DIGITAL IMAGE RECORDER

#### IW-R1

Compact digital image recorder.

- Freeze, store and play modes available.
- Picture quality selectable from three settings - HIGH, MIDDLE or LOW; a maximum of 99 still image frames can be recorded in LOW mode.
- Images stored on a PCMCIA memory card can be down loaded to a PC.
- Remote control operation using either the Series 6 scope's "Five Button" control pad or the MAJ-539 wired remote controller.



#### SPECIFICATIONS

**Voltage:** 12V DC  
**Power Consumption:** 9W  
**Dimensions:** 178(W) x 49(H) x 296(D) mm  
**Weight:** 1.7Kg (3.8lb)

### C-MOUNT CCD CAMERA

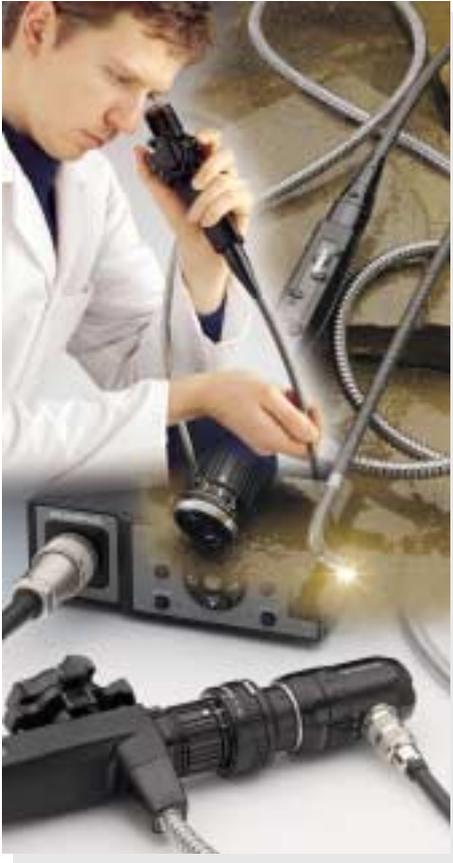
#### OTC-6

Monitor observation with a fiberscope or borescope.

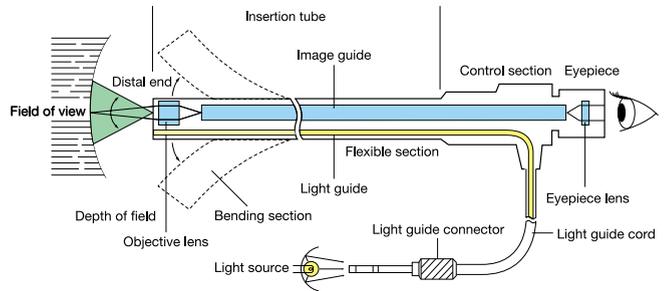


Zooming and other advanced functions of the IV-6A are available for fiberscopes and borescopes when the OTC-6 C-Mount CCD Camera is used. (Note: the OTC-6 camera can be used with IV-6A only)

## Slim diameters, superior optics and maximum flexibility for ultimate control in industrial inspection



### STRUCTURAL DRAWING



### High quality glass fibres for image transmission. Observation through an eyepiece.

Each Olympus Industrial Fiberscope is comprised of the insertion tube (the distal end, bending section\* and flexible section), as well as the control and eyepiece section. Image guide fibres, light guide fibres and wires for tip angulation are all built in.

\*The 0.6mm diameter IF6PD4 does not incorporate bending and control sections.

### MAIN APPLICATIONS

**Ideal for internal inspection of piping, machinery, structural members etc. Highly flexible for versatility and multi-purpose applications.**

For inspecting:

- Inside water supply/drainage pipes and plant piping.
- Inside engines of vehicles, aircraft etc.
- Inside machines such as motors and boilers.
- Inaccessible areas within steel towers, buildings etc.
- Operating conditions of machines etc.

### MAIN FEATURES

#### High resolution

Original Olympus high-performance optics technology, such as high-density glass fibre bundles, offers the world's highest level of fiberoptic resolution and bright, sharp images.

#### TF Tube with superior insertability

IF5 Series scopes (except IF2D5) employ the proven TF (Tapered Flex) Insertion Tube. Ideal for insertion into multiple-bend pipes, the flexibility changes continuously - being highly flexible at the tip and more rigid at the control section. As a result, IF5 Series scopes can easily be passed through bends and elbows. At the same time, the gradually increasing rigidity of the tube as it approaches the control section assures easier transmission of pushing/twisting strength after the first bend. All scopes featuring the TF tube are marked with the logo shown below.



#### Tip angulation

The distal end can be moved in either two or four directions, by hand-held controls (all models except 0.6mm diameter).

#### Interchangeable optical adaptors

Facilitate a wide variety of viewing angles and directions in just one scope (most models).

#### Fully waterproof insertion section

#### Photo and video documentation



## INDUSTRIAL FIBERSCOPES IF6C5X1/IF8C5/IF11C5

Standard fiberscopes with excellent resolution.



### IF6C5X1 Scope Specifications

		IF6C5X1-8	IF6C5X1-13	IF6C5X1-20	IF6C5X1-30
Optical system	Field of view	30°/60°/100° (convertible using optical adaptor)			
	Direction of view	Direct/side viewing (convertible using optical adaptor)			
	Depth of field	See optical adaptor specifications (fixed focus)			
	Illumination system	Light guide system			
Distal end	Outer diameter	ø6.0mm			
	Distal end length	13.7mm			
Bending section	Angulation range	Up 120°, Down 120°, Right 100°, Left 100°			
Insertion tube	Outer diameter	ø6.0mm (TF tube)			
Working length		800mm	1300mm	2000mm	3000mm
Total length		1065mm	1565mm	2265mm	3265mm
Light guide cable length		2000mm			

### IF6C5X1 Optical Adaptor Specifications

		Field of view	Direction of view	Depth of field
Provided	AT60D/FF-IF6C5	60°	Direct viewing	11~∞mm
	AT30D-IF6C5	30°	Direct viewing	26~372mm
	AT60D/NF-IF6C5	60°		5~102mm
Optional	AT100D-IF6C5	100°	Side viewing	4~∞mm
	AT30S-IF6C5	30°		21~138mm
	AT60S/NF-IF6C5	60°		4~85mm
	AT60S/FF-IF6C5	60°		9~∞mm
	AT100S-IF6C5	100°		4~∞mm

### IF8C5 Scope Specifications

		IF8C5-10	IF8C5-15	IF8C5-20	IF8C5-30
Optical system	Field of view	30°/60°/100° (convertible using optical adaptor)			
	Direction of view	Direct/side viewing (convertible using optical adaptor)			
	Depth of field	See optical adaptor specifications (fixed focus)			
	Illumination system	Light guide system			
Distal end	Outer diameter	ø8.4mm			
	Distal end length	21.9mm			
Bending section	Angulation range	Up 120°, Down 120°, Right 100°, Left 100°			
Insertion tube	Outer diameter	ø8.4mm (TF tube)			
Working length		1000mm	1500mm	2000mm	3000mm
Total length		1250mm	1750mm	2250mm	3250mm
Light guide cable length		2000mm			

### IF8C5 Optical Adaptor Specifications

		Field of view	Direction of view	Depth of field
Provided	AT60D/FF-IF8C5	60°	Direct viewing	20~∞mm
	AT30D/NF-IF8C5	30°	Direct viewing	30~70mm
	AT30D/FF-IF8C5	30°		60~250mm
	AT60D/NF-IF8C5	60°		9~50mm
	AT100D/NF-IF8C5	100°		3~200mm
Optional	AT100D/FF-IF8C5	100°	Side viewing	9~∞mm
	AT30S-IF8C5	30°		45~90mm
	AT60S/NF-IF8C5	60°		8~40mm
	AT60S/FF-IF8C5	60°		20~240mm
	AT100S/NF-IF8C5	100°		3~140mm
	AT100S/FF-IF8C5	100°		9~200mm

### IF11C5 Scope Specifications

		IF11C5-10	IF11C5-20	IF11C5-30
Optical system	Field of view	30°/60°/100° (convertible using optical adaptor)		
	Direction of view	Direct/side viewing (convertible using optical adaptor)		
	Depth of field	See optical adaptor specifications (fixed focus)		
	Illumination system	Light guide system		
Distal end	Outer diameter	ø11.3mm		
	Distal end length	25.5mm		
Bending section	Angulation range	Up 120°, Down 120°, Right 100°, Left 100°		
Insertion tube	Outer diameter	ø11.3mm (TF tube)		
Working length		1000mm	2000mm	3000mm
Total length		1250mm	2250mm	3250mm
Light guide cable length		2000mm		

