

Introducing the spinner  
anemometer technology

# iSpin

Wind measurement at the spinner:  
higher yield, lower loads, better insights

**iSpin measures  
and monitors:**

- Power curve
- Yaw misalignment
- Turbulence intensity
- Flow inclination

# iSpin – a revolutionary approach to wind measurement

## Benefit from a new wind measurement technology that helps you achieve full wind turbine performance.

With the innovative spinner anemometer technology, wind conditions can be measured **more accurately than ever before**. Meet the **patented iSpin system** with

proven ultrasonic technology that can measure wind parameters, which until now have been difficult or impossible to measure. iSpin offers you the way to

**more productivity, lower loads, better wind condition insights** – hence a longer life for the turbine and a better return on your investment.

## iSpin puts an end to inadequate wind data.

**The problem:** conventional anemometers, mounted on the wind turbine nacelle **behind the rotor**, provide **imprecise wind measurement data** because of the distortion created by the rotor and nacelle. This makes accurate wind speed, direction and turbulence measurements impossible.

**The solution:** reliable performance monitoring and yaw misalignment detection require **high quality, undisturbed wind data**, which is provided by iSpin. The iSpin sensors measure the wind reaching the turbine at the spinner, **when the wind hits the rotor**.

This uniquely also allows measurement of turbulence intensity. iSpin is like a contact lens for your wind turbine, providing **whole new level of transparency for turbine productivity**.

## iSpin measures and monitors:

### Power curve

Does your turbine achieve its full potential?

### Yaw misalignment

Is your turbine always correctly aligned to the wind, and so fully productive, or is it subjected to excessive loads?

### Turbulence intensity

What kind of damaging turbulence and slipstreams occur at your turbine?

### Flow inclination

From where and how strongly does harmful flow inclination hit your turbine?

iSpin measures the wind speed and yaw misalignment in **all wind sectors**. In addition, the iSpin technology is also able to provide **information about air pressure and temperature**. This enables you to correct the measured power curve for **seasonal variation**.

## ROMO Wind's database of calibration factors provides the perfect fit for all wind turbine models.

iSpin consists of **three specially designed ultrasonic wind sensors** installed at the spinner. Here the wind is only influenced by the induction effect (slowing of the wind) caused by the turning rotor and its passage over the spinner.

Both these **effects are predictable** and can easily be corrected for e.g. using LiDAR or met mast calibration tools.

**ROMO Wind has built a calibration factor database for the most common wind turbine models on the market.**

## iSpin uses three ultrasonic sensors mounted at the spinner.

iSpin is designed logically: the sensors are installed in the front of the wind turbine, where the wind hits first.



# How iSpin works

Three ultrasonic sensors, a data interface and our experience provide you with profound new knowledge about the wind hitting your wind turbine.

The data provided by iSpin is not available from any other product on the market.

**Simultaneous measurement** of the precise wind speed, yaw misalignment, inflow inclination angle and turbulence

intensity at the point of impact with the rotor are **unique features of the iSpin**

**system**, not available from any other product on the market.

The iSpin system: nothing but accurate wind measurement technology.  
The concept of the spinner anemometer is simple:

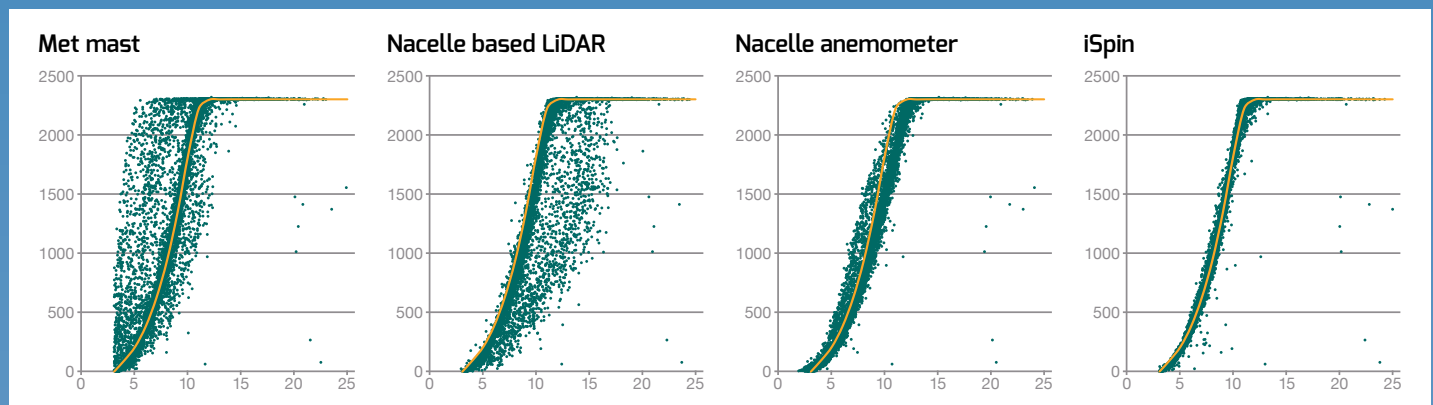
- The three ultrasonic sensors are **permanently installed** at the wind turbine spinner.
- The whole system is **easy and quick to install** from within the spinner.
- All data collected with iSpin is transferred through GSM or the existing turbine web interface to us. **We will analyse and send regular reports** and potential alerts to you. Yaw misalignment is corrected using standard methods.
- **Direct SCADA connection** of iSpin is also possible on request.

## Accurate data in all wind sectors:

The spinner anemometer **iSpin is superior to other technologies** when carrying out 360° wind measurement. The iSpin produces high precision power curves under all conditions. The image below shows power

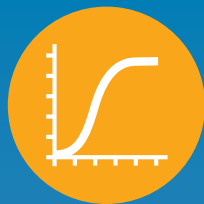
curve data of the same wind turbine from a wind farm where the nacelle anemometer, a nacelle LiDAR, a met mast and the iSpin recorded the wind speed data from **all wind sectors**. Only the iSpin was undisturbed by

terrain effects and wakes from the other turbines in the wind farm.



# The advantages of iSpin

Profit from the unique benefits of iSpin.



## Performance monitoring

With iSpin, you will be able to verify the efficiency of your wind turbine by monitoring the power curve. iSpin lets you know when acute and chronic influences are impacting the performance.



## Higher yield

With iSpin, you can increase the productivity of your wind turbine. iSpin identifies and helps you to adjust previously undetected yaw misalignment.



## Lower loads

With iSpin, you can increase the life of your turbine by reducing loads. By correcting yaw misalignment and using the iSpin turbulence and flow inclination data, you can improve the management of your wind farm. You can profit from shorter downtime and lower maintenance costs.

## iSpin helps you to get the optimal return from your wind turbine investment:

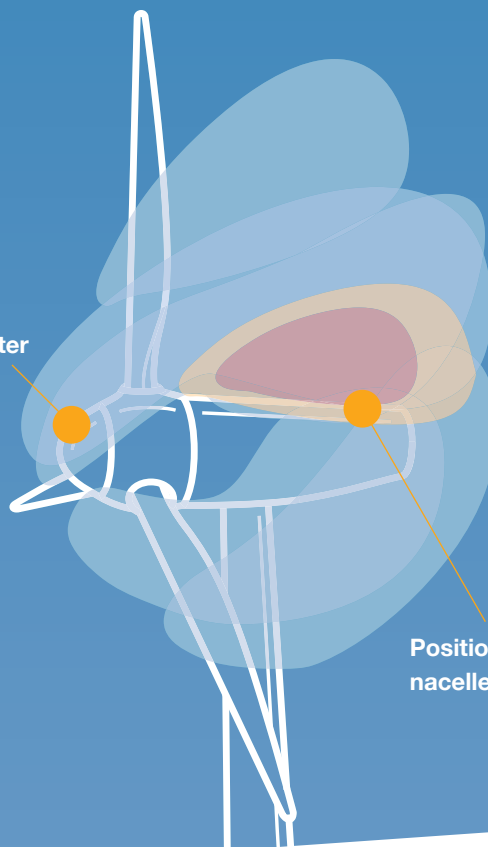
- Profit from a **whole new level of transparency** of turbine data: get a better return on your investment through improved performance and monitoring.
- **Analyse and document turbine optimisation measures** offered by OEMs and other companies.
- **Intervene** if the turbine power curve slides.
- Use the accurate iSpin wind data as a reliable **basis for your operations strategy**, for repowering or expanding your wind farm.
- **Compare power curves** of similar wind turbine models, regardless of location.
- **Lower your maintenance costs** by reducing wear and tear.
- Turn your turbine into a **virtual wind met mast**.
- **Compare original wind assessments** with actual wind conditions in all wind sectors.

