

High-Dynamics PIMag® Linear Stage

Voice Coil-Direct Drive with Direct Position Measurement



V-522 • V-524 • V-528

- Fast scanning and positioning
- Travel ranges 5 mm, 10 mm, 20 mm
- Scanning frequencies of more than 10 Hz
- Max. velocity 250 mm/s
- Crossed roller bearings for the highest precision

Reference-class linear stage

Linear positioning stages with magnetic direct drives largely dispense with mechanical components in the drivetrain and the drive force acts directly on the motion platform. Together with precision bearings, a high travel accuracy and longer lifetime is achieved. The linear positioning stages are particularly suitable for scanning applications.

PIMag® Voice Coil

Voice coil drives consist of 2 essential components: A permanent magnet and a coil, which 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.

Crossed roller bearings

With crossed roller bearings, the point contact of the balls in ball bearings is replaced by a line contact of the hardened rollers. Consequently, they are considerably stiffer and need less preload, which reduces friction and allows smoother running. Crossed roller bearings are also distinguished by high guiding accuracy and load capacity. Force-guided rolling element cages prevent linear guide creeping.

Direct position measurement with incremental encoder

Noncontact optical encoders measure the actual position directly at the motion platform with the greatest accuracy so that nonlinearity, mechanical play or elastic deformation have no influence on position measuring.

Fields of application

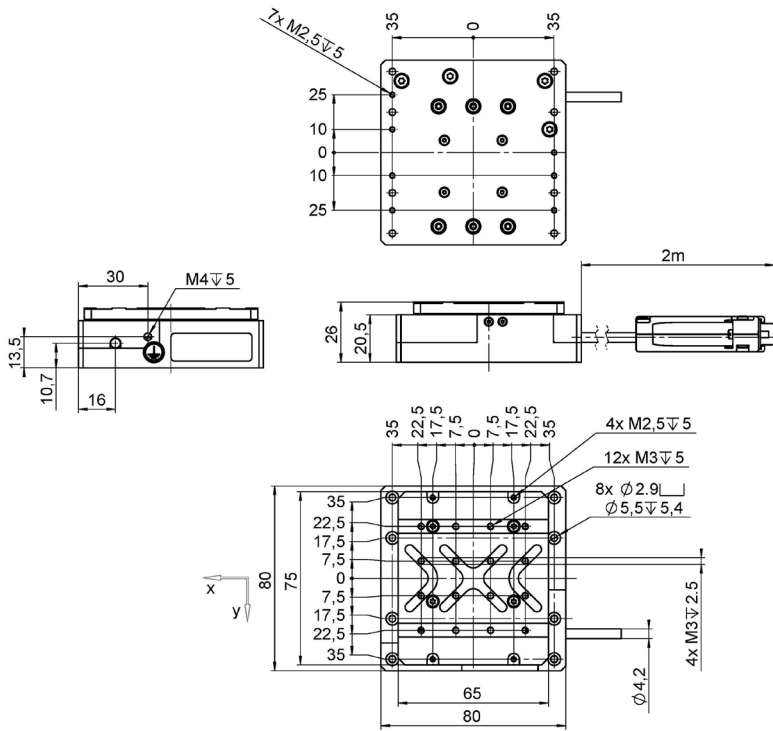
Industry and research. Metrology, photonics and precision scanning in semiconductor or flat panel display manufacturing

