

## Compact Linear Stage

With DC or Stepper Motor



### L-505

- Travel ranges 13 or 26 mm
- Stepper motor or DC servo motor with and without gearhead
- Velocity to 15 mm/s
- Load capacity to 30 N
- Integrated reference point and limit switch

#### Product overview

Compact linear stage with low-backlash drive screw and ball guides. Directly mountable XY combination. Integrated reference point and limit switches: Hall effect.

The linear stage is available in two design variants:

- Narrow, long variant with direct fixed drive (flange motor).
- Wide, compact variant with belt drive (folded drivetrain). These variants are marked by an "F" at the end of the item number.

#### Drive types

- DC motor with or without gearhead
- Stepper motor with or without gearhead

Variants with DC motor are equipped with an incremental linear encoder. This is optional in the case of stepper motor variants. Folded variants with DC motor without gearhead are equipped with a ball screw.

#### Highly accurate position measuring with incremental encoder

Noncontact optical 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

Medical industry, Autofocus, Precision microassembly, Biotechnology, Automation

## Specifications

L-505 with DC motor	L-505.013212 L-505.013212F L-505.023212 L-505.023212F	L-505.014212F L-505.024212F	Unit	Tolerance
	Linear stage with DC motor and linear encoder	Linear stage with DC gear motor and linear encoder		
Active axes	X			
<b>Motion and positioning</b>				
Travel range	L-505.01: 13 L-505.02: 26		mm	
Integrated sensor	Incremental linear encoder			
Sensor signal linear encoder	A/B quadrature, RS-422			
Design resolution	0.05		μm	
Sensor resolution linear encoder	0.05		μm	
Minimum incremental motion	0.1	0.5	μm	typ.
Unidirectional repeatability	0.1	0.25	μm	typ.
Bidirectional repeatability	±0.15	±0.25	μm	typ.
Pitch / yaw	L-505.01: ±50 L-505.02: ±75		μrad	typ.
Straightness / flatness	L-505.01: ±0.5 L-505.02: ±1		μm	typ.
Max. velocity	L-505.xx3xxx: 15 L-505.xxxxxx: 7.5	1	mm/s	
Reference and limit switches	Hall effect			
Reference point switch repeatability	<4		μm	typ.
<b>Mechanical properties</b>				
Guide type	Ball guide			
Drive screw type	Leadscrew L-505.0x3212F: Ball screw	Leadscrew		
Drive screw pitch	0.5		mm	
Load capacity	30		N	max.
Permissible lateral force	30		N	max.
Push/pull force	20		N	max.
Holding force, power off	20 L-505.0x3212F: 10	20	N	typ.
Permissible torque $M_x$ in $\theta_x$	L-505.01: 7 L-505.02: 9		N·m	max.
Permissible torque $M_y$ in $\theta_y$	L-505.01: 6 L-505.02: 8		N·m	max.
Permissible torque $M_z$ in $\theta_z$	L-505.01: 6 L-505.02: 8		N·m	max.
<b>Drive properties</b>				
Motor type	DC motor	DC gear motor		
Operating voltage, nominal	24	12	V	nom.
Operating voltage, max.	48	24	V	max.
<b>Miscellaneous</b>				

