Precision XY Stage

High Travel Accuracy and Stability

L-731

- Travel range 205 mm × 205 mm (8")
- Unidirectional repeatability to 0.025 µm
- Velocity to 90 mm/s
- 2-phase stepper motor or DC motors
- Incremental linear encoder with 1 nm resolution
- Rotary encoder with 20000 impulses/revolution

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. Optical limit and reference switches. More travel ranges on request.

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

Drive types
- 2-phase stepper motor for high torque even at low velocities and higher resolution
- DC motor for high velocity constancy, low vibration, and high velocities

Application fields
Medical industry. Laser cutting. Biotechnology. Measuring technology. Laser inscription.

Motion	Unit	Tolerance	L-731.093111	L-731.093112	L-731.093132	L-731.40SD	L-731.44SD	L-731.4ASD
Active axes			X | Y	X | Y	X | Y	X | Y	X | Y	X | Y
Travel range in X	mm		205	205	205	205	205	205
Travel range in Y	mm		205	205	205	205	205	205
Maximum velocity in X, unloaded	mm/s		50	50	90	45	45	45
Maximum velocity in Y, unloaded	mm/s		50	50	90	45	45	45
Orthogonality	µrad	Typ.	±96.96	±96.96	±96.96	±96.96	±96.96	±96.96
Straightness error E_XY (straightness)	µm	Typ.	±2	±2	±2	±2	±2	±2
Straightness error E_YX (straightness)	µm	Typ.	±2	±2	±2	±2	±2	±2
Straightness error E_ZX (flatness)	µm	Typ.	±2	±2	±2	±2	±2	±2
Straightness error E_ZY (flatness)	µm	Typ.	±2	±2	±2	±2	±2	±2
Angular error E_AY (pitch)	µrad	Typ.	±75	±75	±75	±75	±75	±75
Angular error E_BX (pitch)	µrad	Typ.	±75	±75	±75	±75	±75	±75
Angular error E_CX (yaw)	µrad	Typ.	±30	±30	±30	±30	±30	±30
Angular error E_CY (yaw)	µrad	Typ.	±30	±30	±30	±30	±30	±30

Positioning	Unit	Tolerance	L-731.093111	L-731.093112	L-731.093132	L-731.40SD	L-731.44SD	L-731.4ASD
Minimum incremental motion in X	µm	Typ.	0.1	0.5	0.8	1	0.05	0.05
Minimum incremental motion in Y	µm	Typ.	0.1	0.5	0.8	1	0.05	0.05
Unidirectional repeatability in X	µm	Typ.	±0.05	±0.25	±0.4	±0.5	±0.025	±0.025
Unidirectional repeatability in Y	µm	Typ.	±0.05	±0.25	±0.4	±0.5	±0.025	±0.025
Bidirectional repeatability in X	µm	Typ.	1	1	5	5	1	1
Bidirectional repeatability in Y	µm	Typ.	1	1	5	5	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	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
Reference switch repeatability	µm		1	1	1	1	1	1
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
Integrated sensor			Incremental linear encoder	Incremental linear encoder	Incremental rotary encoder	—	Incremental linear encoder	Incremental linear encoder
Sensor signal			Sin/cos, 1 V peak-peak	A/B quadrature, RS-422	A/B quadrature, RS-422	—	A/B quadrature, RS-422	Sin/cos, 1 V peak-peak
Sensor signal period	µm		20	—	—	—	—	20
System resolution in X	nm		1	10	100	10000	10	1
System resolution in Y	nm		1	10	100	10000	10	1
Sensor resolution	Cts./rev.		—	—	20000	—	—	—

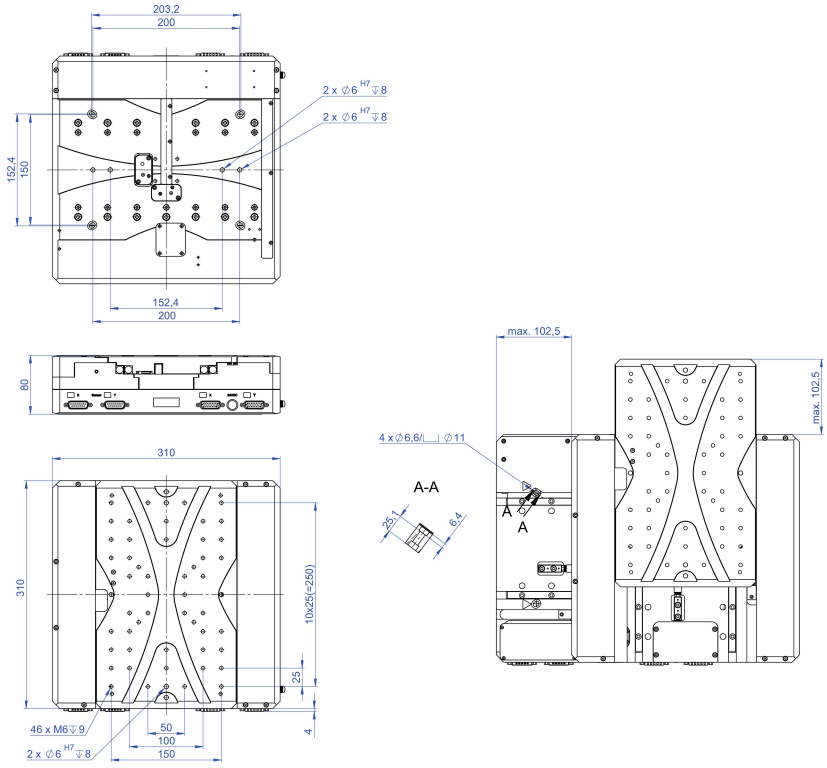
Drive Properties	Unit	Tolerance	L-731.093111	L-731.093112	L-731.093132	L-731.40SD	L-731.44SD	L-731.4ASD
Drive type			DC motor	DC motor	DC motor	2-phase stepper motor	2-phase stepper motor	2-phase stepper motor
Operating voltage	V		24	24	24	24	24	24
Nominal current, RMS	A	Typ.	3.9	3.9	3.9	1.2	1.2	1.2
Motor resolution	Full steps/rev.		—	—	—	200	200	200
Drive force in X	N	Typ.	100	100	100	100	100	100
Drive force in Y	N	Typ.	100	100	100	100	100	100
Resistance phase-phase	Ω	Typ.	5.84	5.84	5.84	3.4	3.4	3.4
Inductance phase-phase	mH		0.56	0.56	0.56	2.8	2.8	2.8