### IF11C5 Optical Adaptor Specifications

		Field of view	Direction of view	Depth of field
Provided	AT60D/FF-IF11C5	60°	Direct viewing	27~390mm
	AT30D/NF-IF11C5	30°	Direct viewing	38~70mm
	AT30D/FF-IF11C5	30°		65~120mm
	AT60D/NF-IF11C5	60°		11~45mm
	AT100D/NF-IF11C5	100°		5~40mm
	Optional	AT100D/FF-IF11C5	100°	Side viewing
AT30S-IF11C5		30°	55~100mm	
AT60S/NF-IF11C5		60°	11~40mm	
AT60S/FF-IF11C5		60°	28~440mm	
AT100S/NF-IF11C5		100°	3~22mm	
AT100S/FF-IF11C5	100°	12~250mm		

### IF6C5X1/IF8C5/IF11C5 Operating Environment

- **Operating temperature:** Insertion tube: In air: -10~80°C (14~176°F)  
In water: 10~30°C (50~86°F)  
All portions except insertion tube: In air: 10~50°C (14~122°F)
- **Operating pressure:** Insertion tube: In air/water: 1013~1317hPa (1~1.3atm)  
All portions except insertion tube: In air: 1013hPa (1atm)
- Drip-proof control section for durable performance in adverse conditions.
- Fully waterproof insertion section for underwater use (corrosion-protected against machine oil, kerosene and 5% saline).

Note: As with any fiberscope, due to normal product characteristics all models may show a small number of broken fibres. The angulation angle decreases as the scope is coiled.

## INDUSTRIAL FIBERSCOPES IF6PD4/IF2D5/IF4D5/IF4S5

Ultra-thin diameters.



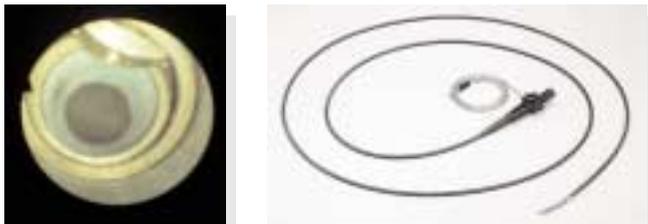
### Scope Specifications

		IF6PD4-6	IF6PD4-11	IF2D5-6	IF2D5-12	IF4D5-7	IF4PD5-15	IF4S5-7	IF4S5-15
Optical system	Field of view	58°		75°		65°		60°	
	Direction of view	Direct viewing		Direct viewing		Side viewing		Side viewing	
	Depth of field	1 ~ 50mm (fixed focus)		2 ~ 50mm (fixed focus)		6 ~ 60mm (fixed focus)		4 ~ 40mm (fixed focus)	
	Illumination system	Light guide system							
Distal end	Outer diameter	ø0.64mm		ø2.4mm		ø4.1mm			
	Distal end length	-		6mm		8.5mm		11.3mm	
Bending section	Angulation range	-		Up 120°, Down 120°					
	Insertion tube	ø0.64mm (non-TF tube)		ø2.4mm (non-TF tube)		ø4.1mm (TF tube)			
Working length		490mm	990mm	600mm	1170mm	700mm	1500mm	700mm	1500mm
	Total length	670mm	1170mm	850mm	1420mm	910mm	1710mm	910mm	1710mm
Light guide cable length		2000mm		2200mm		2000mm			
	Operating temperature	Insertion tube	In air: 10~40°C (50~104°F)	In air: 10~40°C (50~104°F)	In air: -10~80°C (14~176°F)				
All portions except insertion tube			In air: 10~30°C (50~86°F)	In air: 10~40°C (50~104°F)	In air: -10~50°C (14~122°F)				
Operating pressure	Insertion tube	In air: 1013hPa (1atm)	In air/water: 1013hPa (1atm)	In air/water: 1013hPa ~ 1165hPa (1~1.5atm)					
		All portions except insertion tube	In air: 1013hPa (1atm)						

- Waterproof insertion tube. Drip-proof control section (except IF6PD4).

## INDUSTRIAL FIBERSCOPE (ultra-long) IF13D3-60

Extremely long fiberscope penetrates as deep as 6m.



### IF13D3-6000 Scope Specifications

		IF13D3-60
Optical system	Field of view	32° (convertible using optical adaptor)
	Direction of view	Direct viewing (convertible using optical adaptor)
	Depth of field	1mm~∞ (adjustabl focus)
	Illumination system	Light guide system
Distal end	Outer diameter	ø11.3mm
Bending section	Angulation range	Up 120°, Down 120°, Right 120°, Left 120° 90° (when looped once)
	Insertion tube	Outer diameter
Working length		6050mm
Total length		6340mm
Light guide cable length		1500mm

### IF13D3-6000 Optical Adaptor Specifications

	Optical system		
	Field of view	Direction of view	Depth of field
IF11D3-A20D	16°	Direct viewing	13~∞mm
IF11D3-A40D	32°		6~∞mm
IF11D3-A60D	48°		3~∞mm
IF11D3-A80D	63°		2~∞mm
IF11D3-A100D	76°		1~∞mm
IF11D3-A20S	16°	Side viewing	13~∞mm
IF11D3-A60S	48°		3~∞mm
IF11D3-A80S	63°		2~∞mm
IF11D3-A100S	76°		1~∞mm

- Operating temperature: 10~80°C (50~176°F)
- Operating pressure: 1013~1621hPa (1~1.6atm)
- Fully waterproof insertion section for underwater use (corrosion-protected against machine oil, kerosene and 5% saline).

## INDUSTRIAL FIBERSCOPE IF5D4X1-14

Specifically for PT-6 engine inspection.

### IF5D4X1-14 Scope Specifications

		IF5D4X1-14
Optical system	Field of view	49°
	Direction of view	Direct viewing (convertible using optical adaptor)
	Depth of field	5~50mm
	Illumination system	Light guide system
Distal end	Outer diameter	ø5.0mm
Bending section	Angulation range	Up 120°, Down 120°
	Insertion tube	Outer diameter
Working length		1200mm
Total length		1440mm
Light guide cable length		2000mm

### IF5D4X1-14 Optical Adaptor Specifications (supplied as standard)

Optical adaptor	Field of view	Direction of view	Depth of field
AT50S-IF5D4x1	49°	Side viewing	5~50mm

- Operating temperature: Insertion tube: In air: -10~80°C (14~176°F)  
All portions except insertion tube: In air: 10~50°C (14~122°F)
- Operating pressure: Insertion tube: In air: 1013hPa (1atm)

## INDUSTRIAL FIBERSCOPE IF7D3X3-32

For F100 and JT9D inspection.



### IF7D3X3-32 Scope Specifications

		IF7D3X3-32
Optical system	Field of view	66°
	Direction of view	Direct viewing
	Depth of field	8~∞mm (fixed focus)
	Illumination system	Light guide system
Distal end	Outer diameter	ø7.3mm
Bending section	Angulation range	Up 130°, Down 130°, Right 130°, Left 130°
	Insertion tube	Outer diameter
Working length		3200mm
Total length		3455mm
Channel	Inner diameter	ø1.6mm
	Durability	Insertion tube only (except channel)

- Operating temperature: Insertion tube: In air: -6~66°C (21~150°F)  
All portions except insertion tube: In air: -6~50°C (21~122°F)
- Operating pressure: In air: 1013hPa (1atm)

## INDUSTRIAL FIBERSCOPE IF8D3X2-23/MD-999

For JT8D jet engine inspection.



### IF8D3X2-23 Scope Specifications

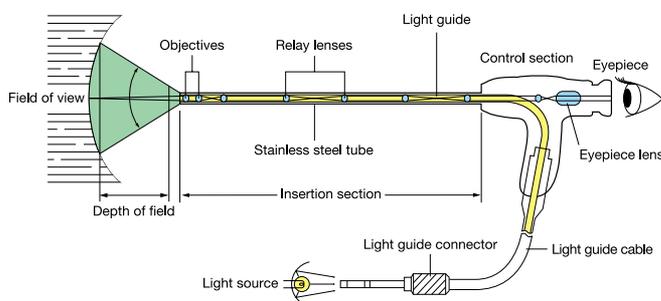
		IF8D3X2-23	
Optical system	Field of view	80°	
	Direction of view	Forward viewing	
	Depth of field	8~∞mm	
	Illumination system	Light guide system	
Insertion tube	Distal end	Outer diameter	ø8.4mm
	Bending section	Rigid distal end length	15.6mm
		Angulation range	Up 185°, Down 105°, Right 105°, Left 105°
Working length	Insertion tube	Outer diameter	ø8.4mm
Total length		2280mm	
Light guide cable length		2500mm	

- Operating temperature: Insertion tube: In air: 10~80°C (50~176°F)  
All portions except insertion tube: In air: 10~80°C (50~176°F)
- Operating pressure: In air: 1013hPa (1atm)

## Enhanced brightness and image clarity - the Series 5 industrial rigid borescopes are ideal for eyeball or TV monitor inspection



### STRUCTURAL DRAWING



**Unbeatable relay lens optics for sharp image transmission with light guide fibres for bright illumination. Wide selection available to suit any requirements.**

Incorporating a multiple-element relay lens system in a durable stainless steel insertion tube, Series 5 industrial rigid borescopes deliver superb high-resolution images. Detachable light guide fibres transmit illumination from a separate light source directly to the site.

