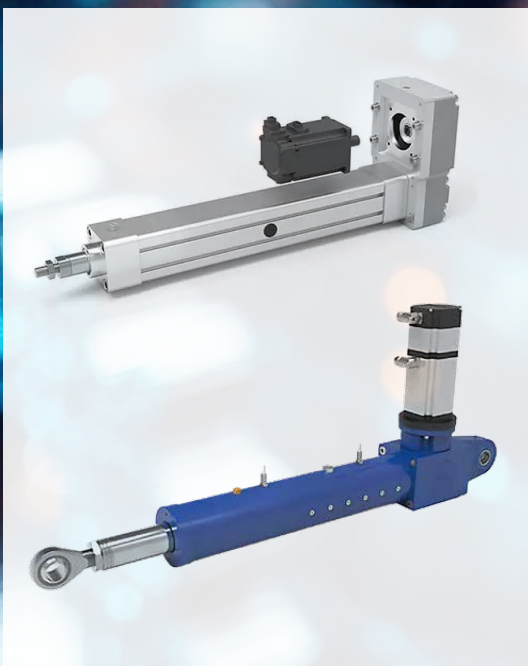


Energy efficiency,  
performance and  
life cycle costs

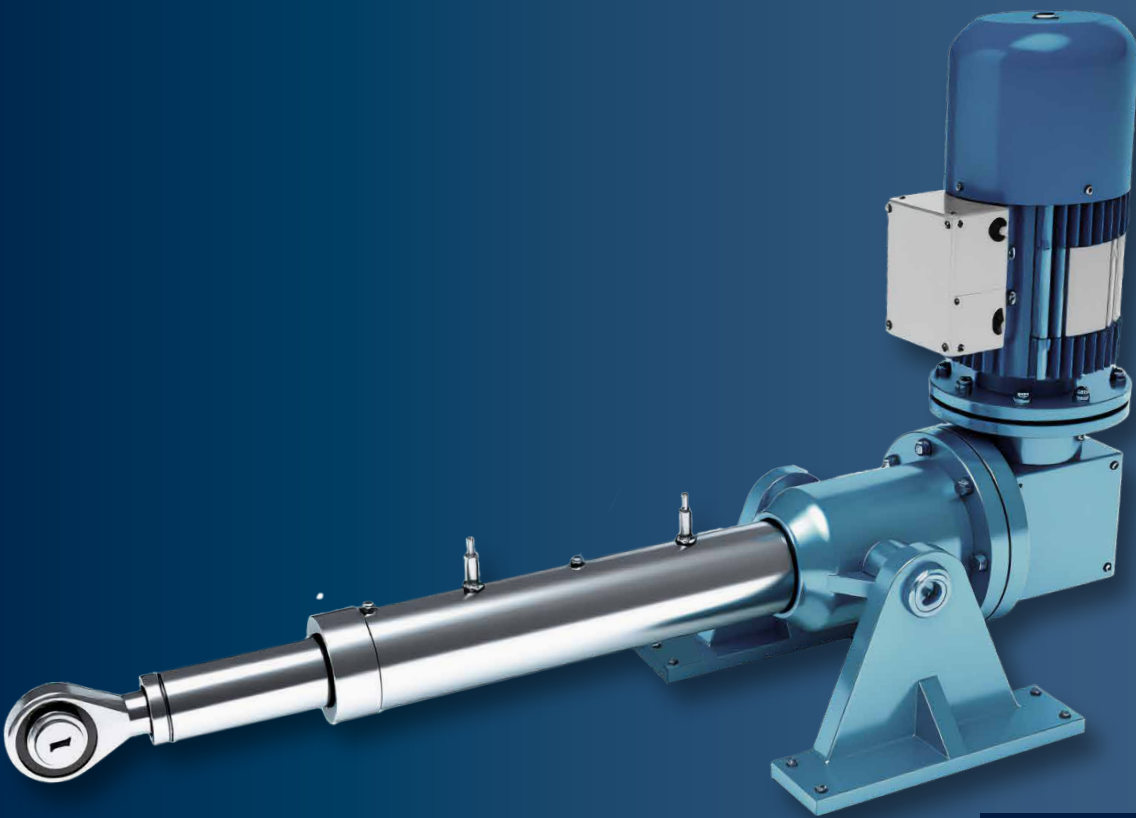
**Electromechanics**  
instead of hydraulics/  
pneumatics **for your**  
**linear motion**



# Electromechanical systems in the mechanical drive train

**Discover the future of drive technology:**

say goodbye to conventional pneumatic and hydraulic systems  
and experience the benefits of our innovative solutions **that**  
**redefine efficiency** and **precision**.



