Motic®

MORE THAN MICROSCOPY

PA53 MET Series

Precision Metallographic Microscopy
for Industrial Excellence

PA53 MET Series

Watch
the video

Power, Precision, and Performance

The Motic PA53 MET series represents the perfect balance of optical performance, ergonomic design, and digital innovation for advanced metallographic applications.

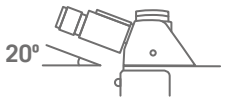
Built with high-performance S-Apo objective lenses, it delivers exceptional clarity and precision, meeting the demands of research laboratories, industrial inspection, and quality control environments. Its intelligent design combines compact construction with modular flexibility, allowing seamless integration of components such as reflected and transmitted light illuminators, motorized XY stages and nosepiece, and precision Z-axis systems.

The ergonomic 20° inclined viewing head, combined with user-friendly controls, minimizes fatigue during extended sessions and ensures comfortable operation for users with different needs. Innovative digital capabilities, powered by advanced imaging software and Moticam S cameras, enable detailed documentation, live analysis, and enhanced data sharing.

Whether for routine inspections, failure analysis, or in-depth material research, the PA53 MET offers the tools to obtain clear, accurate results across a variety of observation methods. With its robust build, adaptable platform, and cutting-edge optics, the PA53 MET sets a new standard for metallographic microscopy, delivering both reliability and performance to today's demanding industrial and research environments.

With expertise, technology, and creativity at its core, the Motic PA53 MET series delivers exceptional optics, comfort, and advanced digital features.

Ergonomy



20° inclined viewing head for improved posture and reduced fatigue.

Ergonomics Designed for Long-Lasting Comfort

The PA53 MET is engineered with a strong focus on user ergonomics and efficiency during extended work sessions. Its 20° inclined viewing head facilitates a natural posture, reducing neck and back strain, while the precision-designed prism minimizes optical loss for optimal image quality. Adjustable height and interpupillary distance ensure a perfect fit for different users.

Optional large sample stages accommodate specimens up to 350×300 mm, 20 mm thick, and weighing up to 2 kg, expanding application versatility. Precision-machined nosepieces, supporting BF, BF/DF, or DIC, maintain image centration across magnifications, ensuring seamless inspections.

High-intensity, stable-color LED or HAL illumination, available in transmitted and reflected modes, delivers even, flicker-free lighting for consistent contrast and color fidelity. A robust, anti-vibration frame guarantees stability at high magnifications, while intuitive controls enable quick adjustments without disrupting workflow.

With its ergonomic design, versatile configuration, and exceptional stability, the PA53 MET ensures comfort, accuracy, and productivity in demanding industrial and research environments.

Large sample stage supports up to 350×300 mm, 20 mm thick, and 2 kg.

Stable, flicker-free illumination for consistent, high-quality imaging.

Contrast Methods

Versatile Contrast Methods for Every Application

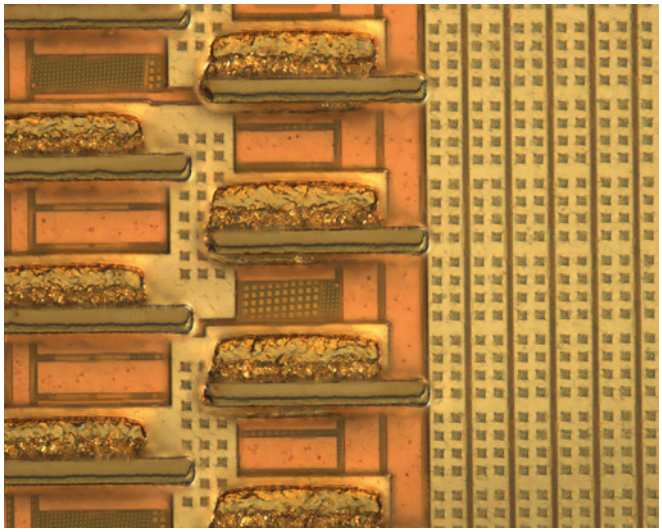
The PA53 MET offers an advanced range of contrast techniques to meet diverse inspection needs. Its reflected light illuminator supports Brightfield (BF), Brightfield/Darkfield (BF/DF), and Differential Interference Contrast (DIC), ensuring optimal visualization of surface structures and microdetails. A front-mounted BF/DF converter switch, combined with an interlocking ND filter, allows quick mode changes while protecting the eyes from sudden brightness shifts.

For polarization analysis, the polarizer and analyzer are designed as accessible sliders, enabling fast transitions between DIC/POL and other observation modes. Motic's Nomarski DIC system, using a single-prism slider, provides high-contrast, 3D-effect imaging without altering prism position across magnifications.

The transmitted light system includes built-in ND6, ND25, and LB filters, along with a LWD condenser for superior image clarity. The PA53 MET also supports fluorescence observation through a dedicated illumination module and filter cubes, expanding capabilities for specialized applications such as detecting photoresist residues or organic particles.

This versatility allows users to adapt instantly to different samples and analysis requirements within one powerful microscope platform.

Unlock surface structures and microdetails with a full range of contrast techniques.



Automation

High-precision motorized nosepiece with control unit, ensuring flawless and exact placement of objectives for optimized accuracy and efficiency.

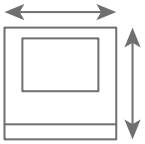
High-Impact Results with 3D Profiling

The PA53 MET stands out for its advanced automation, optimizing control and efficiency in demanding inspection tasks. Motorized nosepieces and a motorized X/Y stage enable swift objective changes and smooth sample positioning, enhancing workflow fluidity and precision.

The Z-Axis Profiler allows effortless acquisition of 3D images through precise vertical control, capturing sequences of 2D images that are combined via advanced software into highly accurate measurements and detailed topographic profiles.