### MAIN APPLICATIONS

**Ideal for internal inspection of sites that can be accessed head-on with relatively shallow insertion. Excellent images are delivered by eye or when a TV camera is attached.**

For inspecting:

- Inside narrow-diameter holes and pipes.
- Inside cast and hydraulic parts and honing-processed holes.
- Inside aircraft engines, hollow walls or buildings, machinery, structures etc.

### MAIN FEATURES

#### Ideal for TV monitor inspection

Up to six times brighter images than conventional models.

#### Clear, high-resolution images

Excellent detail reproductions. Sharp image is easy on the eyes, helping reduce inspector fatigue.

#### Focus adjustment mechanism

Easy to use focus control.

#### 370° orbital scan

Upward pointer keeps you oriented when using the rotation function (except direct viewing scopes and R160 models).

#### Increased field of view

32% larger field of view in 4mm  $\varnothing$  models and 96% larger field of view in 6mm  $\varnothing$  models.

#### Accurate image reproduction

Distortion at image edges has been dramatically reduced.

#### Even illumination

New tip design ensures more even illumination even when viewing close-range subjects.

#### Outstanding durability

Stainless steel insertion tube usable at temperatures between -20°C and 150°C as well as under pressure of up to 1.7 atmospheres.

#### Ergonomic control section

Extremely comfortable and functional.

#### Comprehensive range

Almost 200 models available featuring various diameters, working lengths and viewing directions and angles.



Rigid borescopes are used where there is straight line access to the inspection area. They provide cost effective solutions for applications as diverse as maintenance, quality control, research, development and security.

The Series 5 product design provides:

- Large, bright, clear, high-resolution images
- A wide range of robust, versatile instruments
- A fully integrated system

To satisfy customer and application requirements, the Olympus Series 5 range also includes:

- Series 5 Swing Prism Borescope
- Series 5 Zoom Swing Prism Borescope
- Series 5 Engine Borescope

## STANDARD SERIES 5 BORESCOPE

The Series 5 standard range is available in a choice of seven diameters from 4-16mm. The standard range also offers varying lengths and direction of view and field of view.



## SERIES 5 SWING PRISM BORESCOPE

The Series 5 swing prism borescope has been designed to allow the operator to scan a large area, saving time and expense. The direction of viewing can be adjusted continuously between 45° to 115°, coupled with a field of view, this allows a total viewing arc of 120° to 140°. The Series 5 Swing borescope is available in both 6mm and 8mm diameters.



## SERIES 5 ZOOM SWING PRISM BORESCOPE

The Series 5 Zoom swing prism borescope has been added to the successful swing prism range. It incorporates the same characteristics as the standard swing prism, but with the added feature of 2 x optical zoom. This allows the user to zoom onto an object of interest, providing a magnified view.



## SERIES 5 ENGINE BORESCOPES

The Series 5 engine borescope has been designed to meet manufacturer and user specification requirements specifically for a number of key military and commercial aero engines.



### Borescope R120 - 039 - 090 - 35 ILG

① ② ③ ④ ⑤ ⑥

- ①: Series 5 Borescope      ④: Direction of view degrees (eg 90° lateral)  
 ②: Diameter 0.1mm (eg 12mm)      ⑤: Field of view degrees (eg 35°)  
 ③: Working length cm (eg 39cm)      ⑥: Integral light guide (12 & 16mm diameter only)

R040-021-000-60	R080-104-045-50	R100-067-045-50
R040-033-000-60	R080-124-045-50	R100-095-045-50
R040-022-045-60	R080-144-045-50	R100-025-090-35
R040-033-045-60	R080-024-090-50	R100-025-090-50
R040-022-090-60	R080-025-090-35	R100-029-090-10
R040-033-090-60	R080-028-090-10	R100-039-090-50
	R080-034-090-50	R100-039-090-35
R060-017-000-50	R080-035-090-35	R100-043-090-10
R060-032-000-50	R080-044-090-50	R100-053-090-50
R060-047-000-50	R080-045-090-35	R100-053-090-35
R060-063-000-50	R080-048-090-10	R100-057-090-10
R060-017-045-50	R080-054-090-50	R100-067-090-50
R060-032-045-50	R080-064-090-50	R100-067-090-35
R060-047-045-50	R080-065-090-35	R100-081-090-35
R060-063-045-50	R080-074-090-50	R100-095-090-50
R060-017-090-50	R080-084-090-50	R100-095-090-35
R060-032-090-50	R080-104-090-50	R100-099-110-50
R060-047-090-50	R080-124-090-50	R100-095-110-50
R060-063-090-50	R080-144-090-50	
R060-078-090-50	R080-024-110-50	R120-039-090-35 ILG
	R080-034-110-50	R120-053-090-35 ILG
	R080-044-110-50	
R080-044-000-50	R080-054-110-50	R160-059-000-35 ILG
R080-064-000-50	R080-064-110-50	R160-101-000-35 ILG
R080-084-000-50	R080-094-110-50	R160-143-000-35 ILG
R080-124-000-50	R080-104-110-50	R160-059-090-35 ILG
R080-144-000-50	R080-124-110-50	R160-101-090-35 ILG
R080-024-045-50		R160-122-090-35 ILG
R080-044-045-50	R100-038-000-50	R160-143-090-35 ILG
R080-064-045-50	R100-066-000-50	
R080-084-045-50	R100-039-045-50	

### Borescope R080 - 044 - 045SW115 - 50ZM25

① ② ③ ④ ⑤ ⑥

- ①: Series 5 Borescope      ④: Direction of view degrees (eg 45° to 115°)  
 ②: Diameter 0.1mm (eg 8mm)      ⑤: Field of view degrees (eg 50°)  
 ③: Working length cm (eg 44cm)      ⑥: Field of view zoom range (eg 50° to 25°)  
 (zoom models only)

#### ■ Swing-Prism and Zoom Swing-Prism Specifications

R060-023-045SW115-50	R080-043-045SW115-50
R060-031-045SW115-50	R080-044-045SW115-20
R060-046-045SW115-50	R080-053-045SW115-50
R060-077-045SW115-50	R080-063-045SW115-50
R060-024-045SW115-50ZM25	R080-064-045SW115-20
R060-032-045SW115-50ZM25	R080-083-045SW115-50
R060-047-045SW115-50ZM25	R080-103-045SW115-50
R060-062-045SW115-50ZM25	R080-024-045SW115-50ZM25
	R080-034-045SW115-50ZM25
R080-023-045SW115-50	R080-044-045SW115-50ZM25
R080-024-045SW115-20	R080-054-045SW115-50ZM25
R080-033-045SW115-50	R080-064-045SW115-50ZM25

#### ■ Aero-engine Model Specifications

Instrument	Engine	Instrument	Engine
R055-047-000-55	Pegasus	R080-034-110-55	TRENT
R055-047-090-55	Pegasus/RB199	R100-017-090-35	TRENT
R055-085-090-55	Pegasus	R100-024-090-35V	CFM-56
R060-047-090-55	M88	RE080-012-090-60	CFM-56
R060-047-060-30	M88	RE080-029-060-60	CFM-56
R060-032-070-40GI	MTR-390	RE080-029-110-60	CFM-56
R055-017-090-60	MTR-390	RE100-041-090-35V	GE-90
R080-025-110-35GI	RTM-322	RE100-068-090-55	GE-90
R060-024-070-60	RTM-322	RE080-043-060-55	GE-90
R080-024-060-50	RTM-322	RE080-043-110-55	GE-90
R080-041-070-60	TRENT		

Note: Many aero-engine inspections use standard or swing-prism borescopes. Contact our application specialists for specific advice.

