



Free-space microscopes

Raman microscopy for large or heavy samples

Renishaw's free-space microscopes (FSMs) have a large clearance for oversized samples. FSMs can be configured with the full capabilities of an inVia™ Qontor® confocal Raman microscope, bringing complete automation and LiveTrack™ focus-tracking technology to large and heavy samples.

Raman spectroscopy is used for chemical and structural characterisation on a wide variety of materials. However, some objects cannot be analysed under a standard Raman microscope. Large specimens can be too deep to fit under the microscope nosepiece, or too wide to fit in the microscope body. Also, heavy samples may impose loads beyond those of normal microscope stages.

Example applications:

- Semiconductor wafers with or without a vacuum chuck assembly
- Photovoltaic panels
- Paintings and other cultural heritage items
- Geological samples, such as rock cores
- Samples in large environmental chambers such as cryostats or high temperature cells

Choice of FSM frame widths

The microscope turret and optics are supported by three 25 mm pillar posts and secured to an optical table for stability against mechanical vibrations.

FSM frames are available in two sizes:

Standard FSM for samples up to 370 mm wide

Wide FSM for samples up to 700 mm wide



The MS30 high speed encoded stage is a high performance, motorised sample stage, for use with Renishaw's Raman microscopes.



The MZ40 Z stage is equipped with a 100 nm resolution Renishaw encoder. This enables you to position it accurately and reproducibly anywhere within its 18 mm range of travel.

FSM motorised stage specifications

Renishaw's free-space microscopes are available with a choice of motorised XY translation stages.

Standard FSMs can be equipped with either a Renishaw MS30 high speed encoded stage, or a Prior H105. The MS30 stage can achieve the fastest Raman imaging speeds and is compatible with StreamLine™ and StreamHR™ Rapide imaging technologies. The Prior H105 stage is suitable for samples with a mass of >2 kg, while being compatible with StreamHR imaging technology.

Wide FSMs are usually configured with either the Prior H116 or H112, depending on the XY translation requirement. The Prior H112 stage can be used for Raman analysis from the surface of a 12" semiconductor wafer.

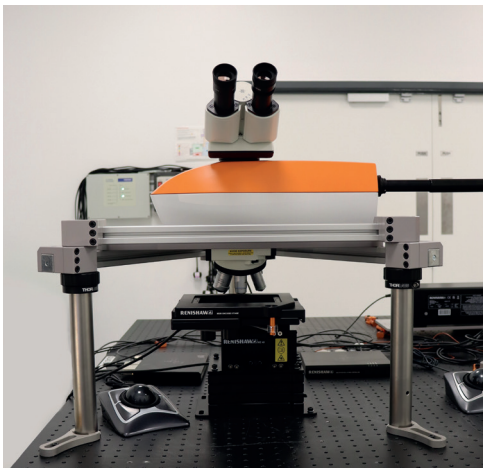
FSMs are configured with Renishaw's MZ40 Z stage, which is ideal for positioning heavy samples up to 25 kg. The MZ40 Z stage is a high-load capacity, high-stability vertical travel stage. It is normally fitted with an additional XY motorised stage, so you can position your sample accurately in three dimensions.

The free-space microscopes are available with a choice of motorised XY translation stages.

FSM Type	XY stage	Maximum sample width, x-max	Maximum stage travel			Maximum sample height	Maximum sample mass
			x-travel	y-travel	z-travel		
Standard	MS30	475 mm	112 mm	76 mm	18 mm	94	2 kg
	H105		154 mm (6")	154 mm (6")		108	
Wide	H116	806 mm	255 mm (10")	215 mm (8")		96	25 kg
	H112		302 mm (12")	302 mm (12")		89	

For further details on motorised stages, please see the following:

1. Renishaw MS30 high speed encoded stage: PN221
2. Renishaw MZ40 Z stage: PN248
3. Prior stages H105, H112 and H116: <https://www.prior.com/product-category/motorized-stages>



