

M-661 · M-662 PLine® Miniature Linear Motor Stage With Ultrasonic Piezo Linear Drives



PLine® M-662 (left side) and M-661 stages are the smallest piezo-motor-driven translation stages available on the market that achieve speeds of up to 500 mm/s

- **Smallest Translation Stages with Linear Motor Drive**
- **Travel Ranges to 20 mm**
- **Max. Velocity 500 mm/s**
- **Acceleration to 5 g**
- **Incremental Motion to 50 nm**
- **Self Locking at Rest**
- **XY-Combination Possible**
- **MTBF 20.000 h**
- **Vacuum Versions to 10⁻⁷ hPa**

M-661 and M-662 PLine® translation stages offer accelerations to 5 g with millisecond response and velocities to 500 mm/sec in an extremely compact package. Providing travel ranges to 20 mm, they

are among the smallest motorized translation stages currently on the market. Both models are designed for open-loop operation (a similar closed-loop stage with linear encoder is available as model M-663). The M-662, with its square footprint, is also suitable for use in XY configurations. For applications where the smallest dimensions are essential, the P-652 micro stage is offered.

Working Principle

PLine® piezo motors use a new, patented, ultrasonic drive developed by PI. At the heart of the system is a piezo ceramic plate, which is excited with high-frequency eigenmode oscillations. A friction tip attached to the plate moves

along an inclined linear path at the eigenmode frequency. Through its contact with the friction bar, the moving part of the mechanics drives forward or backwards. With each oscillatory cycle, the mechanics execute a step of a few nanometers; the macroscopic result is smooth motion with a virtually unlimited travel range.

Advantages of PLine® Micropositioning Systems

The ultrasonic piezoceramic drives used in PLine® micropositioners have a number of advantages over classical drives:

- Higher Accelerations, up to 5 g
- Speeds up to 500 mm/s
- Small Form Factor
- Self-Locking When Powered Down
- No Shafts, Gears or Other Rotating Parts
- Non-Magnetic and Vacuum-Compatible Drive Principle

Choice of Drive Electronics

Special driver electronics are required to create the ultrasonic oscillations for PLine® piezo-

Ordering Information

M-661.370
PLine® Translation Stage, 18 mm, Open-Loop

M-662.470
PLine® Translation Stage, 20 mm, Open-Loop, XY Mountable

Accessories:

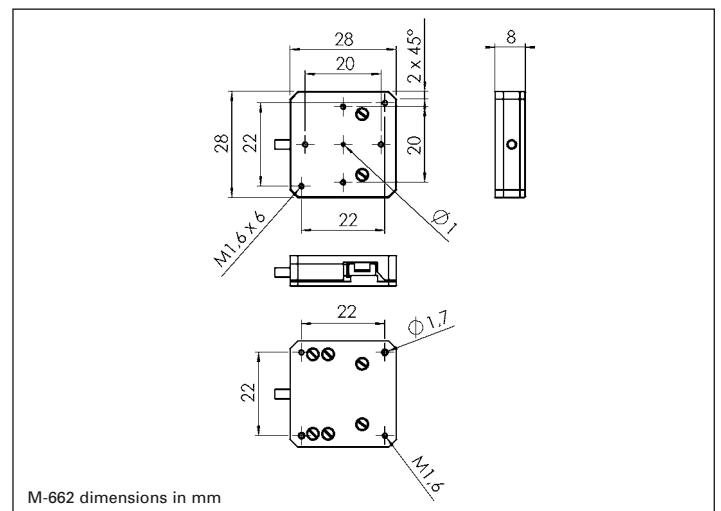
C-184.161
Analog OEM Driver Board for PLine® P-661 Motors

C-185.161
Analog Stand-Alone Drive Electronics with Power Supply for PLine® P-661 Motors

motors. The driver controls the motor speed as a function of an analog ± 10 V signal. The driver is not included, as it is available in different versions, from the low-priced C-184.161 OEM-board to the C-185.161 bench-top unit. The stage and the driver electronics, however, must be ordered together, so that they can be tuned to one-another for optimum performance.

