

TECHLINE<sup>®</sup>  
IMPROVING FLEXIBILITY

# Focus on Wind Turbines

[LINAK.COM/TECHLINE](http://LINAK.COM/TECHLINE)  
[WIND-AUTOMATION.COM](http://WIND-AUTOMATION.COM)

**LINAK<sup>®</sup>**   
WE IMPROVE YOUR LIFE



# Improving energy efficiency

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Global warming and the drive to minimise greenhouse gas emissions has put the focus on how to make the most of natural energy sources. The sun and the wind are freely available almost everywhere in the world and electric actuators can help improve the exploitation and efficiency of these sustainable sources of energy.

## Why wind turbine automation

Wind turbines are mostly located in rural hard-to-reach areas. Offshore wind turbines are such an example. Placed in the middle of the sea, operation stability and ease of maintenance becomes important parameters to keep cost down and efficiency up. The well-proven reliability and long maintenance-free lifetime of LINAK® actuators even under extremely rough conditions make them particularly well-suited for wind turbines.

Compared to a hydraulic solution an electric actuator system has some advantages. They:

- are user-friendly
- are environmentally safe - no leak from oil
- have built-in electrical feedback
- take up less space in the nacelle
- have lower total cost, no pipes and pumps, only cables

LINAK has been a supplier to the wind turbine industry for the past 15 years. As a result, the company possesses a deep pool of knowledge about wind turbines and how they are designed and built. Based on specific applications, with which we have enjoyed great success, and on the basis of numerous studies, LINAK is in a position to take on the role as your knowledgeable partner.

*Intelligent actuators from LINAK help open access gates, hatches and lubrication systems on wind turbines and ensure safety around brakes, locks and ventilation.*

LINAK offers service  
worldwide

Please contact your local LINAK office with  
your enquiry



# A world of movement & opportunities for big wind turbines

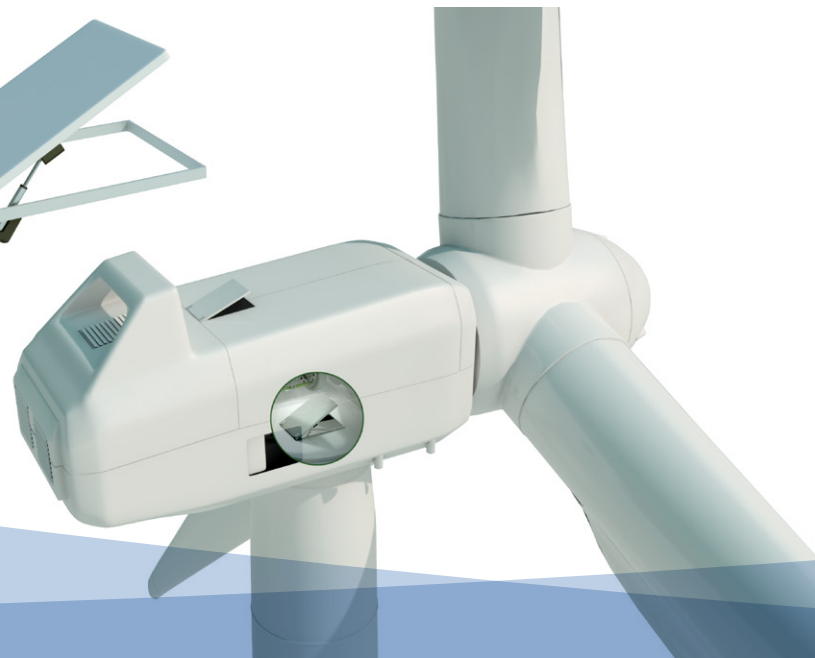
LINAK® knows the market, and LINAK knows the opportunities wind turbine manufacturers have for using LINAK solutions.

In cooperation with our customers we have developed solutions for service situations with automatic opening of all sorts of access gates, hatches and emergency lubricating systems. Electric actuators are also used for a number of safety applications like rotor brakes, rotor locks, wing locks and ventilation systems in both the nacelle and the transformer unit.

## Access hatch

Hatches that are opened electrically provide fitters and technicians with easier access.

At the same time, it can be a safety precaution to avoid unintended access.





### Rotor lock

The actuator solution is very powerful, and therefore very suitable for rotor lock applications. The service technicians can lock the rotor electrically.

