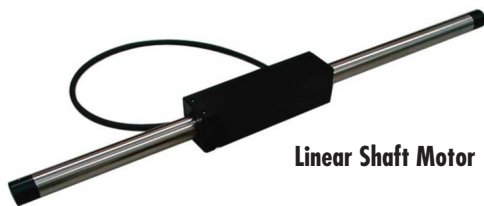


ServoLinear.com

Linear motion made easy!



Linear Shaft Motor

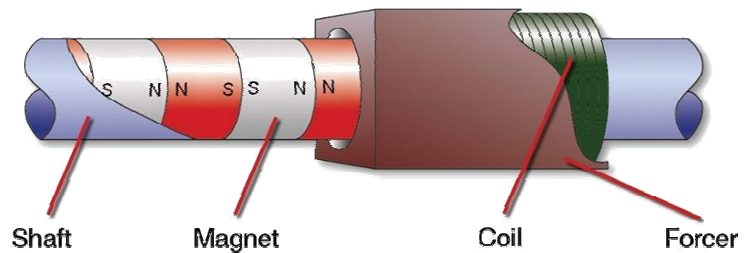


Figure 1

What is a Linear Shaft Motor?

The Linear Shaft Motor is simply a high precision direct drive linear servo motor that consists of a shaft of rare earth-iron-boron-permanent (NIB) magnets and a “forcer” of cylindrically wound coils. The shaft supplies the magnetic field upon which the forcer acts. The innovative magnet/tube or MagTube™ motor is available in ServoLinear actuators with a stroke range of 100 mm/3.9 in to 3500 mm/137.8 in; and a force range from 10 n/2.25 lbs to 2100 n/470 lbs.

Shaft Construction

The magnetic structure of the shaft is built with no spacing between magnets. The magnetic assembly is inserted into a protective stainless steel shaft/tube. (Figure 1) This is a patented process which is protected throughout the world.

Forcer Construction

The coils of the Linear Shaft Motor are of a cylindrical design, thus providing a number of key advantages over other linear motors.

- Coils surround the magnets allowing for the optimal use of the magnetic flux. This makes the air gap non-critical. (Figure 2)
- Magnetic flux cuts motor windings at right angle to travel for max efficiency.
- The Linear Shaft Motors requires less current and less mass to produce a similar force, and is more efficient than any other linear motor on the market.

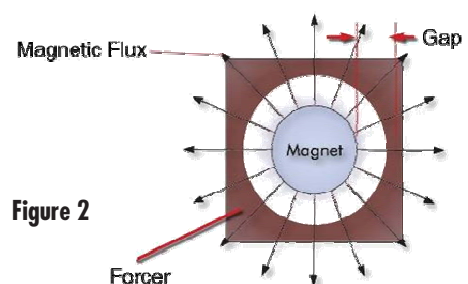


Figure 2

Advantages of the MagTube™ Motor

- **Simple construction**

The MagTube™ motor itself consists of only two parts: the shaft and theforcer, with no physical contact between these components.

- **Direct drive**

Unlike ball screws or belt drives, the MagTube™ motor offers high thrust; high speed & high accuracy without any gearing or backlash.

- **Precise position control**

Linear movement resolution as small as 0.1 nanometers is achievable.

- **Precise speed control**

High speeds (up to 8 meters/second) and low speeds (down to 8 micrometers per second) are achievable with virtually no speed fluctuations.

- **Zero cogging**

The coreless design results in no magnetic cogging whatsoever.

- **Design flexibility**

Multiple forcers can be mounted to a common shaft for opposite and parallel motion; impossible with belt or ball screw actuators.

- **Durable construction**

Capable of operating in a clean room environment, in a vacuum, or under water.

- **Quiet operation**

The absence of friction makes the system extremely quiet. The only mechanical contact section is the linear guide.

- **Compact and lightweight**

Lightweight when compared to traditional type of linear motors.

- **Large air gap**

The non-critical 0.5 mm to 2.5 mm nominal air gap allows for easy installation and alignment.

- **Power efficiency**

The Linear Shaft Motor's extremely strong magnetic flux, cylindrical design and small moving mass provide for a very efficient linear motion. >50% more efficient than non-direct drive systems (belt drive, ball/lead screw, etc.) and >30% more efficient than other direct drive systems.

- **Control compatibility**

The MagTube™ motor can be controlled by most AC servo drives with linear encoder feedback.