

M-665

PILine® Low-Profile Linear Stages with Closed-Loop Ultrasonic Piezo Linear Motors



M-665 piezo linear motor stage with integrated linear encoder

- Low-Profile of 26.5 mm
- Travel Range 50 mm
- Max. Velocity 400 mm/s
- Acceleration to 10 g
- Direct Metrology Linear Encoder
- 0.1 μm Resolution
- XY Combinations Possible
- Vacuum-Compatible Versions Available

PILine® M-665 micropositioning systems have low profiles of 26.5 mm, high guiding accuracy and can carry high loads. They are equipped with 0.1 μm linear encoders for precise positioning, and their square footprint also makes them suitable for use in XY configurations.

Application Examples

- Microscopy
- Metrology
- Quality assurance testing
- Semiconductor testing
- R&D
- Mass storage device testing

High Speed and Acceleration

The highly compact, integrated PILine® piezomotor drive can provide accelerations of up to 10 g and velocities of up to 400 mm/s, together with high resolution and high holding force. Because the ceramic stator is pressed against the slider in the stage, piezomotors resist motion with an intrinsic holding force when the stage is at rest or powered down. The result is very high position stability, without the heat dissipation common with conventional linear motors.

Optimized Controller and Drive Electronics

PILine® motors require a special drive electronics to generate the ultrasonic oscillations

for piezoceramic element. For optimum performance the highly specialized C-866 motion controller is recommended. This sophisticated controller also integrates the drive electronics. Furthermore, the controller has a number of special features, including dynamic parameter switching for an optimized highspeed motion and settling behavior to take into account the motion characteristics typical of piezomotors. The broad-band encoder input (35 MHz) supports the outstanding high accelerations and velocities of PILine® drives at high resolutions.

Optionally, for use with third party servo controllers, the C-185 analog drive electronic (stand-alone unit) is available. It controls the motor speed by an analog ±10 V signal. For optimum performance the driver must be tuned together with the stage and should be ordered at the same time as the motor/stage.

Limit and Reference Switches

For the protection of your equipment, non-contact Hall-

Ordering Information

M-665.265
PILine® Translation Stage, 50 mm, Linear Encoder, 0.1 μm Resolution

M-665.26V
PILine® Translation Stage, 50 mm, Linear Encoder, 0.1 μm Resolution, Vacuum Compatible to 10⁻⁶ hPa

Accessories:

C-866.165
Piezomotor Controller with Drive Electronics, 1 Channel, for PILine® Systems with P-665 Motors

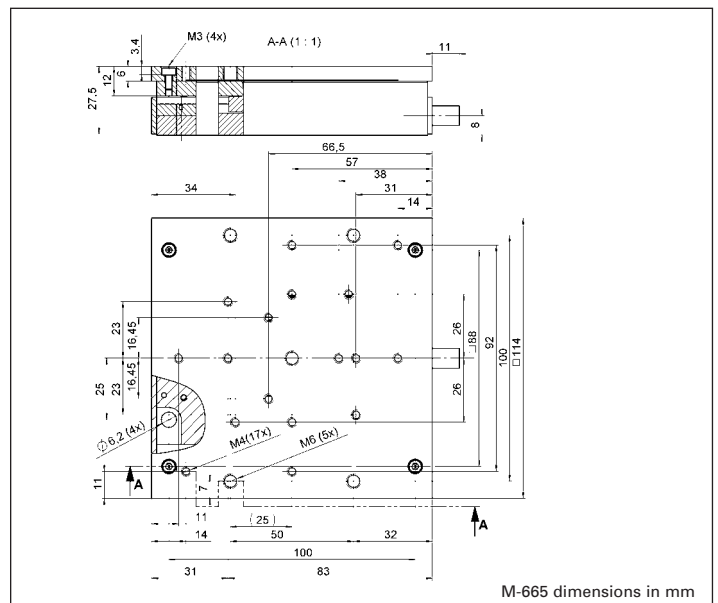
For use with separate controller:

C-185.165
Analog Stand-Alone Drive Electronics with Power Supply for PILine® Translation Stages with P-665 Motors