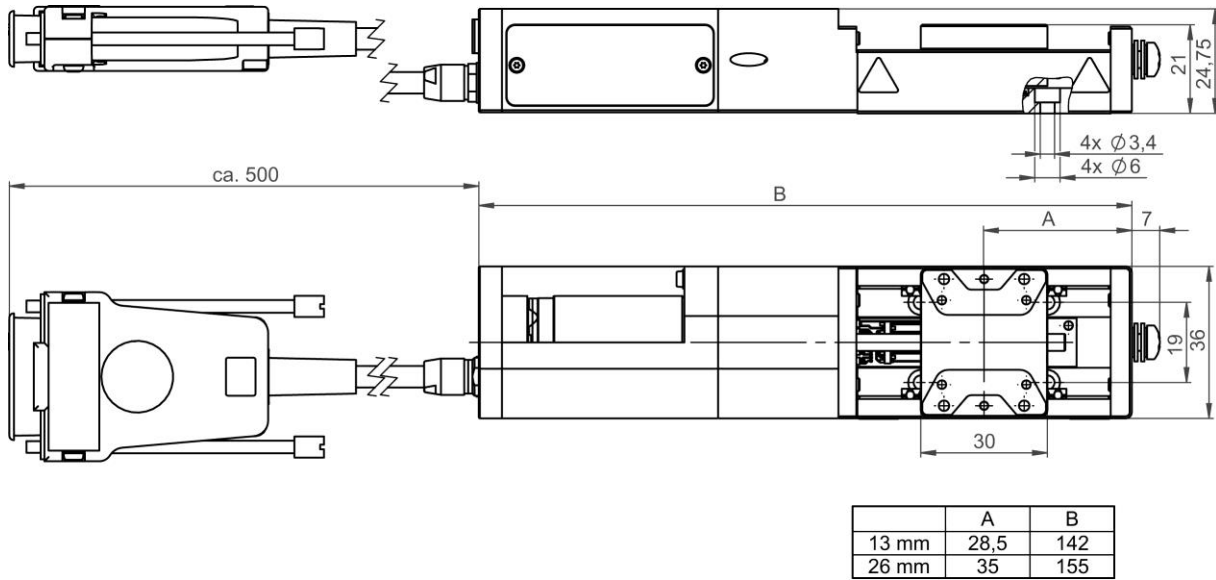
L-505 with DC motor	L-505.013212 L-505.013212F L-505.023212 L-505.023212F	L-505.014212F L-505.024212F	Unit	Tolerance
Operating temperature range	5 to 40		°C	
Material	Anodized aluminum, stainless steel			
Mass	0.4		kg	±5 %
Moved mass	0.07		kg	±5%
Connector	HD D-sub 26 (m)			
Recommended controllers	C-863 (single axis) C-884 (up to 6 axes) C-885 with C-863.20C885 (to 40 axes) ACS modular controller			

L-505 with stepper motor	L-505.011200 L-505.011200F L-505.021200 L-505.021200F	L-505.011212 L-505.011212F L-505.021212 L-505.021212F	L-505.01A200F L-505.02A200F	L-505.01A212F L-505.02A212F	Unit	Tolerance
	Linear stage with stepper motor	Linear stage with stepper motor and linear encoder	Linear stage with stepper motor and gearhead	Linear stage with stepper motor, gearhead; and linear encoder		
Active axes	X	X	X	X		
<b>Motion and positioning</b>						
Travel range	L-505.01: 13 L-505.02: 26				mm	
Integrated sensor	–	Incremental linear encoder	–	Incremental linear encoder		
Sensor signal linear encoder	–	A/B quadrature, RS-422	–	A/B quadrature, RS-422		
Design resolution	2.5 (full step)	0.005	0.732 (full step)	0.005	µm	
Sensor resolution linear encoder	–	0.005	–	0.005	µm	
Minimum incremental motion	0.1	0.05	0.2	0.05	µm	typ.
Unidirectional repeatability	0.3	0.1	0.3	0.1	µm	typ.
Bidirectional repeatability	±2.5	±0.15	±2.5	±0.15	µm	typ.
Pitch / yaw	L-505.01: ±50 L-505.02: ±75				µrad	typ.
Straightness / flatness	L-505.01: ±0.5 L-505.01: ±1				µm	typ.
Max. velocity	L-505.xx1xxx: 10 L-505.xxxxxxF: 7.5		0.75		mm/s	
Reference and limit switches	Hall effect					
Reference point switch repeatability	<4				µm	typ.
<b>Mechanical properties</b>						
Guide type	Ball guide					
Drive screw type	Leadscrew					
Drive screw pitch	0.5				mm	
Load capacity	30				N	max.
Permissible lateral force	30				N	max.
Push/pull force	20		65		N	max.

