

Your Vision, Our Future
Olympus IPLEX FX Specs
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Image-quality, Durability, and Functionality Beyond Your Expectations









The IPLEX FX introduces new levels of durability to industrial videoscopes with its shock-resistant case design and wear-resistant scope exterior. Adding "strength-of-construction" to a frequently used, job-essential tool produces one tough, reliable and long-lasting piece of industrial inspection equipment.



# **Cast Magnesium-alloy Chassis for Impact Resistance**

The main component of the IPLEX FX base unit chassis is magnesium — renowned for its strength and light weight. A typical material used for industrial environment equipment, magnesium was chosen to provide the impact resistance and solid base that withstands the knocks and bumps that commonly occur to industrial videoscopes. In addition to

a crush-resistant chassis each corner is protected by rubber bumpers, further softening a drop and maximizing product reliability while reducing potential for damage. The IPLEX FX survived the repetitive 4-foot drop test for compliance to MIL-STD 810G.\*



The chassis corners are protected by rubber bumpers to reduce the impact force created by the typical bumps and knocks of an industrial workplace.

The crush resistant cast magnesium chassis is the core of the IPLEX FX mechanical design strength. The extra durability in construction results in extra protection against equipment damages.

\* Military Standards (The United States Defense Standard) is used to help achieve standardization objectives by the U.S. Department of Defense.

# **Abrasion Resistant Insertion Tube**

The most critical component of any remote visual inspection tool is the insertion tube. It performs the basic requirement of accessing the inspection area and frequently navigating through narrow paths with abrasive and rough surfaces. The IPLEX FX insertion tube is the latest Olympus IPLEX design, with enhanced crush protection and fray resistance. Strength was added to the insertion tube without compromising the flexibility

and ability to navigate through the most difficult inspections. As with all of our IPLEX products, the IPLEX FX is designed with the Olympus Tough TaperFlex graduated stiffness design for maximum scope flexibility towards the scope end. The IPLEX FX scope unit is available in three insertion tube diameters: 6.0 mm, 4.0 mm and a 6.2 mm model with internal working channel.\*

Articulation wires and electronics only. With LED illumination at the scope tip, fiber optic bundles are not necessary.

To navigate through tight bends or corners, minimum bend radius and shorter rigid tip sections are essential design criteria for our scope tip, optics and tip adaptors.

High density outer braid for maximum wear resistance and durability.

TaperFlex coil features graduated flexibility for easy scope maneuverability and navigation.

\*IPLEX scope diameters are specified as the minimum ring gauge diameter that the scope can pass through.



The simplicity and portability of Olympus videoscopes has seen their usage extend to areas not considered 'traditional' application areas. Go to these harsher environments, but take a system designed for the job... IPLEX FX.



# True Portability — Compact, Lightweight, Battery-powered

Power is provided to the IPLEX FX by an internally mounted, Lithium-ion battery which provides over two hours run-time. The compact size of the IPLEX FX makes portable operation a reality — either body-wear the lightweight system or place it on a surface and allow the non-slip, rubber corners to hold it in place while you carry out your inspections.





# **Temperature Resistance**

The IPLEX FX scope units are resistant to insertion in higher temperature environments — now 100° C (212° F) meaning that inspections can take place sooner as you won't need to wait as long for the area to cool. Additionally, a temperature sensor provides a two-stage visual warning in order to prevent overheating.



## **Resistance to Harsh Environments**

To prevent the ingress of debris, all mechanical joints are hermetically sealed and input/output connectors are covered.

IPLEX FX complies with internationally recognized Military Standards.\* This compliance assures a greater level of environmental performance than regular industry standards and provides increased reliability against dust and fluid.

The inventive design of the FX has removed the need for a cooling fan, and therefore no air intake is required. This results in even greater environmental resistance.



Explosive atmosphere testing



IP55 water resistance testing

\* Military Standards (The United States Defense Standard) is used to help achieve standardisation objectives by the U.S. Department of Defense. Reference page 17 for MIL-STD compliance details.



As a leader in the photographic camera market, Olympus understands what is needed to deliver accurate and color-rich images. This experience continues to be transferred to industrial inspection equipment.



