EWELLIX

A Schaeffler Company

Solutions for mobile machinery

The heritage of innovation

Ewellix is a global innovator and manufacturer of linear motion and actuation solutions. Our state-of-the-art linear solutions are designed to increase machine performance, maximise uptime, reduce maintenance, improve safety and save energy. We engineer solutions for assembly automation, medical equipment, mobile machinery, distribution and a wide range of other industrial applications.

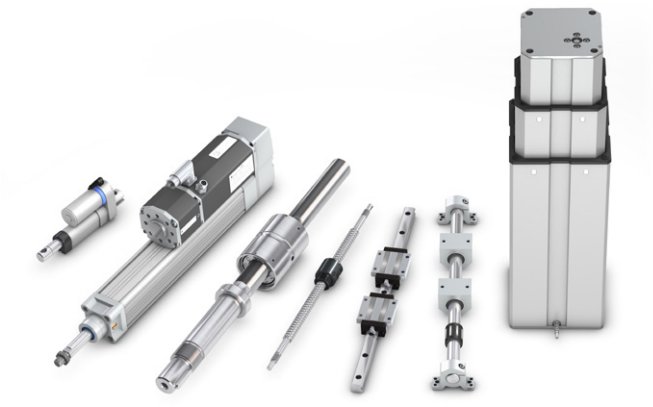
Technology leadership

We earned our reputation through decades of engineering excellence. Our journey began over 50 years ago as part of the SKF Group, a leading global technology provider. Our history provided us with the expertise to continuously develop new technologies and use them to create cutting edge products that offer our customers a competitive advantage.

In 2019, we became independent and changed our name to Ewellix. We are proud of our heritage. This gives us a unique foundation on which to build an agile business with engineering excellence and innovation as our core strengths.

Global presence and local support

With our global presence, we are uniquely positioned to deliver standard components and custom-engineered solutions, with full technical and applications support around the world. Our skilled engineers provide total life-cycle support, helping to optimise the design, operation and maintenance of equipment thus improving productivity and reliability while reducing costs. At Ewellix, we don't just provide products; we engineer integrated solutions that help customers realise their ambitions.



Schaeffler Group – We pioneer motion

Ewellix is since 2023 owned by the Schaeffler Group.

As a leading global supplier to the automotive and industrial sectors, the Schaeffler Group has been driving forward groundbreaking inventions and developments in the fields of motion and mobility for over 75 years.

With innovative technologies, products, and services for electric mobility, CO_2-efficient drives, Industry 4.0, digitalization, and renewable energies, the company is a reliable partner for making motion and mobility more efficient, intelligent, and sustainable.

Schaeffler manufactures high-precision components and systems for powertrain and chassis applications as well as rolling and plain bearing solutions for a large number of industrial applications.

EWELLIX

More benefits with fluid power replacement

Ewellix has a clear strategy to support our customers in developing better mobile machines for tomorrow.

Electrification is a macro-trend across all mobile machines.

Electromechanical actuators have already replaced hydraulic cylinders in many auxiliary adjustment or steering functions. This brochure will guide you through the benefits of using oil-free technologies in linear motion for a wide variety of applications, including aerial work platforms, agriculture machinery, construction equipment, material handling truck, and many more.

You will learn about linear actuators with improved lifting capabilities designed to enhance productivity with more energy efficiency, safety and reliability. High precision adjustment, smooth movement and exceptional stability are just some of the benefits which, together with a lower total cost of ownership, make these solutions increasingly competitive.

Discover how oil-free solutions can be a sustainable alternative for the linear motion of the future.

A recent survey in mobile machinery showed that over 86% of the industry agrees that electrification is an essential topic in their organisations.

Machine manufacturers recognise that even partial electrification of equipment can potentially deliver high benefits in cost, reliability and operations.

Electromechanical actuators are increasingly becoming alternatives to hydraulic systems that have dominated the mobile machinery sector for decades.

Critical drivers for electrification in mobile machinery industries

- Legislation to reduce CO_2 emissions
- Noise emission limits in inner-city operations
- Increased sustainability targets driving energy efficiency improvements

Electromechanical advantages compared to hydraulics

How environmental constraints of mobile machinery are driving electrification trends ‘end to end’ without compromising performance.

The automotive market has seen a fast ramping-up in electrification through a combination of disruptive new technologies (Battery Electric Vehicle) and mixed models (Hybrid EV). The same trend is also driving a transformation in trucks and buses, construction equipment, material handling and other vehicle types.

How is electrification related to fluid power replacement?

A car engine exceeds 100 kW but has limited electric power available to drive electric auxiliary adjustment functions, electric power steering or electric parking brake.