# Industrial Rigid Borescopes

## SMALL DIAMETER BORESCOPIES

Ultra-thin Borescopes, as small as 0.9mm diameter for extremely tight spaces.

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.

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.

The X series range uses 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 a new 0.9mm (0.04") version which offers distinct advantages in some applications. K Series models use a 'Selfoc' optical lens system which offers exceptional image resolution and image brightness, but does not offer the same robustness as the fibre versions.

Any one of the Olympus light sources can be used with the small diameter borescopes including, on the X Series, 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.

- **Fibre Conduit (X Series)**  
Incorporates the very latest in condensed fibre conduit image transmission technology, for high resolution and durability.
- **Selfoc Lens (K Series)**  
A continuous rigid rod lens for image transmission gives the highest resolution.



K Series



X Series



### Small Diameter Borescope Specifications - X Series

Outer diameter	Working length	Direction of view	Field of view	Depth of field
ø0.9mm	60mm or 150mm	Direct (0°) or Forward-oblique (15°)	70°	Direct: 3 to infinity
				Forward-oblique: 2 to 7
ø1.2mm	60mm or 150mm	Direct (0°) or Forward-oblique (15°)	70°	Direct: 3 to infinity
				Forward-oblique: 2 to 7
ø1.7mm	150mm or 250mm	Direct (0°) or Forward-oblique (15°) Lateral (90°)	70°	Direct: 4.5 to infinity
				Forward-oblique: 3 to 12
				Lateral: 3 to 12
ø2.5mm	150mm or 250mm	Direct (0°) or Forward-oblique (15°) Lateral (90°)	70°	Direct: 4.5 to infinity
				Forward-oblique: 3 to 12
				Lateral: 3 to 12

### Small Diameter Borescope Specifications - K Series

Outer diameter	Working length	Direction of view	Field of view	Depth of field	
ø1.2mm	96mm	Direct (0°) or Forward-oblique (15°)	45°	All models 1mm - 40mm	
			53°		
ø1.7mm	96mm or 186mm	Direct (0°)	62°		
			Forward-oblique (15°)		80°
					Lateral (90°)
ø2.7mm	186mm	Direct (0°)	62°		
			Forward-oblique (15°)		80°
					Lateral (90°)

- **Operating temperature:** Insertion tube: In air: -10-80°C (14-176°F)  
In water: 10-30°C (50-86°F)  
All portions except insertion tube: In air: -10-50°C (14-122°F)
- **Operating pressure:** Insertion tube: In air/water: 1013hPa (1atm normal pressure)  
All portions except insertion tube: In air: 1013hPa (1atm normal pressure)

## DIGITAL MEASURING BORESCOPE SYSTEM

The Olympus Digital Measuring Borescope (DMBS) is the first endoscopic system capable of providing accurate and repeatable measurement data.

Decisions which have major implications for operational efficiency and safety often rely on the measurement of defects and the monitoring and recording of component wear.

The Olympus DMBS has been designed to meet critical measurement requirements, assisting in the creation of appropriate maintenance strategies.

- The sensor-incorporating swing prism borescope design allows you to measure both length and depth when the scope is connected to the control unit.
- All you have to do is focus and point the cursor at any two points on the subject. It's simple and easy, but guaranteed to provide you with the highly accurate measurement results you need.
- The built-in swing prism at the distal end allows you to change the direction of view and the narrow 20° field of view provides large, magnified images.



## DIGITAL MEASURING BORESCOPE CONTROLLER

The Digital Measuring Borescope Controller (DMBC) is compact, lightweight and simple to operate with cursor and functions controlled by front panel buttons. All connections, including power for the Digital Measuring Borescope, are direct to the controller making set-up quick and easy.



The DMBC provides four modes of measurement including point-to-point linear, point to line, depth and 2D scaling. This covers the majority of measurements for turbine applications such as crack length, leading edge, displacement, tip loss, FOD depth and blade separation.

### ■ Digital Measuring Borescope System Specifications

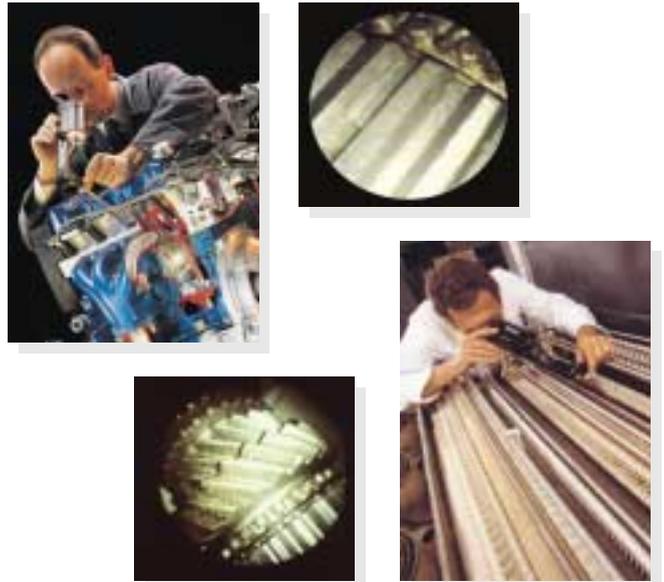
Insertion tube	Outer diameter	ø8.1mm
	Working length	246mm, 446mm
	Direction of view	50°-110°
	Field of view	20°
	Measurement range	10-180mm
Measurement	Accuracy	±4% (10-60mm Measurement range) ±8% (60-180mm Measurement range)

- **Operating temperature:** Insertion tube: In air: -20~150°C (-4~302°F)  
All portions except insertion tube: In air: 0~50°C (32~122°F)
- **Operating pressure:** In air: 709-1722hPa (0.7-1.7atm)  
In water: Up to 1722hPa (1.7atm)
- **Liquid resistance (insertion tube):** Withstands aviation fuels, machine oil, light oil and 5% salt water (normal pressure).

## MODULAR BORESCOPE

The Modular borescope consists of a compact 50W light source, viewing arm and a variety of probes and mirror sheaths giving viewing options unavailable in conventional rigid systems.

This borescope is particularly useful for hard to reach areas, such as petrol and diesel engines and can be supplied as customised kits to suit user requirements in a small robust carrying case.



### ■ Modular Borescopes Specifications

Model	Maximum diameter	Working length	Direction of view	Field of view	Minimum working length
T080-031-090-50	6.0mm	311mm	Lateral (090°)	50°	9 to 100mm
T080-010-000-50	8.1mm	104mm	Direct (000°)	50°	9 to 130mm
T080-020-000-50	8.1mm	204mm	Direct (000°)	50°	9 to 120mm
T080-030-000-50	8.1mm	305mm	Direct (000°)	50°	9 to 100mm
T086-010-090-50	8.8mm	104mm	Lateral (090°)	50°	9 to 130mm
T086-020-090-50	8.8mm	204mm	Lateral (090°)	50°	9 to 120mm
T086-030-090-50	8.8mm	305mm	Lateral (090°)	50°	9 to 100mm
T086-010-110-50	8.8mm	104mm	Retro (110°)	50°	9 to 130mm
T086-020-110-50	8.8mm	204mm	Retro (110°)	50°	9 to 120mm
T086-030-110-50	8.8mm	305mm	Retro (110°)	50°	9 to 100mm
T100-010-000-50	10.1mm	104mm	Direct (000°)	50°	9 to 130mm
T100-020-000-50	10.1mm	204mm	Direct (000°)	50°	9 to 120mm
T100-030-000-50	10.1mm	305mm	Direct (000°)	50°	9 to 100mm
T100-010-090-50	10.2mm	106mm	Lateral (090°)	50°	9 to 130mm
T100-020-090-50	10.2mm	204mm	Lateral (090°)	50°	9 to 120mm
T100-030-090-50	10.2mm	305mm	Lateral (090°)	50°	9 to 100mm

### ■ Modular Borescope - Mirror Sheath Specifications

Model	Maximum diameter	Working length	Direction of view	Field of view	Minimum working length
MT086-010-090	8.7mm	105mm	Lateral (090°)	As probe	0 to 121mm
MT086-020-090	8.7mm	207mm	Lateral (090°)	As probe	0 to 108mm
MT086-030-090	8.7mm	306mm	Lateral (090°)	As probe	0 to 91mm
MT110-010-090	11.2mm	106mm	Lateral (090°)	As probe	0 to 118mm
MT110-020-090	11.2mm	207mm	Lateral (090°)	As probe	0 to 108mm
MT110-030-090	11.2mm	306mm	Lateral (090°)	As probe	0 to 91mm

### ■ Light Source Specifications

Model	Lamp	Weight	Dimensions	Power supply	Power consumption	Light output control
KLS-131	50W Miniature quartz halogen, 12V	0.5kg	137mm long x 53mm diameter (approx)	12V DC ±10%	55W	Constant-colour temperature variable shutter

### ■ Modular Borescope

- **Operating temperature:** Probe/mirror sheath: -10 to +150°C (-14 to +302°F)  
Other parts: -10 to +40°C (+14 to +104°F)
- **Operating pressure:** Probe: In air: 0.7 to 1.7 bar (10.3 to 25 lb/in<sup>2</sup>)  
In water: 1.0 to 1.7 bar (14.7 to 25 lb/in<sup>2</sup>)
- **Fluid resistance:** Probe and mirror sheath can be immersed for short periods in 5% salt water, petrol, diesel, engine oil, brake fluid, ethylene glycol and methanol (at +10°C to +30°C, and atmospheric pressure)



In remote visual inspection applications the choice of light source is vital. When deciding which is the most appropriate, consideration must be given to size, weight and light output.

