

## Precision XY Stage

High Travel Accuracy and Stability



### L-731

- Travel range 205 mm × 205 mm (8")
- Unidirectional repeatability to 0.1 μm
- Velocity to 90 mm/s
- 2-phase stepper motors or DC motors
- Incremental encoder with 10 nm resolution
- Rotary encoder with 20000 impulses/revolutions

#### Direct position measurement with incremental encoder

Noncontact optical encoders measure the actual position directly at the motion platform with the greatest accuracy so that nonlinearity, mechanical play or elastic deformation have no influence on position measuring. Optical limit and reference point switches.

#### Crossed roller bearings

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

#### 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

Other travel ranges on request.

#### Fields of application

Industry and research. Metrology, inspection, industrial microscopy

## Specifications

	L-731.40SD	L-731.44SD	L-731.4ASD	Unit	Tolerance
	XY stage with stepper motor	XY stage with stepper motor and linear encoder (direct position measurement)	XY stage with stepper motor and linear encoder (direct position measurement)		
<b>Motion and positioning</b>					
Active axes	X, Y	X, Y	X, Y		
Travel range	205 × 205	205 × 205	205 × 205	mm	
Integrated sensor	–	Incremental linear encoder with A/B quadrature signal transmission	Incremental linear encoder with sin/cos signal transmission		
Sensor resolution	–	10	10*	nm	
Sensor signal period	–	–	20	µm	
Minimum incremental motion	1.25**	0.05	0.05	µm	typ.
Unidirectional repeatability	0.5**	0.1	0.1	µm	typ.
Bidirectional repeatability	±5**	±0.5	±0.5	µm	typ.
Backlash	3	–	–	µm	
Pitch	±75	±75	±75	µrad	typ.
Yaw	±75	±75	±75	µrad	typ.
Straightness / flatness	±3	±3	±3	µm	typ.
Velocity	45	45	45	mm/s	max.
Reference and limit switches	optical	optical	optical		
<b>Mechanical properties</b>					
Load capacity	50	50	50	N	
Permissible torque in $\theta_x$ , $\theta_y$	125	125	125	N·m	
Permissible torque in $\theta_z$	125	125	125	N·m	
Moved mass in X	12	12	12	kg	
Moved mass in Y	3.5	3.5	3.5	kg	
Overall mass	15.5	15.5	15.5	kg	
Guiding	Crossed roller guide with anti-creep system	Crossed roller guide with anti-creep system	Crossed roller guide with anti-creep system		
<b>Drive properties</b>					
Motor Type	2-phase stepper motor	2-phase stepper motor	2-phase stepper motor		
Spindle pitch	2	2	2	mm	
Operating voltage	24-48	24-48	24-48	V	
Motor power	5	5	5	W	nominal
<b>Miscellaneous</b>					
Operating temperature range	10 to 50	10 to 50	10 to 50	°C	

	L-731.40SD	L-731.44SD	L-731.4ASD	Unit	Tolerance
Humidity	20 – -90 % rel., not condensing	20 – -90 % rel., not condensing	20 – -90 % rel., not condensing		
Material	Aluminum, black anodized	Aluminum, black anodized	Aluminum, black anodized		
Connection	Motor connection: 2 × HD Sub-D 26 (m)	Motor and sensor connection: 2 × HD Sub-D 26 (m)	Motor connection: 2 × HD Sub-D 26 (m) Sensor connection: 2 × Sub-D 15 (f)		
Recommended controller	2 × C-663 Mercury Step Motion Controller, SMC Hydra Motion Controller for 2 axes C-885 PIMotionMaster for multi-axis controller systems	2 × C-663 Mercury Step motion controller C-885 PIMotionMaster for multi-axis controller systems	SMC Hydra Motion Controller for 2 axes		