# **Daylight-view High Resolution LCD Monitor**

Clear observation in direct sunlight is made possible with the new 6.5-inch daylight-view LCD monitor — the minimum recommended screen size for accurate and reliable observation of fine detail. Color reproduction and contrast are maintained, ensuring inspections are not compromised when working outdoors. The environmental resistance of the LCD also matches that of the IPLEX FX system.



# **Optimized Images with Interchangeable LED Tip Adaptors**

To provide high quality, faithfully reproduced images and accurate color, the IPLEX FX features an outstanding optical system, new noise reduction and Olympus' own WiDER<sup>TM</sup> (Wide Dynamic Extended Range) image processing technology. WiDER<sup>TM</sup> delivers bright, contrast-balanced images across the entire depth of field.





Image at standard gain setting.





Image with WiDER™ gain applied. WiDER™ gain brightens the darker areas while maintaining the light level and details shown in the bright area.

# **New LED Illumination with SmartTip™ Optical Adaptors**

Now the light source is in the SmartTip™ optical adaptor with LED's providing illumination, meaning lamp changes are no longer required. This revolutionary new design contributes to reduction in overall system size and power consumption, while maintaining the ability to change direction of view and field of view. This design applies to SmartTip™ optical adaptors for both standard inspections and Stereo Measurement for all three insertion tube diameters. Additionally, Hi-Beam mode boosts illumination up to 1.5x for expanded inspection capability.





The IPLEX FX can perform almost any kind of inspection thanks to a wide range of interchangeable scopes, including models up to 18 m (59.1 feet) long and one with a working channel. More than just another inspection tool, the IPLEX FX is a reliable, feature-rich system capable of precise, real-time measurement and foreign object retrieval.



## **Measurement Accuracy**

The IPLEX FX uses Stereo Measurement technology for accurate, three-dimensional defect measurement at any target angle. With the addition of Olympus' unique Multi and Offset Measurement modes, the IPLEX FX offers a more intuitive measurement environment with eight different modes for accurate evaluation of most inspection targets. Multi Measurement mode is a quick two-point defect identification technique that simultaneously calculates point-to-line, area and distance results. Stereo Measurement tip adaptors are available in direct and side view models for all three insertion tube diameters.

#### IPLEX FX Stereo Measurement Modes

- Distance
- Point-to-line
- Depth
- Area
- Lines
- Profile
- Multi
- Offset (new)



Mechanism of Stereo Measurement

# 58/68D V86 9918 Y791928 Multi W PUI RI RI 1. 82mm A= 2. 42mm P9/27/2886 1826 OLYMPUS

Multi Measurement mode

Our unique Spot-Ranging<sup>TM</sup> feature is the industry's only real-time tip-to-target distance measurement tool. As a rule, a videoscope's measurement accuracy depends on the scope's distance from the target. With the IPLEX FX, the user can easily determine whether the scope tip is close enough to calculate the most accurate measurement on the first try.

