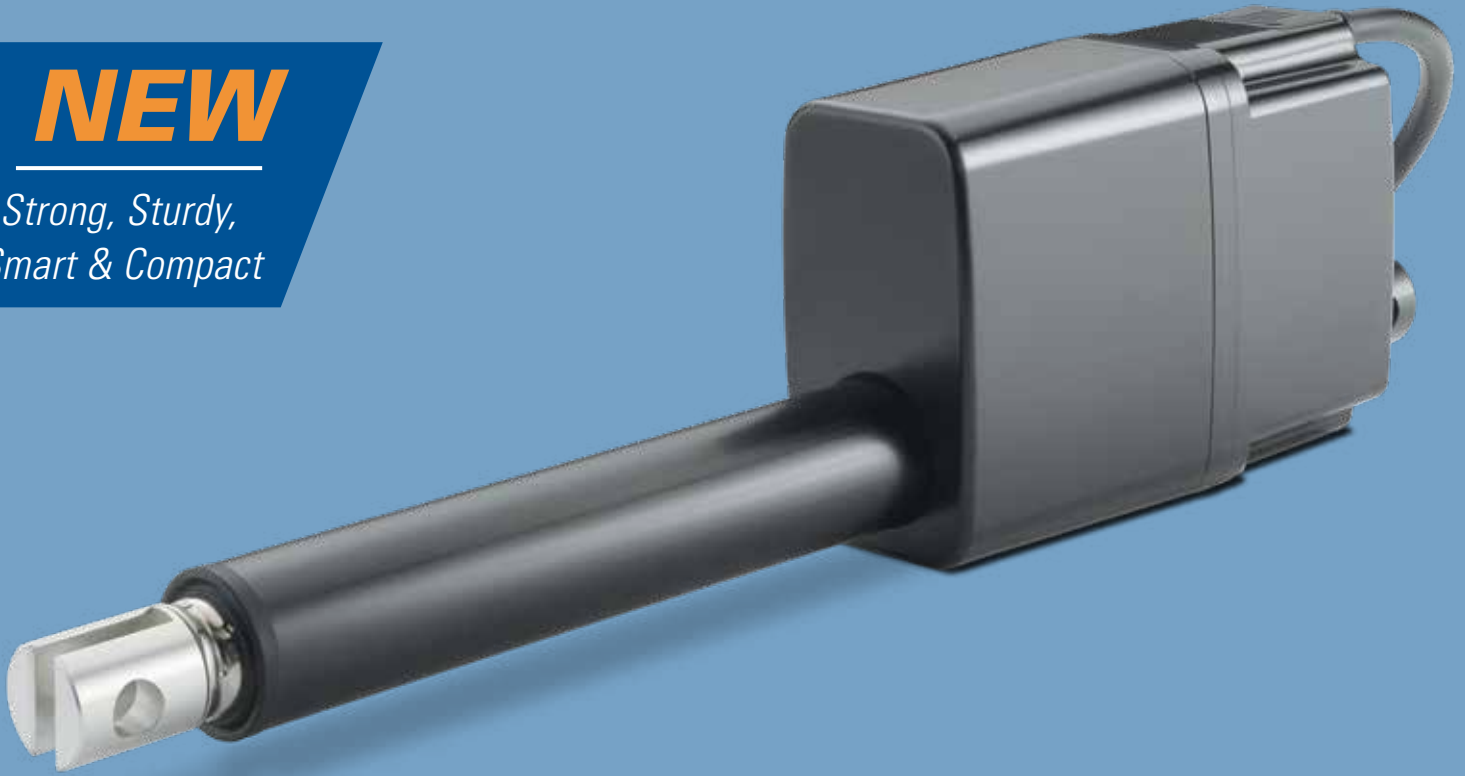


**NEW**

*Strong, Sturdy,  
Smart & Compact*



## Electrak<sup>®</sup> MD

Smart Linear Actuator Featuring Outstanding Power Density  
While Withstanding the Toughest Conditions

## Electrak® MD – Superior Performance in a Compact Package

The Electrak MD is a state-of-the-art electric linear actuator designed around the same architecture as its larger sibling, the Electrak HD. This smart actuator packs a big punch relative to its size and dutifully performs in the harshest environments without the need for service or maintenance.

### State-of-the-Art Onboard Controls

A modular onboard control concept opens the door to a wide range of possibilities, including a simple on/off switch alternative, low-level switching with or without position feedback, or CAN bus options, giving you full control over the actuator.

- Actuator housing and performance remain the same no matter the control option.
- Using the basic control options allows for Pulse Width Modulation (PWM) speed control.
- Electromagnetic Compatibility (EMC) tested to ensure safe operation.
- Same proven and reliable control design as used in the larger Electrak HD.

### Made to Endure the Toughest Conditions

All of the knowledge Thomson gathered throughout decades of building tough, reliable actuators has gone into the development of the Electrak MD. The Thomson Test Standard we developed over the years guarantees that it meets the expectations of even the most demanding customers.

- Wide operating temperature range (-40 to 85°C)
- 500 hours salt spray tested
- IP69K/IP66 ingress protection
- High shock and vibration resistance



### Outstanding Power Density

Electrak MD is proof that looks can be deceiving. This small, lightweight actuator can give many larger, heavier actuators a fight.

- Very strong compared to its overall size
- Loads up to 2 kN
- Speeds up to 45 mm/s

### Additional Features

- Integrated electrical connector
- Built-in anti-rotation mechanism
- Flexible adapter orientation
- Maintenance free



**STRONG.  
STURDY.  
SMART.**

## Basic to Advanced Onboard Controls

Electrak® MD offers basic controllability for simple actuation, advanced controls to replace external relays and limit switches or provide feedback, and upper tier controls with full CAN bus controllability. What a couple of years ago was thought to be impossible to do with an actuator is now an average day's work for the Electrak MD.

### Basic Controls

The basic control level allows you to choose between internal end-of-stroke limit switches with or without potentiometer feedback. This control level also lets you speed control the motor using PWM, which can be advantageous in some applications.

### Electronic Monitoring Package - The Backbone of Smart Actuation

The next level of control can be found with the optional Electronic Monitoring Package. This allows for better control and monitoring of the actuator status.

### EMCS - The Brains of Smart Actuation

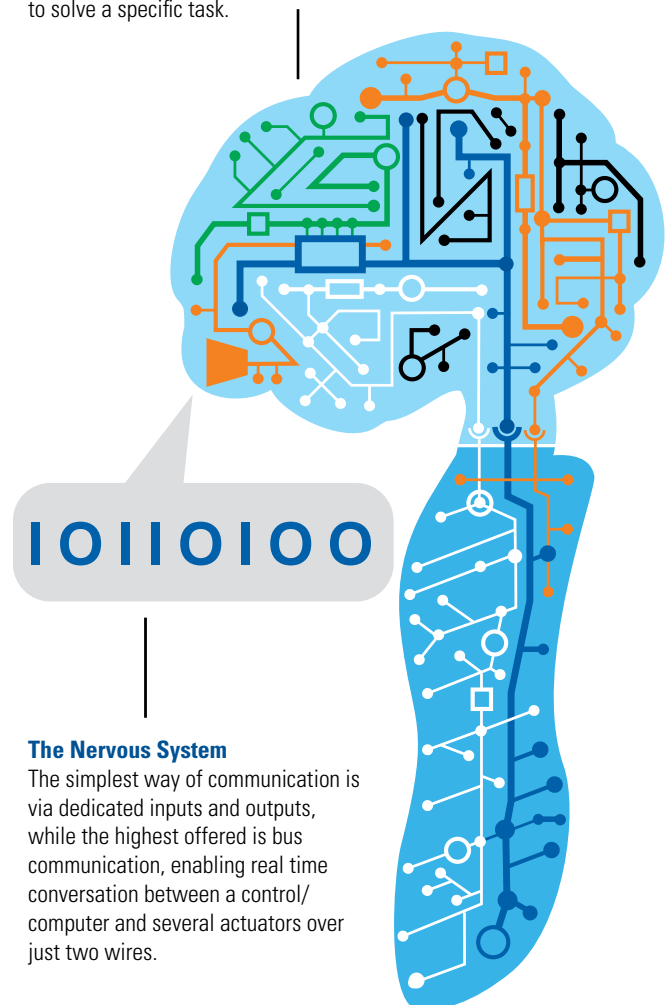
The highest level of control is offered by the Electrak Modular Control System (EMCS), which makes it possible to add functions on top of the Electronic Monitoring Package offering. These range from low level switching and position feedback to bus communication.

### Bus Communication

Electrak MD offers J1939 CAN bus communication, which makes it possible to control and monitor every aspect of actuator operation. It also allows you to coordinate a number of actuators over only two wires, minimizing cable quantity and routing.

#### The Brains

We do not offer only one type of brain. Instead our EMCS system gives you the option to place a number of different control systems on top of the Electronic Monitoring Package that are individually tailored to solve a specific task.



#### The Nervous System

The simplest way of communication is via dedicated inputs and outputs, while the highest offered is bus communication, enabling real time conversation between a control/computer and several actuators over just two wires.

#### The Backbone

The Electronic Monitoring Package ensures safe and reliable operation, and quietly goes about its job in the background until it detects anything worth informing.

## Basic Controls

### Control Option XXX: Internal End-of-Stroke Limit Switches

Built into the actuator, they ensure smooth, repeatable operation and protect both connected equipment and the actuator.

### Control Option XXP: Internal End-of-Stroke Limit Switches + Analog Position Output

The internal end-of-stroke limit switches are combined with a high-quality potentiometer, providing a voltage signal for position and direction feedback.

## Electronic Monitoring Package

### Control Option EXX: Electronic Monitoring Package

This package has the following standard functions:

- **Current Monitoring**  
A critical safety feature that shuts down the actuator on overload and eliminates the need for the traditional mechanical clutch.
- **Voltage and Temperature Monitoring**  
Continuous monitoring protects the actuator by preventing motion if outside normal ranges.
- **Temperature Compensation**  
Boosts productivity by enabling normal operation at lower temperatures without nuisance tripping.
- **Load Trip Point Calibration**  
Each actuator is individually calibrated at assembly to ensure a repeatable overload trip point.
- **Internal End-of-Stroke Limit Switches**  
Built into each actuator, they ensure smooth, repeatable operation and protect both connected equipment and the actuator.
- **End-of-Stroke Dynamic Braking**  
Enables quick, end-of-stroke stops for more repeatable movements when loads would traditionally cause coasting.

## EMCS Add-On Options

### Control Option CNO: J1939 CAN Bus

J1939 CAN bus functionality is added to the Electronic Monitoring Package, allowing plug and play connectivity on your already established J1939 network.

### Control Option EXP: Analog Position Output

A high-quality potentiometer is added to the Electronic Monitoring Package, providing a voltage signal for position and direction feedback.

### Control Option LXX: Low-Level Switching

Inputs to control the movement of the actuator are added to the Electronic Monitoring Package. These inputs improve safety, save energy with an auto-sleep feature and simplify design by using low current (< 22 mA) signals to control the direction of the motion. Its soft start improves the smoothness of the move profile and reduces typical motor inrush current.

### Control Option LXP: Low-Level Switching + Analog Position Output

Both inputs to control the movement of the actuator and potentiometer feedback are added to the Electronic Monitoring Package.

### Control Options LLX and LLP: Low-Level Switching + End-of-Stroke Indication Outputs (LLX) + Analog Position Output (LLP)

Option LLX adds end-of-stroke indication outputs (fully retracted and fully extended extension tube) functionality to option LXX, while LLP does the same but also adds a potentiometer output for position and direction feedback.

## Improve Controllability with Integrated Onboard Electronics

Electrak® MD actuators replace external controls with integrated electronics, which simplify and reduce the size of the overall system design. Low-level switching, for example, can replace relay setups, while internal limit switches or potentiometer feedback eliminates complicated and sensitive external sensors.

### Less Complexity and Quicker Installation

Using the onboard control options simplifies the overall system. There is reduced need for control boxes, external sensors or programming to have the Electrak MD perform to your specifications.

