

MPX-SERIES MULTI-PHOTON MICROSCOPES



TURN-KEY, FLEXIBLE, MULTIMODAL, COMPACT –
EXTENDED CAPABILITIES

The MPX-series **multi-photon multimodal imaging platform** is based on a modular concept. We offer three standard models where each can be upgraded with various options and accessories, as well as entirely custom designed setups - to completely maximize the utility. This offers every user the unique flexibility to design a **multi-photon microscope tailored to their specific need and budget.**

With the **integrated modalities**, micro and macro level sample sizes and different resolutions, this microscope offers refined multifunctionality. The scanhead can be mounted in various configurations. With minimum effort it can be modified to inverted, horizontal or placed at oblique angles. The modular and flexible layout can be upgraded at a later stage and ensures that extra features can be added over time on the same platform.

	MPX-1030	MPX-DUAL	MPX-TUNE
First wavelength: 1030 nm	✓	✓	✓
Second wavelength: 760 - 940 nm (fixed in range)	✗	✓	✗
Second wavelength: 760 - 940 nm (tunable)	✗	✗	✓
Resonant-galvo-galvo scanning module	Optional	Optional	Optional
Widefield fluorescence modality	Optional	Optional	Optional
Brightfield Epi-modality	Optional	Optional	Optional

Its flexibility and high-quality engineering make the system suitable for a broad range of applications:

- Imaging of 2D and 3D cell culture and organoids
- Deep tissue imaging
- Label-free imaging
- Immunohistochemistry / immunocytochemistry imaging
- Digital pathology

SPECIFICATIONS

Laser source: built-in femtosecond lasers	MPX-1030	MPX-DUAL	MPX-TUNE
Single-wavelength: 1030 nm All parameters @ sample: 100 MHz (40 MHz**), >600 mW, <130 fs (using Nikon 16x objective)	✓	✓	✓
Second wavelength: 760 - 940 nm (fixed in range) All parameters @sample: 100 MHz, >200 mW @ 920 nm & >600 mW @ 1040 nm, <130 fs (using Nikon 16x objective)	X	✓	X
Second wavelength: 760 - 940 nm (tunable in range) 100 MHz, >200 mW / output, <150 fs @sample (using Nikon 16x objective)	X	X	✓

MPI signal detection	
Epi-detection (up to 4 PMTs)	Two ultrasensitive GaAsP PMTs, non-cooled, spectral response 300 nm - 740 nm, dark count rate <5000/s included.
Collection optics	SHG & 2PEF fluorescence filter set included (notch and dichroic filters). Manual exchange of individual filters.
Transimpedance amplifiers (TIA)	12° fluorescence collection (half-angle) Filter bandwidth & gain separately configured and controlled through software.

Controller	
Umbilical	Non-detachable umbilical between controller and scanhead, >2.0 m length.
Embodiment	Stand-alone controller with handles and wheels.
Cooling	No chiller, fully aircooled
Power	Single phase, 85 - 240 VAC, 10 A max (max 800 W total power consumption).
Built-in PC hardware	ATX gaming board, AMD Ryzen 9 3900X, 64 GB RAM DDR4, 500 GB SSD NVMe, 4 TB HDD, Quadro RTX 4000 GPU.
Display	31", Ultra HD 4K, <5ms, 100% REC 709, 100% sRGB
Keyboard and mouse	Included, QWERTY (or QERTZ)
Weight scanhead	10 kg
Weight controller	30 kg
Size scanhead	50 cm x 40 cm x 15 cm (WxHxD).
Operating environment	18°C - 28°C. Extended operating conditions available.
Storage temperature	-15°C to +50°C
Humidity	10% - 90% (non condensing).
Noise level	<70 dBa.
Altitude	2500 m max.

Cockpit	
Auxilliary control device	Main functions of the system can be controlled via auxilliary interface to gain quick and direct access to individual settings and controls.

(I) Modality MPI: multi-photon fluorescence imaging	
Motorized laser power control	0.5 % - 100 %
Laser polarization	Circular
Scan path	Resonant**-galvo-galvo scanner
Scan speed (galvo-galvo)	4.6 fps at 512 x 512 pixels 0.3 fps at 2048 x 2048 pixels Pixel dwell time: 0.8 to 32 μs
Field of view (FOV)	20 mm diagonal square (max) at the intermediate image plane.
Beam diameter @ objective back aperture plane	20 mm
Point spread function	Depending on installed objective.
Scan zoom (digitally via ScanImage)	1x to 99x
Scan resolution	Up to 2048 x 2048 pixels (Both bi- and unidirectional).

