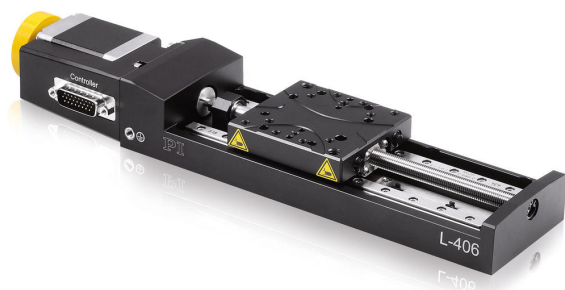


Compact Linear Stage

For Loads to 10 kg



L-406

- Travel ranges from 26 mm to 102 mm (1" to 4")
- Stepper motor or DC servo motor with and without gearhead
- Direction-sensing reference switch
- Integrated optical limit switches

Precision-class linear stage

The linear stage has a ground precision leadscrew that ensures smooth running. The combination of recirculating ball bearing guide and the stress-relieved aluminum base ensures good performance data.

Drive types

- .xxDD variant: DC servo motor for an average velocity up to 20 mm/s
- .xxDG variant: DC servomotor with gearhead for high torques and resolution at low motor power
- .xxSD variant: 2-phase stepper motor, low cost for minimum incremental motion with microsteps

Noncontact optical limit switches. Noncontact optical reference switch with direction sensing in the middle of the travel range. Integrated rotary encoder on the motor shaft (variants with DC servo motor).

Recirculating ball bearing guides

When carefully assembled, recirculating ball bearing guides are distinguished by a beneficial combination of high load capacity, lifetime, maintenance-free operation, and guiding accuracy. The moving part of the stages is supported by four preloaded recirculating ball bearing units, which run on two guide rails. Each bearing unit is made up of two independent rows of circulating ball bearings.

Application fields

Precision microassembly. Research. Automation.

Motion	Unit	Tolerance	L-406. 10DD10	L-406. 20DD10	L-406. 40DD10	L-406. 10DG10	L-406. 20DG10	L-406. 40DG10	L-406. 10SD00	L-406. 20SD00
Active axes			X	X	X	X	X	X	X	X
Travel range in X	mm		26	52	102	26	52	102	26	52
Maximum velocity in X, unloaded	mm/s		20	20	20	3	3	3	20	20
Straightness error in Y (straightness)	μm	Typ.	±2	±4	±6	±2	±4	±6	±2	±4
Straightness error in Z (flatness)	μm	Typ.	±2	±4	±6	±2	±4	±6	±2	±4
Angular error around Y (pitch)	μrad	Typ.	±70	±90	±100	±70	±90	±100	±70	±90
Angular error around Z (yaw)	μrad	Typ.	±70	±90	±100	±70	±90	±100	±70	±90

Positioning	Unit	Tolerance	L-406. 10DD10	L-406. 20DD10	L-406. 40DD10	L-406. 10DG10	L-406. 20DG10	L-406. 40DG10	L-406. 10SD00	L-406. 20SD00
Minimum incremental motion in X	µm	Typ.	0.5	0.5	0.5	0.2	0.2	0.2	0.2	0.2
Unidirectional repeatability in X	µm	Typ.	±0.25	±0.25	±0.25	±0.25	±0.25	±0.25	±0.25	±0.25
Bidirectional repeatability in X	µm	Typ.	10	10	10	10	10	10	10	10
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	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	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	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	Forked photoelectric sensor, N/C contact, 5 V, NPN	Forked photoelectric sensor, N/C contact, 5 V, NPN
Integrated sensor			Incremental rotary encoder	Incremental rotary encoder	Incremental rotary encoder	Incremental rotary encoder	Incremental rotary encoder	Incremental rotary encoder	—	—
System resolution in X	nm		244	244	244	16.4726	16.4726	16.4726	312.5	312.5
Sensor resolution	Cts./rev.		4096	4096	4096	2048	2048	2048	—	—