Mechanical Properties	Unit	Tolerance	L-731.093111	L-731.093112	L-731.093132	L-731.40SD	L-731.44SD	L-731.4ASD
Permissible push force in Z	N	Max.	200	200	200	200	200	200
Permissible torque in θX	N·m	Max.	125	125	125	125	125	125
Permissible torque in θY	N·m	Max.	125	125	125	125	125	125
Permissible torque in θZ	N·m	Max.	125	125	125	125	125	125
Moved mass in X, unloaded	g		12000	12000	12000	12000	12000	12000
Moved mass in Y, unloaded	g		3500	3500	3500	3500	3500	3500
Drive screw type			Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw
Drive screw pitch	mm		2	2	2	2	2	2
Guide			Crossed roller guide	Crossed roller guide	Crossed roller guide	Crossed roller guide	Crossed roller guide	Crossed roller guide
Overall mass	g		16000	16000	16000	15500	15500	15500
Material			Aluminum, black anodized	Aluminum, black anodized	Aluminum, black anodized	Aluminum, black anodized	Aluminum, black anodized	Aluminum, black anodized

Miscellaneous	Unit		L-731.093111	L-731.093112	L-731.093132	L-731.40SD	L-731.44SD	L-731.4ASD
Operating temperature range	°C		5 to 40	5 to 40	5 to 40	5 to 40	5 to 40	5 to 40
Connector			2 × HD D-sub 26 (m)	2 × HD D-sub 26 (m)	2 × HD D-sub 26 (m)	2 × HD D-sub 26 (m)	2 × HD D-sub 26 (m)	2 × HD D-sub 26 (m)
Sensor connector			2 × D-sub 15 (f)	—	—	—	—	2 × D-sub 15 (f)
Recommended controllers / drivers			G-901.R319 C-891.130300 C-885 with C-891.11C885 ACS modular controller	G-901.R319 C-863.12 C-885 with C-863.20C885 C-884.4DC, C-884.6DC ACS modular controller	G-901.R319 C-863.12 C-885 with C-863.20C885 C-884.4DC, C-884.6DC ACS modular controller	G-901.R319 C-663.12 C-885 with C-663.12C885 ACS modular controller	G-901.R319 C-663.12 C-885 with C-663.12C885 ACS modular controller	G-901.R319 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-731, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

Order Information

L-731.093111
Precision XY stage; DC motor; 205 mm × 205 mm travel range (X × Y); 200 N load capacity; 50 mm/s × 50 mm/s maximum velocity; ball screw; incremental linear encoder, 20 µm sensor signal period, sin/cos, 1 V peak-peak

L-731.093112
Precision XY stage; DC motor; 205 mm x 205 mm travel range (X × Y); 200 N load capacity; 50 mm/s × 50 mm/s maximum velocity; ball screw; incremental linear encoder, A/B quadrature, RS-422

L-731.093132
Precision XY stage; DC motor; 205 mm × 205 mm travel range (X × Y); 200 N load capacity; 90 mm/s × 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 counts/rev sensor resolution, A/B quadrature, RS-422

L-731.40SD
Precision XY stage; 2-phase stepper motor; 205 mm × 205 mm travel range (X × Y); 200 N load capacity; 45 mm/s × 45 mm/s maximum velocity; ball screw

L-731.44SD
Precision XY stage; 2-phase stepper motor; 205 mm x 205 mm travel range (X × Y); 200 N load capacity; 45 mm/s × 45 mm/s maximum velocity; ball screw; incremental linear encoder, A/B quadrature, RS-422

L-731.4ASD
Precision XY stage; 2-phase stepper motor; 205 mm × 205 mm travel range (X × Y); 200 N load capacity; 45 mm/s × 45 mm/s maximum velocity; ball screw; incremental linear encoder, 20 µm sensor signal period, sin/cos, 1 V peak-peak