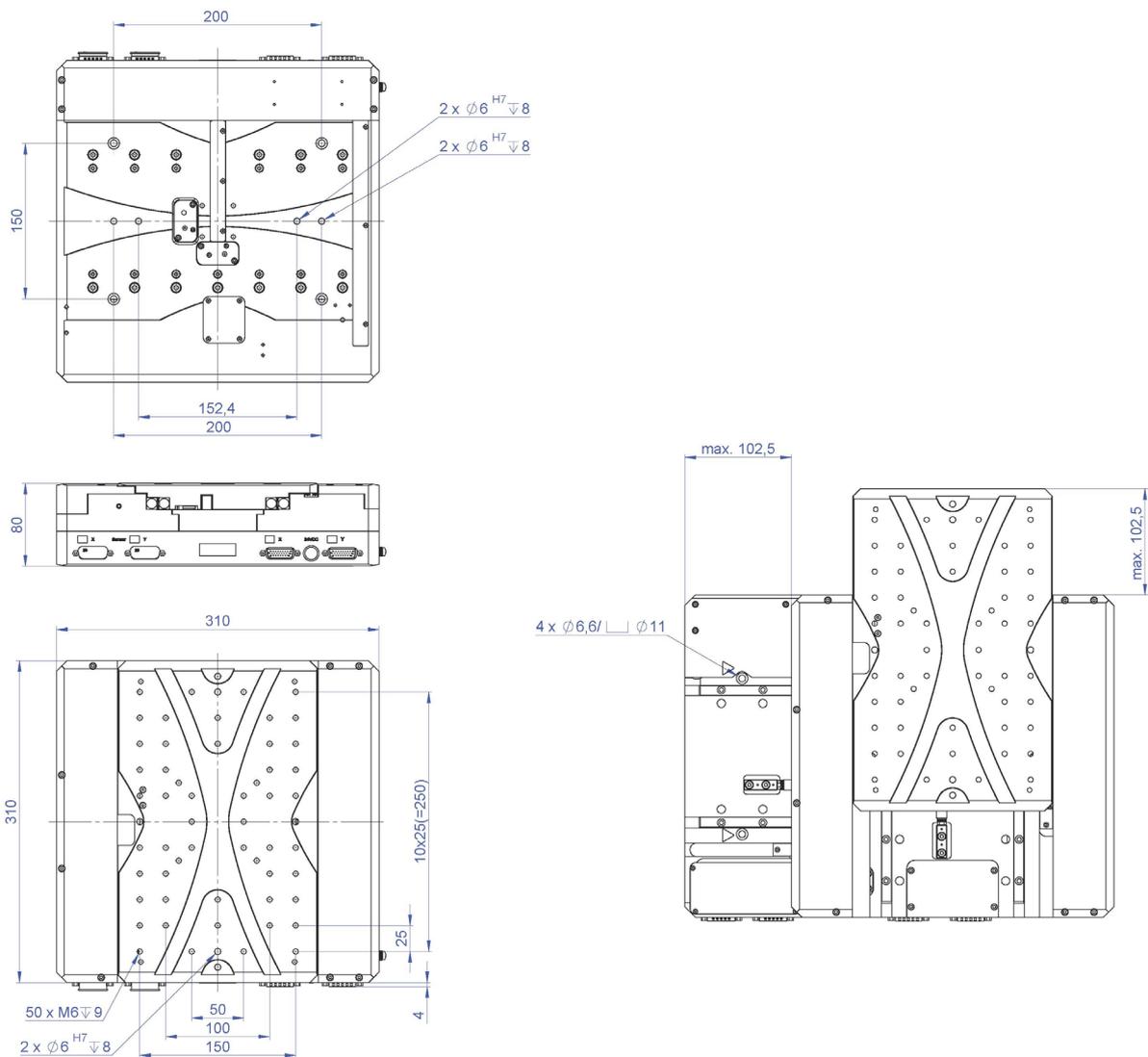
	L-731.093132	L-731.093112	L-731.093111	Unit	Tolerance
	XY stage with DC motor and rotary encoder	XY stage with DC motor and linear encoder (direct position measurement)	XY stage with DC motor and linear encoder (direct position measurement)		
<b>Motion and positioning</b>					
Active axes	X, Y	X, Y	X, Y		
Travel range	205 × 205	205 × 205	205 × 205	mm	
Integrated sensor	Rotary encoder	Incremental linear encoder with A/B quadrature signal transmission	Incremental linear encoder with sin/cos signal transmission		
Sensor resolution		10	10*	nm	
Sensor resolution	20000	–	–	Cts./rev.	
Sensor signal period	–	–	20	μm	
Minimum incremental motion	0.8	1	0.1	μm	typ.
Unidirectional repeatability	0.5	0.2	0.1	μm	typ.
Bidirectional repeatability	±5	±0.5	±0.5	μm	typ.
Backlash	3	–	–	μm	
Pitch	±75	±75	±75	μrad	typ.
Yaw	±75	±75	±75	μrad	typ.
Straightness / flatness	±3	±3	±3	μm	typ.
Velocity	90	50	50	mm/s	max.
Reference and limit switches	optical	optical	optical		
<b>Mechanical properties</b>					
Load capacity	50	50	50	N	
Permissible torque in $\theta_x, \theta_y$	125	125	125	N·m	
Permissible torque in $\theta_z$	125	125	125	N·m	
Moved mass in X	12	12	12	kg	
Moved mass in Y	3.5	3.5	3.5	kg	
Overall mass	16	16	16	kg	
Guiding	Crossed roller guide with anti-creep system	Crossed roller guide with anti-creep system	Crossed roller guide with anti-creep system		

