Compact Precision Z Stage

Compact Design, Multi-Axis Combinations

L-306

- Compact design: Surface 63 × 63 mm
- Stepper motors and closed-loop DC motors
- Optional: Linear encoder for direct position measuring
- Crossed roller guides
- Noncontact reference and limit switches

Compact Z stage, versatile in use
Z stage with compact size due to folded drive with belt gears. Fits onto linear stages with M6 50 mm × 50 mm connection grid (e.g., L-406).

Drive
- 2-phase stepper motor or closed-loop DC motor
- Backlash-compensated ball screws

Position measuring
- Incremental linear encoder (optional with stepper motor variants)
- Noncontact optical reference and limit switches

Highly-accurate position measuring with incremental linear encoder
Noncontact optical linear encoders measure the position with highest accuracy directly on the platform Nonlinearity, mechanical play or elastic deformation have no influence on the measurement.

Crossed roller guide
For crossed roller guides, the point contact of balls in ball guides is replaced by the line contact of hardened rollers. Consequently, they are considerably stiffer and need less preloading, which reduces friction and enables smoother running. Crossed roller guides are also characterized by high guide accuracy and load capacity. Force-guided rolling element cages prevent cage creep.

Application fields
Research. Semiconductor technology. Photonics. Automation.

Motion	Unit	Tolerance	L-306.011100	L-306.011112	L-306.013112
Active axes			Z	Z	Z
Travel range in Z	mm		13	13	13
Maximum velocity in Z, unloaded	mm/s		5	5	5
Straightness error in X	µm	Typ.	±3	±3	±3
Straightness error in Y	µm	Typ.	±3	±3	±3
Angular error around X	µrad	Typ.	±150	±150	±150
Angular error around Y	µrad	Typ.	±175	±175	±175

Positioning	Unit	Tolerance	L-306.011100	L-306.011112	L-306.013112
Minimum incremental motion in Z	µm	Typ.	2.5	0.1	0.1
Unidirectional repeatability in Z	µm	Typ.	±0.25	±0.05	±0.05
Bidirectional repeatability in Z	µm	Typ.	4	1	1
Reference switch			Forked photoelectric sensor, N/C contact, 5 V, NPN	Forked photoelectric sensor, N/C contact, 5 V, NPN	Forked photoelectric sensor, N/C contact, 5 V, NPN
Limit switches			Forked photoelectric sensor, N/C contact, 5 V, NPN	Forked photoelectric sensor, N/C contact, 5 V, NPN	Forked photoelectric sensor, N/C contact, 5 V, NPN
Integrated sensor			—	Incremental linear encoder	Incremental linear encoder
Sensor signal			—	A/B quadrature, RS-422	A/B quadrature, RS-422
Sensor resolution	nm		—	5	50

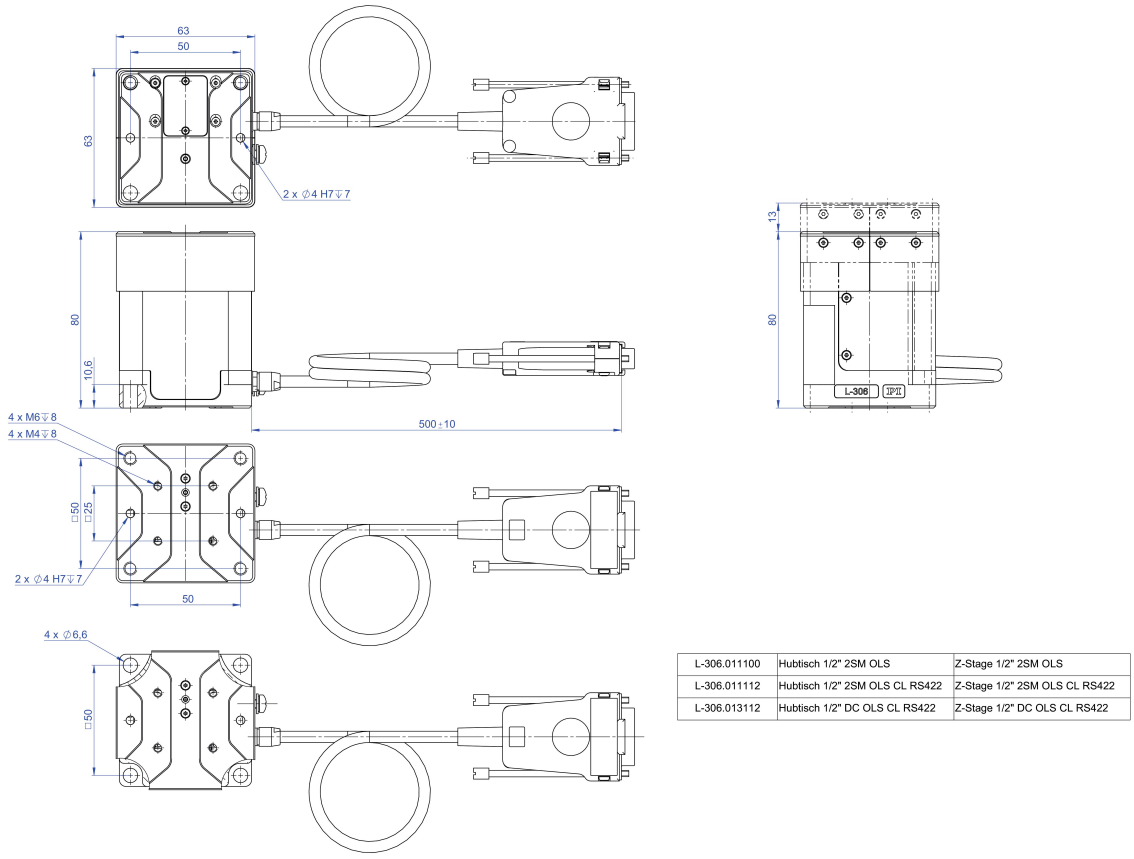
Drive Properties	Unit	Tolerance	L-306.011100	L-306.011112	L-306.013112
Drive type			2-phase stepper motor	2-phase stepper motor	DC motor
Drive force in positive direction of motion in Z	N	Typ.	20	20	20
Drive force in negative direction of motion in Z	N	Typ.	20	20	20

