

Microscope Stages



All microscope stages and components incl. micromanipulators are also available with a black anodized surface finish.

In the life sciences, the equipment used must be extremely precise and reliable, as precise handling and manipulation of samples is the most important part of the day-to-day operation of a microscopy workstation.

Microscope Stages and Manipulators

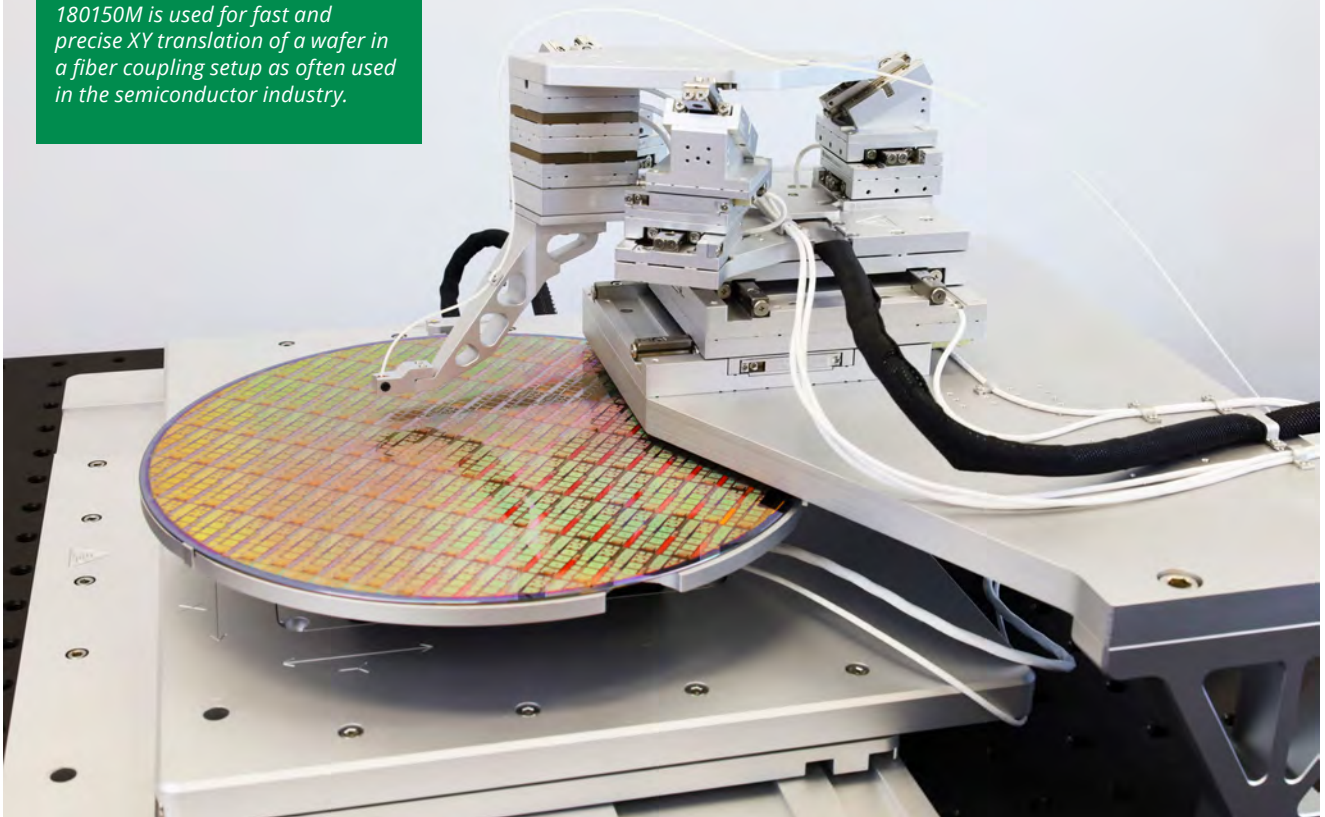
To meet these requirements, SmarAct has developed microscope stages that not only allow the specimen to be positioned in two dimensions, but also allow the mounting of micromanipulation systems for in-situ sample manipulation. The microscope stages themselves are based on compact linear stages and allow long travel ranges with nanometer precision and highest closed-loop repeatability. In addition to the standard universal object slide holder, unified well plate and Petri dish holders are available. A magnetic holder is also available for quick and easy exchange of slides and coverslips in high-throughput experiments. Micromanipulators are very versatile when it comes to handling pipettes, microknives,

