

Industrial Linear Motors

Smart solutions are driven by

LinMot®



PRODUCT OVERVIEW

Precision and dynamics

In the products and in the everyday life of NTI AG, these values are inseparable.

NTI AG

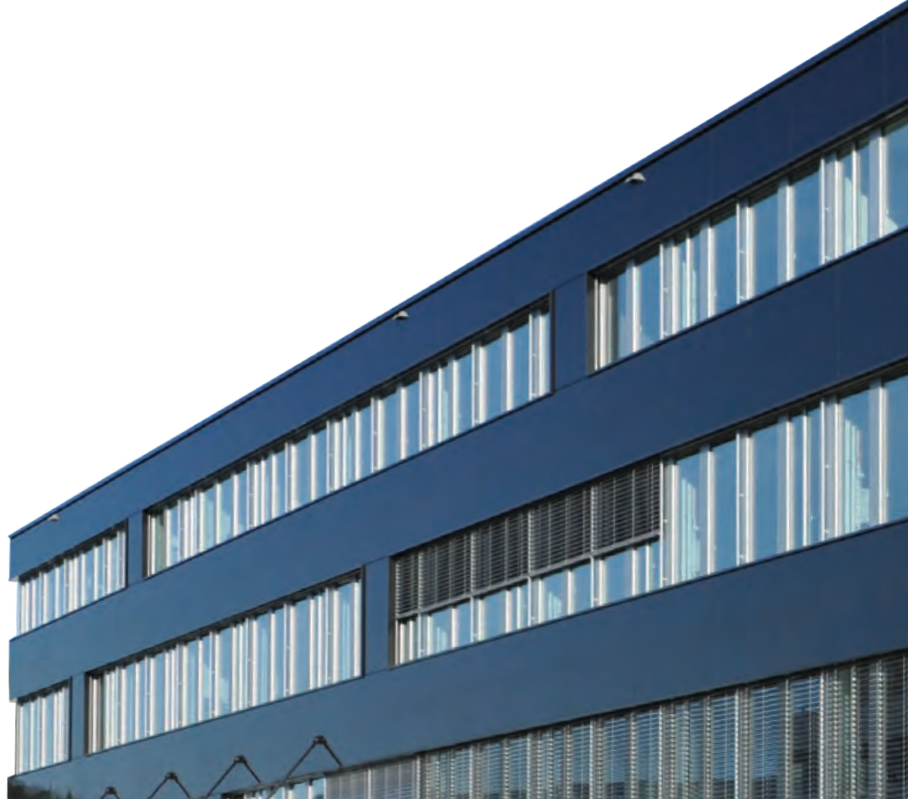
NTI AG is a global manufacturer of high quality tubular style linear motors and linear motor systems and thus focuses on the development, production and distribution of linear direct drives for use in industrial environments.

Founded in 1993 as an independent business unit of the Sulzer Group, NTI AG has been in operation since 2000 as an independent company.

NTI AG headquarters are located in Spreitenbach, near Zurich in Switzerland. In addition to three production sites in Switzerland and Slovakia, NTI AG maintains a sales and support office LinMot® USA Inc. to cover the Americas.

The brands LinMot® for industrial linear motors and MagSpring® for magnetic springs are offered to customers worldwide. NTI AG maintains an experienced customer consultant sales and support network of over 80 locations worldwide.

For the realization of linear motion NTI AG is always a competent and reliable partner.



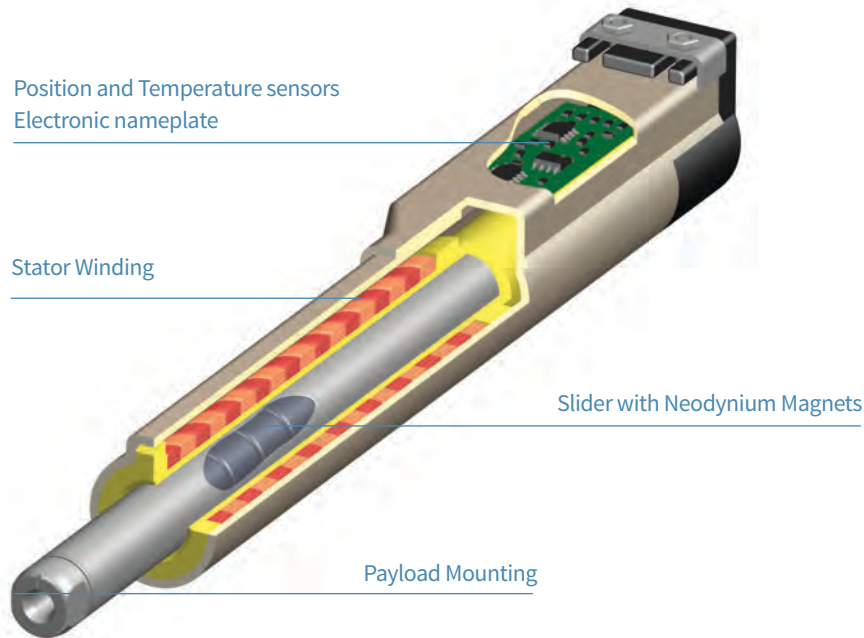
Mission

LinMot offers its customers a sophisticated and dedicated linear drive system that can be easily integrated into all leading control systems. A high degree of standardization, delivery from stock and a worldwide distribution network insure the immediate availability and excellent customer support.

Our aim is to push linear direct drive technology and make it a standard machine design element. We offer highly efficient drive solutions that make a major contribution to the overall resource conservation effort.



Linear Motors



LinMot linear motors employ a direct electromagnetic principle. Electromagnetic force provides direct linear movement without the use of cams, gears, belts, or other mechanical devices. The engine consists of only two parts: The slider and the stator. The slider is made of neodymium magnets in a high precision stainless steel tube. In the stator are the motor windings, the bearing for the slider, the position detection and temperature sensors for thermal monitoring of the motor.