# The **outstanding advantages** of **electromechanics** at a glance

- High **energy efficiency**
- Low **life cycle costs**
- Highest **performance and precision**





# The system is simple proven & effective

## Construction and installation at a glance

The positioning of components and the choice of suitable lines are decisive for the design of fluid technology systems. They influence the machine design and can restrict it. Especially with multiple cylinders with specific clearances, the design is time consuming as easy assembly and maintenance must be considered early on.

Electromechanical systems offer a remarkably **simplified design process**. Thanks to the reduced number of components and the flexible routing of electrical cables, the planning effort is significantly minimized. This not only enables faster implementation, but also **greater adaptability** to individual requirements.

Pneumatic systems require many components. From hoses and pumps to valves and regulators. Lubricators and air filters are also required.

Hydraulic systems also require extensive planning and a complex design. Fluid reservoirs, powerful pumps, robust motors, precise drain valves, efficient heat exchangers and noise-reducing devices are essential here. Commissioning takes longer as the parts have to be matched to each other.

In contrast, electromechanical systems offer **remarkable simplicity**. With just one motor, electrical cables and, depending on the motor type, a servo controller, they significantly reduce the space required.

Their uncomplicated mechanical design **drastically reduces installation and commissioning time**, saving you valuable time and resources.

			
 Construction time	Time-intensive	Time-intensive	Low
 Floor space	Area-intensive	Area-intensive	Minimal
 Commissioning of the system	Time-intensive	Time-intensive	Fast

### Caption



Pneumatics



Hydraulics

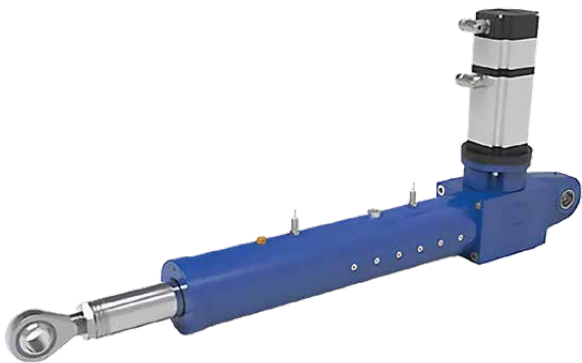


Electromechanics

# Cost factor maintenance and the replacement of components

Fluid power systems require **periodic maintenance** to ensure efficiency and to prevent leaks and failures. Filter systems, valves, pipes and fittings must be checked and maintained regularly. **Manual inspections are required** to monitor the condition of the system.

Electromechanical actuators are virtually **maintenance-free** or require only occasional relubrication. Integrated sensors enable **real-time remote monitoring** and product life prediction, enabling **predictive maintenance** strategies.



Maintenance			
 Maintenance	Regularly	Regularly	Not required/rare
 Maintenance costs	High	High	Very low
 Remote monitoring	Possible	Possible	Easy

Replacement			
 Replacement time	High	High	Low
 Skilled workers	Required	Required	Not required
 Downtime during maintenance	Longer	Longer	Very short

Replacing components in a fluid power system requires depressurization, oil removal (for hydraulic systems), parts replacement and recalibration. This is **time-consuming and requires skilled labor**.

Electromechanical actuators can be **replaced quickly** by disconnecting the cable connections and replacing the actuator.

# The performance makes the difference in the machine

## Positioning accuracy, speed control and time savings

The **control accuracy** of pneumatic cylinders is limited by the compressibility of air, which makes slow, controlled speeds difficult. Hydraulics improve the situation, but require a **complex and expensive** servo-hydraulic configuration.