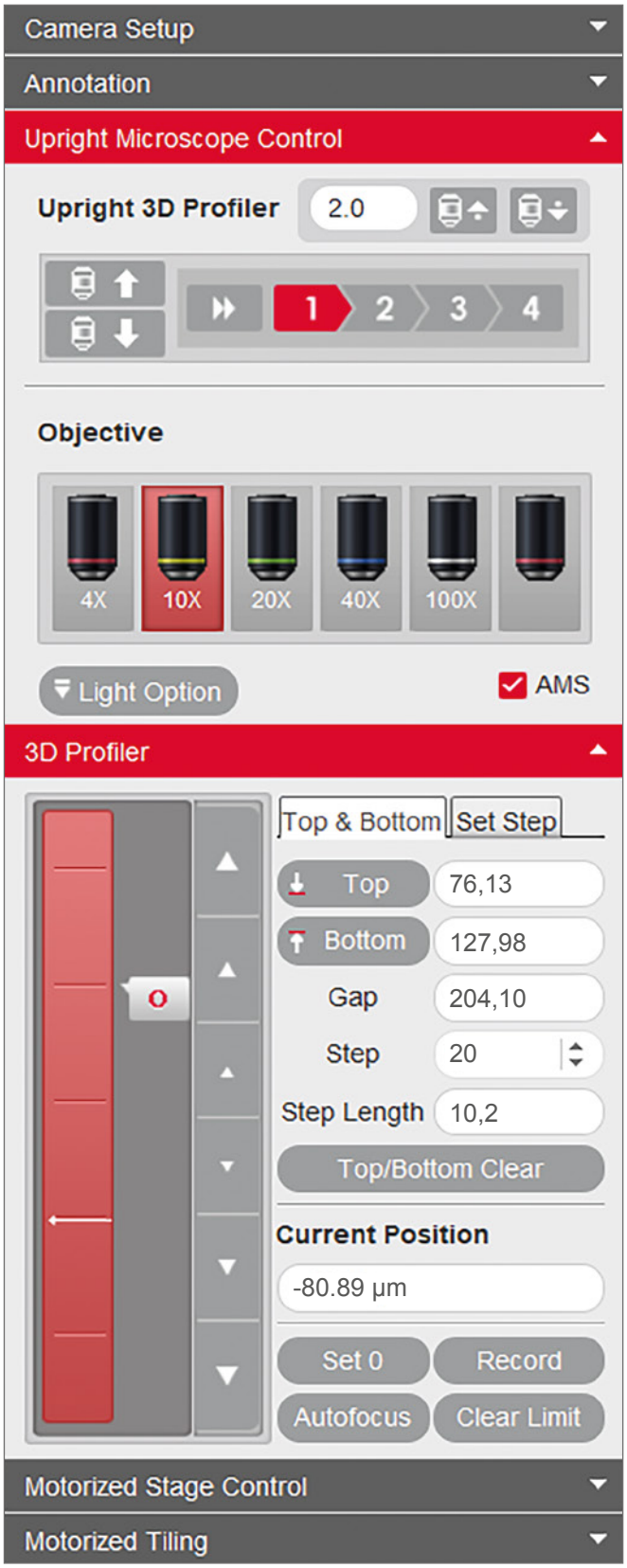
An integrated autofocus system simplifies imaging for specimens with varying focal depths, while software-based analysis merges multiple images into a single, sharp, high-resolution 3D profile. The ergonomic Control Pad offers quick focus adjustments with selectable Z-axis speeds, a clear height display, and a large emergency stop button for added safety.

Compact, accurate, and user-friendly, the PA53 MET ensures reliable results for a wide range of industrial and research applications, making sophisticated 3D profiling and automated inspection more accessible than ever.



High-precision motorized mechanical stage with control unit, ensuring smooth and accurate movement for greater efficiency and precise sample positioning.

High-precision motorized Z-axis stand with control unit, ensuring streamlined vertical movement for superior precision and ease of use.



Digitization

USB 3.1
Data Transfer

sCMOS Sensor

Creative Imaging Solution Delivering Superior Image Processing Capability

The PA53 MET integrates advanced digitization tools to streamline analysis, documentation, and data sharing. Its dedicated Analysis MET software is designed for smooth, intelligent operation, offering precise measurement and inspection functions for research and industrial applications. Live Multi-Focus technology merges multiple images with different focal depths into a single, crisp, unified image in real time, ensuring every structural detail is visible. Live Tiling extends the microscope's field of view by seamlessly stitching images captured during X/Y stage movement, creating wide, high-resolution stitched images without loss of clarity.

To complement these capabilities, Moticam S digital cameras deliver accurate color reproduction and sharp image detail. Built to meet strict quality standards, they provide reliable performance for a range of microscopy applications, ensuring the software's powerful imaging features are fully utilized.

With this combination of intuitive software functions and reliable imaging hardware, the PA53 MET offers a complete, high-performance digital microscopy solution for modern research and inspection environments.

