

# High-Precision Linear Stage

## High Travel Accuracy



### L-511

- Travel ranges from 52 to 155 mm (2" to 6")
- Repeatability to 0.1 µm
- Active Drive DC, BLDC, and DC gear motor
- Stepper motor
- Optional: Linear encoder for direct position measuring
- Direction-sensing reference switch

#### Reference-class linear stage

High travel accuracy and load capacity thanks to recirculating ball bearing guides. Precision ball screw with 2 mm pitch. Stress-relieved aluminum base for high stability. Noncontact optical limit switches. Noncontact optical reference switch with direction sensing in the middle of the travel range.

#### Motor types available

- ActiveDrive DC motor for high velocity: Control via pulse-width-modulated (PWM) signals, the operating voltage is achieved via an amplifier integrated in the motor housing
- DC servo motor with gearbox for high torques and resolution at low motor power
- Brushless DC motor: For applications with a high duty cycle. Use a controller with sine commutation for an exceptionally smooth synchronous motion and low vibrations even at a very low velocity.
- 2-phase stepper motor for low velocity and high resolution

#### Types of position measuring

- Without encoder (open loop)
- Integrated rotary encoder on the motor shaft
- Incremental linear encoder

#### 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.

#### Application fields

Autofocus. Laser cutting. Research. Biotechnology. Automation. Optical alignment.

Motion	Unit	Tolerance	L-511. 033111	L-511. 053111	L-511. 073111	L-511. 035111	L-511. 055111	L-511. 075111	L-511. 033132	L-511. 053132
Active axes			X	X	X	X	X	X	X	X
Travel range in X	mm		52	102	155	52	102	155	52	102
Maximum velocity in X, un-loaded	mm/s		90	90	90	90	90	90	90	90
Straightness error in Y (straightness)	µm	Typ.	±1.5	±2.5	±3	±1.5	±2.5	±3	±1.5	±2.5
Straightness error in Z (flatness)	µm	Typ.	±1.5	±2.5	±3	±1.5	±2.5	±3	±1.5	±2.5
Angular error around Y (pitch)	µrad	Typ.	±40	±60	±70	±40	±60	±70	±40	±60
Angular error around Z (yaw)	µrad	Typ.	±40	±60	±70	±40	±60	±70	±40	±60

Positioning	Unit	Tolerance	L-511.033111	L-511.053111	L-511.073111	L-511.035111	L-511.055111	L-511.075111	L-511.033132	L-511.053132
Minimum incremental motion in X	µm	Typ.	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Unidirectional repeatability in X	µm	Typ.	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1
Bidirectional repeatability in X	µm	Typ.	0.4	0.4	0.4	0.4	0.4	0.4	2.5	2.5
Backlash in X	µm	Typ.	—	—	—	—	—	—	—	—
Reference switch			Optical							
Limit switches			Optical							
Integrated sensor			Incremental linear encoder	Incremental rotary encoder	Incremental rotary encoder	Incremental rotary encoder				
Sensor signal			Sin/cos, 1 V peak-peak	A/B quadrature, RS-422	A/B quadrature, RS-422					
Sensor signal period	µm		—	—	—	20	20	20	—	—
Sensor resolution	nm		—	—	—	—	—	—	—	—
Sensor resolution	Cts./rev.		—	—	—	—	—	—	20000	20000
Motor encoder			—	—	—	Incremental rotary encoder	Incremental rotary encoder	—	—	—
Motor encoder: Sensor signal			—	—	—	A/B quadrature, RS-422	A/B quadrature, RS-422	—	—	—
Resolution, motor encoder	Cts./rev.		—	—	—	20000	20000	20000	—	—

Drive Properties	Unit	Tolerance	L-511.033111	L-511.053111	L-511.073111	L-511.035111	L-511.055111	L-511.075111	L-511.033132	L-511.053132
Drive type			DC motor	DC motor	DC motor	Brushless DC motor	Brushless DC motor	Brushless DC motor	DC motor	DC motor
Nominal voltage	V		24	24	24	24	24	24	24	24
Peak voltage	V		48	48	48	48	48	48	48	48
Nominal current, RMS	A	Typ.	—	—	—	2.42	2.42	2.42	—	—
Motor resolution	Full steps/rev.		—	—	—	—	—	—	—	—
Drive force in positive direction of motion in X	N	Typ.	100	100	100	100	100	100	100	100
Drive force in negative direction of motion in X	N	Typ.	100	100	100	100	100	100	100	100
Torque constant	N·m/A	Typ.	—	—	—	0.031	0.031	0.031	—	—
Resistance phase-phase	Ω	Typ.	—	—	—	0.81	0.81	0.81	—	—
Inductance phase-phase	mH		—	—	—	0.64	0.64	0.64	—	—
Back EMK, rotational	V/kRPM	Max.	—	—	—	—	—	—	—	—
Back EMF, phase-phase, rotational	V/kRPM	Max.	—	—	—	3.3	3.3	3.3	—	—
Number of pole pairs			—	—	—	7	7	7	—	—