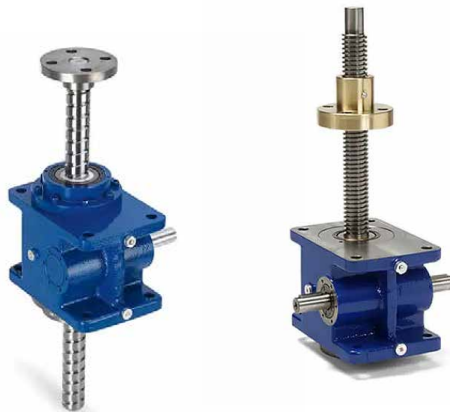
Electromechanical actuators provide a **direct mechanical connection** between motor and spindle, resulting in high repeatability and stiffness. They enable **precise speed changes** and require no warm-up time for accurate control.

Performance			
 Positioning accuracy	Low	Medium	High
 Controlled speed	Difficult	Possible but complex	Easy








# Life cycle costs at a glance at Maintenance and service life

Electromechanical actuators have more components than pneumatic or hydraulic cylinders, but fluid power systems have more **critical parts** and are sensitive to contamination. Faulty parts can paralyze the system and **regular maintenance** is required.



**Electromechanical systems** have a predictable service life for the spindle and bearings, which makes **predictive maintenance easier**. They are also less susceptible to contamination.

Maintenance/ Service life			
 Sensitivity to soiling	High	High	Low
 Predictive maintenance	Possible	Possible	Easy

## Velocity & energy



 High Speed	Very easy	Difficult	Easy
 Energy consumption	High	High	Low

## Power – speed and **energy consumption**

Pneumatic cylinders reach high speeds more easily during operation. Hydraulic cylinders require large flow rates and sufficient pressure oil, resulting in a more complex and costly system with high energy consumption. An accumulator can provide additional capacity.

Electromechanical cylinders **optimize energy consumption** by combining thread pitch and motor speed **without adding system complexity**.

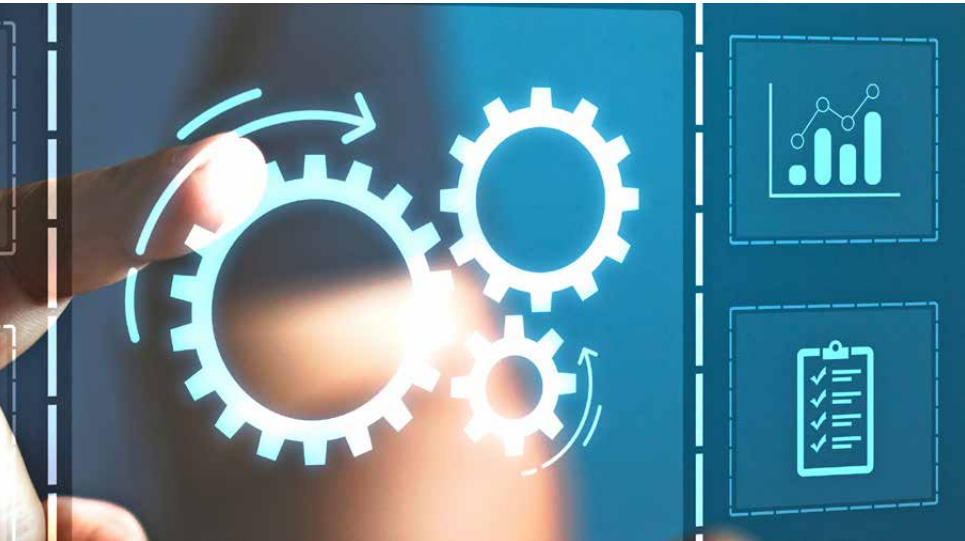
# Power density and weight

are decisive for economic efficiency

Power density			
 Installation space	Large	Large	<b>Small</b>
 Lifting force Standard cylinder	10 kN	1000 kn	<b>600 kN</b>

Pneumatic cylinders are limited by the maximum pressure and energy losses due to air compression. Large cylinder diameters and high pressure levels are required to generate high forces.

Electromechanical cylinders offer a **higher power density** and require **less installation space** than hydraulic cylinders, which take up more space due to pipes and hoses.



Pneumatic and hydraulic cylinders are light, but additional components such as hoses and valves increase the overall weight.

Electromechanical actuators are heavier, but make **the overall system lighter**.