### Let Electrak MD Monitor for You

Current, voltage and temperature are some of the measurements that Electrak MD can monitor to ensure peak performance. Depending on the type of control option, the actuator also can avoid stall conditions and send back the position of the extension tube.

### All Within the Same Compact Envelope

Electrak MD maintains the same outer dimensions and modular harness no matter the control option being used. Even when controls are added or switched out, users can rest assured that the actuator's envelope will remain unchanged.

### Boost the Intelligence of Your Applications

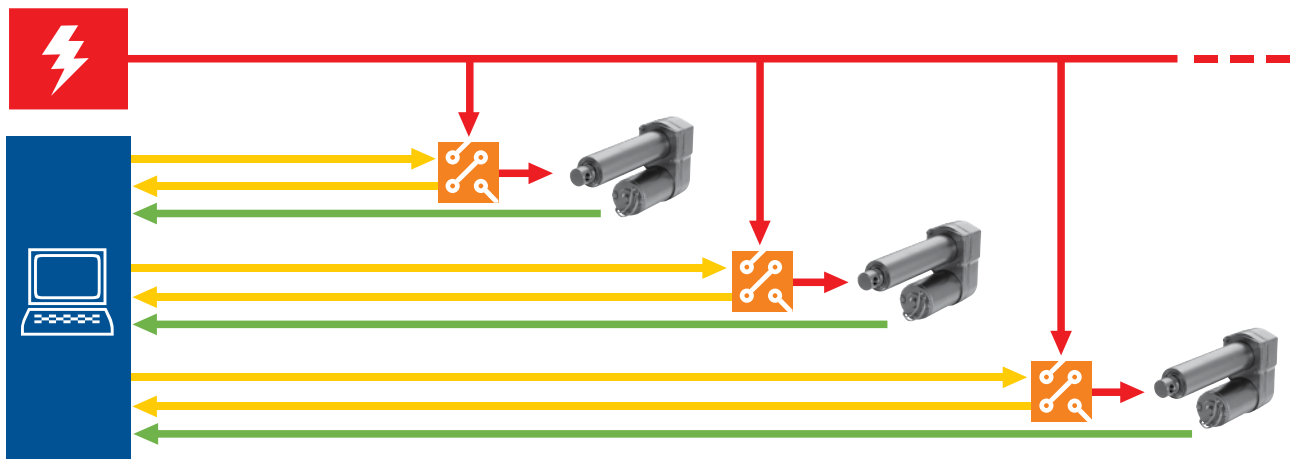
Smart actuators let their internal electronics do as much of the work as possible in order to eliminate external cables, controls, sensors and boxes. But that is only half the story - a smart actuator will, in most cases, also significantly reduce engineering development, installation and maintenance time.



## Basic Controls vs. Smart Systems

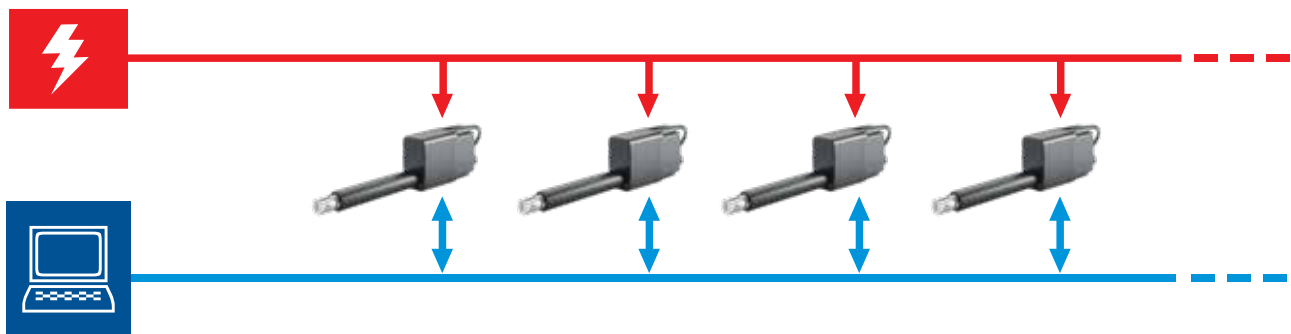
### Basic System

Each actuator is controlled by the host individually. By using control boxes, switches, sensors and position feedback devices, the host controls and keeps track of each actuator.



### Smart Bus Communication System

All actuators speak to the host control over the same bus, and each actuator does what it is told and reports back in real time.



- Power lines
- Control signals
- Position feedback signals
- Bus communication



## A Big Punch in a Small Envelope

Despite the Electrak® MD's housing being shorter than a pencil, the actuator features class-leading power density. It can handle loads up to 2000 N (450 lbs), making it an ideal option to replace both hydraulic and pneumatic cylinders in many applications.

### Small and Powerful

Electrak MD is a game changer. It can fit in small spaces yet be strong enough for applications in which other actuators either are too large or weak. It also has a longer stroke and better efficiency than other actuators of the same size. All in all, Electrak MD makes electric actuation possible where before it was impossible.

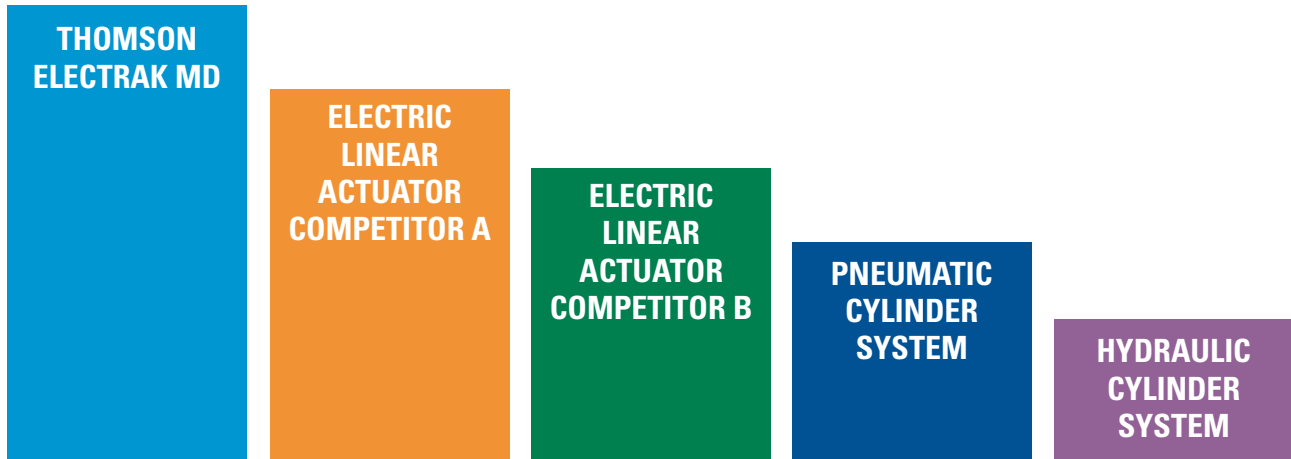
### The Electric Benefit

Moving from hydraulics or pneumatics to electric actuators is desirable for many reasons including:

- Easier and better controllability
- No maintenance required
- Improved energy efficiency
- Cleaner and quieter operation
- Smaller and less complex installations
- Electricity widely available





**POWER DENSITY COMPARISON**

Equipment manufacturers are tasked with reducing the overall footprint and adding functionality, resulting in an increased demand for more compact components such as the power-dense and intelligent Electrak MD. Other electric linear actuator manufacturers fall short of delivering the

power of the Electrak MD in such a small envelope, and pneumatic and hydraulic systems require a much larger footprint for the entire system in order to deliver a high power actuation solution. MD is power-dense, plug-and-play and withstands harsh environments.



## When Failure is Not an Option

Electrak® MD is designed for tough applications. Mud, dirt, dust, water and snow are no problem. This is guaranteed by way of the rigorous testing set out in the Thomson Test Standard, which is based on many years of conducting business with customers carrying the toughest application demands.

### Working Where Extreme is the Norm

Farms, construction sites, dirty roads and dense forests are some of the hardest places for actuators to work, and the conditions can be extreme. Long-term exposure to mud, aggressive chemicals, heat, cold, submersion, vibration or shock loads are common, and often actuators are faced with many of these conditions at the same time. For Electrak MD, this level of adversity is just an ordinary day at work.

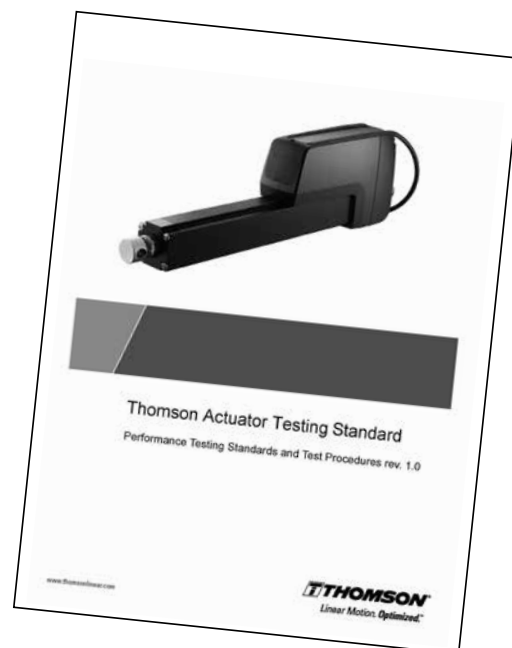
### Proven Tough

The Ingress Protection (IP) classification defines how well an electrical product copes with water and dust, and a high rating ensures that the actuator

can operate in dirty, wet environments. Electrak MD is tested for IP69K statically and IP66 dynamically, which are as high a rating an electrical product with moving parts can achieve. Electrak MD has also passed a 500-hour salt spray test and is able to work in temperatures from -40 to 85°C (-40 to 185°F).

### The Thomson Test Standard

This standard meets and exceeds the toughest OEM mechanical and electrical component tests in the market, and stands as the guarantee that Electrak MD has what it takes to meet even the toughest environmental demands.





## Electrak MD Ratings & Tests

### **IP69K/IP67 Static**

Dust tight and protected against close-range, high-pressure and high-temperature spray-down at standstill.

### **IP66 Dynamic**

Dust tight and protected against powerful jets of water from any direction during motion.

### **Salt Spray Protection**

Withstands a 500-hour salt spray test without failure.

### **Temperature Limits**

Testing in climate chamber ensures operation from -40 to 85°C (-40 to 185°F) without failure.

### **EMC Tested**

A full suite of EMC tests ensures that both the electromagnetic emission and immunity levels are within safe levels.

### **Shock Resistance**

Electrak MD has successfully undergone standardized tests for random vibrations, operational shock and dropping.

### **Materials**

E-coated aluminum housing, hard-coated aluminium cover tube and a stainless steel extension tube protect the actuator against corrosion.

### **Quality Control and Testing**

Every Electrak MD is subjected to quality controls throughout the entire manufacturing process and undergoes a thorough functional test before leaving the factory.