Objectives	
Turret	3-positions, motorized & software controlled
Objectives	Nikon 16x N16XLWD-PF objective included. System requires infinity corrected objectives
Turret threading	M32 x 0.75

Software	
ScanImage Premium V2020 or higher	Laser scanning
Chromogazer™	System monitoring & modality change
MS Windows™ 10 64-bit Professional	PC operating system
ImageJ (Fiji)	Image post-processing
Matlab	Scanimage and house-written acquisition scripts
μManager	ImageJ plugin for widefield fluorescence acquisition



OPTIONS / ACCESSORIES

	MPX-1030	MPX-DUAL	MPX-TUNE
Resonant-galvo-galvo scanning module	✓	✓	✓
Resonant-galvo	✓	✓	✓
Widefield fluorescence	✓	✓	✓
Brightfield Epi-modality	✓	✓	✓
Objective piezo z-Stage	✓	✓	✓
Linear polarization (motorized rotation)	✓	✗	✗
SPF filter set change (motorized)	✓	✓	✓
Additional PMT channel (incl. TIA)	✓	✓	✓
Motion control system	✓	✓	✓
XYZ linear translation scanhead movement, >100mm travel range each, joystick	✓	✓	✓
Inverted configuration	✓	✓	✓
Fixture for inverted configuration	✓	✓	✓
On special request: structured light illumination, photostimulation, FLIM	✓	✓	✓

(II) Modality SPF: widefield fluorescence imaging

Excitation lightsource for widefield / linear fluorescence imaging	Fully integrated up to 8 channel cw light source for DAPI, CFP, FITC, YFP, TRITC, mCherry, Cy5 and Cy7 (395 nm, 438 nm, 475 nm, 511 nm, 555 nm, 575 nm, 635 nm, 747 nm), >150 mW / color @sample. TTL / USB external access <20 ms switching time. Excitation filters installed.
Filter set	Dichroic and emission filter sets individually optimized for 5+3 channels included. Both filter sets manually changeable.
Widefield fluorescence camera	sCMOS monochrome, 6.5 µm pixel size, readout noise 2.1 med e-, quantum efficiency up to 80 %, spectral range 370 nm - 1100 nm, dark current (typ.) 15 e- / pixel / s.

Resonant-galvo-galvo

Resonant-galvo-galvo 30 fps at 512 x 512 pixels (8 kHz resonant galvo CRS8K)

Motorized modality I, II & III change

Switching between operation mode modality I to III is motorized via Chromogazer™ software. Objective positions on turret can be selected individually and used for each modality. Manual fluorescence filter set change required (motorized as an option), depending on installed filters.

(III) Modality BFI: brightfield Epi imaging

Illumination	White light. Built-in 8-channel cw light source mimics broadband white light illumination characteristics via pre-defined settings.
Filter set	50% transmission & reflection dichroic for homogenous light transmission.
Brightfield camera	CMOS 5.1MP, 2/3", 3,45 x 3,45 µm pixel size, color, 2448 x 2048, 35 fps, global shutter.

PMTs

The standard version contains 2 PMTs in Epi-direction. Additional PMTs can be installed. Four PMTs can be controlled and operated simultaneously by ScanImage at a given time.