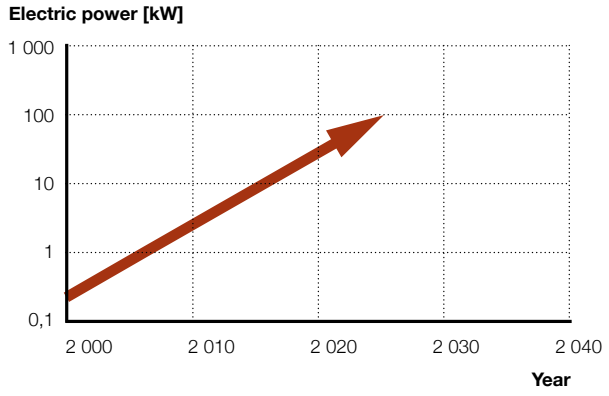
In mobile machinery, the first step was taken when electromechanical actuators replaced hydraulic cylinders to improve auxiliary adjustments with position feedback and good stability, increasing safety.

The next step was the electrification of the vehicle drive functions, with electric drive trains and more auxiliary functions such as electric steering units.

Now, higher capacity electric power sources allow replacing fluid power used for work functions with electromechanical actuators. With greater efficiency and electrical power recuperation from the regenerative lowering system, electromechanical actuators optimise the cost of batteries by increasing their uptime. Better motion control and feedback will achieve greater productivity. Oil-free operation drastically reduces maintenance effort and eliminates the risk of oil leaks. Finally, a machine equipped with electromechanical actuators will offer a lower Total Cost of Ownership (TCO).

Diagram. 1

Increase of the electric power available on the mobile equipment



Benefits

- Energy recuperation capability
- Smaller battery
- Quick recharge for less downtime
- Higher productivity
- More data for On-board diagnostic and telematics

Simpler system

Pneumatic systems require many components, including hoses, pumps, valves, regulators, lubricators and air filters. Hydraulic systems, as well, require a complex setup, along with noise-reduction equipment. Commissioning time is also longer since technicians need to fine-tune several parts.

Electromechanical systems only require a motor, electric cables and a driver connected by a CAN Bus to the electronic control unit (ECU) of the vehicle.

This system allows for a much smaller system footprint and simple mechanical layout, reducing the equipment's installation significantly and the commissioning time needed.

Control, positioning accuracy & stability

Capability to control motion and position while ensuring stability is limited with fluid power and requires costly additional sensors and servo valves.

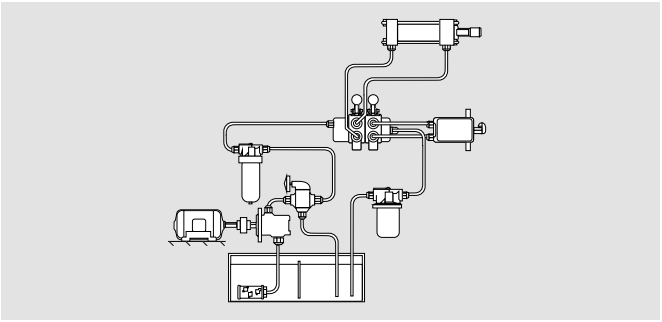
The position and motion are easy to control with an electromechanical actuator, with cost-effective position feedback integrated as standard. The force chain through mechanical components offers stability and safety. Systems are less complex to design, ensuring adequate reliability and performance.

Safety and environment

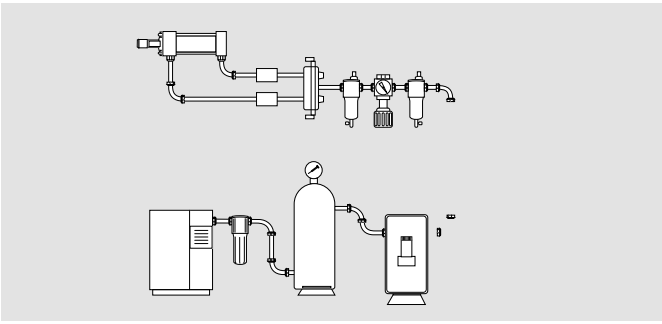
Compressed air has high energy losses. In hydraulics, oil at high pressure has a risk of leakages, which are almost impossible to eliminate and require constant service. Additionally, a faulty line can result in dangerous and costly damage.

Regarding safety in case of power loss, actuators can maintain their position and stability, and not collapse or change position.

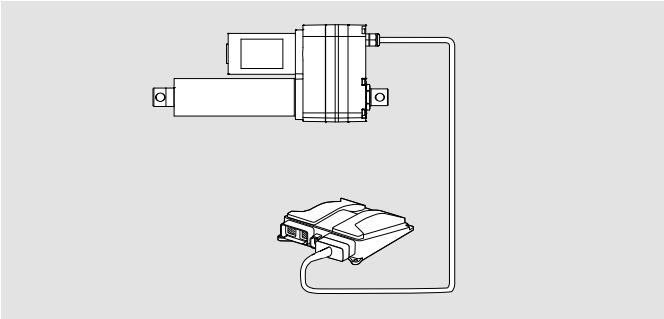
Simpler system



Hydraulic layout



Pneumatic layout



Electromechanical layout

Benefits

- Fewer components
- Smaller footprint
- Cleaner machine design
- Easier integration in existing equipment
- Quicker installation

Energy savings

Air preparation and compressibility make pneumatics less efficient than other linear motion technologies.

