

## Q-Motion® Precision Linear Stage

High Forces and Small Design Due to Piezo Motors



### Q-545

- Only 45 mm in width
- Drive force 7 N
- Incremental sensors with nanometer position resolution
- XY combinations without adapter plate possible

#### Piezoelectric inertia drive

Piezo inertia drives are space-saving and affordable piezo-based drives with relatively high holding forces and a virtually unlimited travel range. The inertia drive principle is based on a single piezoelectric actuator that is controlled with a modified sawtooth voltage provided by special driver electronics. The actuator expands slowly and moves the runner. Due to its inertia, the runner is unable to follow the subsequent fast contraction of the actuator and remains at its position. With an operating frequency of up to 20 kHz, the drives acting directly on the runner and achieve velocities of max. 6 mm/s.

#### Direct-measuring principle

The linear stages are equipped with a noncontact measuring optical linear encoder and a reference switch. Resolution 1 nm.

#### Application fields

Microassembly. Photonics. Optical alignment. Microscopy. Beamline instrumentation. Semiconductor technology. Testing.

## Specifications

Motion and positioning	Q-545.140	Q-545.240	Unit	Tolerance
Active axis	X	X		
Travel range	13	26	mm	
Maximum velocity, closed loop	8	8	mm/s	
Minimum incremental motion	6	6	nm	Typ.
Pitch	250	250	μrad	Typ.
Yaw	100	250	μrad	Typ.
Linearity	2	2	μm	Typ.

Drive properties	Q-545.140	Q-545.240	Unit	Tolerance
Drive force	7	7	N	Typ.
Self-locking	8	8	N	Min.
Motor type	Piezoelectric inertia drive	Piezoelectric inertia drive		

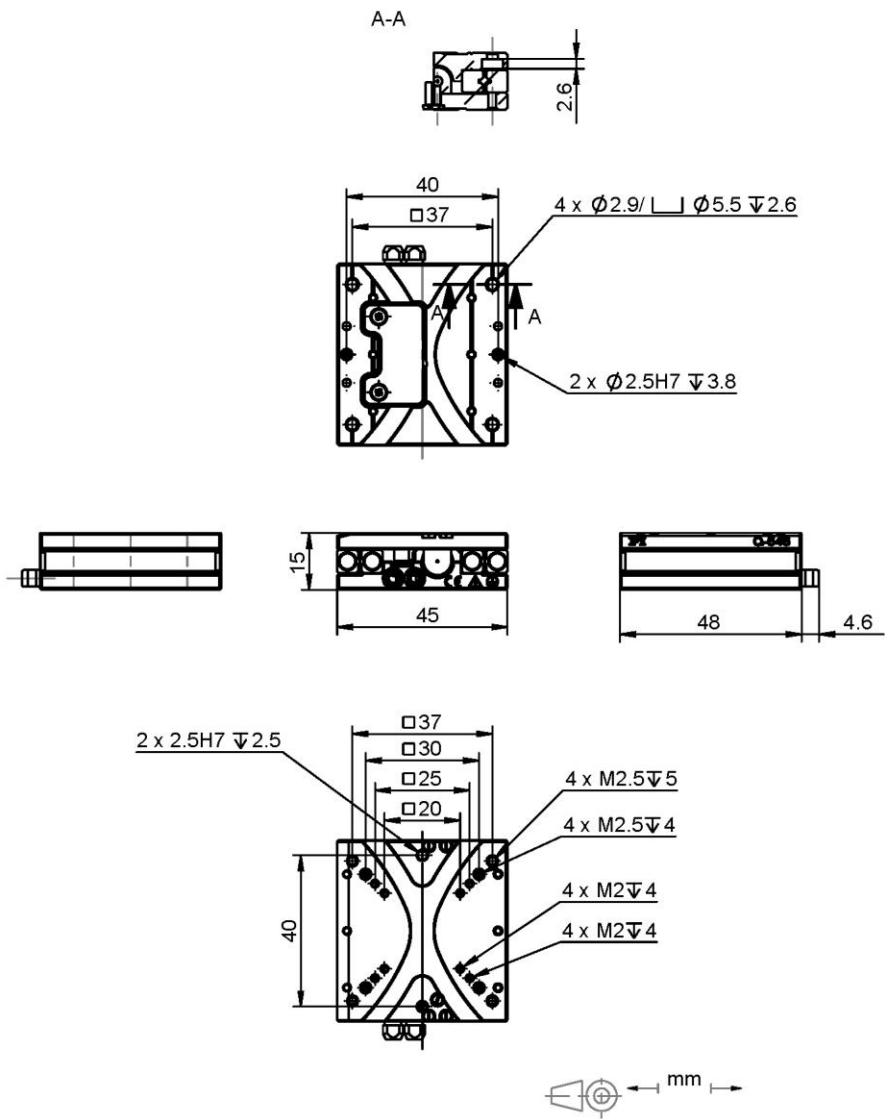
Mechanical properties	Q-545.140	Q-545.240	Unit	Tolerance
Maximum load capacity, horizontal	0.5	0.5	kg	
Maximum load capacity, any	0.1	0.1	kg	
Mass without cable and connector	105	135	g	±10 %
Mass incl. cable and connector	216	245	g	±10 %
Guide type	Crossed roller bearing with anti-creep system	Crossed roller bearing with anti-creep system		
Axial stiffness	1.5	1.5	N/μm	±10 %
Lateral stiffness	9	10	N/μm	±10 %

