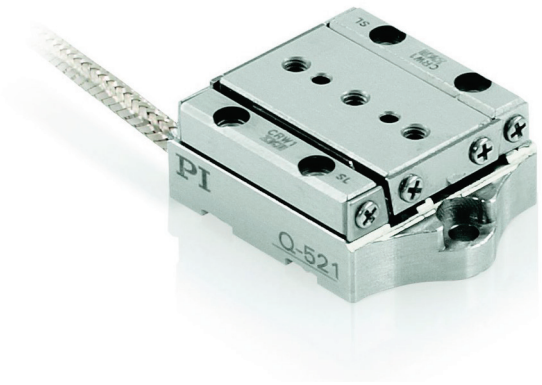
Q-521
Q-Motion® Miniature Linear Stage

Smallest linear stage with position control, high resolution and attractive price



- Only 21 mm wide and 10 mm high
- Direct position measurement with integrated incremental encoder, up to 1 nm resolution (optional)
- Up to 1 nm encoder resolution
- Up to 2 nm minimum incremental motion
- Set-up of multi-axis systems with adapter plate or bracket (optionally available)
- Velocity 10 mm/s
- Suitable for vacuum to 10^{-6} hPa, versions to 10^{-9} hPa available

Precision-class micropositioning stage
Q-Motion® stages are distinguished by their extremely small design and high position resolution in the nanometer range. The piezomotor drive principle and the electrical operation are cost-efficient and can be customized.

PIShift piezo inertia drives
Self-locking when at rest, therefore no heat generation and no servo jitter. Velocity to 10 mm/s. 1 N push/pull force.

Direct-measuring principle
Versions with noncontact optical linear encoder available. Resolution 4 nm or 1 nm, depending on the version. Versions with encoder feature a reference point switch.

Vacuum and nonmagnetic environments
All Q-Motion® stages are suitable for operation in high vacuum to 10^{-6h} hPa. Furthermore, ultrahigh vacuum variants for 10^{-9} hPa are also available. Nonmagnetic versions are available on request.

Fields of application
Industry and research, metrology, microscopy, micromanipulation, biotechnology and automation.

Compatible controllers / drivers / amplifiers
E-873 Q-Motion® servo controller
E-870 PIShift drive electronics
E-871 networkable servo controller for piezomotors
E-873.3QTU Q-Motion® servo controller

Compatible accessories
Q-101.AP1 adapter plate
Q-121.xxx adapter bracket and adapter plate

Related products
Q-614 Q-Motion® miniature rotation stage
Q-622 Q-Motion® miniature rotation stage
Q-632 Q-Motion® rotation stage
Q-545 Q-Motion® precision linear stage
Q-522 Q-Motion® miniature linear stage

Specifications

	Q-521.130	Q-521.140 / Q-521.14U	Q-521.230	Q-521.240 / Q-521.24U	Q-521.330	Q-521.340 / Q-521.34U	Q-521.x00 / Q-521.x0U	Unit
Motion and positioning	12 mm travel range, resolution 4 nm	12 mm travel range, resolution 1 nm, UHV version Q-521.14U	22 mm travel range, resolution 4 nm	22 mm travel range, resolution 1 nm, UHV version Q-521.24U	32 mm travel range, resolution 4 nm	32 mm travel range, resolution 1 nm, UHV version Q-521.34U	12 mm to 32 mm travel range, open-loop, UHV versions Q-521.x0U	
Active axis	X	X	X	X	X	X	X	
Travel range	12	12	22	22	32	32	12 to 32	mm
Integrated sensor	Linear encoder	Linear encoder	Linear encoder	Linear encoder	Linear encoder	Linear encoder	-	
Sensor resolution	4	1	4	1	4	1	-	nm
Min. incremental motion	8	2	8	2	8	2	-	nm
Unidirectional repeatability over entire travel range	25	25	25	25	30	30	-	nm
Bidirectional repeatability over entire travel range	40	40	40	40	50	50	-	nm
Unidirectional repeatability over 100 µm travel range	12	12	12	12	12	12	-	
Bidirectional repeatability over 100 µm travel range	24	24	24	24	24	24	-	nm
Pitch / yaw over entire travel range	100	100	100	100	100	100	100	µrad
Pitch / yaw over 100 µm travel range	1	1	1	1	1	1	1	µrad
Maximum velocity*	10	10	10	10	10	10	10	mm/s