Specifications

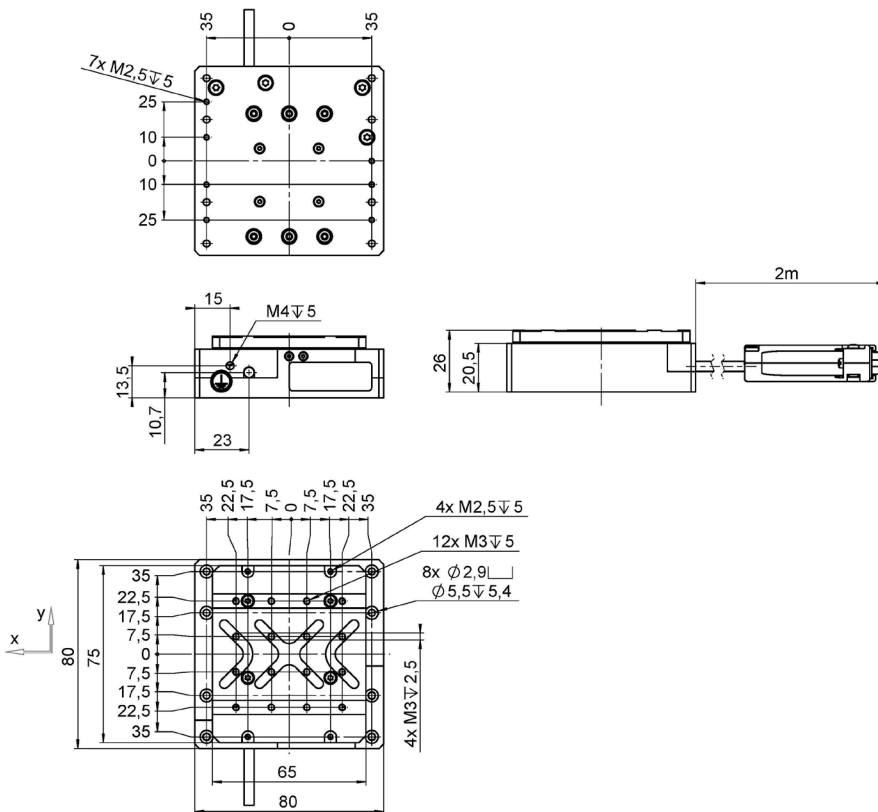
	V-522.1AA V-522.1AB	V-524.1AA V-524.1AB	V-528.1AA V-528.1AB	Unit	Tolerance
Motion and positioning					
Active axes	X				
Travel range	5	10	20	mm	
Integrated Sensor	Optical, incremental	Optical, incremental	Optical, incremental		
Sensor resolution	10	10	10	nm	
Min. incremental motion	20	20	20	nm	typ.
Unidirectional repeatability	20	20	20	nm	
Bidirectional repeatability	±120	±120	±120	nm	typ.
Reference point switch repeatability	<1	<1	<1	µm	
Pitch	±50	±50	±50	µrad	max.
Yaw	±50	±50	±50	µrad	max.
Straightness	0.5	0.5	0.5	µm	max.
Flatness	0.5	0.5	0.5	µm	max.
Velocity	250	250	250	mm/s	max.
Mechanical properties					
Load capacity in Z	100	100	100	N	max.
Moved mass	131	137	150	g	
Overall mass	460	500	580	g	
Drive properties					
Drive type	Voice Coil	Voice Coil	Voice Coil		
Nominal force	4	3.8	2.9	N	nominal
Nominal current	1.3	1.3	1.3	A	nominal
Peak current	3	3	3	A	max. (3s)
Force constant	3.4	2.9	2.3	N/A	typ.
Motor constant	1.3	1.1	0.85	N/(vW)	typ.
Coil resistance	7.2	7.2	7.2	Ω	typ.
Coil inductance	1.7	1.7	1.7	mH	typ.
Time constant	0.32	0.32	0.32	ms	
Miscellaneous					
Material (Housing)	AL	AL	AL		
Cable length	2	2	2	m	±10 mm
Cable exit	V-52x.1AA: Cable Exit in X V-52x.1AB: Cable Exit in Y	V-52x.1AA: Cable Exit in X V-52x.1AB: Cable Exit in Y	V-52x.1AA: Cable Exit in X V-52x.1AB: Cable Exit in Y		
Voltage / sensor connection	Sub-D 15-pin (m)	Sub-D 15-pin (m)	Sub-D 15-pin (m)		
Lifetime	20000	20000	20000	km	
Operating temperature range	18 to 45	18 to 45	18 to 45	°C	
Relative humidity during operation	20 to 80	20 to 80	20 to 80	%	

Ask about custom designs!