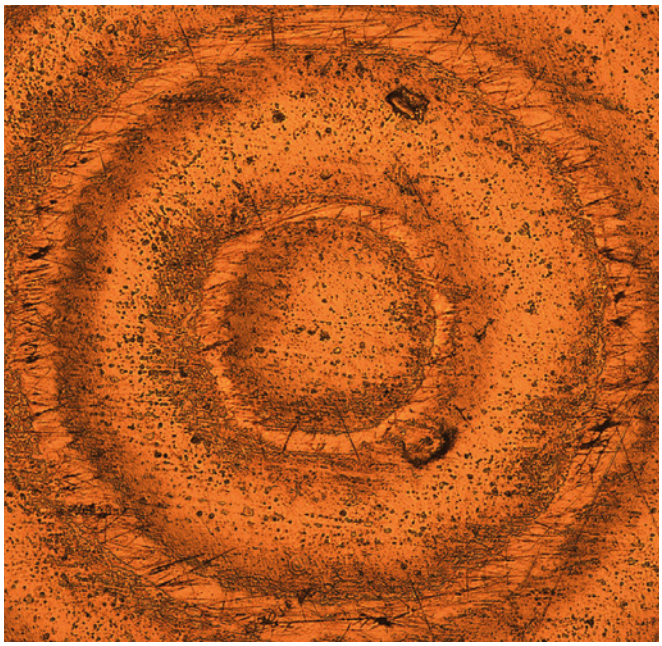
FPS

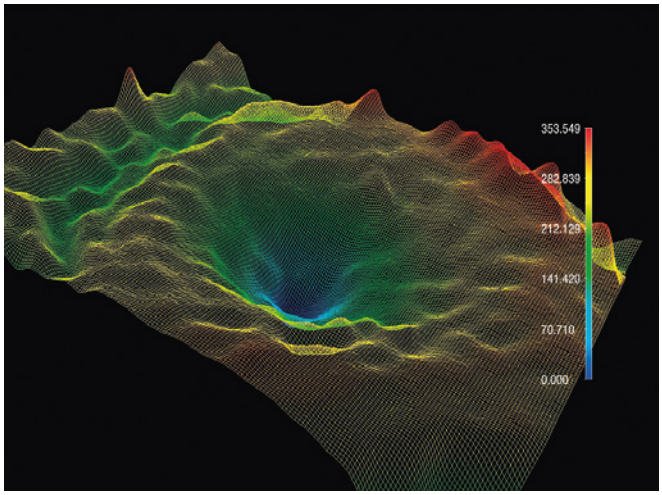
Fast Frame rates

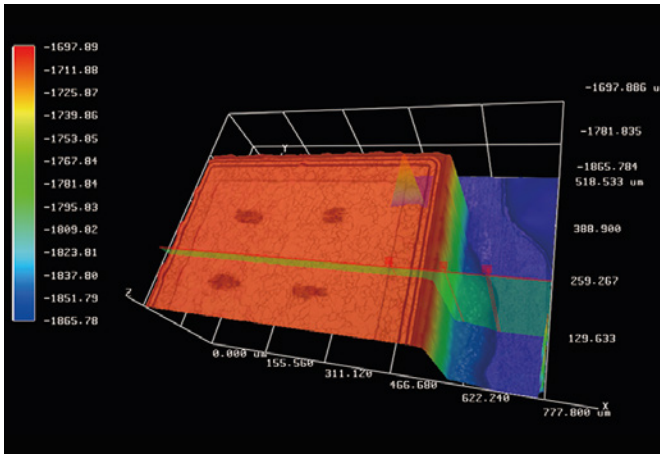
Manual
White balance (pro)

Advanced Sensitivity
& color reproduction

Rolling and Global
shutter models







Application Fields

Ideal for material inspection, quality control, and failure analysis

Precision in Material Inspection

The PA53 MET metallographic microscope is a trusted choice in industrial environments for material analysis, quality control, and failure investigation. It enables professionals to examine metals, alloys, and other materials with exceptional precision, detecting defects, irregularities, and structural variations that could impact product performance. Highly versatile, it meets the demands of diverse sectors such as manufacturing, automotive, aerospace, and electronics.

Automotive and Aerospace Industry

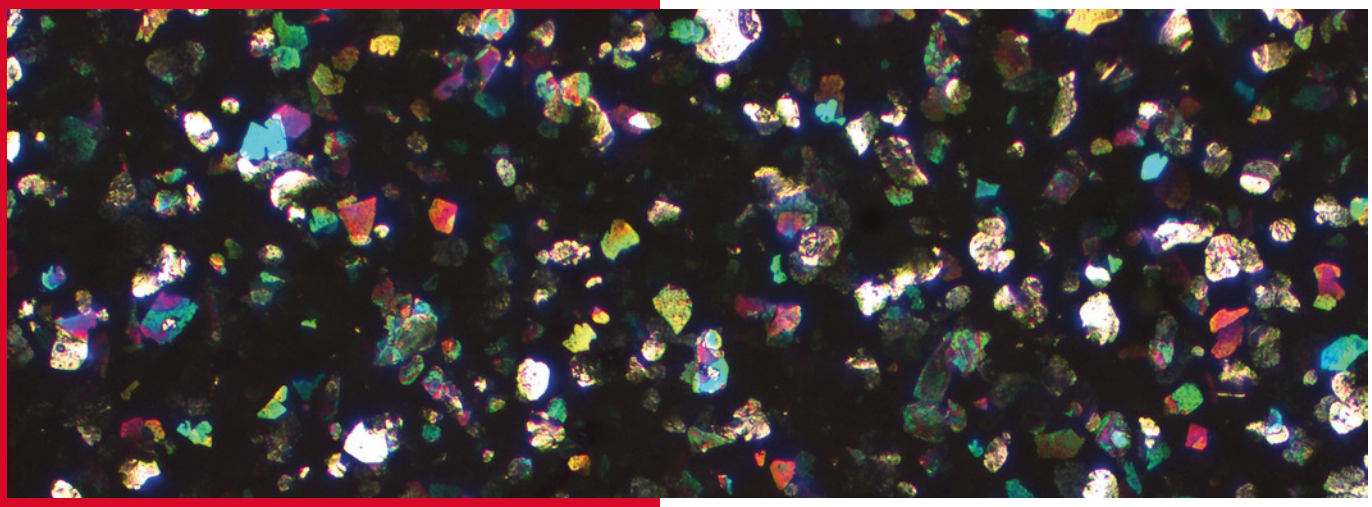
Microscopy is used to inspect mechanical components, composite materials, and structural failures, ensuring the reliability, safety, and performance of vehicles and aircraft in demanding operational conditions.