microgrippers, microinjectors or other mechanical or electrical probes. For the most common tasks, we have several different types of manipulators in our portfolio, with three or more degrees of freedom. Larger stages support not only one, but two or more micromanipulators, providing even more degrees of freedom for sample manipulation. All manipulators can be moved completely independently and can be equipped with different tools and axis configurations.

Compatibility and Adaptability

The microscope stage base plate is breadboard compatible. Standard insert adapters ensure compatibility with common manufacturers. Cover plates and the stages themselves are highly customizable. Please feel free to contact us to discuss adapting our stages to your specific microscope model or custom setup.

SmarAct microscopy stages can be used in a wide range of applications. Shown here: A SOM-MS-180150M is used for fast and precise XY translation of a wafer in a fiber coupling setup as often used in the semiconductor industry.



Controllers and Software

The microscope stages and manipulators are controlled by the SmarAct **MCS2** control system. The **MCS2** allows control of up to 18 individual stages. This makes it possible to create highly versatile setups consisting of an XY stage and four micromanipulators, each with four degrees of freedom. The system and manipulators can be controlled by a variety of handheld devices with tactile buttons and joysticks or by the SmarAct Precision Tool Commander software on your own PC. The stages and manipulators can be integrated into your own control software using the supplied software development kits, which include documentation, libraries, and programming examples for C/C++, Python®, and LabVIEW™. Based on the control interface, the microscope stages can be easily integrated into existing software frameworks, including integration with Micro-Manager, an open-source microscope image acquisition and instrument control software package from Open Imaging Inc.



A customized four-axis micromanipulator allows positioning of tools with nanometer precision in front of the objective lens.



Our team of experts will advise you on the most suitable microscope stage for your requirements and will also be happy to develop a fully customized solution for you if required.

	SOM-MS-180150	SOM-MS-12090	SOM-MS-8070	SOM-MS-808030	SOM-MS-8080	SOM-MS-505020	SOM-MS-5050	
Mechanical	Travel X [mm]	123	83	51		31		
	Travel Y [mm]	103	63	46	51		31	
	Travel Z [mm]	--			16	--	12	--
	Max. Normal Force [N]	≥20			--	≥20	--	≥20
	Max. Lift Force [N]	--			>1.8	--	>2	--
	Dimensions [mm], L x W x H	286 x 216 x 30	226 x 176 x 30	147 x 113 x 27	138 x 138 x 43.8	138 x 138 x 43.8*	113 x 113 x 35	113 x 113 x 35*
	Weight [g]	2830	1390	586	565	480	388	360
Open-Loop	Velocity [mm/s]	>8						
	Resolution [nm]	<1						
Closed-Loop	Sensor Resolution MCS2 [nm]	1 (S) 4 (L)						
	Repeatability, Full Stroke MCS2 [nm]	± 180 (S) ± 360 (L)	± 120 (S) ± 240 (L)	± 80 (S) ± 160 (L)		± 50 (S) ± 100 (L)	± 80 (S) ± 160 (L)	
	Sensor Resolution (H)CU [nm]	100 (L)						
	Repeatability, Full Stroke (H)CU [nm]	± 1000 (L)						
Material Options	Aluminum base as standard; Black anodized (-BK)							
Vacuum Options	HV (10 ⁻⁶ mbar); UHV (10 ⁻¹¹ mbar)							
Non-Magnetic Options	Upon request							

Closed-loop resolution and repeatability differ depending on the sensor type selected.