Drive Properties	Unit	Tolerance	L-406. 10DD10	L-406. 20DD10	L-406. 40DD10	L-406. 10DG10	L-406. 20DG10	L-406. 40DG10	L-406. 10SD00	L-406. 20SD00
Drive type			DC motor	DC motor	DC motor	DC gear motor	DC gear motor	DC gear motor	2-phase stepper motor	2-phase stepper motor
Operating voltage	V		24	24	24	12	12	12	24	24
Motor resolution	Full steps/rev.		—	—	—	—	—	—	200	200
Drive force in X	N	Typ.	15	15	15	100	100	100	50	50

Mechanical Properties	Unit	Tolerance	L-406. 10DD10	L-406. 20DD10	L-406. 40DD10	L-406. 10DG10	L-406. 20DG10	L-406. 40DG10	L-406. 10SD00	L-406. 20SD00
Permissible push force in Y	N	Max.	50	50	50	50	50	50	50	50
Permissible push force in Z	N	Max.	100	100	100	100	100	100	100	100
Permissible torque in θ_X	N·m	Max.	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Permissible torque in θ_Y	N·m	Max.	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Permissible torque in θ_Z	N·m	Max.	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5
Holding force in X, passive	N		15	15	15	100	100	100	50	50
Moved mass in X, unloaded	g		160	160	160	160	160	160	160	160
Drive screw type			Trapezoidal drive screw	Trapezoidal drive screw	Trapezoidal drive screw	Trapezoidal drive screw	Trapezoidal drive screw	Trapezoidal drive screw	Trapezoidal drive screw	Trapezoidal drive screw
Drive screw pitch	mm		1	1	1	1	1	1	1	1
Gear ratio i			—	—	—	2401 : 81	2401 : 81	2401 : 81	—	—
Guide			Recirculating ball bearing guide	Recirculating ball bearing guide	Recirculating ball bearing guide	Recirculating ball bearing guide	Recirculating ball bearing guide	Recirculating ball bearing guide	Recirculating ball bearing guide	Recirculating ball bearing guide
Overall mass	g		800	900	1000	800	900	1000	800	900
Material			Aluminum, steel	Aluminum, steel	Aluminum, steel	Aluminum, steel	Aluminum, steel	Aluminum, steel	Aluminum, steel	Aluminum, steel

Miscellaneous	Unit		L-406. 10DD10	L-406. 20DD10	L-406. 40DD10	L-406. 10DG10	L-406. 20DG10	L-406. 40DG10	L-406. 10SD00	L-406. 20SD00
Operating temperature range	°C		5 to 40	5 to 40	5 to 40	5 to 40	5 to 40	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)	HD D-sub 26 (m)	HD D-sub 26 (m)	HD D-sub 26 (m)	HD D-sub 26 (m)	HD D-sub 26 (m)
Recommended controllers/drivers			C-863.12 C-885 with C-863. 20C885 C-884.4DC, C-884.6DC ACS modular controller	C-863.12 C-885 with C-863. 20C885 C-884.4DC, C-884.6DC ACS modular controller	C-863.12 C-885 with C-863. 20C885 C-884.4DC, C-884.6DC ACS modular controller	C-863.12 C-885 with C-863. 20C885 C-884.4DC, C-884.6DC ACS modular controller	C-863.12 C-885 with C-863. 20C885 C-884.4DC, C-884.6DC ACS modular controller	C-863.12 C-885 with C-863. 20C885 C-884.4DC, C-884.6DC ACS modular controller	C-663.12 C-885 with C-663. 12C885 ACS modular controller	C-663.12 C-885 with C-663. 12C885 ACS modular controller

Motion	Unit	Tolerance	L-406.40SD00
Active axes			X
Travel range in X	mm		102
Maximum velocity in X, unloaded	mm/s		20
Straightness error in Y (straightness)	μm	Typ.	±6
Straightness error in Z (flatness)	μm	Typ.	±6
Angular error around Y (pitch)	μrad	Typ.	±100
Angular error around Z (yaw)	μrad	Typ.	±100

Positioning	Unit	Tolerance	L-406.40SD00
Minimum incremental motion in X	μm	Typ.	0.2
Unidirectional repeatability in X	μm	Typ.	±0.25
Bidirectional repeatability in X	μm	Typ.	10
Reference switch			Forked photoelectric sensor, N/C contact, 5 V, NPN
Limit switches			Forked photoelectric sensor, N/C contact, 5 V, NPN
Integrated sensor			—
System resolution in X	nm		312.5
Sensor resolution	Cts./rev.		—