Metallurgy and Materials Analysis

In the metallurgical industry, microscopy examines the microstructure of metals and alloys, assessing strength, durability, and mechanical properties to guarantee optimal performance in diverse applications.

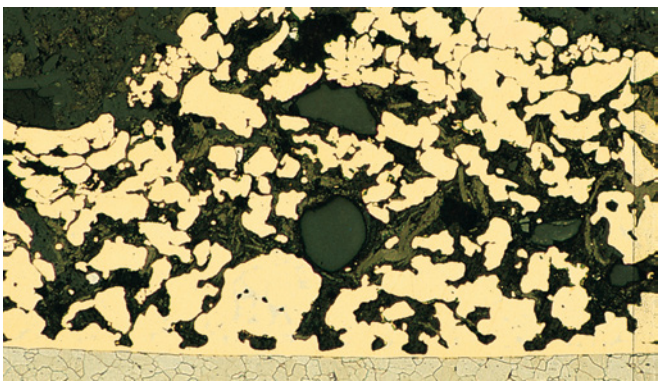
Electronics Industry

Microscopy is essential for inspecting microchips, solder joints, and printed circuit boards (PCBs), detecting defects and maintaining quality in the manufacturing of advanced electronic devices.

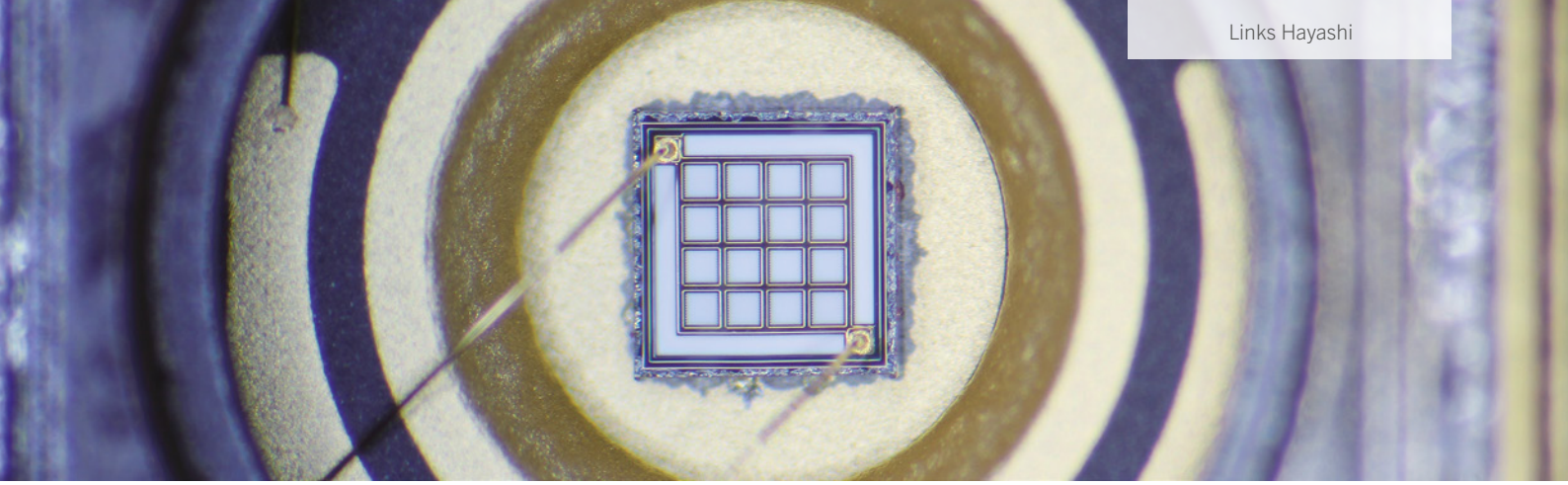


▲ Vehicle painting / clearcoat

By delivering accurate inspections and reliable material assessments, the PA53 MET helps optimize production processes, improve product quality, and minimize the risk of failures. Its performance and adaptability make it an essential instrument for modern industrial applications.



Corrosion ▶



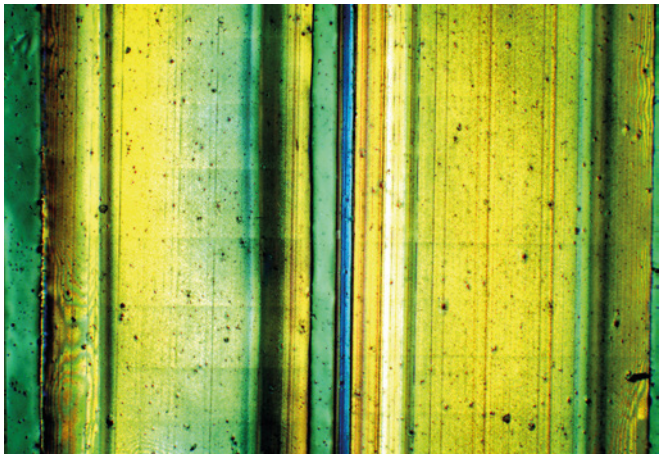
Links Hayashi

Plastics and Polymers Inspection

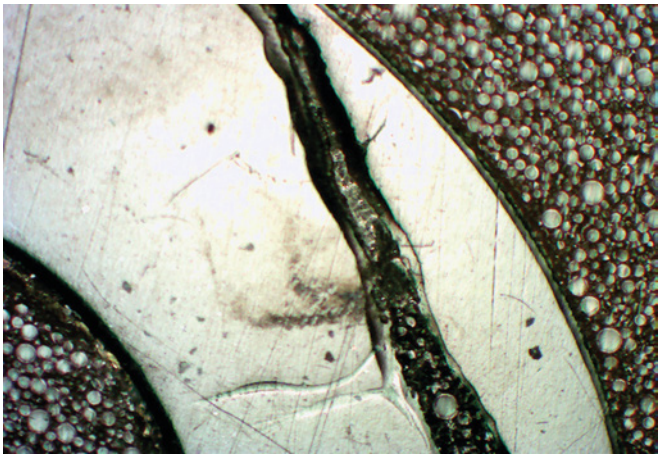
Microscopy enables detailed analysis of the composition, structure, and quality of plastics and polymers used in packaging, automotive manufacturing, and consumer electronics. It supports the detection of defects, inclusions, and processing irregularities that could affect performance or durability, ensuring materials meet required standards.

