PICMAWalk Walking Drive

OEM Walking Drive for Durable Applications with up to 15 mm/s Velocity and up to 50 N Push/Pull Force

N-331

- Robust and industrially usable walking drive with PICMA® technology for extreme durability
- Fastest and strongest drive of its size class
- Variable runner lengths from 25 mm to 100 mm
- Precise, nanometer precision positioning of loads up to 5 kg
- Plug-and-play, thanks to PI proprietary controller technology

Fields of application

- Industrial precision positioning
- Semiconductor technology
- Semiconductor tests
- Wafer inspection
- Lithography
- Nanoimprinting
- Nanometrology
- Motion in strong magnetic fields and in a vacuum

Outstanding lifetime thanks to PICMA® piezo actuators

The patented PICMA® piezo actuators are all-ceramic insulated. This protects them against humidity and failure resulting from an increase in leakage current. PICMA® actuators offer an up to ten times longer lifetime than conventional polymer-insulated actuators. 100 billion cycles without a single failure are proven.

Nanometer precision and high feed force with PiezoWalk® walking drives

Several piezo actuators perform a walking motion in the PiezoWalk® walking drive that leads to forward feed of a runner. Control of the actuators allows the smallest step and forward feed motion at a resolution of well under one nanometer.

Highly accurate position measuring with incremental encoder

Noncontact optical encoders measure the position directly at the platform with the greatest accuracy. Nonlinearity, mechanical play or elastic deformation have no influence on the measurement.

Suitable for sophisticated vacuum applications

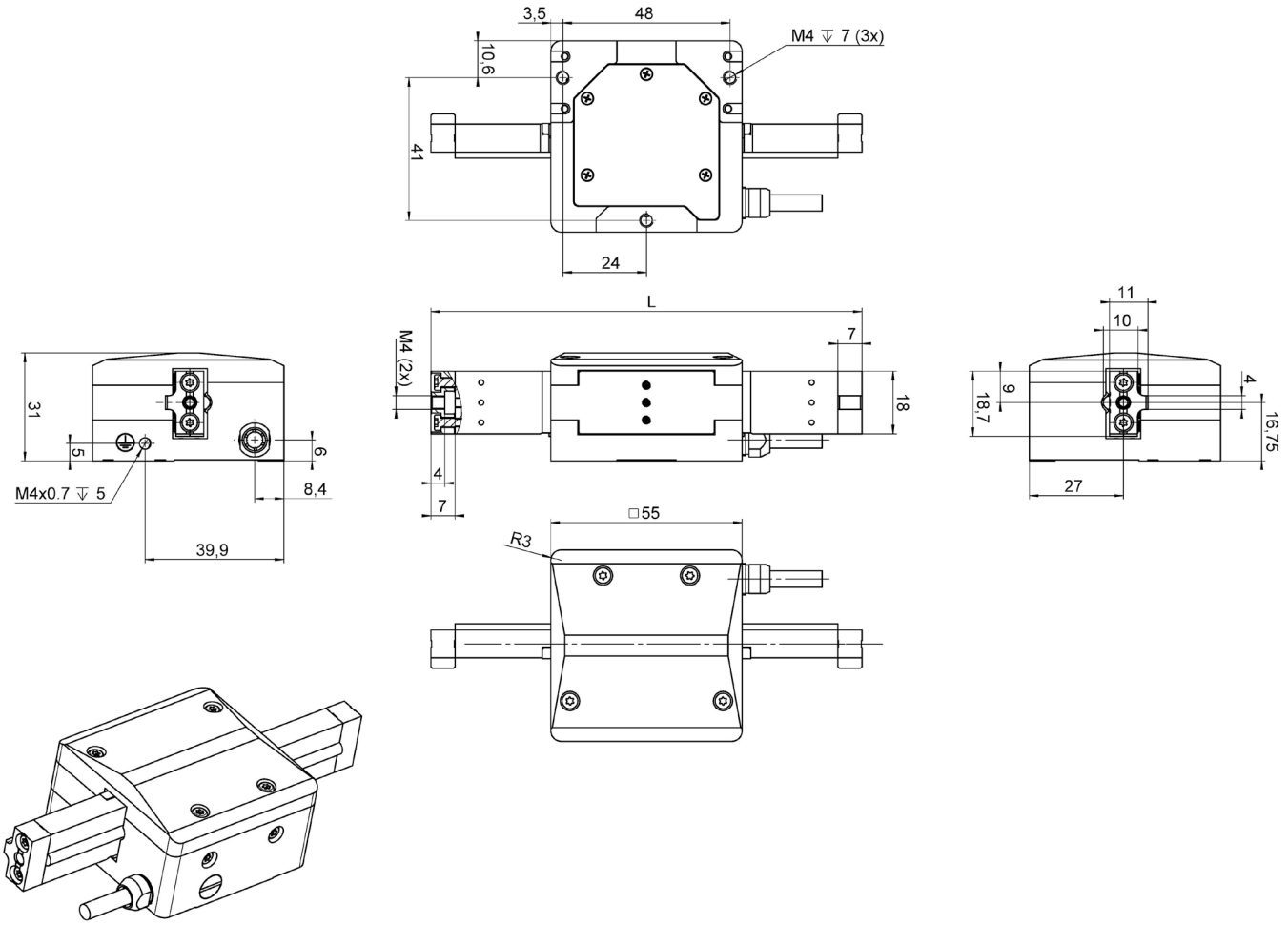
Piezo motors from PI are principally vacuum-compatible and suitable for operation in strong magnetic fields. Special versions of the drives are available for this purpose. Piezo walking drives can also be used in cleanrooms or in environments with strong ultraviolet radiation.