Depending on the load, hydraulics can operate efficiently; however, they encounter several internal and external losses in the conversion between pressure generation and linear movement.

Electromechanical actuators require only 2-3 steps in converting input energy into output power, providing greater energy efficiency (**Fig. 2**).

Overhaul, maintenance and repair

To maintain the performance of the fluid power system, it is essential to follow the overhaul recommendation.

Depending on the type, an electromechanical actuator could be maintenance-free or with very little re-lubrication points. In addition, the built-in electronics of the actuator will provide off-board diagnostic and will help the onboard diagnostic of the machine.

Energy recuperation

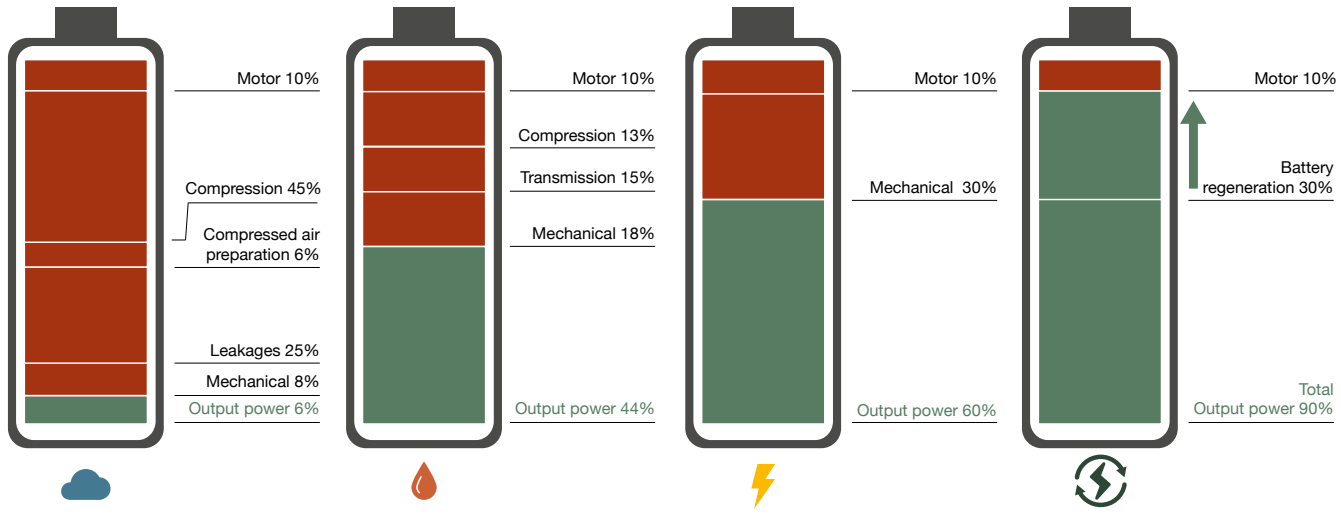
In addition to greater energy efficiency when pushing a load, high efficiency electromechanical actuators can recuperate a significant part of the potential energy used when reversing a movement, depending on its function. This additional benefit can drastically improve the overall efficiency of the system.

Benefits

- Power consumption only when operated
- Higher system efficiency
- Easier predictive maintenance and On-board diagnostic
- Easier energy recuperation

Fig. 2

Energy saving

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VITORIA GASTEIZ
green capital

Linear motion solutions designed for Battery Electric Vehicles

On- and Off-highway vehicles must meet both regulatory requirements and user expectations. Some of the regulations the market faces include legislation on CO_2 and greenhouse gas emissions, environmental zones, EU emissions regulations for combustion engines and enclosed workspaces, work environment regulations and urban noise limits. Electrical solutions for hybrid or all-electric systems are increasingly entering the market both in city and indoor applications. Ewellix provides manufacturers with a wide range of electromechanical actuators for demanding environments to support OEMs in their electrification journey.

Challenges

- No compromise on the work and power density compared to traditional equipment
- Reduced energy consumption and CO_2 emissions
- Quick recharge, more uptime
- Low noise emissions
- Enhanced functionality and safety.

Value

- No oil, no leaks, virtually maintenance-free, less noise, higher reliability
- Extensive range including high-performance actuators for high speed/force applications
- High efficiency, stability without power, energy recuperation capability
- Safety features to prevent damage to operator or machine
- Monitoring and onboard diagnostic to improve process control and reduce downtime
- Lower TCO (Total Cost of Ownership)

EMA-100

Refuse truck

Functions

- Gripper
- Bin lifting
- Compacting
- Tailgate lifting

Benefits

- Oil-free
- Energy efficient
- Smooth movement

High performance actuator

	EMA-100	EMA-130*	EMA-150*
Rated force	up to 82 000 N	150 000 N	150 000 N
Speed	up to 890 mm/s	up to 150 mm/s	up to 190 mm/s
Stroke	up to 2 000 mm	up to 2 000 mm	up to 2 000 mm
Retracted length	Stroke + 326 mm	Stroke + 326 mm	Stroke + 326 mm
Static force	82 000 N	320 000 N	250 000 N

