



PointProbe® Plus XY-Alignment Series

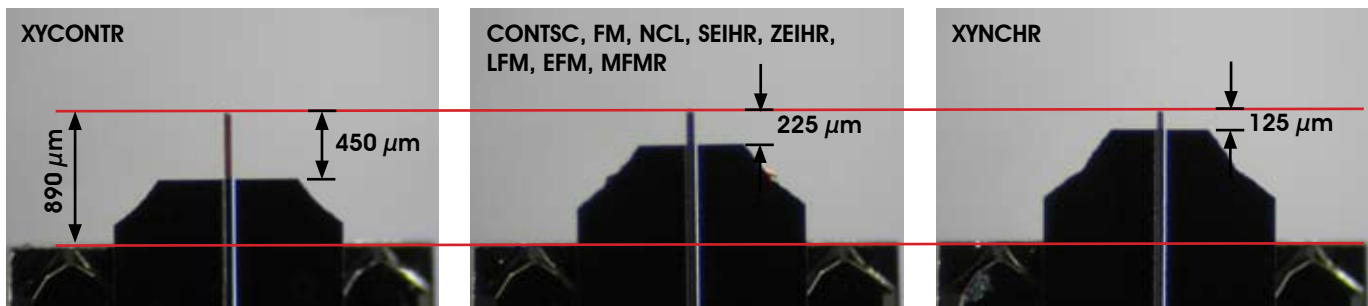
Silicon-SPM-Probes

The XY-Alignment series comprises the well-established Alignment Chip with especially designed XY-Alignment probes enabling an easy and precise tip autoalignment. Due to adapted support chip geometry probes with four different cantilever lengths can be mounted into the Alignment Chip by a unique "plug-and-fit" mechanism. Once your AFM head is equipped with the Alignment Chip, tip exchange time and effort are reduced dramatically because readjustment of the beam deflection laser is no longer required.

The range of compatible probe types covers:

- Soft cantilevers with a force constant of 0.1 N/m for contact mode applications
- Intermediate stiffnesses of 2.8 N/m bridging Contact and Non-Contact Mode for combined topography imaging and surface analysis
- High speed 330 kHz Tapping Mode and Soft Tapping cantilevers

■ XY-Alignment Probes: Identical Tip Position after Probe Exchange



Photographs of the different PointProbe® Plus XY-Alignment series probe types mounted into the Alignment Chip (left: PPP-XYCONTR with 450 μm long cantilever, center: PPP-FM with 225 μm long cantilever, right: PPP-XYNCHR with 125 μm long cantilever).

Due to adjustment of support chip length and alignment groove position an exact tip auto alignment of probes with different cantilever length is possible. The newly developed PointProbe® Plus XYNCHR type is the perfect choice for most Tapping, Intermediate Contact or Non-Contact Mode applications. A resonance frequency of 330 kHz and a force constant of 42 N/m facilitates fast and stable measurements as proven by the well-established PointProbe® Plus NCHR probes comprising the identical cantilever shape. The new PointProbe® Plus XYNCSTR type with a force constant of 7.4 N/m and a resonance frequency of 160 kHz enables Tapping Mode operation with reduced forces.

For Contact Mode applications the PointProbe® Plus XYCONTR type is recommended. Providing a stiffness of 0.2 N/m high resolution Contact Mode measurements with minimum tip wear are possible.

For other applications and/or specific measurement requirements the wide range of established probes with medium size cantilevers can be used. The PointProbe® Plus types CONTSC, FM, NCL, SEIHR, ZEIHR, LFM, EFM, MFMR match exactly to the XY-Alignment series allowing applications as Force Modulation measurements, Lateral or Friction Force Mode applications, Electrostatic Force or Magnetic Force Microscopy and many more.

