

Q- Motion® Precision Linear Stage

HIGH FORCES AND SMALL SIZE THROUGH PIEZOMOTORS



Q-545

- + Only 45 mm wide
- + Push force 8 N
- + Incremental sensors with position resolution 1 nm (optional)
- + XY combinations without adapter plate possible
- + Velocity 10 mm/ s
- + Vacuum- compatible to 10^{-6} hPa (Q-545.xx0)
- + Vacuum- compatible to 10^{-9} hPa (Q-545.xxU)

Precision- class micropositioning stage

Q- Motion® stages have a compact design and a 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. 8 N holding force, 8 N push force

Direct- measuring principle

Versions with noncontact optical linear encoder available. Resolution 1 nm. Versions with encoder feature a reference point switch

Vacuum and nonmagnetic environment

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

Fields of application

Industry and research. For optical metrology, laser technology, micromanipulation, biotechnology, photonics packaging

Specifications

	Q-545.100 / Q-545.10U	Q-545.140 / Q-545.14U	Q-545.200 / Q-545.20U	Q-545.240 / Q-545.24U	Unit	Tolerance
	13 mm travel range, open- loop	13 mm travel range, resolution 1 nm	26 mm travel range, open- loop	26 mm travel range, resolution 1 nm		
Motion and Positioning						
Active axis	X	X	X	X		
Travel	13	13	26	26	mm	
Integrated sensor	–	Linear encoder	–	Linear encoder		
Sensor signal	–	Analog, 1 V _{pp}	–	Analog, 1 V _{pp}		
Sensor resolution	–	1	–	1	nm	
Min. incremental motion	500 (open- loop)	6	500 (open- loop)	6	nm	typ.
Unidirectional repeatability	–	0.018	–	0.018	µm	
Bidirectional repeatability	–	±0.018	–	±0.018	µm	
Angular crosstalk	±50	±50	±80	±80	µrad	
Linear crosstalk	±1	±1	±2	±2	µm	
Maximum velocity, open- loop	10	10	10	10	mm/ s	min.
Maximum velocity, closed- loop	–	10	–	10	mm/ s	
Reference point switch	–	Optical	–	Optical		
Mechanical Properties						
Load capacity	10	10	10	10	N	
Axial stiffness	1.5	1.5	1.5	1.5	N/ µm	±10 %
Lateral stiffness	9	9	10	10	N/ µm	±10 %
Holding force, de- energized	8	8	8	8	N	min.
Push / pull force	8	8	8	8	N	typ.
Drive Properties						
Motor Type	Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive	Piezoelectric inertia drive		
Miscellaneous						
Operating temperature range	0 to 50	0 to 50	0 to 50	0 to 50	°C	
Material	Aluminum	Aluminum	Aluminum	Aluminum		
Mass, including cabling	216 / 210	216 / 210	245 / 240	245 / 240	g	
Cable length	Q-545.100: 2 Q-545.10U: 1	Q-545.140: 2 Q-545.14U: 1	Q-545.200: 2 Q-545.20U: 1	Q-545.240: 2 Q-545.24U: 1	m	
Connector	Sub- D 15	Sub- D 15	Sub- D 15	Sub- D 15		
Recommended controller / driver	E-870	E-871, E-873	E-870	E-871, E-873		

Vacuum versions to 10⁻⁶ hPa are available under the following ordering number: Q-545.xx0.

Vacuum versions to 10⁻⁹ hPa are available under the following ordering number: Q-545.xxU.

Ask about custom designs!

The Q-545 stage series replaces the LPS-45 series.

Order Information

Q-545.100

Q- Motion® Linear Stage, 13 mm Travel Range, without Position Sensor for Open- Loop Operation, 8 N Push / Pull Force, Dimensions 45 × 48 × 15 mm (W × L × H), Piezoelectric Inertia Drive, Vacuum- Compatible to 10⁻⁶ hPa

Q-545.10U

Q- Motion® Linear Stage, 13 mm Travel Range, without Position Sensor for Open- Loop Operation, 8 N Push / Pull Force, Dimensions 45 × 48 × 15 mm (W × L × H), Piezoelectric Inertia Drive, Vacuum- Compatible to 10⁻⁹ hPa

Q-545.140

Q- Motion® Linear Stage, 13 mm Travel Range, Linear Encoder, 1 nm Resolution, 8 N Push / Pull Force, Dimensions 45 × 48 × 15 mm (W × L × H), Piezoelectric Inertia Drive, Vacuum- Compatible to 10⁻⁶ hPa

Q-545.14U

Q- Motion® Linear Stage, 13 mm Travel Range, Linear Encoder, 1 nm Resolution, 8 N Push / Pull Force, Dimensions 45 × 48 × 15 mm (W × L × H), Piezoelectric Inertia Drive, Vacuum- Compatible to 10⁻⁹ hPa