*More data available on request

CAHB-2x

Sweeper

Functions

- Height adjustment
- Arm deployment

Benefits

- Oil-free
- Energy efficient
- Smooth movement
- Lower TCO

EMA-100

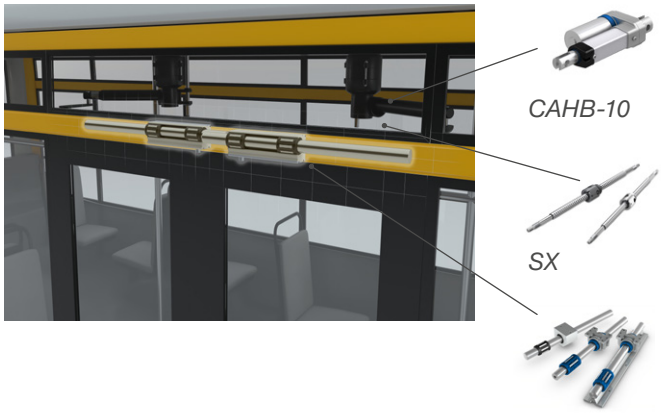
Skid-steer loader

Functions

- Lifting
- Tilting

Benefits

- Oil-free
- Energy efficient
- Smooth movement
- Lower TCO



CAHB-10

SX

LBBR

Buses

Functions

- Door opener
- Guiding

Benefits

- Powered function pneumatic free
- Compatible with pneumatic control
- Smooth operation

Linear actuators, linear guides and precision ball screws

	CAHB-10	CAHB-2x
Rated push load	up to 1 500 N	up to 10000 N
Speed	up to 56 mm/s	up to 57 mm/s
Retracted length	Stroke + 108/168 mm	Stroke + 160/268 mm
Static load	2 500 N	20 000 N
Size and range	–	–
Dynamic load rating	–	–

LBB range
–
up to 5 m/sec
–
–
3 to 80
up to 37,5 kN

	SX series
Shaft diameter	20 to 63 mm
Lead	5 to 10 mm
Max axial load	10 to 100 kN
Max lengh	up to 5 700 mm
Max speed	up to 330 mm/s
	–

Aerial work platform

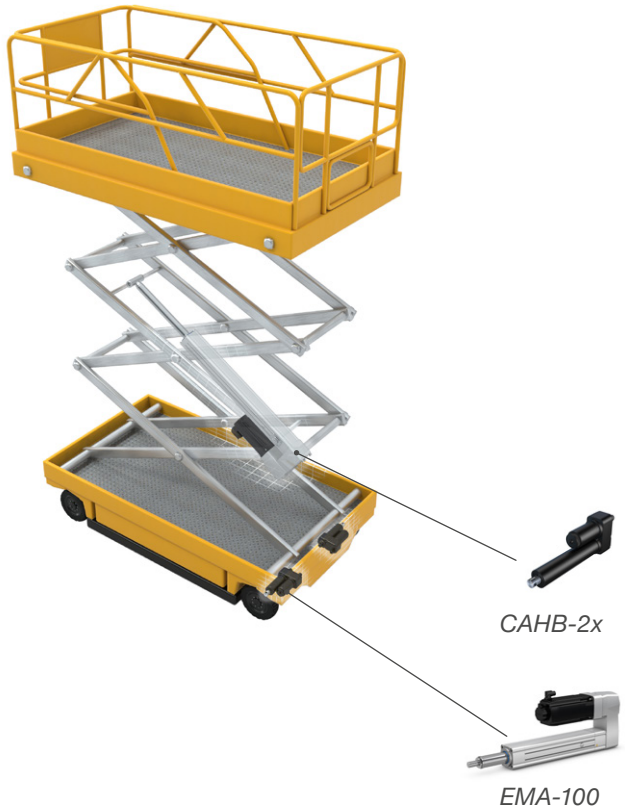
Aerial work platforms and access equipment are used in different locations, but they are becoming increasingly regulated by law on construction sites in our cities and buildings. Legislation on CO_2 and greenhouse gas emissions, low emission zones, EU emissions regulations, emission limits for enclosed spaces, environmental rules and urban noise limits are key aspects that manufacturers need to consider. The trend is towards hybrid or all-electric solutions. Ewellix electromechanical actuators are strategic components in electrical solutions.