Industrial Forensics

Microscopy plays a key role in identifying the root causes of material or product failures through high-resolution microscopic examination. It allows precise investigation of fractures, corrosion patterns, wear marks, and contamination, providing critical insights for improving manufacturing processes, preventing recurrence, and ensuring long-term product reliability.

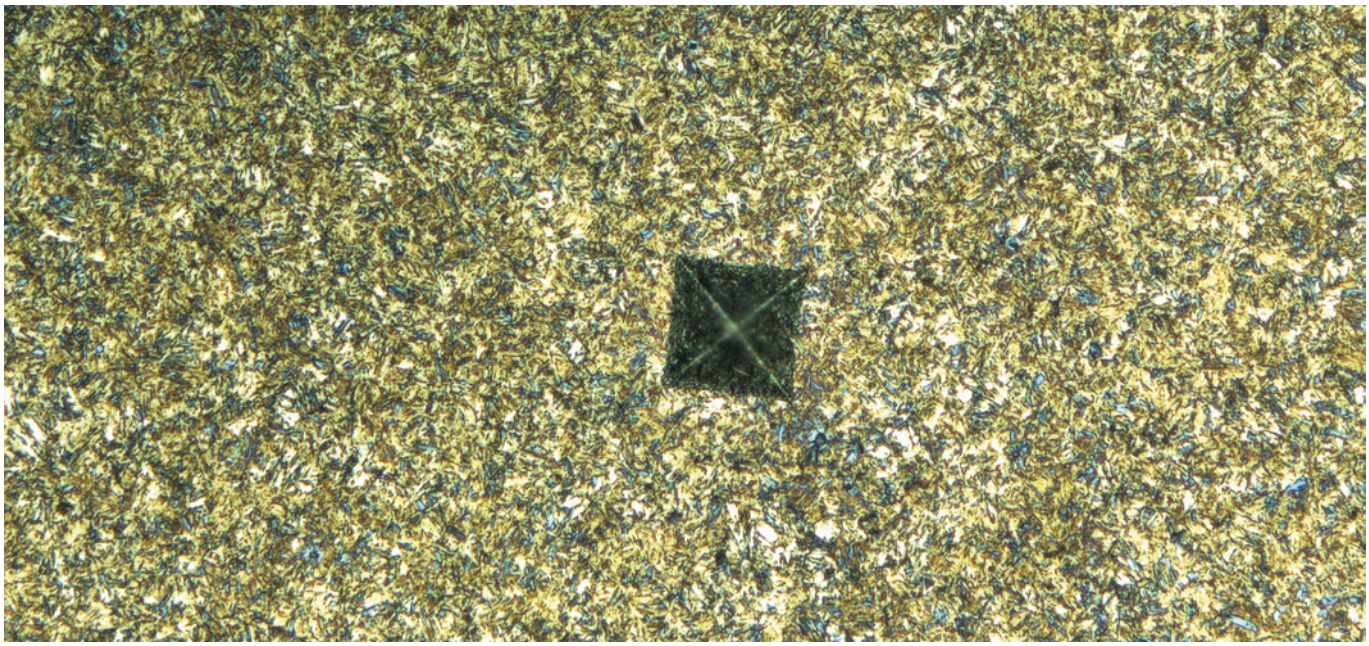


Film



Fracture

▼ Steel



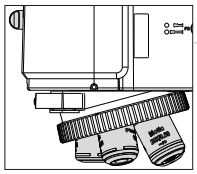
Technical Specifications

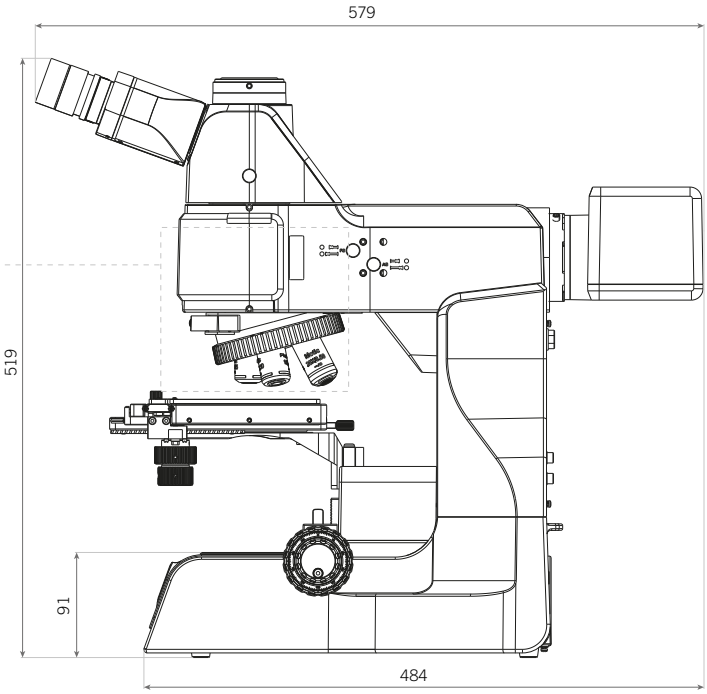
Model name	PA53 MET LED	PA53 MET-BD LED	PA53 MET-BD-T-3D
Optical system	Colour Corrected Infinity Optical System (CCIS®)		
Observation tube	Trinocular head, Siedentopf type		
Camera			sCMOS Moticam S6, 1/1.8" sensor, 6MP, 2.4 x 2.4 µm pixel size, USB 3.1
Inclination	20° inclined		
Trinocular light split	100:0/0:100 erect image		
Interpupillary distance	50-75mm		
Diopter adjustment	On both eyepieces, +/- 4 diopter		
Eyepieces	Widefield WF10X/25mm with diopter adjustment		
Intermediate body	Epi-illuminator LED 10W with integrated field and aperture diaphragms, slots for filters, filters ND6, LBD and BF module	Epi-illuminator LED 10W with integrated field and aperture diaphragms, slots for filters, filters ND6, LBD and BF/DF module	Epi-illuminator quartz halogen 100W with integrated field and aperture diaphragms, slots for filters, filters ND6, LBD and BF/DF module
Nosepiece	Reversed quintuple, coded for brightfield objectives with DIC slot	Reversed quintuple, coded for brightfield and darkfield objectives with DIC slot	
Objective classification	CCIS® Plan S-Apochromatic BF	CCIS® Plan S-Apochromatic BD	