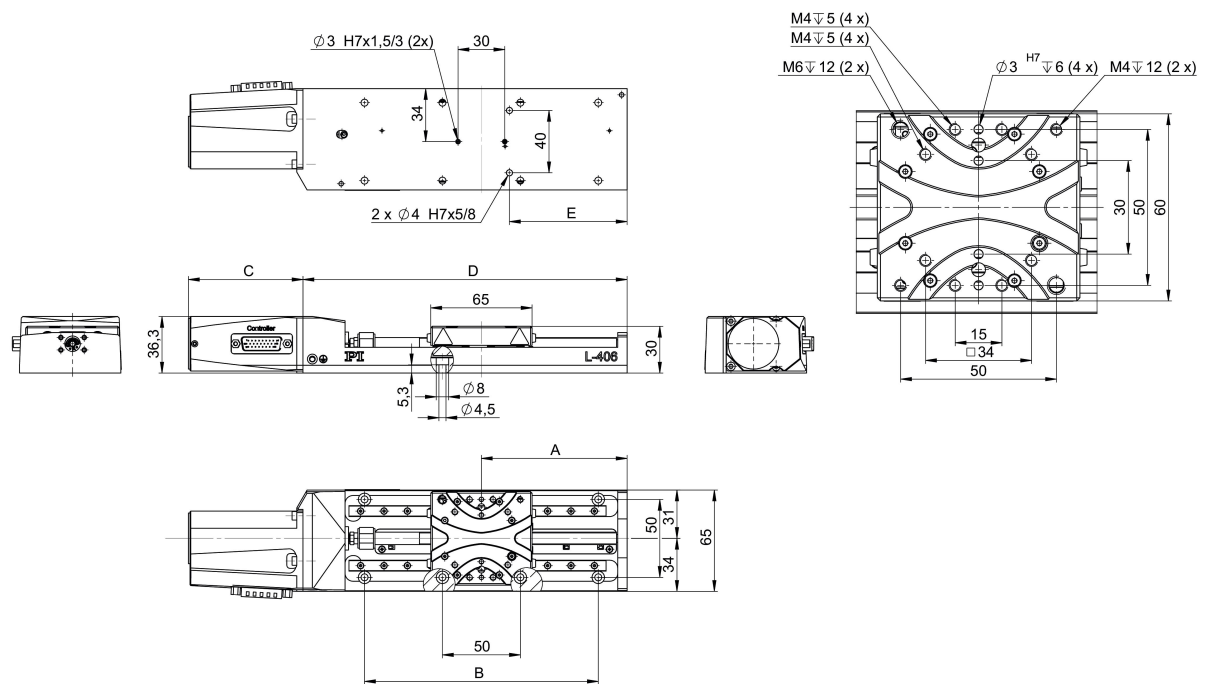
Drive Properties	Unit	Tolerance	L-406.40SD00
Drive type			2-phase stepper motor
Operating voltage	V		24
Motor resolution	Full steps/rev.		200
Drive force in X	N	Typ.	50

Mechanical Properties	Unit	Tolerance	L-406.40SD00
Permissible push force in Y	N	Max.	50
Permissible push force in Z	N	Max.	100
Permissible torque in θX	N·m	Max.	7.5
Permissible torque in θY	N·m	Max.	7.5
Permissible torque in θZ	N·m	Max.	7.5
Holding force in X, passive	N		50
Moved mass in X, unloaded	g		160
Drive screw type			Trapezoidal drive screw
Drive screw pitch	mm		1
Gear ratio i			—
Guide			Recirculating ball bearing guide
Overall mass	g		1000
Material			Aluminum, steel

Miscellaneous	Unit		L-406.40SD00
Operating temperature range	°C		5 to 40
Connector			HD D-sub 26 (m)
Recommended controllers/drivers			C-663.12 C-885 with C-663.12C885 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.

