

PIMag[®] Voice Coil Linear Actuator

High Dynamics and Inexpensive



V-273

- Travel ranges to 20 mm
- Velocity to 100 mm/s
- Integrated linear encoder, 0.01 μm resolution
- 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

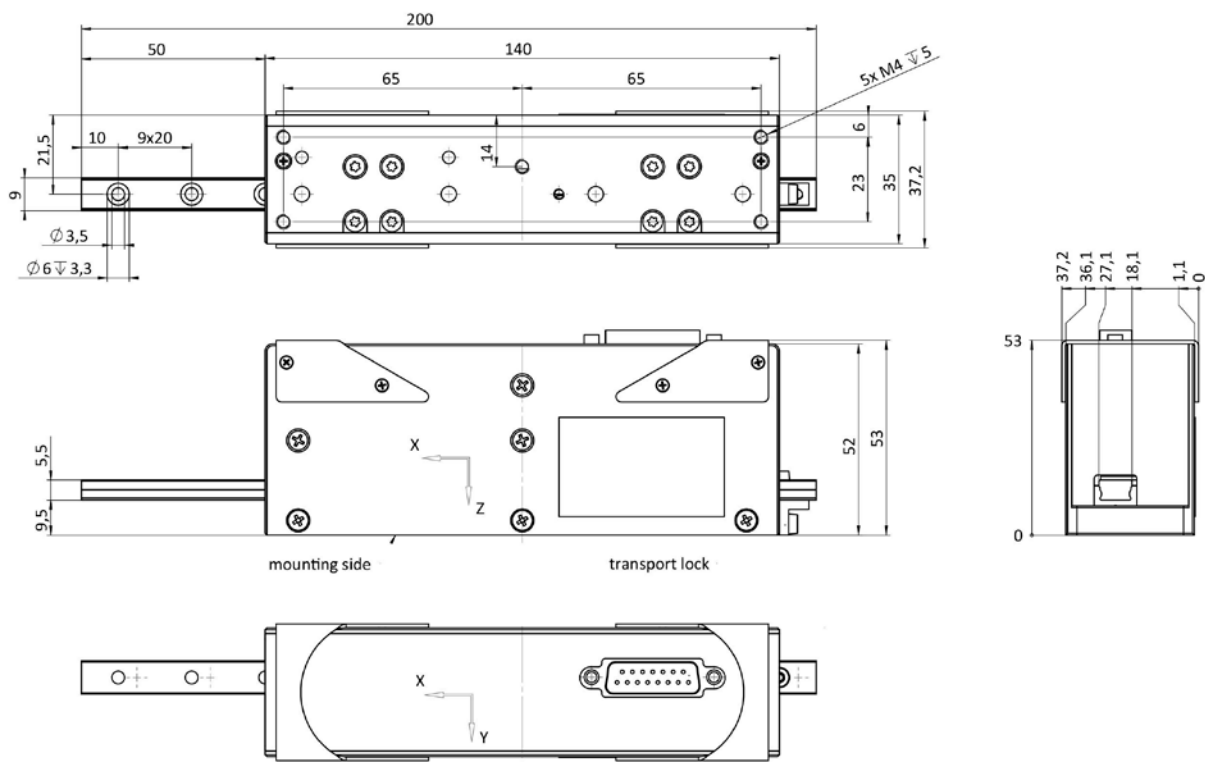
| | V-273.440 V-273.441 | Unit | Tolerance |
|---|---|--------|---------------|
| Active axes | Z | | |
| Motion and positioning | | | |
| Travel range | 20 | mm | |
| Integrated sensor | Optical linear encoder | | |
| Sensor resolution | 10 ⁽¹⁾ | nm | max. |
| Minimum incremental motion | 100 | nm | typ. |
| Linearity error, closed loop | 1 | % | typ. |
| Repeatability | ±0.5 | µm | typ. |
| Velocity | 100 | mm/s | max. |
| Force sensor resolution (optional) | 1 | mN | max. |
| Smallest force step (optional) | 5 | mN | typ. |
| Mechanical properties | | | |
| Bearing / guide | Recirculating ball bearing guide | | |
| Motion straightness | ±20 | µm | ±5 % |
| Moved mass without load | 100 (230 with force sensor) | g | typ. |
| Drive properties | | | |
| Motor type | PIMag® voice coil drive, moving coil | | |
| Coil resistance | 16 | Ω | typ., at 20°C |
| Coil inductance | 6 | mH | typ., at 20°C |
| Time constant | 0.375 | ms | |
| Back EMF | 8 | V-s/m | |
| Force constant | 8 | N/A | typ. |
| Motor constant | 2 | N/(√W) | |
| Current constant | 0.125 | A/N | typ. |
| Nominal current | 375 ⁽²⁾ | mA | max. |
| Peak current (max. 3 s) | 800 | mA | |
| Average push/pull force | 3 | N | nominal |
| Power dissipation of the coil with 100 % duty cycle | 2.25 | W | |
| Maximum push/pull force | 6 | N | max. |
| Permitted temperature for actuator components | 60 | °C | max. |
| Miscellaneous | | | |
| Operating temperature range | 10 to 60 | °C | |
| Material | Aluminum | | |
| Mass | 660 (790 with force sensor) | g | ±5 % |
| Cable length | Motor / sensor cable: 1.5 V-273.441: Force sensor cable: 1 | m | |
| Motor / sensor connector | D-sub 15 (m) with force sensor: 2 × D-sub 15 (m) | | |
| Lifetime | >10 ⁷ | cycles | min. |
| Recommended controller | C-413.2x | | |