Specifications

	N-331.10 / N-331.13 N-331.20 / N-331.23 N-331.40 / N-331.43	Unit	Tolerance
Active axes	X		
Motion and positioning			
Integrated sensor	N-331.x0: Without sensor N-331.x3: With incremental sensor		
Travel range (step mode, open loop)*	N-331.1x: 30 N-331.2x: 55 N-331.4x: 105	mm	±0.5 mm
Travel range (step mode, closed loop)	N-331.1x: 25 N-331.2x: 50 N-331.4x: 100	mm	
Step frequency**	600	Hz	max.
Velocity (step mode)**	15	mm/s	max.
Travel range (analog mode)	±10	µm	typ.
Resolution (open loop)	0.02	nm	typ.
Resolution (closed loop)	<10 (N-331.x3)	nm	typ.
Endurance (atmospherical operation)***	>30	km	
Mechanical properties			
Push/pull force (active)	50	N	max.
Holding force (passive)	60	N	max.
Drive properties			
Drive type	PICMAWalk		
Operating voltage	-20 to 120	V	
Connectors			
Connector	Sub-D 37 (m)		
Miscellaneous			
Operating temperature range	0 to 50	°C	
Material	Aluminum, stainless steel		
Mass with cable	N-331.1x: 580 N-331.2x: 610 N-331.4x: 660	g	±20 g
Moved Mass	N-331.1x: 110 N-331.2x: 140 N-331.4x: 190	g	±10 g
Cable length	2.0	m	±10 mm
Recommended electronics	E-712.1AN • E-712.2AN • E-712.3AN		

* From one mechanical hard stop of the runner to the other mechanical hard stop, only in open-loop operation
** When operated with a digital controller with 25 W peak power output
*** With an optimally decoupled load of 2 kg at max. 70 % duty cycle and external cooling of the digital controller, at 20 °C and 1013 hPa. Highest endurance within the PiezoWalk® family.
All specifications based on room temperature (22 °C ±3 °C).
Ask about customized versions.

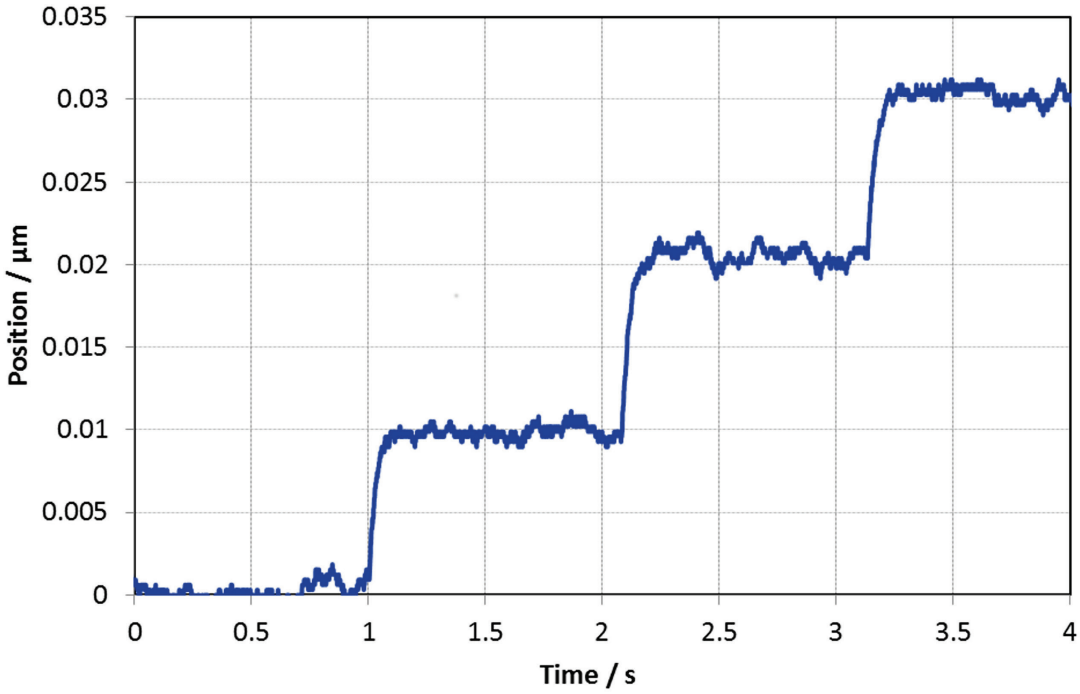
Drawings / Images



N-331.x3, dimensions in mm. The dimensions for the N-331.x0 are identical.

N-331.1x: L = 99 mm
N-331.2x: L = 124 mm
N-331.4x: L = 174 mm

Drive dimensions without runner: 55 mm × 55 mm × 31 mm



The N-331 drive reliably performs repeatable 10-nm steps. Measured by an interferometer.

Ordering Information

N-331.10
Piezoelectric walking drive PICMAWalk, 25 mm travel range, open loop, 50 N push/pull force

N-331.13
Piezoelectric walking drive PICMAWalk, 25 mm travel range, incremental sensor, 50 N push/pull force

N-331.20
Piezoelectric walking drive PICMAWalk, 50 mm travel range, open loop, 50 N push/pull force

N-331.23
Piezoelectric walking drive PICMAWalk, 50 mm travel range, incremental sensor, 50 N push/pull force

N-331.40
Piezoelectric walking drive PICMAWalk, 100 mm travel range, open loop, 50 N push/pull force

N-331.43
Piezoelectric walking drive PICMAWalk, 100 mm travel range, incremental sensor, 50 N push/pull force