



Motorised Linear Stages

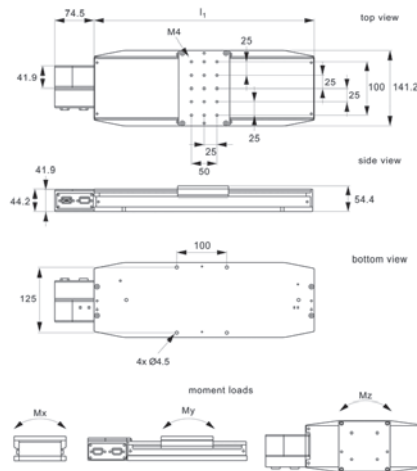
high precision

Motorised Linear Stages



L3505

MOTORISED LINEAR STAGES



Material

Black anodised aluminium body (6061). Hardened linear guideways, stainless steel Acme lead screw (with internally lubricated anti-backlash nut).

Technical Notes

These are smooth running, precise and stiff linear stages. For ease of use they have separate connections for motor power and limit/encoder signals. Integrated limit switches are provided as standard. Supplied with optical linear encoder. Easy plug and play system. Controllable from PC or PLC when used in conjunction

with a motion controller. Controllers come with their own software but many pre-existing software packages (such as Labview) can be used.

Can be readily supplied in XY, XZ and XYZ configurations for 100 and 150mm stroke models.

Applications - research, semi-conductors, fibre optics, automation etc.

Tips

Stepper motor - Nema 17, high torque, brushless. 0.95 Amp/phase, 5.0 Ohm/phase, 3.1 mH/phase, 1.8°/step.

Limit switches wired normally closed.

Supplied with in-built linear encoder to increase positional accuracy. Drawings show stepper motor configuration. See special pages for further motor options.

Important Notes

Max. moment loads:

$M_y = 20 \text{ Nm}$

$M_z = 20 \text{ Nm}$.

For combined stages, add suffixes:

XY - for XY stage

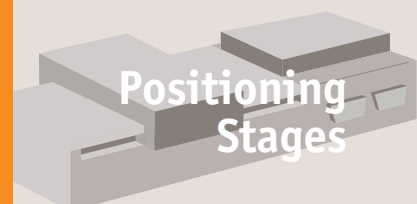
XZ - for XZ stage

XYZ - for XYZ stage

| Order No. | Travel | Motor type | Horizontal load kg max. | Accuracy ± µm | Side load kg max. | Repeatability ± µm | Lead screw pitch | Speed mm/s max. | I_1 | I_2 | Resolution ± µm | Weight kg |
|------------------|--------|----------------|-------------------------------|---------------------|-------------------------|--------------------------|---------------------|-----------------------|-------|-------|-----------------------|--------------|
| L3505.100 | 100 | Stepper & enc. | 22,6 | 3µ | 4,5 | 0,5µ | 5 | 50 | 225,4 | 74,7 | 0,1µ | 2,9 |
| L3505.150 | 150 | Stepper & enc. | 22,6 | 3µ | 4,5 | 0,5µ | 5 | 50 | 275,4 | 74,7 | 0,1µ | 3,2 |
| L3505.200 | 200 | Stepper & enc. | 22,6 | 3µ | 4,5 | 0,5µ | 5 | 50 | 325,4 | 74,7 | 0,1µ | 3,6 |
| L3505.250 | 250 | Stepper & enc. | 22,6 | 3µ | 4,5 | 0,5µ | 5 | 50 | 375,4 | 74,7 | 0,1µ | 3,9 |
| L3505.300 | 300 | Stepper & enc. | 22,6 | 3µ | 4,5 | 0,5µ | 5 | 50 | 425,4 | 74,7 | 0,1µ | 4,2 |
| L3505.050 | 50 | Stepper & enc. | 22,6 | 3µ | 4,5 | 0,5µ | 5 | 50 | 174,6 | 74,7 | 0,1µ | 2,7 |