The Olympus range of light sources have been designed to meet the customers needs and requirements, from the high intensity range of light sources, which offer versatility and maximum light output, to the more economical, lower power consumption tungsten range.

- If viewing over longer distance, or in particularly dark areas, use a high intensity light source, which incorporates an arc lamp, such as metal halide or UHP.
- If a lower cost light source is required, and viewing distance is smaller, then use a Tungsten halogen light source
- If using from a battery, or if low power consumption is required, then a low wattage lamp (such as ILH-2B) will offer longest battery life.

Remember that a high intensity arc lamp will provide much more light than a Tungsten halogen lamp, particularly with small diameter instruments. Contact your local distributor for selection advice, and try the complete system on a typical application.

### SPECTRAL OUTPUT (see Figure 1)

The spectral output of a lamp details the amount of electro-magnetic radiation produced across a range of wavelengths, from ultra-violet (UV), through the visible spectrum, to infra-red (IR). Radiation wavelengths are expressed in nanometres (nm), one nanometre being  $10^{-9}$  metres.

The visible spectrum is between approximately 390 and 770nm, with ultra-violet being below and infra-red being above this range. In order to give true colour images, the light source should have a relatively even output across the visible spectrum. Ideally, the amount of IR radiation produced should be minimised, as IR radiation is converted to heat, which may then require a dissipation system, adding cost, volume and weight to the light source.

The spectral outputs of the three most frequently used lamp types are shown in Figure 1 and compared with that of the sun.

### COLOUR TEMPERATURE

The colour temperature of a lamp is an indication of its radiance and is measured in degrees absolute ( $^{\circ}$ K in SI units).

Typically, tungsten-halogen lamps have a colour temperature of 3,200 $^{\circ}$ K, whilst metal-halide and UHP arc lamps are around 5,600 $^{\circ}$ K. The colour temperature of the sun is 5,900 $^{\circ}$ K.

With tungsten-halogen lamps, the colour temperature can be reduced by decreasing the voltage across the lamp filament. Some light sources use this method to adjust the 'intensity' of the light output. Unfortunately, this 'rheostat' type control increases the 'yellowing' of the resultant illumination.

For this reason, all Olympus light sources use a mechanical shutter to control light output, as the full colour temperature of the lamp is preserved.

### POWER

A lamp's power rating refers to the power required to operate it – it is not a direct indication of a lamp's illumination power. For instance, a 50W metal-halide or UHP lamp will produce a higher illumination level (in output per unit area) than a 500W tungsten-halogen lamp.

## HIGH INTENSITY LIGHT SOURCES ILH-2A/ILH-2B

The ILH-2A and ILH-2B light sources have a custom designed high output 50W metal halide arc lamp. This produces nearly x 3 the output of the ILK-7. The unit is small in size and as well as being used with borescopes and fiberscopes, can be installed into the System Case 2 or used separately

Both the ILH-2A and ILH-2B have two Hirose power outputs offering a 12VDC 2 amp total for operation of Olympus ancillary equipment.

### SPECIFICATIONS

<b>Lamp:</b>	50W Metal Halide
<b>Weight:</b>	3kg
<b>Dimensions:</b>	173 x 235 x 85mm
<b>Power Supply:</b>	ILH-2A – 110-230V 50-60Hz, 115V 400Hz ILH-2B – 110-230V 50-60Hz, 115V 400Hz (with AC Adaptor) 12VDC
<b>Power Consumption:</b>	100W max



## ILP-1

The ILP-1 light source has been specifically designed for large void inspections. Incorporating the latest UHP lamp technology it is now the brightest, most powerful light source ever produced by Olympus.

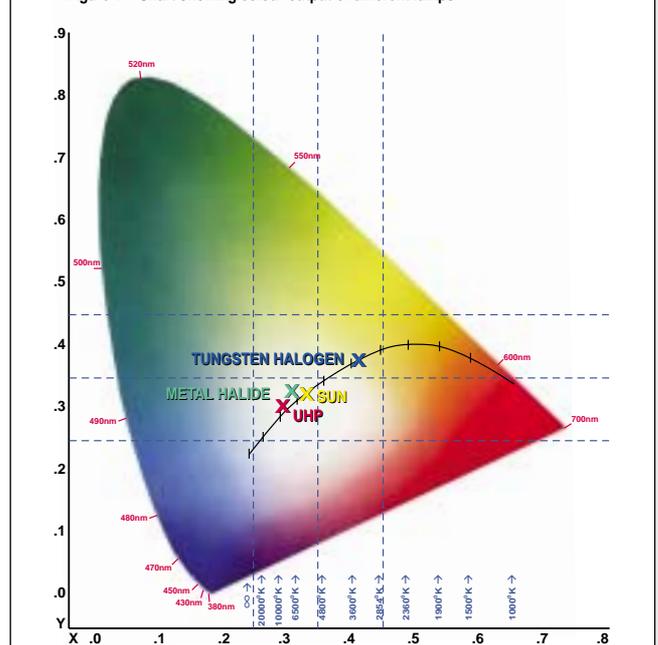
The ILP-1 has two Hirose power outputs offering a 12VDC 4 amp total for operation of Olympus ancillary equipment.

### SPECIFICATIONS

<b>Lamp:</b>	120W Ultra High Performance (UHP)
<b>Weight:</b>	4kg
<b>Dimensions:</b>	197 x 288 x 105mm
<b>Power Supply:</b>	100-120VAC, 200-240VAC, 115VAC 400Hz
<b>Power Consumption:</b>	230W max



Figure 1 - Chart showing colour output of different lamps



## TUNGSTEN HALOGEN LIGHT SOURCES ILK-7/ILK-7A/ILK-7B

The ILK-7 range of light sources incorporates a 150W tungsten-halogen lamp offering features necessary to meet most industrial needs.

### SPECIFICATIONS

Lamp:	150W tungsten-halogen
Weight:	2.3kg
Dimensions:	178 x 230 x 76mm
Power Supply:	ILK-7 – 100-120V 50-60Hz, 115V 400Hz ILK-7A – 100-240V 50-60Hz, 115V 400Hz 12VDC ILK-7B – 100-240V 50-60Hz, 115V 400Hz

Power Consumption: 190W max



## LIGHT SOURCE ILK-D1

The ILK-D1 portable light source has been specifically designed for use with a battery belt, being operated from a 12V supply. The light source has a large spring clip to enable it to be mounted on a belt or jacket pocket.

### SPECIFICATIONS

Lamp:	75W tungsten-halogen
Weight:	0.6kg
Dimensions:	140 x 80 x 60mm
Power Supply:	12VDC
Power Consumption:	80W



## LIGHT SOURCE ILK-D2

The ILK-D2 is a compact, portable light source powered from a 12V DC supply. It can be mounted on a belt using a spring clip.

### SPECIFICATIONS

Lamp:	100W tungsten-halogen
Weight:	0.6kg
Dimensions:	75 x 147 x 168mm
Power Supply:	12VDC
Power Consumption:	105W



## LIGHT SOURCE KLS-131

The KLS-131 light source can be used as a stand alone system or as part of the modular borescope system. It is available with either XLR connector or crocodile clips for car battery use.

### SPECIFICATIONS

Lamp:	50W tungsten-halogen
Weight:	0.6kg
Dimensions:	137 x 53mm
Power Supply:	12VDC
Power Consumption:	80W



## LIGHT SOURCE ILK-M1

The ILK-M1 light source is specifically designed for use with X Series Small Diameter borescopes. It is battery powered and uses a 2.5V lamp.