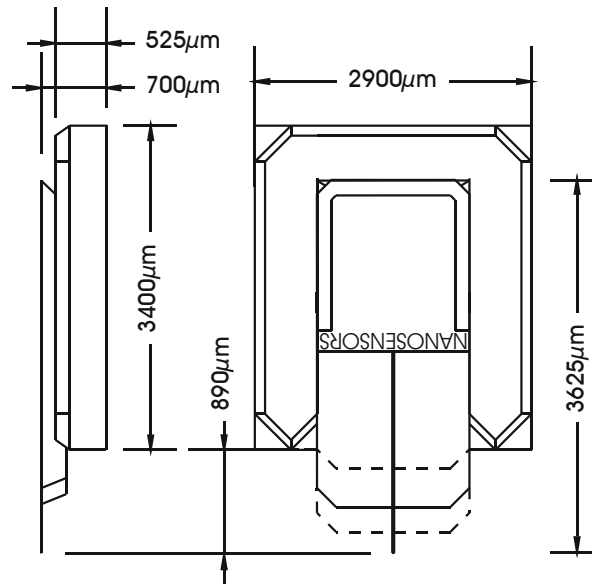
Although the length of the cantilever is either 125 μm , 150 μm , 225 μm or 450 μm , the position of the tip with respect to the alignment grooves of the holder chip fitting to the Alignment Chip is precisely the same. An exact tip positioning of any probe type with a precision of $\pm 8 \mu\text{m}$ is possible.



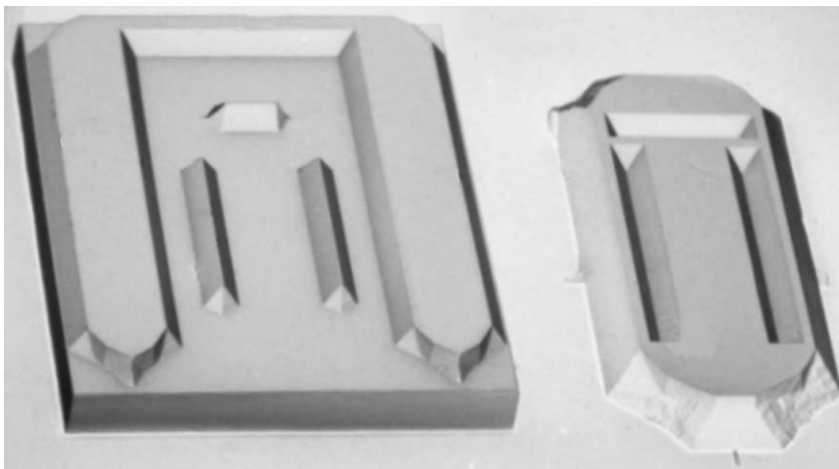
Additionally, the distance between tip and opposite rim of the support chip is equal for all probes of the XY-Alignment series (3630 μm) enabling a reproducible repositioning with a mechanical bedstop at the probe holder.

Alignment Chip

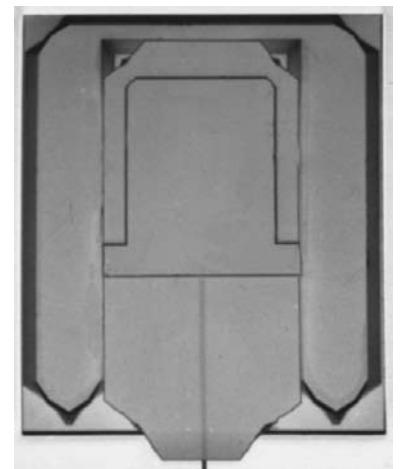
The Alignment Chip (ALIGN) is used for a reproducible alignment between PointProbe® Plus AFM probes and the AFM detection system. The chip has three ridges that fit exactly into corresponding grooves at the backside of each of our PointProbe® Plus probes. Due to this alignment mechanism the SPM probe can be exchanged with precise repositioning of the tip within ± 2 μm.



Sketch of Alignment Chip with mounted PointProbe® Plus XY-Alignment Series probes.



SEM image of Alignment Chip and backside of PointProbe® Plus support chip.



SEM image of Alignment Chip with mounted PointProbe® Plus probe.