Q-545.200

Q- Motion® Linear Stage, 26 mm Travel Range, without Position Sensor for Open- Loop Operation, 8 N Push / Pull Force, Dimensions 45 × 63 × 15 mm (W × L × H), Piezoelectric Inertia Drive, Vacuum- Compatible to 10⁻⁶ hPa

Q-545.20U

Q- Motion® Linear Stage, 26 mm Travel Range, without Position Sensor for Open- Loop Operation, 8 N Push / Pull Force, Dimensions 45 × 63 × 15 mm (W × L × H), Piezoelectric Inertia Drive, Vacuum- Compatible to 10⁻⁹ hPa

Q-545.240

Q- Motion® Linear Stage, 26 mm Travel Range, Linear Encoder, 1 nm Resolution, 8 N Push / Pull Force, Dimensions 45 × 63 × 15 mm (W × L × H), Piezoelectric Inertia Drive, Vacuum- Compatible to 10⁻⁶ hPa

Q-545.24U

Q- Motion® Linear Stage, 26 mm Travel Range, Linear Encoder, 1 nm Resolution, 8 N Push / Pull Force, Dimensions 45 × 63 × 15 mm (W × L × H), Piezoelectric Inertia Drive, Vacuum- Compatible to 10⁻⁹ hPa

Ask about custom designs!

Controllers / Drivers / Amplifiers

[E-870 PIShift Drive Electronics](#)

[E-871 Networkable Servo Controller for Stick- Slip Piezo Motors](#)

Accessories

[Q-145 Adapter Bracket](#)

Related Products

[Q-522 Q- Motion Miniature Linear Stage](#)

[LPS-65 Linear Piezo Stage](#)

[M-663 Compact Linear Positioning Stage](#)

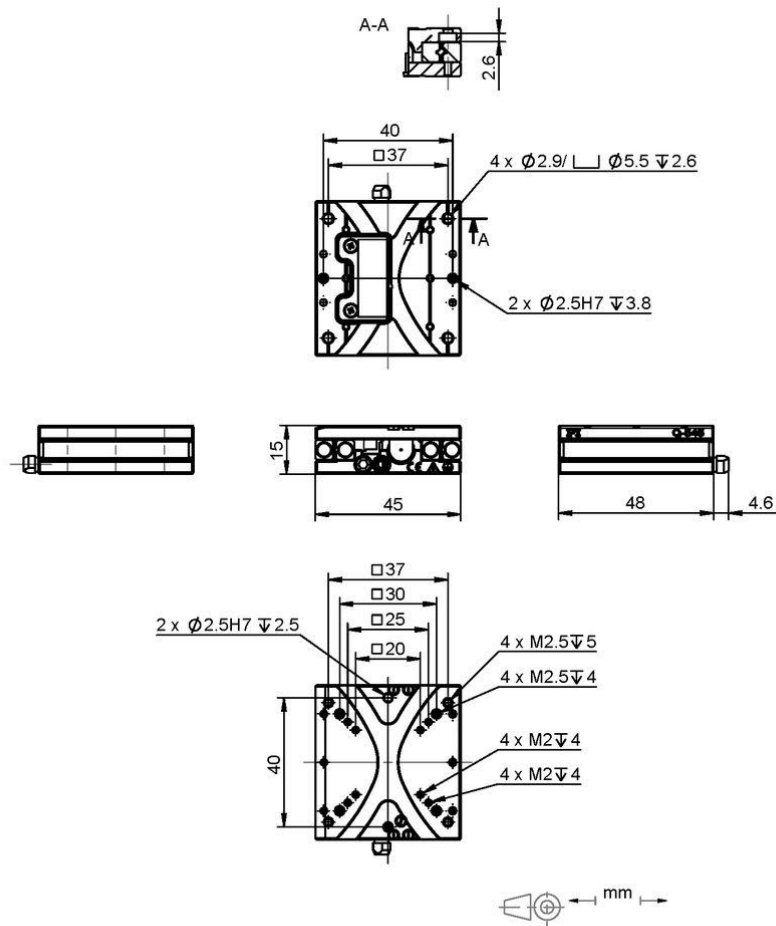
[M-687 PISLine® XY Stage System with Controller and Joystick](#)