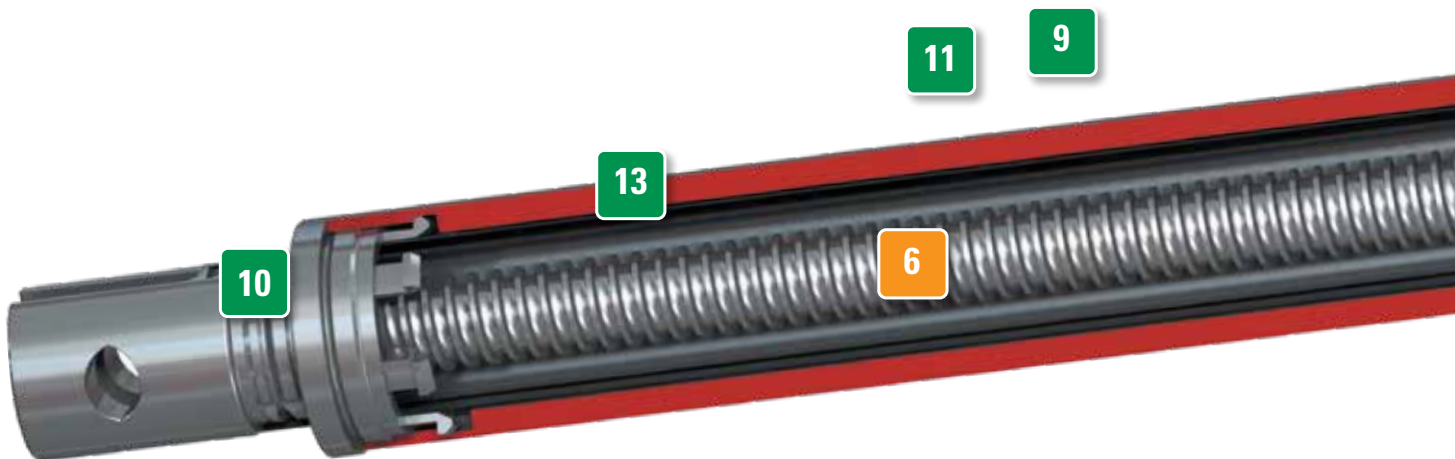
## State of the Art Inside and Out

The performance specifications for Electrak® MD reflect those you would expect from an industry leader in electric linear actuator technology. Thomson engineers incorporated only the best materials, practices and manufacturing techniques in order to create a truly state-of-the-art product. Take a look for yourself inside the Electrak MD.

### INDUSTRY-LEADING ONBOARD CONTROLS

Electrak MD lets you choose the exact level of controllability you need - starting with basic control options and the Electronic Monitoring Package to EMCS options.

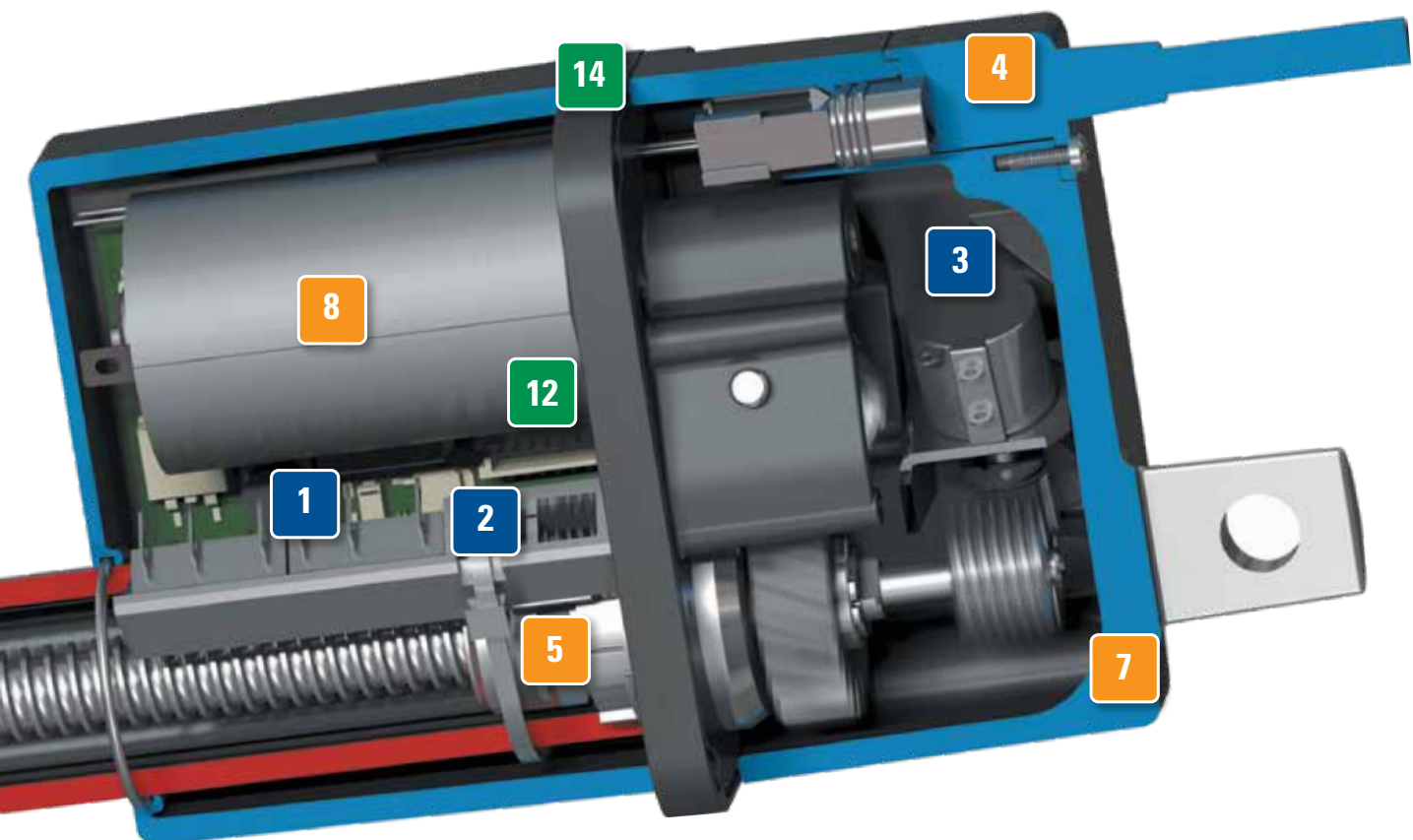
- 1 Modular Printed Circuit Board**
- 2 Built-in End-of-Stroke Limit Switches**
- 3 Position Feedback Potentiometer**



## SUPERIOR PERFORMANCE

Higher power and longer stroke lengths enable the Electrak MD to tackle applications outside the range of other electric linear actuators of similar size.

- 4 Robust IP67 Connector**
- 5 Standard Anti-Rotation Feature**
- 6 High-Quality Self-Locking Acme Screw**
- 7 Compact Design**
- 8 Strong Reliable Smooth Running Motor**



## UNRIVALED ENVIRONMENTAL PROTECTION

Electrak MD is tested to meet and exceed the toughest OEM mechanical and electronic component acceptance tests on the market today.

- 9 IP69K/IP66 Protection Class**
- 10 Stainless Steel Extension Tube**
- 11 Salt Spray Tested for 500 Hours**
- 12 Large Operating Temperature Range**
- 13 Hard-Coat Anodized Aluminum Cover Tube**
- 14 E-Coated Aluminum Housing**

## Applications - Smart Logistics

Electrak® MD actuators are ideal in smaller-space, mobile, low-duty applications that are being electrified, such as AGVs and logistics trains where larger actuators are difficult to use, and pneumatics or hydraulics are nearly impossible. Electrak MD is also a good fit in equipment used to control the flow of materials or to feed/empty machines or storage shelves.

### Reliability

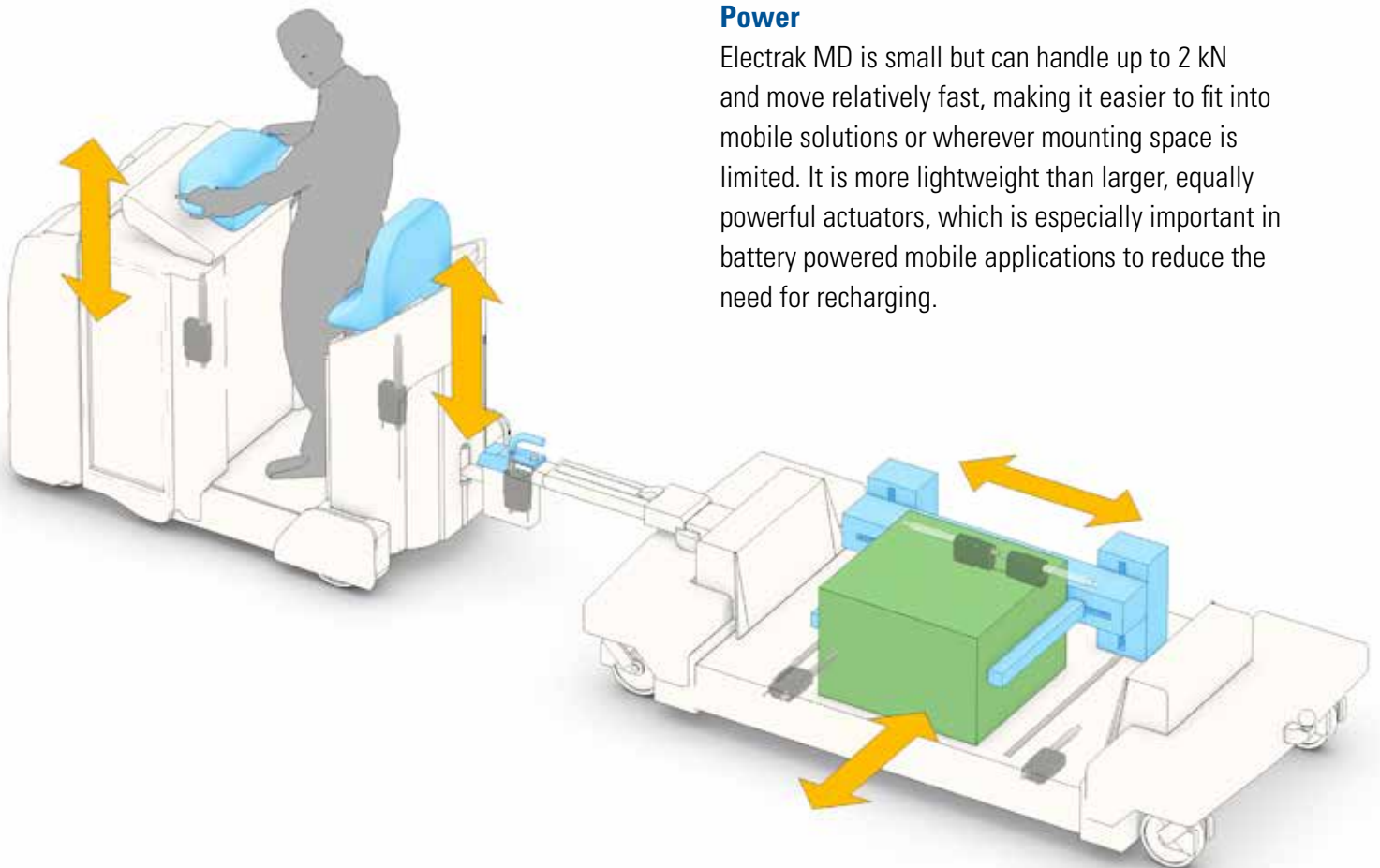
Electrak MD requires no maintenance and provides long life. Due to it being EMC tested, it will not interfere with other equipment throughout the factory. Its self-monitoring capabilities and EMCS functionality means that its work can be monitored and controlled in real time.

### Controllability

The large number of onboard control options makes it easy to get the level of controllability you need. If you only need to move the actuator with a simple toggle switch, the Electrak MD can handle it. Need positional feedback? No problem. Is bus communication the solution for you? The Electrak MD offers CAN bus.

