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 gearhead 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	Toleran-ce	L-511. 033111	L-511. 033132	L-511. 035111	L-511. 035132	L-511. 053111	L-511. 053132	L-511. 055111	L-511. 055132
Active axes			X	X	X	X	X	X	X	X
Travel range in X	mm		52	52	52	52	102	102	102	102
Maximum velocity in X, unloaded	mm/s		90	90	90	90	90	90	90	90
Straightness (Linear crosstalk in Y with motion in X)	µm	Typ.	±1.5	±1.5	±1.5	±1.5	±2.5	±2.5	±2.5	±2.5
Flatness (Linear crosstalk in Z with motion in X)	µm	Typ.	±1.5	±1.5	±1.5	±1.5	±2.5	±2.5	±2.5	±2.5
Pitch (Rotational crosstalk in θY with motion in X)	µrad	Typ.	±40	±40	±40	±40	±60	±60	±60	±60
Yaw (Rotational crosstalk in θZ with motion in X)	µrad	Typ.	±40	±40	±40	±40	±60	±60	±60	±60

Positioning	Unit	Tolerance	L-511.033111	L-511.033132	L-511.035111	L-511.035132	L-511.053111	L-511.053132	L-511.055111	L-511.055132
Integrated sensor			Incremental linear encoder	Incremental rotary encoder	Incremental linear encoder	Incremental rotary encoder	Incremental linear encoder	Incremental rotary encoder	Incremental linear encoder	Incremental rotary encoder
Unidirectional repeatability in X	µm	Typ.	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Bidirectional repeatability in X	µm	Typ.	±0.1	±1.25	±0.1	±1.25	±0.1	±1.25	±0.1	±1.25
Minimum incremental motion in X	µm	Typ.	0.1	0.2	0.1	0.2	0.1	0.2	0.1	0.2
Backlash in X	µm	Typ.								
Sensor signal			Sin/cos, 1 V peak-peak	A/B quadrature, RS-422	Sin/cos, 1 V peak-peak	A/B quadrature, RS-422	Sin/cos, 1 V peak-peak	A/B quadrature, RS-422	Sin/cos, 1 V peak-peak	A/B quadrature, RS-422
Sensor resolution	nm									
Sensor signal period	µm				20				20	
Sensor resolution	Cts./rev.			20000		20000		20000		20000
Reference switch			Optical	Optical	Optical	Optical	Optical	Optical	Optical	Optical
Limit switches			Optical	Optical	Optical	Optical	Optical	Optical	Optical	Optical
Motor encoder					Incremental rotary encoder	Incremental rotary encoder			Incremental rotary encoder	Incremental rotary encoder
Resolution, motor encoder	Cts./rev.				20000	20000			20000	20000
Motor encoder: Sensor signal					A/B quadrature, RS-422				A/B quadrature, RS-422	

Drive Properties	Unit	Tolerance	L-511.033111	L-511.033132	L-511.035111	L-511.035132	L-511.053111	L-511.053132	L-511.055111	L-511.055132
Drive type			DC motor	DC motor	Brushless DC motor	Brushless DC motor	DC motor	DC motor	Brushless DC motor	Brushless DC motor
Maximum power consumption	W									
Motor resolution	Full steps/rev.									
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	2.42
Drive force in negative direction of motion in X	N	Typ.	100	100	100	100	100	100	100	100
Drive force in positive 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	0.031
Resistance phase-phase	Ω	Typ.			0.81	0.81			0.81	0.81
Inductance phase-phase	mH				0.64	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	3.3
Number of pole pairs					7	7			7	7

Mechanical Properties	Unit	Toleran-ce	L-511. 033111	L-511. 033132	L-511. 035111	L-511. 035132	L-511. 053111	L-511. 053132	L-511. 055111	L-511. 055132
Guide			Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de
Drive screw type			Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw
Drive screw pitch	mm		2	2	2	2	2	2	2	2
Gear ratio i					1	1			1	1
Holding force in X, passive	N									
Moved mass in X, unloa-ded	g		600	600	600	600	600	600	600	600
Permissible push force in X	N	Max.			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
Overall mass	g		2500	2500	2400	2400	2600	2600	2700	2700
Material			Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel

Miscellaneous	Unit		L-511. 033111	L-511. 033132	L-511. 035111	L-511. 035132	L-511. 053111	L-511. 053132	L-511. 055111	L-511. 055132
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)	HD D-sub 26-pin (m)
Sensor connector			D-sub 9-pin (m)		D-sub 9-pin (m)		D-sub 9-pin (m)		D-sub 9-pin (m)	
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
Recommended controllers / drivers			C-863 C-885 with C-863. 20C885 C-884 ACS modu-lar control-ler	C-863 C-885 with C-863. 20C885 C-884 ACS modu-lar control-ler	ACS modu-lar control-ler	C-891 C-885 with C-891. 10C885 ACS modu-lar control-ler	C-863 C-885 with C-863. 20C885 C-884 ACS modu-lar control-ler	C-863 C-885 with C-863. 20C885 C-884 ACS modu-lar control-ler	ACS modu-lar control-ler	C-891 C-885 with C-891. 10C885 ACS modu-lar control-ler

