mFVU-3000
MAP Series FlexLight Dual-Objective Connector Microscope

The mFVU-3000 connector microscope sets a new standard in optical interface inspection. Its exceptional lighting flexibility and fully automated dual objective performance ensures unparalleled precision and efficiency.

The mFVU-3000, is an advanced multipurpose microscope which leverages VIAVI's 20-year leadership in connector inspection for lab, manufacturing and field applications.

Contamination on fiber optic connectors can severely impact optical network performance. Left in place it can damage connectors, leading to permanent defects and increased maintenance costs. In manufacturing, this results in test failures, impacts yield and increases costs.

For connector manufacturers and integrators, ensuring the highest standards of cleanliness and implementing robust contamination control measures is essential to maintaining optimal performance and reliable products. Contaminants can originate from various sources, including the manufacturing environment, handling, and improper storage or residual polishing residue.

Connector complexity is growing exponentially and the mFVU-3000 is designed to meet the challenge.

Key Benefits and Features

- **Process Control Focus:** Drive down cost through waste reduction and yield improvement, offering a comprehensive approach to connector inspection beyond the IEC-driven pass/fail criteria.

- **Open REST API Interface:** FiberChekULTRA Software allows users to leverage advanced image control, powerful visualization tools and flexible workflows - directly in the software and through easy-to-integrate API.

- **Enhanced Imaging Speed:** Next-generation camera and panoptic imaging engine for ultra fast efficient defect detection.

- **Automated Inspection:** Automated pass/fail analysis and customizable report generation for efficient workflows.

- **Dual Magnification:** Auto-section of 400X high-resolution magnification and 30x wide field of view in a single unit.

- **Programmable Lighting:** Axial and oblique lighting modes with angle and direction control to illuminate your connector with clarity.

- **Versatile Adapters:** Supports FMU adapter series with autosense capabilities and dual PC/APC support, designed to clear pull-tabs and other obstructions. Available in hybrid plates with two connectors.

- **Compliance with Standards:** Ensures compliance with IEC 61300-3-35 standards and provides real-time full connector endface view.

Microscope Details

The mFVU-3000 includes a next-generation camera with a field of view (FOV) designed to enhance both resolution and process speed. It features dual-optic lenses for advanced imaging and defect identification, full mechatronic automation with autofocus and objective transition, and an enhanced EFI image engine for high-resolution images. The system is an infinity-corrected compound microscope. It supports fiber and full ferrule imaging with dual objectives for high and low magnification, 10X objective lighting with Köhler co-axial, and 2X objective lighting with Köhler axial and angle tunability plus oblique illumination. The high numerical aperture (NA) ensures superior resolving power and image quality, while the large area sensor captures more fibers in a single image.

Dual magnification critically allows for both high-resolution and wide-field inspection within the same device. Furthermore, it enables these important features:

- **Detailed Analysis:** High magnification (i.e., 400X) provides detailed views of small defects and contaminants on the fiber end-face, which is crucial for ensuring high-quality connections.
- **Comprehensive Inspection:** Lower magnification (i.e., 30X) offers a broader view, allowing for the inspection of the entire connector end-face and surrounding areas. This helps in identifying larger issues that might be missed with high magnification alone.
- **Efficiency:** Switching between magnifications can be automated, speeding up the inspection process and reducing the need for manual adjustments.
- **Versatility:** Dual magnification makes the microscope suitable for a wide range of applications, from detailed defect analysis to general cleanliness checks, enhancing its utility in various inspection scenarios.

Overall, dual magnification enhances the flexibility and effectiveness of the inspection process, ensuring thorough and accurate assessments of fiber optic connectors.

Test Button

Power Button

Magnetic Adapter Connector Plate with PC and APC flexible

Flexible flip up feet

Figure 1. mFVU-3000 FlexLight Dual-Objective Connector Microscope

Flexible and Versatile Adapters

The mFVU-3000 supports a variety of adapters to enhance its versatility and functionality:

- **Adapter Series:** The mFVU-3000 uses the FMU adapter series.
- **Adapter Auto-ID:** Automatically identifies the adapter type, removing the need to manually update microscope configuration or settings.
- **Adapter Type Autosense:** The FMU adapters are equipped with autoID capabilities along with safety features to ensure bright illumination is not present when the adapter is removed.
- **Dual PC/APC Support:** The FMU adapters support both PC and APC connectors, ensuring compatibility with a wide range of connector types.
- **Hybrid Adapters:** For the first time ever VIAVI offers hybrid adapters of different combinations to enable user to test both ends of a hybrid patch-cord.
- **Easy Swap:** The adapter plates feature magnetic elements, allowing for quick and effortless changes.

Figure 2. FMU magnetic adapters. Shown in single connector format only.