# **Interchangeable Scopes**

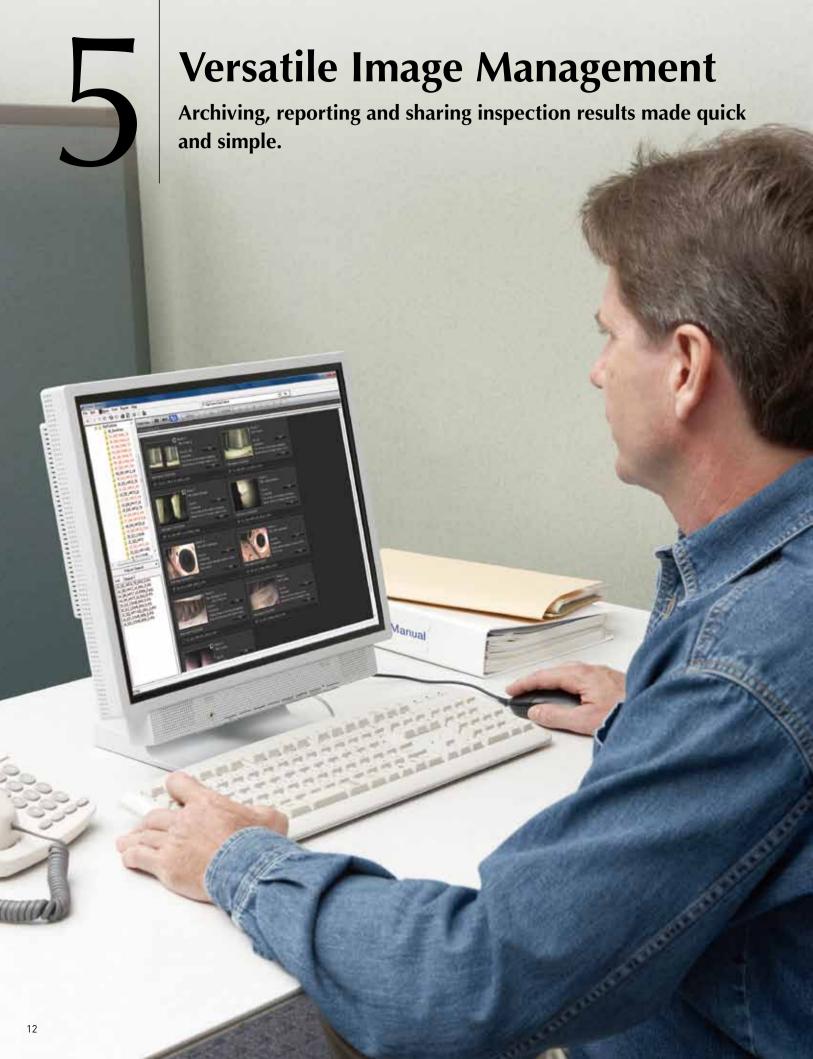
The IPLEX FX offers a range of interchangeable scopes, allowing you to choose the right one to fit the job. This means a single IPLEX FX can be configured for a variety of inspections. Scopes are available in diameters of 4.0 mm (0.157 in) and 6.0 mm (0.236 in) and in various lengths ranging from 2 m (6.6 feet) to 18 m (59.1 feet). A 7.5 m (24.6 feet) scope with a smooth outer coating is also offered. This scope is ideally suited to nuclear and pharmaceutical plant inspections where ease of cleaning and decontamination are priorities.



# **Foreign Object Retrieval**

Adding to the array of versatile IPLEX FX benefits is a new 6.2 mm (0.244 in) diameter scope featuring an internal working channel. Six retrieval tools allow you to remove foreign objects from inside inspection areas — ideal for helping avoid costly overhauls — and perform hook and drag inspections in engines. Both forward and side view Stereo Measurement tip adaptors are also available with the working channel scope, providing a complete inspection solution.





These days, inspections don't end when you've packed up your videoscope. It's just the beginning. The IPLEX FX is equipped with an array of recording options and external interface solutions for a seamless transition to post-inspection analysis and archiving.



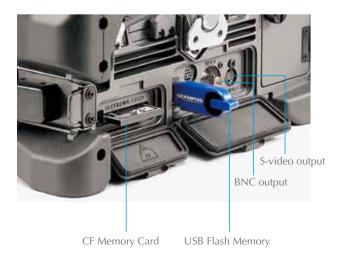
# **ImageNotepad™ for Extended Image Annotation**

Information frequently needs to be added to videoscope images to aid post-inspection diagnosis and create reports. IPLEX FX makes this process an integral part of inspections with easy-to-use ImageNotepad<sup>TM</sup>. Fields for titles and text are available for entering key words and phrases to allow extended descriptions of inspected objects. Additionally, text input is simplified by display of a list of predicted words each time a letter is entered. This valuable information is immediately accessible as part of each image when inspection data is transferred to a computer.



# **Inspection Recording Options**

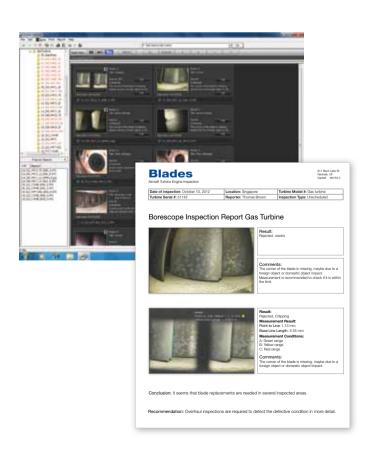
Archiving, sharing and reporting inspection results are made simple with the IPLEX FX. It features still image and movie recording to internal memory, removable compact flash cards or USB flash drives. Due to the rigors of the industrial inspection workplace, the IPLEX FX is designed to store images on solid-state media devices, ensuring that valuable data is not lost due to the instability of storage media with movable parts. All file formats are Windows-compatible (still format: JPEG, TIFF; movie format: AVI) and can be easily used in reports or attached to e-mail for instant sharing of inspection results. The IPLEX FX is also compatible with other recording devices via S-video and composite video outputs. For more efficient on-site viewing, the IPLEX FX's movie viewing functions now include pause, fast-forward and rewind.