Objectives	5X/0.15 (WD 18.75mm), 10X/0.3 (WD 12mm), 20X/0.45 (WD 2.35mm), 50X/0.8 (WD 1mm)		
Objective mounting thread	W 4/5"x1/36" (RMS standard)	M26X0.706	
Stand type	Upright		Upright. 3D profiling system, motorized Z-axis (30mm stroke) with control box and control pad
Stage	Mechanical stage, hard coated with built-in coaxial stage control & metal stage plate		Mechanical stage, hard coated with built-in coaxial stage control & glass stage plate
Stage size	210x170mm		
Travel range X&Y	104x102mm (4"x4")		
Condenser	-		Focusable and centerable LWD condenser N.A. 0.65 with iris diaphragm
Focus mechanism	Coaxial coarse and fine focusing system with tension adjustment		
Fine focus precision	1µm		
Focusing stroke	29.5mm - Coarse:17.7mm/revolution - Fine: 0.1mm revolution (1µm scale)		
Upper limit stop	Upper limit stop preset but adjustable		
Filter			Integrated filters ND6, ND25, LBD
Incident illumination	Köhler LED 10W for BF, DIC, POL with intensity control	Köhler LED 10W for BF, DF, DIC, POL with intensity control	Köhler Quartz halogen 12V/100W for BF, DF, DIC, POL with intensity control
Transmitted illumination	-		Köhler Quartz halogen 12V/100W with intensity control and field diaphragm
Illumination features	Power saving mode ECO function, LED voltage indicator and Intelligent Light function		
Software	Analysis Basic- - USB and dongle		Analysis Professional - USB and dongle
Power supply	110-240V (CE)		
Accessories included	-		0.5x C-mount camera adapter
Dimensions LxWxH	572x246x514		
Net weight	19kg		21kg
CONTRAST TECHNIQUES			
Brightfield	Yes		
Polarization	Optional slider reflected		Optional slider reflected & add-on transmitted
Darkfield	-	Yes	
DIC Nomarski	Optional slider reflected		
Fluorescence	Optional reflected MET-FL illuminator & Lumos LED		