Challenges

- Oil-free operation with comparable performance and power density
- Energy-efficient electrical solution
- Critical functions and upgraded functionalities

Value

- Large assortment including actuators for high speed/force applications
- Higher reliability and mechanical efficiency with brake/lowering device
- Valuable data output for telematics
- Lower TCO (Total Cost of Ownership)



Aerial work platform scissor lift

Functions

- Lifting
- Steering
- Platform extension

Benefits

- Oil-free
- Energy efficient
- Smooth movement
- Energy recuperation

High performance actuator and linear actuators

	EMA-100	CAHB-2x
Rated push load	up to 82 000 N	up to 10 000 N
Speed	up to 890 mm/s	up to 57 mm/s
Stroke	up to 2 000 mm	up to 700 mm
Retracted length	Stroke + 326 mm	Stroke + 160/235 mm
Static load	82 000 N	20 000 N

Material handling

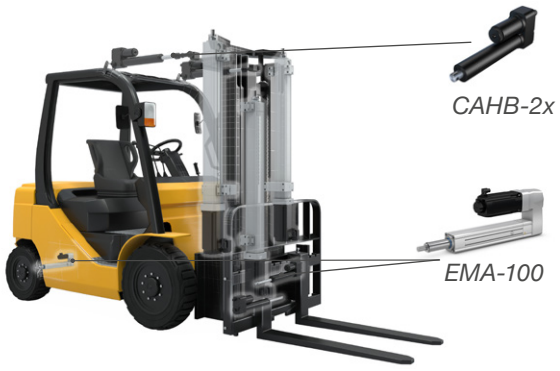
Material handling equipment requires smooth and fast motion to move material around an operation efficiently. Most forklift trucks and Autonomous Guided Vehicles (AGV) or Autonomous Mobile Robots (AMR) operate with electric drives. Energy efficiency is a crucial feature in material handling to increase runtime and productivity, whilst systems are still prevalent in high power lifting functions but have poor energy efficiency. Ewellix electromechanical actuators provide energy-efficient alternatives for these functions in material handling.

Challenges

- Oil-free operation with the same performance and power rating
- High responsiveness, speed and positioning
- Key safety features

Value

- Extensive selection with high-performance drive speeds
- High energy efficiency and recuperation capability
- No risk of leakage
- Greater reliability and mechanical efficiency
- Telematics-ready sensors and feedback options
- Lower TCO (Total Cost of Ownership)



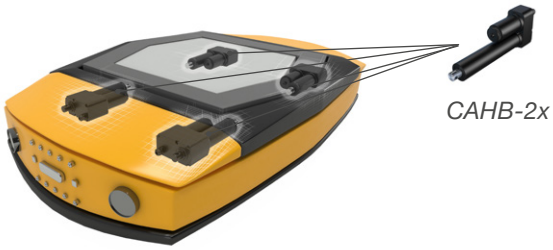
Forklifts

Functions

- Lifting
- Mast lifting
- Mast tilting
- Steering
- Fork adjustment

Benefits

- Oil-free
- Energy efficient
- Smooth movement
- Lower TCO
- Energy recuperation



AGV/AMR

Functions

- Unit load lift
- Height adjustment forklift
- Side movement
- Tow gripper

Benefits

- Oil-free
- Energy efficient
- Compactness
- Position feedback
- On-board diagnostic

Linears actuators, high performance actuator and precision ball screws

	CAHB-2x	EMA-100		SX series
Rated push load	up to 10 000 N	up to 82 000 N	Shaft diameter	20 to 63 mm
Speed	up to 57 mm/s	up to 890 mm/s	Lead	5 to 10 mm
Stroke	up to 700 mm	up to 2 000 mm	Max axial load	10 to 100 kN
Retracted length	Stroke + 160/235 mm	Stroke + 326 mm	Max lengh	up to 5 700 mm
Static load	20 000 N	82 000 N	Max speed	up to 330 mm/s

Agricultural machinery

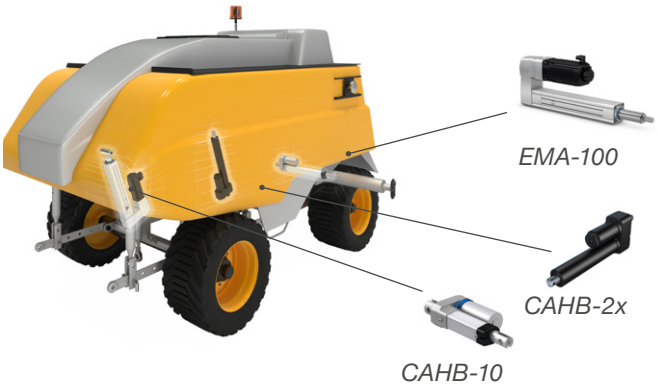
Farmers today face the challenge of reducing costs while increasing crop yields. Agricultural machinery manufacturers have developed a wide range of equipment with the latest technologies that can adapt better to the conditions in which it will be used, thereby improving performance. They need a wide range of products with greater load-bearing capacity and speed, as well as individual solutions from reliable suppliers with a global presence and support. Current industry regulations are already having a significant impact on the engine used, which has consequences for other components such as cooling systems and a heavier bonnet. A new generation of equipment such as battery-electric and autonomous vehicles are being launched. Ewellix offers solutions for increased reliability, performance and safety for OEMs manufacturing such machines.