Standard Motors
High-Performance Motors
Short Type Motors
Stainless Steel Motors
ATEX Motors
Special Motors

- ✓ Freely positionable
- ✓ Speed adjustable
- ✓ Acceleration adjustable
- ✓ Programmable force

- ✓ Extreme dynamics
- ✓ Monitored movements
- ✓ Soft movements
- ✓ Synchronized movements

- ✓ Long service life
- ✓ Low maintenance costs
- ✓ Hygienic
- ✓ Low energy costs

Standard Motors Universal



- » Highly dynamic drives
- » Wide stroke range
- » Available with cable outlet or with rotatable connector
- » Optional with air cooling
- » Wide range of applications in handling modules as well as in plant and machine construction

Stroke up to	mm	1830
Max. Force	N	23-1024
Nominal Force	N	9-354
Peak Velocity	m/s	6.9
Peak Acceleration	m/s ²	500
Repeatability	mm	0.05/0.01
Stator Length	mm	162-410
Slider Length	mm	130-2000

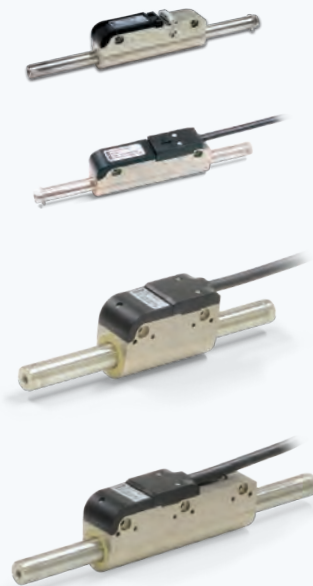
HP Motors High-Performance



- » Particularly strong magnetic circuit
- » Increased duration of force and acceleration
- » Enables higher operating temperatures
- » In comparison with the standard motors, a smaller HP motor can be used with the same load.

Stroke up to	mm	1480
Max. Force	N	21-255
Nominal Force	N	15-92
Peak Velocity	m/s	7.3
Peak Acceleration	m/s ²	780
Repeatability	mm	0.05/0.01
Stator Length	mm	162-257
Slider Length	mm	170-1600

Short Type Motors Compact



- » Short design
- » Integrated mounting flange
- » Pluggable motor cable with cover
- » Free positionable cable outlet
- » For use where space is limited and in multi-axis applications

Stroke up to	mm	1480
Max. Force	N	29-255
Nominal Force	N	8-65
Peak Velocity	m/s	7.3
Peak Acceleration	m/s ²	750
Repeatability	mm	0.05/0.01
Stator Length	mm	90/105/150
Slider Length	mm	130-1600

P10-54 Motors

Power packages

- » 230VAC and 3 x 400VAC technology
- » Peak forces up to 900 N
- » Rotating push-pull TWIN connector for power and encoder cables
- » One-piece clamping flange
- » Can also be controlled by standard third-party servo drives

Stroke up to	mm	2240
Max. Force	N	892
Nominal Force	N	255
Peak Velocity	m/s	11.1
Peak Acceleration	m/s ²	413
Repeatability	mm	0.01
Stator Length	mm	22-402
Slider Length	mm	350-2500



P10-70 Motors

High Power

- » 3 x 400VAC technology
- » Peak force up to 2700 N
- » Extremely high accelerations
- » Separate connector for sensor and power cable
- » Can be operated by standard "third party" Servo Drives

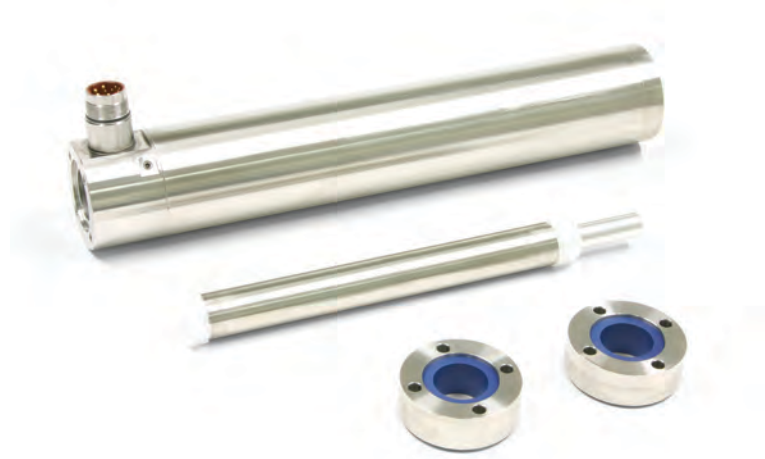
Stroke up to	mm	1770
Max. Force	N	557-2703
Nominal Force	N	65-862
Peak Velocity	m/s	7.4
Peak Acceleration	m/s ²	975
Repeatability	mm	0.05/0.01
Stator Length	mm	180-500
Slider Length	mm	290-1990



Stainless Steel Motors *Hygienic*

- » Stainless steel housing
EN 1.4404/ AISI 316
- » Hygienic design
- » Welded connections, no gaskets
- » Completely encapsulated (IP69K)
- » Optional integrated water cooling
- » For use in the food
or in the pharmaceutical sector

Stroke up to	mm	980
Max. Force	N	210-888
Nominal Force	N	24-360
Peak Velocity	m/s	3.4
Peak Acceleration	m/s ²	440
Repeatability	mm	0.05/0.01
Stator Length	mm	296/395/515
Slider Length	mm	395-1400



ATEX Motors *Encapsulated*

- » ATEX and IECEx certified
- » Welded connections
- » Completely encapsulated (IP69K)
- » Protection class IP69K
- » Optional integrated water cooling
- » For use in protection zones 1 / 2 (gas)
- » Suitable for use in protection zones
21 / 22 (dust)

Stroke up to	mm	980
Max. Force	N	210-888
Nominal Force	N	24-360
Peak Velocity	m/s	3.4
Peak Acceleration	m/s ²	440
Repeatability	mm	0.05/0.01
Stator Length	mm	296/395/515
Slider Length	mm	395-1400



P04 Motors

Pneumatic substitute

- » Peak force up to 550 N
- » Stroke up to 150 mm
- » Hardened rod capable to handle side load
- » Ø 16 mm rod with M10x1.25 thread
- » Mounting connection according to ISO pneumatic cylinder
- » Stator encapsulated (IP54)

Stroke up to	mm	150
Max. Force	N	550
Nominal Force	N	255
Peak Velocity	m/s	3.9
Peak Acceleration	m/s ²	50
Repeatability	mm	±0.05
Stator Length	mm	400-455
Slider Length	mm	429-488



PD04 Motors

Pneumatic substitute

- » Stand alone configuration of the motor
- » Setting 4 positions in real time
- » Best usability with clear display
- » Absolute sensor, no homing required
- » Motor conforms to protection class IP54
- » Integrated linear guide

Stroke up to	mm	150
Max. Force	N	550
Nominal Force	N	255
Peak Velocity	m/s	3.9
Peak Acceleration	m/s ²	50
Repeatability	mm	±0.05
Stator Length	mm	400 - 455
Slider Length	mm	429-488



P03 Motors Integrated Drive

- » High-performance linear motor with integrated drive
- » Compact form factor
- » Highly dynamic
- » Suitable for daisy-chain linkages
- » Integrated mounting flange
- » Low cabling effort
- » Low overall costs
- » Simple commissioning

Stroke up to	mm	135
Max. Force	N	255
Nominal Force	N	35
Peak Velocity	m/s	3.2
Peak Acceleration	m/s ²	450
Repeatability	mm	±0.05
Stator Length	mm	400
Slider Length	mm	240