Mechanical Properties	Unit	Tolerance	L-511.033111	L-511.053111	L-511.073111	L-511.035111	L-511.055111	L-511.075111	L-511.033132	L-511.053132
Permissible push force in X	N	Max.	—	—	—	500	500	500	—	—
Permissible push force in Y	N	Max.	250	250	250	250	250	250	250	250
Permissible push force in Z	N	Max.	500	500	500	500	500	500	500	500
Permissible pull force in Y	N	Max.	250	250	250	250	250	250	250	250
Permissible torque in θX	N·m	Max.	60	60	60	60	60	60	60	60
Permissible torque in θY	N·m	Max.	30	30	30	30	30	30	30	30
Permissible torque in θZ	N·m	Max.	30	30	30	30	30	30	30	30
Holding force in X, passive	N		—	—	—	—	—	—	—	—
Moved mass in X, unloaded	g		600	600	650	600	600	650	600	600
Drive screw type			Ball screw							
Drive screw pitch	mm		2	2	2	2	2	2	2	2
Gear ratio i			—	—	—	1	1	1	—	—
Guide			Recirculating ball bearing guide							
Overall mass	g		2500	2600	3100	2400	2700	3000	2500	2600
Material			Aluminum, stainless steel							

Miscellaneous	Unit	L-511.033111	L-511.053111	L-511.073111	L-511.035111	L-511.055111	L-511.075111	L-511.033132	L-511.053132
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)
Sensor connector		D-sub 9 (m)	D-sub 9 (m)	D-sub 9 (m)	D-sub 9 (m)	D-sub 9 (m)	D-sub 9 (m)	—	—
Recommended controllers / drivers		C-863 C-885 with C-863. 20C885 C-884 ACS modular controller	C-863 C-885 with C-863. 20C885 C-884 ACS modular controller	C-863 C-885 with C-863. 20C885 C-884 ACS modular controller	ACS modular controller	ACS modular controller	ACS modular controller	C-863 C-885 with C-863. 20C885 C-884 ACS modular controller	C-863 C-885 with C-863. 20C885 C-884 ACS modular controller

Motion	Unit	Tolerance	L-511.073132	L-511.035132	L-511.055132	L-511.075132	L-511.20DG10	L-511.40DG10	L-511.60DG10	L-511.20SD00
Active axes			X	X	X	X	X	X	X	X
Travel range in X	mm		155	52	102	155	52	102	155	52
Maximum velocity in X, unloaded	mm/s		90	90	90	90	6	6	6	45
Straightness error in Y (straightness)	µm	Typ.	±3	±1.5	±2.5	±3	±1.5	±2.5	±3	±1.5
Straightness error in Z (flatness)	µm	Typ.	±3	±1.5	±2.5	±3	±1.5	±2.5	±3	±1.5
Angular error around Y (pitch)	µrad	Typ.	±70	±40	±60	±70	±40	±60	±70	±40
Angular error around Z (yaw)	µrad	Typ.	±70	±40	±60	±70	±40	±60	±70	±40

Positioning	Unit	Tolerance	L-511.073132	L-511.035132	L-511.055132	L-511.075132	L-511.20DG10	L-511.40DG10	L-511.60DG10	L-511.20SD00
Minimum incremental motion in X	µm	Typ.	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.2
Unidirectional repeatability in X	µm	Typ.	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1	±0.1
Bidirectional repeatability in X	µm	Typ.	2.5	2.5	2.5	2.5	4	4	4	4
Backlash in X	µm	Typ.	—	—	—	—	—	—	—	1
Reference switch			Optical	Optical						
Limit switches			Optical	Optical						
Integrated sensor			Incremental rotary encoder	—						
Sensor signal			A/B quadrature, RS-422	—						
Sensor signal period	µm		—	—	—	—	—	—	—	—
Sensor resolution	nm		—	—	—	—	—	—	—	—
Sensor resolution	Cts./rev.		20000	20000	20000	20000	4096	4096	4096	—
Motor encoder			—	Incremental rotary encoder	Incremental rotary encoder	—	—	—	—	—
Motor encoder: Sensor signal			—	—	—	—	—	—	—	—
Resolution, motor encoder	Cts./rev.		—	20000	20000	20000	—	—	—	—

Drive Properties	Unit	Tolerance	L-511. 073132	L-511. 035132	L-511. 055132	L-511. 075132	L-511. 20DG10	L-511. 40DG10	L-511. 60DG10	L-511. 20SD00
Drive type			DC motor	Brushless DC motor	Brushless DC motor	Brushless DC motor	DC gear motor	DC gear motor	DC gear motor	2-phase stepper motor
Nominal voltage	V		24	24	24	24	24	24	24	24
Peak voltage	V		48	48	48	48	48	48	48	48
Nominal current, RMS	A	Typ.	—	2.42	2.42	2.42	—	—	—	—
Motor resolution	Full steps/rev.		—	—	—	—	—	—	—	200
Drive force in positive direction of motion in X	N	Typ.	100	100	100	100	100	100	100	100
Drive force in negative direction of motion in X	N	Typ.	100	100	100	100	100	100	100	100
Torque constant	N·m/A	Typ.	—	0.031	0.031	0.031	—	—	—	—
Resistance phase-phase	Ω	Typ.	—	0.81	0.81	0.81	4.09	4.09	4.09	3.3
Inductance phase-phase	mH		—	0.64	0.64	0.64	0.18	0.18	0.18	2.8
Back EMK, rotational	V/kRPM	Max.	—	—	—	—	1.68	1.68	1.68	—
Back EMF, phase-phase, rotational	V/kRPM	Max.	—	3.3	3.3	3.3	1.68	1.68	1.68	—
Number of pole pairs			—	7	7	7	—	—	—	—