### Power

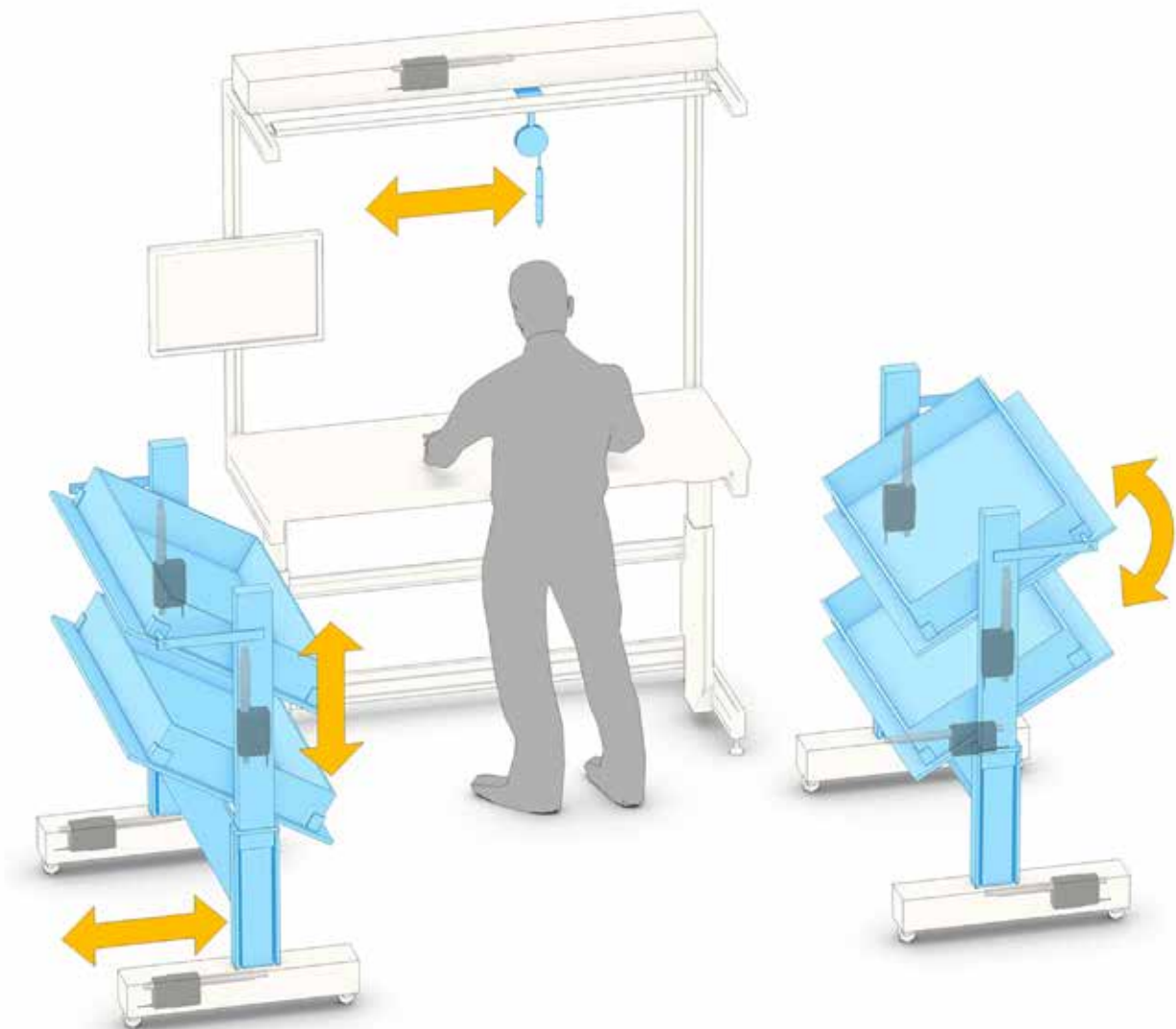
Electrak MD is small but can handle up to 2 kN and move relatively fast, making it easier to fit into mobile solutions or wherever mounting space is limited. It is more lightweight than larger, equally powerful actuators, which is especially important in battery powered mobile applications to reduce the need for recharging.



### Powered by Batteries Means Easy Mobility

Batteries are the main power source in most mobile indoor equipment since electrical motors are the means to get them in motion. Using anything else that is not electrically powered onboard would be disadvantageous for many reasons. Additional weight, increased complexity,

and less efficiency and controllability top the list. Electrak MD offers 12 or 24 Vdc supplied models, can easily be connected to other control equipment, and have been designed from the start with maximum mobility in mind.



## Applications - Smart Packaging

Modern packaging machines need to be quick to set up and adjust easily to be able to run different package sizes. The duty cycle requirements in this type of application are typically low, while maintaining position when moving and holding must be easy to control. The robust and weather-proof Electrak® MD actuator, with its onboard electronics, is an ideal fit for these types of tasks.

### **Wet on the Outside, Dry on the Inside**

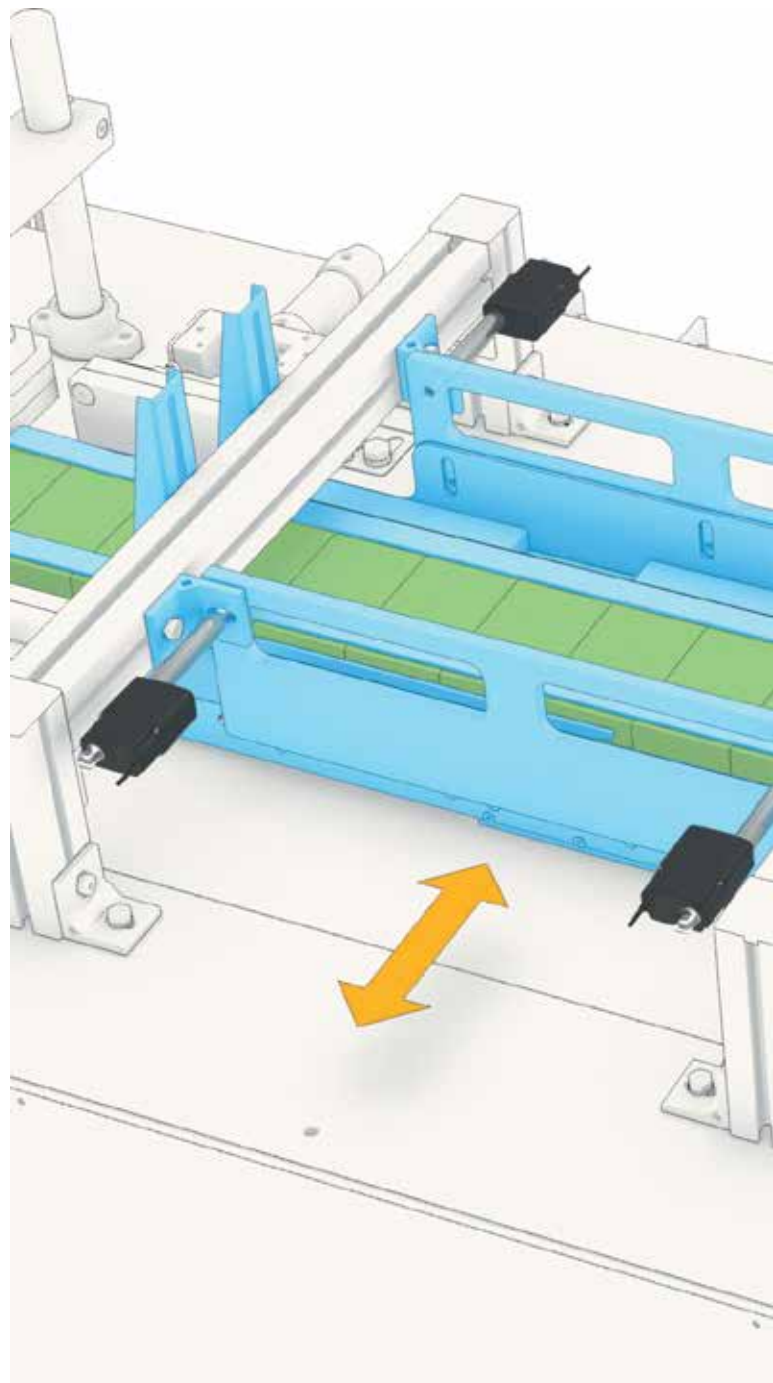
Components used in packaging equipment for the food and beverage industry must withstand damp conditions. The cleaning process can be especially tough as both high-pressure water and steam can be used. Electrak MD has no problem dealing with these conditions and, in fact, can be washdown cleaned during operation, which can increase the efficiency.

### **Long, Reliable Life**

Electrak MD is tested for 40 000 cycles under the hardest conditions for which it is rated. The tests are based on the Thomson Test Standard, one of the strictest test regimens to which an actuator can be subjected. Based on its performance, Thomson engineers are confident in saying that Electrak MD is as tough as actuators get.

### **Small Yet Powerful**

Electrak MD can handle up to 2000 N (450 lbs), which makes it an ideal candidate for pneumatic or hydraulic replacement. Electrak MD is, in fact, one of the most power-dense electric actuators, making it easier to fit into existing applications without the need for any major re-engineering of the equipment. Many times, Electrak MD simply fits right in.

