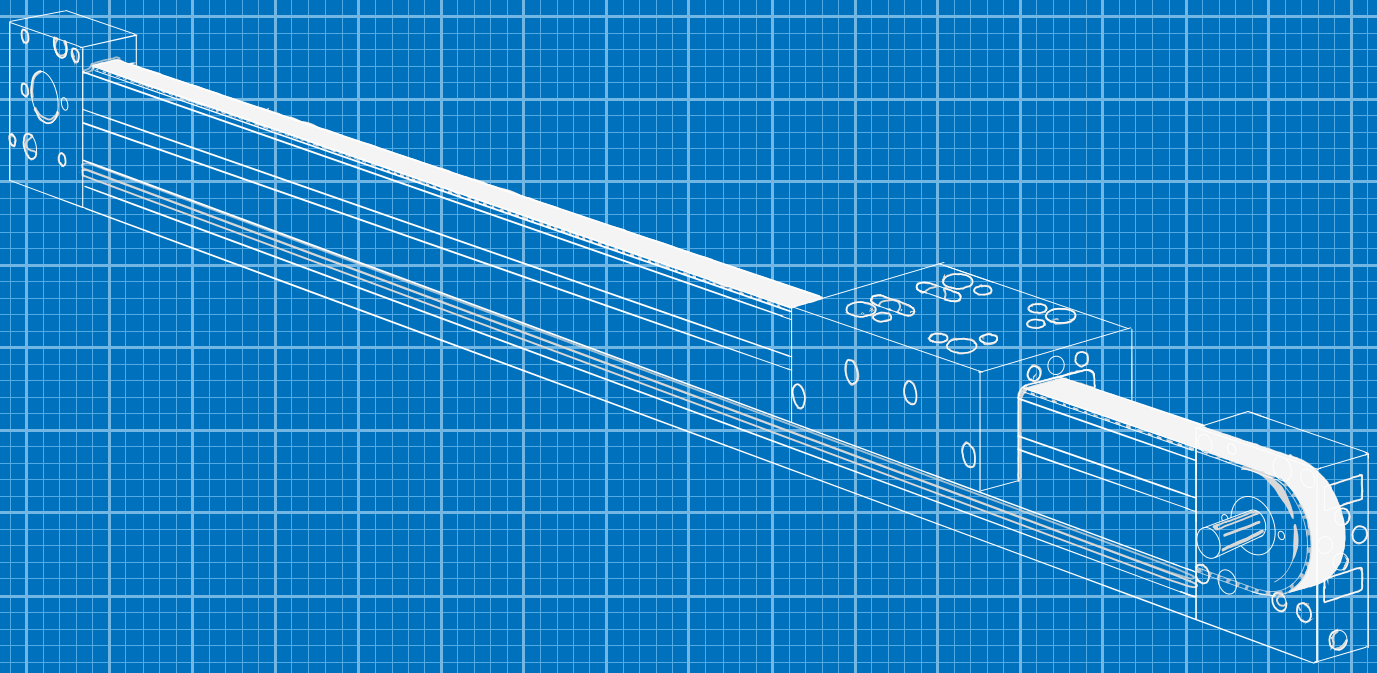

BELTING SOLUTIONS FOR LINEAR ACTUATOR APPLICATIONS

MEGADYNE

What Are Linear Actuators?

In today's ever-evolving manufacturing sphere, businesses must make speed and automation top priorities in order to stay competitive and provide consistent product quality in the global marketplace.

The rise of automation and the incorporation of design flexibility have played a key role in changing the face of the packaging industry. In this sector, reliable motion control is essential; timing and precision are everything. As automation equipment becomes more complex, productive, precise, and flexible, it must also be able to provide smooth position control and accurate repeatability through various changes of motion.

Linear actuators play a crucial role in shaping today's equipment design, and engineers have a wide range of options available. But the four most popular types of linear actuators are mechanical/electromechanical, hydraulic, pneumatic, and piezoelectric.