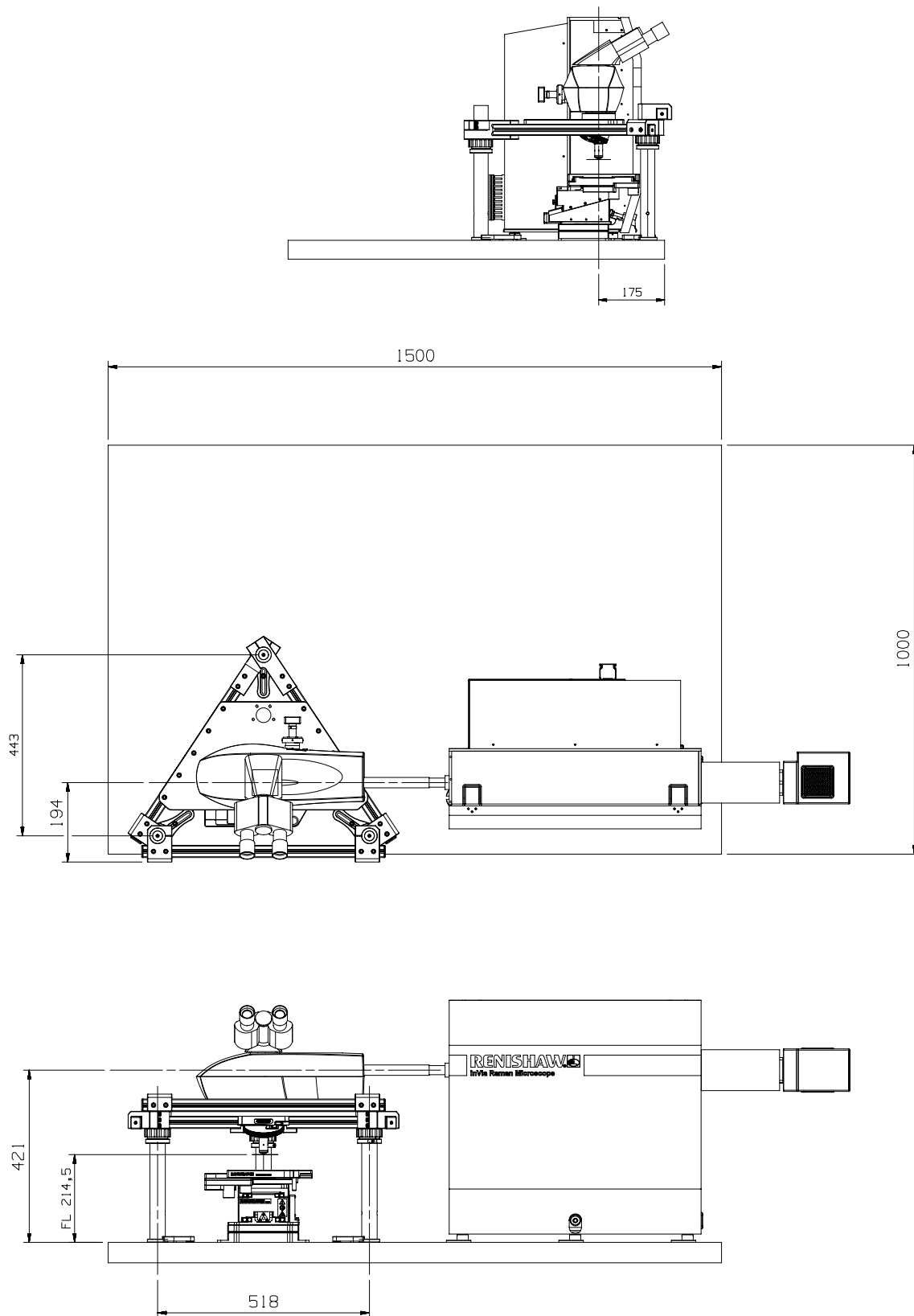
An inVia Reflex™ confocal Raman microscope is configured as a standard free-space microscope with Renishaw MS30 and MZ40 stages to enable precise, repeatable and stable motion in three dimensions.