(1) With C-413 controller.

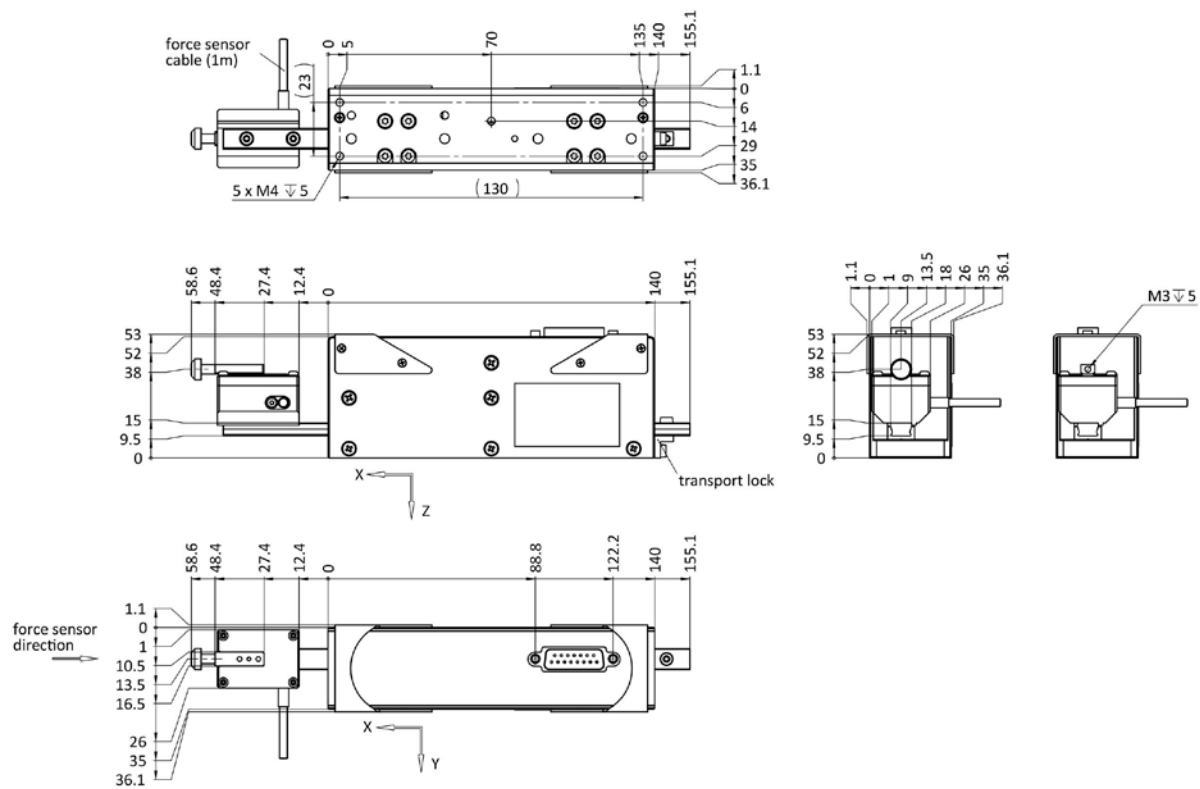
(2) Do not exceed for continuous operation.