Motion	Unit	Toleran-ce	L-511. 073111	L-511. 073132	L-511. 075111	L-511. 075132	L-511. 20AD10	L-511. 20DG10	L-511. 20SD00	L-511. 24AD00
Active axes			X	X	X	X	X	X	X	X
Travel range in X	mm		155	155	155	155	52	52	52	52
Maximum velocity in X, unloaded	mm/s		90	90	90	90	90	6	45	90
Straightness (Linear cros-stalk in Y with motion in X)	µm	Typ.	±3	±3	±3	±3	±1.5	±1.5	±1.5	±1.5
Flatness (Linear crosstalk in Z with motion in X)	µm	Typ.	±3	±3	±3	±3	±1.5	±1.5	±1.5	±1.5
Pitch (Rotational crosstalk in θY with motion in X)	µrad	Typ.	±70	±70	±70	±70	±40	±40	±40	±40
Yaw (Rotational crosstalk in θZ with motion in X)	µrad	Typ.	±70	±70	±70	±70	±40	±40	±40	±40

Positioning	Unit	Toleran-ce	L-511. 073111	L-511. 073132	L-511. 075111	L-511. 075132	L-511. 20AD10	L-511. 20DG10	L-511. 20SD00	L-511. 24AD00
Integrated sensor			Incremental linear encoder	Incremental rotary encoder	Incremental linear encoder	Incremental rotary encoder	Incremental rotary encoder	Incremental rotary encoder		Incremental linear encoder
Unidirectional repeatability in X	µm	Typ.	0.1	0.2	0.1	0.2	0.488	0.2	0.2	0.1
Bidirectional repeatability in X	µm	Typ.	±0.1	±1.25	±0.1	±1.25	±1.25	±2	±2	±0.2
Minimum incremental motion in X	µm	Typ.	0.1	0.2	0.1	0.2	0.488	0.1	0.2	0.1
Backlash in X	µm	Typ.							1	
Sensor signal			Sin/cos, 1 V peak-peak	A/B quadrature, RS-422	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
Sensor resolution	nm									50
Sensor signal period	µm				20					
Sensor resolution	Cts./rev.			20000		20000	16384	4096		
Reference switch			Optical	Optical	Optical	Optical	Optical	Optical	Optical	Optical
Limit switches			Optical	Optical	Optical	Optical	Optical	Optical	Optical	Optical
Motor encoder					Incremental rotary encoder	Incremental rotary encoder				
Resolution, motor encoder	Cts./rev.				20000	20000				
Motor encoder: Sensor signal					A/B quadrature, RS-422					

Drive Properties	Unit	Toleran-ce	L-511. 073111	L-511. 073132	L-511. 075111	L-511. 075132	L-511. 20AD10	L-511. 20DG10	L-511. 20SD00	L-511. 24AD00
Drive type			DC motor	DC motor	Brushless DC motor	Brushless DC motor	DC motor with ActiveDrive	DC gear motor	2-phase stepper motor	DC motor with ActiveDrive
Maximum power consumption	W									
Motor resolution	Full steps/rev.								200	
Nominal voltage	V		24	24	24	24	24	24	24	24
Peak voltage	V		48	48	48	48	24	48	48	24
Nominal current, RMS	A	Typ.			2.42	2.42				
Drive force in negative direction of motion in X	N	Typ.	100	100	100	100	100	100	100	100
Drive force in positive 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				
Resistance phase-phase	Ω	Typ.			0.81	0.81	1.63	4.09	3.3	1.63
Inductance phase-phase	mH				0.64	0.64	0.27	0.18	2.8	0.27
Back EMK, rotational	V/kRPM	Max.						1.68		
Back EMF, phase-phase, rotational	V/kRPM	Max.			3.3	3.3	3.95	1.68		3.95
Number of pole pairs					7	7				

Mechanical Properties	Unit	Toleran-ce	L-511. 073111	L-511. 073132	L-511. 075111	L-511. 075132	L-511. 20AD10	L-511. 20DG10	L-511. 20SD00	L-511. 24AD00
Guide			Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de
Drive screw type			Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw
Drive screw pitch	mm		2	2	2	2	2	2	2	2
Gear ratio i					1	1		29,642		
Holding force in X, passive	N							50	50	
Moved mass in X, unloa-ded	g		650	650	650	650	600	600	600	600
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	60	30	30	60
Overall mass	g		3100	3100	3000	3000	2500	2500	2400	2500
Material			Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, stainless steel	Aluminum, steel	Aluminum, steel	Aluminum, stainless steel

Miscellaneous	Unit		L-511. 073111	L-511. 073132	L-511. 075111	L-511. 075132	L-511. 20AD10	L-511. 20DG10	L-511. 20SD00	L-511. 24AD00
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)	D-sub 15-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	D-sub 15-pin (m)
Sensor connector			D-sub 9-pin (m)		D-sub 9-pin (m)					
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
Recommended controllers / drivers			C-863 C-885 with C-863. 20C885 C-884 ACS modu-lar control-ler	C-863 C-885 with C-863. 20C885 C-884 ACS modu-lar control-ler	ACS modu-lar control-ler	C-891 C-885 with C-891. 10C885 ACS modu-lar control-ler	C-863 C-885 with C-863. 20C885 C-884	C-863 C-885 with C-863. 20C885 C-884 ACS modu-lar control-ler	C-663.12 C-885 with C-663. 12C885 ACS modu-lar control-ler	C-863 C-885 with C-863. 20C885 C-884