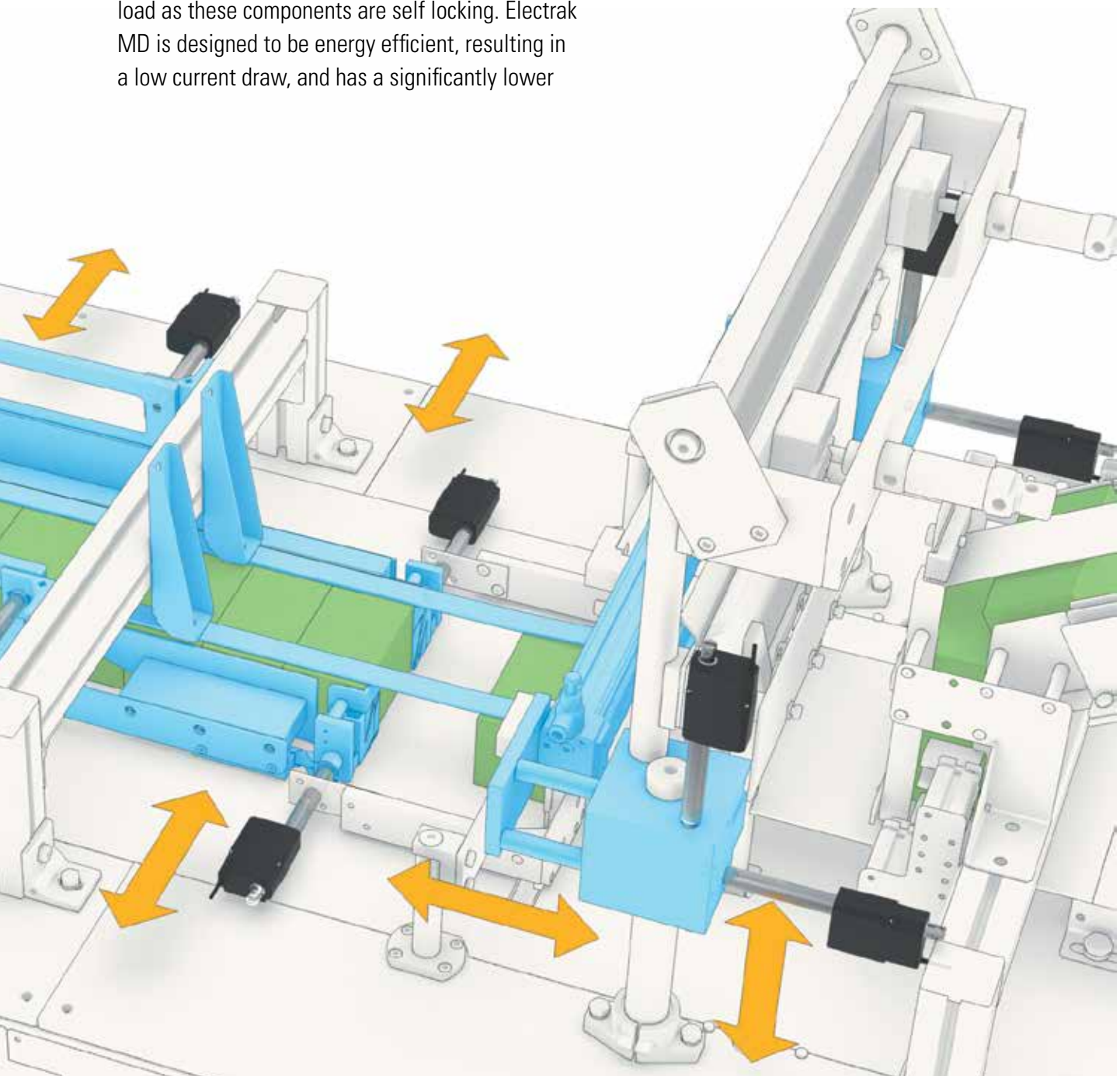




### Save Energy

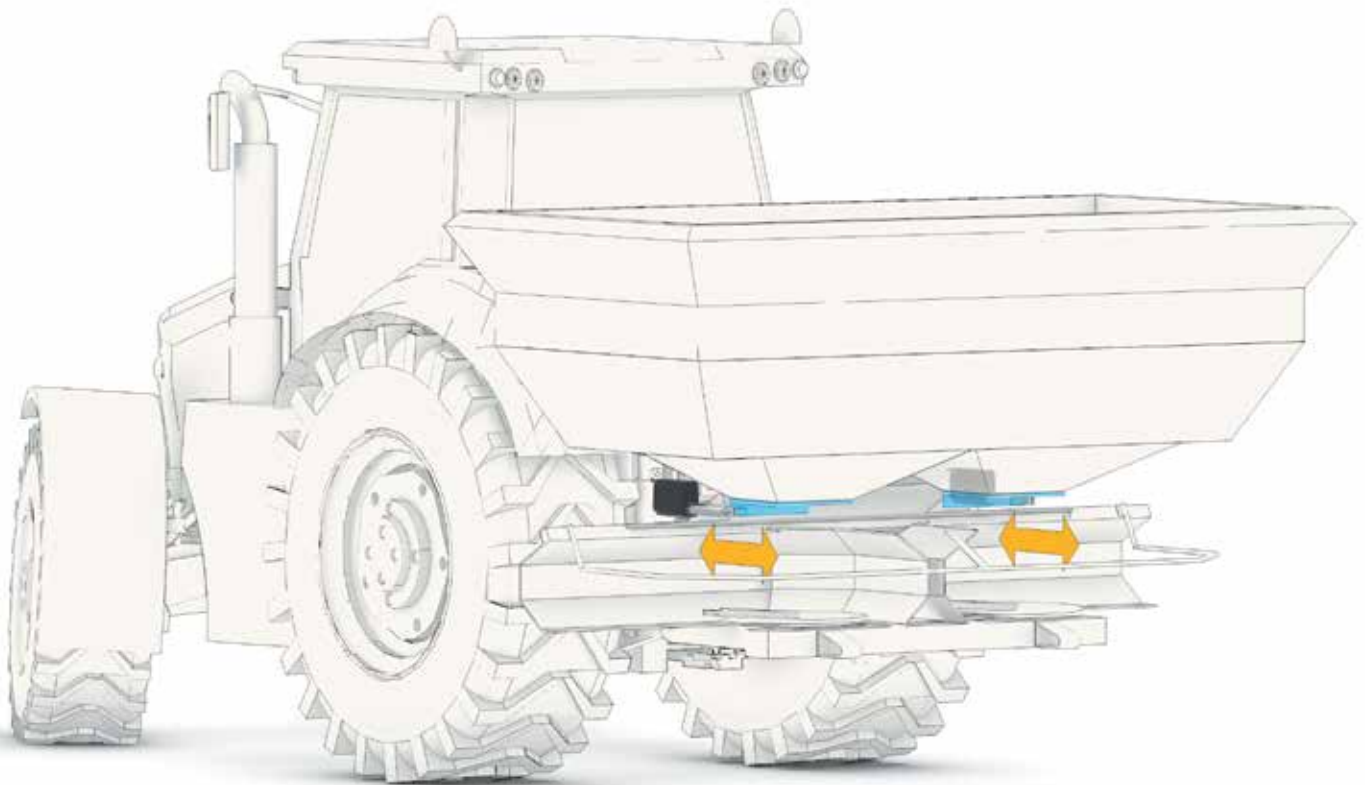
The power consumption of a packaging machine can be significant – often due to the large number of pneumatic or hydraulic cylinders used. The cylinders often run continuously in order to keep the position or hold the load. With electric actuators, you do not need to waste any energy on holding a position or a load as these components are self locking. Electrak MD is designed to be energy efficient, resulting in a low current draw, and has a significantly lower

energy cost than a comparable pneumatic cylinder performing the same job. On CAN bus models, which require electricity in order to run the onboard electronics, a built-in sleep mode lowers the power consumption when idle.



## Applications - Smart Agriculture, Gardening and Landscaping

The roots of the Electrak® MD reside in our ongoing commitment to develop the highest-quality mobile off-highway actuators on the market. Smarter controls, lower energy consumption and stronger performance result in more efficient use of seed, water and fertilizers, more precise plowing, thinning and harvesting, and improved ergonomics, safety and fuel costs.



### **Precision Farming**

Smart actuators let you control functions more precisely, which translates to a better yield for the same or less amount of work. Reducing the use of fertilizers, seed and water also reduces costs and environmental impact. Being able to measure and record data in real time over a bus system allows you to adjust on the fly based on readings and historical data.

### **Cope with Mother Nature**

Electrak MD actuators are tested to withstand just about any conditions thrown at it. Tropical to sub-Arctic temperatures are no match, nor are water, dirt or any combination of the two. When it comes to chemicals, Electrak MD has been tested to endure the most common ones used in the agricultural business. At the end of the day, simply high-pressure wash the unit, and it will be good as new for the next day's work.

### Gardening and Landscaping

Gardening and landscaping place similar demands on actuators, however, the vehicles used are often smaller, lighter and quieter for use in residential areas. With its compact size, strength and robustness, Electrak MD fits perfectly into these vehicles, creating new application options for electric actuation.

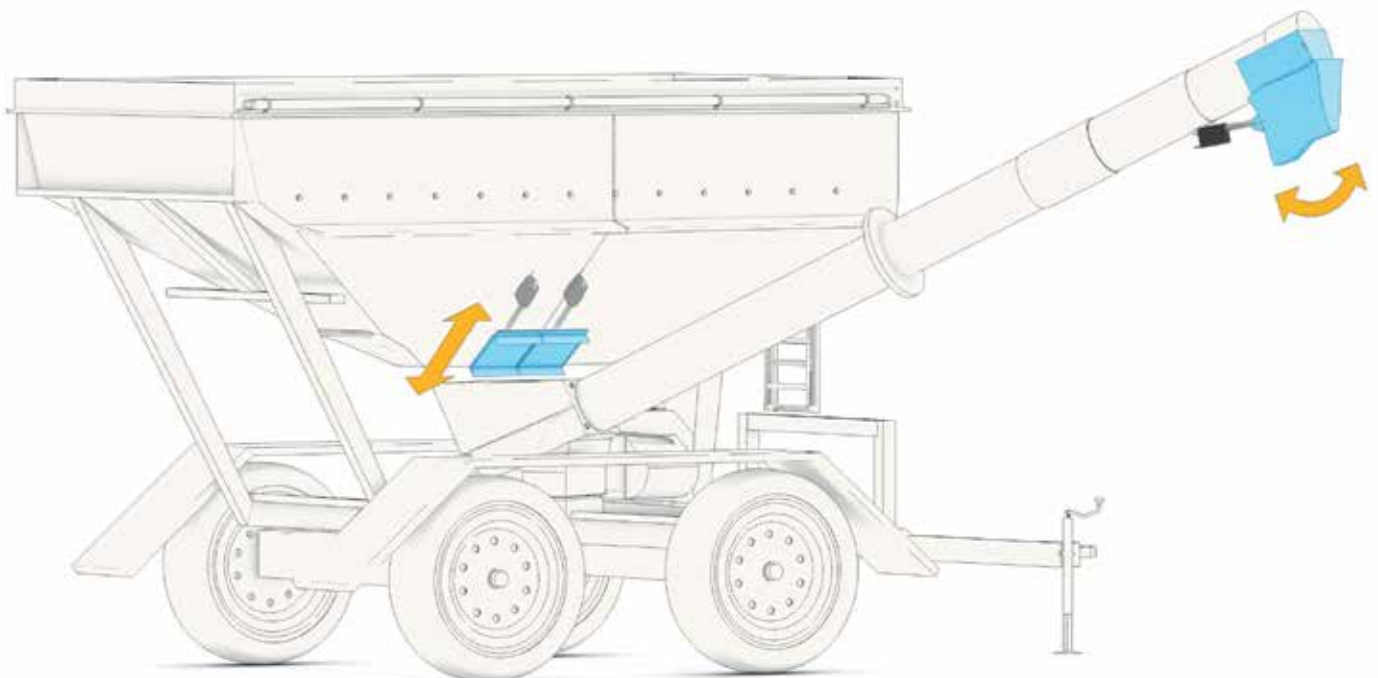
### Customization

Thomson has a long, successful history of actuator customization. Over the past several decades, we have made thousands of actuator adaptations, and the odds are good that we already have a solution in store for any customizations you may have in mind. Custom strokes and connectors are done routinely, but we can also offer customization on motors,

controls, control software, mounting brackets, supply voltages, test regimens or any combination you can imagine. In fact, many of our standard products have sprouted from custom projects that took on a life of their own.

### Thomson – the Mobile Off-Highway Expert

Thomson started manufacturing electric actuators in 1967, and from the beginning, they were designed to meet the demands from the mobile off-highway market. Since then, we have expanded and refined our actuator business, but 50+ years later, the mobile off-highway market remains a high priority for us. If our actuators can make it here, we are confident that they can make it anywhere.



## Technical Features



### Electrak® MD - the New Compact Electric Linear Actuator from Thomson

- Best-in-class power density
- Onboard electronics, including versions with J1939 CAN bus
- Suitable for pneumatic and hydraulic-to-electric application conversions
- Designed and tested to meet the toughest environmental demands
- Reliable and maintenance free

#### General Specifications

Screw type	acme
Nut type	lead
Manual override	no
Anti-rotation	yes
Static load holding brake	no (self-locking)
Electrical connections	cable with flying leads
Compliance	CE, RoHs, REACH, ISO 13766

#### Optional Features

Mechanical options	Multiple cable length options
	Alternative adapter orientation
Control options (see page 26)	End-of-stroke limit switches
	Analog position feedback
	Low-level signal motor switching
	J1939 CAN bus

#### Control Options Safety Features

Safety Feature	Control Option						
	XXX	XXP	EXX	EXP	LXX	LXP	CNO
Dynamic braking	no	no	yes	yes	yes	yes	yes
End-of-stroke protection	yes	yes	yes	yes	yes	yes	yes
Overload protection	no	no	yes	yes	yes	yes	yes
Temperature monitoring	no	no	yes	yes	yes	yes	yes
Temperature compensation	no	no	yes	yes	yes	yes	no
Voltage monitoring	no	no	yes	yes	yes	yes	yes
PWM voltage compatible	yes	yes	no	no	no	no	no

## Technical Specifications

Mechanical Specifications		
Max. static and dynamic load (Fx)	[N (lbs)]	
MDxxA025		250 (56)
MDxxA050		500 (112)
MDxxA100		1000 (225)
MDxxA200		2000 (450)
Speed @ no load/max. load	[mm/s (in/s)]	
MDxxA025		52/43.8 (2.04/1.72)
MDxxA050		28/18.5 (1.1/0.73)
MDxxA100		14.5/11 (0.57/0.43)
MDxxA200		7/5.4 (0.28/0.21)
Min. ordering stroke (S) length	[mm]	50
Max. ordering stroke (S) length	[mm]	300
Ordering stroke length increments	[mm]	50
Operating temperature limits	[°C (F)]	-40 – 85 (-40 – 185)
Full load duty cycle @ 25 °C (77 °F)	[%]	25
End play, maximum	[mm (in)]	1.2 (0.047)
Restraining torque	[Nm (lbs)]	0
Protection class - static		IP67/IP69K
Protection class - dynamic		IP66
Salt spray resistance	[h]	500

Electrical Specifications		
Available input voltages	[Vdc]	12, 24
Input voltage tolerance	[Vdc]	
MD12 (12 Vdc input voltage)		9 - 16
MD24 (24 Vdc input voltage)		18 - 32
Current draw @ no load/max. load	[A]	
MD12A025		1.2/5.2
MD24A025		0.6/2.6
MD12A050		1.4/6.2
MD24A050		0.7/3.1
MD12A100		1.2/5.2
MD24A100		0.6/2.6
MD12A200		1.4/6.2
MD24A200		0.7/3.1
Motor leads cross section	[mm <sup>2</sup> (AWG)]	0.75 (18)
Signal leads cross section	[mm <sup>2</sup> (AWG)]	0.35 (22)
Cable lengths, standard	[mm (in)]	300 (11.81) or 1000 (39.37)
Cable diameter	[mm (in)]	7.5 (0.3)