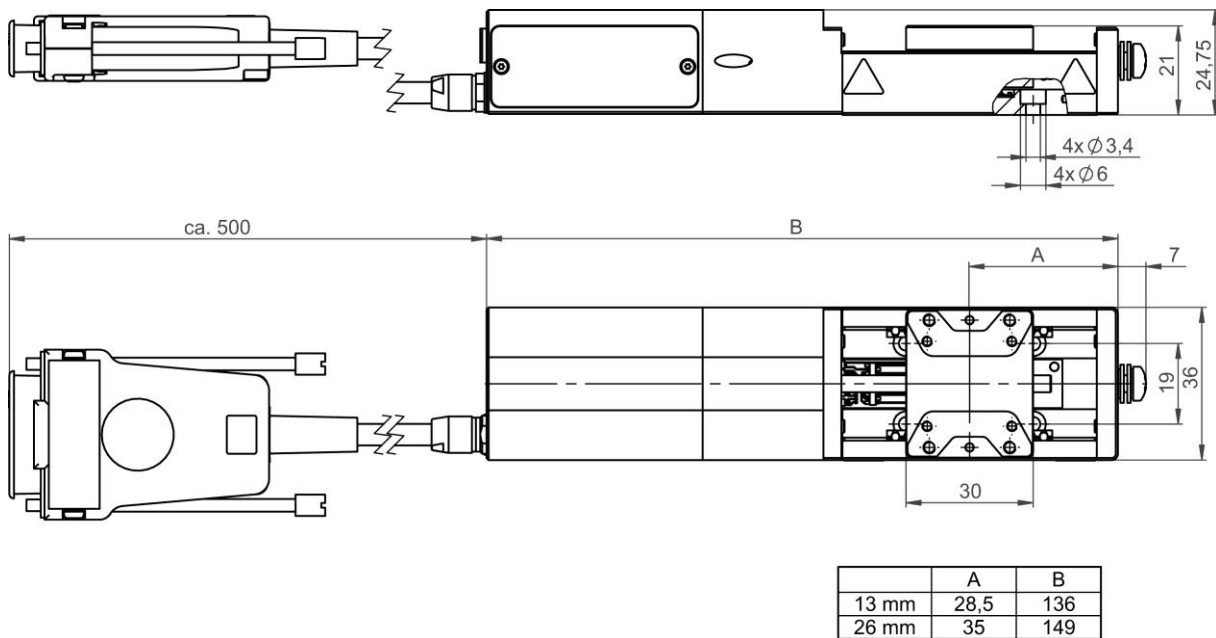
L-505 with stepper motor	L-505.011200 L-505.011200F L-505.021200 L-505.021200F	L-505.011212 L-505.011212F L-505.021212 L-505.021212F	L-505.01A200F L-505.02A200F	L-505.01A212F L-505.02A212F	Unit	Tolerance
Holding force, power off	20				N	typ.
Permissible torque $M_x$ in $\theta_x$	L-505.01: 7 L-505.02: 9				N·m	max.
Permissible torque $M_y$ in $\theta_y$	L-505.01: 6 L-505.02: 8				N·m	max.
Permissible torque $M_z$ in $\theta_z$	L-505.01: 6 L-505.02: 8				N·m	max.
<b>Drive properties</b>						
Motor Type	2-phase stepper motor		2-phase stepper motor with gearhead			
Operating voltage, nominal	24		24		V	nom.
Operating voltage, max.	48		48		V	max.
Step resolution	200		24		Full steps/rev	
Miscellaneous						
Operating temperature range	5 to 40				°C	
Material	Anodized aluminum, stainless steel					
Mass	0.4				kg	±5 %
Moved mass	0.07				kg	±5%
Connector	HD D-sub 26 (m)					
Recommended controllers	C-663.12 (single axis) SMC Hydra (double axis) C-885 with C-663.12C885 (up to 20 axes) ACS modular controller					

All cables required for operation with the recommended controller are included in the scope of delivery. The cable length is 3 m. Cable for connecting to other controllers can be ordered as accessory.  
Custom designs or different specifications on request.