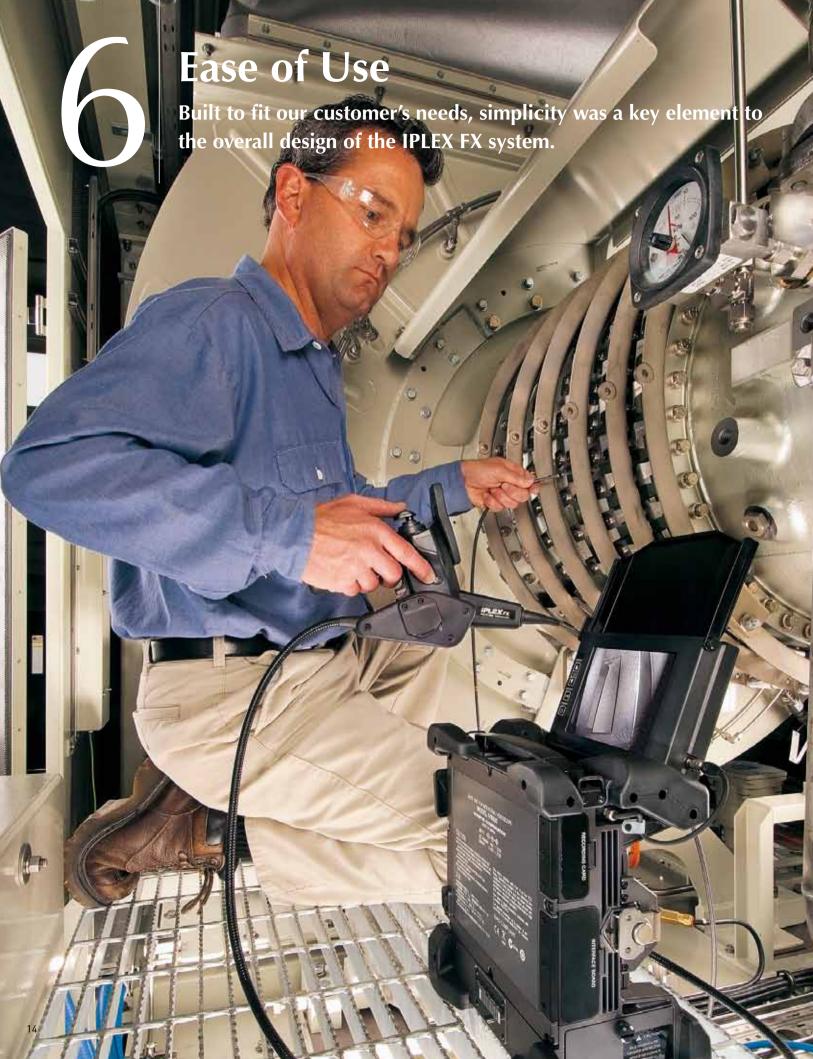


# InHelp<sup>TM</sup> Inspection Assist Software



InHelp, the optional inspection data management and reporting software streamlines many aspects of remote visual inspections with the IPLEX FX. The software greatly improves work efficiency and simplifies inspections by organizing stored images on the IPLEX FX and generating detailed inspection reports on a PC with simple click-operation.





With the IPLEX FX quick access control buttons and intuitive software menu, inspectors of all skill levels can easily utilize the advanced software features that produce accurate and confident inspection results.



# **TrueFeel™ Scope Tip Articulation**

The IPLEX FX features TrueFeel™ scope tip articulation for power-assisted manual articulation and precision control. With instant movement and accurate feel, the user takes full control of the scope position resulting in easier and faster inspections.