Weights			
 Cylinder weight	Low	Low	<b>Heavy</b>
 Weight of the overall system	Heavy	Heavy	<b>Low</b>








# Occupational safety for employees – Environmental protection for everyone

Hydraulic cylinders often work at high pressure and can be dangerous due to leaks and coupling errors. Pneumatic cylinders harbor risks due to stored energy. **Safety measures increase costs and complexity. Air must be filtered to prevent**

**contamination.** Leaks and the disposal of hydraulic oil pose environmental problems.

Electromechanical actuators **are safer** as there are no pressurized fluids. They can be **safely serviced** by switching off the motor. Self-locking actuators or external safety brakes increase the level of safety.

Electromechanical systems use grease as a lubricant, which is completely contained in the actuator housing, and generate **less heat**, which **increases efficiency**.

Environment			
 Risk of environmental pollution	Medium	Significant	None
 Heat development	Significant	Significant	Low




Occupational safety			
 Hazard potential	Medium	Significant	Low
 Operational safety	Complex	Complex	Very easy

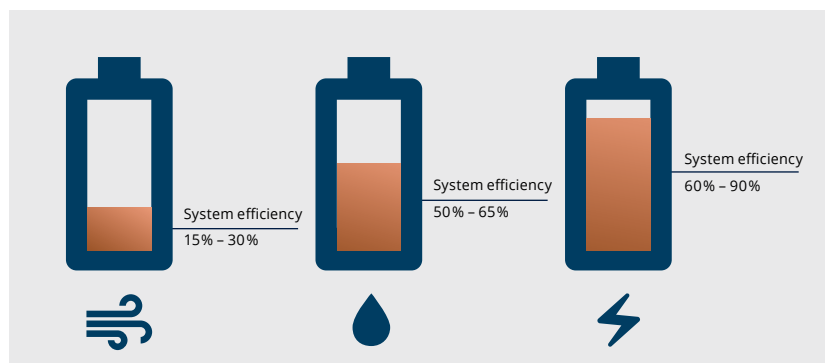


# High energy efficiency even in idle mode with low noise level

Pneumatic cylinders are less efficient due to pressure losses and the compressibility of the air. Hydraulic cylinders are more efficient, but lose energy when converting pressure into movement. **Both systems require continuously running pressure generators, even when stationary.**





Electromechanical systems only use energy when required, which means that **energy consumption is almost zero** when at rest. Their high efficiency in converting electrical into mechanical power leads to **considerable energy savings.**

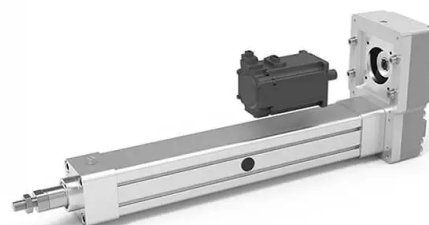
Energy consumption			
 Consumption in idle state	Medium	High	Nearly zero



Pressure pulsation from pumps is a major cause of noise in fluid power systems, with valves and compressors also contributing to noise generation.

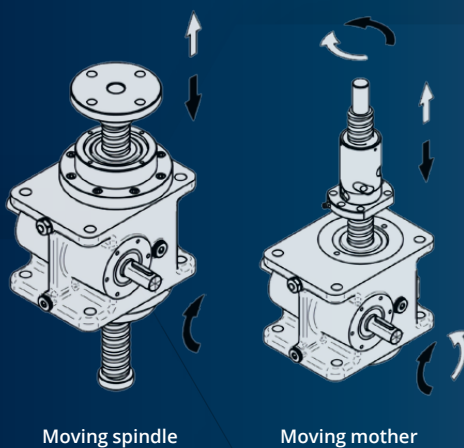
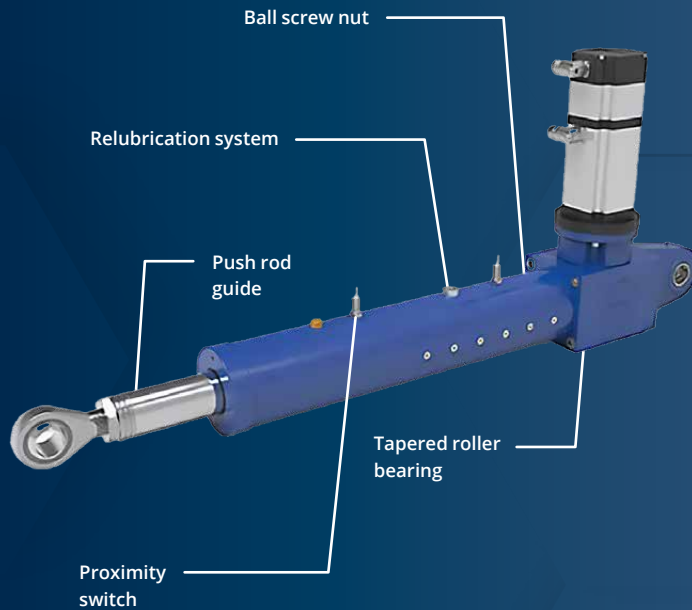
In electromechanical systems, noise is mainly generated by the spindle movement and only during operation of the actuator. **The overall noise level is usually lower than in fluid power systems.**

