In Cooperation with

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PiezoMike Linear Actuators

HIGH RESOLUTION AND LONG-TERM STABILITY

PiezoMike Linear Actuator

Minimum Dimensions, High Forces, Stable Positioning

N-470

- Holding force >100 N
- Step size 30 nm
- Travel range 7.4 mm
- Compact design
- Feed force 22 N

Linear Actuator with PIShift Piezomotor
Linear screw-type actuator with PIShift piezo inertia drive for high-resolution and stable positioning. Open-loop operation

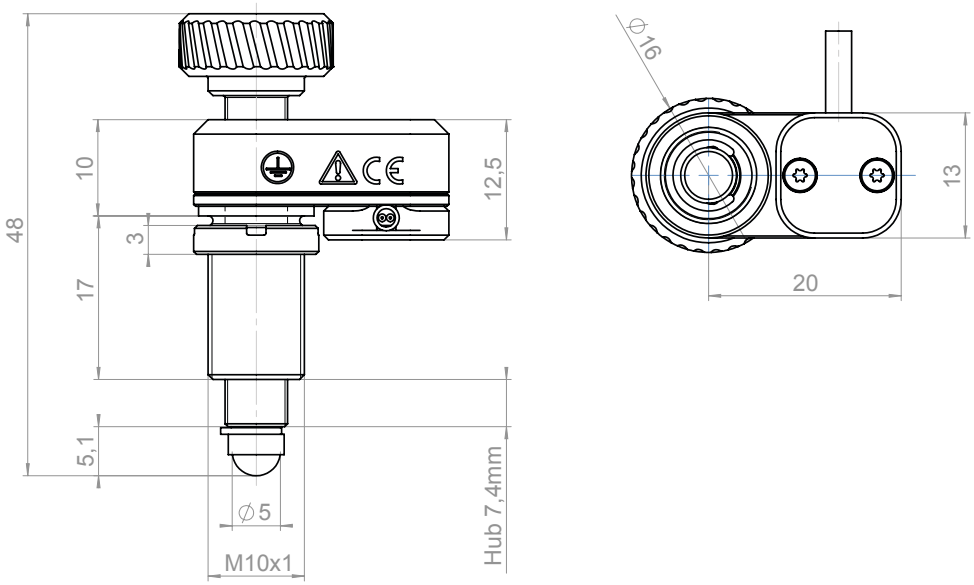
PIShift Piezomotors
Compact, cost-effective inertia drive (Stick-Slip). When at rest, the drive is self-locking and therefore requires no current and generates no heat. It holds the position with maximum force

Alignment of Mechanical and Optical Components
Stable alignment of optical paths. Long-term positioning stability: High stability in target position, reliable start-up even after longer downtimes. High holding force and resolution by combining piezo actuators with mechanical thread translation. Vacuum-compatible to 10^{-6} hPa

PiezoMike linear actuators replace manual micrometer screws in tip/tilt mirror mechanics

Preliminary data	N-470	Unit
Active axes	X	
Motion and positioning		
Travel range	7.4	mm
Max. step size in step mode	0.03	µm
Step frequency	2000	Hz
Max. velocity in full-step mode*	0.06	mm/s
Mechanical properties		
Stiffness in motion direction	15.5	N/µm
Feed force (active)	22	N
Holding force (passive)	>100	N
Permissible lateral force	1	N
Drive properties		
Drive type	PIShift inertia drive	
Max. operating voltage	80	V
Max. power consumption	6.4	W
Miscellaneous		
Operating temperature range	10 to 40	°C
Material	Screw: Stainless steel, Case: Aluminum	
Dimensions	16 mm × 28 mm × 48 mm	
Mass	80	g
Cable length	2	m
Connector	DIN 4-pin	
Recommended controller / driver	E-870 PIShift drive electronics	

* Short-term, depending on drive electronics.



N-470, dimensions in mm

PIShift Drive Electronics

Versatile and Cost-Effective

E-870

- For PIShift and PiezoMike piezo inertia drives
- Ideal for OEM applications
- One to four actuators, serial control (through demultiplexing)
- With digital USB interface

Drive electronics for one to four axes

OEM module with solder pins or on carrier board with connectors and terminal strips for the operation of open-loop PIShift piezo inertia drives

Operating modes

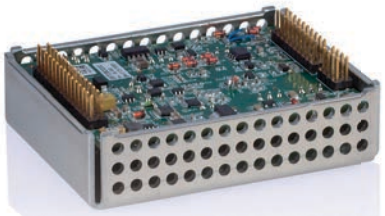
Full-step mode, max. piezo voltage 0 to 100 V (configurable). Various command modes. Configuration of the operating parameters can be programmed via USB or via hardware settings. Serial control of up to 4 actuators by one unit

Interfaces

USB for control, configuration and for firmware updates. Interfaces for TTL and analog control. Optional SPI interface

Fields of application

Lab automation, medical technology, handling



E-870.10: Single-channel driver for piezo inertia drives (to be plugged in or soldered)

The E-870.41 allows the serial control of up to four PIShift or PiezoMike actuators through demultiplexing