### Actuator Weight [kg (lb)]

Ordering Stroke (S) [mm]					
50	100	150	200	250	300
1.1 (2.4)	1.2 (2.6)	1.3 (2.8)	1.4 (3.1)	1.5 (3.3)	1.6 (3.5)

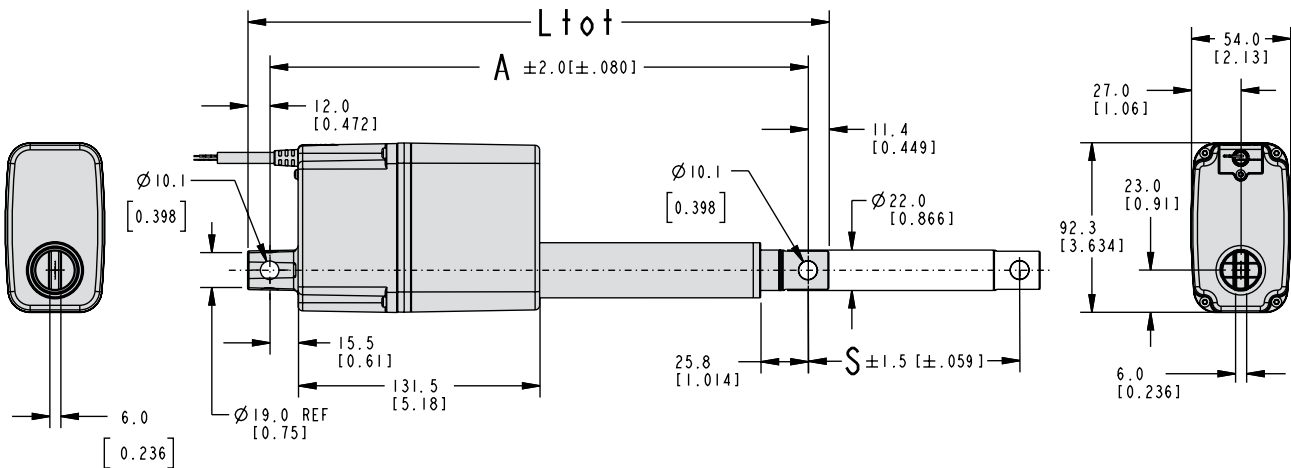
## How to Order

This ordering key provides a quick overview of the product versions available. It is important to consider many application details when selecting a product, including the loads, speeds and control options required, as well as the product environment and necessary accessories. To explore additional technical resources and options, contact Thomson customer support or visit [www.thomsonlinear.com/md](http://www.thomsonlinear.com/md).

Ordering Key								
1	2	3	4	5	6	7	8	9
<b>MD12</b>	<b>A025-</b>	<b>0300</b>	<b>XXX</b>	<b>2</b>	<b>N</b>	<b>N</b>	<b>S</b>	<b>D</b>
<p><b>1. Model and input voltage</b> MD12 = Electrak MD, 12 Vdc MD24 = Electrak MD, 24 Vdc</p> <p><b>2. Screw type, dynamic load capacity</b> A025- = acme screw, 250 N (56 lbs) A050- = acme screw, 500 N (112 lbs) A100- = acme screw, 1000 N (225 lbs) A200- = acme screw, 2000 N (450 lbs)</p> <p><b>3. Ordering stroke length <sup>(1)</sup></b> 0050 = 50 mm 0100 = 100 mm 0150 = 150 mm 0200 = 200 mm 0250 = 250 mm 0300 = 300 mm</p> <p><b>4. Electrak Modular Control System options</b> XXX = internal end-of-stroke limit switches XXP = XXX + analog (potentiometer) position output EXX = Electronic Monitoring Package EXP = EXX + analog (potentiometer) position output LXX = EXX + low-level signal motor switching LLX = LXX + end-of-stroke indication outputs LXP = LXX + analog (potentiometer) position output LLP = LXP + end-of-stroke indication outputs CNO = EXX + J1939 CAN bus + open-loop speed control</p>				<p><b>5. Harness option</b> 1 = 0.3 m long cable with flying leads 2 = 1 m long cable with flying leads</p> <p><b>6. Rear adapter option</b> N = forked cross hole for 10 mm pin</p> <p><b>7. Front adapter option</b> N = forked cross hole for 10 mm pin</p> <p><b>8. Adapter orientation</b> S = standard M = 90 ° turned</p> <p><b>9. Connector option</b> D = flying leads</p> <p>(1) Other stroke lengths available upon request. Please contact customer support.</p>				

# Dimensions

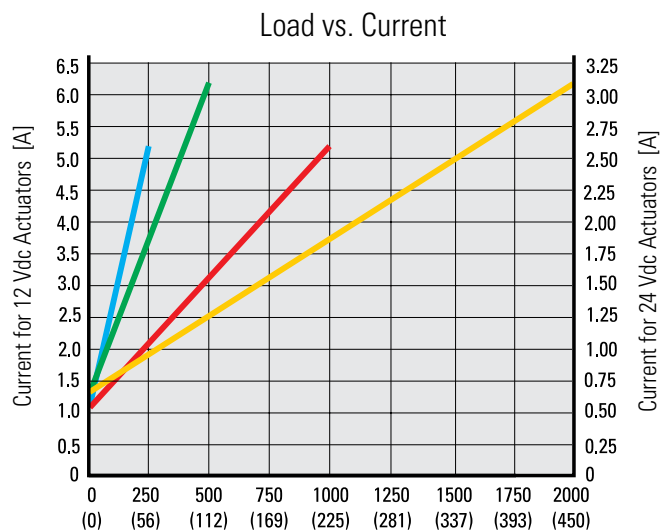
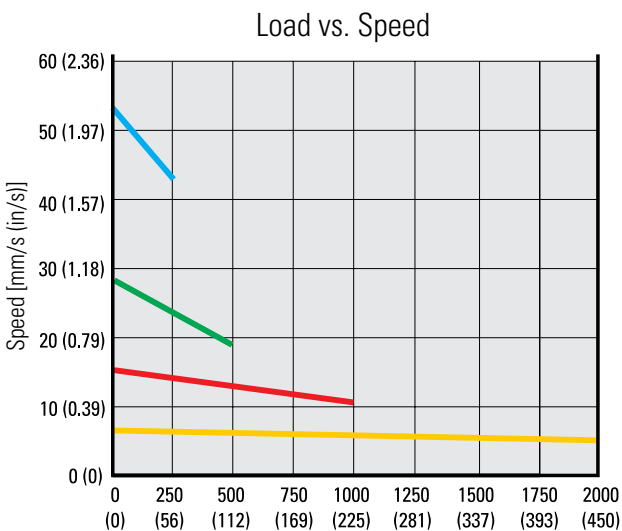
Dimensions	Projection
mm [inch]	



Note: All adapters shown in the standard orientation.

Ordering Stroke (S), Total Length (L <sub>tot</sub> ) and Retracted Length (A) Relationships		
Standard Ordering Strokes (S)	[mm]	50, 100, 150, 200, 250, 300
Total Length (L <sub>tot</sub> )	[mm]	L <sub>tot</sub> = A + 23.4
Retracted Length (A)	[mm]	A = S + 133.2

# Performance Diagrams



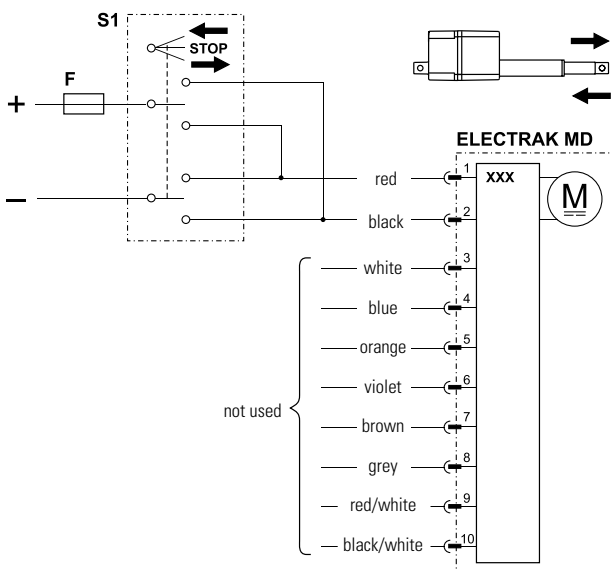
Dynamic Load Capacity

- 250 N (56 lbs)
- 500 N (112 lbs)
- 1000 N (225 lbs)
- 2000 N (450 lbs)

Note! Curves were generated at an ambient temperature of 21°C (70°F). Different ambient temperature and individual actuator characteristics can produce slightly different values.

## Control Options

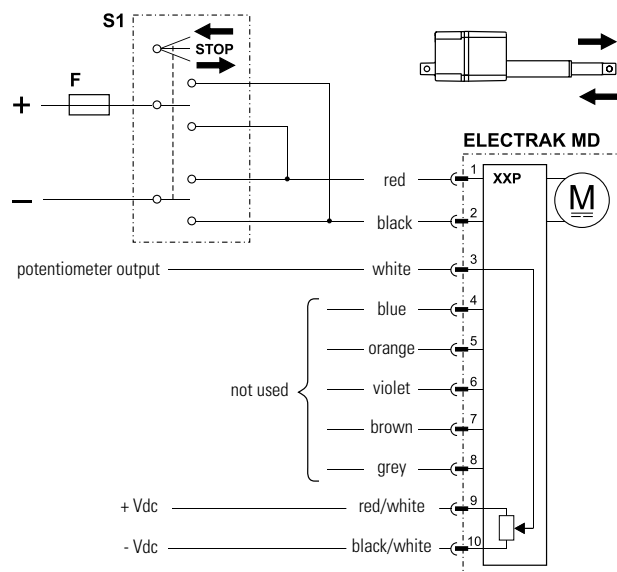
Control Option Type XXX		
Actuator supply voltage	[Vdc]	
MD12		9 - 16
MD24		18 - 32
Actuator current draw	[A]	see page 23



F Fuse  
S1 Double pole double throw switch

With control option XXX, the polarity of the motor voltage is switched by a customer-supplied switch (switch, relay, etc.) to make the actuator extend or retract. The actuator will automatically stop when reaching the ends of stroke due to the built-in end-of-stroke limit switches. The switch, power supply, wiring and all other components must be able to handle the motor current for the actuator model and load being used, as well as the inrush current (up to three times the max. continuous current for the max. load being used for up to 150 milliseconds).

Control Option Type XXP		
Actuator supply voltage	[Vdc]	
MD12		9 - 16
MD24		18 - 32
Actuator current draw	[A]	see page 23
Potentiometer type		wire-wound
Potentiometer max. input voltage	[Vdc]	32
Potentiometer max. power	[W]	1
Potentiometer linearity	[%]	± 0.25
Potentiometer output resolution	[ohm/mm]	
MDxxA025, all strokes		16.67
MDxxA100, all strokes		16.67
MDxxA050, 50 - 250 mm stroke		33.33
MDxxA200, 50 - 250 mm stroke		33.33
MDxxA050, 300 mm stroke		16.67
MDxxA200, 300 mm stroke		16.67



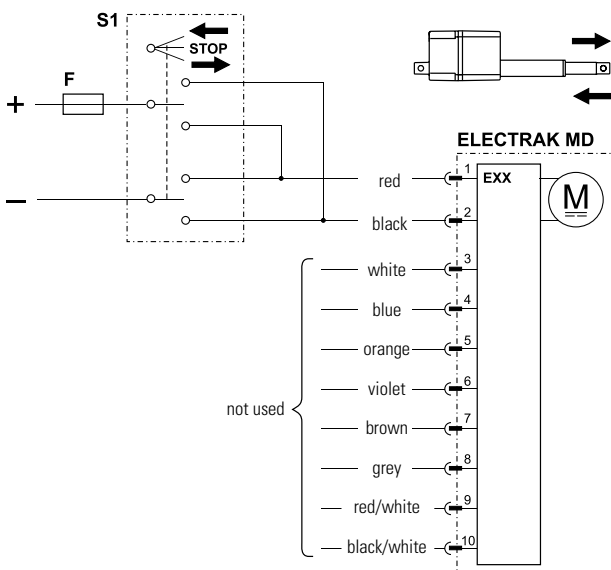
F Fuse  
S1 Double pole double throw switch

Control option XXP works as option XXX but also has an analog (potentiometer) output that will provide feedback on the extension tube position.