Motion	Unit	Toleran-ce	L-511. 2ASD00	L-511. 40AD10	L-511. 40DG10	L-511. 40SD00	L-511. 44AD00	L-511. 4ASD00	L-511. 60AD10	L-511. 60DG10
Active axes			X	X	X	X	X	X	X	X
Travel range in X	mm		52	102	102	102	102	102	155	155
Maximum velocity in X, unloaded	mm/s		45	90	6	45	90	45	90	6
Straightness (Linear cros-stalk in Y with motion in X)	µm	Typ.	±1.5	±2.5	±2.5	±2.5	±2.5	±2.5	±3	±3
Flatness (Linear crosstalk in Z with motion in X)	µm	Typ.	±1.5	±2.5	±2.5	±2.5	±2.5	±2.5	±3	±3
Pitch (Rotational crosstalk in θY with motion in X)	µrad	Typ.	±40	±60	±60	±60	±60	±60	±70	±70
Yaw (Rotational crosstalk in θZ with motion in X)	µrad	Typ.	±40	±60	±60	±60	±60	±60	±70	±70

Positioning	Unit	Tolerance	L-511.2ASD00	L-511.40AD10	L-511.40DG10	L-511.40SD00	L-511.44AD00	L-511.4ASD00	L-511.60AD10	L-511.60DG10
Integrated sensor			Incremental linear encoder	Incremental rotary encoder	Incremental rotary encoder		Incremental linear encoder	Incremental linear encoder	Incremental rotary encoder	Incremental rotary encoder
Unidirectional repeatability in X	µm	Typ.	0.1	0.488	0.2	0.2	0.1	0.1	0.488	0.2
Bidirectional repeatability in X	µm	Typ.	±0.2	±1.25	±2	±2	±0.2	±0.2	±1.25	±2
Minimum incremental motion in X	µm	Typ.	0.02	0.488	0.1	0.2	0.1	0.02	0.488	0.1
Backlash in X	µm	Typ.				1				
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	A/B quadrature, RS-422	A/B quadrature, RS-422
Sensor resolution	nm		5				50	5		
Sensor signal period	µm									
Sensor resolution	Cts./rev.			16384	4096				16384	4096
Reference switch			Optical	Optical	Optical	Optical	Optical	Optical	Optical	Optical
Limit switches			Optical	Optical	Optical	Optical	Optical	Optical	Optical	Optical
Motor encoder										
Resolution, motor encoder	Cts./rev.									
Motor encoder: Sensor signal										

Drive Properties	Unit	Tolerance	L-511.2ASD00	L-511.40AD10	L-511.40DG10	L-511.40SD00	L-511.44AD00	L-511.4ASD00	L-511.60AD10	L-511.60DG10
Drive type			2-phase stepper motor	DC motor with ActiveDrive	DC gear motor	2-phase stepper motor	DC motor with ActiveDrive	2-phase stepper motor	DC motor with ActiveDrive	DC gear motor
Maximum power consumption	W									
Motor resolution	Full steps/rev.					200				
Nominal voltage	V		24	24	24	24	24	24	24	24
Peak voltage	V		48	24	48	48	24	48	24	48
Nominal current, RMS	A	Typ.								
Drive force in negative direction of motion in X	N	Typ.	100	100	100	100	100	100	100	100
Drive force in positive direction of motion in X	N	Typ.	100	100	100	100	100	100	100	100
Torque constant	N·m/A	Typ.								
Resistance phase-phase	Ω	Typ.	3.3	1.63	4.09	3.3	1.63	3.3	1.63	4.09
Inductance phase-phase	mH		2.8	0.27	0.18	2.8	0.27	2.8	0.27	0.18
Back EMK, rotational	V/kRPM	Max.			1.68					1.68
Back EMF, phase-phase, rotational	V/kRPM	Max.		3.95	1.68		3.95		3.95	1.68
Number of pole pairs										

Mechanical Properties	Unit	Toleran-ce	L-511. 2ASD00	L-511. 40AD10	L-511. 40DG10	L-511. 40SD00	L-511. 44AD00	L-511. 4ASD00	L-511. 60AD10	L-511. 60DG10
Guide			Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de	Recircula-ting ball bearing gui-de
Drive screw type			Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw	Ball screw
Drive screw pitch	mm		2	2	2	2	2	2	2	2
Gear ratio i					29,642					29,642
Holding force in X, passive	N		50		50	50		50		50
Moved mass in X, unloa-ded	g		600	600	600	600	600	600	650	650
Permissible push force in X	N	Max.			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	60	30	30	60	30	60	30
Overall mass	g		2400	2800	2700	2600	2700	2600	3300	2900
Material			Aluminum, steel	Aluminum, stainless steel	Aluminum, steel	Aluminum, steel	Aluminum, stainless steel	Aluminum, steel	Aluminum, stainless steel	Aluminum, steel

Miscellaneous	Unit		L-511. 2ASD00	L-511. 40AD10	L-511. 40DG10	L-511. 40SD00	L-511. 44AD00	L-511. 4ASD00	L-511. 60AD10	L-511. 60DG10
Connector			HD D-sub 26-pin (m)	D-sub 15-pin (m)	HD D-sub 26-pin (m)	HD D-sub 26-pin (m)	D-sub 15-pin (m)	HD D-sub 26-pin (m)	D-sub 15-pin (m)	HD D-sub 26-pin (m)
Sensor connector			D-sub 9-pin (m)					D-sub 9-pin (m)		
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
Recommended controllers / drivers			C-663.12 C-885 with C-663. 12C885 ACS modu-lar control-ler	C-863 C-885 with C-863. 20C885 C-884	C-863 C-885 with C-863. 20C885 C-884 ACS modu-lar control-ler	C-663.12 C-885 with C-663. 12C885 ACS modu-lar control-ler	C-863 C-885 with C-863. 20C885 C-884	C-663.12 C-885 with C-663. 12C885 ACS modu-lar control-ler	C-863 C-885 with C-863. 20C885 C-884	C-863 C-885 with C-863. 20C885 C-884 ACS modu-lar control-ler