### Natural ventilation/cooling

LINAK actuator solutions ensure natural ventilation of the nacelle to keep the usage of the costly air cooling system at a minimum. By means of sensors the hatches will be closed if it snows or rains. A variety of feedback systems can be mounted on the actuator to make sure that the wind turbine control systems know whether the systems are on or off.

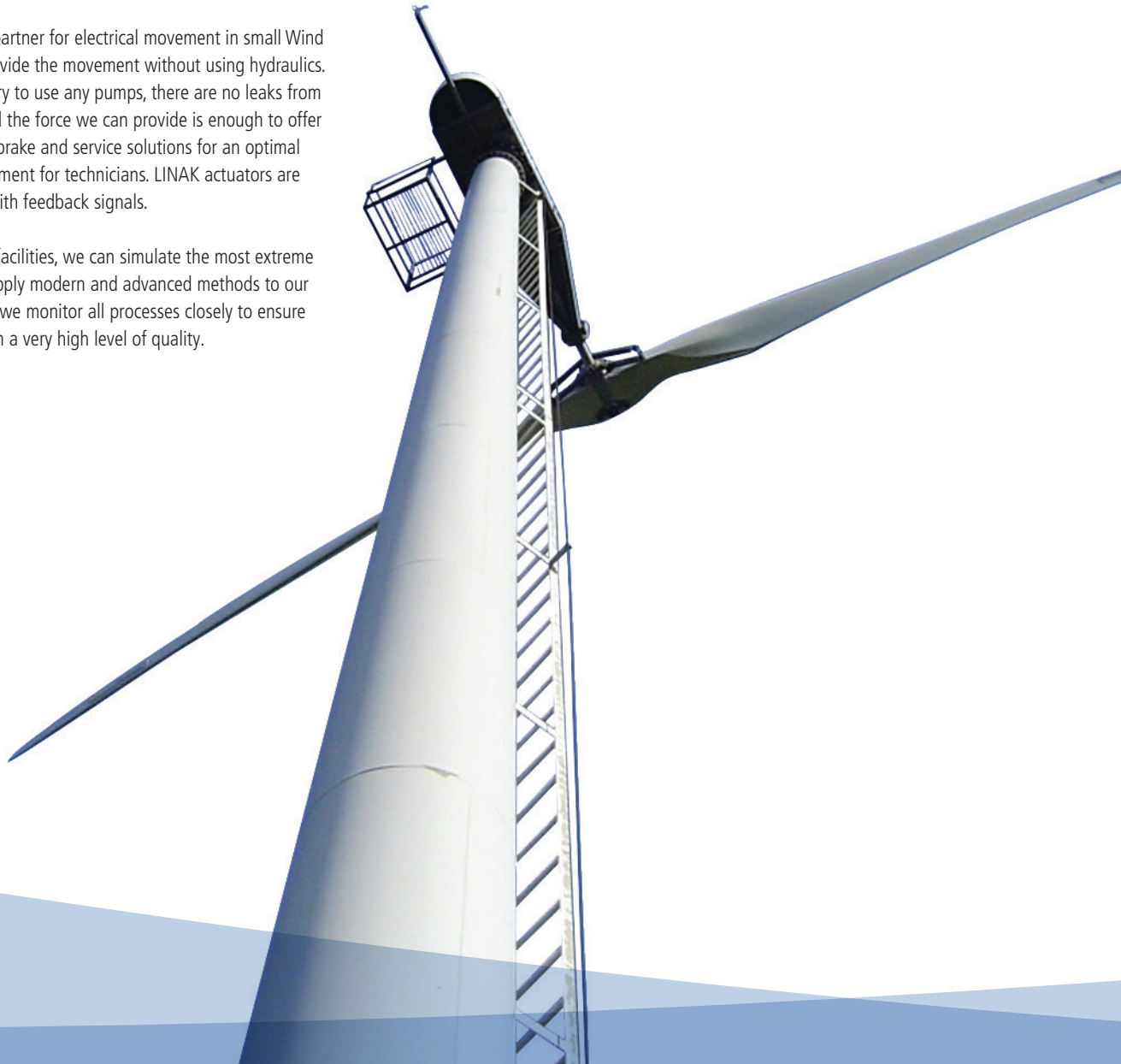


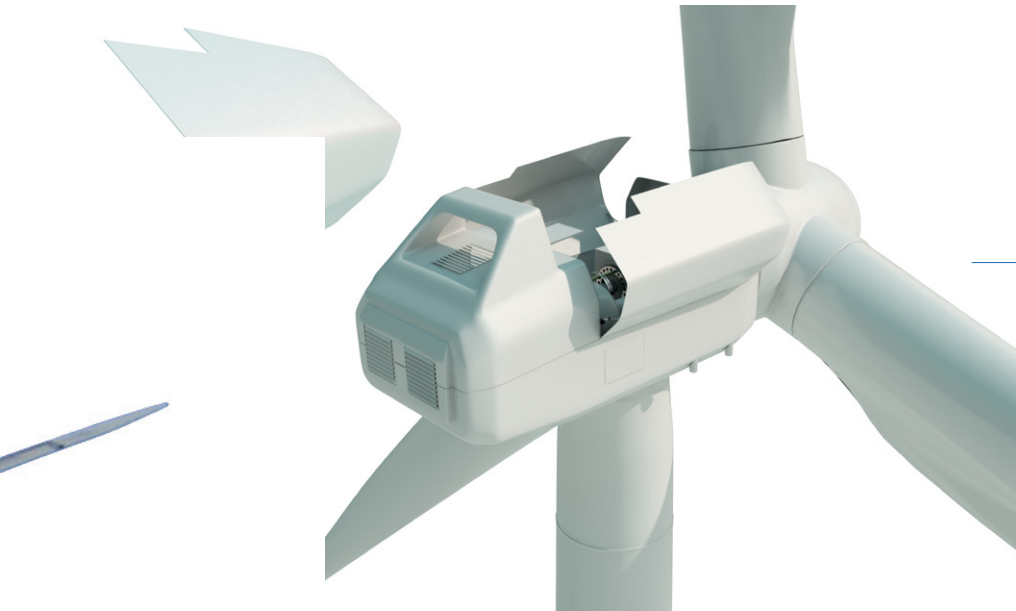
# LINAK the perfect partner

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LINAK® is your partner for electrical movement in small Wind Turbines. We provide the movement without using hydraulics. It is not necessary to use any pumps, there are no leaks from hydraulic oil, and the force we