Challenges

- Higher crop yield and productivity
- Consistent performance even in demanding environments
- High-cost efficiency

Value

- Ingress protection in movement IP66M
- Higher controllability and positioning feedback
- No leakage, tested and maintenance-free
- Lower TCO (Total Cost of Ownership)



AG robot

Functions

- 3-point hitch lifting
- Arm deployment
- Lateral positioning tool
- Height adjustment tool

Benefits

- Oil-free
- Energy efficient
- Smooth movement
- Position feedback
- On-board diagnostic

Harvester combine

Functions

- Reel-in out of the header
- Ladder rotation
- Concave adjustment
- Cleaning fan adjustment
- Chopper shift
- Straw deflector orientation
- Sieve table adjustment
- Auger folding
- Spout orientation
- Grain tank cover opening
- Armrest sliding panel

Benefits

- Precise adjustment
- Position feedback
- Smooth movement

High performance actuator and linear actuators

	EMA-100	CAHB-2x	CAHB-10
Rated push load	up to 82 000 N	up to 10 000 N	up to 1 500 N
Speed	up to 890 mm/s	up to 57 mm/s	up to 18 mm/s
Stroke	up to 2 000 mm	up to 700 mm	up to 700 mm
Retracted length	Stroke + 326 mm	Stroke + 160/235 mm	Stroke + 109/143 mm
Static load	82 000 N	20 000 N	2 500 N

Construction equipment

Construction machinery manufacturers today face the challenges of reducing costs on the one hand and increasing productivity on the other. Products with higher work capacity and performance are needed to achieve these goals and pose higher demands to the components installed. Ewellix offers a wide range of electromechanical actuators for demanding environments to provide more comfort and productivity for construction equipment.

Challenges

- Greater productivity
- Improved operator safety and ergonomics
- High cost-efficiency

Value

- Reliable and maintenance-free
- Improved manoeuvrability and position sensing
- No risk of leakage
- Lower TCO (Total Cost of Ownership)

Road machine

Functions

- Scraper plate adjustment
- T top height adjustment
- Seat adjustment
- Mirror adjustment
- Beacon adjustment

Benefits

- Accurate positioning
- Position feedback
- Stability
- Easy operation

Articulated compact dumper

Functions

- Dumping
- Steering

Benefits

- Oil-free
- Energy efficient
- Smooth movement

High performance actuator, linear actuators and linear guides

	EMA-100	CAHB-2x	CAHB-10
Rated push load	up to 82 000 N	up to 10 000 N	up to 1 500 N
Speed	up to 890 mm/s	up to 57 mm/s	up to 18 mm/s
Stroke	up to 2 000 mm	up to 700 mm	up to 700 mm
Retracted length	Stroke +326 mm	Stroke +160/235 mm	Stroke +109/143 mm
Static load	82 000 N	20 000 N	2 500 N

	LBB range
Size and range	3 to 80
Dynamic load rating	up to 37,5 kN
Speed	up to 5 m/sec

Municipal vehicles

Municipal vehicles as delivery truck and ground support equipment must meet both regulatory requirements and user expectations. Electrical solutions for hybrid or all-electric systems are increasingly entering the market. Ewellix provides manufacturers with a wide range of electromechanical actuators for demanding environments to support OEMs in their electrification journey providing high energy efficiency, no oil solution and lower total cost of ownership (TCO).

Challenges

- Decrease CO_2 emissions
- Ergonomics and safety for the operator

Value

- Lower CO2 emissions
- More productivity
- More uptime (linguistic check)
- Lower TCO

EMA-100

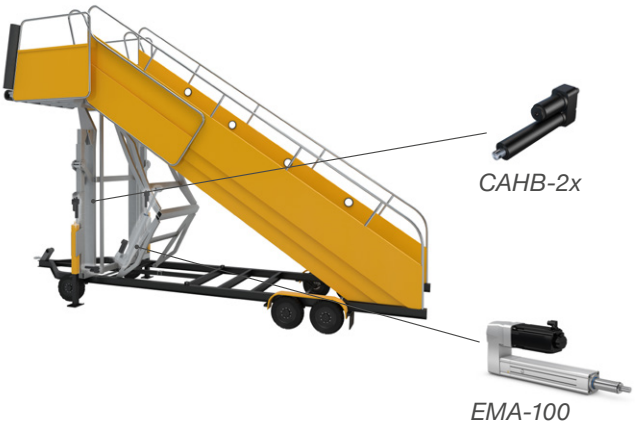
Tail lift delivery truck

Functions

- Lift and tilt

Benefits

- Less overhaul and maintenance
- Compactness
- Stability
- Smooth movement
- Parallel motion
- Energy efficiency



CAHB-2x

EMA-100

Ground support equipment

Functions

- Lift and adjust the ladder
- Engage the parking brake

Benefits

- Less overhaul and maintenance
- Compactness
- Position feedback
- Stability
- Smooth movement

High performance actuator and linear actuators

	EMA-100	CAHB-2x
Rated push load	up to 82 000 N	up to 10 000 N
Speed	up to 890 mm/s	up to 57 mm/s
Stroke	up to 2 000 mm	up to 700 mm
Retracted length	Stroke + 326 mm	Stroke + 160/235 mm
Static load	82 000 N	20 000 N

Your development partner

Tested for your environment

Ewellix's expertise in mechanics and electronics, and specific application requirements contribute to the development of electromechanical actuators to meet the requirements of mobile machinery manufacturers. We verify our products by a comprehensive test plan that covers all regulatory and environmental requirements.