Motion	Unit	Toleran-ce	L-511.60SD00	L-511.64AD00	L-511.6ASD00
Active axes			X	X	X
Travel range in X	mm		155	155	155
Maximum velocity in X, unloaded	mm/s		45	90	45
Straightness (Linear cros-stalk in Y with motion in X)	µm	Typ.	±3	±3	±3
Flatness (Linear crosstalk in Z with motion in X)	µm	Typ.	±3	±3	±3
Pitch (Rotational crosstalk in θY with motion in X)	µrad	Typ.	±70	±70	±70
Yaw (Rotational crosstalk in θZ with motion in X)	µrad	Typ.	±70	±70	±70

Positioning	Unit	Toleran-ce	L-511.60SD00	L-511.64AD00	L-511.6ASD00
Integrated sensor				Incremental linear encoder	Incremental linear encoder
Unidirectional repeatabili-ty in X	µm	Typ.	0.2	0.1	0.1
Bidirectional repeatability in X	µm	Typ.	±2	±0.2	±0.2
Minimum incremental motion in X	µm	Typ.	0.2	0.1	0.02
Backlash in X	µm	Typ.	1		
Sensor signal				A/B quadrature, RS-422	Sin/cos, 1 V peak-peak
Sensor resolution	nm			50	5
Sensor signal period	µm				
Sensor resolution	Cts./rev.				
Reference switch			Optical	Optical	Optical
Limit switches			Optical	Optical	Optical
Motor encoder					
Resolution, motor enco-der	Cts./rev.				
Motor encoder: Sensor si-gnal					

Drive Properties	Unit	Toleran-ce	L-511.60SD00	L-511.64AD00	L-511.6ASD00
Drive type			2-phase stepper motor	DC motor with ActiveDrive	2-phase stepper motor
Maximum power con-sumption	W				
Motor resolution	Full steps/ rev.		200		
Nominal voltage	V		24	24	24
Peak voltage	V		48	24	48
Nominal current, RMS	A	Typ.			
Drive force in negative di-rection of motion in X	N	Typ.	100	100	100
Drive force in positive di-rection of motion in X	N	Typ.	100	100	100
Torque constant	N·m/A	Typ.			
Resistance phase-phase	Ω	Typ.	3.3	1.63	3.3
Inductance phase-phase	mH		2.8	0.27	2.8
Back EMK, rotational	V/kRPM	Max.			
Back EMF, phase-phase, rotational	V/kRPM	Max.		3.95	
Number of pole pairs					

Mechanical Properties	Unit	Toleran-ce	L-511.60SD00	L-511.64AD00	L-511.6ASD00
Guide			Recirculating ball bearing guide	Recirculating ball bearing guide	Recirculating ball bearing guide
Drive screw type			Ball screw	Ball screw	Ball screw
Drive screw pitch	mm		2	2	2
Gear ratio i					
Holding force in X, passive	N		50		50
Moved mass in X, unloa-ded	g		650	650	650
Permissible push force in X	N	Max.			
Permissible push force in Y	N	Max.	250	250	250
Permissible push force in Z	N	Max.	500	500	500
Permissible pull force in Y	N	Max.	250	250	250
Permissible torque in θx	N·m	Max.	60	60	60
Permissible torque in θY	N·m	Max.	30	30	30
Permissible torque in θZ	N·m	Max.	30	60	30
Overall mass	g		3100	3500	3100
Material			Aluminum, steel	Aluminum, stainless steel	Aluminum, steel

Miscellaneous	Unit		L-511.60SD00	L-511.64AD00	L-511.6ASD00
Connector			HD D-sub 26-pin (m)	D-sub 15-pin (m)	HD D-sub 26-pin (m)
Sensor connector					D-sub 9-pin (m)
Operating temperature range	°C		5 to 40	5 to 40	5 to 40
Recommended controllers / drivers			C-663.12 C-885 with C-663.12C885 ACS modular controller	C-863 C-885 with C-863.20C885 C-884	C-663.12 C-885 with C-663.12C885 ACS modular controller