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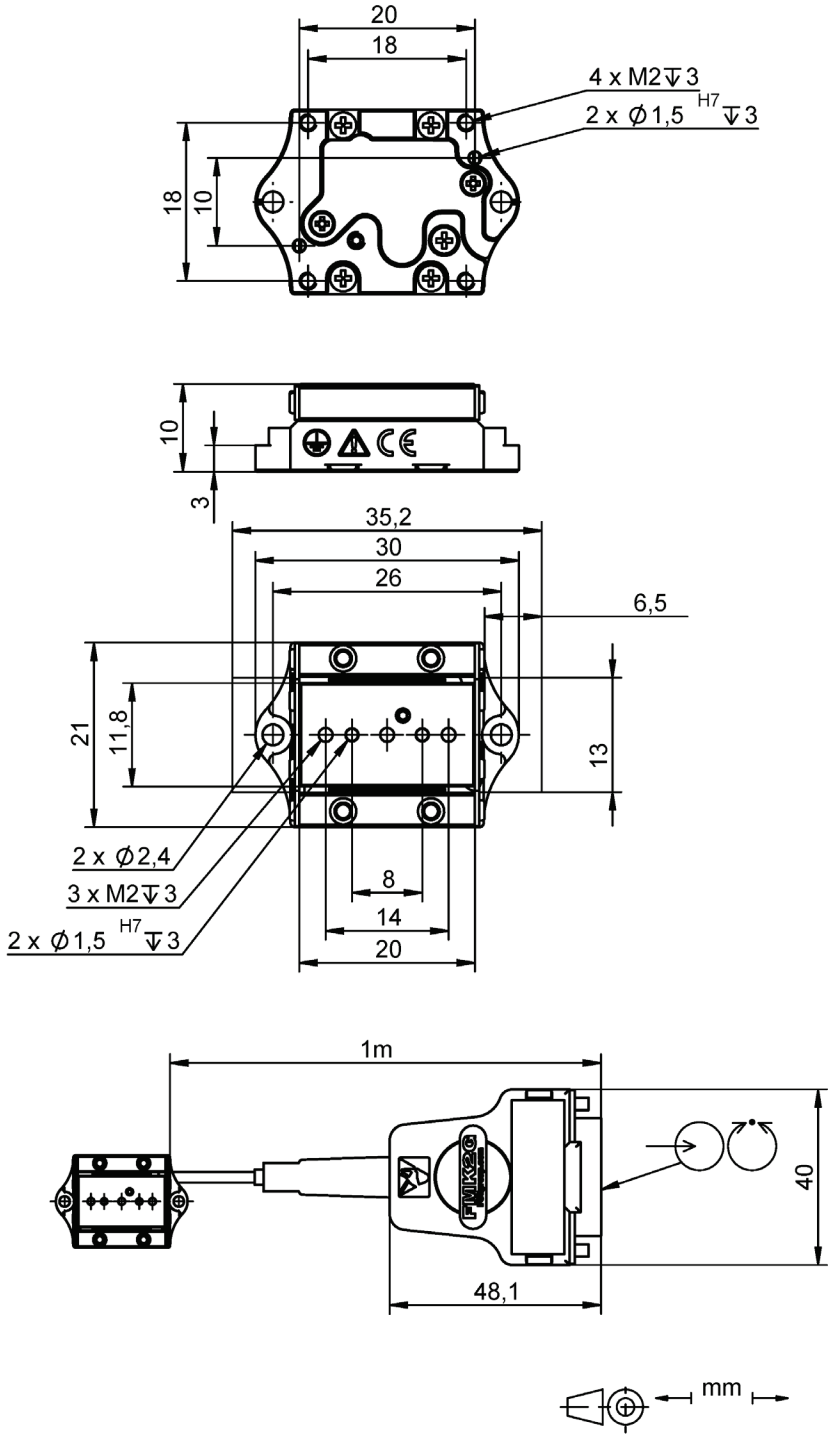
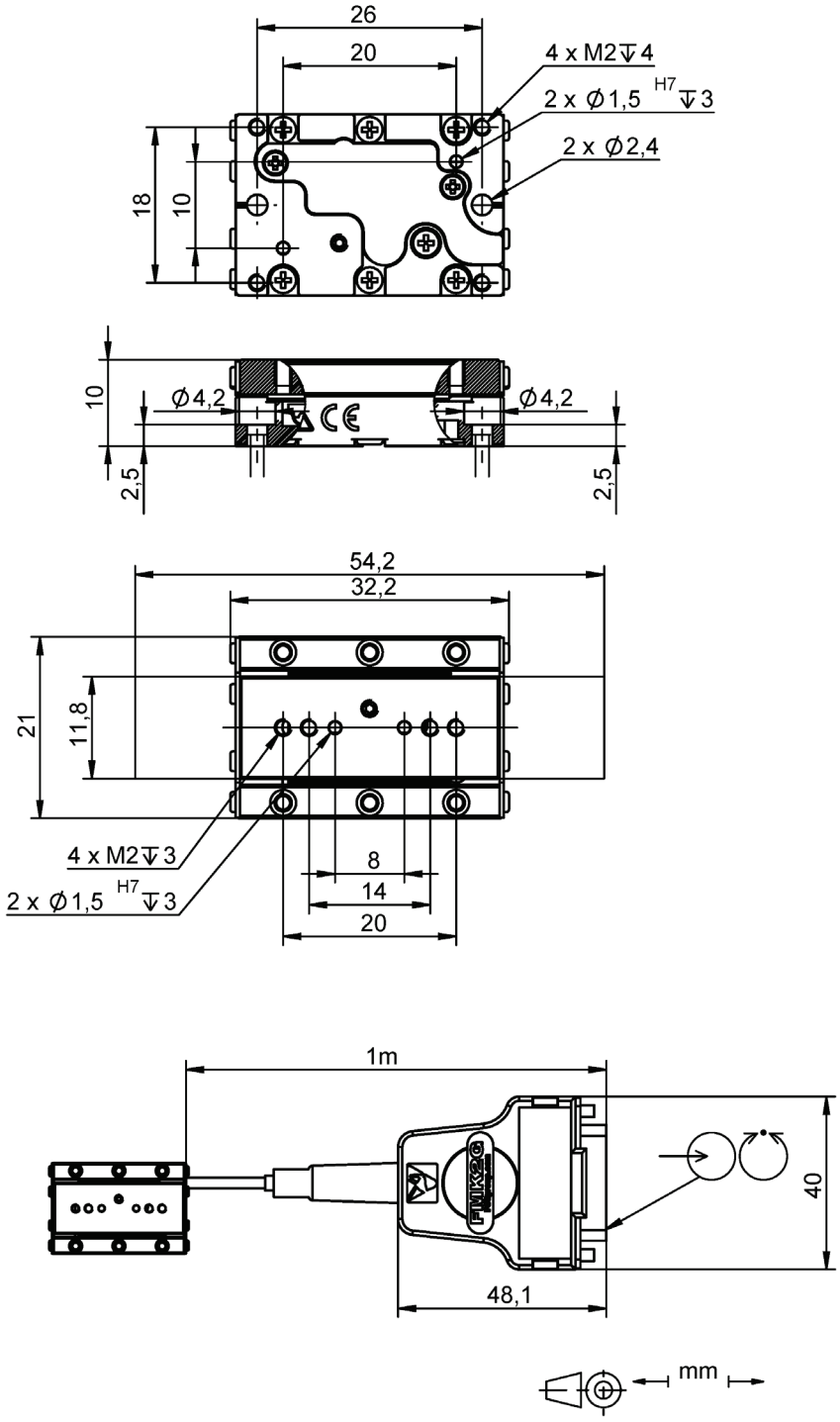
Mechanical properties								
Load capacity	10	10	10	10	10	10	10	N
Length	30	30	32.2	32.2	42.2	42.2	30 to 42.2	mm
Width	21	21	21	21	21	21	21	mm
Height	10	10	10	10	10	10	10	mm
Drive properties								
Motor type	Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive	
Push / pull force	1	1	1	1	1	1	1	N
Holding force, de-energized	1.3	1.3	1.3	1.3	1.3	1.3	1.3	N
Miscellaneous								
Operating temperature range	0 to 40	0 to 40	0 to 40	0 to 40	0 to 40	0 to 40	0 to 40	°C
Material	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	Stainless steel	
Cable length	1	1	1	1	1	1	1	m
Connector	Sub-D	Sub-D	Sub-D	Sub-D	Sub-D	Sub-D	Sub-D	
Recommended controller	E-871, E-873	E-871, E-873	E-871, E-873	E-871, E-873	E-871, E-873	E-871, E-873	E-870	