Related products

N-412 • N-422 PIShift linear actuator

Perliminary Data	E-870.10	E-870.11	E-870.41
Function	Drive electronics for PIShift linear drives, OEM circuit board with solder pins	Drive electronics for PIShift linear drives, OEM circuit board with connectors	Drive electronics for PIShift linear drives, OEM circuit board with connectors
Channels	1	1	4 (serial control through demultiplexing)
Amplifier			
Channels	1	1	1 (4-fold demultiplexing)
Output voltage	0 to 100 V	0 to 100 V	0 to 100 V
Peak output power	30 W	30 W	30 W
Output current/channel (<5 ms)	±650 mA	±650 mA	±650 mA
Interface and operation			
Communication interfaces	USB 2.0, analog Interface, ±10 V, 10 bit ADC, TTL inputs	USB 2.0, analog Interface, ±10 V, 10 bit ADC, TTL inputs	USB 2.0, analog Interface, ±10 V, 10 bit ADC, TTL inputs
Actuator connection	Solder pins	DIN 4-pin	DIN 4-pin
Analog and digital inputs	Solder pins	Terminal strip	Terminal strip
Digital output	Overtemperature protection indicated at 75°C, operating status and error output		
Command set	PI GCS 2	PI GCS 2	PI GCS 2
User software	Configuration and operation tool	Configuration and operation tool	Configuration and operation tool
Software drivers	LabVIEW driver, shared libraries for Windows	LabVIEW driver, shared libraries for Windows	LabVIEW driver, shared libraries for Windows
Supported functionality	Alternative command modes: pulse-controlled, pulse slope-controlled, quadrature decoder control, analog velocity control		
Display	–	LED display for operation, error status and overtemperature protection	LED display for operation, error status and overtemperature protection
Manual control	–	Integrated pushbutton control forwards/backwards, joystick via USB	Integrated pushbutton control forwards/backwards, joystick via USB
Miscellaneous			
Operating temperature range	0 to 50°C	0 to 50°C	0 to 50°C
Overtemp protection	Deactivation at 85°C	Deactivation at 85°C	Deactivation at 85°C
Dimensions	76 mm × 61 mm × 20 mm	92.5 mm × 104 mm × 36 mm	92.5 mm × 105 mm × 36 mm
Mass	100 g	172 g	185 g
Operating voltage	12 to 24 V (power supply not included in the scope of delivery)	12 to 24 V (power supply not included in the scope of delivery)	12 to 24 V (power supply not included in the scope of delivery)
Max. power consumption	35 W	35 W	35 W

Compact Linear Actuators

For Alignment of Optomechanical Components


M-231


M-232


M-230


N-381

	M-231	M-232	M-230	N-381
	Slim gear motor	Highly compact through folded drive	High resolution	Nanometer precision with piezomotor, optionally nonmagnetic
Dimensions in mm	Ø 19 × 134	20 × 49 × 72	Ø 19 × 175 to 205	Ø 25 × 121.5
Travel range in mm	17	17	10 to 25	30
Axial force in N	40	40	up to 70	10
Max. velocity in mm/s	1.5	1.5	1.2 to 2	10
Design resolution in µm	0.007	0.007	0.0046 to 0.037	0.02
Min. incremental motion in µm	0.1	0.1	0.05	0.02
Backlash in µm	2	2	2	0.2
Unidirectional repeatability in µm	±0.2	±0.2	±0.1	0.1
Motor type	DC gear motor, 2-phase stepper motor	DC gear motor, 2-phase stepper motor	DC gear motor, 2-phase stepper motor	NEXACT® piezo stepping drive
Recommended controller	C-863 single-axis C-884 up to 4 axes	C-863 single-axis C-884 up to 4 axes	C-863 single-axis C-884 up to 4 axes C-663 single-axis	E-861 single-axis

All product details can be found at www.pi.ws and www.pimicos.com

PI Group

Unique in Piezo Technology and Precision Positioning

No other company in the world offers a broader and deeper portfolio of precision motion technologies than the PI Group. Continuous growth through the development of novel products and technologies is one of the main characteristics of the PI Group.

With more than 700 highly qualified employees all over the world, research and manufacturing centers on three continents and subsidiaries in 13 countries, the PI Group is in a position to fulfill almost any requirement with regard to innovative precision motion technology.

Typical for PI: PIFOC® objective scanner – nanometer resolution for precision focus control in microscopy

PICMA® multilayer piezo actuators from PI Ceramic with all-ceramic coating for optimum reliability and lifetime

SpaceFAB positioning system from PI miCos. Parallel kinematics for positioning in up to six degrees of freedom

Physik Instrumente (PI) – Precision Positioning for Industry and Research

PI was founded more than four decades ago and is considered today a global market and technology leader in the field of precision positioning technology with accuracies to the sub-nanometer range. At the development and manufacturing site in Karlsruhe, more than 350 employees work on high-resolution drive systems and positioning solutions.

PI Ceramic – Piezo Technology Specialist

PI Ceramic currently employs 200 people. It was founded in Lederhose (Thuringia, Germany) in 1992 as development and manufacturing site for piezoelectric transducers. Today, it is one of the world leaders in the field of piezo actuators and sensors used for wealth of applications, reaching from precision positioning to metrology, and from ultrasound generation to energy recovery.

PI miCos – Motion Control and Systems Integration

PI miCos, founded in 1990 in Eschbach, Germany, joined the PI Group in 2011. With currently more than 60 employees, the company develops, produces and markets unique systems and components for high-precision positioning applications throughout the world. It mainly focuses on positioning technology under vacuum conditions, air-bearing solutions, linear motors and integration of complex systems such as used in beamline instrumentation.

PI Catalog – Finding the Right Solution, Quickly and Reliably

Request Now!

The PI catalog 2013/2014 displays the PI Group's technical expertise in all precision positioning sectors on 270 pages. Here PI presents its wide range of high-performance precision positioning systems: Different drive technologies based on piezo elements as well as electrical and magnetic principles and their integration in positioning systems with up to six axes.

Get important background knowledge: Technical tutorials give you detailed information about the technologies used in the broad and deep product portfolio of PI (Physik Instrumente), PI miCos and PI Ceramic, expert in piezo technology.

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