

## M-230 Precision Linear Actuator

### Non-Rotating Tip, Limit Switches, Stroke to 25 mm



M-230.10, M-230.25, high-resolution DC-Mike actuators, 10 and 25 mm travel range

- Travel Range 10 & 25 mm
- Min. Incremental Motion to 0,05  $\mu\text{m}$
- Non-Rotating Tip
- Max. Velocity 2 mm/s
- Closed-Loop DC Motors and Stepper Motors
- Non-Contact Limit and Reference Switches
- Front Mount or Clamp Mount
- MTBF > 20.000 h

M-230 are ultra-high-resolution linear actuators providing linear motion up to 25 mm with sub-micron resolution in a compact package. They consist of a micrometer with non-rotating tip driven by a 2-phase stepper motor or a closed-loop DC motor / gearhead combination with motor-shaft-mounted, high-resolution encoder.

#### Non-Rotating Tip

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

- Elimination of torque-induced positioning errors
- Elimination of sinusoidal motion errors
- Elimination of wear at the contact point
- Elimination of tip-angle-dependent wobble

#### High Accuracy & Long Life

M-230 actuators provide a cost-effective solution for heavier-duty industrial and OEM environments. They feature extremely low-stiction, low-friction construction, allowing for minimum incremental motion as low as 50 nanometers and speeds up to 2 mm/sec.

#### Limit and Reference Switches

For the protection of your equipment, non-contact Hall-effect limit and reference switches are installed. The direction-sensing reference

switch supports advanced automation applications with high precision.

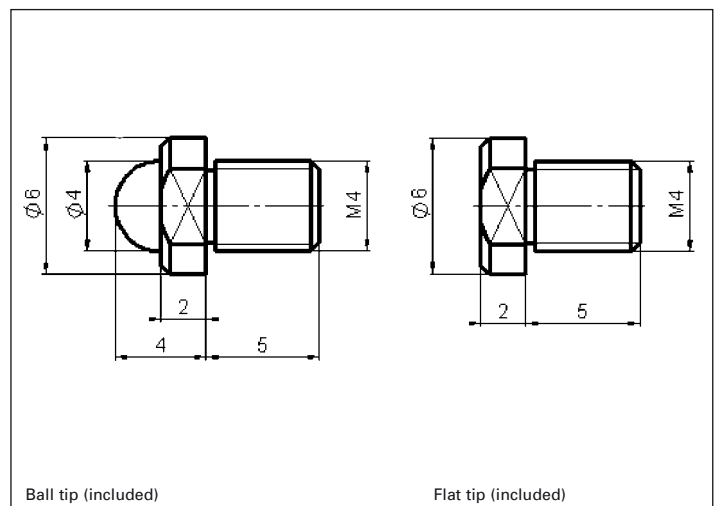
#### Integrated Line Drivers

All actuators include an integral 0.5 m cable with 15-pin sub-D connector and come with a 3 m extension cable. On the DC servo versions, the connector features integrated line drivers for cable lengths up to 10 meters between actuator and controller.

#### High-Load Versions

For higher loads and travel ranges refer to the M-235 (see p. 1-50) and M-238 (see p. 1-52).

A screw-in ball tip and a flat tip are included.



Ball tip (included)

Flat tip (included)

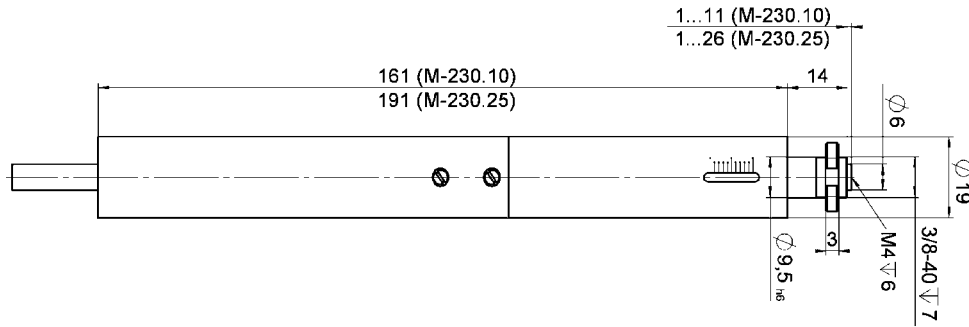
#### Ordering Information

**M-230.10**  
High-Resolution DC-Mike Linear Actuator, 10 mm, Limit Switches

**M-230.10S**  
High-Resolution Stepper-Mike Linear Actuator, 10 mm, Limit Switches

**M-230.25**  
High-Resolution DC-Mike Linear Actuator, 25 mm, Limit Switches

**M-230.25S**  
High-Resolution Stepper-Mike Linear Actuator, 25 mm, Limit Switches



M-230. Cable length: 500 mm, 15-pin sub-D connector with integrated line drivers (DC motor models). Dimensions in mm

### Technical Data

Model	M-230.10	M-230.25	M-230.10S	M-230.25S	Units
Active axes	X	X	X	X	
<b>Motion and positioning</b>					
Travel range	10	25	10	25	mm
Integrated sensor	Rotary encoder	Rotary encoder			
Sensor resolution	2,048	2,048			Cts./rev.
Design resolution	0.0046	0.0046	0.037	0.037	μm
Min. incremental motion	0.05	0.05	0.05	0.05	μm
Backlash	2	2	2	2	μm
Unidirectional repeatability	0.1	0.1	0.1	0.1	μm
Max. velocity	1.2	1.2	2	2	mm/s
Reference switch repeatability	1	1	1	1	μm
<b>Mechanical properties</b>					
Spindle	Leadscrew	Leadscrew	Leadscrew	Leadscrew	
Spindle pitch	0.4	0.4	0.4	0.4	mm
Gear ratio	42.92063:1	42.92063:1	28.44444:1	28.44444:1	
Motor resolution**			384**	384**	steps/rev.
Max. push/pull force	70	70	45*	45*	N
Max. lateral force	30	20	30	20	N
<b>Drive properties</b>					
Motor type	DC-motor, gearhead	DC-motor, gearhead	2-phase stepper motor**	2-phase stepper motor**	
Operating voltage	0 to ±12	0 to ±12	24	24	V
Electrical power	2	2			W
Limit and reference switches	Hall-effect	Hall-effect	Hall-effect	Hall-effect	
<b>Miscellaneous</b>					
Operating temperature range	-20 to +65	-20 to +65	-20 to +65	-20 to +65	°C
Material	Al (anodized), steel	Al (anodized), steel	Al (anodized), steel	Al (anodized), steel	
Mass	0.3	0.35	0.3	0.35	kg
Cable length	0.5	0.5	0.5	0.5	m
Connector	15-pin sub-D connector	15-pin sub-D connector	15-pin sub-D connector	15-pin sub-D connector	
Recommended controller/driver	C-863 single-axis C-843 PCI board, for up to 4 axes	C-863 single-axis (p. 4-114) C-843 PCI board, for up to 4 axes (p. 4-120)	C-663 single-axis	C-663 single-axis (p. 4-112)	

\*at velocities of up to 1 mm/s

\*\*2-phase stepper motor, 24 V chopper voltage, max. 0.25 A/phase, 24 full steps/rev., motor resolution with C-663 stepper motor controller

### Linear Actuators & Motors

PiezoWalk® Motors / Actuators

PILine® Ultrasonic Motors

### DC-Servo & Stepper Actuators

Piezo Actuators & Components

Guided / Preloaded Actuators

Unpackaged Stack Actuators

Patches/Benders/Tubes/Shear..

### Nanopositioning / Piezoelectrics

### Nanometrology

### Micropositioning

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