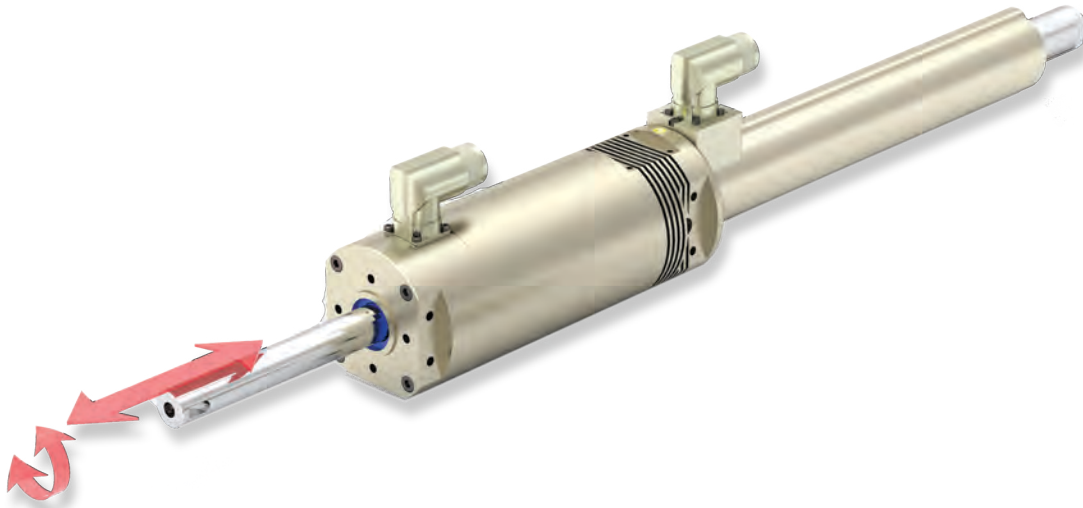
Special Motor Integrated Drive IP69k

Omega Motor

- » Stainless Steel Motor with integrated drive
- » Especially for applications in the pharmaceutical and food industry with very tight spaces
- » Welded connections
- » Completely encapsulated (IP69K)
- » Special designed connector
- » Control via fieldbus or Industrial Ethernet



Linear Rotary Motors



The PR01 motor series combines linear and rotary movements in a single integrated direct drive solution. The two motors are individually and independently driven. Working with a higher-level control high dynamic linear and rotary movements can be realized. These can be programmed either synchronously or independently of each other.

Complex tasks such as screwing, closing, capping, stacking, aligning and much more can be realized with a single component. The PR01 linear-rotary motor allows for independently specified linear force/pressing force as well as rotary torque.

Standard
Gearbox
Hollow shaft
Stainless steel

✓ Linear and rotary direct drive

✓ Synchronous linear and rotary movements

✓ Programmable forces and torques

✓ Stainless steel version available

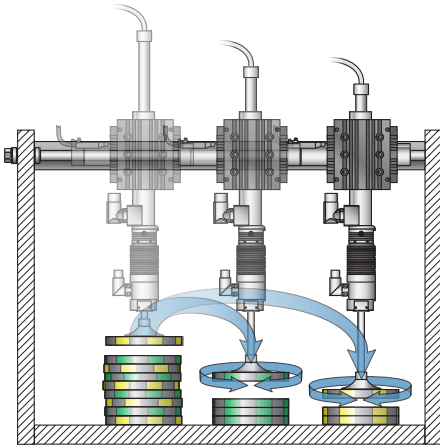
✓ With gear transmission or hollow shaft

✓ Simplest realization of seamers & cappers

Hollow shaft



- » Version with hollow shaft
- » Inner diameter 2.5 / 4.0 mm
- » Upgradeable to vacuum gripper
- » Can be combined with a pneumatic or electric gripper



Stroke up to	mm	150
Max. Force	N	229-921
Nominal Force	N	45-319
Peak Velocity	m/s	3.9
Peak Torque	m/s ²	1.53-8.9
Constant Torque	Nm	0.32-2.64
Max. Num. of Rev.	rpm	1000-1500
Repeatability	mm	0.05/0.01
Length	mm	503-959

Standard



Stroke up to	mm	300
Max. Force	N	255-1024
Nominal Force	N	51-354
Peak Velocity	m/s	3.9
Peak Torque	m/s ²	1.53-8.9
Constant Torque	Nm	0.32-2.64
Max. Num. of Rev.	rpm	1000-1500
Repeatability	mm	0.05/0.01
Length	mm	503-1222

- » Linear direct drive
- » Rotary direct drive
- » Independent linear and rotary motions
- » Integrated position sensors
- » Absolute temperature feedback
- » Programmable position / motion profiles
- » Programmable press force
- » Programmable torque



Stainless steel

- » Linear rotary shaft in stainless steel
EN 1.4404 / AISI 316
- » Hygienic Design
- » Resistant to cleaning supplies
- » Designed for use with food products
- » Designed for use in the chemical industry
- » With interchangeable plain bearings



Gearbox

- » Independent linear and rotary motions
- » For applications with high inertia loads
- » For applications with high torque requirement
- » 3 selectable transmission ratios
- » With guide rails to bear transverse loads



Max. Stroke	mm	150
Max. Force	N	1024
Nominal Force	N	354
Peak Velocity	m/s	3
Gear	n	1:5/1:7/1:10
Peak Torque	Nm	44/62/89
Constant Torque	Nm	9.5/13/19

