

**M-168**

**High Resolution Stepper-Mike Actuators**



M-168.10, M-168.30, M-168.40 Stepper-Mikes

- 10, 25 & 50 mm Travel Ranges
- Resolution < 0.1 μm
- 2- and 5-Phase Stepper Motor
- Manual Positioning Knob
- Sub-nm Resolution with Optional PZT Actuator
- >5,000 Hours MTBF

M-168 are compact, high-resolution linear actuators providing linear motion up to 50 mm

**Ordering Information**

**M-168.10**  
Stepper-Mike Actuator, 10 mm, 5-Phase Stepper

**M-168.30**  
Stepper-Mike Actuator, 25 mm, 5-Phase Stepper

**M-168.40**  
Stepper-Mike Actuator, 50 mm, 5-Phase Stepper

**M-168.12S**  
Stepper-Mike Actuator, 10 mm, 2-Phase Stepper

**M-168.22S**  
Stepper-Mike Actuator, 25 mm, 2-Phase Stepper

**M-168.52S**  
Stepper-Mike Actuator, 50 mm, 2-Phase Stepper

**Custom Designs for Volume Buyers**

with sub-micron resolution. They consist of a micrometer-drive with non-rotating tip driven by a 2000 half-step/revolution, 5-phase stepper motor or a 20,000 microstep/rev, 2-phase stepper motor.

**Non-Rotating Tip**

Compared to conventional rotating-tip micrometer drives, the non-rotating-tip design offers the following advantages:

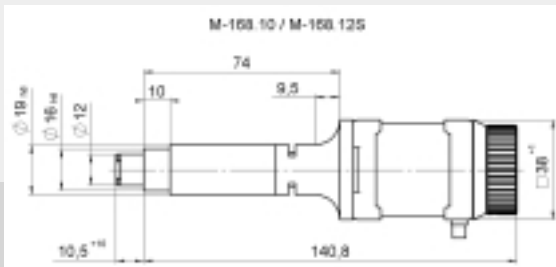
- Elimination of torque-induced stage platform tilt
- Elimination of wear at the contact point
- Elimination of tip-angle-dependent wobble

M-168 Stepper-Mikes feature an extremely low-stiction, low-friction construction allowing for high resolution and repeatability. A manual positioning knob provides coarse resolution of 5 μm. All models come with standard flat tips (see page 7-75 for spherical tips and other options).

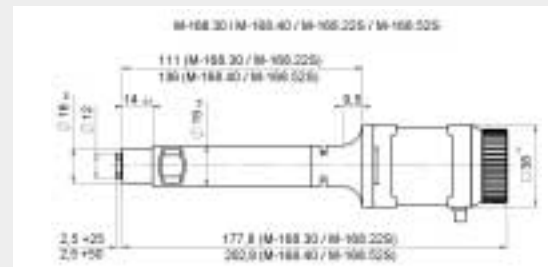
**High-Resolution Piezo Option**

The optional piezo tip provides 20 μm travel with sub-nanometer resolution for dynamic scanning and tracking (see page 7-75).

For mounting, the Stepper-Mikes are clamped around the 19 mm diameter section. Clamping around the 16 mm diameter section should only have a supporting function; high forces at this point will increase friction and reduce accuracy and resolution. For the same reason, lateral forces on the tip must be avoided.



M-168.10 & M-168.12S dimensions (in mm)



M-168.30, M-168.40, M-168.22S & M-168.52S dimensions (in mm)

**Technical Data**

Models	M-168.10	M-168.30	M-168.40	M-168.12S	M-168.22S	M-168.52S	Units	Notes see p. 7-96
Travel range	10	25	50	10	25	50	mm	
Design resolution	0.25	0.25	0.25	0.025	0.025	0.025	μm	A3
Min. incremental motion	0.25	0.25	0.25	0.05	0.05	0.05	μm	A4
Unidirectional repeatability	0.25	0.25	0.25	0.1	0.1	0.1	μm	
Backlash	2	2	2	2	2	2	μm	
Max. velocity	3	3	3	5	5	5	mm/sec	
Max. push/pull force	50	50	50	50	50	50	N	
Max. lateral force	0.02	0.02	0.02	0.02	0.02	0.02	N (at tip)	
Motor resolution	2000	2000	2000	20000**	20000**	20000**	steps/rev.	
Drive screw pitch	0.5	0.5	0.5	0.5	0.5	0.5	mm	
* Motor type	* 5-phase stepper	* 5-phase stepper	* 5-phase stepper	** 2-phase stepper	** 2-phase stepper	** 2-phase stepper		
Weight	0.4	0.45	0.5	0.4	0.45	0.5	kg	
Recommended motor controllers	C-600, C-630					C-600, C-630		D2

\* 5-phase stepper, 24 V chopper voltage, 0.5 A / phase, 8 Ωs / phase.

\*\* 2-phase stepper, 24 V chopper voltage, max. 1.5 A / phase, 20,000 microsteps with C-600, C-630 controllers