* Height excluding slide mechanism

Microscope Stages

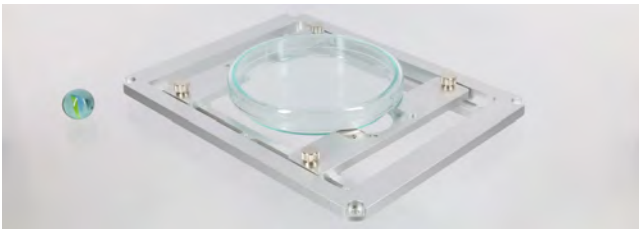
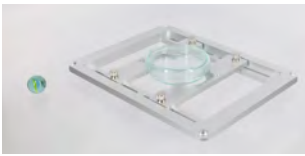
SOM-MS-180150M		48 V-Version	20 V-Version
Mechanical	Travel X [mm]	121	121
	Travel Y [mm]	101	101
	Continuous Force [N]	8	8
	Max. Normal Force [N]	50	50
	Peak Force [N]	25	12
	Dimensions [mm], L x W x H	320 x 230 x 35	320 x 230 x 35
	Weight [g]	4700	4700
Closed-Loop	Velocity [mm/s]	300	200
	In-Position Stability [nm]	5	2
	Uni-Directional Repeatability [nm]	± 120 (X) ± 60 (Y)	± 80 (X) ± 40 (Y)
Material Options		Aluminum base as standard; Black anodized (-BK)	

Choose the most appropriate drive principle for your application.

In addition to our piezo stick-slip microscopy stages, our direct-drive microscopy stage completes the portfolio. It offers a very smooth motion profile with nanometer precision and high dynamics. Positioning speeds of up to 0.3 m/s and features to automate your process enable high-throughput data acquisition across the entire aperture. The contactless drive principle makes this stage ideal for high duty cycle applications. Two operation modes for 48 V and 20 V allow the ideal choice of parameters depending on the application enabling compatibility for fluid microscopy.



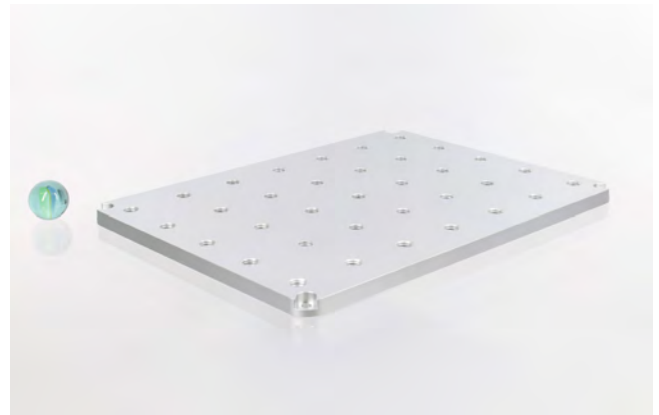
The direct drive technology combined with our optical encoder in the SOM-MS-180150M allows high-throughput sampling with nanometer precision and a smooth movement profile.



SOM-AP-01

Dimensions [mm]	130 x 170 x 16.4
Material Options	Aluminum base as standard; Black anodized (-BK)
Compatibility	SOM-MS-12090, SOM-MS-180150, SOM-MS-180150M