* Typical velocity at a control frequency of 20 kHz

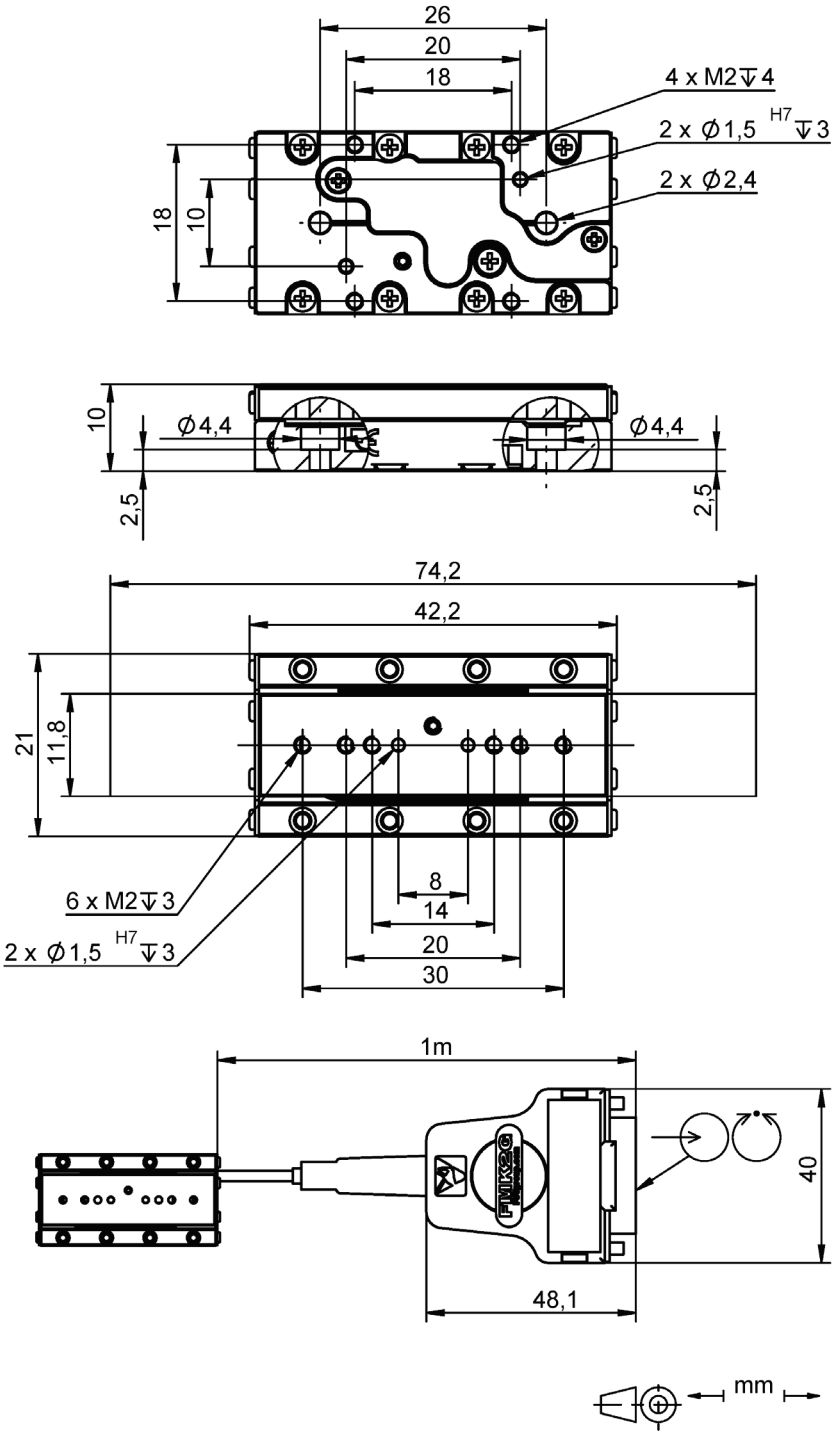
Drawings and images



Q-521.1xx, Dimensions in mm. Note that the decimal places are separated by a comma in the drawings.



Q-521.2xx, Dimensions in mm. Note that the decimal places are separated by a comma in the drawings.



Q-521.3xx, Dimensions in mm. Note that the decimal places are separated by a comma in the drawings.

Ordering information

Q-521.100
Q-Motion® miniature linear positioning stage, 12 mm travel range, without position sensor for open-loop operation, 1 N push/pull force, dimensions 21 × 30 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-6} hPa

Q-521.130
Q-Motion® miniature linear positioning stage, 12 mm travel range, linear encoder, 4 nm resolution, 1 N push/pull force, dimensions 21 × 30 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-6} hPa

Q-521.140
Q-Motion® miniature linear positioning stage, 12 mm travel range, linear encoder, 1 nm resolution, 1 N push/pull force, dimensions 21 × 30 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-6} hPa

Q-521.14U
Q-Motion® miniature linear positioning stage, 12 mm travel range, linear encoder, 1 nm resolution, 1 N push/pull force, dimensions 21 × 30 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-9} hPa

Q-521.200
Q-Motion® miniature linear positioning stage, 22 mm travel range, without position sensor for open-loop operation, 1 N push/pull force, dimensions 21 × 32 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-6} hPa

Q-521.230