| | | | |
|--|---|--|--|
| L3500 Medium duty motorised stage  | L3504 Heavy-duty motorised stage  | L3505 Motorised linear stage  | L3506 Miniature motorised stage  |
| L3508 Motorised linear stage  | L3510 Motorised linear stage  | L3521 Single axis stepper controller  | L3522 Two axes stepper controller  |
| L3524 Multi-axes stepper controller  | L3525 Single axis servo controller  | L3550 Motorised rotary stage Ø50  | L3552 Motorised rotary stage Ø75  |
| L3554 Motorised rotary stage Ø75  | L3556 Motorised rotary stage Ø125  | L3558 Motorised rotary stage Ø125  | L3559 Manual rotary stage Ø125  |
| L3562 Motorised rotary stage Ø200  | L3569 High speed rotary table  | L3591 Vertical lift stage motorised  | L3592 Vertical lift stage motorised  |



Our motorised linear stages are precise, heavy duty and available from 25mm stroke to 800mm.

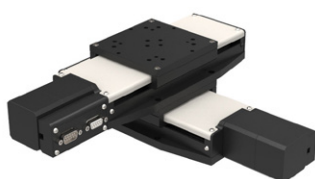
They can be easily controlled either with an Intelligent motor (this is a motor with an inbuilt driver and controller) or with a motor and one of our motion controller stages.

Programming for both the intelligent motor (less expensive) and the motion controllers is very simple and we provide free software and sample source code for Labview, VB, C++, OSX etc. It is also possible to download a stand-alone programme to the device so it can run independently of a host.

We also offer a Joystick controller.

The stages can be readily supplied in X, XY, XZ and XYZ configurations and can also be used with our range of rotary tables (L3550 to L3562).

XY Assembly



XY Assembly



XY Assembly



Using intelligent motors

- RS-485 - USB connection.
- Can run independently from host.
- Joystick control option

Using motion controllers

- RS-485 - USB connection.
- Can run independently from host.
- Joystick control option





Stepper limitations

For all of their advantages, stepper motors have a number of limitations which can cause significant implementation and operational issues depending on your application. Stepper motors do not have any reserve power. In fact, stepper motors lose a significant amount of their torque as they approach their maximum driver speed. A loss of 80% of the rated torque at 90% of the maximum speed is typical.

Stepper motors are also not as good as servo motors in accelerating a load. Attempting to accelerate a load too fast where the stepper cannot generate enough torque to move to the next step before the next drive pulse will result in a skipped step and a loss in position. If positional accuracy is essential, either the load on the motor must never exceed its torque or the stepper must be combined with a position encoder to ensure positional accuracy.

Stepper motors may also suffer from vibration and resonance problems. At certain speeds, partially depending on the load dynamics, they may resonate and be unable to drive the load. This may result in skipped steps, stalled motors, excessive vibration and noise.

Servo limitations

Servo motors are capable of delivering more power than stepper motors, but do require much more complex drive circuitry and positional feedback for accurate positioning. Servo motors are also much considerably expensive than stepper motors and are often harder to find. Servo motors often require gear boxes, especially for lower speed operation.

The requirement for a gearbox and a position encoder makes servo motor designs more mechanically complex and increases the maintenance requirements for the system. To top it all off, servo motors are more expensive than stepper motors before adding on the cost of a position encoder.

Summary

Selecting the best motor for your application depends on a few key design criteria for your system including cost, positional accuracy requirements, torque requirements, drive power availability, and acceleration requirements. Overall, servo motors are best for high speed, high torque applications while stepper motors are better suited for lower acceleration, high holding torque applications as well as generally being less expensive and easier to control.

Motor options

| | |
|--|---|
| | Stepper motor <ul style="list-style-type: none"> • Standard • With rotary encoder (1000 line) |
| | Intelligent stepper motor <ul style="list-style-type: none"> • Standard • With rotary encoder (512 line) |
| | Servo motor <ul style="list-style-type: none"> • Standard • With rotary encoder (1000 line) |