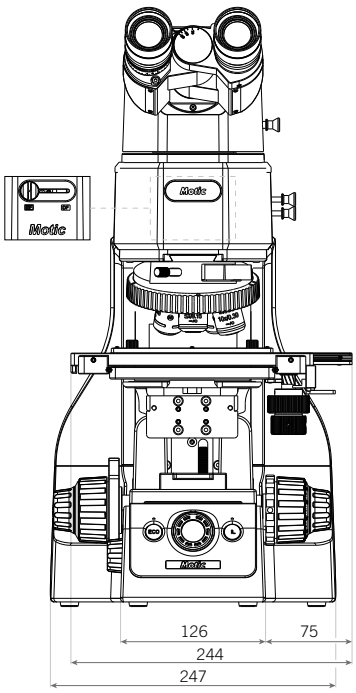
Dimensions

PA53 MET LED
PA53 MET-BD LED

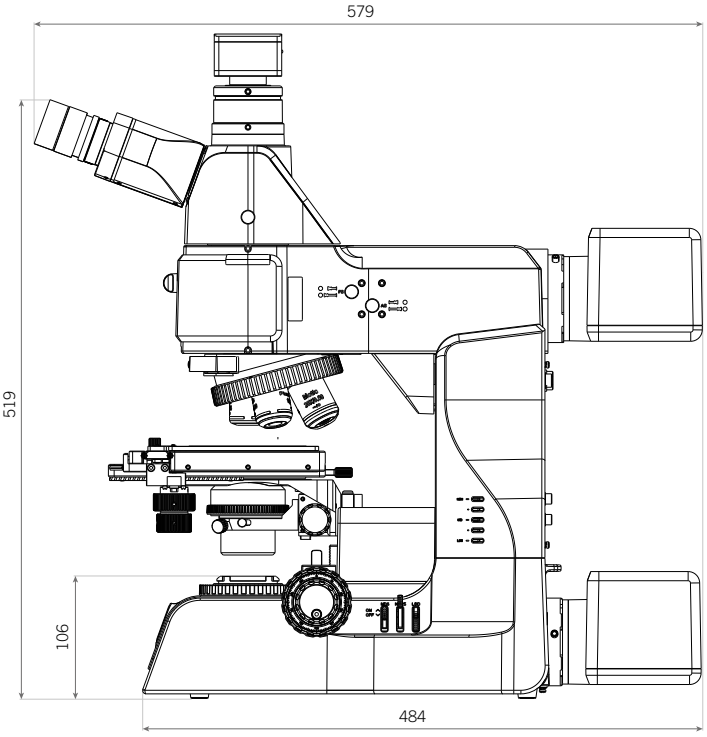
PA53 MET-BD LED

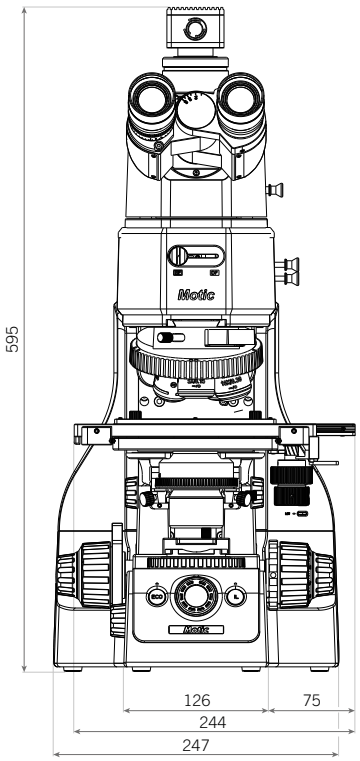






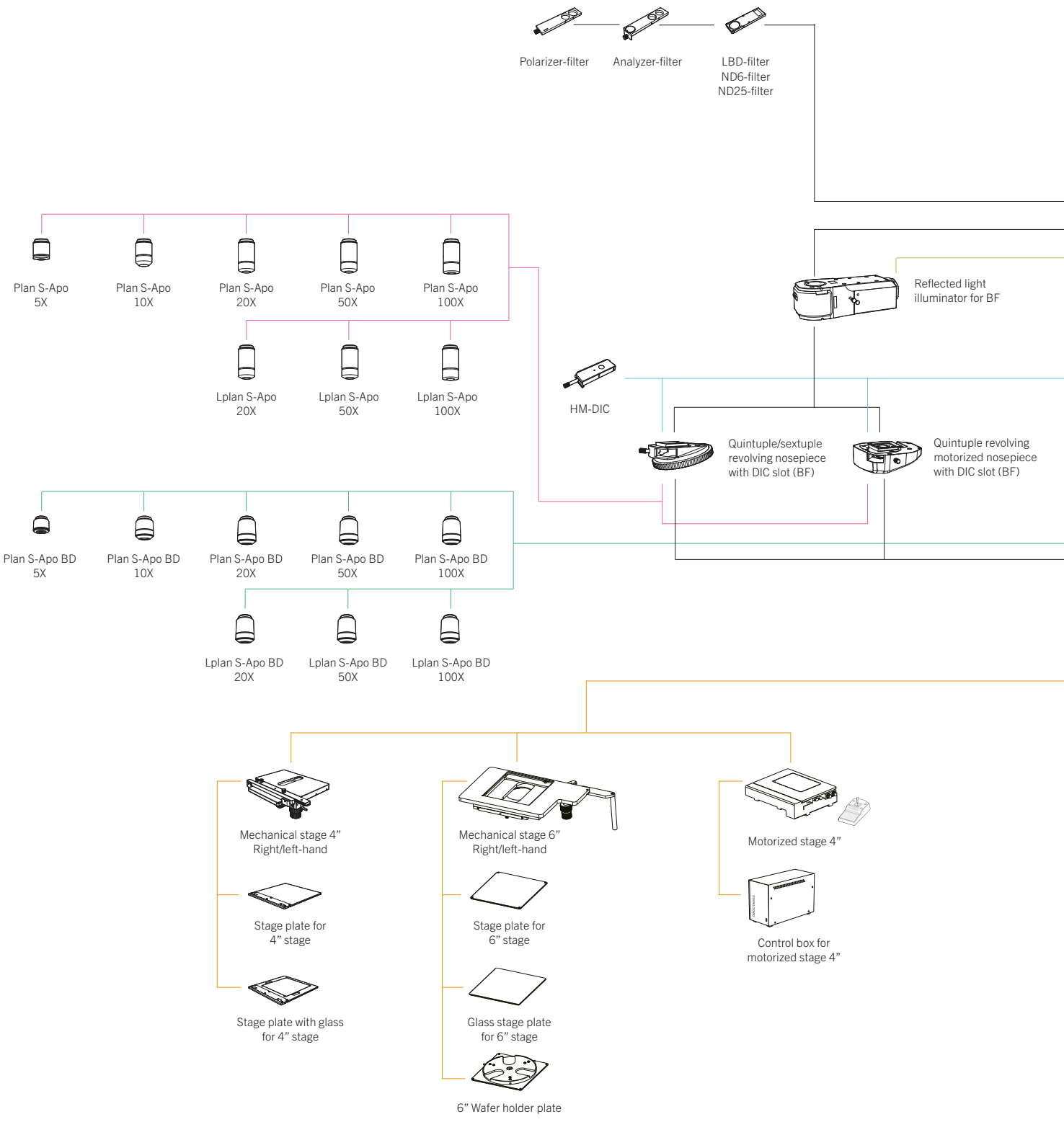
PA53 MET-BD-T 3D





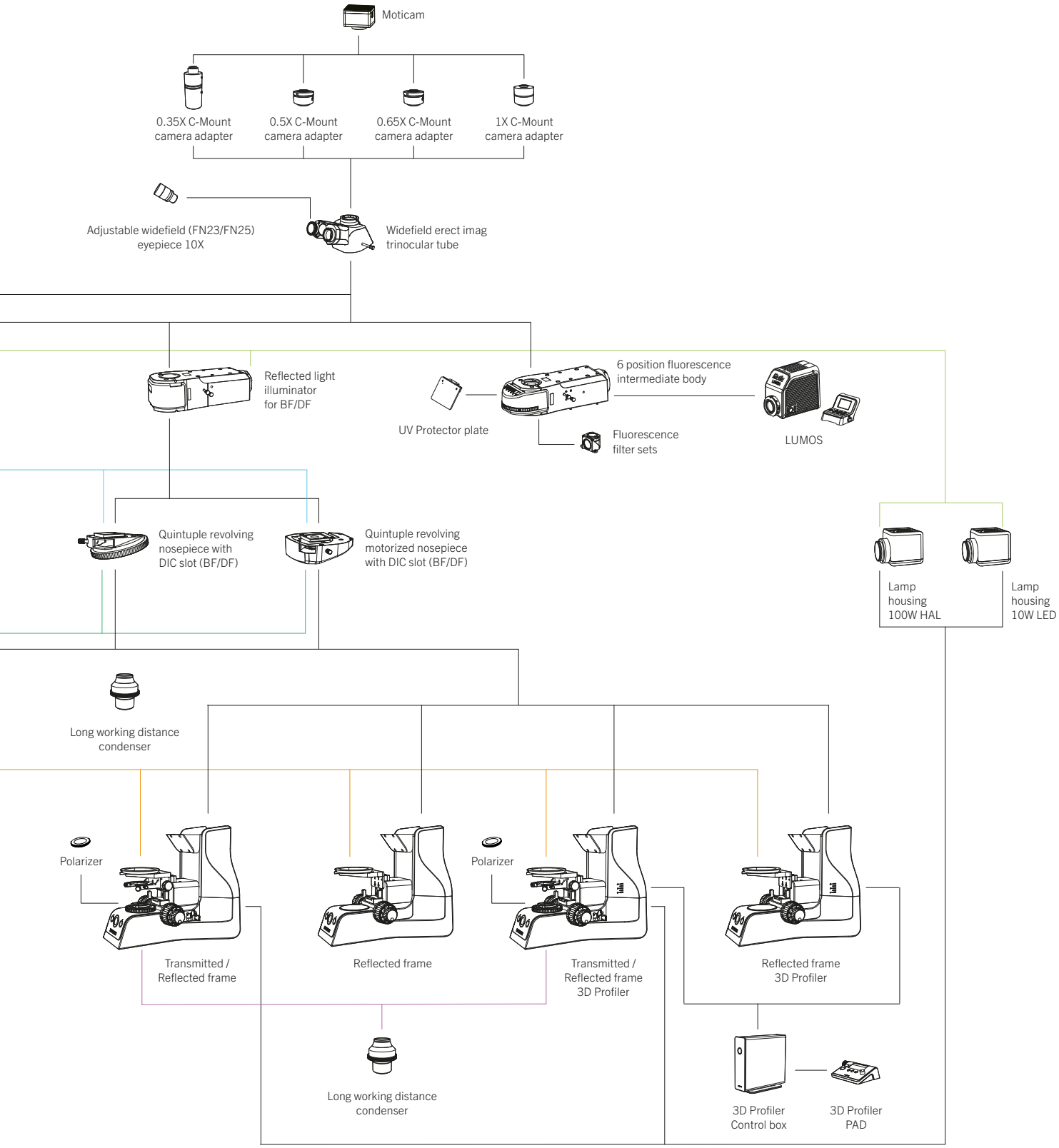
System Overview

Modular Microscopy for Advanced Applications



The PA53 MET metallographic microscope series is built with modularity at its core, offering a highly adaptable platform to meet the evolving demands of industrial material analysis. Its innovative design allows seamless customization with a wide range of modules and accessories, from reflected and transmitted light illuminators to motorized stages, advanced imaging systems, and specialized contrast methods.

This flexibility ensures that each configuration can be precisely tailored to specific applications, whether for quality control, failure analysis, or in-depth metallurgical research. By combining high-precision optics, ergonomic operation, and a scalable architecture, the PA53 MET delivers exceptional performance and unmatched versatility across a broad spectrum of industrial inspection tasks.



Analysis MET Software

Functions and versions

		Analysis Basic	Analysis Standard	Analysis Professional
Image Acquisition	Capturing (Snap)	•	•	•
	Video Recording	•	•	•
