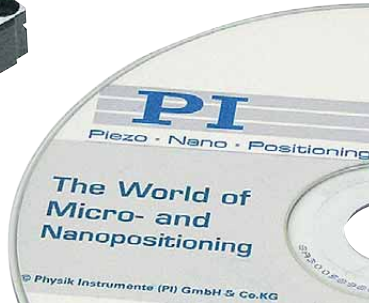


U-164 PLine® Piezo Linear Drive

Fast, Compact OEM Ultrasonic Linear Motor



OEM ultrasonic piezo linear motor
U-164.01



- **Patented Principle Features with High Forces in Small Space**
- **Easy Mounting**
- **Max. Velocity 500 mm/s**
- **Acceleration up to 5 g**
- **Min. Incremental Motion to 0,05 µm**
- **Self Locking, Push-/Pull Forces to 4 N**
- **No Electro-Magnetic Fields**
- **Integrated Actuators & Positioning Systems Also Available**

PLine® Linear Motors—Small, Fast, Highly Effective

Despite their small size, PLine® linear motors generate high driving and holding forces. PLine® piezo motors have a new, patented, ultrasonic drive

Application Examples

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

developed by PI. The core piece of the system is a piezoceramic 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 executes a step of a few nanometers; the macroscopic result is smooth motion with a virtually unlimited travel range.

High Speed and Acceleration

PLine® piezomotor drives can provide accelerations of up to 5 g and speeds of up to 500 mm/s, together with high resolution and high holding force. Because the ceramic

stator is pressed against the slider, holding forces are generated when the motor is powered down. The result is very high position stability without the heat dissipation common in conventional linear motors.

Accessories for Easy Integration

The PLine® motors require a special drive electronics to generate the ultrasonic oscillations for the piezoceramic element. The drive electronics is available as OEM board, stand-alone device or integrated inside a controller and therefore not included in the delivery. PI offers friction bars with different lengths.

Long Lifetime

PI has over 30 years experience with piezo technology and nanopositioning. PLine® drives offer high precision and reliability. This is because PLine® piezo linear motor drives have no mechanical components such as shafts and gears which can cause failures in conventional motors.

Ordering Information

U-164.01
PLine® Piezo Linear Motor, 4 N

Accessories:

P-664.B01
Friction Bar for PLine® Miniature Linear Piezomotor, 15 mm

P-664.B02
Friction Bar for PLine® Miniature Linear Piezomotor, 25 mm

P-664.B05
Friction Bar for PLine® Miniature Linear Piezomotor, 55 mm

C-184.164
Analog OEM Driver Board for PLine® Motors

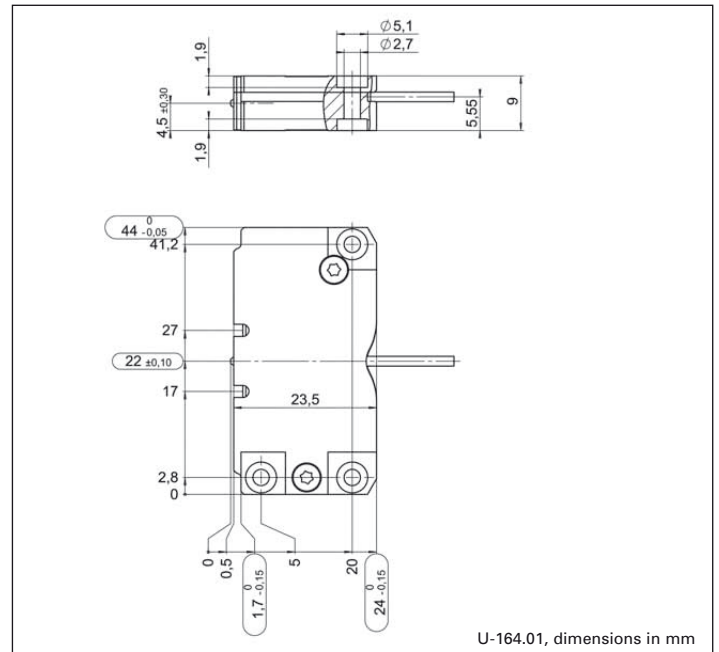
C-185.164
Analog Stand-Alone Drive Electronics with Power Supply for PLine® Motors

Controllers for closed-loop operation are available as C-867 (see p. 4-116).

Ask about custom designs!

Patent Information

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



U-164.01, dimensions in mm

Technical Data (preliminary)

Model	U-164.01	Unit	Tolerance
Motion and positioning			
Displacement	unlimited*	mm	
Minimum incremental motion, open-loop	0.05**	μm	typ.
Max. velocity	500	mm/s	
Mechanical properties			
Stiffness when powered down	3	N/μm	±10 %
Holding force when powered down	3	N	Max.
Push / pull force	4	N	Max.
Preload on friction bar	18	N	±10 %
Drive properties			
Resonant frequency	155	kHz	typ.
Motor voltage	60 (RMS)	V	
Operating voltage driver electronics	12	V	
Max. el. power consumption driver	10	W	
Miscellaneous			
Operating temperature range	-20 to +50	°C	
Body material	Al (black anodized)		
Mass	0.02	kg	±5 %
Cable length	1.0	m	±10 mm
Connector	Open leads		
Recommended controller/driver	C-184.164 OEM board C-185.164 in box		

*The travel range of piezo linear motors is virtually unlimited and depends on the length of the friction bar, which is available separately.

**The minimum incremental motion is a typical value that can be achieved in the open-loop mode of a piezomotor stage. To reach the specifications it is important to follow the mounting guidelines of the OEM-motors.