Mechanical tests

The actuators are used on mobile equipment, and we put them on different test benches to validate how they withstand vibration and shock on all three-axes.

- Random vibration EN 60068-2-6
- Drop test
- Mechanical shock (operational)

Climatic tests

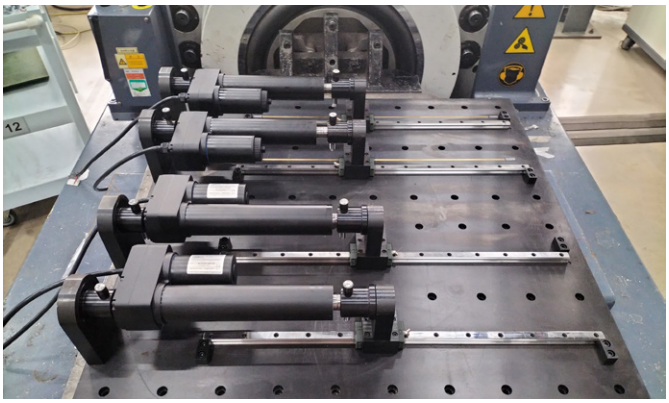
The actuators are tested in a climatic test chamber that reproduces extremely low -40°C and high temperatures +85°C, and any possible variations, including humidity and corrosive atmospheres. Doing this ensures that all the functions and performance of the actuators are working as expected.

- Cold test EN60068-2-1 (Ab and Ad)
- Dry heat EN60068-2-2 (Bd)
- Change of temperature EN60068-2-14 (Na)
- Salt mist EN60068-2-52 (Kb)
- Degree of protection, dust IEC 60529 IP6xM,
- Degree of protection, water IEC 60529 IPx6M
- Degree of protection, high-pressure water and temperature ISO 20653:2013 IPx9K

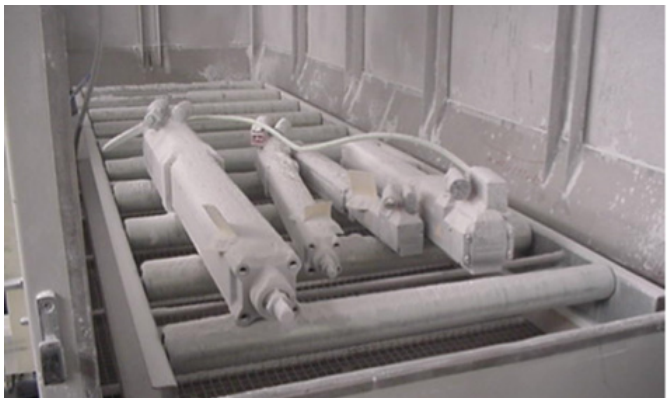
Electrical tests

The actuators are tested with different test equipment that reproduces the electrical environment recommended by international standards, such as power supply, immunity to the electrostatic discharges, and electromagnetic compatibility during extreme cases, even during the transient mode typical on a vehicle.

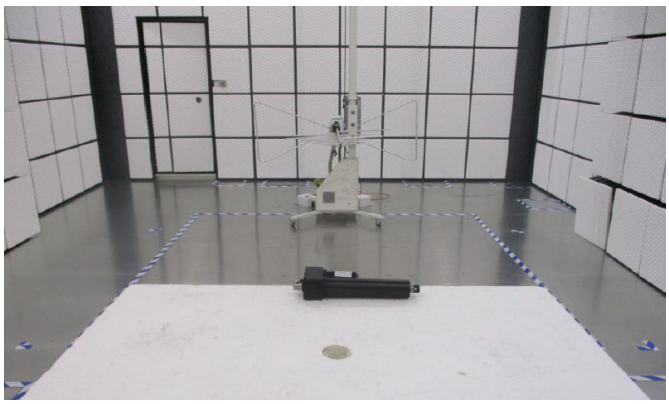
- Power supply 12 VDC ASAE EP455
- Power supply 24 VDC ASAE EP455
- EMC, HF-immunity EN 61000-6-1 and EN 61000-6-2
- EMC, Emission EN 61000-6-3 and EN 61000-6-4
- EMC, Automotive transients ISO 7637-2