### Control Option Type EXX

Actuator supply voltage	[Vdc]	
MD12		9 - 16
MD24		18 - 32
Actuator current draw	[A]	see page 23

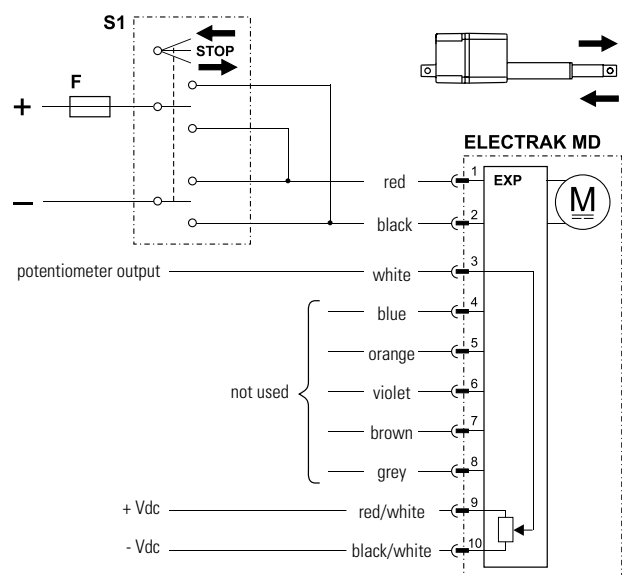


F Fuse  
S1 Double pole double throw switch

Control option EXX contains all of the basic Electronic Monitoring Package features described on page six, guaranteeing safe operation of the actuator and equipment. With control option EXX, the polarity of the motor voltage is switched by a customer-supplied switch (switch, relay, etc.) to make the actuator extend or retract. The switch, power supply, wiring and all other components must be able to handle the motor current for the actuator model and load being used, as well as the inrush current (up to three times the max. continuous current for the max. load being used for up to 150 milliseconds).

### Control Option Type EXP

Actuator supply voltage	[Vdc]	
MD12		9 - 16
MD24		18 - 32
Actuator current draw	[A]	see page 23
Potentiometer type		wire-wound
Potentiometer max. input voltage	[Vdc]	32
Potentiometer max. power	[W]	1
Potentiometer linearity	[%]	± 0.25
Potentiometer output resolution	[ohm/mm]	
MDxxA025, all strokes		16.67
MDxxA100, all strokes		16.67
MDxxA050, 50 - 250 mm stroke		33.33
MDxxA200, 50 - 250 mm stroke		33.33
MDxxA050, 300 mm stroke		16.67
MDxxA200, 300 mm stroke		16.67

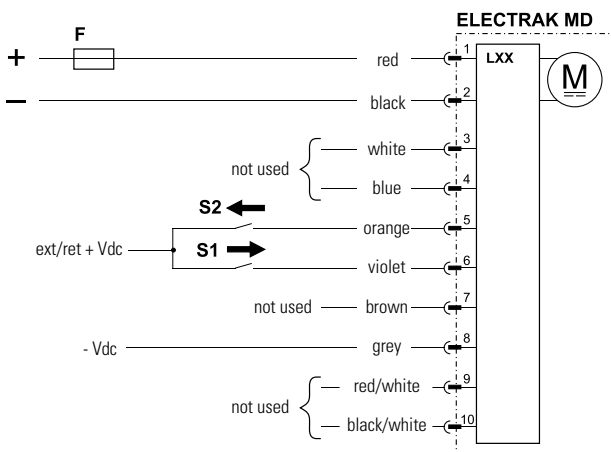
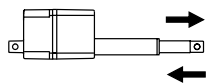


F Fuse  
S1 Double pole double throw switch

Control option EXP works as option EXX but also has an analog (potentiometer) output that will provide feedback on the extension tube position.

## Control Options

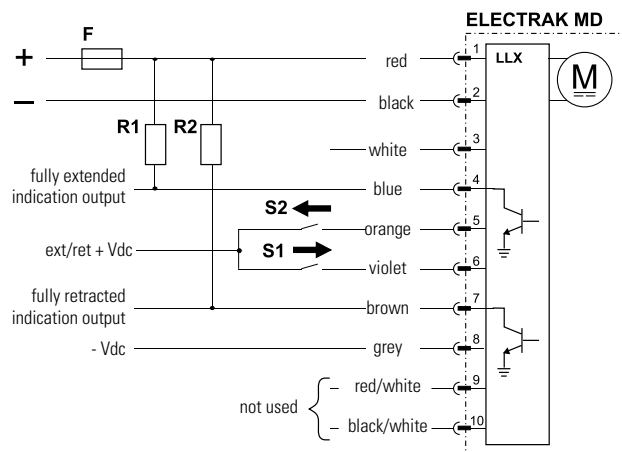
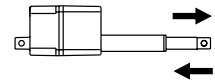
Control Option Type LXX		
Actuator supply voltage	[Vdc]	9 - 16 MD12 MD24
Actuator current draw	[A]	see page 23
Extend / retract input voltage	[Vdc]	9 - 32
Extend / retract input current	[mA]	6 - 22



- F Fuse
- S1 Extend switch
- S2 Retract switch

Control option LXX has all the basic Electronic Monitoring Package features included in control option EXX, but the polarity of the motor voltage is switched by the onboard electronics instead. The customer-supplied switches used to command the actuator to extend or retract only need to handle low-level signals. However, the power supply and wiring that supply the actuator must be able to handle the motor current for the actuator model and load being used, as well as the inrush current (up to one and a half times the max. continuous current for the max. load being used for up to 150 milliseconds).

Control Option Type LLX		
Actuator supply voltage	[Vdc]	9 - 16 MD12 MD24
Actuator current draw	[A]	see page 23
Extend / retract input voltage	[Vdc]	9 - 32
Extend / retract input current	[mA]	6 - 22
End-of-stroke outputs max. voltage	[Vdc]	32
End-of-stroke outputs max. current	[mA]	25

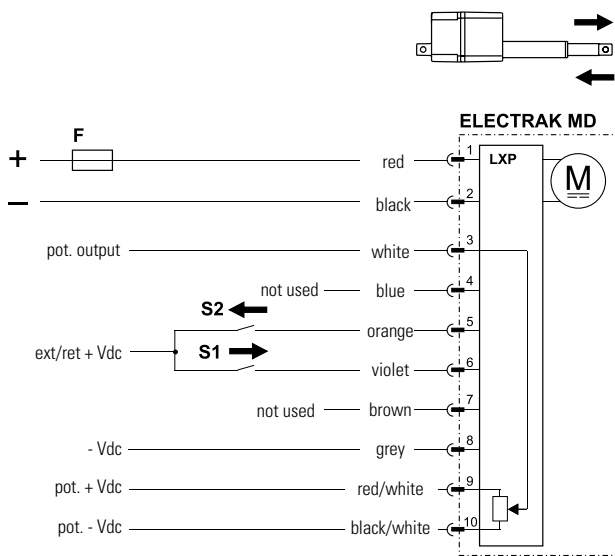


- F Fuse
- S1 Extend switch
- S2 Retract switch
- R1 Pull-up resistor
- R2 Pull-up resistor

Control option LLX works as option LXX but also has two end-of-stroke indication outputs that will signal when the actuator is fully extended or fully retracted. Since these outputs are current sinking open collector outputs, they will each require an external pull-up resistor to operate effectively.

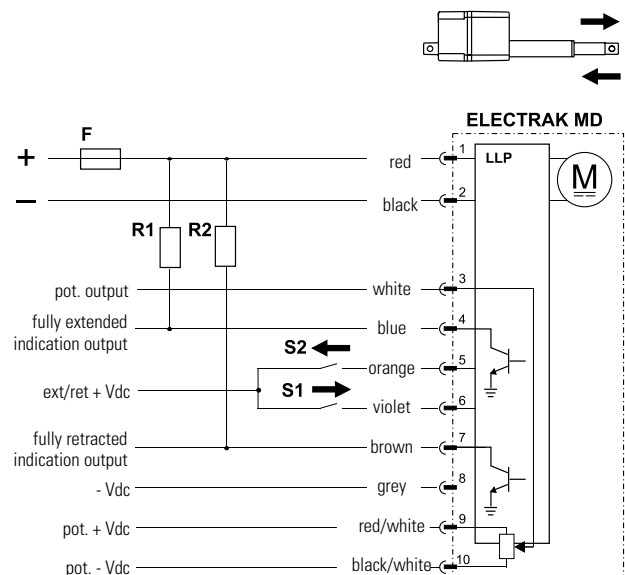
Control Option Type LXP		
Actuator supply voltage	[Vdc]	9 - 16 18 - 32
Actuator current draw	[A]	see page 23
Potentiometer type		wire-wound
Potentiometer max. input voltage	[Vdc]	32
Potentiometer max. power	[W]	1
Potentiometer linearity	[%]	± 0.25
Potentiometer output resolution	[ohm/mm]	
MDxxA025, all strokes		16.67
MDxxA100, all strokes		16.67
MDxxA050, 50 - 250 mm stroke		33.33
MDxxA200, 50 - 250 mm stroke		33.33
MDxxA050, 300 mm stroke		16.67
MDxxA200, 300 mm stroke		16.67
Extend / retract input voltage	[Vdc]	9 - 32
Extend / retract input current	[mA]	6 - 22

Control Option Type LLP		
Actuator supply voltage	[Vdc]	9 - 16 18 - 32
Actuator current draw	[A]	see page 23
Potentiometer type		wire-wound
Potentiometer max. input voltage	[Vdc]	32
Potentiometer max. power	[W]	1
Potentiometer linearity	[%]	± 0.25
Potentiometer output resolution	[ohm/mm]	
MDxxA025, all strokes		16.67
MDxxA100, all strokes		16.67
MDxxA050, 50 - 250 mm stroke		33.33
MDxxA200, 50 - 250 mm stroke		33.33
MDxxA050, 300 mm stroke		16.67
MDxxA200, 300 mm stroke		16.67
Extend / retract input voltage	[Vdc]	9 - 32
Extend / retract input current	[mA]	6 - 22
End-of-stroke outputs max. voltage	[Vdc]	32
End-of-stroke outputs max. current	[mA]	25



- F Fuse
- S1 Extend switch
- S2 Retract switch

Control option LXP works as option LXX but also has an analog (potentiometer) output that will provide feedback on the extension tube position.

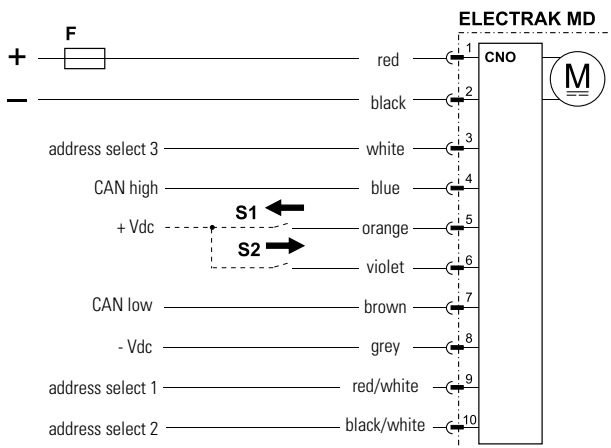
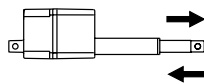


- F Fuse
- S1 Extend switch
- S2 Retract switch
- R1 Pull-up resistor
- R2 Pull-up resistor

Control option LLP works as option LLX but also has an analog (potentiometer) output that will provide feedback on the extension tube position.