# SmartTip™ Automatic Recognition Technology

The IPLEX FX introduces the industry's first intelligent tip adaptors. SmartTip<sup>™</sup> optical tip adaptors are uniquely identified, allowing instant system settings change to match the tip adaptor optics and features without the need for manual user selection.



# **One-handed Scope Control and Interface**

The ergonomic 750 g (1.7 lb) scope handset is comfortable to use even during prolonged inspections and provides quick access to all frequently used menu commands. The unique IPLEX FX dual joystick design separates tip articulation and menu navigation, providing a more intuitive and comprehensible interface.

accommodate both left-handed and

right-handed users.

# **IPLEX FX Features and Specifications**

## SCOPE UNIT

Model No.		IV8420	IV8435	IV8620	IV8635	IV8635X1	IV8650	IV8675	IV8675X2	IV86120	IV86180
						φ6.2 mm	UCOOVI				USIDOVI
Scope diameter		φ4.0 mm	(0.157 in.)	φ6.0 mm	(0.236 in.)	(0.244 in.)		φ	6.0 mm (0.236	in.)	I
Scope length		2.0 m (6.6 ft)	3.5 m (11.5 ft)	2.0 m (6.6 ft)	3.5 m (11.5 ft)	3.5 m (11.5 ft) with working channel	5.0 m (16.4 ft)		5 m .6 ft)	12.0 m (39.4 ft)	18.0 m (59.1 ft)
Exterior				High du	rability tungs	sten braid			Smooth resin	High durability tungste braid	
Tube flexibility		Uniforme	Uniformed stiffness Tapered Flex™ tube with flexibility gradually increasing toward the distal end. Uniformed stiff								d stiffness
Articulation angl UP/DOWN/RIGH		13	130° 150° 130° 120° 110° 90° 7					70°	50°		
Approx. weight		1.7 kg (3.7 lb)   1.9 kg (4.2 lb)   1.7 kg (3.7 lb)   1.9 kg (4.2 lb)   2.0 kg (4.4 lb)   2.2 kg (4.9 lb)   2.6 kg (5.7 lb)   3.1 kg (6.8								3.1 kg (6.8 lb)	
Articulation mec	hanics	TrueFeel™ scope tip articulation with electronic power-assisted, manual articulation									
Temperature sen	sor	2-stage indicator for high temperature warning									
Illumination		Multiple ultra	a-high intensit	ty LEDs, 2-stag	ge setting for	extra-bright illu	mination				
Optical Tip Adap	tor Identification	SmartTip™	automatic reco	ognition techn	ology						
Optical Tip Adap Mechanism	tor Locking	Double threa	ided attachme	ent with O-ring	ı seal						
	Dimensions	311 mm x 93 mm x 192 mm (12.2 in x 3.7 in x 7.6 in)									
Handheld	Weight	Approx. 750 g (1.7 lb)									
control unit	Quick access buttons	The following features have dedicated quick access buttons, levers or joysticks on the hand control unit: Live mode, WiDER™ Gain Control, Brightness, Zoom, Freeze Image, Record Still/Video, Articulation Control, Articulation Lock, Menu Access, Saved Recording Index Access, Quick Last Image Recall.									
BASE UNIT											
Model No.		IV8000-2									
Dimensions (W x D x H)		250 mm x 160 mm x 285 mm (9.8 in x 6.3 in x 11.2 in)									
Approx. weight (with battery)		4.9 kg (10.8 lb)									
LCD monitor		6.5-inch daylight-view LCD, anti-reflective type									
Power supply		Internal battery: 14.8 V nominal, 150-minute operating time AC power: 100 V to 240 V, 50/60 Hz (with supplied AC adaptor)									
	Video output	S-Video, Co	mposite BNC								
Hardware	Audio input	External microphone, 3.5 mm mono jack									
connectors	Auxiliary connector	Two-way communication connector									
	USB	One USB connector									
	Image controls	3X digital zoom, 9 step digital brightness control, 5 step contrast adjustment for frozen and retrieved images									
Software	Adjustable gain control	4 step adjustable gain control with exclusive WiDER™ brightness level balancing technology.									
controls	Exposure control	Adjustable CCD exposure time. PAL: 20 ms to 500 ms, NTSC: 17 ms to 500 ms									
	Colour enhancement	Monochrome mode or Colour Emphasis of red, blue or all primary colours									
	Recording media	Compact Flash card (1 GB standard, compatible with recommended Compact Flash cards up to 4 GB). USB Flash Drive recommended.									
	Internal memory	1 GB standard									
	Image management functions	Search by date, Live/Saved image comparison									
	Overlay	30-character title with date, time and system settings. ImageNotepad™ allows up to 10 descriptions to be added to an image, displayed by categories and contents.									
Recording management	Thumbnail image display	Recorded images can be displayed as thumbnails.									
	Still image recording	Resolution (pixel) NTSC: 640 x 480, PAL: 768 x 576									
		Recording format JPEG: Super high quality, high quality, standard quality, TIFF: Uncompressed (for Stereo Tip Adaptors only)									
	Video recording	Resolution (pixel) NTSC: 320 x 240/640 x 480, PAL: 384 x 288/768 x 576  Recording format AVI format, Motion JPEG compression, Windows Media Player compatible									
	Audio recording	Recording for	rmat WAV 1	format, 60 sec	max.						
Stereo measurement	Distance	Distance between two points.									
	Point-to-Line	Perpendicular distance between a point and a user-defined line.									
	Depth	Orthogonal depth/height distance between a point and a user-defined plane.									
	Area/Lines	Multiple point circumference and area measurement									
	Profile	Plot of cross	section betw	een two points	3						
	Multi	Multiple mea	surements (di	istance, point-	to-line, area	and line) betwee	en two points				
		Point-to-Line measurement with a parallel line passing on a measurement point									
	Offset	Point-to-Line	measuremer	nt with a parall	el line passin	g on a measure	ment point				