can provide is enough to offer reliable control, brake and service solutions for an optimal working environment for technicians. LINAK actuators are also equipped with feedback signals.

In our own test facilities, we can simulate the most extreme situations. We apply modern and advanced methods to our production, and we monitor all processes closely to ensure that we maintain a very high level of quality.



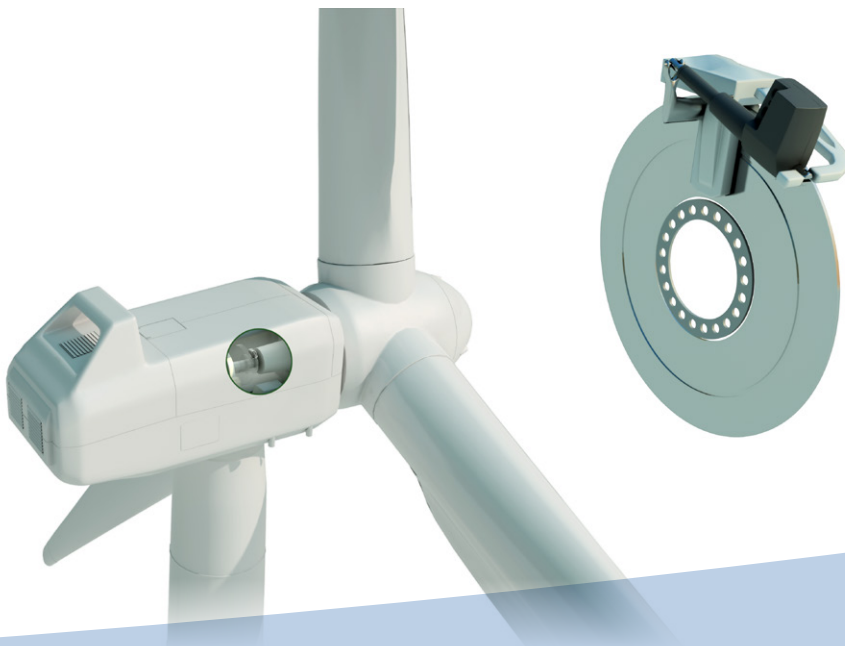


### Service hatch

Hatches that are opened electrically provide fitters and technicians with easier access.

At the same time, it can be a safety precaution to avoid unintended access.

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### Brake

They ensure a good and stable breaking of the Wind Turbine.