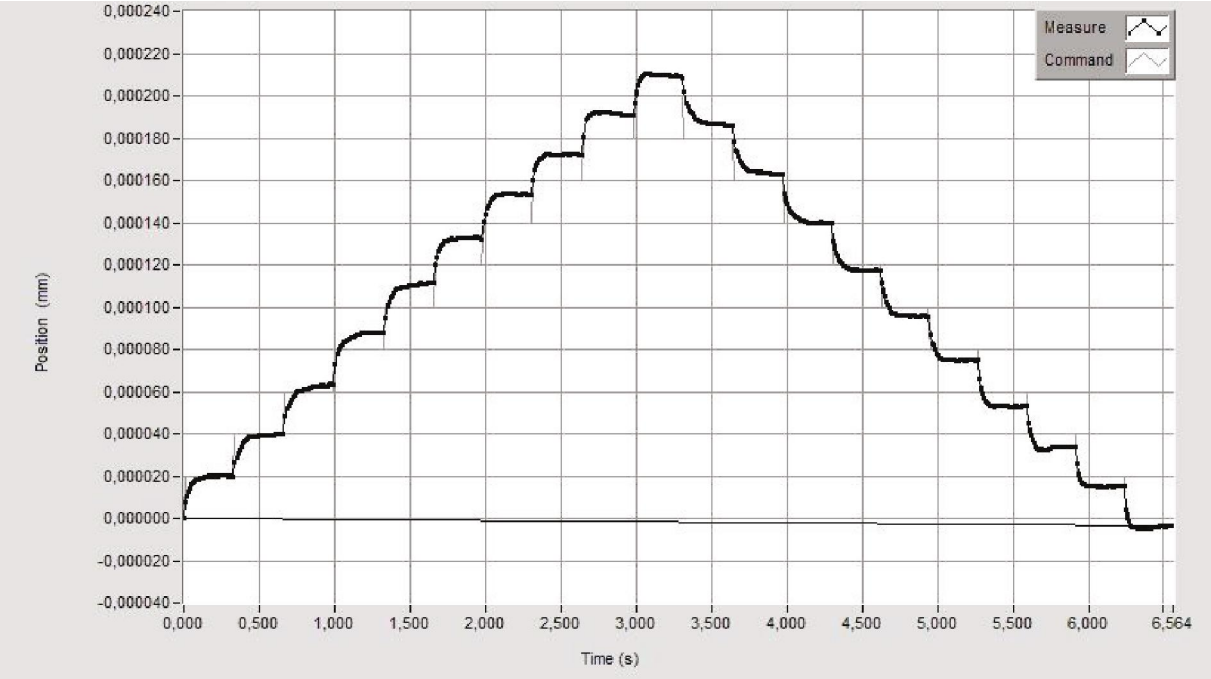
Drawings / Images

		Unit	L-511.2/03	L-511.4/05	L-511.6/07
Travel range in X		mm	52	102	155
Positioning performance		**Unit**			
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 θx/ θy (Pitch/Roll)		µrad	80	120	140

Load characteristics	Unit		Electric properties	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 θx	Nm	60	**Motor connector**		HD D-Sub 26 (m)		
Permissible torque in θy	Nm	30	**Encoder connector**			D-Sub 9 (m)	
Permissible torque in θz	Nm	30					

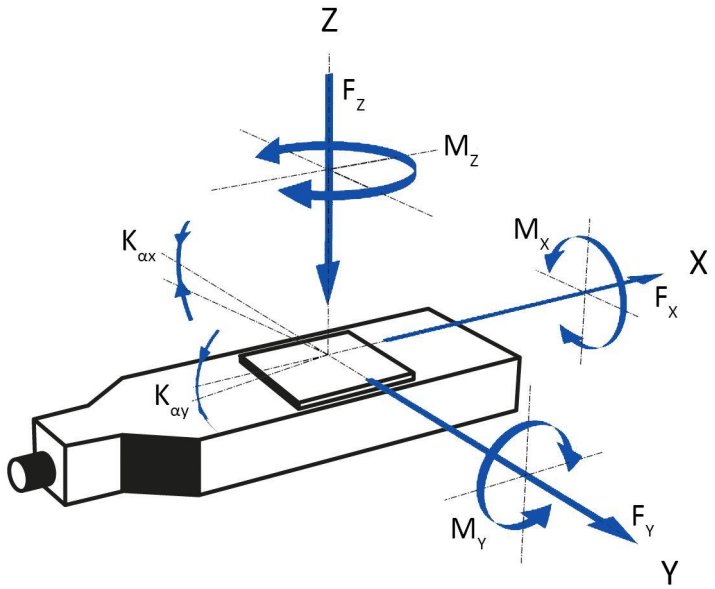
Please refer to our datasheet for more information

Drawings / Images



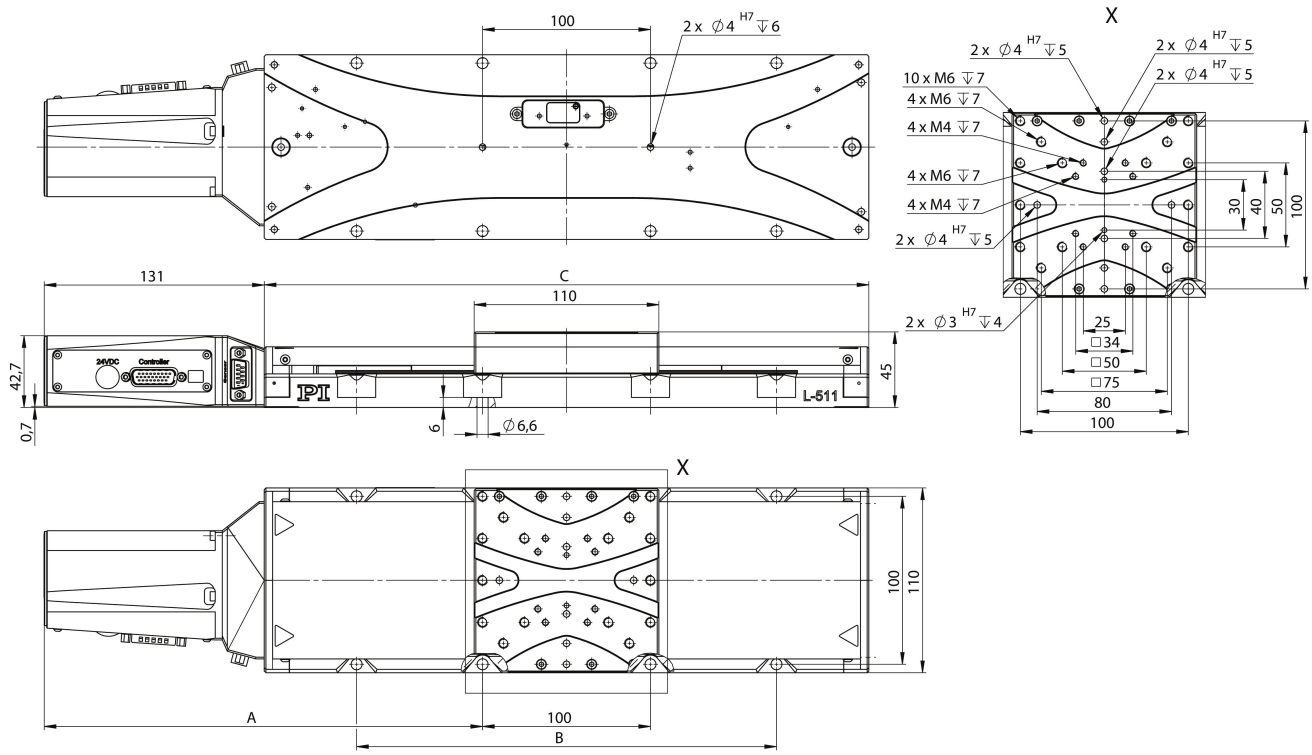
The L-511 with linear encoder reliably performs repeatable 20-nm steps.