### SPECIFICATIONS

Lamp:	Tungsten-halogen
Weight:	50g
Dimensions:	2.8mm diameter
Power Supply:	3VDC type battery



## Battery Options

For portability, many Olympus Industrial light sources can be powered from battery packs. Different models are available to suit individual needs, all including long life nickel-cadmium cells.



The IC-2 belt incorporates a built-in charger which can be used from 100 and 230V supplies.

The 'Lok-on' belt uses separate battery packs, to allow continuous use.



## PIPE INSPECTION SYSTEM OLYMPUS PT400

Pipe inspection at distances up to 40 metres and interchangeable camera heads for different pipe diameters.

- 40m working length.
- Immersible up to 3m.
- Two interchangeable shock-resistant camera heads, 23mm diameter and 40mm diameter.
- Bottom indicating sensor built into the 40mm diameter camera head.
- Optional detachable centring devices keep the camera head in the centre of the pipe.
- Compact integrated design with the cable drum and control unit.
- Can be powered by a car cigarette lighter and 12V DC battery.



CAMERA HEAD OPTIONS



D23N (NTSC)/D23P (PAL)



D40N (NTSC)/D40P (PAL)

### ■ Olympus PT400 Specifications

Camera optical system	Illumination system	White LED illumination
	Brightness adjustment system	Automatic adjustment by means of AGC and electric shutter
Insertion tube	Outer diameter	Distal end: $\phi 18\text{mm}$ Flexible portion (camera cable): $\phi 9.0\text{mm}$
	Working length	40m
	Minimum bending radius	R120mm
Cable drum (integrated with control unit)	Frame	480(W) x 480 (H) x 350(D) mm
	Video signal	NTSC, PAL 2 lines (RCA, BNC)
	Power supply	12V DC (operating voltage range:10.8-13.2V DC)
	Maximum power consumption	Approx 6W (camera & LED)
	Output power supply	1 line 12V DC, 2A (max)
	Weight	14.5Kg
AC adaptor	Rated input	100-240V AC (50/60Hz)
	Rated output	12V DC, 2.5A
Other	Provided accessories	Accessory storage case, AC adaptor, Video cable RCA-RCA

### ■ Camera Head for PT400 Specifications

		D23N (NTSC)	D23P (PAL)	D40N (NTSC)	D40P (PAL)
Optical system	Field of view	80°		100°	
	Direction of view	Forward			
	Depth of field	20mm-∞mm (adjustable focus)			
Distal end	Outer diameter	23mm		40mm	

- **Operating temperature:** Insertion tube: In air: 0-40°C
- **Operating pressure:** In air: 1013hPa  
In water: 1013-1114hPa
- **Waterproof properties:** Watertight design, waterproof structure (3m depth of water)

## Custom Packaging

### Packaging

Packaging has always been a very important part of the Olympus product range. We have therefore standardised our packaging to suit various customer needs including dedicated customised packaging for system configurations.

Olympus can offer a variety of hardcase and softbag solutions.

## IV SYSTEM CASE 2

The Olympus System Case 2 is a compact, portable, easy to use system that can contain a videoscope (up to a length of 7.5m), collection of tips, ILH-2B light source, choice of IV-6 or IV-6A camera control unit, high resolution LCD screen, IW-R1 or DSM-2 image management system and either a MAJ-522 or PSU-PLUS power supply for operation.

### SPECIFICATIONS

**Dimensions:** 470(W) x 435(H) x 220(D) mm  
**Weight:** 22kg (maximum depending on contents)  
**Power Input:** 110-230V 50-60Hz or 12V DC



## INFRA-RED TELESCOPIC CAMERA SYSTEM

For large vessel inspection. The Infrared Telescopic Camera System (IRTC) features a CCD camera with integral infrared illumination mounted on a telescopic arm, together with a compact monitor and battery module. The complete system is supplied in a single rugged carrying case.

- Up to 12 metres viewing distance in darkness.
- Up to 2 hours battery life in continuous use.
- High resolution monochrome monitor.
- Robust carrying case.



Corrosion of heat exchanger end plate

Viewing head	Size	150 x 46 x 28mm (compact version) including illuminator 230 x 46 x 28mm (standard version) including illuminator
	Camera	Monochrome, 380 x 420 lines resolution
	Sensitivity	0.2 lux at f1.2
	Illumination	Infrared LED array - 850nm (compact version) - 950nm (standard convert version)
	Power	12V DC, supplied by battery within chest pouch
Telescopic Pole	Type	Lightweight, telescopic
	Length	435 - 1530mm (extended)
	Weight	0.5kg (including camera head/ illuminator)
Monitor	Type	Monochrome - CRT
	Size	120 x 230 x 60mm with 4" screen
	Resolution	420 lines
Battery	Type	12V 2.5Ah Cyclon, sealed lead acid
	Run Time	Minimum: 2 hours continuous use (compact version) 1 hours continuous use (standard version)
	Charge Time	2 hours provides 95% capacity, full charge approx 8 hours
Battery Charger	Type	Constant voltage
	Input	198 - 264V AC, 50Hz or 100 - 110V AC, 60Hz
	Output	14.4V DC max, 2.2A
Chest Pouch	Padded nylon with sun shield. Neck and waist straps with quick release buckles	
Carrying Case	Double skinned, toughened ABS. Waterproof, with O ring seal and pressure relief valve.	
Standard Set	Telescopic pole with camera head/ illumination, control unit, 4" monochrome monitor, 1 x battery pack, battery charger, chest pouch, carrying case and instructions.	
Accessories	Protective cover for camera head. Wrist strap.	



## DIGITAL CAMERA ADAPTOR AI-DC3/AK-DC3

Now you can take advantage of the superior image quality and high resolution of an Olympus CAMEDIA digital camera to document your inspection results. Simply connect the camera to your Olympus Industrial fiberscope or borescope via the AI-DC3 or AK-DC3 digital camera adaptor. Images are available immediately and are ready-made for e-mail, insertion into word processor documents, presentations and more.

- Endoscopic images can be documented using the high-resolution CAMEDIA digital camera.
- Fiberscope and borescope images can be turned into digital data at the touch of a button and downloaded to a PC without having to make prints.
- An inspection site's external view can be documented with the camera alone, and the internal view can be documented when the camera is connected to the endoscope.



CAMEDIA digital camera connected to Olympus Industrial fiberscope via AI-DC3



CAMEDIA digital camera connected to Olympus Industrial borescope via AK-DC3

### ■ Specifications

	AI-DC3	AK-DC3
Compatible scope	IF4D5/4S5	Series 5 industrial rigid borescopes
	IF5D4X1	K12/17/27 (mini borescopes) X009/X012/X017/X025 (small diameter borescopes)
	IF6C5X1	IF6PD4
	IF8C5	IF2D5
	IF11C5	IF8D4X2/X3
Connection with camera	Screwed into tripod socket of camera*	
Compatible camera	C-2000ZOOM/C-2020ZOOM/C-3030ZOOM/C-3100ZOOM/ C-4040ZOOM/C-4100ZOOM/C-3020ZOOM/C-4000ZOOM/C-5050ZOOM	
Construction	Two components: stay-provided mount for scope eyepiece and intermediate ring for camera filter thread.	

Note: When the adaptor is connected to the fiberscope, interference between the fiberoptic matrix and the LCD pixels may cause striped patterns (moiré).

To prevent moiré, set the camera's focus to manual mode.

\* When the adaptor is connected to the camera, the camera's tripod socket cannot be used. To secure the camera on a tripod, use the optional fiberscope holder (MB-936/MB-937) or borescope tripod mount (KN-29).

## 35mm SLR CAMERA

### SC35 (Type 15)

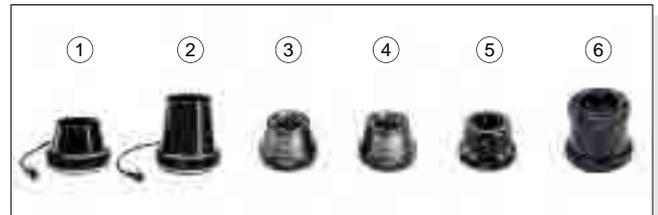
By using an optional OM Adaptor, images observed by an Olympus Industrial fiberscope or borescope can be easily photographed with automatic exposure.

Note: Ordinary photography is not possible with this camera.



## OM ADAPTORS

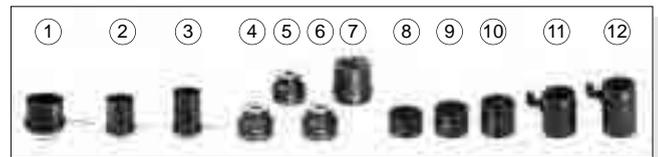
For connection of SC35 still camera to Fiberscopes and Rigid Borescopes.