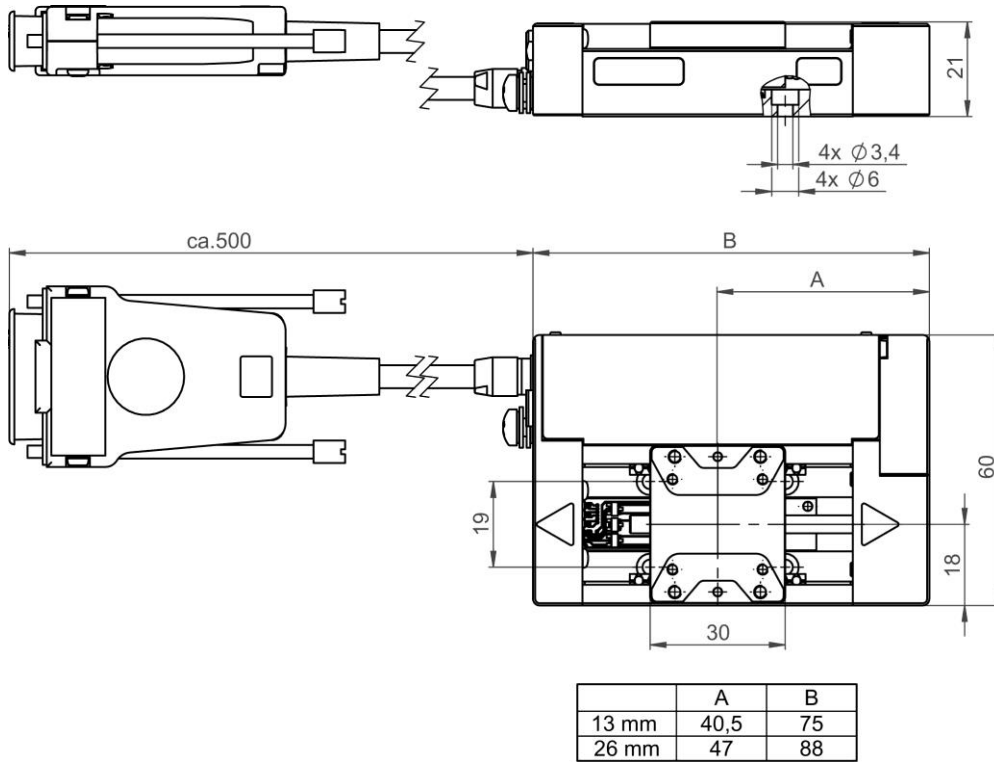
## Drawings / Images



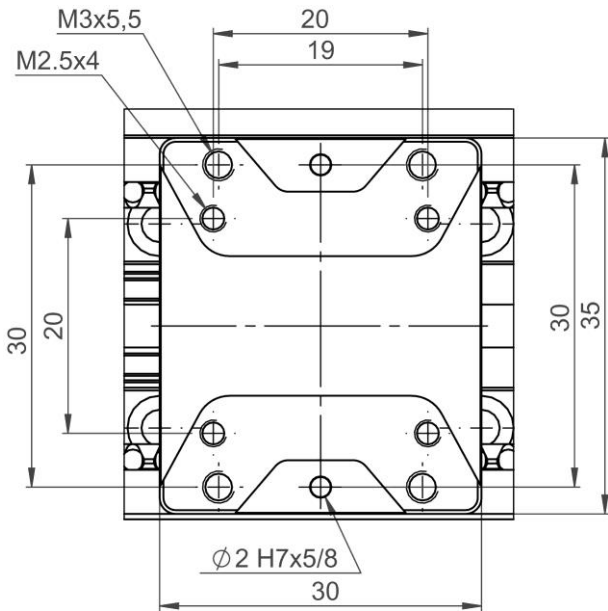
L-505 with direct fixed drive and DC motor, dimensions in mm



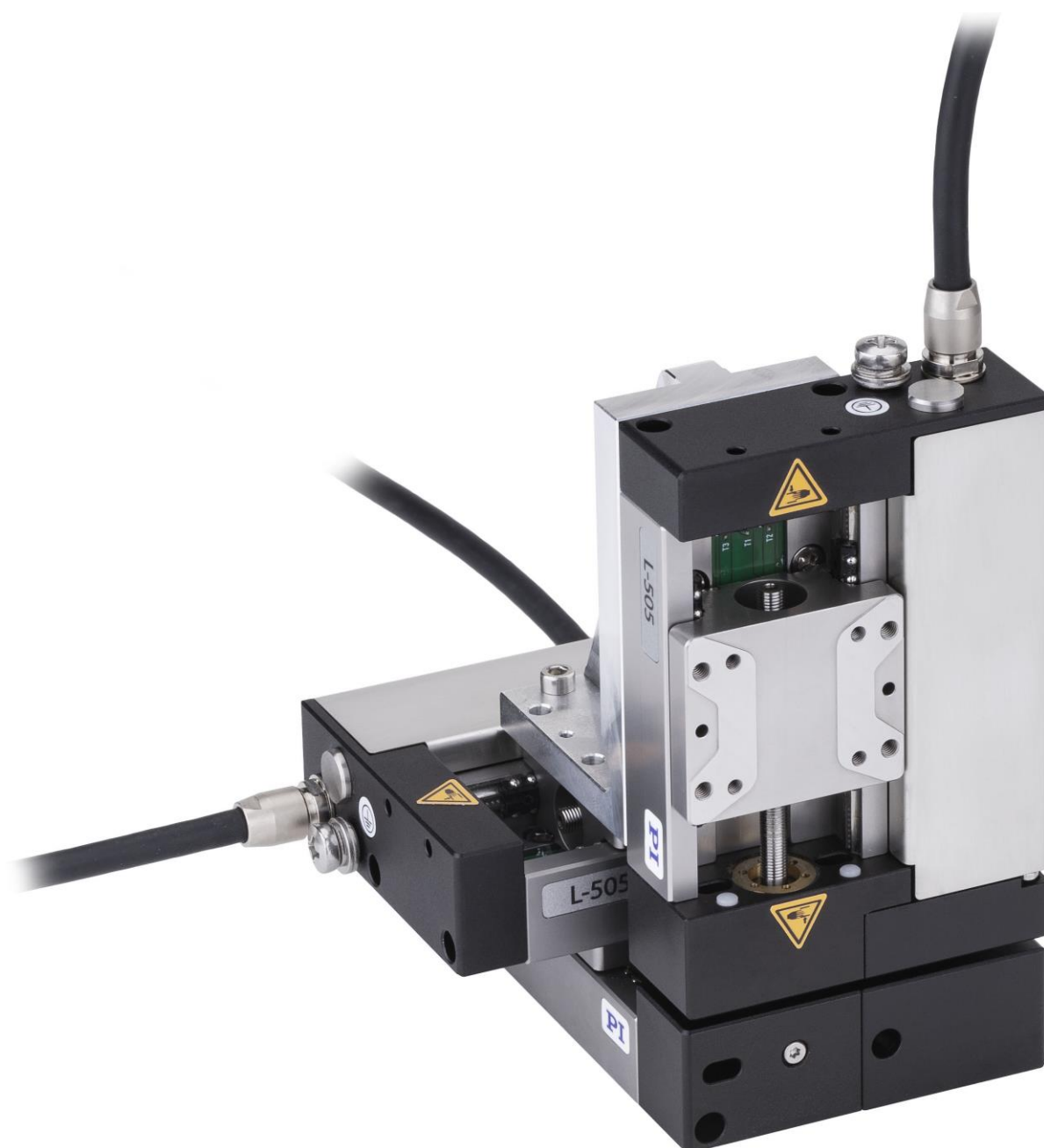
L-505 with direct fixed drive and stepper motor, dimensions in mm