Spotting Trouble: Common Fiber Optic Connector Defects and Why They Matter

Common defects that can be detected during fiber optic connector inspection:

- **Scratches:** These are linear defects on the fiber end-face that can occur during handling or cleaning. They can affect signal transmission by scattering light.
- **Pits:** Small depressions or holes on the fiber surface, often caused by improper polishing or handling. Pits can lead to signal loss and increased back reflection.
- **Contamination:** Particles of dust, dirt, or other foreign materials on the fiber end-face. Contamination can cause significant signal attenuation and connection issues.
- **Chips:** Small pieces of the fiber end-face that have broken off, usually due to mechanical damage. Chips can severely degrade the performance of the fiber connection.
- **Cracks:** Fractures in the fiber end-face, often resulting from excessive force or impact. Cracks can lead to complete failure of the fiber connection.

- **Polish Defects:** Imperfections in the polishing process, such as uneven surfaces or residual polishing compounds. These defects can affect the quality of the optical signal.
- **Debris in Guide Holes:** Particles or residues in the guide holes of multi-fiber connectors, which can prevent proper alignment and mating of the fibers.

Detecting and addressing these defects is crucial for maintaining high-quality fiber optic connections and ensuring optimal performance of optical networks.
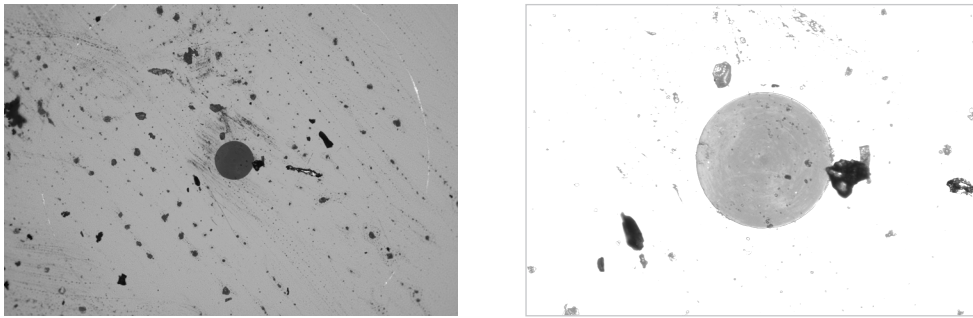

Figure 3. Pits, contamination and scratches viewed using the mFVU
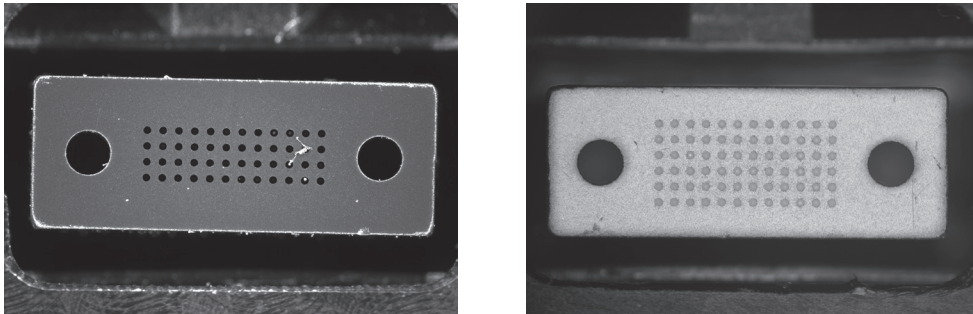

Figure 4. a) MPO with large raised contamination, b) MPO with large scratches viewed using the mFVU

Figure 5. 3D view of a dual fiber using the mFVU

Next Gen Inspection Software: FiberChekULTRA

Unlock the full potential of your microscope, now powered by the next-generation FiberChekULTRA PC application — the successor to the renowned VIAVI FiberChekPRO. The FiberChekULTRA software is an integral part of the mFVU-3000, providing a powerful platform for fiber inspection and analysis. Designed for lab and production environments, this next-generation software offers comprehensive end-face inspection capabilities. Key features and benefits of FiberChekULTRA include:

Key Features

- **Automated Inspection:** Fast, reliable, and automated fiber end-face inspection with comprehensive software analysis.
- **Versatile Compatibility:** Supports inspection applications for pluggable optics, breakout cassettes, dual-port MPO 12 and MPO 16, and Very Small Form Factor (VSFF) connectors such as SN and MMC connectors.
- **Advanced Imaging:** Panoptic imaging engine for wide field-of-view images and detailed inspection of each fiber in the array.
- **User-Friendly Interface:** Intuitive GUI that is dynamic and configurable per customer/operator.
- **Customizable Reporting:** Supports PDF, HTML, and CSV reporting, extensive database support (SQL Server, MySQL) and multi-language support with a translation pack available.
- **Enhanced Analysis:** Features such as Scratch-View for enhanced visibility of faint scratches and automated IEC Test analysis for objective testing to industry standards.
- **Integration and Automation:** Open API for integration into customer workflows, allowing advanced users to utilize JavaScript scripting for further customization of application functionalities beyond the GUI.
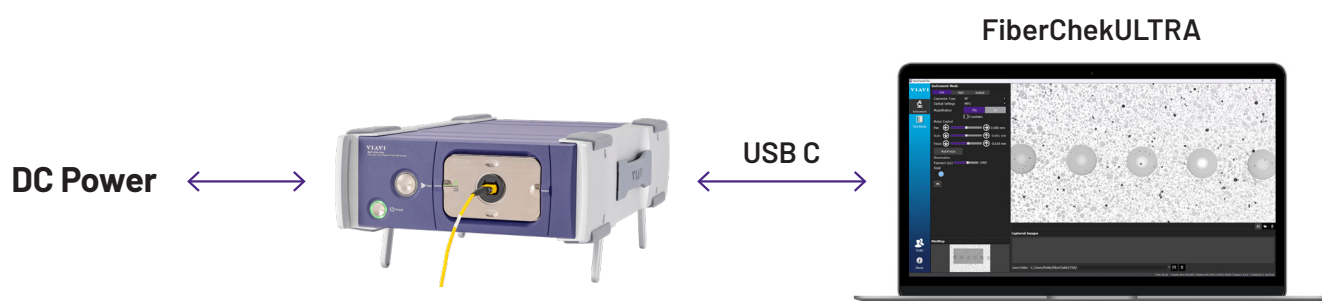- **Continuous Development:** Regular free updates ensure new features and compliance with evolving IEC standards.

Figure 6. mFVU powered by FiberChekULTRA software

Benefits

- **Increased Efficiency:** By automating the inspection process, FiberChekULTRA significantly reduces the time required for each inspection, allowing for higher throughput and productivity.

- **Improved Accuracy:** The advanced imaging and analysis tools ensure precise and repeatable inspection results, reducing the risk of defects going undetected.

- **Enhanced Data Management:** Customizable reporting and extensive database support make it easy to manage and analyze inspection data, facilitating better decision-making and quality control.

- **User Adaptability:** The user-friendly interface and multi-language support make FiberChekULTRA accessible and easy to use for operators with varying levels of expertise.

- **Future-Proof:** Continuous development and regular updates ensure that FiberChekULTRA remains at the forefront of fiber optic inspection technology, adapting to new standards and industry requirements.

Overall, FiberChekULTRA is a powerful tool that enhances the efficiency, accuracy, and reliability of fiber optic connector inspection, making it an essential component of the mFVU-3000 system.

Part of the Family

The mFVU-3000 is part of the VIAVI family of microscopes, which includes the FVAi, FVDi and FVAM models. Each model offers unique features and capabilities targeting devices from patch-cord to transceivers. The mFVU-3000 stands out with automated focus, multifiber support with automated operation, dual objective optical magnification, digital zoom, and adjustable oblique lighting mode.

The CleanBlastPRO is VIAVI's automated fiber end-face cleaning system, designed for seamless deployment by component and connectivity manufacturers and integrators. It ensures clean fiber connectors across production facilities by using a precise non-contact air-solvent-air sequence to blast and remove contamination particles.

Figure 7. VIAVI's Benchtop Inspection and Cleaning Family

Specifications

Parameters		Specification
Field of View	High Magnification (X400)	Horizontal: 1443 µm Vertical: 990 µm
	Low Magnification (X30)	Horizontal:7218 µm Vertical:4950 µm
Live Image		Yes
Minimum Particle Size Detection		1.2 µm
Working Distance		12.2 mm (0.48 in)
Auto-Focus		Yes
Auto-Panning		Yes
Light Source		LED 470 nm 10x Axial, LED 530 nm 2x (Oblique, Axial)
Lighting Technique		Coaxial / Köhler illumination
Output		USB-C
Power Source		External Power Supply + USB
Power Supply		12V, 5A External Brick + USB
Management Software		FiberChekULTRA
USB Host Interface		USB 3.0
PC Control Interface		REST API through Ethernet Over USB
Certification		IEC 61300-3-35
Dimensions (H x W x D)		100mm x 255mm x 415mm (3.9 in x 10.0 in x 16.3 in)
Weight		8.61 kgs
Operating Temperature		5 to 40°C (41 to 104°F)
Operating Humidity		0 to 90% Non-Condensing
Storage Temperature		-30 to 70°C (-22 to 158°F)

Ordering Information

Mainframe

Part Number	Description
MFVU-3430F-A1	mFVU Dual Objective Microscope – with Autofocus, Autopan and Autoscan at 400x and 30x Mag

Adapters

Part Number	Description
FMU-LC-R1	LC PC and APC Microscope Adapter Plate
FMU-MPO-R1	MPO PC and APC Microscope Adapter Plate
FMU-SC-R1	SC PC and APC Microscope Adapter Plate
FMU-U12-R1	Universal 1.25mm PC and APC Microscope Adapter Plate
FMU-U25-R1	Universal 2.5mm PC and APC Microscope Adapter Plate

For more information on this or other products and their availability, please contact your local VIAVI account manager or VIAVI directly at 1-844-GO-VIAVI (1-844-468-4284) or to reach the VIAVI office nearest you, visit viavisolutions.com/contacts.

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