Mechanical Properties	Unit	Tolerance	L-511. 073132	L-511. 035132	L-511. 055132	L-511. 075132	L-511. 20DG10	L-511. 40DG10	L-511. 60DG10	L-511. 20SD00
Permissible push force in X	N	Max.	—	500	500	500	500	500	500	—
Permissible push force in Y	N	Max.	250	250	250	250	250	250	250	250
Permissible push force in Z	N	Max.	500	500	500	500	500	500	500	500
Permissible pull force in Y	N	Max.	250	250	250	250	250	250	250	250
Permissible torque in θX	N·m	Max.	60	60	60	60	60	60	60	60
Permissible torque in θY	N·m	Max.	30	30	30	30	30	30	30	30
Permissible torque in θZ	N·m	Max.	30	30	30	30	30	30	30	30
Holding force in X, passive	N		—	—	—	—	50	50	50	50
Moved mass in X, unloaded	g		650	600	600	650	600	600	650	600
Drive screw type			Ball screw							
Drive screw pitch	mm		2	2	2	2	2	2	2	2
Gear ratio i			—	1	1	1	29,642	29,642	29,642	—
Guide			Recirculating ball bearing guide							
Overall mass	g		3100	2400	2700	3000	2500	2700	2900	2400
Material			Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, steel	Aluminum, steel	Aluminum, steel	Aluminum, steel

Miscellaneous	Unit		L-511. 073132	L-511. 035132	L-511. 055132	L-511. 075132	L-511. 20DG10	L-511. 40DG10	L-511. 60DG10	L-511. 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)
Sensor connector			—	—	—	—	—	—	—	—
Recommended controllers / drivers			C-863 C-885 with C-863. 20C885 C-884	C-891 C-885 with C-891. 10C885 ACS modular controller	C-891 C-885 with C-891. 10C885 ACS modular controller	C-891 C-885 with C-891. 10C885 ACS modular controller	C-863 C-885 with C-863. 20C885 C-884	C-863 C-885 with C-863. 20C885 C-884	C-863 C-885 with C-863. 20C885 C-884	C-663.12 C-885 with C-663. 12C885 ACS modular controller

Motion	Unit	Tolerance	L-511.40SD00	L-511.60SD00	L-511.2ASD00	L-511.4ASD00	L-511.6ASD00
Active axes			X	X	X	X	X
Travel range in X	mm		102	155	52	102	155
Maximum velocity in X, unloaded	mm/s		45	45	45	45	45
Straightness error in Y (straightness)	µm	Typ.	±2.5	±3	±1.5	±2.5	±3
Straightness error in Z (flatness)	µm	Typ.	±2.5	±3	±1.5	±2.5	±3
Angular error around Y (pitch)	µrad	Typ.	±60	±70	±40	±60	±70
Angular error around Z (yaw)	µrad	Typ.	±60	±70	±40	±60	±70

Positioning	Unit	Tolerance	L-511.40SD00	L-511.60SD00	L-511.2ASD00	L-511.4ASD00	L-511.6ASD00
Minimum incremental motion in X	µm	Typ.	0.2	0.2	0.02	0.02	0.02
Unidirectional repeatability in X	µm	Typ.	±0.1	±0.1	±0.05	±0.05	±0.05
Bidirectional repeatability in X	µm	Typ.	4	4	0.4	0.4	0.4
Backlash in X	µm	Typ.	1	1	—	—	—
Reference switch			Optical	Optical	Optical	Optical	Optical
Limit switches			Optical	Optical	Optical	Optical	Optical
Integrated sensor			—	—	Incremental linear encoder	Incremental linear encoder	Incremental linear encoder
Sensor signal			—	—	Sin/cos, 1 V peak-peak	Sin/cos, 1 V peak-peak	Sin/cos, 1 V peak-peak
Sensor signal period	µm		—	—	—	—	—
Sensor resolution	nm		—	—	5	5	5
Sensor resolution	Cts./rev.		—	—	—	—	—
Motor encoder			—	—	—	—	—
Motor encoder: Sensor signal			—	—	—	—	—
Resolution, motor encoder	Cts./rev.		—	—	—	—	—