	HDR	•	•	•
	Manual Tilling	•	•	•
	Manual Multi-Focus	•	•	•
	Live Multi-Focus		•	•
	Time Lapse		•	•
	Live Tilling		•	•
	Automatic Tilling			•
	EDF			•
Image analysis & measurements	Basic 2D Measurement - Tools, (angles, circles, polygons, distance, ellipses, line ruler, angle ruler and rectangles)	•	•	•
	Report Creation (Excel and CSV)	•	•	•
	2D Live Measurement	•	•	•
	2D Combination measurement	•	•	•
	Cross hair, Scale bar and info stamp display	•	•	•
	Image Processing Tools (filters, brightness/contrast, hue/saturation, grayscale, etc.)	•	•	•
	Data Collector	•	•	•
	Annotations	•	•	•
	Advanced 2D Measurement - Tools (freehand polylines and morphology filters)		•	•
	Line Profiling		•	•
	Histogram		•	•
	Digital Reticle/Grid		•	•
	Auto Count			•
	Auto Measurement			•
	Auto Segmentation (Threshold)			•
3D Profiling (requires motorized Z-axis)	3D Measurement			•
	3D Scanning			•
	Auto Focus			•
	Auto Smoothing			•
	Auto Height Measurement			•
	Level Correction			•
Device control (some functions depend on the device and its configuration)	AMS	•	•	•
	IL	•	•	•
	ECO	•	•	•
	Motorized stage Control		•	•
	Motorized Nosepiece			•
	Z-Axis Control			•

From panoramic imaging to flawless multi-focus and 3D profiling, Analysis MET turns motorized control into seamless precision.

Motic®

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