

Precision Z Stage

Compact Multi-Axis Combinations with Linear and Rotation Stages



L-310

- Travel range 26 mm (1")
- High-resolution encoder
- DC, BLDC, and stepper motors
- Zero-play ball screw
- Load capacity to 10 kg
- Variants suitable for vacuum available

Precision-class Z stage

High guiding accuracy and stiffness due to ball screws and crossed roller guides. Stress-relieved aluminum base for high stability. Vacuum-compatible product variants on request. Noncontact limit and reference switches (Hall effect). Reference switch with direction sensing in the middle of the travel range.

Drive types

- .xxSD variant: 2-phase stepper motor for high torque even at low velocities and high resolution.
- .023xxx variant: DC servo motor
- .025xxx variant: Brushless DC motor (BLDC) for high rotational velocity. Smooth running and low wear, therefore longer lifetime.

Position measuring

- Versions with DC motor: Rotary encoder
- Optional: Integrated linear encoder, installed centrally.

Highly accurate position measuring with incremental linear encoder

Noncontact optical linear encoders measure the position directly at the platform with the greatest accuracy. Nonlinearity, mechanical play or elastic deformation have no influence on the measurement.

Minimum incremental motion and slow motion

In conjunction with an ACS controller (e.g., ECMsm-4B44T-NNNNN), versions with stepper motor and integrated linear encoder (L-310.xASD) achieve repeatable minimum incremental motion in the range of the sensor resolution. The same configuration achieves constant low velocities of a few sensor increments per second.

Application fields

Precision positioning in industry and research, high duty cycles.

Motion	Unit	Tolerance	L-310.023211	L-310.023212	L-310.023232	L-310.025212	L-310.025232	L-310.20SD	L-310.2ASD
Active axes			Z	Z	Z	Z	Z	Z	Z
Travel range in Z	mm		26	26	26	26	26	26	26
Maximum velocity in Z, unloaded	mm/s		50	50	50	50	50	15	15
Flatness (Linear crosstalk in X with motion in Z)	μm	Typ.	± 3	± 3	± 3	± 3	± 3	± 3	± 3
Straightness (Linear crosstalk in Y with motion in Z)	μm	Typ.	± 3	± 3	± 3	± 3	± 3	± 3	± 3
Yaw (Rotational crosstalk in X with motion in Z)	μrad	Typ.	± 150	± 150	± 150	± 150	± 150	± 150	± 150
Pitch (Rotational crosstalk in Y with motion in Z)	μrad	Typ.	± 150	± 150	± 150	± 150	± 150	± 150	± 150
Roll (Rotational crosstalk in Z with motion in Z)	μrad	Typ.	± 150	± 150	± 150	± 150	± 150	± 150	± 150