Drive Properties	Unit	Tolerance	L-511.40SD00	L-511.60SD00	L-511.2ASD00	L-511.4ASD00	L-511.6ASD00
Drive type			2-phase stepper motor				
Nominal voltage	V		24	24	24	24	24
Peak voltage	V		48	48	48	48	48
Nominal current, RMS	A	Typ.	—	—	—	—	—
Motor resolution	Full steps/rev.		200	200	—	—	—
Drive force in positive direction of motion in X	N	Typ.	100	100	100	100	100
Drive force in negative direction of motion in X	N	Typ.	100	100	100	100	100
Torque constant	N·m/A	Typ.	—	—	—	—	—
Resistance phase-phase	Ω	Typ.	3.3	3.3	3.3	3.3	3.3
Inductance phase-phase	mH		2.8	2.8	2.8	2.8	2.8
Back EMK, rotational	V/kRPM	Max.	—	—	—	—	—
Back EMF, phase-phase, rotational	V/kRPM	Max.	—	—	—	—	—
Number of pole pairs			—	—	—	—	—

Mechanical Properties	Unit	Tolerance	L-511.40SD00	L-511.60SD00	L-511.2ASD00	L-511.4ASD00	L-511.6ASD00
Permissible push force in X	N	Max.	—	—	—	—	—
Permissible push force in Y	N	Max.	250	250	250	250	250
Permissible push force in Z	N	Max.	500	500	500	500	500
Permissible pull force in Y	N	Max.	250	250	250	250	250
Permissible torque in $\theta_X$	N·m	Max.	60	60	60	60	60
Permissible torque in $\theta_Y$	N·m	Max.	30	30	30	30	30
Permissible torque in $\theta_Z$	N·m	Max.	30	30	30	30	30
Holding force in X, passive	N	—	50	50	50	50	50
Moved mass in X, unloaded	g	—	600	650	600	600	650
Drive screw type	—	—	Ball screw				
Drive screw pitch	mm	—	2	2	2	2	2
Gear ratio i	—	—	—	—	—	—	—
Guide	—	—	Recirculating ball bearing guide				
Overall mass	g	—	2600	3100	2400	2600	3100
Material	—	—	Aluminum, steel				

Miscellaneous	Unit	L-511.40SD00	L-511.60SD00	L-511.2ASD00	L-511.4ASD00	L-511.6ASD00
Operating temperature range	°C	5 to 40				
Connector	—	HD D-sub 26 (m)				
Sensor connector	—	—	—	D-sub 9 (m)	D-sub 9 (m)	D-sub 9 (m)
Recommended controllers / drivers	—	C-663.12 C-885 with C-663. 12C885 ACS modular controller				

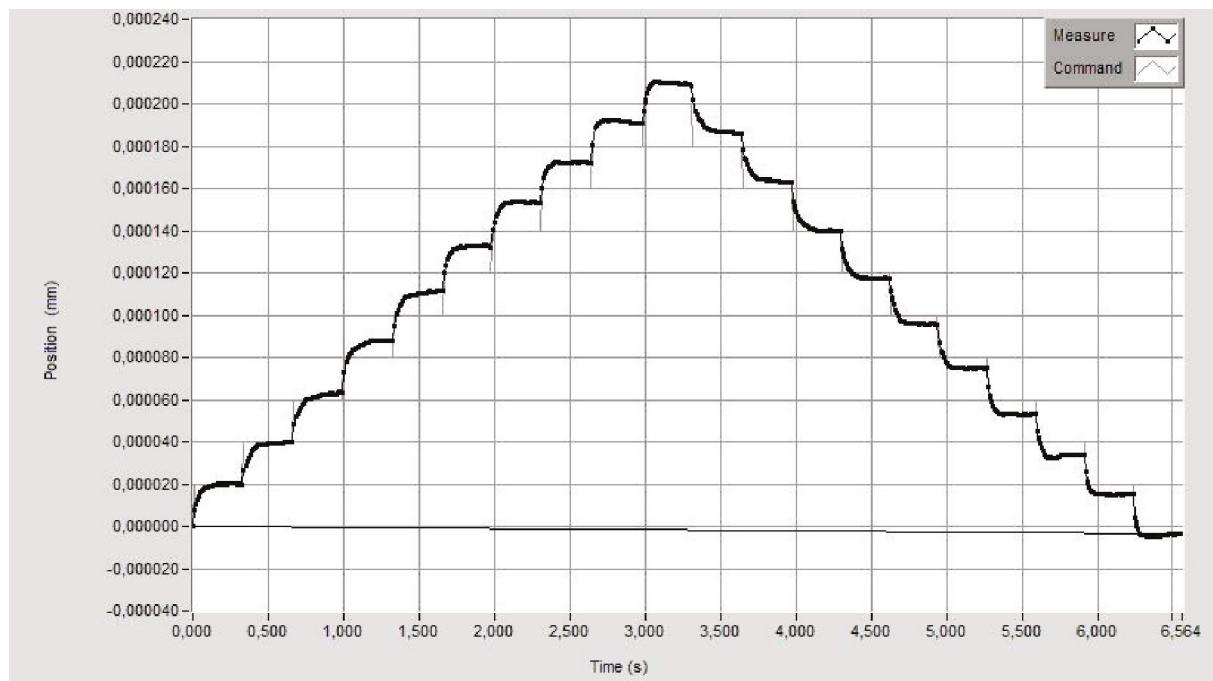
At PI, technical data is specified at  $22 \pm 3$  °C. Unless otherwise stated, the values are for unloaded conditions. Some properties are interdependent. The designation "typ." indicates a statistical average for a property; it does not indicate a guaranteed value for every product supplied. During 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