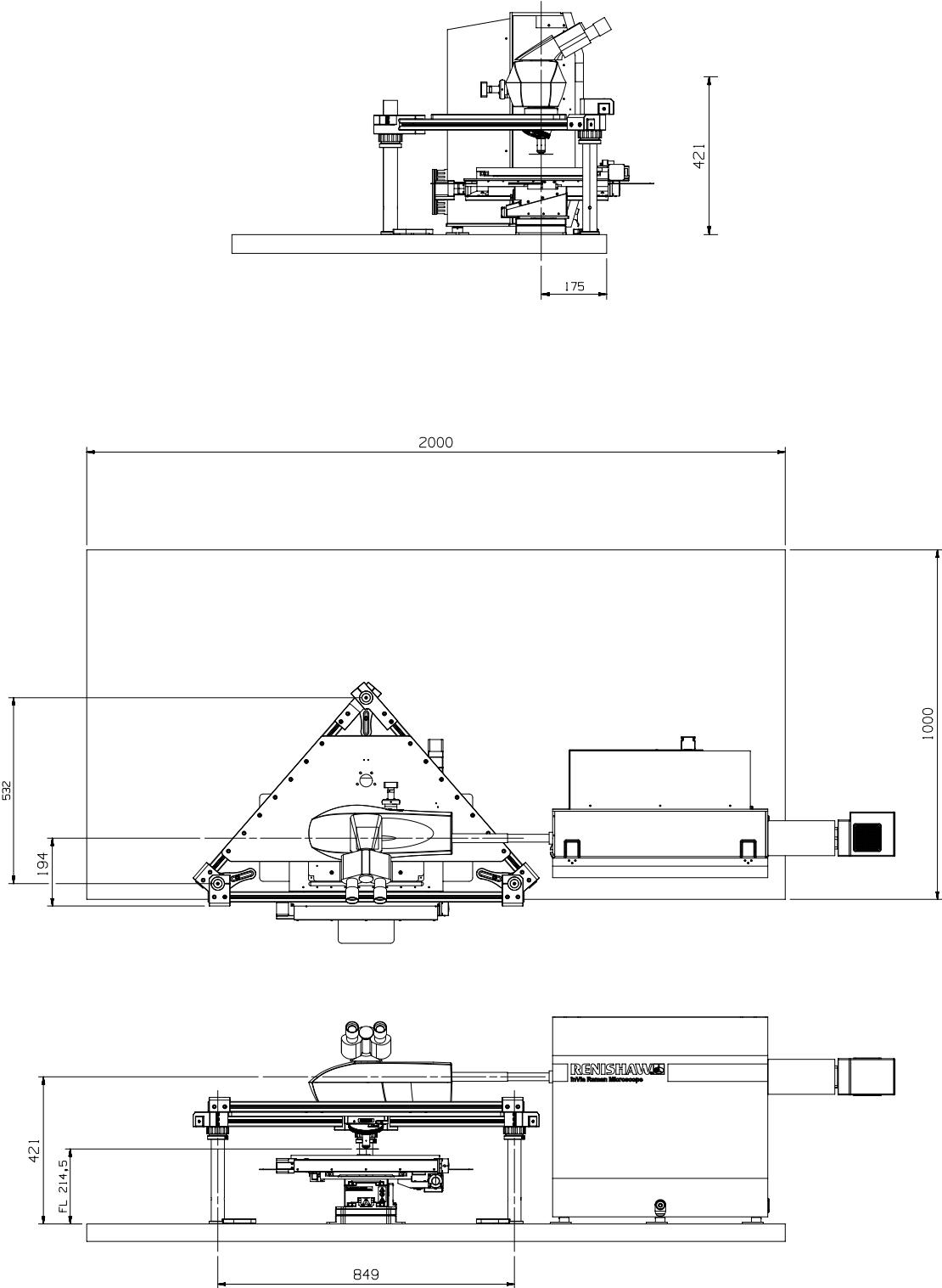
An inVia Qontor confocal Raman microscope is configured as a wide free-space microscope. Together, the Prior H112 and Renishaw MZ40 stages enable the complete inspection of 12" semiconductor wafers.

Example configurations (All units shown in mm)

Standard FSM for samples up to 370 wide

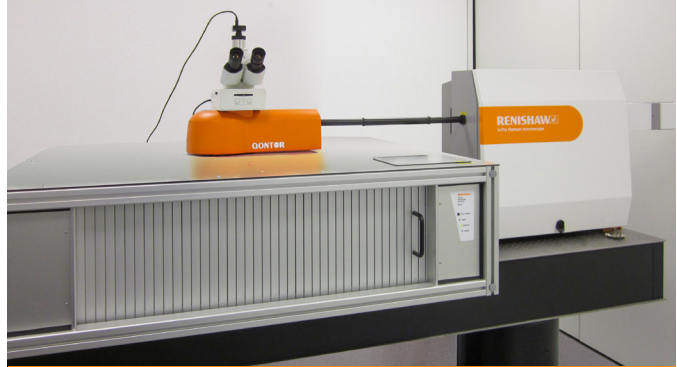


Wide FSM for samples up to 700 wide



Custom microscope solutions

Our special products team has extensive experience in the development of custom solutions, such as dual microscope configurations, inverted microscopes and large Class 1 laser safety enclosures. Please contact us if you require any additional space within the enclosure to accommodate vacuum clamps and related ancillaries. We will be happy to discuss your specific requirements.



An inVia Qontor microscope is configured as a wide free-space microscope with a large Class 1 laser safety enclosure. The wide FSM enclosure can inspect the entire surface of a 12" semiconductor wafer.

Laser safety

Class 3B laser product

- Standard system for operation with laser wavelengths from 320 nm to 1064 nm.

Class 1 laser product

- This option is available (subject to system configuration) for systems operating with laser wavelengths in the range 320 nm to 1064 nm.

Class 4 DUV laser product

- System with at least one path configured for operation at laser wavelengths in the range 180 nm to 315 nm. (Dependent on configuration, these systems may also operate at laser wavelengths from 320 nm to 1064 nm).

Class 4 Vis/NIR laser product

- Systems operating with Class 4 (visible) lasers can be provided as a custom solution tailored to meet customers' requirements subject to the laser power(s) not compromising the integrity or function of the system.



www.renishaw.com/raman



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