#### **OPERATING ENVIRONMENT**

Operating temperature	Insertion tube	In air: -25 to 100°C (-13°F to 212°F) In water: 10 to 30°C (50°F to 86°F)
	Other parts	In air: -21 to 49°C (-5.8°F to 120°F)
Relative humidity	All parts	15 to 90%
Liquid resistance	All parts	Operable when exposed to machine oil, light oil or 5% saline solution.
Waterproofing	Insertion tube	Operable under water with viewing tip adaptor attached.*1 Up to a water pressure equivalent to 7.5 m (24.6 ft) depth. Not operable underwater with stereo measurement tip adaptors.
	Other parts	Operable in blowing rain conditions (Battery compartment must be closed). Not operable underwater.

<sup>\*1</sup> Excluding IV8675X1

MIL-STD COMPLIANCE
The operating environment performance is confirmed by the following MIL-STD-810F/G and MIL-STD-461F under battery operation.

Туре	Method
Vibration	MIL-STD-810F, Method 514.5, Procedure I
Shock (Drop)	MIL-STD-810G, Method 516.5, Procedure IV
Rain and Blowing Rain	MIL-STD-810F, Method 506.4, Procedure I
Humidity	MIL-STD-810F, Method 507.
Salt Fog	MIL-STD-810F, Method 509.4.
Blowing Dust	MIL-STD-810G, Method 510.4, Procedure I
Icing/Freezing Rain	MIL-STD-810F, Method 521.2.
Electromagnetic interference (EMI)	MIL-STD-461F, RS-103, (Radiated susceptibility test for non-metallic below deck shipboard conditions).
Explosive atmosphere	MIL-STD-810F, Method 511.4, Procedure I