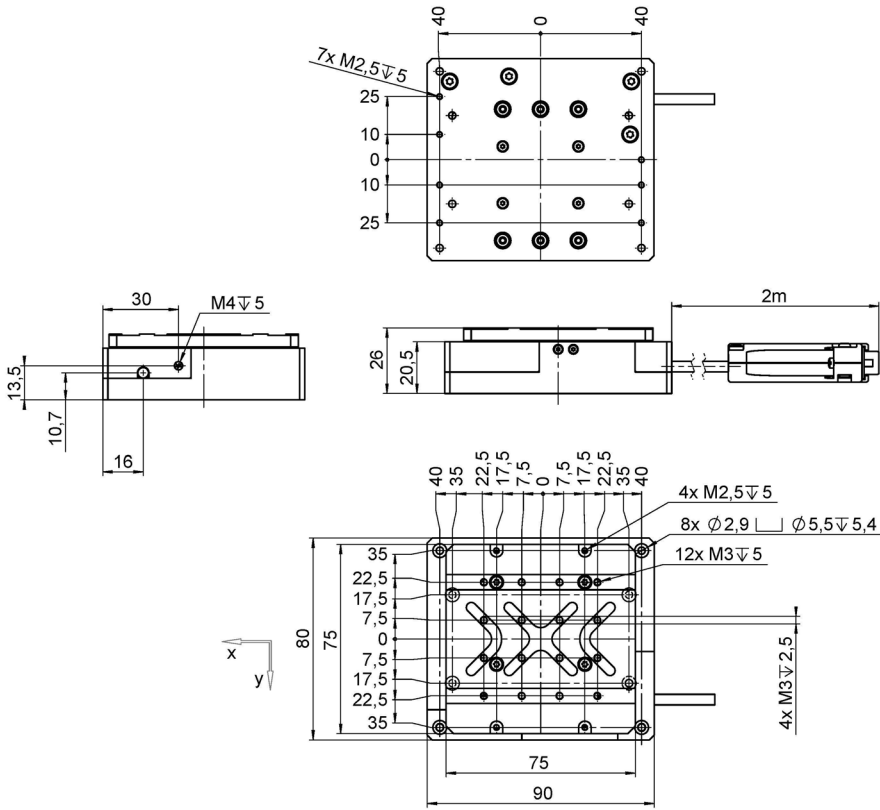
Drawings and Images



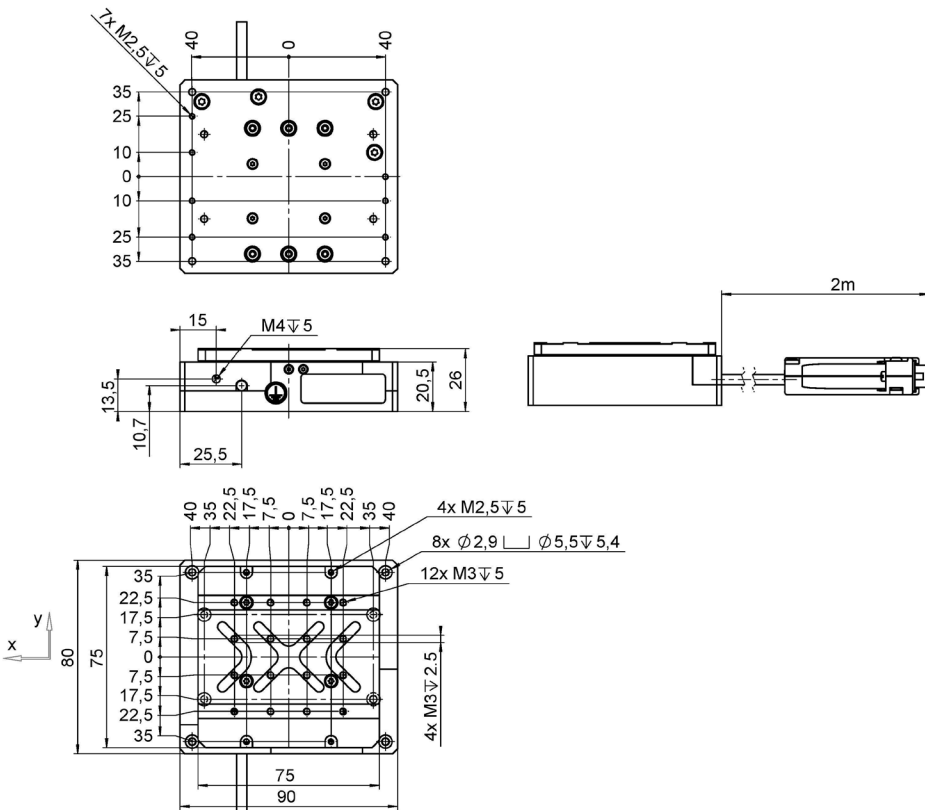
V-522.1AA, dimensions in mm



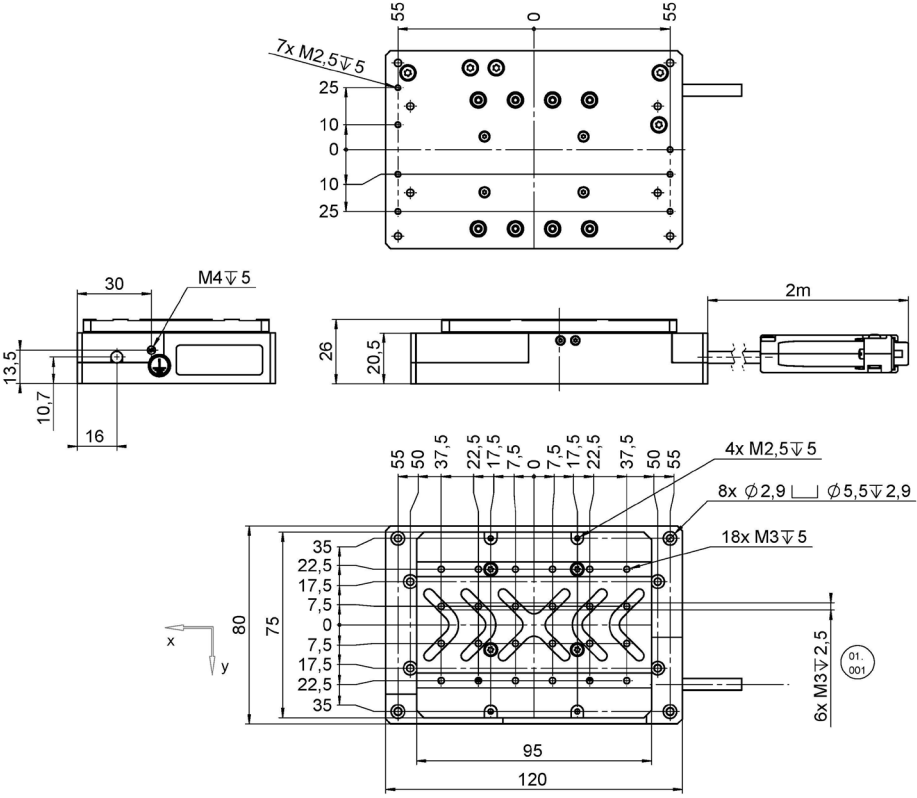
V-522.1AB, dimensions in mm



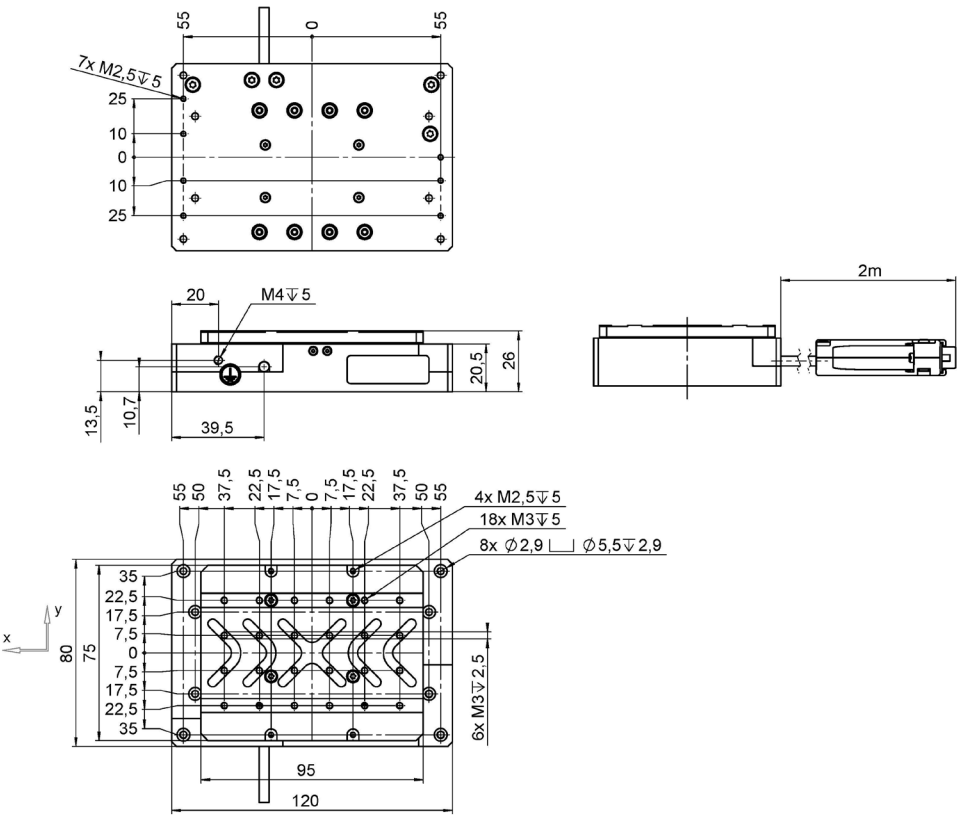
V-524.1AA, dimensions in mm



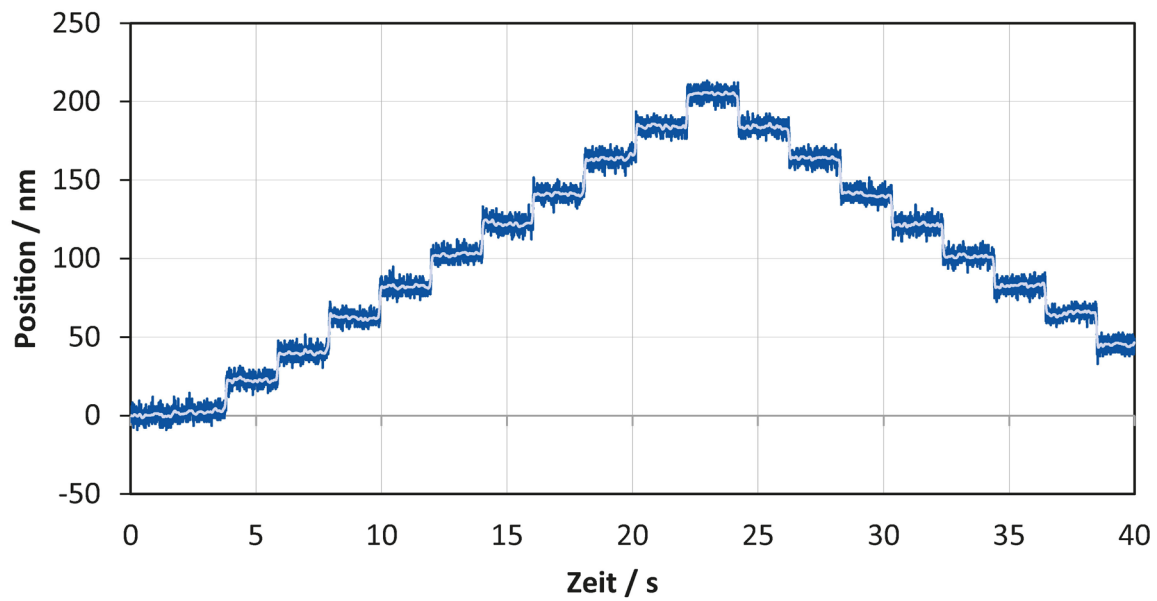
V-524.1AB, dimensions in mm



V-528.1AA, dimensions in mm



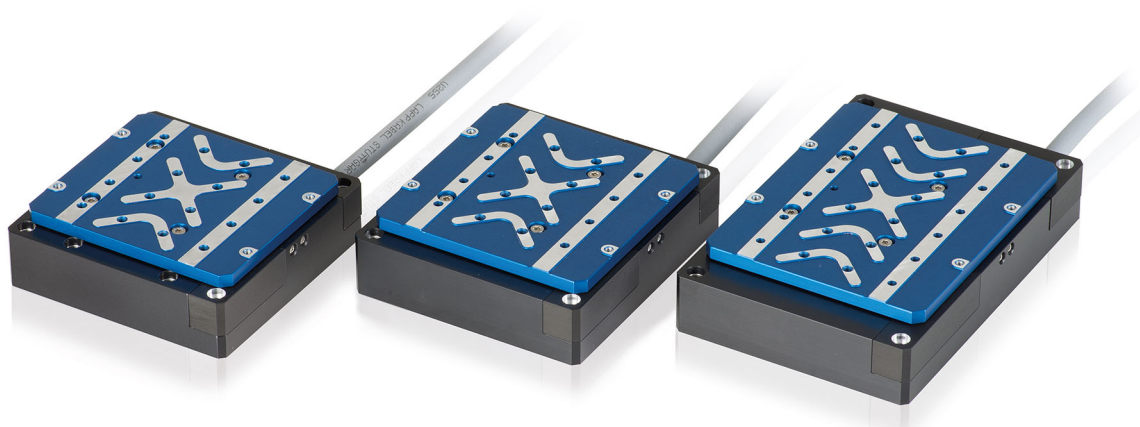
V-528.1AB, dimensions in mm