Technology

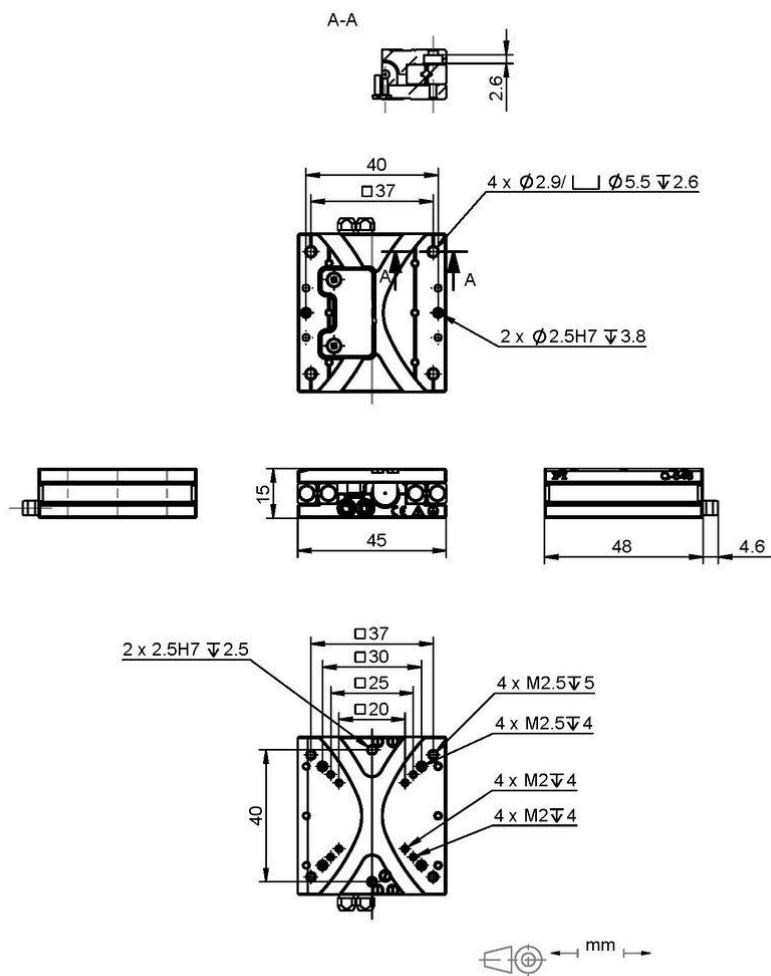
[Piezoelectric Inertia Drives | Inertia Drives](#) are space- saving and low- cost piezo- based inertia drives with relatively high holding forces and a travel range that is only limited by the length of the moving rod. [Learn more ...](#)

Drawings / Images

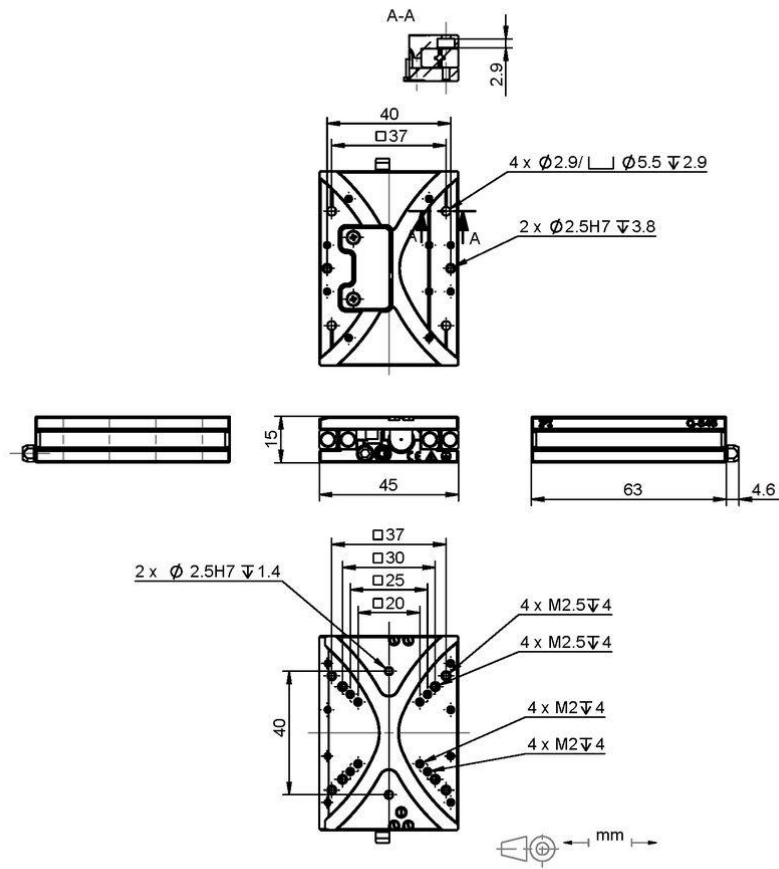
Q-545.100 / .10U,
dimensions in mm



Q-545.140 / .14U,
dimensions in mm



Q-545.200 / .20U,
dimensions in mm



Q-545.240 / . 24U,
dimensions in mm