# **Tip Adaptor Optical Specifications**

#### OPTICAL TIP ADAPTOR VARIATION

		6.0 mm Viewing Tip Adaptors									
		AT40D-IV86	AT80D/NF-IV86	AT80D/FF-IV86	AT120D/NF-IV86	AT120D/FF-IV86	AT80S-IV86	AT120S/NF-IV86	AT120S/FF-IV86		
	Field of view	40°	8	80°	12	0°	80°		120°		
Optical system	Direction of view			Forward			Side				
	Depth of field*1	200 to ∞ mm	8 to ∞ mm	35 to ∞ mm	4 to 190 mm	25 to ∞ mm	18 to ∞ mm	1 to 25 mm	5 to ∞ mm		
Distal end	Outer diameter*2				φ6.	.0 mm	mm				
	Distal end*3			19.8 mm		25.2 mm					
					4.0 mm Viewii	ng Tip Adaptors					
		AT120	AT120D/NF-IV84 A				S/NF-IV84		AT120S/FF-IV84		
	Field of view	AT120D/NF-IV84 AT120D/FF-IV84 AT120S/NF-IV84 AT120S/FF-IV84  120°									
Optical system	Direction of view		F	orward		Side					
	Depth of field*1	4 to	190 mm	25	to ∞ mm	1 to 2	0 mm	6	6 to ∞ mm		
Distal end	Outer diameter*2				·						
	Distal end*3	19	.7 mm	1	19.6 mm 22.2 mm						
					6.2 mm Viewi	ng Tip Adaptors					
		AT120D	/NF-IV86X1	AT120	D/FF-IV86X1		-IV86X1	AT1:	20S-IV86X1		
	Field of view			120°	8		0°	120°			
Optical system	Direction of view		F	orward		Side					
system	Depth of field*1	4 to	190 mm	25	to ∞ mm	18 to ∞ mm		6 to ∞ mm			
Distal end	Outer diameter*2				φ6.	φ6.2 mm					
	Distal end*3	20	20.6 mm		20.5 mm		24.7 mm				
				Store	o Tin Adontoro (4 (	nm 60 mm and	6.2 mm)				
		AT50D/50D-	IV94 ATEO	S/50S-IV84	o Tip Adaptors (4.0 mm, 6.0 mm and AT60D/60D-IV86 AT60S/60S-IV				AT60S/60S-IV86X1		
	Field of view	A130D/30D-	50°/50°	3/303-1004	A100D/00D-1000	A1003/003-1V	60°/60°	7/00D-1V00X1	A1003/003-1700X1		
Optical system	Direction of view	Forward/For		de/Side	Forward/Forward	Side/Side		ard/Forward	Side/Side		
	Depth of	5 to ∞ mr	n 4 t	o ∞ mm	5 to ∞ mm	4 to ∞ mm	5	to ∞ mm	4 to ∞ mm		
system	field*1										
Distal end	field*1 Outer diameter*2		φ4.0 mm		φ6.	.0 mm		φ6.2 m	nm		

<sup>\*1.</sup> Indicates the viewing distance with optimal focus.
\*2. The adaptor can be inserted into a  $\phi$ 4.0 mm,  $\phi$ 6.0 mm or  $\phi$ 6.2 mm hole when it is mounted on the scope.
\*3. Indicates the length of the rigid portion at the scope's distal end when mounted.

#### **Accessories**

#### Rigid sleeve sets

MAJ-1737 (for 4.0 mm dia. insertion tube) MAJ-1253

(for 6.0 or 6.2 mm dia. insertion tube)

Rigid sleeve sets are available for 6.2 mm, 6.0 mm and 4.0 mm scopes. Each set consists of three rigid sleeves — 250 mm, 340 mm and 450 mm lengths.



# Handheld controller holder

Allows the controller to be affixed to a tripod, making it useful for prolonged inspections.



#### **Optical tip adaptors**

The IPLEX FX has a complete and comprehensive range of tip adaptors to meet the optical requirements of any application.



# Guide tube for inspection of JT8D engines

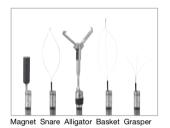
Provides a second movable joint for incredibly flexible control, which is ideal for inspecting the combustion chamber of JT8D engines. Available on the 2 m and 3.5 m scopes.

Note: Pratt & Whitney approved for JT8D engine inspection.



#### **Retrieval tools**

An assortment of versatile tools is available to remove foreign objects and facilitate inspections of complicated engines.



#### Guide tube for long scope

Protects the scope and assists in smooth entry when inserting it into a wide pipe. Available on scopes in lengths from 5 m to 18 m.



#### Lithium-ion battery NP-L7S Battery charger

JL-2PLUS/OL-0 (115 V type) JL-2PLUS/OL-1 (220 V type)

The carrying case is designed to carry one battery charger and two batteries. With a full set of batteries, the IPLEX FX system is ready for inspection anywhere, anytime.









#### • OLYMPUS CORPORATION is ISO9001/ISO14001 certified.

•This product is designed for use in industrial environments for the EMC performance. Using it in a residential environment may affect other equipment in the environment.

-Specifications, design and accessories are subject to change without any notice or obligation on the part of the manufacturer.

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