Scope	OM adaptor	Magnification ratio	Brightness ratio
IF3 Series IF7D3X3-26, 32 IF13D3-60, IF8D3X2-23 Image Carriers	SM-2S ①	1.0	1.0
	SM-3S ②	1.375	0.529
IF4D4/4S4, IF5D4X1 IF6D4, IF8D4, IF11D4 IF4D5/4S5, IF6C5, IF6C5X1 IF8C5, IF11C5	AI-3M ③	1.0	1.0
	AI-4M ④	1.319	0.575
IF6PD4, IF2D4, IF2D5 Rigid Borescopes Small Diameter Borescopes Modelscope	SM-R ⑤	1.0	1.0
	AK-1M ⑥	1.8	0.31

## C-MOUNT ADAPTORS

For connection of TV cameras to Fiberscopes and Rigid Borescopes.



Scope	C-Mount adaptor	Magnification ratio	Brightness ratio
IF3 Series IF7D3X3-26, 32 IF13D3-60, IF8D3X2-23 Image Carriers	MC-04	0.8	1.6
	MC-05 ①	1.0	1.0
	MC-08 ②	1.6	0.39
	MC-10 ③	2.0	0.25
IF4D4/4S4, IF5D4X1 IF6D4, IF8D4, IF11D4 IF4D5/4S5, IF6C5, IF6C5X1 IF8C5, IF11C5	AI-10C ④	0.8	1.56
	AI-11C ⑤	1.0	1.0
	AI-12C ⑥	1.51	0.44
	AI-3C ⑦	2.0	0.25
IF6PD4, IF2D4, IF2D5 Rigid Borescopes Small Diameter Borescopes Modelscope	AK2-3C	0.45	-
	AK2-4C	0.6	-
	AK2-5C ⑧	0.75	1.8
	AK2-10C ⑨	1.0	1.0
	AK2-20C ⑩	1.35	0.55
	MC-R44 ⑪	1.85	0.3
	MC-R58 ⑫	2.4	0.17

## Viewing Adaptors

These adaptors allow the eyepiece of a rigid borescope or flexible fiberoscope to be extended or angled for a more comfortable viewing position.



### Viewing Adaptors Specifications

Adaptor Name	Angle	Arm Length / Magnification
AK2-18-90	90° angle	18cm arm
AK2-9-60	60° angle	9cm arm
AK2-8-90	90° angle	8cm arm
AK2-79-90	90° angle	79cm arm
AK2-80-00	Direct Viewing	80cm arm
AK2-ZOOM	Direct Viewing	1.5 to 3x magnification
AK-U	Universal angle	7cm arm
AK-VARI	90° angle	1.2/2.4x magnification (mirror image)
LS-10	Flexible twin viewing adaptor	

## POWER SUPPLY UNIT MAJ-522/PSU-PLUS

The MAJ-522 power supply offers 110/230V auto switching AC input and has on the rear of the unit x 2 XLR connectors and x 2 Hirose connectors for connection and operation of up to x 4 Olympus products.

The MAJ-522 can be connected to a variety of Olympus products including the ILH-2, IV-6, IV6A, DSM-2 and IW-R1 can be mounted into the System Case 2 for maximum system portability.

The PSU-PLUS is a multi-input power supply with the same inputs and connections as the MAJ-522 but with the added advantage of both AC and DC input voltage. With a 12V input on the front of the PSU-PLUS, battery products can be connected to the PSU-PLUS and offer stand-alone operation of the System Case 2.

### SPECIFICATIONS

#### MAJ-522

**Input Voltage:** 100 to 240V AC  
**Input Frequency:** 50/60Hz  
**Rated output:** 12V DC 13.3A (DC Output Terminal 1,2; Max 3A)  
 12V DC 13.3A (DC Output Terminal 3,4; Max 10A)

**Power Consumption:** Max 220W  
**Dimensions:** 174(W) x 55(H) x 230(D) mm  
**Weight:** 2.6kg (5.8lb)

#### PSU-PLUS

**Input Voltage:** 85-32 / 170-265V AC (auto voltage select)  
**Input Frequency:** 50/60Hz  
**Rated output:** 12V DC 13.3A (DC Output Terminal 1,2; Max 3A)  
 12V DC 13.3A (DC Output Terminal 3,4; Max 10A)

**Power Consumption:** Max 220W  
**Dimensions:** 174(W) x 55(H) x 230(D) mm  
**Weight:** 2.3kg



## Engine Turning Tools

The Olympus Electronic Engine Turning Tool (OTT) can offer increased speed and efficiency for all internal turbine inspections. Using a simple hand held controller each blade can be precisely positioned for an optimal view, allowing single operator inspections. The Engine Turning Tool is designed to be attached to engines quickly and easily - the engine-specific adaptor connect the drive motor directly to the engines' gearbox turning point or air starter position. Once connected the operator can select rotation speed and direction (forward or reverse). The Olympus Turning Tool is suitable for use on most turbine engines for aerospace and power generation applications.

The Olympus Turning Tool uses an electric stepper motor rather than compressed air, making its operation precise, quiet and efficient. The range consists of four different models, depending on the specific engine requirements. Features include blade identification on an easy to read LED, convenient foot switch, offering hands-free operation and many other specific features, outlined below.

#### OTT-1

This turning tool package is a high specification unit. A complete kit includes a Central Processing Unit, Hand Controller, Foot Pedal, Software Module, Engine Adaptor and all required cables. Features of this turning tool include video overlay, variable torque settings, interchangeable engine adaptor, backlash compensation, blade counting and tagging, auto indexing and adjustable rotation speed, direction and dwell time.

#### OTT-2

This turning tool is specifically designed for the F100 engine. Features of this unit are the same as those of the OTT-1, but without the video overlay function.

#### OTT-3

The OTT-3 is the most portable turning tool in the Olympus range. The unit is simple yet effective, employing the same engine adaptor as in the OTT-1 system. The use of these engine adaptor results in a turning tool with flexibility for use with a variety of engine configurations and inspection requirements. The base equipment can be expanded by the addition of further engine adaptor, to make the equipment suitable for use on various engines at little extra cost.

#### OTT-4

The OTT-4 turning tool is a lightweight unit, targeted at specific engines, designed to achieve simple but efficient engine turning capabilities. Note, however, that there is no compatibility with other turning tools in the Olympus Range.



Pratt & Whitney	General Electric	International Aero Engines	SNECMA	CFMI	Rolls-Royce
JT8D	CF34-8C1	V2500	M88	CFM56-3	TAY/SPEY
JT8D Starter	CFE738	OTT-2 V2500		CFM56-5	RB211-535
JT9D	CF6-50			CFM56-7	RB211-524
PW2000	CF6-80A				TRENT500/600/700
PW4000	CF6-80C2 NON FADEC				BR710
F100	CF6-80C2 FADEC				BR715
OTT- F100	CF6-80C2 IDG				RB199
F100 LP	GE90				F402
TF30	F101				INDUSTRIAL TRENT
F118	F108				RB211-24G DLE
	F110-100				501K
	OTT2 F110-100				
	F404				
	TF39				
	LM2500				
	LM5000				
	LM600				

3D EYE-TREK (for IPLEX)

**FMD-3DN** (NTSC)

**FMD-3DP** (PAL)

Allows you to confirm the conditions of an inspection site with super-real three-dimensional images. 3D Eye-Trek makes it easier to get an accurate sense of distance, also facilitating insertion of the scope and access to the site.



REMOTE CONTROL EXTENSION CABLE (for IPLEX)

**MAJ-1091** Length: 4m

Extends the remote control cable, allowing more freedom of movement during operation. Attaching this cable and removing the monitor from the monopod allows you to operate the main IPLEX unit while moving freely around a wider area.

Note: The remote control shown in the photograph is supplied as a standard part of the IPLEX system, and is also available as a spare part.



RIGID SLEEVE (for IPLEX)

**MAJ-1281** (for  $\varnothing 4\text{mm}$  dia. insertion tube)

**MAJ-1253** (for  $\varnothing 6\text{mm}$  and  $\varnothing 6.2\text{mm}$  dia. insertion tube)

Useful as an auxiliary insertion tool and also makes the scope easier to handle. Simply fit and lock the sleeve over the scope insertion tube.



## RETRIEVAL TOOLS

Various types of retrieval tools are available which can be used either internally, with 6.2mm or 7.3mm diameter videoscopes and fiberscopes, or externally, using a fixing kit, with instruments of 6mm diameter and above.

For details, consult your local Olympus sales representative.