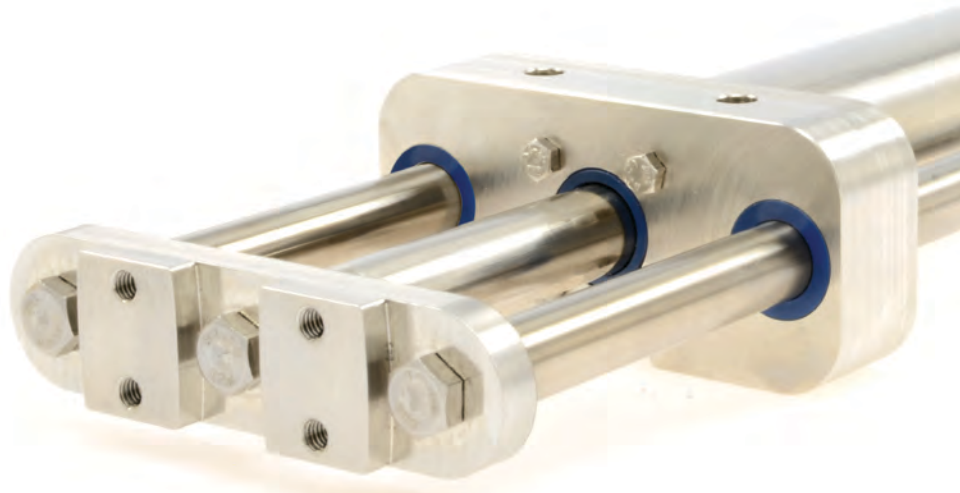
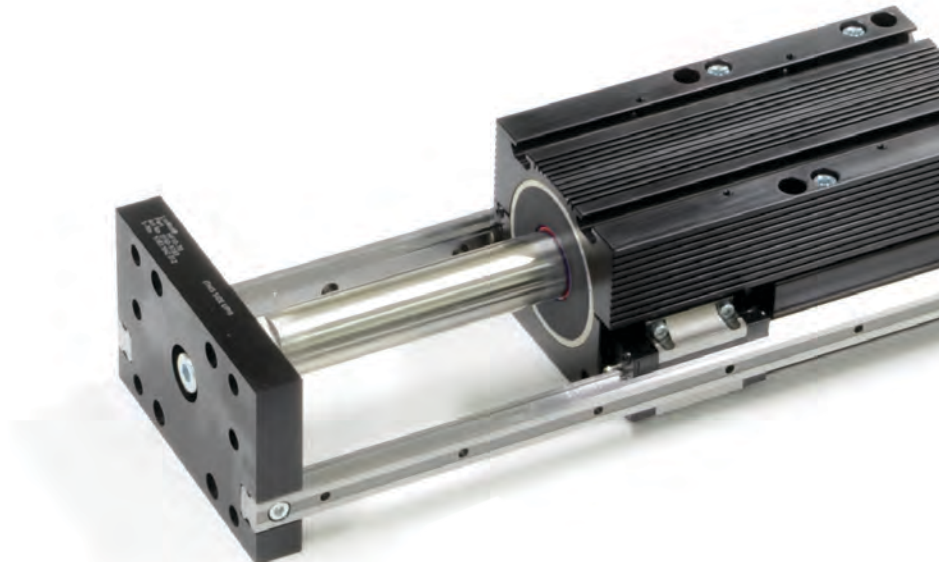
Linear Guides

LinMot linear guides are compact guide units with integrated ball bushings or bearings for the LinMot linear motors.

The guides use load bearings to support external forces, torques, and bending moments. Additionally the linear guides act as an anti-twist device. These products offer high guidance accuracy and facilitate dynamic and precise positioning of the load.

The load is connected directly to the front panel of the linear guide. The mechanical dimensions and mounting options are compatible with many pneumatic guides. The modular design allows an easy mounting of accessories, such as a mechanical brake or MagSpring (magnetic spring) for load balancing in a vertical installation position.

LinMot also offers a stainless steel guide, which can be used together with the stainless steel motors in special conditions.




Linear Guides H01

- » Bearing external forces, torque and bending moments
- » Turning resistance
- » Compatible with pneumatic guides
- » Integrated Linear ball bearings or sintered bearings


Linear Guides B01

- » Increased stiffness by endplate
- » Use in high-clearance sliders
- » Bearing external forces, torque and bending moments
- » Turning resistance
- » Compatible with pneumatic guides
- » Integrated Linear ball bearings or sintered bearings


Linear Guides H10

- » Bearing external forces, torque and bending moments
- » Turning resistance
- » Compatible with pneumatic guides
- » Integrated Linear ball bearings or sintered bearings


Linear Guides H01-SSC

- » Bearing external forces, torque and bending moments
- » Turning resistance
- » Made of stainless steel (1.4404 / AISI 316)
- » Hardened stainless steel guide shafts
- » Sliding bearing with FDA approval
- » No seals; connections are welded
- » Tapered surfaces
- » Motor inside is completely flushable



MagSpring

Weightlessness in your application

When installed vertically, linear motors and other direct drives must apply a constant force to counteract the force of gravity.

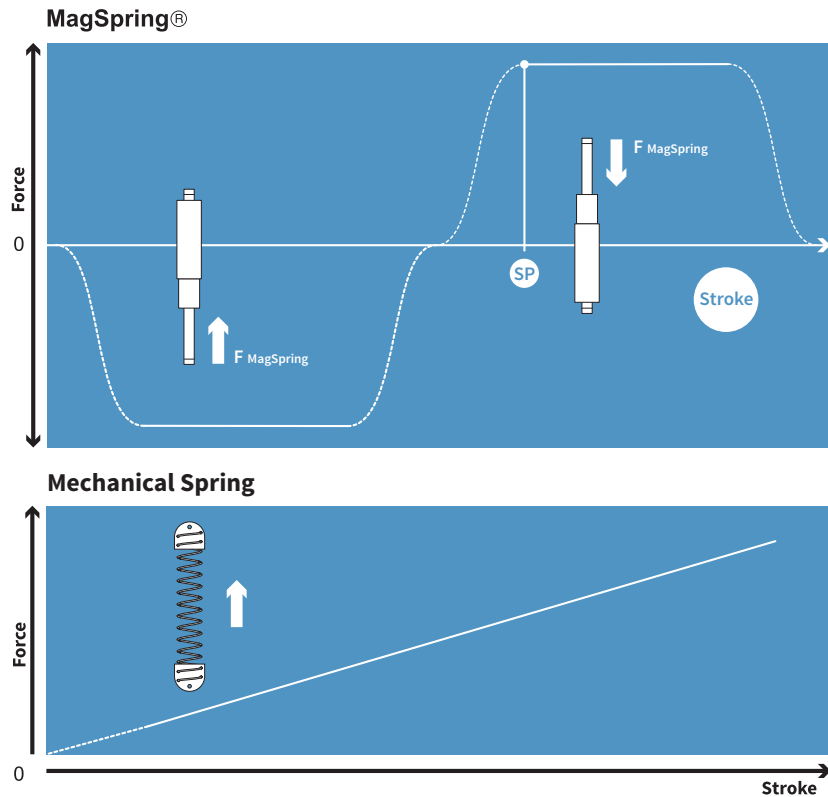
This is exactly why LinMot has developed the «Magnetic Spring» MagSpring.

Mounted parallel to the linear motor, the weight force can be passively compensated via the MagSpring. When the vertical axis de-energizes, the MagSpring may prevent lowering of the vertical axis. Utilizing a MagSpring the linear motor is used only for actual positioning and application of dynamic forces, thus allowing smaller dimensioned motors.

The functionality is based on the attraction of the permanent magnet. Accordingly, no power supply (electricity, compressed air, etc.) is necessary, allowing easy implementation of safety-related applications.



Thanks to the constant power path characteristic numerous applications are possible, such as position-independent generation of a constant contact force, the application of a constant holding force over a large stroke range or the unilateral power assistance in driving tasks.