L-505.xxxxxxF with belt drive, dimensions in mm



L-505 motion platform, dimensions in mm



*An XYZ assembly consisting of three L-505.023212F linear stages.*

## Ordering Information

### **L-505.011200**

Compact linear stage, 36 mm width, 13 mm travel range, 30 N load capacity, stepper motor, leadscrew, 0.5 m cable length

### **L-505.011200F**

Compact linear stage, 60 mm width, folded drivetrain, 13 mm travel range, 30 N load capacity, stepper motor, leadscrew, 0.5 m cable length

### **L-505.011212**

Compact linear stage, 36 mm width, 13 mm travel range, 30 N load capacity, stepper motor, leadscrew, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.011212F**

Compact linear stage, 60 mm width, folded drivetrain, 13 mm travel range, 30 N load capacity, stepper motor, leadscrew, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.013212**

Compact linear stage, 36 mm width, 13 mm travel range, 30 N load capacity, DC motor, leadscrew, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.013212F**

Compact linear stage, 60 mm width, folded drivetrain, 13 mm travel range, 30 N load capacity, DC motor, Ball screw, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.014212F**

Compact linear stage, 60 mm width, folded drivetrain, 13 mm travel range, 30 N load capacity, DC gear motor, leadscrew, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.01A200F**

Compact linear stage, 60 mm width, folded drivetrain, 13 mm travel range, 30 N load capacity, stepper motor with gearhead, leadscrew, 0.5 m cable length

**L-505.01A212F**

Compact linear stage, 60 mm width, folded drivetrain, 13 mm travel range, 30 N load capacity, stepper motor with gearhead, leadscrew, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.021200**

Compact linear stage, 36 mm width, 26 mm travel range, 30 N load capacity, stepper motor, leadscrew, 0.5 m cable length

**L-505.021200F**

Compact linear stage, 60 mm width, folded drivetrain, 26 mm travel range, 30 N load capacity, stepper motor, leadscrew, 0.5 m cable length

**L-505.021212**

Compact linear stage, 36 mm width, 26 mm travel range, 30 N load capacity, stepper motor, leadscrew, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.021212F**

Compact linear stage, 60 mm width, folded drivetrain, 26 mm travel range, 30 N load capacity, stepper motor, leadscrew, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.023212**

Compact linear stage, 36 mm width, 26 mm travel range, 30 N load capacity, DC motor, leadscrew, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.023212F**

Compact linear stage, 60 mm width, folded drivetrain, 26 mm travel range, 30 N load capacity, DC motor, Ball screw, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.024212F**

Compact linear stage, 60 mm width, folded drivetrain, 26 mm travel range, 30 N load capacity, DC gear motor, leadscrew, linear encoder with A/B quadrature signal transmission, 0.5 m cable length

**L-505.02A200F**

Compact linear stage, 60 mm width, folded drivetrain, 26 mm travel range, 30 N load capacity, stepper motor with gearhead, leadscrew, 0.5 m cable length

**L-505.02A212F**

Compact linear stage, 60 mm width, folded drivetrain, 26 mm travel range, 30 N load capacity, stepper motor with gearhead, leadscrew, linear encoder with A/B quadrature signal transmission, 0.5 m cable length