Signal transmitters can provide feedback as to whether the brake is activated or not.

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# Explore the rich technology behind actuators

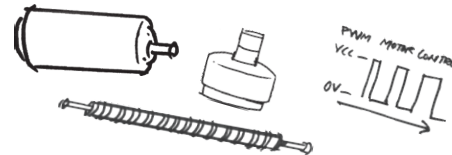
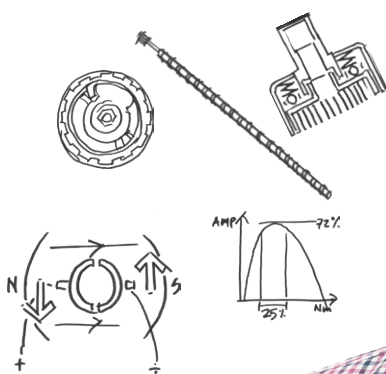


At the Actuator Academy™, you will find a library of videos and information about actuator components, actuator testing, and intelligent actuator control.

Find out what you should expect of a good industrial actuator, what affects its performance and efficiency, and how to best utilise your linear motion actuator.

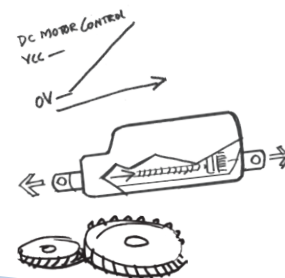
We hope to inspire you and ultimately make you wiser on the moving electric revolution we are all part of.

**Happy exploring!**

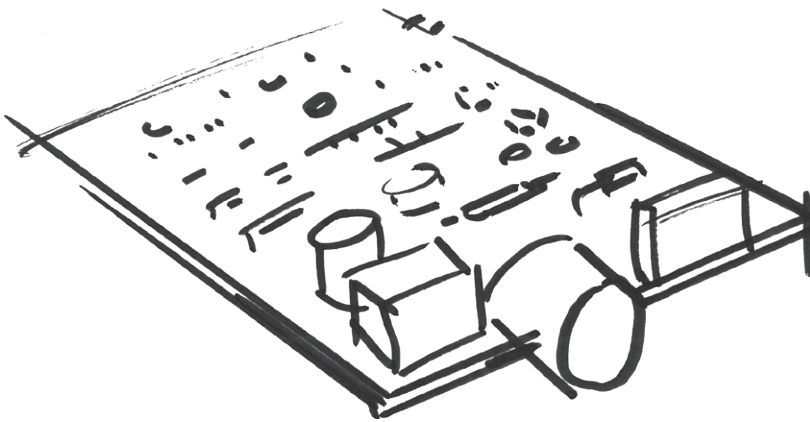


Check out the  
Actuator Academy

[LINAK.COM/  
ACTUATOR-ACADEMY](http://LINAK.COM/ACTUATOR-ACADEMY)



# Smart movement for wind turbines



A LINAK® IC actuator with built-in controller reduces the number of external components and the need for a third-party supplier for power electronics.

It also offers a comprehensive range of interfaces and gives you access to productivity enhancing data - all delivered by a single supplier you can trust.

By helping you move smarter at every stage of your application process, from development, installation and integration to tailored movement and improved productivity, our IC actuators add value across the board.

## IC INTEGRATED CONTROLLER™

Choosing an IC actuator for your application is a smart move in many ways:

- Reduced complexity for faster development and production
- Flexible integration with a variety of industrial interfaces
- Data monitoring that minimise downtime and boost productivity
- Benefit from one single supplier



For more information on IC, please visit [LINAK.COM](http://LINAK.COM) or scan the QR code.

# Actuators for wind turbines

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LINAK® industrial actuators offer a versatile array of movement solutions for wind turbines.

With **thrusts up to 15,000 N, max speeds up to 160 mm/s, and strokes between 20 and 999 mm**, the actuators are highly adaptable for a wide variety of applications.

Industrial actuators with **heavy-duty aluminium housings** are very suitable for use in corrosive environments. Having been thoroughly salt spray and chemical resistance tested and approved for ratings up to **IP66 and IP69K static**, these actuators will work reliably for years, even when exposed to salt, water, wind, and sun.

**Operating temperatures between -40°C to +85°C** make them fit for work in numerous settings.

Actuator LA37



Actuator LA36



Actuator LA35



Actuator LA33



Actuator LA25



Actuator LA14



Actuator LA12



## Robust and powerful

LINAK® products are reliable products, made to last! High quality is the trademark of LINAK, and an element of the highest importance to us.