The V-522 reliably performs 20-nm repeatable steps.



Multi-axis set-up with two V-528 PIMag® voice coil linear stages.



V-522, V-524, and V-528 PIMag® voice coil linear stages

Ordering information

V-522.1AA

PIMag® Voice Coil Linear Stage, Direct Drive, Velocity 250mm/s, Direct Position Measurement with Incremental Encoder, 5 mm Travel Range, Cable Exit in Direction of Motion

V-522.1AB

PIMag® Voice Coil Linear Stage, Direct Drive, Velocity 250mm/s, Direct Position Measurement with Incremental Encoder, 5 mm Travel Range, Cable Exit Orthogonal to Direction of Motion

V-524.1AA

PIMag® Voice Coil Linear Stage, Direct Drive, Velocity 250mm/s, Direct Position Measurement with Incremental Encoder, 10 mm Travel Range, Cable Exit in Direction of Motion

V-524.1AB

PIMag® Voice Coil Linear Stage, Direct Drive, Velocity 250mm/s, Direct Position Measurement with Incremental Encoder, 10 mm Travel Range, Cable Exit Orthogonal to Direction of Motion

V-528.1AA

PIMag® Voice Coil Linear Stage, Direct Drive, Velocity 250mm/s, Direct Position Measurement with Incremental Encoder, 20 mm Travel Range, Cable Exit in Direction of Motion

V-528.1AB

PIMag® Voice Coil Linear Stage, Direct Drive, Velocity 250mm/s, Direct Position Measurement with Incremental Encoder, 20 mm Travel Range, Cable Exit Orthogonal to Direction of Motion

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