# Control Options

Control Option Type CNO		
Actuator supply voltage	[Vdc]	
MD12		9 - 16
MD24		18 - 32
Actuator current draw	[A]	see page 23
Command data includes:		
<ul style="list-style-type: none"> <li>• position</li> <li>• speed</li> <li>• current</li> </ul>		
Feedback data includes:		
<ul style="list-style-type: none"> <li>• position</li> <li>• speed</li> <li>• current</li> <li>• other diagnostic information</li> </ul>		
Manual extension/retraction input voltage	[Vdc]	9 - 32
Manual extension/retraction input current	[mA]	6 - 22



- F Fuse
- S1 Manual extension switch (optional)
- S2 Manual retraction switch (optional)

Control option CNO has a J1939 CAN bus control interface. Extend and retract commands are sent via CAN messages on the CAN low and CAN high pins. Address select 1, 2 and 3 pins can be used as a binary encoded decimal (BCD) address to the default address. This can be used when multiple CAN actuators are on a single bus. The actuator can be manually forced to extend or retract by using pin 6 (violet wire) and 5 (orange wire).

## Online Resources

Thomson offers a wide variety of online tools to help you in the sizing and selection process. An experienced team of engineers is also available to help size and select an Electrak<sup>®</sup> MD model to best fit your application needs. To explore additional technical resources and options, contact customer support at [www.thomsonlinear.com/cs](http://www.thomsonlinear.com/cs).

### Electrak MD and HD Website

Get additional information and learn more about Electrak MD on this content-rich site. [www.thomsonlinear.com/md](http://www.thomsonlinear.com/md)



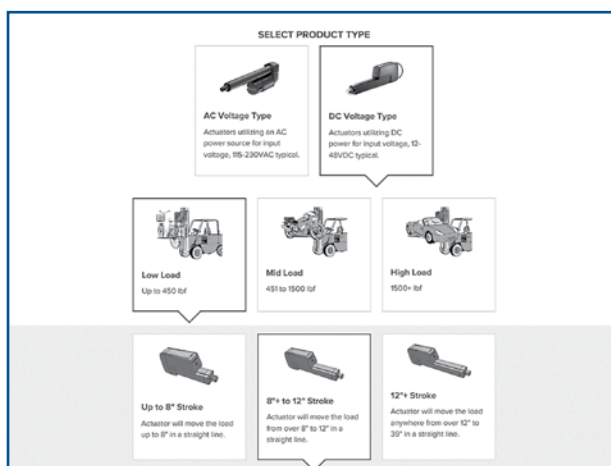
### Interactive 3D CAD Models

Download free interactive 3D CAD models in the most common CAD formats. [www.thomsonlinear.com/en/products/linear-actuators-drawings](http://www.thomsonlinear.com/en/products/linear-actuators-drawings)



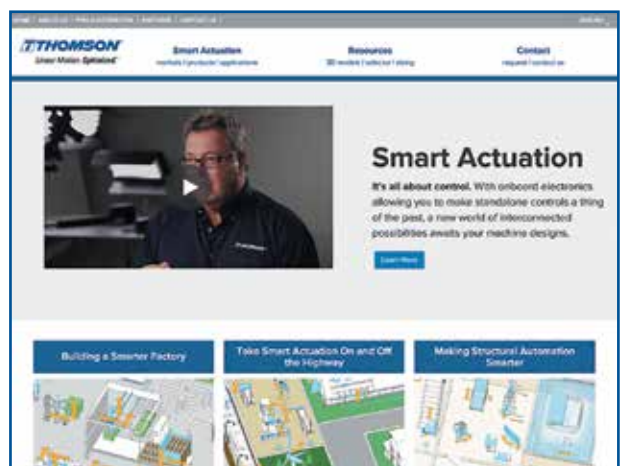
### Product Selector

The product selector will walk you through the selection process. [www.thomsonlinear.com/en/products/linear-actuators-products](http://www.thomsonlinear.com/en/products/linear-actuators-products)



### Smart Actuators Website

Learn more about smart actuators and how they can help you build more intelligent machines at: [www.thomsonlinear.com/smart](http://www.thomsonlinear.com/smart)



## Online Sizing and Selection Tool

Thomson LinearMotioneering® for Linear Actuators is a self-service, online sizing and selection tool that saves you time and cost, and helps avoid misapplication. It allows you to quickly and accurately find your ideal solution by completing a self-guided, interactive series of questions that taps into the extensive application engineering knowledge base of Thomson experts.

LinearMotioneering is an easy-to-use, step-by-step tool that gathers all necessary information and then presents you with suitable solutions. Once the best candidate among the options is defined, LinearMotioneering will let you download all of the technical data and a 3D CAD model of the selected actuator, show you the cost and delivery time, and even let you purchase it from the Thomson online store.

### Your Own Project Library

All of your projects are stored in your own library so you can return and continue working on them

or use an old project as the basis for a new one. Since projects are stored online, you can open them from any computer, mobile phone or tablet - from anywhere in the world

### Help with Custom Solutions

If LinearMotioneering can't find a suitable actuator for your project, you have the option to ask for a custom solution. The tool will ask for the necessary data so that our engineers can have a look and help you get what you need.

The screenshot shows the Thomson Linear Motioneering website interface. At the top, there is a navigation bar with links for HOME, ABOUT US, FIND A DISTRIBUTOR, NEWSROOM, PARTNERS, CONTACT US, and REGION: EUROPE. There are also links for SETTINGS, LOGIN, and a language dropdown set to English. Below the navigation bar is the Thomson logo and the tagline "Linear Motion. Optimized.". The main header area includes "Home", "learn more", "support", and "my projects" links. The main content area is titled "Linear MOTIONEERING® LINEAR ACTUATORS" and "Size and Select Your System". A breadcrumb trail reads: START > SIZING & SELECTION > SOLUTIONS COMPARISON > OPTIONS & ACCESSORIES > BILL OF MATERIAL. Below the breadcrumb trail are buttons for "Back", "Reset", "Save Project", and "Continue". The main form is titled "Step 1 - Fundamentals" and contains several input fields: "Dynamic Force" (Max. required push/pull force at motion [N], Min: 0 N, Max: 20000 N), "Static Force" (Max. required holding force at stand still [N], Min: 0 N, Max: 20000 N), "Max. Stroke Length" (Max. required stroke [mm], Min: 0 mm, Max: 1500 mm), and "Actuator Supply Voltage" (a dropdown menu). There are also radio button options for "Environmental Conditions (select best match)": Standard Factory – IP55, Outdoors – IP65, High Dirt and Dust Exposure – IP6x, Washdown – IPx6, and High Temperature and Pressure Washdown – IP69K. On the right side of the form, there are two buttons: "Solutions Based on Application Type" and "Solutions by Family", both with "Continue" buttons. At the bottom right, there is a "Request for Custom Quotation" button.

**Need help sizing and selecting the ideal linear actuator?**  
**Please visit: [www.linearactuators.linearmotioneering.com](http://www.linearactuators.linearmotioneering.com)**

## Frequently Asked Questions

### What is the typical life of an actuator?

Life is a function of load and stroke length. Please contact customer support for more information.

### What are the most common reasons for premature actuator failure?

Side load due to incorrect mounting, shock loading, exceeding the duty cycle and incorrect wiring are the most prominent causes for premature failure.

### Is Electrak® MD maintenance free?

Yes. Electrak MD never requires lubrication, maintenance or adjustment for wear.

### What are IP ratings?

Ingress Protection (IP) ratings are commonly referenced standards that classify electrical equipment using standard tests to determine resistance to ingress of solid objects (first digit) and liquids (second digit). See the IP Ratings table below.

### Is Electrak MD suitable for tough environments such as washdown or extreme temperatures?

Yes. Electrak MD actuators are designed for washdown and have passed 500 hours of salt spray tests. They can operate in temperatures ranging from -40°C to +85°C (-40°F to +185°F).

### How is the duty cycle determined?

The duty cycle = on time / on time + off time. For example, if Electrak MD is powered for 15 seconds and then off for 45 seconds, the duty cycle for that minute would be 25%. All models are rated to 25% at full load, and an ambient temperature of 25°C (77°F). If load and/or ambient temperature are lower, then the duty cycle can exceed 25%. At higher temperatures, the duty cycle will be lower.

### Can Electrak MD be side loaded?

No. A proper design of the application should eliminate any side loads.

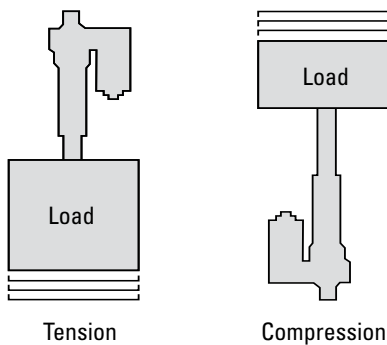
IP Rating (EN60529)		
Code	First Digit Definition	Second Digit Definition
0	No protection.	No protection.
1	Protected against solid objects over 50 mm.	Protected against vertically falling drops of water.
2	Protected against solid objects over 12.5 mm.	Protected against vertically falling drops of water, if the case is disposed up to 15° from vertical.
3	Protected against solid objects over 2.5 mm.	Protected against vertically falling drops of water, if the case is disposed up to 60° from vertical.
4	Protected against solid objects over 1 mm.	Protected against splash water from any direction.
5	Limited protection against dust ingress (no harmful deposits).	Protected against low-pressure water jets from any direction. Limited ingress permitted.
6	Totally dust protected.	Protected against high-pressure water jets from any direction. Limited ingress permitted.
7	–	Protected against short periods of immersion in water.
8	–	Protected against long, durable periods of immersion in water.
9K	–	Protected against close-range, high-pressure and high-temperature spray downs.

### Is it possible for a load to back-drive the extension tube?

The acme screw used is self locking up to max. static load. Higher static load may result in damage and back driving.

### What is the difference between a tension and a compression load?

A tension load tries to stretch the actuator, while a compression load tries to compress it. With bi-directional loads, the end play of the actuator extension tube may need to be taken into consideration when using the actuator for positioning tasks.



### What is the range of input voltage an Electrak® MD can operate with?

A 12 Vdc version will accept 9 – 16 Vdc, while a 24 Vdc version will accept 18 – 32 Vdc. Outside of these limits, the actuator will be prevented from operating if it is equipped with the Electronic Monitoring Package. Actuators without the Electronic Monitoring Package should not be operated outside of these limits as that may cause erratic operation and permanent failure to the actuator.

### Can the speed of an Electrak MD be adjusted by changing the input voltage?

If the actuator is equipped with the Electronic Monitoring Package, then as long as the input voltage is within the acceptable limits, the Electrak MD will keep the correct speed for the load in question. If it is not equipped with the Electronic Monitoring Package, then it is possible as long as the voltage is within the acceptable input voltage limits.

### What is the inrush current?

The inrush current is a short current peak that appears at the start of an actuator as the motor tries to get the load moving. Typically, the inrush current will last between 75 - 150 milliseconds and can be up to three times higher (on a low-level switched actuator 1.5 times higher) than the current for the actuator and load. Batteries have no problem delivering the inrush current, but if using an AC power supply, it is important to size it to handle the inrush current.

### What special mounting considerations does the Electrak MD require?

There is no restraining torque that needs to be considered as Electrak MD is internally restrained. However, the actuator must be mounted so that there are no side loads acting on the extension tube.

### What is the maximum extension speed?

The extension speed of an Electrak MD actuator is a function of the load. To determine the speed at a certain load, consult the load vs. speed charts on page 25. If a higher linear travel speed is required, a simple mechanical linkage can be employed.



## Thomson Smart Actuators

The full range of Thomson smart electric linear actuators feature integrated onboard electronics, which enables enhanced control functions that were previously external, such as power switching, position feedback and system diagnostics, without the need for an external control. This allows engineers to quickly and easily design compact, intelligent and powerful actuator systems that can act on their own or communicate with each other or over remote networks.



The Thomson range of smart actuators (from left to right):  
Electrak® Throttle, Electrak HD and Electrak MD

**Learn about smart actuators at: [www.thomsonlinear.com/smart](http://www.thomsonlinear.com/smart)**





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