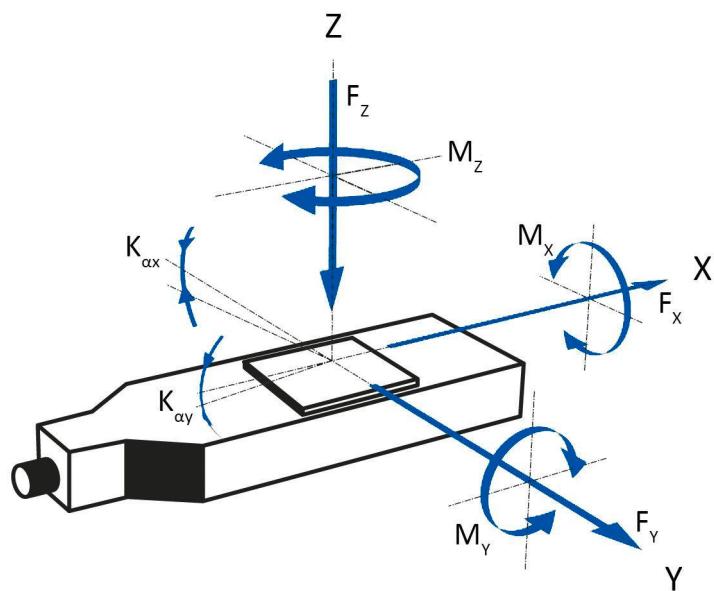
	Unit	L-511.2/03		L-511.4/05		L-511.6/07					
Travel range in X	mm	52		102		155					
<b>Positioning performance</b>		<b>Unit</b>									
Rot. enc. (DC-G/BLDC)	Bidirectional repeatability	µm	4/2.5								
Rot. + lin. enc. (BLDC)	Bidirectional repeatability	µm	0.2								
Linear encoder (2SM)	Bidirectional repeatability	µm	0.4								
Microstepping (2SM)	Bidirectional repeatability	µm	4								
Positioning accuracy, uncalibrated	µm	5	10	20							
Crosstalk in Y/Z (Straightness/Flatness)	µm	3	5	6							
Crosstalk in $\theta_X$ / $\theta_Y$ (Pitch/Roll)	µrad	80	120	140							
<b>Load characteristics</b>		Unit	<b>Electric properties</b>		Unit	DC-G	BLDC	2SM			
Drive force in X	N	100									
Holding force in X (2SM)	N	50	Velocity, unloaded		6		90	45			
Moved mass, unloaded	kg	0,65	Voltage range		V	12-24	36-48	24-48			
Payload	N	500	Resistance		Ω	4.09	0.807	3.3			
Permissible push force in Y	N	250	Inductance		mH	0.18	0.644	2.8			
Permissible torque in $\theta_X$	Nm	60	Motor connector		HD D-Sub 26 (m)						
Permissible torque in $\theta_Y$	Nm	30	Encoder connector		D-Sub 9 (m)						
Permissible torque in $\theta_Z$	Nm	30									