Mechanical Properties	Unit	Tolerance	L-306.011100	L-306.011112	L-306.013112
Permissible push force in Y	N	Max.	10	10	10
Permissible push force in Z	N	Max.	20	20	20
Permissible torque in θX	N·m	Max.	1	1	1
Permissible torque in θY	N·m	Max.	1	1	1
Permissible torque in θZ	N·m	Max.	2	2	2
Holding force in Z, passive	N		20	20	—
Moved mass in Z, unloaded	g		180	180	180
Drive screw type			Ball screw	Ball screw	Ball screw
Drive screw pitch	mm		0.5	0.5	0.5
Guide			Crossed roller guide	Crossed roller guide	Crossed roller guide
Overall mass	g		600	600	600
Material			Anodized aluminum, steel	Anodized aluminum, steel	Anodized aluminum, steel

Miscellaneous	Unit		L-306.011100	L-306.011112	L-306.013112
Operating temperature range	°C		5 to 40	5 to 40	5 to 40
Connector			HD D-sub 26 (m)	HD D-sub 26 (m)	HD D-sub 26 (m)
Cable length	m		0.5	0.5	0.5
Recommended controllers / drivers			C-663.12 C-885 with C-663.12C885 ACS modular controller	C-663.12 C-885 with C-663.12C885 ACS modular controller	C-863.12 C-885 with C-863.20C885 ACS modular controller

At PI, technical data is specified at 22 ±3 °C. Unless otherwise stated, the values are for unloaded conditions. Some properties are interdependent. The designation "typ." indicates a statistical average for a property; it does not indicate a guaranteed value for every product supplied. During the final inspection of a product, only selected properties are analyzed, not all. Please note that some product characteristics may deteriorate with increasing operating time.

Drawings / Images



L-306.011100	Hubtisch 1/2" 2SM OLS	Z-Stage 1/2" 2SM OLS
L-306.011112	Hubtisch 1/2" 2SM OLS CL RS422	Z-Stage 1/2" 2SM OLS CL RS422
L-306.013112	Hubtisch 1/2" DC OLS CL RS422	Z-Stage 1/2" DC OLS CL RS422

L-306, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Order Information

L-306.011100
Compact precision Z stage; 2-phase stepper motor; 13 mm travel range; 20 N load capacity; 5 mm/s maximum velocity; ball screw; 0.5 m cable length

L-306.011112
Compact precision Z stage; 2-phase stepper motor; 13 mm travel range; 20 N load capacity; 5 mm/s maximum velocity; ball screw; incremental linear encoder, 5 nm sensor resolution, A/B quadrature, RS-422; 0.5 m cable length

L-306.013112
Compact precision Z stage; DC motor; 13 mm travel range; 20 N load capacity; 5 mm/s maximum velocity; ball screw; incremental linear encoder, 50 nm sensor resolution, A/B quadrature, RS-422; 0.5 cable length