Types of Linear Actuators

MECHANICAL/ELECTROMECHANICAL LINEAR ACTUATORS

Mechanical and electromechanical linear actuators are usually used to convert rotary motion into linear motion. While mechanical actuators are driven by hand, electromechanical linear actuators are driven by an external or internal power source, such as a motor.

Common mechanisms include the screw (roller screw, ball screw, or lead screw designs), in which rotating the nut moves the screw shaft in a straight line; the wheel and axle, in which rotating a wheel produces linear motion along a belt, chain, cable, or rack; and the cam, in which an eccentrically shaped wheel is rotated, producing linear motion.

HYDRAULIC LINEAR ACTUATORS

Hydraulic linear actuators make use of pressurized hydraulic fluid, typically oil. These actuators have been around for hundreds of years, and are used in a range of different applications. Hydraulic actuators are especially well-suited to rugged applications requiring high force, superior dynamic response, high power per unit weight and volume, and optimal mechanical stiffness. These actuators can operate at forces of 500 PSI or higher and provide much tighter control than pneumatic systems.

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Key disadvantages include heat, noise, and leakage problems, which are most common when the actuator is not properly maintained. It's also important to keep in mind that these actuators often require additional equipment, such as fluid reservoirs, release valves, motors, and pumps, as well as noise- and heat-reducing equipment.

PNEUMATIC LINEAR ACTUATORS

Pneumatic linear actuators utilize pressurized air or gas. As with the hydraulic model, their basic design is hundreds of years old. Today, these actuators are typically powered by an electric compressor and are often used in applications requiring 100 PSI or less . Pneumatic models are also ideal for applications requiring high speeds, ranging from a couple of inches per second.

PIEZOELECTRIC LINEAR ACTUATORS

Piezoelectric actuators use voltage to expand a material, typically a ceramic. These actuators allow for extremely fine positioning down to the sub-nanometer range, with very short motion range. Piezoelectric models can also bear extremely heavy loads — even those exceeding several tons — and have the fastest acceleration rates available, exceeding 10,000 Gs.

Unlike linear actuators, piezoelectric actuators generate little or no measurable magnetic field. They also have minimal power consumption, and endure little wear and tear or abrasion, making them ideal for clean room applications. Plus, these actuators have no practical temperature limitations since the piezoelectric effect operates close to 0 Kelvin.

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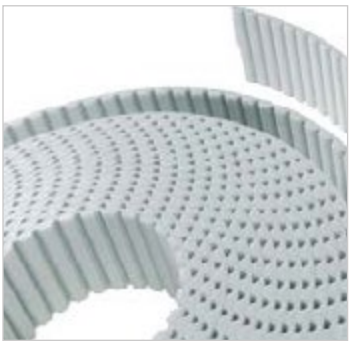
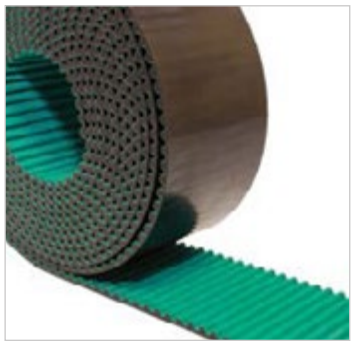

How to Select the Right Belt for Your Linear Actuator Application

We offer a range of industry-leading solutions, from tooth geometries designed to deliver highly efficient tooth-to-pulley interface to cord structures designed to provide strength and flexibility.

Megadyne supplies a wide range of belting solutions for diverse companies across the globe. Common industries where Megadyne belts are used in linear actuators include:

- Packaging
- Material handling
- Robotics and automation
- Printing and paper
- Automotive
- Machine tools
- Medical
- Fitness
- Elevators and lifts

> For applications requiring mechanical belt-driven linear actuators, in particular, many of today's leading companies rely on Megadyne.