Drawings / Images



Direction of the axes and torques for linear stages

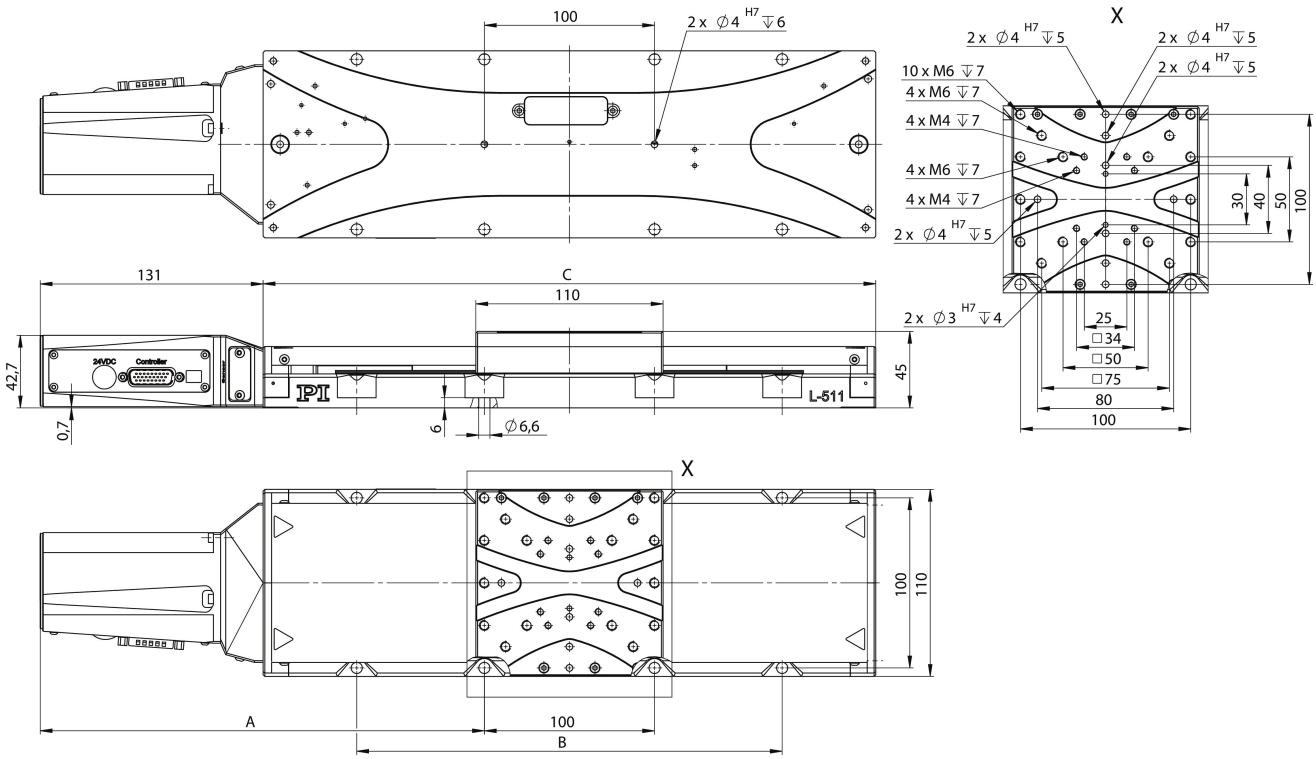
Drawings / Images



DC OLS CL 1Vpp	A	B	C
L-511.033111	186	-	210
L-511.053111	211	-	260
L-511.073111	261	250	360
BLDC OLS CL 1Vpp			
L-511.035111	186	-	210
L-511.055111	211	-	260
L-511.075111	261	250	360