Please refer to our datasheet for more information

## Drawings / Images

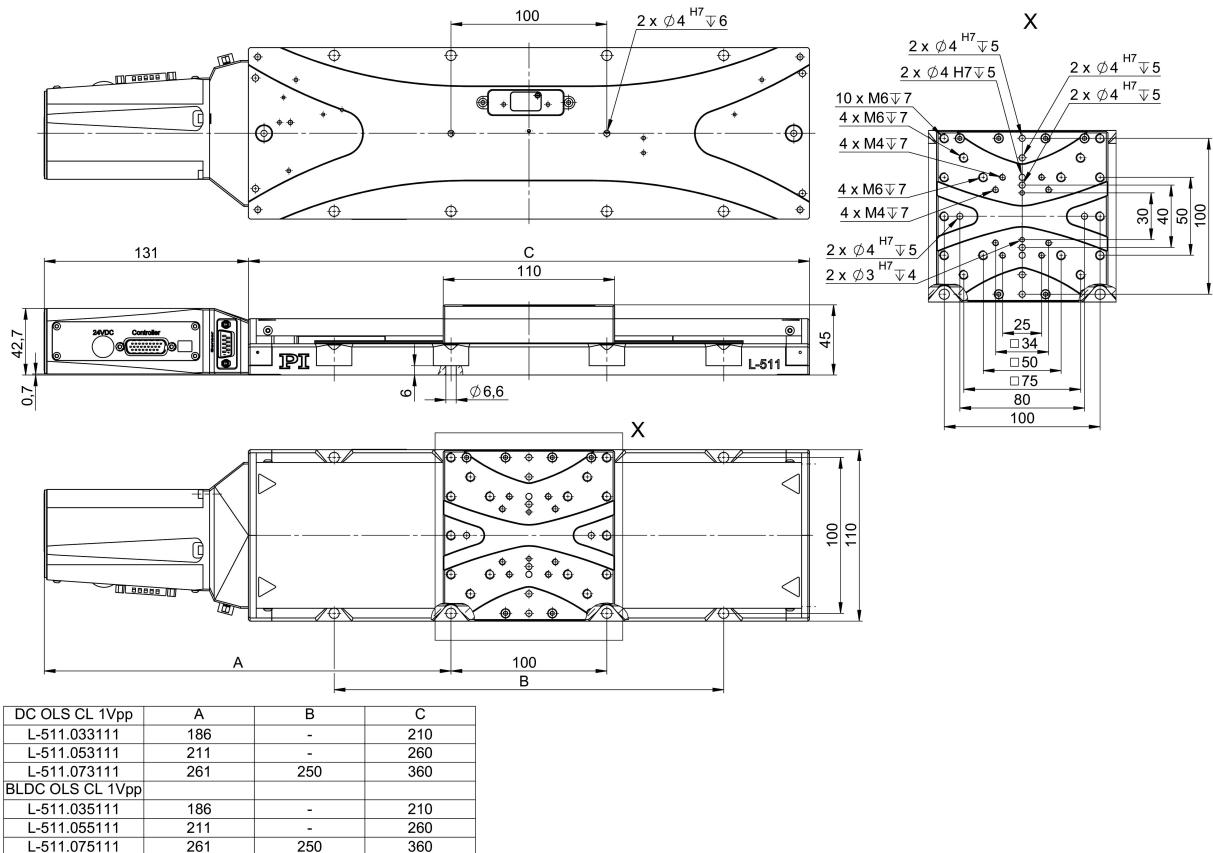


The L-511 with linear encoder reliably performs repeatable 20-nm steps.



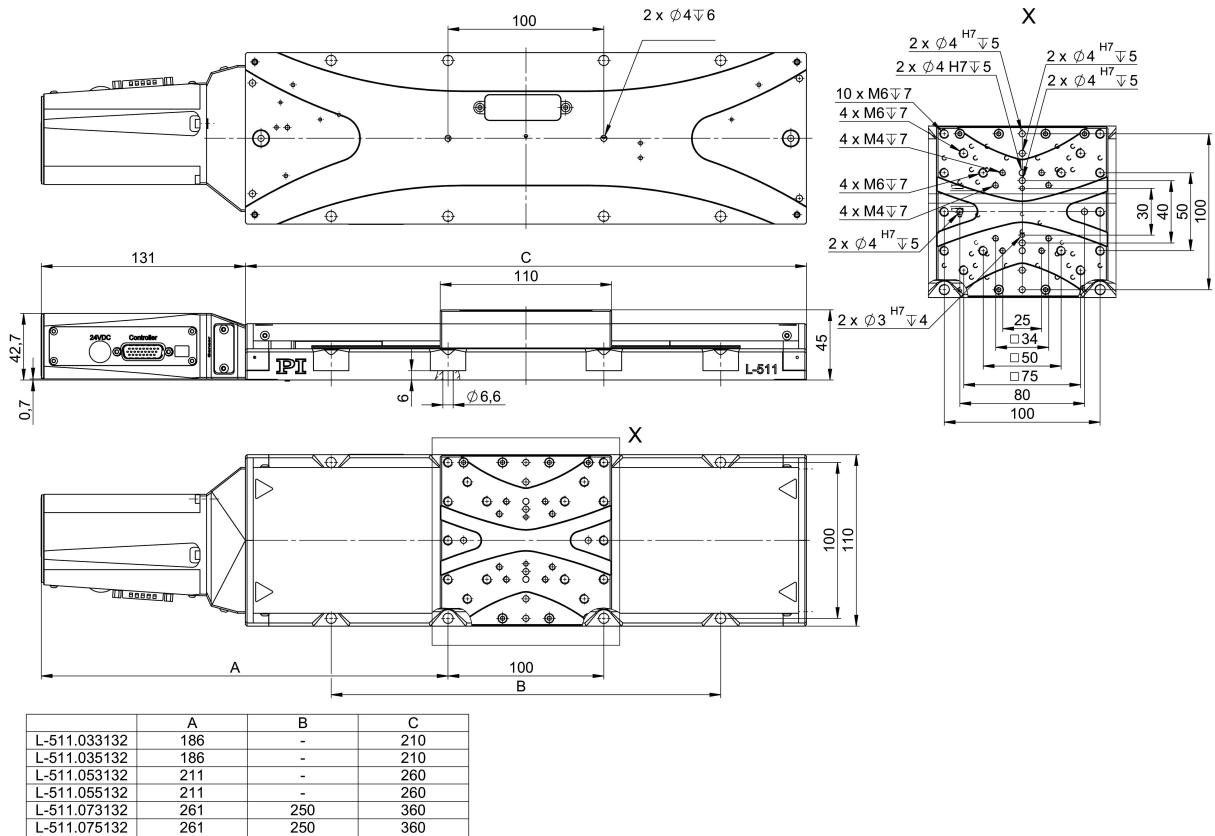
Direction of the axes and torques for linear stages