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

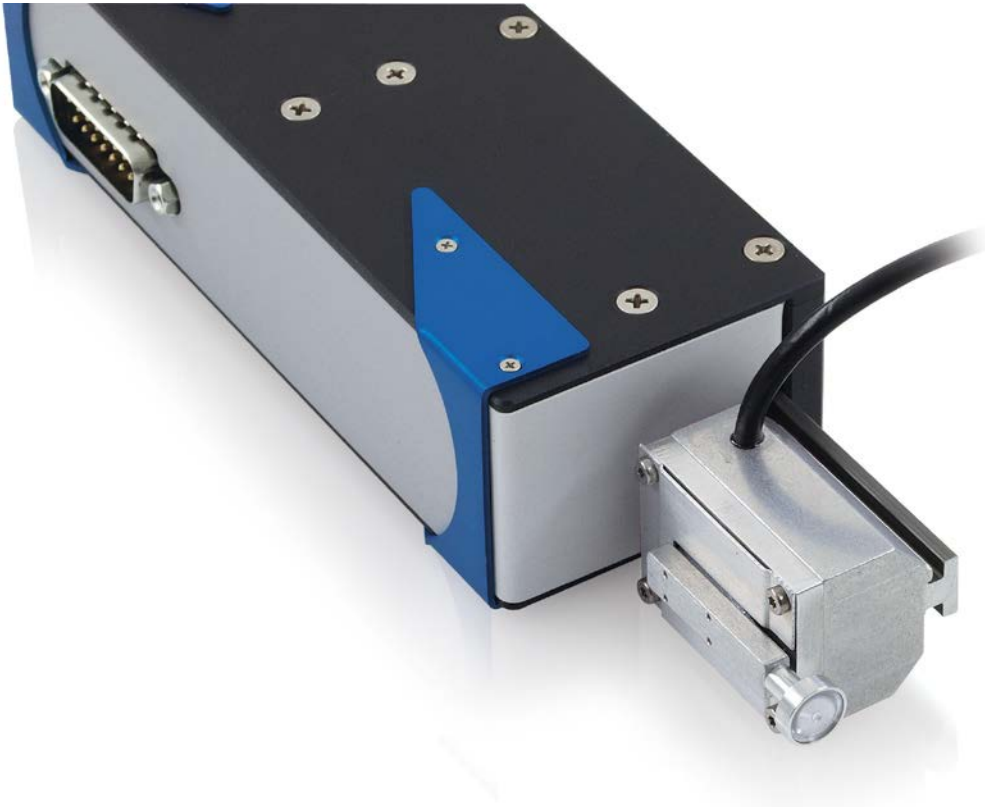
Drawings / Images



V-273,440, dimensions in mm



V-273,441, dimensions in mm



V-273.441 with force sensor

Ordering Information

V-273.440

PIMag® voice coil linear actuator, 20 mm travel range, 10 N drive force, 10 nm resolution

V-273.441

PIMag® voice coil linear actuator, 20 mm travel range, 10 N drive force, 10 nm resolution, force sensor