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

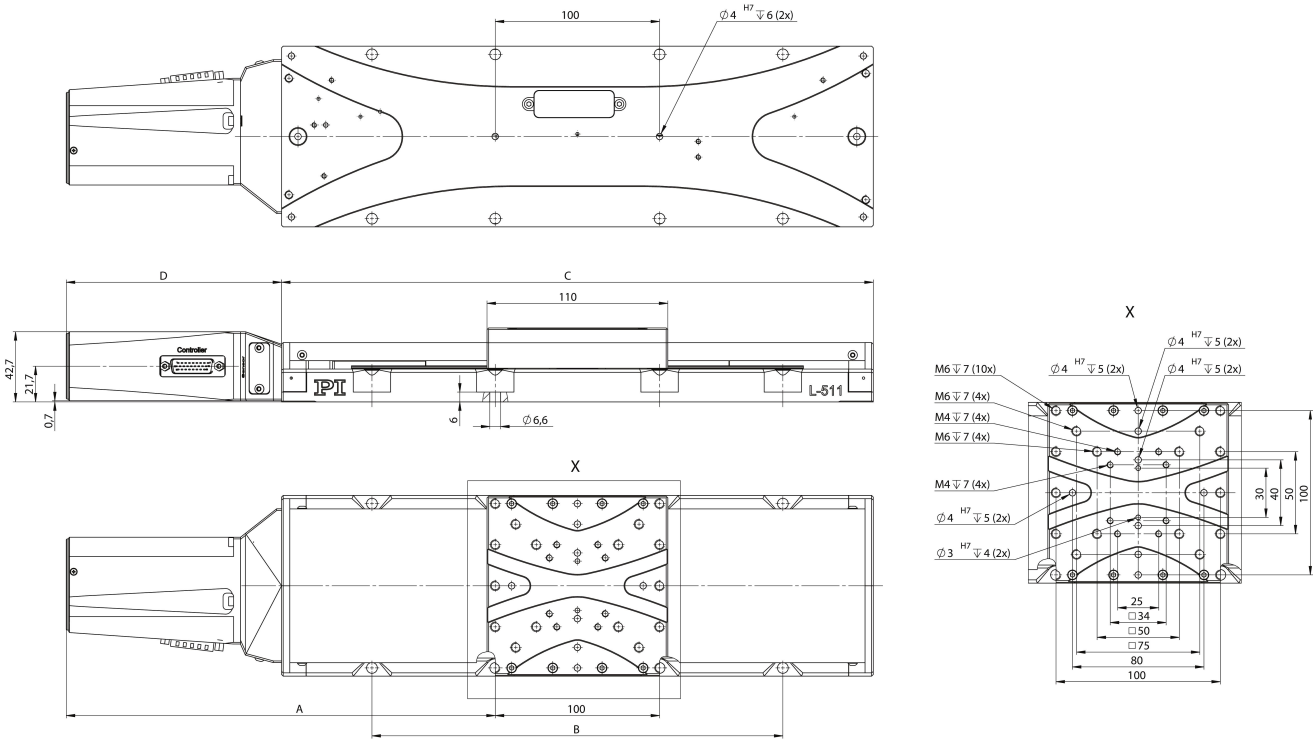
Drawings / Images



	A	B	C
L-511.033132	186	-	210
L-511.035132	186	-	210
L-511.053132	211	-	260
L-511.055132	211	-	260
L-511.073132	261	250	360
L-511.075132	261	250	360

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

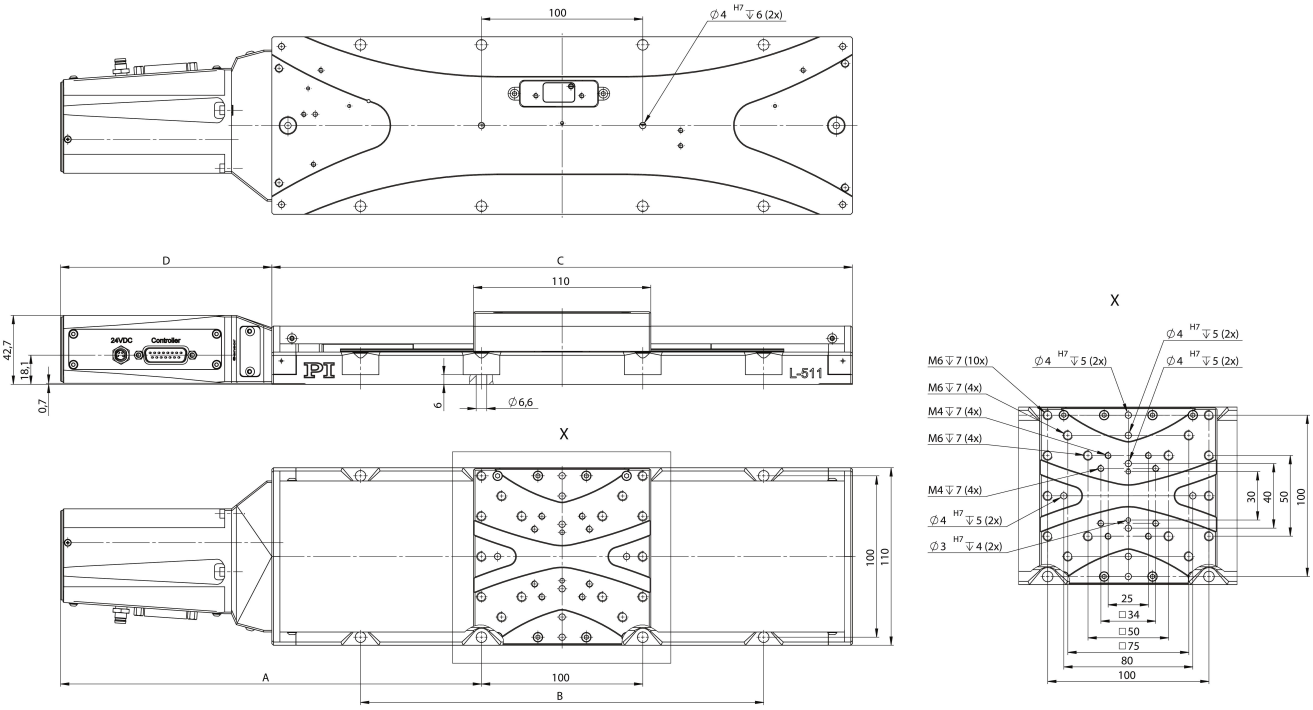
Drawings / Images



	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.x0DG10, dimensions in mm. Note that a comma is used in the drawings instead of a decimal point.