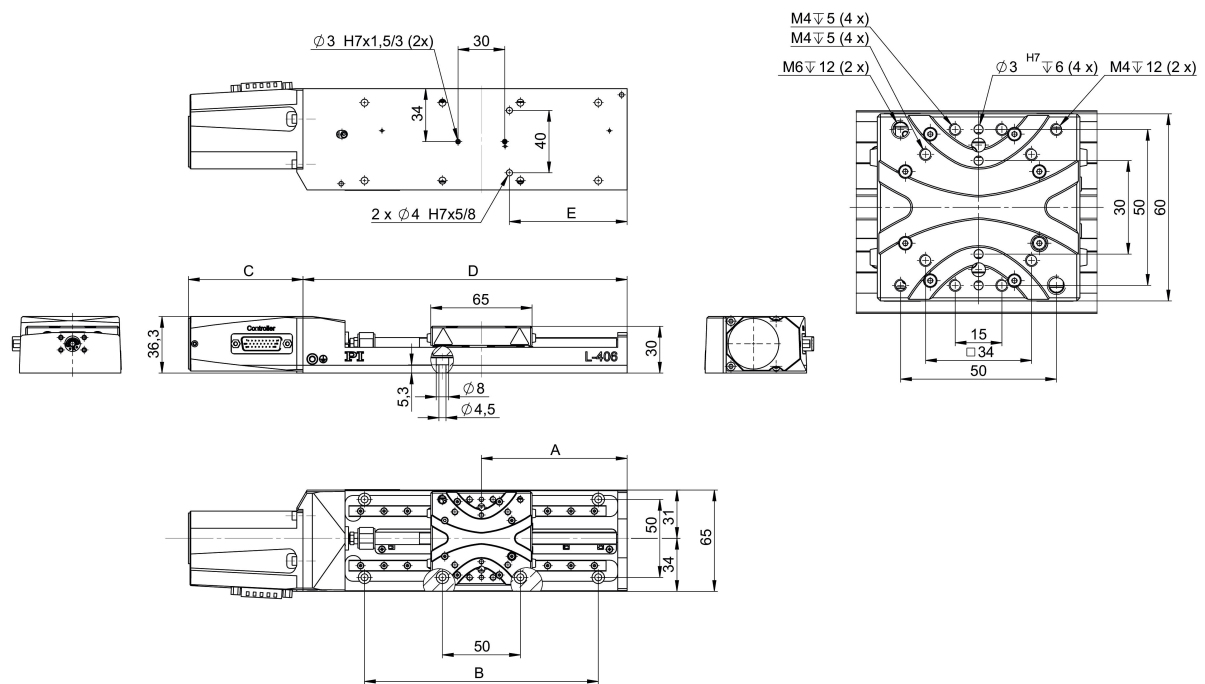
Drawings / Images



	A	B	C	D	E
L-406.10DD10	55,5	-	73,5	132	62,5
L-406.20DD10	68,5	100	73,5	158	75,5
L-406.40DD10	93,5	150	73,5	208	75,5

L-406 with DC motor, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

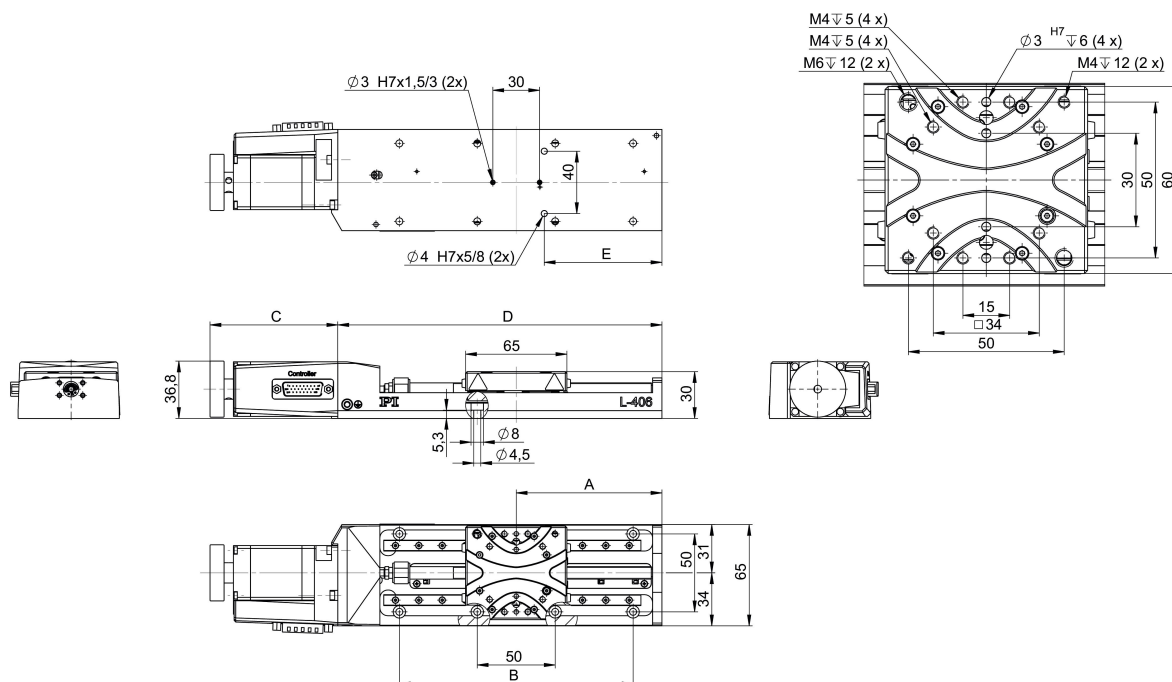
Drawings / Images



	A	B	C	D	E
L-406.10DG10	55,5	-	73,5	132	62,5
L-406.20DG10	68,5	100	73,5	158	75,5
L-406.40DG10	93,5	150	73,5	208	75,5

L-406 with DC gear motor, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Drawings / Images



	A	B	C	D	E
L-406.10SD00	55,5	-	82	132	62,5
L-406.20SD00	68,5	100	82	158	75,5
L-406.40SD00	93,5	150	82	208	75,5

L-406 with 2-phase stepper motor, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Drawings / Images



L-406 linear stages can be combined for multi-axis positioning in several axes without using an adapter plate.

Order Information

L-406.10DD10

Compact linear stage; DC motor; 26 mm travel range; 100 N load capacity; 20 mm/s maximum velocity; trapezoidal-threaded spindle; incremental rotary encoder, 4096 counts/rev sensor resolution; optical limit switches

L-406.20DD10

Compact linear stage; DC motor; 52 mm travel range; 1000 N load capacity; 20 mm/s maximum velocity; trapezoidal-threaded spindle; incremental rotary encoder, 4096 counts/rev sensor resolution; optical limit switches

L-406.40DD10

