

# FV Benchtop Microscopes

High Performance Inspection Solutions for  
Lab and Manufacturing applications



FV microscopes equip optical connectivity manufacturers with the ability to ensure clean fiber connector end-faces throughout the entire manufacturing process.

## FV Benchtop Microscopes

Since each stage of the optical connector manufacturing process is unique, FV Benchtop microscopes are available in various configurations, equipped with features and capabilities that address specific fiber inspection needs, while leveraging a common form factor, user interface, and analysis platform to provide operators with a similar experience for each application.

Optical connectivity manufacturers can leverage FV benchtop microscopes to ensure quality production and drive manufacturing efficiency. Improving production yields, eliminating costly component waste, reducing customer returns, and leveraging automated test will lower costs and improve customer satisfaction.

There are two variants of FV microscopes, 30x (2030) and 400x (2400). All microscopes provide dual magnification, automated analysis, and options for auto-focus. The 2030 microscope is ideal for confirming connector cleanliness throughout manufacturing process while the 2400 microscope is targeted for high resolution applications including confirming polish quality and certifying connector quality.

## BENEFITS

- Easily detect contamination and defects on fiber connector end-faces.
- Control end face contamination throughout the entire manufacturing process with the right tool at each stage.
- Improve production yields by eliminating costly component damage.
- Leverage manufacturing efficiencies by automating various procedures.
- Save valuable benchtop space with compact size.
- Certify product quality and maintain digital records.

## FEATURES

- Integrated 3.5" LCD Video Display.
- Auto-focus significantly reduces inspection time.
- Automated end-face analysis.
- Compatible with FiberChekPRO™ software.

## APPLICATIONS

- Post-polish certification to IEC.
- Identify contamination during the various stages of manufacturing and test (polarity test, IL/RL and final inspection).
- Identify contamination during mechanical (connector body, cassette, cabinet, pedestal) assembly.
- Final packaging verification to IEC certification.

## 2030: Get the Big Picture

When it comes to optical connector manufacturing, controlling contamination is essential. Less contamination means less problems in achieving reproducible manufacturing efficiencies.

The new 2030 is the ideal microscope to control connector contamination throughout the production process.

Equipped with 30x optics, ultra-wide field of view, dual magnification, automatic focus, and built-in end face analysis, the FVAi-2030 gives operators fast and complete visibility of the entire ferrule end face so that any contamination on or near the fiber end face can be quickly found and dealt with.

Designed specifically to ensure cleanliness of the entire fiber end face, the 2030 features several new innovative features to help accomplish the task.



- New SL series FMAX Adapters leverage patented Shaped-Lighting technology that gives operators visibility to both the polished area of the ferrule and the surrounding chamfer with equal visibility and contrast in a single image. This technology enables the use of coaxial illumination in a wide field-of-view making identifying defects possible across the entire fiber end face.
- New Chamfer Focus feature in FiberChekPRO allows operators to easily switch the optimized focus plane between the polished surface and the chamfer region with the push of a button