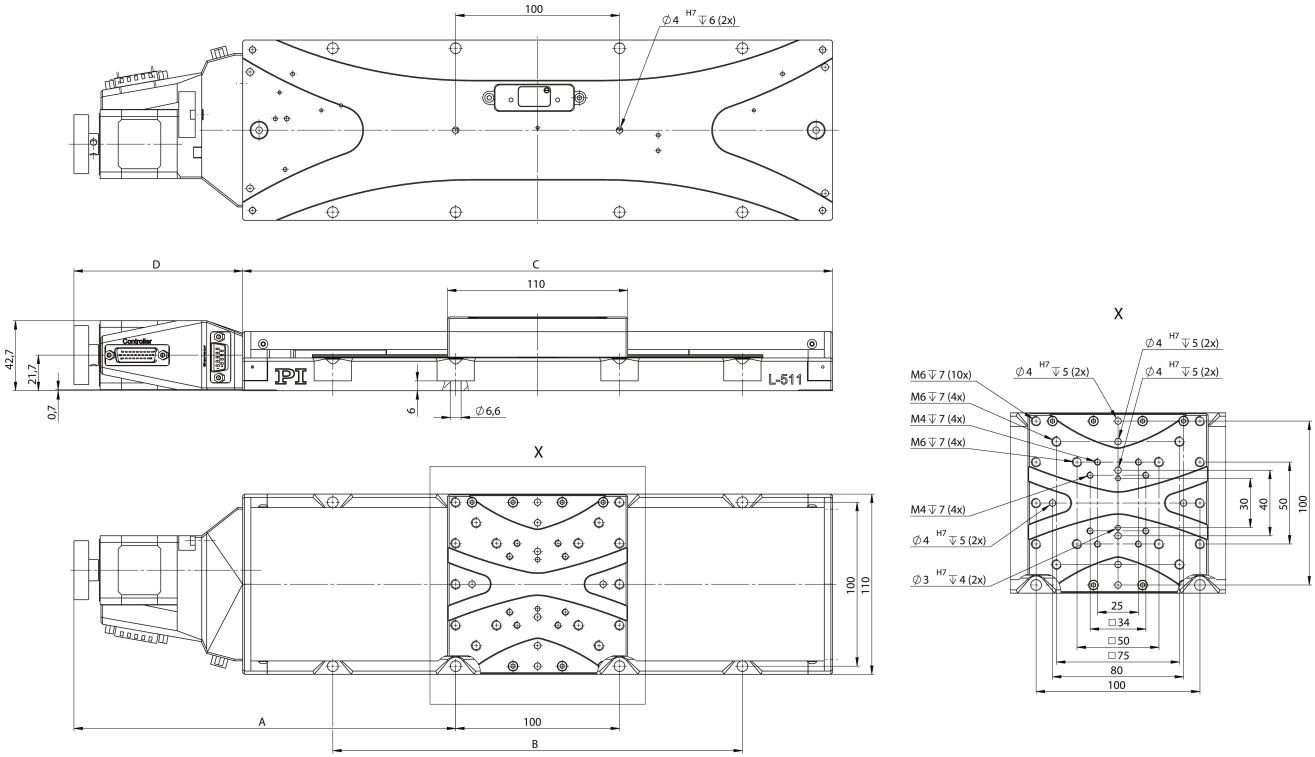
Drawings / Images



	A	B	C	D
L-511.20AD10	186	-	210	131
L-511.24AD00	186	-	210	131
L-511.40AD10	211	-	260	131
L-511.44AD00	211	-	260	131
L-511.60AD10	261	250	360	131
L-511.64AD00	261	250	360	131

L-511.xxADx0, 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-511.033132
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-511.035111
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-511.035132
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-511.053111
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-511.053132
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-511.055111
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-511.055132
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

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-511.073132
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-511.075111
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

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-511.20AD10
High-precision linear stage; DC motor with ActiveDrive; 52 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 16384 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-511.20SD00
High-precision linear stage; 2-phase stepper motor; 52 mm travel range; 500 N load capacity; 45 mm/s maximum velocity; ball screw

L-511.24AD00
High-precision linear stage; DC motor with ActiveDrive; 52 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental linear encoder, 50 nm sensor resolution, A/B quadrature, RS-422

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-511.40AD10
High-precision linear stage; DC motor with ActiveDrive; 102 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 16384 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-511.40SD00
High-precision linear stage; 2-phase stepper motor; 102 mm travel range; 500 N load capacity; 45 mm/s maximum velocity; ball screw

L-511.44AD00
High-precision linear stage; DC motor with ActiveDrive; 102 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental linear encoder, 50 nm sensor resolution, A/B quadrature, RS-422

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-511.60AD10
High-precision linear stage; DC motor with ActiveDrive; 155 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental rotary encoder, 16384 counts/rev sensor resolution, A/B quadrature, RS-422

Order Information

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-511.60SD00
High-precision linear stage; 2-phase stepper motor; 155 mm travel range; 500 N load capacity; 45 mm/s maximum velocity; ball screw

L-511.64AD00
High-precision linear stage; DC motor with ActiveDrive; 155 mm travel range; 500 N load capacity; 90 mm/s maximum velocity; ball screw; incremental linear encoder, 50 nm sensor resolution, A/B quadrature, RS-422

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