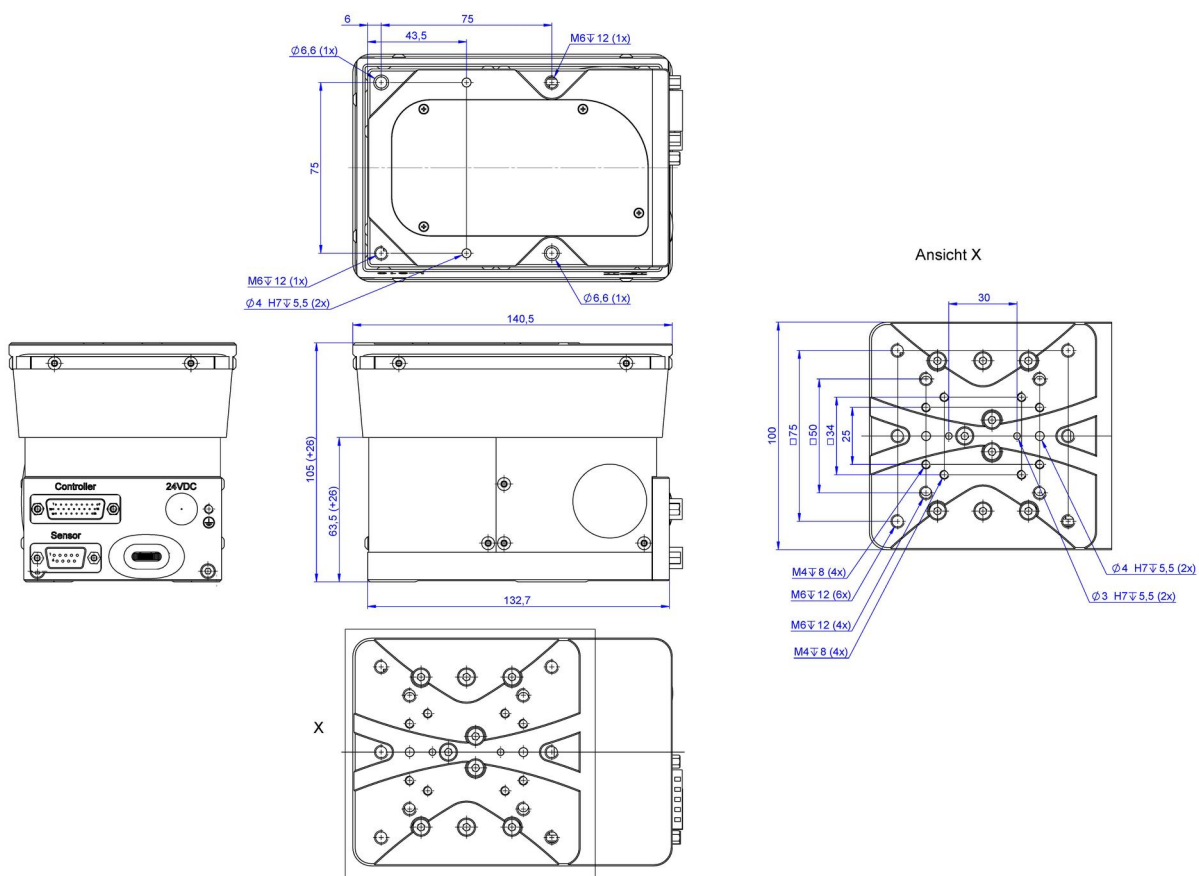
Positioning	Unit	Tolerance	L-310.023211	L-310.023212	L-310.023232	L-310.025212	L-310.025232	L-310.20SD	L-310.2ASD
Integrated sensor			Incremental linear encoder	Incremental linear encoder	Incremental rotary encoder	Incremental linear encoder	Incremental rotary encoder		Incremental linear encoder
Unidirectional repeatability in Z	µm	Typ.	0.2	0.2	0.3	0.2	0.3	0.3	0.1
Bidirectional repeatability in Z	µm	Typ.	± 0.2	± 0.2	± 2	± 0.2	± 2	± 2	± 0.2
Minimum incremental motion in Z	µm	Typ.	0.2	0.2	0.3	0.2	0.3	0.3	0.05
Sensor signal			Sin/cos, 1 V peak-peak	A/B quadrature, RS-422	A/B quadrature, RS-422	A/B quadrature, RS-422	A/B quadrature, RS-422		Sin/cos, 1 V peak-peak
Sensor resolution	nm			50		50			
Sensor signal period	µm		20						20
Sensor resolution	Cts./rev.				16384	20000	20000		
Reference switch			Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN
Reference switch repeatability	µm		2	2	2	2	2	2	2
Limit switches			Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN	Hall effect, N/C contact, 5 V, NPN