## Drawings / Images



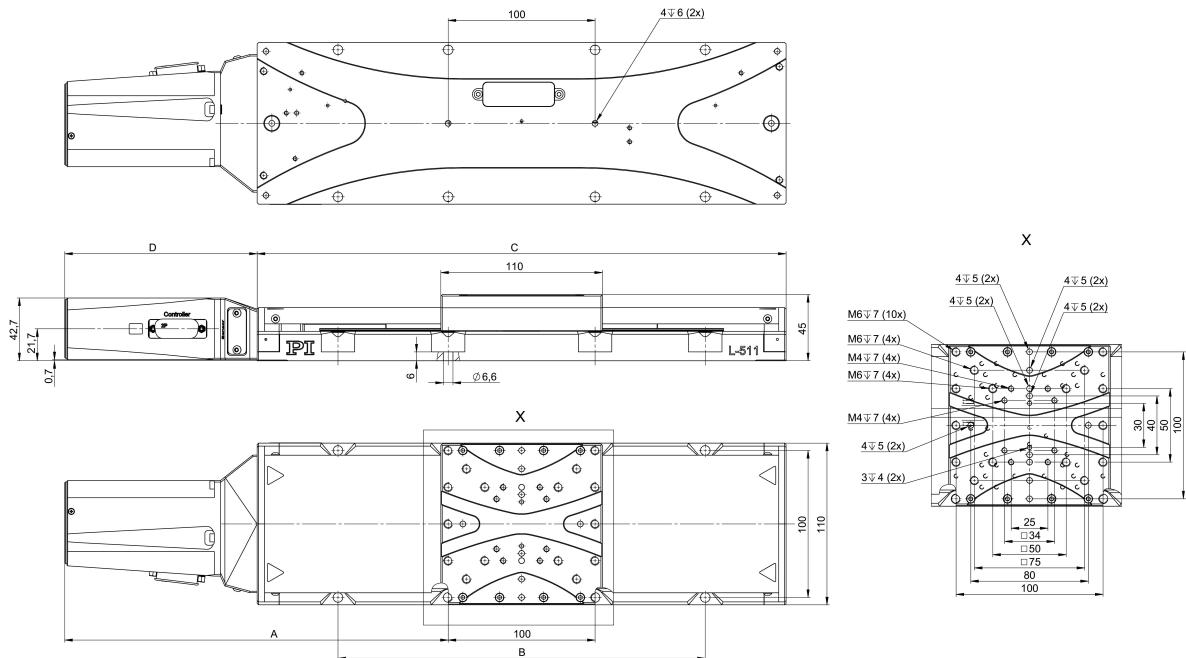
L-511.0xx111, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