Our belts are available in two different variations: urethane and rubber. Urethane is the more popular option for this application due to its superior wear resistance. Plus, unlike rubber belts, urethane models will not dry out, become brittle, crack, or dust-out over time due to bidirectional slewing.

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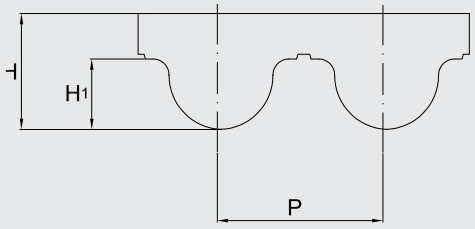
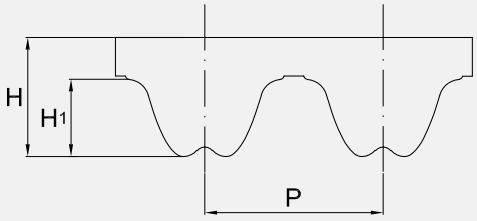
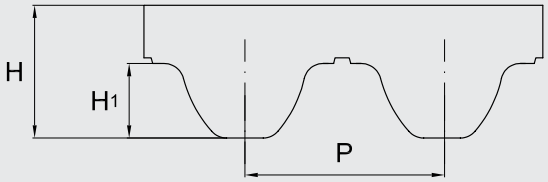
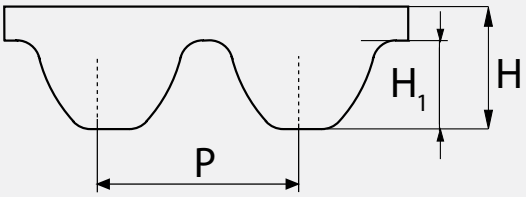
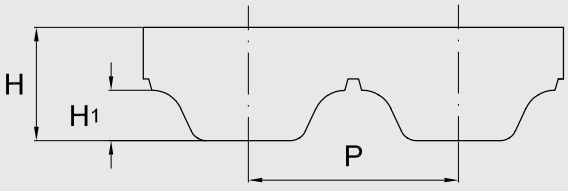
The most commonly used Megadyne options for belt-driven linear actuation are: 8M with HF cords

Tooth Shape	Sketch	Commonly Used With
MTD		Urethane 8M with HP and HF cords
RPP		Urethane 5M and 8M with S and HP cords; rubber 8M with S cords
STD		8M with HF cords
QST		8M with S and HP cords
AT		AT5 and AT10 with S, HP, HF, and HPF cords

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Urethane Tooth Shapes: MTD, RPP, STD, QST, GW, and AT

Rubber Tooth Shapes: RPP

Cord Constructions: S = steel, HF = high-flex steel, HP = high-performance steel, HPF = high-performance flexible

All Megalinear and Megaflex timing belts are available in long lengths and can be customized for unique applications and requirements. Megadyne belts are particularly well-suited for long-stroke actuation applications.

Our expert application engineers can provide thorough analyses of actuator speed, length of stroke, acceleration and deceleration profile, actuator carrier or clamp mass, noise-level requirements, and overall design package size (for pulley size selection). This allows us to guide clients toward the ideal tooth shape, cord structure, and material for their specific job.

Learn More

The linear actuator industry is growing every day, and investing in quality timing belts is crucial for remaining competitive in today's market. Megadyne is proud to offer a range of high-quality belting materials and designs, all engineered and built in-house.

To learn more about the key factors to consider when selecting a belt for your linear actuator, contact the team today.

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About The Megadyne Group

Founded in 1957 in Mathi, Italy, Megadyne is a leading global manufacturer and fabricator of power transmission, product handling, materials handling and linear positioning belts, hose and metal products.

With manufacturing operations in Europe, Middle East and Africa (EMEA), Asia Pacific (APAC) and the Americas, Megadyne is well poised to be your partner. From a broad selection of materials and processes, we service over 20 major industries offering high quality product, outstanding service, technical support and state of the art logistics to ensure we develop the right product for your application and have it at the right location when you need it.

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