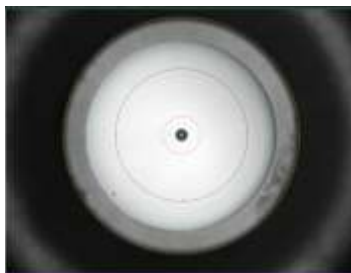


Figure 1: Fiber Focus

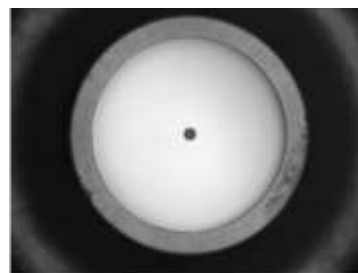
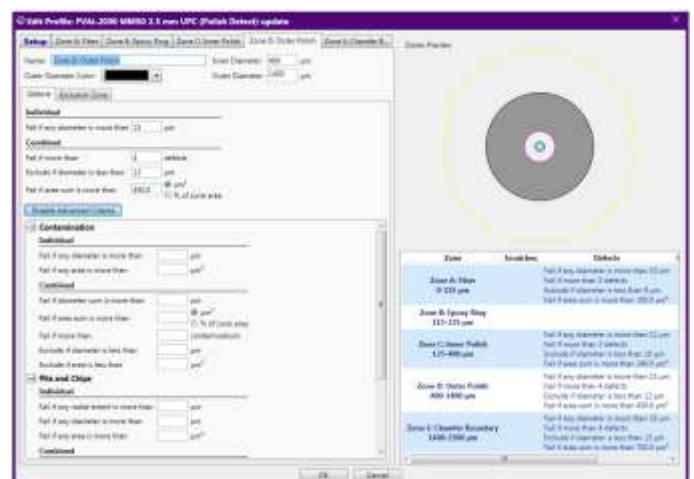


Figure 2: Chamfer Focus

- New Automated Polish Zone Detection adjusts the outer-most zone to accommodate variations in the location of the chamfer region, enabling a common setup for multiple product types.
- Advanced Analysis Options help operators easily identify cleaning effectiveness with a variety of configurable parameters (e.g. Total Occluded Area, Particle Count, Total Area, Total Particle Size, etc).

These capabilities are provided within FiberChekPRO software.



## 2400: Get the Details

To see fine details, a higher magnification and smaller FOV are necessary. The 2400 microscopes are designed to inspect for quality and performance expectations for optical connector end faces. Microscopes with this performance are required for ensuring compliance to IEC61300-3-35 inspection standards.

**The 2400** benchtop microscopes have been utilized by leading manufacturers around the world to ensure IEC standard compliance.

Equipped with 400x optics, high resolution field-of-view, dual magnification, automated end-face analysis, both the FVDi-2400 and FVAi-2400 provide a fast and reliable solution to deliver certifiable proof to meet standard industry requirements.

For over 20 years, leading optical connectivity manufacturers have relied on 400x high-resolution microscopes in their production facilities. Designed to ensure that optical end faces meet quality and performance requirements, 2040 microscopes are ideal for ensuring IEC-61300-3-35 standards compliance. These powerful microscopes are also equipped with several features that provide additional details to ensure optimized production methods, quality control, and product performance.

- **Automated IEC Test analysis** gives operators the ability to objectively test to industry standards, such as IEC-61300-3-35 at the press of a button. 2400 microscopes are shipped from the factory with standard analysis profiles.
- **User configurable parameters** in the FiberChekPRO software allow operators to go beyond testing to industry standards. This is valuable when building products to customer specific requirements and for manufacturing engineers looking to refine polishing processes and optimize quality control.
- **Scratch-View** is an automated image enhancement feature in FiberChekPRO that adjusts various optical attributes of the fiber end face image so that faint scratches are more clearly visible to the operator. This is a valuable capability when manufacturing any product that is used for high-performance applications such as reference-grade cable assemblies.
- **Multiple product configurations** of the 2400 ensure that operators can scale according to their specific needs. FVAi-2400 models are equipped with Auto-Focus capability, while FVDi-2400 models offer manual-focus. In addition, FVDi-2400-L models are equipped with special long-working distance optics, which are used in applications such as inspecting pinned-MPO connector end faces.



## Intuitive device controls make operation scalable and fast

### Interchangeable Adapters

- FMAX Series adapters attach directly to FVAi microscopes to enable precision inspection
- Includes 40+ different types for various connectors and applications
- See a complete listing of adapters in the Fiber Inspection Tips and Adapters Selection Guide.



3.5-inch LCD color touch-screen video display Icon based User Interface



Activates FV microscope view



Activates probe microscope view (icon appears when probe is connected via USB)



Activates power meter view (icon appears when supported power meter is connected via USB)



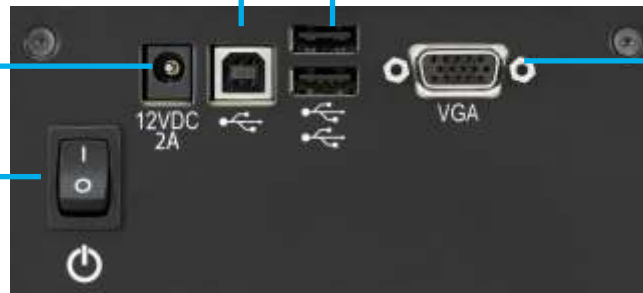
Accesses more FV features (microscope settings, stored results, etc.)