# Accessories for wind turbines

## Motor controller TR-EM-208 - Complete control

- Variable power supply 12-35 V DC
  - Overload protection - adjustable current limit 1-20 A
  - Adjustable soft start and stop
  - Integrated brake
- (\*)



## Rocker switch - easy operation

- For all actuators with limit switches
  - Easy operation of actuators without use of further electronics
  - IP66 for outdoor use
  - Easy to install
  - Tested with an LA36 12 V DC for 50,000 operations
- (\*)



## Bellow - protective

- Gives a better protection and therefore an increased lifetime of the actuator
- Protects the inner tube against dust and dirt
- Can be used for the actuators: LA22, LA28, LA30 and LA32
- Does not influence the the IP rating
- Available in black

(\*)



## LSD for LA30

- Individually adjustable microswitches
- Weather resistant design in anodised aluminium, rubber and stainless steel
- The microswitches cut off the current to the motor in end position and have diodes for return stroke
- The LSD system is factory installed
- Storage temperature: -40°C to +70°C



(\*) "The specified product is a third party product that is produced by third party and distributed by LINAK as a supplement to LINAK's existing product range. It is the responsibility of the product user to determine the suitability of the product for a specific application. LINAK will at point of delivery replace/repair defective products covered by the warranty if promptly returned to LINAK."

If you use IC there is no need for these accessories!

# Testing programme

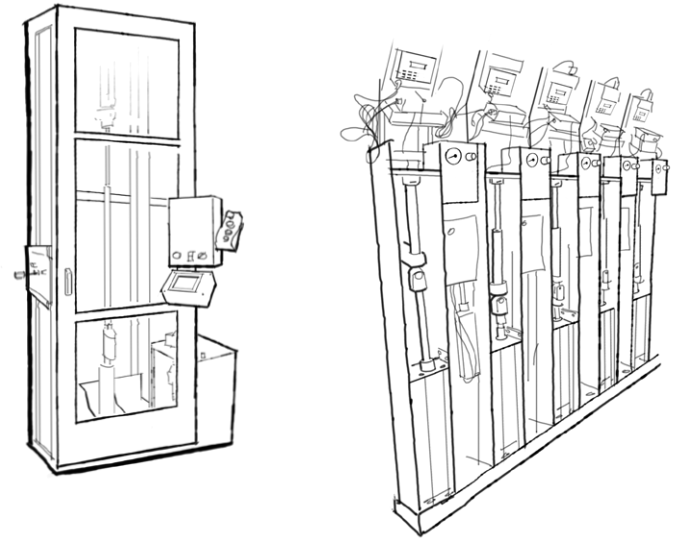
In each industrial application, the actuator is just one component of many, but at LINAK® we fully appreciate that it is of utmost importance to you and your customers. Not a single actuator leaves the factory until it has undergone a 100% function test.

Depending on the actuator type, various tests have been carried through. Please consult your local LINAK office or take a look at the actuator data sheet in question to get a thorough test overview.

This is your guarantee that a solution based on LINAK TECHLINE electric actuator systems is a solution that will work reliably for years and years.

“Our actuators must never malfunction. Therefore, it is important that all our products are tested inside and out, and to the extreme in a wide range of tests.”