Positioning	Q-545.140	Q-545.240	Unit	Tolerance
Integrated sensor	Linear encoder	Linear encoder		
Sensor resolution	1	1	nm	
Reference switch	Optical	Optical		
Bidirectional repeatability	100	200	nm	
Sensor signal	Analog, 1 Vpp	Analog, 1 Vpp		

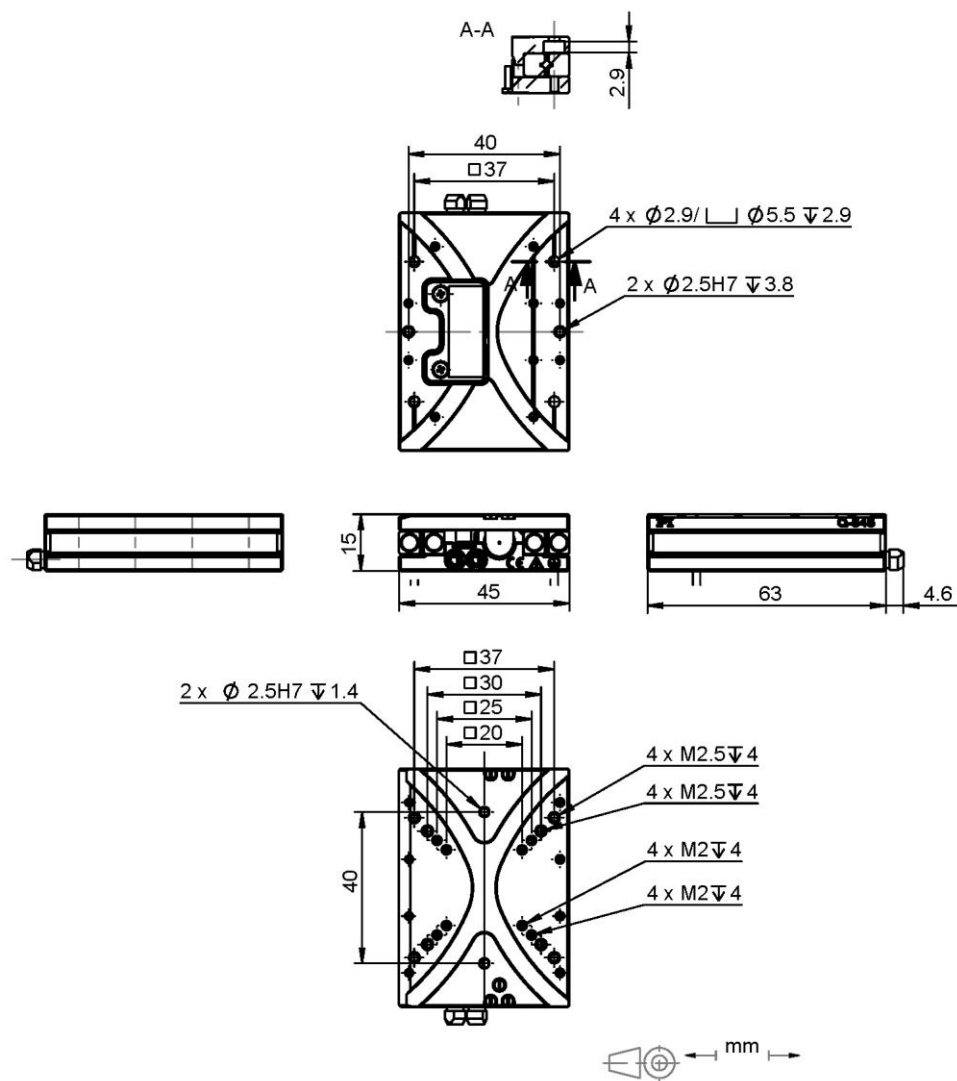
Miscellaneous	Q-545.140	Q-545.240	Unit	Tolerance
Operating temperature range	0 to 50	0 to 50	°C	
Cable length	2	2	m	±5 %
Motor / sensor connector	D-sub 15 (m)	D-sub 15 (m)		
Material	Aluminum	Aluminum		
Recommended electronics	E-873.1AT, E-873.10C885	E-873.1AT, E-873.10C885		

Specifications tested with E-873.1AT  
Ask about customized versions.

## Drawings / Images



Q-545.140, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.



Q-545.240, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

## Ordering Information

### Q-545.140

Q-Motion® Linear stage, piezoelectric inertia drive, 13 mm travel range, linear encoder, 1 nm resolution, 7 N drive force, dimensions 45 × 48 × 15 mm (W × L × H)

### Q-545.240

Q-Motion® Linear stage, piezoelectric inertia drive, 26 mm travel range, linear encoder, 1 nm resolution, 7 N drive force, dimensions 45 × 63 × 15 mm (W × L × H)