## Drawings / Images



L-511.0xx132, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

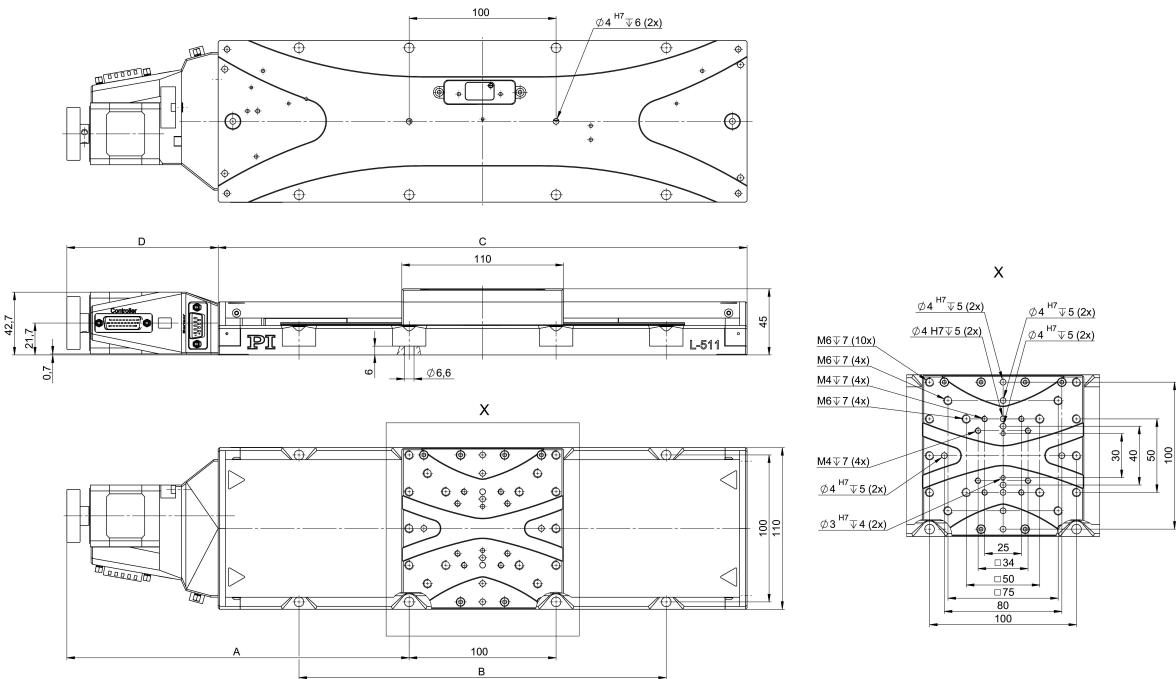
## Drawings / Images



	A	B	C	D
L-511.20DG10	186	-	210	131
L-511.40DG10	211	-	260	131
L-511.60DG10	261	250	360	131

L-511.xxDG10, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

## Drawings / Images



	A	B	C	D
L-511.20SD00	158	-	210	103
L-511.2ASD00	158	-	210	103
L-511.40SD00	183	-	260	103
L-511.4ASD00	183	-	260	103
L-511.60SD00	233	250	360	103
L-511.6ASD00	233	250	360	103

L-511.xxSD00, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

## Drawings / Images



Multi-axis setup with L-511 (horizontal) and L-509 (vertical) precision stages

## Order Information

### L-511.033111

High-precision linear stage; DC motor; 52 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental linear encoder, sin/cos, 1 V peak-peak

### L-511.053111

High-precision linear stage; DC motor; 102 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental linear encoder, sin/cos, 1 V peak-peak

### L-511.073111

High-precision linear stage; DC motor; 155 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental linear encoder, sin/cos, 1 V peak-peak

### L-511.035111

High-precision linear stage; brushless DC motor; 52 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 cts./rev. resolution, A/B quadrature, RS-422; incremental linear encoder, 20 µm sensor signal period, sin/cos, 1 V peak-peak

### L-511.055111

High-precision linear stage; brushless DC motor; 102 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 cts./rev. resolution, A/B quadrature, RS-422; incremental linear encoder, 20 µm sensor signal period, sin/cos, 1 V peak-peak

### L-511.075111

High-precision linear stage; brushless DC motor; 155 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 cts./rev. resolution, A/B quadrature, RS-422; incremental linear encoder, 20 µm sensor signal period, sin/cos, 1 V peak-peak

### L-511.033132

High-precision linear stage; DC motor; 52 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 counts/rev sensor resolution, A/B quadrature, RS-422

### L-511.053132

High-precision linear stage; DC motor; 102 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 counts/rev sensor resolution, A/B quadrature, RS-422

### L-511.073132

High-precision linear stage; DC motor; 155 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 counts/rev sensor resolution, A/B quadrature, RS-422

### L-511.035132

High-precision linear stage; brushless DC motor; 52 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 cts./rev. resolution; incremental rotary encoder, 20000 counts/rev sensor resolution, A/B quadrature, RS-422

### L-511.055132

High-precision linear stage; brushless DC motor; 102 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 cts./rev. resolution; incremental rotary encoder, 20000 counts/rev sensor resolution, A/B quadrature, RS-422

## Order Information

### L-511.075132

High-precision linear stage; brushless DC motor; 155 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 20000 cts./rev. resolution; incremental rotary encoder, 20000 counts/rev sensor resolution, A/B quadrature, RS-422

### L-511.20DG10

High-precision linear stage; DC gear motor; 52 mm travel range; 500 N load capacity; 6 mm/s maximum velocity; ball screw; incremental rotary encoder, 4096 counts/rev sensor resolution, A/B quadrature, RS-422

### L-511.40DG10

High-precision linear stage; DC gear motor; 102 mm travel range; 500 N load capacity; 6 mm/s maximum velocity; ball screw; incremental rotary encoder, 4096 counts/rev sensor resolution, A/B quadrature, RS-422

### L-511.60DG10

High-precision linear stage; DC gear motor; 155 mm travel range; 500 N load capacity; 6 mm/s maximum velocity; ball screw; incremental rotary encoder, 4096 counts/rev sensor resolution, A/B quadrature, RS-422

### L-511.20SD00

High-precision linear stage; 2-phase stepper motor; 52 mm travel range; 500 N load capacity; 45 mm/s maximum velocity; ball screw

### L-511.40SD00

High-precision linear stage; 2-phase stepper motor; 102 mm travel range; 500 N load capacity; 45 mm/s maximum velocity; ball screw

### L-511.60SD00

High-precision linear stage; 2-phase stepper motor; 155 mm travel range; 500 N load capacity; 45 mm/s maximum velocity; ball screw

### L-511.2ASD00

High-precision linear stage; 2-phase stepper motor; 52 mm travel range; 500 N load capacity; 45 mm/s maximum velocity; ball screw; incremental linear encoder, 5 nm sensor resolution, sin/cos, 1 V peak-peak

### L-511.4ASD00

High-precision linear stage; 2-phase stepper motor; 102 mm travel range; 500 N load capacity; 45 mm/s maximum velocity; ball screw; incremental linear encoder, 5 nm sensor resolution, sin/cos, 1 V peak-peak

### L-511.6ASD00

High-precision linear stage; 2-phase stepper motor; 155 mm travel range; 500 N load capacity; 45 mm/s maximum velocity; ball screw; incremental linear encoder, 5 nm sensor resolution, sin/cos, 1 V peak-peak