M01-20			M01-37		
Constant force	N	11 / 17 / 22	Constant force	N	40 / 50 / 60
Stroke (Constant force)	mm	≤ 290	Stroke (Constant force)	mm	≤ 350
Stator mass	g	75 - 388	Stator mass	g	440 - 2200
Slider mass	g	75 - 280	Slider mass	g	75 - 420

Product characteristics

- » Constant force along the entire stroke
- » Purely passive, no electricity needed nor compressed air
- » Ideal for compensating the gravitational force
- » Also suitable for dynamic movements
- » Different stroke ranges and forces
- » Compatible with H-guides
- » Simple construction



SIEMENS**Rockwell
Automation**
Allen-Bradley**BECKHOFF****Schneider**
Electric **BOSCH****Controller****Communication Interfaces**

24...72 VDC

LinMot Drives**LinMot Motors****Voice Coil****EC/DC Motor****Linear Motor**

OMRON

Lenze

CODESYS

NATIONAL INSTRUMENTS
LabVIEW™

MATLAB®
SIMULINK®



ETHERNET
POWERLINK

EtherCAT®

sercos
the automation bus

RS 485

RS 232



LinMot Drives



3 x 400 VAC

3rd Party Drives



P10-70



AC Servo



P10-70



AC Servo

Servo Drives

The wide product range of LinMot servo drives allows the rapid implementation in applications from simple two position point to point movements up to complex, high-precision multi-axis synchronization with electronic line shaft.

LinMot Drives cover the entire power range from the 24 to 72VDC low voltage range up to powering high performance servo motors with direct connection to 3phase 480VAC.

A 1100

C 1100

C 1200

E 1200

C1400

E 1400

- ✓ Wide range of applications from point to point to complex multi-axis applications

- ✓ Serial communication, field buses and realtime ETHERNET

- ✓ Internally stored motion profiles or program sequences

- ✓ Control of position, velocity, acceleration and force

- ✓ Integrated safety functions for switching off the power output stage

- ✓ Compact design and easy commissioning

C 1200

Compact Drive / NC Motion



- » 24...72VDC
- » Absolute / relative positioning commands
- » Limited jerk motion commands
- » Time Curves
- » Real Time (Streaming)
- » Synchronous control (Drive profiles)
- » PLC or Stand-Alone Solutions
- » Configuration over Industrial Ethernet (EoE)
- » Digital and Analog IO's
- » Safe Torque Off
- » Interface for optional incremental and absolute sensor
- » Supports Plug and Play
- » UL 508C



EtherCAT

Sercos
the automation bus

ETHERNET
POWERLINK

EtherNet/IP

C 1100

Compact-Drive / Point to Point



- » 24...72VDC
- » Absolute / relative positioning commands
- » Limited jerk motion commands
- » Time Curves
- » Real Time (Streaming)
- » PLC or Stand-Alone Solutions
- » Digital and Analog IO's
- » Safe Torque Off
- » Safe Limited Speed Ready
- » Interface for optional incremental and absolute sensor
- » Supports Plug and Play
- » UL 508C



EtherCAT

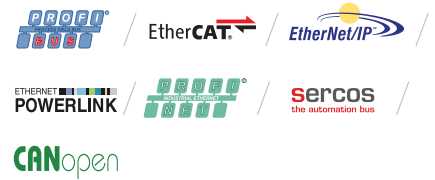
CANopen

E 1200

High End



- » 24...72VDC
- » Absolute / relative positioning commands
- » Limited jerk motion commands
- » Time Curves
- » Real Time (Streaming)
- » Synchronous control (Drive profiles)
- » Master Encoder Synchronization (In/Out)
- » PLC or Stand-Alone Solutions
- » Industrial Ethernet Configuration / Remote Access Ethernet
- » Digital and Analog IO's
- » Interface for optional incremental and absolute sensor
- » Position Encoder Simulation (RS 422)
- » Master / Slave Solutions
- » ± 10 VDC Force / Speed Control
- » Supports Plug and Play



A 1100

Small drive for instrument engineering



- » 24...72VDC
- » Absolute / relative positioning commands
- » Limited jerk motion commands
- » Time Curves
- » PLC or Stand-Alone Solutions
- » Digital IO's
- » Supports Plug and Play
- » UL 508C



E 1400

High feature drive



- » 3x400...480VAC
- » Controls LinMot motors / AC servomotors
- » Absolute / relative positioning commands
- » Limited jerk motion commands
- » Time Curves
- » Real Time (Streaming)
- » Synchronous control (Drive profiles)
- » Master Encoder Synchronization (In/Out)
- » PLC or Stand-Alone Solutions
- » Industrial Ethernet Configuration
/ Remote Access Ethernet
- » Digital and Analog IO's
- » Safe Torque Off
- » Interface for optional incremental
and absolute sensor
- » Position Encoder Simulation (RS 422)
- » Master / Slave Solutions
- » ± 10 VDC Force / Speed Control
- » Supports Plug and Play



C1400

Universal



- » 1x200...240VAC
- » For LinMot P10/AC servomotors
- » 100 programmable motion profiles
- » 255 storable motion commands
- » Interface for incremental or absolute
sensors
- » RS232 configuration interface



LinMot Talk and LinMot Designer

Correctly size and monitor your linear motors

Complete control in configuration and operating modes

A linear drive application starts with the correct sizing of the linear motor. LinMot provides designers with an easy to use tool. LinMot Designer calculates the parameters required to select a drive and linear motor for a given motion sequence and load case, and relates them to the selected linear motor and servo drive.

Using LinMot Talk PC interface, the engineer can configure LinMot servo drives. The motors are also monitored during operation and the current motion sequences are analysed (monitoring).

The integrated control panel gives the user direct access to the control and status words, as well as all commands that are invoked by the upper-level controller.



Design with LinMot Designer

- » Specification of all global data
- » Simulation of motions
- » Determination of kinematic data
- » Calculating motor power draw
- » Approval of selected motor
- » “Cost efficiency” tab that compares energy use between pneumatic cylinders and linear motors
- » Design of rotary motors

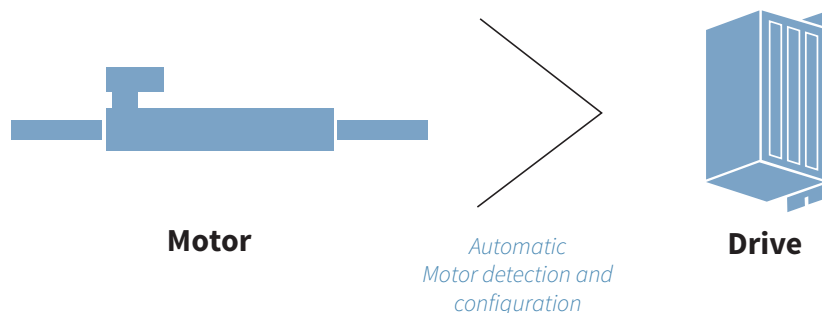
Configuration with LinMot Talk

- » Drive and motor configuration
- » Configuration of application data
- » Create and save motion sequences
- » Controller optimization and status monitoring
- » Records and measurements with oscilloscope
- » Reading error history (error management)

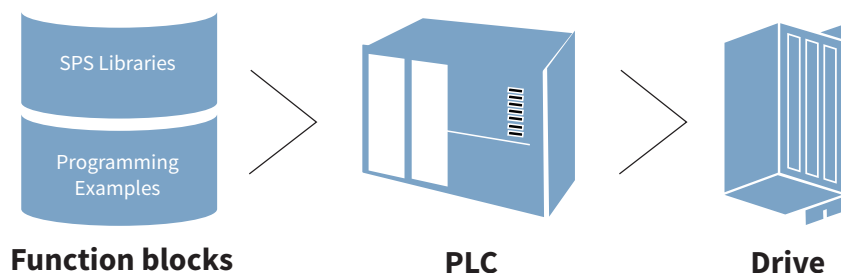
Commissioning by a click

Proven technology to get moving quickly.