## CCTV EQUIPMENT

Various CCD cameras, CRT and LCD monitors and video recording equipment products are available for TV observation.

For details of the latest models, contact your local Olympus sales representative.



## LIGHT GUIDE CABLE

This accessory transmits light from a separate light source to a rigid borescope, but is not required for a flexible videoscope or fiberscope. Different types and lengths are available for specific applications.



## MULTI-PURPOSE SLEEVE

Useful to provide a constant insertion depth of rigid borescopes.



## FIBERSCOPE AND VIDEOSCOPE HOLDER

This accessory enables mounting of a fiberscope's and Series 6 videoscope's control section onto commercially available tripods or other similar devices.

For IV6C6, IV8C6, IV7D6, IV6C5-110/160, IV6C5XI, IF8C5: MB-937

For Fiberscopes other than the above: MB-936

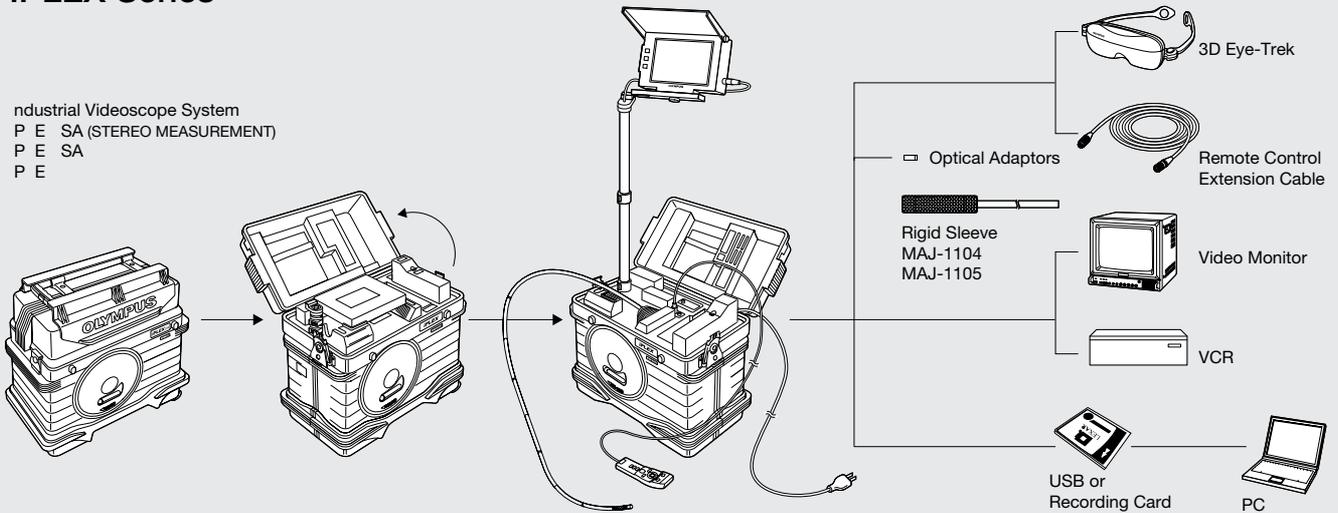
A separate holder is available for Series 5 borescopes (KN-29).



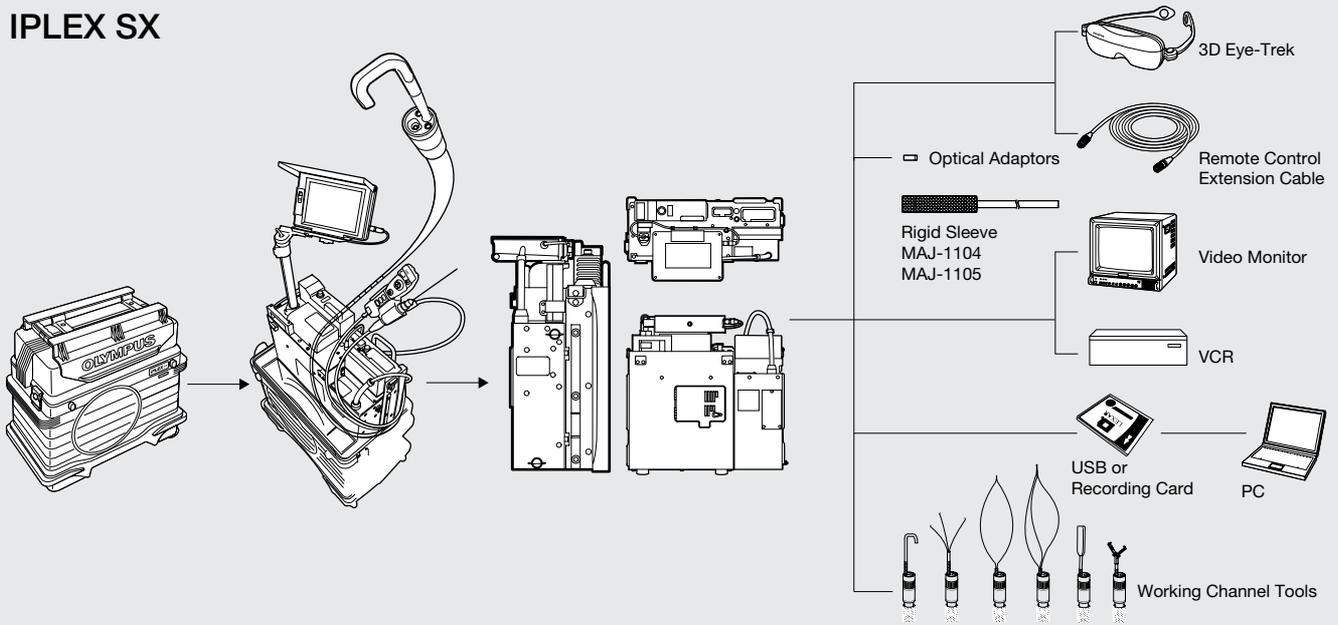
## VIDEOSCOPES

### IPLEX Series

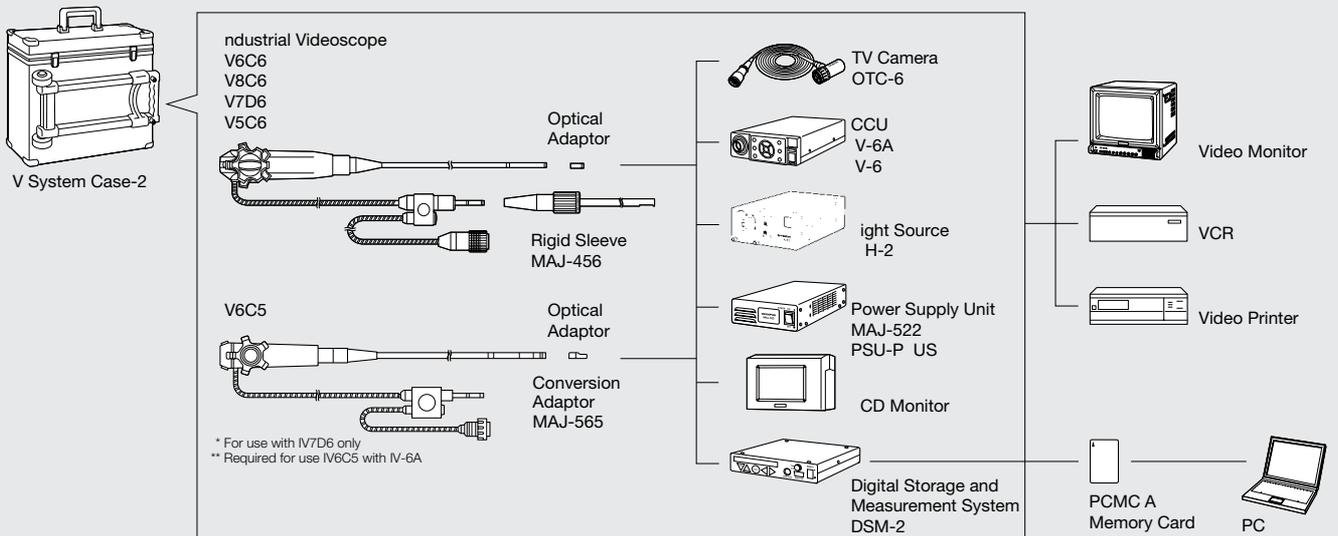
Industrial Videoscope System  
 PE SA (STEREO MEASUREMENT)  
 PE SA  
 PE



### IPLEX SX



### System Case for Series 6 Videoscope



FIBERSCOPES AND RIGID BORESCOPES