1X USB Type B Host port  
For connection with PC

2X USB Type A device ports  
For external devices: P5000i probe,  
MP-60 Power Meter, etc.

Pluggable Power Supply Input  
Includes 12VDC 2A interchangeable  
wall plug for EU, UK, US and AU

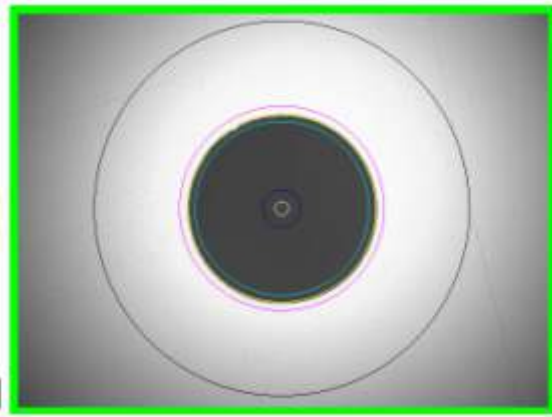
ON/OFF Power Switch



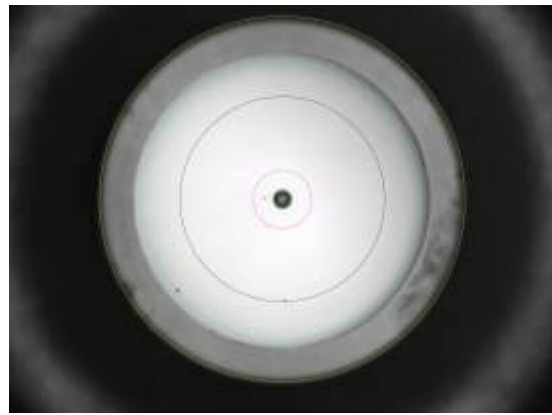
VGA port  
For external display

## On-Board Automated Image Analysis

Equipped with automated image analysis, FV microscopes eliminate the guesswork of subjective inspection and enable better process control and efficiency throughout every stage of the production cycle. By providing reliable detection, FV microscopes give operators objective visibility to control cleanliness and quality in a cost-effective solution.



Automated analysis on a 2400



Automated analysis on a 2030

### Key benefits of automated analysis on FV microscopes:

- Quickly locate defects of all sizes
- Receive exact details of what you are looking at
- Obtain an objective result based on mathematical special analysis
- Drive consistent results across all operators with a standard process
- Implement a uniform product quality standard throughout the line
  - Increase first-pass production yields
  - Accelerate test cycle times
  - Simplify inspection with the press of a button
  - Enable documentation and record keeping
  - Provide a certification of quality to specific acceptance criteria

## Enable more capabilities with FiberChekPRO Software

For years, FiberChekPRO software from VIAVI Solutions has been trusted in labs, production floors, and in the field to inspect and analyze fiber end faces for cleanliness and product quality. Known for its reliability and intuitive user interface, FiberChekPRO has consistently given operators what they need.