Motion control

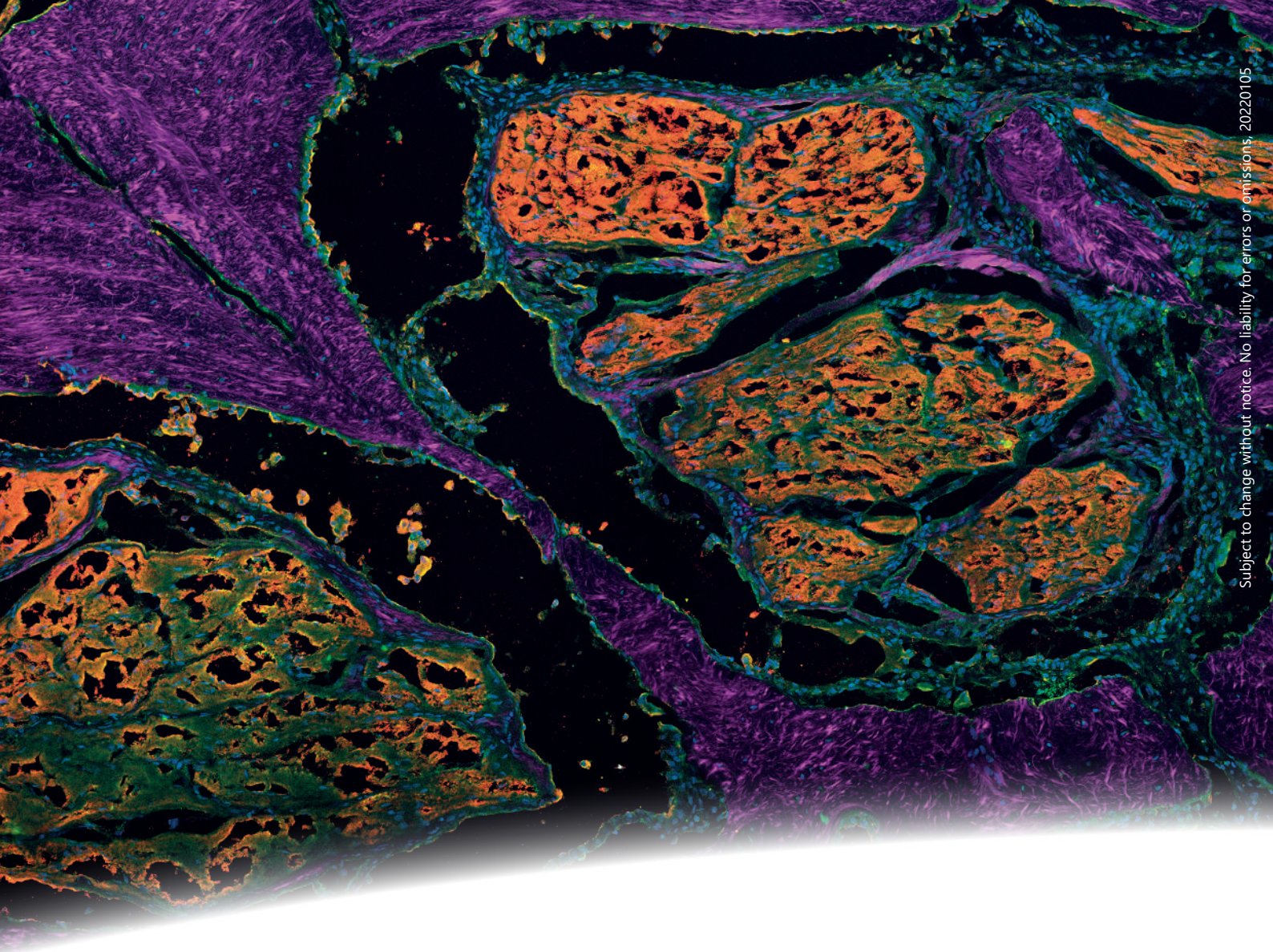
Microscope body (scanhead) motion	Free-moving scanhead, translation and rotation in all directions. Various motion solutions available.
Piezo objective scanner	Not included in standard version. Various piezo objective scanners can be integrated.

Extra software

Widefield Imaging (widefield fluorescence & brightfield)	Pre-installed & configured
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SERVICE PACKAGES AND WARRANTY

- Installation and training at customer site
- Free training at PI factory
- System upgradable after purchase
- Standard warranty 24 months, can be extended up to 5 years in total.



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CONTACTS

EU

Prospective Instruments LK OG

6850 Dornbirn, Austria
Email contact@p-inst.com
www.p-inst.com

SWITZERLAND

Prospective Instruments GmbH

8105 Regensdorf, Switzerland
Email contact@p-inst.com
www.p-inst.com

USA

two-level systems

Allentown, PA, 18101
Email info@two-levelsystems.com
www.two-levelsystems.com

CHINA

Sinsi Technology Co., Ltd.

Chaoyang District, Beijing 100013, China
Email info@sinsitech.com
www.sinsitech.com

Leads Bio-Technology Limited

Minhang District, Shanghai 201107, China
Email info@leads-tech.com
www.leads-tech.com

INDIA

Atos Instruments Marketing Services

Bangalore, Karnataka- 560035, India
Email atos@atosindia.com
www.atosindia.com

TAIWAN

Biochiefdom International Co., Ltd.

New Taipei City, 23147, Taiwan
Email info@bio-chief.com.tw
www.bio-chief.com.tw



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