Vibraton test



Low temperature test

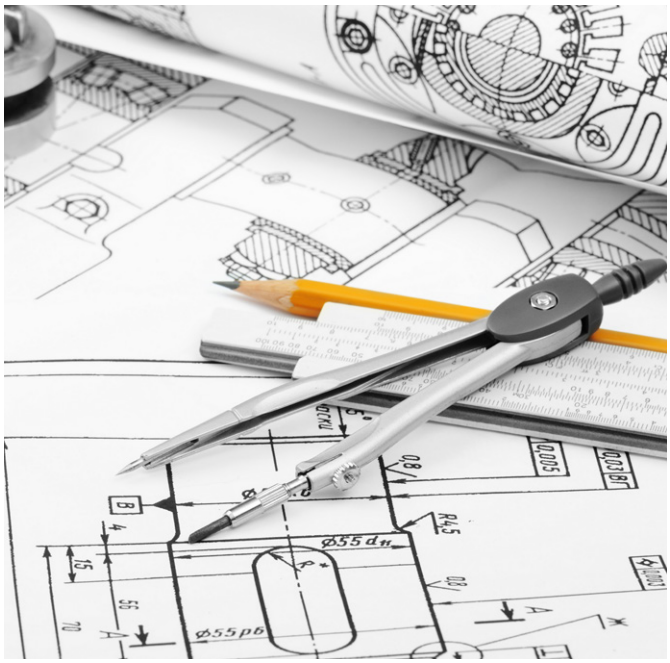


EMC test air immunity or radiation test

Customisation

Our engineers support customers in developing new solutions based on proven processes and modular platforms, focusing on client-specific requests.

Our strong understanding of linear and actuation technologies enables us to offer an extensive customisation program to meet virtually any application need.



Basic customisation

The following basic design options can be implemented quickly and easily:

- Stroke
- Mounting holes
- Colours
- Attachments
- Motors
- Cables / connectors

Advanced customisation

These design options are more complex and require a dedicated project by Ewellix personnel working with the customer:

- Materials
- Housing
- Guiding system
- Gearbox (e.g., with hand crank)
- Screw (e.g., lead, treatments)
- Screw nut (e.g., additional backup nut)
- Painting and surface treatments

Complete customisation

If the standard actuator offering cannot fully satisfy the technical requirements, Ewellix can offer customised solutions tailored for each client. These design options are more complex and require a dedicated project by Ewellix working with the client.

Digitalisation

Ewellix made a step forward in automating and electrifying the machinery and equipment by adding integrated smart control functions, sensors, and communication. All these new functions are integrated into the SmartX digital platform, where Ewellix delivers actuation solutions that can represent IoT enablers for customers, supporting their journey toward digitalisation.

SmartX digital platform from Ewellix is a set of solutions that address modern equipment needs: intelligent, flexible and connected. With this offering, we enable customers (OEMs and end-users) to unlock a new world of benefits like increased productivity, higher uptime and lower total cost of ownership. We can offer embedded future-proof functionalities that create new possibilities for current and next-generation machinery.

Innovation

We work pro-actively to better understand and improve our customer's applications, the challenges and benefits they are facing when electrifying their equipment.

On the right a concept vehicle is shown: an electric forklift in which all hydraulic functions have been replaced by electromechanics.

Scalability of the solution

To enable electromechanical solutions for larger mobile machinery or with higher power work functions, we are continuously expanding our offer to increase the power range. On the right our extension of the EMA-100 actuator series is shown.

EMA-150 (top) and EMA-100

Supporting tools

Digital

Ewellix has developed a portfolio of tools to support customers easily selecting and calculating the right Ewellix product for their application.

Actuators

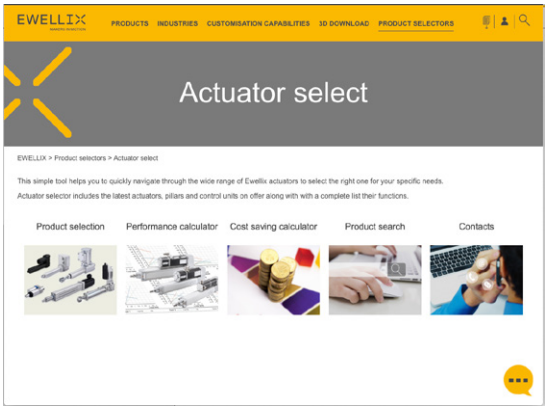
- Product selection
- Performance calculator
- Cost saving calculator

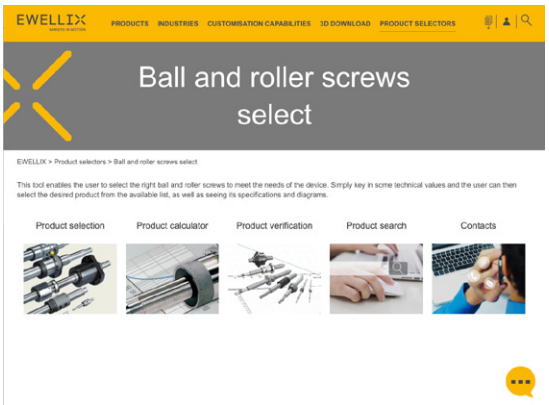
Ball and roller screws

- Product selection
- Product calculator
- Product verification

Linear guides

- Product selection
- Product calculator
- Cross reference





Publications

Supporting documents are available for downloading on ewellix.com in each product page under technical data section:

- operating manual
- mounting instruction

Linear actuator CAHB series

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