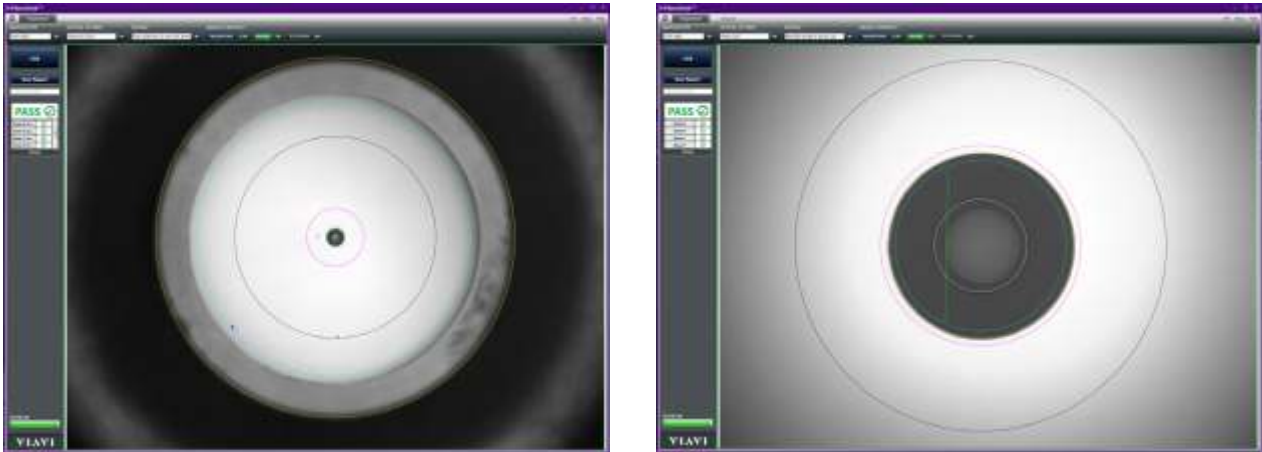


Figure 4: FiberChekPRO analysis view on FVAi-2030 (left) and FVAi-2400 (right) microscopes

In addition to the capabilities mentioned previously, FiberChekPRO also has several specialized features that many connectivity manufacturers can leverage to optimize manufacturing efficiencies throughout their facilities.

- **Automation APIs** allow operators to integrate FiberChekPRO into their own PC based applications. For customers who prefer to manage their own workflow, data management and integrate with other test equipment, the API's enable fast and easy integration into all development environments.
- **Job Mode** allows managers and operators to group pre-configure tests based on multi-fiber cables and/or work orders. This mode simplifies customer data presentation and simplifies historical data reviews. Simple guided process flow helps operators test in sequence.
- **Report generation** gives operators the ability to maintain a record of test results with digital and print versions of analysis data. Printed reports are often included with the final shipped product while digital records are kept on file by the manufacturer. These records also provide the option to utilize HTML formatting, which gives operators the ability to interact with the report images (e.g. zoom, toggle overlay zones, hover over defects for information) long after the product has shipped.