Compact linear stage; DC motor; 102 mm travel range; 100 N load capacity; 20 mm/s maximum velocity; trapezoidal-threaded spindle; incremental rotary encoder, 4096 counts/rev sensor resolution; optical limit switches

L-406.10DG10

Compact linear stage; DC gear motor; 26 mm travel range; 100 N load capacity; 3 mm/s maximum velocity; trapezoidal-threaded spindle; incremental rotary encoder, 2048 counts/rev sensor resolution; optical limit switches

Order Information

L-406.20DG10

Compact linear stage; DC gear motor; 52 mm travel range; 100 N load capacity; 3 mm/s maximum velocity; trapezoidal-threaded spindle; incremental rotary encoder, 2048 counts/rev sensor resolution; optical limit switches

L-406.40DG10

Compact linear stage; DC gear motor; 102 mm travel range; 100 N load capacity; 3 mm/s maximum velocity; trapezoidal-threaded spindle; incremental rotary encoder, 2048 counts/rev sensor resolution; optical limit switches

L-406.10SD00

Compact linear stage; 2-phase stepper motor; 26 mm travel range; 100 N load capacity; 20 mm/s maximum velocity; trapezoidal-threaded spindle; optical limit switches

L-406.20SD00

Compact linear stage; 2-phase stepper motor; 52 mm travel range; 100 N load capacity; 20 mm/s maximum velocity; trapezoidal-threaded spindle; optical limit switches

L-406.40SD00

Compact linear stage; 2-phase stepper motor; 102 mm travel range; 100 N load capacity; 20 mm/s maximum velocity; trapezoidal-threaded spindle; optical limit switches