## iSpin enables significant production increase.

Our measurements show that **more than half of all wind turbines equipped with iSpin have significant yaw misalignment**. On average you can expect a **2% production increase** from your wind farm by applying iSpin.

Yaw misalignment in degrees	Optimisation potential
2°	0.12%
4°	0.49%
6°	1.10%
8°	1.98%
10°	3.11%
12°	4.52%
14°	6.22%
16°	8.22%
18°	10.56%
20°	13.25%

Position of iSpin spinner anemometer



Position of conventional nacelle anemometer

# Benefit from a win-win partnership with ROMO Wind

Get the iSpin system for a fixed monthly fee.

Every turbine should tap its full production potential.

To enable as many operators as possible to benefit from accurate iSpin data, we are leasing iSpin systems for a **fixed monthly service fee**. In return you get **installation**

**and calibration, data collection, regular reports, analysis and alerts, and service and maintenance of iSpin.** The best thing is that the additional yield, which

can be generated by correcting yaw misalignment, can more than cover the service fee.

ROMO Wind offers a no-hassle solution. Choose the iSpin offer that fits your needs or contact us for an individual solution:

## iSpin Basic

### Prevent yaw misalignment:

iSpin Basic assures productivity thanks to **permanent measuring and monitoring of yaw misalignment**, which is not possible with any other current wind measurement method. In our experience correction of yaw misalignments on average leads to **2% more production** from a wind farm. Permanent monitoring is necessary as yaw misalignments may often recur.

## iSpin Advanced

### Improve your wind farm operation:

As well as delivering all the benefits of iSpin Basic, iSpin Advanced also provides you with **exact 360 degree wind measurement data, turbulence intensity insights and flow inclination data**. This will help you to protect your turbines and, when combined with power measurement data, to optimise your operations by monitoring the power curve. It can also be used for repowering or wind farm expansion planning.

## iSpin Advanced Plus

### Full insight for full performance:

In addition to the iSpin Advanced benefits, iSpin Advanced Plus offers you **permanent, relative power curve monitoring** – for total transparency and efficiency checks on your turbine at any time. Based on your time-synchronised power measurement data we will provide you with comprehensive and **accurate information about the turbine performance**.



For an individual offer or more information contact us at [info@romowind.com](mailto:info@romowind.com), or get in touch with your local sales person. Visit [www.romowind.com](http://www.romowind.com) for contact details.



# Wind knowledge is wind power

**ROMO Wind is an independent technology service provider, setting new standards for optimising wind turbine performance.**

ROMO Wind is a **technology and service company** and the exclusive provider of the patented iSpin technology. The **unique iSpin spinner anemometer system** is based on ultrasonic technology and measures and monitors wind conditions where it matters –

directly at the spinner, **in front of the rotor**. iSpin is able to measure parameters at the nacelle which until now have been difficult or **impossible to accurately measure**, such as power curve, yaw misalignment, turbulence intensity and flow inclination.

We provide our customers with the best solutions for measuring, monitoring and **improving wind turbine performance for a better return on their investment.**

**ROMO Wind offers valuable insights thanks to a revolutionary approach to wind measurement.**

Our goal is to **make iSpin the standard wind measurement technology for the wind industry**. The revolutionary iSpin technology, developed by the Danish Technological University (DTU) has been comprehensively tested since 2004 and

came onto the market in 2013. The iSpin system is an **independent wind measuring technology** intended for permanent installation. iSpin is included in the international IEC 61400-12-2 standard for power performance measurement.

We invite you to share our **knowledge of wind turbine performance and operations** for higher yield, lower loads and better insights.

**Please contact us for an individual offer.**

Just send us an email and we will get back to you immediately:

**[sales@romowind.com](mailto:sales@romowind.com)**

Find your regional contact person on our website:

**[www.romowind.com](http://www.romowind.com)**

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