## Controlling Contamination requires the Right Tools in the Right Place

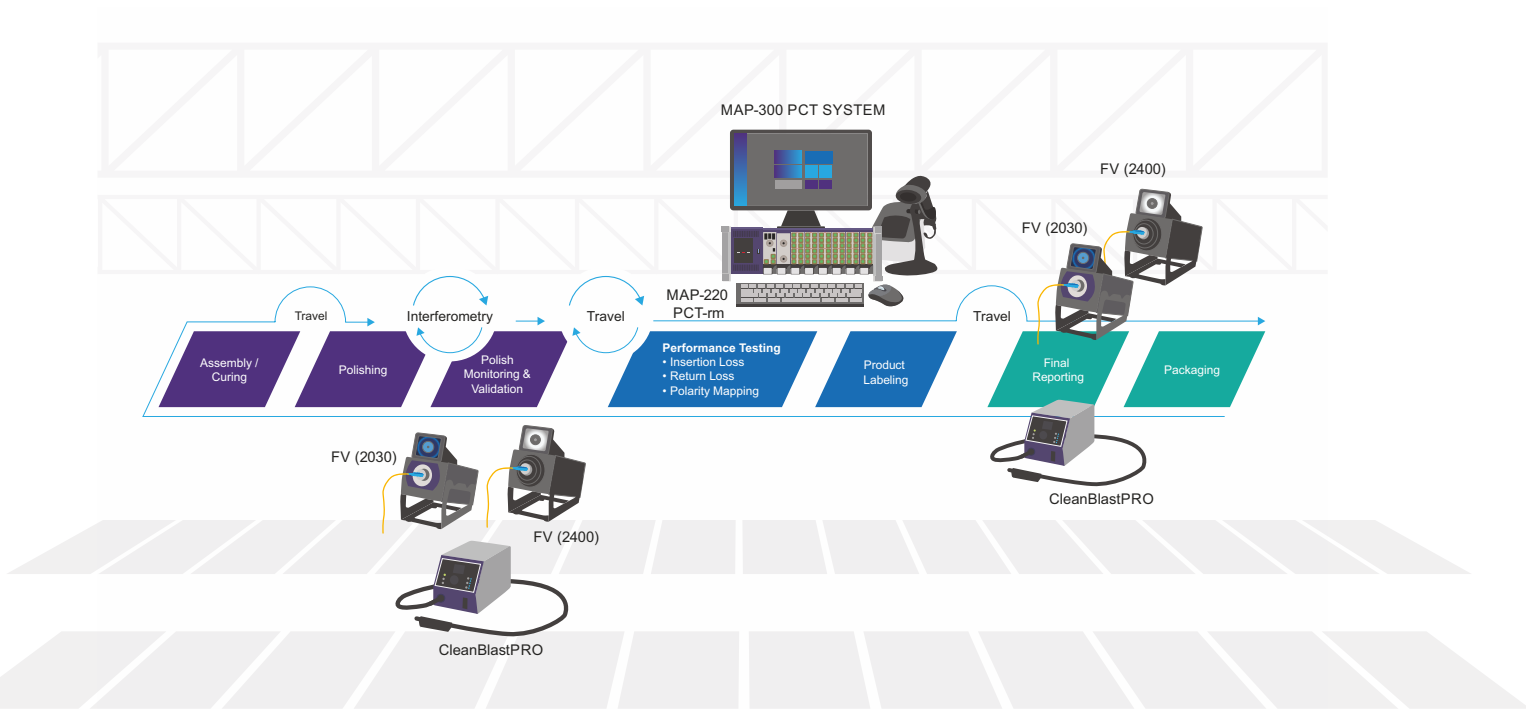
FV Series microscopes are available in 2 magnification options, 2030 and 2400. Each option has features and capabilities that address specific fiber inspection needs. By understanding the value of each, optical connectivity manufacturers can leverage each type to **improve production yields, eliminate costly component waste, and optimize test performance results** that ensure quality production **with manufacturing efficiency.**

## FV applications for Manufacturers of Optical Connectivity

Since each stage of the process is unique, the FV Series provides a family of microscopes, each designed to address the specific inspection needs at each location and control end face contamination throughout the manufacturing process.

The following table provides examples of where the 2030 and 2400 microscopes could be best utilized when manufacturing optical connectivity.

FV Applications: Manufacturing Connectivity	FV Microscope	
	2030	2400
Polish Quality Monitoring	—	■
Post Polish	■	■
Cleaning Validation	■	—
Final Testing	■	■



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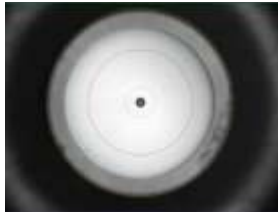

## FV applications for Users of Optical Connectivity

In addition to various uses for connectivity manufacturing, FV Microscopes are also beneficial in other applications that use optical connectivity on a regular basis.

The following table provides examples of where the 2030 and 2400 microscopes could be best utilized in applications that use optical connectivity for other purposes.

FV Applications: Using Connectivity	Common Challenges	FV Microscope	
		2030	2400
R&D Labs	<ul style="list-style-type: none"> <li>• Unknown history, multiple users, common asset</li> <li>• Frequent connect/disconnect activity</li> <li>• Non-optical experts interacting with connectivity</li> </ul>	■	—
Network Technology Manufacturing	<ul style="list-style-type: none"> <li>• Optical Amplifiers, Switches, etc. that require clean connectivity to perform required tasks</li> <li>• Frequent connect/disconnect activity</li> </ul>	■	■
Service Centers	<ul style="list-style-type: none"> <li>• Unknown history, multiple users, common asset</li> <li>• Frequent connect/disconnect activity</li> <li>• Need to return to customer in best possible state</li> </ul>	■	—