Q-Motion® miniature linear positioning stage, 22 mm travel range, linear encoder, 4 nm resolution, 1 N push/pull force, dimensions 21 × 32 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-6} hPa

Q-521.240
Q-Motion® miniature linear positioning stage, 22 mm travel range, linear encoder, 1 nm resolution, 1 N push/pull force, dimensions 21 × 32 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-6} hPa

Q-521.24U
Q-Motion® miniature linear positioning stage, 22 mm travel range, linear encoder, 1 nm resolution, 1 N push/pull force, dimensions 21 × 32 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-9} hPa

Q-521.300
Q-Motion® miniature linear positioning stage, 32 mm travel range, without position sensor for open-loop operation, 1 N push/pull force, dimensions 21 × 42 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-6} hPa

Q-521.330
Q-Motion® miniature linear positioning stage, 32 mm travel range, linear encoder, 4 nm resolution, 1 N push/pull force, dimensions 21 × 42 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-6} hPa

Q-521.340
Q-Motion® miniature linear positioning stage, 32 mm travel range, linear encoder, 1 nm resolution, 1 N push/pull force, dimensions 21 × 42 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-6} hPa

Q-521.34U
Q-Motion® miniature linear positioning stage, 32 mm travel range, linear encoder, 1 nm resolution, 1 N push/pull force, dimensions 21 × 42 × 10 mm (W × L × H), piezoelectric inertia drive, vacuum-compatible to 10^{-9} hPa

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