Drive Properties	Unit	Tolerance	L-310.023211	L-310.023212	L-310.023232	L-310.025212	L-310.025232	L-310.20SD	L-310.2ASD
Drive type			DC motor	DC motor	DC motor	Brushless DC motor	Brushless DC motor	2-phase stepper motor	2-phase stepper motor
Motor resolution	Full steps/rev.							200	200
Nominal voltage	V		24	24	24	24	24	24	24
Peak voltage	V		48	48	48	48	48	48	48
Drive force in negative direction of motion in Z	N	Typ.	100	100	100	100	100	55	55
Drive force in positive direction of motion in Z	N	Typ.	100	100	100	100	100	55	55

Mechanical Properties	Unit	Tolerance	L-310.023211	L-310.023212	L-310.023232	L-310.025212	L-310.025232	L-310.20SD	L-310.2ASD
Guide			Crossed roller guide	Crossed roller guide	Crossed roller guide	Crossed roller guide	Crossed roller guide	Crossed roller guide	Crossed roller guide
Drive screw type			Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw
Drive screw pitch	mm		1	1	1	1	1	1	1
Holding force in Z, passive	N							50	50
Moved mass in Z, unloaded	g		900	900	900	900	900	900	900
Permissible push force in Y	N	Max.	100	100	100	100	100	100	100
Permissible push force in Z	N	Max.	100	100	100	100	100	55	55
Permissible torque in θ_x	N·m	Max.	40	40	40	40	40	40	40
Permissible torque in θ_Y	N·m	Max.	80	80	80	80	80	80	80
Permissible torque in θ_Z	N·m	Max.	80	80	80	80	80	80	80
Overall mass	g		2700	2700	2700	2700	2700	2700	2800
Material			Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum	Anodized aluminum

Miscellaneous	Unit		L-310.023211	L-310.023212	L-310.023232	L-310.025212	L-310.025232	L-310.20SD	L-310.2ASD
Connector			HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)
Sensor connector			D-sub 9-pin (m)						D-sub 9-pin (m)
Recommended controllers / drivers			C-863 C-885 with C-863.20C885 C-884 G-901 G-910 ACS modular controller	C-863 C-885 with C-863.20C885 C-884 G-901 G-910 ACS modular controller	C-863 C-885 with C-863.20C885 C-884 G-901 G-910 ACS modular controller	G-901 G-910 ACS modular controller	G-901 G-910 ACS modular controller	C-663.12 C-885 with C-663.12C885 G-901 G-910 ACS modular controller	C-663.12 C-885 with C-663.12C885 G-901 G-910 ACS modular controller
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

Drawings / Images



L-310, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Order Information

L-310.023211

Precision Z stage; DC motor; 26 mm travel range; 100 N load capacity; 50 mm/s maximum velocity; ball screw; incremental linear encoder, 20 µm sensor signal period, sin/cos, 1 V peak-peak

L-310.023212

Precision Z stage; DC motor; 26 mm travel range; 100 N load capacity; 50 mm/s maximum velocity; ball screw; incremental linear encoder, 50 nm sensor resolution, A/B quadrature, RS-422

L-310.023232

Precision Z stage; DC motor; 26 mm travel range; 100 N load capacity; 50 mm/s maximum velocity; ball screw; incremental rotary encoder, 16384 counts/rev sensor resolution, A/B quadrature, RS-422

L-310.025212

Precision Z stage; brushless DC motor; 26 mm travel range; 100 N load capacity; 50 mm/s maximum velocity; ball screw; incremental linear encoder, 50 nm sensor resolution, A/B quadrature, RS-422

L-310.025232

Precision Z stage; brushless DC motor; 26 mm travel range; 100 N load capacity; 50 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 counts/rev sensor resolution, A/B quadrature, RS-422

L-310.20SD

Precision Z stage; 2-phase stepper motor; 26 mm travel range; 55 N load capacity; 15 mm/s maximum velocity; ball screw

L-310.2ASD

Precision Z stage; 2-phase stepper motor; 26 mm travel range; 55 N load capacity; 15 mm/s maximum velocity; ball screw; incremental linear encoder, 20 µm sensor signal period, sin/cos, 1 V peak-peak