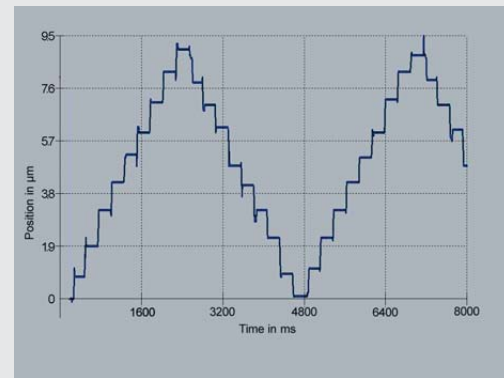
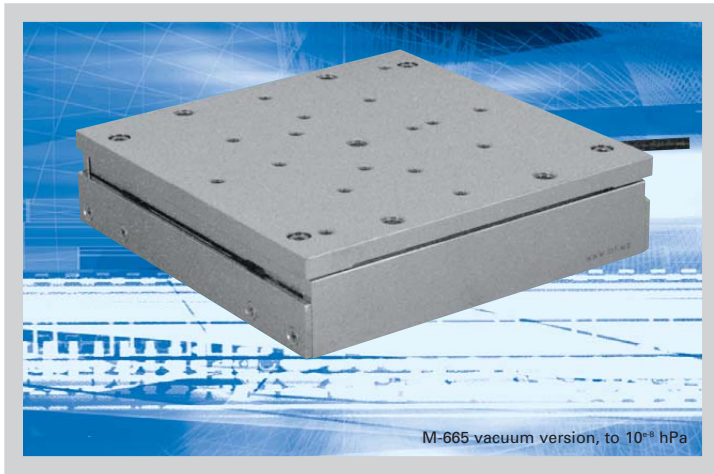
effect limit and reference switches are installed. The directionsensing reference switch supports advanced automation applications with high precision.

Note

The products described in this document are in part protected by the following patents:
German Patent No. 19945042
US Patent No. 6,979,934



M-665 dimensions in mm



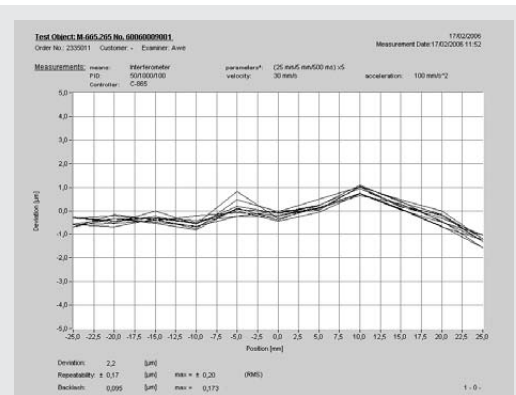
PILine® Piezo linear motor stage performing 1 µm steps. Piezomotors are self-locking. After a stable position is reached, there is no servo dither as is common with other linear motors

Technical Data

Models	M-665.265	Units	Notes see p. 10-28
Active axes	X		
Motion and positioning			
Travel range	50	mm	
Integrated sensor	Linear encoder		
Sensor resolution	0.1	µm	
Min. incremental motion	0.2	µm	typ.
Backlash	±0.3	µm	typ.
Unidirectional repeatability	0.2	µm	typ.
Pitch	±70	µrad	typ.
Yaw	±70	µrad	typ.
Max. velocity	400	mm/s	
Reference switch repeatability	1	µm	typ.
Mechanical properties			
Max. load	50	N	
Max. push/pull force	4	N	
Max. holding force	5	N	
Drive properties			
Motor type	P-665 PILine® ultrasonic piezo drive		
Operating voltage	600 (peak-peak)* 170 (RMS)*	V	
Electrical power 5**	W	nominal	
Current	1000**	mA	
Limit and reference switches	Hall-effect		
Miscellaneous			
Operating temperature range	-20 to +50	°C	
Material	Al (black anodized)		
Mass	0.8	kg	±5%
Cable length	1.5	m	±10 mm
Connector	MDR, 14-pin		
Recommended controller/driver	C-866.165 single-axis controller/driver C-185.165 drive electronics		

* Power for the motor is supplied by the drive electronics, which runs on 12 V DC.

** For driver electronics



Positioning accuracy data for M-665 over the whole travel range. Absolute deviation represents approx. 2 µm, backlash and repeatability are only a few encoder counts