Configuration via PnP



Configuration via PLC



SPS Libraries and Programming Examples

LinMot Drives have all common fieldbus interfaces available for connection to a master controller.

In order to realize simple control concept integration, extensive function blocks and programming examples are provided for the customer. These function blocks allow for direct and quick LinMot drive integration.

The function blocks run standard functions as well as commands such as drive parameterization and configuration directly from the controller. The complete drive configuration of the corresponding axis is thus stored on the controller.

Maintenance or replacement can be easily realized via automatic drives detection and configuration over the communication bus. Thus manual and time-consuming configuration of the drives in case of failure is eliminated.

Automatic motor configuration

Plug & Play technology, well established in the computer industry, is now used by LinMot for commissioning linear motors.

With Plug & Play motors, the parameters are saved directly to the stator. The servo drive reads these values when it boots up, and sets the parameters accordingly. This automatic device detection

eliminates the selection of the required model parameters from an extensive library.

Immediately after installing and connecting the cable, the motor can be moved immediately. Without having the configuration software to boot, first commands can be sent directly by the PLC control. Initial commissioning and replacement with a motor are thus very simple operations.

The right linear motor for every application



Food Products



LinMot drives provide machine builders with optimal components for putting the manufacturing and packaging processes in motion. In combination with freely programmable motion parameters via the drive, the motors provide a high level of flexibility for various food and beverage applications.

- » Beverage filling
- » Single and multiple closures
- » Weight products
- » Metering products
- » Sorting using pushers or pull noses
- » Reject products
- » Cutting food products
- » Packaging
- » Placing products in packages
- » Sealing
- » Compressing



Textile Machines



LinMot linear motors are characterized by highly dynamic movements and strong environment resistance. In addition, they have no wear-prone components and thus guarantee a long service life. Modern weaving machines profit by these advantages for years. For the precise winding of textile yarn, the machine engineers prefer to use linear motors. For this purpose, LinMot has programmed a complete function block that controls the entire winding process and can be easily started by the PLC.



Wood Processing

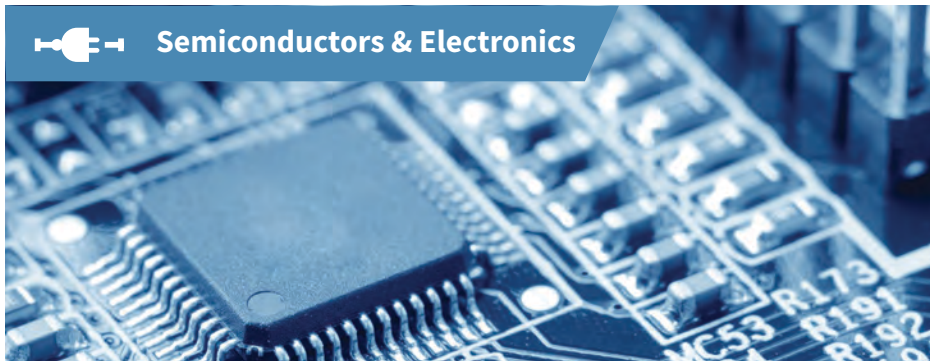


Linear technology ensures automatic step width adjustment in order to guarantee optimal material cuts. Other tasks for the drives include rapid transport of several drills, precise cuts for endless materials, or feeding and handling of material for the machine.

- » Automatic step width adjustment
- » Precise cuts for endless materials
- » Rapid transport of several drills
- » Handling of material



Semiconductors & Electronics



In the semiconductor industry, up-time availability of systems and machines is an absolute requirement.

Modern electronics production must be capable of handling frequent product changes. With innovative drive solutions from LinMot and intelligent drive and controls components, production and conveying applications can be implemented cost effectively.

- » Front-end machines
- » Back-end machines
- » Wafer handling
- » Semiconductor handling
- » Semiconductor inspection machines
- » Semiconductor packaging machines
- » Populating machines
- » Flying probe testers
- » Depaneling
- » CD/DVD production systems & packaging machines



Automotive



Linear drive components from LinMot lead to greater flexibility and productivity in the automotive industry. They can effectively provide not only functional and durability tests for automobiles, but also applications all along the manufacturing process. This especially includes applications in the areas of assembly, material management, and error inspection.

- » Functional and durability tests
- » Assembling
- » Material management
- » Error inspection



Laboratory Automation



Automated workstations or laboratory equipment require a high level of flexibility and reproducibility from the selected drives.

LinMot components meet these requirements and are quiet, low-maintenance, clean-room-compatible and ensure smooth movements. Because electromagnetic drives operate without wear, they can be used in a clean room environment without any problem. LinMot compact drives are ideal for use in this type of automated equipment

- » Handling
- » Loading and unloading
- » Pick & place
- » Insertion
- » Closures



Medical & Pharmaceutical



The range of applications for linear drives in the medical and pharmaceutical sector is very broad.

For handling blood samples, counting and filling pills, or packing challenging medications, LinMot drive components provide a high level of dynamics and precision for implementing these tasks.