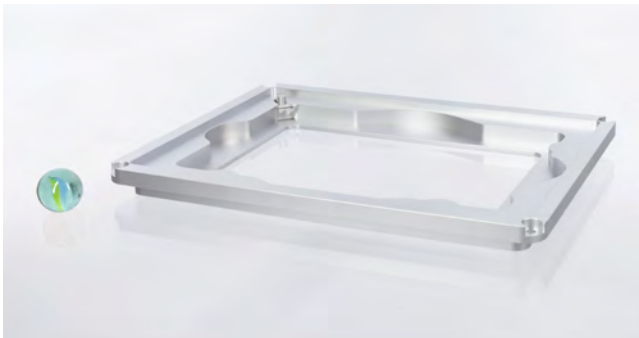
The SOM-AP-01 is a versatile insert frame for SmarAct XY microscope stages with adjustable mounting elements. Due to the flexible setting, standard glass substrates (slides with 26 x 76 mm), as well as round substrates and incubation vessels (e.g. Petri dishes) with diameters from 35 to 100 mm can be accommodated.



SOM-AP-02

Dimensions [mm]	130 x 170 x 6
Material Options	Aluminum base as standard; Black anodized (-BK)
Compatibility	SOM-MS-12090, SOM-MS-180150, SOM-MS-180150M

The SOM-AP-02 is a breadboard insert for SmarAct XY microscope stages with 35 x M6 threaded holes 25 mm pattern.



SOM-AP-03

Dimensions [mm]	130 x 170 x 12.3
Material Options	Aluminum base as standard; Black anodized (-BK)
Compatibility	(SOM-MS-12090), SOM-MS-180150, SOM-MS-180150M

The SOM-AP-03 is an insert for SmarAct XY microscope stages to accommodate microtiter (multiwell) plates according to the ANSI standard (SBS) and with lip strength of 2-3 mm.



SOM-AP-04

Dimensions [mm]	130 x 170 x 10.5
Material Options	Aluminum base as standard; Black anodized (-BK)
Compatibility	(SOM-MS-12090), SOM-MS-180150, SOM-MS-180150M

The SOM-AP-04 is an insert for SmarAct XY microscope stages to hold four standard glass (26 x 76 mm slides) in parallel orientation. The special spring holders allow one-handed operation.

SOM-FS-1720		
Mechanical	Stages used	SLC-1720-D-S (Z)
	Degrees of Freedom	1
	Travel [mm]	12
	Payload [N]	3.5
	Dimensions [nm], L x W x H, Ø-Holder	68.5 x 45 x 35 Ø 34
	Weight [g]	75
Closed-Loop	Sensor Resolution MCS2 [nm]	1 (S) 4 (L)
	Sensor Resolution (H)CU [nm]	50 (L)
Material Options	Aluminum base as standard; Black anodized (-BK)	

Focus Stages

The SOM-FS-1720 is an objective lens manipulator for Z-focusing with a resolution of up to 1 nm and a travel range of 12 mm. It functions as an adapter for standard microscopes and insert systems. To ensure precise focusing, it is designed with zero backlash and features weight compensation for different objective sizes and loads. The SOM-FS-1720 is also available in an inverted microscopy configuration and can be purchased with different travel ranges or fully customized adapters.



With the development and production of market-leading solutions in the field of high-precision positioning, automation and metrology, the SmarAct Group reliably accompanies their customers in achieving their goals. The broad product portfolio – from single positioning stages to complex parallel kinematics, miniaturized robots, control systems and measurement technology – is complemented by automated microassembly solutions. Even the most challenging customer requirements can be met by maximum adaptability and complete in-house production.

Since its founding in 2005, SmarAct has steadily grown from a small team of engineers to a group of companies with three independent business units and over 270 highly skilled members. Today, SmarAct relies on years of experience and, above all, on a very passionate team with unconditional customer focus.

Headquarters

SmarAct GmbH

Schuetze-Lanz-Strasse 9
26135 Oldenburg
Germany
T: +49 441 – 800 87 90
T: +49 441 – 559 79 18 0
Email: info-de@smaract.com
www.smaract.com

USA

SmarAct Inc.

2140 Shattuck Ave. Suite 302
Berkeley, CA 94704
United States of America
T: +1 415 – 766 90 06
Email: info-us@smaract.com
www.smaract.com