## Specifications

Field-of-view values (µm)	FV*i-2030	FV*i-2400
		
		
<b>High Magnification</b>		
Horizontal	1850	185
Vertical	1400	140
<b>Low Magnification</b>		
Horizontal	3750	300
Vertical	2850	225



Product Specifications	FVAi-2030	FVAi-2400	FVDi-2400
Dimensions (H x W x D)	176mm x 135mm x 214mm	176mm x 135mm x 214mm	176mm x 135mm x 232mm
Weight	3.1kg	3.25kg	3.0kg
Auto-Focus enabled	Yes		No
Power Supply	12 V, 2A with interchangeable wall plug for EU, UK, US, and AU		
Camera Sensor	2560 x 1920, 1/2.5-in CMOS, 5 megapixels		
Built-in LCD Screen Size	High-contrast 3.5" color LCD with touch-screen functionality		
Built-In LCD Resolution (in pixels)	Live Image: 320 x 240 x 8 bit grey, 10 fps		
External Display Port	VGA		
External Display image resolution	640 x 480	640 x 480	
Particle size detection	< 10µm	<0.5µm	
Light Source	Blue LED, 100,000+ hour life		
Lighting Technique	Coaxial		
USB Ports	Device: 2x USB Type A Host: 1x USB Type B USB		
Adapter Type	FMAX SL Series	FMAX	FMA
Certification	CE, EN/IEC 61326		

#### Ordering Information

##### Module Part Numbers

Part Number	Description
FVAi-2030	Benchtop microscope with Integrated LCD Autofocus 30x
FVAi-2400	Benchtop microscope with Integrated LCD Autofocus 400x
FVAi-2400-L	Benchtop microscope with Integrated LCD Autofocus 400x LWD
FVDi-2400	Benchtop microscope with Integrated LCD 400x
FVDi-2400-L	Benchtop microscope with Integrated LCD 400x LWD

Type	Microscope Application	Connector Chamfer Angle	Part Number	Description
FMAX-SL	2030 / 2400	35	FMAX-U12-SL35	Universal 1.25mm PC Adapter
			FMAX-U12A-SL35	Universal 1.25mm APC Adapter
		35	FMAX-LC-SL35	LC/PC Simplex Adapter
			FMAX-LC-DUX-SL35	LC/PC Duplex Adapter
			FMAX-LCA-SL35	LC/APC Simplex Adapter
		30	FMAX-LCA-DUX-SL35	LC/APC Duplex Adapter
			FMAX-U25-SL30	Universal 2.5mm PC Adapter
		30	FMAX-U25A-SL30	Universal 2.5mm APC Adapter
		41	FMAX-U25A-SL41	Universal 2.5mm APC Adapter
		30	FMAX-SC-SL30	SC/PC Simplex Adapter
			FMAX-SC-DUX-SL30	SC/PC Duplex Adapter
		30	FMAX-SCA-SL30	SC/APC Simplex Adapter
		41	FMAX-SCA-SL41	SC/APC Simplex Adapter
		35	FMAX-MDC-SL35	MDC/PC Duplex Adapter
			FMAX-SN-SL35	SN/PC Duplex Adapter
			FMAX-CS-SL35	CS/PC Duplex Adapter
			FMAX-MDC-APC-SL35	MDC/APC Duplex Adapter
FMAX-SN-APC-SL35	SN/APC Duplex Adapter			
			FMAX-CS-APC-SL35	CS/APC Duplex Adapter
FMAX-SL	2030 / 2400	N/A	FMAX-MTP	MTP/MPO RibbonDrive™ Adapter, MM
			FMAX-MTPA	MTP/MPO RibbonDrive™ Adapter, SM

Type	Product and description	
Probe Microscope*	FBP-P5000i	P5000i Digital Analysis Probe with FiberChekPRO™ and universal 2.5mm inspection tip
Fiber Endface Cleaning System	FCL-PRO-L	CleanBlastPRO™ System with large internal solvent tank and universal 2.5mm cleaning tip

\*Note: A complete listing of the FMAX Series adapters for the FVA Series and tips for inspection probes is available in the Fiber Inspection Tips and Adapters Selection Guide