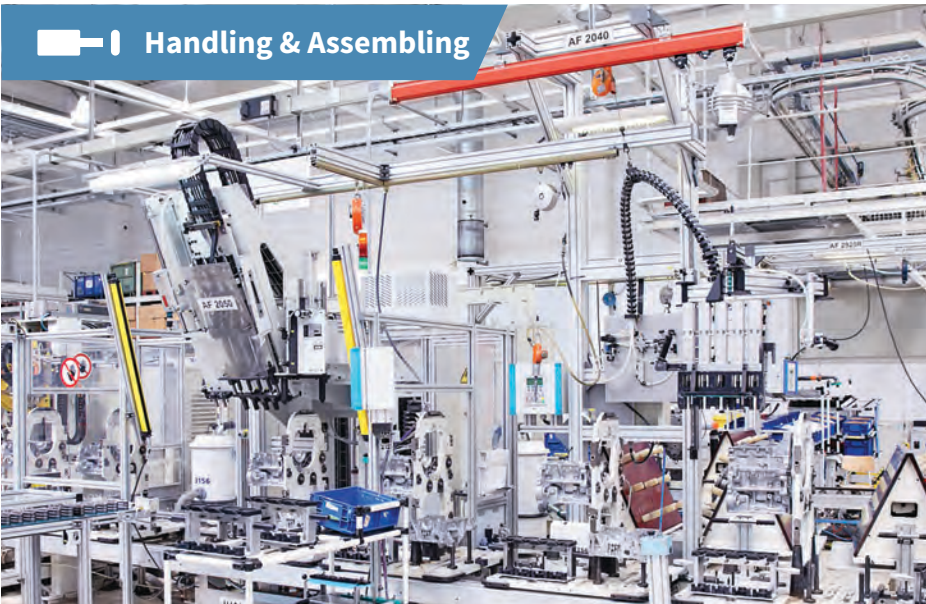
The hygienic design of LinMot linear motors makes it possible to cleanly process these highly sensitive products in accordance with clean room regulations.

- » Flexible filling stations
- » Metering and counting
- » Insertion
- » Closures
- » Pressing of closures
- » Pressing of closures
- » Carton packaging
- » Labeling
- » Pick and place systems
- » Product handling and palletizing

- » Blister & tray handling
- » Packing systems for blisters & trays



Handling & Assembling



In the global competition the “time-to-market” period has become an increasingly important factor. Shorter innovation cycles and large model variety are the greatest challenges. To meet these requirements, it is necessary to have flexible production with intelligent automation solutions. With freely programmable and highly dynamic LinMot linear motors, the plant or design engineer can find the optimal components for a modern production machine.

- » Feeders
- » Transfer systems
- » Pick & place modules
- » Palletizing units
- » Stacking units
- » XY tables
- » Precision pressing
- » Sorting systems
- » Automatic screwdrivers
- » Metering units
- » Gluing stations
- » Quality assurance
- » Test fixtures
- » Camera positioning
- » Lighting positioning



Printing & Labeling



Sensitive products can be printed more quickly using LinMot linear motor technology, because the printing process is performed using position, speed, and force control. The force impacts associated with pneumatic solutions do not occur.

In general, the freely programmable force and motion profiles lead to decisive process improvements in comparison with other types of drives, opening up many fields of application.

- » Inspection systems
- » Paper feeding
- » Decorating
- » Color mixing systems
- » Pad printing
- » Screen printing
- » Doctor blade controls
- » Labeling



Packaging



Packaging is an indispensable part of everyday life. Not only are the functionality and design of the package important, but also its production.

The highly dynamic and durable LinMot drives ensure high productivity and availability. The programmable drives can be adapted quickly to new products and types of packaging at the push of a button, providing continuous monitoring of motion parameters.

In many of these applications, linear motors are used as replacements for pneumatic cylinders, in order to make machines and systems more flexible, productive, and reliable while simultaneously reducing the production energy cost for each package.

- » Insertion
- » Feeding
- » Guiding
- » Carton packaging
- » Sealing
- » Labeling
- » Unloading
- » Discharge

Electric linear motion
Superior to pneumatic cylinders in
many applications.

Electricity instead of air

Energy and cost savings - Unique Advantages of electric linear motion technology

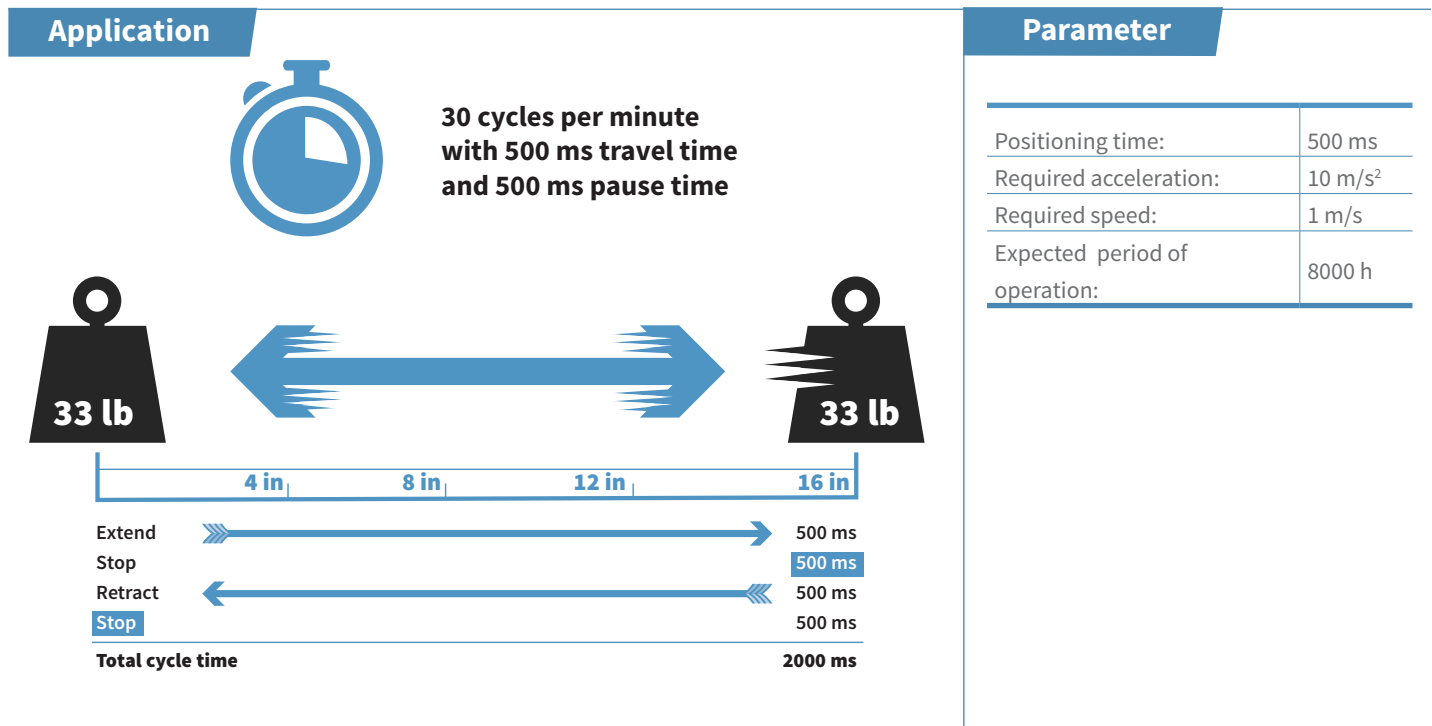
Machine design engineers have found numerous situations where linear direct drives provide distinct advantages over pneumatic actuators. These include: If more than two end positions are needed, if the positions are to be changed by software, if running synchronously with a main drive is required or the dynamics / life of a pneumatic cylinder is simply no longer sufficient.