Technical Data XY-Alignment Series	Nominal Value
Tip repositioning accuracy (same probe) [μm]	±2
Tip repositioning accuracy (any probe) [μm]	±8



■ XY-Alignment Compatible PointProbe® Plus Types

	<i>Types without Reflex coating</i>	<i>Types with Reflex coating</i>	<i>Application</i>	<i>Force Constant [N/m] (nominal)</i>	<i>Res. Frequency [kHz] (nominal)</i>
Contact		PPP-XYCONTR	Contact Mode	0.2	13
	PPP-CONTSC	PPP-CONTSCR PPP-CONTSCAuD	Contact Mode	0.2	25
Non-Contact		PPP-XYNCHR	Non-Contact / Tapping Mode (high frequency)	42	330
	PPP-NCL	PPP-NCLR PPP-NCLAuD	Non-Contact / Tapping Mode (long cantilever)	48	190
		PPP-XYNCSTR	Non-Contact / Tapping Mode (soft tapping)	7.4	160
		PPP-SEIHR	Non-Contact / Tapping Mode Seiko NC-Mode	15	130
Special	PPP-FM	PPP-FMR PPP-FMAuD PPP-QFMR	Force Modulation Mode	2.8	75
		PPP-RT-FMR	Force Modulation (Rotated Tip)	2.8	75
		PPP-LFMR	Lateral / Friction Force Microscopy	0.2	25

■ XY-Alignment Compatible SuperSharpSilicon™ Types

	<i>Types without Reflex coating</i>	<i>Types with Reflex coating</i>	<i>Application</i>	<i>Force Constant [N/m] (nominal)</i>	<i>Res. Frequency [kHz] (nominal)</i>
Non-Contact	SSS-NCL	SSS-NCLR	Non-Contact / Tapping Mode (long cantilever)	48	190
	SSS-SEIH	SSS-SEIHR	Non-Contact / Tapping Mode Seiko NC-Mode	15	130
Special	SSS-FM	SSS-FMR	Force Modulation Mode	2.8	75

■ XY-Alignment Compatible Probe Types with High Aspect Ratio Tips

	<i>Types without Reflex coating</i>	<i>Types with Reflex coating</i>	<i>Application</i>	<i>Force Constant [N/m] (nominal)</i>	<i>Res. Frequency [kHz] (nominal)</i>
Non-Contact	AR5-NCL	AR5-NCLR	Non-Contact / Tapping Mode (long cantilever)	48	190



■ XY-Alignment Compatible Coated Probe Types

	Coating	Type	Application	Force Constant [N/m] (nominal)	Res. Frequency [kHz] (nominal)
Contact	Platinum-Iridium	CONTSCPT	Contact Mode	0.2	25
	Gold	CONTSCAu	Contact Mode	0.2	25
Non-Contact	Diamond / Conductive Diamond	DT-NCLR CDT-NCLR	Non-Contact / Tapping Mode (long cantilever)	48	190
	Platinum-Iridium	PPP-NCLPt	Non-Contact / Tapping Mode (long cantilever)	48	190
	Gold	PPP-NCLAu	Non-Contact / Tapping Mode (long cantilever)	48	190
Special	Diamond / Conductive Diamond	DT-FMR CDT-FMR	Force Modulation Mode	2.8	75
	Hard Magnetic	PPP-MFMR PPP-LM-MFMR SSS-MFMR	Magnetic Force Microscopy	2.8	75
	Soft Magnetic	PPP-LC-MFMR	Magnetic Force Microscopy	2.8	75
	Platinum-Iridium	PPP-EFM	Electrostatic Force Microscopy	2.8	75
	Gold	PPP-FMAu	Electrostatic Force Microscopy	2.8	75

■ XY-Alignment Compatible Tipless and Plateau Tip Probe Types

	Types without Reflex coating	Types with Reflex coating	Application	Force Constant [N/m] (nominal)	Res. Frequency [kHz] (nominal)
Non-Contact	TL-NCL		Tipless Cantilever	48	190
	PL2-NCL	PL2-NCLR	Plateau Tip Probe	48	190
Special	TL-FM		Tipless Cantilever	2.8	75
	PL2-FM	PL2-FMR	Plateau Tip Probe	2.8	75

For more details please refer to the product datasheet on our website
www.nanosensors.com

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