

PIMag® Voice Coil Linear Actuator

High Dynamics, with Optional Force Control



V-275

- Push force up to 10 N
- Velocity to 600 mm/s
- Integrated linear encoder, 0.01 μm resolution
- Weight force compensation
- Optional force sensor with 1 mN resolution

PIMag® voice coil

Voice coil drives consist of 2 essential components: A permanent magnet and a coil that is located in the air gap of the magnetic field. When current flows through the coil, it moves in the magnetic field of the permanent magnet. The direction of motion depends on the polarity. Thanks to their low weight and friction-free drive principle, voice coil drives are particularly suitable for applications, which require high dynamics and high velocities at limited travel ranges. High scan frequencies and precision positioning are also possible with these drives, because they are free of the effects of hysteresis.

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.

Fields of application

OEM drives in automation. For fast handling tasks and precision positioning in the micrometer range, micromanipulation. Testing of force-sensitive switches and surfaces.

Specifications

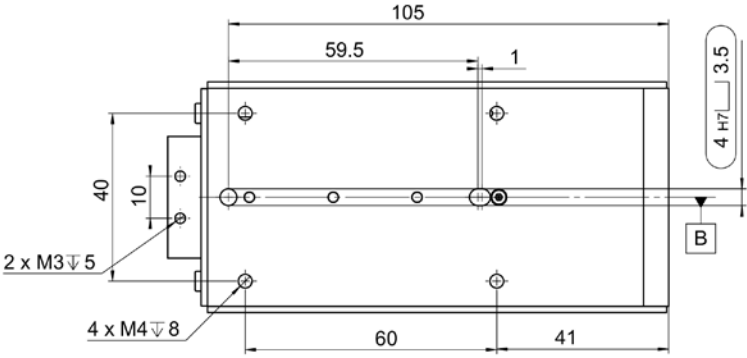
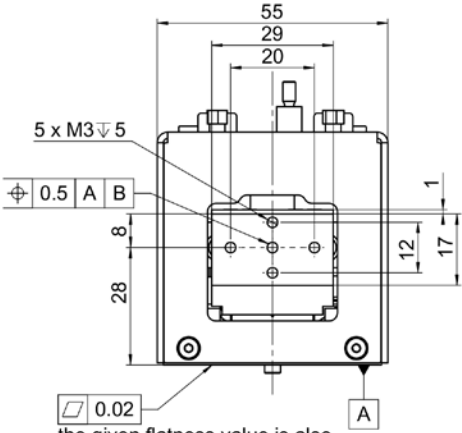
	V-275.430 V-275.431	Unit	Tolerance
Active axes	Z		
Motion and positioning			
Travel range	10	mm	
Integrated sensor	Optical linear encoder		
Sensor resolution	10 ⁽¹⁾	nm	max.
Minimum incremental motion	100	nm	typ.
Linearity error, closed loop	1	%	typ.
Repeatability	±0.5	µm	typ.
Velocity	600	mm/s	max.
Force sensor resolution (optional)	1	mN	max.
Smallest force step (optional)	5	mN	typ.
Mechanical properties			
Bearing / guide	Linear recirculating ball bearing guide		
Motion straightness	±5	µm	±5 %
Moved mass without load	150	g	typ.
Drive properties			
Motor type	PIMag® voice coil drive, moving coil		
Coil resistance	5.7	Ω	typ., at 20 °C
Coil inductance	3.75	mH	typ., at 1 kHz
Time constant	0.65	ms	
Back EMF	10	V·s/m	
Force constant	10	N/A	typ.
Motor constant	4.2	N/(√W)	
Current constant	0.1	A/N	typ.
Nominal current	700 ⁽²⁾	mA	max.
Peak current (max. 3 s)	1500	mA	
Average push/pull force	7	N	nominal
Power dissipation of the coil with 100 % duty cycle	4	W	
Maximum push/pull force	15	N	max.
Permitted temperature for actuator components	60	°C	max.
Miscellaneous			
Operating temperature range	10 to 60	°C	
Material	Aluminum		
Mass	800	g	±5 %
Cable length	1.5	m	
Motor connector	D-sub 9 (m)		
Sensor connector	D-sub 25 (m)		
Lifetime	>10 ⁷	cycles	min.
Recommended controller	C-413.1x		

(1) With C-413 controller.

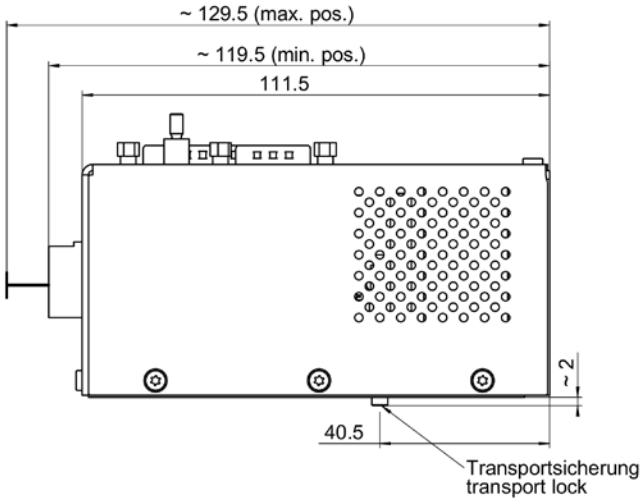
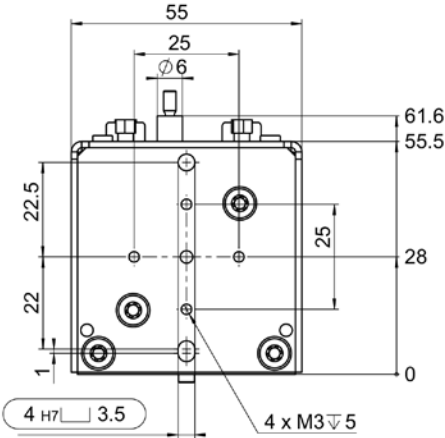
(2) Do not exceed for continuous operation.