Due to the high operating costs of pneumatic cylinders, linear motors may also prove to be a cost efficient alternative in simple point to point motions even with only two end positions.

This is especially true when the motions are in a cyclic operation and carried out regularly. Many times pneumatic cylinders must be oversized due to the speed and load conditions. In many cases the pneumatic cylinder energy and maintenance costs exceed the investment costs within a few weeks.

A typical cost comparison shows the impressive cost savings with LinMot linear motors.

Cost comparison example



Comparison of technology

Linear Motors

- » Acceleration work is performed only during 100 ms.
- » At standstill, no energy is expended.
- » At a constant speed, only energy to overcome the friction is used.
- » Kinetic energy is stored in the DC link capacitor of the servo drives.
- » **The measured power consumption for this application is 92 W on average.**

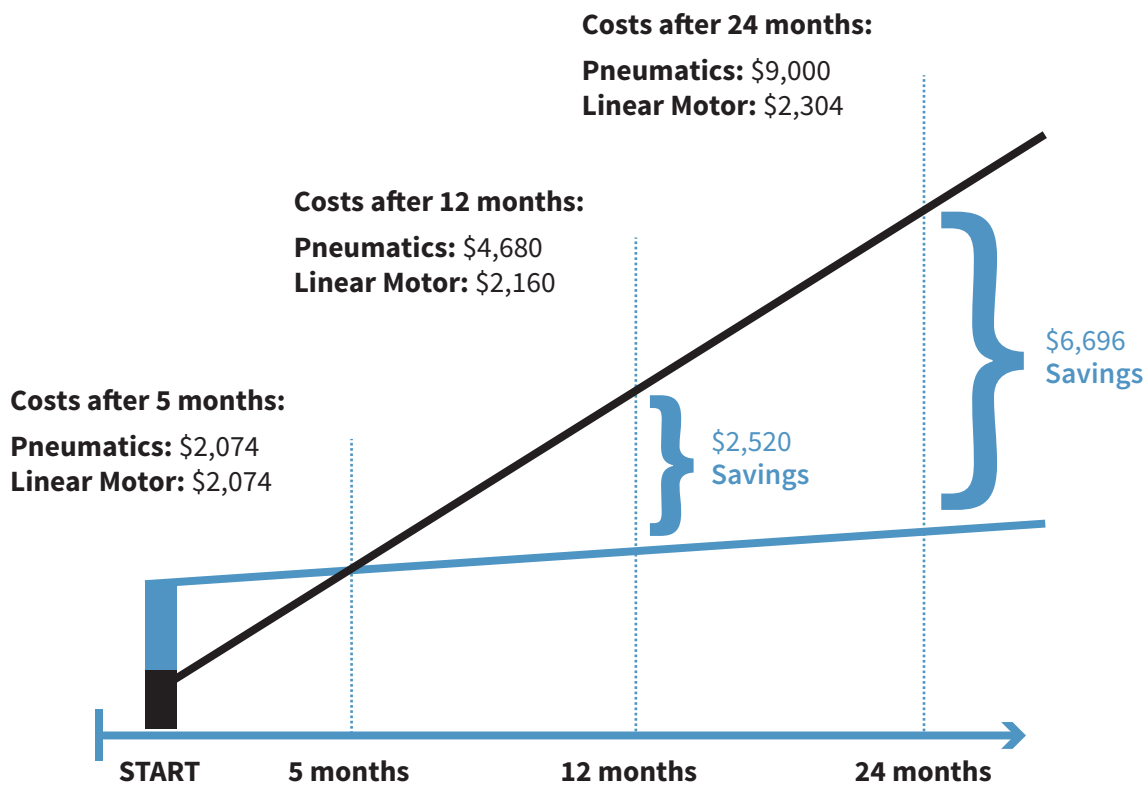
Pneumatic cylinder

- » For the required mass and velocity a piston diameter of 50 mm is required.
- » During the entire moving time, compressed air power is required.
- » Dampers absorb the energy during braking. The energy cannot be stored.
- » Due to the cylinder diameter, the stroke and the cycle time the annual air requirement equals 848,000 ft³ per year.
- » Pneumatic manufacturers list production costs for compressed air at 0.0054 \$/ft³.

Energy costs

- » At a current price of \$ 0.17 / kWh and 8000 hours of operation, **the annual energy cost is \$ 144.**
- » With production costs of \$ 0.054 EUR / ft³ and an air consumption of 150.000 Nm³.
- » **The annual compressed air costs are \$ 4,579.**

Total cost comparison and CO₂ emissions



The initial costs of a linear direct drive system including all components (cables, converters, etc.) required for the operation are higher than the initial costs for a pneumatic actuator system (incl. valves, hoses, etc.). But by accounting for the significantly lower energy costs of linear motors, these initial costs are recovered in less than half a year. After this time, the cost savings are realized as lower operating costs and increased profit margins. The operating energy costs of pneumatics exceed their initial investment costs after only three months.

CO₂ emissions can be drastically reduced by switching to an electric linear drive providing another huge benefit. The energy of 24,000 kWh, which is additionally required by the pneumatic cylinder in this sample calculation, results in an annual output of 12,000 kg CO₂. This calculation takes into account the German energy mix of 500g CO₂ / kWh.

Thus, the CO₂ record speaks clearly: A change to electric direct drives!

Competence

Everything from one source



Support

As the world`s leading manufacturer of industrial linear motors, NTI AG uses its knowledge and innovation to provide customized solutions. Seeking the optimal solution of specific drive tasks our application engineers offer exceptional support to the customer. Our customers can rely on years of production experience for the implementation and production for customer specific drive solutions.



Innovation

Through continuous development and investment and with the input of our worldwide sales consultants, engineers and partners NTI AG is able to offer its customers commercially viable new products at attractive prices.



Production

The standardized LinMot and MagSpring products are manufactured via self-designed production facilities. This guarantees rapid product availability even in larger quantities while simultaneously allowing for maximum flexibility and customizations. The highly automated production facilities ensure constant high quality products.



Seeking optimal solutions for specific drive tasks LinMot application engineers provide exceptional customer support.



Logistics

LinMot and MagSpring products are standardized products, which are typically supplied from stock and available worldwide. Currently more than 1000 different drive and motor combinations are in stock and available within 48 hours worldwide.



Quality

Quality control starts with the checking of incoming material and continues into production all the way through the final burn-in testing before delivery. All LinMot linear motors are subjected to a 24-hour burn-in before delivery. For long-term quality assurance, LinMot products are labeled with a unique serial number on the Stator, on its electronic nameplate and in the Servo Drive.

ALL LINEAR MOTION FROM A SINGLE SOURCE

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