<b>Drive properties</b>					
Motor Type	DC motor	DC motor	DC motor		
Spindle pitch	2	2	2	mm	
Operating voltage	24	24	24	V	
Motor power	5	5	5	W	nominal
<b>Miscellaneous</b>					
Operating temperature range	10 to 50	10 to 50	10 to 50	°C	
Humidity	20 – -90 % rel., not condensing	20 – -90 % rel., not condensing	20 – -90 % rel., not condensing		
Material	Aluminum, black anodized	Aluminum, black anodized	Aluminum, black anodized		
Connection	Motor connection: 2 × HD Sub-D 26 (m)	Motor and sensor connection: 2 × HD Sub-D 26 (m)	Motor connection: 2 × HD Sub-D 26 (m) Sensor connection: 2 × Sub-D 15 (f)		
Recommended controller	2 × C-863 Mercury motion controller, SMC Hydra motion controller for 2 axes C-885 PIMotionMaster for multi-axis controller systems C-884 four-channel motion controller	2 × C-863 Mercury motion controller, SMC Hydra motion controller for 2 axes C-885 PIMotionMaster for multi-axis controller systems C-884 four-channel motion controller	SMC Hydra Motion Controller for 2 axes		

\* with SMC Hydra. Other interpolation factors available as an option.

All cables required for operation with the recommended controller are included in the scope of delivery. Cable for connecting to other controllers can be ordered as accessory.

## Drawings and Images



L-731, dimensions in mm

## Ordering Information

### L-731.40SD

Precision XY Stage, 310 mm × 310 mm Width, 205 mm × 205 mm Travel Range, 2-Phase Stepper Motor

### L-731.4ASD

Precision XY Stage, 310 mm × 310 mm Width, 205 mm × 205 mm Travel Range, 2-Phase Stepper Motor, Linear Encoder with Sin/Cos Signal Transmission, 20 μm Sensor signal period

### L-731.44SD

Precision XY Stage, 310 mm × 310 mm Width, 205 mm × 205 mm Travel Range, 2-Phase Stepper Motor, Linear Encoder with A/B Quadrature Signal Transmission, 10 nm Sensor Resolution

**L-731.093132**

Precision XY Stage, 310 mm × 310 mm Width, 205 mm × 205 mm Travel Range, DC Motor, Rotary Encoder

**L-731.093111**

Precision XY Stage, 310 mm × 310 mm Width, 205 mm × 205 mm Travel Range, DC Motor, Linear Encoder with Sin/Cos Signal Transmission, 20 µm Sensor signal period

**L-731.093112**

Precision XY Stage, 310 mm × 310 mm Width, 205 mm × 205 mm Travel Range, DC Motor, Linear Encoder with A/B Quadrature Signal Transmission , 10 nm Sensor Resolution