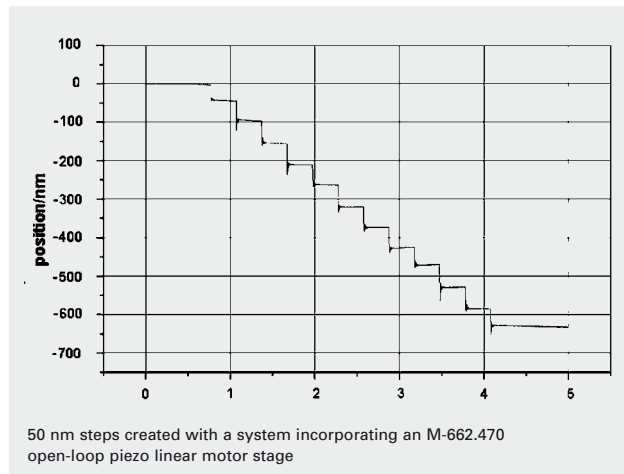
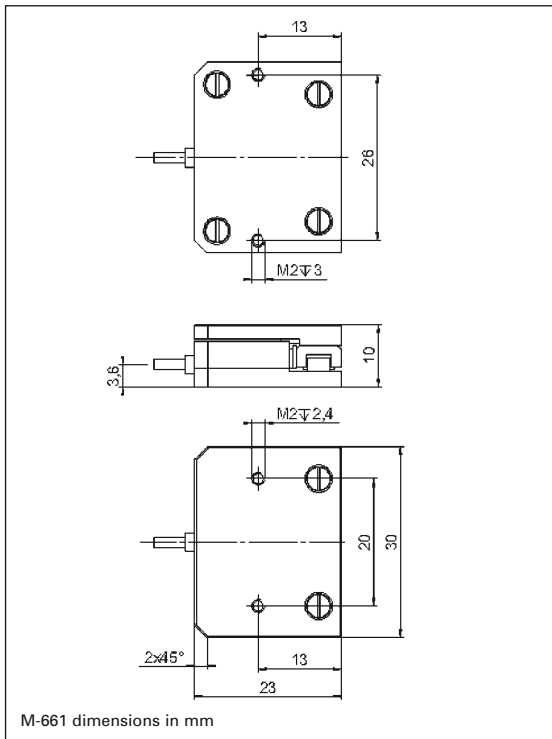
Notes

The products described in this document are in part protected by the following patents: US Pat. No. 6,765,335
German Patent No. 10154526



Application Examples

- Biotechnology
- Micromanipulation
- Microscopy
- Quality assurance testing
- Semiconductor testing
- Metrology
- Mass storage device testing
- R&D
- Photonics packaging



Technical Data

Model	M-661.370	M-662.470	Units	Tolerance
Motion and positioning				
Travel range	18	20	mm	
Min. incremental motion	0.05*	0.05*	µm	typ.
Max. velocity	500	500	mm/s	
Mechanical properties				
Max. load	5	5	N	
Max. push/pull force	1	1	N	
Max. holding force	2	2	N	
Drive properties				
Motor type	P-661 PLine® ultrasonic piezomotor drive	P-661 PLine® ultrasonic piezomotor drive		
Operating voltage	120 (Peak-Peak)**	120 (Peak-Peak)**	V	
Electrical power	42 (RMS)**	42 (RMS)**	W	nominal
Current	5***	5***	mA	
Miscellaneous				
Operating temperature range	-20 to +50	-20 to +50	°C	
Material	Al (black anodized)	Al (black anodized)		
Dimensions	30 x 23 x 10	28 x 28 x 8		
Mass	0.03	0.03	kg	±5 %
Cable length	1.5	1.5	m	±10 mm
Connector	LEMO connector	LEMO connector		
Recommended controller/driver	C-184.161 OEM board C-185.161 Bench-top	C-184.161 OEM board C-185.161 Bench-top (p. 1-36)		

*The minimum incremental motion is a typical value that can be achieved in the open-loop mode of a piezomotor stage.

To obtain it, it is important to follow the mounting guidelines in the motor documentation.

**The stage supply power is drawn from the drive electronics, which runs on 12 VDC.

***For drive electronics.

Linear Actuators & Motors

Nanopositioning / Piezoelectrics

Nanometrology

Micropositioning

Hexapod 6-Axis Systems /
Parallel Kinematics

Linear Stages

Translation (X)

Vertical (Y)

Multi-Axis

Rotary & Tilt Stages

Accessories

Servo & Stepper
Motor Controllers

Single-Channel

Hybrid

Multi-Channel

Micropositioning
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