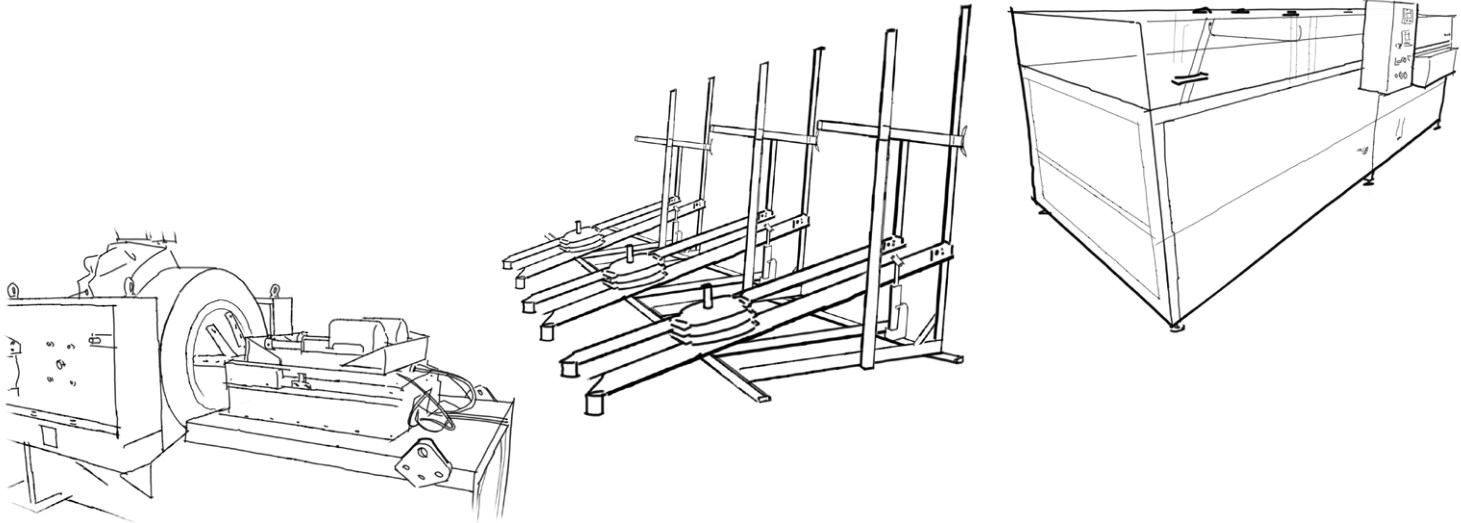
- Claus H. Sørensen, Director R&D



## Climatic tests:

In the climatic test the actuators are tested to operate in extreme temperatures as well as to endure rapid changes in temperature. In a dunk test, the actuators have to withstand repeating temperature fluctuations between +85°C to -40°C and still maintain full functionality and ingress protection.

<b>EN60529-IP6X</b>	- Dust
<b>EN60529-IPX6</b>	- Water
<b>ISO16750- IP69K</b>	- High pressure cleaning
<b>IEC60068-2-3</b>	- Moisture storage
<b>IEC60068-2-30</b>	- Operation in moisture
<b>ISO16750-4:2010</b>	- Dunk test
<b>EN60068-2-52</b>	- Salt spray
<b>BS7691 Section 6.11.2.4</b>	- Chemicals



### Electrical tests:

All electrical parts are tested i.e. power supply, power and signals cables, control signals etc. Electrical immunity is tested according to industrial standards i.e. for radio noise, electrical discharge and burst.\*

<b>EN/IEC 61000-6-4</b>	- Generic standard emission industry
<b>EN/IEC 60204</b>	- Electrical equipment of machinery
<b>EN 50121-3-2</b>	- Railway applications - Rolling stock apparatus
<b>94/25/EC</b>	- Recreational crafts directive
<b>EN/ISO 13766</b>	- Earth moving machinery
<b>EN/IEC 61000-6-2</b>	- Generic standard immunity industry
<b>2004/104/EC</b>	- Automotive Directive
<b>EN/ISO 14982</b>	- Agricultural and forestry machines
<b>EN/ISO 13309</b>	- Construction machinery

\* These tests do not apply to third party products!

### Mechanical tests:

**Vibration:** The actuator must withstand continuous vibration in three directions.

**Shock:** The shock test puts the actuator through 3 shocks of up to 50 G in each of six directions.

**Bump:** The actuator receives bumps of up to 30 G in each of six directions several hundred times.

**EN60068-2-64 (Fh)** - Random vibration

**EN60068-2-27 (Ea)** - Shock

**EN60068-2-29 (Eb)** - Bump

Find out more about how we test actuators to the extreme:

[linak.com/segments/techline/tech-trends/testing/](http://linak.com/segments/techline/tech-trends/testing/)





For further information, please visit our website:  
[LINAK.COM/BUSINESS-AREAS/ENERGY/WIND-ENERGY/](https://www.linak.com/business-areas/energy/wind-energy/)

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**QUALITY**

Built by market leading experts, using state-of-the-art technologies and perfected production methods, you can expect the same quality worldwide.



**INNOVATION**

Innovation is in our core. We take the lead and have the courage to make it real.



**RESPONSIBILITY**

We are responsible in what we do – towards customers, employees and environment. Creating trust is a natural part of who we are.



**LOCAL  
& GLOBAL**

From global presence to local understanding. We believe in world-wide support and being close to our customers.