The specifications apply to room temperature (22 °C ±3 °C), specifications may deviate outside of this range.

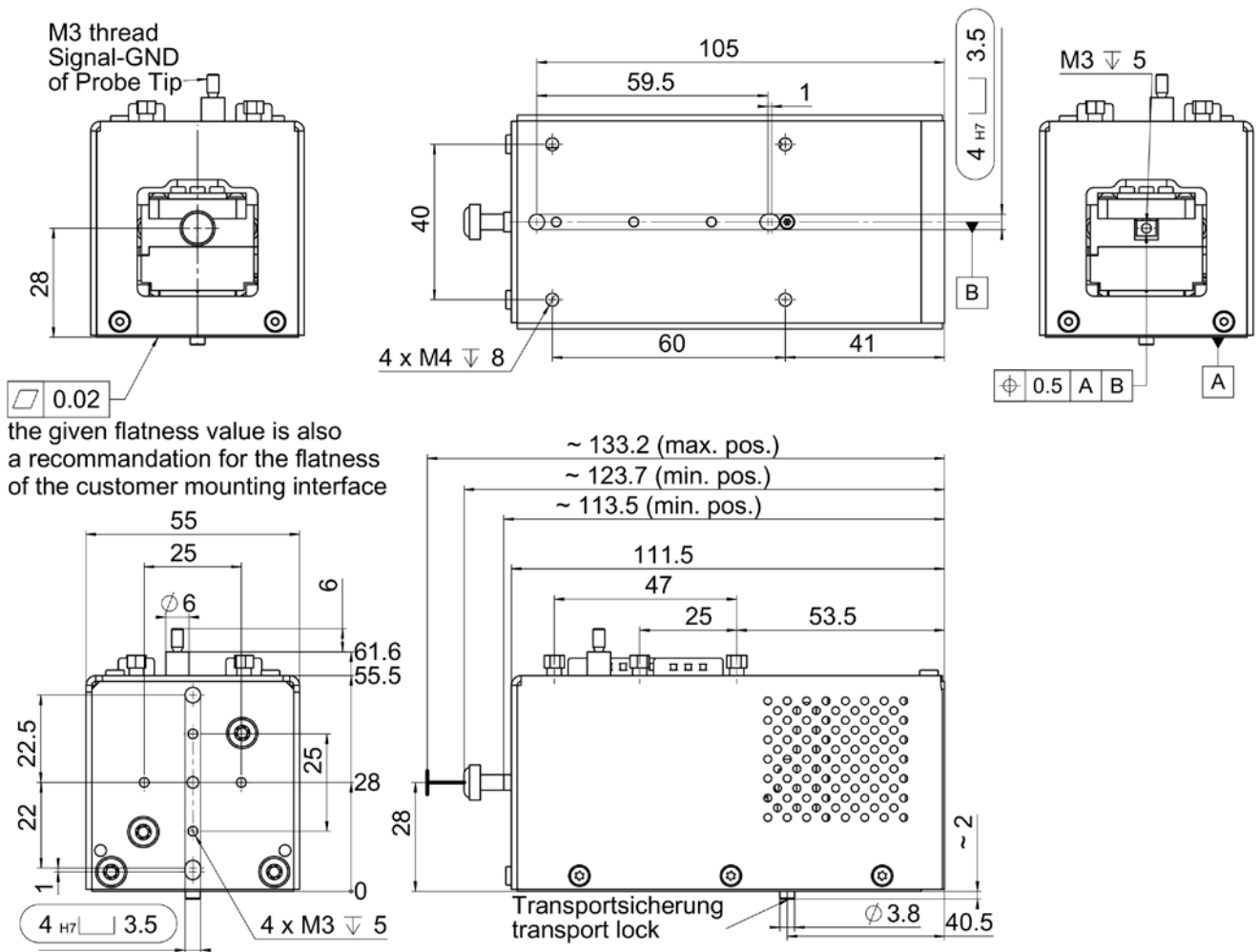
Drawings / Images



the given flatness value is also a recommendation for the flatness of the customer mounting interface



V-275.430, dimensions in mm



V-27.431, dimensions in mm

Ordering Information

V-275.430

PIMag® voice coil linear actuator, 10 mm travel range, 15 N drive force, 10 nm resolution

V-275.431

PIMag® voice coil linear actuator, 10 mm travel range, 15 N drive force, 10 nm resolution, force sensor