Noise level			
 Noise level	High	Medium	Almost zero



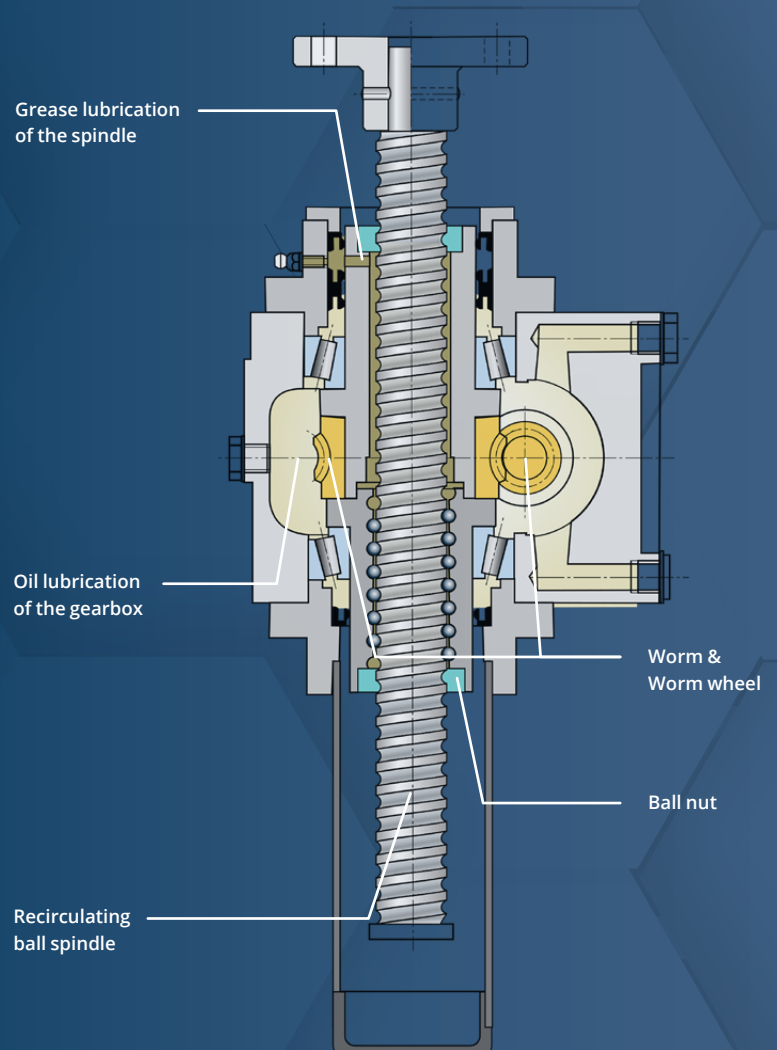
## Servomech HSA – High Speed Actuator

- High speed applications, **Linear speeds up to 1.5 m/s**
- **High energy efficiency**
- **High positioning accuracy** and simple control
- **Simple installation**, and low operating costs



## Screw jacks in mechanical engineering

- Screw jack with ball screw for **high energy efficiency**
- Screw jacks with trapezoidal screw for **low acquisition costs**
- **Patented lubrication**





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